THE HEIGHTS STREETSCAPE PLAN

Appendices

memo

to **Dustin Nilsen and Will Norris, City of Hood River**

from **Nathan Polanski, PE**

re **Heights Streetscape Plan**
Preferred Concept Plan: Planning Level Opinion of Probable Project Cost
MIG #15174

date **November 15, 2023**

Purpose

This memorandum is intended to provide the City of Hood River and Urban Renewal Agency with the basis of the methodology and the assumptions used in developing the planning level opinion of probable project costs for projects included in the Heights Streetscape Implementation Plan. The Opinion of Probable Project Costs are based on the street improvements shown in the preferred concept plan and the individual projects described in the Project Profile pages of the Heights Streetscape Plan dated November 2023.

Project costs are based on applying unit prices and allowances to the itemization and quantity tabulation of anticipated project elements for each project to identify a construction cost subtotal. Project costs include allowances for design, permitting, management, and contingencies for the design and construction phases of each project. For simplicity these fixed allowances have been applied to all projects, however, the Implementation Plan includes a variety of projects, in terms of type, size, and complexity. The city may find these costs can be reduced based on the scope, scale, and complexity of each project.

The following pages include a summary of the planning level project costs for each project followed by a more detailed breakdown of how the construction cost subtotal was calculated.

Assumptions for Planning Level Opinion of Probable Project Cost Analysis

The following assumptions were used to prepare the Opinion of Probable Project Costs:

1. Unit prices are based on 2023 dollars using various sources including recent bids provided by the city and engineer's estimate for projects in the region. A standard list of unit prices was used to develop the construction cost subtotals across each project and is included in the attached pages.

2. Quantities are based on the typical street cross sections and project lengths and/or planning level quantity takeoffs from the preferred concept plan for each project described in the Heights Streetscape Implementation Plan.
3. Escalation is not included but should be considered as implementation timelines are established to develop more accurate future costs for project budgeting.
4. Design, Management, and Permitting: A 40% allowance for the engineering design, city management, and permitting of future projects is included.
5. Design and Construction Contingencies: 30% and 20% respectively. The design contingency is for changes as the design is developed and the construction contingency is for construction management and unforeseen conditions or changes that may occur during construction.
6. Property acquisition costs are not included. The costs for property acquisition will depend on real estate market conditions and the acquisition process, which may depend on the project funding source (e.g., a federally funded project would be expected to have additional costs to execute and document the acquisition process).
7. Public Utilities: The replacement of public utility mains is not included in the project costs. In some locations the city is planning utility replacements, which are documented in the City's Capital Improvement Plan. Where planned utility projects overlap the Heights Streetscape Plan (based on information provided by the City's Public Works Department), the Implementation Plan notes this as part of the Project Profiles, however, costs for the utility replacements are not included in the project costs.

   The project costs do include allowances for adjustments to existing utilities (e.g., adjustments to water meters, manholes, handholes, etc.) and costs for stormwater adjustments, including allowances for water quality treatment facilities, when proposed street improvements are expected to impact existing infrastructure or trigger stormwater requirements. Flow control or detention costs are not included.
8. Franchise Utilities: Costs are not included for the relocation or undergrounding of overhead franchise utilities (e.g., electrical, communication, fiber). The costs to relocate or underground these utilities depend on the franchise easement agreement between the utility providers and the owner of the public right-of-way (i.e., City or ODOT).
   - Relocations: In many cases franchise utility providers are required to relocate utilities at low or no cost to the owner of the right-of-way when the relocation is needed for a public street improvement.

- Undergrounding: Overhead lines along 12th and 13th Streets are generally street light distribution and franchise utilities (e.g., communications) with overhead electrical distribution occurring in the alleys and/or on east-west streets in the Heights. The actual cost to the city to underground this infrastructure depends on 1) the franchise easement agreements and 2) the specific infrastructure on the utility poles (e.g., electrical transformers). We recommend the URA identify the goals and extents for undergrounding and coordinate with franchise utility providers to discuss feasibility and costs for undergrounding existing infrastructure.

  In addition to the capital cost to underground overhead distribution there is a cost to modify private buildings to transition from the existing overhead service to a new underground service. These costs are not typically paid for by the utility provider and fall to property owners. Depending on the need and/or impact on existing buildings these costs can be substantial for property owners.

Attachments:

1. Summary of Heights Streetscape Implementation Plan Project Costs
2. Unit Cost List for Developing Planning Level Opinion of Probable Construction Costs
3. Planning Level Opinion of Probable Construction Cost for Implementation Plan Projects

Heights Streetscape Plan - Implementation Plan: Project Costs
MIG #15174; October 2023

Description		13th Intersections	Taylor Ave	13th East Sidewalks	May Street Roundabout	Belmont, 12th, and 13th intersections and two-way traffic	Bike connection to Pacific Ave	May Street Safe Route to School	12th Street Blocks South	12th Street Blocks North	Belmont Shared Street	A, B, & C Blocks
Subtotal of Construction Cost:		$ 682,000	$ 640,000	$ 439,000	$ 6,528,000	$ 6,032,000	$ 2,198,000	$ 2,515,000	$ 5,315,000	$ 1,753,000	$ 994,000	$ 1,425,000
Design, Management and Permitting	40%	$272,800	$256,000	$175,600	$2,611,200	$2,412,800	$879,200	$1,006,000	$2,126,000	$701,200	$397,600	$570,000
Subtotal A (Construction Cost + Design/Management):		**$ 954,800**	**$ 896,000**	**$ 614,600**	**$ 9,139,200**	**$ 8,444,800**	**$ 3,077,200**	**$ 3,521,000**	**$ 7,441,000**	**$ 2,454,200**	**$ 1,391,600**	**$ 1,995,000**
Design Contingency	30%	$286,440	$268,800	$184,380	$2,741,760	$2,533,440	$923,160	$1,056,300	$2,232,300	$736,260	$417,480	$598,500
Subtotal B (A + Design Contingency):		**$1,241,240**	**$1,164,800**	**$798,980**	**$11,880,960**	**$10,978,240**	**$4,000,360**	**$4,577,300**	**$9,673,300**	**$3,190,460**	**$1,809,080**	**$2,593,500**
Construction Contingency	20%	$248,248	$232,960	$159,796	$2,376,192	$2,195,648	$800,072	$915,460	$1,934,660	$638,092	$361,816	$518,700
Subtotal C (B + Contingency and Construction Management):		**$1,489,488**	**$1,397,760**	**$958,776**	**$14,257,152**	**$13,173,888**	**$4,800,432**	**$5,492,760**	**$11,607,960**	**$3,828,552**	**$2,170,896**	**$3,112,200**
TOTAL ESTIMATED PROJECT COST		**$ 1,489,488**	**$ 1,397,760**	**$ 958,776**	**$ 14,257,152**	**$ 13,173,888**	**$ 4,800,432**	**$ 5,492,760**	**$ 11,607,960**	**$ 3,828,552**	**$ 2,170,896**	**$ 3,112,200**
ROUNDED UP PROBABLE PROJECT COST		**$ 1,490,000**	**$ 1,400,000**	**$ 960,000**	**$ 14,260,000**	**$ 13,180,000**	**$ 4,810,000**	**$ 5,500,000**	**$ 11,610,000**	**$ 3,830,000**	**$ 2,180,000**	**$ 3,120,000**
Planning Level Low Range (90% of total cost)		**$ 1,340,000**	**$ 1,250,000**	**$ 860,000**	**$ 12,830,000**	**$ 11,850,000**	**$ 4,320,000**	**$ 4,940,000**	**$ 10,440,000**	**$ 3,440,000**	**$ 1,950,000**	**$ 2,800,000**
Planning Level High Range (115% of total cost)		**$ 1,720,000**	**$ 1,610,000**	**$ 1,110,000**	**$ 16,400,000**	**$ 15,150,000**	**$ 5,530,000**	**$ 6,320,000**	**$ 13,350,000**	**$ 4,410,000**	**$ 2,500,000**	**$ 3,580,000**

Notes:
1. Opinion of probable construction costs based on the final Preferred Concept Plan layout and rendering.
2. Construction unit costs based on 2023 dollars.
3. Does not include escalation.
4. Does not include sales tax.
5. Does not include R/W acquisition costs.
6. Includes cost for stormwater treatment but does not include costs for stormwater quantity (detention) if required.
7. Does not include undergrounding, assumes costs for franchise utility relocations at not cost to the city.

Heights Streetscape Plan - Implementation Plan
Unit List for Developing Planning Level Opinion of Probable Construction Costs
MIG #15174; October 2023

Notes:
1. Unit prices assume 2023 dollars and are based on reviewing recent bid tabs provide by the City's Public Works Deparment and planning estimates for similar projects.
2. Items shown with allowances to be determined based on project specific needs. See additional notes and assumptions associated with individual projects.
relocations at no cost to the
city and

Item	Unit	Unit Price	Notes on Unit/Unit Price
Site Demolition and Earthwork			
Remove Concrete Sidewalk	SF	$ 2.50	
Remove Curb	LF	$ 15	
Remove Asphalt Pavement	SF	$ 4.50	
2" Grind Existing Asphalt Pavement	SF	$ 2.50	
Utilities			
Adjust Existing Utilities	ALLOWANCE	$ -	This cost is for adjusting existing utilities to grade and does not include removal and replacement of existing utility services or mains. See Note 2.
Lighting	ALLOWANCE	$ -	See Note 2
Storm Drain Catch Basin and Pipe Connection	EA	$ 8,000	
Water Quality Treatment	ALLOWANCE	$ -	See Note 2
Paving, Signage, and Striping			
Concrete Sidewalk	SF	$ 15	
Curb/Curb and Gutter	LF	$ 55	
Asphalt Pavement	SF	$ 15	
Asphalt Pathway	SF	$ 10	
2" Asphalt Overlay	SF	$ 2.50	
Curb Ramp	EA	$ 6,000	
Striping	ALLOWANCE	$ -	See Note 2
Signage	ALLOWANCE	$ -	See Note 2
Planting and Streetscape			
Planting Area	SF	$ 25	Does not include irrigation.
Trees - Standard	EA	$ 750	
Trees - Soil Cells	EA	$ 4,000	
Street Furnishings	ALLOWANCE	$ -	See Note 2

Additional Elements
See individual project costs for additional items included based on the anticipated project scope.

Heights Streetscape Plan - Planning Level Opinion of Probable Construction Costs: 13th Street Intersections
MIG #15174; October 2023

Notes/Assumptions:
1. Totals shown are for one intersection, total project cost shown on the summary is for two intersections.
2. Does not include full street construction or grind and overlay for intersection.
3. Does not include improvements to existing street lights.

Item	Unit	Unit Price	Quantity	Total Cost	Notes on Unit/Unit Price
Site Demolition and Earthwork					
Remove Concrete Sidewalk	SF	$ 2.50	1100	$ 2,750	based on proposed intersection area shown in concept plan at A Street
Remove Curb	LF	$ 15	200	$ 3,000	based on proposed intersection area shown in concept plan at A Street
Remove Asphalt Pavement	SF	$ 4.50	2000	$ 9,000	includes 2' pavement patch at curbs
2" Grind Existing Asphalt Pavement	SF	$ 2.50	0	$ -	not included
Utilities					
Adjust Existing Utilities	ALLOWANCE	$ 5,000	1	$ 5,000	assume limited utilities to adjust for intersections
Lighting	ALLOWANCE	$ -	0	$ -	assumes existing lighting is adequate
Storm Drain Catch Basin and Pipe	EA	$ 8,000	4	$ 32,000	assume four locations based on street view
Water Quality Treatment	ALLOWANCE	$ 40,000	1	$ 40,000	Assume two water quality structures/facilities for future street improvements
Paving, Signage, and Striping					
Concrete Sidewalk	SF	$ 15	1100	$ 16,500	based on proposed intersection area shown in concept plan at A Street
Curb/Curb and Gutter	LF	$ 55	280	$ 15,400	based on proposed intersection area shown in concept plan at A Street
Asphalt Pavement	SF	$ 15	560	$ 8,400	2' pavement patch along curbs
Asphalt Pathway	SF	$ 10	0	$ -	
2" Asphalt Overlay	SF	$ 2.5	0	$ -	not included
Curb Ramp	EA	$ 6,000	8	$ 48,000	two ramps per corner
Striping	ALLOWANCE	$ 10,000	1	$ 10,000	4 crosswalks, 2 stop bars, channelization
Signage	ALLOWANCE	$ 6,000	1	$ 6,000	assume 2 signs/corner; 8 signs total @ $750/sign
Planting and Streetscape					
Planting Area	SF	$ 25	700	$ 17,500	based on proposed intersection area shown in concept plan at A Street
Trees - Standard	EA	$ 750	4	$ 3,000	based on proposed intersection area shown in concept plan at A Street
Street Furnishings	ALLOWANCE	$ -	0	$ -	
Additional Elements					
RRFB	EA	$ 60,000	1	$ 60,000	Assumes solar service for power

Item Subtotal		$ 276,550
TESC	2%	$ 5,531
Traffic Control	10%	$ 27,655
Mobilization	10%	$ 30,980
Total per Intersection		**$ 341,000**

Heights Streetscape Plan - Planning Level Opinion of Probable Construction Costs: Taylor Avenue
MIG #15174; October 2023

Notes/Assumptions:
1. Does not include full street construction; assumes new pavement only for construction of curbs in street.
2. Partial street retrofit does not trigger water quality treatment for stormwater runoff.
3. Cost for adjustments to franchise utilities not included (assume easement agreements require utility provider to adjust).
4. Lighting is for pedestrian lighting along cycle track, does not include new street lighting.
5. Typical street cross section used for developing costs:

Element	Width (ft)	
Conc walk	16.5	
Cycle Track	10	
Buffer	2.5	
Planting	0	
Curb & Gutter	4	Hood River Standards 24" C&G
Asphalt Road	27	
total	*60*	*total ROW width check*
Length (ft)	200	

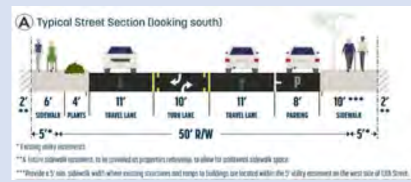
Item	Unit	Unit Price	Quantity	Total Cost	Notes on Unit/Unit Price
Site Demolition and Earthwork					
Remove Concrete Sidewalk	SF	$ 2.50	2400	$ 6,000	2 existing 6' sidewalks
Remove Curb	LF	$ 15	400	$ 6,000	based on length of improvements
Remove Asphalt Pavement	SF	$ 4.50	800	$ 3,600	includes 2' pavement patch at curbs
2" Grind Existing Asphalt Pavement	SF	$ 2.50	0	$ -	not included
Utilities					
Adjust Existing Utilities	ALLOWANCE	$ 20,000	1	$ 20,000	includes cost for adjustments for piping ex. curb discharge
Lighting	ALLOWANCE	$ 75,000	1	$ 75,000	Assumes 40' spacing for ped light poles along cycle track (5 total); service from existing street lights
Storm Drain Catch Basin and Pipe Connection	EA	$ 8,000	2	$ 16,000	assume one for each curb alignment
Water Quality Treatment	ALLOWANCE		0	$ -	assumed not required/triggered
Paving, Signage, and Striping					
Concrete Sidewalk	SF	$ 15	3800	$ 57,000	based on length and width of improvements
Curb/Curb and Gutter	LF	$ 55	400	$ 22,000	based on length of improvements
Asphalt Pavement	SF	$ 15	800	$ 12,000	2' pavement patch along curbs
Asphalt Pathway	SF	$ 10	2000	$ 20,000	based on length and width of improvements
2" Asphalt Overlay	SF	$ 2.50	0	$ -	not included
Curb Ramp	EA	$ 6,000	0	$ -	Not included; assumes ramps at 13th already constructed; improvements stop short of 12th
Striping	ALLOWANCE	$ 30,000	1	$ 30,000	Green paint at driveways, 13th crossing, parking
Signage	ALLOWANCE	$ 7,500	1	$ 7,500	assume 10 @ $750/sign
Planting and Streetscape					
Planting Area	SF	$ 25	200	$ 5,000	
Trees - Standard	EA	$ 750	5	$ 3,750	based on preferred concept plan
Street Furnishings	ALLOWANCE	$ 10,000	1	$ 10,000	
Additional Elements					
Reconfigure 12th Street for connection to Taylor	ALLOWANCE	$ 150,000	1	$ 150,000	
Adjust existing features along existing frontages at R/W line	ALLOWANCE	$ 25,000	1	$ 25,000	
Adjustments at intersections	ALLOWANCE	$ 50,000	1	$ 50,000	

Item Subtotal		$ 518,850
TESC	2%	$ 10,377
Traffic Control	10%	$ 51,885
Mobilization	10%	$ 58,120
Project Total		**$ 640,000**

Heights Streetscape Plan - Planning Level Opinion of Probable Construction Costs: 13th Street East Side Sidewalks
MIG #15174; October 2023

Notes/Assumptions:
1. Costs does not include 2' sidewalk in future sidewalk easement
2. Cost only considers east side of the street
3. Cost for adjustments to franchise utilities not included (assume easement agreements require utility provider to adjust).
4. Does not include improvements to existing street lights.
5. Typical street cross section used for developing costs:

Element	Width (ft)	
Conc walk	6	
Buffer	0	
Planting	3.5	
C&G	2	City Standard 24" C&G
Asphalt Road	2	
total	*13.5*	*check for width of improvements*
Length (ft)	800	4, 200' blocks



Item	Unit	Unit Price	Quantity	Total Cost	Notes on Unit/Unit Price
Site Demolition and Earthwork					
Remove Concrete Sidewalk	SF	$ 2.5	7600	$ 19,000	existing 9.5' sidewalk
Remove Curb	LF	$ 15	800	$ 12,000	based on length of improvements
Remove Asphalt Pavement	SF	$ 4.5	1600	$ 7,200	includes 2' pavement patch at curbs
2" Grind Existing Asphalt Pavement	SF	$ 2.5	6400	$ 16,000	remaining 8' width of adjacent lane
Utilities					
Adjust Existing Utilities	ALLOWANCE	$ 20,000	1	$ 20,000	assume limited utilities to adjust for replacing sidewalk in kind
Lighting	ALLOWANCE	$ -	0	$ -	not included
Storm Drain Catch Basin and Pipe Connection	EA	$ 8,000	4	$ 32,000	assume one per block
Water Quality Treatment	ALLOWANCE	$ -	0	$ -	not required
Paving, Signage, and Striping					
Concrete Sidewalk	SF	$ 15	4800	$ 72,000	based on length and width of improvements
Curb/Curb and Gutter	LF	$ 55	800	$ 44,000	based on length of improvements
Asphalt Pavement	SF	$ 15	1600	$ 24,000	2' pavement patch along curbs
Asphalt Pathway	SF	$ 10	0	$ -	not included
2" Asphalt Overlay	SF	$ 2.5	6400	$ 16,000	remaining 8' width of adjacent lane
Curb Ramp	EA	$ 6,000	0	$ -	Not included; assumes improvements stop short of curb returns at intersections to avoid future rework when E/W streets are improved
Striping	ALLOWANCE	$ -	0	$ -	not required
Signage	ALLOWANCE	$ 9,000	1	$ 9,000	assume 3 signs per block @ $750/sign
Planting and Streetscape					
Planting Area	SF	$ 25	2800	$ 70,000	based on length and width of improvements
Trees - Standard	EA	$ 750	20	$ 15,000	40' spacing
Street Furnishings	ALLOWANCE	$ -	0	$ -	not included

Item Subtotal		$ 356,200
TESC	2%	$ 7,124
Traffic Control	10%	$ 35,620
Mobilization	10%	$ 39,900
Project Total		**$ 439,000**

Heights Streetscape Plan - Planning Level Opinion of Probable Construction Costs: May Street Roundabout

MIG #15174; October 2023

Notes/Assumptions:

1. Costs and quantities are based on the layout of surface features (i.e. paving and landscape elements) shown in the preferred concept plan.
2. Does not include right-of-way acquisition costs.
3. Does not include utility costs except for minor utility adjustments, new catch basis for curb adjustments, and allowances for stormwater mitigation.
4. Does not include costs for adjustments to franchise utilities (assume easement agreements require utility provider to adjust).

Item	Unit	Quantity	Unit Price	Total Cost	Notes on Unit/Unit Price
Roadway/Civil					
Remove pavement and curbs	SY	6,000	$50	$ 300,000	
Remove structures and obstructions (Public R/W)	Allowance	1	$50,000	$ 50,000	assumes $50k/existing intersection
Remove structures and obstructions (Private Parcels)	Allowance	3	$100,000	$ 300,000	3 residences impacted
Clearing and grubbing	SF	15,000	$5	$ 75,000	
Earthwork (excavation and haul)	CY	8,900	$50	$ 445,000	
Asphalt pavement	SF	32,350	$15	$ 485,250	
Concrete Pavement (mountable for roundabout)	SF	5,550	$20	$ 111,000	
Curb and gutter/Mountable curb	LF	2,400	$55	$ 132,000	
Curb Ramps	EA	8	$6,000	$ 48,000	
Concrete Sidewalks	SF	11,200	$15	$ 168,000	
Asphalt Path	SF	4,500	$10	$ 45,000	
Walls	SFF	3,000	$100	$ 300,000	
RRFB	EA	4	$60,000	$ 240,000	
Landscaping	SF	18,000	$25	$ 450,000	
Channelization	LS	1	$150,000	$ 150,000	includes costs for crosswalk, lane striping and symbols
Signing	LS	1	$36,000	$ 36,000	assume 12 per leg of intx, @$750/ea
Drainage					
Catch basin and storm drain pipe connection	EA	8	$8,000	$ 64,000	
Water Quality	Allowance	1	$140,000	$ 140,000	
Utility					
Utility Modifications	Allowance	1	$200,000	$ 200,000	multiple watermains in May and 13th may need to be replaced for intersection regrading
Street lighting	Allowance	1	$320,000	$ 320,000	2 lights per corner; $40k/light
Ped lighting along cycle track	Allowance	1	$90,000	$ 90,000	assumes 6 ped light poles along cycle track; service from existing street lights
Additional Items					
Placemaking at Southeast Corner	Allowance	1	$150,000	$ 150,000	
			Subtotal	**$ 4,300,000**	
		TESC and Site Prep	3%	$ 129,000	
		Traffic Control	10%	$430,000	
		Indeterminates	25%	$1,075,000	
		Mobilization	10%	$594,000	
			Project Total	**$6,528,000**	

Heights Streetscape Plan - Planning Level Opinion of Probable Construction Costs: Belmont, 12th, and 13th intersections and two-way traffic
MIG #15174; October 2023

Notes/Assumptions:
1. Costs and quantities are based on the layout of surface features (i.e. paving and landscape elements) shown in the preferred concept plan.
2. Does not include right-of-way acquisition costs.
3. Does not include utility costs except for minor utility adjustments, new catch basis for curb adjustments, and allowances for stormwater mitigation.
4. Does not include costs for adjustments to franchise utilities (assume easement agreements require utility provider to adjust).

Item	Unit	Quantity	Unit Price	Total Cost	Notes on Unit/Unit Price
Roadway/Civil					
Remove pavement and curbs	SY	4,500	$50	$ 225,000	
Remove structures and obstructions (Public R/W)	Allowance	1	$100,000	$ 100,000	assumes $50k/existing intersection
Clearing and grubbing	SF	4,000	$5	$ 20,000	
Earthwork (excavation and haul)	Allowance	1	$110,000	$ 110,000	1' for 30,000 SF area around new T intersection, triangle parcel, placemaking area @ $50/CY, plus additional $50k
Asphalt pavement	SF	22,200	$15	$ 333,000	
Concrete Pavement (median)	SF	612	$20	$ 12,240	
Curb and gutter/Mountable curb	LF	1,400	$55	$ 77,000	
Curb Ramps	EA	16	$6,000	$ 96,000	
Concrete sidewalks	SF	13,500	$15	$ 202,500	
Asphalt Trail	SF	2,024	$10	$ 20,240	
Traffic Signal New	EA	1	$350,000	$ 350,000	3-leg signal
RRFBs	LS	1	$60,000	$ 60,000	Assumes solar service for power
illumination - Intersections	Allowance	1	$280,000	$ 280,000	assume three each at 13/Belmont, 13/12, one at 12/Belmont; $40k/light
Landscaping	SF	6,600	$25	$ 165,000	
Channelization - Intersections	Allowance	1	$40,000	$ 40,000	crosswalks, lane striping, symbols
Signing	Allowance	1	$30,000	$ 30,000	assume 30 signs; approx. 4/intx leg
Furnishings	Allowance	1	$50,000	$ 50,000	
Drainage					
Catch basin and storm drain pipe connection	EA	12	$8,000	$ 96,000	assume 4/intersection
Water Quality	Allowance	1	$120,000	$ 120,000	assume six locations $20k/each
Utility					
Utility Modifications	Allowance	1	$150,000	$ 150,000	
Additional Items					
13th - Medians	LF	500	$750	$ 375,000	
13th - Rechannelization and Crosswalks	LF	2000	$50	$ 100,000	$30/lf for three lane lines; crosswalks at 4 intersections
13th - illumination for new two-way traffic	Allowance	1	$800,000	$ 800,000	100' light spacing; $40k/light
12th - Interim Cycle Track	Allowance	1	$160,000	$ 160,000	assume $40k/block
			Subtotal	**$3,972,000**	
		TESC and Site Prep	3%	$120,000	
		Traffic Control	10%	$398,000	
		Indeterminates	25%	$993,000	
		Mobilization	10%	$549,000	
			Project Total	**$6,032,000**	

Heights Streetscape Plan - Planning Level Opinion of Probable Construction Costs: Pacific bike connection
MIG #15174; October 2023

Notes/Assumptions:
1. Project length includes 150' on May west of 12th, 45' on May between offset intersection at 12th, and 90' on 12th St south of May, which for simplic
2. Cost for adjustments to franchise utilities not included (assume easement agreements require utility provider to adjust).
3. Typical street cross section used for developing costs:

Element	Width (ft)	
Wall	1	
Buffer	2	
Pathway	12	
Planter	4.5	
total	*19.5*	*check for width of improvements*
Length (ft)	1050	Union St to Pacific Ave

Item	Unit	Unit Price	Quantity	Total Cost	Notes on Unit/Unit Price
Site Demolition and Earthwork					
Remove Concrete Sidewalk	SF	$ 2.5	6300	$ 15,750	existing 6' walk
Remove Curb	LF	$ 15	1050	$ 15,750	based on length of improvements
Remove Asphalt Pavement	SF	$ 4.5	8400	$ 37,800	narrow road by 6' + 2' patch for gutter
2" Grind Existing Asphalt Pavement	SF	$ 2.5	8000	$ 20,000	remaining 10' width of road for 800 LF (south of future 12th/13th intx)
Utilities					
Adjust Existing Utilities	ALLOWANCE	$ 50,000	1	$ 50,000	
Lighting	ALLOWANCE	$ 1	390000	$ 390,000	assumes 40' spacing for ped light poles along cycle track (26 total); service from existing street lights
Storm Drain Catch Basin and Pipe Connection	EA	$ 8,000	5	$ 40,000	based on existing catch basins
Water Quality Treatment	ALLOWANCE	$ -	0	$ -	not required for pathway project
Paving, Signage, and Striping					
Concrete Sidewalk	SF	$ 15	0	$ -	based on length and width of improvements
Curb/Curb and Gutter	LF	$ 55	1050	$ 57,750	based on length of improvements
Asphalt Pavement	SF	$ 15	2100	$ 31,500	2' pavement patch along curbs
Asphalt Pathway	SF	$ 10	12600	$ 126,000	based on length and width of improvements
2" Asphalt Overlay	SF	$ 2.5	8800	$ 22,000	assume adjacent travel lane only due to sawcut for roadway narrowing between Pacific and new intx at 12th/13th
Curb Ramp	EA	$ 6,000	4	$ 24,000	assume 2 ramps at Pacific and 2 companion ramps
Striping	ALLOWANCE	$ 50,000	1	$ 50,000	assume $60/LF for thermoplastic striping for two lane lines and TWLTL for 800 LF
Signage	ALLOWANCE	$ 9,000	1	$ 9,000	assume 8 signs @ $750/ea
Planting and Streetscape					
Planting Area	SF	$ 25	10500	$ 262,500	4.5' planting strip + 5' restoration at back of wall
Trees - Standard	EA	$ 750	14	$ 10,500	50' spacing from 12tth/13th intx to Dutch Bros
Additional Elements					
Clearing and grubbing	SF	$ 2	8400	$ 16,800	8' width x project length
Adjustments at Dutch Bros/Shell Station Parcels	ALLOWANCE	$ 150,000	1	$ 150,000	
Adjustments at southern Indian Creek Trailhead	ALLOWANCE	$ 20,000	1	$ 20,000	
MSE Retaining wall	SFF	$ 65	3600	$ 234,000	600 LF x 6' high wall (3' avg height + 3' embedment)
Gravel borrow for structural earth wall	CY	$ 80	1000	$ 80,000	600 LF x 6' high wall x 7' strap depth
Guardrail at top of wall	LF	$ 200	600	$ 120,000	assume 600' length of wall

Item Subtotal		$ 1,783,350
TESC	2%	$ 35,667
Traffic Control	10%	$ 178,335
Mobilization	10%	$ 199,740
Project Total		**$ 2,198,000**

Heights Streetscape Plan - Planning Level Opinion of Probable Construction Costs: May Street
MIG #15174; October 2023

Notes/Assumptions:
1. Project length includes 150' on May west of 12th, 45' on May between offset intersection at 12th, and 90' on 12th St south of May, which for simpl
2. Cost for adjustments to franchise utilities not included (assume easement agreements require utility provider to adjust).
3. Lighting is for pedestrian lighting along cycle track, does not include new street lighting except at 12th Street intersection.
4. Typical street cross section used for developing costs:

Element	Width (ft)	
Conc walk	18	
Cycle Track	10	
Buffer	2.5	
Planting	4.5	
C&G	4	Hood River Standards 24" C&G
Asphalt Road	30	
total	*69*	*total ROW width check*
Length (ft)	285	

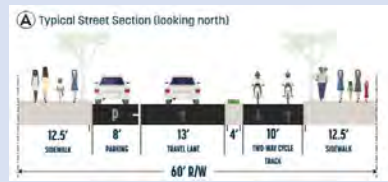
Item	Unit	Unit Price	Quantity	Total Cost	Notes on Unit/Unit Price
Site Demolition and Earthwork					
Remove Concrete Sidewalk	SF	$ 2.5	3420	$ 8,550	existing 6' sidewalks both sides
Remove Curb	LF	$ 15	570	$ 8,550	based on length of improvements
Remove Asphalt Pavement	SF	$ 4.5	13680	$ 61,560	full reconstruction
2" Grind Existing Asphalt Pavement	SF	$ 2.5	0	$ -	not included
Utilities					
Adjust Existing Utilities	ALLOWANCE	$ 30,000	1	$ 30,000	assume $10,000/100 LF of roadway; add'l costs included with intersection cost
Lighting	ALLOWANCE	$ 105,000	1	$ 105,000	assumes 40' spacing for ped light poles along cycle track (7 total); service from existing street lights
Storm Drain Catch Basin and Pipe Connection	EA	$ 8,000		$ -	accounted for in intersection cost
Water Quality Treatment	ALLOWANCE	$ 80,000	1	$ 80,000	Assume four water quality structures/facilities
Paving, Signage, and Striping					
Concrete Sidewalk	SF	$ 15	5850	$ 87,750	based on length and width of improvements
Curb/Curb and Gutter	LF	$ 55	570	$ 31,350	based on length of improvements
Asphalt Pavement	SF	$ 15	8550	$ 128,250	2' pavement patch along curbs
Asphalt Pathway	SF	$ 10	2850	$ 28,500	full reconstruction based on length and width of improvements
2" Asphalt Overlay	SF	$ 2.5	0	$ -	not included
Curb Ramp	EA	$ 6,000	0	$ -	accounted for in intersection cost
Striping	ALLOWANCE	$ 50,000	1	$ 50,000	striping at intersections included in intersection cost: green paint at driveways, channelization
Signage	ALLOWANCE	$ 9,000	1	$ 9,000	signage at intersection included in intersection cost; assume 1 sign/50LF roadway each side (12 total signs at $750/ea)
Planting and Streetscape					
Planting Area	SF	$ 25	1290	$ 32,250	`
Trees - Standard	EA	$ 750	7	$ 5,250	40' spacing
Street Furnishings	ALLOWANCE	$ 25,000	1	$ 25,000	
Additional Elements					
Allowance for regrading	ALLOWANCE	$ 150,000	1	$ 150,000	
Full Intersection Reconstruction	ALLOWANCE	$ 800,000	1	$ 800,000	arterial-arterial intersection, based in part from partial intersection cost at 13th St Intersections
Traffic signal	ALLOWANCE	$ 400,000	1	$ 400,000	3-leg signal at 12th/May

Item Subtotal		$ 2,041,010
TESC	2%	$ 40,820
Traffic Control	10%	$ 204,101
Mobilization	10%	$ 228,600
Project Total		**$ 2,515,000**

Heights Streetscape Plan - Planning Level Opinion of Probable Construction Costs: 12th Street Blocks Belmont Ave to Taylor Ave
MIG #15174; October 2023

Notes/Assumptions:
1. Project length includes four blocks from Union to Taylor and 6 intersections.
2. Cost for adjustments to franchise utilities not included (assume easement agreements require utility provider to adjust).
3. Lighting is for pedestrian lighting along cycle track, does not include new street lighting.
4. Typical street cross section used for developing costs:

Element	Width (ft)	
Conc walk	24	
Cycle Track	10	
Planting	3	
C&G	5	Hood River Standards 24" C&G
Asphalt Road	18	
total	*60*	*total ROW width check*
Length (ft)	850	Belmont to Pine, excluding intersection lengths



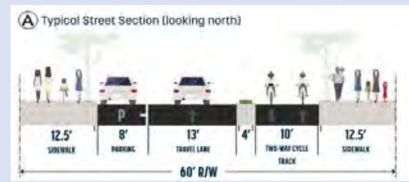
Item	Unit	Unit Price	Quantity	Total Cost	Notes on Unit/Unit Price
Site Demolition and Earthwork					
Remove Concrete Sidewalk	SF	$ 2.5	16150	$ 40,375	existing 9.5' sidewalk width both sides
Remove Curb	LF	$ 15	1700	$ 25,500	based on length of improvements, both sides
Remove Asphalt Pavement	SF	$ 4.5	32300	$ 145,350	existing 40' road width less gutter pan
2" Grind Existing Asphalt Pavement	SF	$ 2.5	0	$ -	assumes full removal
Utilities					
Adjust Existing Utilities	ALLOWANCE	$ 160,000	1	$ 160,000	allow for $40,000/block
Lighting	ALLOWANCE	$ 300,000	1	$ 300,000	assumes 40' spacing for ped lights along cycle track side (20 total); service from existing street lights
Storm Drain Catch Basin and Pipe Connection	EA	$ 8,000	0	$ -	accounted for in intersection cost
Water Quality Treatment	ALLOWANCE	$ -	0	$ -	accounted for in intersection cost
Paving, Signage, and Striping					
Concrete Sidewalk	SF	$ 15	20400	$ 306,000	based on length and width of improvements
Curb/Curb and Gutter	LF	$ 55	3400	$ 187,000	based on length of improvements, includes cycle track curbs
Asphalt Pavement	SF	$ 15	23800	$ 357,000	based on length and width of improvements
Asphalt Pathway	SF	$ 10	0	$ -	included in roadway area (assume full depth pavement)
2" Asphalt Overlay	SF	$ 2.5	0	$ -	not included, assumes new pavement
Curb Ramp	EA	$ 6,000	0	$ -	accounted for in intersection cost
Striping	ALLOWANCE	$ 100,000	1	$ 100,000	cycle track and lane striping ($25,000/block)
Signage	ALLOWANCE	$ 36,000	1	$ 36,000	assume 6 signs/block face, 48 total signs @ $750/sign
Planting and Streetscape					
Planting Area	SF	$ 25	2550	$ 63,750	curb bulbs in intersection cost
Trees - Standard	EA	$ 750	44	$ 33,000	1 tree per 40'
Street Furnishings	ALLOWANCE	$ 160,000	1	$ 160,000	$40,000/block
Additional Elements					
Regrade roadway	ALLOWANCE	$ 300,000	1	$ 300,000	$75,000 allowance/block
Typical full intersection reconstruction	EA	$ 350,000	6	$ 2,100,000	arterial-local intersection, based in part from partial intersection cost at 13th St Intersections

Item Subtotal		$ 4,313,975
TESC	2%	$ 86,280
Traffic Control	10%	$ 431,398
Mobilization	10%	$ 483,170
Project Total		**$ 5,315,000**

Heights Streetscape Plan - Planning Level Opinion of Probable Construction Costs: 12th Street Blocks Taylor Ave to May St
MIG #15174; October 2023

Notes/Assumptions:
1. Project length includes two blocks from Taylor to May and 1 intersections (June St).
2. Cost for adjustments to franchise utilities not included (assume easement agreements require utility provider to adjust).
3. Lighting is for pedestrian lighting along cycle track, does not include new street lighting.
4. Typical street cross section used for developing costs:

Element	Width (ft)	
Cross Section	LF	
Conc walk	24	
Cycle Track	10	
Planting	3	
C&G	5	Hood River Standards 24" C&G
Asphalt Road	18	C&G in road, VC at cycle track
total	*60*	*total ROW width check*
Length (ft)	400	estimated in CAD



Item	Unit	Unit Price	Quantity	Total Cost	Notes on Unit/Unit Price
Site Demolition and Earthwork					
Remove Concrete Sidewalk	SF	$ 2.5	7600	$ 19,000	existing 9.5' sidewalk width both sides
Remove Curb	LF	$ 15	800	$ 12,000	based on length of improvements, both sides
Remove Asphalt Pavement	SF	$ 4.5	15200	$ 68,400	existing 40' road width less gutter pan
2" Grind Existing Asphalt Pavement	SF	$ 2.5	0	$ -	assumes full removal
Utilities					
Adjust Existing Utilities	ALLOWANCE	$ 80,000	1	$ 80,000	allow for $40,000/block
Lighting	ALLOWANCE	$ 150,000	1	$ 150,000	assumes 40' spacing for ped lights along cycle track side (10 total); service from existing street lights
Storm Drain Catch Basin and Pipe Connection	EA	$ 8,000	0	$ -	accounted for in intersection cost
Water Quality Treatment	ALLOWANCE	$ -	0	$ -	accounted for in intersection cost
Paving, Signage, and Striping					
Concrete Sidewalk	SF	$ 15	9600	$ 144,000	based on length and width of improvements
Curb/Curb and Gutter	LF	$ 55	1600	$ 88,000	based on length of improvements, includes cycle track curbs
Asphalt Pavement	SF	$ 15	11200	$ 168,000	based on length and width of improvements
Asphalt Pathway	SF	$ 10	0	$ -	included in roadway area (assume full depth pavement)
2" Asphalt Overlay	SF	$ 2.5	0	$ -	not included, assumes new pavement
Curb Ramp	EA	$ 6,000	0	$ -	accounted for in intersection cost
Striping	ALLOWANCE	$ 50,000	1	$ 50,000	cycle track and lane striping ($25,000/block)
Signage	ALLOWANCE	$ 18,000	1	$ 18,000	assume 6 signs/block face, 24 total signs @ $750/sign
Planting and Streetscape					
Planting Area	SF	$ 25	1200	$ 30,000	curb bulbs in intersection cost
Trees - Standard	EA	$ 750	20	$ 15,000	1 tree per 40'
Street Furnishings	ALLOWANCE	$ 80,000	1	$ 80,000	$40,000/block
Additional Elements					
Regrade roadway	ALLOWANCE	$ 150,000	1	$ 150,000	$75,000 allowance/block
Typical full intersection reconstruction	EA	$ 350,000	1	$ 350,000	arterial-local intersection, based in part from partial intersection cost at 13th St Intersections

Item Subtotal		$ 1,422,400
TESC	2%	$ 28,448
Traffic Control	10%	$ 142,240
Mobilization	10%	$ 159,310
Project Total		**$ 1,753,000**

Heights Streetscape Plan - Planning Level Opinion of Probable Construction Costs: Belmont Avenue Shared Street
MIG #15174; October 2023

Notes/Assumptions:
1. Project area includes 175' length between 12th and 13th Street intersections and 50' R/W width
2. Cost for adjustments to franchise utilities not included (assume easement agreements require utility provider to adjust).
3. Typical street cross section used for developing costs assumed:

Element	Width (ft)	
Conc walk	24	
Road	26	
total	*50*	*total ROW width check*
Length	175	estimated in CAD

Item	Unit	Unit Price	Quantity	Total Cost	Notes on Unit/Unit Price
Site Demolition and Earthwork					
Remove Concrete Sidewalk	SF	$ 2.5	2100	$ 5,250	existing 6' walk both sides
Remove Curb	LF	$ 15	350	$ 5,250	removal of C&B on both sides of street
Remove Asphalt Pavement	SF	$ 4.5	7000	$ 31,500	assume 40' total width
2" Grind Existing Asphalt Pavement	SF	$ 2.5	0	$ -	assumes full pavement removal
Utilities					
Adjust Existing Utilities	ALLOWANCE	$ 50,000	1	$ 50,000	
Lighting	ALLOWANCE	$ 150,000	1	$ 150,000	assumes 40' spacing for ped light poles along both sides of street (10 total); service from existing street lights
Storm Drain Catch Basin and Pipe Connection	EA	$ 8,000	4	$ 32,000	
Water Quality Treatment	ALLOWANCE	$ 50,000	1	$ 50,000	Allowance for green stormwater opportunities
Paving, Signage, and Striping					
Concrete Sidewalk	SF	$ 15	4200	$ 63,000	based on length and width of improvements
Curb/Curb and Gutter	LF	$ 55		$ -	not included for shared street
Asphalt Pavement	SF	$ 15		$ -	
Asphalt Pathway	SF	$ 10		$ -	
2" Asphalt Overlay	SF	$ 2.5		$ -	
Curb Ramp	EA	$ 6,000		$ -	improvements do not extend into intersection
Striping	ALLOWANCE	$ 10,000	1	$ 10,000	limited striping needed
Signage	ALLOWANCE	$ 6,000	1	$ 6,000	assume 4 signs/block face, 8 total signs @ $750/sign
Planting and Streetscape					
Planting Area	SF	$ 25	1400	$ 35,000	assume 15% of area is planted
Trees - Soil Cells	EA	$ 4,000	8	$ 32,000	number per plan, assume all trees in soil cells
Street Furnishings	ALLOWANCE	$ 50,000	1	$ 50,000	
Additional Elements					
Street Edge Treatment	ALLOWANCE	$ 150,000	1	$ 150,000	e.g., bollards and tactile edge treatment
Concrete pavement	SF	$ 30	4550	$ 136,500	based on length and width of improvements

Item Subtotal		$ 806,500
TESC	2%	$ 16,130
Traffic Control	10%	$ 80,650
Mobilization	10%	$ 90,330
Project Total		**$ 994,000**

Heights Streetscape Plan - Planning Level Opinion of Probable Construction Costs: A, B, and C Blocks

MIG #15174; October 2023

Notes/Assumptions:

1. Cost for adjustments to franchise utilities not included (assume easement agreements require utility provider to adjust).
2. Typical street cross section used for developing costs:

Element	Width (ft)	
Conc walk	19	does not include curb
C&G	4	Hood River Standards 24" C&G
Asphalt Road	27	includes parking, excludes C&G
total	*50*	*total ROW width check*
Length	600	estimated in CAD

B Typical Street Section - A, B, and C Streets (looking east or west)

Item	Unit	Unit Price	Quantity	Total Cost	Notes on Unit/Unit Price
Site Demolition and Earthwork					
Remove Concrete Sidewalk	SF	$ 2.5	6000	$ 15,000	existing 5' walk both sides
Remove Curb	LF	$ 15	1200	$ 18,000	removal of C&B on both sides of street
Remove Asphalt Pavement	SF	$ 4.5	6000	$ 27,000	assume 10' total width
2" Grind Existing Asphalt Pavement	SF	$ 2.5	0	$ -	not included
Utilities					
Adjust Existing Utilities	ALLOWANCE	$ 60,000	1	$ 60,000	assume $20,000/block
Lighting	ALLOWANCE	$ -	0	$ -	not included
Storm Drain Catch Basin and Pipe Connection	EA	$ 8,000	0	$ -	accounted for in intersection cost
Water Quality Treatment	ALLOWANCE	$ -	0	$ -	accounted for in intersection cost
Paving, Signage, and Striping					
Concrete Sidewalk	SF	$ 15	11400	$ 171,000	based on length and width of improvements
Curb/Curb and Gutter	LF	$ 55	1200	$ 66,000	based on length of improvements
Asphalt Pavement	SF	$ 15	2400	$ 36,000	2' pavement patch along curbs
Asphalt Pathway	SF	$ 10	0	$ -	
2" Asphalt Overlay	SF	$ 2.5	0	$ -	not included
Curb Ramp	EA	$ 6,000	0	$ -	accounted for in intersection cost
Striping	ALLOWANCE	$ 15,000	1	$ 15,000	assume $5,000/block
Signage	ALLOWANCE	$ 18,000	1	$ 18,000	assume 4 signs/block face, 24 total signs @ $750/sign
Planting and Streetscape					
Planting Area	SF	$ 25	0	$ -	curb extensions accounted for in intersection cost
Trees - Standard	EA	$ 750	0	$ -	accounted for in intersection cost
Street Furnishings	ALLOWANCE	$ 30,000	1	$ 30,000	assume $10,000/block
Additional Elements					
Intersections	EA	$ 350,000	2	$ 700,000	arterial-local intersection, based in part from partial intersection cost at 13th St Intersections

Item Subtotal		$ 1,156,000
TESC	2%	$ 23,120
Traffic Control	10%	$ 115,600
Mobilization	10%	$ 129,480
Project Total		**$ 1,425,000**

Appendix B. ODOT letter to Hood River Urban Renewal Agency

Oregon
Tina Kotek, Governor

Department of Transportation
Region 1 Headquarters
123 NW Flanders St
Portland, OR 97209

September 27, 2023

Hood River Urban Renewal Agency
211 2nd Street
Hood River, OR 97031

Hood River Urban Agency Members,

ODOT has reviewed and provided technical comments on the recommendations in Phase 3 of the Urban Renewal Concept Plan. We are excited to see the urban design concepts that match the very important goals of safety, business access, and creating a livable, walkable Heights. We appreciate the opportunity to review and provide comments and commend the city on this clearly articulated vision for this important community center. Many of the design recommendations are creative and we are happy to see that the concepts have robust community support.

However, consistent with our position throughout this urban design process, while the concepts are in line with the community's vision and provide creative solutions to the issues found within the Heights, ODOT would like to reiterate that the concepts as presented for OR 281 do not meet highway design manual standards and may not be approvable if the road continues to serve as an ODOT highway. As the City continues to pursue these design concepts, ODOT recommends starting the jurisdiction transfer process prior to the design process to ensure that your vision for this section of roadway through the Heights moves forward. ODOT supports moving forward with a transfer process and we want to work proactively to ensure that the Heights project can move forward quickly as funding becomes available.

ODOT and the City have a good relationship and understanding moving forward with jurisdictional transfers, and as always, the transfers will need to consider the following:

- Freight movements on the highway will not be restricted beyond the limits set in the agreement after a highway segment is transferred per ORS 374.329.
- Loads allowed by state prior to the transfer must be allowed by the city.
- sidewalks, curb ramps, and pedestrian activated signals meet the requirements of the ADA.
- Any improvements or modifications must adhere to the American Association of State Highway and Transportation Officials (AASHTO) standards.
- Roadway will retain the OR Route 281 designation.

Our technical comments and concerns with the project's design not aligning with ODOT standards and practices include the following:

General intersection design:
- All design must follow ODOT's Highway Design Manual (HDM) if ODOT still owns and maintains OR281.
- ODOT requires intersection control changes (such as the recommended roundabout at 13th and May, and the signal at 13th/Belmont/12th) to go through an intersection control evaluation study or document and must be approved by the State Traffic and Road Engineer.

- Any intersection changes will need to consult with the Commerce and Compliance Division on any special permitted vehicles on the highway – the ability for these types of vehicles to navigate through the area must be maintained.

Recommended Roundabout at 13th and May:

- Placing a roundabout on a steep grade can be challenging and may require retaining walls that could increase construction costs.
- If Federal funding is used to construct the roundabout, there are environmental concerns with impacting the park on the southwest corner of the intersection.
- The Oregon Bike Bill requires accommodating bicycling and walking on all new road projects.

Recommended signal at 13th/Belmont/12th"

- Southbound queuing seems excessive with the recommendation to close Belmont – more analysis may be helpful to understand the queuing.

12th Street Recommendation:

- Since ODOT approved the CBD/traditional downtown context and ODOT continues to own and maintain OR 281. It means the sidewalk width should be 14'-10' not including the landscaped area. Anything less than stated will be subject to a design exception process for approval.
- Separated bike lane will be evaluated carefully at each intersection. ODOT will look at the frequency of driveways when evaluating bi-directional bike way. Design should follow the ODOT HDM Part 800 & Appendix L. City should maintain separated bikeway to ensure the level of service meets City expectations.
- The city (no matter who owns and operates the roadway) should consult with the Commerce & Compliance Division (aka Motor Carrier) for any special permitted vehicles is recommended even though this highway is not a Reduction Review Route or a designated Freight Route.

13th Street Recommendation:

- The Oregon Bike bill applies here, for both ODOT and city-owned facilities, which means cyclist must be accommodated.
- ODOT standards call for 14-10-foot sidewalks not including landscaping in a CBD context; a design exception would be needed for the proposed 10-foot sidewalks, or the narrower proposed sidewalks at pinch points.
- ODOT has specific requirements for addressing standing water in the travel lane. Drainage will need to be managed effectively.
- ODOT standards require a minimum 11-foot two-way left turn lane.
- Areas where the sidewalk is planned to be 4.5 feet will require a design exception and may not be approvable.
- Traffic calming strategies that place vertical elements next to the street (including trees in landscaping strips) will need to be consistent with ODOT's clear zone requirements and would be subject to design evaluation. Similarly, Bioswales and transit in-lane stops would need to be evaluated according to ODOT standards.

Thank you for the opportunity to provide the feedback.

Sincerely,

P.Scarlett

Paul Scarlett
Area Manager East

DKS

720 SW WASHINGTON STREET, SUITE 500, PORTLAND, OR 97205 • 503.243.3500 • DKSASSOCIATES.COM

HOOD RIVER HEIGHTS STREETSCAPE PLAN

DATE: November 29, 2021

TO: Nathan Polanski, P.E. | MIG

Dustin Nilsen, Will Norris | City of Hood River

FROM: John Bosket, P.E.; Rochelle Starrett, P.E.; Alex Correa | DKS Associates

SUBJECT: Hood River Heights District Parking Study

Project #20203-000

1.0 INTRODUCTION

The Hood River Heights Streetscape Plan project is considering transportation network and streetscape improvement opportunities for the Hood River Heights District (hereafter referred to as “the Heights”). The Heights, today, operates much like a central business district for Hood River, exhibiting a dense mix of land uses, including restaurants and retail shops surrounded by residential neighborhoods, parks, and schools. While the existing land uses encourage and support active transportation, the Heights is bisected by a state highway routed over 12th Street and 13th Street, which currently have no bicycle facilities and limited pedestrian amenities. The Hood River Heights Streetscape Plan will identify several potential streetscape changes which can foster multimodal transportation and support anticipated growth, although due to limited right-of-way, on-street parking may be impacted by these alternatives.

Therefore, the purpose of this parking study is to evaluate the types and availability of parking within the Heights District and to compare the available parking supply to existing and future parking demands. The findings will inform decision making related to trade-offs where on-street parking may be reduced to accommodate streetscape improvements.

Today, the Heights includes a mix of on-street and off-street parking. The parking study area, seen in Figure 1, includes the 12th and 13th Street couplet between May Street and the end of the couplet, south of Belmont Avenue/Union Street, and all side streets between approximately 11th Street and 14th Street, approximately one block to the east or west. The diversity of uses within a small area (approximately six blocks) means that observing parking for a single land use alone may be difficult. Visitors might park once and access multiple destinations, such as stopping by a retail shop and visiting a restaurant in the same trip, and the different land uses may experience peak parking demand at different times. Therefore, this analysis considers the Heights area as a single entity to evaluate parking demand.

FIGURE 1: PARKING STUDY AREA

2.0 EXISTING CONDITIONS

The project team evaluated existing parking conditions within the Heights to assess characteristics of the parking supply, sufficiency, and convenience of parking in the study area. The following sections summarize the existing parking conditions for the Heights.

2.1 PARKING AND LAND USE INVENTORY

The project team inventoried existing parking stalls, land use, and approximate square footage of buildings within the study area to support the parking demand evaluation. The parking study area includes 304 on-street parking stalls and 410 off-street parking stalls on privately owned properties in the Heights for a total of 714 stalls. Although 714 stalls are available, some stalls include usage restrictions (e.g., 10-minute parking, 2-hour parking, ADA spots, Customer Only). All restricted parking spots are included in the parking supply for the purposes of this parking analysis, but these restrictions may limit the utility of the available parking supply for residents, employees, and visitors. For example, a business employee would be less likely to park in a 2-hour parking zone compared to a visitor. Figure 2 shows the locations of on-street parking stalls in the Heights, with restricted spaces identified, while Figure 3 shows the number of off-street parking stalls provided in each lot.

While some of the on-street parking is time restricted, there are very few stalls that are unusable by the average retail customer or visitor. Conversely, most off-street parking is restricted to business patrons. Notably the large parking lots at the corners of 13th Street/Taylor Avenue and 13th Street/A Street are not signed as being use-restricted, but are privately owned and their use could be regulated in the future. The full parking inventory in Appendix A includes all noted parking restrictions.

The Heights, today, includes a variety of land uses including retail, restaurant, office space, and limited residential. The primary zoning in the Heights is General Commercial (C-2), while the surrounding area to the east and west is zoned for residential uses. The existing zoning and tax parcel information in the Heights parking study area was used to develop a list of existing land uses and approximate building square footage, which was verified from observations in the field. The total floor area for non-residential space within the parking study area is approximately 205,000 square feet; the full land use inventory, including all identified sites and their zoning, is included in Appendix A.

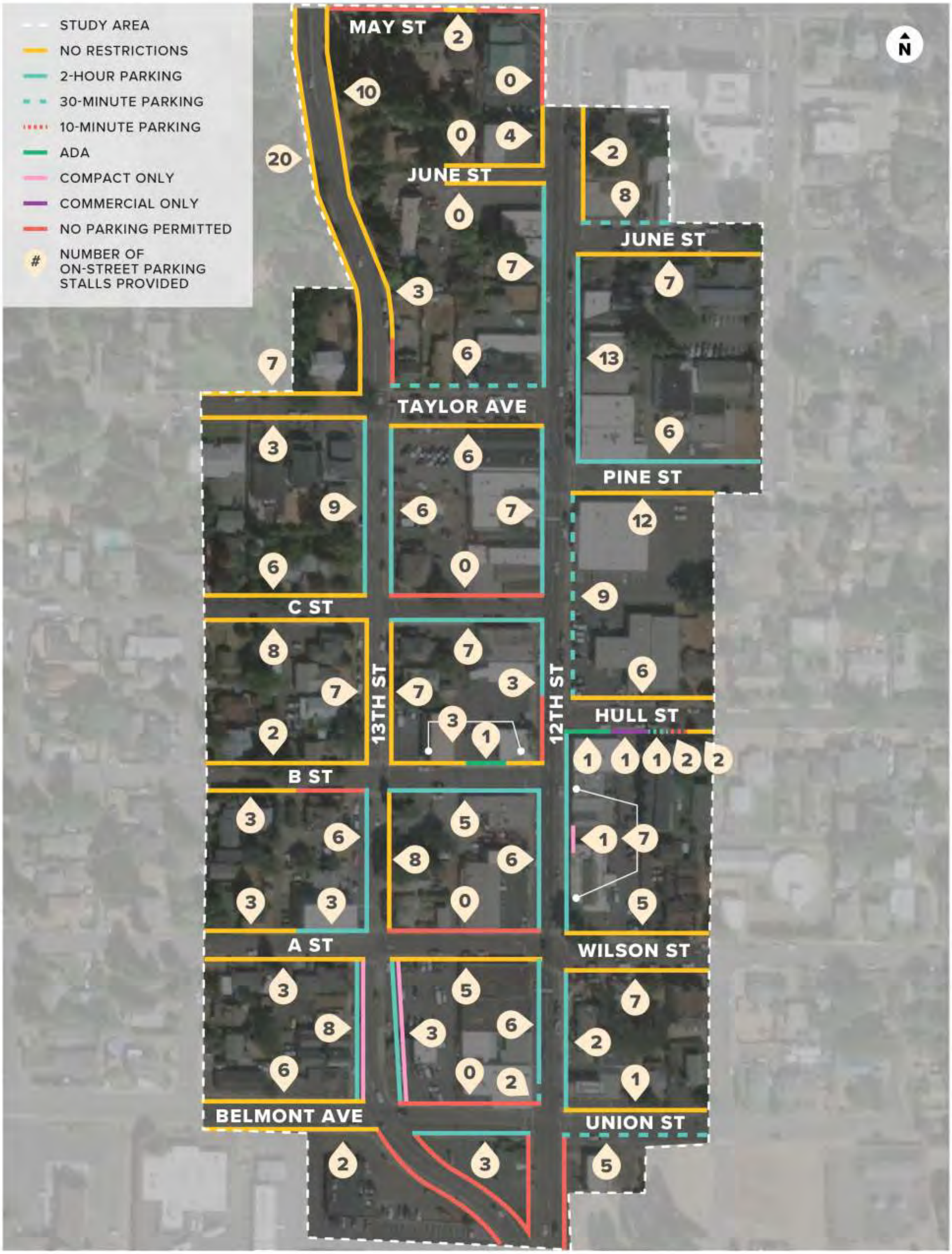


FIGURE 2: ON-STREET PARKING LOCATIONS AND RESTRICTIONS

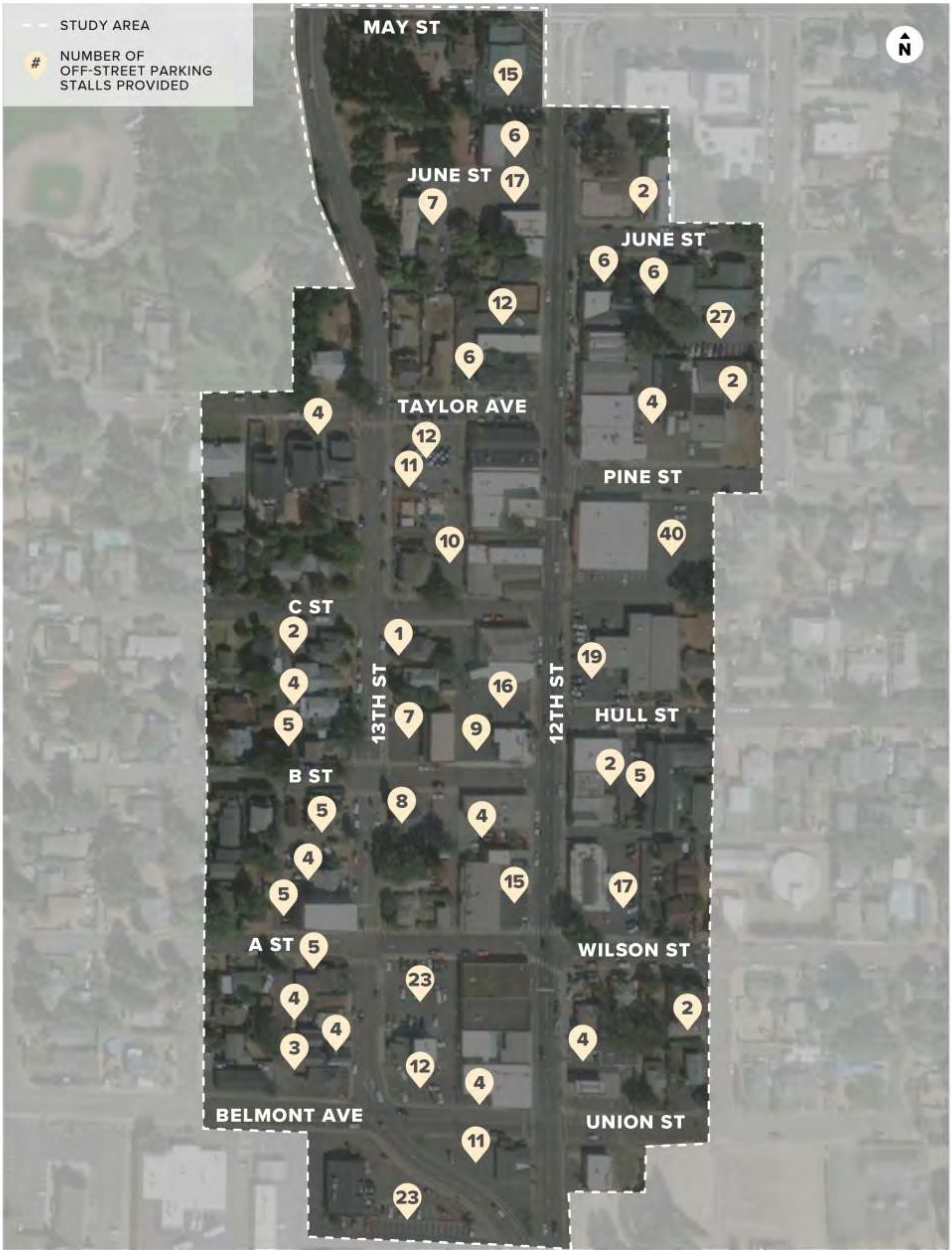


FIGURE 3: OFF-STREET PARKING LOCATIONS

2.2 PARKING OCCUPANCY DATA COLLECTION

Summer is generally considered to be the peak season for travel and activity in Hood River, a city that serves as a popular attraction for outdoor recreation. DKS collected parking occupancy data on Tuesday, August 17th, and Saturday, August 21st, to analyze peak season parking demand for both a weekday and weekend. The project team collected hourly on-street and off-street parking utilization data for all stalls in the parking study area over a six-hour period on both study days. During the weekday observation period, parking counts were collected from 7-9 AM, 11 AM -1 PM, and 4-6 PM. The weekend observation period included continuous parking counts from 9 AM to 3 PM. Parking occupancy data was collected during these times to capture periods of higher activity in the Heights, which would reflect a realistic peak parking occupancy for the study area.

2.3 PARKING UTILIZATION FINDINGS

Parking activity on Tuesday, August 17th, was generally higher than on the weekend; the total number of spots occupied during the six-hour study period was 58 percent higher than on Saturday, August 21st. Parking demand was very low on both days until after 11 AM, and the peak parking demand for both days occurred between 12 to 1 PM. The peak hour among all 12 hours studied (six on the weekday, six on the weekend) occurred on the weekday from 12 to 1 PM when 367 parked vehicles (165 on-street and 203 off-street) were recorded. Figure 4 shows the peak hour parking occupancy for the study area on Tuesday, August 17th.

As shown on Figure 4, most blocks in the Heights were less than 85 percent[1] occupied during the peak parking demand period. Areas where finding a parking spot may be more difficult include June Street, B Street, Wilson Street, and select block faces on 12th Street. However, even at these locations, there are adjacent blocks with lower parking occupancy that provide convenient access to parking within 250 feet (approximately the walking distance of one average block-face within the Heights).

Also shown on Figure 4 are three areas where off-street parking occupancy is high and the adjacent on-street parking occupancy is also high. These include the areas on June Street east of 12th Street, the southeast corner of 13th Street at Taylor Street, and B Street between 12th Street and 13th Street. Table 1 also summarizes the weekday peak hour parking occupancy data for the study area. On-street parking occupancy is approximately five percent higher than off-street parking occupancy although there were still 139 spaces available on-street during the peak demand period. While more off-street parking spaces are available, these spaces are generally restricted to use by customers or employees rather than the general public, which limit their overall utility for the parking supply.

[1] A peak parking occupancy of 85 percent is typically considered best practice to allow for accommodation of variation in demand. The 85 percent rule has also been previously applied locally during the downtown parking analysis work.

TABLE 1: EXISTING WEEKDAY PEAK HOUR (12-1 PM) VEHICLE PARKING DEMAND

LOCATION	PARKING STALLS	PEAK DEMAND	AVAILABLE STALLS	PEAK OCCUPANCY
ON-STREET	304	165	139	54%
OFF-STREET	410	202	208	49%
TOTAL	714	367	347	51%

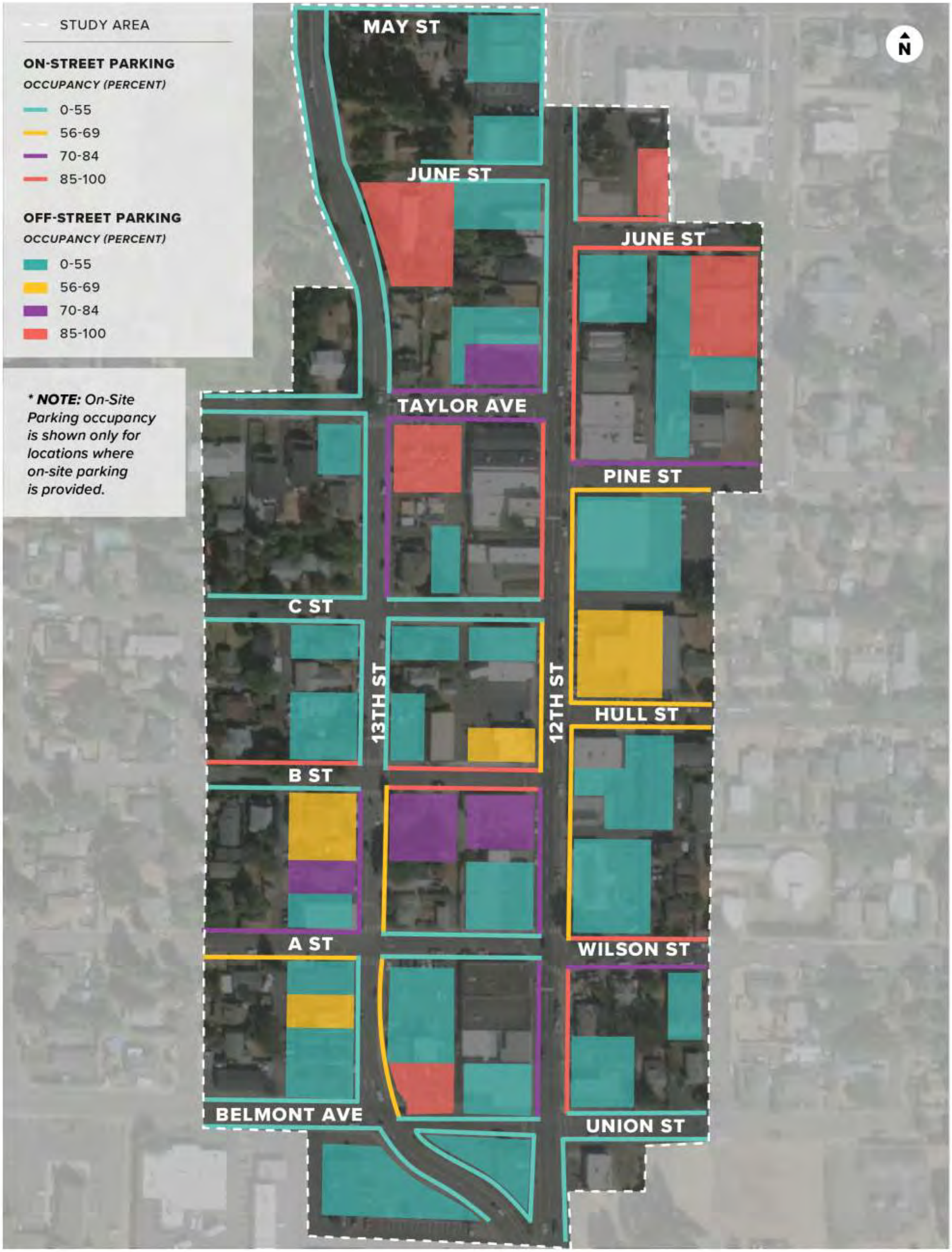


FIGURE 4: WEEKDAY PEAK HOUR (12-1 PM) PARKING OCCUPANCY

3.0 CURRENT PARKING DEMAND ANALYSIS

Three measures were applied to evaluate the current parking supply and demand in the Heights area: the built parking ratio, true demand ratio, and calibrated true demand ratio, as described below. The built parking ratio is a measure of the availability of parking within a study area while the true demand ratio and calibrated true demand ratio measure the adequacy of the parking supply to meet the projected demand. Both the true demand ratio and the calibrated true demand ratio utilize observed parking occupancy data from the peak hour (summarized in Table 1) as a reasonable worst-case scenario.

The built parking ratio is expressed as the number of stalls per 1,000 square feet of built area. This ratio expresses the relationship between all parking stalls within the study area and the total square footage of built space within the study area, regardless of whether or not the buildings are occupied.

The true demand ratio is expressed as the observed number of vehicles parked (at peak times) per 1,000 square feet of occupied building area. That is, while built parking ratios measure the supply of parking for a built area, the true demand ratio measures the amount of parking needed to serve the demand generated by the occupied built area.

The calibrated true demand ratio is the true demand ratio factored up by 15%. This measure allows parking to be built to exceed the true demand rather than only meet the true demand to account for variability in parking demand. This 15 percent buffer is considered ideal and allows for a peak parking occupancy of 85 percent, which is an industry best practice[2] and has been previously applied locally for downtown parking management.

3.1 OBSERVED PARKING DEMAND

Today the Heights has 714 parking stalls, or 3.48 parking stalls per 1,000 square feet of built area.[3] To calculate the true and calibrated true demand ratios, the number of observed parked vehicles per "occupied" building area must be established. Since the existing building occupancy rate in the Heights is unknown, a reasonable range of building occupancies was considered, as shown in Table 2. Based on the observed peak parking occupancy (summarized in Table 1) and assuming a 90 percent building occupancy in the Heights (at the conservative end of the range considered, but realistic based on field observations), 2.28 parking stalls per 1,000 square feet of occupied building area should be provided to keep parking occupancy at or below 85 percent. In other words, when building occupancy is at 100 percent, the Heights needs approximately 467 parking stalls to maintain the preferred 85 percent occupancy. This is considerably less than the 714 parking stalls currently provided, suggesting there may be a surplus of parking in the Heights.

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[2] Parking Made Easy: A Guide to Managing Parking In Your Community, Chapter 6, Oregon Transportation & Growth Management Program. July 2013.

[3] Built area was approximated based on aerial photo reconnaissance and field verification.

However, restrictions for off-street parking may limit the feasibility of reducing the number of on-street spaces.

TABLE 2: OBSERVED PARKING DEMAND RATIOS FOR A RANGE OF BUILDING OCCUPANCIES

ESTIMATED BUILDING OCCUPANCY	OCCUPIED SQUARE FOOTAGE	TRUE DEMAND RATIO (VEH./1,000 SQ. FT.)	CALIBRATED TRUE DEMAND RATIO (VEH./1,000 SQ. FT.)
95%	195,000	1.88	2.16
93%	190,000	1.93	2.22
90%	185,000	1.98	2.28

3.2 THEORETICAL PARKING DEMAND

Theoretical parking demand rates from national surveys of similar land uses were also calculated for comparison against locally calculated parking demand rates. The theoretical rates were obtained from the ITE Parking Generation (5th Ed.) Manual[4]. The theoretical demand rates were calculated using a weighted average of ITE parking demand rates for each property within the parking study boundary. Using this method, the theoretical built parking ratio is 3.33 parked vehicles per thousand square feet.

Based on the theoretical parking demand rates, the Heights needs approximately 785 parking stalls to maintain the preferred 85 percent occupancy compared to the 714 parking stalls currently provided. However, the theoretical parking demand rate is expected to be overly conservative by nature as it does not account for the influence that a complimentary land use mix has on the overall demand for parking in an area like the Heights. The dense mix of commercial uses in the Heights requires less parking be dedicated to single entities, like it may be in an area with less shared space, allowing for shared parking activity. Moreover, the theoretical parking demand rate does not account for the effects that a complimentary land use mix has on encouraging people to walk or bike to destinations in the Heights in lieu of driving. The theoretical demand rate was calculated as a "reality check" that verifies the assumption that the Heights operates as a central business district for Hood River and thus can be examined as a single entity when evaluating parking demand. The theoretical parking demand rate should notably not be used in place of the locally calculated parking demand rates since it does not reflect the unique urban character of the Heights.

[4] Parking Generation Manual, 5th Edition, Institute of Transportation Engineers, 2019.

4.0 PARKING DEMAND FORECASTING

Parking demand forecasting applies the existing parking demand rates to the future land use to estimate the parking supply needed to serve future growth. Future land use information was developed from year 2040 assumptions for employment and household growth in the Heights area that were included in the travel forecasting model[5] for the City of Hood River and adjusted based on known developments and current day observations. Table 3 reflects the growth rates calculated for residential and non-residential land use, which will be used to forecast parking demand.

Previous growth assumptions that were incorporated into the travel forecasting model did not assume there would be growth in households in the Heights District. However, since that time, the City has approved a mixed-used development in the Heights that includes 32 residential units and has expressed a desire to encourage additional mixed-use developments of this nature in the future. Therefore, two residential growth scenarios are shown in Table 3, with the low-growth scenario accounting for only the approved 32-unit development and the high-growth scenario that assumes two additional developments similar to the first would be approved (for a total of 96 residential units) by the year 2040.

TABLE 3: LAND USE GROWTH ASSUMPTIONS IN THE HEIGHTS DISTRICT (2021-2040)

LAND USE TYPE	LOW-GROWTH RESIDENTIAL SCENARIO	HIGH-GROWTH RESIDENTIAL SCENARIO
RESIDENTIAL	32 Households	96 Households
NON-RESIDENTIAL	93 Employees	93 Employees

4.1 NON-RESIDENTIAL PARKING DEMAND

Non-residential parking demand was projected using the most conservative observed calibrated true parking demand rates seen in Table 2: 2.28 spaces per thousand square feet of occupied space. The future square footage of non-residential uses was estimated using an annual growth of 0.8%, for a total of 235,000 square feet of non-residential space by 2040. The parking demand forecast is summarized in Table 4.

[5] Future year employment and household information is consistent with projections prepared for the Westside Area Concept Plan preferred land use scenario and is consistent with the City of Hood River's TSP, as amended in April 2021.

TABLE 4: NON-RESIDENTIAL PROJECTED PARKING DEMAND (2021-2040)

SCENARIO	
SQUARE FOOTAGE NET GROWTH	30,000
PARKING DEMAND NET GROWTH 2.28 VEH./1,000 SQ. FT.	68

4.2 RESIDENTIAL PARKING DEMAND

This analysis did not previously calculate a residential-exclusive parking demand rate for the existing conditions. Since most of the Heights is either commercial or single-family residential, applying the non-residential parking demand rate to estimate the number of spaces needed to accommodate future residential parking demand would overstate the amount of parking needed. Instead, the residential parking demand rate from a previous parking study conducted for Hood River will be used to estimate future residential parking needs[6]. This study evaluated peer jurisdictions with similar transportation characteristics to develop a residential parking demand rate of 1.27 parked cars per housing unit. Table 5 summarizes the projected parking required to accommodate the low-growth and high-growth residential scenarios by 2040.

TABLE 5: RESIDENTIAL PROJECTED PARKING DEMAND (2021-2040)

SCENARIO	LOW-GROWTH RESIDENTIAL SCENARIO	HIGH-GROWTH RESIDENTIAL SCENARIO
HOUSING UNITS NET GROWTH	32	96
ADDITIONAL PARKING STALLS NEEDED 1.27 VEH./UNIT	41	122

4.3 PARKING DEMAND FORECAST SUMMARY

The projected future parking demand is the sum of the existing parking demand, non-residential growth-related parking demand, and residential growth-related parking demand. Table 6 summarizes the existing and projected parking demand using the observed calibrated true demand rate from Table 2.

[6] White Paper #3: Parking Demand Forecasting – Commercial and Residential Development. Rick Williams Consulting. June 2019.

TABLE 6: SUMMARY OF EXISTING AND PROJECTED (2040) PARKING DEMAND

PARKING SCENARIO	NUMBER OF PARKING STALLS
EXISTING PARKING DEMAND (CALIBRATED TRUE DEMAND)	467
NEW PARKING DEMAND FROM NON-RESIDENTIAL GROWTH	68
NEW PARKING DEMAND FROM HIGH-GROWTH RESIDENTIAL SCENARIO	122
FUTURE PARKING DEMAND	657
PARKING SPACES AVAILABLE TODAY	714

Based on the observed parking demand in the Heights, the parking supply is adequate today and will remain adequate in the future. Using a conservative observed demand estimate, 657 parking stalls will be needed to serve the projected parking demand in the Heights by 2040 to achieve an 85 percent parking occupancy. Today, 714 parking stalls are provided within the study area, so up to 57 parking stalls could be removed in the Heights without negatively impacting the overall parking supply. However, there are several factors that could impact this assumption, such as the redevelopment of the larger private lots that currently provide many off-street parking stalls, fewer trips being made by automobile in response to the Heights becoming more walkable and bikeable and the addition of transit stops, and improved parking management strategies to make more efficient use of the parking that is provided.

5.0 CONCLUSIONS

The Hood River Heights offers a mix of land uses, as well as a mix of on and off-street parking. The density and diversity of land uses allows a visitor to park once to access multiple different destinations, stopping by a retail shop and visiting a restaurant in the same trip, for example. Today most blocks in the Heights are less than 85 percent occupied during the peak parking demand period, although a driver may struggle to find a parking spot on June Street, B Street, Wilson Street, or select block faces on 12th Street. However, even at these locations, there are adjacent blocks with lower parking occupancy that could provide convenient access to parking.

Observed parking occupancy data and the existing land uses in the Heights were used to estimate the demand for parking stalls relative to the occupied non-residential building square footage. Non-residential spaces are expected to generate the demand for 2.28 parking spaces per 1,000 square feet of occupied development, while a previous study found that multi-family residential developments are expected to generate 1.27 parking spaces per dwelling unit. Based on the estimated demand, the Heights will need 657 parking spaces by 2040 to achieve a desired parking occupancy of 85 percent, indicating that the existing supply of 714 spaces is sufficient to meet the future demand. By comparison, the planned improvements to 12th Street and 13th Street in the

City's Transportation System Plan to provide buffered bike lanes would result in the removal of approximately 84 on-street parking stalls. This would leave only 630 parking stalls, which is 27 stalls fewer than projected to be needed by 2040.

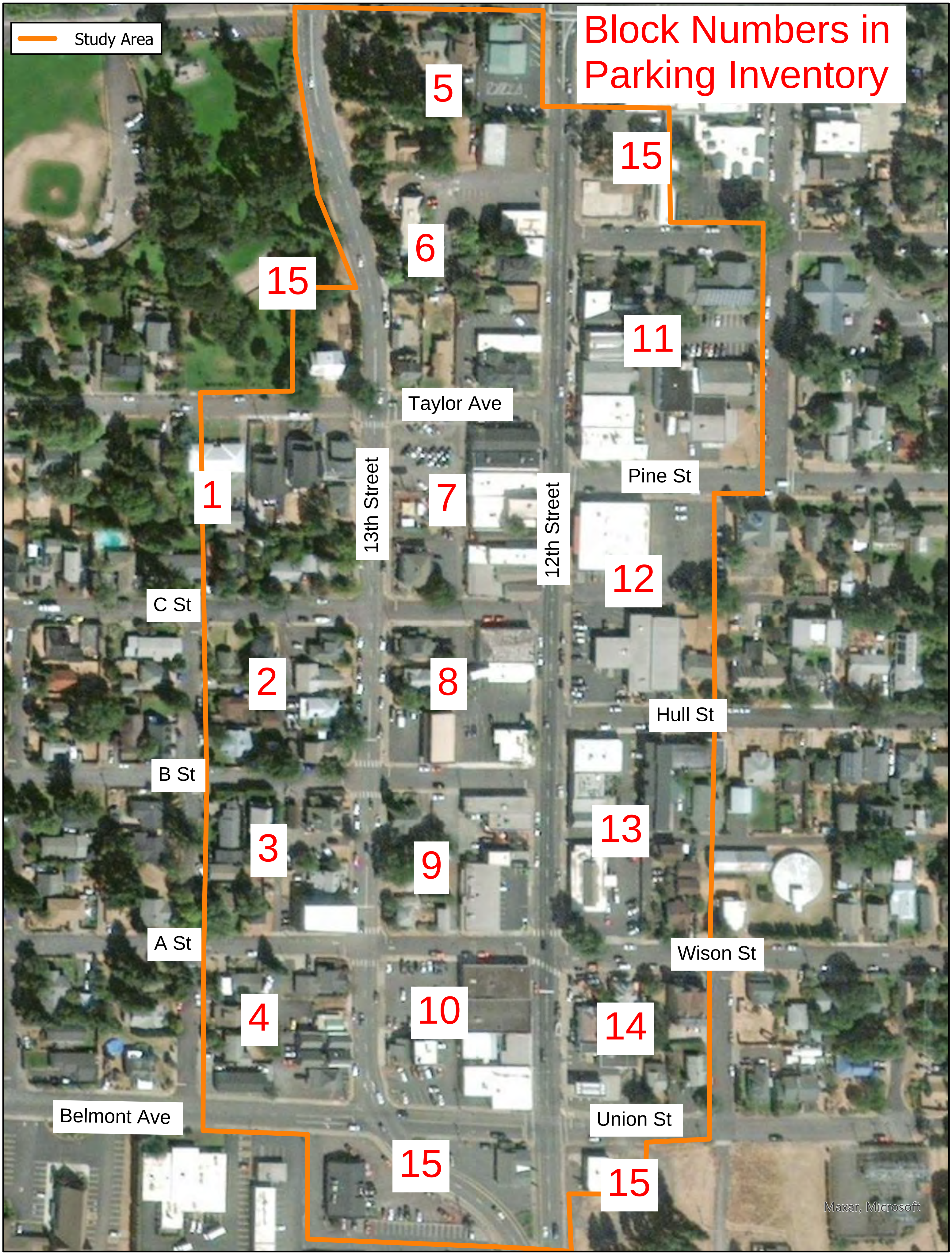
Although the expected future parking demand is less than the existing supply, eliminating a significant number on-street parking stalls may be challenging, particularly since off-street spaces are generally restricted to use by customers or employees rather than the general public. However, the projected surplus of parking indicates that some on-street parking could be eliminated to provide for enhanced multimodal facilities or other streetscape amenities in the Heights without negatively impacting the parking supply, even if growth or redevelopment spurs additional demand for parking.

Furthermore, new multimodal facilities and the addition of future transit stops will also encourage residents to walk or bike to the Heights instead of driving, which will further reduce the future parking demand. While the magnitude of such a mode shift is difficult to estimate, results from past travel demand management strategies in other cities suggest there could be a reduction in trips made by automobile of about five percent (equating to approximately 33 parking stalls).

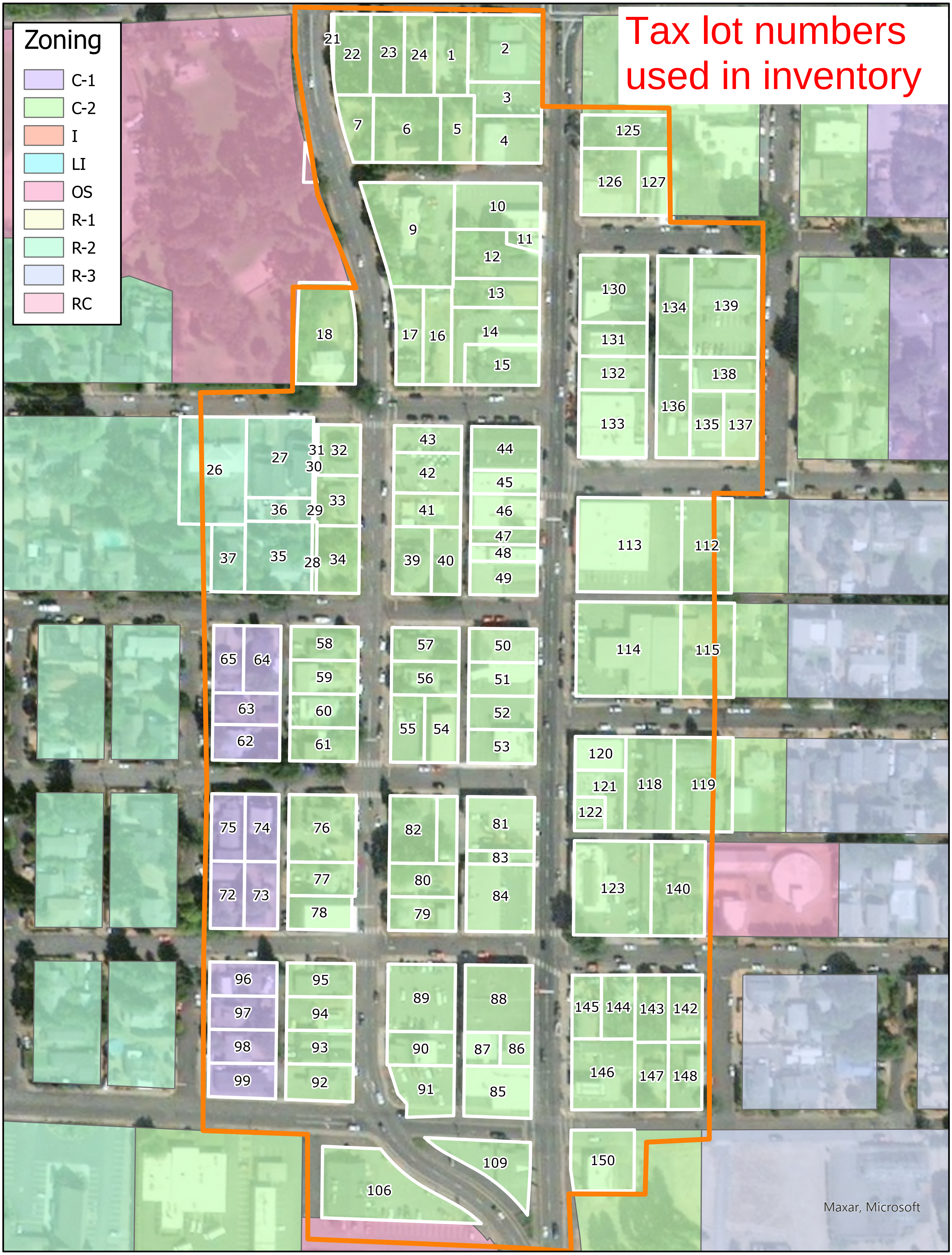
Improved parking management practices (e.g., enforcement of existing parking restrictions, use of metered parking) may also provide for greater parking utility even with less spaces. Under little regulation or management today, the existing number of parking stalls exceeds the estimated demand. Rather than meeting future parking needs simply by adding stalls, regulating the demand through more effective management systems is an option the City may consider, similar to the approaches taken for managing parking in the downtown.

CONTENTS

A. PARKING INVENTORY DATA



Study Area
Block Numbers in Parking Inventory
5
15
6
15
11
Taylor Ave
Pine St
1
7
13th Street
12th Street
12
C St
2
8
Hull St
B St
13
3
9
A St
Wison St
4
10
14
Belmont Ave
Union St
15
15
Maxar, Microsoft


Tax lot numbers used in inventory
Zoning
C-1
C-2
I
LI
OS
R-1
R-2
R-3
RC
Maxar, Microsoft

Existing On-Site Parking Inventory by Block

Block Number & Tax Code	Zoning Code	Existing Office (SF)	Existing Parking (Spaces)	Existing Retail (SF)	Existing Parking (Spaces)	Existing Residential (SF)	(Units)	Existing Parking (Spaces)	Notes
Block 1									
26	R-2					3,991	2		
27	R-2					4,754	1		
28	C-2			0	0				
29	C-2			0	0				
30	C-2			0	0				
31	C-2			0	0				
32	C-2			2480	4				
33	C-2					1025	1		
34	C-2			926	0				
35	R-2					1937	1		
36	R-2					0	0		
37	R-2					2539	1		
Block 2									
58	C-2	1844	2						
59	C-2			2260	0				
60	C-2			1764	4				
61	C-2			2043	5				1 ADA
62	C-1					1643	1	N/A	
63	C-1					2258	1	N/A	
64	C-1					1,600	1	N/A	
65	C-1					1,517	1	N/A	
Block 3									
72	C-1					5000.25	1	N/A	
73	C-1					1,887	1	N/A	
74	C-1					906	1	N/A	
75	C-1					1,358	1	N/A	
76	C-2			1,768	5				1 ADA
77	C-2			1,482	4				
78	C-2			3,387	0	3,387	5	5	Tenent Only
Block 4									
92	C-2	1377	3						3 customer only

Block Number & Tax Code	Zoning Code	Existing Office (SF)	Existing Parking (Spaces)	Existing Retail (SF)	Existing Parking (Spaces)	Existing Residential (SF)	(Units)	Existing Parking (Spaces)	Notes
93	C-2			3289	4				Suite owners only
94	C-2			811	4				1 ADA, Customer Only
95	C-2	1988	5						Customer only
96	C-1					1215	1	N/A	
97	C-1					1131	1	N/A	
98	C-1					1210	1	N/A	
99	C-1					2154	1	N/A	
Block 5									
1	C-2					1584	1	N/A	
2	C-2	4152	15						2 ADA
3	C-2			-	-				
4	C-2			2002	6				1 ADA
5	C-2			-	-				
6	C-2					1945	1	N/A	
7	C-2					-	1	N/A	
21	C-2					-	-		
22	C-2					1637	1	N/A	
23	C-2					1417	1	N/A	
24	C-2					894	1	N/A	
Block 6									
9	C-2			909	7	2047			1 ADA
10	C-2			3960	17				6 "No parking" signs posted in front of parking spots, but stalls still included in the 17.
11	C-2				0				
12	C-2					2255	1	N/A	
13	C-2					946	1	N/A	
14	C-2			2154	12				
15	C-2					2941.6	6	6	
16	C-2					1092	1	N/A	
17	C-2					1338	1	N/A	
Block 7									
39	C-2			2712	0				

40	C-2			0	10				1 ADA
Block Number & Tax Code	**Zoning Code**	**Existing Office (SF)**	**Existing Parking (Spaces)**	**Existing Retail (SF)**	**Existing Parking (Spaces)**	**Existing Residential (SF)**	**(Units)**	**Existing Parking (Spaces)**	**Notes**
41	C-2			1528	0				
42	C-2			0	11				1 30 Min Parking
43	C-2			0	12				1 ADA
44	C-2			0	0				
45	C-2			0	0				
46	C-2			0	0				
47	C-2			0	0				
48	C-2			0	0				
49	C-2			0	0				
Block 8									
50	C-2			3842	16				
51	C-2			1612	-				
52	C-2			0	-				
53	C-2	2321	9						
54	C-2			2793	-				
55	C-2			0	7				
56	C-2					1709	1	N/A	
57	C-2			1390	1				1 ADA
Block 9									
79	C-2					1261	1	N/A	
80	C-2			1271	0				
81	C-2			3,969	4				
82	C-2			1338	8				5 Employee Only
83	C-2			1097	0				
84	C-2			5644	15				1 ADA
Block 10									
85	C-2			5568	4				
86	C-2			1754	0				
87	C-2			1782	0				
88	C-2			0	0				
89	C-2			0	23				
90	C-2			2,233	0				
91	C-2	0	12						1 ADA
Block 11									
130	C-2			5,309	6				

131	C-2			2,249	0				
Block Number & Tax Code	**Zoning Code**	**Existing Office (SF)**	**Existing Parking (Spaces)**	**Existing Retail (SF)**	**Existing Parking (Spaces)**	**Existing Residential (SF)**	**(Units)**	**Existing Parking (Spaces)**	**Notes**
132	C-2			3,686	0				
133	C-2			8,005	0				
134	C-2			2,424	6				1 ADA
135	C-2			3,278	0				
136	C-2			3,716	4				
137	C-2			570	0				
138	C-2			0	2				
139	C-2			4,924	27				14 Employee Only, 1 ADA
Block 12									
112	C-2	0	0						
113	C-2			10,222	40				1 ADA
114	C-2			10,740	19				
115	C-2					1,236	1	N/A	
Block 13									
118	C-2					10,910	5	5	Residents only
119	C-2			5,818	0				
120	C-2			0	0				
121	C-2			1662	2				1 ADA
122	C-2			0	0				
123	C-2			4,893	17				1 ADA
140	C-2					1,104	4	0	
Block 14									
142	C-2	1,153	0			1,153	4	2	
143	C-2					750	1	N/A	
144	C-2					1,606	1	N/A	
145	C-2			1,472	0				1 ADA
146	C-2			2,235	4				
147	C-2					1,011	1	N/A	
148	C-2					920	1	N/A	

Block Number & Tax Code	Zoning Code	Existing Office (SF)	Existing Parking (Spaces)	Existing Retail (SF)	Existing Parking (Spaces)	Existing Residential (SF)	(Units)	Existing Parking (Spaces)	Notes
Block 15									
18	C-2					2,825	1	N/A	
106	C-2			4,480	23				1 ADA
109	C-2			2,500	11				
125	C-2			0	0				
126	C-2			0	0				
127	C-2			2,744	2				
150	C-2			1,838	0				
Totals	**-**	-	46	-	346	-	-	18	

Off-Street Total:	410

Existing On-Street Parking Inventory by Street Segment

Location (Blocks Encompassed)	One-Way/Two-Way	Number Lanes (One-Direction)	Functional Class	On Street Parking Spaces	Signed Restrictions	Field Notes
12th Street between May Street and Union Street (Blocks 6-14)	One-Way	2	U Min Art	69	30 Min Parking (North half of Block 12, Block 10), 2 Hr parking everywhere else, 1 Compact only 13W	Includes 2 spots located on May Street near 12th Street
13th Street between May Street and Belmont Avenue (Blocks 1-10)	One-Way	2	U Min Art	87	2 Hr parking marked all along corridor. Yellow curb paint and no parking sign present on both sides of street at Block 6, Block 4 east and block 10 west are compact only	
May Street between 12th Street and 13th Street (Block 5)	Two-Way	1 Eastbound, 2 Westbound	U Min Art	2		
June Street between 12th Street and 11th Street (Blocks 5-6)	One-Way	1	Local	15	30 min parking (west side of block 15)	
Taylor Ave from the Jackson Park boundary (approximately 280 feet west of 13th Street) to 12th Street (Blocks 1,15 & 7,6)	Two-Way	1	Local	22	"No parking here to corner" approx 10' from N corner of Block 15, 30 min parking south of Block 6	
Pine Street from 12th Street to 11th Street (Blocks 6-7)	Two-Way	1	Local	18	No signage, approx. 9 unmarked spots on Block 7	
C Street from 14th Street to 12th Street (Blocks 1-2, 7-8)	Two-Way	1	Local	21	No spots on blocks 1 & 2 are signed/marked. "No Parking This Side of Street" on Block 7	
Hull Street from 12th Street to approximately 280 feet east of 12th Street (Blocks 12-13)	Two-Way	1	Local	13	1 ADA spot north side of block 13, 3 unmarked/unsigned spots on east block 12, 1 30 min 13N, 2 10 Min 13 North, 1 Comm Loading area 13 North	Block 13 Signs illegible
B Street from 14th Street to 12th Street (Blocks 2-3,8-9)	Two-Way	1	Local	14	1 ADA spot east side block 8, 2-hr parking elsewhere	
A Street/ Wilson Street from 14th Street to 11th Street (Blocks 3-4,9-10,13-14)	Two-Way	1	Local	26	Unsigned/Unmarked Blocks 13-14, "No parking this side of street" block 9, 3 unmarked spots block 3	
Belmont Avenue/ Union Street from 14th Street to 11th Street Blocks 4,10,14,15)	Two-Way	1	U Collector	17	2 unmarked/unsigned spots block 15, 30 min parking block 15, 6 unmarked/unsigned spots block 4, 2 unmarked/unsigned spots block 15)	2 unmarked/unsigned spots on block 15 are at the opening of a right turning lane. Unlikely people would park here for vehicle safety reasons

Off Street Total:	304

HOOD RIVER PARKING COUNT UPDATES

DATE: September 23, 2022

TO: Dustin Nilsen | City of Hood River

FROM: John Bosket, PE; Alex Correa, EIT | DKS Associates

SUBJECT: Hood River Parking Count Updates
Heights Peak Season Counts
Project #22263-000

This memorandum presents findings associated with peak season parking demand counts conducted during the summer of 2022 in the Hood River Heights to support the City of Hood River's ongoing monitoring of parking in this area. This parking study will be supplemented in the future with further analysis during the winter (anticipated to be in February or March of 2023) to assess off-peak season conditions.

A previous parking study was conducted by DKS in the Hood River Heights in 2021, where peak season parking demand counts were collected, existing parking occupancy and demand rates were calculated, and parking needs forecasts were generated. Where applicable, the analysis presented in this memorandum builds off assumptions and data previously utilized for the 2021 Hood River Heights District Parking Study (hereafter referred to as the 2021 Parking Study).[1]

The Heights operates much like a central business district for Hood River, exhibiting a dense mix of land uses, including restaurants and retail shops surrounded by residential neighborhoods, parks, and schools. Business operations in the Heights are supported by a mix of on-street and off-street parking. Consistent with the methods used in the 2021 Parking Study, this parking study analyzed parking demand for the entirety of the Heights as a single entity rather than analyzing parking demand brought on by each individual land use within the Heights because of the density and diversity of land uses present.

As shown in Figure 1, this parking study includes the same area previously studied in 2021. This includes the 12th and 13th Street couplet between May Street and the end of the couplet south of Belmont Avenue/Union Street, and all side streets between approximately 11th Street and 14th Street, approximately one block to the east or west.

[1] Hood River Heights Streetscape Plan, Hood River Heights District Parking Study, DKS Associates, November 29, 2021.

FIGURE 1: HEIGHTS PARKING STUDY AREA

EXISTING PARKING AND LAND USE INVENTORY

The parking and land use inventory utilized for this study were replicated from the 2021 Parking Study and adjusted based on field observations during the data collection periods as necessary. Table 1 below summarizes the parking inventory utilized for this study.

TABLE 1: HEIGHTS DISTRICT PARKING INVENTORY

ON-STREET STALLS AVAILABLE	OFF-STREET STALLS AVAILABLE	TOTAL STALLS AVAILABLE
302[1]	410	712

[1]On-street stalls available adjusted to 302 from 304 recorded in 2021. Field observations indicated that two parking stalls previously assumed on May Street between 12th Street and 13th Street are no longer available due to a "No Parking This Side of Street" sign not noted in the 2021 Parking Study.

Many of the parking stalls within the Heights have usage restrictions (e.g., 10-minute parking, 2-hour parking, ADA, Customer Only). All restricted parking spots are included in the parking supply for the purposes of this parking analysis. Figures 2 and 3 display the locations of each of the of the parking stalls recorded in the parking inventory, including noted restrictions.

The land use inventory utilized for this analysis matches that of the 2021 Parking Study. The total floor area of non-residential space within the parking study area is assumed to be approximately 205,000 square feet.

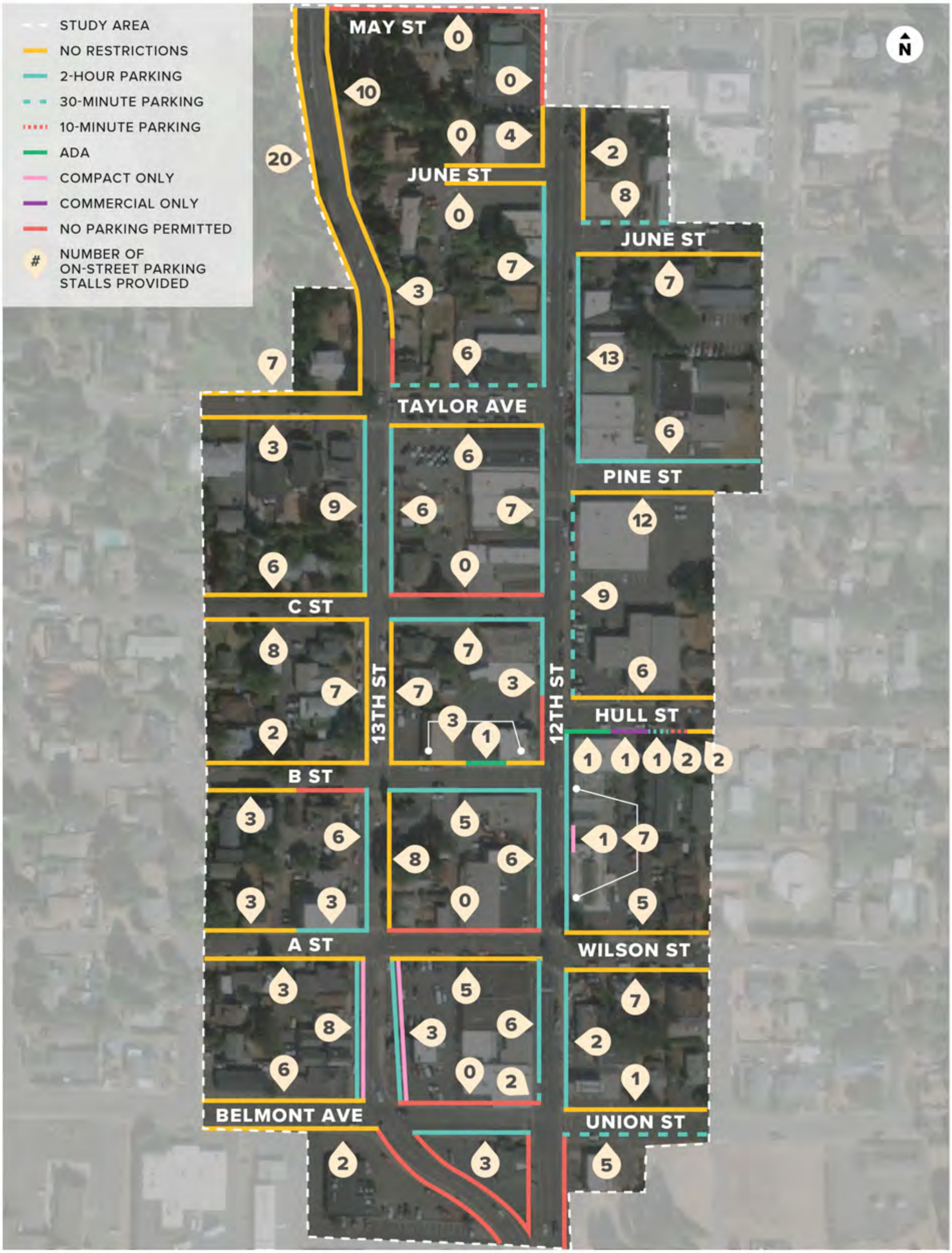


FIGURE 2: ON-STREET PARKING LOCATIONS AND RESTRICTIONS

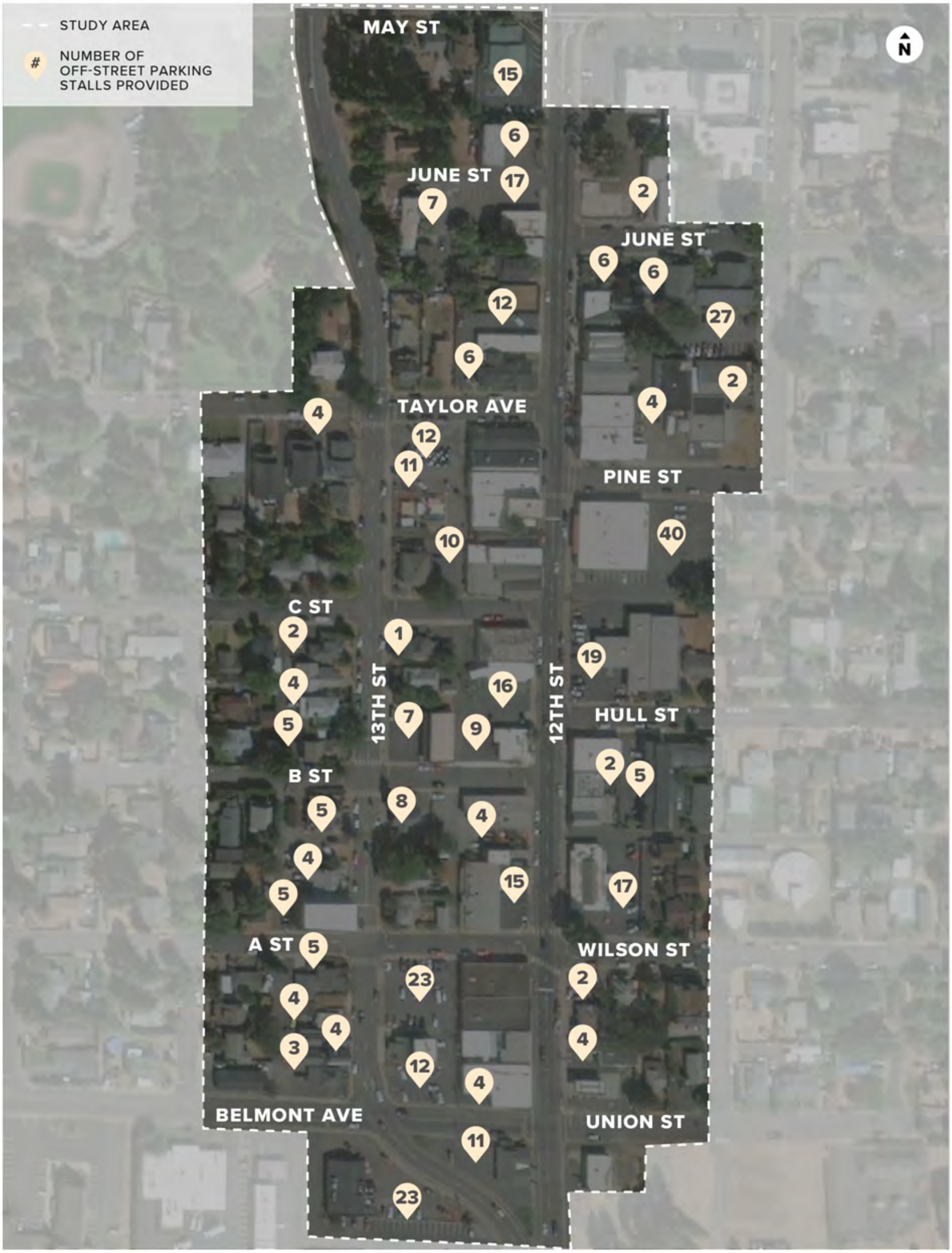


FIGURE 3: OFF-STREET PARKING LOCATIONS

PARKING OCCUPANCY DATA COLLECTION AND FINDINGS

Peak season parking demand data collection was conducted on a weekday and weekend on Thursday, August 25th and Saturday, August 27th, 2022. The project team collected hourly on-street and off-street parking utilization data for all stalls in the study area over a six-hour period on both days. The collection period began on the weekday morning at 11:00 a.m. and ended just before 5:00 p.m. On the weekend, data collection started at 10:00 a.m. and ended just before 4:00 p.m.

Table 2 summarizes the daily parking utilization peak hour data for both the weekday and weekend during both 2021 and 2022. Figures 4 and 5 show bar charts of parking demand by time of day for all hours counted during the weekday and weekend periods, respectively.

TABLE 2: PEAK HOUR PARKING UTILIZATION SUMMARY

COLLECTION DAY	LOCATION	PEAK HOUR		PARKING STALLS UTILIZED		PERCENT OF STALLS OCCUPIED	
		2021	2022	2021	2022	2021	2022
WEEKDAY	On-Street	12-1 p.m.	12-1 p.m.	165	145	54%	48%
	Off-Street			202	191	49%	47%
	Total			367	336	51%	47%
WEEKEND	On-Street	12-1 p.m.	10-11 a.m.	108	114	36%	32%
	Off-Street			125	107	30%	29%
	Total			233	221	33%	31%

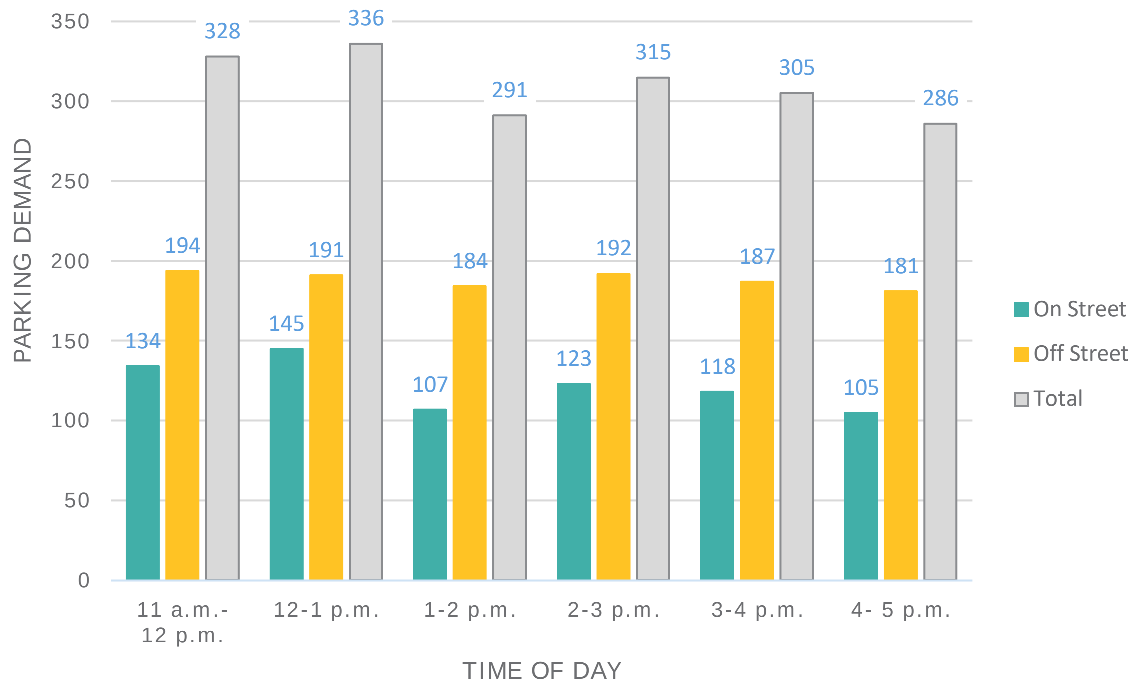


FIGURE 4: 2022 WEEKDAY PARKING DEMAND BY TIME OF DAY

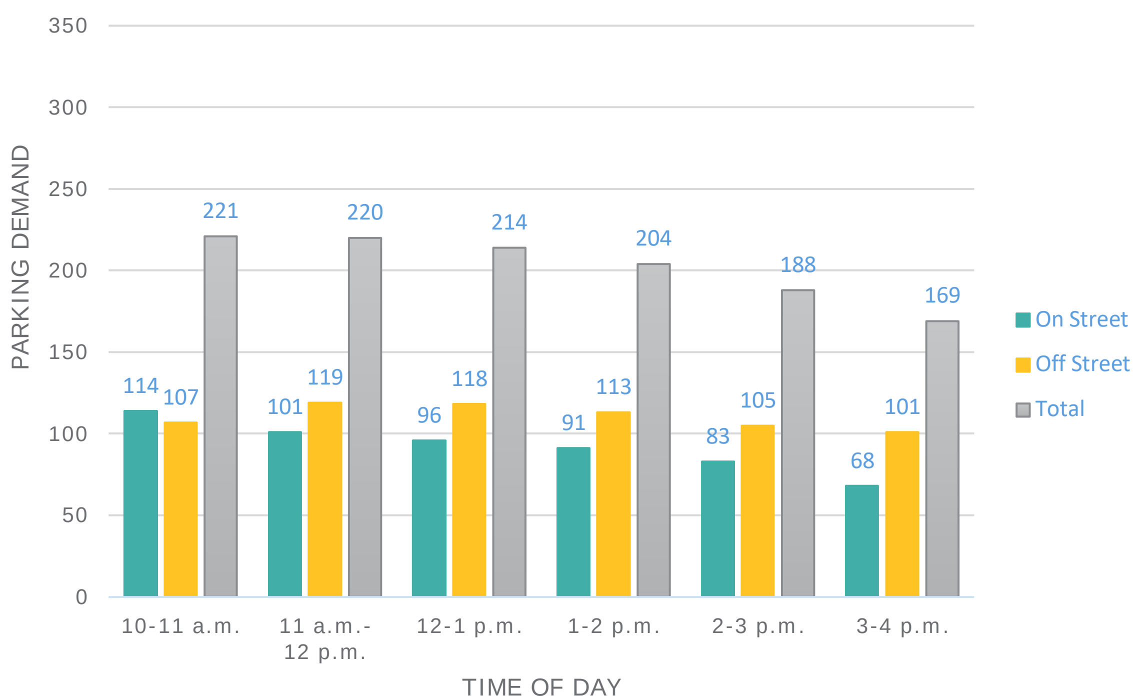


FIGURE 5: 2022 WEEKEND PARKING DEMAND BY TIME OF DAY

General trends of the new Hood River Heights parking data collected reveal the following:

- The Heights is significantly busier during the week than it is during the weekend (e.g., the busiest weekend hour had only 77 percent of the parking demand counted during the least-busy weekday hour).
- The system peak hour of parking demand occurred from 12:00 – 1:00 p.m. on a weekday, which was the same as observed in 2021.
- For both the weekday and weekend, parking demand is higher in the late-morning/early-afternoon and tapers off in the mid-afternoon.
- The peak hour parking demand counted was approximately 8 percent lower in 2022 than it was in 2021 (336 spaces occupied in 2022 compared to 367 in 2021), though peak parking demand for weekdays and weekends was similar between the two years.
- Areas where on-street parking may have been the most difficult to find were on the south side of A Street, both sides of B Street, and some block faces abutting 12th and 13th Streets in the southern part of the study area.
- The distribution of on-street vs. off-street usage remains relatively constant in the 2022 weekday peak compared to that in 2021. In 2021, approximately 45 percent of parked vehicles were utilizing on-street stalls and 55 percent were utilizing off-street stalls. In 2022, the usage was approximately 43 percent and 57 percent, respectively.

Figure 6 below shows a peak hour heat map of the 2022 counts recorded. Typically, a peak period parking occupancy maximum of 85 percent is desirable, as it helps accommodate variations in demand that could apply pressure to the parking system. The "85 Percent" rule was previously applied locally in Hood River during parking analysis work in the Heights and Downtown. As shown in Table 2 the parking system within the Heights operates well below the 85 percent desired occupancy threshold. Some off-street parking lots and on-street block faces experienced peak hour occupancy greater than 85 percent of capacity. However, in these cases, there are nearby block faces that are below 85 percent occupancy that present reasonable parking alternatives. Overall, the current parking capacity available within the Heights is adequate to accommodate the current demand.

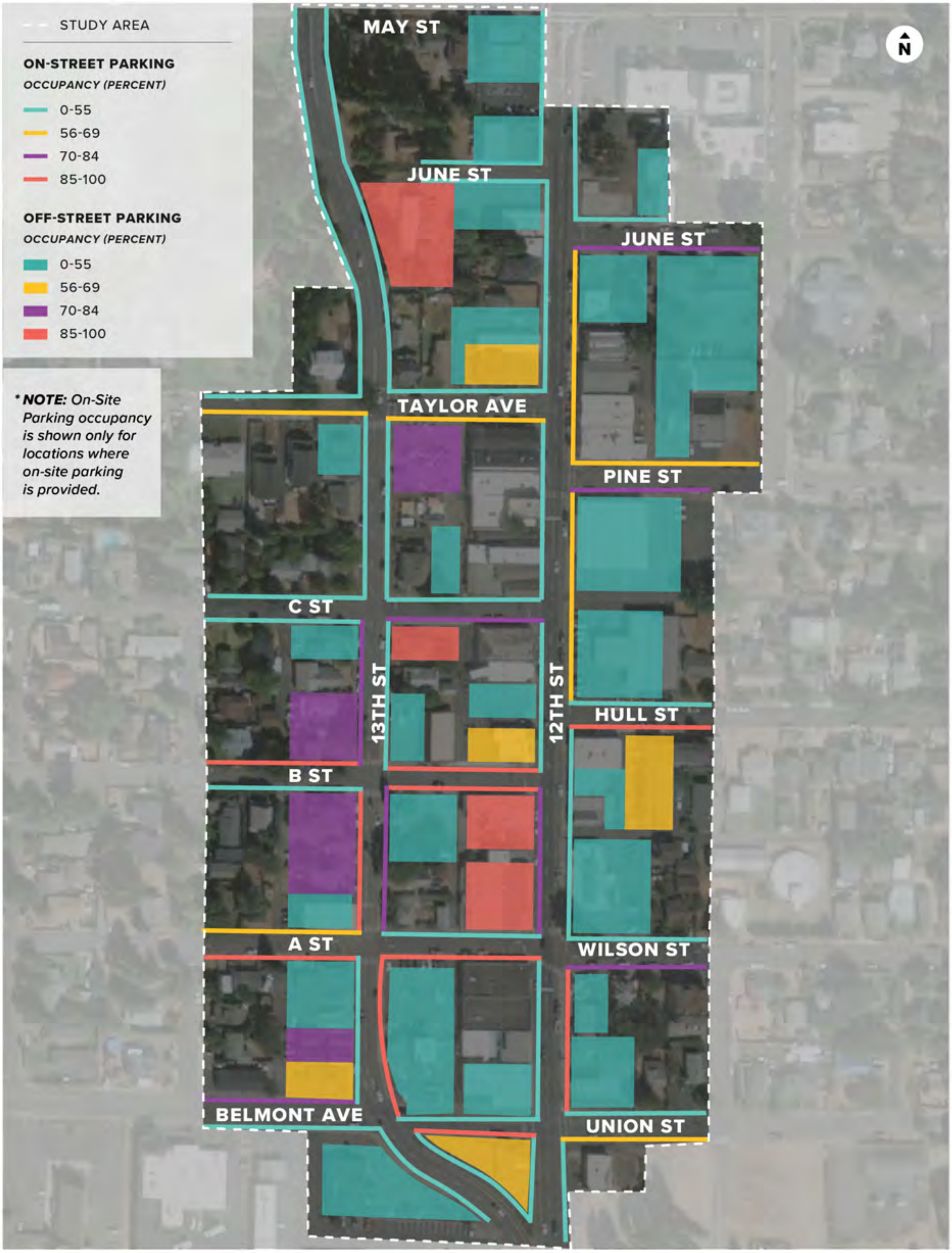


FIGURE 6: PEAK HOUR PARKING OCCUPANCY HEAT MAP (WEEKDAY, 12:00-1:00 P.M.)

PARKING DEMAND ANALYSIS

As was the case for the 2021 Parking Study, three measures were applied to evaluate the current parking supply and demand: the built parking ratio, true demand ratio, and calibrated true demand ratio, as described below. The built parking ratio is a measure of the availability of parking within a study area while the true demand ratio and calibrated true demand ratio measure the adequacy of the parking supply to meet the projected demand. Both the true demand ratio and the calibrated true demand ratio utilize observed parking occupancy data from the peak hour (summarized in Table 2) as a reasonable worst-case scenario.

The built parking ratio is expressed as the number of stalls per 1,000 square feet of built area. This ratio expresses the relationship between all parking stalls within the study area and the total square footage of built space within the study area, regardless of whether or not the buildings are occupied.

The true demand ratio is expressed as the observed number of vehicles parked (at peak) per 1,000 square feet of occupied building area. That is, while built parking ratios measure the supply of parking for a built area, the true demand ratio measures the amount of parking needed to serve the demand generated by the occupied built area.

The calibrated true demand ratio is the true demand ratio factored up by 15 percent. This measure allows parking to be built to exceed the true demand rather than only meet the true demand to account for variability in parking demand. This 15 percent buffer is considered ideal and allows for a peak parking occupancy of 85 percent, which is an industry best practice[2] and has been previously applied locally for the Heights and Downtown parking studies.

OBSERVED PARKING DEMAND

Today, the Heights has 712 parking stalls[3], resulting in a built parking ratio of 3.47 parking stalls per 1,000 ft^2 of built area. To calculate the true and calibrated demand ratios, the number of observed parked vehicles per “occupied” square feet of building area must be established. As was the case in the 2021 Parking Study, occupancy estimations of the buildings during the peak hour of 90 percent, 93 percent, and 95 percent were assumed to establish a range of demand rates that describe the level of building occupancy. Using the estimated levels of peak hour building occupancy and the gross square footage of built area within the Heights discussed previously, observed parking demand ratios are established for the 2022 counts. Table 3 below summarizes the true and calibrated true demand ratios for 2021 and 2022.

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[2] Parking Made Easy: A Guide to Managing Parking In Your Community, Chapter 6, Oregon Transportation & Growth Management Program. July 2013.

[3] Down from 714 stalls reported in 2021, as discussed in Table 1.

TABLE 3: TRUE AND CALIBRATED TRUE PARKING DEMAND RATIOS (2021 AND 2022)

ESTIMATED BUILDING OCCUPANCY	OCCUPIED SQUARE FOOTAGE	TRUE DEMAND RATIO (VEH./1,000 SQ. FT.)		CALIBRATED TRUE DEMAND RATIO (VEH./1,000 SQ. FT.)	
		2021	2022	2021	2022
95%	195,000	1.88	1.73	2.16	1.99
93%	190,000	1.93	1.77	2.22	2.03
90%	185,000	1.98	1.83	2.28	2.10

As shown in Table 3, assuming the most conservative estimate of building occupancy, the true parking demand ratio is 1.83 vehicles per 1,000 square feet of built space and the calibrated true parking demand ratio is 2.10 vehicles per 1,000 square feet of built space. In line with the slight decreases in parking demand previously discussed, the parking demand shows decreases in 2022 relative to 2021 of about 8 percent. The calibrated true parking demand of 2.10 implies that at that rate, approximately 431 parking stalls are necessary to meet the existing peak season parking demand in the Heights while maintaining a maximum of 85 percent occupancy. This amount is considerably less than the 712 parking stalls currently provided and slightly less than the 467 parking stalls that were determined to be needed to meet current demand from the 2021 Parking Study.

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HOOD RIVER PARKING COUNT UPDATES

DATE: June 15, 2023

TO: Dustin Nilsen | City of Hood River

FROM: John Bosket, PE; Alex Correa, EIT | DKS Associates

SUBJECT: Hood River Parking Count Updates
Heights Off-Peak Season Counts
Project #22263-000

This memorandum presents findings associated with off-peak season parking demand counts conducted during the winter of 2023 in the Hood River Heights to support the City of Hood River's ongoing monitoring of parking in this area. This parking study supplements previous analysis provided in the summer of 2022 that assessed the peak-season parking conditions.[1]

As was the case for the peak-season parking study conducted in 2022 (hereafter referred to as the Peak-Season Study), the analysis presented in this memorandum builds off assumptions and data previously utilized in the 2021 Hood River Heights District Parking Study.[2]

The Heights operates much like a central business district for Hood River, exhibiting a dense mix of land uses, including restaurants and retail shops surrounded by residential neighborhoods, parks, and schools. Business operations in the Heights are supported by a mix of on-street and off-street parking. Consistent with the methods used in the Peak-Season Study, this parking study analyzed parking demand for the entirety of the Heights as a single entity rather than analyzing parking demand brought on by each individual land use within the Heights because of the density and diversity of land uses present.

Figure 1 displays the study area of this parking study. The study area includes the 12th and 13th Street couplet between May Street and the end of the couplet south of Belmont Avenue/Union Street, and all side streets between approximately 11th Street and 14th Street, approximately one block to the east or west.

[1] Hood River Parking Count Updates, Hood River Heights Peak Season Counts, DKS Associates, September 23, 2022.

[2] Hood River Heights Streetscape Plan, Hood River Heights District Parking Study, DKS Associates, November 29, 2021.

FIGURE 1: HEIGHTS PARKING STUDY AREA

EXISTING PARKING AND LAND USE INVENTORY

The parking and land use inventory utilized for this study were replicated from the Peak-Season Study and adjusted as necessary based on field observations. No field conditions during the off-peak data collection period required alterations to the parking inventory. Table 1 below shows the parking inventory utilized for this study.

TABLE 1: HEIGHTS DISTRICT PARKING INVENTORY

ON-STREET STALLS AVAILABLE	OFF-STREET STALLS AVAILABLE	TOTAL STALLS AVAILABLE
302	410	712

When collecting data, the analysis team noted that two businesses which formally occupied buildings within the Heights had signs noting that the businesses had moved to different locations. Both vacated buildings represent a total of approximately 3,700 square feet. This observation did not result in changes to the existing land-use inventory that was utilized in the Peak-Season Study. Overall, the change in gross-square footage is less than 2 percent and there was no indication that these buildings would be removed, thus they may become occupied again in the future. The total floor area of non-residential space within the parking study area is assumed to be approximately 205,000 square feet.

PARKING OCCUPANCY DATA COLLECTION AND FINDINGS

Off-peak season parking demand data collection was conducted on a weekday and weekend on Tuesday, March 14 and Saturday, March 18, 2023. The project team collected hourly on-street and off-street parking utilization data for all stalls in the study area over a six-hour period on both days. The collection period began on the weekday morning at 11:00 a.m. and ended just before 5:00 p.m. On the weekend, data collection started at 10:00 a.m. and ended just before 4:00 p.m.

Table 2 summarizes the daily parking utilization peak hour data for both the weekday and weekend during both the 2022 peak season counts and 2023 off-peak season counts. Figures 2 and 3 show bar charts of parking demand by time of day for all hours counted during the weekday and weekend periods, respectively.

TABLE 2: PEAK HOUR PARKING UTILIZATION SUMMARY

COLLECTION DAY	LOCATION	PEAK HOUR		PARKING STALLS UTILIZED		PERCENT OF STALLS OCCUPIED	
		Peak Season (2022)	Off-Peak Season (2023)	Peak Season (2022)	Off-Peak Season (2023)	Peak Season (2022)	Off-Peak Season (2023)
WEEKDAY	On-Street	12-1 p.m.	11 a.m. - 12 p.m.	145	128	48%	42%
	Off-Street			191	183	47%	45%
	Total			336	311	47%	44%
WEEKEND	On-Street	10-11 a.m.	10-11 a.m.	114	93	32%	31%
	Off-Street			107	101	29%	25%
	Total			221	194	31%	27%

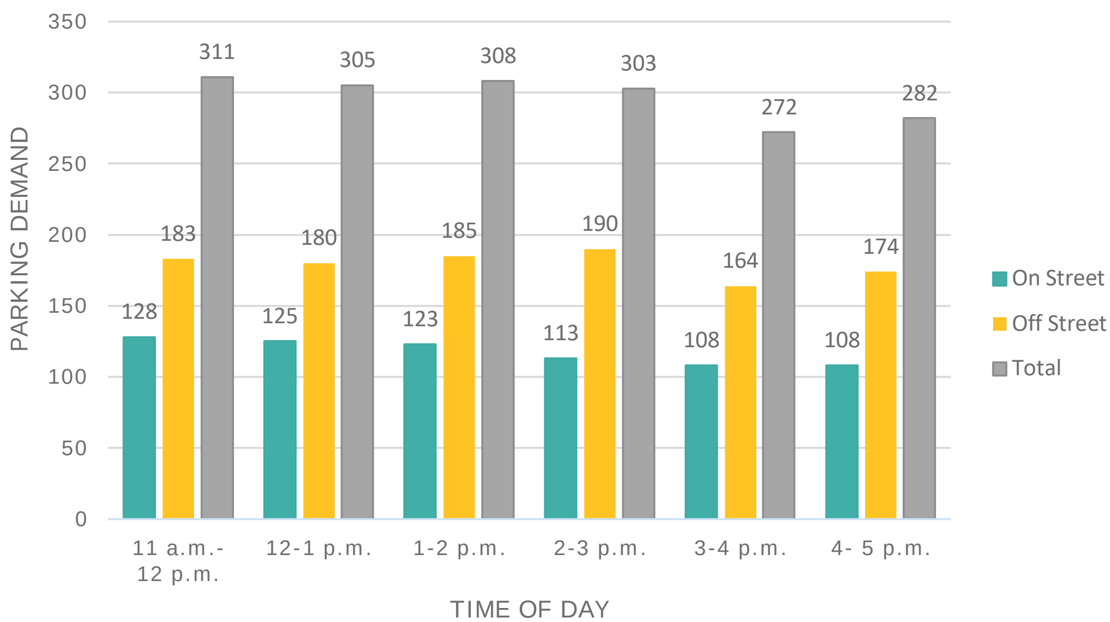

FIGURE 2: 2023 OFF-PEAK SEASON WEEKDAY PARKING DEMAND BY TIME OF DAY

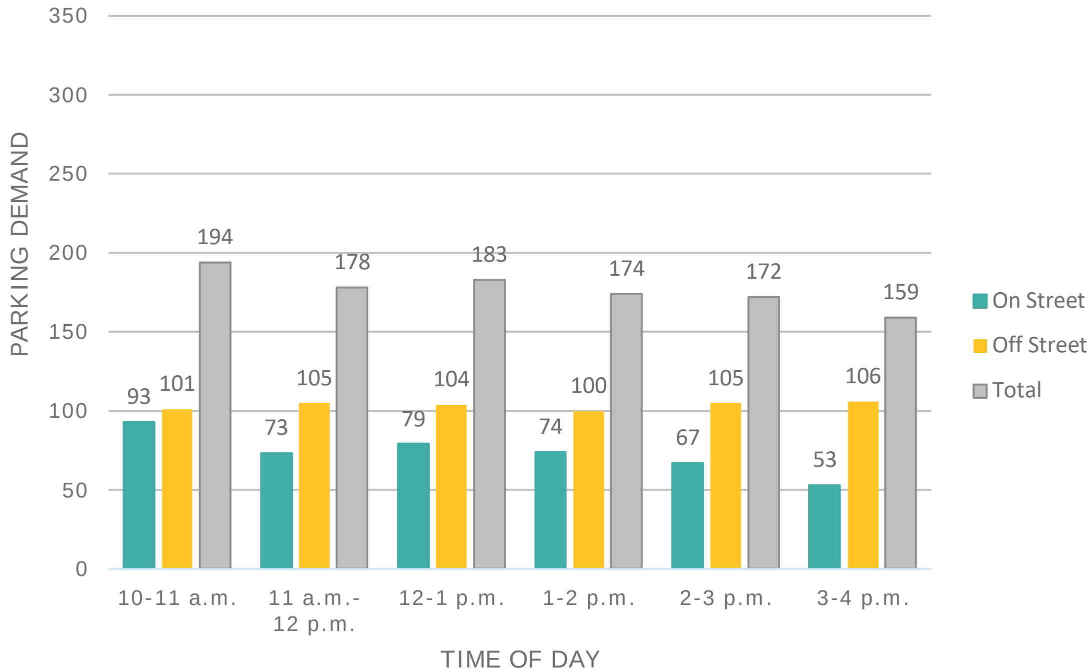

FIGURE 3: 2023 OFF-PEAK SEASON WEEKEND PARKING DEMAND BY TIME OF DAY

General trends of the Hood River Heights off-peak season parking data compared to the peak-season counterparts reveal the following:

- Overall parking utilization in the Heights remains relatively low, whether on-street or off-street.
- The Heights continues to be significantly busier during the week than it is during the weekend in the off-peak season.
- The system peak hour of parking demand occurred from 11:00 a.m. – 12:00 p.m. on a weekday, which differs from the peak hour found in the peak-season studies in 2022 and 2021 (though the variation is minor). However, the trend that parking demand is generally highest in the late mornings-early afternoons (roughly around the lunch period) remains.
- The weekday peak hour parking demand counted is approximately 7 percent lower during the off-peak season than it was in 2022 peak season (311 spaces occupied in the off-peak compared to 336 in the peak season). The decrease in weekend parking demand during the off-peak season is more sizable with approximately 12 percent less demand during the off-peak season (194 spaces occupied in the off-peak compared to 221 in the peak season).
- Areas where on-street parking may have been the most difficult to find were on the south side of A Street, the south side of June Street, the north side of Pine Street, and some block faces abutting 12th and 13th Streets throughout the study area.
- The distribution of on-street vs. off-street usage remains relatively constant in the peak and off-peak seasons. In the peak season, approximately 43 percent of parked vehicles were utilizing on-street stalls and 57 percent were utilizing off-street stalls. In the off-peak season, the usage was approximately 41 percent and 59 percent, respectively.

Figure 4 below shows a peak hour heat map of the off-peak season counts recorded. Overall, variations in parking demand and parking behavior in the Heights during the peak and off-peak seasons remain relatively consistent, but with a decrease in overall demand between 7 and 12 percent.

PARKING DEMAND ANALYSIS

As was the case for the Peak-Season Study, three measures were applied to evaluate the current parking supply and demand: the built parking ratio, true demand ratio, and calibrated true demand ratio, as described below. The built parking ratio is a measure of the availability of parking within a study area while the true demand ratio and calibrated true demand ratio measure the adequacy of the parking supply to meet the projected demand. Both the true demand ratio and the calibrated true demand ratio utilize observed parking occupancy data from the peak hour (summarized in Table 2) as a reasonable worst-case scenario.

The built parking ratio is expressed as the number of stalls per 1,000 square feet of built area. This ratio expresses the relationship between all parking stalls within the study area and the total square footage of built space within the study area, regardless of whether or not the buildings are occupied.

The true demand ratio is expressed as the observed number of vehicles parked (at peak) per 1,000 square feet of occupied building area. That is, while built parking ratios measure the supply of parking for a built area, the true demand ratio measures the amount of parking needed to serve the demand generated by the occupied built area.

The calibrated true demand ratio is the true demand ratio factored up by 15 percent. This measure allows parking to be built to exceed the true demand rather than only meet the true demand to account for variability in parking demand. This 15 percent buffer is considered ideal and allows for a peak parking occupancy of 85 percent, which is an industry best practice[3] and has been previously applied locally for the Heights and Downtown parking studies.

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[3] Parking Made Easy: A Guide to Managing Parking In Your Community, Chapter 6, Oregon Transportation & Growth Management Program. July 2013.

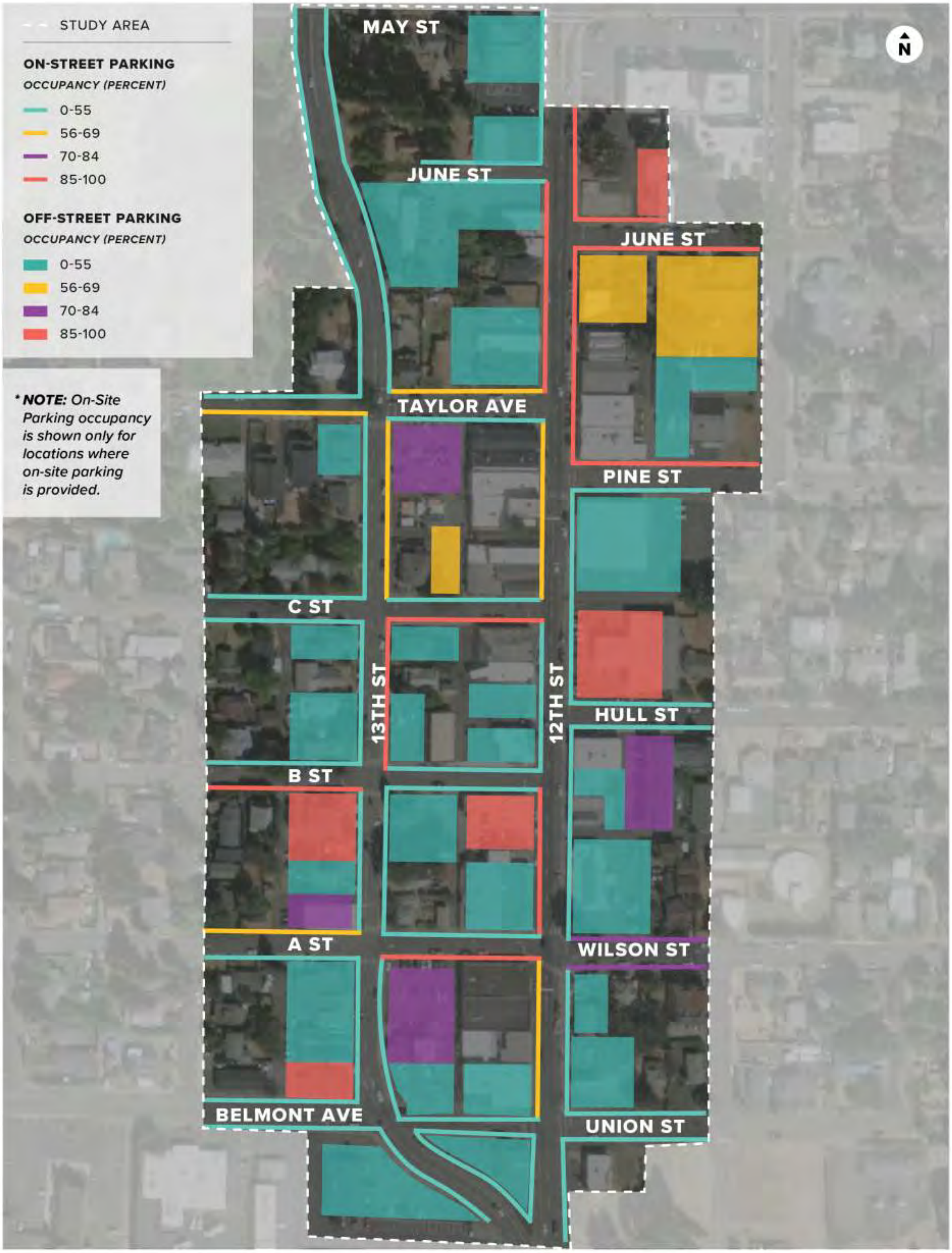


FIGURE 4: OFF-PEAK SEASON PEAK HOUR PARKING OCCUPANCY HEAT MAP (WEEKDAY, 11:00 A.M.-12:00 P.M.)

OBSERVED PARKING DEMAND

Today, the Heights has 712 parking stalls[4], resulting in a built parking ratio of 3.47 parking stalls per 1,000 ft^2 of built area. To calculate the true and calibrated demand ratios, occupancy estimations of the buildings during the peak hour of 90 percent, 93 percent, and 95 percent were assumed to establish a range of demand rates that describe the level of building occupancy. Using the estimated levels of peak hour building occupancy and the gross square footage of built area within the Heights discussed previously, observed parking demand ratios are established for the off-peak season counts. Table 3 below summarizes the true and calibrated true demand ratios for the off-peak season counts and the peak-season counterparts.

TABLE 3: TRUE AND CALIBRATED TRUE PARKING DEMAND RATIOS (PEAK VS OFF-PEAK SEASONS)

ESTIMATED BUILDING OCCUPANCY	OCCUPIED SQUARE FOOTAGE	TRUE DEMAND RATIO (VEH./1,000 SQ. FT.)		CALIBRATED TRUE DEMAND RATIO (VEH./1,000 SQ. FT.)	
		Peak Season (2022)	Off-Peak Season (2023)	Peak Season (2022)	Off-Peak Season (2023)
95%	195,000	1.73	1.60	1.99	1.84
93%	190,000	1.77	1.64	2.03	1.88
90%	185,000	1.83	1.69	2.10	1.94

As shown in Table 3, parking demand ratios are smaller in the off-peak season as compared to the peak season, differing by approximately 8 percent. The calibrated true parking demand of 1.94 implies that at that rate, approximately 398 parking stalls are necessary to meet the existing off-peak season parking demand in the Heights while maintaining a maximum of 85 percent occupancy. This amount is considerably less than the 712 parking stalls currently provided and slightly less than the 431 parking stalls that were determined to be needed to meet current demand from the Peak-Season Study.

[4] Down from 714 stalls reported in 2021, as discussed in Table 1.

memo

to Dustin Nilsen and Will Norris, City of Hood River

from Nathan Polanski, PE, Alex Dupey, AICP, MIG

re The Heights Streetscape Plan – Phase 1 Summary Memo

date August 31, 2021

This memorandum summarizes finding and outcomes from Phase 1 of the Heights Streetscape Project. Phase 1 was focused on establishing the project vision and foundation and included reviewing existing planning studies completed in the project area, documenting the context of the study area, and conducting public engagement to identify community and stakeholder priorities. A key outcome from Phase 1 was the identification of project goals that will be used to guide the development and evaluation of streetscape concepts during Phase 2 - Concept Development.

Existing Conditions

<u>Past community and Urban Renewal planning efforts</u> - The project team reviewed existing planning documents relevant to the Heights Streetscape study area. This included Heights Urban Renewal documents and past community planning efforts such as the Walkshop with Dan Burden and Streets Alive demonstration projects. Findings from this review:

- helped frame stakeholder and community conversations,
- confirmed project specific goals align with Urban Renewal goals and community priorities, and
- will inform community preferences are integrated into proposed streetscape concepts.

<u>Regulatory process</u>: The project team also reviewed City and ODOT policies, regulatory requirements, and design standards to inform design discussions with City and ODOT staff. This review has informed preliminary coordination with ODOT. Prior to the start of concept development, the project team will confirm with ODOT the urban context, as defined in ODOT's Blueprint for Urban Design Manual, for 12th and 13th Streets; the urban context is used to establish design guidance for elements of the street cross section (e.g. width of travel lane width).

<u>Project basemap</u>: a survey basemap was also conducted for the study area streets to assist in the development of streetscape concepts.

Community Engagement

A comprehensive community engagement plan was conducted to gather information and feedback from the community and project stakeholders.

Online survey: an online survey ran from March 8 to March 29, 2021, that received more than 340 responses. The survey provided clear insights on preliminary project goals and existing issues and needs for the area building on our review of past city and community planning efforts. Key findings included:

- Project goals most important to survey participants are related to slowing traffic, creating safe streets and intersections for all users, and promoting a livable community through street improvements that support access to local businesses.
- Street improvements, particularly at intersections, are needed for people walking, biking and driving to increase safety throughout the project area, particularly for people moving east and west across 12th or 13th Streets.
- To support business and economic development, improving opportunities to access businesses across transportation modes and maintaining and improving views to storefronts on 12th and 13th should be considered.
- Accessibility improvements, street trees, and lighting are desired street environment enhancements.

The survey was published in English and Spanish, however, no surveys were completed in Spanish. For future outreach efforts we are planning to focus on in-person discussions to the extent feasible and adjusting our outreach to the Latino community. This adjustment has included getting the word out via Radio Terra , a local Spanish radio program, and contacting St Mary's Church to advertise the project in church newsletters.

Stakeholder meetings: small group meetings were conducted to gather input on the project area from individuals and groups with a specific interest in the area (e.g., they own a business in the Heights). The project team conducted seven separate meetings, including two meetings in Spanish led by the Next Door. City staff led the process for identifying meeting participants and Next Door contacted attendees for the meetings in Spanish. Meetings included:

- Hood River Landmarks Review Board members
- Business stakeholders in the project area – this included a separate Spanish led discussion with Latino business owners
- Community members from Latinos en Accion
- Up Valley community members
- Local community organizations that have taken an active role in previous planning efforts or provided previous input on the Heights
- Columbia Area Transit

Key takeaways from these conversations were:

- Preserving the areas as a local destination and building on the area's character and history; members of the Landmarks Review Board discussed how the development of infrastructure in the Heights likely contributed to and informed how people and goods move through the Heights
- Slowing traffic and making streets safer to cross
- Improving connections to neighborhoods and schools
- Improving bicycle connections and amenities
- Managing on-street parking

Although meetings were well attended the project team identified the need for additional participation from the local business community. A short letter and questionnaire were developed to circulate to local business owners. City staff, with support from Urban Renewal Advisory Committee members, sent the letter to local business owners. Ten completed questionnaires were received with additional feedback helping the project team to understand how the streetscape can be improved to support their business, how customers and deliveries access their business (e.g. on-street vs private parking lot).

A consistent topic of discussion with stakeholders was whether changes can be expected to the existing on-street parking. Given the concern for impacts to existing parking supply the project team is proposing to conduct a parking study to better understand the existing parking supply (on- and off-street) within the project area and how future development and design concepts might impact, or change the availability and access to existing parking. The parking study will be conducted during Phase 2 as concepts are being developed.

<u>Comments from the Project Website or Email:</u> The project website provides an opportunity to comment about any project related issue. As of July 22, 2021, 20 comments were submitted along with a handful of emails that provided input on the project. Comments were focused on the following topics, many of which are outside the scope of the streetscape project, but do inform feelings about current issues in and adjacent to the project area:

- Concern about future development that was recently approved by the City of Hood River at 1306 Taylor Street
- Desire for more mixed-use development
- Existing parking availability and lack of enforcement of two-hour limits
- Need for tree planting and green stormwater infrastructure
- Concern about changes to traffic flow and number of lanes for cars (there were comments both for and against lane reductions)
- Desire for a better pedestrian and bicycle environment and consistent signage.
- Reduction in the amount of gravel used during the winter
- Need to provide better crossings for people walking across 12th and 13th Streets
- Include voices from the Latino community
- Keep the area local

Project Goals

The Heights Business District Urban Renewal (UR) Plan (First Amendment March 2016) has seven goals that apply to the entire urban renewal area and are broad statements designed to guide future planning and urban renewal funded projects in the area. As a part of this project we have developed project specific goals focused on improving 12th and 13th Streets and the intersections and couplets that tie the couplet together at the north and south ends of the area. These goals have been developed incorporating input from the:

- Urban Renewal Agency Board (URAB) and Urban Renewal Advisory Committee (URAC) kickoff meeting held February 4, 2021
- online community survey, open from March 8, 2021 through March 29, 2021
- stakeholder meetings held in April and May 2021
- URAC meeting on May 20, 2021, and
- URAB meeting June 14, 2021.

The project goals, affirmed by the URAB at their July 12, 2021 meeting, include four community priority goals and three additional goals that align with UR Plan goals:

Community Priority Goals:

- Calm traffic and improve intersections to improve safety for people driving, walking, biking, taking transit and supporting local businesses.
- Preserve and promote a livable community and economy through streetscape improvements that increases safety for people walking and biking and addresses parking needs to support local business access, and future mixed-use development.
- Create an identify for the Heights that reflects the diverse culture and history of the area and as destination for local residents for goods and services.
- Create streets and gathering spaces that provide safe, comfortable places for people walking, accessing transit, and biking along and across the corridor and that connects area recreation and commercial destinations and neighborhoods.

Goals that align with the Urban renewal Plan:

- Support existing and future development by maintaining and improving utility infrastructure as part of the streetscape project.
- Engage local residents and businesses, the school district, and those that use the corridor to provide ongoing input in the streetscape project.
- Provide locations for people to gather, to stop and rest.

During Phase 2 the project team will develop preliminary concepts and an approach to evaluate concepts based on the community’s vision and project goals.

THE HEIGHTS STREETSCAPE PLAN

memo

to Dustin Nilsen and Will Norris, City of Hood River

from Nathan Polanski, PE, Alex Dupey, AICP, MIG

re The Heights Streetscape Plan – Phase 2 Summary Memo

date June 17, 2022

This memorandum summarizes findings and outcomes from Phase 2 of the Heights Streetscape Project. In Phase 2 the project team:

- Developed concepts that align with the project goals confirmed in Phase 1;
- Completed transportation, parking, and other analyses to evaluate the concepts against project goals;
- Provided opportunities for community feedback on the concepts and technical analysis; and
- Identified preliminary recommendations for design.

The product of Phase 2 is the recommendation of a general design concept the project team will use to develop a preferred design concept during Phase 3 – Develop Preferred Concept and Action Plan. The project team's recommendation is based on a quantitative and qualitative evaluation of the concepts related to the project goals and feedback from the community.

Design Process

The Heights Streetscape Plan has implemented a project design process approved by the Urban Renewal Agency Board (URAB) and informed through the Urban Renewal Advisory Committee (URAC) and extensive community input.

During Phase 1 (Feb-Aug 2021), the project team:

- Gathered information about the existing conditions and project context;
- Created a project webpage to provide the public access to project information;
- Conducted a public survey, which reached over 300 respondents, to develop project goals;
- Conducted discussions with a variety of agency and stakeholder groups including the Latino community, local businesses, county and transportation organizations (e.g., Columbia Area Transit), and Safe Routes to Schools project team among others.

During Phase 2 (Sept 2021-June 2022), the project team:

- Developed evaluation criteria and design concepts to gauge alignment with project goals;
- Conducted a district parking study;
- Refined evaluation criteria and design concepts based on URA feedback;
- Completed a technical evaluation of the design concepts based on final evaluation criteria;
- Conducted outreach with emergency service providers and agencies;
- Presented the design concepts and evaluation findings to the community;
- Coordinated a peer review for the potential to design roundabouts at key intersections; and
- Summarized in-person and online survey results.

The next step in this process combines findings from the technical evaluation and community feedback to identify a preferred design concept to be used as a basis and framework for improving the streets and intersections in the Heights.

Design Concepts

The project team developed three design concepts to explore potential street and intersection configurations for consideration. The preferred design to be developed in Phase 3 may combine aspects of more than one concept.

Design Concept 1 – Two Lane, Two-way Traffic

This concept converts existing one-way traffic on 12th and 13th Streets to two-way traffic, eliminating one-way streets. Along 13th, parking would be removed and replaced with one-way curb-separated bike lanes. Along 12th, parking would remain on both sides of the street. Traffic signals would be installed on 13th Street at May Street and Belmont Avenue.

Design Concept 2 – One Lane, One-way Traffic

This concept reduces 12th Street and 13th Street to one lane of one-way traffic in each direction. This concept was developed to calm traffic through the Heights, provide shared space for walking and biking along 13th Street, and provide on-street parking on 12th and 13th Streets. A roundabout at 13th/May and a double roundabout at 13th/12th/Belmont would control traffic at key intersections.

Design Concept 3 - Hybrid

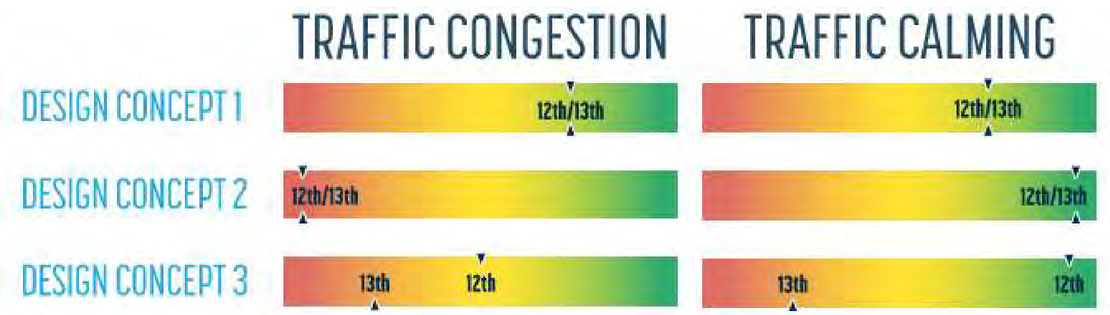
This concept converts the existing one-way traffic on 13th Street to two-way traffic while maintaining one-way traffic on 12th Street. For this concept 12th Street also has diagonal parking and a two-way protected bike lane (or cycle track) and 13th Street has a center turn lane and on-street parking on one side of the street. The intersection at 13th/May would be controlled with a roundabout and the intersection at 13th/Belmont would be controlled with a traffic signal.

Technical Evaluation

The project team completed a technical evaluation of the concepts to determine how each concept aligns with project goals. The evaluation summary memorandum (Appendix A) describes the findings of the analysis. In general, the technical analysis found that while each concept met many of the project's goals, Design Concept 1 aligned the best with project goals followed by Design Concept 3 and then Design Concept 2. A summary of key differences between design concepts, which were identified during the tehcnical analysis, are described below.

<u>Traffic Congestion</u>

Each design concept was developed with a goal to calm traffic along 12th and 13th Streets compared to today's traffic and to improve the street environment for people walking, biking, and taking transit. As a result, all three concepts result in more traffic congestion, a reduced Level of Service for vehicles, and more time to drive through the Heights compared to the future Transportation System Plan Scenario, which is the current adopted plan. The graphic below shows how each concept rated (green = good rating, red = poor rating) in terms of traffic congestion and traffic calming. Traffic calming is a key component of Goal 1.



<u>Key intersections</u>

The intersections at 13th/May and 13th/12th/Belmont are "bottlenecks" for vehicle performance. These intersections are currently operating at a failed condition and will continue to fail without intersection improvements with the projected growth in traffic. Existing pedestrian facilities also do not meet ADA or city standards and because there are no bike lanes the intersections do not align with the city's Transportation System Plan or Safe Routes to School recommendations.

In the future, these intersections could be controlled with a traffic signal or roundabout regardless of the preferred design concept for traffic along 12th and 13th Streets. Roundabouts will require a significant amount of land acquisition, have a greater impact on adjacent properties and businesses, and significantly increase implementation costs.

Appendix B includes findings from a "Roundabout Peer Review," which evaluated a potential layout and property impacts for roundabouts on adjacent properties.

Parking

Each design concept would alter and reduce on-street parking along 12th and 13th Streets, as described in Table 1; however, each design concept has less impact on existing parking than the City's Transportation System Plan, which was adopted in 2011.

Table 1. On-Street Parking Impacts by Design Concept		
	Approx. On-street Parking along 12th and 13th Streets	Approx. On-street District Parking (parking within one block of 12th and 13th Streets)
Parking (current)	141	304
2011 Transportation System Plan	56 (60% reduction)	220 (28% reduction)
Design Concept 1	68 (52% reduction)	230 (24% reduction)
Design Concept 2	112 (21% reduction)	275 (10% reduction)
Design Concept 3	81 (43% reduction)	245 (20% reduction)

One Lane Streets and Emergency Access

The project team met with local public safety officials to get feedback on the design concepts. The meeting included Hood River County Sheriff, City of Hood River Fire Department, and City of Hood River Police Department; West Side Fire District was also invited but did not attend. Representatives from each agency indicated that one-lane streets in Design Concept 2 would present challenges for emergency access and indicated that although a single lane street may work as a neighborhood street, 12th and 13th Streets serve a larger community and one lane streets are therefore not desirable for emergency access. There was less concern for the one-lane street along 12th Street in Design Concept 3 because first responders would likely use 13th Street for emergency access and regional trip travel and response.

Community Outreach and Feedback for Phase 2

Community outreach included a field visit to local businesses, a two-day public open house, and an online survey promoted for one month. Over 250 people attended the open house, 1,200 opened the City's Survey, and 306 people competed the full survey, including 21 people who completed the Spanish version of the survey.

Media Presence and Outreach

The project team used a variety of tools and platforms to spread the word, in both English and Spanish, to encourage community participation. The web and media presence included but was not limited to the following:

- Project webpage and online presence
- Radio Tierra
- Local news organizations (e.g., Columbia Gorge News)
- Social media (Facebook, Instagram, etc.)
- City E-newsletter

Direct Business Outreach

Prior to the public open house project team members went store to store to engage businesses along 12th and 13th Streets and invite them to participate in the open house, answer questions, and inform their customers and community of the project and opportunities to get engaged and provide input.

A concern for some business owners, particularly those who depend on drive up customers, is reducing on-street parking and the perception that the project has become a bike lane project. Other feedback included growing concerns for pedestrian safety and excessive traffic speeds, particularly along 12th Street where the density of businesses results in more on-street parking and more people walking. The desire for improved curb appeal was also mentioned as was a truck traffic concern related to potential stops at May Street for commercial trucks travelling uphill on 13th during winter weather.

Open House

The open house provided an opportunity to provide comments and discuss the concepts with project team members and other community members (a complete summary is included as Appendix C). Key takeaways from the open house include:

- A roundabout was preferred over a traffic light at 13th/May.
- Some attendees noted concerns for the loss of businesses and impacts to private property needed to make improvements at the intersections of Belmont, 12th, and 13th.
- Parking for businesses was a common concern and there is opposition to reducing parking in the Heights.

Appendices not attached to this PDF

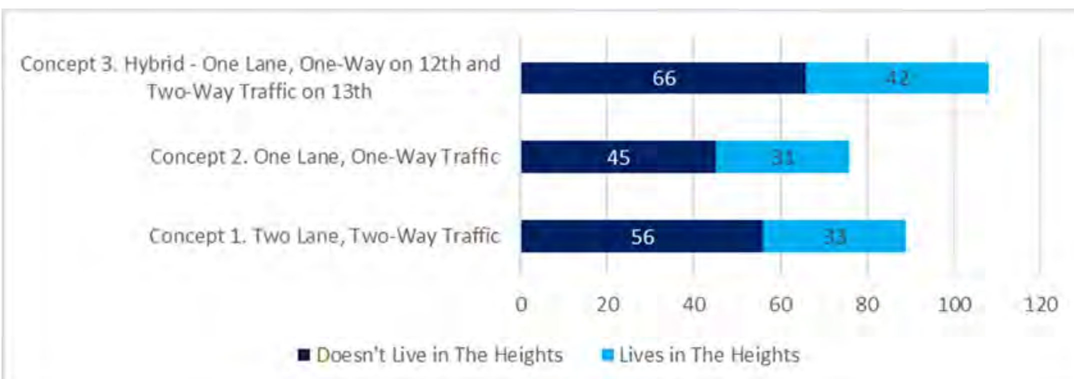
- People are concerned about **emergency vehicle access**.
- There are mixed views on converting 12th and 13th Street to **two-way traffic**.
- Some attendees were concerned with **winter conditions, particularly icy roads** and how a traffic signal could impact trucks travelling uphill (southbound) on 13th and how well bike lanes would be used during the winter months.
- Some attendees questioned whether 12th and 13th Streets are appropriate for bike lanes and wondered if **bike lanes should be located on neighborhood streets** instead.
- A dot exercise to solicit feedback on the **streetscape character** of the Heights suggested community preferences for creating opportunities for a variety of gathering spaces (small and large), using more contemporary materials, and incorporating local culture and character.

The community's feedback from the open house, including these key takeaways, have informed the project team's recommendation for developing a preferred design as presented below.

Online Survey

Survey results identified several key themes (see Appendix D for a complete summary):

- Results showed **respondents were divided** when asked for their level of support or to identify how important a concept, goal, or key difference was to them.
- When asked to pick which concept they felt most aligned with, **more people picked Concept 3** than Concepts 1 or 2.



- **Differences in decision-making.** Respondents who preferred Concepts 2 and 3 found better pedestrian access and opportunities for gathering and better bike access most important when choosing their preferred concept. Respondents who preferred Concept 1 found better auto access and preserving parking were most important.

Responses were also analyzed based on where respondents live.

- Respondents **who do not live in the Heights**:
  - Identified parking to be more important than respondents who live in the Heights.
  - Identified placemaking as the least important difference between concepts.
- Respondents **who live in the Heights** identified traffic calming, comfortable places for walking, and placemaking as important differences when compared to people who do not live in the Heights.

Appendices not attached to this PDF

Respondents were asked to identify how important key differences are between the design concepts. The charts below show the average responses based on where respondents live and for all respondents (‘Not at all important’ = 0, ‘Very Important’ = 100).

Respondents were split in whether roundabouts are appropriate to the District. There was slightly more support for roundabouts from respondents who live in the Heights.

The survey included a budgeting exercise that asked respondents to prioritize and invest limited resources into improvements they valued for improving streets and intersections in the Heights. Generally, respondents spent most of their resources constructing roundabouts, but items that required less resources such as improved east/west crossings or enhancing street trees and landscaping were chosen the most. This suggests that improving all intersections for safety is important to the community as are opportunities to integrate planting and natural systems into the streetscape environment.

Appendices not attached to this PDF

Recommendation for Developing a Preferred Design

Based on the technical evaluation and community feedback, the project team recommends a design concept that builds on Concept 3 (Hybrid). Concept 3 offers a compromise that aligns well with the project goals and balances the divided community feedback.

Initially, Concept 1 aligned slightly better in terms of alignment with project goals, however, this rating was not weighted for elements that are most important to the community. For example, Concept 1 has the greatest reduction in on-street parking and does not align as well with Safe Routes to Schools recommendations when compared to Concept 3. Although Concept 3 has some qualities in terms of traffic calming and walking environment that are not ideal along 13th Street, the project team feels a preferred design can be developed to help mitigate these concerns.

As the preferred design is developed the project team will incorporate the following features based on community feedback in order to develop a final design that aligns well with project goals and community feedback:

1. <u>The design of east-west streets for on-street parking</u>: to offset reduced parking on 12th and 13th Streets the design of east/west streets should explore opportunities to increase parking compared to today's streets; parking strategies on Taylor Ave and A St/Wilson St should be balanced with improving access for people walking and biking. Based on observations of existing parking use the parking on east/west streets should also explore ways to incorporate slightly longer parking stalls to accommodate trucks and sprinter vans recognizing longer vehicles may not park as comfortably in angle parking stalls on 12th Street.
2. <u>Traffic calming and sidewalk environment along 13th Street</u>: the three-lane road section on 13th Street did not align strongly with project goals related to traffic calming and comfort for people walking. The design of 13th Street will incorporate traffic calming strategies such as medians and visibility enhancements at key crosswalks. Along the east side of 13th Street, where the travel lane is directly adjacent to the sidewalk (no on-street parking), a continuous planting strip or similar treatment should be incorporated to improve the safety and comfort of people walking.
3. <u>Emergency access and raised bike lanes</u>: public safety officials suggested exploring how raised bike lanes adjacent to the roadway along May Street and 12th Street might be used by emergency service vehicles during an emergency response. The design team should explore how the design of the road edge/curb condition might support emergency access without compromising safety for people biking.
4. <u>Bike connections</u>: although the project study ends just south of Belmont the project could make a recommendation for how to continue the two-way cycle track south to Pacific Ave and the Indian Creek Trail, which has been a major infrastructure component considered in the safe routes to school effort. A more detailed review and design to support the movement of people walking and biking through key intersections at 13th/May and 13th/12th/Belmont will be completed after the intersection control type (traffic signal or roundabout) is identified.
5. <u>Streetscape environment</u>: opportunities for incorporating a variety of gathering spaces and vegetation (planting, street trees, and green stormwater facilities) will be explored.

As noted above both key intersections at 13th/May and 13th/Belmont are failing and require future intersection controls to properly function. These intersections also need to be improved and will require significant investment to meet ADA requirements, improve pedestrian facilities, and provide safe places for people biking. The city's adopted Transportation System Plan and the traffic analysis for this project indicate traffic signals or roundabouts could be used to control traffic at the intersections of 13th/May and 13th/12th/Belmont. Intersection improvements, depending on whether it is a signal or roundabout, may have significant impacts to adjacent properties and businesses.

Given these impacts a decision for intersection control should be made the URAB. The following highlights key considerations for making a decision:

<u>13th/May Intersection</u>

- Based on feedback from the open house and online survey a roundabout was identified as a preferred alternative by the community and emergency responders, in part due to concerns related to a traffic signal stopping traffic from the north, which could cause trucks to get stuck in icy conditions more frequently than if a roundabout is constructed.
- A roundabout will require property acquisition. Figure 4 of Appendix B includes a geometric layout of a roundabout with potential property impacts. A traffic signal is also anticipated to impact property but to a lesser extent. The size of the roundabout shown in Figure 4 will likely increase to incorporate bike lanes and address topography.
- A roundabout will require a longer path of travel for people walking and biking to navigate through the intersection.
- A roundabout will require significantly more funding to implement compared to a traffic signal (potentially 3X the cost) due to the larger footprint and the cost to acquire property.
- The roundabout layout presented in Appendix B, with two entry lanes for the southbound and westbound approaches to the intersection, would operate at Level of Service B or better in the design target year (2039) and would easily meet ODOT's mobility target.
- Roundabouts reduce the severity of crashes at intersections and have the potential to reduce injury crashes by up to 82 percent (ODOT Crash Reduction Factor List, 2020, CMF ID: 228) and reduce vehicle speeds compared to traffic signals.
- Installing roundabouts in place of traffic signal has been found to reduce vehicle emissions and the delay for vehicles travelling through this intersection would be less for a roundabout than a traffic signal.
- Depending on preferences roundabouts could be perceived to contribute to placemaking goals.

<u>13th/12th/Belmont Intersection</u>

- A double roundabout would require property acquisition from up to nine adjacent properties, including up to four full parcels, and would eliminate at least two existing buildings. A roundabout will also change the street design on 13th Street between A St and Belmont from the typical street cross section to add a travel lane for vehicles entering the roundabout (see Figure 5, Appendix B). This additional travel lane could reduce on-street parking, impact business access, and change the streetscape environment along this block.
- Integrating the preferred design for bike lanes, a two-way cycle track along 12th Street from Concept 3, may expand the footprint of a double roundabout slightly towards the east. Depending on the final configuration a double roundabout may also require a longer path of travel for people walking and biking to navigate through the intersections.
- A double roundabout will require significantly more funding to implement compared to a traffic signal (potentially 5X the cost) due to the larger footprint and the cost to acquire property.

Appendices not attached to this PDF

- The double, multi-lane roundabout layout presented in Appendix B would operate at Level of Service B or better in the design target year (2039) and would easily meet ODOT's mobility target.
- Roundabouts reduce the severity of crashes at intersections and have the potential to reduce injury crashes by up to 82 percent and reduce vehicle speeds compared to traffic signals.
- Installing roundabouts in place of traffic signal has been found to reduce vehicle emissions and the delay for vehicles travelling through this intersection would be less for a roundabout than a traffic signal.
- A roundabout would significantly change the south entry to the Heights and with that there would be different opportunities for incorporating placemaking.

Next Steps – Phase 3

Once the URA confirms the concept to be used to develop the preferred design the project team will prepare the Phase 3 contract for approval. During Phase 3 the preferred concept will be developed along with implementation recommendations and cost considerations for future implementation.

A draft of the preferred design will be developed and presented to the URAC and URAB for review and feedback. Phase 3 does not include focused community outreach and updates to the community will occur through URAC and URAB meetings, updates to the project website, and mailing list updates as the draft and final plan are developed.

Phase 3 is anticipated to last approximately four months with the goal of finalizing the plan in the fall of 2022.

Attached (Appendices not attached to this PDF)

Appendix A – Evaluation Summary of Design Alternatives (Feb 25, 2022)

Appendix B – Roundabout Peer Review Technical Memorandum (Draft, May 31, 2022)

Appendix C – Heights Streetscape Plan Open House Summary (April 2022)

Appendix D – Heights Streetscape Plan Online Survey Summary (May 2022)

Appendices not attached to this PDF

memo

to Dustin Nilsen and Will Norris, City of Hood River

from Nathan Polanski, PE, Alex Dupey, AICP, MIG

re The Heights Streetscape Plan – Public Engagement Summary

date December 22, 2023

This memorandum provides an overview of the public engagement activities completed for The Heights Streetscape Plan. Full results of engagement activities are included as an appendix. Project-specific meeting results and survey summaries are also available on the project website at https://cityofhoodriver.gov/urban-renewal/the-heights-streetscape-plan/.

Engagement consisted of three phases of work:

In Phase 1, the project team:

- Created a draft and final public engagement plan and preliminary outreach schedule (Attachment 1);
- Created a project charter and facilitated a joint kickoff meeting with the Urban Renewal Agency Board and Advisory Committee (Attachment 2);
- Developed a project website (Attachment 3) and preliminary project outreach materials;
- Facilitated small group meetings with individuals, interest groups, local business owners within the study area, and residents, including two meetings in Spanish (Attachment 4);
- Developed and distributed a questionnaire to local business and property owners to gather additional information following small group meetings (Attachment 5),
- Initiated an online survey in English and Spanish to identify preliminary project goals, existing issues and needs for the area (Attachment 6), and
- Presented to and facilitated discussions with the Urban Renewal Advisory Committee and the Urban Renewal Agency Board on the status of the project. These meetings also elicited input from these groups.

In Phase 2, the project team:

- Developed a communications plan for the rollout of a community open house and online survey (Attachment 7);
- Met with technical stakeholders (Columbia Area Transit, the City's Safe Routes to Schools

project team, Public Works, public safety focus group (City Police and Fire, Hood River Sheriff, and West Side Fire) and ODOT to review and get feedback on the preliminary design concepts;

- Hosted a two-day open house with over 250 people attending to provide input on the design alternatives (Attachment 8);
- Hosted an approximately month-long online survey in a similar format as the in-person event. Approximately 1,200 people opened the survey, with 306 competed surveys. 21 people completed the survey in Spanish (Attachment 9);
- Dropped in to visit local businesses;
- Maintained an active web and media presence (Attachment 10) including:
    - Project webpage and online presence
    - Radio Tierra
    - Local news organizations (e.g., Columbia Gorge News)
    - Social media (Facebook, Instagram, etc.)
    - City E-newsletter
- Regular reporting and presentations to the Urban Renewal Advisory Committee and the Urban Renewal Agency Board; and
- Summarized in-person and online survey results and feedback.

In Phase 3, the project team:

- Presented final recommendations to the Urban Renewal Advisory Committee and Urban Renewal Agency Board for approval of the streetscape plan and discussion of next steps.

Appendix

The attached appendix includes the results of the major community engagement tasks and results (as applicable) completed for the project. Attachments include:

Phase 1:

Phase 2:

Project Webpage comments:

memo

to Will Norris, City of Hood River

from Alex Dupey, AICP, Nathan Polanski, PE, MIG

re The Heights Streetscape Plan

(MIG 15174.01): **Task 3.1 – Draft Public Involvement Plan**

date **January 15, 2021**

The memorandum identifies the anticipated public engagement, communications, and decision-making process to assist the Hood River Heights community and Hood River Urban Renewal Agency (URA) develop a comprehensive streetscape plan for 12^{th} and 13^{th} Streets. The proposed process described incorporates previous work completed within the projects, and where appropriate, builds upon the results of engagement completed. This document will be updated, as necessary, to reflect engagement outcomes and current conditions.

As with many projects underway, COVID-19 has had a dramatic impact on how traditional public engagement can occur, and while COVID-19 has changed many of the ways we engage with our communities, there are still a number of methods that can be employed to continue project outreach and maintain transparency and robust public input for the project. We expect at some point to meet again in person during the project.

This memorandum identifies the following elements:

- Goals and objectives for public involvement;
- Communications and social media support assumptions;
- Recommendations for managing and updating the project website and online engagement;
- Stakeholder and business meetings;
- Public kickoff event assumptions and expectations;
- Public Open House expectations and establishing om agreement from a diverse group of stakeholders;
- URAB/URAC coordination and anticipated timing; and
- Legislative and Approval Process through Public Hearings

Goals and Objectives for Public Involvement

The design and implementation process for The Heights project incorporates, as applicable, input gathered from initial URAB, URAC, and community engagement over the last several years within the corridor that will inform future engagement activities. The proposed community engagement process will collect and incorporate ideas and input from both stakeholders in the immediate vicinity of the project and broader engagement from City residents, businesses, and interest groups to create a project that establishes key vision elements and a prioritized implementation strategy for the project area.

ENGAGEMENT GOALS

The goals of the community engagement tasks include the following:

1. **Gather community feedback.** Provide opportunities for input by parties and individuals that are interested in this project.
2. **Provide accessible approaches and tools.** This includes providing translation and interpretation in Spanish for online surveys and in-person events.
3. **Provide varied platforms for participation**. Provide a range of options to engage community members and stakeholders, including online and in-person events.
4. **Track input to maximize outreach**. Track respondent's demographics and areas of interest, as possible, to ensure that a diverse number of community members are being heard.
5. **Generate excitement and community ownership**. Provide materials that show how this project will be implemented over time, building upon the information gathered through community dialogue and technical studies that enhances the areas unique location and character.
6. **Influence and shape the project design so that community fingerprint is maintained on the final approvable product**. Provide transparency in decision-making as recommendations are developed through public input and technical evaluation.

Objectives

The following public engagement objectives are specific, measurable actions that will advance the engagement goals.

1. **Accessibility**. The process should provide community members with diverse abilities and needs multiple opportunities to engage.
   - City sponsored public events will be held in an ADA accessible location, when possible. All opportunities for community input, including online surveys and community workshops, will be made accessible for visually and hearing impaired participants, as needed.
   - As possible, City sponsored public events will be scheduled at times to allow participation by people with a range of different work schedules.
   - Meeting materials will be translated into Spanish. Interpretation at community events will be provided.
   - Maximize accessibility through socially-distanced events online engagement that meets COVID-19 related local and state health guidelines until it is safe to meet in person.
2. **Extent**. The process should involve and inform community members and landowners, businesses, and other stakeholders directly or indirectly associated with the project.
   - Event/survey information will be posted along the corridor, with flyers provided in community places throughout the City and distributed to local businesses for distribution. Flyers will be in Spanish and English.

- Event/survey information will be publicized using the project landing page on the City's website and the City's social media accounts to reach citywide audiences.
- The total number of participants will be tracked across all outreach activities to measure the number of people reached.

3. **Diversity and Equity in Participation**. The process should engage a range of people that reflects the diversity of interests, ethnicities, incomes, and needs of the Heights District.
   - Outreach activities will collect demographic data, where practical, to help assess how well we are reaching community members who are reflective of district and broader Hood River population.
   - Populations of special concern include business and property owners, renters, and residents who speak a language other than English at home. These populations typically do not participate in public engagement processes. The Project Team will coordinate with City staff to identify potential contacts within those communities.
   - All events and online surveys will be provided in Spanish and English.
   - As necessary, the proposed public engagement deliverables may be revised to address community demographics.
4. **Impact**. The public outreach process should inform the design of the streetscape and related implementation recommendations.
   - Input on major elements of the project identified through the public engagement efforts will be recorded and presented to City staff, the URAB and URAC.

TARGET PARTICIPANTS

Community engagement tasks are designed to target City residents, neighbors, and businesses along the corridor. While discussions about the Heights have taken on a number of forms over the past several years, this project will be the first comprehensive evaluation of the corridor and is an opportunity to engage and mobilize community members, including those who might not traditionally participate in public planning processes. Accommodations for COVID-19 may have some impact on the timing of outreach to specific group/participants. Modifications due to COVID-19 are described in the following section for each outreach tool.

Potential target participants include:

- City and neighborhood residents
- Employers and landowners fronting 12th and 13th Streets within the project area;
- Police and Fire Departments
- Agencies and/or organizations representing bicycle and pedestrian interests
- Hood River Chamber of Commerce
- The Heights Business Association
- ODOT
- Relevant utilities and other service providers
- Non-English speakers, primarily Spanish-speaking residents, and business owners

- Neighborhood youth and the Hood River School District (focused on Safe Routes to Schools routes)
- Tourists and motorists traveling through the corridor

Communication and Outreach Methods and Tools

The project will develop the following public information materials and methods, described below.

PUBLIC INFORMATION MATERIALS

NOTE: Emphasis will be placed on electronic materials that can be shared and distributed directly to users and easily shared amongst community members.

Project Logo and Brand

MIG will develop a project logo and color scheme for the project that is readily identifiable and can be used for all project deliverables. MIG will also develop templates for presentations and documents.

Project Website

MIG will develop a project landing page using the City's main web platform to develop a project landing page using the project logo and color scheme that provides information about the project and incorporates the following elements:

- Allow users to sign up for project updates, including when new information is posted and for upcoming meetings;
- Provide a project repository of public documents related to the project
- Provide access to online surveys/open houses
- Provide opportunities to comment on the project

MIG will maintain comment logs throughout the duration of the project and will update the website as new project information becomes available during the project, particularly at major milestones and events. The City may at times assist in writing copy for and providing updates to the website.

Project FAQs

MIG will prepare up to three 1-2 page FAQ sheets during major milestones of the project that provides information on the project to date, including key outcomes from public engagement activities and technical analyses. Information included in each FAQ will be determined by the project team and will be translated into Spanish.

Mailing List

MIG will maintain and periodically update a project mailing list with new contact information gathered during the project. MIG will use existing lists to the greatest degree practicable, modified with new contact information. The City will use this information to distribute project information to interested stakeholders.

PROJECT ENGAGEMENT TASKS

NOTE: see propose modifications expected as a result of COVID-19 for each task (as applicable), below.

Spanish Translation and Interpretation: Next Door will provide Spanish interpretation for public events and focus groups to encourage in-person and online engagement. MIG will provide Spanish translation for online surveys and up to three FAQs.

Direct Stakeholder Outreach along Project Corridor

MIG and The Next Door will coordinate with the City, URAB and URAC to complete up to eight (8) individual or small group meetings with a direct interest in the corridor. The stakeholder meetings may will include representatives from local neighborhood and community groups, the Chamber of Commerce, Rotary, development experts, landowners and business owners, and other stakeholders. The City will lead the scheduling of these meetings. MIG assumes that it will complete approximately half of the meetings early in the project, with the remaining meetings completed when corridor alternatives are developed.

The intent of the interviews is to gain information on the state of the corridor, considerations moving forward such as considerations for how to improve The Heights street environment and increase business attraction, retention, and future investment. Up to two meetings will be interpreted in Spanish by Next Door. Interviews are anticipated to take up to an hour each and will be documented with notes from each meeting combined into one summary document.

Anticipated modifications due to COVID-19: Round One meetings will be completed using ZOOM or similar online platform. MIG will coordinate with Next Door to determine if Spanish language meetings should occur virtually, and if so, if additional accommodations are needed to increase participation.

Online Survey: Public Kickoff

Collateral Materials: Prior to the survey release, MIG, with assistance from the City, will develop a "doorhanger" or similar flyer that will be distributed to area businesses and residences adjacent to the project area that provides survey link and contact information. Flyers will be translated into Spanish. MIG will also develop a press release for local media.

MIG will update the project website with meeting information and provide two social media posts for the City's social media outlets.

Survey Instrument and Organization: MIG will develop a georeferenced online survey for the project that will ask questions about design, safety, accessibility, and other issues pertinent to future design tasks. Consultant will launch the online survey and will constitute the first broad outreach for the project. The survey will be provided in English and Spanish, and will be live for approximately one month. Following the survey, MIG will summarize and evaluate the results, providing a PowerPoint presentation that can be used for project updates with interested parties.

Anticipated modifications due to COVID-19: the online survey was originally anticipated to run concurrently with the in-person project kickoff. To maintain schedule and ensure safety of participants, the project schedule has been modified to launch the online survey individually in advance of in-person meetings.

Public Workshop (Public Event 1):

MIG will organize and facilitate a public workshop, preferably hosted at a location within the project area to discuss streetscape concepts and urban design options. The Next Door will provide in-person Spanish translation services for the workshop.

Collateral Materials: Prior to the public event, MIG, with assistance from the City, will develop a "doorhanger" or similar flyer that will be distributed to area businesses and residences adjacent to the project area that provides survey link and contact information. Flyers will be translated into Spanish. MIG will also develop a press release for local media. A MIG team member will distribute flyers to area businesses and discuss the project prior to the event. MIG assumes this will occur in one day.

MIG will update the project website with meeting information and provide two social media posts for the City's social media outlets.

Meeting Organization: Prior to the meeting, MIG and The Next Door will develop a meeting organization plan that identifies the major elements, staffing expectations, and responsibilities of the project. The approximate two-hour public workshop will introduce the project, verify visioning from URAC kickoff workshop and provide interactive exercises for meeting participants to identify opportunities and constraints along the corridor. The results of the meeting will be summarized in a PowerPoint presentation that can be used by the URA and/or Consultant for briefings with local neighborhood organizations, Planning Commission and City Council. Consultant assumes that the City will secure the location for the public workshop and assist in facilitating small groups, if necessary.

Anticipated modifications due to COVID-19: This meeting was originally scheduled to be conducted simultaneously with the online survey during Phase 1 of the project. Because of COVID-19, MIG assumes that this meeting will be conducted when it is safe to meet in person. MIG recommends use this in-person meeting to vet district alternatives in Phase 2 or implementation considerations in Phase 3 of the project.

Public Open House (Event 2):

Collateral Materials: Prior to the event, MIG, with assistance from the City, will develop collateral materials similar to those developed for Event 1.

Meeting Organization: MIG will facilitate an open house during Phase 2 of the project that presents the project's streetscape and urban design concepts and the degree that each concept addresses the project's evaluation criteria. MIG will develop posters that provide brief project summaries, graphically illustrate proposed concepts, and general timeline of expected next steps. Following the event, MIG will summarize the results in a PowerPoint presentation. Results of this event will be summarized in a manner the identifies project decisions and next steps. Results are expected to be qualitative.

Anticipated modifications due to COVID-19: No changes assumed at this point. Schedule assumes this will occur later in 2021. If social distancing is still required, MIG and the PMT will develop appropriate meeting strategies.

Public Engagement Summary

Upon completion of the public engagement tasks. MIG, with assistance from The Next Door, will summarize the public input in a Public Engagement Kickoff Summary Memorandum. The summary will identify the key information from those meetings, with appendices, as needed, with supporting materials.

PROJECT COORDINATION MEETINGS

URA Board (URAB) and Committee (URAC) Meetings

Note: The following meetings identify potential topics and anticipated attendees. As the project progresses, meetings may be revised to address issues identified during the project.

MIG will attend (either in person or online) and facilitate up to six (6) project specific meeting with the URAC and/or URAB during the project. The City will be responsible for meeting coordination, except if meetings are conducted online, MIG will provide connection/link information and will provide materials and staff the meetings with up to three (3) consultant staff. Within seven (7) days of the meeting, MIG will provide a brief summary memorandum that identifies key outcomes and/or next steps.

Meeting content is assumed to consist of the following:

- Meeting #1 (URAB/URAC): Kickoff workshop to describe project scope, review and approve a draft project charter to identify project roles and responsibilities, and discuss goals. (Phase 1).
- Meeting #2 (URAC): Discuss existing roadway and urban design standards and identify potential opportunities and constraints throughout the corridor (Phase 2).
- Meeting #3 (URAC): Present streetscape/corridor design concepts and level of consistency with the project's parameters, goals, and evaluation criteria that influence the project (Phase 2).
- Meeting #4 (URAB/URAC): Present preferred alternative (developed as part of Task 5, Phase 3).
- Meeting #5 (URAC): Present Draft Concept/Action Plan (developed part of Task 5, Phase 3)
- Meeting #6 (URAB): Present Final Concept/Action Plan (developed part of Task 5, Phase 3).

Prior to Meeting #1, MIG with develop a project charter that will describe the roles, responsibilities group expectations for the URAB and URAC to be distributed in advance of Meeting #1.

In addition to the six meetings outlined above, MIG will provide 15-minute check-ins as the first agenda item at up to twelve URAB meetings via Zoom or another video conferencing platform. URAC members are encouraged to attend the URAB meeting to also receive the update.

Anticipated modifications due to COVID-19: All meetings are assumed to be completed online until approved of larger gatherings are permitted by the City of Hood River and the State of Oregon. MIG and the City will coordinate on a regular basis to determine when in-person meetings are safe.

Schedule The schedule outlined below is preliminary for Phase 2 and 3 and will be updated upon URA approval of Phase 2 and 3 of the project.

	2020	2021											
	Dec	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Public Engagement Plan	• Internal review	• Draft to city Finalize mid-January											
Project Website	• Draft mockup • Logos/ palette	• Logo/palette approval • Website review (two weeks) • Website live	• Update for survey and online open house information	• Periodic Updates				• Update for survey and open house information	• Periodic Updates				
FAQ			X			X			•		X		
Stakeholder Meetings		• Draft Stake-holder List • Round One business/ landowner meetings							• Round Two business/ landowner meetings				
Press Releases for events/ survey		• Draft and final press release • Doorhanger/ flyers	• Survey Live-periodic email/social media blasts					• Draft and final press release • Doorhanger/ flyers					

	2020	2021											
	Dec	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Survey		• Internal draft • City Review (one week) • Revisions/ 2nd review (one week)	• Survey Live	• Close Survey (3/28)	• Draft Summary (4/8) • Final Summary								
Public Workshop							• Open house plan • Internal draft of products • City Review (one week) Revisions/ 2nd review (one week)	• Date TBD Draft Summary					

	2020	2021											
	Dec	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Public Open House								• Open house plan	• Internal draft of products • City Review (one week) Revisions/ 2nd review (one week)	• Date TBD • Draft Summary	•		
URAC/URAB Meetings (G)			X	X		X		X		X			X
Public Engagement Summary											• Draft Summary Report	• Final Summary	

Attachment 2 - URA Kickoff meeting materials and notes

THE HEIGHTS STREETSCAPE PLAN

Joint Meeting (#1)

Urban Renewal Agency Board with
Urban Renewal Advisory Committee and Staff

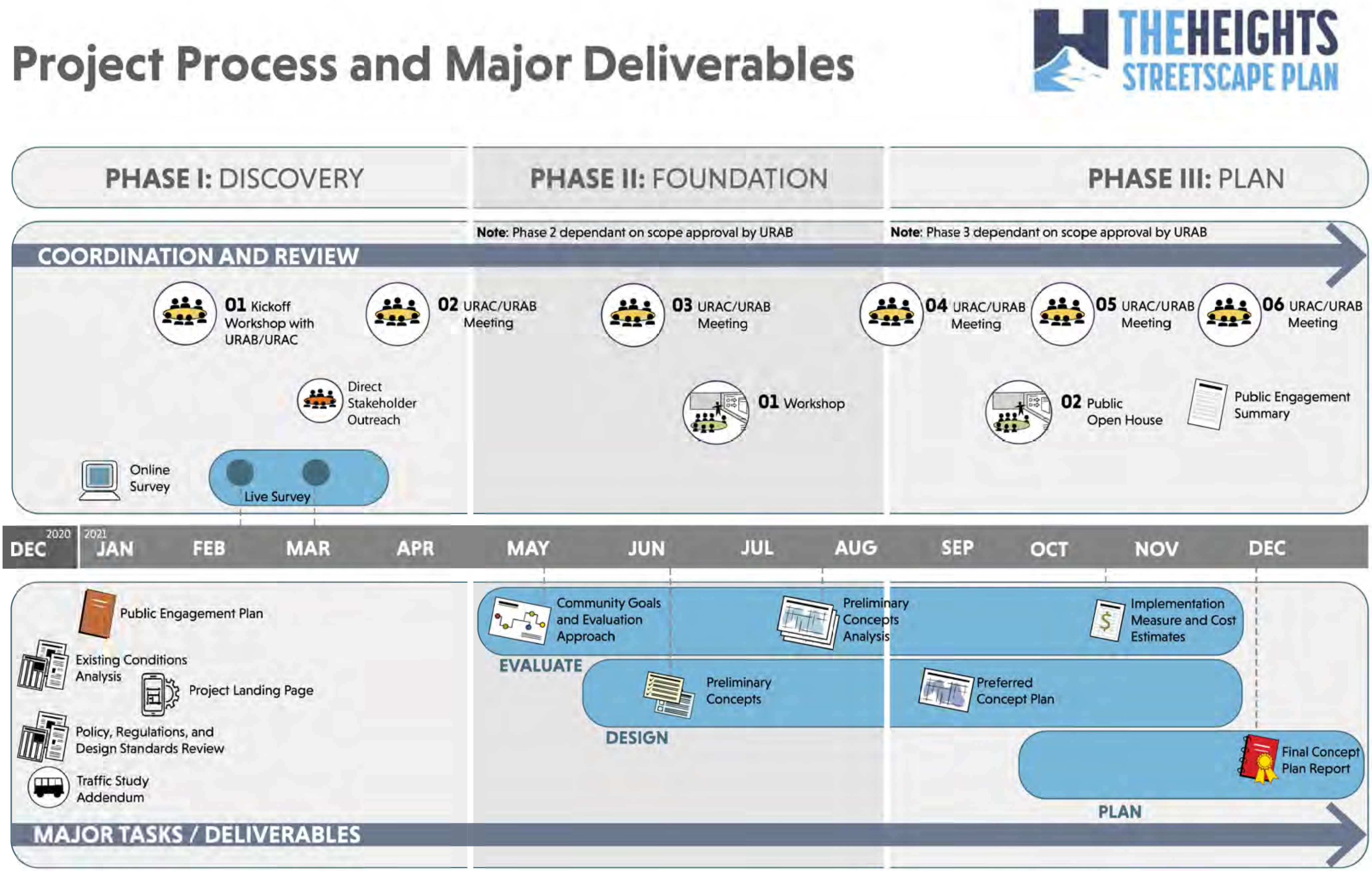
February 4, 2021
5:30 pm – 7:30 pm
Virtual Meeting Call-In Information:

https://zoom.us/webinar/register/WN_xA8mysjTSj2OrmVOHeufoA

AGENDA

5:30 pm – 6:00 pm	Welcome and Agenda Overview • Introductions • Project Charter
6:00 pm – 6:10 pm	**Presentation:** Project Overview and Schedule
6:10 pm – 6:45 pm	**Presentation/Discussion:** Vision Elements
6:45 pm – 7:15 pm	**Presentation/Discussion:** Draft Goals
7:20 pm – 7:30 pm	Close & Next Steps

Project Process and Major Deliverables



URBAN RENEWAL ADVISORY BOARD/URBAN RENEWAL ADVISORY COMMITTEE: PROJECT CHARTER

1. Purpose of this Charter

The purpose of the Heights Streetscape Plan Charter is to provide clarity on the decision-making structure for the project, identifying specific roles and responsibilities of the Urban Renewal Agency Board (URAB), Urban Renewal Advisory Committee (URAC) and Hood River community. The Heights Streetscape Plan will establish a community vision, goals and streetscape concept plan that will establish a clear path forward to implement the vision. The strategies may include new projects, programs, partnerships, or policies that create a cohesive, unified district that enhances existing assets in the area and sets the stage for new development. Public input and ongoing involvement will be foundational to the success of the Plan.

2. Roles and Responsibilities

The URAB is a nine-member board consisting of the Hood River City Council and two appointed members from the Port of Hood River and is the governing body for the City of Hood River's Urban Renewal Areas. For the Heights Streetscape Plan, the URAB will be responsible for setting project goals, establishing, and maintaining budgets, and making final decisions about project direction and next steps.

The URAC is a seven-member advisory committee that includes representation from one member of the Planning Commission. The role of the URAC for this project will be to provide input to be considered by the URAB on draft deliverables, to review and provide input on community engagement activities, and provide input to the URAB at major project milestones. The figure, below, illustrates the decision-making process for the Heights Streetscape Plan.

3. Regular Project Meetings and Monthly Check-Ins

The Public Engagement and Communications Plan identifies six (6) project meetings that will be held during milestones of the project with the URAC, and in some cases the URAB for joint meetings. Advisory recommendations and decision-making during those meetings will use the following guidelines:

- For URAC only meetings, the MIG meeting facilitator will document the discussion and recommendations to the project team about specific deliverables. The URAC will be expected to provide input on key deliverables and, at milestones, provide recommendations to the URAB for approval or additional discussion. Their recommendations are non-binding, meaning that the URAB may provide their own direction in addition to, or differing from, the URAC recommendations.
- For URAB only meetings, the meeting facilitator will coordinate with City staff to comply with the established URAB meeting process. Decisions will be documented and incorporated into the plan.
- For joint URAB/URAC meetings, input for both groups are expected to provide input on project direction. The meeting facilitator will document the discussion, and as possible, identify whether the input is from a URAC and URAB member during a decision-making process. As decisions occur during the meeting, the project facilitator will document input from both parties and then provide time for discussion by the URAB for final approval, considering input from the URAC.

In addition to committee meetings described above, the project team will provide approximately 15 minute updates during regularly scheduled URAB meetings. URAC members are encouraged, but not required, to call into/attend the URAB meeting to also receive the project update, which will be at the beginning of the meeting.

4. Conditions of Membership, Standards of Conduct

Each URAB and URAC member is expected to meet the following conditions:

- All members will make their best effort to attend each of the six project meetings and to arrive promptly and to stay for the duration of the meeting.
- All members will make their best effort to attend the projects public outreach events.
- Review meeting materials provided in advance of the meetings.
- Participate in group discussions, staying on agenda topic and framing comments in such a way that advances the discussion.
- Participate, but share the floor.
- Respect the facilitator's role.
- Wait to speak in turn.
- Speak with civility, both in tone and content.
- Speak to issues, not individuals (avoid making or taking issues personally).
- Strive for brevity, avoiding restatement or speech-making.
- Value diverse points of view and the right of others to express differing points of view.
- Extend trust relative to the intentions of other members. Avoid making assumptions about the interests and motivations of others.
- Ask questions as necessary to ensure understanding of the information being presented.
- Avoid side conversations and distractions during meetings.
- Turn off cell phones during meetings.

- Refrain from significant conversations outside of the project-related meetings, including by e-mail, to ensure conversations can be recorded, benefit from the participation of all URAB/URAC members, and inform the project team.
- All URAC and URAB members are free to represent their personal opinions to the media, but will refer all media inquiries to Dustin Nilsen, City of Hood River Director of Planning and Zoning and Project Manager for this project, for an official project response.
- Other ground rules as determined through discussion at the project meetings.

5. Meeting Process

Meetings will start and end on time. Please arrive on time and prepared for the discussion.

- Alex Dupey will convene and conclude the meetings.
- Discussion will be facilitated by Alex Dupey and Nathan Polanski (MIG), with assistance from the project team, as needed.
- In general, the URAB will seek to reach consensus on issues. When necessary, the facilitator may ask for specific motions with votes to resolve issues. Majority and minority views will be reflected in the meeting notes.
- Meetings will be captured in a meeting summary, which are public record. All conversations related to the project among URAB and URAC members should take place during project meetings or during regularly scheduled URAB and URAC meetings.
- Project meetings will be held approximately six times throughout the project. Materials provided for meetings will be provided at a minimum of five (5) days prior to the meeting and will include, at a minimum:
    - An agenda stating the time, place, and discussion items.
    - Project information, as applicable, that will be discussed during the meeting.
    - Materials will be emailed or placed on the project website, depending on the size and number of documents.

Attendee Report

Topic	Webinar ID	Actual Start Time	Actual Duration (minutes)
	936 4594 1612	2/4/2021 17:01	149

Joint Meeting (#1) Urban Renewal Agency Board with Urban Renewal Advisory Committee and Staff			
Attended	User Name (Original Name)	Email	Join Time
Yes	Alex Dupey | MIG (MIG Portland)		2/4/2021 17:01
Panelist Details			
Attended	User Name (Original Name)		Join Time
Yes	Amanda Goeke URAC (Amanda Goeke)		2/4/2021 17:32
Yes	Tina Lassen B URAC (Tina Lassen)		2/4/2021 17:25
Yes	Kate McBride (Kate McBride)		2/4/2021 17:27
Yes	John Bosket | DKS (John Bosket)		2/4/2021 17:26
Yes	Nathan Polanski | MIG (Nathan Polanski)		2/4/2021 17:02
Yes	Monique Bassey | MIG (Monique Bassey)		2/4/2021 17:24
Yes	Jessica Metta (Jessica Metta)		2/4/2021 17:25
Yes	Jack Trumbull URAC (Jack Trumbill)		2/4/2021 17:26
Yes	David Meriwether URAB (David Meriwether)		2/4/2021 17:17
Yes	Clint Harris urac (Clint Harris)		2/4/2021 17:26
Yes	Will Norris		2/4/2021 17:27
Yes	Mark Zanmiller URAB (Mark Zanmiller)		2/4/2021 17:26
Yes	Elizabeth Betts (Elizabeth Klein)		2/4/2021 17:27
Yes	Pat McAllister urac (Pat McAllister)		2/4/2021 17:22
Yes	Dustin Nilsen Staff (Dustin Nilsen)		2/4/2021 17:19
Yes	Hoby Streich URAB (Hoby Streich)		2/4/2021 17:26
Yes	Megan Saunders (Megan Saunders)		2/4/2021 17:26
Yes	Abby Capovilla URAC (Abby Capovilla)		2/4/2021 17:25
Yes	Rachael Fuller (Rachael Fuller)		2/4/2021 17:26
Yes	Joshua Chandler | URAC (Joshua Chandler)		2/4/2021 17:27
Yes	Gladys Rivera (Gladys Rivera)		2/4/2021 17:24
Attendee Details			
Attended	User Name (Original Name)	First Name	Last Name
Yes	Heather Staten	Heather	Staten
Yes	Amy Schlappi	Amy	Schlappi
Yes	Terra Lingley	Terra	Lingley
Yes	Tom Bacci	Tom	Bacci
Yes	Alex Hattenhauer	Alex	Hattenhauer
Yes	Kathy Fitzpatrick	Kathy	Fitzpatrick
Yes	Jennifer Gray	Jennifer	Gray
Yes	Nick Kraemer	Nick	Kraemer
Yes	Nick Kraemer	Nick	Kraemer
Yes	White Buffalo Calf Wannassay-Hause	White Buffalo Calf	Wannassay-Hause
Yes	Mark Hickok	Mark	Hickok
No	Thomas	Thomas	Bacci
No	Patrick	Patrick	Pierz

01 // VISION

Question 1:
What words or brief statement(s) define the Heights today?

URAB

fast traffic, not welcoming for bikes and pedestrians	Lived in, has some grit. It is used	A mix of old and new buildings.	too much speed important to reduce to speed for cross traffic.	unappealing
poorly maintained	Locals hub	desire for traffic to remain as is (i.e. 2 lanes)	conflicting interests between local and regional needs	Scary to cross the street (for drivers too)
not pedestrian / bike friendly	unsafe	Looks tired	Valley concerns that changes will slow traffic they like/ count on	driver and pedestrian interactions and communication is challenging and unsafe
infrastructure needs	a gateway from the valley to everywhere in town	Heights is falling behind with marketing the area.	It is the main linkage between downtown and the valley	businesses seem worried about growth and increases traffic in congestion

URAC

autocentric	localcentric	need safe corridors for schools	need to allow commerce to serve grocery and bigger stores	local access needs vs. throughput	gateway to the valley
encourages fast traffic!	gateway in summer when downtown is busy	getaway, people like to escape to the heights, yet locals might not perceive it that way	It is not well lit for nighttime safety	some areas of blight, feels a bit "neglected", but people enjoy parts of the Heights that feel more relaxed and accessible	under-maintained
poor sight lines/hard to see (walking, driving)	lots of businesses in flux (recent closures)	Local hub	back end parking to increase bike lane and create a safe corridor.	ugly power lines	perception of parking needs/lack of
unsafe for people biking	sidewalks are in poor condition	important connection btwn downtown and the valley	nuances associated with traffic/safety are known to locals but not visitors	not comfortable for drivers too	becoming trendy
dangerous for people not in vehicles (and drivers too)	mixed use neighborhood	poor crosswalks	parking issues with free metered parking in front of businesses	heights are for locals and downtown is for tourists - it is transitioning	

01 // VISION

Question 2:
What defines the Heights in 20 years?

URAB

safe for people walking and biking	calmer traffic - pedestrians feel safe	an efficient throughway for the valley	Feels comfortable for all users (bikes belong; traffic moves safely)	underground power; less clutter
information in both in english and spanish	maintain a locals identity	good lighting	underground power lines	vibrant
supports redevelopment new buildings	hard to imagine in the middle of a pandemic	accommodate for change and retail	revitalize the old and new buildings collectively	thriving mixed use neighborhood and community area
local art	a distilled "Heightsier" Heights that brings out all the good parts of the District (locals, actual/year-round use/ community feel/etc), but is safer and easier to use	functionable, sustainable & thriving	easy to access with cars, available parking.	More residences above businesses.
beautiful	parklets	safe routes for people walking to school	more greenery	improved access to parking; EV charging stations

URAC

safe commercial district accessible to all	unified look - consistent streetscape look and feel	parklets	safe routes to local schools	short term parking spots for things like curbside pick-up
improved ada access; comfortable	green stormwater	possibly reduced lanes and angle parking along 12th/13th	electric vehicle parking	E bikes
Vegetation/ street trees - consideratoins for maintenance	more mixed use development — housing at various price points above commercial	changes to E/W streets: opportunities for parking changes too	more accessible / easier parking	public services (e.g. public restroom like Cascade St.)
buried and rerouted overhead utilities	clean/ maintainable	improve connections, access to transit	Parklets!	Keeping areas clean and visible and encourage responsible use
consistent look and feel with expectation, and safety for the pedestrian.	Maintaining a local identity while supporting many user groups, both commercial and residential	public ridership with covid, will make people think differently		

01 // VISION

Question 3:
What's the one biggest challenge to achieving your vision?

URAB

- ODOT
- funding limitations
- calming traffic
- how to prioritize and balance competing needs
- fear of change
- improve without gentrification
- throughway vs calm local place
- a street for all users
- changes to parking will require a perspective shift.
- implementation plan, phasing approach
- This is the long game - $$ will come over time
- streets that inform and signal traffic changes and conditions along the street
- people will adopt the changes to the streetscape ex. street trees
- how to prioritize improvements
- community buy in

URAC

- alignment of community voices
- keeping the couplet and meeting community goals
- balancing competing needs, all users
- funding
- topography suggests going faster.
- odot
- underground and routing of utilities
- consensus
- finding a middle ground
- resistance to change
- dreaming big
- costs, underground utilities expensive
- think outside the box. what about a roundabout??
- phased changes
- accomodating parking and all needs

02 // GOALS

1 . ECONOMY:

Promote the role of the Hood River Heights Business District Urban Renewal Area as diversifying the economic base in the Hood River area and strengthening the area's role as a regional economic center. Preserve and promote a livable community, better utilizing commercial and mixed use and residential lands. Accommodate the need for expansion of new and existing businesses and housing to support those businesses.

URAB

- link between identity and housing
- how do can improvements support mixed use development?
- opportunity for storefront improvements
- access for business deliveries
- opportunity to diversify businesses, promote equal opportunity
- Heights is an important incubator for businesses
- [illegible]
- local economy benefits from infrastructure improvments

URAC

- opportunities for assistance for storefront improvements
- local economy benefits from infrastructure improvments

02 // GOALS

2 . DISTRICT IDENTITY:

Help create and enhance a distinct identity for the Area as a mixed-use neighborhood of Hood River. The identity should include the role of the Area as a gateway to the city and as a place for residents of the city to live, shop for goods and services, work, and play.

URAB

- streetscape furnishings and signage
- unity of landscaping
- feels local and well used
- uniformity/ consistency in street furnishings
- opportunities for gathering (e.g. benches, parklets)
- Speaks to/ captures the history of the area
- sidewalk and street tree vs powerlines
- transition from a roadway to a place [illegible] as you enter the corridor
- look and feel should represent local history, reflect local values
- unique to hood river
- unify the diverse cultures of the place.

URAC

- pedestrian pathway for school kids and locals
- streetscape reflects operational goals (e.g. slower traffic)
- Welcoming, safe, friendly/ local, easy crosswalks
- streetscape reflects values (e.g. bike parking, gathering)

02 // GOALS

3. RECREATION:

Promote the role of the Hood River Heights Business District Urban RProvide facilities and parks to support the Hood River Heights Business District and neighboring residential community.

URAB

- bicycle connections
- direct connection to local/regional activities
- connection to Indian creek trail
- connections to adjacent neighborhoods and parks
- parklets; opportunities to stop and rest (strategic placement)
- Bus stops for all to access the Heights

URAC

- East/west routes for kids
- bike parking
- May Street , Pine Street and Belmont/Union
- Maybe tables and chairs like in the library gardens where people could eat take-out from local restaurants or use wi-fi and have a coffee but not be attached to a certain business
- access / parking to Indian Creek trail

02 // GOALS

4 . TRAFFIC AND TRANSPORTATION:

Implement transportation improvements that are designed and constructed in a manner that enhances Hood River's livability. Provide a safe transportation system and transportation facilities which are accessible to all members of the community, reduce trip length, and provide for the efficient movement of goods.

URAB

- intersection improvements; opportunities for roundabouts?
- bike lanes
- traffic calming
- maintain traffic flow for residents and businesses
- improve safety for all users
- bump outs; flashing traffic signs; solar speed signs
- accommodate trucks; awareness of hill and truck issues
- jurisdictional transfer
- connected, accessible sidewalks along all streets
- pedestrian push button for safe crossings
- process should consider impacts for changing traffic
- expand transportation options
- planning for transit

URAC

- Traffic calming (bump outs, flashing crosswalk signs, solar speed signs)
- Proven to slow traffic
- safety improvements for intersections (e.g. May St, Pine St, Belmont/ Union)
- Support Micromobility

02 // GOALS

5. PUBLIC UTILITIES:

Ensure that new development is adequately served by public infrastructure.

URAB

- underground overhead distribution
- maintainable storm drainage infrastructure
- replace and upgrade existing utilities

URAC

- make sure storm drainage system functoins/is maintained
- bury—clean the sidewalks of power poles, guy wires, etc. improved lighting
- better lighting
- Underground overhead utilities
- the sewer capacity is currently overburdened

02 // GOALS

6. PUBLIC INVOLVEMENT:

Maintain a citizen involvement program that ensures the opportunity for citizens to be involved in all phases of the planning and implementation process.

URAB

- during each phase of the project
- engage businesses to understand delivery/access needs
- first responders
- Engage the Chamber of Commerce, Heights Business Assn, HR Valley Adult Center, Fruit Growers Assn
- Human centered design
- medical and social service providers
- valley residents and businesses
- orchard/fruit transit also seems to be a concern from the valley reach out to packing houses?
- communication to valley residents we are committed to maintaining traffic - might not look the same but we still meet those needs.
- school district as a stakeholder
- Community Advisory Council (a subset of CCO)

URAC

- part of process; not necessarily a goal or outcome
- providence - school district too
- Property owners and tenants should be contacted within the district.
- emergency responders & fire department

02 // GOALS

7. HOUSING:

Promote the role of the Heights Urban Renewal Area in diversifying the supply of housing in Hood River and strengthen the Area's role as a residential neighborhood. Preserve and promote a livable community, better utilizing commercial, mixed use and residential lands. Accommodate the need for development of long-term housing (rental and ownership) at affordable and other income levels to strengthen the Area.

URAB

- housing in relationship to parking
- accommodate future mixed use development
- Private development driven
- opportunity to support upper level housing to existing buildings
- how do we impact housing as a corridor project
- parking as it relates to future housing/mixed use demand

URAC

Attachment 3 -
Project website setup

The Heights Streetscape Plan

Urban Renewal / The Heights Streetscape Plan

Urban Renewal
Urban Renewal Agency Board
Urban Renewal Advisory Committee
Waterfront District
Heights District – Streetscape Plan
Columbia Cascade District
Westside District

THE HEIGHTS STREETSCAPE PLAN

Phase 3 is Nearing Completion

The Phase 3 Final Preferred Design draws heavily on the Alternative #3, "Hybrid Option", that was favored during the public engagement portions of Phase 2. This final Preferred Design was unanimously approved by the Urban Renewal Advisory Committee and Urban Renewal Agency Board. A copy of the final draft of the Heights Streetscape Plan is available by clicking HERE. The final report with executive summary and appendices is expected in early December, 2023. It will be posted to this webpage and presented to the Urban Renewal Agency Board for formal inclusion in the Heights Urban Renewal Plan. Please sign up to receive Heights related emails to receive these meeting packet materials by clicking HERE.

This Streetscape Plan is the product of several years of public engagement as well as several additional technical and design studies requested by the Urban Renewal Agency Board after Phase 2. The Heights Streetscape Plan includes project sequencing plan. The ultimate timeline for implementation will depend on negotiations with the Oregon Department of Transportation and funding availability. Bookmark this webpage for future updates on Heights Streetscape projects.

Phase 2 is Complete

Using the project goals and information from Phase 1, the project team developed streetscape alternatives that demonstrate urban design elements centered around the community's goals and priorities identified in Phase 1. The project team completed several technical analyses of the alternatives (e.g., traffic, parking, connectivity etc.) and gathered community input during a multi-day open house. Over 250 people attended the open houses on April 22nd and 23rd. Many stayed for dinner, talked with staff and friends from the neighborhood, and enjoyed a community gathering. Hundreds of people also completed the online survey.

Phase 2 also included discussions with agencies like the Oregon Department of Transportation (who own and maintain 12th and 13th) and the Urban Renewal Agency Board to discuss technical analysis and community input. The Urban Renewal Agency Board approved moving forward with a hybrid design for additional study, including the design of key intersections at 13th/May Street and 13th/12th/Belmont Avenue, the design of east/west streets, and the review of 12th Street south of the study area for opportunities to provide a bicycle connection to Pacific Avenue that works with the hybrid design approach.

Phase 1 is Complete

In Spring and Summer 2021, Hood River told us about its vision for the future of how we should be able to move around the Heights. Safe street crossings and better sidewalks for pedestrians, safe bicycle facilities, adequate parking, and access for vehicles to local businesses are all priority elements of a future streetscape design in the Heights. With that information, project goals are now established to guide the project, but there is much more work to do.

About the Project

The Heights is a Hood River destination, filled with unique homes and diverse local businesses. It is also an important gateway to Mount Hood and the historic family farms and outdoor recreation in the Hood River Valley. As the Heights grows, we need to create a safe streetscape for the pedestrians, bicyclists, and motorists traveling to and through the area every day.

The Height's central transportation spine is OR 281, linking downtown Hood River with the Hood River Valley. The corridor serves many public amenities, such as Providence Hospital, May Street Elementary School, Hood River Middle School, Jackson Park, and Indian Creek Trail.

The Heights Streetscape Plan focuses on the commercial core of OR 281 between May Street and Belmont Avenue, which has a mix of office, restaurant, and other retail uses, with single and multi-family housing located next to the commercial core. Both the local business district and surrounding neighborhoods are culturally and socially diverse, with a strong Latino community presence.

Getting Involved

If you want email updates and reminders about upcoming meetings, sign up for updates via Hood River Connect and select "Urban Renewal Heights District" under "Current Issues". You may also leave us a comment via the form below.

Heights Streetscape Project - We'd Like to Hear from You!

Your valuable input and participation throughout the process is critical to identify and prioritize improvements to make the Heights District a safe, vibrant, and economically successful district for the community.

Name *

First Last

Email *

Comments *

Submit

» What is Urban Renewal, and what is the Heights Urban Renewal District?

» Past Projects in the Heights

EVENTS CALENDAR

DECEMBER, 2023

11 DEC
Urban Renewal Agency Meeting - December 11, 2023
CLICK TO SEE MORE

21 DEC
Urban Renewal Advisory Committee Meeting - December 21, 2023
5:30 PM
211 SECOND ST.
CLICK TO SEE MORE

MOST RECENT DOCUMENTS

- Final Draft Heights Streetscape Preferred Design and Implementation Plan
- Phase 3 Design Studies (Undated)
- Phase-3-Design-Studies-Heights-Presentation-Dates-to-URA-Board.pdf
- Phase 2 Summary
- April 2022 Materials Español (5 of 5)
- April 2022 Materials Español (4 of 5)
- April 2022 Materials Español (3 of 5)
- April 2022 Materials Español (2 of 5)
- April 2022 Materials Español (1 of 5)
- April 2022 Open House Materials (5 of 5)
- April 2022 Open House Materials (4 of 5)
- April 2022 Open House Materials (3 of 5)
- April 2022 Open House Materials (2 of 5)
- April 2022 Open House Materials (1 of 5)
- April 2022 Survey Summary
- April 2022 Open House Summary
- The Heights Frequently Asked Questions - April 2022
- The Heights Streetscape Plan - Evaluation Summary of Design Alternatives
- The Heights Parking Study
- Heights_Preliminary alternatives and evaluation criteria_2021-10-08.pdf
- The Heights Streetscape Plan Phase I Summary (Updated)
- The Heights Stakeholder Meeting Summary
- The Heights Online Survey Results: Goals, Opportunities and Constraints
- The Heights Existing Traffic Analysis Addendum
- Heights District_Document Review Memo
- Heights District_Design Standards Review Memo

Chat with us!

THE HEIGHTS STREETSCAPE PLAN

memo

to Dustin Nilsen and Will Norris, City of Hood River

from Alex Dupey, AICP, Nathan Polanski, PE, MIG

re The Heights Streetscape Plan

Stakeholder Meeting Summary

date May 21, 2021

This memorandum, which will be updated as additional stakeholder meetings take place during Phase 1 of the project, summarizes the major themes identified during a series of small group interviews conducted in April and May 2021. These interviews were conducted by MIG, Inc., the consultant project manager, and the Next Door, part of the consultant team charged with facilitating meetings with primarily Spanish-speaking participants. Stakeholder meeting were organized to gather input on the project area from individuals and groups with a specific interest in the area (e.g., they own a business in the Heights) and provided an opportunity for the project team to explore specific issues in depth. Meetings were captured using one to two notetakers. Summaries are attached as Appendix A at the end of this document. The project team facilitated the following small groups (attendees does not include City staff or consultant team members):

- Landmarks Board (Cindy Walbridge, Jeff Dellis, Cathy Orfall. Jennifer Kaden, Arthur Babitz), May 4 11:00am-12:00 pm
- Latinos en Accion (see attached summary notes for attendees), April 8, 5:00 pm
- Latino businesses in the project area (seven attendees), April 7 6:30-8:00 pm
- Up Valley community members (Randy Franz, Heather Staten, Jonathan Graza), May 4 1:00-2:00 pm
- Community organizations that have taken an active role in previous planning efforts or provided previous input on the Heights (Megan Ramey, Tina Lassen, Kristi Chapman), May 6 4:00-5:00 pm
- Businesses (Katie Kadlub. Businesses were invited but did not attend), May 7 3:00-4:00 pm

Each group was asked similar questions as well as questions specific related to their areas of interest. The following themes emerged from the interviews.

Preserve the Area as a Local Destination

Most participants characterized this area as “locally serving” and distinct from Downtown or the waterfront that may be more tourism focused. It is a location where area residents go to get everyday items. It is also an area between the hospital and community college, with a unique set of services. One participant said, "it is comforting to be in the Heights." While some meeting participants felt the Heights should be local, there was an understanding of the need for strong connections to other parts of the city and agricultural areas and Mt Hood to the south when talking about how the Heights fits in with the broader Hood River context.

A number of meeting participants spoke about the evolution of the area over time. Past infrastructure projects, such as the roadway fill and culverts across Indian and Adams Creeks, led to area's development. Over time, the farm to market road changed with the creation of the 12th/13th couplet that has changed the district. While the local focus of the Heights as a neighborhood has remained, many respondents felt the streets are more about moving cars as opposed to supporting a walkable district and adjacent neighborhoods.

Slow Down Traffic

There was general consensus among participants that speeds are too fast in the Heights. Northbound motorists on 12th Street do not slow down upon entering the couplet and commercial area. One participant suggested that because the southern entrance to the Heights is particularly car-centric; enhancements for people walking and biking are needed and bicycle lanes south to Elliot Drive should be considered.

Similarly, southbound traffic on 13th enters the Heights moving quickly through the May Avenue intersection. A number of participants said maintaining access to businesses and parking on both sides of the street is important because 12th and 13th Streets are hard and unsafe to cross and people don't have to cross the street.

Make Crossing Streets Safer

There was general consensus among all meeting participants that crossing 12th and 13th Streets was dangerous for people of all ages and abilities. One participant labeled the 12th/13th Street couplet the "Great Wall" for pedestrians. Intersections at both ends of the Heights (May to the north and Belmont to the south) do a poor job of setting the tone for speed and safety within the Heights. A number of problem intersections were identified specifically:

- Belmont Avenue intersections: Drivers are travelling at high speed as they enter the Heights from the north on 12th Street. The 12th Street/Belmont intersection does not provide visual cues that drivers are entering a pedestrian area. A number of participants also said the 13thStreet/ Belmont Avenue vicinity is dangerous for pedestrians and cyclists because of limited sightlines along the curve and long crosswalks. Vehicles are also increasing speed as they leave the Heights on 13th Streets.
- May Street intersections: Drivers are generally travelling fast southbound on 13th Street through this intersection, particularly during the winter when stopping on the hill could make it difficult to maintain momentum. Participants said that the fast moving traffic and general lack of traffic control makes this area dangerous for pedestrians and cyclists. The free right turn from May Street to 13th Street is also challenging. Similarly, the right turn lane on 12th Street to eastbound May Avenue was also identified and dangerous; although there is a signal at this intersection, several participants said they feel unsafe crossing the street and it is challenging for pedestrians from the Hospital to access businesses south of May Street.

- **Taylor Avenue/Pine Street intersections:** Many meeting participants said this is a primary east/west corridor for pedestrians and bicyclists and also primary route for students crossing the streets to attend the schools and access parks in the area.

Participants also said that it is hard to see traffic because of **limited site distance at intersections** throughout the Heights. Participants who drive in the area said cars are parked too close to the intersections, requiring them to edge out into traffic (while also blocking sidewalks). Participants who walk in the area said they have a hard time being seen, and with the speed of cars, do not feel comfortable stepping into travel lanes. **Suggested changes to the corridor included slower speeds, bulb outs, and reconfiguring parking to improve visibility**.

Improve Connections to Neighborhoods and Schools

Participants in all of the stakeholder meetings talked about the benefits of living in or near the Heights. Services are generally within walking distance and side streets are relatively quiet. There was general consensus that safe pedestrian connections from the Heights into the neighborhoods is important, as is being able to cross 12th and 13th Streets safely (described in more detail, above). The long-term desire is for safe streets to support neighborhoods and businesses.

Some participants highlighted the need to provide safe connections to schools. While kids are within walking distance of schools, participants said some parents will drive kids even short distances due to pedestrian safety. Participants also suggested that this project align with the results of City's current **Safe Routes to School Project** now underway in the area (NOTE: the projects are coordinating).

Improve Bicycle Connections and Amenities

Potential future configurations of bicycle lanes on 12th and 13th Streets were discussed, including whether those should be two-way, the type of separation needed, and other details. One participant noted that two-thirds of the right-of-way is dedicated for vehicles and questioned whether that is appropriate for the Heights. Another noted that there are very few bicycle racks or existing facilities for people biking in the Heights. Comments from participants generally fell into these categories

- **Dangerous conditions in the Heights**. The current road design is very dangerous for cyclists because of a lack of bicycle lanes, fast traffic, and poor sight lines. As a result, cyclists ride on the sidewalk, which affects pedestrians.
- **Motorists are uncertain**. For motorists, bicyclists are a challenge because they are unpredictable. Some participants complained about having to share vehicle travel lanes with cyclists.
- **The area needs better, more connected bicycle and pedestrian facilities.** The Heights should be better connected for bicycles and pedestrians. There were many opinions about how that might occur and whether that includes removing parking and/or travel lanes, adding bicycle lanes, wider sidewalks, or some combination of those elements.

While many people supported adding bicycle lanes on 12th and 13th Streets, there was a broader discussion in a number of meetings about the highest and best future use of the right-of-way. This included discussions about wider sidewalks, preserving on-street parking, or adding other amenities that would use the existing right-of-way. Some said this is a discussion about which values should be prioritized and whether that is motor vehicle mobility, pedestrians and cyclists, or a more balanced approach.

Several participants also noted that A Street and Wilson Street are important east/west connections for people biking.

Build on the Area's Character and History

Participants talked about the Heights' many local businesses that are regular stopping places, including up-valley residents who come to the Heights instead of other locations. The area also has a high percentage of Latino/a-owned businesses, which creates a unique location and hub within the city. Some participants talked about its history as a gateway to orchards and Mt. Hood, as well as an area with historic Main Street qualities that are different than Downtown. Many are worried that this character will be overshadowed by new development but recognize the opportunity to invest in infrastructure (transportation system and utilities) to support community and future needs.

Manage On-Street Parking

Every stakeholder group talked about parking and there is no agreement on how on street-parking should be allocated in the Heights. Businesses would like to maintain parking and some suggested that it be metered (others were very against metered spaces). There were also discussions about whether on-street parking should convert to bicycle lanes, parklets, or other uses. Up valley participants were against any changes to on-street parking but acknowledged the need for safe places for people to bike. Others are concerned that permitted future residential development in the Heights will take all of the on-street parking now used for businesses. There were, however, generally two points of agreement:

- Current parking in the Heights is dangerous because it is too close to corners, which makes it dangerous for motorists as well as pedestrians and cyclists.
- Side streets are underutilized, and may some have opportunity to provide additional parking if reconfigured, such as converting parallel parking to angled parking (there was no discussion of back-in parking).

Conclusions

Meeting participants we very engaged in the discussion and want to stay involved in future meetings and activities in the Heights. While there is general consensus on a number of topic areas, use of existing rights-of-way, parking, urban form, and other elements will require additional public input as part of the concept development process that will occur in Phase 2 of the streetscape plan. As in-person communication becomes more feasible, additional outreach will be required with local businesses to supplement this initial stakeholder assessment.

Attachments

1. Heights Streetscape Plan: Stakeholder Questionnaire (2 pages)
2. Notes from Stakeholder Meetings (14 pages)

Attachment 1: Stakeholder Questionnaire (2 pages)

THE HEIGHTS STREETSCAPE PLAN

THE HEIGHTS STREETSCAPE PLAN: STAKEHOLDER QUESTIONNAIRE

General:

1. What do you think are the biggest opportunities and/or challenges with transportation in the Heights today? What do you think is needed to address the challenges you have identified?
2. What do you think can be done to improve traffic and/or make intersections safer than they are today?
3. What attracts (or detracts) you to the area? If the corridor were to change by adding landscaping, lighting, and other streetscape features (e.g. benches, planting, street trees) , do you think that would change your perception of the area? Should the corridor be left alone?
4. If you could pick one thing to change in the area, what would it be?

Business owners/operators:

5. Why did you choose to locate in the Heights?
6. Are there particular features that you think could be improved along the corridor to support your business?
7. Do you have off-street parking? If so, how do people access the lot? Do other businesses use your lot or is it reserved?
8. Do you think on-street parking is well used? Who do you think uses it most regularly (e.g. visitors, employees, business patrons)? What if on-street parking were used for something else, like bike lanes or wider sidewalks with additional seating?
9. How does your business receive deliveries? For example, do they come to the front or back door? Do you know the type of delivery vehicles that are typically used and where and how they access your business (e.g. off-street parking lot, on-street parking, alley)?

Active Transportation:

10. Do you consider this to be a safe (e.g., accessible, comfortable, easy to navigate) environment if you are walking or riding a bike? What are the biggest challenges for bicycles and pedestrians in this corridor?
11. What do you think would make it more comfortable for cyclists and walkers to use the area? What would it take for you to walk or ride your bike in the corridor (if you don't already)?
12. Who are the people walking, biking or taking transit in the corridor? Do they take transit or other modes of travel to get to jobs/businesses? For transit riders, are there areas with a higher density of riders?
13. If you are on foot or bike, are there particular locations along the corridor that attract people? Are there other connections in the area that people are traveling to?
14. In your opinion, what is the most challenging or dangerous location for crossing the road by foot?
15. What improvements do you think are most needed in the corridor to improve multimodal travel? Are there examples that you think would fit well into this corridor?

THEHEIGHTS STREETSCAPE PLAN

16. How well do you think transit serves this area?

THE HEIGHTS STREETSCAPE PLAN: STAKEHOLDER QUESTIONNAIRE

General (Both Groups):

1. Can you raise your hand if you saw the City's online survey for The Heights Streetscape Plan Project? Can you raise your hand if you took it?

   - Only 2 have heard of this project before this meeting.

2. Do you think the streets in the Heights (see map below) work well for people driving, walking, biking, and taking the bus?

   - It seems perfect to me that they do this type of remodeling and have the streets outline so bicycles can have their own lane.
   - I have seen that there is more traffic every day, so I agree that the renovations should be done
   - I don't think they are safe
   - No, the streets are not safe, people who come from outside go in the opposite direction on the street going down the hospital even if there are signs. This just happened to me last week
   - I worked right at the corner on Belmont and 13th and I have seen almost every two weeks someone driving the opposite way.
   - Also where Pine Street is, the cars can't see the area where pedestrians cross the street so I think it is a good plan to do this renovation
   - There should be a lane for people who ride bicycles and also a yellow light for pedestrians who cross the street, they are hard to see when crossing because of the cars that are parked.
   - It is super difficult to pass between Belmont Street and 13th Street because there is not good visibility when we want to pass towards Belmont.
   - There is no good visibility across the street to the paint store. Where the US Bank is, it is very saturated with cars.
   - It is also difficult for me to cross the street where Pine Street and the mail office is
   - I also agree with the person who said that there is poor visibility when trying to cross by car between the US Bank, parked cars obstruct visibility for cars, pedestrians and cyclists
   - -Participant ask: How far are 12th and 13th streets considered for remodeling? Dustin answered from North May Street to Belmont

Business owners/operators:

1. What do you like about the Heights business area and why did you choose to locate your business in the Heights?
2. Can you describe the current parking options for your business? Would you like to see any changes in parking options in the Heights?
3. What if on-street parking were used for something else, like bike lanes or wider sidewalks with additional seating or trees?
4. Can you describe how deliveries access your business?
5. Is there anything else you would like to share about your business being in the Heights?

Latinos En Accion

1. Do you spend time in the Heights? What do you do in the Heights?

   - It is a place of business and restaurants and I used them to go to eat
   - Gasoline (fuel station) is important to me

2. What do you think attracts people to the Heights?

   - The Saint Mary's church is in the area and I think that attracts a lot of us
   - I live in the heights by OCH area and the truths is that I like it a lot because I can find things that are necessary for me. I can walk to a lot of places. When driving when I am getting closer to 12 ant 13 it gets a little more difficult to drive for me.
   - I feel this remodeling plans are very important because this are the 2 streets that take us to downtown Hood River.
   - Food businesses
   - Is a commerce area, the church, coffee shops, and restaurants. And yes there should be more marked crossing areas well identified for pedestrians.
   - The corner between Belmond and 13 is very dangerous to pass because it is not well marked for the crossing
   - Also to cross the street to get to the Thai House restaurant gets a bit dangerous because the cars sometimes come at high speed
   - I think that the people who use the heights more are the people who live in town, I think that tourists stay more in downtown. We locals use it for restaurants, services and for work too
   - Parking is a big problem in the heights, parking on the streets causes no visibility
   - Flashing lights for pedestrians
   - Maybe a stoplight at 13th street

- I agree with the traffic lights because there are many people who like to use those streets for exercise such as running and there are many places where it is not possible to cross safely
- There should be another area where cars can park. And that that area will only be used for walking
- Participant question: All the ideas we are giving are good, but does Dustin already has his plan made and if yes changes still can be made? Dustin: Right now the project is to listen to ideas and voices, we don't have a design, and we don't have a plan. We need to make a plan and for now we are just listening to the community. This plan is 15 to 18 months before starting to build.

3. What do you think are the biggest concerns for the Heights residents and business owners?

- Parking
- A safe place to park
- We live in a city where it snows in the winter and sometimes it snows a lot. So it is very difficult to clean the streets when there is snow and the drainage is covered with snow. It is a big problem. It would be better if the parking was not on the streets so that they could be better cleaned in the winter.

4. Are there locations that the community gathers in the area?

- I feel that people gather in the corner by el Potrillo and Chicken Teriyaki Restaurant

If so, what draws them there? If not, what specifically would help draw the Latino/a community to new gathering areas?

- parking near by
- Benches to make it look more beautiful
- Hours to park on the street
- The businesses that exist in downtown are not the same as those above, bringing more businesses, more restaurants, brewers to attract more tourists to the heights. (I don't want it to be filled with bars either)
- Benches on the sidewalks for pedestrians to rest
- Boutiques to attract more tourists
- The business façade
- Stores of different cultures, that there would be more opportunities for small businesses
- Better not bring more restaurants here because otherwise they will raise the price for us
- Organize something like the first Friday

- Benches to sit down
- Build a kiosk/refreshment stand
- A sky transportation like the one at OHSU to go down to downtown
- Events with Music in Spanish to dance

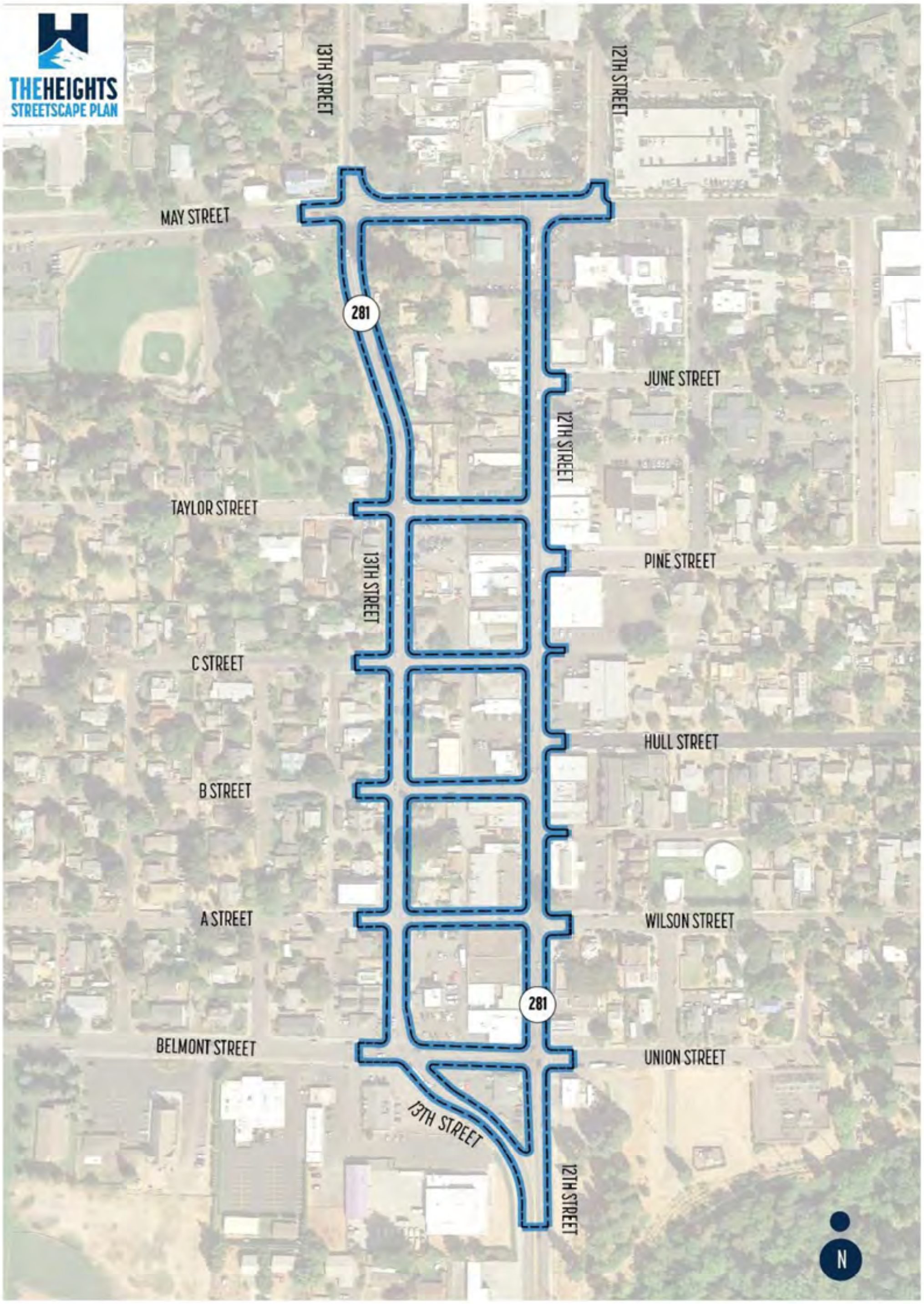
5. Is there anything else you would like to share?

Participant asked:

- After the focus group, how are we going to know how they took into account our opinions in the plan?

  Dustin: This is the first part of the project. We will hopefully have more meetings in person throughout the year after this focus group. We will have more meetings with other URACs, committees, boards, more ideas from the community and other community organizations and then we will show elected officials. Then we will return with more information and as the plan progresses that is where the ideas will be seen.

Map of Study Area



Heights Focus Group for Latino Business

April 7, 2021 6:30 PM-8:00 PM

Notes by Joel Pelayo
Facilitator by Gabriel Muro

Participants: Rosa Ayala Taqueria Ayala, Nabor Matias (chicken Teriyaki), Teresa Ocampo Chiken Teriyaki, Abby Capovilla, Mary Ortega Lake Taco, Dustin Nilsen, Emmanuel Flores, Mayra Ceja and Liliana Justo Bello The Next Door Economic Development.

- **Emmanuel Flores** works in the area of Belmont he is from The Dalles. Mary Rivas owns the Lake Taco. She said Hood River is growing a lot and the housing is very expensive.
- **Dustin, Director of City planning of Hood River** says it is very important to listen the voice of the community.
- **Rosa Ayala** has been living in this area for 15 years in Odell. She owns the business of Taqueria Ayala. She wishes to listen about what others think.
- **Maryra Ceja** has been living in Odell for 10 years. She said, "I like that Hispanics are included." I see lots of traffic on the streets 12th and 13th. As an open place it is very difficult because there is no place for parking. I know other business from outside will come here. My business is small and it is not fair we live here, but they can come in too. It is important to listen how this will benefit us.
- **Dustin** was talking about the project plan, what is going to happen. It is an important part of the project for the community to be heard. We need to hear their ideas about security, traffic, etc. This is the first step, to plan focus groups to learn what they think about safety, pedestrians, cars, bicycles, etc. The next parts of the project we will continue with the design then the construction.
- **Gabriel** asked to raise your hand if participants have been having access to the survey: Only Mary Ortega raised her hand, the majority have not heard about it.
- **Do you think the streets of the heights work well for the people…**
  Cars do not respect the speed limit. And drivers from outside the area take the wrong way on 12th street.

What do you like about business area of the heights, why do you decide to put your business in this area? Would you like to see any changes, options for parking?

Mary Ortega (Lake Taco): When we installed our business, there was not too much traffic. It was more accessible, more independent from the tourism. Now there is too much traffic and it is more out of control. It is more difficult to cross the streets for pedestrians, there are not good signs, and we should focus more on the pedestrian's safety.

Liliana Justo Bello, There is too much traffic. Lots of business are hidden, and some have better location than others. The real problem is that there is not sufficient parking, some are OK and others are not.

Mary Ortega: At our location parking is not working, but other business have little availability. Driver's park on the close streets and walk over.

One customer said "They will start to build apartments close to the Jackson Park."

Mayra: I agree with Mary Ortega we need more parking. It is important that the parking will be free, no charge for the parking.

Mrs. Ayala There is no parking now and so people leave.

Liliana Justo Bello: There are lots of conflicts for the business. There are big buildings, also there are churches and many visitors.

If you do something different you should consider the Summer traffic flow and now with the COVID the tourism has come more into the Heights.

If you are going to charge for parking, we will have very difficult times.

Gabriel Muro: I believe it will be fluid in terms of traffic flow. There are hours that are very busy and others less so.

Liliana Justo Bello: There are banks, and when their parking is full, the drivers park outside on the streets.

Mary Ortega: Is very close to the hospital, also there is a fire department, the traffic is congested close to emergency vehicles.

Gabriel showed us the street plan

Nabor: I would like to see 12th street to be blocked at the exit close to Juanitas. There have been several crashes. We should leave the exit area free, or add the modification like a tree that provides shade, a garden place to purify the air.

What about using it for to bicycles, sidewalks, benches, etc.

Mayra: I know it is important for pedestrians and the bicycles not circulate out of their lane and I'm afraid to hit them. They are careless. I would like more space for parking. Sometimes I do not support room for benches, because they will take out space for parking.

Mary Ortega: The streets are very narrow. They were not planned well, so the traffic is very congested. At May Street there are two schools, lots of school buses and lots of bicycles. Not sufficient planning when they built many of the buildings. At Juanitas, there are people that do see well and they are affected by the lack of a clear view of traffic. If this remodeling is to going make it more fluid, that is good.

Nabor: I agree, there are problems with routes of bicycles. Maybe they could be restricted on a different schedule, like prohibited at late afternoon? It could prevent lots of accidents. It will help with the congestion if we can use the schedule with not much traffic for bicycles.

Teresa Ocampo If you build lines for bicycles, I think that there are small business that will be blocked. If there are pedestrians walking with their dog that is not easy to see them either.

Mary Ortega: One option is on Belmont Street where you could build a big parking lot that could benefit the heights. There is not much housing there now and this will help.

How is your business deliveries load and unloading?

Nabor: It is necessary to pave the access to business. There are parts of the streets where the taqueria is located that is full of holes right now.

Mary Ortega: If people park on 13th street the neighbors are not happy, because they do not have sufficient space. It is complicated and it is dangerous. They do not have sufficient space there are big trucks, it is complicated.

Anything else you would like to share?

Mayra: I have a small business, and I put a sign on the side walk that calls the attention to customers. I had some flashing lights too. After two months the city sent a paper saying I need to remove it all because I'm not suppose put up any signs. The economy is not going well, and this is unfair.

Mary Ortega: They will be increasing costs to lots of things, it will need to balance costs & profit for different business, because for sure costs will increase.
Rosa: We are paying for everything they do not allow us install signs, not even a small taco sign. I put out a table and they did not accept that either. One pays for everything and I don't know why.
Nabor: On the small street (alley?), they could plant grass in order to prevent the accumulation of garbage.
Liliana Justo Bello: Signs are not professional, the way they are exhibited. At times. It does not add visibility, but it is very important to create a solution.

Questions to Dustin

Will you charge for parking? There is no plan to charge for parking. At the city center they charge because there was no parking! Any decisions will be at the design phase, they are just starting, and they are taking inputs from the community.
Liliana Justo Bello: What factors are taking into consideration for this project about safe streets? Factors include bicycles on the main street, housing, schools, and creating the future. We are just taking information and we know the impact of the main factor is the safety.
Nabor (Chiken Teriyaki): As my personal opinion, I would like to install parking meters. It is better than parking machines, because it will reduce impact on business.
Dustin answers: there is no guarantee, is not in the plan, we have them at the city center because it is congested!
Liliana Justo Bello: How long it will take?
Dustin: 15 to 28 months
Mary Ortega Lake Taco: Living here is related to Cascade Street, where Taco Bell is located and there will be another project.
Mayra: Maybe they will charge for parking in the future. It's clear it will be traffic congestion and crowded. It is happening already, they are cheating.
Dustin: it is not in the plan. When we have problems at the City Center, it was a normal solution, so it could happen.
There will be another meeting?

Dustin: Yes, many. We do not have one programed, I hope we can have one in-person. There will be more meetings including Latinos.
Liliana Justo Bello: There will be follow up as the project continues?
Gabriel Muro: Is it written in stone?
Dustin: Something will happen depending how the changes happen
Abby: There will be an opportunity of working together. I hope we accomplish a lot in the future, it will be something!

THE HEIGHTS STREETSCAPE PLAN

STAKEHOLDER MEETINGS MAY 2021

- NO MASTER PLAN / FLOW
- KIND OF A HODGEPODGE
- BUSINESSES → MOSTLY LOCAL
- HEIGHTS LOGO HAS BEEN DEVELOPED
  - → STORYTELLING WHERE THE BUSINESSES CAME FROM
- EASY TO WALK → WHAT'S THE EXPERIENCE?
- PROXIMITY TO SERVICES & SCHOOLS
- DRIVE BUT WALK ONCE THERE
- PARKING OK EXCEPT DURING EVENTS

LOCAL OPTIONS VS TOURIST ATTRACTIONS

DISTRICTS W/IN A CITY

- IMPROVEMENT TO DOWNTOWN ISSUES
- IMPROVED LANDSCAPING
- INTERSECTION CONTINUITY

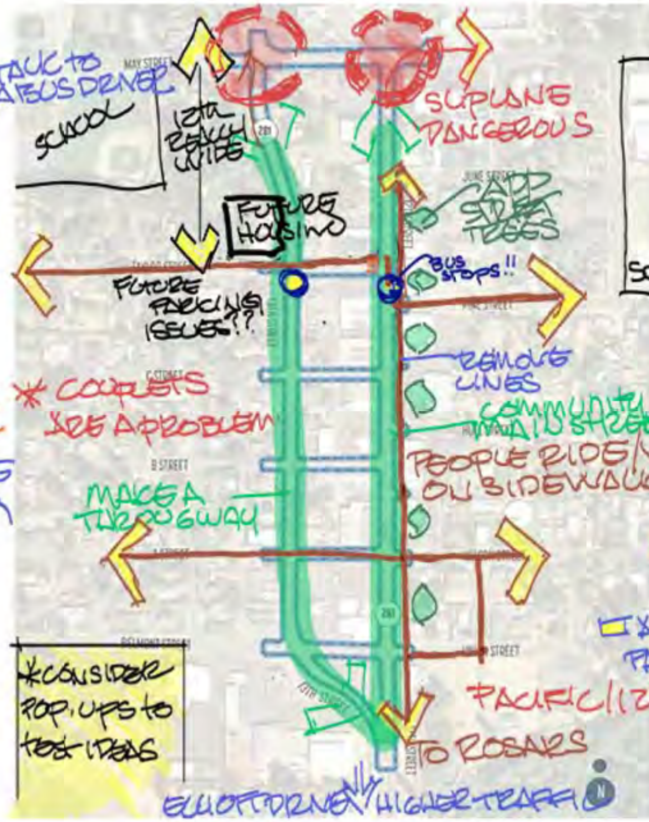
THE HEIGHTS STREETSCAPE PLAN

STAKEHOLDER MEETINGS
MAY 2021

- More parklets
- Businesses are struggling
- Latinx businesses
- Local businesses
- Drive & ride on the road
  - Scary to ride
  - Sharrows

* Need to slow traffic

- Tough to know where pedestrians are going
- Parking too close
- Heavy traffic
- May 19th sets walk audit
- Enforce parking law ⇒ use for bike corrals



- Lane needs to have 10,000 vehicles
- "Great wall of China" → divides neighborhood
- More housing needed
- School: Who are we prioritizing?
- 70s era design
- Intersections are all problematic
- Sharing sidewalk tough
- Garbage cans
- Bulbouts & visibility
- Angled parking 12th/side streets → dangerous
  - * Ride on sidewalks
- Two lanes to the south

Reorganize space!
Intersections
"Compact car space"

THE HEIGHTS STREETSCAPE PLAN

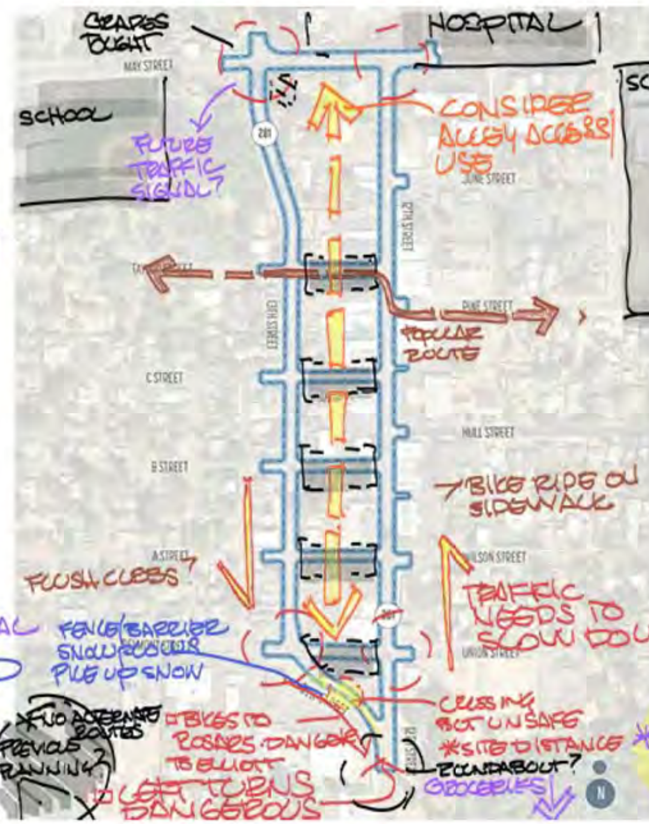
STAKEHOLDER MEETINGS
MAY 2021

WHAT DEFINES THE HEIGHTS?

- DIVERSE
- GRITTIER THAN DNTWN
- HOUSING TYPES/AFFORDABLE
- BEST NEIGHBORHOOD TO LIVE W/O A CAR

IN THE FUTURE

- ☐ * PEOPLE CAN DO EVERYDAY THINGS
- ☐ MULTIPLE MODES SUPPORTED
- ☐ GROWTH WILL OCCUR TO THE SOUTH TO THE CEMETARY
- ☐ NARROWER LANES/WIDER SIDEWALKS/STREET TREES
- ☐ CONNECTION TO BIKE LANES OUTSIDE OF AREA/TRAIL CONNECTIONS
- ☐ BUS STOPS
- ☐ CONSIDER MIXED USE/RESIDENTIAL
- ☐ LEFT TO GO N IS HARD
- ☐ SPEED OF CARS
- ☐ TRAFFIC NOISE IS AN ISSUE



SCHOOL

- ☐ NEED TO ADDRESS BIKES
  - ☐ BIKE ABOUT ROUTES
- ☐ ACCESS TO BUSINESSES
  - ☐ CLOSE BY PARKING
- ☐ WIDE STREETS
  - * PEOPLE GO TOO FAST
- ☐ KEEP PARKING ON BOTH
- ☐ ANGLED PARKING ON SIDE STREETS?
- ☐ BULBOUTS

* NEED TRANSITION TO THE HEIGHTS!!

THE HEIGHTS STREETSCAPE PLAN

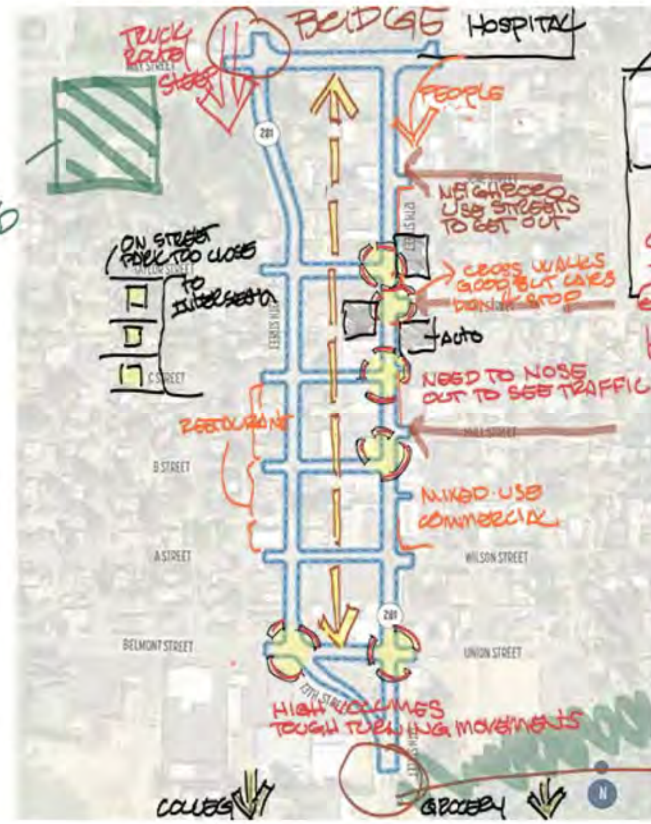
STAKEHOLDER MEETINGS
MAY 2021

PINE STREET BAKERY
- WALKABLE AREA
- UNIQUE CHARACTER NOT KNOWN BY TOURISTS
- MAINTAIN FOR LOCALS
  *CHARACTER NEEDED
- FIRE 1940s

- SMALL LOTS
- OLDER BUILDINGS
- 45' HEIGHTS →
- NOT IN A DISTRICT
  *INVENTORY COMPLETED
  *VITALITY / INFRASTRUCTURE
- LOCAL RESTAURANTS
- CHALLENGE TO DEVELOP BECAUSE OF AGE

*WORKING PERSONS DISTRICT

BASE BALL FIELD



SCHOOL / ATHLETIC FIELDS

SPEEDS!
GET TO HIGHWAY / PASS through

- NEED FOR PARKING
- BIKE LANES
- TRUCK ACCESS
- FRUIT TRUCKS / WHERE SHOULD THEY GO?
- LOCAL TRUCKS?

BRANDING / IDENTITY
- SERVES LATINO COMMUNITY!!
- STAY LOCAL
- GO UP ON THE HEIGHTS!
- LOCAL SERVING BUSINESSES.
- FACADE IMPROVEMENTS

FULTON CREEK BRIDGE

Attachment 5 - Responses to follow up questionnaire for business and property owners in the Heights

THE HEIGHTS STREETSCAPE PLAN

Dear Business and Property Owners in the Heights:

The City of Hood River and Urban Renewal Agency has launched a streetscape planning and design project to develop a comprehensive plan for improving 12th and 13th Streets, side streets and intersections between May Street and Belmont Avenue/Union Street. In addition to addressing traffic and safety needs for people walking, biking, and driving through the Heights, the project is also exploring strategies to support local businesses and create a stronger sense of community identity for the area.

The project has already gathered extensive input through a month-long community wide survey in March and several small stakeholder meetings, which have included community members, business owners, and community organizations. We are reaching out to you because we are looking for additional feedback from business and property owners along 12th and 13th Streets to make sure we hear as many perspectives from the community as possible early on in this project. Our goal is to gather information to understand how the existing streets and parking are used by you and your customers and to identify opportunities and needs for improving the project area streets.

We are hoping you can take 15-20 minutes to review and answer the five questions on the following pages. You can either hand deliver your responses to Klein & Associates, a local business in the Heights located at 1411 13th St, or you can email me, Dustin Nilsen, the City's Project Manager for this project at D.Nilsen@cityofhoodriver.gov.

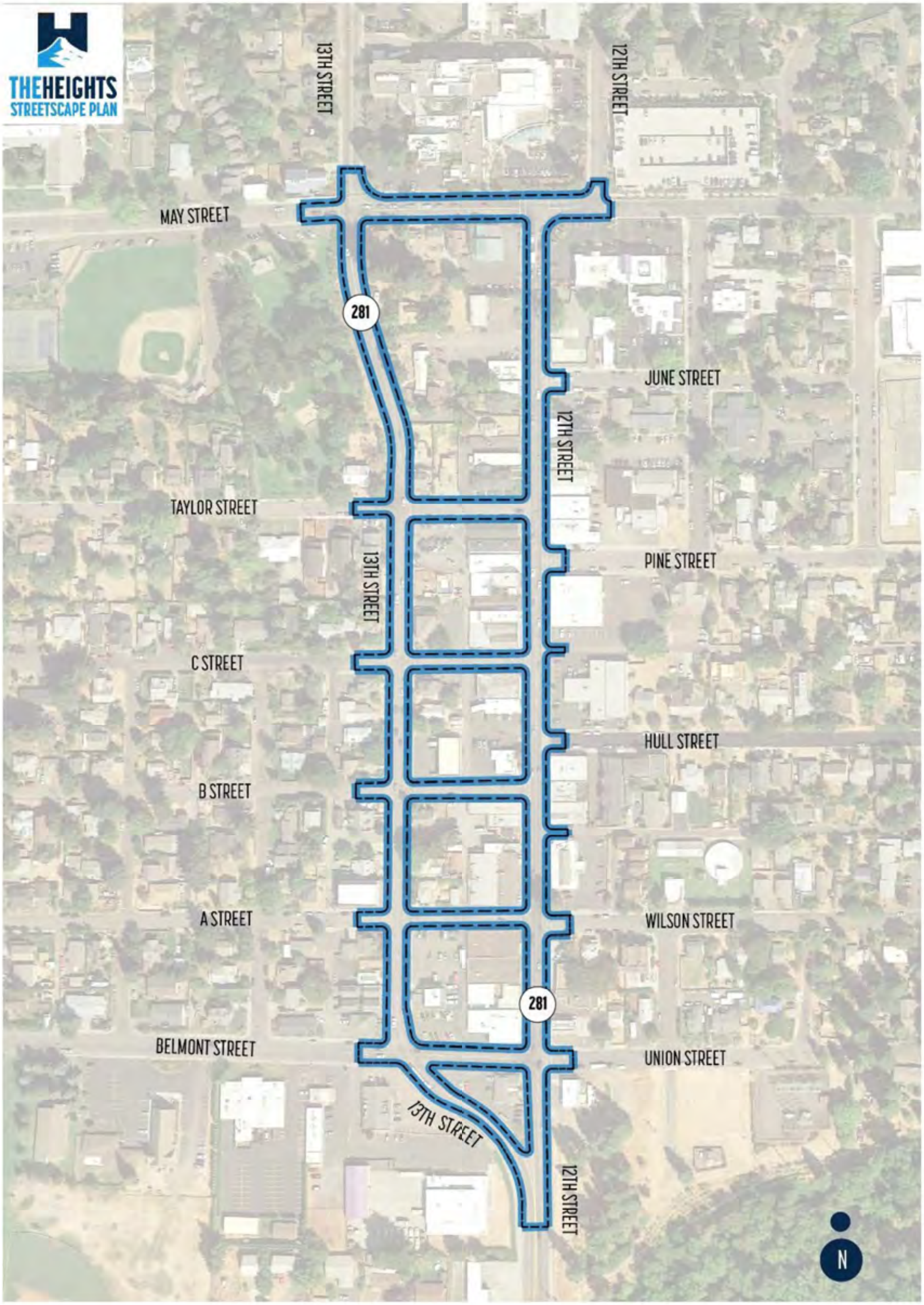
Thank you in advance for your time and consideration in participating in this exciting and important project for the Heights.

Best,

Dustin Nilsen, Director of Planning & Zoning
The Heights Streetscape Plan Project Manager

THEHEIGHTS
STREETSCAPE PLAN

Map of Study Area



THE HEIGHTS STREETSCAPE PLAN [redacted]

1. Why did you choose to locate in the Heights?

To serve our local community & avoid tourists downtown.

2. Are there particular features that you think could be improved along the corridor to support your business?

I know there are complexities w/ implementing traffic slowing/calming on 281, But It has to happen. We watch accidents involving cars & pedestrians all the time & I feel like I risk my life crossing 12th St. several times every day. Crosswalks need flashing lights to alert drivers of pedestrians in the crosswalk.

3. Do you have off-street parking? If so, how do people access the lot? Do other businesses use your lot or is it reserved?

no we do not.

THE HEIGHTS STREETSCAPE PLAN

4. Do you think on-street parking is well used? Who do you think uses it most regularly (e.g. visitors, employees, business patrons)? What if some of the on-street parking were used for something else, like bike lanes or wider sidewalks with additional seating?

yes it is, mostly business patrons

I don't think bike lanes should be on the highway (12th & 13th) it's way too scary & dangerous. I am a cycling advocate & would like to see designated bikeways on side-streets w/ limited motor vehicle access on those streets.
Wider sidewalks seem nice, but still, 12th & 13th are not pleasant streets to sit on.

5. How does your business receive deliveries? For example, do they come to the front or back door? Do you know the type of delivery vehicles that are typically used and where and how they access your business (e.g. off-street parking lot, on-street parking, alley)?

we have very large deliveries every week day. The trucks use side street (c street) to access rolling garage door & usually it is 18 wheeler (crg or Peninsula)

Romey / Garvin
[redacted]

PORTLAND OR 972
7 JUL 2021 PM 4 L

Klein + Associates
1411 13th Street
Hood River OR 97031

97031-161511

THE HEIGHTS STREETSCAPE PLAN

1. Why did you choose to locate in the Heights? We built a building on 12th Street

① Near my home
② Promising Location
③ "Bike-ability"

2. Are there particular features that you think could be improved along the corridor to support your business?

Improved walkability / bike ability

3. Do you have off-street parking? If so, how do people access the lot? Do other businesses use your lot or is it reserved?

Yes. Alley. Reserved.

THEHEIGHTS STREETSCAPE PLAN

4. Do you think on-street parking is well used? Who do you think uses it most regularly (e.g. visitors, employees, business patrons)? What if some of the on-street parking were used for something else, like bike lanes or wider sidewalks with additional seating?

it is likely used by a roughly equal mix of all three groups

Converting some parking into bike lanes wider sidewalks with more outdoor seating is very desirable.

5. How does your business receive deliveries? For example, do they come to the front or back door? Do you know the type of delivery vehicles that are typically used and where and how they access your business (e.g. off-street parking lot, on-street parking, alley)?

Back door

Our lower level is office space so not much in the way of deliveries occurs. There is ample room for deliveries from the back of our building.

THEHEIGHTS STREETSCAPE PLAN

1. Why did you choose to locate in the Heights?

Affordability, good visibility with high traffic street.

2. Are there particular features that you think could be improved along the corridor to support your business?

Safer pedestrian crossings. Slowing down traffic. Parking options. Bike parking. Improving sidewalks, landscaping.

3. Do you have off-street parking? If so, how do people access the lot? Do other businesses use your lot or is it reserved?

Yes, we have off street parking. People access our lot via an alley that's connected to A street. We are the only business that uses our lot.

THEHEIGHTS
STREETSCAPE PLAN

4. Do you think on-street parking is well used? Who do you think uses it most regularly (e.g. visitors, employees, business patrons)? What if some of the on-street parking were used for something else, like bike lanes or wider sidewalks with additional seating?

Yes. The majority of our customers and the customers at our neighboring businesses use the street parking with most people only parking for 5-15min. The parking is generally only used by customers.
Street signs with a 30 min time limit would be helpful as sometimes people will park in the street spots and leave their cars for most of the day. We could potentially lose some of our street parking for a bike lane but I believe that the bike lanes would not be heavily utilized with the current speed and volume of traffic on 13th street, with bikers opting for quieter roads in the neighborhood streets. I think bike lanes/ pathways would possibly be better routed to the neighboorhood streets to the sides of 12 and 13th and keeping the street parking available to businesses. If street parking is removed for a bike lane then parking needs to be added someone else to make up for the loss.

5. How does your business receive deliveries? For example, do they come to the front or back door? Do you know the type of delivery vehicles that are typically used and where and how they access your business (e.g. off-street parking lot, on-street parking, alley)?

Most deliveries come through the front door. The vehicles are generally regular cars and they park in the street parking in front of our business.

Flow Hood River - from email:

"Attached are photos of my answers to the Questionnaire. I chose to move my business to the Heights due to its accessibility to locals and free parking for my customers.

Of utmost importance to my small business are the following:

1) More bike parking - the circles that can be installed on sidewalks work really well, are inexpensive, and accommodate ebikes.

2) Keep all on-street parking and keep parking FREE

3) I do not support "improvements" that will disrupt business accessibility."

THEHEIGHTS
STREETSCAPE PLAN

1. Why did you choose to locate in the Heights?

Because the Heights is more accessible to locals. Free parking is one of the main attractions.

2. Are there particular features that you think could be improved along the corridor to support your business?

Bike parking

~~[illegible]~~

Festive lighting?

Block parties?

I don't support improvements that will disrupt business accessibility.

3. Do you have off-street parking? If so, how do people access the lot? Do other businesses use your lot or is it reserved?

No.

Nathan Polanski <npolanski@migcom.com>

Fwd: Heights Survey

1 message

Dustin Nilsen <D.Nilsen@cityofhoodriver.gov> Fri, Jun 11, 2021 at 8:30 AM
To: Alex Dupey <alexd@migcom.com>, Nathan Polanski <npolanski@migcom.com>

Dustin Nilsen, AICP

Begin forwarded message:

From: Joy Kloman <[redacted]
Date: June 11, 2021 at 7:54:07 AM PDT
To: Dustin Nilsen <D.Nilsen@cityofhoodriver.gov>
Subject: Heights Survey

1.Why did you choose to locate in the Heights?

Initially, the rent was more reasonable than downtown, especially important for a local, small business owner in a town with a relatively small full-time population.

2. Are there particular features that you think could be improved along the corridor to support your business?

Yes. A more unified, cohesive look with more lighting and without power lines would be beneficial. Perhaps a roundabout or light at Belmont would help with that busy area. I frequently see drivers driving the wrong way down 13th St. Many neighborhoods surround the area, but it is not particularly pedestrian friendly. The crosswalks that were removed made it even more dangerous, since people still use those areas that were once labeled. Sadly, I had to change the garden in front of my business because of the numerous extremely hazardous items (such as drug paraphernalia and other) that were being thrown into it.

3. Do you have off-street parking? If so, how do people access the lot? Do other businesses use your lot or is it reserved?

Yes, parking is available in front of the business and along streets. The back four spaces are marked for employees; however, customers often use them when street parking is full.

4. Do you think on-street parking is well used? Who do you think uses it most regularly (e.g. visitors, employees, business patrons)? What if some of the on-street parking were used for something else, like bike lanes or wider sidewalks with additional seating?

The on-street parking is crucial for small businesses. Many customers would not stop by if parking weren't easily accessible, particularly in winter months.

5. How does your business receive deliveries? For example, do they come to the front or back door? Do you know the type of delivery vehicles that are typically used and

where and how they access your business (e.g. off-street parking lot, on-street parking, alley)

I do not have supplies delivered to my business due to homelessness and loitering in my immediate area.

Thank-you,

Joy's Art Studio

4. Do you think on-street parking is well used? Who do you think uses it most regularly (e.g. visitors, employees, business patrons)? What if some of the on-street parking were used for something else, like bike lanes or wider sidewalks with additional seating?

5. How does your business receive deliveries? For example, do they come to the front or back door? Do you know the type of delivery vehicles that are typically used and where and how they access your business (e.g. off-street parking lot, on-street parking, alley)?

Thank-you,
Joy Kloman

www.joysartstudio.com

THE HEIGHTS STREETSCAPE PLAN

1. Why did you choose to locate in the Heights?

Our location served our needs perfectly and was within our budget.

2. Are there particular features that you think could be improved along the corridor to support your business?

The streets are narrow and traffic travels fast. It is dangerous to cross the road and use the on-street parking. The streets + sidewalks are thick with gravel residue from winter and dust is kicked up all year. We lowered our expectations :

3. Do you have off-street parking? If so, how do people access the lot? Do other businesses use your lot or is it reserved?

We have a private lot for our building tenants. It is very busy and our vehicles have been damaged numerous times. We also had a truck stolen + ripped apart – same truck had catalytic converter stolen 6 months later. Crime and safety are big concerns. Cars travel fast and the lot + surrounding streets are crowded, dirty with litter + dangerous. Lots of unstable homeless people. We do have considered relocating.

THEHEIGHTS STREETSCAPE PLAN

4. Do you think on-street parking is well used? Who do you think uses it most regularly (e.g. visitors, employees, business patrons)? What if some of the on-street parking were used for something else, like bike lanes or wider sidewalks with additional seating?

On street parking is full in front of our business, used mainly for business patrons. While it would be GREAT to have bike-lanes and wider sidewalks - it seems like we don't have much room to work with. Traffic would bottleneck if we went to one lane. Both lanes are continuous all day. The speed that some people + big trucks use is of concern. Everything is so tight now + without great visibility that adding more bikes + seated patrons would be extremely dangerous →

5. How does your business receive deliveries? For example, do they come to the front or back door? Do you know the type of delivery vehicles that are typically used and where and how they access your business (e.g. off-street parking lot, on-street parking, alley)?

Our deliveries come in a pick-up truck and use the on-street parking ~ once a month. Not a problem for us.

we avoid foot travel + bike travel due to safety. It would have to be a MAJOR overhaul to improve the safety + cleanliness to get it to a different standard. If that could be accomplished with the amount of space given it would be a welcome change!!!

1. Why did you choose to locate in the Heights?

All of our owners own or rent homes in the Heights, or have at some point within the ownership of this business. This neighborhood is home to us and we believe it truly represents the locals in this community. We wanted to be located in the Heights as a means of offering more variety and unique businesses for locals. While we try to also draw tourists and visitors to our location, we pride ourselves on being a locally-focused and owned business.

2. Are there particular features that you think could be improved along the corridor to support your business?

Walkability, bikability, accessibility from tourist locations, more public transit options, more city funds and energy put into marketing and improving this beautiful part of the city. Outdoor seating. City taking over jurisdiction of 12th and 13th streets within the streetscape plan map in order to allow parklets and visibility to businesses. Annual street events. Organizations like Visit Hood River or the Chamber promoting businesses in the Heights. Possibly angled parking with a good plan for traffic. Roundabouts instead of traffic lights.

3. Do you have off-street parking? If so, how do people access the lot? Do other businesses use your lot or is it reserved?

We have off-street parking for staff only in spots we own.

THEHEIGHTS STREETSCAPE PLAN

4. Do you think on-street parking is well used? Who do you think uses it most regularly (e.g. visitors, employees, business patrons)? What if some of the on-street parking were used for something else, like bike lanes or wider sidewalks with additional seating?

The Heights is one of the last remaining neighborhoods in town where parking is still free, and we often hear from patrons that it's why they come see us. Especially locals. Especially in the summer. I know that most of our parking is used by business patrons of the 3-4 businesses in our block, along with visitors and tourists. We definitely wouldn't be opposed to turning on-street parking into bike lanes or wider sidewalks or additional seating or anything that gives us more visibility in the community. It would be nice if an option for roll-over parking could be offered like downtown and at the port.

5. How does your business receive deliveries? For example, do they come to the front or back door? Do you know the type of delivery vehicles that are typically used and where and how they access your

business (e.g. off-street parking lot, on-street parking, alley)?

We received deliveries from trucks ranging from Sprinter-size delivery vans to full-size semis. All deliveries are received in the alley behind our business.

THEHEIGHTS
STREETSCAPE PLAN

1. Why did you choose to locate in the Heights?

We made the conscious choice to open our business in the Heights because we wanted to make locals our main customer base instead of relying on tourism to support our business. The locals are always here and will always be here and we wanted to serve our people. If visitors found/find us, great, but we wanted to be where more of the people who live in Hood River live and have easier access to with good walkablity and bikablity. It's also where we live. The free parking was also a bonus. We also felt like there was a lot of potential for the Heights to be an awesome local neighborhood and we wanted to do our part to help that along. We opened 11 years ago, for some perspective.

2. Are there particular features that you think could be improved along the corridor to support your business?

Of course! Crosswalks to help customers (and us) walk safely in the district, sightlines so our customers can see people walking and cars coming down 12th and 13th. Kind of going along with sightlines is parking. I think the amount of parking is fine, there doesn't seem to be a shortage, but I think it could be laid out better. The way it is now blocks views of cars turning and pedistrians. We for sure need a bike lane and more consistent bike racks. We have a lot of customers who bike and we had to request additional bike racks. There should be plenty of places to park bikes and flexible racks that make it easy to park different types of bikes (e-bikes, road bikes, fat tire bikes, etc). Loading zones might be nice for delivery trucks. Traffic needs to be slowed down, for safety, and also atmosphere of sidewalk seating. Something that would improve our maintining of our business would be fixing the stormwater drains and evening out the sidewalks. Again, not exactly your question, but while we love greenery, we also want to make sure that in the future our storefront doesn't get obscured by trees.

3. Do you have off-street parking? If so, how do people access the lot? Do other businesses use your lot or is it reserved?

We do not, however we do utilize the parking lot behind our building for staff parking, and some customers may also park there, but for the most part I don't think they do.

4. Do you think on-street parking is well used? Who do you think uses it most regularly (e.g. visitors, employees, business patrons)? What if some of the on-street parking were used for something else, like bike lanes or wider sidewalks with additional seating?

I think on-street parking is well used overall. We seem to have plenty. Even if the parking on our block is full, customers can usually park within a 1 block radius. We ask our employees to not park on the block in front of our business. They usually use a lot that is not ours but has open spaces most of the time. I think most of the parking on 12th and 13th is used by business patrons most of the time. I think it would be great if the parking were used for other things like bike lanes and wider sidewalks. Mostly bike lanes becuase the sidewalks are decently wide already, but i'm not opposed to repurposing some of the on-street parking. Maybe even using some car parking spots for bike parking areas.

5. How does your business receive deliveries? For example, do they come to the front or back door? Do you know the type of delivery vehicles that are typically used and where and how they access your business (e.g. off-street parking lot, on-street parking, alley)?

Deliveries come through our front door on 12th St. The trucks park in front of our business in the on-street parking (they usually find a spot(s), sometimes bigger trucks have to park across the street on Union between the gas station and the old dry cleaner, depending on the day and time of delivery). Our deliveries come in a variety of vehicles, ranging from pick-up trucks and sprinter vans, to box trucks, to full on semi trucks.

THEHEIGHTS STREETSCAPE PLAN

1. Why did you choose to locate in the Heights?

Weatherly Printing has been located at 1114 12th Street for forty four years.

2. Are there particular features that you think could be improved along the corridor to support your business?

I believe some for of traffic control device is necessary to regulate traffic. Ideally this would be one or more traffic lights. The 12th and Pine intersection seems like the biggest trouble spot on 12th from my perspective. A light at 12th and Belmont would be good to regulate traffic flow, especially as visibility coming off the various cross streets is terrible.

Another issue I witness regularly is wrong-way drivers going down 12th in the vicinity of the 1100 block. I think a better posted "one way" sign, maybe with flashing yellow lights would be a good investment at Pine and maybe even at Taylor.

3. Do you have off-street parking? If so, how do people access the lot? Do other businesses use your lot or is it reserved?

No. I'm in the middle of the block with only the on street parking.

4. Do you think on-street parking is well used? Who do you think uses it most regularly (e.g. visitors, employees, business patrons)? What if some of the on-street parking were used for something else, like bike lanes or wider sidewalks with additional seating?

That depends on which block you're on and when you're looking. The west side of the 1100 block on 12th Street has fewer parking spots than store fronts and offices. There are times when customers can't find a parking spot anywhere on the block but 15 minutes later, most of the spots are open. The trouble with sacrificing parking places for other purposes is that there are so few alternatives for parking on 12th street, and you can't really be selective when making that sacrifice. A bike lane can't very well weave back and forth from one side of the street to the other; if you're putting in a bike lane, it's going to wipe out parking on one side of the street for the entire length of the corridor. There are occasions when I have customers picking up large orders with multiple cartons of paper. Having them park across the street, around the corner, and/or a couple blocks down the road is more than just an inconvenience.

5. How does your business receive deliveries? For example, do they come to the front or back door? Do you know the type of delivery vehicles that are typically used and where and how they access your business (e.g. off-street parking lot, on-street parking, alley)?

I receive paper deliveries twice a week on a large tractor-trailer type truck. I have the drivers park in the alley and bring the material through the back door. If the alley is blocked, or the driver new (or stubborn), the truck may wind up parked on B street or even on 12th street.

UPS and FedEx routinely use on street parking on 12th street to deliver to my business and others.

Mr. Nelson - 6-3-21 (From Randy Frank)

Below is a collection of views from a group of ugly Locals -

Keeping 2 Lanes north on 12th and 2 Lanes South on 13th is a must.

Keeping Parking on Bothsides of 12th & 13th is needed for business to work

Bump outs at crosswalks a must for safety.

Lighted signs to show someone is using the Crosswalk is very effective

Maupin has a State road threw it w/ Bumpouts and works very well

Uni Lane on 12th & 13th for Bike & Vehicle traffic as is on State street

A Bike path from Pacific to union is needed which could go down the Indian creek trail head - Bike streets off the 2 main (12th & 13th) are a good option - Some exist now -

Keeping kids out of harms way is the goal we all hope - putting younge people in everyday traffic is not a way to do it.

As was said from the start 7 places on the 12th & 13th serve Alchol you shouldn't drink and drive but people do so having kids feeling safe using the same traffic areas as these places is dangerous -

Finally the downtown is a tourist destination don't ruin the Heights save the quaintness

Streetscape Survey

1. **Why did you choose to locate in the Heights?**

Accessibility. Traffic and parking in the downtown have been problematic for years.

2. **Are there particular features that you think could be improved along the corridor to support your business?**

Yes! Several years back, ODOT erased the crosswalk lines on 12^{th} street for all crosswalks in the Heights except for two. This was due to the fact that many of the crosswalks were not ADA accessible. We would like to see the sidewalks brought up to ADA compliance so that all crosswalks can be repainted. Also, while we are at it, how about planting more trees? And if the state allows, perhaps slowing traffic to 20 mph for pedestrian safety.

3. **Do you have off-street parking? If so, how do people access the lot? Do other businesses use your lot or is it reserved?**

Yes, we have 5 regular spaces and one handicapped space that are accessed via 12^{th} street. Our lot is reserved for our business.

4. **Do you think on-street parking is well used? Who do you think uses it most regularly (e.g. visitors, employees, business patrons)? What if some of the on-street parking were used for something else, like bike lanes or wider sidewalks with additional seating?**

During peak times, on street parking is full. We have often needed to park on a side street to visit a local restaurant. The main extra off street parking is behind Juanita's at the south end of the heights and is too far to walk to pick up groceries or access other stores at the north end of 12^{th} St. Removing on-street parking for a bike lane or wider sidewalks would present a parking hardship for local business. We would rather not have the Heights encounter the sort of traffic and parking problems we referenced regarding the downtown (see above).

5. **How does your business receive deliveries? For example, do they come to the front or back door? Do you know the type of delivery vehicles that are typically used and where and how they access your business (e.g. off-street parking lot, on-street parking, alley)?**

Delivery trucks park in the alley alongside our store

Jonathan & Ruth Maletz
Daniel's Health & Nutrition

THE HEIGHTS
STREETSCAPE PLAN

Scan Me
or visit
bit.ly/imaginetheheights

THE HEIGHTS
STREETSCAPE PLAN

Escanéeme

o visite

bit.ly/imagineselosheights

THE HEIGHTS STREETSCAPE PLAN

Scan Me

or visit

bit.ly/imaginetheheights

Imagine The Heights!

TAKE THE SURVEY


THE HEIGHTS
STREETSCAPE PLAN
Escanéeme
o visite
bit.ly/imagineheights
¡Imagínese los Heights!
LLENE LA
ENCUESTA

THE HEIGHTS STREETSCAPE PLAN ONLINE SURVEY SUMMARY – MARCH 2021

Introduction

In 2020, the City of Hood River began work to develop The Heights Streetscape Plan (Plan), a document intended to support the Urban Renewal Agency in improving 12th and 13th Streets and intersections along the corridor. As part of the planning process, an online map-based survey was conducted that invited community members to provide input on preliminary project goals and existing issues and needs in The Heights.

Preliminary project goals were developed based on the Heights Business District Urban Renewal Plan goals and input from the Urban Renewal Advisory Board. The preliminary project goals presented with the survey were:

- Calm traffic and improve intersections to improve safety for people driving, walking, and biking.
- Create streets that provide safe, comfortable places for people walking and biking along and across the corridor.
- Preserve and promote a livable community through streetscape improvements that support access to local businesses and future mixed-use development.
- Engage local residents and businesses, the school district, and those that use the corridor to provide input in the streetscape project.
- Support existing and future development by maintaining and improving utility infrastructure.
- Provide locations to gather with people and to stop and rest.
- Create an identify for the Heights that reflects the diverse culture and history of the area and as destination for local residents.

The survey input received will help shape the goals and recommended improvements of the Plan. This document summarizes the questionnaire methodology and key findings.

Questionnaire Methodology

The online survey ran from March 8 to March 29, 2021. It included 16 questions related to The Heights and six questions related to respondent demographics. Nine of the 16 questions were map-based and asked respondents to place pins on the map to indicate places they visited, routes they used, and where improvements were needed. A link to the questionnaire was posted on the City's website and distributed via email, social media, and other outreach methods. While survey results should not be interpreted as statistically representative, the results help identify common and shared goals, concerns, and priorities. When combined with the technical analysis conducted as part of the Plan, these findings inform the planning process.

A total of 344 responses were received. Several questions allowed respondents to write in responses which are attached in Appendix A (note: many responses are associated with specific locations on a map, however, for simplicity in summarizing feedback the mapped location is not noted in the attached appendix). Although the online survey was published in English and Spanish no surveys were completed in Spanish. Demographics collected as part of the survey are summarized on pages 13 and 14.

Key Takeaways

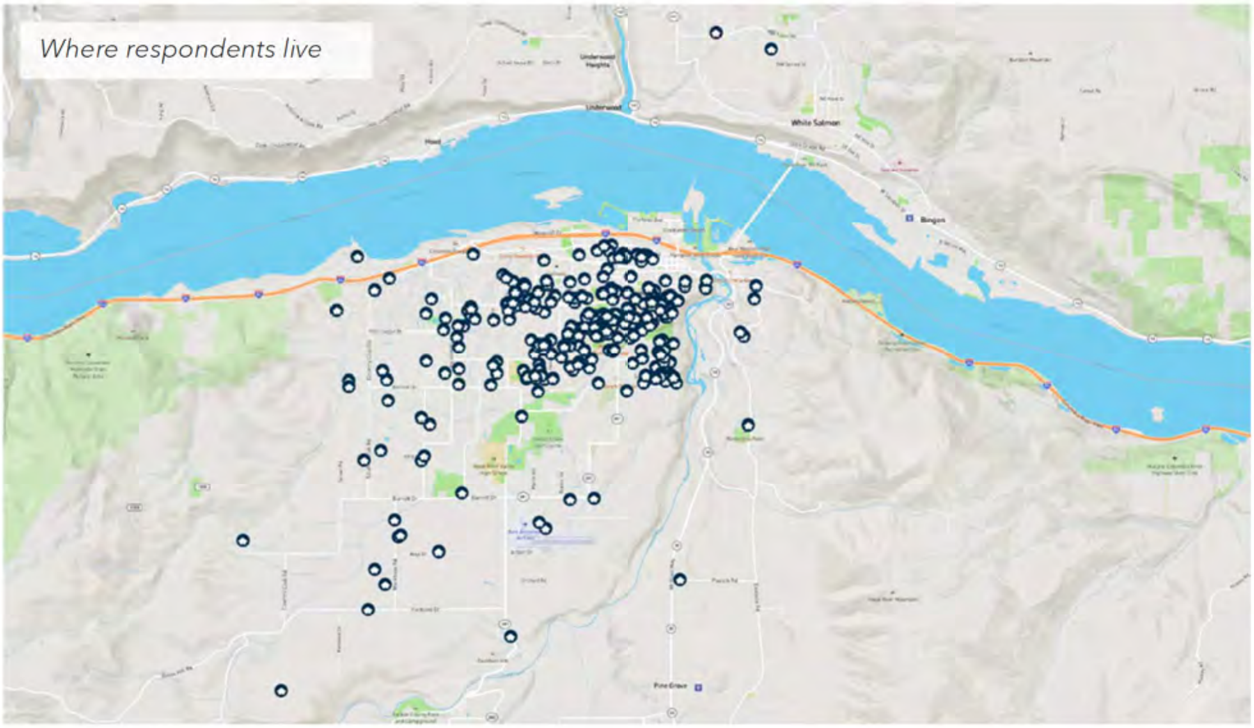
The Heights Streetscape Plan survey provided some clear insights on preliminary project goals and existing issues and needs for the area.

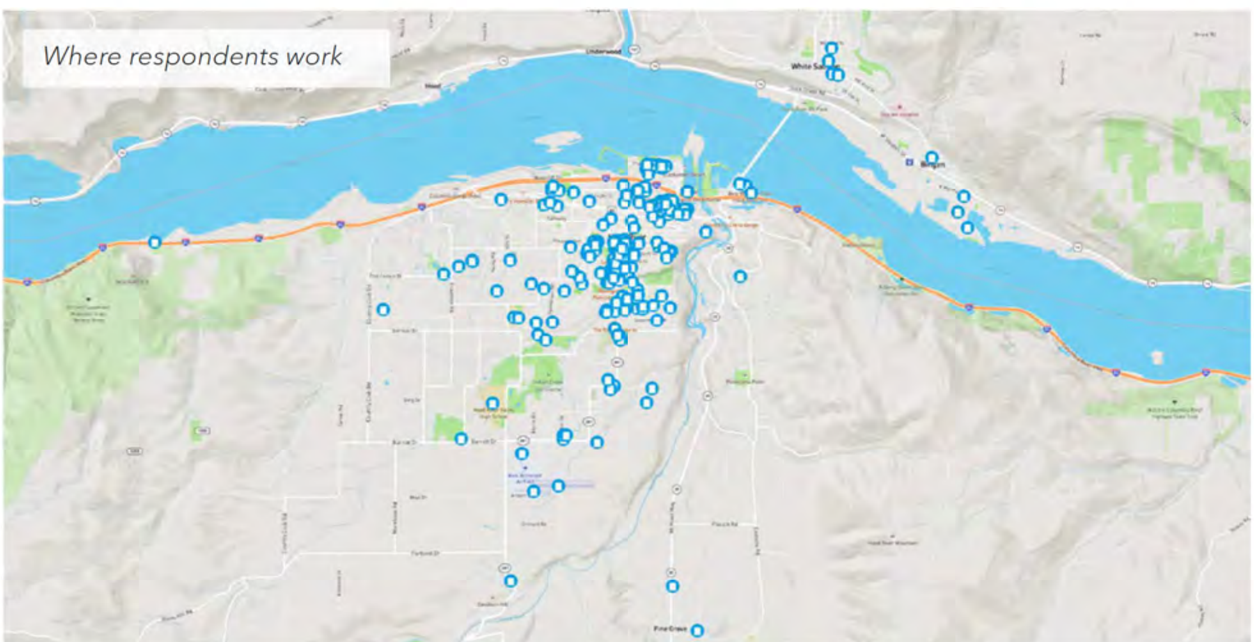
- The preliminary project goals most important to survey participants are related to slowing traffic, creating safe streets and intersections for all users, and promoting a livable community through street improvements that support access to local businesses.
- The desire and need to improve safety for people driving, walking, and biking was echoed throughout the survey results.
- Improved crossings are needed for pedestrians and bikes to increase safety at certain intersections and improve access overall. Pedestrians, bikers, and drivers all noted visibility issues trying to cross 12th or 13th from the east or west.
- Map-based feedback for people walking and biking indicates all east/west connections are well used but there did appear to be slight preference for improved east/west crossings along A St/Wilson St and Taylor Ave/Pine St in addition to Belmont Ave and May St.
- Crosswalks and crosswalk improvements are desired by pedestrians for a safer walking experience. Crosswalk related improvements suggested included flashing beacons or pedestrian islands.
- To support business and economic development, improving opportunities to access businesses across transportation modes and maintaining and improving views to storefronts on 12th and 13th should be considered.
- Accessibility improvements, street trees, and lighting are desired street environment enhancements.
- Community engagement should consist of both online and in person engagement to ensure broad participation from the community.

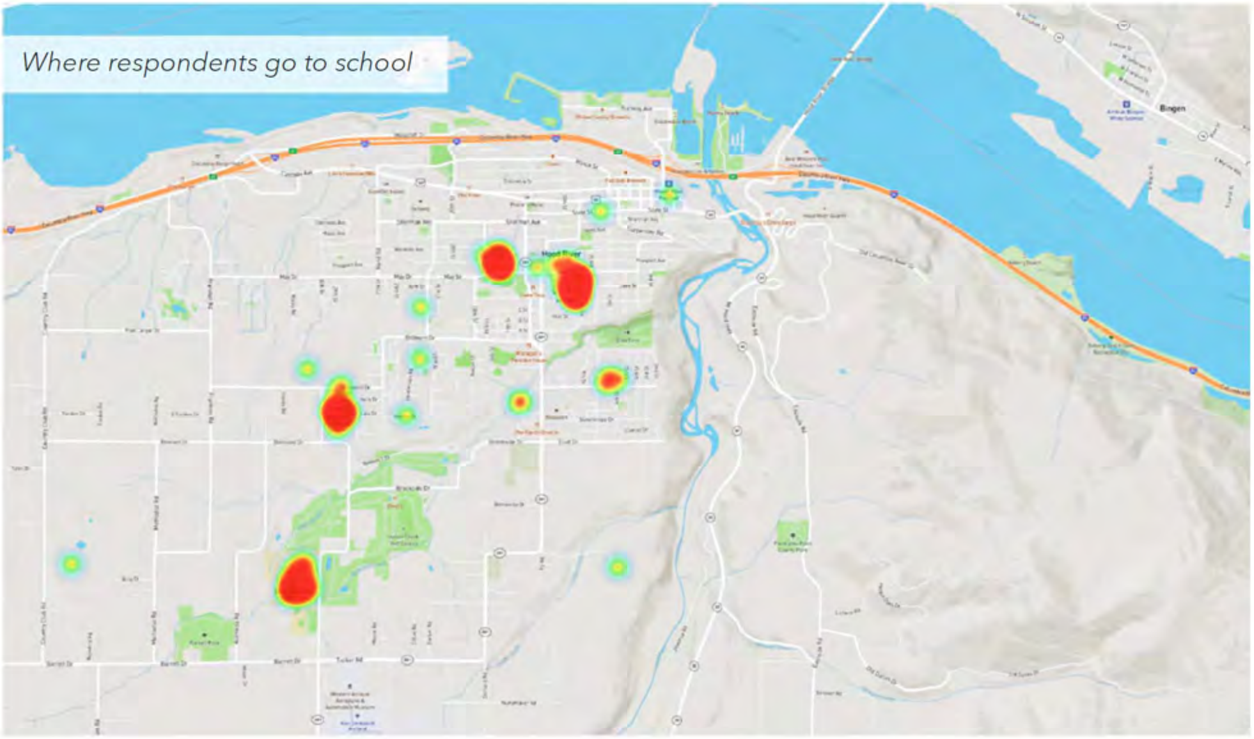
Key Locations

Participants were asked to place pins on the map to indicate where they live, work, and go to school as well as to show places along 12th Street and 13th Street that were important to them. Concentrations of those pins are shown a heat map. Red areas indicate the highest concentrations of pins.

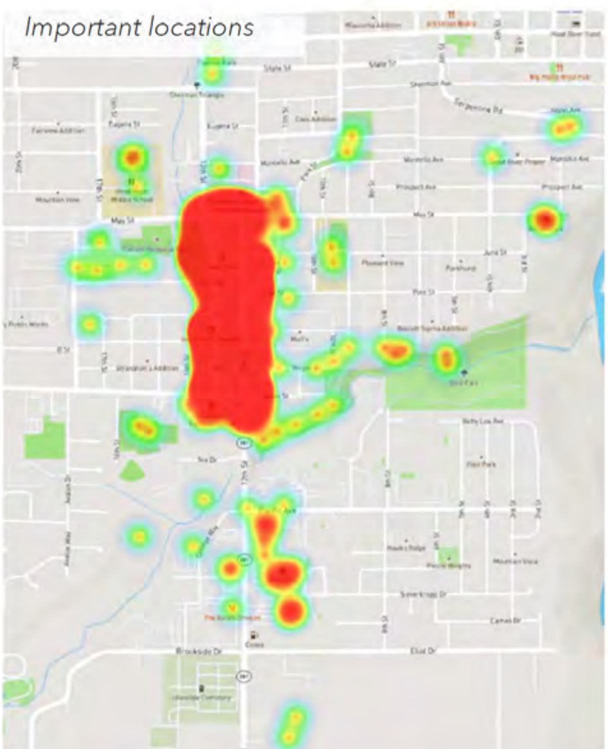
Figure 1: Key Locations



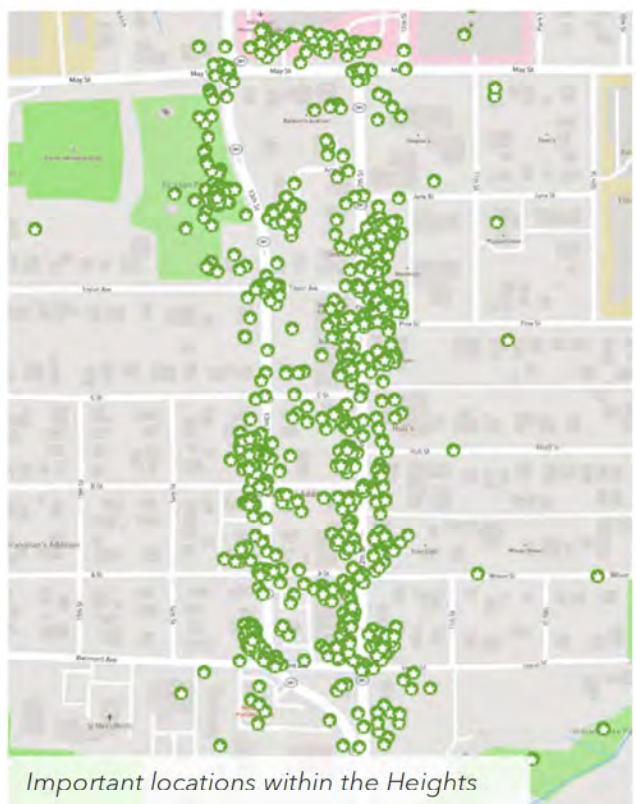




Where respondents go to school



Important locations



Important locations within the Heights

Assessing Preliminary Project Goals

Respondents were asked to indicate which of the Urban Renewal Area goals (NOTE: goals were slightly modified to incorporate Urban Renewal Advisory Board input related to this project prior to the survey) were most important to them and this project. This question also allowed participants to write in their own goals which included providing more accessible parking, improving vehicle traffic flow, providing protected bike lanes and pedestrian paths whether through the Heights or on other nearby streets, and considering access and equity when planning for this area.

Figure 2: Goals most relevant to The Heights

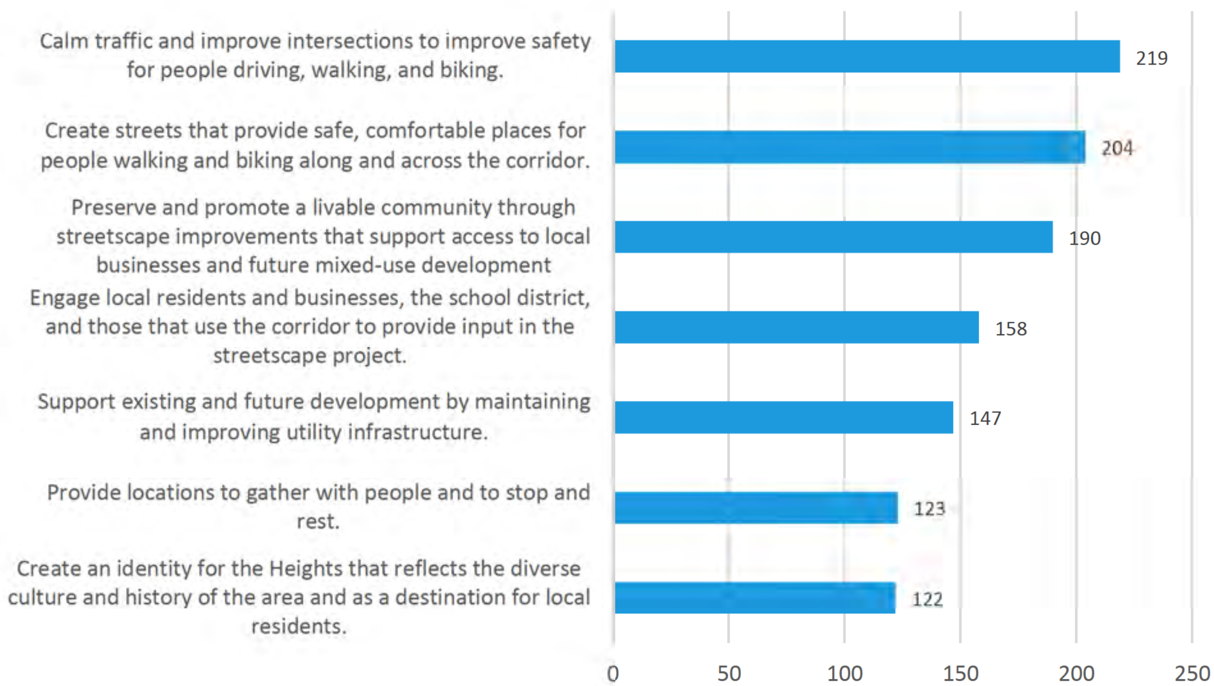
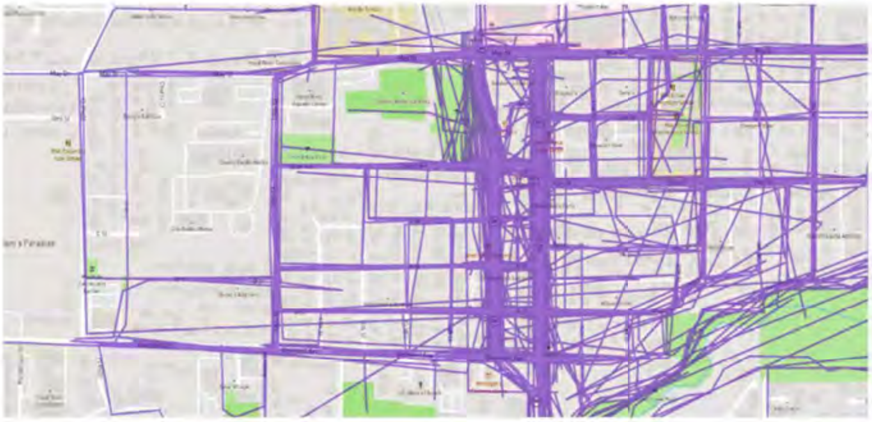


Figure 3: Word cloud with write-in goals

Walking in The Heights

Figure 4: Walking routes in The Heights



Walking destination results

40% Businesses or services

28% Parks or recreation

13% Other

8% Work

7% Home

4% School

Respondents were asked to identify where issues or challenges exist for people walking in The Heights. Most issues were concentrated around intersections, particularly near Belmont Ave and 13th, Union St and 12th, 13th and May St, and on 12th near between Taylor Ave and Pine St (Figure 5). Improving safety and visibility at crosswalks and reducing the speed of traffic are the most desired pedestrian improvement, with respondents also favoring adding street elements and enhancing existing sidewalks (Figure 6). Other common comments included:

- Improving the confusing intersection at 13th St/May St and reducing long cross distances along this route to local schools.
- The removal of existing east/west crosswalks at various locations along 12th/13th Streets.
- The importance of safe east/west crosswalks at Taylor Ave/13th St and the need for crosswalks at Pine St/12th St along the heavily use route to/from Jackson Park and neighborhood schools to the Heights business area.

Street trees, accessible sidewalks and curb cuts, and lighting were the most desired street elements to enhance the walking environment (Figure 7).

Figure 5: Needed pedestrian improvements in The Heights

Figure 6: Top pedestrian improvements

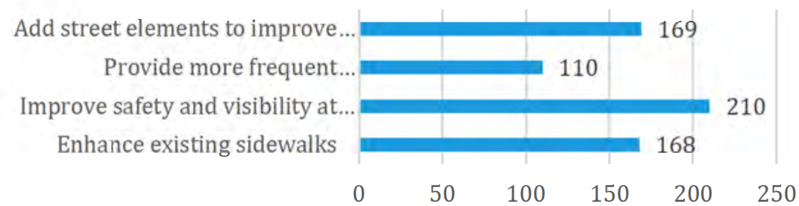


Figure 7: Preferred street elements along 12th and 13th

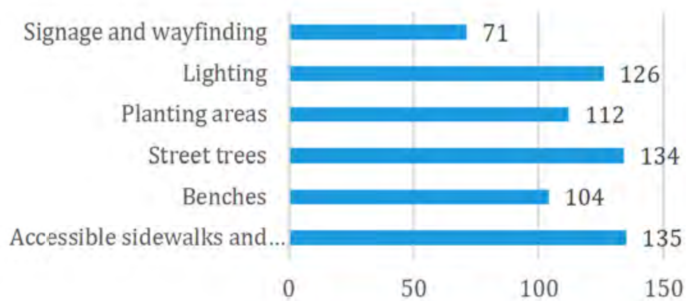


Figure 8: Word cloud with issues and improvements in write-in walking responses

Figure 9: Biking routes in The Heights

Biking destination results

28% Businesses or services

26% Parks or recreation

14% Home

12% Work

12% Other

8% School

Biking in The Heights

Respondents were asked to identify where they thought issues or challenges exist for people biking. Similar to the feedback related to issues for people walking, respondents identified challenges for biking at 13th and Belmont Ave, Union St and 12th, A St and 13th, and the area near Taylor Ave and Pine St, as well as several other intersections (Figure 10). Many respondents noted it is difficult to cross intersections due to the speed of traffic and poor visibility. Recommended improvements at these intersections included protected bike lanes, better crossings, and bike racks. Overall, the most popular improvements among partcipants include providing safe, comfortable places to bike and improving east/west connections across 12th and 13th (Figure 11).

Survey comments indicate there is a slight preference for improved east/west crossings along A St/Wilson St and Taylor Ave/Pine St in addition to Belmont Ave and May St; Belmont Ave and May St are shown in the City's Bicycle System Plan has having future bike lanes.

Another comment comment was the desire to improve connections to Indian Creek Trail.

Figure 10: Needed bicycle improvements in The Heights

Figure 11: Top biking improvements

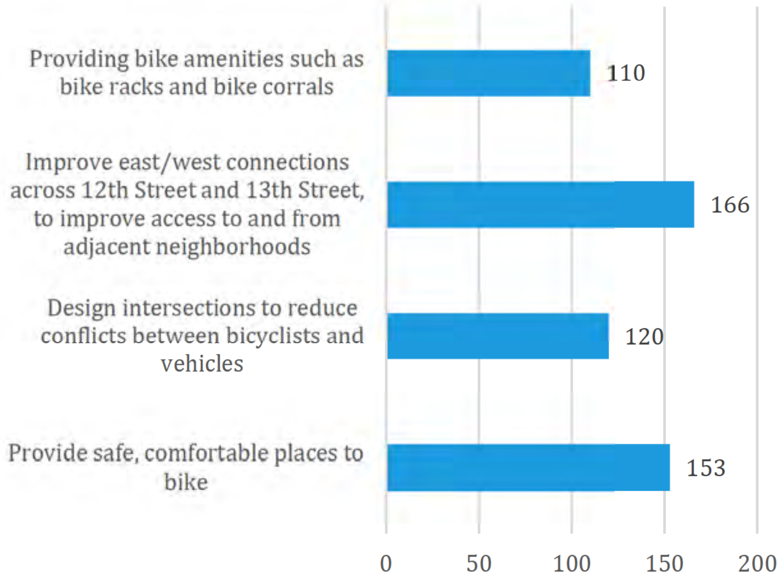


Figure 12: Word cloud with issues and improvements in write-in biking responses

Driving in The Heights

For drivers, the intersections of May St and 13th, Belmont Ave and 13th, Union St and 12th, and area near Taylor Ave and Pine St need improvements. Many respondents noted visibility and dangerous speeds on 12th, issues when trying to cross 12th or 13th from the east and west, with some noting cars parked along the street as contributing to that issue. Others noted changing lanes was difficult due to the number of intersections and the narrow streets. Some respondents indicated that while there were needed improvements, they would like 12th and 13th to remain a traffic corridor. The most popular improvements for driving in The Heights were improving intersections for safety and better traffic flow and providing street improvements to slow vehicular traffic. Some common comments for key intersections of concern:

- 13th St/May St: The intersection is not intuitive, fast traffic speeds make it challenging to navigate, and the pavement condition is poor.
- 13th St/Belmont Ave: The intersection is hard to cross for east/west traffic, due to fast traffic speeds on 13th and poor visibility due to parked cars. Wrong way traffic turning onto 13th Street was also mentioned.
- 12th St/Union St: A busy intersection with fast traffic northbound as cars enter the Heights and poor visibility at the intersection.
- 12th St/Pine St: This intersection is heavily used to access nearby businesses and it is challenging to cross 12th St from Pine St to Taylor St. Vehicles turning left from 12th St onto Taylor Ave sometimes encroach on the oncoming eastbound travel lane when making the turn.

Figure 13: Needed driving improvements in The Heights

Figure 14: Top driving improvements

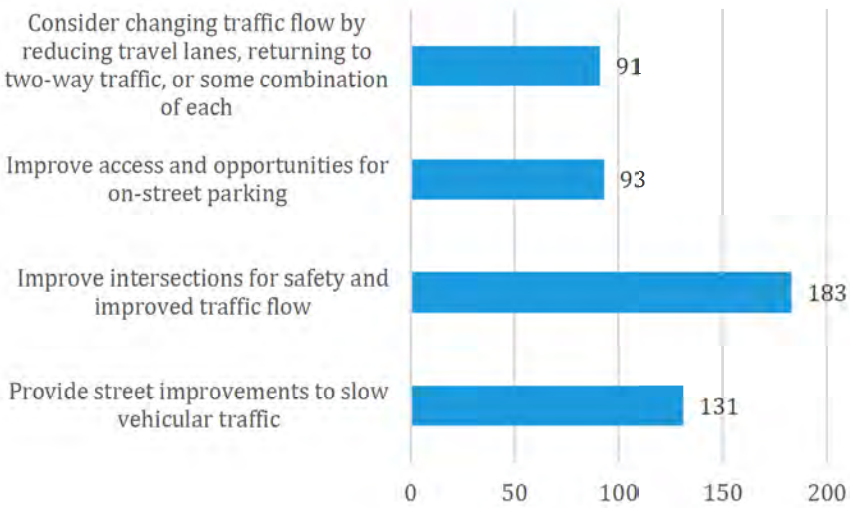


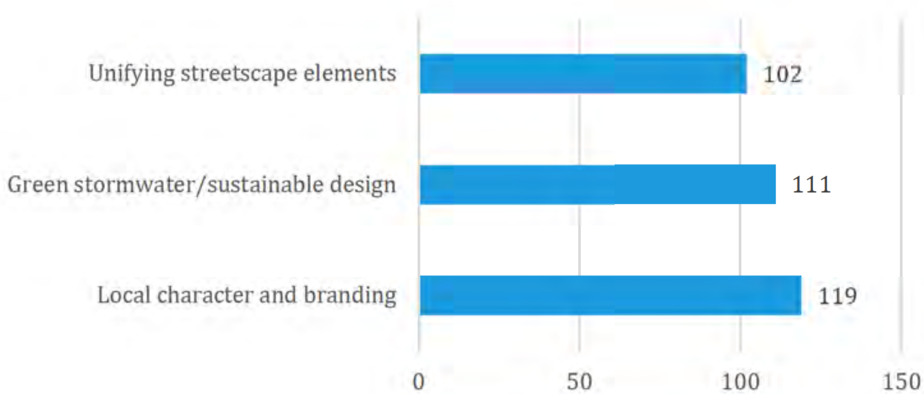
Figure 15: Word cloud with issues and improvements in write-in driving responses

Business and Economic Development

Improvements along the corridor have the potential to support local businesses and guide the redevelopment of adjacent properties. To achieve this, respondents support improving opportunities to access businesses for people walking, biking, taking transit, and driving as well as maintaining and improving views to storefronts and 12th and 13th streets (Figure 16). To enhance the identity of The Heights, respondents slightly favored local character and branding over green stormwater and sustainable design or unifying streetscape elements although all three choices received similar levels of support.

Figure 16: Improvements to support economic and business development

Figure 17: Enhancing local identity



Demographics

The following questions were optional. Most respondents to the survey were people who either shop or use services in The Heights or pass through the area. Some respondents have lived in The Heights, but few respondents work in The Heights. Those surveyed were predominantly people aged 35-54 who identify as Caucasian/White.

Figure 18: Relationship to The Heights

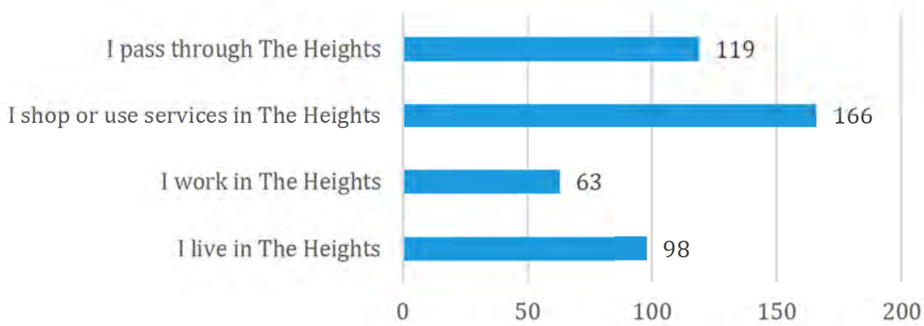


Figure 19: How long they have worked in The Heights

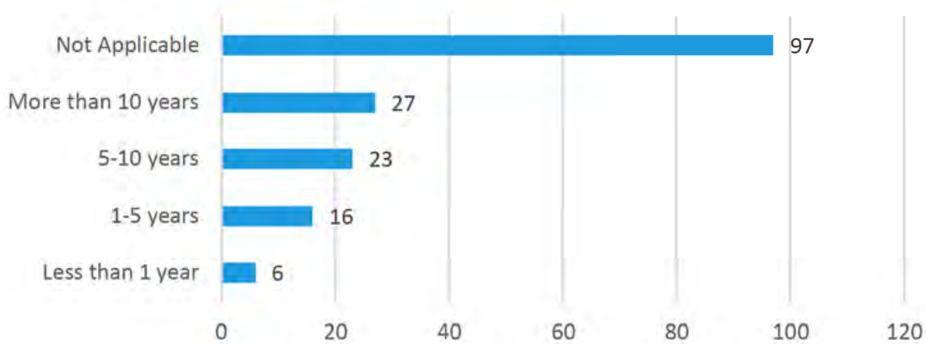


Figure 20: How long they have lived in The Heights

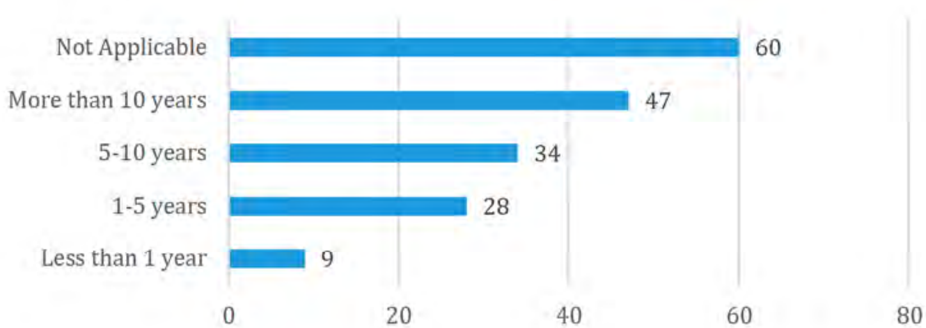


Figure 21: Age

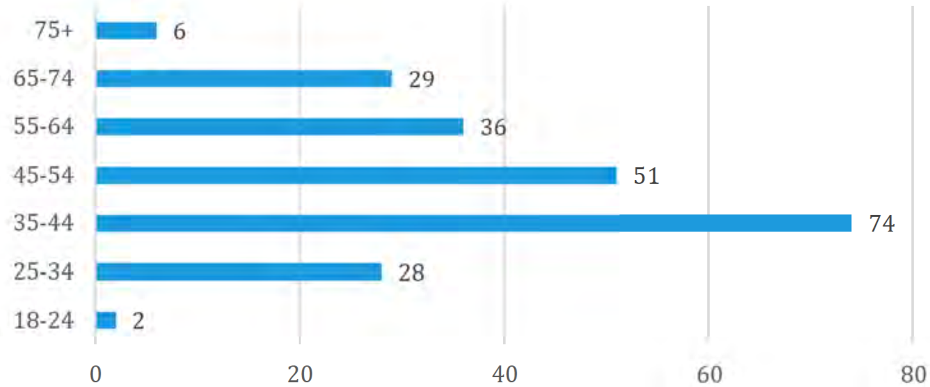


Figure 22: Gender identity

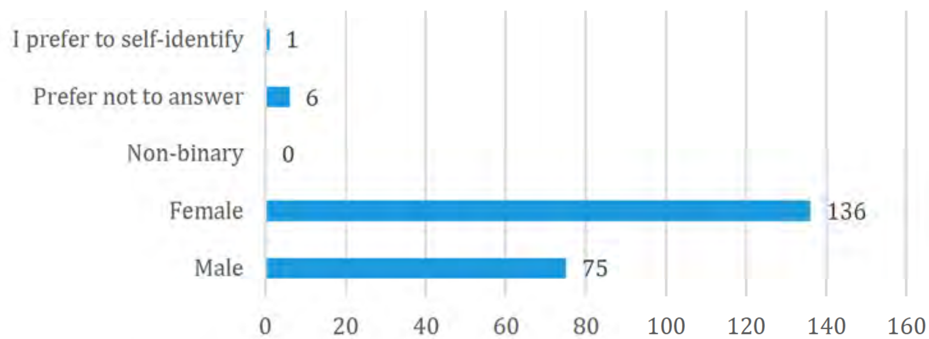
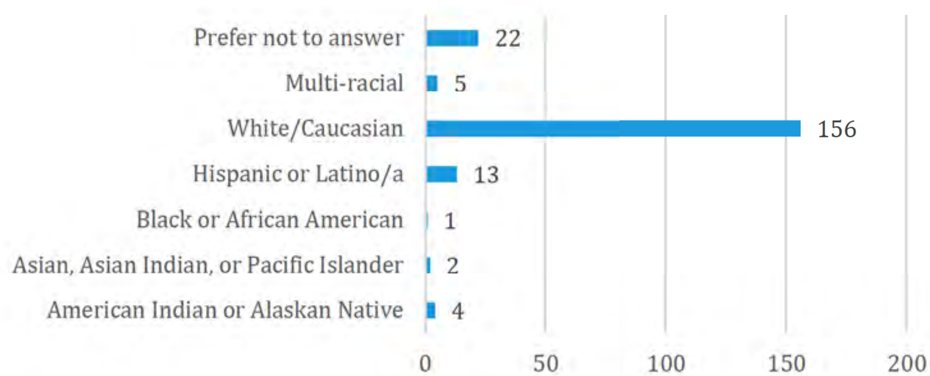


Figure 23: Ethnic or racial identity



APPENDIX A

Appendix A includes all write-in responses to the survey questions from the 344 responses. Note, many write-in responses are associated with specific locations on a map, however, for simplicity in summarizing feedback the mapped location is not included with write-in responses summarized below.

Table 1: When walking in The Heights, what are issues or challenges that you experience that you would like improved?

Crossing the street
Crosswalk is needed here
underpass for pedestrian travel from trail so people do not cross here!
need more crosswalks in this popular area (pine street bakery, farmstand, etc.)
Crosswalk was removed
Vehicles don't stop for pedestrians
Former crosswalk was removed, would like it back
Sidewalks in disrepair
Pedestrians have been hit by vehicles here
Sidewalk is falling/crumbling, supports are cracking
Sketchy crosswalk, low visibility of traffic coming uphill
Such a clunky corner, traffic flow, pedestrian crossing
Zig zag use of 12th to Taylor, ripe for danger
There's no marked crosswalk here
It's really dark here at night, and cars often drive faster than 25
There is a crosswalk here, but it's not safe at all. I would never risk crossing here because of all the traffic.
No cross walk
No cross walk
Congestion
Speed, congestion
Speed, congestion, no bike lanes
Speed, congestion, poor visibility
Speed, congestion, traffic flow, bike lanes
Crossing 13th
Ability to safely cross the street
Making it safer for our kids to cross the roads. Right now too many cars go too fast or don't look for kids crossing the roads.
Challenging and unsafe intersection.
Challenging and unsafe intersection.
This crosswalk was closed and there is not another safe and marked crossing until you get to Pacific street; people are now running across 12th/13th to get to the other side.
Poor visibility; need pedestrian bump outs.
Poor visibility; need pedestrian bump outs.
Poor visibility; need pedestrian bump outs.
Poor visibility; need pedestrian bump outs.
Poor visibility; need pedestrian bump outs.
Poor visibility; need pedestrian bump outs.
Poor visibility; need pedestrian bump outs.
People hit the gas getting up the hill and end up peaking the hill going way too fast; need increased signage and other traffic calming measures so people slow down here.

Possible round-about location for pedestrians/bikes/cars.
There is no bike lane on either side of the street here so for bikes to be safe they end up on the sidewalk which can make it tricky for pedestrians and bikes to be on the same sidewalk with different speeds and directions.
Difficult to cross street in Traffic
Taylor east west over towards pine would be a good pedestrian thoroughfare and double as traffic slowing.
Common Crossing
Pedestrians heading North commonly and dangerously cross here.
Nice seating/gathering open space at field/Indian creek trail entrance. Garbage/Recycling
A St to Wilson would be another good east west, pedestrian thoroughfare -
Slow traffic, improve visibility
no crosswalk, no one stops for pedestrians here
no cross walk
lots of families and kids cross here for the park and cars dont have a lot of time to see them and are going fast up the hill
awkward area for walkers and bikers
hard to see cars coming from the north
Nervous to let my kids cross here to get to Jackson Park
More crosswalks along this whole area, both 12th and 13th
Safer road crossing, consider traffic light, intersection is so sketchy with kids
Crossing near park on one way where visibility is clear
Cross walk on South side of intersection so people crossing have to watch for cars turning and cars coming up the hill. If cross walks were on the norht side of intersections walkers and bikers would only have to watch for the one way traffic, not the cars turning from the side steets as well. That's a lot to ask of kids trying to get across these streets to school.
This intersection is tough for kids to figure out, even some adults.
slow the traffic or divert it, many blind spots and speeding Caras
maybe we need a traffic light for safe pedestrian crossing
a traffic light to slow traffic, maybe a pedestrian crossing here to access Indian Creek Trail
Traffic that you can't see coming with all the cars parked on the road.
Inability for drivers to see you trying to cross
Safer crosswalk
Safer crosswalk
Hard to cross, can't be seen well esp at night
Crosswalk was removed by ODOT - each intersection should have three crosswalks in the shape of a U with the bottom of U being first spot of directional traffic
May Street is a mess and needs some attention
Busy traffic area. Many pedestrians try to cross, but crosswalk was removed. Baffling!
Speeding cars, no painted crosswalk, large truck and vans blocking visibility (even though there are signs)
nopainted crosswalk, speeding cars
Getting across the street without dodging cars!
It seems cars come up 13th pretty fast. Its hard to tell if someone sees you when you are crossing Belmont. As a driver I have been on car side of this, where you look north on Belmont for a long while waiting for traffic to clean and then someone starts crossing Belmont. But you (the driver) then see them kinda late or its at least surprising to see them.
As a pedestrian here crossing 13th, cars seems to roar up the hill. Most stop but it can feel a little nerve wracking to cross.
Still difficult to watch for people here with so many lanes of traffic
Pine St bakery very popular, as well as Apple Green, Tammy's Floral, and other nearby businesses. Always feels like traffic is going too fast to be safe walking here
Crossing hazard - need more crosswalks
Weird intersection with too many elements

Can't see people crossing to park
Hard to see people crossing
As a driver, hard to pull out
One of the most invisible places for seeing pedestrians crossing
Belmont intersection needs a light! Super dangerous crossing area amd people cant see
visibility, distance/width of crossing
needs an official crosswalk
need a cross walk somewhere around here - it's a long distance between official crosswalks on 12th street in this area
could use a crosswalk in this area
bringing back this crosswalk would be nice - belmont/union is a connection to the indian creek trail
terrible visibility when driving or walking. Parking too close to the corner on southwest side. Auto shop always parking cars in yellow zone on the Southeast side. Cars coming through too fast.
Poor visibility. Parked vehicles always blocking view for both walkers and drivers. Tree and street sign block view for drivers trying to cross 13th from east to west. Cars traveling too fast on 13th.
Poor visibility. Drivers do not see people wanting to cross from west to east. Drivers going too fast.
Drivers at this intersection are so focused on looking for traffic upstream (to the south) that they do not see pedestrians waiting to cross on the north (downstream) side fo the intersection. When there is a break in the traffic the drivers quickly turn onto 12th and there may be pedestrians in the crosswalk.
Drive up bank traffic often extends onto Wilson street in both directions and causes confusion and congestion at the intersection. Drivers aggressively pass waiting cars and there is very little space left on the road and the sidewalk across the bank driveway is treacherous.
The sidewalk on the south side of Wilson does not meaningfully continue east, making walkers again get into the street.
Poor visibility because of parked cars and drivers going too fast.
no safe way to cross Belmont
No safe way to cross Belmont
Pedestrians waiting to use the crosswalk are hidden from view by parked cars on either side of the street and by the USPS mailbox on the west side of the street. Also pretty sure there is a curb on the east side of the intersection which is an impediment to kids and the disabled.
Sidewalk is very narrow, often congested with bikes/walkers because no shoulder or bike lane
Busy and awkward location/ intersection
Visibility for crossing
Visibility for crossing
Visibility for crossing. Maybe parking one side of street.
Visibility crosswalk
Crossing safety
Oncoming traffic never see or stop for pedestrians. Needs a pedestrian activated flashing sign.
Oncoming traffic never sees or stops for pedestrians. Pedestrian activated flashing sign would be helpful.
Oncoming traffic never sees or stops for pedestrians. Pedestrian activated flashing sign would be helpful.
A very popular spot to cross. Traffic usually stops more at this crosswalk, but due to the amount people who like to cross here it would be good to add a pedestrian activated flashing signal.
The intersection is the worst. Cars never know how to interact with this intersection and very unfriendly for the pedestrian. It is hard for pedestrians to be seen as it is fairly dark. Cars are always traveling fairly fast.
bumpouts, remove parking spaces at north corners, pedestrian island, flashing beacons
bumpouts, remove parking spaces at north corners, pedestrian island, flashing beacons
bumpouts, remove parking spaces at north corners, pedestrian island, flashing beacons
dutch style roundabout with safety heirarchy: walking and rolling>vehicles
Yielding Pedestrian scramble. southbound vehicles yield to pedestrians crossing diagonally between Jackson Park, Middle School and the hospital. Westbound vehicles have a yield turn for northbound. Pure east-west vehicles stop as they do currently.

need crosswalk here, bumpouts, remove parking spaces at south corners, pedestrian island, flashing beacons
Need crosswalk and all the treatments
Add crosswalk and safety treatments here.
flashing stop beacons
Create 2-way protected bike lane so people biking and walking don't mix on the sidewalk
Add north crosswalk, bumpouts, flashing beacon and pedestrian island
Signalized pedestrian scramble interval
Improved off-street parking, alleys for walking, better visibilty for pedestrians on streets
Reduce on-street parking on 12th & 13th for better vehicle/pedestrian visibility.
This intersection needs major improvements with priority for pedestrians.
Intersection needs to be designed for pedestrians.
This intersection is deadly for pedestrians.
I have almost been hit by cars twice at this crossing.
This intersection should slow cars down before they enter The Heights. A roundabout or some gateway treatment would help.
Both intersections here need to prioritize the safe movement of people walking.
closed crosswalk is inconvenient, people use it anyway, traffic coming up hill is moving fast
dangerous intersection
super hard to cross, long distances, unsafe
hard to cross streets, traffic coming from many directions, long crossing distances
very inconvenient now that crosswalk has closed, I still use the closed crosswalk because its more convenient, fix this so that people can safely cross in all directions
every intersection in the Heights on the one ways are dangerous to cross because often one lane of traffic stops for pedestrians but the second lane doesn't see you and just keeps coming
every intersection in the Heights on the one ways are dangerous to cross because often one lane of traffic stops for pedestrians but the second lane doesn't see you and just keeps coming
every intersection in the Heights on the one ways are dangerous to cross because often one lane of traffic stops for pedestrians but the second lane doesn't see you and just keeps coming
Crossing 12th/13th from Nix drive is a roll of the dice every time.
The street here are off center and there is only one safe cross walk on the south end of this intersection. Also many times cars from Pine St are trying to get to Taylor Ave which can lead to quick lane changes and traffic in that small intersection.
Crazy busy and fast traffic making crossing difficult.
Separation of sidewalk from traffic
Speed limit 20 mph
Speed limit 20 mph
Cars driving to fast
people not giving right of way
General traffic/pedestrian issues here
Crosswalks hard to see; parked cars impede visibility.
poor traffic visibility when heading west in a vehicle. you are so focused on watching the cars you might not see a person.
heading west across A street in a vehicle has poor visibility to many corner obstructions.
Missing mid-block crossing
Missing mid-block crossing
Missing mid-block crossing
Drivers don't stop
this intersection needs some major changes. A roundabout seems unlikely. Maybe Eastbound is RIGHT-TURN only?
remove this building and parking lot and turn into a more mature traffic flow, like a roundabout?
Bumpout or flashing light (like library) for crossing

Issue is speed. Bumpout or flashing light to alert both lanes
Same as B street
Same
Same as B
Unsafe pedestrian crossing. Cars don't see the people as the cars come up the hill.
Needs more pedestrian signage. I avoid crossing here.
Cars don't respect pedestrians right of way here. This is a terrible intersection for cars, people, and bikes.
The stretch between the right-hand and left-hand turns would be better as a round about. Cars turning left often turn into the oncoming lane of traffic (lazy left turns). Also, pedestrians are often not seen by cars turning left, so those cars will either not give pedestrians the right-of-way or stop in the middle of the intersection if they saw the pedestrian after they stared their left turn.
Cars often approach this intersection way too fast.
I often find myself only looking right while turning left while driving at this intersection. And then I miss the pedestrian trying to cross Taylor. More signage for pedestrian awareness? I'm not sure what would help. Overall a dangerous intersection for pedestrians.
dangerous intersection, where pedestrians cross even though there's no crosswalk
Dangerous intersection with pedestrians crossing even though there's no crosswalk
People want to access the heights from Jackson Park or access the park from the Heights, and often it's young people. This is a crucial intersection to make safer. Cross walk lights, etc.
While I don't know that much about sight access, etc, it seems like cross walks and access should be uniform across both 12th and 13th.
Your pop outs prevent me from putting the pin where I wanted, which was by Belmont and 12 to 13th. While this is a congested area, it's where people want to cross the street. Improve the safety with cross walk lights, better cross walk striping, and removing parallel parking near the intersections for better site access for cars to see pedestrians and other cars coming along the road. As a driver, crossing some of the intersections with car parked right up to the intersection's edge is like taking your life into your own hands just to cross. Even removing two parking spots back would improve site access.
Again, just trying to put the pin but the popout (improvement for people walking) would allow me to place the pin where I intended. So if you don't get a lot of votes for Belmont crosswalk and access, that could be why.
Improve the crosswalk crossing May Street. There's a lot of traffic at this light, and drivers don't always appear to pay attention. Is there an alternate route to keep people safe?
This intersection has improved greatly since I moved here 17 years ago. It's still a pinch point for traffic, and people use it regularly for bike and ped access. It still needs work from a safety point. I would hesitate to send my kids on this route by themselves, not because I don't trust them, but because the driving pattern is unclear (some stop, others don't (as on May to 13th)), and, to me, make it an accident waiting to happen.
A way to stop traffic for pedestrians walking
Feels very exposed when walking. Planters/trees and flashing lights for walkers
Sidewalk is right along busy road. Pedestrians and bikers only use this side of sidewalk. Gravel path very hard to bike up
Hazard
Dangerous
Visibility of walkers by drivers since the crosswalk is at the top of a hill
Bicycle and pedestrian crossing
Bicycle crossing
Bicycle crossing
Bicycle crossing
Bicycle crossing
No crosswalk
Side walk very worn out
People do not stop for pedestrians
People do not stop for pedestrians

People do not stop for pedestrians
People do not stop for pedestrians
People do not stop for pedestrians
People do not stop for pedestrians
People do not stop for pedestrians
Crosswalk
Unsafe crosswalk, poor visibility for cars, sidewalks to nowhere on belmont
unsafe crosswalk, especially for kids going to the park
heavily used unsafe crosswalk
need a clear connection to the Indian Creek Trail
crosswalk
Crosswalk on both north and south sides of street
Many people still make right on red at 12 and may, creating a hazard at this intersection with desperate drivers trying to go west at may and 12 not always respecting pedestrians. This is a crazy messed up intersection in general and one of the most dangerous in hood river
clearly marked cross walks
clearly marked crosswalks
crosswalk improvements
the existing pedestrian crossing was removed - should be reinstalled
Better cross walk
cross walk
crosswakl
cross walk
cross walk
logical crosswalks
Crossing
Crossing
Inefficient crosswalk from Pine St Bakery
Difficult and dangerous crossing
This intersection is confusing to drivers so it's dangerous to pedestrians
Still too dangerous for student crossings and for events at Jackson Park or the Middle Schoo. Perhaps a pedestrian crossing button like at the Library.
The curve makes the intersection too broad for pedestrians and too blind for drivers
Dangerous intersection. Belmont should be closed to vehicle traffic between 12th & 13th
Close A St
Close B St to vehicle traffic
Close C St to vehicle traffic
I do not believe that there is a problem to fix since there are adequate sidewalks on both sides of the street of 12th and 13th street. You can make them prettier if you want but I do not support changes for walking (or biking) that limit traffic flow on these two streets.
Cross to park
cross walk
Crossing 12th is difficult for kids
Improved sidewalk on south and southeast side
this intersection is dangerous. the traffic control makes no intuitive sense for cars traveling E-W or W-E. Who has the right of way? It is very confusing for drivers and therefore dangerous to walkers
This is a challenging intersection for drivers to navigate, making it especially dangerous to walkers. visibility is poor here.
poor visibility at the new crosswalk
Make sidewalks safe, currently they are in bad condition
Make sidewalks safe, currently they are in bad condition

Put in sidewalks on both sides of the street.
Make sidewalks safe, currently they are in bad condition
Space for people to gather and sit
Space for people to gather and socializr
Crosswalks on both side of the street (north and south). Crossing 13th on Belmont.
Crosswalks on both north/south side of 13th crossing on Belmont
Traffic control for walking & drivers crossing on Belmont
Parking & getting across street to restaurants
Better traffic control (island?) for pedestrians & cars
I cross here almost every day even though it's not a crosswalk. If you are walking up 11th St you have to go all the way to the Shell Station in order to cross four lanes of traffic. I opt to cross two lanes of traffic here. I wish this were a traffic circle.
Indian Creek Trail dead ends.
This crosswalk was officially closed I think? I still use it to get from Belmont to 10 Speed Coffee.
Very poor visibility. You have to step out into traffic for people to see you and stop (hopefully)
Having to get off the Indian Creek Trail and go up to cross 4 lanes of traffic to get back to the Indian Creek Trail is a bummer. I wish there were a tunnel under the road (dreaming).
I never feel safe crossing here and avoid at all costs
dangerous intersection r/t speed of traffic, poor visibility d/t parked cars along side of street, No pedestrian alert system (flashing light or stop sign)
crossing street
crossing street
crossing street
Shoulders on Eliot Drive and Brookside
Traffic is moving too fast. does not stop.
Traffic too fast. Not safe for bikes to cross on designated bike road.
Dangerous corner for kids crossing to get to and from school. People turning on to Pine and not looking
Dangerous merge area from pine street.
Crossing the street with cars speeding or not stopping
Crossing the street. Westbound cars turning from Pine onto 12th then onto Taylor not stopping for pedestrians
Crossing the street and having traffic stop
crosswalk
crosswalk
poor visibility
crosswalk
crosswalk
Dangerous for pedestrians and low visibility for vehicles. The change made almost 40 years ago at this intersection was a mistake. The intersection is surrounded on 3 sides by parking lots that are off-limits to the public. The triangle within 12th, 13th, and Belmont could be a park and/or perhaps those three roads could be totally redesigned. The idea of walking to Rosauers or Walgreens or Ace appeals, _Except_ for the Ugliness and Traffic in that zone. (Caps are for emphasis, not out of anger.)
Duplicating my 13th and Belmont comment: Dangerous for pedestrians and low visibility for vehicles. The change made almost 40 years ago at this intersection was a mistake. The intersection is surrounded on 3 sides by parking lots that are off-limits to the public. The triangle within 12th, 13th, and Belmont could be a park and/or perhaps those three roads could be totally redesigned. The idea of walking to Rosauers or Walgreens or Ace appeals, _Except_ for the Ugliness and Traffic in that zone. (Caps are for emphasis, not out of anger.)
Much better with the new crosswalk running E-W, but to get from Jackson Park and the May Street parking strip to the north side of May is dangerous. Sidewalks are horrible also, as I'm sure you know.
unsafe crossing for kids walking to school
Tempting to cross here, but dangerous

Table 2: When biking in The Heights, what are issues or challenges that you experience that you would like improved?

Traffic and street crossings
safer way to cross belmont
bike lanes
Parked cars impede ability to see and cross safely.
Dangerous
No bike lane; super scary area to ride with cars.
No bike lane; super scary area to ride with cars.
Difficult interesection to cross with cars going very quickly.
Difficult interesection to cross with cars going very quickly.
Difficult interesection to cross with cars going very quickly.
Difficult interesection to cross with cars going very quickly.
Difficult interesection to cross with cars going very quickly.
Need bike parking for Jackson Park attendees; especially with increased e-bike use. At big events, i.e. Music and Families in the Park there are e-bikes all over the place.
Would be idea to have a bike lane all the way to Eliot and if we're dreaming big...as far as the FISH Food bank for folks who may be biking for those services....
awkward on a bike
hard crossing to the east here
hard to see cars coming from the north
Traffic can't see when bikers and walkers are trying to get across unless bikers and walkers move forward into the intersection.
Traffic can't see when bikers and walkers are trying to get across unless bikers and walkers move forward into the intersection.
dedicated bike lane with barriers
dedicated bike lane with barriers
bike rack
bike rack
bike rack
bike rack big enough for ebikes
This WHOLE street as with all the traffic and cars parked on the side of the road its so dangerous.
Bike lane disappears on corner
Poor visibility to cross and fast uphill traffic
Hectic intersection for bikes. Western bound cars turning left try to beat uphill traffic on 13th
Belmont/ Union are a mess - I don't ride down 12th or up 13th I cut over to Indian Creek Trail
Bike lane here or adjacent streets- for both directions. Prioritize safety for kids biking
We really don't bike on 12th or 13th because it is too dangerous. We use Wilson and A to cut across to get from our house to friends and relatives houses. It would be nice to feel safe enough to use our bikes on these main roads as they are more direct than weaving around the side streets.
Terrible visibility. Traffic moving too quickly. Parking is way too close to the corner on the west side fo 12th
Terrible visibility. Cars always parked in yellow in front of auto shop. Traffic going too fast.
Poor visibility. Parking too close the the corner on the west side of 12th south of B street. Makes no sense why there is parking on 12th south of B street where all the traffic is coming from and parking prohibited north of B street on the west side of 12th where no one needs the visibility.
no bike lane. Parking on both sides of the road make it dangerous with drivers getting in and out of cars and parking spaces.
Fast traffic and no bike lane made more dangerous by parking on both sides of road with people opening car doors and getting in and out of parking spaces unaware of bikers.
No bike lane, uneven pavement, fast traffic, narrow side walk with utility poles

No bike lane, fast traffic, drivers changing lanes, narrow sidewalk not good for bikes and pedestrians
Bad visibility, traffic going too fast
Bad visibility, traffic going too fast
Narrow road often crowded with delivery vehicles and on street parking
No shoulder or bike lane. Much confusion between right of way between walkers, bikers, and vehicles
Bike lanes
Parking on both sides of the street and parking close to intersection makes it difficult to see oncoming traffic. Two lanes of oncoming traffic makes it more difficult to cross
No bike lanes down 12th. Parking on both sides forces bikes into car lane and increases risk of getting hit by a car door opening
Making this turn to get to Belmont is fairly difficult to do due to traffic. Also a many bicyclists will travel South on 12th street because it is inconvenient or difficult to get to 13th street to go South.
At times a dangerous crossing on you bike due to vehicles going quickly. Not all bicyclists have electric bike and it takes a bit to get on your bike and get it moving iif stopped.
A-Wilson should be a neighborhood greenway prioritized for rolling and walking with diverters, crosswalks, crossbikes, lane islands, wayfinding signage
A-Wilson should be a neighborhood greenway prioritized for rolling and walking with diverters, crosswalks, crossbikes, lane islands, wayfinding signage
Pine-Taylor should be a neighborhood greenway prioritized for rolling and walking with diverters, crosswalks, crossbikes, lane islands, wayfinding signage
Pine-Taylor should be a neighborhood greenway prioritized for rolling and walking with diverters, crosswalks, crossbikes, lane islands, wayfinding signage
2-way parking protected bike lane on the west side of 13th
2-way protected bike lane on east side of 12th from Pacific to June. Make it a parking protected from Union to June to reduce infra costs
Green turn bike box
Protected scramble intersection for walking and biking
protected biking and walking intersection as a route to downtown
neighborhood greenway crossing with wayfinding signage
protected bike lanes on May Street west of Katie's lane and east of Park; instead of routing bikes on May Street across 12th/13th, divert them north and south to safer intersections
Central heights location that would provide a good area for bike racks
Again, reduce on street parking for bike lane, improve off-street parking
13th is a really uncomfortable street to bike - I use it if I'm going south to Rosauers but it always feels sketchy
12th Street is scary to bike on - I use it when I'm in a hurry but will take neighborhood back streets if I'm looking for a more comfortable ride
terrible intersection for bike! Cars aren't paying attention because they are engaged in their own complicated maneuvers
another awful intersection for bikes - especially if you are travelling north on 12th and want to go west on May
Hard to cross this intersection if you are on Belmont heading east
not enough space for bikes on roadway
12th going south where it is 4 lanes is very unsafe.
Concerns about getting doored
Bad intersection for walk and bike
Cars drive fast with limited visibility
Actually, all the areas are nightmares for bicycles. There is no room for us. Cars are hostile. ODOT puts ball bearings (winter rocks) on the road to kill us either by falling or by choking. Biking is really almost too scary to even attempt. Please do something to help.
Too much traffic (fast), parked cars and no bike lane.
Please removing some parking to add Bike lanes on 12th/13th

Please remove some on-street parking for protected bike lanes
Needs more bike parking, less car storage
Awkward E/W Connection to school
Crossing here is a nightmare
E/W could use a bike lane, protected intersections
major change needed
this triangle doesn't work for cars or bikes, redesign needed
cars speed up this hill and don't appear until its too late
Dedicated bike lane, separate from traffic and parking
Safer crossing across 13th and 12th
Safer crossing across 13th and 12th
Protected bike lane (unless there's a 2-way bike lane on 12th)
Poor visibility when trying to cross intersection. Traffic sometimes does not stop
No good way to get to rosauers and ace. Trail is too gravelly to get up hill and sidewalk to narrow and right along road.
Dangerous
visibility
crossing and visibility, parked vehicles close to intersections
Safe and timely crossing
Safe and timely crossing. At peak times there are no safe breaks in traffic flow
Safe and timely crossing
Safe and timely crossing
Safe and timely crossing
Safe and timely crossing
confusion about whose turn it is, and not enough time for bike to get across intersection
No good time for bikes to go because cars never stop coming
This has no good place to ride
This and most intersections in this area oncoming traffic is hard to see because of parked cars. This is a problem with riding bikes or driving a small car
bike lane
totally unsafe for bikes to cross
Need a connection to the indian creek trail
Park should absolutely have a bike lane, it is how kids to bike from downtown to school, swimming, and businesses on the heights. Living downtown I still want to bike to the heights, please make this one way with a bike lane
unsafe to cross
traffic speed, blind corner
left turn on Belmonte, car traffic, speed.
weird intersection
DO NOT promote bike and foot traffic on 12th and 13th. Instead build a dedicated path between 12th & 13th. 12th & 13th are MAJOR arterials for vehicles and should be preserved as such
I do not support bikes lanes in this area. It is a state highway and critical for traffic flow. Bikes should obey current traffic laws and everything will be fine. I do not believe that there is any problem to fix.
Difficult to cross two lanes to pass from Pine St to Taylor St
going from Pine st across 12th to Taylor - Hard sometimes due to traffic in both lanes
Need bike land on 12th street.
Need bike lane on 13th
Bike "green" zone needed to easily cross 13th and 13th on A street
Crossing 12th and 13th is treacherous and sometimes one can not see over the cars parked on the street especially in front of 10 speed coffee. Again, we need a round about there and perhaps another farther north closer to the school path. Bike lanes would be awesome down Belmont to 12 th and 13th so one could ride in

residential area back by May St. School. How about a bike route to get downtown from the Heights. Just bought two electric bikes. Drivers are polite.
Traffic control for cars coming up 13th
Traffic control for crossing 13th
Designated bike street; need bike Xing
Trying to navigate traffic on bike
Trying to navigate traffic on bike
Trying to navigate traffic on bike
Trying to navigate traffic on bike
Trying to navigate traffic on bike
We desperately need a bike lane that starts at Elliot and continues to the hospital. Eliot to Belmont is the ONLY stretch of 4 lanes of traffic in the city of Hood River. It connects an entire neighborhood (Sieverkrop) to the rest of town. It's super dangerous. People go way too fast - they see it as a drag strip.
Hard to make a left turn here (impossible). Traffic circle would help solve that.
crossing traffic, same concerns as pedestrian
crossing
crossing
crossing
accessing Indian Creek Trail, crossing 12 & 13
This is a Bike Route on the side streets but crossing is still not safe.
better bike safety for kids traveling to school

Table 3: When driving in The Heights, what are issues or challenges that you experience that you would like improved?

traveling east-went on belmont and trying to see traffic coming along 12th is difficult/dangerous
Parking impedes ability to safely turn onto this road. Frequent in many places along 12 and 13
Put up barrier to eliminate zigzag cross from Pine St to Taylor
Difficult intersection on all sides. Needs a light or stop. Cars coming from 13th, across from 12th, making right on Belmont and pedestrians, bikers
Possible round-about spot?
Possible round-about location? This is a ridiculous intersection. I heard from Dan Burden (street/walkability expert) that it is one of the WORST he has seen in the wcrld.
Another bad intersection...needs improvement.
Would love to see single-lane of driving to allow for protected bike lane and back in parking.
Would love to see single-lane of driving to allow for protected bike lane and back in parking.
hard to see people coming from the north
hard to cross from west to east
Difficult to cross traffic
This intersection should have been reconfigured during the hospital construction. Continuing north on 12th is confusing and dangerous for drivers and pedestrians!
Traffic comes in too fast into this section. Is there a way to slow them down, realizing there is congestion in this area.
Slow drivers down so they realize they are coming into a congested area.
Very difficult intersection to get across 13th. The visiabilty is poor due to cars speed coming into this intersection from the north.
how amazing it would be to close 12th to cars and have a pedestrian only district
let the two lanes of traffic here to flow in both directions
Vegetation makes it hard to see road
very busy intersection
Trying to turn onto 12th is so scary and difficult with the loss of vision because of parked cars and traffic
Trying to turn with oncoming traffic and no traffic light
Hard to go straight through to 12th street with difficult seeing oncoming cars
Poor visibility for cars trying to cross 13th
Bad pavement for cars and bikes
Tourists very frequently drive the wrong way down one way.
speeding cars, cars do not stop for pedestrians, cannot see oncoming traffic, no traffic control
Cannot see cars coming up the hill, speeding cars
Reduced sight lines make this a hazardous intersection
No turn on red light is problematic and non-residents constantly get pulled over for the traffic violation
The couplet is an eyesore. Would benefit of some visual enhancement to let people know they are entering 'the heights'
Street parking in 13th makes it very difficult and unsafe for all east-west traffic to pull out. Attention is on gaps in traffic through brief windows and attention is not on pedestrians nearby.
The visibility here is bad. You have to go way out to see the traffic and them most of the people are turning in front of you to go west on Belmont.
Going west bound on Belmont across 13th can feel like taking a leap of faith.
Dangerous crossing with low visibility
round about
Awkward for southbound traffic to turn east here
Hard to cross eastbound here
Awkward to joking southbound and westbound drivers here at the stoplight. Hoses up intersection and creates blocked road sometimes

weird intersection
people come up the hill and change lanes which makes a dangerous situation for people turning and crossing Taylor, coming out of the parking lots, etc. from 13th st.
parked cars make visibility of oncoming traffic horrible when turning on to 13th St.
horrible intersection. people drive to fast and at busy times it can be hard to get across 13th on belmont
parked cars make visibility very bad turning onto 12th st from pine st
people drive too fast coming from may st - something to slow traffic would be nice
people drive way too fast coming into this section of 12th st. traffic calming features would be great. Makes it hard to pull out from parking or side streets onto 12th and is also super dangerous for walkers and bikers
street parking makes visibility really bad turning onto 12th st from june st
Poor visibility. Parking too close to corner on west side fo 12th south of A street
Bad visibility for turning onto 12th. Parking too close to corner on west side of 12th
Parked cars, a tree with low branches and a poorly placed traffic sign all block the view of oncoming traffic when trying to cross 13th from east to west. One has to pull so far forward that it blocks the sidewalk crossing on 13th and cars turning left from 13th onto A have to be very careful to avoid the cars on stopped on A trying to see oncoming traffic.
Poor visibility of oncoming traffic while trying to cross 12th from east to west. Cars often parked in yellow in front of auto shop. Traffic on 12th going too fast
Drive up banking traffic often backs up onto Wilson causing congestion and confusion and danger.
cars pulling out of gas station and changing lanes make this location dangerous
cars often parked in yellow zone. Large trucks often obstructing view.
traffic going south on 13th should not be able to turn left onto May street.
bad visibility for crossing 13th. Parking too close to corner. Traffic going too fast.
on street parking and delivery trucks crowd the street here. Probably better as a one way
on street parking and delivery trucks crowd the street here. Bank drive up often extends onto road. Probably better as a one way
lane changes to turn left onto Taylor from 12th make this spot congested
Traffic going too fast to safely cross 13th on Belmont
Poor visibility for drivers trying to cross or turn onto 13th.
Drivers are so focused on looking south for oncoming traffic that they are unaware of pedestrians trying to use the crosswalk on the north side of the intersection of 12th and A
A lot of lane changing on the curve here gets dangerous.
On street parking and delivery trucks crowd the street here. Probably better as a one way
Impossible to see oncoming traffic to turn safely on to 13th from any of these cross streets due to parked cars blocking the view
People often stop in the left hand turn lane which is meant for pacific ave in order to turn into the gas station, which blocks traffic flow. Same issue with cars turning immediately into Walgreens off pacific, which blocks other cars in the 12th/pacific intersection, creating much congestion
With parking on both sides plus two lanes of traffic, lanes are narrow and there is high risk of hitting parked cars and getting your door dinged when you open it. Consider reducing to one lane to leave room for parking and bike lanes
When heading west on Belmont, crossing 13th, very difficult to see oncoming traffic with curve and parked cars on east side of 13th. Also hard to cross two lanes of oncoming tradfic
Poor sight lines. Traffic moves too fast.
Poor sight lines. Traffic moves too fast. Heavily used corner.
Extremely poor sight lines
Traffic moves too fast. Heavily used intersection.
Poor sight lines
It is hard to see pedestrians. It is very easy to go too fast.
It is hard to see pedestrians. It is very easy to go too fast.
It is hard to see pedestrians. It is very easy to go too fast.

It is hard to see pedestrians. It is very easy to go too fast.
It is hard to see pedestrians. It is very easy to go too fast.
It is difficult to cross east to west at this intersection because it is often difficult to see on-coming traffic.
Belmont and 12th and 13th should be a Dutch style roundabout that would increase flow and safety
Dutch roundabout to increase flow, safety and emergency evacuation
No visibility to cross 13th street
visibility at crosswalks
with the one-way streets you accelerate up the hill and are suddenly going 35 mph through the district. Street design encourages drivers to go fast
the wiggle - drivers from Pine street want to get onto 13th southbound and they do this getting onto 12th, cutting across both travel lanes and taking a left on Taylor
wide streets and one way traffic, everyone drives fast. Makes the Heights a place you drive through rather than a destination
pretty crazy intersection
Most intersections pose chance of being rear-ended when you stop for a pedestrian and the fast moving traffic behind you doesn't
very hard to cross 13th on Belmont because 13th st traffic is constant and fast moving
Too easy to go fast. Poor visibility.
The large number of intersections makes it hard to change lanes safely.
It's hard to see pedestrians trying to cross. A crosswalk with a flashing light would be helpful.
Cars are parked way too close to all intersections and you have no visibility of people in crosswalks until you are right on them. Also this intersection is one where people get so frustrated waiting for an opening at busy times that they just fly across.
Slow traffic to 20 mph
Slow traffic to 20 mph
Better timing of lights
Enforce parking restrictions and closed street crossing
busy times of day traffic backs up to the intersection.
Traffic backup
Traffic
Ability to turn on red light.
cant see when crossing
cant see when crossing
confusing intersection easy to accidently turn left down the one way. not sure weather to pull up to the traffic light or the stop sign. fast moving traffic
hard to know if cars are turning east onto may. you think its safe to go left into the left lane... but then it isnt.
This is a confusing mess. Maybe just a 4-way stop here?
Make 13th a two-way through-traffic route. Roundabout to provide access
Provide bump-outs at intersections so easier to see pedestrians.
Treatments to slow the traffic in this pedestrian/bike zone. We do NOT need to improve traffic flow. It flows through there too fast.
Speed and cross traffic impair visibility of ped. at all intersections on 12th and 13th
Parked cars by crosswalks impede visibility of pedestrians.
Same as B St.
Drivers don’t slow down soon enough when entering the heights.
This is a bad combination of left/right turns. Cars often make the left-hand turn into oncoming traffic.
In combination with north-bound traffic from 12th St turning right, this is a dangerous intersection for south-bound car at the stop sign. The left-turning cars often turn into oncoming southbound traffic (lazy left turns). I think this could be remedied with a traffic circle.

The change for pedestrians crossing has helped this corner greatly. However, southbound drivers often change lanes (into the left lane, just past May St) while a left turning vehicle facing west on May St is turning left. There can be a back up of vehicles on westbound May St, waiting to turn left.
Pedestrian visibility
Pedestrian visibility
Pedestrian visibility
Pedestrian visibility
Impossible to drive through this intersection heading west. Difficult to cross going east.
Pedestrian visibility
Pedestrian visibility
Pedestrian visibility
Traffic light
Visability
Visability
Really, I could put a pin down on each intersection. Site access turning off any of these intersections is difficult because car can parallel park right up to the intersections edge and they are often big and hard to see around.
Dangerous
Visibility
As long as 12th and 13th are the only north/south transit from upper and lower Hood River, any attempt to reduce volume or speed of vehicular traffic will generate different user conflict.
Hard to cross intersection E-W because N-S cars rarely provide adequate gap. Therefore too many unsafe chances taken to shoot the gap
Hard to see to the right when coming from the West to see when it's safe to enter traffic. Few gaps in traffic so have to chance it a bit. Usually turning left here (North)
When going from West - East here, often have to punch it across intersection to make it between never-ending flow of cars up the hill from the North. Feels unsafe every time I do it, which I feel is necessary if I ever want to get across.
Visibilty for cross traffic to see oncoming traffic
Visibilty for cross traffic to see oncoming traffic
Visibilty for cross traffic to see oncoming traffic
Needs to be better marked so drivers do not turn wrong way into on-coming one-way traffic
All of these east west intersections have parking spots to close seeing oncoming traffic is almost impossible
People drive to fast
People drive to fast
turning left can be tricky due to bushes the block your view of on coming traffic on the right
Trees and cars on the right block view to safely turn left
too much going on at this intersection
too much going on
this whole block should be a roundabout
unsafe to cross. It's taken me 10 minutes to cross after dropoff at daycare
really dangerous for cars trying to get E to W and turn left to go back up 12th
would be better for cars if there was only parking on one side of the street and a clearly separated bike line. With cars parking on both sides and pulling out I've almost gotten into accidents twice
poor visability
people need to slow down here
heading south from Pine Str. Right turn on 12, left turn on Taylor and right left turn on 13. AND then you are finally heading to Rosauers. All three turns across traffic, or into fast moving traffic.
Cross 13 on Belmont, bad line of sight, two lane fast traffic. Only way to head West from Rosauers. This place needs a "round about" Good luck City, with the State Hwy. Dept.
Need a roundabout at Belmont/12th/13th
Roundabout here

people driving up the hill much faster than 25 and changing lanes at intersections / visiblity for oncoming and cross traffic is terrible at all the intersections where onstreet parking blocks visibility
Somewhat of a blind corner westbound
somewhat of a blind stop eastbound
Confusing intersection
Confusing intersection
It's hard to guess which cross street to use to access the businesses on the opposite directional street.
Dangerous intersection. Close Belmont between 12th & 13th
Do NOT reduce traffic flow or impede volume efficiency in any way
Do NOT reduce traffic flow or impede volume efficiency in any way
People trying to go "straight" from Pine Street, across 12th to get to 13th.
Difficult to see to turn left onto 12th street
I do not think this thoroughfare should be altered in a way that restricts traffic flow. It is a state highway and critical to productive traffic flow. Same with 12th street. you can make it look prettier if you want, but don't impede traffic flow. Bikes do just fine on this road. Leave it alone. I don't like in the heights now, but I did for 10 years and never had a problem. But this road is critical to locals for traffic flow.
This street needs to remain uncongested by bikes lanes, etc. and kept at two lanes for critical traffic flow. It is a state highway.
Hard to merge with traffic
Crossing 13th on Belmont is difficult
Traffic is going too fast on both 13th, and 12th. Especially on 13th. Reduce lanes and posted speed
Signal at 13 and Belmont
People turning north off of pine and going directly west on Taylor.
Crosswalk light to alert vehicles coming up 13th
Vehicles entering 13th from side streets often have obstructed views of roadway by oversized vehicles parked at intersections.
during busy summer months it is very difficult to drive E-W or W-E across traffic. For instance it is very difficult to leave the doctors office at 13th and montello to drive north or east.
of all the crazy intersections in HR this might be the most bizarre. It is unintuitive and dangerous for drivers, walkers and bikes.
last summer I witnessed 6 wrong way drivers on 12th st. I don't live or work on this street but I drive it frequently.
Poor visibility at this busy intersection with fast moving n-s traffic
when trying to turn N onto 12th visibility is poor
when trying to turn N onto 12 visibility is poor
poor visibility when trying to turn N onto 12th
poor visibility when trying to turn N onto 12th
Traffic control crossing 13th on Belmont
Traffic control for crossing & turning from May
cross 12th
cross 12th
cross 12th
cross 12th and get to taylor
cross 12th
cross 12th
round about would help slow traffic
People backing out of the professional building on the corner of 13th and Taylor stop traffic on Taylor and 13th while they back out.
Westbound cars on Pine Street turning onto 12th and then left onto Taylor Street make it hard to turn left from Taylor onto 12th. Cars cutting the corner from 12th St. turning onto Taylor. Cars on Taylor having to pull forward to see past the parked cars on 12th.
Vehicles turning left on Taylor from 13th St. from the right hand Lane. Thinking it's two way traffic?

visibility, safety
visibility, safety
visibility, safety
visibility, safety
speeding
speed, visibility for pedestrians
Blind corner turning south from east.
Not a blind corner, but I tend to avoid this intersection completely, as heading west on Belmont, I sometimes wonder if I will make it before someone driving from the north (on 13th) will appear at the last minute. One-way was _not_ a good change on 13th, or 12th.
Dangerous to head across 13th from the east on Taylor. Sloped road and cars coming from May to 13th as well as those headed south on 13th have just negotiated a tricky intersection and aren't prepared for folks going across 13th on Taylor. Bad, especially for Heights residents wanting to go the Jackson Park. Walking would be Horrible!
Difficult to go from Pine street West bound to 13th street in order to drive south

memo

to Will Norris and Dustin Nilsen, City of Hood River

from Alex Dupey, AICP, Nathan Polanski, PE, MIG

re The Heights Streetscape Plan

Spring 2022 Communications Plan, Open House, and Survey Rollout

date March 4, 2022

This memorandum provides a brief overview of the proposed communication and media rollout for Phase 2 of the Heights Streetscape Plan. The purpose of this memorandum is to coordinate with the City's communication team and identify roles and responsibilities for the public open house and online survey.

Target Date: The open house will occur on 22nd-23rd with the survey launched one week in advance of the open house and remaining open for two to three weeks after the event.

The event will be Friday 5pm-9pm and Saturday 10am-2pm.

Survey Dates: Survey will be distributed one week in advance of the Public Open house. Respondents will have three to four weeks to fill out the survey.

Tools

City newsletter: City is developing and distributing newsletter in early March

Social Media: Three posts (for Facebook) in advance of the public event and survey to drive interest. Posts will have minor wording changes to let people know about the event and upcoming survey.

- Posts will include the same graphics used for the postcard/poster
- Posted in both English and Spanish.
- Post language to be developed
- Target people to share (Chamber, The Next door, URAC businesses etc.)

Website: MIG and City will complete regular updates starting mid-March for project related information. City website will include banners and introductory information. Project website will include:

  - Narrative
  - Video
  - Micro polls (TBD)

Printed collateral materials and infographics:

Schedule

February: Complete

URAC: MIG and City provide project update to the committee. Key points of the update will include:

- Provide general update on the project
- Present the opportunity to be ambassadors and tour guides during the open house
- Help promote the community event and open house
- Workshop marketplace? Inside and outside

MARCH

February 27-March 5

Revised Draft Communications Plan: MIG will update the communications p an with current information.

City: Confirm actions and establish internal schedule for production. Nubia and Paige to review

City newsletter: City to create a brief story for the citywide newsletter that identifies where are in the process and what's coming up in the next three months.

- Create brief process schedule showing where we're at and where we're going
- Identify information on the website that is currently available including preliminary concepts (subject to change)
- Contact information for the project

March 6-12

Draft Open House Plan: MIG will provide an open house meeting plan that provides approximately six weeks in advance of the open house. City to review and provide comments

City: Review draft open house plan to prepare for discussion with URAC member on March 17th.

March 13-19

Draft Survey/Virtual Open House Framework: MIG will develop a draft survey framework. Survey and open house will be aligned in terms of content and imagery and developed as a virtual open house with opportunities to provide input. MIG will strive to write the survey and open house materials in "plain" language.

City: Review draft survey framework. (one week)

Revised Open House Plan: MIG will update the open house plan based on City comments. Revised draft due to the City by March 14th

City: City will distribute draft open house plan for discussion at the March 17th URAC meeting

URAC Update (March 17): MIG will present open house plan (MIG to provide materials on/before 6/14 so City can submit materials to the URAB in advance of the meeting).

Infographic #1: MIG to develop an infographic illustrating where have we been, how many people have we talked to, and what options are being considered. To be formatted for both the open house and social media.

City: City to review and when ready distribute on social media feeds

Infographic #2: Options considered and preliminary evaluation results. Include key issues such as parking, traffic and placemaking

City: City to review and when ready distribute on social media feeds

Radio and Update to St. Mary's (City): City to discuss project and upcoming event/survey. The City will work with St. Mary's to update their congregation.

March 20-27

Website Update: MIG will update the website to add date(s) for the public event:

- Introductory video(s) describing the key aspects of each alternative and draft evaluation (**TBD**)
- Introductory videos introducing the alternatives and evaluation (TBD)

Commented [AD1]: We are meeting with Dustin's video person on March 8th to discuss

City: City to incorporate the open house information onto the City's main landing page banner.

Posters and Postcards: MIG will update the postcards and posters from Phase 1 for the current engagement window.

- Distributed to local businesses and interested parties
- Spanish and English
- QR Code and teaser wording developed to provide post context, information about the meeting and link to survey
- Formatted to be used on Facebook

City: City to print and distribute

Social Media (City): City to post postcard graphics on social media. Posts should be in English and Spanish

Post 1#: We want to hear what you think! Over the last several months, the project team has been developing street design options for 12th and 13th in the Heights. Sign up for updates and check back for information about an upcoming survey and open house.

APRIL

March 28-April 2

Press Release: MIG to develop press release

City: Review press release and submit to local media

April 3-April 9

Social Media (City): City to post postcard graphics on social media. Posts should be in English and Spanish

Post 2#: Put it on your calendar. We want to hear what you think! Over the last several months, the project team has been developing street design options for 12th and 13th in the Heights. Sign up for updates and check back for information about an upcoming survey and open house.

April 10-April 16

Social Media (City): City to post postcard graphics on social media. Posts should be in English and Spanish

Post 3#: Take the survey (LINK) about street design options in the Heights! Sign up for updates and visit us during our open house on April 22-23rd at the Armory. Food and beverages will be available from local vendors. Make it a date! This is a family-friendly event.

April 17-April 23

Social Media (City): City to post postcard graphics on social media. Posts should be in English and Spanish

Post 4#: We want to hear what you think! Come talk to community members and the project team about potential street designs in the Height. Food and beverages will be available from local vendors. Make a night of it! This is a family-friendly event. Or take the survey here LINK.

In-Person Public Event: April 22-23 (Meeting plan is currently being developed): MIG and City will host an event occurring over two days to gather input on the streetscape options.

Friday: Happy Hour with food carts/beverages for sale in the parking lot of The Armory. Branded as a family-friendly community event. Open house event will be self-directed, with staff, consultants, and URAC members acting as "tour guides." Anticipated event time 4-7pm, with additional setup/breakdown times.

Saturday: Open House with meeting times of approximately three hours.

Materials (tentative):

- Short video of the 5 minute overview as an intro
- Open house will be structured similar to the online survey section (survey sections become open house stations)
- MIG will a create a "tour guide brochure" that steps through each of the alternatives and asks questions at each station. The tour guide will provide opportunity to provide written input.
- MIG will create posters that provide brief project summaries, graphically illustrate proposed alternatives, and provide general timeline of expected next steps.
- MIG will provide an open house floorplan with locations for stations, seating, and tables.

Anticipated modifications due to COVID-19: No changes assumed at this point, unless capacity or social distancing measures are still required

April 24-30th

Social Media (City): City to post postcard graphics on social media. Posts should be in English and Spanish

Post 5#: Don't Miss Your Chance: The Heights Streetscape Plan Alternatives | Take the Survey.

MAY

May 1-7

Social Media (City): City to post postcard graphics on social media. Posts should be in English and Spanish

Post 6#: Last Chace: The Heights Streetscape Plan Alternatives | Take the Survey.

Dear [Insert recipient]:

The City of Hood River is inviting you to preview the potential street design concepts that have been developed through the Heights Streetscape Plan public planning process. Your input is valuable, and we hope you will be able to attend. The Heights Streetscape Plan preview will be held at the Armory on **April 22nd from 4-5pm**. You can also attend the public open houses from 5-9pm on Friday, or on Saturday April 23rd from 10am-2pm.

The Heights Streetscape Plan will establish a comprehensive plan for the major arterials, side streets and intersections along the six block area along 12th and 13th streets between May and Belmont/Union Streets. In addition to addressing pedestrian and traffic flow, the project is exploring how design strategies could support a stronger sense of community identity for the area.

We hope you can attend the preview or one of the public events. We look forward to talking with you.

Best,

Dustin Nilsen, Director of Planning & Zoning
The Heights Streetscape Plan Project Manager

PRESS RELEASE

City of Hood River Seeks Community Input on Streetscape Alternatives

Creating a stronger community identity for the Heights includes addressing pedestrian safety, traffic flow and improved streetscape that supports local businesses. The two-day open house at the Armory and an online survey will provide the community opportunities to discuss the future comprehensive multimodal streetscape plan.

Hood River, OR. – DATE – The City of Hood River will host a two-day open house on April 22nd from 5 to 9pm and April 23rd from 10am to 2pm for the Hood River community to provide input on potential concepts for 12th and 13th Streets in the Heights. The open house will have project staff on hand and materials to discuss. Food and beverages will be available for purchase from local vendors. The open house will occur at the Armory (1590 12th St).

As part of the community outreach process, the City is also launching a community-wide survey, starting DATE, to gather community input on the potential street concepts. The three-week online survey is part of the alternatives phase of an 18 to 24 month effort to formalize a comprehensive streetscape and urban design plan in coordination with the Hood River Urban Renewal Agency with renewed emphasis on addressing traffic, transit, bicycle and pedestrian safety, walkability, and the area's local businesses.

The goal is to establish a comprehensive plan for the major arterials as well as the side streets and intersections along the 5-6 block area that stretches along 12th and 13th streets and that is bounded by May Street and Belmont/Union Streets. In addition to addressing pedestrian, bicycle, and traffic flow, the project is exploring how design strategies could support a stronger sense of community identity for the area.

The process will provide an opportunity for the community to provide input that will shape elements such as biking enhancements; intersection improvements and other street designs; parking; alley uses; adjacent development; and other possibilities. The process is being guided in conjunction with the community engagement and design firm, MIG. MIG is providing engineering and design support, and is developing a concept plan based on technical analysis and community input. Information about the project and links to the survey is available online at https://cityofhoodriver.gov/urban-renewal/the-heights-streetscape-plan/.

"We want to hear from residents and businesses about this important project. We're also excited to be able to meet in person in what will be a family-friendly environment with food, drinks, and activities for the whole family. We need your input now to help us define recommendations for improvements in the Heights. Community participation is key to ensuring that this project reflects the vision of the community as we work together to plan safer streets that support businesses and economic opportunities, embraces our history, and enhances the livability and image of the entire Hood River community," said Dustin Nilsen, The City of Hood River's Director of Planning and Zoning and Project Manager for the streetscape plan.

This project is funded through the Heights Urban Renewal District that was created by the City in 2011 to focus on improvements in the Heights, including those that address streetscape modifications to improve safety for bicycles and pedestrians along 12th and 13th Streets, which also serve as State Highway 281.

Attachment 8 - Phase 2 Public Open House Materials and Summary

THE HEIGHTS STREETSCAPE PLAN

DESIGN CONCEPT 1 - TWO LANE, TWO-WAY CIRCULATION + STREET SECTIONS

13th STREET "MOBILITY STREET"

12th STREET "MAIN STREET WITH PARKING"

MAY STREET

DESIGN CONCEPT 1 - TWO LANE, TWO-WAY INTERSECTION CONCEPT

12TH AND 13TH STREETS AT MAY STREET

DESIGN CONCEPT 1 - TWO LANE, TWO-WAY INTERSECTION CONCEPT

12TH AND 13TH STREETS AT BELMONT AVENUE

DESIGN CONCEPT 1 SUMMARY

OVERVIEW

- converts 12th and 13th Streets to two-way traffic
- traffic signals manage vehicle flow at key intersections
- gathering spaces are located in curb extensions or in place of on-street parking
- widths of sidewalks are similar to today's sidewalks
- possible future bus stops align with crosswalks
- separated bike lanes replace parking on 13th Street

12TH STREET

13TH STREET

TRAFFIC CALMING

Two-way traffic and curb extensions at intersections help to slow vehicle traffic

TRAFFIC CONGESTION

IMPROVES BUSINESS ACCESS AND VISIBILITY

Two-way traffic provides visibility in both directions, especially at intersections

PROVIDES COMFORTABLE PLACES FOR WALKING

PROVIDES COMFORTABLE PLACES FOR BIKING

One-way bike lanes on 13th are separated from traffic and simplify neighborhood connections

CREATES OPPORTUNITIES FOR PLACEMAKING

Gathering spaces are located in curb extensions and places where parking is removed

ALIGNS WITH SRTS GOALS

Aligns well with Safe Routes to School recommendations

PARKING*

COST TO IMPLEMENT

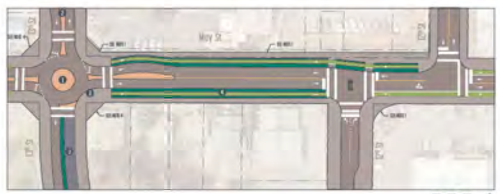
$$$

THE HEIGHTS STREETSCAPE PLAN

DESIGN CONCEPT 2 - ONE LANE, ONE-WAY CIRCULATION + STREET SECTIONS

DESIGN CONCEPT 2 - ONE LANE, ONE-WAY INTERSECTION CONCEPT

12TH AND 13TH STREETS AT MAY STREET



DESIGN CONCEPT 2 - ONE LANE, ONE-WAY INTERSECTION CONCEPT

12TH AND 13TH STREETS AT BELMONT AVENUE

DESIGN CONCEPT 2 SUMMARY

OVERVIEW

- 12th and 13th Streets reduced to one-lane of traffic
- uses roundabouts at key intersections (requires additional right-of-way)
- creates opportunities for expanded gathering spaces
- wider sidewalks and shorter street crossings
- possible future bus stops align with crosswalks
- a shared path for walking and biking on 13th Street

12TH STREET

- parking on both sides of the street
- additional space for gathering and landscaping

13TH STREET

- a shared path for people walking and biking (instead of bike lanes)
- parking on one side of the street

TRAFFIC CALMING

A single lane of traffic narrows the road and supports slow vehicle speeds.

TRAFFIC CONGESTION

Has the most congestion of any concept and significant delay for traffic on side streets.

IMPROVES BUSINESS ACCESS AND VISIBILITY

One lane streets improves access for people walking to businesses.

PROVIDES COMFORTABLE PLACES FOR WALKING

More separation from the roadway and narrow streets but mixing with bikes on 13th.

PROVIDES COMFORTABLE PLACES FOR BIKING

A shared path on 13th provides a slow, comfortable place for biking but mixes with walking.

CREATES OPPORTUNITIES FOR PLACEMAKING

Narrower streets create more opportunities for placemaking.

ALIGNS WITH SRTS GOALS

Aligns well with Safe Routes to School recommendations.

PARKING*

May remove 20% of 141 existing on-street parking spaces on 12th and 13th

COST TO IMPLEMENT

$ $ $ $ $

THE HEIGHTS STREETSCAPE PLAN

DESIGN CONCEPT 3 - HYBRID CIRCULATION + STREET SECTIONS

DESIGN CONCEPT 3 - HYBRID INTERSECTION CONCEPT

DESIGN CONCEPT 3 - HYBRID INTERSECTION CONCEPT

DESIGN CONCEPT 3 SUMMARY

OVERVIEW

- 12th Street becomes one-way with one travel lane and angle parked
- 13th Street converts to two-way traffic with a center turn lane
- Incorporates a roundabout at 13th and May (requires additional right-of-way)
- creates opportunities for gathering spaces along 12th Street but not along 13th Street
- Sidewalk widths are similar to today
- possible future bus stops align with crosswalks
- Two-way cycle track located on 12th Street

12TH STREET

13TH STREET

TRAFFIC CALMING

TRAFFIC CONGESTION

IMPROVES BUSINESS ACCESS AND VISIBILITY

PROVIDES COMFORTABLE PLACES FOR WALKING

PROVIDES COMFORTABLE PLACES FOR BIKING

A separated two-way cycle track on 12th

CREATES OPPORTUNITIES FOR PLACEMAKING

ALIGNS WITH SRTS GOALS

Aligns well with Safe Routes to School recommendations

PARKING*

COST TO IMPLEMENT

$ $ $ $

THEHEIGHTS STREETSCAPE PLAN

STREET DESIGN ELEMENTS

Use sticky dots to identify which images you think should inform the selection of materials and atmosphere of the streetscape.

MATERIALS









PLACEMAKING











DESIGN AND ATMOSPHERE





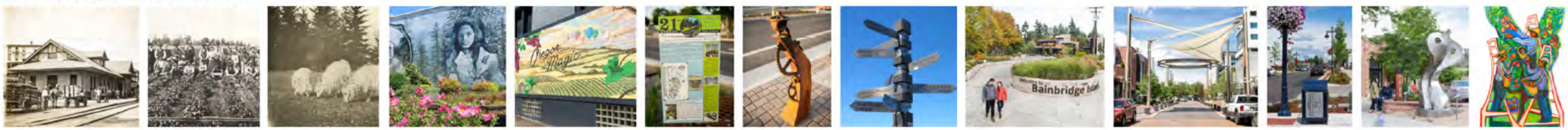

THE HEIGHTS
STREETSCAPE PLAN

STREET DESIGN ELEMENTS | ELEMENTOS DE DISEÑO DE CALLES

Use sticky dots to identify which images you think should inform the selection of materials and atmosphere of the streetscape.
Use puntos adhesivos para identificar qué imágenes cree que deberían informar la selección de materiales y la atmósfera del paisaje urbano.

MATERIALS | MATERIALES

PLACEMAKING | LUGAR DE FABRICACIÓN



DESIGN AND ATMOSPHERE | DISEÑO Y AMBIENTE

THE HEIGHTS STREETSCAPE PLAN

PROJECT HISTORY TIMELINE

- **Heights District Urban Renewal Area Public Input Summary** — January 2018 — A Community preference is identified for "a multi-faceted project... focusing on public transportation safety"
- **City Issues RFP for Developing a Streetscape Plan for the Heights** — December 2019
- **Urban Renewal Agency approves comprehensive project for the Heights** — September 2020
- **Phase 2: Develop Concepts** — September 2021 – Present — Develop preliminary concepts and a recommended design for the Heights

2018 — **City Adopts Current Transportation System Plan**

2019 — **Walkshop with Dan Burden**

Streets Alive Demonstration Project

2020

2021 — **Phase 1: Develop Project Goals**

PROJECT SCHEDULE

PHASE 1 - GOALS, OPPORTUNITIES AND ISSUES

In March 2021, approximately 340 people from a diverse group of business, community and residential stakeholders provided input on draft project goals, opportunities, and areas that need improvements.

PHASE 1 - PROJECT GOALS

- **Goal 1** - Calm **traffic** and improve intersections to improve safety for people driving, walking, biking, taking transit and supporting local businesses.
- **Goal 2** - Preserve and promote a **livable community and economy** through streetscape improvements that increases safety for people walking and biking and addresses parking needs to support local business access, and [illegible] development.
- **Goal 3** - Create an **identity for the Heights** that reflects the diverse culture and history of the area and as destination for local residents for goods and services.
- **Goal 4** - Create [illegible] gathering spaces that provide **safe, comfortable places for people** walking, accessing transit, and biking along and across the corridor and that connects area recreation and commercial destinations and neighborhoods.
- **Goal 5** - Support existing and future development by maintaining and improving **utility infrastructure** as part of the streetscape project.
- **Goal 6** - **Engage local residents and businesses**, the school district, and those that use the corridor to provide ongoing input in the streetscape project.
- **Goal 7** - Provide **locations for people** to gather, to [illegible].

PHASE 2 - EVALUATION CRITERIA

Each Project Goal was further defined to create evaluation criteria to understand how well the design concepts meet project goals.

- **Goal 1 (traffic)** - provides traffic calming, accommodates vehicular traffic, improves intersections for safety
- **Goal 2 (livability)** - accommodates parking, supports the local economy, supports livability, adapts seasonally
- **Goal 3 (local identity)** - opportunity for creating identity, supports the Heights as a destination for locals, creates opportunities for an enhanced landscape
- **Goal 4 (connecting people)** - provides comfortable places for walking, provides comfortable places for biking, aligns with Safe Routes to School goals, improves connections, connects to planned bike route
- **Goal 5 (utility infrastructure)** - impacts to utility infrastructure
- **Goal 6 (community engagement)** - will be part of the final evaluation after the public has had the opportunity to review and provide comments on the design alternatives and evaluation process
- **Goal 7 (placemaking)** - creates opportunities for placemaking
- **Feasibility** - potential cost and funding opportunities for implementation, potential construction impacts, ability to maintain the proposed infrastructure improvements, ease of obtaining ODOT design approval, property impacts and the potential need for right of way acquisition

PHASE 2 - PARKING STUDY

PURPOSE: The project team evaluated parking space types and availability compared to existing and future demands.

EXISTING PARKING:
- 304 on-street stalls
- 410 off-street stalls (privately owned)
- 714 total parking stalls

EXISTING PARKING USE:
- Peak parking demand occurs weekdays during lunch
- 367 parking stalls observed in use, resulting in 51% occupancy

FUTURE ESTIMATED PARKING DEMAND:
- 651 parking stalls (based on growth assumptions)

1942 MAP OF THE HEIGHTS

CURRENT ADOPTED TRANSPORTATION SYSTEM PLAN 2011 CIRCULATION + STREET SECTIONS

*The City's current Transportation Plan would remove 60% of on-street parking spaces from 12th and 13th Streets

THE HEIGHTS STREETSCAPE PLAN

DESIGN CONCEPT 1 - TWO LANE, TWO-WAY CIRCULATION + STREET SECTIONS

13th STREET "MOBILITY STREET"

12th STREET "MAIN STREET WITH PARKING"

MAY STREET

DESIGN CONCEPT 1 - TWO LANE, TWO-WAY INTERSECTION CONCEPT

12TH AND 13TH STREETS AT MAY STREET

DESIGN CONCEPT 1 - TWO LANE, TWO-WAY INTERSECTION CONCEPT

12TH AND 13TH STREETS AT BELMONT AVENUE

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12TH STREET

13TH STREET

TRAFFIC CALMING

Two-way traffic and curb extensions at intersections help to slow vehicle traffic

TRAFFIC CONGESTION

IMPROVES BUSINESS ACCESS AND VISIBILITY

Two-way traffic provides visibility in both directions, especially at intersections

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PROVIDES COMFORTABLE PLACES FOR BIKING

CREATES OPPORTUNITIES FOR PLACEMAKING

ALIGNS WITH SRTS GOALS

Aligns well with Safe Route to School recommendations

PARKING*

COST TO IMPLEMENT

$$$

THE HEIGHTS STREETSCAPE PLAN

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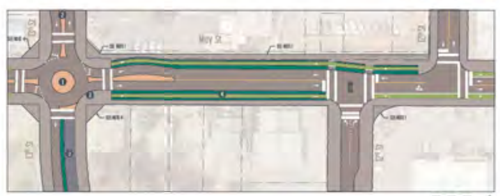

DESIGN CONCEPT 2 - ONE LANE, ONE-WAY INTERSECTION CONCEPT

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12TH STREET

13TH STREET

TRAFFIC CALMING

TRAFFIC CONGESTION

IMPROVES BUSINESS ACCESS AND VISIBILITY

PROVIDES COMFORTABLE PLACES FOR WALKING

PROVIDES COMFORTABLE PLACES FOR BIKING

CREATES OPPORTUNITIES FOR PLACEMAKING

ALIGNS WITH SRTS GOALS

PARKING*

COST TO IMPLEMENT

$ $ $ $ $

THE HEIGHTS STREETSCAPE PLAN

DESIGN CONCEPT 3 - HYBRID CIRCULATION + STREET SECTIONS

13th STREET "THROUGH STREET"

12th STREET "PEOPLE STREET"

MAY STREET

DESIGN CONCEPT 3 - HYBRID INTERSECTION CONCEPT

12TH AND 13TH STREETS AT MAY STREET

DESIGN CONCEPT 3 - HYBRID INTERSECTION CONCEPT

12TH AND 13TH STREETS AT BELMONT AVENUE

DESIGN CONCEPT 3 SUMMARY

OVERVIEW

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- Sidewalk widths are similar to today
- possible future bus stops align with crosswalks
- Two-way cycle track located on 12th Street

12TH STREET

13TH STREET

TRAFFIC CALMING

One lane and angle parking slow traffic on 12th, but 13th has a wider roadway

TRAFFIC CONGESTION

Traffic flow is better than concept 2 for southbound congestion and safe street design along 13th will be significant

IMPROVES BUSINESS ACCESS AND VISIBILITY

12th improves local business access, but 13th reduces access and visibility

PROVIDES COMFORTABLE PLACES FOR WALKING

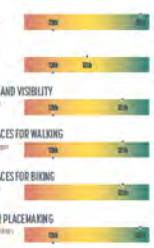
Shorter street crossings across 12th, longer crossings and less separation on 13th

PROVIDES COMFORTABLE PLACES FOR BIKING

A separated two-way cycle track on 12th

CREATES OPPORTUNITIES FOR PLACEMAKING

More opportunities on 12th, less opportunities on 13th



ALIGNS WITH SRTS GOALS

Aligns well with Safe Routes to School recommendations

PARKING*

May remove 40% of 141 existing on-street parking spaces on 12th and 13th

COST TO IMPLEMENT

$ $ $ $

THE HEIGHTS STREETSCAPE PLAN

Frequently Asked Questions

Q: What is the purpose of The Heights Streetscape Plan project?

A: The Heights Streetscape Plan will identify ways to improve 12th and 13th Streets through the Heights for people who drive, walk, bike, take the bus, and shop at local businesses. The plan will include recommendations for improvements to 12th and 13th Streets and the intersections and the streets between May Street and Belmont Avenue.

Q: Is the Oregon Department of Transportation (ODOT) involved in the project?

A: 12th and 13th Streets are part of the state highway system (OR-281). ODOT owns the public right-of-way and maintains the roadway, crosswalks, and curb ramps along OR-281; the city maintains the sidewalks. ODOT has been involved in the planning process. Future projects resulting from this planning process will need to be permitted by ODOT.

Q: How much will future street and intersections improvements cost to build and how will it be paid for?

A: The estimated cost to design and construct street improvements will be identified after a preferred design is developed. The cost to reconstruct all of the streets and intersections in the study area will exceed $25 million dollars.

The City expects improvements will be paid for by a combination of funding sources, including the Heights Urban Renewal District, City funds for street and utilities, ODOT funds for maintaining the roadway and curb ramps, and grant funding.

Q: When will the Plan be completed and how soon will construction begin?

A: The preferred design and a street improvement implementation plan will be developed during the next phase of the project (Phase 3). Phase 3 will be completed in Fall 2022. There is no timeline for constructing future street improvements.

Q: When will crosswalks be improved to help people cross 12th and 13th Streets?

A: After a preferred design has been identified, the city will work with ODOT to move high priority projects forward. The exact timing of crosswalk improvements is dependent on many factors, including funding availability and logical sequencing with other Heights capital projects. The Plan will give the city confidence that crosswalk improvements will be designed to work with the city's long-term plans for the Heights.

THE HEIGHTS STREETSCAPE PLAN

Q: Will changes to the street impact how long it takes to drive through the Heights?

A: It depends. Each of the preliminary concepts affect travel times in different ways, but generally traffic will drive slower. The goal of the Plan is to balance vehicle travel with comfort and safety of people walking and biking. The increase in travel time will depend on the final design chosen.

Q: Will the plan change parking in the Heights?

A: Each of the three preliminary design concepts and the City's current adopted Transportation System Plan (2011) will alter on-street parking along 12th and 13th Streets between May Street and Belmont Avenue. Parking on side streets may be redesigned to maximize usage.

A parking study identified 304 on-street parking stalls within the Heights District, which includes on-street parking within one block of 12th and 13th Streets, and 410 off-street parking stalls on privately owned properties.

Changes to 12th and 13th Streets presented in the design concepts reduces on-street parking in the Heights as summarized below. The project is not proposing changes to off-street parking on privately owned properties.

Design Title	Approximate number of on-street District Parking Spaces within one block of 12th and 13th Streets
Current Configuration	304
2011 Adopted Transportation System Plan	220 (28% reduction)
Design Concept #1	230 (24% reduction)
Design Concept #2	275 (10% reduction)
Design Concept #3	245 (20% reduction)

Q: Will the city place overhead electrical wires underground?

A: The Plan will include considerations for replacing existing public utilities that need to be replaced as well as opportunities for undergrounding overhead electrical wires.

Q: How can I stay involved in the Plan?

A: The project website includes a place to leave your name, email, and any comments you have. If you leave your name and email address, we will add you to the future email distributions.

Preguntas Frecuentes

P: ¿Cuál es el propósito del proyecto del paisaje urbano de Los Heights?

R: El Plan de paisaje urbano de Los Heights identificará formas de mejorar las calles 12 y 13 a través de Los Heights para personas que conducen, caminan, andan en bicicleta, toman el autobús y compran en comercios locales. El plan incluirá recomendaciones para mejoras a las calles 12 y 13 y las intersecciones y las calles entre May y la Avenida Belmont.

P: ¿El Departamento de Transporte de Oregón (ODOT) está involucrado en el proyecto?

R: Las calles 12 y 13 son parte del sistema de carreteras estatales (OR-281). ODOT posee el derecho de paso público y mantiene las banquetas, los cruces peatonales y las rampas en las aceras a lo largo de OR-281; la ciudad mantiene la baquetas ODOT ha estado involucrado en el proceso de planificación. Futuros proyectos derivados de esta planificación ODOT deberá permitir el proceso.

P: ¿Cuánto costará construir las futuras mejoras de calles e intersecciones y cómo se pagará?

R: El costo estimado para diseñar y construir mejoras en las calles se identificará después de un se desarrolla el diseño. El costo de reconstruir todas las calles e intersecciones en el área de estudio será supere los $25 millones de dólares.

La ciudad espera que las mejoras se paguen mediante una combinación de fuentes de financiación, incluida la Distrito de Renovación Urbana de Los Heights, fondos de la ciudad para calles y servicios públicos, fondos de ODOT para mantener las rampas en las banquetas, y financiamiento mediante subvenciones.

P: ¿Cuándo se completará el Plan y cuándo comenzará la construcción?

R: El diseño preferido y un plan de implementación de mejoramiento de calles se desarrollarán durante el siguiente fase del proyecto (Fase 3). La Fase 3 se completará en el otoño de 2022. No hay un cronograma para construir futuras mejoras en las calles.

P: ¿Cuándo se mejorarán los cruces peatonales para ayudar a las personas a cruzar las calles 12 y 13?

R: Después de que se haya identificado un diseño preferido, la ciudad trabajará con ODOT para mover los proyectos de alta prioridad adelante. El momento exacto de las mejoras en los cruces peatonales depende de muchos factores, incluidos disponibilidad de fondos y secuencia lógica con otros proyectos de capital de Los Heights. El Plan dará a la ciudad confianza en que las mejoras en los cruces peatonales se diseñarán para trabajar con los planes a largo plazo de la ciudad para el Los Heights.

P: ¿Los cambios en la calle afectarán el tiempo que lleva conducir a través de Heights?

R: Depende. Cada uno de los conceptos preliminares afecta los tiempos de viaje de diferentes maneras, pero generalmente el tráfico conducirá más lento. El objetivo del Plan es equilibrar los desplazamientos en vehículo con la comodidad y seguridad de las personas caminar y andar en bicicleta. El aumento del tiempo de viaje dependerá del diseño final elegido.

P: ¿El plan cambiará el estacionamiento en Los Heights?

R: Cada uno de los tres conceptos de diseño preliminar y el Sistema de Transporte adoptado actualmente por la Plan de la Ciudad (2011) modificará el estacionamiento en la calle a lo largo de las calles 12 y 13 entre la calle May y Avenida Belmont. El estacionamiento en las calles laterales puede rediseñarse para maximizar el uso.

Un estudio de estacionamiento identificó 304 puestos de estacionamiento en la calle dentro del distrito de Los Heights, que incluye puestos de estacionamiento en la calle estacionamiento dentro de una cuadra de las calles 12 y 13, y 410 puestos de estacionamiento fuera de la calle en privado propiedades propias.

Los cambios a las calles 12 y 13 presentados en los conceptos de diseño reducen el estacionamiento en la calle en el Los Heights como se resume a continuación. El proyecto no propone cambios en el estacionamiento fuera de vía en zonas privadas. propiedades propias.

Título de Diseño	Número aproximado de Espacios de estacionamiento del distrito en la calle dentro de una cuadra de Las calles 12 y 13
Configuración actual	304
2011 Adoptado Plan del Sistema de Transporte	220 (reducción del 28%)
Concepto de diseño #1	230 (reducción del 24%)
Concepto de diseño #2	275 (reducción del 10%)
Concepto de diseño #3	245 (reducción del 20%)

P: ¿La ciudad colocará los cables eléctricos aéreos bajo tierra?

R: El Plan incluirá consideraciones para reemplazar los servicios públicos existentes que necesitan ser reemplazados a medida que así como oportunidades para soterrar cables eléctricos aéreos.

P: ¿Cómo puedo seguir participando en el Plan?

R: El sitio web del proyecto incluye un lugar para dejar su nombre, correo electrónico y cualquier comentario que tenga. Si deja su nombre y dirección de correo electrónico, lo agregaremos a las futuras distribuciones de correo electrónico.

THE HEIGHTS STREETSCAPE PLAN
OPEN HOUSE APRIL 2022 SUMMARY

Introduction

In 2020, the City of Hood River began work to develop The Heights Streetscape Plan (Plan), a document intended to support the Urban Renewal Agency in improving 12th and 13th Streets and intersections. Project goals were established under Phase 1 of the project and under Phase 2 those goals were used to develop three streetscape alternatives that demonstrate urban design elements centered around the community's goals and priorities.

Over 250 people attended the open house held at The Armory on April 22nd and 23rd. Five large posters (see Attachment A) were set up at tables around the room so attendees could get an overview of the project, see each of the three design concepts, and review a street design elements board. Attendees wrote their comments about the design concepts on sticky notes and placed them directly on the posters. For the design materials, attendees were able to place sticky dots to note images they liked. Comment forms were also available for attendees to write longer comments on the design concepts (see Attachment B).

The input received at the open house and in the online survey will help shape the development of a preferred alternative. This document summarizes the key findings and themes from the open house. The results of the online survey will be summarized separately.

Key Takeaways

The open house provided some clear insights on attendee preferences between the design concepts and concerns.

- Under each concept a roundabout is generally more supported than a traffic light at 13th and May Street.
- Parking for businesses is a common concern across the three design concepts and many noted their opposition to reductions in parking.
- In each concept there were concerns about emergency vehicles (Fire/EMS) having sufficient access.
- There were mixed views on turning 12th and 13th Street to two-way traffic instead of one-way.
- Some attendees are concerned with winter conditions, particularly icy roads and that bicycle use will decrease during the season.
- Some attendees also noted their opposition to the loss of businesses within the triangle between Belmont, 12th, and 13th.

Design Concept One

Concept 1 converts 12th and 13th Streets to two-way traffic.

- Attendees had mixed views on two-way traffic on 12th and 13th Streets, most comments were opposed to the idea, but a few were in favor.
- Attendees were generally supportive of separated bike lanes.
- Several comments addressed the need for improved crosswalks and accommodating pedestrians.

Figure 1: Design Concept One Input Word Cloud

Design Concept Two

Concept 2 reduces 12th and 13th Streets to one lane of one-way traffic.

- Attendees were generally in support of the roundabouts shown in this concept but some noted concerns for impacts to businesses at the intersections of 12th/13th/Belmont.
- Some attendees are concerned with the idea of a shared use path and a potential conflict between cyclists and pedestrians.
- Some noted concerns that reducing traffic to one lane will increase congestion.

Figure 2: Design Concept Two Input Word Cloud

Design Concept Three:

Concept 3 is a hybrid and reduces 12th Street to one lane of one-way traffic, and converts 13th Street to two-way traffic and adds a center turn lane.

- Respondents were generally supportive of a roundabout and preferred that over a stop light. But some were concerned about pedestrians crossing the roundabout.
- Several responses were supportive of bike lanes and other bicycle accommodations.
- Some responses were supportive of angled parking.

Figure 3: Design Concept Three Input Word Cloud

Street Design Elements

Attendees placed sticky dots on images they liked under materials, placemaking, and design and atmosphere. The dot counts for each image are presented below.

Materials

Placemaking

14


12


12


9


9


8



7
Oregon
Magic


5


5


5
BERLIN
JERUSALEM
SOUTH POLE
NEW DELHI


5


4
Welcome to
Bainbridge Island


4
21st
STREET

Design and Atmosphere

45

25

25

24

15

13

5

Attachments

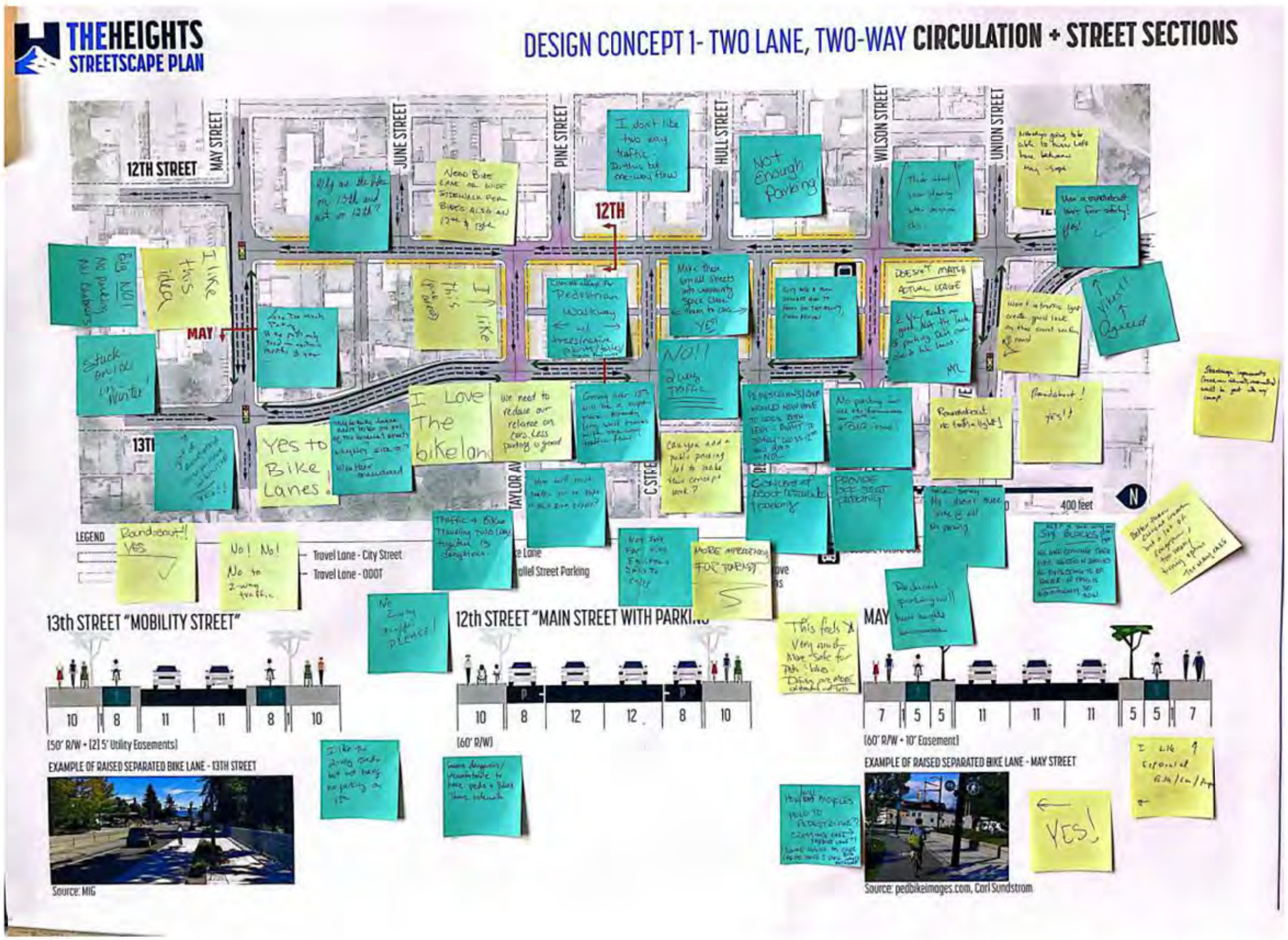
Attachment A: Open House Roll Plot Posters

Attachment B: Open House Comment Forms

Attachment C: Sign-In Sheets

Attachment D: Transcribed Roll Plot Poster Comments

Attachment A - Open House Roll Plot Poster Comments



Attachment A - Open House Roll Plot Poster Comments

Attachment A - Open House Roll Plot Poster Comments

DESIGN CONCEPT 1 **SUMMARY**

OVERVIEW

- converts 12th and 13th Streets to two-way traffic
- traffic signals manage vehicle flow at key intersections
- gathering spaces are located in curb extensions or in place of on-street parking
- widths of sidewalks are similar to today's sidewalks
- possible future bus stops align with crosswalks
- separated bike lanes replace parking on 13th Street

12TH STREET

- a "Main Street" with parking on both sides of the street
- supports the Heights as a local destination

13TH STREET

- a "Mobility Street", that supports people driving, walking and biking in and through the Heights
- One-way bike lanes separated from vehicle traffic by a curb

TRAFFIC CALMING

Two-way traffic and curb extensions at intersections help to slow vehicle traffic.

12th/13th

TRAFFIC CONGESTION

Performs the best between concepts and has the least delay to traffic on side streets

12th/13th

IMPROVES BUSINESS ACCESS AND VISIBILITY

Two-way traffic provides visibility in both directions, especially at intersections

13th 12th

PROVIDES COMFORTABLE PLACES FOR WALKING

Sidewalk widths are similar to today and curb extensions make crosswalks safer

12th/13th

PROVIDES COMFORTABLE PLACES FOR BIKING

One-way bike lanes on 13th are separated from traffic and simplify neighborhood connections

13th

CREATES OPPORTUNITIES FOR PLACEMAKING

Gathering spaces are limited to curb extensions and places where parking is removed

13th 12th

ALIGNS WITH SRTS GOALS

Aligns well with Safe Route to School recommendations

PARKING*

May remove **50% of 141** existing on-street parking spaces on 12th and 13th

*the City's current Transportation System Plan would remove 60% of on-street parking spaces

COST TO IMPLEMENT

$ $ $ $ $

Attachment A - Open House Roll Plot Poster Comments

Attachment A - Open House Roll Plot Poster Comments

Attachment A - Open House Roll Plot Poster Comments

Attachment A - Open House Roll Plot Poster Comments

Attachment A - Open House Roll Plot Poster Comments

Attachment A - Open House Roll Plot Poster Comments

Attachment A - Open House Roll Plot Poster Comments

DESIGN CONCEPT 3 SUMMARY

OVERVIEW

- 12th Street becomes one-way with one travel lane and angle parked
- 13th Street converts to two-way traffic with a center turn lane
- Incorporates a roundabout at 13th and May (requires additional right-of-way)
- creates opportunities for gathering spaces along 12th Street but not along 13th Street
- Sidewalk widths are similar to today
- possible future bus stops align with crosswalks
- Two-way cycle track located on 12th Street

12TH STREET

- parallel parking is replaced with angle parking along one side of the street
- a separated two-way cycle track aligns with goals for safe routes to schools

13TH STREET

- a center turn lane helps maintain traffic flow when people are turning
- parallel parking on one side of the street

TRAFFIC CALMING

One-lane and angle parking slow traffic on 12th, but 13th has a wider roadway

TRAFFIC CONGESTION

Traffic flow is better than concept 2 but southbound congestion and side street delays along 13th will be significant

IMPROVES BUSINESS ACCESS AND VISIBILITY

12th improves local business access, but 13th reduces access and visibility

PROVIDES COMFORTABLE PLACES FOR WALKING

Shorter street crossings across 12th. Longer crossings and less separation on 13th.

PROVIDES COMFORTABLE PLACES FOR BIKING

A separated two-way cycle track on 12th

CREATES OPPORTUNITIES FOR PLACEMAKING

More opportunities on 12th, less opportunities on 13th

ALIGNS WITH SRTS GOALS

Aligns well with Safe Route to School recommendations

PARKING*

May remove **40% of 141** existing on-street parking spaces on 12th and 13th

*the City's current Transportation System Plan would remove 60% of on-street parking spaces

COST TO IMPLEMENT

$ $ $ $ $

Attachment B: Open House Comments April 22-23, 2022

Name:	Email:	Comment:
		I prefer the designs WITHOUT the roudabouts - they work fine in towns w larger stretches of roads, u I think we are too small - a light at Belmont & 13th would help a lot. Love the raised or seperated bike paths - safer for drivers & bikes it would seem. Angled parking is not desirable - always seems harder to see what is coming than parallell park. Can not see 12th or 13th being less than 2 lanes of traffic - just needed for volumne of traffic.
		Love roudabouts. They would speed up traffic and be safer. Especially at May/13h and Belmont/13th. Wide sidewalks for bikes & pedestrians would be nice. People can ride slow & great to get bikes off street for their safety. Need bike lanes of some sort on 12th, 13th, & May. Biker safery at roundabouts is a concern of mine. Need two lanes on both 12th & 13th of traffice, no matter which way they go. Like the one lane as is now.
		1. Loss of Coorge style salon and other businesses - bad!!! How will these business owners be compensated? Will they be offered space at the same price? 2. Keep the traffice pattern (2 lanes going one direction) the same on 12th and 13th. No need to make that 2-way traffic. Dangerous and cars do not always drve the posted speed limits.3. Traffic circles needed @ May/13th and @ Belmont/13th. No need for 2 on 12th and 13th off of Belmont. 4. If yo ulose public parking will people encroach into residential areas? This would be bad!!! Will parking still be free?? 5. How will this impact EMS and law enforcement responding to emergencies on the Heights? It will hinder their response times and create traffic backups. 6. There should be NO parking on the crest of a hill (13th) near A St. 7. Is this the best of use money in Hood River? Everyone is concerned about resources for the homeless; could this money be used for another school, or social services like job training, healthcare, post secondary education???
		Traffic circle @ May/13th great idea - Belmont/13th great idea Loss of business in triangle between Belmont/13th/12th st. not good idea. One way traffic = good. Two way = bad. No parking on crest of hill (13th) near A street - hazard due to limited visibility and speed. Loss of 50% parking = bad. loss of 20% = ok, not good, but ok. Single lane of travel= bad, will cause back up and make EMS transit in emergences difficult. What is the plan for parking off 12/13th? Residential neighboroods will be impacted and cause problems. Will parking cost $? How will existing business feel about loss of parking.
		Any of these plans will vastly improve the current situation. I favor plan 3 with plan 2 as a second choice. I like roundabouts!
		There needs to be a fourth plan that keeps parking and traffic that pucs bikes on side streets away from 12th and 13th.
		Roudabout looks interesting- have seen it work well in many places. Don't support dieagnol parking. Have a studio upstaris on 2nd and oak - watch how dangerous diagnol parking is there. Support 2 lanes of 1 way traffic on 12th and 13th with bike landes and parking on each side. Thank you for presening all these to the community for consideration and comment
		Look at impact on 13th and Oak.
		Yes! To one-way and roundabouts! We need to STOP priortitzing cars. That will make streets safer :) Less parking. One way flow for cars, two way wide lanes for bikes. Roundabouts all over! No more stop and go idling :) Thank you for your hardwork!
		Option 3 is my preference. I see problems with the diagonal parking on 12th st - having clearance from traffic with only one lane and cars and larger vehicles will back into bike lanes. Signal @ May and 12th northbound will cause problems with short distances back to 12th south of May. Maybe add crossing gurards for the school kids when needed? Prefer signlan rather than roundabout on 13th at both May and Belmont.

	I like plan 3 and yes to roundabout. I've been to many small owns in the east coast recently and tey work very well. Some of these small towns I remember from times past (in Vermont) before they had roundabouts - traffic was awful. Much improved now since they put them in to new infrastructure.
	I like concept 3 but I would change flow on 12th st: 1. Make bike lanes to center alley between 12th and 13th. 2. Make A, B, C, Taylor St, on way and add angled parking on both side if possible to maintain # of parking spaces. 3. If you move bike lanes to alley, maybe you could add either another lane of same-way traffic to 12th st or add more parking to 12th street. Lastly, trees and tree/plant islands are pretty but tey obstruct drivers vies which is against why we are doing this to add safety. And secondly, as a firefigher, they really add visibility and driving problems for emergency vehicles.
	I work and have a business in the service industry (hairstylist - freestyle hair design 1104 12th street.) I have only one REAL concern with any of the new street plans is parking! Havig any client to walk a bolck away will impact our business... I saw this as I was impacted with limited parking downtown 4 years ago before moving to the heights. We have a wide range of aged clients. My 81 year old client aleady struggle to find adequate parking with the welcomed additional businesses that have opened ore relocated since the original traffic study. Thank you for reading my real concern or issuse for aduquate, accessible, parking!
	We all hope and pray that no matter who makes the decision on this project they talk to the people who live and work on 12th and 13th and not the 100 people who want to build a little eden on the heights. This is a place to work and shop not meander and sip wine and hang with the crowd. Please think of the people who rely on this area and all the people in the county that try to shop and commute at Hood River.
	Make 13th the main transit street (2 way) and focus the community empowerment on 12th. Put in place more roundabouts. Close off or rethink B + C to one-way traffic. Use that space to develop more community seating and walking/socializing. I think about the ike lanes in connection to a wider county bike plan. Put in more pedestrian bump outs at major intersections.
	Por que quiro Un Heights Mejor? Para el mejor proyecto y alivito ale mis ninos. Conectar el vecindario, Apyar neocios locales, Plaza, Carril bici y movildad, Rutas seguras a las escuelas, Cruces seguros
	Concerned about business on 12th/13th who lose parking. Bike lanes if added can be 2-way. Concerned about fire/emergency traffic be able to travel thru heights if only 1 lane on each street.

Attachment C: Sign-In Sheets

4/22/2022

Name:	Email:
Gary Beachman	
Bob Palmer	
Patricia Mouhn	
Wanda Martin	
Paul Kollas	
Maria Kollas	
Joella Anglin	
Javier Hernandez Jr.	
Ian Stronguist	
Anny Samounty	
Chelsea Derochemont	
Peter Cornelison	
Mari Ruth Petzing	
Mathew Barmann	
Norberto Maahs	
Pam Neild	
Kateri Osborn Cohr	
Jeni Stembridge	
Alison Brown RosBroar	
Maria Valdivva	
Manuel	
Elaine Marchant	
Linda Maddy	
Shawna Russell	
Phineas England	
Taylor Gautier	
Kate Hoffman	
Amy Schlappi	
Mariah McAlister	
Molly Lewis	
Karen Dehart Cohn	
Timothy Curry-Stevents	
Kate McBride	
Rich McBride	
Kristi Chapman	
Michele Jacobs	
Ken Locley	
Matt Morroaw	
Keely S.	
Nancy Asai	
Aron Asai	
Frank Levin	
Barb Blizzard	

Jackie Kramer	
Keith & Nancy Clarke	
Leonard and Erma Hickman	
Micheal Cummings	
Joe Guenther	
Mari Beth Guenter	
Laurel Oaks	
Kevin Prates	
Doug Stepina	
Lisa Wish	
Silvia Tello	
??? Enriquez	
Chelsea Powell	
Ian Coleman	
Karen Bureker	
Gary Reed	
Cindy Wallbridge	
Aspen McKeenna	
Katie Crafts	
Pat E.	
Cecilia Poulard	
Mayra Castro	
Vanessa Avila	
Leanne Hogie	
Mike Hendricks	
Paul Weatherly	
Sherri Johnson	
Martha and Charlie Capovilla	
Mike & Jodi Petty	
Jim & Penny Rutlidge	
Randy & Joanne Franz	
Darla Kroll	
Patti N	
Will Ennis	
John & Kim Vogel	
Eric Smith	
Renee Wilson	
Chuck Waiston	
Erik Kaneda	
Zac Lytle	
Patty Golditch	
Todd Golditch	
Polly Wood	
Zack Chown	
Adam Mims	
Armanda Mason	
Rob Neild	

Mark Mason	
Carol Doherty	
Dwight E Moe	
Vash Stembridge	
Angela Patterson	
Rossy Lean	
Heather Staten	
Charolette Brumam	
Jonothan Graca	
Rebecca Chown	
Kathleen Murray	
Patrick Pierz	
Carol Pierz	
Christopeher Pierz	
Heather Bacci	
Tom Bacci	
Taylor Bacci	
Samantha Irvin	
Jeff Irvin	
Judy Sheahan	
Patricia Haupt	
Linday McClure	
Blaine Baker	
Patty Gauland	
Megan Ramey	
Dyana Fiediga	
Anneka Ayers	
Linda Chung	
Garth Eliason	
Ann Carloss	
Dave Bick	
Becky Brun	

Attachment C: Sign-In Sheets

4/23/2022

Name:	Email:
Cathy Orfall	
Nick Kenyon	
Emery Cowan	
Alan Schwaller	
Tim Sedguick	
Donna Rieke	
Justin and Danielle Kamerer	
Marcus Reed	
Keith Howell	
Warren Morgan	
Nick Reed	
Erick Haynie	
Chris Swisher	
Matt Flow	
Brooke Flood	
Carol Breen	
Lorna Paddock	
Betty and Russ Paddock	
Brian Watts and Jeanie Watts	
Audrey Fisher	
Megan Bassett	
Geoff Phillins	
Tammy Cederstam	
Mary King and Drew	
Joe Carpenter	
Rich Polkinghorn	
Joyce Jennings	
Dave Robinson	
Hanna Metzer	
Renee Griend	
Amy McIlvenna	
Linda Maddox	
Greg Crafts	
Brendan Ramey	
Matt Sherell	
Alejandra Retamales	
George Monroe	
Jon Monroe	
Marilyn Smith	
Gladys Rivena	
Dawn Stender	
Kathy Eastman	
Amy Davidson	

Carlos Garrido	
Andrew Bryden	
Sally Goeke	
Altick Gizhling	
Brian Robb	
Theo Davis	
Paige Rouse	
Kerry Mikkelson	
Matt Mesa	
Dan Ball	
Lori Golze	
Jody Behr	
Meredith Martin	
Rhonda Marlee	
Emily Martin	
Paul Woolery	
Martha W Sedguick	
Paula Chakowski	
Sheila Richmond	
Dale and Susan Young	
Deanie and Brian Watt	
Mick Sherrell	
Fiona Paterson	
Dan Crane	
Paul Cummings	
Andrea Klaas	
Jim Klaas	
Lindsay Gott	

Attachment D: Transcribed Roll Plot Poster Comments

Current Transportation Plan System 2011 - Circulation + Street Sections

Comment:	Location:
(Drawing of a roundabout)	12th/May Street
<3 Roundabouts! Modernize! Yay for roundabouts!	13th/May Street
I love roundabouts, crosswalks on 3 corners	13th/May Street
Something needs to happen here! I hate roundaouts, need traffic light	13th/May Street
I like roundabouts	13th/May Street
This is the crest of a hill, bad line-of-sight	13th/Taylor Street
This adopted plan is better than any of the alternative. Street could use refinement, simplified for cars and improvements for safety	13th/Taylor Street
Blinking pedestrian crossing button like across from roseanners at 13th and Taylor	13th/Taylor Street
Lower pavement, water runs into stores, start higher than side wall	13th/C Street
Where is business parking?	13th/C Street
Slow down the traffic now!	12th/Hull Street
<3 Roundabouts	Belmont/Union Street
Traffic light here	Belmont/Union Street
60% will kill local businesses	"*City's current transportation plan would remove 60% of on-street parking spaces from 12th and 13th"
Shouldn't the plans reflect that we don't want/need to increase vehicle capacity?	side comment
Looks like the goals aren't focused on car capacity. Isn't the truck route not located through here anyways	side comment

Attachment D: Design Concept One - Two Lane, Two Way

Comment:	Location:
Circulation and Street Sections	
I like this idea	12th/May Street
Big NO. No parking, no customers	12th/May Street
Roundabout yes!	13th/May Street
Light or roundabout. Always an issue in the winter. Yes!	13th/May Street
No! No! No to two way traffic	
No two way traffic please!	
I like the two way roads but not having no parking on 13th	
Yes to bike lanes!	13th/May Street
Light or roundabout	13th/May Street
Traffic and bike lanes travelling two ways together is dangerous	13th Street
Why do bike lanes needs to be on one of the busiest streets? Why not side streets? Weather considered	13th Street
No two way traffic!	13th Street
I love the bike lane	13th Street
Why are the bike lanes on 13th and not 12th street?	12th Street
Need bike lane or wide sidewalks for bikes also on 12th and 13th street	12th Street
I like this (pink area)	Taylor Avenue
We need to reduce our reliance on cars. Less parking is good	13th/Taylor Avenue
How will trucks get to Napa or Hood River Supply?	Taylor Avenue
Not safe for fire equipment going to calls	C Street
Crossing over 13th street is going to be a nightmare. Already long wait times with one way traffic	13th/C Street
More improvements for toursits	
Can you add a public parking lot to make this concept work?	
Make these small spaces into community space. Close them to cars. Yes!	C Street, B Street betweem 12th/13th Street
City did a plan decades ago that focuses on alleys, check records	
Close off alleys for pedestrians with trees, native plans, seating	Taylor Avenue, C Street
How will bikes yield to pedestrians that cross the bike lane? Same issues as cars	Example of seperated bike lane
Yes!	Example of seperated bike lane

I like seperated bike lane	Example of seperated bike lane
Reduced parking will hurt The Heights businesses	
Two way doesn't make any sense at all. No parking	
Keep it one way on six blocks (12/13th street). No one should be coming through this way expecting to go faster. IF this is a community go slow	
Better than the current conditions. But a lot of congestion. Too many turning options, too many cars	
Doesn't match actual usage	12th/Wilson Street
Think about snow plowin when designin this	(between union and wilson street)
I don't like two way traffic. Do this but with one way flow.	
two way roads good. Not lack of parking. Don't care about bike lanes.	
Roundabout, no traffic light	Belmont/13th Street
Provide off street parking	
No parking for all the businesses on 13th is a big issue	
Use a roundabout here for safety!	12th/13th
Yikes! Agreed! (points to above comment)	12th/13th
This feels very much more safe for bikes and peds. Drivers are more distracted not less	
Wont a traffic light create gridlock on this short section of road?	Belmont Drive (between 12th/13th)
Streetscape improvements would be great with any concept	
Nobody is going to be able to turn left here between May -Sept	Union/12th
Roundabout! Yes!	Belmont/13th Street
Intersection Concept 12th and 13th Streets at May Street	
Stop lights halt flow :(	13th/May Street
No stopping on such a steep uphill. Think about carbon footprint of getting traffic moving again every light cycle on a major grade.	13th/May Street
Traffic light cause congestion!	13th/May Street
Want lights! Parking for businesses	13th/May Street
This intersection will get very busy with traffic making left from May St on to 13th	13th/May Street
Will this impact school drop off?	13th/May Street
13th street should stay a thru street uphill to avoid winter hazard if stopped uphill on icy surface, no traffic light	13th/May Street
Stop light = congestion, tricky for bikes, roundabout please	13th/May Street

no left turn on uphill portion of 13th. Extremely dangerous in winter and backs up traffic all year, AGREED	13th/May Street
#2 Concern trees located later. Worried it wont happen	13th/May Street
I like this idea. Two way on 12/13th makes sense	12th/May Street (west)
What happens when it snows and they plow?	12th/May Street (west)
Yes! (to above comment)	12th/May Street (west)
Well we need the lights on the heights but we need to keep parking for businesses	12th/May Street (west)
What about this intersection?	12th/May Street (east)
This needs attention! Kids walk to school in this dangerous area.	12th/May Street (east)
Yes! (to above comment)	12th/May Street (east)
Too much about cars, how about pedestrians?	
Yes to trees, we need to cool spaces we are making into hardscape. Affects livability and health	#2 and #3
Nice but not needed, café seating preferred	#2
I like this, nice for cyclists	#3
Intersection Concept 12th and 13th Streets at Belmont Avenue	
YES to no overhead power lines impeding tree growth	
Looks like an accident ready to happen	#2 Bike Box
I like this green bike road, yes	#2 Bike Box
Enhanced crosswalk good. Yes!!	#3 Enhanced Crosswalk
Yes, or crosswalk w/ blinking light when in use	#3 Enhanced Crosswalk
Great way to slow traffic. But maybe attact vermin??	#4 Traffic calming opportunity
Great way to include water permability and pollinator habitat and cooling thermal heat	#4 Traffic calming opportunity
I don't like the idea of bikes being funneled into the same thoroughfare as a main traffic - difficult especially during winter w/snow gravel on side of street	13/Belmont Ave
These intersections look very confusing, maybe a traffic circle would be a better fix	13/Belmont Ave
Currently peds restricted from crossing on south side of intersection. Requiring peds to cross street 2-3x to continue on south side. Needs improvement	13/Belmont Ave
How many bicycles really use roads in Hood River?	13/Belmont Ave
Agreed (to above comment)	13/Belmont Ave
Two way bike lanes!	
This concept seems most practical for the scale of the city. One-lane leads to too much congestion	

What about emergency vehicles?	
Yes! (to above comment)	
Too many two ways	13th Street
Many more would if they felt safe	12th/13th Street
This is confusing	12th/13th Street
Nope - too confusing	12th/13th Street
Two way bike lanes	12th/13th Street
Could cause congestion here since 12th is two way	12th/13th Street
Confusing	12/Belmont Ave
Confusing!!! Parking?	12/Belmont Ave
Lights! Parking for business. Better walk crossing. That's all!	12/Belmont Ave
Is this the natural bikeway to downtown?	12/Belmont Ave
Maybe make clear that bikers also can turn right? Make their way downtown through the rush hr roads	12/Belmont Ave
Anything that calms traffic is critical and good here but this doesn't seem as good as a traffic circle	12/Belmont Ave
We like this option best for Belmont	
Best one	
Still car-centric design. How about focusing on peds?	
Potential for a lot of confusion, backups and bike-car conflict would be great to have bike lanes at intersecitons to allow for turning	12th Street
Biking through the heights isnt a major problem except for stretch between Belmont and Pacific	12th Street
Perhaps better integration with Indian Creek path?	13th Street
Need bike lane here	14th Street
Summary	
Not fair to businesses to lose parking. As a mom, would not allow my child on bike lane. Too busy of a road	
A lot of businesses have no off street parking put bike lanes on side streets	

How does design #1 improve business access when there is no parking on 13th?	"Improves business access and visibility"
Isn't this bad for business on 13th?	
We can't lose the parking spaces we currntly have. We must provide adequate parking for the businesses on 12th and 13th	
Would be helpful to differntiate between peds and slow moving bikes vs fast bikes. Fast bikes are more like cars. Peds and slow moving bikes are critical in old neighborhood.	

Attachment D: Design Concept Two - One Lane, One Way

Comment:	Location:
Circulation and Street Sections	
May towards 12th - impossible to pass if people drive east on May for 13th	12/May Street
Yes to more roundabouts	12/May Street
Poor traffic flow, bike use limited during winter, loss of parking	12/May Street
City needs to buy house at May/12 now!	12/May Street
Roundabout yes!	13/May Street
Roudabout will help a lot	13/May Street
Roundabout better than a light	13/May Street
Yes, but kids from school is risky	13/May Street
Pedestrian walking 13/May and 12/May	13/May Street
This roundabout looks good especially for traffic coming east on May	13/May Street
Single one lane traffic will cause clogs	13/May Street
I like the separate path ofr bikes but would there be lanes or other features to direct traffic? Seems like that could help mitigate bike congestion	13th Street "Green Street"
Please separate bike lanes and people	13th Street "Green Street"
Yes to shared use path rather than separate bike lanes on road. Just make it wide	13th Street "Green Street"
Agreed (To above comment)	13th Street "Green Street"
^ With a separate "commuter" lane or something that seperates e-bikes/high speed bikes from pedestrians/slow ppl/dogs/etc/	13th Street "Green Street"
Shared use path seems like accident waiting to happen. Should have separate zones for bikes and walkers	13th Street "Green Street"
Heavy traffic flow on 12/13 in spring, summer, fall if you take out lanes it will be???	12th/13th Street
Im a fan of single lane, one way traffic flow on 12/13	12th/13th Street
Bke lane should be on 12th, 13thm should remain two lanes toward potential uphill back ups in leg condition	12th/13th Street
Single lane is only shown if road is designed to slow traffic. Trees walls, close to narrow lane, 20 mph design	12th Street
How are the fire trucks and emergency get through this design?	12th/13th Street
<3 1 lane of vehicles so kids don’t have to play frogger with their lives	12th/13th Street
Terrible idea. Leave the heights alone	

Not safe for fire equipment going to calls	
2 directions on 13th will slow traffic better than 12th - also keep lanes narrow and get trees close to lanes to keep speeds down	
Forget this if it does not allow for the flow of enough traffic to make any sense	
Love protected bike lanes	May Street
Fire truck access? Plowing issues?	A/B Street
Where do people park to eat at the taquiria?	A/B Street
Not A	A Street
Can we move towards better using 12/13th street by taking advantage of the blocks between them for parking on public space	A/B Street
Yes, what if A-C street and Taylor be one way w/ one side parking	A/B Street
I like the shared path but would like to see it on both streets for kids biking to school	A Street
What about businesses?	Belmont/13th Street
Reduce lanes means more potential back up traffic when someone slows to turn, more braking honking when only one car lane, I love our quiet neighborhood with 2 lanes	
I do not like, you are going to tear office down	
Sidewalk|Car|Car|Parking|Bike|Sidewalk|	
Yay for roundabouts	13th/Belmont
I would hope there is a nearby way for bikes/peds to cross 12th street here	Union Street
This loosk scary is it less scary in real life?	Union Street (N of 13th)
Where do pedestrians go from here?	13th/Union Street
Agreed, really want to see integration/consideration of a way for cyclists to safely get from pacific to here	13th/Union Street
One way traffic seems unpractical. Where's the room for ems vehicles and delivery trucks	
I love this! Yes to one-way yes to big bike lanes, tes to roundabouts :)	
There only needs to be 1 roundabout	13/12th
Yes to roundabout	
Another Yes for roundabouts	
Lose off street parking	
Seems like you'll have to reduce parking on each side of 12th and 13th to allow for bike lanes. Seems like amount of traffic demands 2 lanes	
one lane seems dangerous for congestion, fire and ems hard for them	

Intersection Concept 12th and 13th Streets at May Street	
Scary to think about this as a ped or bike when its icy	
Good idea roundabout	
Big Yes!	
This keeps traffic moving <3 roundabout	
Yes! Roundabout!	
Roundabouts do not function well for peds because the cars do not want to stop for them at least some of them	
No to the roundabout! Dangerous for walkers and bikes	
Who takes care of vegetation?	#3
Yes drought tolerant native plants	#4
I like the roundabout! Eeps traffic flowing but slows it down	
Yes for the roundabout! I agree! Me too!	
Yes Roundabout!	
Yes Roundabout!	
No Roundabout! Too much traffic - need light only!	
Yay Roundabout!	
I love roundabouts but do have concerns about the middle school kids trying to bike across a roundabot. Need the flashing lights :)	
Yes to roundabout	
Roundabout would work great	
Yes, roundabout	
Single lane traffic on 12/13 is a horrible idea. Must have been tought up from a transplant	
This is not a good idea!	
Would prefer 2-way cycle track on North side of May	
Take out people's businesses?	
Take out business??	
Shared path looks interesting and good	#5
See potential problem with dogs on and off leashes!	#5
Intersection Concept 12th and 13th Streets at Belmont Avenue	
Concept #2 fantastic for quality of life. Our main goal	
I like the tress, make sure to keep them in concept	
Definetly better than the current configuration but not sure this si the right solution	

This looks absolutely crazy - an oblong roundabout - there must be another solution	
this looks like a waste of space and not a place I would walk (double roundabout) w/ my young family. Seems dangerous to be on the roundaout itself #1	#1 Double roundabout
If this could be achieved it would make this space functional, efficient, and commmunity friendly	#2 Placemaking Opportunity
Best approach for peds with roundabouts. But ped bridge also works with roundabouts or any intersection until cars are doing 20 mph	#4 rectangular rapid flash beacon at crosswalk
Too complicated	
Summary	
As a parent I would not let my child ride on the bike lane, to busy a road	
Not in favor of one traffic	
one lane not enough. Roundabouts confusing	
2 lanes is not enough - 1 lane won't work	
not enough parking	
Nonsense- it causes parking	
The only good thing about this plan is the roundabout otherwise chaos and misdirected effort	
We wont have congestion where folks who don't have to drive use alt modes = bikes, walk, transit, or car share. Promote alternate modes by building for multi-use instead of car-centric design. We can do it	
Like this concetp with all roundabouts add a couple parking to this concept like concept 3 has on 12th or make cross streets one way with angle parking	
Like that 12th and 13th have parking for businesses. Needs parking lot or garage for the heights	
Making bikes with pedestrians does not work. Cyclists cant really ride and end up having to walk. Not cyclists friendly	
Shard paths = danger town. Not good for peds or cyclists	
I am a little concerned about the cost even though I <3 this concept.	

Attachment D: Design Concept Three - Hybrid

Comment:	Location:
Circulation and Street Sections	
Roundabout will be better than signal light to keep traffic moving when snowy/icy	13th/May Street
Hooray! Roundabout!! I'd like a continuous sidewalk (e side) up 13th - unbroken	13th/May Street
Seriously? A roundabout at the top of the hill in winter? Where are we putting the snow?	13th/May Street
Where does the snow go currently? My ???	13th/May Street
A child cannot cross 3 lanes of traffic. A parent will not let their kids cross	13th/May Street
I've always wondered who owns this empty lot and cement pad. Would be great for parking	June Street
One lane on 12th would cause too muc congestions, parking maitenance and lane closures. Where would the traffic go?	12th Street
Too much loss of parking, bke use limited in winter months, why change from present?	13th street
Needs to be parallel parking, are you renovating storefronts for angled parking?	12th Street
Could two be 2 lane rather than 3? 3 is so WIDE	13th street
Add diaonal parking on cross streets	Taylor Ave/C Street
Make A,B,C, Taylor one way streets and add angles parking	B Street
Bike lane here	12th/Hull Street
More crosswalks with blinking lights	
Love 12th as one way and bike lanes + ped amenities	12th Street
Traffic would be congested here	12th/Belmont Ave
Very confusing	12th/Belmont Ave
Where's the parking for larger bikes?	
This makes more sense to me, designate one route for people and one for traffic/cars	
Please continue bike track s along tucker rd. Particularly between belmont and Rosavers. Bike/ped is currently dangerous	
This plan is great!	
Why no roundabouts in this design? I like roundabouts for concept 2	12th/Union Street 13th/Union
Flashing red stop light, 4 way stop	13th/Union Street

Yes! Prioritize bikes! Make driving and parking cars a hassle :)	
I don't like two way traffic. Love big bike priority and roundabouts	
Slower traffic and parking opportunities encourages people to stop and support small business	
One lane?	
No way!	
Heck no	
Reduce the speed limit to 20 mph like downtown	
Speed tallis and raised intersection at tyalor and a streets	Wilson Street
15mph zone??	13th/A Street 13th/B Street
Not safe for fire equipment going to calls. Bad for public	B Street
Not a fan of two way traffic in a turn lane	
Too much traffic coming up town to reduce it to one lane	
Flashing crosswalks Taylor and Astrick	Taylor Ave
No thank you	
Put bike alnes on both sides of 12th but not a 2 way cycle track	
Do not like angle back out parking. Very dangerous on a busy street	
Removes too much parking	
What about emergency vehicles?!	
If parking is needed remove turn lane and create diagonal parking	
Bike lane on 13th as well	
Bikes are already becoming a safety hazard for peds. Eed education and safety for those fast moving bikes	
Intersection Concept 12th and 13th Streets at May Street	
I think roundabout promote better traffic flow than light	
Needs a light only!	
Roundabouts work really well	
Yes - roundabout keeps everything flowing and works well in small towns/bottlenecks	
This seems frightening as a ped or biker who frequently crosses here especially when its icy	
If you are taking up the streets you should lay conduit for EV parking/charging	
Roundabouts keep traffic moving. Needs sings for ped crossing	

Don't need a crosswalk here on southside of 13th	13th/May Street (south side)
No way! Crosswalk not necessary here. Dangerous	13th/May Street (south side)
Hell no	
Hell yes!	
This is one of the worst intersections in town. Roundabout would be great!	
I like the pedestrian bump outs at crosswalks. Leave the traffic lanes alone	
I prefer a roundabout to a stop light better movement, better for winter/icy roads. This looks like a great spot for a roundabout	
Seems like a ped crossing at roundabout exits could be dangerous to peds	
Bikes need room to start comingin this hill going east	
Safe routes to school plan has the 2-way protected ike way o nthe south side of May. That is the desire	
Do away with all the lights. More roundabouts	
I like this clear signal for bikes	12th/May Street (west side)
This intersection needs correction. No sure what that would be :)	12th/May Street (east side)
Light here seems to be overkill and back up traffic flowing down 12th	
Yes- this is a dangersous place for pedestrians (speed!) but a light seems inefficient	
Intersection Concept 12th and 13th Streets at Belmont Avenue	
Curves = yes slows traffic but keeps flow very well	#2
Is it possible to have a roundabout here too>	12th/Belmont Ave
Provide a bike box to prevent right turns into bike lanes by vehicles	
Parking concerns. Safety concerns	
Bike lanes on 13th/Belmont are not needed with a neigborhing on A Street but crossing to 12th is important	
Or a roundabout here. Yes to roundabout. Yes, roundabout or traffic light here	12th/Belmont Ave
We do need a light at this corner. I never go through this intersection - too dangersous. Yes! Traffic light at this intersection	
Bike lanes needed	
Bike lane not needed here! Just use 2 way on east of 12th	13th Street (south side)
I like the bike lane. How would you get to rosavers/CGCC on bike w/out it?	13th Street (south side)
Not safe for fire, ems going to calls. Leave it alone	

Turn lane	
Best plan for this intersection. Yes!	
Will this get backed up easily?	12th Street
One lane not enough	12th Street
Why all the planting. On all plans?	
Yes!	12th/13th
The crosswalks and islands seem good!	12th/13th
What happens to the bike lane here?	12th/13th
I like this as a more direct way for cyclists to get downtown	
Not enough parking now as it is.	
Lets just put a light in and let it go at that. All imposes on business on heights	13th/Belmont
few parents will be wanting their children in the bikeways too busy and dangerous of a street	13th
Roundabouts difficult to manuever	
Back in parking!	12th Street (north side)
2 way bikeway on east side of 12th is the desire line for kids	
Love the cycle track and angled parking	
Like the painted bike lane	
Angled parking is good for more parking	
Bike lane on 13th as well	
Need long term plan for 2-way bike lanes, not just short section on 12th/13th. Could work if they are bie lanes throughout the city. Still need to design for fast moving bikes and peds. Portland does this. We can learn from them.	
Summary	
One way is good. Only if there is more then one lane stoppers.	
In summary: #2 is dead to me. Obviously parking will seerly decrease. That's not going to work long term. Is anyone exploring a parking garage?	
Not in favor of one way traffic	

THE HEIGHTS STREETSCAPE PLAN ONLINE SURVEY SUMMARY MAY 2022

Introduction

The Heights Streetscape Plan focuses on the commercial core of OR 281 between May Street and Belmont Avenue, which has a mix of office, restaurant, and other retail uses, with single and multi-family housing located next to the commercial core. Both the local business district and surrounding neighborhoods are culturally and socially diverse, with a strong Latino community presence.

Using the project goals and information from Phase 1, the project team developed streetscape concepts that demonstrate urban design elements centered around the community's goals and priorities. The online survey asked for input on the three street design concepts.

1. Concept 1 converts 12th and 13th Streets to two-way traffic.
2. Concept 2 reduces 12th and 13th Streets to one lane of one-way traffic.
3. Concept 3 is a hybrid and reduces 12th Street to one lane of one-way traffic, and converts 13th Street to two-way traffic and adds a center turn lane.

The concepts had also been evaluated to determine how well they align with the project goals developed through previous public input and adopted by the Urban Renewal Agency Board. The survey results along with feedback from the April 2022 open house will help shape the preferred design concept. This document summarizes the questionnaire methodology and key findings.

Questionnaire Methodology

The online survey ran from April 15, 2022, to May 16, 2022. It included information on the technical evaluation completed and the three design concepts that were developed. A variety of questions were asked related to how well respondents thought the design concepts aligned with the project goals and which key differences between the concepts were most important to them. Respondents were also asked about their level of support for roundabouts and could participate in a budgeting exercise. Six questions related to respondent demographics were optional.

A total of 1,217 people viewed or responded to some of the questions while 306 people completed the full survey. The online survey was published in both English and Spanish, with 21 responses completed in Spanish. One question allowed respondents to write in additional input and those response are included in Attachment B. The full response counts for each question are shown in graphs in Attachment A.

Key Themes

- Divided feedback. Many question results showed respondents were divided. The survey had several opportunities for respondents to rank their level of support or how important a concept, goal, or key difference was to them. This polarization in feedback resulted in the average result or score often falling in the middle.
- Living in the Heights. Due to the divided opinion on many of the questions and concepts, results were separated between those who indicated they lived in The Heights and those that did not. The graphics and charts show the overall results, or average response in some cases, and then also show the results based on where respondents stated they lived. While not all respondents answered whether they lived in the Heights or not, 132 people stated they did live in The Heights.
- Important concept differences. Traffic congestion, comfortable places for walking, and Safe Routes to School were the most important differences between the three concepts.
- Roundabout support. Respondents are split in their level of support for roundabouts. Overall, a roundabout at 13th and May received a slightly higher level of support than a double roundabout at the intersections of 13th, Belmont, and 12th.
- Concepts and community goals. When asked how well each of the concepts aligned with community goals, more respondents fell in the 0-20 point range indicating they felt the concept did not align at all with the goal than any other point range. Concept 1 scored poorly in terms of alignment across all goals, however Concepts 2 and 3 had more people scoring alignment in the 60 to 100 range, resulting in slightly higher average scores.
- Concept alignment. When asked to pick which concept they felt most aligned with, more people picked Concept 3 than Concepts 1 or 2.
- Differences in decision-making. Respondents who preferred Concepts 2 and 3 found better pedestrian access and opportunities for gathering and better bike access most important when choosing their preferred concept. Respondents who preferred Concept 1 found better auto access and preserving parking were most important.
- Budgeting improvements. In the budgeting exercise, respondents spent the most points on constructing roundabouts, but items that cost fewer points such as improved east / west crossings or enhancing street trees and landscaping were chosen the most.
- Respondent demographics. The majority of respondents were white, between 35-44 years old. A majority indicated they shop or use services in the area, followed by "I pass through the area." Most respondents do not live or work in The Heights.

Evaluating the Concepts

Survey participants were shown a graphic of how the technical evaluation demonstrated that each concept meets the project goals in different ways. After reviewing the graphic, participants were asked to show on a slider bar how important these key differences between the concepts were to them with 'Not at all' at 0 and 'Very' at 100 on the scale. Responses were then averaged and are presented below for each important difference between the concepts.

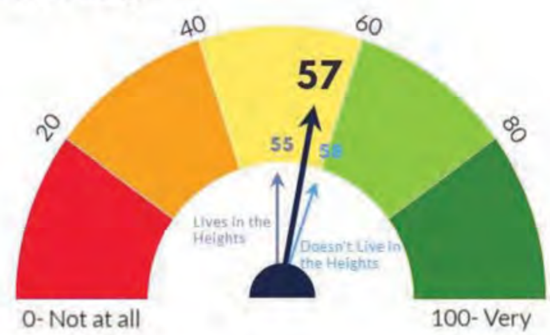
What do you think are the most important differences between the concepts?

Traffic Calming

Traffic Congestion

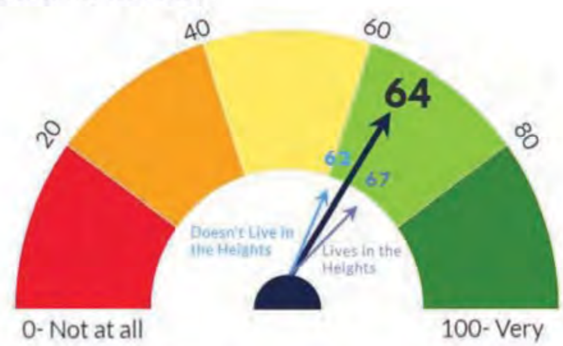
Comfortable Places for Walking

On-Street Parking



Opportunities for Placemaking

Safe Routes to School



Participants were also asked whether they had anything else to add about the concept evaluation before moving to the next questions. Those responses are included as Attachment B.

Traffic Signals versus Roundabouts

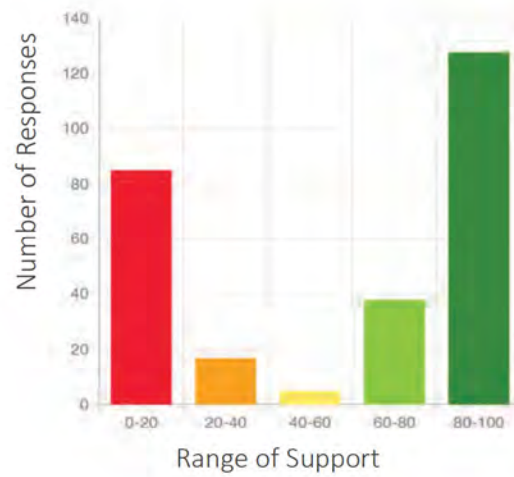
The survey asked respondents to show on a slider bar how supportive they were of roundabouts at two key intersections with 'Not supportive' at 0 and 'Very supportive' at 100 on the scale.

Respondents are split on their level of support for a roundabout at 13th and May. Some appear to strongly support a roundabout (scored 70 and higher), while others indicated that they are not supportive and scored a roundabout between 0-10. Respondents seem to be polarized on the idea of a roundabout with a majority of respondents either showing strong support or strong opposition, creating an average level of support of 56.

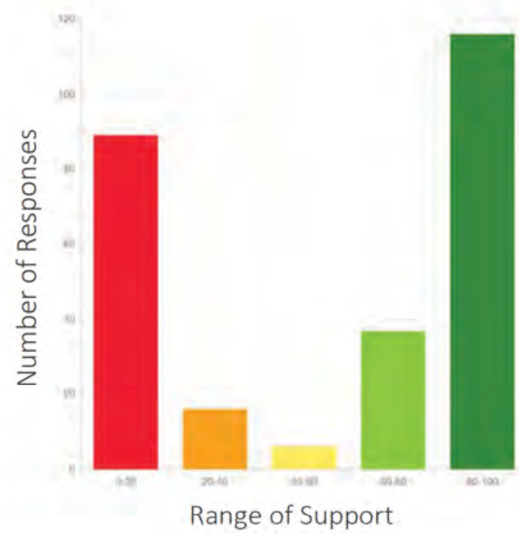
Similar to the roundabout at 13th and May, the level of support for a double roundabout is only slightly less than the level of support for a single roundabout. However, overall fewer respondents indicated a strong level of support for a double roundabout compared to a single roundabout.

The temperature gauge shows the average level of support while the graph shows the number of responses for 20-point increments (range of support) between Not supportive (0) and Very supportive (100).

What is your level of support for a roundabout at 13th and May?



What is your level of support for a double roundabout where 13th, Belmont, and 12th come together?



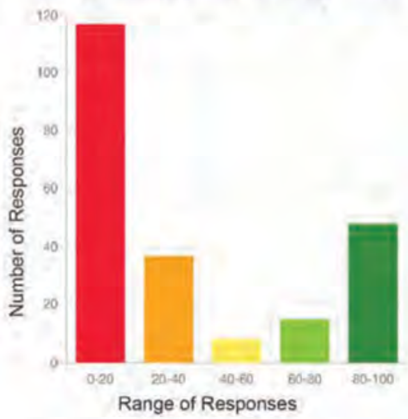
Aligning Concepts and Community Goals

Respondents were again asked to use slider bars to show how well they thought each of the concepts aligned with the community's priority goals with 'Doesn't Align' at 0 at 'Aligns' at 100. Across all four goals each concept had a number of respondents scoring the alignment between 0-20 indicating they felt the concept did not align with the goal at all. Concept 1 scored poorly in terms of alignment across all goals, however Concepts 2 and 3 had more people scoring alignment in the 60 to 100 range, resulting in slightly higher average scores.

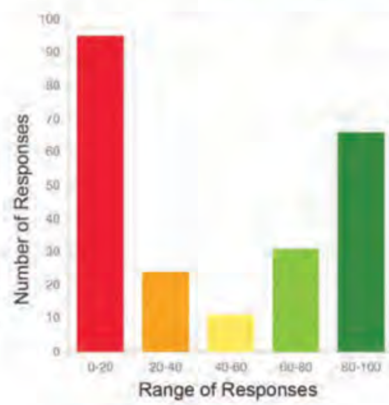
	Average Alignment Scores			
	Goal 1	Goal 2	Goal 3	Goal 4
Concept 1	32	29	29	28
Concept 2	40	40	36	40
Concept 3	41	41	38	39

Goal 1: Calm traffic and improve intersections to improve safety for people driving, walking, biking, taking transit, and supporting local businesses. The responses for Goal 1 are very similar for each concept. Most respondents indicated that the concepts were not aligned with the goal of calming traffic and safety. Concepts 2 and 3 have more responses indicating it is aligned with this goal compared to Concept 1 for Goal 1.

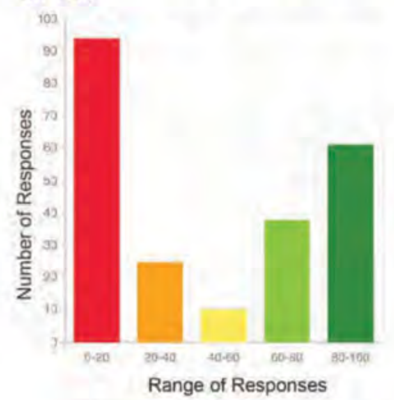
Concept 1. Two Lane, Two-Way Traffic



Concept 2. One Lane, One-Way Traffic

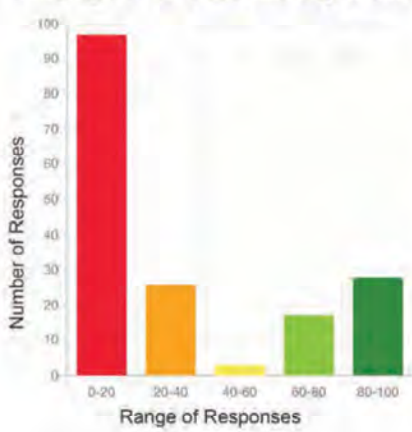


Concept 3. Hybrid - One Lane, One-Way on 12th and Two-Way Traffic on 13th

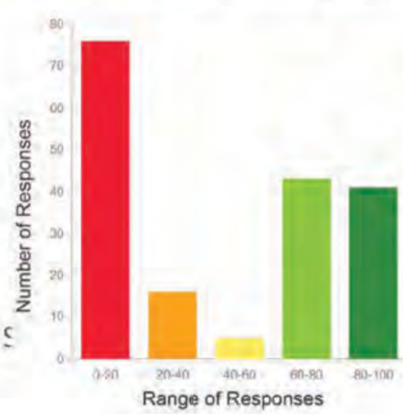


Goal 2: Preserve and promote a livable community and economy through streetscape improvements that increases safety for people walking and biking and addresses parking needs to support local business access, and future mixed-use development. Similar to Goal 1, most respondents indicated that none of the concepts were aligned with Goal 2 but Concepts 2 and 3 had slightly more respondents ranking alignment more favorably.

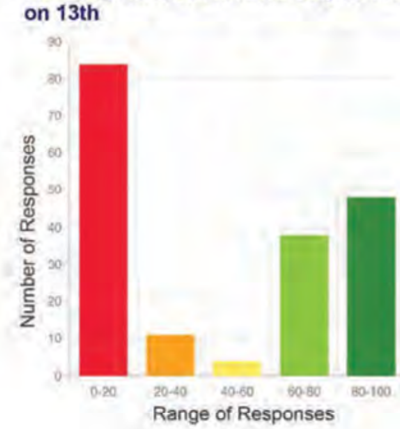
Concept 1. Two Lane, Two-Way Traffic



Concept 2. One Lane, One-Way Traffic



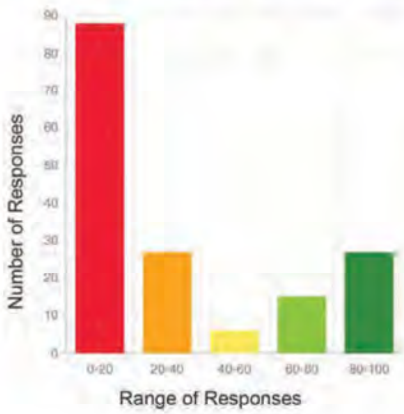
Concept 3. Hybrid - One Lane, One-Way on 12th and Two-Way Traffic on 13th



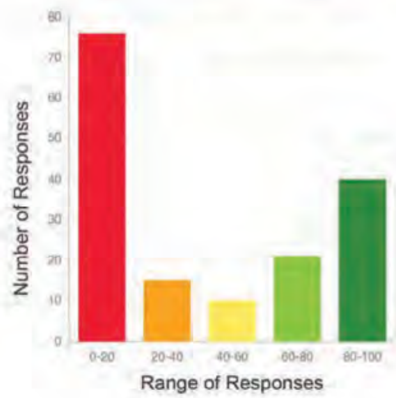
Goal 3: Create an identity for the Heights that reflects the diverse culture and history of the area and as a destination for local residents for goods and services.

Goal 3 had a similar outcome to the previous goals.

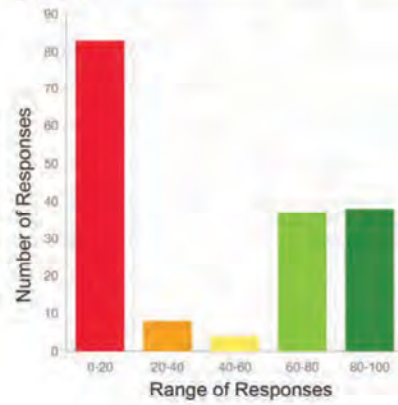
Concept 1. Two Lane, Two-Way Traffic



Concept 2. One Lane, One-Way Traffic



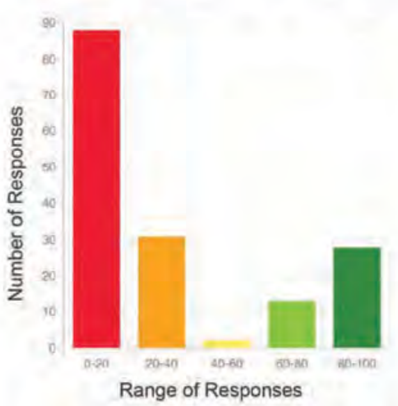
Concept 3. Hybrid - One Lane, One-Way on 12th and Two-Way Traffic on 13th



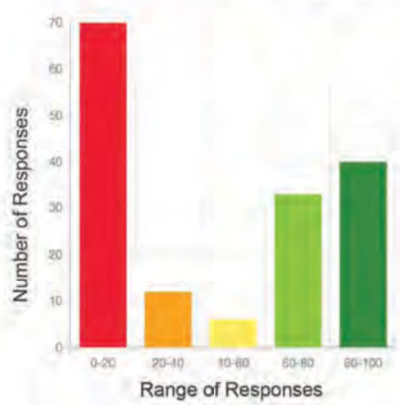
Goal 4: Create streets and gathering spaces that provide safe, comfortable places for people walking, accessing transit, and biking along and across the corridor and that connects area recreation and commercial destinations and neighborhoods.

Most respondents indicated that none of the concepts align with Goal 4 although more respondents believed that Concept 2 was aligned or at least somewhat aligned with Goal 4 compared to the other concepts.

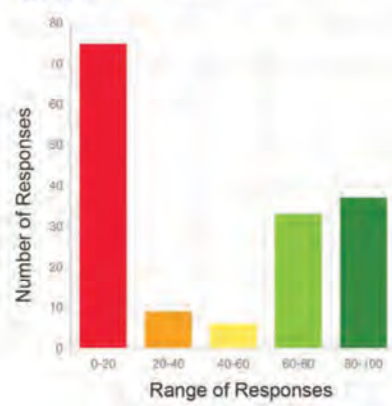
Concept 1. Two Lane, Two-Way Traffic



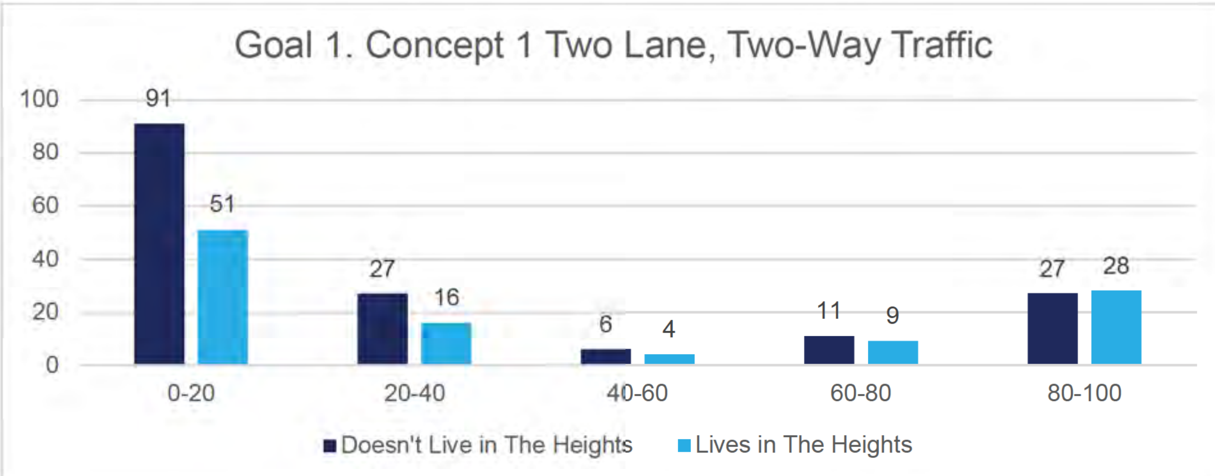
Concept 2. One Lane, One-Way Traffic

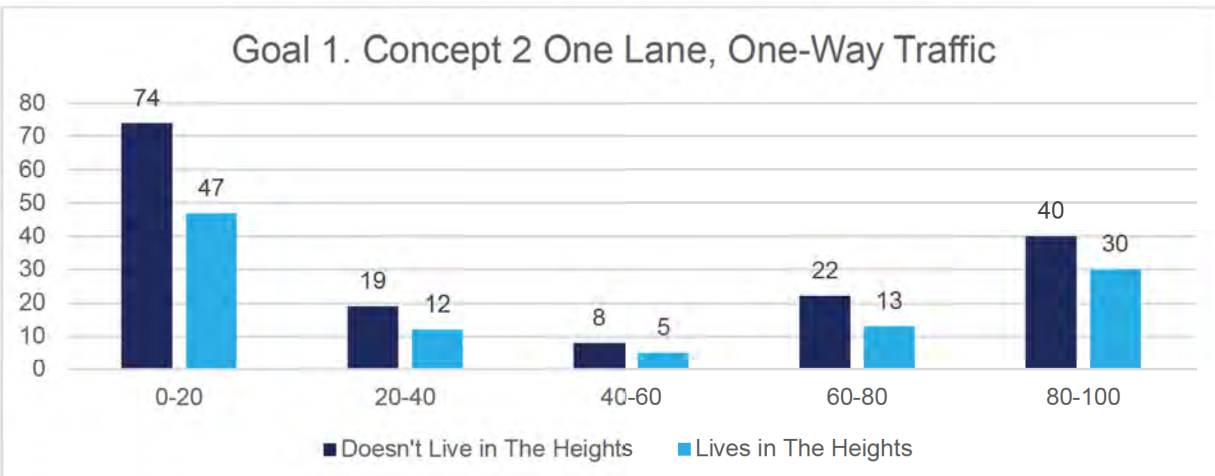


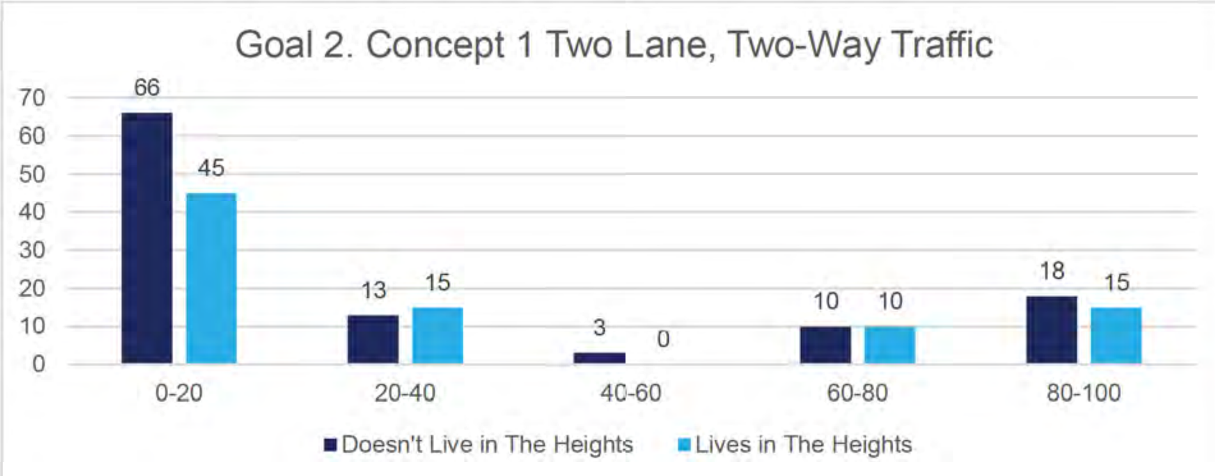
Concept 3. Hybrid - One Lane, One-Way on 12th and Two-Way Traffic on 13th

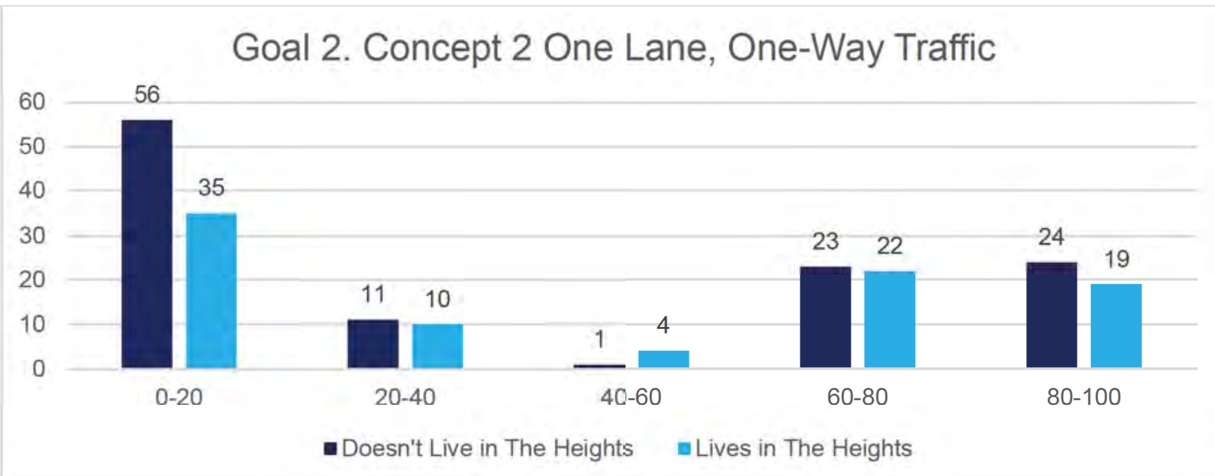


While the graphs above show the overall range of responses for how well the concepts chosen align with the project goals, the graphs below show the range of responses divided by whether respondents indicated they lived in The Heights or not. While fewer respondents indicated that they were residents of The Heights, their results generally parallel the responses of those who do not.

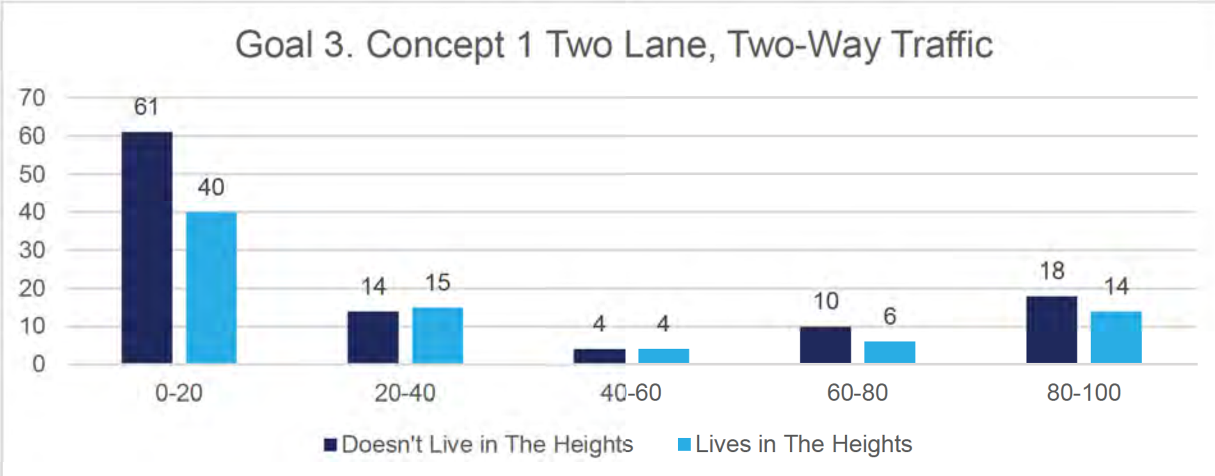


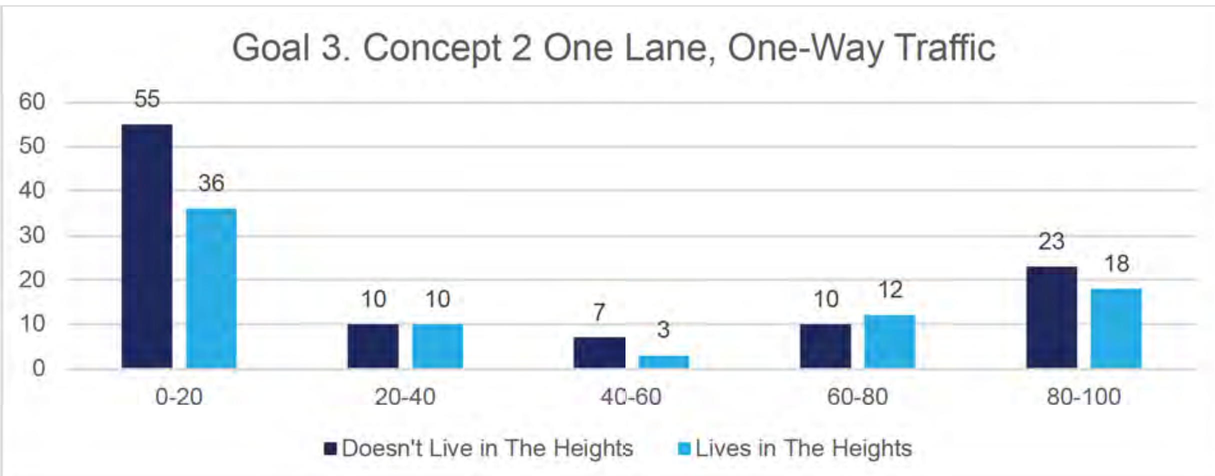



Goal 2. Concept 1 Two Lane, Two-Way Traffic
70
60
50
40
30
20
10
0
66
45
13
15
3
0
10
10
18
15
0-20
20-40
40-60
60-80
80-100
Doesn't Live in The Heights
Lives in The Heights


Goal 2. Concept 2 One Lane, One-Way Traffic
60
50
40
30
20
10
0
56
35
11
10
1
4
23
22
24
19
0-20
20-40
40-60
60-80
80-100
Doesn't Live in The Heights
Lives in The Heights


Goal 2. Concept 3 Hybrid- One Lane, One-Way on 12th and Two-Way Traffic on 13th
70
60
50
40
30
20
10
0
61
40
6
7
4
0
20
21
27
26
0-20
20-40
40-60
60-80
80-100
Doesn't Live in The Heights
Lives in The Heights


Goal 3. Concept 1 Two Lane, Two-Way Traffic
70
60
50
40
30
20
10
0
61
40
14
15
4
4
10
6
18
14
0-20
20-40
40-60
60-80
80-100
Doesn't Live in The Heights
Lives in The Heights


Goal 3. Concept 2 One Lane, One-Way Traffic
60
50
40
30
20
10
0
55
36
10
10
7
3
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12
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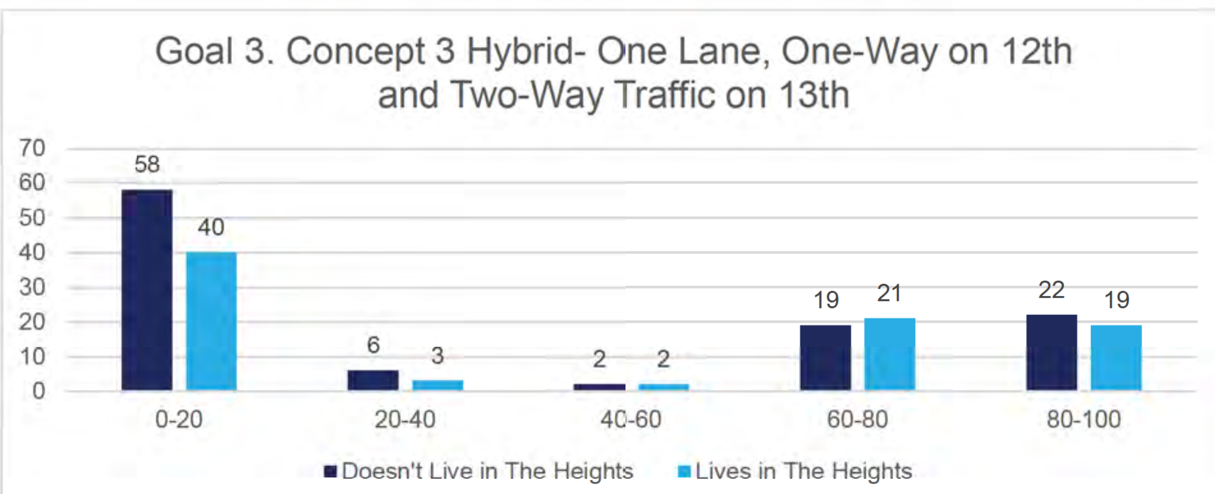
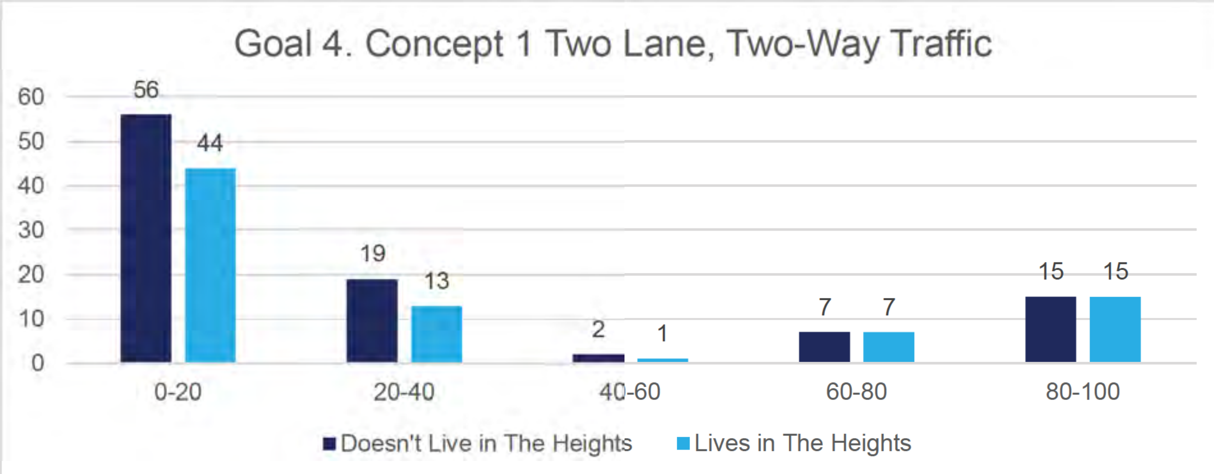
18
0-20
20-40
40-60
60-80
80-100
Doesn't Live in The Heights
Lives in The Heights


Goal 3. Concept 3 Hybrid- One Lane, One-Way on 12th and Two-Way Traffic on 13th
70
60
50
40
30
20
10
0
58
40
6
3
2
2
19
21
22
19
0-20
20-40
40-60
60-80
80-100
Doesn't Live in The Heights
Lives in The Heights


Goal 4. Concept 1 Two Lane, Two-Way Traffic
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50
40
30
20
10
0
56
44
19
13
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1
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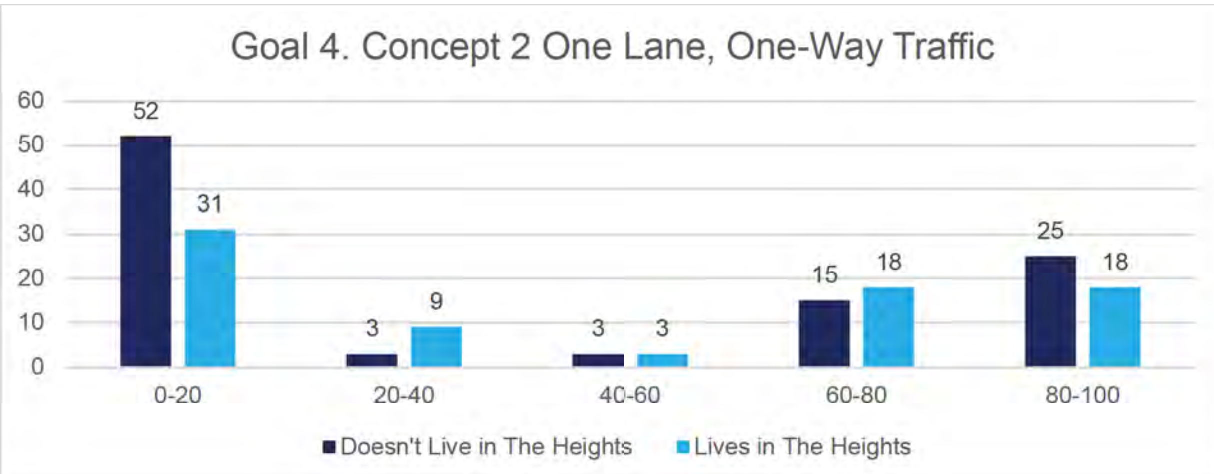
20-40
40-60
60-80
80-100
Doesn't Live in The Heights
Lives in The Heights


Goal 4. Concept 2 One Lane, One-Way Traffic
60
50
40
30
20
10
0
52
31
3
9
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18
25
18
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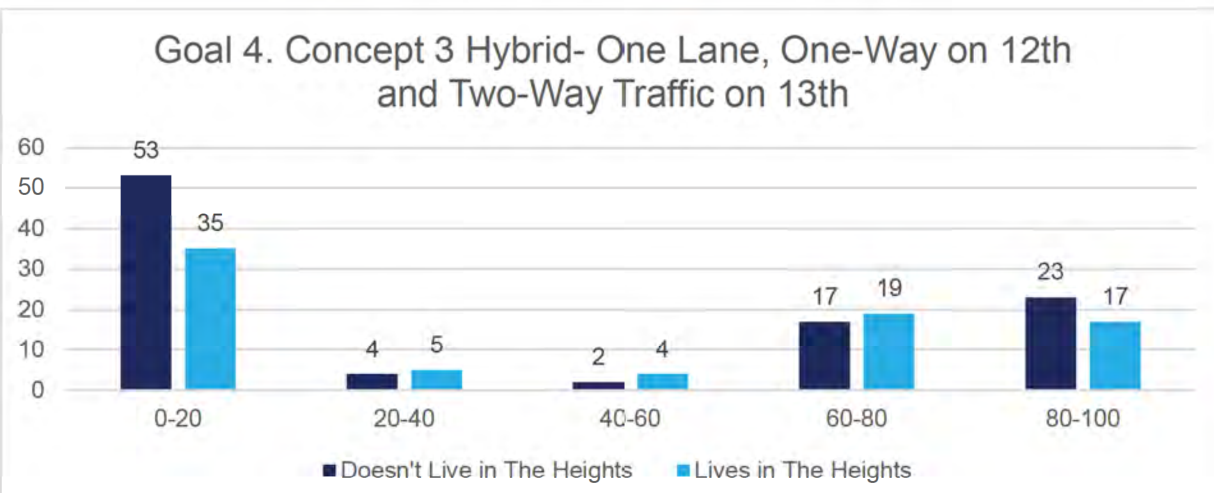
20-40
40-60
60-80
80-100
Doesn't Live in The Heights
Lives in The Heights


Goal 4. Concept 3 Hybrid- One Lane, One-Way on 12th and Two-Way Traffic on 13th
60
50
40
30
20
10
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53
35
4
5
2
4
17
19
23
17
0-20
20-40
40-60
60-80
80-100
Doesn't Live in The Heights
Lives in The Heights

Preferred Concept

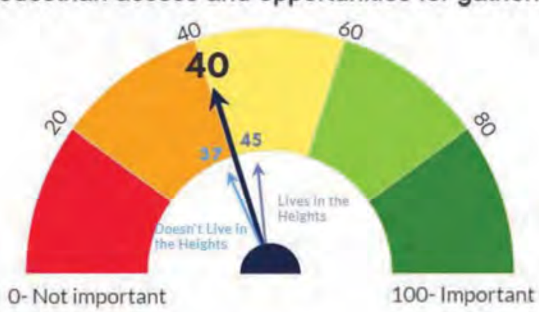
After ranking the concepts based on how they met community goals, respondents were then asked whether there was a concept they felt most aligned with. Concept 3 ranked first and while Concept 1 ranked poorly when compared to alignment with community goals in the previous section, here it ranked ahead of Concept 2 by a small margin.

Is there a concept you feel most aligned with?

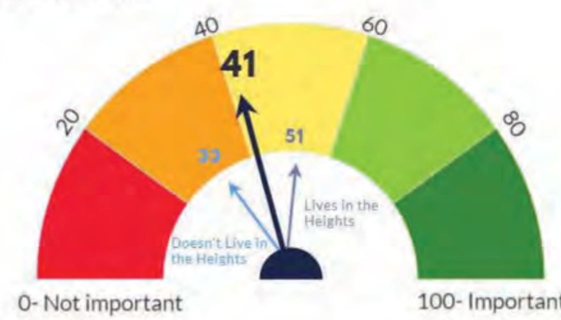
Based on the concept they selected, respondents were then asked to use slider bars to rank how important each four factors were in making their decision from 'Not important' at 0 to 'Important' at 100.

For those who picked Concept 1, the following four graphics show the average score of importance for each of the factors. Better auto access and preserving parking were most important.

Better pedestrian access and opportunities for gathering



Better bike access



Better auto access

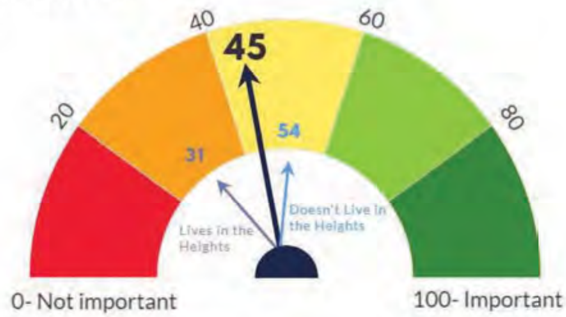
Saves parking

For those who picked Concept 2, the following four graphics show the average score of importance for each of the factors. Better pedestrian access and opportunities for gathering and better bike access were most important.

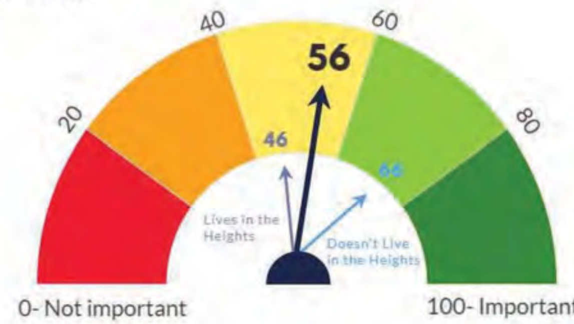
Better pedestrian access and opportunities for gathering

Better bike access

Better auto access



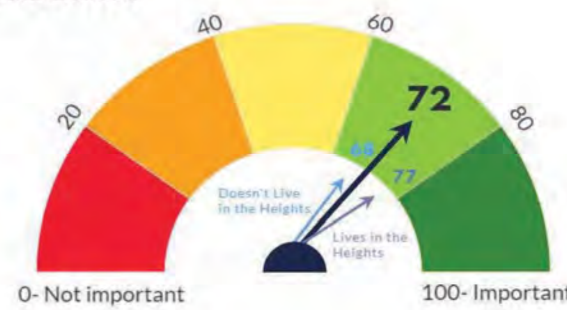
Saves parking



For those who picked Concept 3, the following four graphics show the average score of importance for each of the factors.

Better pedestrian access and opportunities for gathering

Better bike access



Better auto access

Saves parking

Prioritizing Improvements

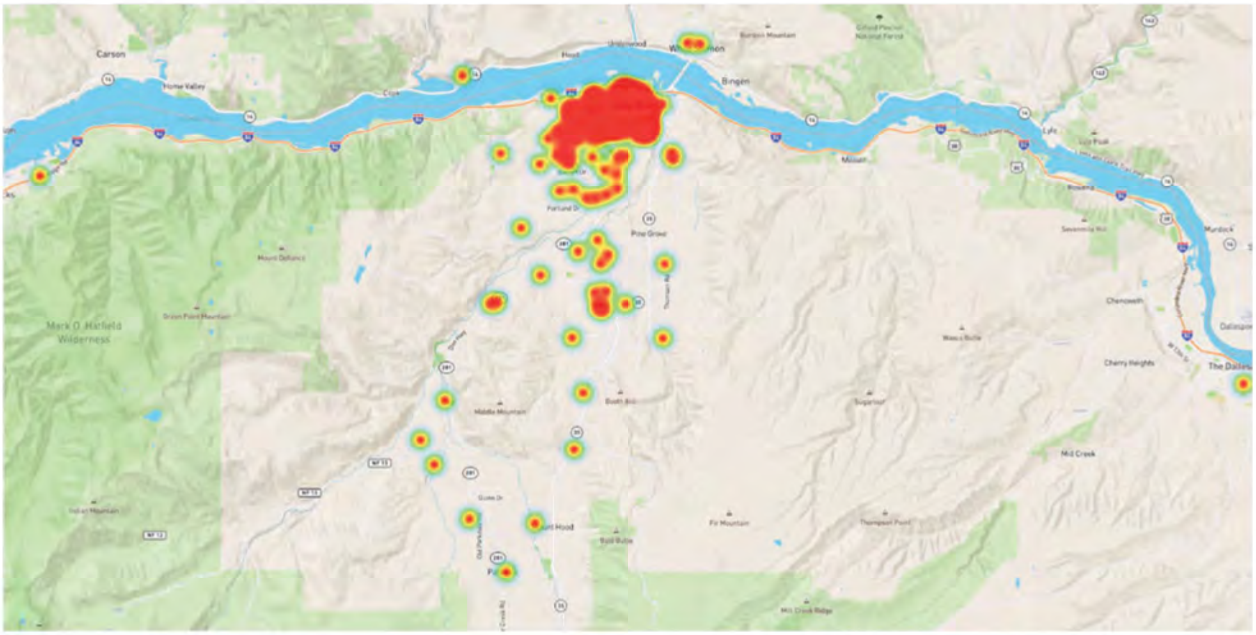
For the last section respondents were given a budgeting exercise and asked to pick from a list of improvements for how they would spend their budget. The total budget was 20 points, but 10 have already been spent to address basic street and safety upgrades needed in the area. That left the respondents with 10 points to spend how they wished. The table below shows each improvement, the cost of the improvement in points, the total number of points spent on that improvement, and the number of times that improvement was chosen.

Improvement	Point Cost	Total Points Spent on Item	Number of Times Item Was Picked
Roundabout. Construct a roundabout instead of a traffic signal at 13th Street and May Street.	3	354	118
Double roundabout. Combine intersections of 13th Street, Belmont Ave, and 12th Street and construct a large, double roundabout.	5	530	106
On-street parking. Modify street design to create more on-street parking.	3	243	81
Bike Lanes. Construct a two-way bike lane instead of one-way bike lanes.	2	206	103
Add gathering spaces. Modify street design to remove some on-street parking and provide more places for people to meet and gather.	2	176	88
Improved lighting. Provide pedestrian lighting to supplement street lights.	2	230	115
Improved east / west crossings. Construct enhanced street crossings at B Street and C Street in addition to the enhanced crossings provided at Pine/Taylor and Wilson/A St.	1	158	158
Enhances street trees and landscaping. Provide more planting areas and street trees.	1	167	167
Enhanced building frontages. Provide support to improve the look of buildings.	1	112	112
Green stormwater infrastructure. Incorporate natural systems into the landscape.	1	123	123

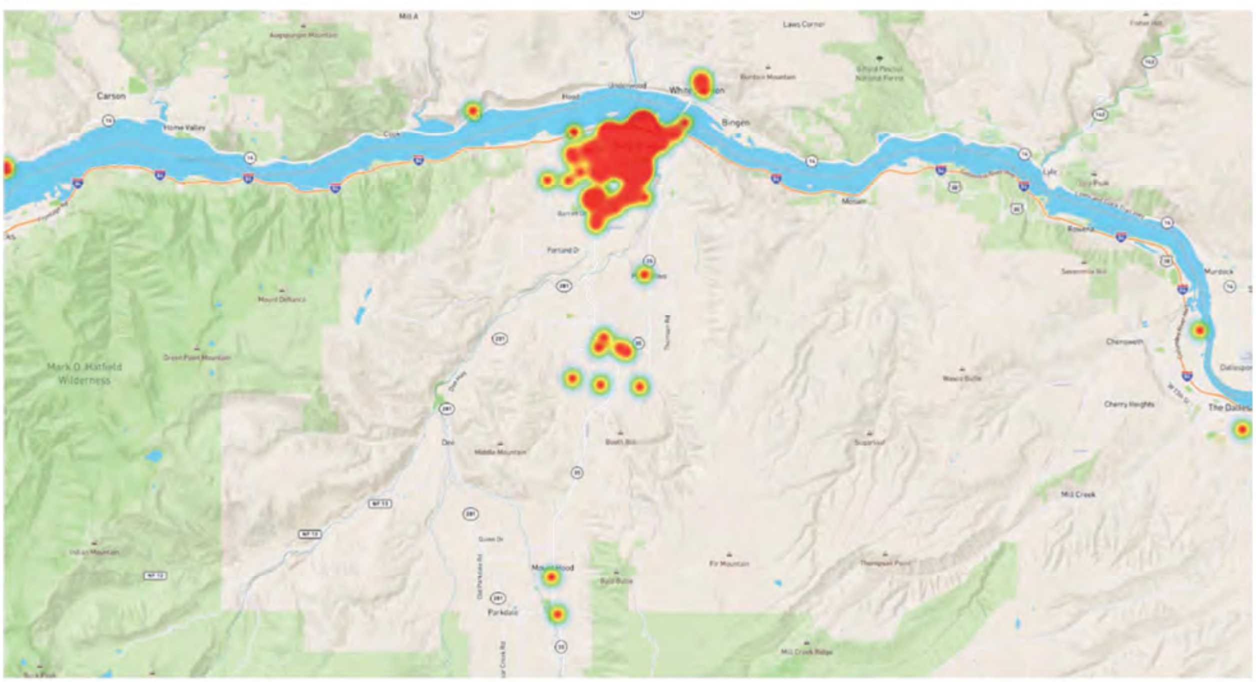
Demographics

Demographic questions were options. The majority of respondents were white, between 35-44 years old. Most respondents also indicated they shop or use services in the area, followed by "I pass through the area." Most respondents do not live or work in The Heights. Of the ones that do, most indicated they have lived or worked in The Heights for more than 10 years. Demographic data is included in Attachment A.

Where do respondents live?



Where do respondents work?



Attachments

Attachment A: Online Survey Charts

Attachment B: Survey Open Ended Responses

Attachment A Online Survey Charts

Importance of Key Differences

As you review the results of the analysis, what do you think are the most important differences between these concepts? Use the slider bars below to indicate how important the key differences between concepts are to you with Not important as 0 and Very important as 100.

Figure 1: Traffic Calming (slower traffic)

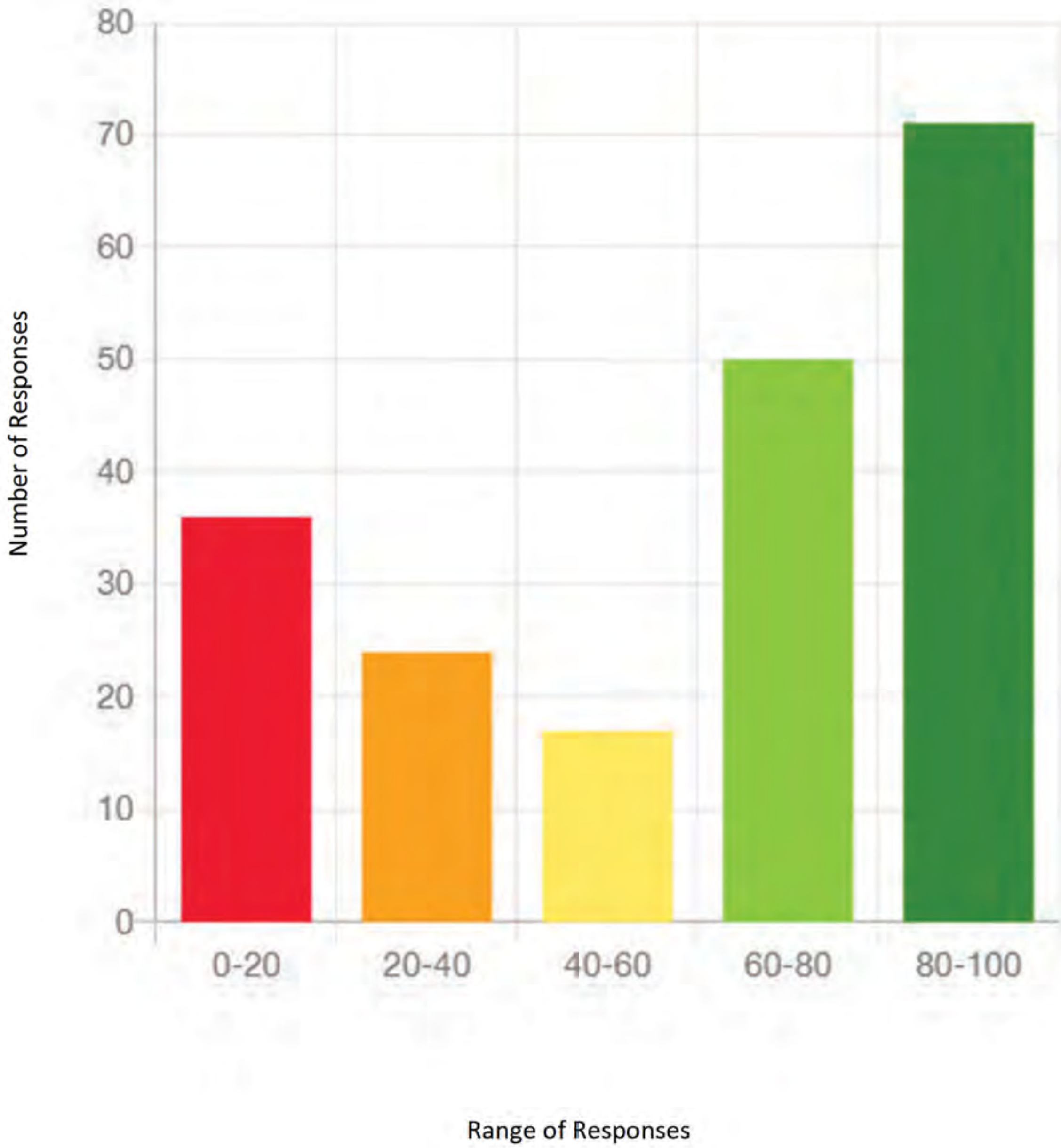


Figure 2: Traffic congestion

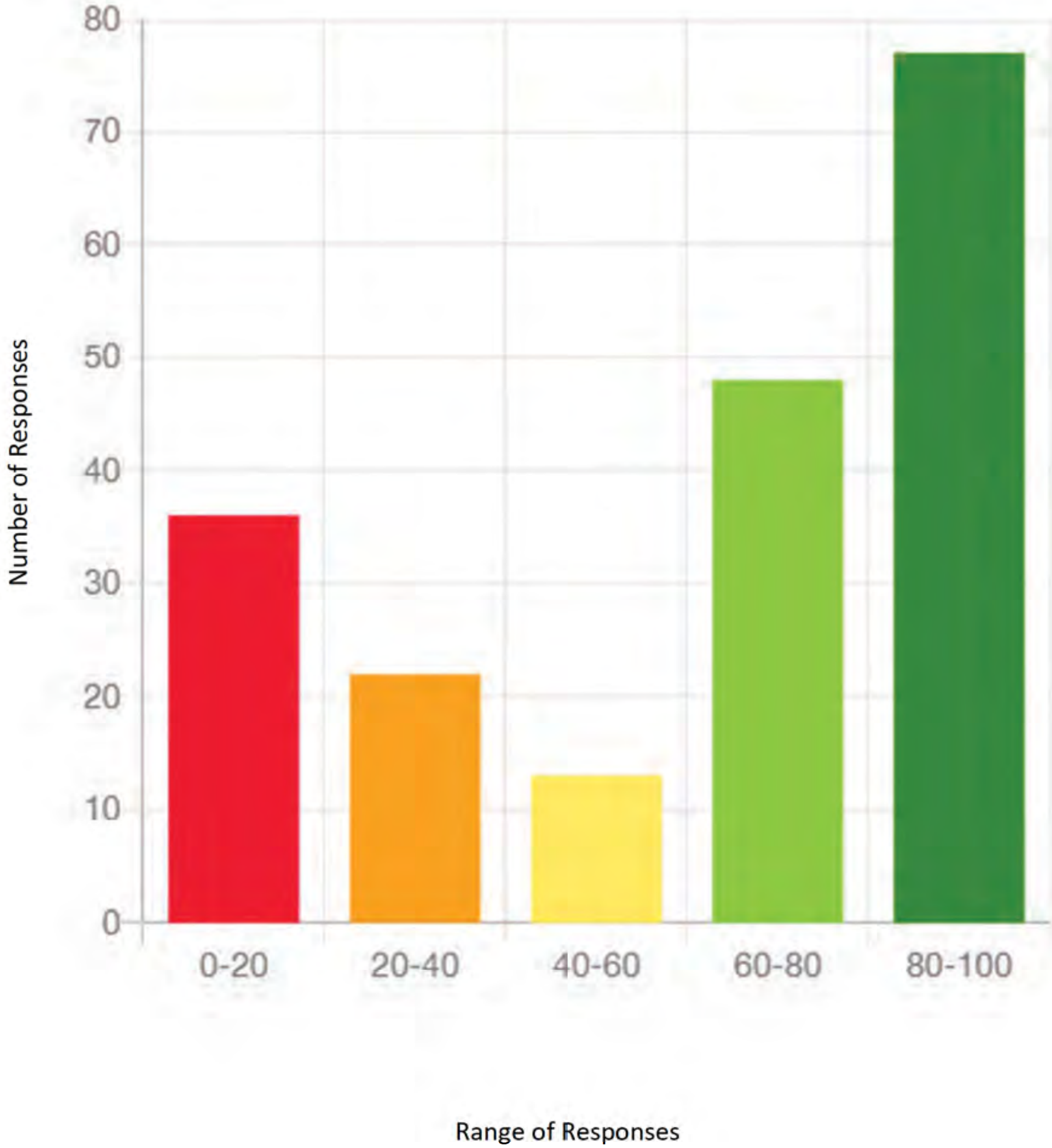


Figure 3: On-street parking

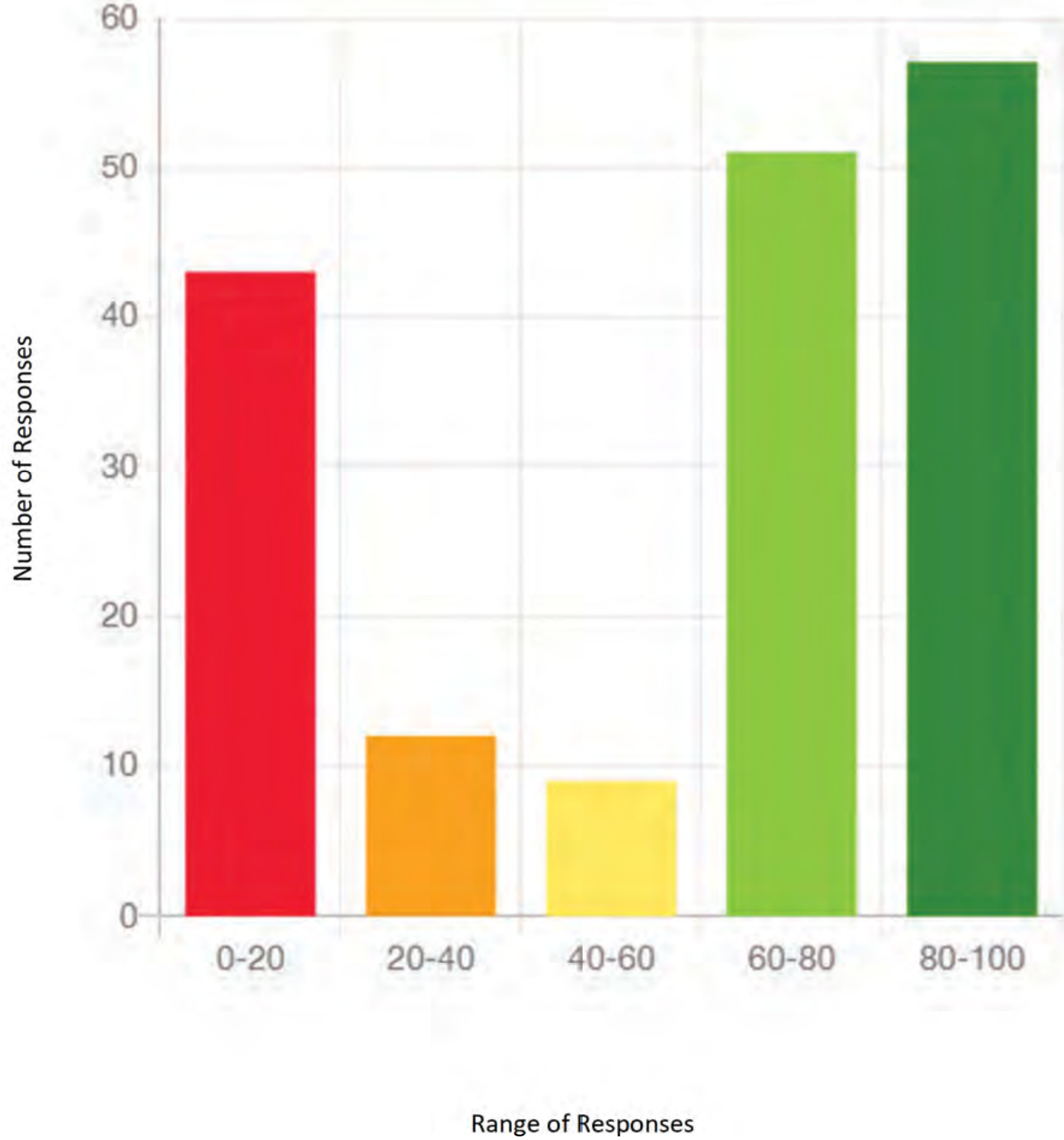


Figure 4: Comfortable places for walking

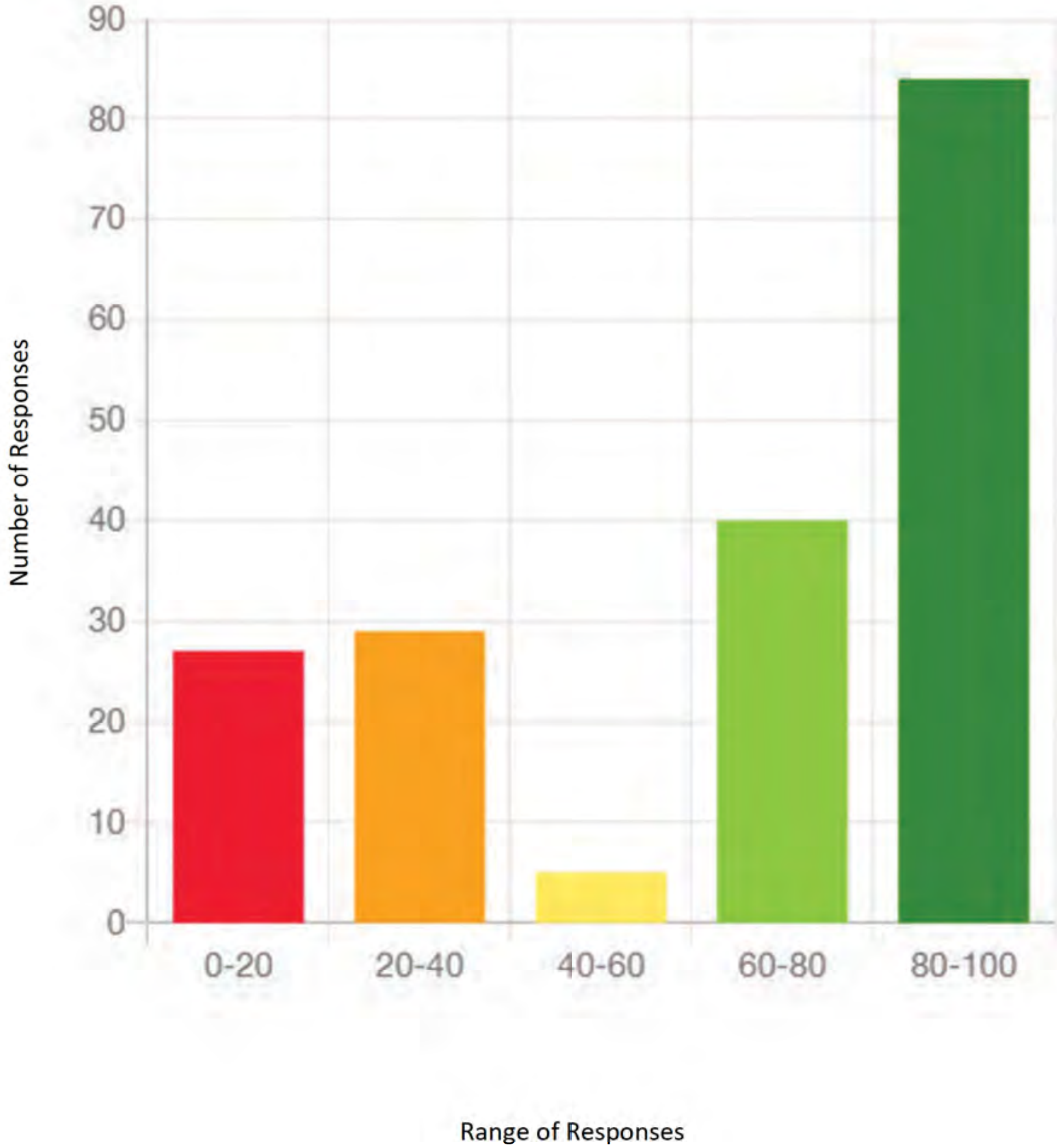


Figure 5: Opportunities for Placemaking

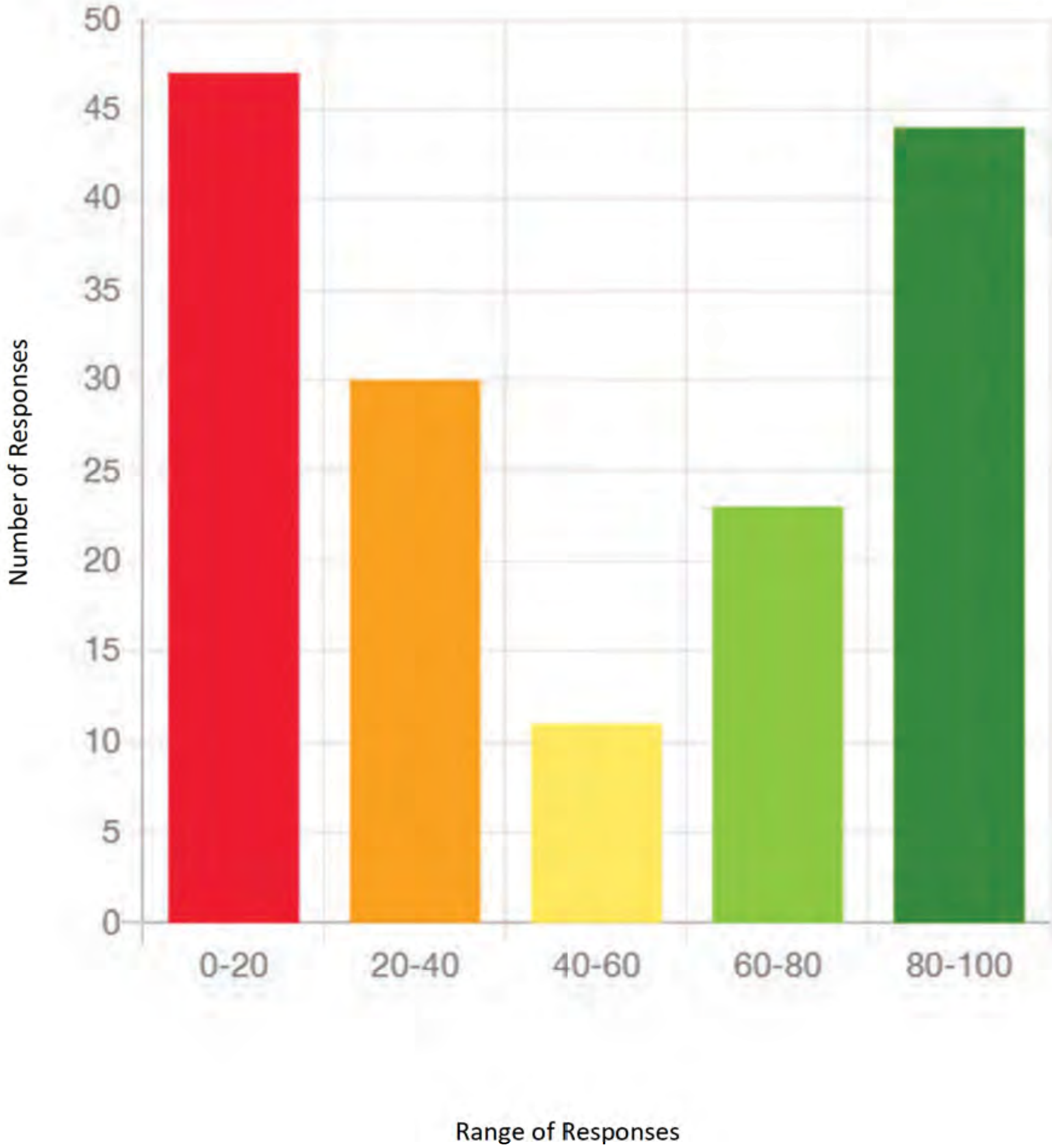
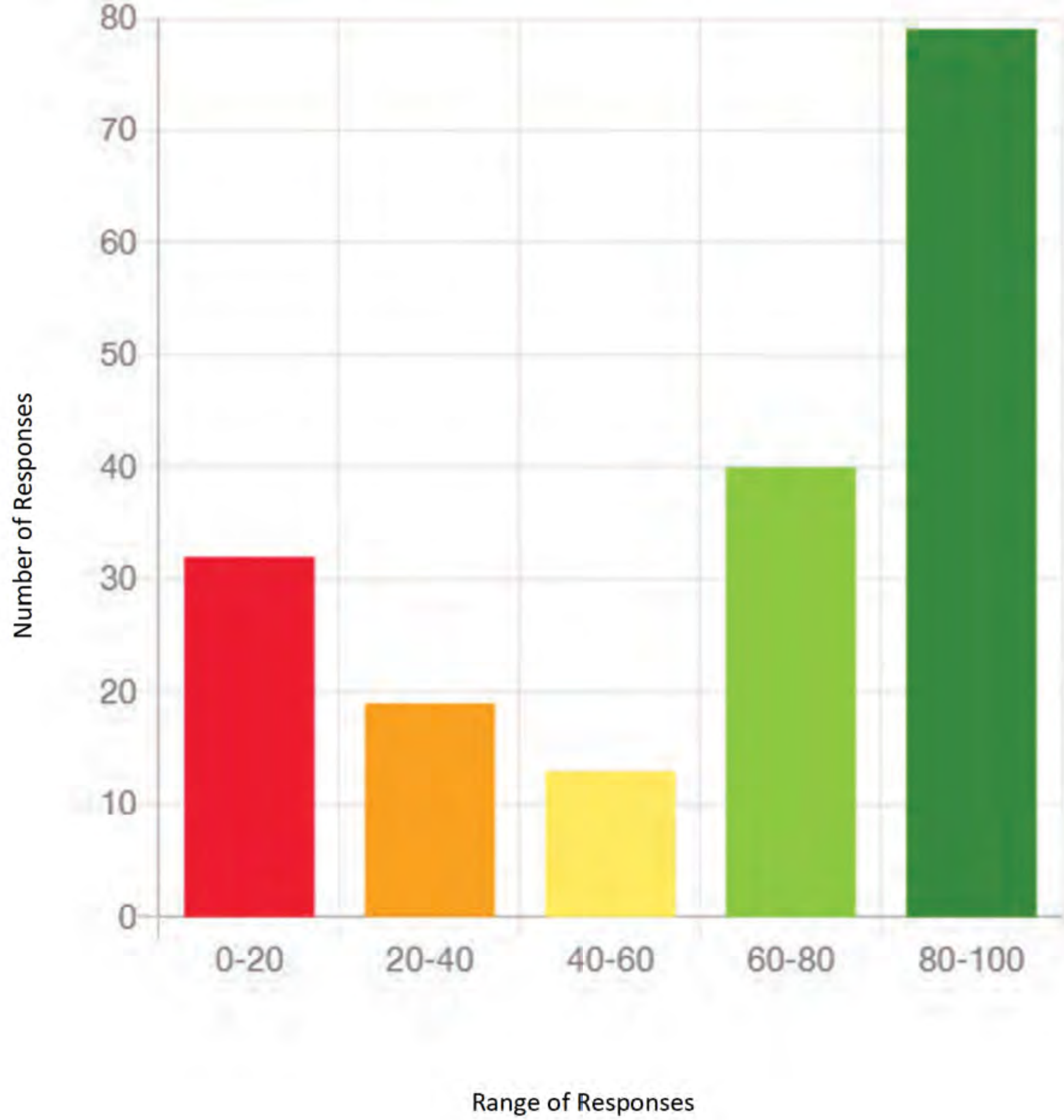


Figure 6: Safe Routes to School



Roundabout Support

Respondents were asked to use slider bars to indicate their level of support for roundabouts with 0 as Not Supportive and 100 as Very Supportive.

Figure 7: What is your level of support for a double roundabout where 13th, Belmont, and 12th come together?

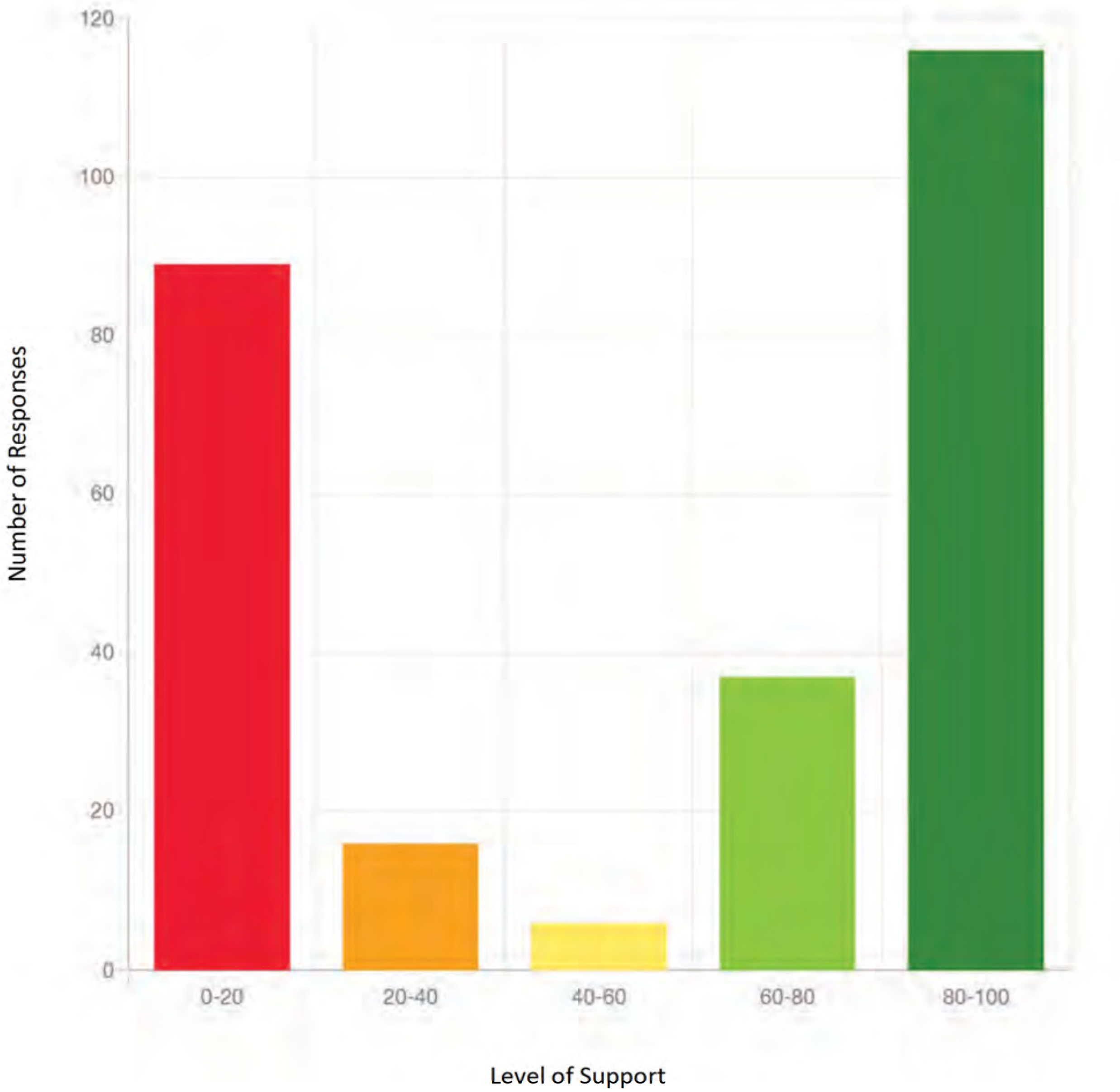
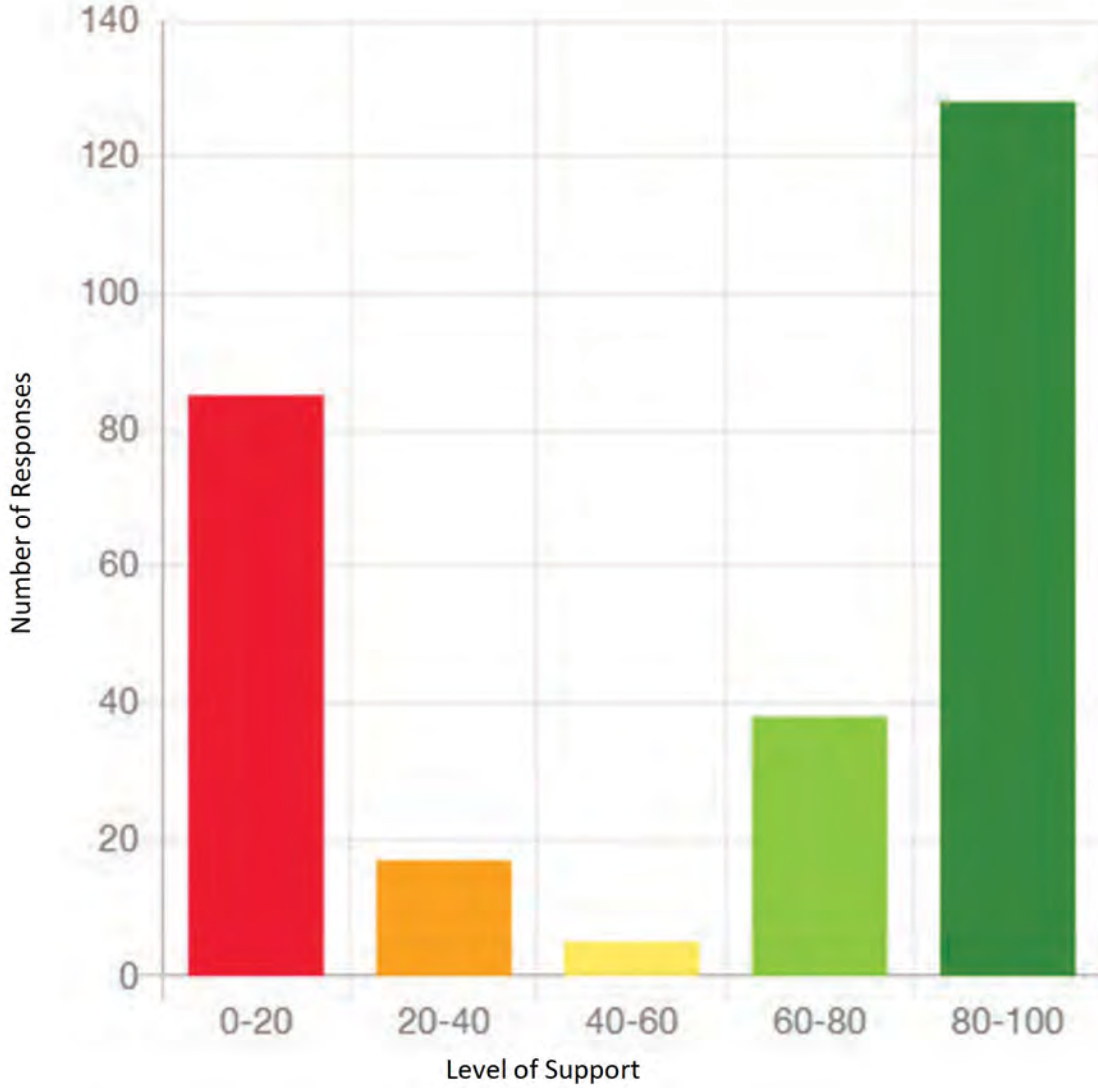


Figure 8: What is your level of support for a roundabout at 13th and May?



Aligning Concepts and Community Goals

In 2021, we asked the community about goals to help guide development of the concepts. The community identified four priority goals. How well do you think the three concepts align with the community's priority goals?

Using the sliding bars below, show how well you think each of the concepts aligns with community goals with Doesn't Align at 0 and Aligns at 100.

Goal 1: Calm traffic and improve intersections to improve safety for people driving, walking, biking, taking transit, and supporting local businesses.

Figure 9: Goal 1 Alignment Concept 1. Two Lane, Two-Way Traffic

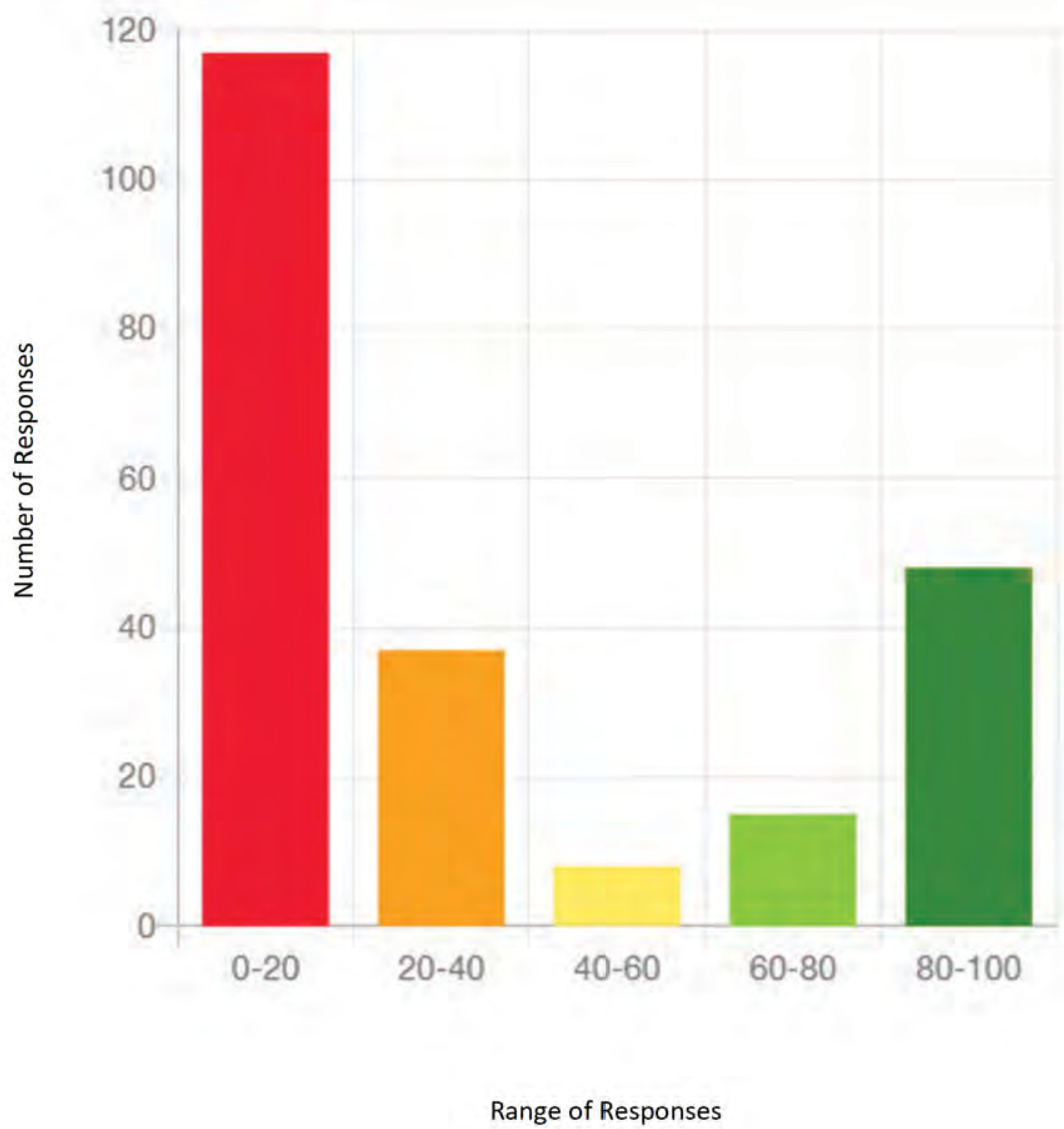


Figure 10: Goal 1 Alignment Concept 2. One Lane, One-Way Traffic

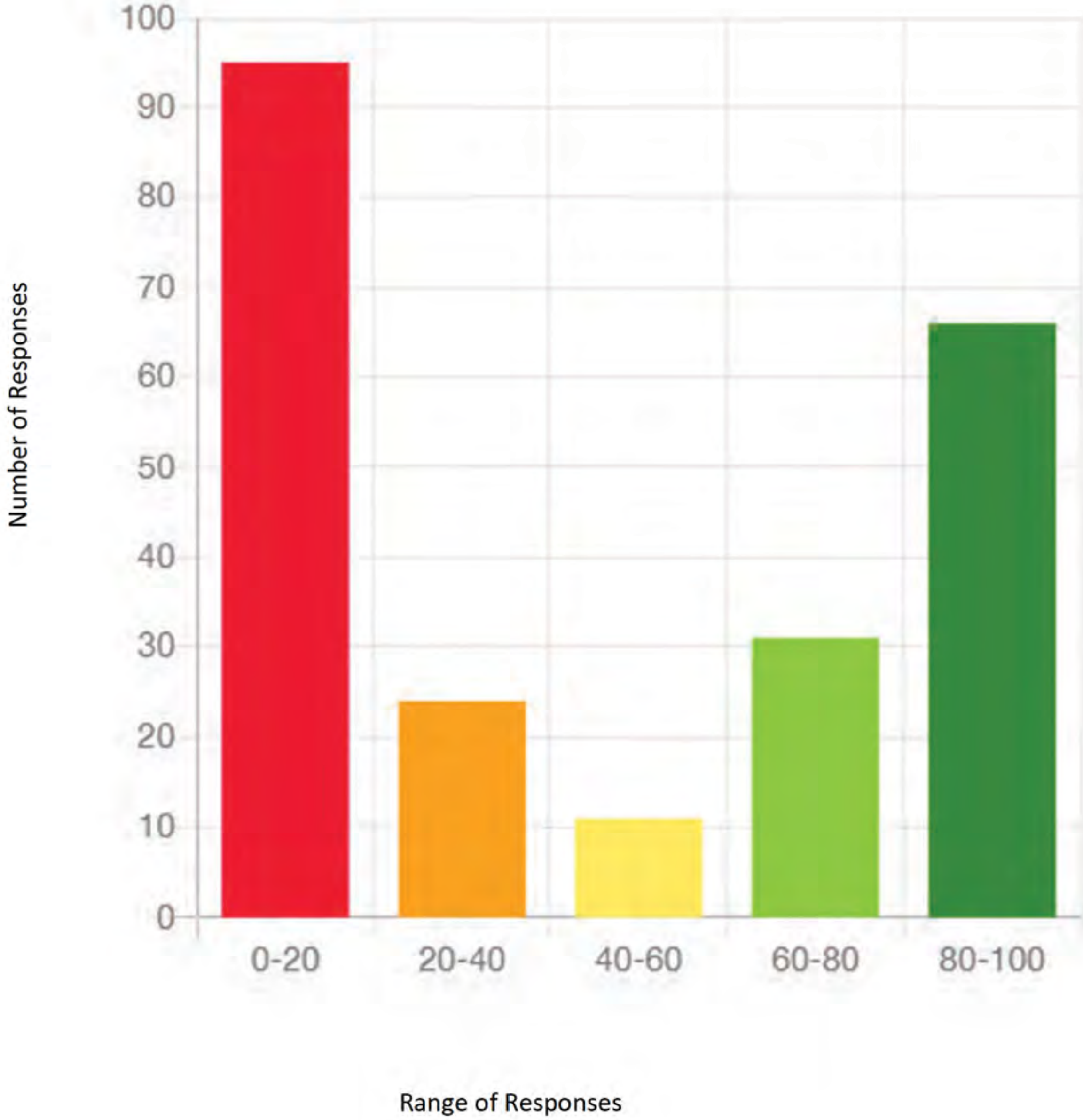
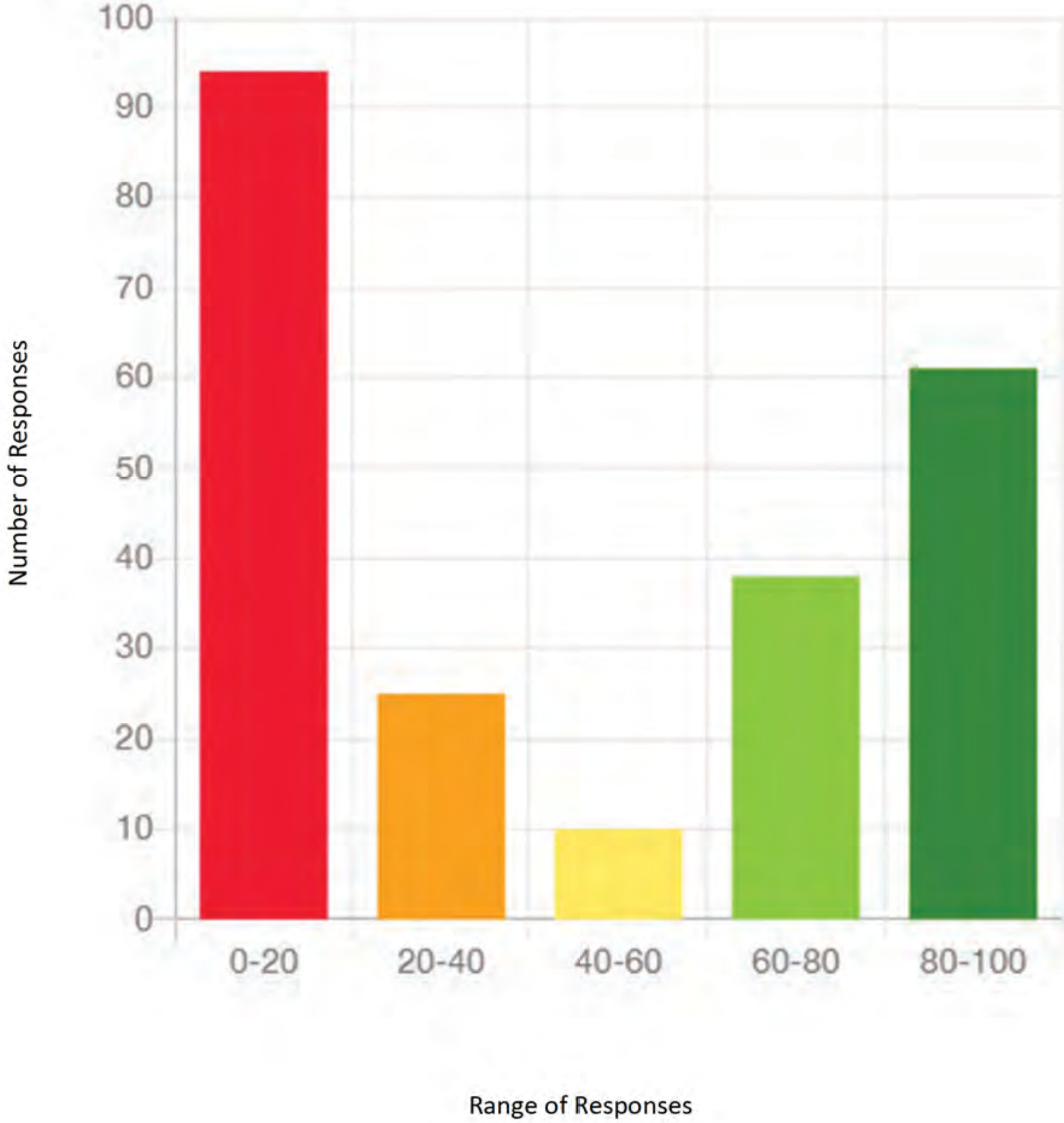


Figure 11: Goal 1 Alignment Concept 3. Hybrid



Goal 2: Preserve and promote a livable community and economy through streetscape improvements that increases safety for people walking and biking and addresses parking needs to support local business access, and future mixed-use development.

Figure 12: Goal 2 Alignment Concept 1. Two Lane, Two-Way Traffic

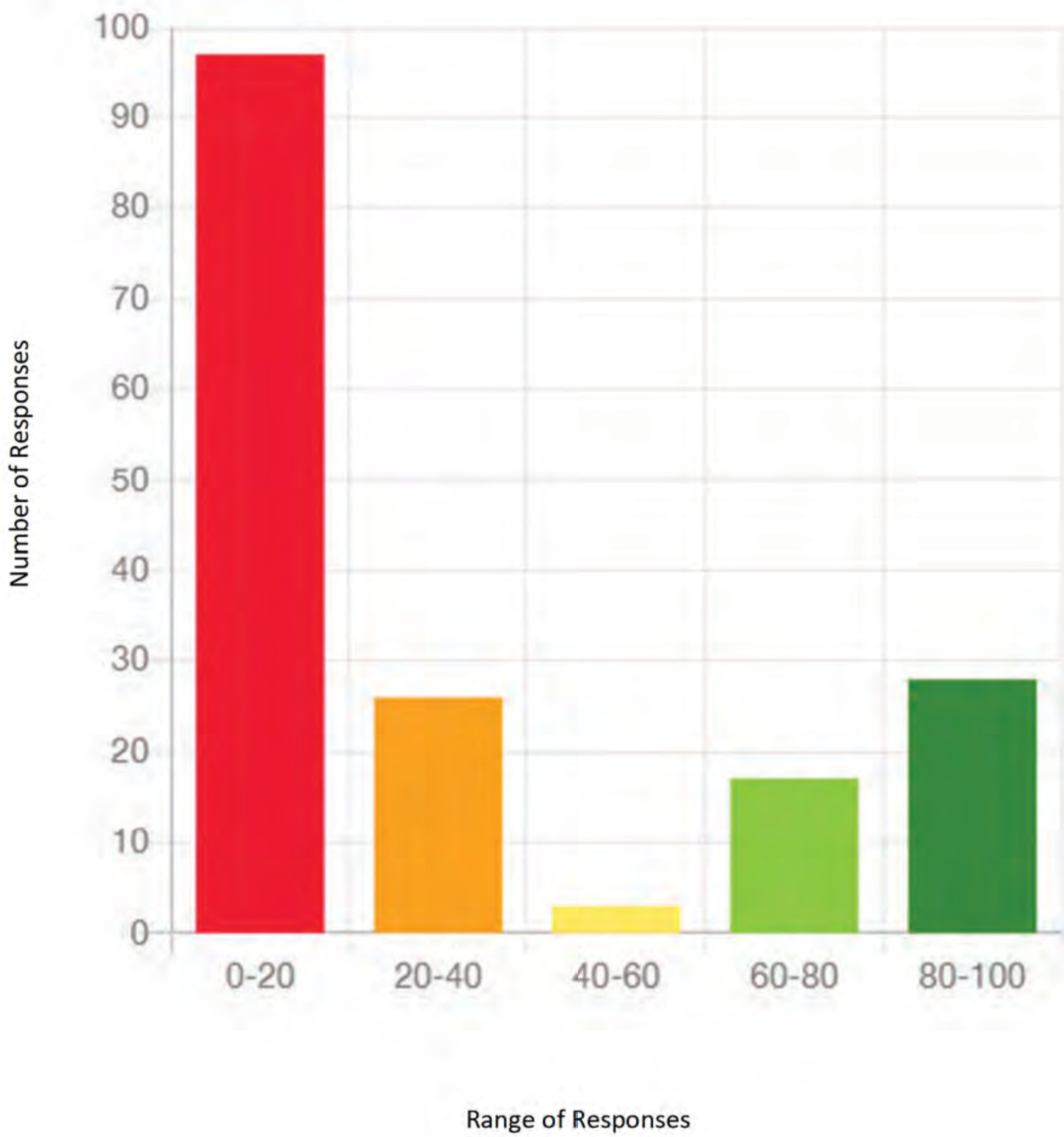


Figure 13: Goal 2 Alignment Concept 2. One Lane, One-Way Traffic

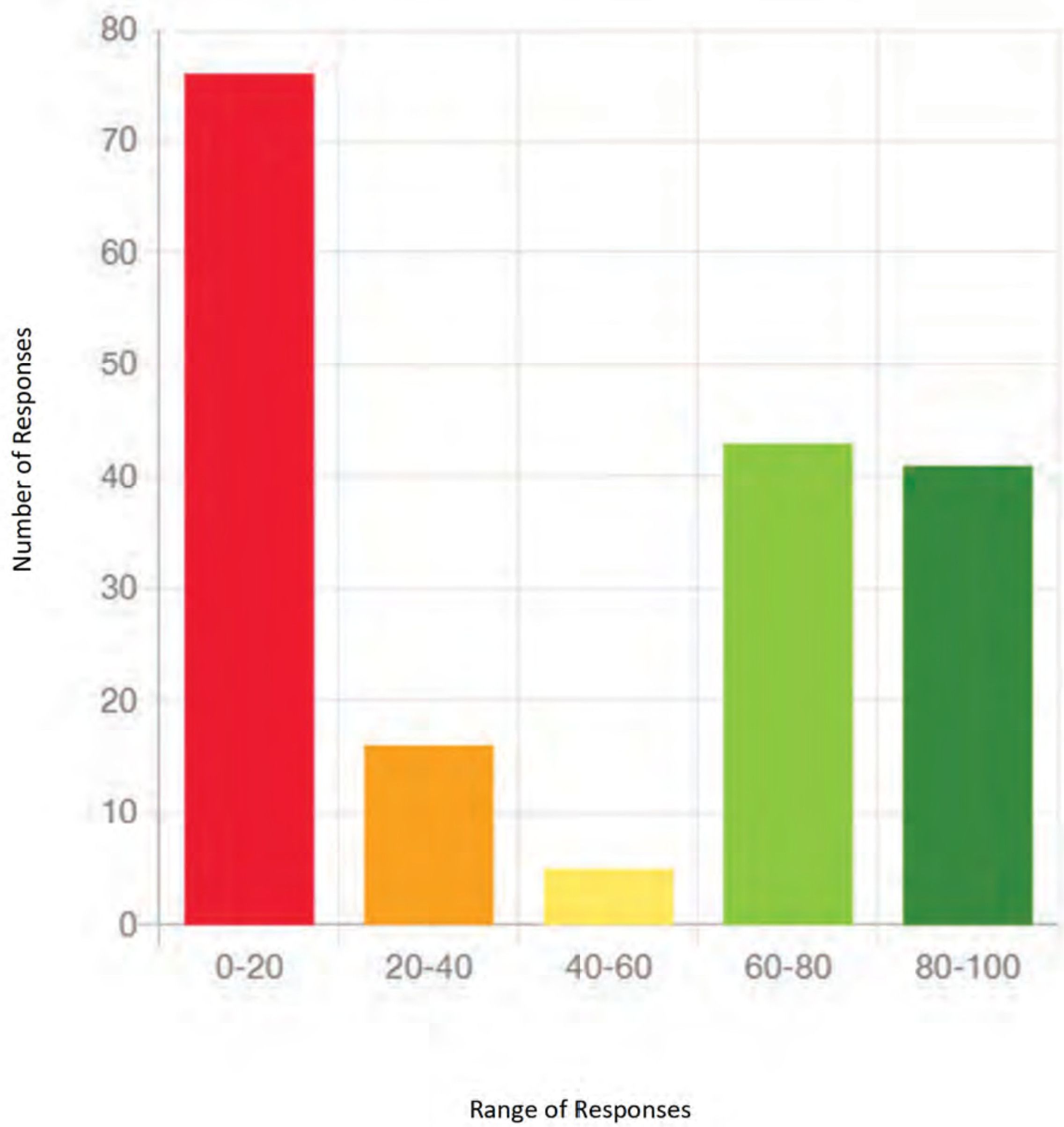
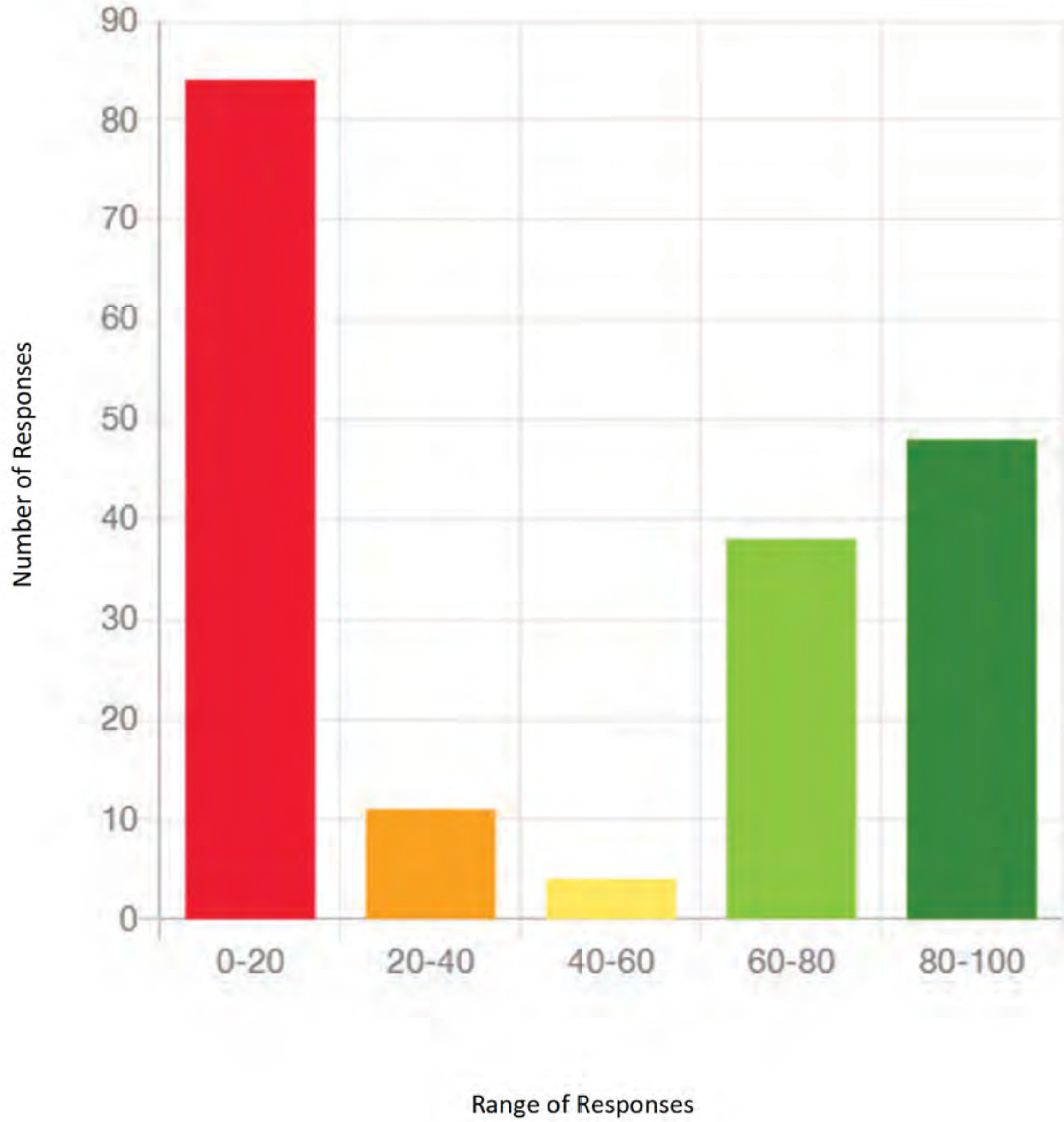


Figure 14: Goal 2 Alignment Concept 3. Hybrid



Goal 3: Create an identity for the Heights that reflects the diverse culture and history of the area and as a destination for local residents for goods and services.

Figure 15: Goal 3 Alignment Concept 1. Two Lane, Two-Way Traffic

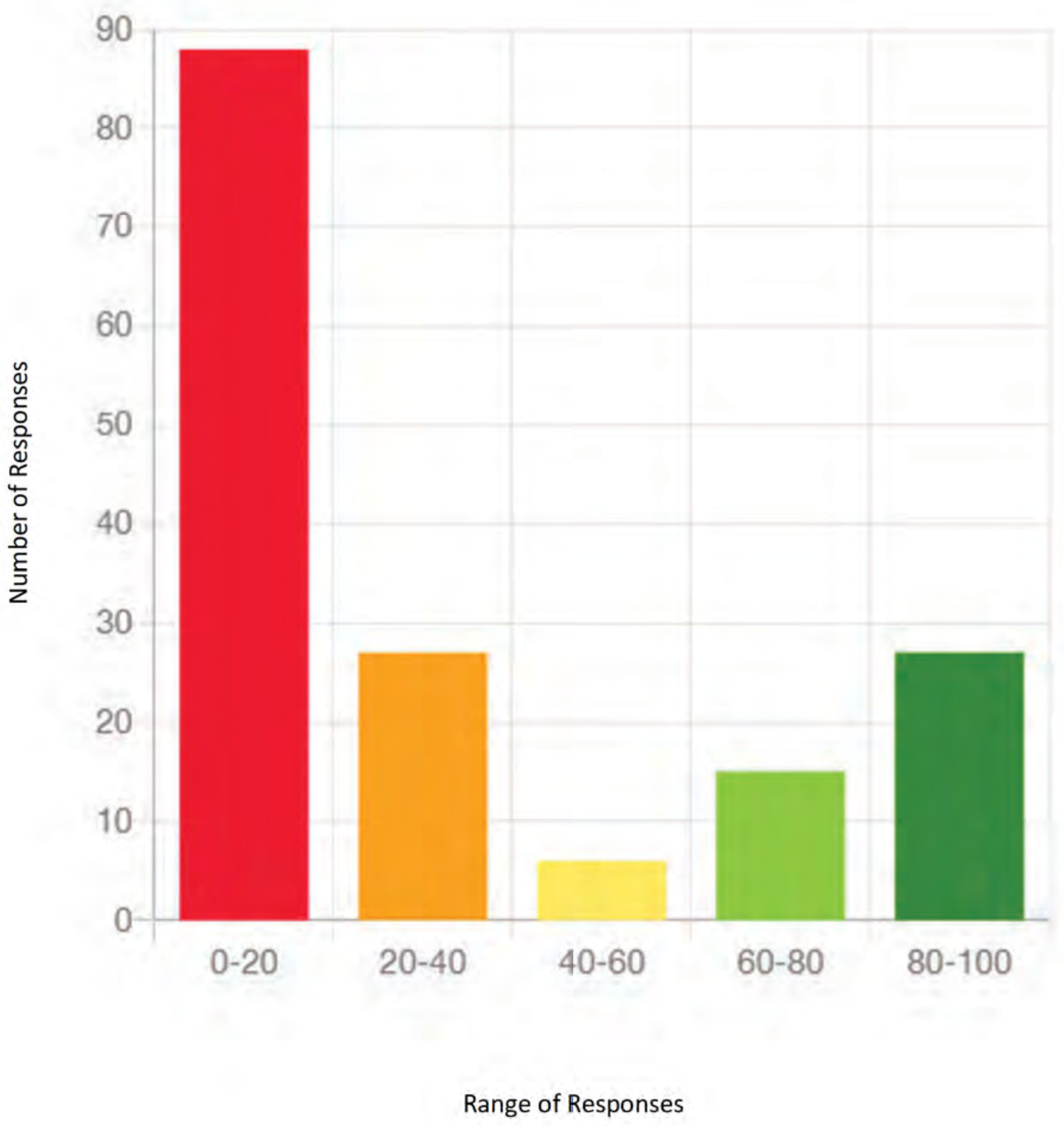


Figure 16: Goal 3 Alignment Concept 2. One Lane, One-Way Traffic

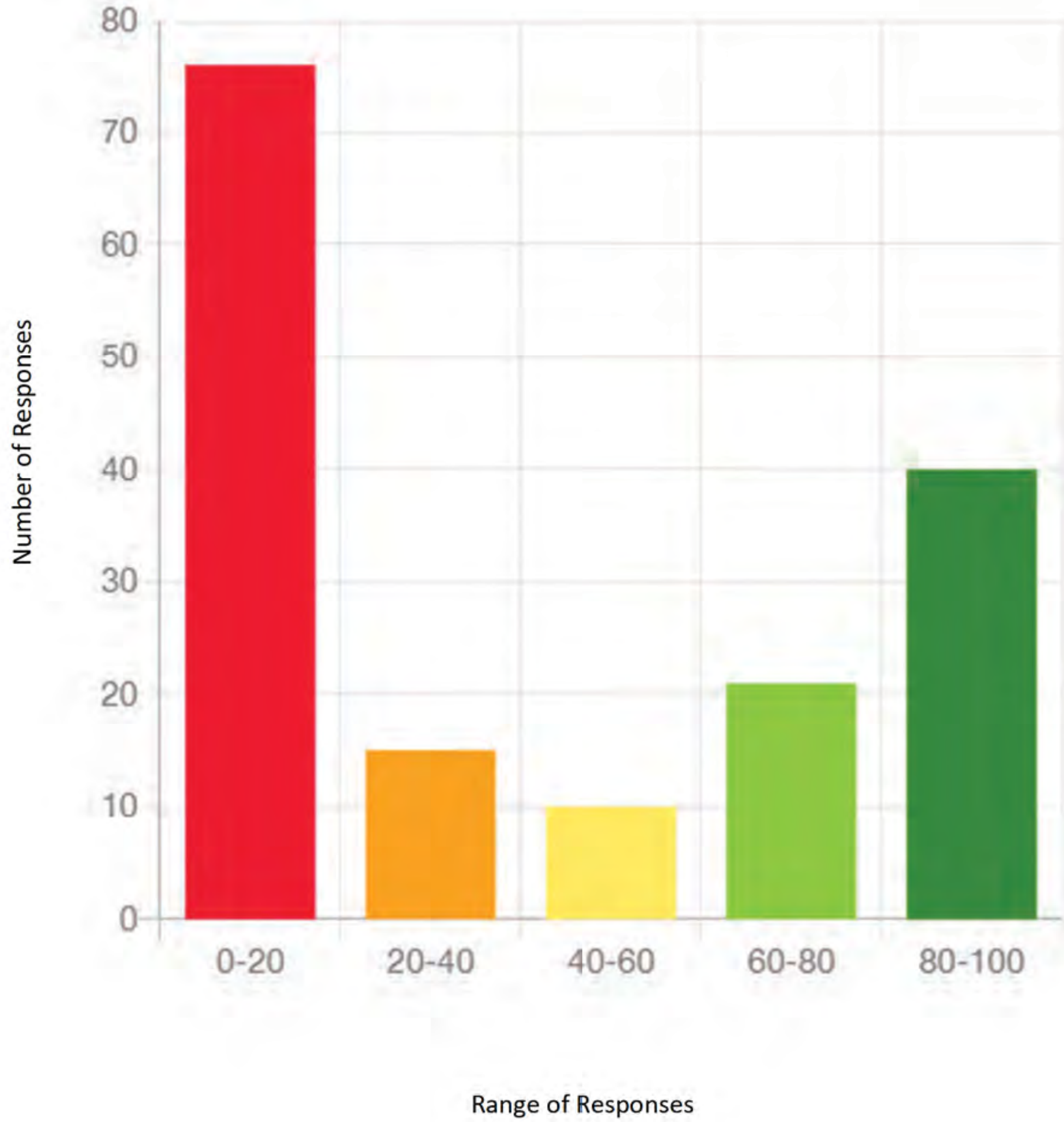
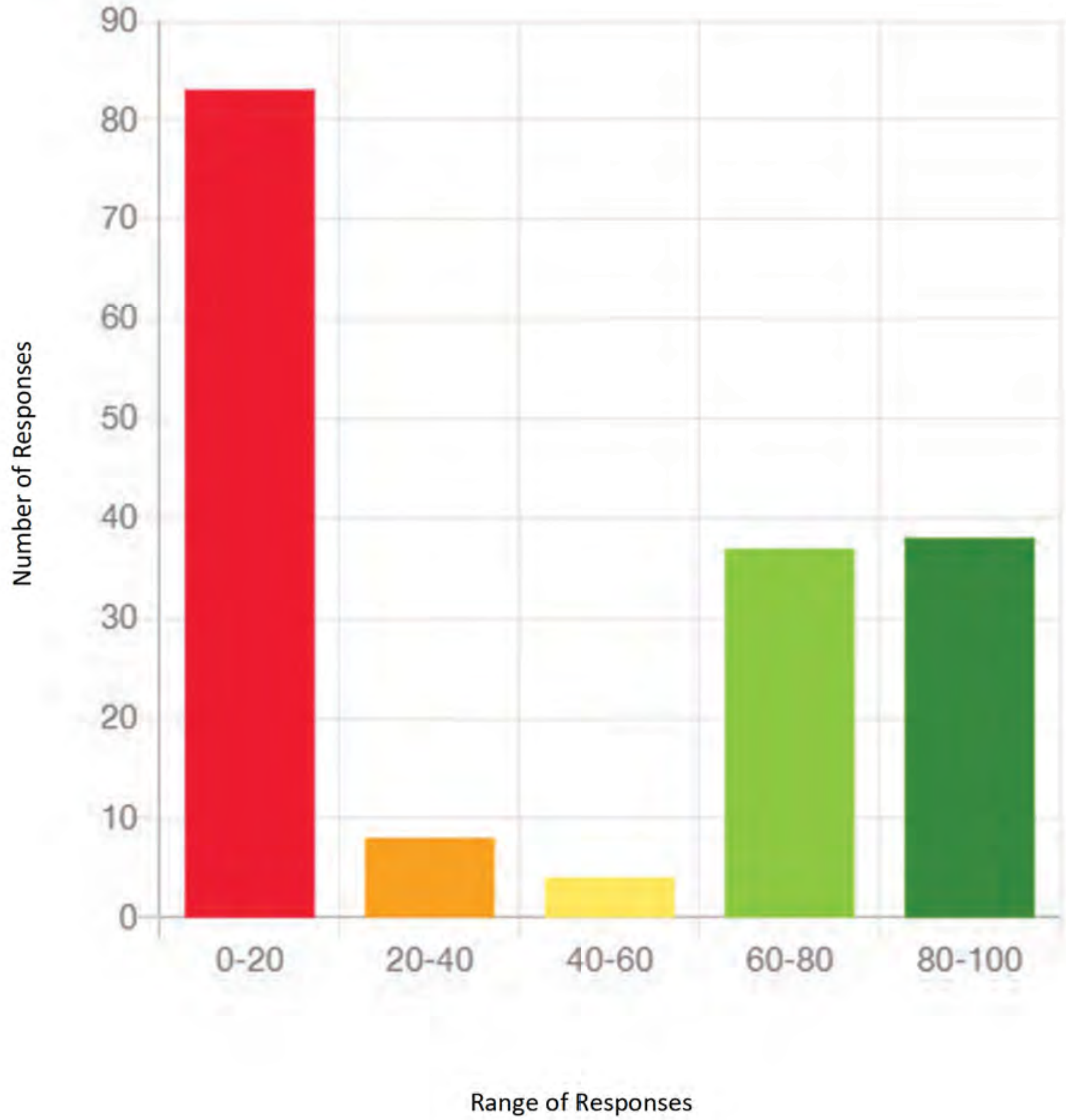


Figure 17: Goal 3 Alignment Concept 3. Hybrid



Goal 4: Create streets and gathering spaces that provide safe, comfortable places for people walking, accessing transit, and biking along and across the corridor and that connects area recreation and commercial destinations and neighborhoods.

Figure 18: Goal 4 Concept 1. Two Lane, Two-Way Traffic

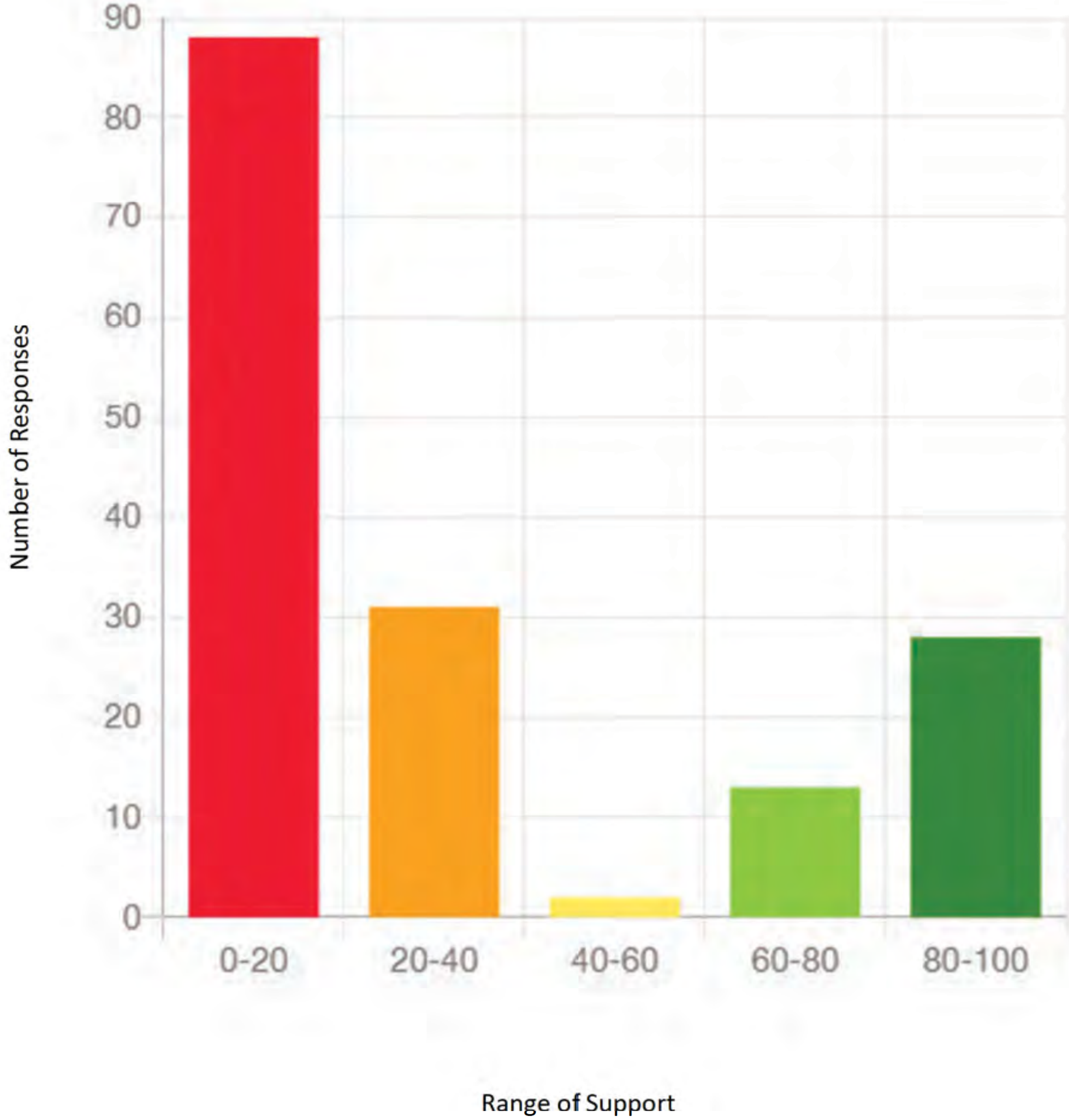


Figure 19: Goal 4 Concept 2. One Lane, One-Way Traffic

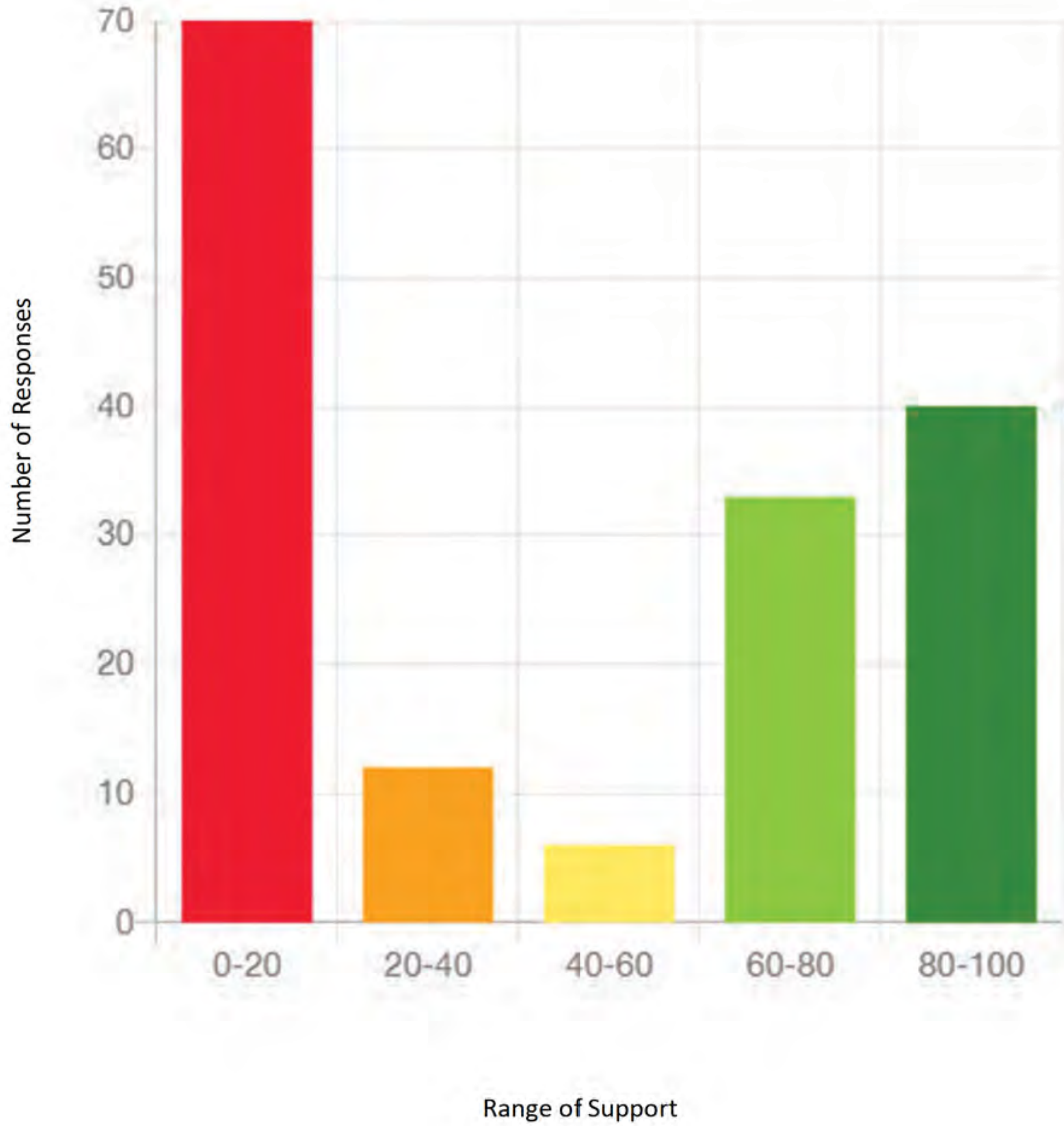
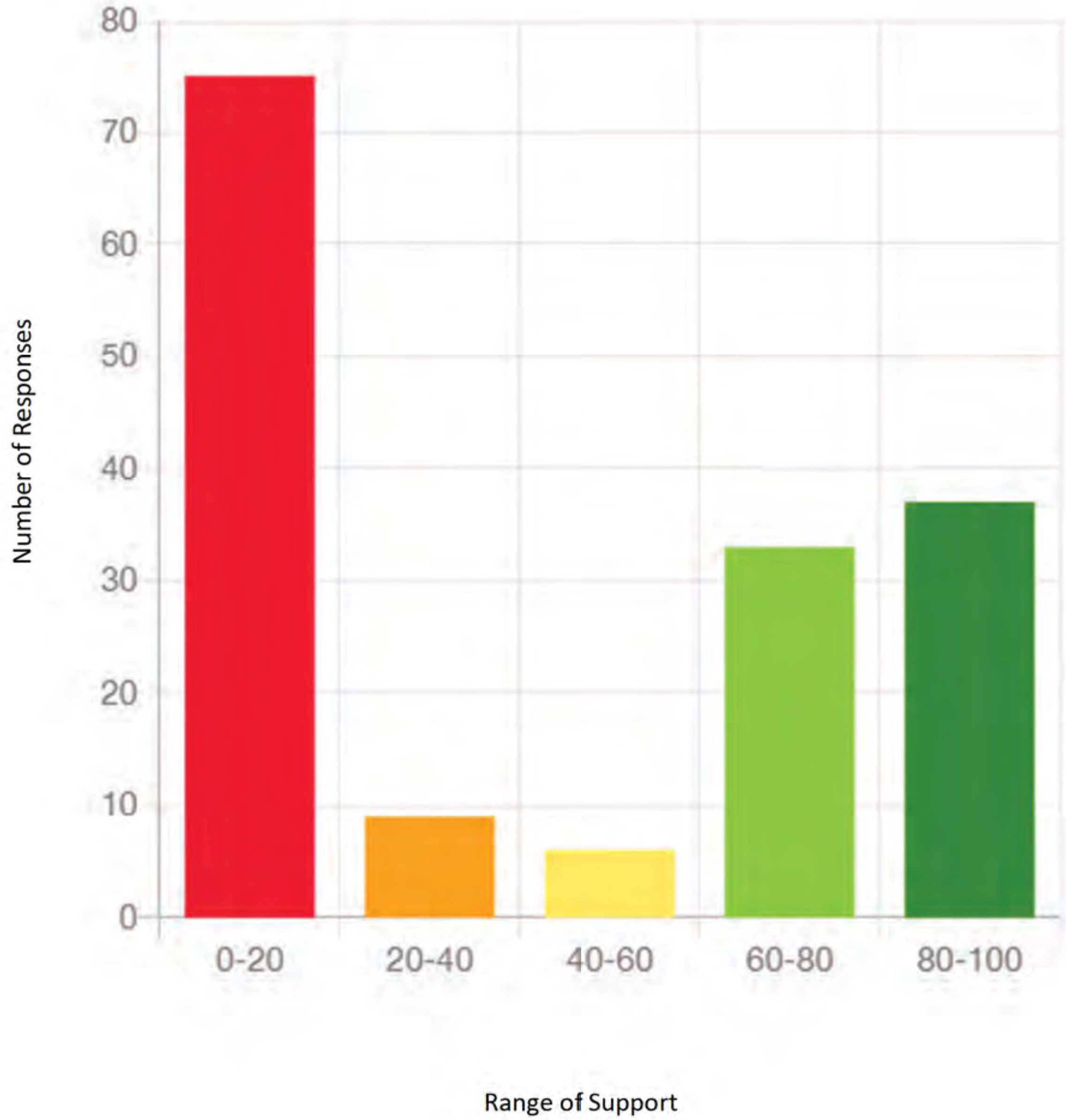


Figure 20: Goal 4 Concept 3. Hybrid



Demographics

Figure 21: My age is...

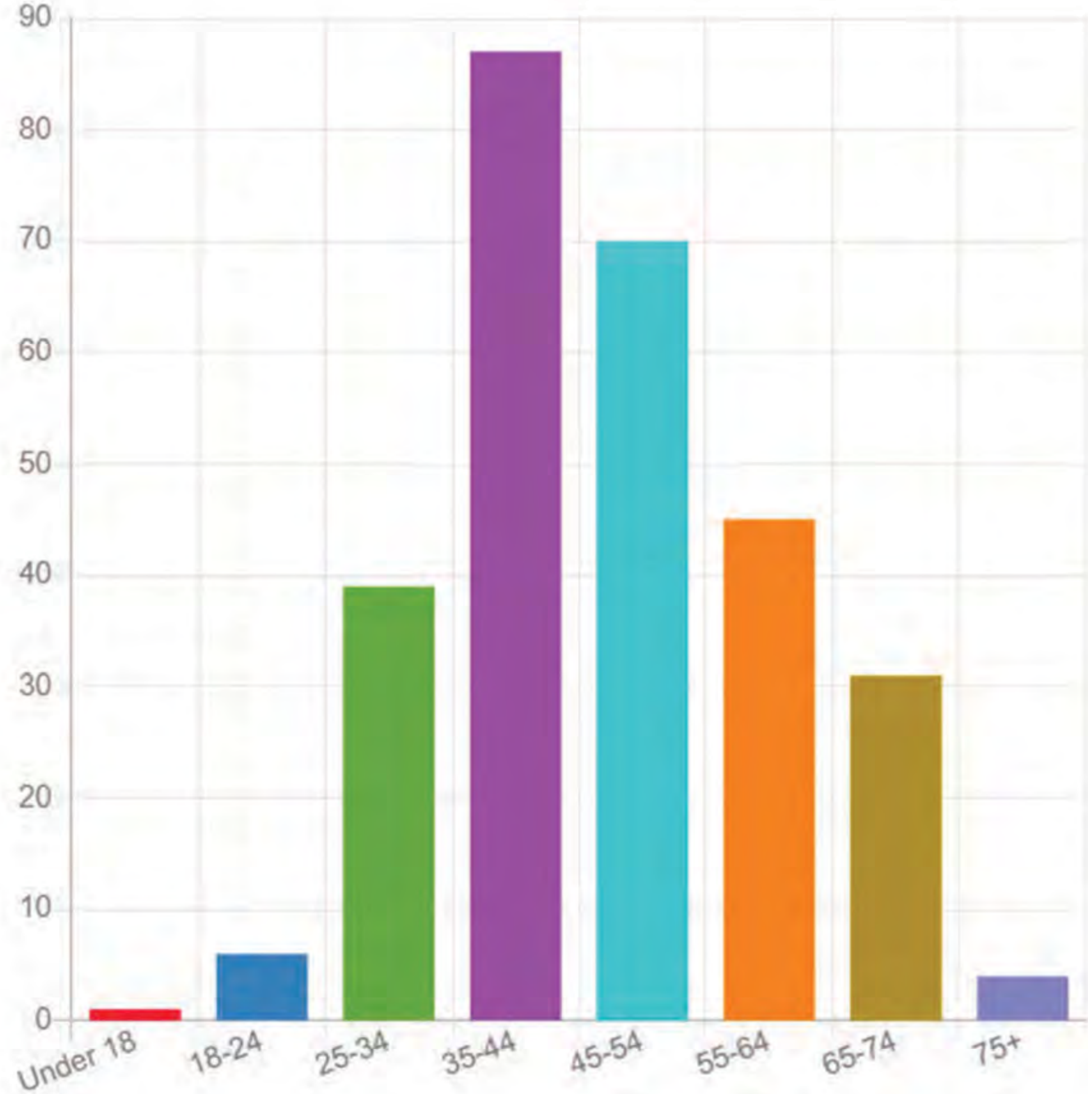


Figure 22: I identify myself as...

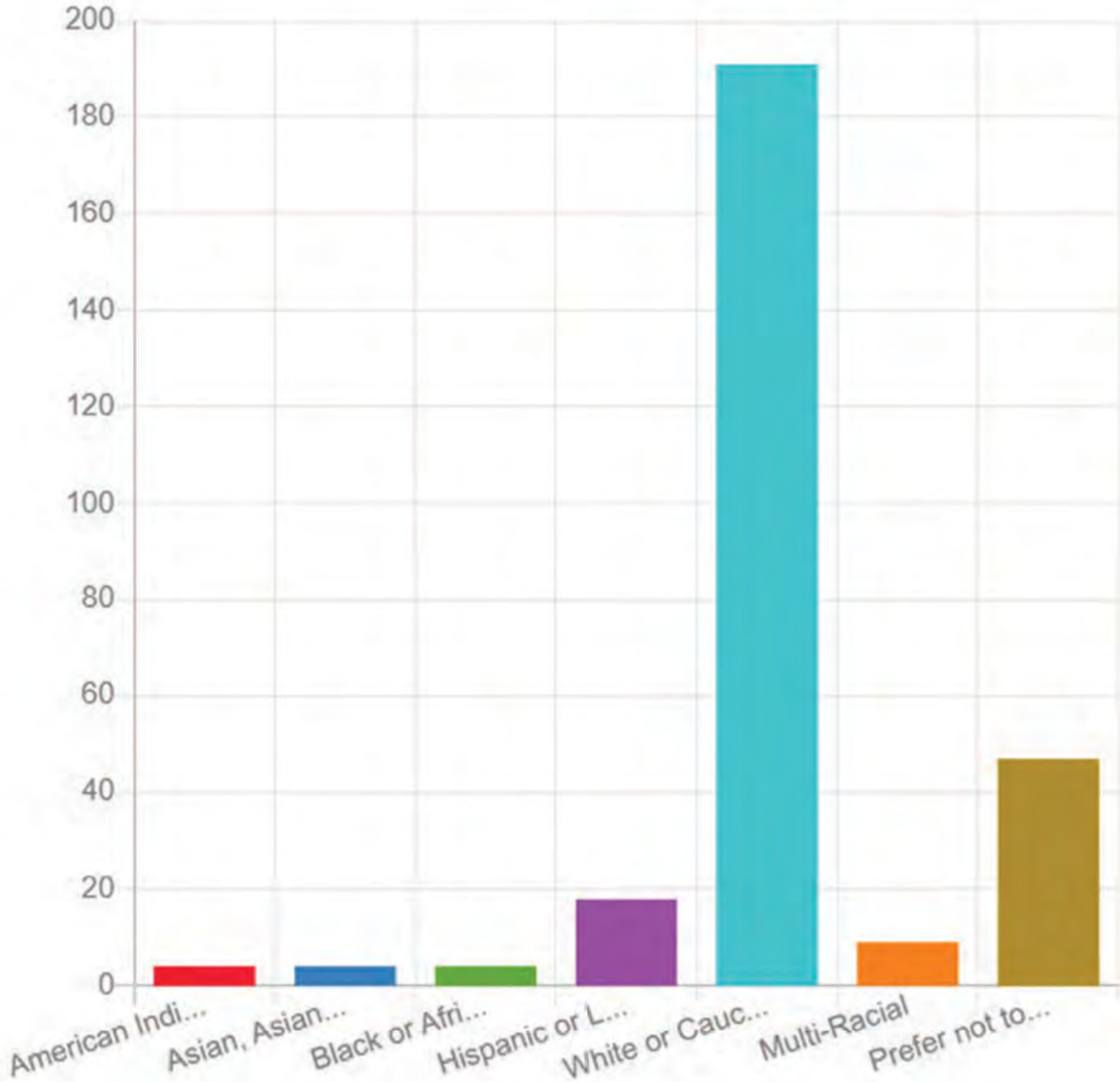


Figure 23: My relationship to The Heights

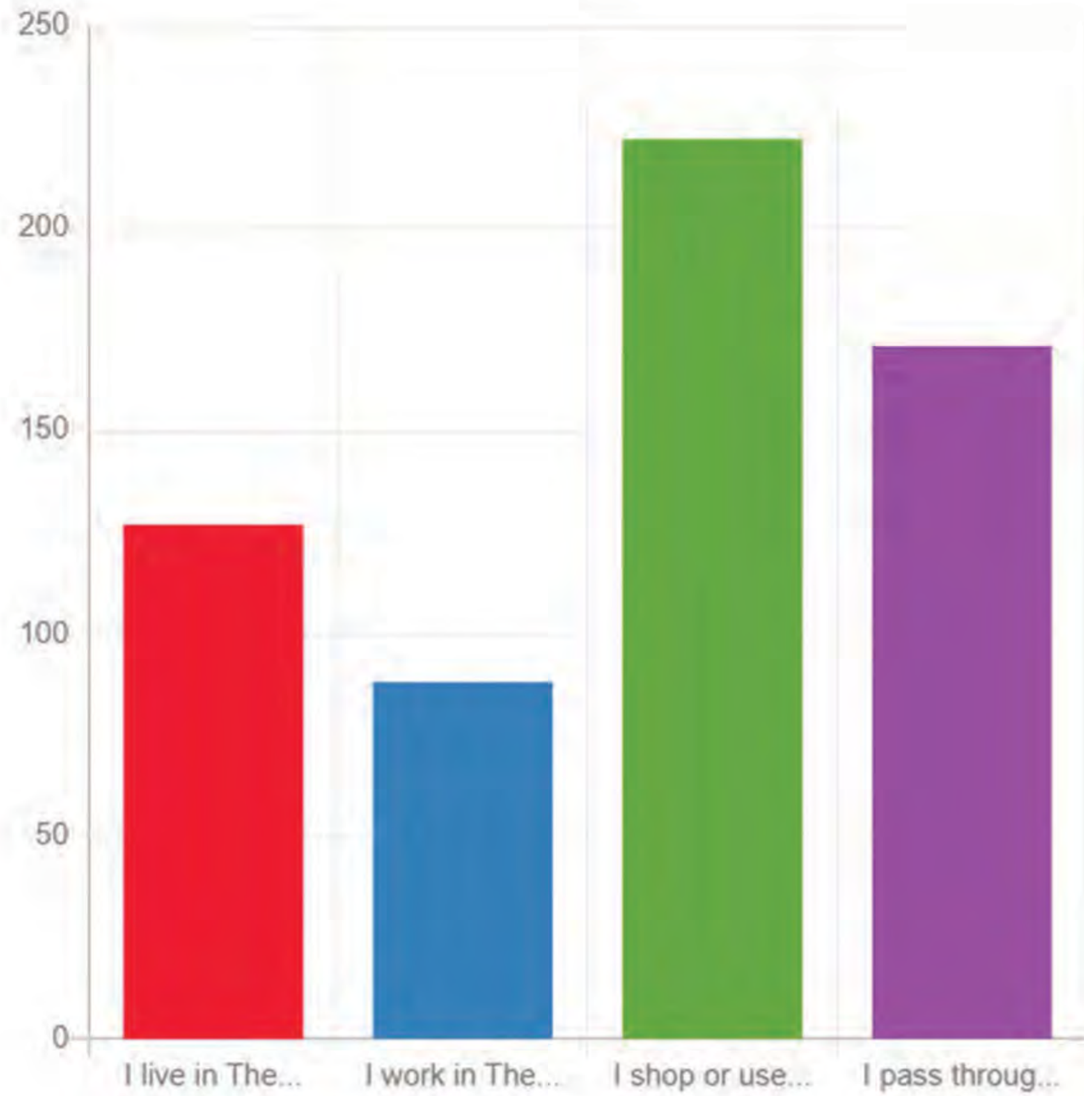


Figure 24: I have lived in The Heights for...

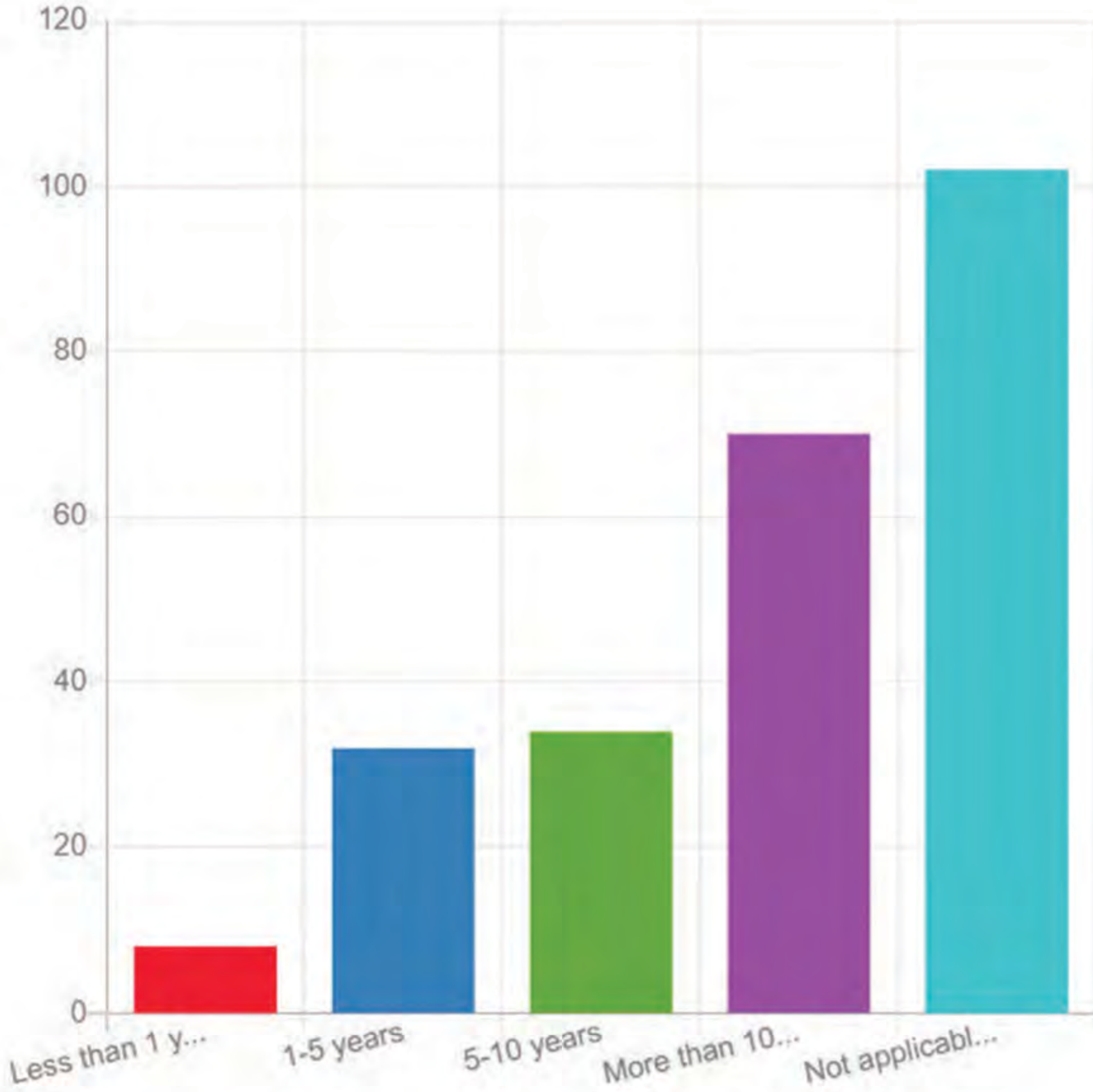
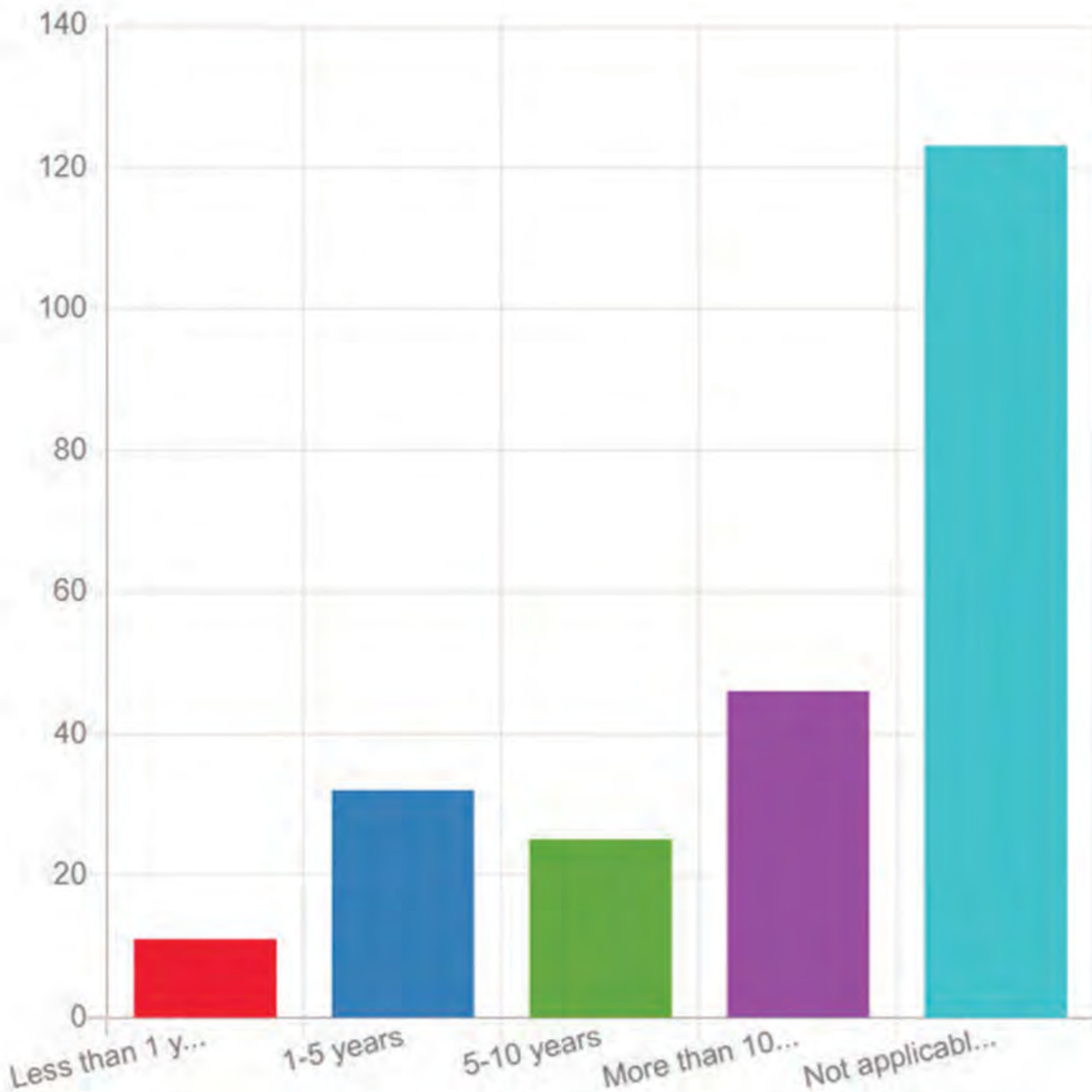


Figure 25: I have worked in The Heights for...



Attachment B Online Survey Open-Ended Responses

Before moving on, is there anything else you'd like to add about how important the key differences are to you?
Proper urban forestry planning at these early stages. Rather than having "contractors" plant the cheapest trees. You have a great opportunity to establish a new urban forest for generations.
Alt 2 (preferably) & Alt3 are far better than the current dangerous landscape we deal with every day.
Reducing these lanes to one would be a huge mistake. They are much too busy of streets and the main way to the heights. It would create unnecessary congestion and force people to take residential roads to avoid the congestion.
There's too much traffic to go back to two way. There's barely enough room with cars parked on both sides.
None of these concepts are good! Go back to the drawing board and start over.
It is currently unknown how resident domiciles adjacent to 12/13th, or separated by 1 block, will be effected. Imminent domain?
Don't see an issue with how it already is. Put this money to building a new bridge and not charge a toll. Can't believe this is even a thing right now!l, sounds like we might need a new city planner.
To be honest the trees in the concepts are awesome, other then that I think its a huge waist of money to do any of the concepts.
Kids should bike on sidewalks not streets. There's a lot of talk about kids safety here, but kids shouldn't be biking on roads. Make crosswalks safe and leave the rest alone. I feel like we're trying to fix problems that don't exist.
Bike travel is the most important for me. I would also like safer ways to cross 13th with a bike
As a business owner along 12th street I find this very disappointing. This will have a negative impact on our business. We will vocally, financially and physically object to this proposal.
I believe traffic congestion should be one of the major considerations. It is difficult to drive through downtown Hood River in the summer. It would be a shame to have 12th and 13th be equally crowed with traffic and pedestrians making it difficult to navigate.
The Heights is NOT a place people go to sightsee. They go to do a quick errand, eat, have a visit with a friend for coffee. We DON"T need wider sidewalks we need parking and wider roadways.
In the last 20 years the amoung of traffic comming from the valley has increased and will only increase more as more people move in. NONE of these concepts address that at all, where are all the cars going to go? Not to metion the proposed apartment complex with minimal off street parking.
Traffic congestion will be horrific with any of the proposed alternatives. In my opinion, creating congestion on a major arterial street is a failure of the project. One way traffic on both 12th and 13th is imperative for the future of Hood River and the upper valley. One way traffic is a much more efficient. Intentionally slowing and hindering efficient traffic flow is irresponsible for all goals and objectives, including environmental.
I see no need to spend money on this. Why do you think it's safer. Let's keep some Old Town flavor. We do t need to change for change sake

Business on 12th and 13th have problems finding parking as it is so taking it away is not a good idea.
Why are we changing???
We live on A Street and 16th, 2 blocks from 13th. We encounter the problems several times per day. My husband and I feel very uncomfortable with 12th and 13th as they are now. The get more dangerous all the time. The problem is the One Way Streets. You are looking both ways, but focused on the traffic coming at you. And there are pedestrians coming from ALL directions. They are coming from the direction you are not looking to try to cross a road to get downtown or any errand. Please make both streets 2 way, for everyone's safety.
Improve businesses and property values. Avoid gentrification. Connect Indian Creek Trail E-W
Downtown is a much larger issue than the Heights
alternative 1 feels claustrophobic - too many people forced in too tight an area while cars have essentially 4 lanes just seems like the opposite of how we should be designing. And I have doubts about it reducing congestion as easier road access always leads to more traffic (induced demand?) So that metric is suspect. I would like to see an analysis of profitability for small businesses when they have outside their business car parking vs bike parking vs wide sidewalks with outside seating. There was a graphic going around transit twitter recently showing wide sidewalks + outside seating was significantly more profitable for the community.
My question is... 12th Street through The Heights is a state highway, so how can it be changed at all?
I am a business owner on the heights and what is important to me is parking and accessibility to my business.
By increasing traffic congestion and removing parking spaces, you will eliminate access to businesses to anyone not young enough or healthy enough or with leisure time enough to access them on foot or on a bicycle. This will push people further to take their business online.
What on earth is 'placemaking'?
None you're making it worse
I wish there was a slider to talk about biking. For me biking is very important.
As a resident of the heights (we live near A and 15), the safety, walkability, bikability, placemaking, and Safe Routes to School are the most critical considerations for our household and home neighborhood. We feel lucky to live on the new-ish bike way but are concerned about the harrowing cross walks that we use to intersect the heights from our home to May Street elementary and our preschool in the heights. We've had too many near misses to mention with fast cars. More and more households are investing in ebikes and moving through the heights by foot or wheel so increasing bike and pedestrian safety is critical. I know one report said that travel time might increase by "90-seconds" with some of these alternatives and this was deemed a concerning delay. I think that is negligible and for the people who actually live, work, play, and learn in this part of town, it matters more that we can safely and comfortably move about. I am a huge fan of option 3 and using roundabouts for traffic.
I want my kids to be able to cross 12th and 13th without worrying about the drivers who can't see anything b/c it's too congested and tight
There are other pathways for safer routes to schools. Although crossing 12th and 13th equally / safely is important with cross walks that are easily seen and navigated.
I don't care for these options. The whole idea needs to slow down. Fiest of all, this is not Portland. We are not a city and do not need any traffic restrictions .

I think it w
I'm tired of bikers thinking they can stop traffic to cross. They may get off of their bikes and actually follow the rules!
This should be a long-term investment and so should focus on the needs of the community we want to build. We are currently too reliant on cars. We should be building for a future with more bikes, buses, scooters, one-wheels, foot traffic, etc.
I feel that it is very important to slow traffic down and make drivers more aware of pedestrians.
Bike lanes!
Please leave the area alone. It is the only north south route into town. You will be creating a mess.
Making car use inconvenient is a priority for me. The toxic air car use creates, free storage of private vehicles in the public right of way, and the noise and hazard of large moving vehicles should be minimized. I see no ideal plan, but any of them will be better than the status quo. Two way bike lanes and mixing pads and bikes seems less than ideal.
Replace list parking and retail/office soace with a multi-story parking structure, including some retail/office space on ground level. Also lease some of Providence garage, which is empty much of the time.
I think the one way traffic is great, along with being able to park on both sides of streets. The sidewalk is fine. Let's keep the Heights friendly to locals. We don't need to turn it into downtown.
The main streets should be designed around everyday traffic, as it was intended. Bicycles should use smaller side streets, where it is safer and doesn't create a traffic problem. The new proposed changes are not good solutions. Go back to the drawing board!
The focus for these features is assumed to be focus on 12th and 13th and not the district as a whole and the various opportunities for design elements to be implemented where they are best appropriate. So I find this question confusing.
There is already little parking for businesses on the heights! We need our business and all of these plans cut the parking and also cuts the flow of traffic.
Further hindering of traffic flow through the heights would be a detriment to the businesses and residents who call hood river home.
I think the roads are perfect as they are. My only concern is eliminating a parking spot before each road that is turning into traffic. It's really hard to see if you're turning o
Leave the heights alone!!
I think all three options are a terrible idea! There already is any parking downtown and now you are going to ruin the heights too. This will destroy the businesses on the heights. There already is so much congestion in that area much of the time. This will ruin the surrounding neighborhoods too. They will have so much more traffic and people parking in front of their houses.
Reducing off street parking will bring less attraction to the business on the heights and more frustration to those who live here.
Free on street parking most important to locals so they can continue to park somewhere especially in the summer!
Speed limit should be 15 or 20 with "your speed" digital readout signs throughout this zone.
Prioritizing safety of pedestrians and cyclists is very important to me on both streets
Bikes don't pay for the roads let them continue to use side of road. Could narrow sidewalks on one side of 12th and 13th to allow for a normal bike lane between parked cars and the traffic

to allow safe and hood flow for every one. Don't copy Portland and make it harder and more dangerous for everyone by cutting traffic
Ease of Vehicle crossing of 12th and 13th streets is VERY important.
Safety for pedestrians especially children. Currently it is very dangerous to cross 12th and 13th street. Cars rarely stop for or pay attention to pedestrians.
I would also like to add the importance of good sight lines for cars crossing or turning onto 12th or 13th. Currently there are several intersection where it is impossible to see the oncoming traffic due to parked cars obstructing the view. I think two way would be almost impossible to get across when driving without a signal, it is already a challenge with two one-way lanes.
This is a busy area, my concern includes egress for safety vehicles like police and fire. The one lane one way does not seem safe to me in this area.
The only thing that really concerns me as a long time heights resident is the increase on traffic over the years. How will any of the new 12th and 13th plans address the increase in traffic (both cars and trucks)?
Encouraging taller buildings will advance traffic calming, peacemaking, and create more walkers. Please ensure private enterprise can contribute to the public realm through the height of their building walls
Traffic modeling would be helpful to understand how congested the area may get.
Get rid of or figure out the triangle at Belmont
On-street parking is incredibly convenient for food to-go pickups at 13th street restaurants
It's a major arterial and a busy business district. Most important are making traffic flow and providing parking.
My daughters are blind.
It's important to build with a future eye toward public transit, walking, and bicycling. As a community, we should invest more in environmentally friendly modes of transportation and safety. Placemaking is also very important for building community and creating safe, friendly outdoor activity spaces.
Leave the heights alone. Just replace 12th and 13th
None of these plans are good for business.
None of them seem good
Every option is better than what we currently have, but I like the idea of two way traffic and lots of places for walkers and bikers.
You can't have safety and speed at the same time. Congestion will give you a safer ROW for biking and walking. The Heights should prioritize the community first, not through traffic.
I do not feel competent to provide educated input. Alternative 1 seems like it achieves all goals the best and with the lowest price. I like bike lanes and roundabouts.
There are a lot of cars consistently flooding 12th and 13th. Turning it into 1 lane will create a never-ending line of traffic, always
Protected bike lanes are important. Shared bike + pedestrian paths aren't comfortable places for walking.
I'd like to add that you aren't sharing enough details. We are citizens and adults, show us the entire plan, don't dumb it down, then ask for our informed input. You mention roundabouts but you aren't specific. I want to know more and I want to see more designs.
Leave it all alone.
All of these will cause a traffic nightmare where none exists today. Improvement is needed downtown at 2nd and Oak. Leave the Heights alone!

There's more and more people in the Heights and not many ways to get downtown reducing lanes of traffic is going to be a nightmare.
.don't be stupid leave things alone.
Keep 12th and 13th streets the same. No need to change anything.
None of the three plans accomplish the goals
placemaking....?.....new business?
12th and 13th are primary arteries to move traffic from lower to upper areas of HR. Fast mobility without traffic lights, stop signs, excessive cross-walks, etc. in this area are crucial to the feel of this town and cannot be underestimated. Find another place to do "placemaking" that doesn't have such a high traffic/mobility impact.
It's too congested. Hood River had outgrown itself. Need to bring businesses to outer lying areas like Odell. I don't do anything in town much. No food is worth the headache. I go to the dalles where there's more traffic but easier to maneuver. Even if you make it more pleasant for foot traffic, you have to understand we have all, almost been ran over by people who don't want to slow down and stop, laugh as they roll by is waiting in crosswalk, or they can't see us. Go to 2 way traffic and get those things like in asia where they pop up and you can't go forward until crosswalk is clear!!!
We and neighbors we have spoken to don't like any of the alternatives. They all will make our daily lives worse.
Do not take it down to a single lane it will cause massive traffic congestion
Sorry this feels like a weird way to do this questionnaire. Maybe because I'm doing it from my phone and only the Spanish version is in view. I keep thinking it's asking how important not what's the difference
The most important aspect are the businesses. I want to pick the choice that help these businesses thrive.
None of these will do anything but make it worse for surrounding neighborhoods. The best option is how 12th and 13th are currently set up. The intersection at the hospital will become worse, and traffic through surrounding neighborhoods will worsen. This money can be better spent elsewhere like a dog park, or fixing our roads that are in poor condition. Making a parking lot across from the farm stand.
Keep Davis but put traffic light at Belmont on both 12 th and 13th
All these options are stupid.
Don't do it
Safety and opportunity for
Lots of greenery and natural scapes for mental wellness!
Safe places for biking

Community Outreach and Feedback for Phase 2

Community outreach included a field visit to local businesses, a two-day public open house, and an online survey promoted for one month. Over 250 people attended the open house, 1,200 opened the City's Survey, and 306 people competed the full survey, including 21 people who completed the Spanish version of the survey.

Media Presence and Outreach

The project team used a variety of tools and platforms to spread the word, in both English and Spanish, to encourage community participation. The web and media presence included but was not limited to the following:

- Project webpage and online presence
- Radio Tierra
- Local news organizations (e.g., Columbia Gorge News)
- Social media (Facebook, Instagram, etc.)
- City E-newsletter

Direct Business Outreach

Prior to the public open house project team members went store to store to engage businesses along 12th and 13th Streets and invite them to participate in the open house, answer questions, and inform their customers and community of the project and opportunities to get engaged and provide input.

A concern for some business owners, particularly those who depend on drive up customers, is reducing on-street parking and the perception that the project has become a bike lane project. Other feedback included growing concerns for pedestrian safety and excessive traffic speeds, particularly along 12th Street where the density of businesses results in more on-street parking and more people walking. The desire for improved curb appeal was also mentioned as was a truck traffic concern related to potential stops at May Street for commercial trucks travelling uphill on 13th during winter weather.

Open House

The open house provided an opportunity to provide comments and discuss the concepts with project team members and other community members (a complete summary is included as Appendix C). Key takeaways from the open house include:

- A roundabout was preferred over a traffic light at 13th/May.
- Some attendees noted concerns for the loss of businesses and impacts to private property needed to make improvements at the intersections of Belmont, 12th, and 13th.
- Parking for businesses was a common concern and there is opposition to reducing parking in the Heights.

Appendices not attached to this PDF

- People are concerned about emergency vehicle access.
- There are mixed views on converting 12th and 13th Street to two-way traffic.
- Some attendees were concerned with winter conditions, particularly icy roads and how a traffic signal could impact trucks travelling uphill (southbound) on 13th and how well bike lanes would be used during the winter months.
- Some attendees questioned whether 12th and 13th Streets are appropriate for bike lanes and wondered if bike lanes should be located on neighborhood streets instead.
- A dot exercise to solicit feedback on the streetscape character of the Heights suggested community preferences for creating opportunities for a variety of gathering spaces (small and large), using more contemporary materials, and incorporating local culture and character.

The community's feedback from the open house, including these key takeaways, have informed the project team's recommendation for developing a preferred design as presented below.

Online Survey

Survey results identified several key themes (see Appendix D for a complete summary):

- Results showed respondents were divided when asked for their level of support or to identify how important a concept, goal, or key difference was to them.
- When asked to pick which concept they felt most aligned with, more people picked Concept 3 than Concepts 1 or 2.

- Differences in decision-making. Respondents who preferred Concepts 2 and 3 found better pedestrian access and opportunities for gathering and better bike access most important when choosing their preferred concept. Respondents who preferred Concept 1 found better auto access and preserving parking were most important.

Responses were also analyzed based on where respondents live.

- Respondents who do not live in the Heights:
    - Identified parking to be more important than respondents who live in the Heights.
    - Identified placemaking as the least important difference between concepts.
- Respondents who live in the Heights identified traffic calming, comfortable places for walking, and placemaking as important differences when compared to people who do not live in the Heights.

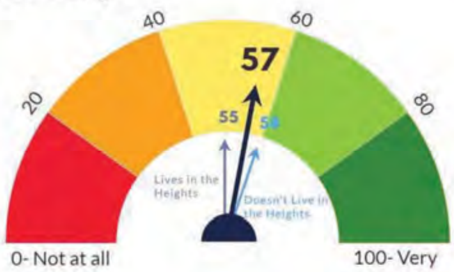
Appendices not attached to this PDF

Respondents were asked to identify how important key differences are between the design concepts. The charts below show the average responses based on where respondents live and for all respondents ('Not at all important' = 0, 'Very Important' = 100).

Traffic Calming

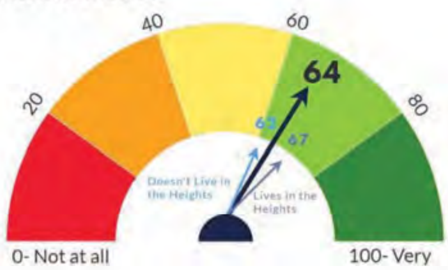
Traffic Congestion

On-Street Parking



Comfortable Places for Walking

Safe Routes to School



Opportunities for Placemaking

Respondents were split in whether roundabouts are appropriate to the District. There was slightly more support for roundabouts from respondents who live in the Heights.

The survey included a budgeting exercise that asked respondents to prioritize and invest limited resources into improvements they valued for improving streets and intersections in the Heights. Generally, respondents spent most of their resources constructing roundabouts, but items that required less resources such as improved east/west crossings or enhancing street trees and landscaping were chosen the most. This suggests that improving all intersections for safety is important to the community as are opportunities to integrate planting and natural systems into the streetscape environment.

THE HEIGHTS STREETSCAPE PLAN

Comments submitted through the project webpage

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We’d Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Mon, Nov 27, 2023 at 9:58 PM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

Are there any plans to address the turn from 12th St (going South) to May St (going West)? Virtually every vehicle that makes this turn violates ORS 811.355 (i.e. they do not turn into the closest lane). Vehicles routinely block both lanes and don't give right of way to vehicles coming from the stop sign at the intersection on May. Most everyone currently treats the section of May from 12th to 12th as a single lane.

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We’d Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Mon, Nov 27, 2023 at 8:56 AM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

As your picture in this article illustrates, one of the best views in our area is Mt Adams perfectly situated in the “V” of the Washington hills in the foreground. That view can be significantly enhanced by burying or moving the overhead power lines along 12th street.

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We'd Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Tue, Aug 29, 2023 at 8:37 AM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

I'd like to speak to the Heights Urban Renewal District board at your September meeting regarding the proposal to remove the plants along 12th street at Indian Creek. Please put me on your agenda and notify me. Thank you

MIG

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We’d Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Mon, Aug 21, 2023 at 9:41 AM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

The roundabout on the heights in Hood River is going to be a complete disaster!!! The county can’t keep our roads up and housing is atrocious!!!! We need to go back to catering to the locals and not people who just want to visit. This town has gone downhill for locals and is it’s horrible! There is no affordable housing! Really???? Where is the affordable housing for people who need it????? I have yet to see it. I wish we were more about listening to the locals and not looking at dollar signs.

MIG

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We'd Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Mon, Aug 21, 2023 at 9:41 AM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

The roundabout on the heights in Hood River is going to be a complete disaster!!! The county can't keep our roads up and housing is atrocious!!!! We need to go back to catering to the locals and not people who just want to visit. This town has gone downhill for locals and is it's horrible! There is no affordable housing! Really???? Where is the affordable housing for people who need it????? I have yet to see it. I wish we were more about listening to the locals and not looking at dollar signs.

MIG

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We'd Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Fri, Aug 18, 2023 at 7:36 AM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

Do you have the funds or are you going to raise taxes? Have you considered the additional congestion that this will cause. Taking 1 lane away, angled parking that will cause traffic to stop to allow parked cars to back out? There are not enough bicycles to warrant such a drastic cha he. Are you predicting the gorge trail to increase our summer/ fall biking up town? We will not have much in the ice and snow. Why are you not taking this bike lane to a safer residential street? This is going to be a nightmare for the locals/ are you wanting this for the tourists? If it is for the kids, a residential street would be safer.

MIG

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We’d Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Fri, Aug 18, 2023 at 8:00 AM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

This is so needed! The heights is a terrible place for pedestrians and cyclists right now, and making it safer for these two groups of people will undoubtably reduce the number of people that drive in. If I could bike into the heights without being scared of being hit by a car, I would do it very often!

MIG

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We’d Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Fri, Aug 18, 2023 at 9:07 AM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

The North/South arterials in Hood River are always busy. To narrow and complicate the primary arterial serving the whole community seems counter productive. I agree with better crossings, but certainly not reducing to a single lane!

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We'd Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Fri, Aug 18, 2023 at 2:47 PM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

A round about would be very dangerous in the winter at the top of the hill. There are many who would begin to slide backward if forced to stop at such a steep point. Many of the people who winter in town do not have brand new vehicles with studded tires etc. that would be required to make a start from full stop at that pitch.

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We'd Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Fri, Aug 18, 2023 at 10:07 AM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

I own several businesses 12 th please let it be as is .family owned bought in 1956 never seen a problem with the heights ever we don't see anything to update. We love it it's hood river

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We’d Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Fri, Aug 18, 2023 at 10:22 AM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

I just want to say, that I love roundabouts and I think it's a great idea to start building them here asap. Needs to happen before things get too built up. I'm just sorry we can't have one downtown at the main intersection.

Folks in my old hometown were vehemently against them before, but now enjoy them.. It took some getting used to.

Alan White
[redacted]

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We’d Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Fri, Aug 18, 2023 at 10:46 AM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

Do not do this.

MIG

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We'd Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Thu, Aug 17, 2023 at 3:19 PM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

I am fully in support of increasing business to the heights and its local grocery stores, etc. This is the worst possible way to do so. How come people are just now hearing about this? Traffic is already backed up currently during rush hour with two lanes, how is an ambulance supposed to get to the hospital with one lane backed up and no way to get around? How is the roundabout going to work during winter when it's icy and slanted and large trucks try to drive through it. How on earth are local businesses going to be able to make deliveries when there is only one lane of traffic. How are people who are parked at an angle supposed to back up into traffic safely if they can't even see any oncoming cars because of the other cars parked around them? This is horrible and unsafe and dangerous. We are going to have so many crashes. Please allow us to vote on having this done.

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We’d Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Thu, Aug 17, 2023 at 5:32 PM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

I think it is a horrible idea to move forward with this idea , from the round about at the top of hospital hill in the winter weather to bottle necking the busiest roads in the county to one lane each just to achieve bike lanes is just a bad idea . And then the parking change with the one lane will just be a nightmare. No.thanks

MIG

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We’d Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Thu, Aug 17, 2023 at 5:57 PM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

I believe the local community and county community have stated this plan is unrealistic for the Hieghts, this will cause lose of commercial parking for the businesses of the Hieghts. And the traffic will be horrendous, your job as the city council is to be insure your constituents agree with plans not to just push the plans through , you are not doing your best for Hieghts you are only thinking of the tourist that come here for recreation, not the tax payers of this country. You need to to do better !!

MIG

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We'd Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Thu, Aug 17, 2023 at 6:43 PM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

Normally I would give an enthusiastic yes to roundabouts and bike lanes. But I see several problems with this design proposal that could cause catasrophe:

1) Stopping large trucks going up hill in the middle of our icy winters is a horrible, unsafe idea, as they are prone to sliding backwards downhill in those slippery conditions.
2) I'm a bike commuter and I understand the desire to add bike lanes to this design. However going down to 1 lane each way for cars seems a terrible idea, I'm sorry to say. Here's why:
- Nowhere for cars to go when emergency vehicles need to pass.
- Not safe for diagonally parked cars to back out into the only lane of traffic (It's quite scary, frustrating and dangerous trying to do this in White Salmon, because the person backing up is blinded by neighboring parked cars. This is a big problem there, and White Salmon is a much smaller town with a lot less traffic.)
- With only one lane each way, traffic is going to bottleneck, and this will only divert frustrated drivers to neighborhood side streets, putting kids and other pedestrians at unnecessary risk! I'd hate to see someone get hurt. How about putting North-South bike lanes on neighborhood side streets instead? Everyone is now safer.
3) I do like the idea of one way streets going from east to west, and adding bike lanes to them. Again, why not put North-South bike lanes on neighborhood side streets instead? Safer and more enjoyable to bike that way.

KEEP TWO LANES EACH WAY on 12th and 13th, PLEASE!!

Thank you for reading and taking our considerations seriously.
McGill Family

MIG

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We'd Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Thu, Aug 17, 2023 at 8:00 PM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

I'm pretty sure I looked long and hard at the original options and this one is dumb. It's almost hit a person or car already turning into Pine St to get to medical buildings or the school... Us locals will just use the back streets to get to where we need to be (work) which will put a lot of activity on those streets Wilson, ect that aren't used to it. The way better option was at 13th and Belmont. Bigger area, another main way in and out of the heights. I've seen a lot of near accidents there.

MIG

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We’d Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Thu, Aug 17, 2023 at 8:15 PM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

This truly has to be the most ridiculous plan I have seen come to Hood River, most especially since it affects us locals. I have had a businesses on both 12th & 13th street and I’m grateful to God that I won’t have to endure these changes as a business owner. As locals have already been severely impacted by tourism in downtown Hood River, the heights is the one place we can enjoy to do business with little interruption but this is going to be a an absolute nightmare for both businesses and consumers alike. It’s an a waste of our tax dollars and I do not want to see this happen. If you want to spend some money then start improving the streets in Hood River they are in terrible condition.

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We’d Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Thu, Aug 17, 2023 at 8:21 PM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

This idea is not only cringe but also dumb. You are finding a fake solution to a fake perceived problem. This is inevitably going to turn utterly sour. I don’t think it’s a mistake though. This seems deliberately designed to be useless, waste resources and probably line your pockets in the mean time. Fooey to your scam and fooey to you. You deserve ridicule. You deserve exile. You deserve to be paraded, tarred, feathered and launched into space from a cannon. You are a waste. You are a cunt.

MIG

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We’d Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Thu, Aug 17, 2023 at 8:27 PM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

You are an evil dipshit. Leave our city the hell alone with your fucking utterly spastic ideas. Do you know what’s on the other side of the proposed roundabouts you god damned utter moron? It’s a fucking bunch of groceries and markets that need trucks to actually be able to access the area especially in the winter

MIG

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We’d Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Thu, Aug 17, 2023 at 8:31 PM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

Both my spouse and I live in Odell and individually commute into Hood River (different start/stop times) for work. This proposal will severely affect our day to day lives in a harmful way. The current proposals create traffic blocks, frustration and drivers sitting in vehicles for longer periods of time to get to work, the store, dinner etc….. I foresee unsafe streets through this proposal that severely disrupts the flow and ability to navigate our town. Please , please the suggestions to even further narrow the lanes puts us all at risk. A vehicle needs adequate room to navigate and that means ALL vehicles that use this road. Lord help the poor drivers of tractor trailers who will be forced to navigate a road that is meant to trap them into narrow lanes that can’t accommodate them. Let’s not not even talk about the snow build up and limited removal. The disaster that a round about in the snow on a hill, a very steap hill will create. Thank god it’s near the hospital cuz their ER will be very busy!

MIG

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We’d Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Thu, Aug 17, 2023 at 8:45 PM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

I live in the Heights and work down on the corner of Oak and State Street. I drive that area at least two times a day. I strongly believe that a roundabout is not the answer. I believe it would take up too much valuable space. And for myself, I would avoid that area every day, I would go, out of my way to avoid it. That is my opinion for whatever it’s worth. Thank you.

MIG

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We’d Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Thu, Aug 17, 2023 at 9:10 PM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

The streetscape plan for the Heights in Hood River is a terrible idea for our city.
In regards to the impractical idea that people will bike everywhere and not drive:
The weather here is inclement at least six months a year; many people are older and cannot get around that way; many residents live outside of town in rural areas; there are many hills etc.
It is some utopian dream to think everyone is going to go to the store, go to work, go the bank or the doctors office etc. on bikes. This plan was dreamed up a subset of cycling fanatics who are healthy, have money with plenty of time on their hands to recreate and not have to accomplish anything in their day.
(It is also a terrible idea to put a round about going up hospital hill, especially in winter.)
My family, and everyone I have spoken to, is opposed to our tax dollars being used to pander to cyclists and ruin our needed parking spots and roadways!

MIG

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We'd Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Thu, Aug 17, 2023 at 10:22 PM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

This is not a logical plan. There are large commercial semi trucks that deliver through that area. They are too large to go around a round about. We don't need to accommodate the tourists any more. 12th and 13th streets are too busy with cars, trucks, semis, and pedestrians. Making the lanes smaller will make it more congested.

It's time for the city to start listening to the tax payers and stop accommodating our tourists. It I'd the tax payers money to decide.

MIG

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We'd Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Wed, Aug 16, 2023 at 6:45 PM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

I support everything about the new plan, except for the traffic lights at 13th and Belmont. That intersection has never had problems with traffic (at least whenever I drive through it). I feel like implementing traffic lights at that intersection will create a new hub for traffic congestion. I understand that traffic lights will enable pedestrians to cross more safely, but it would be more practical to implement crosswalk signs that flash lights for drivers to stop, only when a pedestrian that's trying to cross presses a button. That would make traffic go by way easier, and only make it stop when need be. Better yet, another roundabout could be built at that intersection for even better traffic flow, but I understand that it would take a tremendous amount of time and money to build two roundabouts. But maybe someday that should happen. I do support the closing of Belmont street though, as it could help make the heights a bit more walkable and possibly bring in small, local vendors. Plus, it's kind of a useless part of Belmont anyways.

MIG

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We'd Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Wed, Jun 7, 2023 at 9:48 AM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

It is my understanding that there is to be a roundabout on 13th and May near Jackson Park. Has any consideration been given to the trucks that must come up the hill to make deliveries? It is already hard enough for them to turn up the hill at Cascade and 13th, due to the downhill traffic parked, waiting to turn west onto Cascade. Now you expect the trucks to maneuver around a roundabout a short time later. Most drivers in this part of the country don't have a clue as to how roundabouts work, anyway, yet they are cropping up all over our state. I think it is a very bad idea. A traffic light there might be better, even though the trucks would have to stop and start up again on a hill. Another concern is that trucks will try to get around the roundabout by taking a different route. Oh, and please don't plant anything in the center of the roundabout. It may be esthetically pleasing, but it will make it hard to drivers to see!

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We’d Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Mon, May 15, 2023 at 12:01 PM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

Our clinic is located on the intersection of May and 13th. Our providers do mindfulness and therapy sections with their patients. I want to prepare because this construction is going to interrupt our daily work. Approximately, how long is going to last? Do you have an approximate start date yet?

MIG

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We'd Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Mon, May 15, 2023 at 11:55 AM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

Hello, I am the property manager for a business on the intersection of 13th an May St. Tenant is concerned about noise as they use talk therapy with patients and are afraid that they will not be able to hear their patients when in session. Please let me know how the noise will be kept down or done after hours. I would love to know duration of the project and ETA. Thank you.

MIG

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We’d Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Sun, May 14, 2023 at 5:09 PM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

Thank you. So glad this project is in the process.

DeAnn Orand

MIG

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We’d Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Sun, May 14, 2023 at 7:35 AM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

Maybe too late, but, the Hood River traffic has grown to a point that changing 12th and 13th to two way streets each is going to be a disaster. The current two lane streets can hardly handle the traffic as it is. Thanks

MIG

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We'd Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Sat, May 13, 2023 at 11:48 AM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

Please reconsider a roundabout for May and 13th. That is a horrible idea for that small space with many walkers crossing. Roundabouts are great at keeping traffic moving, but there are so many pedestrians in that intersection, it will never be used the way it is intended. I've seen cities pay millions to put in a circle only to pay millions to undo it because of safety issues. Please don't put a circle in that location.

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We’d Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Fri, May 12, 2023 at 4:19 PM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

Please, please do not close Belmont between 12th and 13th. I live on Belmont (3515) and go to Rosauers fairly often. How do you think I am going to get back home from Rosauers is Belmont is closed between 12th and 13th? Please tell me. Thank you.

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We’d Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Fri, May 12, 2023 at 4:19 PM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

Please, please do not close Belmont between 12th and 13th. I live on Belmont (3515) and go to Rosauers fairly often. How do you think I am going to get back home from Rosauers is Belmont is closed between 12th and 13th? Please tell me. Thank you.

MIG

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We'd Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Thu, May 4, 2023 at 5:57 PM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

Leave the heights as is but lower the speed limit through there to 15mph. It's not that long of a stretch to be in a hurry

MIG

Alex Dupey <alexd@migcom.com>

FW: Heights Streetscape Plan Concerns

1 message

Dustin Nilsen <D.Nilsen@cityofhoodriver.gov> Mon, Nov 14, 2022 at 10:52 AM
To: Alex Dupey <alexd@migcom.com>, Nathan Polanski <npolanski@migcom.com>

For the comment file.

Dustin Nilsen, AICP (He, Him, Él)
Director of Planning & Zoning
City of Hood River • CityofHoodRiver.gov
211 2nd Street • Hood River, OR 97031 • P 541.645.4713

-----Original Message-----
From: [redacted]
Sent: Thursday, November 10, 2022 5:14 PM
To: Dustin Nilsen <D.Nilsen@cityofhoodriver.gov>
Subject: Heights Streetscape Plan Concerns

Hi Dustin,

I am a business owner in the Heights on 13th st, and I am voicing my concerns for the selected plan for the Heights Urban Renewal. I believe this plan will be extremely detrimental to the businesses on 13th st with the significant traffic increase, the addition of the traffic light at Belmont, and most importantly the removal of all of western side street parking (around 30 spots). This is the street parking in front of my business that is heavily used by my customers and all of the customers at 10 Speed Coffee next door, which sees a high volume of people everyday and has no onsite parking. Hood River Taqueria and 10 Speed Coffee both have outdoor seating areas close to the road that will become unpleasant or even unsafe once there is heavy traffic moving in the lane next to the sidewalk, and in the case of 10 Speed, waiting cars backed up at the proposed light at Belmont.
While I do support building bike infrastructure I think there are better ways to achieve neighborhood bikeability without sacrificing a lane of parking. I think bike traffic should be redirected through the residential streets, which I believe most cyclists would be naturally inclined to use anyways. I feel like this plan sacrifices the quality of 13th street "the traffic street" for 12th st "the people street".
I believe that making both streets 2 way, so traffic is more evenly distributed, and keeping parallel parking on both sides of the street, similar to downtown, would be in the best interest of the neighborhood overall.

Thank you,
[redacted]

MIG

Alex Dupey <alexd@migcom.com>

FW: Letter of Support for Safe Routes in Heights Streetscape Design

1 message

Dustin Nilsen <D.Nilsen@cityofhoodriver.gov> Mon, Jun 27, 2022 at 5:22 PM
To: Alex Dupey <alexd@migcom.com>, Nathan Polanski <npolanski@migcom.com>

Something that we should add to the comments.

Dustin Nilsen, AICP (He, Him, Él)

Director of Planning & Zoning

City of Hood River • CityofHoodRiver.gov

211 2nd Street • Hood River, OR 97031 • P 541.387.5210

CITY OF HOOD RIVER est. 1898 CLICK TO STAY CONNECTED

From: Jennifer Gray <J.Gray@cityofhoodriver.gov>
Sent: Thursday, June 9, 2022 1:40 PM
To: Abby Capovilla <abby@shipinteriorsystems.com>; Amanda Goeke <agoeke@gmail.com>; Clint Harris <clint@pinestreetbakery.com>; Jack Trumbull <jacktrumbull@hotmail.com>; Joshua Chandler <joshuac211@gmail.com>; Kate Hoffman <K.Hoffman@cityofhoodriver.gov>; Pat McAllister <patmc@gorge.net>
Cc: Dustin Nilsen <D.Nilsen@cityofhoodriver.gov>; Abigail Elder <A.Elder@cityofhoodriver.gov>
Subject: FW: Letter of Support for Safe Routes in Heights Streetscape Design

Please see attached letter from Superintendent Rich Polkinghorn. Thank you

Jen Gray

City Recorder

City of Hood River • CityofHoodRiver.gov

211 2nd Street • Hood River, OR 97031 • 541.387.5212

CITY OF HOOD RIVER est. 1895 CLICK TO STAY CONNECTED

From: Meghan West <meghan.west@hoodriver.k12.or.us>
Sent: Wednesday, June 8, 2022 7:30 PM
To: Jennifer Gray <J.Gray@cityofhoodriver.gov>
Cc: Megan Ramey <megan@bikabout.com>; Rich Polkinghorn <rich.polkinghorn@hoodriver.k12.or.us>
Subject: Letter of Support for Safe Routes in Heights Streetscape Design

Jennifer,

Megan Ramey asked me to share this letter of support with you from HRCSD Superintendent Rich Polkinghorn for the Safe Routes in the Heights Streetscape Design.

--

Meghan West

Administrative Assistant to the Superintendent & Board of Directors

Hood River County School District

1011 Eugene St, Hood River OR 97031

(541) 387-5013 | Fax: (541) 387-5099

www.hoodriver.k12.or.us

Letter of Support for Safe Routes to School in Heights Streetscape Design Plan #3.pdf
84K

MIG

Alex Dupey <alexd@migcom.com>

FW: Letter of Support for Safe Routes in Heights Streetscape Design

1 message

Dustin Nilsen <D.Nilsen@cityofhoodriver.gov> Thu, Jun 9, 2022 at 1:54 PM
To: Will Norris <w.norris@cityofhoodriver.gov>, Alex Dupey <alexd@migcom.com>, Nathan Polanski <npolanski@migcom.com>, Elizabeth Betts <elizabeth@kleinassocinc.com>, John Bosket <jab@dksassociates.com>

Just a quick note that this came through just now.

Dustin Nilsen, AICP (He, Him, Él)

Director of Planning & Zoning

City of Hood River • **CityofHoodRiver.gov**

211 2nd Street • Hood River, OR 97031 • P 541.387.5210

CITY OF HOOD RIVER est. 1895 CLICK TO STAY CONNECTED

From: Jennifer Gray <J.Gray@cityofhoodriver.gov>
Sent: Thursday, June 9, 2022 1:40 PM
To: Abby Capovilla <abby@shipinteriorsystems.com>; Amanda Goeke <agoeke@gmail.com>; Clint Harris <clint@pinestreetbakery.com>; Jack Trumbull <jacktrumbull@hotmail.com>; Joshua Chandler <joshuac211@gmail.com>; Kate Hoffman <K.Hoffman@cityofhoodriver.gov>; Pat McAllister <patmc@gorge.net>
Cc: Dustin Nilsen <D.Nilsen@cityofhoodriver.gov>; Abigail Elder <A.Elder@cityofhoodriver.gov>
Subject: FW: Letter of Support for Safe Routes in Heights Streetscape Design

Please see attached letter from Superintendent Rich Polkinghorn. Thank you

Jen Gray

City Recorder

City of Hood River • **CityofHoodRiver.gov**

211 2nd Street • Hood River, OR 97031 • 541.387.5212

CITY OF HOOD RIVER est. 1895 CLICK TO STAY CONNECTED

From: Meghan West <meghan.west@hoodriver.k12.or.us>
Sent: Wednesday, June 8, 2022 7:30 PM
To: Jennifer Gray <J.Gray@cityofhoodriver.gov>
Cc: Megan Ramey <megan@bikabout.com>; Rich Polkinghorn <rich.polkinghorn@hoodriver.k12.or.us>
Subject: Letter of Support for Safe Routes in Heights Streetscape Design

Jennifer,

Megan Ramey asked me to share this letter of support with you from HRCSD Superintendent Rich Polkinghorn for the Safe Routes in the Heights Streetscape Design.

--

Meghan West

Administrative Assistant to the Superintendent & Board of Directors

Hood River County School District

1011 Eugene St, Hood River OR 97031

(541) 387-5013 | Fax: (541) 387-5099

www.hoodriver.k12.or.us

Letter of Support for Safe Routes to School in Heights Streetscape Design Plan #3.pdf
84K

MIG

Alex Dupey <alexd@migcom.com>

FW: FW: Heights Streetscape Designs

1 message

Dustin Nilsen <D.Nilsen@cityofhoodriver.gov> Mon, Jun 6, 2022 at 12:36 PM
To: Alex Dupey <alexd@migcom.com>, Nathan Polanski <npolanski@migcom.com>

One more reponse for the file that went through the boss and should be inlcuded in our compendium.

Dustin

From: Abigail Elder <A.Elder@cityofhoodriver.gov>
Sent: Wednesday, June 1, 2022 4:55 PM
To: Dustin Nilsen <D.Nilsen@cityofhoodriver.gov>
Subject: FW: FW: Heights Streetscape Designs

Hi Dustin—sharing this reply with you, in case it should be shared with MIG.

I've replied, so you don't need to correspond with the sender.

Thanks! -ae

From: [redacted]
Sent: Friday, May 27, 2022 9:33 PM
To: Abigail Elder <A.Elder@cityofhoodriver.gov>
Subject: Re: FW: Heights Streetscape Designs

Hi Abigail, Thank for your email. I would just like to say the survey wasn't fair. There was no way to dislike all three choices. Therefore, the information collected by the survey doesn't accurately reflect how of the community really feels about this project. Thanks, [redacted]

On Fri, May 27, 2022 at 4:19 PM Abigail Elder <A.Elder@cityofhoodriver.gov> wrote:

> Hello [redacted] Thank you for your email to Hood River City Council, which was forwarded to me as the City Manager.
>
> We are in the process of collecting information and feedback on the design alternatives, so I will share your message with Alex Dupey and Nathan Polanski of MIG, who are the consultants on the project. We have received more than 1000 comments from the open house, online survey, and emailed comments.
>
> I anticipate MIG will present a summary of the feedback received to the Urban Renewal Advisory Board on June 27.
>
> Thank you!
> -abigail

Abigail Elder (she/her)

City Manager

City of Hood River

Address: 211 2nd St., Hood River, OR 97031

Phone: 541-387-5252

Email: a.elder@cityofhoodriver.gov

Web: www.CityofHoodRiver.gov

From: [redacted]
Date: May 16, 2022 at 11:14:52 PM PDT
To: Erick Haynie <E.Haynie@cityofhoodriver.gov>, Gladys Rivera <G.Rivera@cityofhoodriver.gov>, Jessica Metta <J.Metta@cityofhoodriver.gov>, Kate McBride <K.McBride@cityofhoodriver.gov>, m.sanders@cityofhoodriver.gov, Mark Zanmiller <M.Zanmiller@cityofhoodriver.gov>, Tim Counihan <T.Counihan@cityofhoodriver.gov>
Subject: Heights Streetscape Designs

Dear Mayor and City Council of Hood River:

I'm writing to express shock and disapproval with the Heights Streetscapes design alternatives about which I recently learned. All of your design alternatives create "significant changes from today's traffic patterns, reduce the comfort and convenience for vehicular traffic," and will result in "poor" or "undesirable" alignment with the goal of operational capacity and level of service.

As as long-time resident here, I just had to ask, "are you kidding me?"

Let me state the obvious here because it seems to have been lost. One of the most attractive aspects of living and working in Hood River is the ease with which we can move between sections of the town. For residents of lower Hood River to access businesses and amenities in the Heights, it is a very easy and low-stress commute and vice-versa. The one-way 12th and 13th street corridors have served this town tremendously for many years and contributed to this vibrancy and livability in ways which are impossible to quantify. Few other small towns have managed to foster a vibrant walkable downtown with the important more intense commercial elements in the Heights with such ease of mobility.

I note that none of the design goals stress this aspect of preserving mobility and traffic flow. Rather, other subjective goals are elevated, which are not appropriate for a key arterial connection. Everyone knows that placemaking is best done in natural low traffic areas or areas where the traffic impact can be offset. Everyone also knows that creating "traffic calming" here will have a huge negative impact on the quality of life for commuters, residents, and businesses that depend on the connection.

Furthermore, the projected level of service changes in the traffic study are estimates based on layers and layers of assumptions. At peak levels and high volume scenarios, the impact would be much greater than indicated by the theoretical model.

Another unstated aspect of this proposal is that forcing placemaking on this arterial corridor will naturally cannibalize the downtown, further diffusing commercial critical mass. The downtown core is struggling as is. Why put tens of millions of a dollars to work creating a new place when the existing "place" literally has just survived a massive disruption from lockdowns, etc. This can only been seen as extremely out-of-touch.

In summary, maintaining traffic flow is a NEED TO HAVE element of a successful thriving and growing community. Placemaking by virtue of disrupting traffic is a NICE TO HAVE for literally TENS OF MILLIONS OF DOLLARS that MAY benefit a few people at a tremendous inconvenience and cost to many. Instead, focus should be placed on increasing the safety of the intersections first and assisting redevelopment of the existing business in the corridor.

Put money and effort where it is NEEDED and not to actively harm the critical arterial infrastructure for uncertain future benefits while ripping into the viability of the downtown core.

Don't blow it, Hood River.

Regards,

L[redacted]

MIG

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We'd Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Tue, May 17, 2022 at 7:27 AM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

In the 80's, 13th st was just a residential street. It was decided then, that two lanes were not enough to handle current, and future traffic flow. Two lanes became four lanes.
These four lanes are a main artery for traffic between the Heights and downtown.
We all understand that population will go up in Hood River. The number of vehicles in Hood River will also continue to rise.
It would be a dis-service to our community to reduce any of those four lanes.
I am opposed to reducing any of the four lanes on 12th and 13th in the Hood River Heights.
I would support traffic lights, or flashing pedestrian lights to increase safety.

Do not remove vehicle lanes.
Thank you

MIG

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We’d Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Sat, May 14, 2022 at 8:40 AM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

I vote for alternative 1. It is imperative to have two lanes of travel on both 12th and 13th for emergency vehicles and so that one car stalled does not block traffic entirely.

MIG

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We'd Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Thu, May 12, 2022 at 11:19 AM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

Alex--Thanks for taking public comment.

My concerns have to do with adequate north and south flow of traffic on 12th and 13th streets. Currently there is a lot of traffic on both streets and we are expecting considerable population growth in the next couple of decades due to changes in our housing code. We need to plan for that population increase and allow for adequate traffic circulation with 4 lanes.

As presented both concepts 2 and 3 reduce the number of available lanes from 4 lanes to 2 or 3. I suggest that at a minimum we need 2 lanes north and 2 lanes south no matter how they are configured. Two thirds of our population live outside of the city limits and our high school is also outside the city limits.

By topography our area is challenging as well, especially east to west, which does not provide many alternative routes.

Then there is the question of how much automobile traffic do we want to push through residential areas? More automobile traffic in residential areas makes those areas less safe and walkers and bikers prefer to be in quieter residential areas.

With increased population we need traffic lights to control the flow of traffic and to make the streets safer.

Regarding roundabouts: aside for taking up much land and allowing traffic flow they are very dangerous for walkers and bikers who have to cross the street either before or after the roundabout. My experience with them was on Cape Cod, MA in the 1970's and 80's and in France. In Hyannis we would drive for miles to avoid one near the airport. It was so dangerous with all the tourists. In rural France there are many small ones which slow cars in rural areas. In Paris there are huge ones which are very challenging to cross. In this project one might work on the south end where the two streets join.

Adequate parking is an issue too and needs to be addressed. All of the concepts show a net loss of parking and that certainly won't work for the businesses there. Parking is also an issue in downtown Hood River. Again, how can we provide for adequate parking in this planning process?

There are a number of issues here. It is a challenging project. Let's hope we can make our streets workable and safer for all. Thanks.

I have been involved in planning for years and if I can be of help in any way let me know.

[redacted]

MIG

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We'd Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Tue, May 10, 2022 at 8:36 AM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

I want to become more informed and more involved. What do you recommend?

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We’d Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Mon, May 9, 2022 at 12:07 PM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

As a long time resident of Hood River and active member in our community I would like to express how terrible I think this plan is. The Heights has a flow to it that does not need fixing. It does not even have the pedestrian traffic like downtown. These plans help no one and will severely effect traffic in a negative way. If we want to improve anything put a parking garage in the lot in front of the post office and build more parking where it is needed! Please listen to the community members that this effects and save our towns money, time and stress.

MIG

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We’d Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Sun, May 8, 2022 at 8:51 PM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

If I remember right years ago both 12th and 13th were both two way streets. I believe the reason they made northbound a two lane one way and southbound a two lane one way was to ease with traffic flow. It now seems odd that with the large increase in traffic that there is even talk to reduce down to a one lane.

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We’d Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Sun, May 8, 2022 at 5:29 AM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

I think plan 1 is best because if I’m reading correctly it allows traffic to flow mostly on 13th and that acts as the vehicle mover while 12th acts as a retail business stroll with ample street parking. As someone who travels through the heights daily - I’d like to avoid the shopping retail area and get through the heights smoothly without as much worry of pedestrians and bikers sharing the road on 13th but then take a longer time when needed when I stop in the heights for something. Also I like whatever intersection plan that allows less queue for the higher traffic times. Two lanes on both streets sounds better than one way because of delivery vehicles and other obstacles that can block the road - there would be two alternatives to reroute.

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We'd Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Sat, May 7, 2022 at 7:33 AM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

I want to hear more about this.

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We'd Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Thu, May 5, 2022 at 10:36 AM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

i am having trouble getting to the online survey.

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We’d Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Wed, May 4, 2022 at 11:59 PM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

I would like more information on the property acquisition aspect involved in the alternative plans. Is this foreseen in all 3 alternatives, and will that be addressed only once the design phase begins, after selecting the “winning” alternative? My concern is that governmental takings issues almost always result in lengthy legal battles which could indefinitely prolong the implementation of the overall plan, and could cost a significant amount—not only in legal costs, but with the rising property values in Hood River and the fact that this is a commercial area, the cost of just compensation could be more than what’s currently anticipated.

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We’d Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Tue, May 3, 2022 at 9:50 AM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

I'm relieved that this is moving forward. The changes made to 12th and 13th back in the 80s(?) were not favorable to traffic safety, in my opinion, and worse yet, they made walking/crossing at intersections dangerous. New crosswalks on 12th have been Great!

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We’d Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Tue, Apr 26, 2022 at 3:50 PM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

Crosswalks on 12th and 13th, SAFE and connected bike lanes and walking and routes to schools/downtown/East and West thoroughfares that include Park Ave as the safest and most direct route to May St and the Heights from downtown and downtown neighborhoods, it's not just about the heights, it's about how the whole community functions together.

MIG

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We’d Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Tue, Apr 26, 2022 at 3:20 PM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

You will ruin the businesses if you change anything. Leave things the way they are. I have lived here 66 years. Born and raised in this town and sick and no tired of people moving here and trying to make this town what they moved away from. Us locals can't even go downtown without almost being killed because of all the tourists. Please quit ruining our town.

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We'd Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Tue, Apr 26, 2022 at 1:52 PM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

As someone who is a 4th generation Hood River born and raised child, who is trying to raise her 5th generation son in her beloved home town, I am worried. We live right off of the main streets effected by this proposal I have many concerns. My main concern being parking. Parking needs to be a priority for businesses and it needs to remain on the main streets. If you remove parking from the main streets then cars are forced to park along side streets which takes up street parking for tenets and home owners. My second concern is traffic. How if this going to affect traffic? It is already a busy street and has some difficult intersections. Slowing down traffic and/or making it single lane will just make the roads harder to navigate. Thirdly, I don't live in down town Hood River for a reason. While I love to consider my homes location "in town" I quite enjoy the medium amount of traffic and feel I am still able to enjoy local businesses that I would otherwise not be able to. We are losing our home, our small town charm, it's becoming more and more overgrown with tourists and out-of-towners. Now I know the business is good for our local economy but the tourist trap of down town if leeching further and further into the heart of Hood River. I want to have that separation of home town feel away from the tourism. Which is becoming more and more difficult. I am all for the growth of our town but it needs to have local needs/wants above tourism.

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We’d Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Tue, Apr 26, 2022 at 1:09 PM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

This will hurt local businesses on the heights, businesses will close due to lack of costumers. There will be lack of jobs because of it in our community.. You also will be hurting a family members lively hood which I do not take kindly to. We do not need bike lanes on the heights we have sidewalks. They need to learn to use them. Not only will you be hurting businesses on the heights but downtown as well. How you may ask? Well the more businesses that close down the more downtown businesses close down due to lack of money in the community because of lack of jobs. Hurting locals because of environmental wack jobs want a say in how our community runs when they don't live here full time should be illegal. Locals do not want this plan none of them. We are tired of our town being taken over. We want our town left alone. You will hear our voices one way or another.

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We’d Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Tue, Apr 26, 2022 at 12:47 AM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

Hello, My name is [redacted] I read about the options and changes that might be made , although this sounds wonderful in my case I would lose my job as well as 6 other hard working Women that also work at Gorge style salon ! . We will lose parking for our clients which some are local Seniors. This will effect our business terribly . I hope you keep us in consideration.

[redacted]

MIG

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We'd Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Mon, Apr 25, 2022 at 9:24 PM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

This is a dumb idea. I also go to gorge style and don't want to loose my place I go to for my hair to get done from Teresa Davis. I will be mad

MIG

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We'd Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Mon, Apr 25, 2022 at 4:05 PM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

i would like to see many of these improvements however my veterinary clinic probably would not survive the placement of a roundabout in front of my building. Obviously that is distressing to me. If someone has better information in regards to that i would be happy to talk with them. Maybe someone can alleviate my concerns.
Sadly i wasn't able to attend any of last weeks events.

[redacted]

MIG

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We’d Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Sun, Apr 24, 2022 at 9:26 AM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

Hello Good People of the planning commission,
These are aesthetically beautifully concepts, though I question the functionality, and in my case/our case, lose of work space and parking for my senior clients. As it is, we struggle to save parking spaces for them to our shop, the accounting firm, the Veterinarian and the Dog grooming business next door. THE SENIORS LOSE AGAIN. THEY LOST ACCESS TO DOWNTOWN. NOW YOU ARE SQUEEZING THEM OUT OF THE HEIGHTS.

Also and on an other note, You didn’t finish the project at the corner of Wine Country-Mt Adams and Cascade. There needs to be a light to direct traffic there. Taking that left is DEADLY. It requires you to enter into traffic that is going 30+miles an hour in both directions.

[redacted]

MIG

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We’d Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Sat, Apr 23, 2022 at 7:03 PM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

It seems that making 12th St a one lane street would really slow traffic causing more congestion. The roundabout at 12th and Belmont: isn't that what we basically have already? Just removing the building in the triangle would help, since it's difficult to see traffic coming from the south.
Roundabout at May and 13th would be very helpful.
Leave 13th a one way street - it works!
I really don't like the idea of diagonal parking anywhere. Yes, you can fit more cars in but it's so difficult trying to back out - you can't see who is coming!!
Providence bought the lot on 12th and June St some years ago. Still sits there empty. Wouldn't that make a great parking lot? Could the city work a deal?
I hope there will be no parking meters anywhere.

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We’d Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Sat, Apr 23, 2022 at 2:24 PM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

Thank you for providing the opportunity to help determine a better transportation pattern in the Heights. I mainly walk and bicycle (yearround), and so I appreciate the design proposals that would enhance pedestrian and non-motorized vehicle safety, especially at intersections.

A traffic circle at May and 13th seems like it could be scary in the winter when pavement is snowy and icy. Would southbound (uphill) drivers on 13th yield to pedestrians and bikes? Would snow plows pile snow on the sidewalks at the crossings? I need to gain momentum on my bike to get up the hill going east on May across 13th; I’m not sure how a traffic circle would affect this.

What happens in the Heights could affect access to downtown from the Westside. If more northbound traffic is funneled onto 13th, would crossing 13th on foot at State Street and by bike at Sherman become even more difficult, especially in busy summer months? (The recent crosswalk striping and Stop Here for Pedestrian signs at 13th and State have helped tremendously – THANK YOU!)

I like the concept of using 12th as a more bike and pedestrian friendly street, but I would encourage you to work toward combining elements of Alternatives 2 and 3 into a better version of the current Transportation Management Plan’s adopted design. I don’t favor Alternative 1 because it looks like it would put bicycles in areas congested with vehicles.

Please consider the following suggestions:
• integrate the design with the Indian Creek trail to maximize opportunities for pedestrians to avoid roadways
• integrate the design with safer bicycle access to shopping areas south of Indian Creek and plow or shovel the sidewalks/bike paths in the winter and PLEASE DO NOT PILE SNOW IN THE CROSSWALK AREAS AT INTERSECTIONS

I really appreciate this effort. Thank you so much!

MIG

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We'd Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Sat, Apr 23, 2022 at 1:16 PM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

My hope for the Heights is to encourage a street friendly neighborhood. A place where small shops can thrive, people can walk the area and/or ride bikes safely and comfortably. Now 12th and 13th Streets are very hazardous for pedestrians and bikes. Even driving is sketchy, especially if one drives over 20 mph.

I would like to see a plan that encourages this small town business neighborhood character. Even if it sacrifices some through transit speed. It would be nicer to have the area as a people friendly destination. How that is achieved I leave to the planners and traffic engineers. I'm not qualified to makes those kinds of decisions.

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We'd Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Fri, Apr 22, 2022 at 11:24 AM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

Hello, thank you for putting together a succinct look at the ideas on redoing the heights. In my opinion, this is not the right time to do this type of build out given the economy and associated costs. Plus, it really feels like a "portland" style project. The push for transit and lane/parking reductions in 2 of the 3 options is not ideal. We are not a big city and bottlenecking the heights will lead to a bad situation. We used to live downtown (8th & oak) and when meters were put in, all the downtowners parked in front of our house, blocked our driveway and even hit our cars. These plans will force people to park in the heights neighborhood and that is not ideal for those who live off 12th/13th. What this sounds like is a lot of investment excitement for a few in town. I recommend proceeding very slowly on this and putting some real long time residents on as advisors.

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We’d Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Fri, Apr 22, 2022 at 7:40 AM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

I responded to the survey, but I want to add a comment.
I live at the corner of A Street and 16th Street. My husband and I use 12th and 13th streets many times per day. It has gotten so dangerous, with more pedestrians, cyclists and other modes of transport. The one way streets are incredibly dangerous. I would like to see both of them go away. It's very difficult because you have to cross 2 streets to go downtown from the Heights. If both streets were 2 way, you would only have to cross 1 street to go downtown from either the East or West neighborhoods. That is cutting the danger of street crossing in half, 50% less chance of an accident just by using 2 way streets on both 12th and 13th. The other problem, is with one way streets, you are focused on safely crossing, because there is much more traffic now, while pedestrians or cyclists are coming from the other direction, in the crosswalk and not in your view. I am surprised there haven't been more accidents from this dangerous situation. No one wants to be in the position of causing an accident that might cause harm to anyone else. Please make it easier for people to drive and cross the street safely. Thank you.

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We’d Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Wed, Apr 20, 2022 at 2:28 PM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

As a Heights resident I would prefer alternative #3 to all of the other available options.

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We'd Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Wed, Apr 20, 2022 at 9:15 AM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

We need to create a walkable and bikable heights for our community. The current speed of traffic, lack of street trees and safe crosswalks and heavy car orientation is a major detraction for me from shopping at local businesses in the Heights.

MIG

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We'd Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Sat, Apr 9, 2022 at 12:10 AM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

Hello. I'm writing with concerns about possible changes in the heights parking/driving situation. Many I have spoken with are in support of better sidewalks, crosswalks, and bike paths, however, not at the expense of reduced parking and loss of traffic lanes.

Many of my customers walk and ride their bikes to my business, Little Shredders Dental, but they are only a percentage. There are days when most of my patients are traveling from out of town...Arlington, Goldendale, The Dalles, Cascade Locks, White Salmon, etc. It's a significant number.

In 20l4, I did a numbers analysis of the gorge for my business (Klickitat, Skamania, Hood River, and Wasco counties). At the time, the population of the combined counties was approximately 87,000 and the city of Hood River was around 10,000 or 12% of the population I serve. That means many of my customers will not be walking or biking to my office.

I'm in full support and willing to help organize better biking and walking options, for example, the current "death trap" sidewalk section between the Heights business area (Volcanic) to Walgreens. This is an especially unsafe area for kids on bikes or walking and limits people doing such. This needs to be addressed, but not at the expense of losing traffic lanes. Also, making 13th a two direction street will only make if more difficult to cross by vehicle, bike, or foot.

MIG

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We'd Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Fri, Apr 8, 2022 at 4:11 PM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

email sign up test

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We'd Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Wed, Mar 30, 2022 at 7:40 PM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

I am concerned that the heights renewal plan sounds beautiful but is overlooking that the people shopping at our businesses have to drive because they don't live close enough to walk or bike. Literally everyone that comes to my business drives! The heights is growing fast and more businesses are opening every day all needing more and more parking. People just don't use public transit here/ it's a small town not a city. People live in too many places that shop in Hood River. Pedestrian crosswalk safety is a must but please don't let us lose our parking! We have 5 workers and the need for 10 client spaces every hour (15 spaces) and we are a 900 square foot space. I chose the heights for my business to have free, easy parking for my clients. I am also concerned that my rent will go up after the improvements are done which will be hard on the businesses that rent and don't own their building. I am sure taxes will go up for the building owners but the overall value of their building will increase so I think that is who will benefit not residents, patrons or business owners.
Please, please don't let us lose any of our parking spaces! If anything create more!

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We'd Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Wed, Mar 30, 2022 at 11:43 AM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

Hello, I am a resident and also a business owner in the Heights. My number one priority for the Heights is: abundant and FREE parking. If any of this project entails costs or plans to significantly reduce parking or to begin charging for parking that is a significant detriment to what makes the Heights attractive to both residents and to small businesses. I am also VERY concerned with the inconvenience to potential customers from construction on this project that could severally financially impact heights businesses during a time of economic recovery due to the pandemic. NOW is not the time for a major upheaval in the Heights. I would rather money be put into beautifying the existing infrastructure and adding more bike circles for parking bikes on existing sidewalks (maybe purchasing one of the existing private/commercial areas that is underutilized to create a small park/green area and some tables on 12th or 13th instead of this upheaval). I am concerned with the congestion that could result from taking away one of the traffic lanes, too.

MIG

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We'd Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Wed, Mar 30, 2022 at 5:56 AM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

We are looking forward to the April 22-23 open houses. The final project will make a huge difference in the quality of life and safety of our Heights neighborhood.

MIG

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We’d Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Mon, Nov 27, 2023 at 9:58 PM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

Are there any plans to address the turn from 12th St (going South) to May St (going West)? Virtually every vehicle that makes this turn violates ORS 811.355 (i.e. they do not turn into the closest lane). Vehicles routinely block both lanes and don't give right of way to vehicles coming from the stop sign at the intersection on May. Most everyone currently treats the section of May from 12th to 12th as a single lane.

MIG

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We'd Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Fri, Aug 18, 2023 at 10:22 AM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

I just want to say, that I love roundabouts and I think it's a great idea to start building them here asap. Needs to happen before things get too built up. I'm just sorry we can't have one downtown at the main intersection.

Folks in my old hometown were vehemently against them before, but now enjoy them.. It took some getting used to.

[redacted]

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We’d Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Fri, Aug 18, 2023 at 10:07 AM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

I own several businesses 12 th please let it be as is .family owned bought in 1956 never seen a problem with the heights ever we don’t see anything to update. We love it it’s hood river

MIG

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We’d Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Fri, Aug 18, 2023 at 9:07 AM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

The North/South arterials in Hood River are always busy. To narrow and complicate the primary arterial serving the whole community seems counter productive. I agree with better crossings, but certainly not reducing to a single lane!

MIG

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We'd Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Fri, Aug 18, 2023 at 8:00 AM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

This is so needed! The heights is a terrible place for pedestrians and cyclists right now, and making it safer for these two groups of people will undoubtably reduce the number of people that drive in. If I could bike into the heights without being scared of being hit by a car, I would do it very often!

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We'd Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Fri, Aug 18, 2023 at 7:36 AM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

Do you have the funds or are you going to raise taxes? Have you considered the additional congestion that this will cause. Taking 1 lane away, angled parking that will cause traffic to stop to allow parked cars to back out? There are not enough bicycles to warrant such a drastic cha he. Are you predicting the gorge trail to increase our summer/ fall biking up town? We will not have much in the ice and snow. Why are you not taking this bike lane to a safer residential street? This is going to be a nightmare for the locals/ are you wanting this for the tourists? If it is for the kids, a residential street would be safer.

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We’d Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Wed, Mar 23, 2022 at 4:27 PM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

Hi,
I'm very concerned. DKS recently published a streetscape study whose intent was to "identify several potential streetscape changes which can foster multimodal transportation" (https://cityofhoodriver.gov/wp-content/uploads/bsk-pdf-manager/2022/02/Hood-River-Heights-Parking-Study-11-29-21.pdf). The stated purpose of the Heights Urban Renewal Plan is to "improve specific areas of a city that are poorly developed or underdeveloped. These areas can have old or deteriorated buildings, public spaces that need improvements, streets and utilities in poor condition, a complete lack of streets and utilities altogether, or other obstacles to development. The Area has infrastructure needs, lacks adequate streetscape and parking, and does not have a program for assistance to business owners.” The DKS Plan is about 'multimodal transportation' i.e. bike lanes. Did the Heights Streetscape Plan fund this study? If so, when did the Streetscape Plan pivot to be a Bike Lane Plan? My understanding is that past public meetings identified improving sidewalks, crosswalks and planting trees as the public's consensus for this program. Can you please clarify.
Thanks,

[redacted]

MIG

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We’d Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Wed, Mar 16, 2022 at 8:57 AM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

I like the 3 streetscape proposals, especially option 3 as I am an avid biker and travel this path nearly daily. However, it is important that the reality be considered, 12th & 13th are major arteries for vehicle traffic. As much as I would like to cater to pedestrian and cycling traffic, I feel reducing those streets to single lanes is going to create a traffic nightmare. All it will take is one pedestrian crossing the street, and the entire lane will be bottlenecked. The question is will traffic adjust? Will drivers start to choose other options to get to downtown, example Belmont > 22nd, or Wilson > Pine St > 4th > Serpentine? Although we will be creating a greater appeal to 12th & 13th, this could lead to greater traffic volume in more fragile areas of the Heights.

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We'd Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Fri, Jan 28, 2022 at 2:31 PM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

I would only plea for round-abouts rather than traffic lights. Besides being greener (no electricity!), they will automatically adjust to the different levels of traffic between summer and winter.

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We'd Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Thu, Dec 16, 2021 at 11:35 AM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

Can you please specify on the Design Alternative layouts what the pink highlighted "Enhancement to Improve East/West Connections" means? I don't quite understand what is planned for those zones after reading the public documents.

Thank you!

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We’d Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Tue, Dec 14, 2021 at 10:12 PM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

We live at 14th & A and are so excited about this project!
It's an ongoing issue to cross 13th & 14th Streets. Minimal crosswalks are marked and there is not enough lighting - especially during this short winter days. We often have to wait for quite a while for cars to finally stop for us. Often times they don't want to stop and keep driving even when seeing us clearly - but other times people just don't see us. It's honestly scary and I avoid crossing those streets after some close calls.
I look forward to seeing the concepts in early 2022!

MIG

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We'd Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Fri, Mar 19, 2021 at 4:04 PM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

Lots of suggestions... thanks for asking.
1. I know ODOT loves the gravel in winter, but it is a nightmare for us who walk and especially bike. Biking is dangerous enough through Hood River and Heights with little or no room, but to have the road covered in ball bearings and choking dust is awful. They have started using liquid de-icer on I84; how about on OR 281?
More to come!

Thank you

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We'd Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Sun, Mar 14, 2021 at 8:10 AM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

Concerned about traffic safety and sight-distance problems for vehicles turning on to 12th and 13th from intersecting east-west streets. More "Compacts Cars Only" parking spaces on 12th and 13th near intersections would help a lot!

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We’d Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Fri, Mar 12, 2021 at 6:21 AM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

It would be good to divert part of the traffic so that we could have a bike lane and larger space for restaurants and shops.
Adding trees would also help as those facades are fairly unappealing

MIG

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We’d Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Thu, Mar 11, 2021 at 7:07 PM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

So happy to see an urban renewal district formed to help with a more accessible town center w/ safe street crossings. Would love to see decorative street landscaping ie,, hanging baskets w/ decorative fixtures and street signage - Design Review regs is a must!

Perhaps a roundabout at the intersection of Belmont to help w/ traffic flow . . .

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We’d Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Thu, Mar 11, 2021 at 3:18 PM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

Whatever you do, please DO NOT put paid parking meters in the Heights. This will work against making the Heights a vibrant and "economically successful" district. Thank you.

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We'd Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Thu, Mar 11, 2021 at 2:42 PM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

Yes we need some improvement in the heights. Things like a couple of roundabout's would really be helpful. But please do not gentrify the heights. Talking with hispanic business owners they are very worried that they will be priced out of business with higher taxes and higher rent. My fear if we have outside cafes and no essential business like to many gift shops. Let's leave that for down town and be like Port Townsend, WA and have the heights for locals to shop. Also It is important we keep ownership of heights businesses on Hood River and not Portland

MIG

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We’d Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Thu, Mar 11, 2021 at 12:16 PM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

The only comment I have atm, is about improving road biking infrastructure. I'd like to see this take a front seat in the Heights renewal discussions. For a town that prides itself on being outdoor-centric, the lack of safe bicycle lanes was surprising when we moved here 5+ years ago. Over the years, when my kids attended HRVH, I watched as children navigated the roads from the heights to the HS without any bike lane. On their left, rushing cars. On their right, an orchard ditch. I understand this is probably exempt from the Heights streetscape, but it's reflective of how Hood River in general has aupported bike infrastructure. We can and should do better. A close second w/r/t concerns/wishes when renewing, is encouraging businesses who support our community, not just use it. The Heights shouldn't be an extension of downtown.

That's all I got off the top of my head. :)

Best,

[redacted]

MIG

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We'd Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Mon, Mar 8, 2021 at 6:42 PM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

I love the idea of urban renewal on the heights. My family lives in the Sieverkropp subdivision just East of the Heights, and we travel through the Heights daily, multiple times. Both my kids go to May street, and soon HR middle school, and I work on the HR waterfront, meaning 12th and 13th are our highway to many services we participate in. We try to do all or most of our local shopping in the heights, and we support many of the businesses, from bakeries, coffee shops, restaurants, grocery stores, all of it.

While we do most of our travel down these streets in the car, we long for the time when we can ride our bikes, scooters, or Onewheels down to get a coffee, cider, baguette, or beer at the businesses we patronize. Currently, 12th and 13th are not very bike friendly, so we'd like to see bike-ability improvements, as well as trees, benches for sitting, and some modern landscaped features to make it look more like a neghborhood, and less like a stretched out 5 block strip mall.

We would love for some of the restaurants on the Heights be able to have additional space for outdoor seating so we can eat more local, and have options that we could walk to from our home.

The Heights has so much potential to be a beautifully landscaped, and tastefully designed artery. While much of Hood River (such as downtown and the Waterfront) is updated, modern, and beautiful, areas such as the Heights, and West Cascade still look industrial, ugly, and old school. The Heights can certainly benefit from a re-imagination to update it to modern design standards, increased bike ability, walkability, and a community feeling that it currently misses.

MIG

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We’d Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Sun, Mar 7, 2021 at 10:02 AM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

We really need to clean up the Heights by refinishing street surfaces, fixing trip hazards on the sidewalks, and by creating green bike lanes for user’s safety. It would be so wonderful to see the area historically honored with classic street lamps throughout that can be seasonally decorated to highlight the beauty of the area and the small businesses. Hopefully it would attract other local vendors to create additional businesses, as well.

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We'd Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Sat, Mar 6, 2021 at 5:59 PM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

Glad to see the process is starting

MIG

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We’d Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Sat, Mar 6, 2021 at 4:43 PM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

Pedestrian Friendly, Pedestrian Friendly, Pedestrian Friendly...., and more trees!

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We'd Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Fri, Mar 5, 2021 at 5:09 PM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

I heard a rumor that you are considering closing A St., is this true? This would most certainly negatively affect my business. I don't recall this as part of the Heights renewal plan from before. I don't see it mentioned in any planning documents.
Please inform me.
[redacted]

Alex Dupey <alexd@migcom.com>

Website submission from Heights Streetscape Project - We’d Like to Hear from You!

1 message

City of Hood River <dee@gorgewebdesign.com> Fri, Mar 5, 2021 at 10:03 AM
To: alexd@migcom.com

Name

[redacted]

Email

[redacted]

Comments

The biggest recommendation is to provide some traffic deterrent on 13th street between Cascade and Belmont. They 13th/Belmont intersection is treacherous...visibility of southbound traffic almost nil. People who live in area go blocks out of the way to avoid it. Thanks for any attention you give this. Also, amazing to me that with all of the summer tourists we still don’t have a dog park! There is nowhere to let dogs off leash! As far as the 12th Street strip, a city parking area might cut down the street parking to allow for more friendly and attractive street life.

Appendix G – Traffic Studies, various

TOOLE DESIGN

HOOD RIVER HEIGHTS URBAN RENEWAL AREA – TRANSPORTATION STUDY

Prepared for the Oregon Department of Transportation and the City of Hood River

February 7, 2020

INTRODUCTION

This report documents the evaluation of the transportation system in the Hood River Heights Urban Renewal District. The District is preparing for revitalization and future growth and as part of that requires a transportation system that can address key issues such as pedestrian safety, business and local access, and maintaining the function of OR-281 as a key regional highway.

This report documents existing and expected future conditions with the current street network in place to set a baseline from which to compare future street network options that will be developed as part of the urban renewal project. This report can be updated to document the evaluation of those alternatives and recommend a preferred street network alternative at a future date.

STUDY AREA

The Hood River Heights Urban Renewal Area is shown on Figure 1 and extends from Oak Street in the north to Eliot Drive in the south. The primary north-south street through the district is OR-281, which is a two-lane, two-way street between Oak Street and May Street that converts to a one-way couplet with two lanes in each direction along 12th Street (northbound) and 13th Street (southbound) from May Street to just south of Belmont Avenue / Union Avenue, before rejoining into a four-lane, two-way street south of Belmont Avenue / Union Street.

At the north-end of the couplet, northbound traffic on 12th Street has the option of turning left or right at May Street. Currently, many drivers destined for Downtown Hood River or I-84 turn right onto May Street and then left onto 12th Street and then use the local street network including Eugene Street and 9th Street to make that connection. Future network alternatives should consider whether this route is appropriate or whether 13th Street (the designated highway route) should be encouraged to make that connection.

The east-west streets through the Heights play an important role in connecting the local community to the business district as well as facilitating movement through the district to access key destinations such as the Hood River Middle School, May Street Elementary, Friendship, Jackson, and Indian Creek Parks, and the Hood River Aquatic Center. ODOT recently conducted a planning and engineering study of pedestrian crossings on 12th and 13th Streets in the Heights and installed several crossings and removed unapproved crosswalk markings based on that analysis. Pedestrian crossings in the Heights will be an important consideration of any future street network and similarly, creating east-west pedestrian and bicycling connections that are safe and comfortable for all ages and abilities will also be important.

TRANSPORTATION STUDY SCOPE

The purpose of this transportation study is to identify existing and base future traffic conditions so that proposed street network alternatives that address safety, access, and mobility concerns in the Heights can be compared to the current street network. Transportation performance is an important consideration for the Heights, but is just one of many considerations including quality of life, economic development, and other measures that will come into consideration in evaluating a preferred option.

This transportation assessment was conducted using methodologies and assumptions consistent with the Oregon Department of Transportation's (ODOT) Analysis Procedures Manual (APM) and the scope of this study was developed in liaison with ODOT, the City of Hood River, and the Urban Renewal Advisory Committee (URAC).

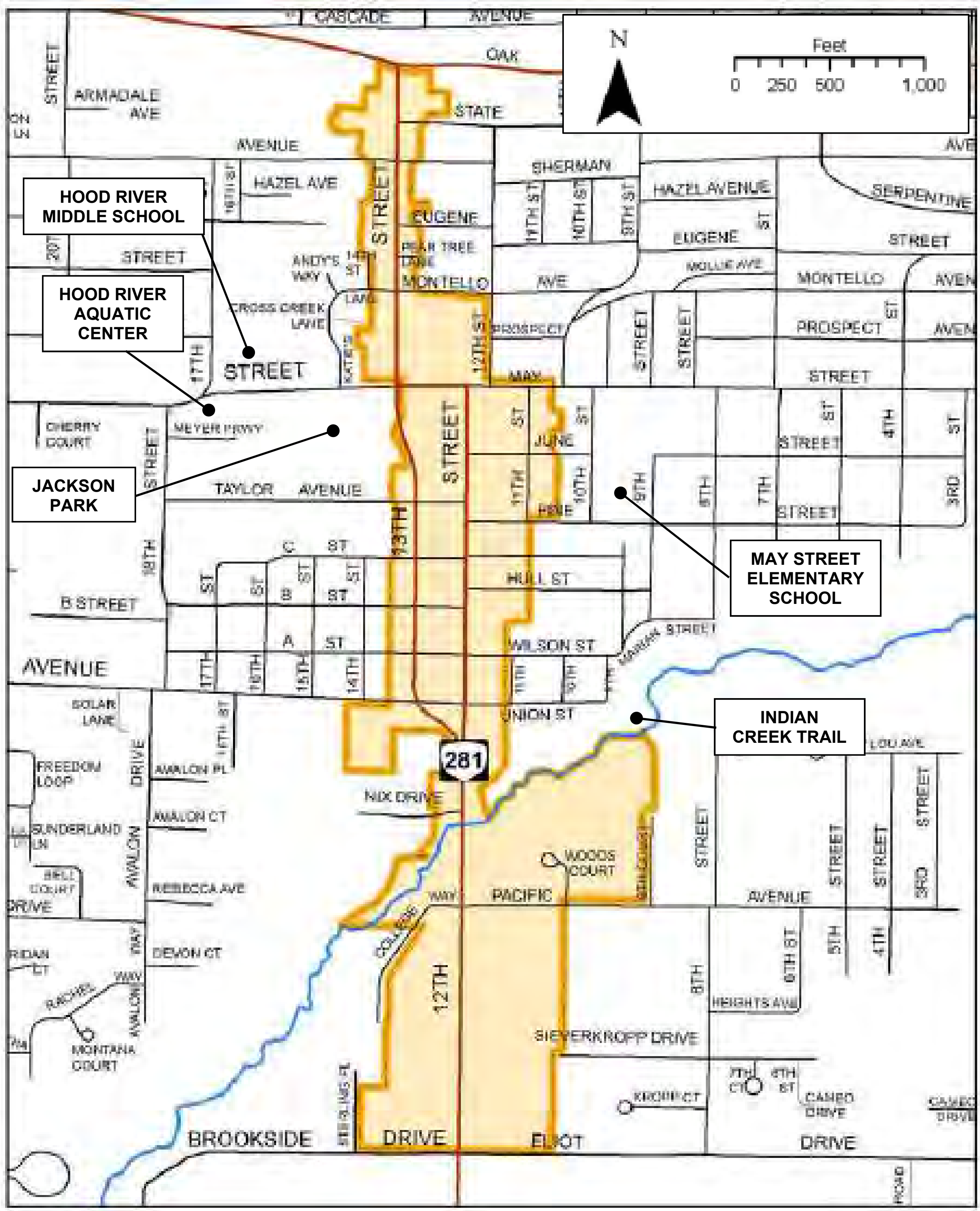


Figure 1: Hood River Heights Urban Renewal Area Boundary.

In terms of traffic operations, there are over 20 intersections along OR-281 within the Urban Renewal Area, some of which will be affected by street network changes made as part of this project. A sub-set of these intersections (i.e., those with significant crossing streets, higher turning movement volumes, and that will see the most impact from any network changes) were selected to test the impact of any proposed changes. These intersections will be analyzed according to the operational, multimodal, and safety analysis methodologies detailed in the APM. **Figure 2** shows the traffic control type and lane allocations at the study intersections.

It is noted that the 13th Street & Oak Street intersection was included in the study to evaluate any future impacts of street network changes that may divert northbound traffic from its existing route on May Street – 12th Street – Eugene Street – 9th Street to 13th Street. South of the couplet there are no changes anticipated for how traffic accesses the district and as such the OR-281 intersections with Pacific Avenue and Eliot Drive were not included in the scope of the traffic study.

There are three signalized intersections in the Urban Renewal Area at the 13th Street & Oak Street, 12th Street & May Street, and 12th Street & Pacific Avenue intersections. The remainder of intersections are unsignalized and priority is given to traffic on 12th and 13th Streets with stop control on the side streets. The intersections on 13th Street are all four-way intersections. On 12th Street, the intersections with Belmont Avenue / Union Street and A Street / Wilson Street are four-way intersections but the intersections with B Street / Hull Street, Taylor Avenue / Pine Street, June Street, and May Street are offset T-intersections. Offset T-intersections have fewer conflict points (22 compared to 32 conflict points at a conventional four-way intersection) and can potentially reduce angle collisions. However on one-way streets they can limit local circulation if the offset is in the wrong direction and on multi-lane streets and if the offset distance is short, they can increase crash risk exposure for traffic crossing through the intersection and for pedestrians and bicyclists if crossing traffic is required to focus their attention on selecting gaps in multi-lane traffic. The offset T-intersections may limit some future street network alternatives.

A review of the existing network and a Bicycling Level of Traffic Stress (BLTS) analysis was conducted to assess bicycling conditions on the major street segments in the Heights. As well, a review of the existing pedestrian network and gaps in the network was also conducted.

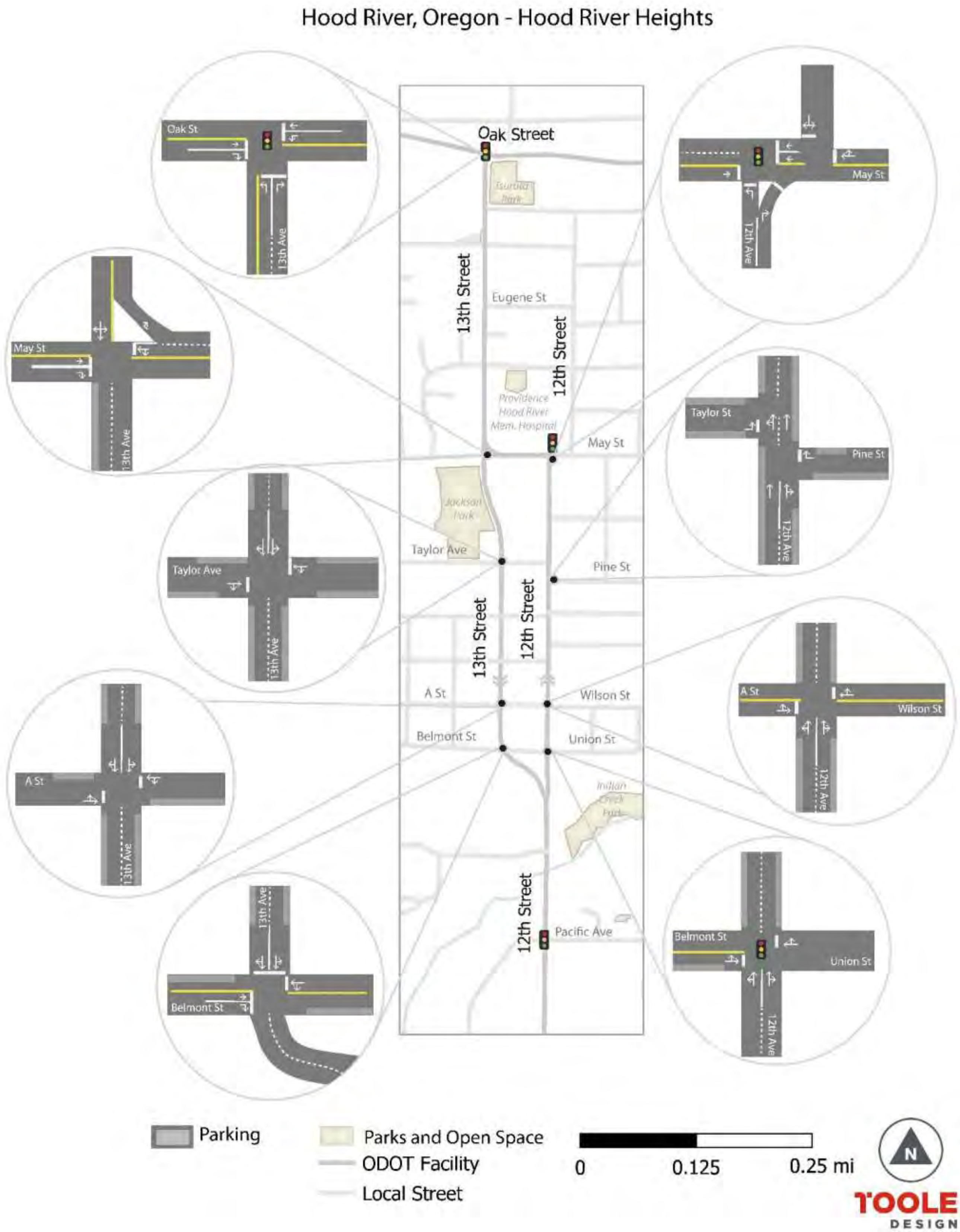


Figure 2: Traffic Study Intersections, Traffic Control, and Lane Allocations.

SECTION 1
BASE CONDITIONS

BASE TRAFFIC CONDITIONS

Turning movement counts were conducted at the study intersections on Thursday September 12, 2019 between 7:00 and 9:00 AM and 4:00 and 6:00 PM. The peak hours for traffic in Hood River Heights were identified as:

- AM Peak Hour: 7:25 to 8:25 AM, and
- PM Peak Hour: 4:20 to 5:20 PM.

Figure 3 shows turning movement counts at the study intersections for the identified peak hours.

SEASONAL ADJUSTMENT

Turning movement counts were adjusted to account for seasonal variations in traffic volumes as per the methodology described in Section 5.5.3 of the APM to create 2019 base year traffic volumes. This method uses historic traffic volumes recorded at Automatic Traffic Recorders (ATRs) on roadways with similar characteristics to OR-281. The most representative locations were identified from the ATR Characteristic Table based on “traffic trend” (commuter), “area type” (urbanized, small urban), “number of lanes”, and “traffic volume”.

Two roadways were identified as comparable[1]:

- OR 99E, Pacific Highway East No. 81
    - ATR #24-001, 0.11 miles south of NE Belle Passi Road
- OR99, Pacific Highway West
    - ATR #20-024, 1.00 mile south of Meadowview Road

The ATR Trend Summaries found in the Transportation Volume Tables were used to identify the peak month as August and compare it to the count month of September. This data is shown in Error! Reference source not found.. The lowest and highest values are removed and the three remaining years are used to identify a seasonal adjustment factor for each highway, from which the average was calculated and used as the seasonal factor for OR-281.

Table 1: Calculation of Seasonal Adjustment Factor using Comparable ATR Trend Summaries

	ATR #24-001		ATR #20-024		Seasonal Adjustment Factor		
	Peak Month	Count Month	Peak Month	Count Month	ATR #24-001	ATR #20-024	Average
2014	110%	107%	~~106%~~	~~103%~~	--	--	--
2015	~~107%~~	~~104%~~	107%	102%	--	--	--
2016	107%	105%	107%	101%	--	--	--
2017	~~113%~~	~~107%~~	~~111%~~	~~101%~~	--	--	--
2018	107%	105%	107%	101%	--	--	--
Average	*108%*	*105.7%*	*107%*	*101.3%*	*1.022*	*1.056*	***1.039***

[1] OR224, Sunrise Expressway, ATR #03-021, 0.8 miles north of Clackamas Highway was also identified as comparable but only has two years of data available so was excluded from the analysis.

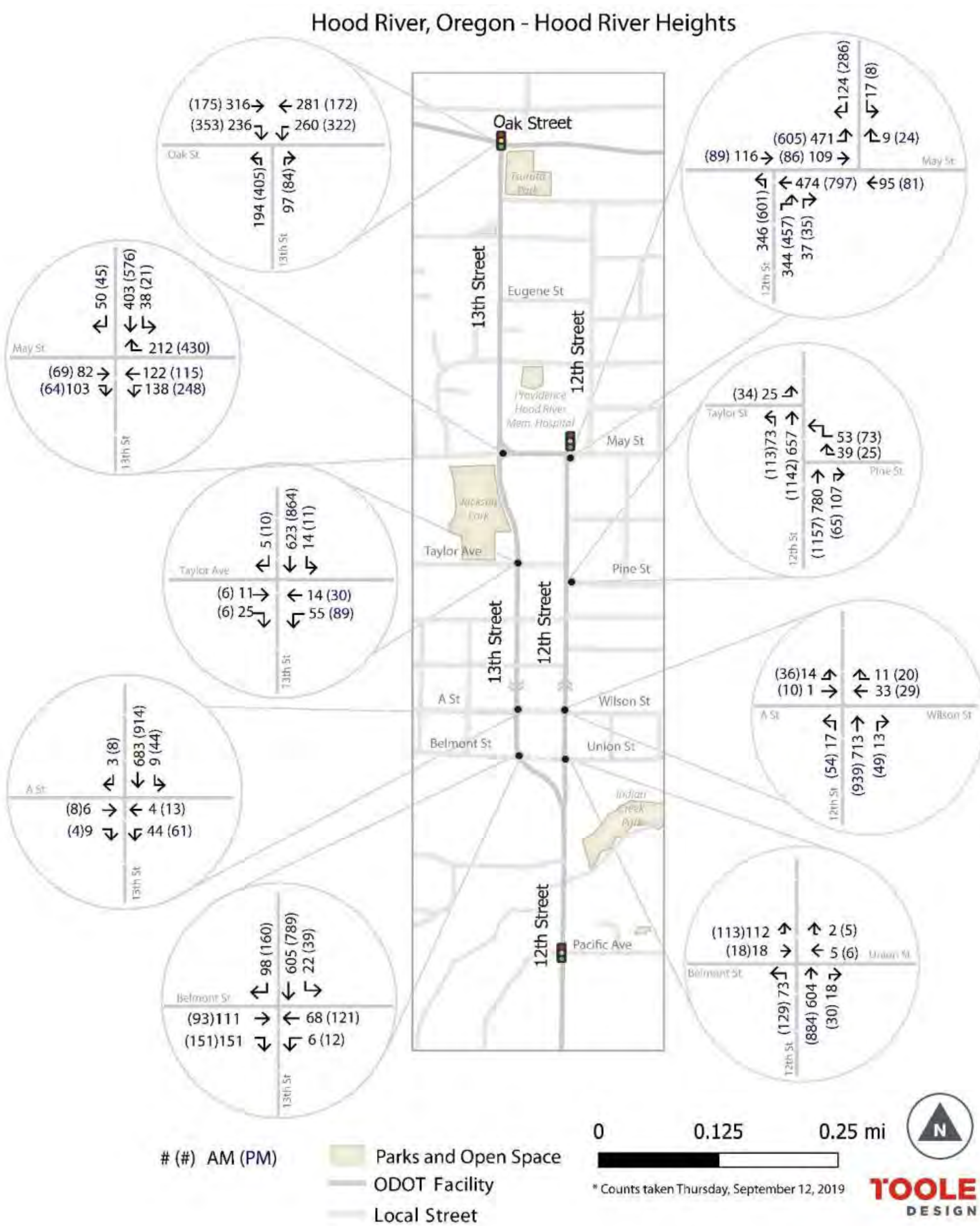


Figure 3: 2019 Peak Hour Traffic Volumes (Unadjusted).

The 1.039 seasonal adjustment factor was applied to the north-south through movements on OR-281. It was not applied to turning volumes as these are related to neighborhood traffic, which is generally not subject to seasonal variations such as increased summer highway and recreational traffic. The resultant 2019 Base Traffic Volumes are shown on **Figure 4**.

FUTURE TRAFFIC CONDITIONS

A 20-year design horizon was considered for the traffic analysis. Traffic growth rates for various state and local roads are included in the 2011 Hood River Transportation System Plan. The rate provided for Tucker Road was selected as the most comparable for the study area and traffic volumes were increased 1.29% per year assuming linear growth over the 20-year design horizon. The growth factor of 1.258 was applied to all turning movements to establish 2039 Base Traffic Volumes, which are shown on **Figure 5**.

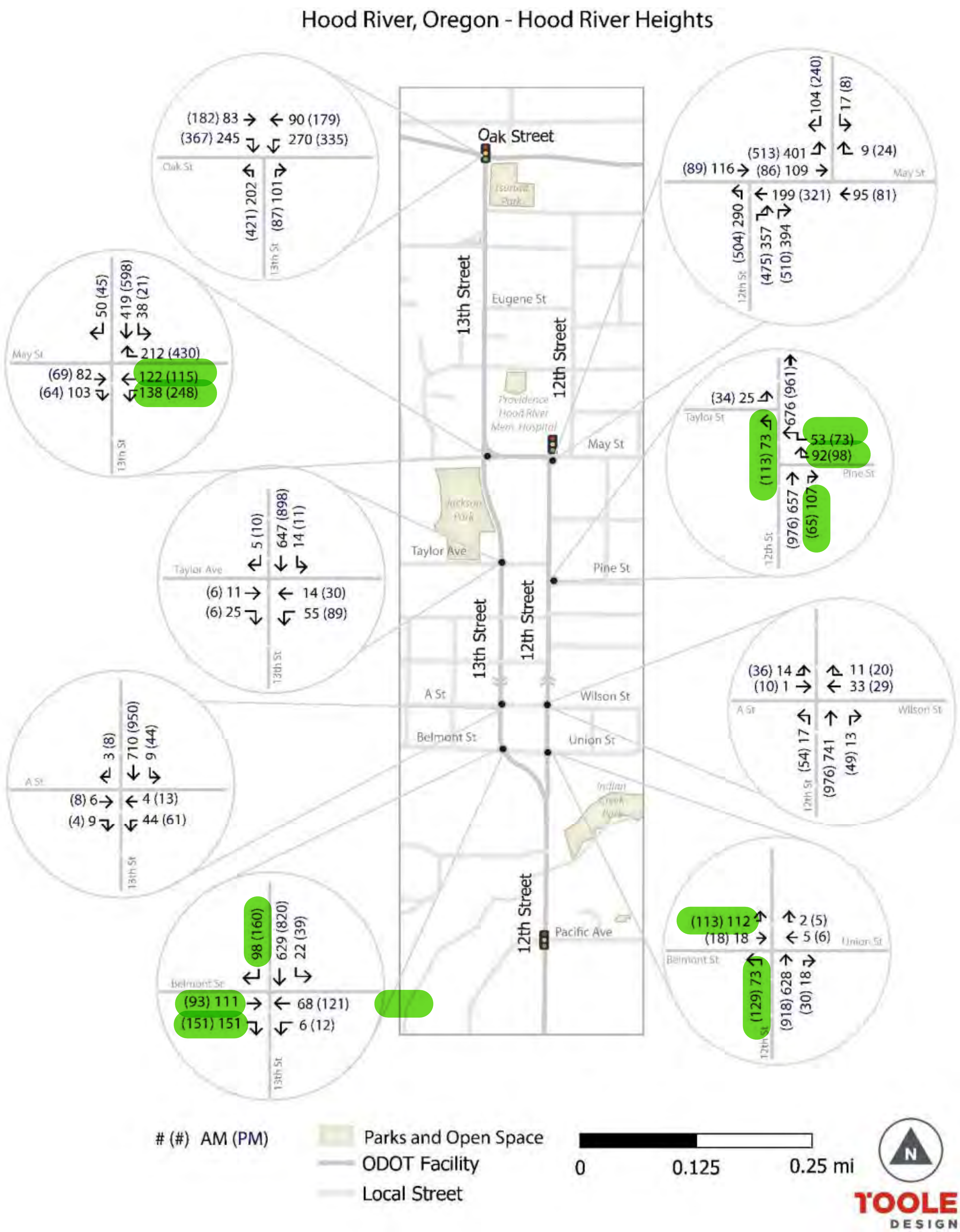


Figure 4: 2019 Base Traffic Volumes (Seasonally Adjusted).

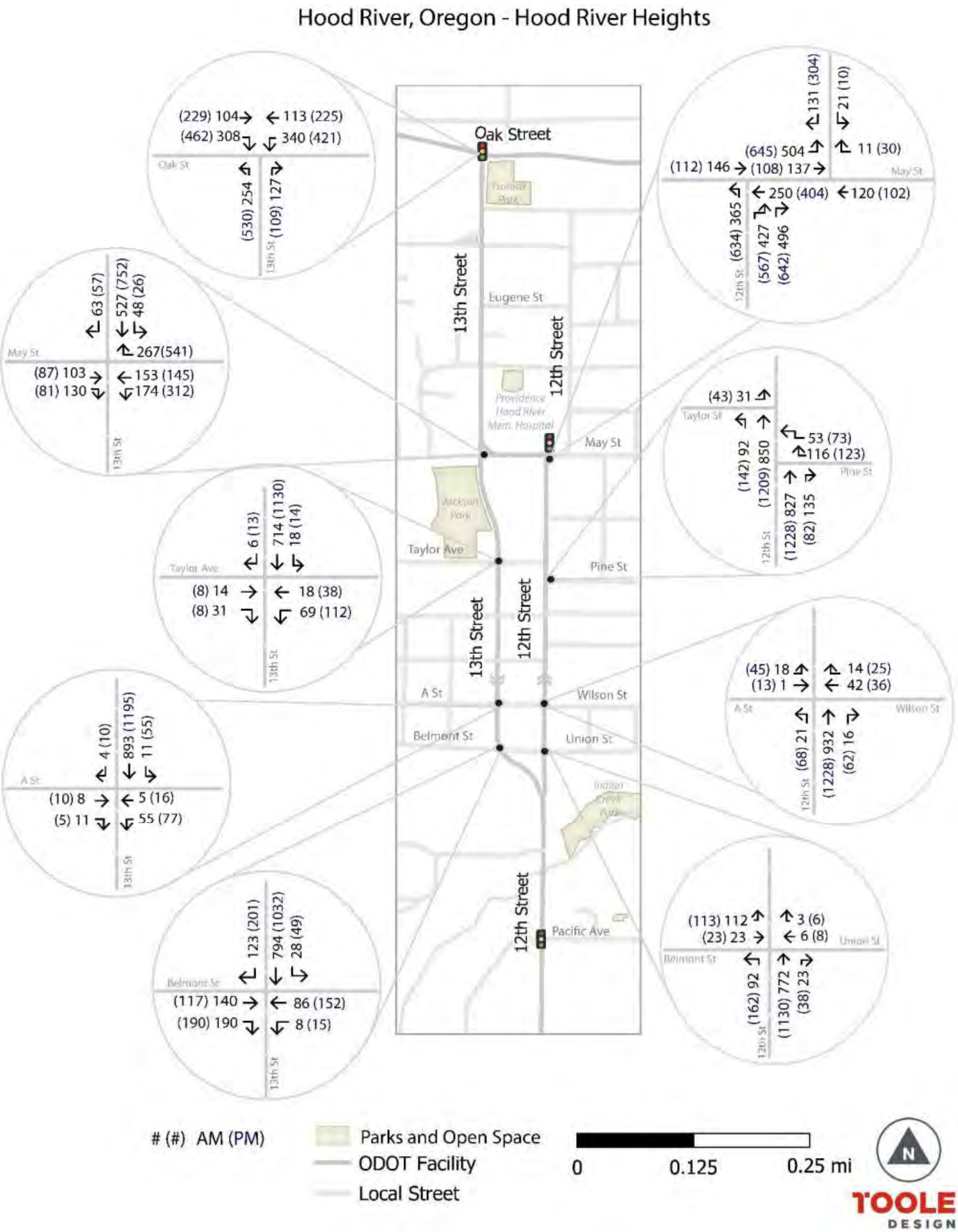


Figure 5: 2039 Base Traffic Volumes.

INTERSECTION OPERATIONAL STANDARDS

The operational standards used to assess intersection traffic conditions were selected from Table 6 of the 1999 Oregon Highway Plan (OHP). OR-281 is defined as a "District Highway" in a community "Inside Urban Growth Boundary, Non-MPO, Outside of STA, posted speed <= 35 mph", and as such volume-to-capacity (v/c) ratios of less than 0.95 need to be maintained.

Traffic analysis also considered Level of Service (LOS), which is a measure of the delay experienced by drivers. This is categorized into levels ranging from A – free-flowing conditions with minimal delay to F – over-saturated conditions with significant delay experienced by drivers.

Traffic operations were evaluated using the Synchro intersection analysis software. The results of the 2019 Base Traffic and 2039 Base Traffic analyses are shown in **Table 2**.

Table 2 shows that under seasonally adjusted 2019 traffic conditions, nearly all intersections meet ODOT's required volume-to-capacity thresholds. However, there are some movements where demand exceeds capacity (i.e., the volume-to-capacity ratio is greater than 1.0) and where significant delays are experienced by drivers (LOS F). These include:

- <u>13th Street & May Street</u>: this intersection is a two-way stop-controlled intersection and during both the AM and PM peak hours the demand for the westbound through and left-turn movements exceeds its capacity resulting in significant delay for drivers trying to find gaps in the southbound traffic flow on 13th Street (LOS = F; v/c > 1.0). This intersection was identified in the 2011 Transportation System Plan (TSP) to be upgraded to a signalized intersection.

- <u>13th Street & Belmont Street</u>: this intersection is a two-way stop-controlled intersection and during the PM peak hour the demand for the westbound through and left-turn movements exceeds its capacity resulting in significant delay for drivers trying to find gaps in the southbound traffic flow on 13th Street (LOS = F; v/c > 1.0). This intersection was identified in the 2011 TSP to be upgraded to a signalized intersection.

Under 2039, the increase in traffic volumes will increase delay. In addition to the intersections described above, the following intersections are also expected to exceed ODOT's required volume-to-capacity and delay thresholds (LOS F). In summary:

- <u>12th Street & Wilson Street</u>: this intersection is a two-way stop-controlled intersection that operates within volume and delay thresholds under existing conditions. However, it would exceed delay thresholds with the growth in traffic volumes and drivers would experience significant delay trying to find gaps in traffic on 12th Street (LOS = F). This intersection was not identified for traffic capacity upgrades in the 2011 Transportation System Plan and operational improvements will need to be considered as part of future street networks.

- <u>12th Street & Union Street</u>: this intersection is a two-way stop-controlled intersection and under future traffic volumes it is expected that movements on the side street will exceed capacity and result in significant delay for drivers trying to find gaps in traffic on 12th Street (LOS = F; v/c > 1.0). This intersection was identified in the 2011 TSP for minor changes including adding signs to limit the westbound approach to right-turns only.

Table 2: 2019 and 2039 Base Traffic Analysis Results

Intersection	Type of Control	Peak Hour	Traffic Scenario					
			2019 Base			2039 Base		
			M/ment	LOS	v/c	M/ment	LOS	v/c
13th Street & Oak Street	Signal	AM	-	B	0.49	-	B	0.58
		PM	-	C	0.67	-	C	0.82
13th Street & May Street	Two-Way Stop	AM	WB	**F**	**>1.0**	WB	**F**	**>1.0**
		PM	WB	**F**	**>1.0**	WB	**F**	**>1.0**
13th Street & Taylor Street	Two-Way Stop	AM	WB	B	0.17	WB	C	0.28
		PM	WB	C	0.37	WB	E	0.63
13th Street & A Street	Two-Way Stop	AM	WB	C	0.13	WB	C	0.20
		PM	WB	C	0.26	WB	E	0.47
13th Street & Belmont Street	Two-Way Stop	AM	WB	C	0.42	EB	E	0.71
		PM	WB	**F**	0.85	EB	**F**	**>1.0**
12th Street & May Street	Signal	AM	-	A	0.40	-	A	0.50
		PM	-	A	0.59	-	A	0.68
12th Street & Taylor Street	Two-Way Stop	AM	EB	C	0.07	EB	C	0.12
		PM	EB	C	0.15	EB	E	0.32
12th Street & Pine Street	Two-Way Stop	AM	WB	B	0.19	WB	C	0.28
		PM	WB	C	0.25	WB	C	0.39
12th Street & Wilson Street	Two-Way Stop	AM	WB	C	0.17	WB	D	0.29
		PM	EB	D	0.24	WB	**F**	0.52
12th Street & Union Street	Two-Way Stop	AM	EB	C	0.38	EB	D	0.62
		PM	EB	E	0.65	EB	**F**	**>1.0**

BASE PEDESTRIAN CONDITIONS

PEDESTRIAN NETWORK

The existing pedestrian network includes sidewalks, curb ramps, intersection crossings, and crosswalks. **Figure 6** shows the existing sidewalk network and shows that there are several gaps including:

- East side of 13th Street between May Street and Taylor Street. This gap is identified for improvement in the 2011 Hood River Transportation System Plan,
- Several short missing sidewalk segments on the cross-streets just east and west of the 12th and 13th Street couplet including:
  - South side of Taylor Avenue, west of 13th Street,
  - South side of B Street, west of 13th Street,
  - South side of Wilson Street, east of 12th Street, and
  - Both sides of Union Street, east of 12th Street.

Pedestrian crossing conditions are shown on **Figure 7**. It shows the location of marked crossings and in July 2018, ODOT collected AM and PM peak pedestrian crossing data at 11 intersections in the Heights and evaluated pedestrian crossings at those locations. ODOT's assessment resulted in several pedestrian network changes that were made in the summer of 2019. These included:

- Crossing improvements:
  - Installation of three marked crosswalks on 12th Street,
  - Installation of four marked crosswalks on 13th Street,
  - Installation of four marked crosswalks and stop lines on side streets, and
  - Removal of unapproved crosswalk markings
- Closed crossings:
  - North leg of 13th Street & Taylor Street: due to stopping sight distance criteria not being met,
  - North leg of 12th Street & Pine Street: due to no curb cut on west side and presence of parking
  - South leg of 13th Street & Belmont Street: due to horizontal alignment and vehicle speeds.

The Hood River Transportation System Plan identified the following crossing improvements in the Heights business district:

- 13th Street & Oak Street: Advance stop bar and advance warning signage for the eastbound right-turn lane to encourage motor vehicles to yield to users.
- 12th Street & May Street: Curb extensions on the east leg to reduce pedestrian crossing distance.
- 13th Street & May Street:
  - There is an Enhance grant project in process to rebuild the sidewalk and ramps at the northwest corner of this intersection, which is currently failing
  - Interim improvement: Refuge island for pedestrians to help cross the right turn slip lane from westbound May Street onto 13th Street northbound
  - Interim improvement: Stripe new crosswalks on east leg to and from the new refuge island and add advance warning signage to increase visibility.
  - Interim improvement: Pedestrian-activated rectangular rapid-flash beacons (RRFB) on east leg of intersection.
  - Future improvement: signalized intersection.
- 12th Street & Belmont Street: Stripe crosswalks on north and/or south legs of the intersection across 12th Street and add advance warning signage.

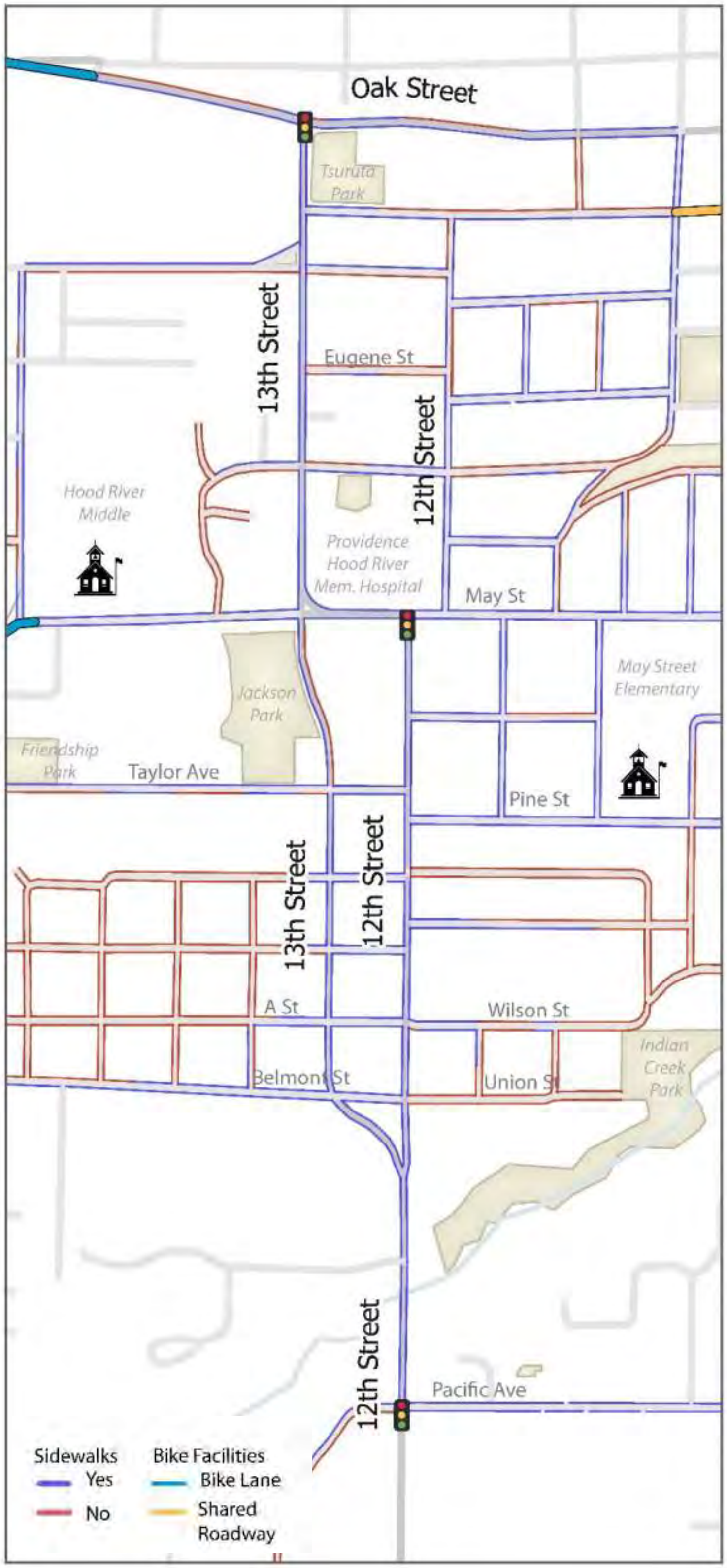


Figure 6: Existing Active Transportation Network.

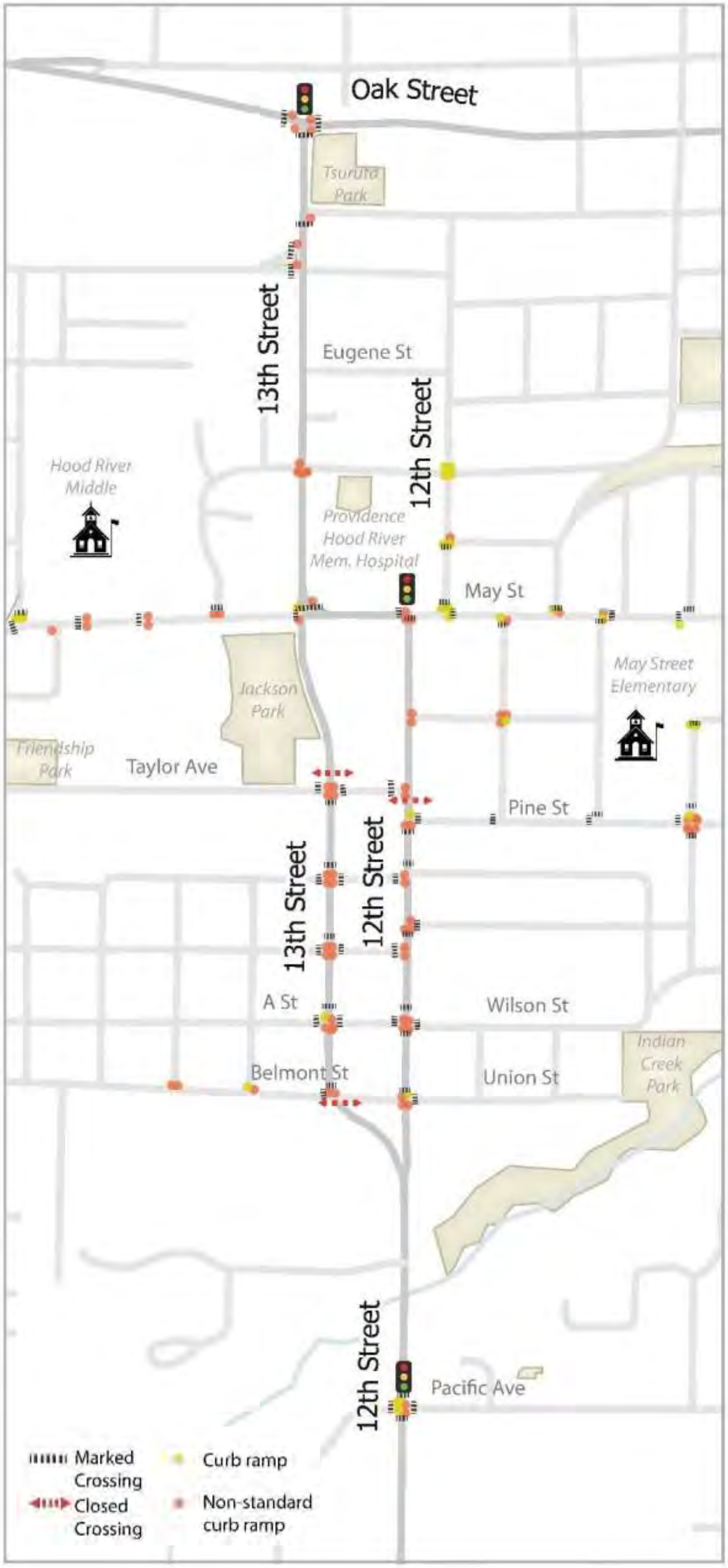


Figure 7: Existing Pedestrian Crossing Conditions.

- 13th Street & Belmont Street:
    - Interim improvement: Stripe crosswalks on north and/or south legs of intersection across 13th Street and add advance warning signage.
    - Interim improvement: Curb extension on one side of 13th Street to reduce crossing distances.
    - Future improvement: signalized intersection.

Figure 7 also shows that there are many locations in the district with non-standard curb ramps.

Pedestrian safety was identified as one of the major concerns as part of previous outreach and future network options will explore ways to improve pedestrian conditions, address network gaps, and improve safety and comfort for pedestrians using or travelling through the Heights business district.

BASE BICYCLING CONDITIONS

BICYCLING NETWORK

The existing bicycle network was shown on Figure 6 and includes very few dedicated bike lanes meaning that bicyclists share the street with motor vehicle traffic.

A Bicycling Level of Traffic Stress (BLTS) analysis was conducted for the major street segments in the Heights. The analysis measures the expected comfort or stress of a given street based on a number of street characteristics including:

- Traffic speed (posted or prevailing),
- Travel lanes per direction,
- Average daily traffic (ADT),
- On-street parking presence and width,
- Bike facility presence, type, and width, and
- Centerline presence.

The methodology is outlined in Chapter 14 of ODOT's APM and scores streets on a scale from 1 to 4, with BLTS 1 and 2 generally considered low-stress, BLTS 3 as medium-stress, and BLTS 4 as high-stress.

The BLTS analysis for the 2039 Base Conditions is shown on **Figure 8**. It shows that 12th and 13th Streets through the Heights have a high level of traffic stress for bicyclists because bicyclists have to share the vehicle lanes with high volumes of traffic. Installing bike lanes on these streets was identified as a future bike network change in the 2011 TSP. This would improve comfort to a BLTS rating of 3. Any further improvements would require physical separation from traffic.

The TSP also identifies the segments of May and Belmont Streets from west of the study area to 12th Street for bike lanes. Currently, these segments are somewhat comfortable for bicyclists (BLTS = 3), although May Street between 12th and 13th Streets is uncomfortable (BLTS = 4). Adding bike lanes would improve bicyclist comfort to a BLTS rating of 2.

The other local east-west streets including Taylor Street – Pine Street and A Street – Wilson Street provide comfortable local street connections for bicyclists (BLTS = 1 or 2) and can form the basis for a future neighborhood greenway system with improvements to the crossings at 12th and 13th Streets.

Figure 8: Bicycling Level of Traffic Stress - Existing Conditions.

SECTION 3
STREET NETWORK OPTIONS

STREET NETWORK OPTIONS

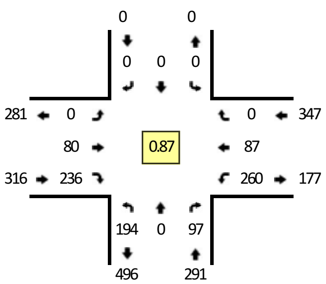
The next phase of the project will summarize previous work conducted as part of the TSP, the Blue Zones walk audit, recent traffic impact assessments, demonstration projects, public outreach events, etc. It should also gather input from the community on the features they support. Based on this feedback, street network reconfiguration scenarios can be developed and refined with ODOT and the City of Hood River. Traffic operations, road user safety, bicycle level of traffic stress, and pedestrian connectivity should be key criteria in the evaluation and recommendation of a preferred street network option.

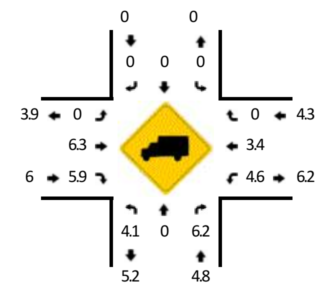
APPENDIX A
TRAFFIC COUNT DATA

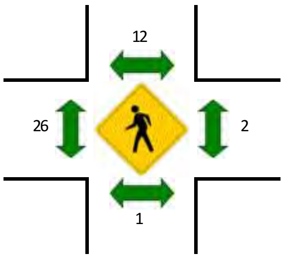
LOCATION: 13th St -- Oak St
CITY/STATE: Hood River, OR

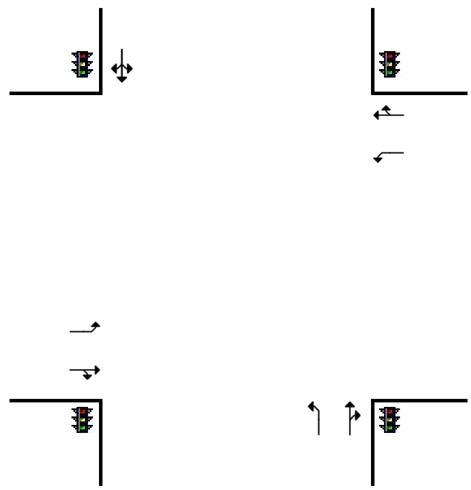
QC JOB #: 15070401
DATE: Thu, Sep 12 2019

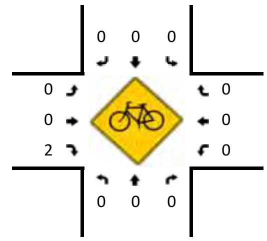
Peak-Hour: 7:25 AM -- 8:25 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

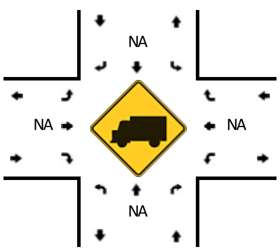


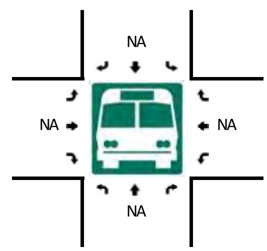












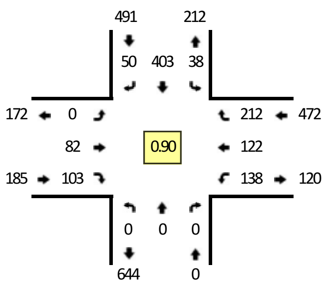
5-Min Count Period Beginning At	13th St (Northbound)				13th St (Southbound)				Oak St (Eastbound)				Oak St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	10	0	6	0	0	0	0	0	0	7	11	0	10	1	0	0	45	
7:05 AM	9	0	6	0	0	0	0	0	0	4	7	0	7	1	0	0	34	
7:10 AM	9	0	3	0	0	0	0	0	0	9	12	0	15	2	0	0	50	
7:15 AM	11	0	1	0	0	0	0	0	0	5	11	0	6	2	0	0	36	
7:20 AM	8	0	5	0	0	0	0	0	0	11	15	0	13	5	0	0	57	
7:25 AM	11	0	9	0	0	0	0	0	0	10	20	0	21	4	0	0	75	
7:30 AM	11	0	3	0	0	0	0	0	0	8	18	0	15	7	0	0	62	
7:35 AM	17	0	7	0	0	0	0	0	0	7	23	0	18	10	0	0	82	
7:40 AM	19	0	12	0	0	0	0	0	0	4	12	0	24	11	0	0	82	
7:45 AM	16	0	8	0	0	0	0	0	0	7	30	0	22	11	0	0	94	
7:50 AM	19	0	9	0	0	0	0	0	0	7	26	0	20	4	0	0	85	
7:55 AM	16	0	10	0	0	0	0	0	0	7	23	0	32	8	0	0	96	798
8:00 AM	18	0	3	0	0	0	0	0	0	6	19	0	27	9	0	0	82	835
8:05 AM	12	0	10	0	0	0	0	0	0	6	14	0	27	5	0	0	74	875
8:10 AM	17	0	7	0	0	0	0	0	0	4	16	0	16	5	0	0	65	890
8:15 AM	23	0	10	0	0	0	0	0	0	8	20	0	26	6	0	0	93	947
8:20 AM	15	0	9	0	0	0	0	0	0	6	15	0	12	7	0	0	64	954
8:25 AM	19	0	4	0	0	0	0	0	0	5	17	0	19	7	0	0	71	950
8:30 AM	13	0	3	0	0	0	0	0	0	6	15	0	15	9	0	0	61	949
8:35 AM	8	0	6	0	0	0	0	0	0	10	14	0	18	11	0	0	67	934
8:40 AM	11	0	7	0	0	0	0	0	0	13	19	0	17	10	0	0	77	929
8:45 AM	15	0	6	0	0	0	0	0	0	8	25	0	18	3	0	0	75	910
8:50 AM	20	0	4	0	0	0	0	0	0	7	25	0	20	4	0	0	80	905
8:55 AM	16	0	4	0	0	0	0	0	0	11	21	0	19	4	0	0	75	884

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	204	0	108	0	0	0	0	0	0	84	316	0	296	92	0	0	1100
Heavy Trucks	0	0	4		0	0	0		0	8	16		16	0	0		44
Pedestrians		4				0				36				0			40
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

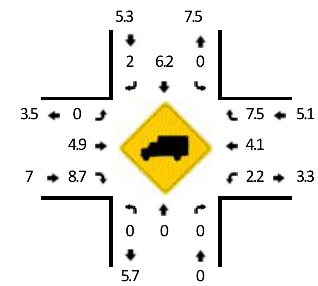
Comments:

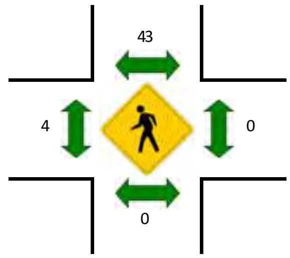
Type of peak hour being reported: System Peak | Method for determining peak hour: Total Entering Volume

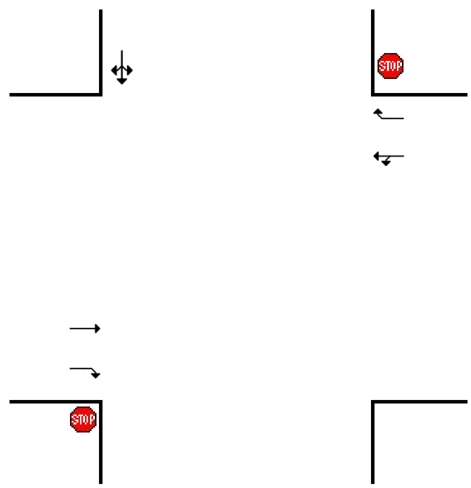
LOCATION: 13th St -- May St | **QC JOB #:** 15070405
CITY/STATE: Hood River, OR | **DATE:** Thu, Sep 12 2019

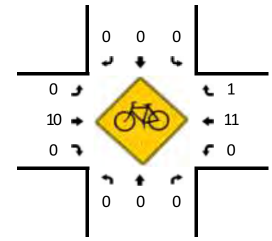


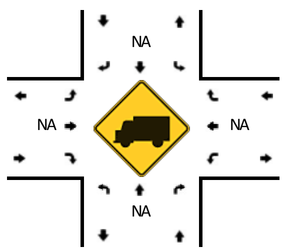
Peak-Hour: 7:25 AM -- 8:25 AM
Peak 15-Min: 7:55 AM -- 8:10 AM

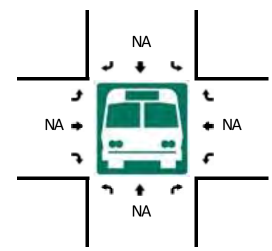












5-Min Count Period Beginning At	13th St (Northbound)				13th St (Southbound)				May St (Eastbound)				May St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	0	0	0	2	17	0	0	0	5	1	0	5	0	10	0	40	
7:05 AM	0	0	0	0	1	13	1	0	0	2	0	0	4	1	15	0	37	
7:10 AM	0	0	0	0	9	12	1	0	0	4	1	0	6	4	12	0	49	
7:15 AM	0	0	0	0	2	15	0	0	0	7	4	0	8	3	11	0	50	
7:20 AM	0	0	0	0	5	26	2	0	0	7	1	0	8	4	11	0	64	
7:25 AM	0	0	0	0	12	27	3	0	0	7	4	0	16	6	11	0	86	
7:30 AM	0	0	0	0	4	26	2	0	0	12	2	0	10	4	12	0	72	
7:35 AM	0	0	0	0	5	38	4	0	0	13	7	0	12	10	21	0	110	
7:40 AM	0	0	0	0	3	30	2	0	0	3	9	0	17	12	24	0	100	
7:45 AM	0	0	0	0	3	32	2	0	0	5	8	0	15	11	16	0	92	
7:50 AM	0	0	0	0	2	38	5	0	0	6	5	0	10	11	19	0	96	
7:55 AM	0	0	0	0	2	40	8	0	0	9	8	0	13	8	24	0	112	908
8:00 AM	0	0	0	0	1	42	4	0	0	6	15	0	9	15	11	0	103	971
8:05 AM	0	0	0	0	3	39	5	0	0	2	12	0	14	13	15	0	103	1037
8:10 AM	0	0	0	0	2	22	9	0	0	9	15	0	7	14	21	0	99	1087
8:15 AM	0	0	0	0	0	48	5	0	0	4	9	0	8	9	23	0	106	1143
8:20 AM	0	0	0	0	1	21	1	0	0	6	9	0	7	9	15	0	69	1148
8:25 AM	0	0	0	0	2	34	2	0	0	4	3	0	9	8	19	0	81	1143
8:30 AM	0	0	0	0	1	33	0	0	0	1	0	0	10	4	13	0	62	1133
8:35 AM	0	0	0	0	2	26	3	0	0	8	2	0	12	7	15	0	75	1098
8:40 AM	0	0	0	0	2	29	0	0	0	4	2	0	5	13	12	0	67	1065
8:45 AM	0	0	0	0	2	38	2	0	0	6	1	0	8	2	19	0	78	1051
8:50 AM	0	0	0	0	4	46	0	0	0	4	1	0	14	4	15	0	88	1043
8:55 AM	0	0	0	0	2	38	0	0	0	5	7	0	12	3	18	0	85	1016

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	24	484	68	0	0	68	140	0	144	144	200	0	1272
Heavy Trucks	0	0	0		0	44	0		0	4	20		0	8	8		84
Pedestrians		0				24				0				0			24
Bicycles	0	0	0		0	0	0		0	0	0		0	4	0		4
Railroad																	
Stopped Buses																	

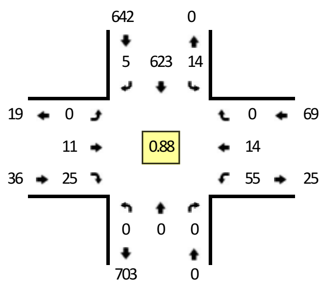
Comments:

Report generated on 9/23/2019 4:42 PM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: System Peak | Method for determining peak hour: Total Entering Volume

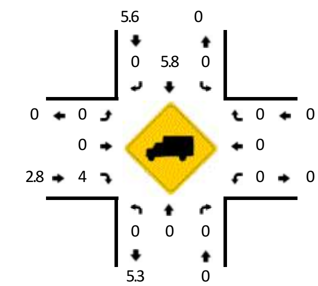
LOCATION: 13th St -- Taylor Ave | **QC JOB #:** 15070409

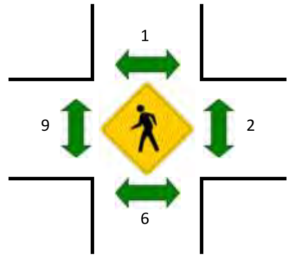
CITY/STATE: Hood River, OR | **DATE:** Thu, Sep 12 2019

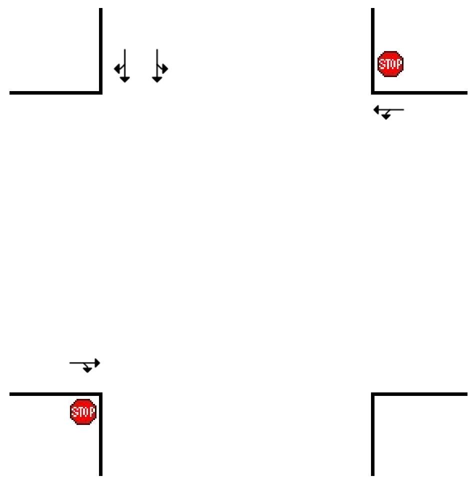


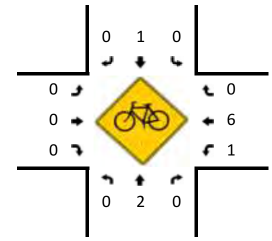
Peak-Hour: 7:25 AM -- 8:25 AM

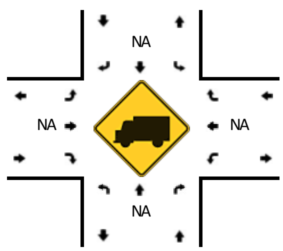
Peak 15-Min: 7:55 AM -- 8:10 AM

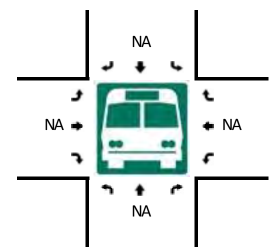












5-Min Count Period Beginning At	13th St (Northbound) Left	Thru	Right	U	13th St (Southbound) Left	Thru	Right	U	Taylor Ave (Eastbound) Left	Thru	Right	U	Taylor Ave (Westbound) Left	Thru	Right	U	Total	Hourly Totals
7:00 AM	0	0	0	0	0	24	0	0	0	0	0	0	2	0	0	0	26	
7:05 AM	0	0	0	0	0	15	0	0	0	0	1	0	4	0	0	0	20	
7:10 AM	0	0	0	0	1	17	0	0	0	1	1	0	4	1	0	0	25	
7:15 AM	0	0	0	0	1	28	0	0	0	0	0	0	3	0	0	0	32	
7:20 AM	0	0	0	0	0	35	0	0	0	0	1	0	6	0	0	0	42	
7:25 AM	0	0	0	0	1	45	0	0	0	3	1	0	4	1	0	0	55	
7:30 AM	0	0	0	0	1	36	0	0	0	1	3	0	9	2	0	0	52	
7:35 AM	0	0	0	0	1	54	0	0	0	0	4	0	4	0	0	0	63	
7:40 AM	0	0	0	0	1	59	0	0	0	2	2	0	10	1	0	0	75	
7:45 AM	0	0	0	0	1	53	0	0	0	0	1	0	3	3	0	0	61	
7:50 AM	0	0	0	0	1	55	0	0	0	2	0	0	3	0	0	0	61	
7:55 AM	0	0	0	0	1	56	0	0	0	1	3	0	3	1	0	0	65	577
8:00 AM	0	0	0	0	1	63	1	0	0	1	3	0	4	1	0	0	74	625
8:05 AM	0	0	0	0	0	65	0	0	0	0	2	0	2	4	0	0	73	678
8:10 AM	0	0	0	0	2	44	1	0	0	0	2	0	4	0	0	0	53	706
8:15 AM	0	0	0	0	3	56	2	0	0	0	4	0	6	0	0	0	71	745
8:20 AM	0	0	0	0	1	37	1	0	0	1	0	0	3	1	0	0	44	747
8:25 AM	0	0	0	0	2	46	0	0	0	1	0	0	4	1	0	0	54	746
8:30 AM	0	0	0	0	1	42	0	0	0	0	3	0	5	1	0	0	52	746
8:35 AM	0	0	0	0	0	37	0	0	0	1	0	0	11	1	0	0	50	733
8:40 AM	0	0	0	0	1	35	0	0	0	1	0	0	5	0	0	0	42	700
8:45 AM	0	0	0	0	0	47	0	0	0	0	0	0	3	1	0	0	51	690
8:50 AM	0	0	0	0	0	60	0	0	0	0	0	0	1	2	0	0	63	692
8:55 AM	0	0	0	0	4	53	1	0	0	1	0	0	2	1	0	0	62	689

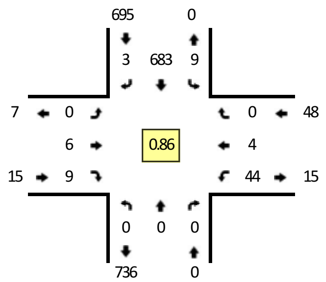
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	0	0	0	0	8	736	4	0	0	8	32	0	36	24	0	0	848
Heavy Trucks	0	0	0		0	64	0		0	0	0		0	0	0		64
Pedestrians		8				0				8				0			16
Bicycles	0	0	0		0	1	0		0	0	0		0	4	0		5
Railroad																	
Stopped Buses																	

Comments:

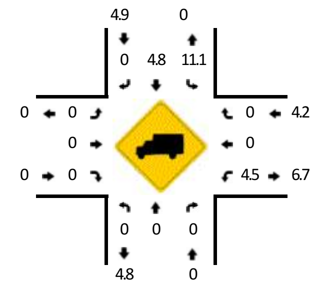
Report generated on 9/23/2019 4:42 PM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

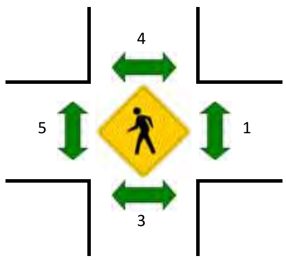
Type of peak hour being reported: System Peak | Method for determining peak hour: Total Entering Volume

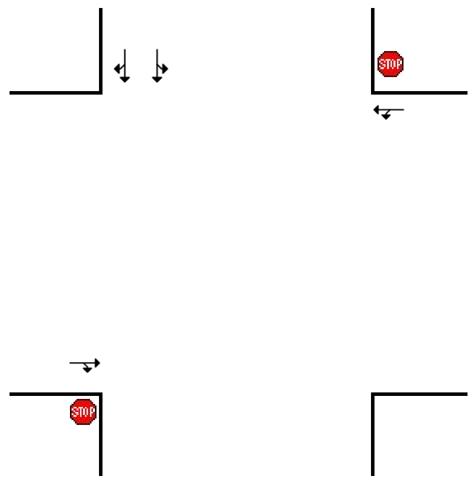
LOCATION: 13th St -- A St | **QC JOB #:** 15070413
CITY/STATE: Hood River, OR | **DATE:** Thu, Sep 12 2019

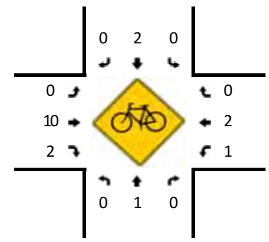


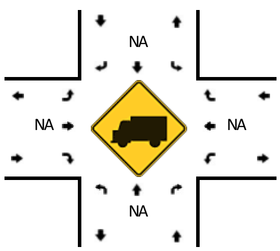
Peak-Hour: 7:25 AM -- 8:25 AM
Peak 15-Min: 7:55 AM -- 8:10 AM

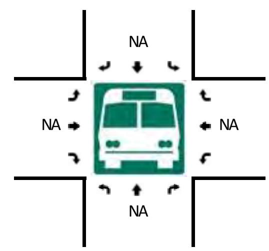












5-Min Count Period Beginning At	13th St (Northbound)				13th St (Southbound)				A St (Eastbound)				A St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	0	0	0	1	26	0	0	0	0	0	0	1	1	0	0	29	
7:05 AM	0	0	0	0	0	22	0	0	0	1	0	0	3	1	0	0	27	
7:10 AM	0	0	0	0	1	18	0	0	0	0	1	0	1	1	0	0	22	
7:15 AM	0	0	0	0	1	27	0	0	0	0	0	0	2	0	0	0	30	
7:20 AM	0	0	0	0	2	43	0	0	0	1	0	0	1	1	0	0	48	
7:25 AM	0	0	0	0	0	42	0	0	0	1	0	0	3	0	0	0	46	
7:30 AM	0	0	0	0	1	49	0	0	0	0	3	0	4	0	0	0	57	
7:35 AM	0	0	0	0	0	52	0	0	0	1	0	0	5	0	0	0	58	
7:40 AM	0	0	0	0	1	66	1	0	0	0	0	0	5	0	0	0	73	
7:45 AM	0	0	0	0	0	60	1	0	0	1	1	0	3	1	0	0	67	
7:50 AM	0	0	0	0	0	57	1	0	0	0	0	0	4	1	0	0	63	
7:55 AM	0	0	0	0	1	64	0	0	0	2	0	0	5	0	0	0	72	592
8:00 AM	0	0	0	0	1	65	0	0	0	1	1	0	3	0	0	0	71	634
8:05 AM	0	0	0	0	0	70	0	0	0	0	0	0	5	2	0	0	77	684
8:10 AM	0	0	0	0	3	52	0	0	0	0	2	0	5	0	0	0	62	724
8:15 AM	0	0	0	0	0	58	0	0	0	0	0	0	1	0	0	0	59	753
8:20 AM	0	0	0	0	2	48	0	0	0	0	2	0	1	0	0	0	53	758
8:25 AM	0	0	0	0	3	42	0	0	0	1	1	0	4	0	0	0	51	763
8:30 AM	0	0	0	0	0	47	0	0	0	1	0	0	3	0	0	0	51	757
8:35 AM	0	0	0	0	1	48	0	0	0	1	1	0	2	0	0	0	53	752
8:40 AM	0	0	0	0	0	40	0	0	0	1	1	0	0	0	0	0	42	721
8:45 AM	0	0	0	0	1	41	1	0	0	1	0	0	2	2	0	0	48	702
8:50 AM	0	0	0	0	1	63	0	0	0	0	0	0	3	2	0	0	69	708
8:55 AM	0	0	0	0	2	47	2	0	0	0	0	0	1	0	0	0	52	688

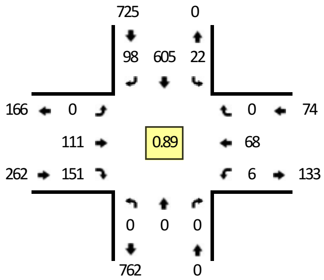
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	8	796	0	0	0	12	4	0	52	8	0	0	880
Heavy Trucks	0	0	0		0	56	0		0	0	0		0	0	0		56
Pedestrians		4				8				0				0			12
Bicycles	0	0	0		0	1	0		0	3	0		0	0	0		4
Railroad																	
Stopped Buses																	

Comments:

Report generated on 9/23/2019 4:42 PM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

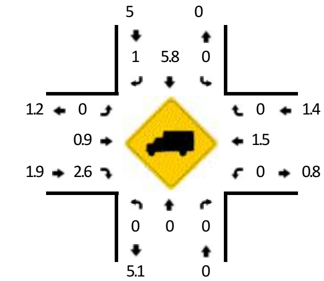
Type of peak hour being reported: System Peak Method for determining peak hour: Total Entering Volume

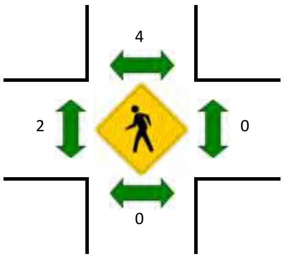
LOCATION: 13th St -- Belmont Ave **QC JOB #:** 15070417
CITY/STATE: Hood River, OR **DATE:** Thu, Sep 12 2019

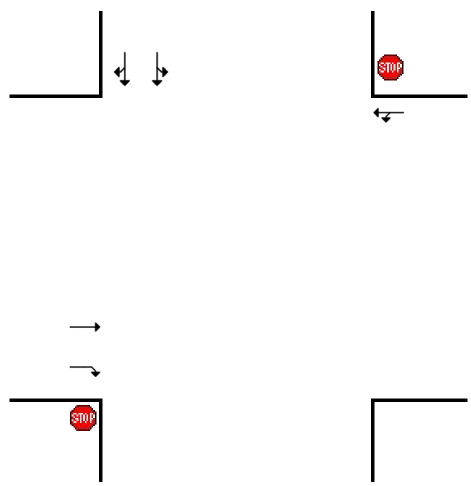


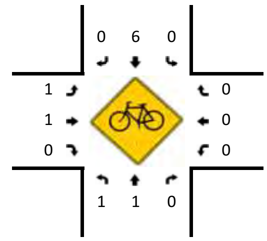
Peak-Hour: 7:25 AM -- 8:25 AM
Peak 15-Min: 7:55 AM -- 8:10 AM

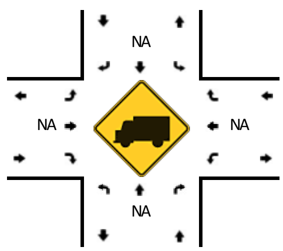
Quality Counts
DATA THAT DRIVES COMMUNITIES

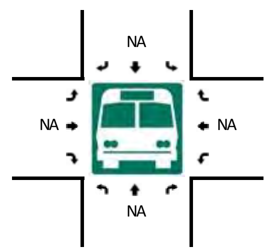












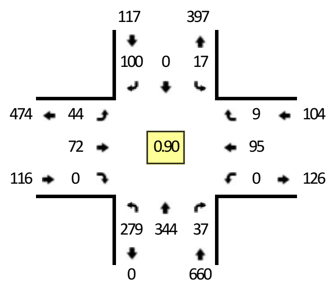
5-Min Count Period Beginning At	13th St (Northbound)				13th St (Southbound)				Belmont Ave (Eastbound)				Belmont Ave (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	0	0	0	1	21	3	0	0	5	6	0	0	2	0	0	38	
7:05 AM	0	0	0	0	0	21	6	0	0	8	5	0	0	1	0	0	41	
7:10 AM	0	0	0	0	1	14	4	0	0	8	4	0	0	3	0	0	34	
7:15 AM	0	0	0	0	0	25	5	0	0	6	3	0	0	4	0	0	43	
7:20 AM	0	0	0	0	1	31	6	0	0	9	6	0	0	4	0	0	57	
7:25 AM	0	0	0	0	1	36	11	0	0	10	6	0	0	6	0	0	70	
7:30 AM	0	0	0	0	0	47	7	0	0	9	14	0	0	6	0	0	83	
7:35 AM	0	0	0	0	1	49	3	0	0	8	12	0	1	3	0	0	77	
7:40 AM	0	0	0	0	2	65	8	0	0	9	12	0	0	7	0	0	103	
7:45 AM	0	0	0	0	3	50	8	0	0	10	9	0	2	6	0	0	88	
7:50 AM	0	0	0	0	2	49	10	0	0	13	14	0	1	6	0	0	95	
7:55 AM	0	0	0	0	2	62	2	0	0	9	13	0	0	4	0	0	92	821
8:00 AM	0	0	0	0	3	55	11	0	0	9	14	0	0	4	0	0	96	879
8:05 AM	0	0	0	0	1	60	12	0	0	8	19	0	2	8	0	0	110	948
8:10 AM	0	0	0	0	0	42	13	0	0	14	14	0	0	6	0	0	89	1003
8:15 AM	0	0	0	0	6	49	3	0	0	6	10	0	0	4	0	0	78	1038
8:20 AM	0	0	0	0	1	41	10	0	0	6	14	0	0	8	0	0	80	1061
8:25 AM	0	0	0	0	1	43	5	0	0	8	9	0	0	9	0	0	75	1066
8:30 AM	0	0	0	0	3	32	11	0	0	5	11	0	1	5	0	0	68	1051
8:35 AM	0	0	0	0	5	38	8	0	0	8	12	0	0	4	0	0	75	1049
8:40 AM	0	0	0	0	0	37	4	0	0	11	10	0	0	2	0	0	64	1010
8:45 AM	0	0	0	0	1	37	6	0	0	6	14	0	1	7	0	0	72	994
8:50 AM	0	0	0	0	2	60	5	0	0	11	6	0	0	5	0	0	89	988
8:55 AM	0	0	0	0	6	37	3	0	0	5	9	0	0	7	0	0	67	963

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	24	708	100	0	0	104	184	0	8	64	0	0	1192
Heavy Trucks	0	0	0		0	60	0		0	0	4		0	0	0		64
Pedestrians		0				0				4				0			4
Bicycles	0	0	0		0	1	0		1	0	0		0	0	0		2
Railroad																	
Stopped Buses																	

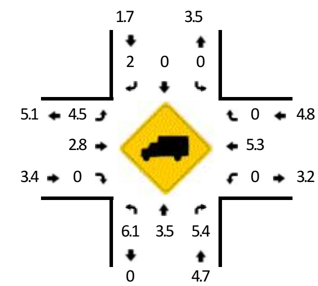
Comments:

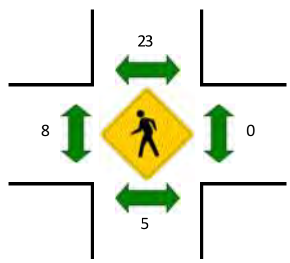
Type of peak hour being reported: System Peak | Method for determining peak hour: Total Entering Volume

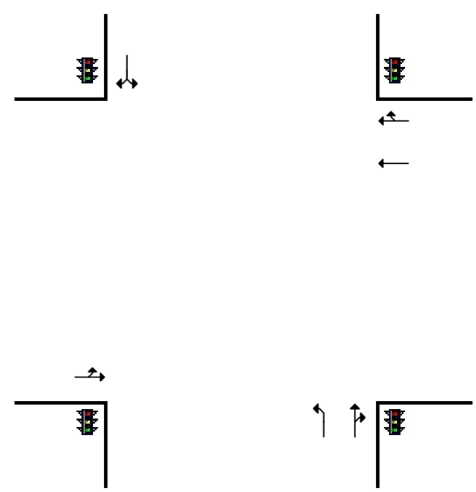
LOCATION: 12th St (offset) -- May St | **QC JOB #:** 15070403
CITY/STATE: Hood River, OR | **DATE:** Thu, Sep 12 2019

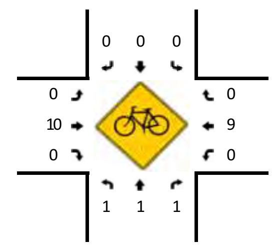


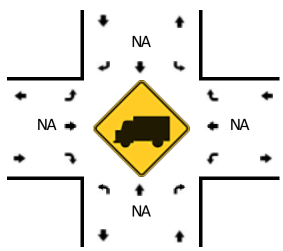
Peak-Hour: 7:25 AM -- 8:25 AM
Peak 15-Min: 7:50 AM -- 8:05 AM

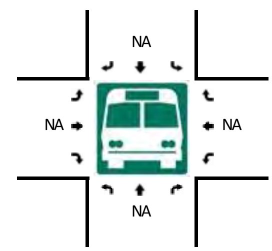












5-Min Count Period Beginning At	12th St (offset) (Northbound)				12th St (offset) (Southbound)				May St (Eastbound)				May St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	11	11	2	0	1	0	4	0	1	5	0	0	0	1	1	0	37	
7:05 AM	15	25	1	0	0	0	4	0	1	1	0	0	0	1	0	0	48	
7:10 AM	14	11	3	0	2	0	4	0	1	13	0	0	0	3	0	0	51	
7:15 AM	10	21	3	0	1	0	6	0	2	7	0	0	0	6	0	0	56	
7:20 AM	9	27	1	0	1	0	2	0	2	10	0	0	0	14	1	0	67	
7:25 AM	16	23	5	0	2	0	8	0	1	15	0	0	0	10	1	0	81	
7:30 AM	10	24	2	0	0	0	7	0	2	17	0	0	0	11	0	0	73	
7:35 AM	22	18	6	0	3	0	3	0	6	12	0	0	0	18	2	0	90	
7:40 AM	24	32	0	0	1	0	8	0	4	2	0	0	0	19	3	0	93	
7:45 AM	21	17	4	0	2	0	11	0	4	3	0	0	0	10	0	0	72	
7:50 AM	30	39	6	0	1	0	7	0	3	4	0	0	0	5	0	0	95	
7:55 AM	27	43	2	0	2	0	13	0	5	6	0	0	0	3	0	0	101	864
8:00 AM	25	32	3	0	1	0	11	0	4	1	0	0	0	4	1	0	82	909
8:05 AM	22	35	4	0	1	0	9	0	2	3	0	0	0	4	2	0	82	943
8:10 AM	32	20	2	0	0	0	5	0	6	6	0	0	0	6	0	0	77	969
8:15 AM	30	31	0	0	4	0	10	0	2	2	0	0	0	2	0	0	81	994
8:20 AM	20	30	3	0	0	0	8	0	5	1	0	0	0	3	0	0	70	997
8:25 AM	24	21	2	0	2	0	8	0	5	2	0	0	0	2	2	0	68	984
8:30 AM	14	20	2	0	0	0	7	0	0	3	0	0	0	5	0	0	51	962
8:35 AM	22	29	5	0	0	0	14	0	4	4	0	0	0	2	0	0	80	952
8:40 AM	20	19	0	0	3	0	5	0	4	4	0	0	0	3	1	0	59	918
8:45 AM	20	15	0	0	1	0	9	0	3	3	0	0	0	2	1	0	54	900
8:50 AM	18	20	0	0	1	0	13	0	3	4	0	0	0	4	0	0	63	868
8:55 AM	16	13	1	0	3	0	9	0	3	6	0	0	0	7	1	0	59	826

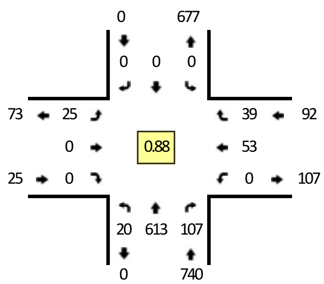
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	328	456	44	0	16	0	124	0	48	44	0	0	0	48	4	0	1112
Heavy Trucks	12	4	8		0	0	4		4	0	0		0	4	0		36
Pedestrians		0				12				4				0			16
Bicycles	0	1	1		0	0	0		0	1	0		0	2	0		5
Railroad																	
Stopped Buses																	

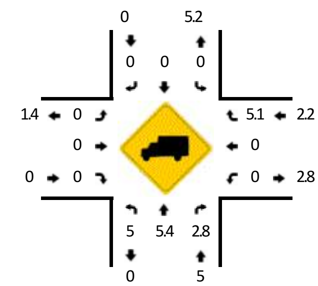
Comments:

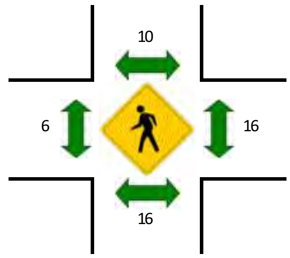
Report generated on 9/23/2019 4:42 PM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

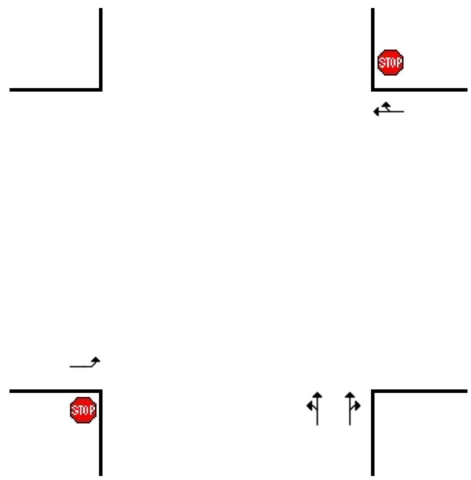
LOCATION: 12th St -- Taylor Ave/Pine St (offset) **QC JOB #:** 15070407
CITY/STATE: Hood River, OR **DATE:** Thu, Sep 12 2019

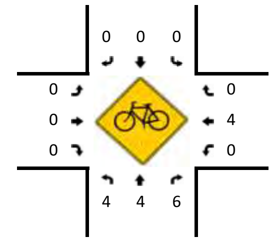
Peak-Hour: 7:25 AM -- 8:25 AM
Peak 15-Min: 7:50 AM -- 8:05 AM

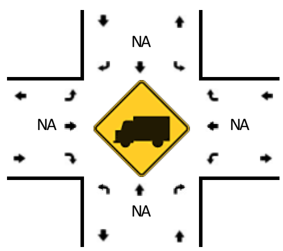


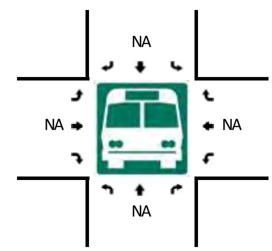












5-Min Count Period Beginning At	12th St (Northbound)				12th St (Southbound)				Taylor Ave/Pine St (offset) (Eastbound)				Taylor Ave/Pine St (offset) (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	23	8	0	0	0	0	0	1	0	0	0	0	1	0	0	33	
7:05 AM	0	44	4	0	0	0	0	0	0	0	0	0	0	4	0	0	52	
7:10 AM	1	25	9	0	0	0	0	0	1	0	0	0	0	3	1	0	40	
7:15 AM	0	34	13	0	0	0	0	0	2	0	0	0	0	3	2	0	54	
7:20 AM	1	31	17	0	0	0	0	0	0	0	0	0	0	4	3	0	56	
7:25 AM	2	44	20	0	0	0	0	0	4	0	0	0	0	4	1	0	75	
7:30 AM	2	39	15	0	0	0	0	0	4	0	0	0	0	8	1	0	69	
7:35 AM	2	35	14	0	0	0	0	0	1	0	0	0	0	5	6	0	63	
7:40 AM	1	40	5	0	0	0	0	0	2	0	0	0	0	9	5	0	62	
7:45 AM	2	41	9	0	0	0	0	0	1	0	0	0	0	6	4	0	63	
7:50 AM	2	69	9	0	0	0	0	0	3	0	0	0	0	3	5	0	91	
7:55 AM	1	70	4	0	0	0	0	0	2	0	0	0	0	2	5	0	84	742
8:00 AM	0	55	5	0	0	0	0	0	2	0	0	0	0	5	1	0	68	777
8:05 AM	2	53	9	0	0	0	0	0	0	0	0	0	0	4	2	0	70	795
8:10 AM	1	56	5	0	0	0	0	0	3	0	0	0	0	3	4	0	72	827
8:15 AM	3	62	6	0	0	0	0	0	1	0	0	0	0	2	2	0	76	849
8:20 AM	2	49	6	0	0	0	0	0	2	0	0	0	0	2	3	0	64	857
8:25 AM	2	43	11	0	0	0	0	0	1	0	0	0	0	3	0	0	60	842
8:30 AM	3	38	4	0	0	0	0	0	2	0	0	0	0	5	1	0	53	826
8:35 AM	2	48	3	0	0	0	0	0	3	0	0	0	0	8	2	0	66	829
8:40 AM	0	33	5	0	0	0	0	0	2	0	0	0	0	2	1	0	43	810
8:45 AM	1	36	5	0	0	0	0	0	0	0	0	0	0	4	0	0	46	793
8:50 AM	1	38	9	0	0	0	0	0	1	0	0	0	0	3	1	0	53	755
8:55 AM	1	31	7	0	0	0	0	0	6	0	0	0	0	0	3	0	48	719

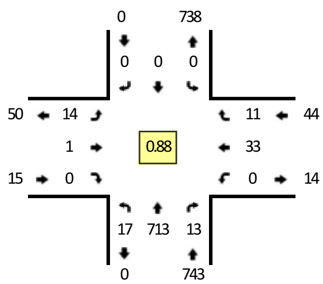
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	12	776	72	0	0	0	0	0	28	0	0	0	0	40	44	0	972
Heavy Trucks	0	28	0		0	0	0		0	0	0		0	0	0		28
Pedestrians		8				16				0				12			36
Bicycles	0	1	0		0	0	0		0	0	0		0	0	0		1
Railroad																	
Stopped Buses																	

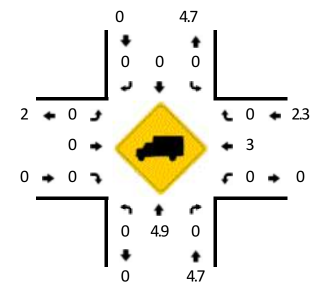
Comments:

Type of peak hour being reported: System Peak | Method for determining peak hour: Total Entering Volume

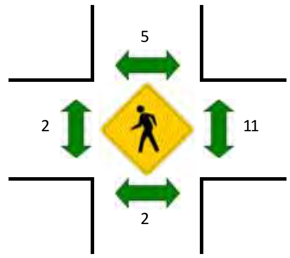
LOCATION: 12th St -- A St/Wilson St | **QC JOB #:** 15070411
CITY/STATE: Hood River, OR | **DATE:** Thu, Sep 12 2019

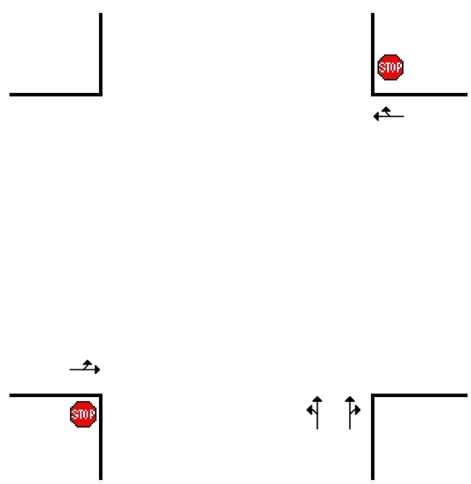
Peak-Hour: 7:25 AM -- 8:25 AM
Peak 15-Min: 7:50 AM -- 8:05 AM

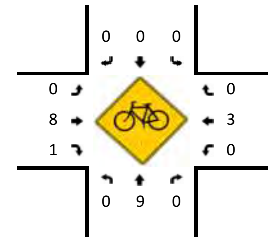


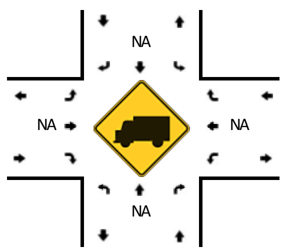


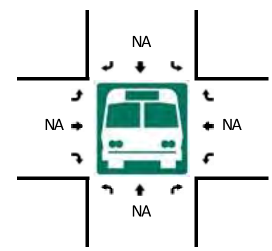
Quality Counts
DATA THAT DRIVES COMMUNITIES











5-Min Count Period Beginning At	12th St (Northbound)				12th St (Southbound)				A St/Wilson St (Eastbound)				A St/Wilson St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	3	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36	
7:05 AM	2	41	1	0	0	0	0	0	0	1	0	0	0	1	1	0	47	
7:10 AM	1	36	0	0	0	0	0	0	0	0	0	0	0	1	0	0	38	
7:15 AM	0	44	1	0	0	0	0	0	0	0	0	0	0	2	0	0	47	
7:20 AM	2	47	1	0	0	0	0	0	2	2	0	0	0	0	0	0	54	
7:25 AM	2	66	0	0	0	0	0	0	1	0	0	0	0	1	0	0	70	
7:30 AM	1	49	1	0	0	0	0	0	1	0	0	0	0	4	1	0	57	
7:35 AM	2	48	1	0	0	0	0	0	1	0	0	0	0	3	1	0	56	
7:40 AM	0	45	2	0	0	0	0	0	0	1	0	0	0	5	0	0	53	
7:45 AM	2	52	2	0	0	0	0	0	0	0	0	0	0	2	2	0	60	
7:50 AM	3	73	1	0	0	0	0	0	1	0	0	0	0	2	2	0	82	
7:55 AM	1	73	0	0	0	0	0	0	3	0	0	0	0	5	0	0	82	682
8:00 AM	2	56	3	0	0	0	0	0	1	0	0	0	0	1	0	0	63	709
8:05 AM	2	61	1	0	0	0	0	0	1	0	0	0	0	5	1	0	71	733
8:10 AM	2	61	1	0	0	0	0	0	3	0	0	0	0	2	0	0	69	764
8:15 AM	0	77	1	0	0	0	0	0	0	0	0	0	0	1	1	0	80	797
8:20 AM	0	52	0	0	0	0	0	0	2	0	0	0	0	2	3	0	59	802
8:25 AM	1	48	2	0	0	0	0	0	3	1	0	0	0	3	2	0	60	792
8:30 AM	0	45	3	0	0	0	0	0	1	0	0	0	0	2	1	0	52	787
8:35 AM	2	48	1	0	0	0	0	0	2	0	0	0	0	1	1	0	55	786
8:40 AM	0	41	2	0	0	0	0	0	1	0	0	0	0	0	0	0	44	777
8:45 AM	1	40	1	0	0	0	0	0	1	1	0	0	0	1	1	0	46	763
8:50 AM	4	49	3	0	0	0	0	0	1	0	0	0	0	1	0	0	58	739
8:55 AM	0	37	1	0	0	0	0	0	2	0	0	0	0	1	2	0	43	700

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	24	808	16	0	0	0	0	0	20	0	0	0	0	32	8	0	908
Heavy Trucks	0	24	0		0	0	0		0	0	0		0	0	0		24
Pedestrians		0				0				0				4			4
Bicycles	0	4	0		0	0	0		0	3	1		0	0	0		8
Railroad																	
Stopped Buses																	

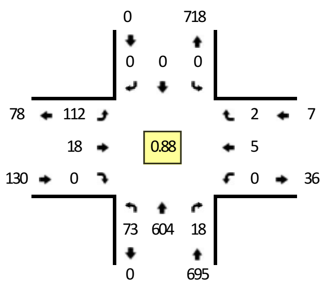
Comments:

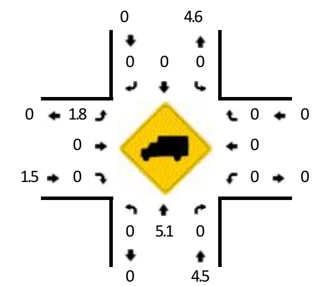
Report generated on 9/23/2019 4:42 PM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

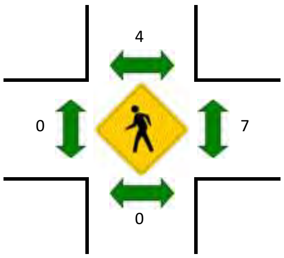
Type of peak hour being reported: System Peak | Method for determining peak hour: Total Entering Volume

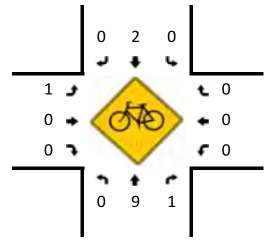
LOCATION: 12th St -- Belmont Ave/Union St | **QC JOB #:** 15070415
CITY/STATE: Hood River, OR | **DATE:** Thu, Sep 12 2019

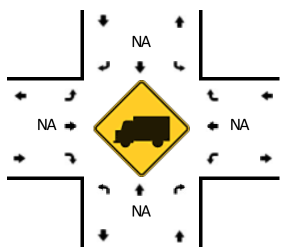
Peak-Hour: 7:25 AM -- 8:25 AM
Peak 15-Min: 7:50 AM -- 8:05 AM

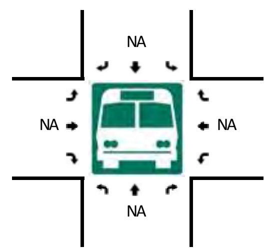












5-Min Count Period Beginning At	12th St (Northbound)				12th St (Southbound)				Belmont Ave/Union St (Eastbound)				Belmont Ave/Union St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	1	30	3	0	0	0	0	0	6	0	0	0	0	0	0	0	40	
7:05 AM	1	33	0	0	0	0	0	0	7	1	0	0	0	0	0	0	42	
7:10 AM	3	29	2	0	0	0	0	0	8	1	0	0	0	0	0	0	43	
7:15 AM	4	38	1	0	0	0	0	0	6	0	0	0	0	1	0	0	50	
7:20 AM	3	39	2	0	0	0	0	0	9	0	0	0	0	0	1	0	54	
7:25 AM	6	55	0	0	0	0	0	0	10	2	0	0	0	0	0	0	73	
7:30 AM	6	43	1	0	0	0	0	0	8	0	0	0	0	0	0	0	58	
7:35 AM	6	42	1	0	0	0	0	0	8	1	0	0	0	1	0	0	59	
7:40 AM	6	33	1	0	0	0	0	0	11	1	0	0	0	0	0	0	52	
7:45 AM	5	45	1	0	0	0	0	0	11	1	0	0	0	1	0	0	64	
7:50 AM	7	67	0	0	0	0	0	0	9	3	0	0	0	1	0	0	87	
7:55 AM	5	58	1	0	0	0	0	0	11	2	0	0	0	0	0	0	77	699
8:00 AM	4	52	5	0	0	0	0	0	9	3	0	0	0	0	0	0	73	732
8:05 AM	8	52	1	0	0	0	0	0	9	0	0	0	0	2	0	0	72	762
8:10 AM	8	51	2	0	0	0	0	0	11	2	0	0	0	0	1	0	75	794
8:15 AM	6	64	4	0	0	0	0	0	8	3	0	0	0	0	1	0	86	830
8:20 AM	6	42	1	0	0	0	0	0	7	0	0	0	0	0	0	0	56	832
8:25 AM	9	42	2	0	0	0	0	0	7	2	0	0	0	1	0	0	63	822
8:30 AM	4	40	3	0	0	0	0	0	4	4	0	0	0	1	0	0	56	820
8:35 AM	3	39	1	0	0	0	0	0	11	2	0	0	0	0	1	0	57	818
8:40 AM	3	31	0	0	0	0	0	0	9	2	0	0	0	0	0	0	45	811
8:45 AM	7	34	0	0	0	0	0	0	5	2	0	0	0	0	0	0	48	795
8:50 AM	5	46	0	0	0	0	0	0	11	1	0	0	0	0	0	0	63	771
8:55 AM	8	29	4	0	0	0	0	0	7	2	0	0	0	0	2	0	52	746

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	64	708	24	0	0	0	0	0	116	32	0	0	0	4	0	0	948
Heavy Trucks	0	20	0		0	0	0		4	0	0		0	0	0		24
Pedestrians		0				4				0				0			4
Bicycles	0	4	0		0	0	0		0	0	0		0	0	0		4
Railroad																	
Stopped Buses																	

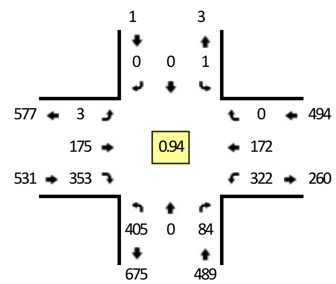
Comments:

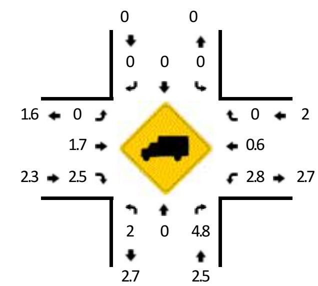
Report generated on 9/23/2019 4:42 PM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: System Peak | Method for determining peak hour: Total Entering Volume

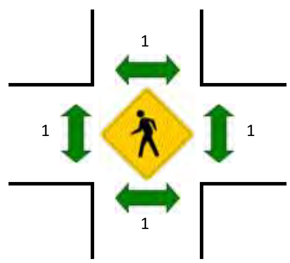
LOCATION: 13th St -- Oak St | **QC JOB #:** 15070402
CITY/STATE: Hood River, OR | **DATE:** Thu, Sep 12 2019

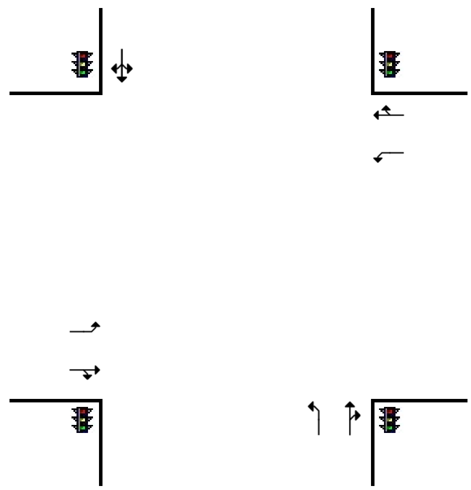
Peak-Hour: 4:20 PM -- 5:20 PM
Peak 15-Min: 4:40 PM -- 4:55 PM

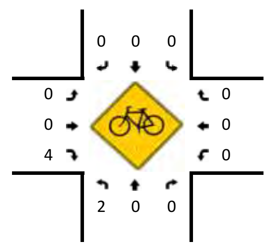


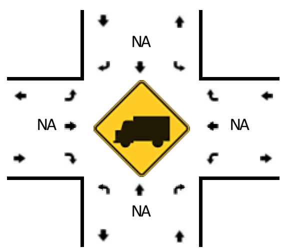


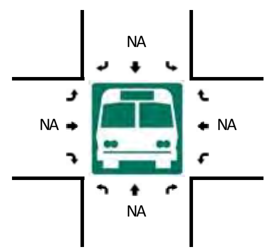
Quality Counts
DATA THAT DRIVES COMMUNITIES











5-Min Count Period Beginning At	13th St (Northbound)				13th St (Southbound)				Oak St (Eastbound)				Oak St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	26	0	6	0	0	0	0	0	0	12	40	0	24	20	0	0	128	
4:05 PM	28	0	1	0	0	0	0	0	0	22	20	0	33	6	0	0	110	
4:10 PM	36	0	10	0	0	0	0	0	0	10	28	0	14	10	0	0	108	
4:15 PM	25	0	4	0	0	0	1	0	0	12	25	0	25	15	0	0	107	
4:20 PM	26	0	7	0	0	0	0	0	0	14	29	0	27	12	0	0	115	
4:25 PM	31	0	6	0	0	0	0	0	0	12	31	0	19	14	0	0	113	
4:30 PM	29	0	8	0	0	0	0	0	1	13	37	0	29	16	0	0	133	
4:35 PM	30	0	8	0	0	0	0	0	0	11	18	0	24	7	0	0	98	
4:40 PM	36	0	3	0	0	0	0	0	0	13	36	0	34	16	0	0	138	
4:45 PM	26	0	6	0	0	0	0	0	0	19	32	0	19	19	0	0	121	
4:50 PM	46	0	7	0	0	0	0	0	0	8	31	0	35	17	0	0	144	
4:55 PM	33	0	10	0	0	0	0	0	0	15	24	0	32	9	0	0	123	1438
5:00 PM	37	0	4	0	0	0	0	0	1	18	32	0	27	17	0	0	136	1446
5:05 PM	36	0	9	0	1	0	0	0	0	15	30	0	29	11	0	0	131	1467
5:10 PM	42	0	10	0	0	0	0	0	0	16	25	0	24	18	0	0	135	1494
5:15 PM	33	0	6	0	0	0	0	0	1	21	28	0	23	16	0	0	128	1515
5:20 PM	41	0	6	0	0	0	0	0	0	12	37	0	15	9	0	0	120	1520
5:25 PM	27	0	3	0	0	0	0	0	0	16	36	0	24	16	0	0	122	1529
5:30 PM	36	0	4	0	0	0	0	0	0	8	37	0	23	9	0	0	117	1513
5:35 PM	30	0	4	0	0	0	0	0	0	21	28	0	25	14	0	0	122	1537
5:40 PM	24	0	5	0	0	0	0	0	0	13	22	0	18	14	0	0	96	1495
5:45 PM	22	0	6	0	0	0	0	0	0	11	26	0	21	9	0	0	95	1469
5:50 PM	22	0	2	0	0	0	0	0	0	7	28	0	26	8	0	0	93	1418
5:55 PM	25	0	8	0	0	0	0	0	0	19	25	0	32	18	0	0	127	1422

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	432	0	64	0	0	0	0	0	0	160	396	0	352	208	0	0	1612
Heavy Trucks	8	0	8		0	0	0		0	0	8		4	0	0		28
Pedestrians		4				0				0				0			4
Bicycles	1	0	0		0	0	0		0	0	2		0	0	0		3
Railroad																	
Stopped Buses																	

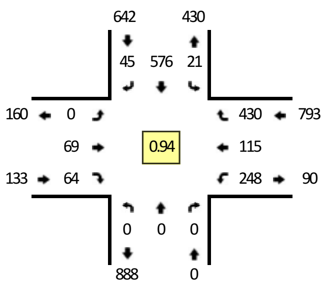
Comments:

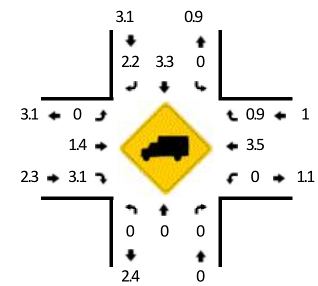
Report generated on 9/23/2019 4:43 PM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

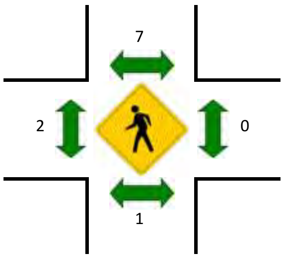
Type of peak hour being reported: System Peak | Method for determining peak hour: Total Entering Volume

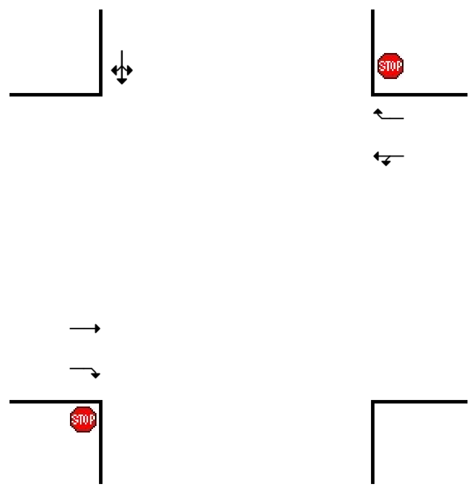
LOCATION: 13th St -- May St | **QC JOB #:** 15070406
CITY/STATE: Hood River, OR | **DATE:** Thu, Sep 12 2019

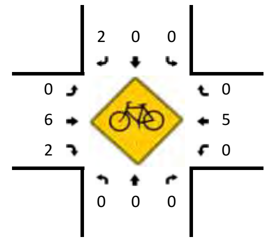
Peak-Hour: 4:20 PM -- 5:20 PM
Peak 15-Min: 5:00 PM -- 5:15 PM

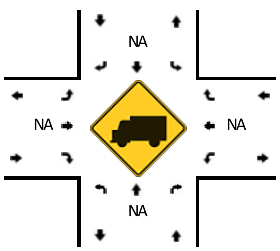


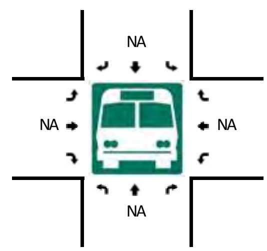












5-Min Count Period Beginning At	13th St (Northbound) Left	Thru	Right	U	13th St (Southbound) Left	Thru	Right	U	May St (Eastbound) Left	Thru	Right	U	May St (Westbound) Left	Thru	Right	U	Total	Hourly Totals
4:00 PM	0	0	0	0	2	42	4	0	0	5	6	0	20	12	30	0	121	
4:05 PM	0	0	0	0	1	38	3	0	0	3	6	0	18	8	27	0	104	
4:10 PM	0	0	0	0	0	55	6	0	0	1	6	0	20	11	38	0	137	
4:15 PM	0	0	0	0	0	45	1	0	0	7	8	0	23	10	20	0	114	
4:20 PM	0	0	0	0	1	50	3	0	0	4	6	0	18	3	35	0	120	
4:25 PM	0	0	0	0	2	45	4	0	0	2	4	0	21	11	27	0	116	
4:30 PM	0	0	0	0	4	54	3	0	0	5	8	0	12	10	29	0	125	
4:35 PM	0	0	0	0	4	43	6	0	0	8	5	0	20	9	30	0	125	
4:40 PM	0	0	0	0	3	59	3	0	0	8	4	0	18	10	30	0	135	
4:45 PM	0	0	0	0	0	48	2	0	0	8	7	0	19	9	40	0	133	
4:50 PM	0	0	0	0	3	40	6	0	0	3	6	0	19	10	46	0	133	
4:55 PM	0	0	0	0	1	48	5	0	0	6	2	0	21	13	38	0	134	1497
5:00 PM	0	0	0	0	1	51	4	0	0	9	2	0	20	9	35	0	131	1507
5:05 PM	0	0	0	0	1	52	3	0	0	3	7	0	27	10	45	0	148	1551
5:10 PM	0	0	0	0	0	42	3	0	0	6	9	0	26	11	42	0	139	1553
5:15 PM	0	0	0	0	1	44	3	0	0	7	4	0	27	10	33	0	129	1568
5:20 PM	0	0	0	0	1	44	3	0	0	3	1	0	17	9	32	0	110	1558
5:25 PM	0	0	0	0	0	47	2	0	0	5	13	0	10	8	33	0	118	1560
5:30 PM	0	0	0	0	2	55	7	0	0	3	4	0	15	9	21	0	116	1551
5:35 PM	0	0	0	0	0	61	3	0	0	6	6	0	17	11	26	0	130	1556
5:40 PM	0	0	0	0	0	45	1	0	0	3	7	0	16	10	20	0	102	1523
5:45 PM	0	0	0	0	1	44	2	0	0	6	5	0	14	8	26	0	106	1496
5:50 PM	0	0	0	0	3	49	1	0	0	3	5	0	10	12	19	0	102	1465
5:55 PM	0	0	0	0	1	52	4	0	0	7	12	0	15	6	21	0	118	1449

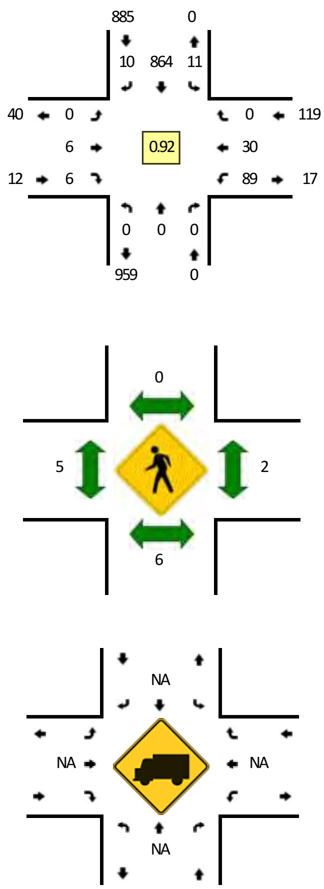
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	0	0	0	0	8	580	40	0	0	72	72	0	292	120	488	0	1672
Heavy Trucks	0	0	0		0	12	0		0	0	4		0	4	0		20
Pedestrians		0				8				4				0			12
Bicycles	0	0	0		0	0	0		0	2	0		0	1	0		3
Railroad																	
Stopped Buses																	

Comments:

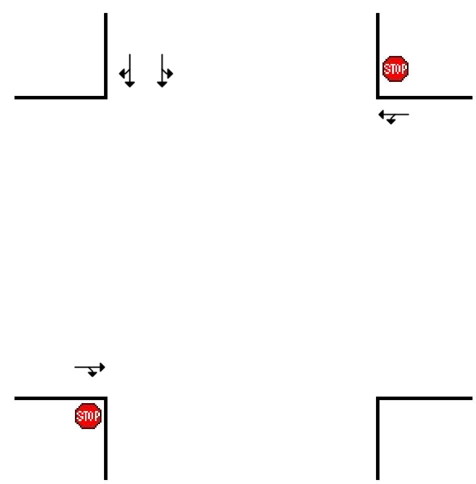
Report generated on 9/23/2019 4:43 PM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

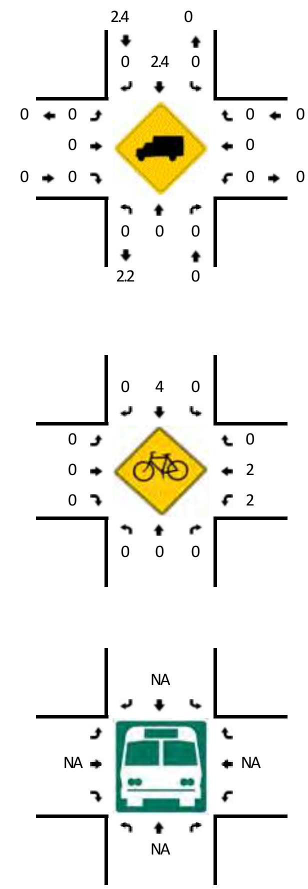
Type of peak hour being reported: System Peak — Method for determining peak hour: Total Entering Volume

LOCATION: 13th St -- Taylor Ave — **QC JOB #:** 15070410
CITY/STATE: Hood River, OR — **DATE:** Thu, Sep 12 2019



Peak-Hour: 4:20 PM -- 5:20 PM
Peak 15-Min: 5:00 PM -- 5:15 PM





5-Min Count Period Beginning At	13th St (Northbound) Left	Thru	Right	U	13th St (Southbound) Left	Thru	Right	U	Taylor Ave (Eastbound) Left	Thru	Right	U	Taylor Ave (Westbound) Left	Thru	Right	U	Total	Hourly Totals
4:00 PM	0	0	0	0	1	71	0	0	0	0	1	0	8	2	0	0	83	
4:05 PM	0	0	0	0	2	63	0	0	0	3	1	0	9	1	0	0	79	
4:10 PM	0	0	0	0	0	81	0	0	0	0	0	0	5	1	0	0	87	
4:15 PM	0	0	0	0	0	75	1	0	0	0	3	0	0	2	0	0	81	
4:20 PM	0	0	0	0	0	71	0	0	0	1	1	0	8	3	0	0	84	
4:25 PM	0	0	0	0	1	69	4	0	0	1	0	0	10	4	0	0	89	
4:30 PM	0	0	0	0	1	67	2	0	0	1	0	0	5	4	0	0	80	
4:35 PM	0	0	0	0	0	70	0	0	0	0	0	0	4	1	0	0	75	
4:40 PM	0	0	0	0	1	78	0	0	0	0	0	0	4	2	0	0	85	
4:45 PM	0	0	0	0	0	74	2	0	0	2	2	0	8	3	0	0	91	
4:50 PM	0	0	0	0	3	59	1	0	0	0	2	0	5	1	0	0	71	
4:55 PM	0	0	0	0	0	71	0	0	0	0	0	0	4	1	0	0	76	981
5:00 PM	0	0	0	0	1	75	0	0	0	0	0	0	15	0	0	0	91	989
5:05 PM	0	0	0	0	1	80	0	0	0	1	0	0	10	7	0	0	99	1009
5:10 PM	0	0	0	0	0	76	0	0	0	0	0	0	6	3	0	0	85	1007
5:15 PM	0	0	0	0	3	74	1	0	0	0	1	0	10	1	0	0	90	1016
5:20 PM	0	0	0	0	1	63	0	0	0	2	0	0	5	4	0	0	75	1007
5:25 PM	0	0	0	0	2	66	1	0	0	0	0	0	4	3	0	0	76	994
5:30 PM	0	0	0	0	1	70	0	0	0	1	0	0	4	2	0	0	78	992
5:35 PM	0	0	0	0	0	83	0	0	0	0	0	0	3	1	0	0	87	1004
5:40 PM	0	0	0	0	0	69	1	0	0	0	0	0	3	1	0	0	74	993
5:45 PM	0	0	0	0	0	62	0	0	0	0	0	0	4	3	0	0	69	971
5:50 PM	0	0	0	0	1	64	0	0	0	0	1	0	1	0	0	0	67	967
5:55 PM	0	0	0	0	0	71	3	0	0	1	2	0	3	2	0	0	82	973

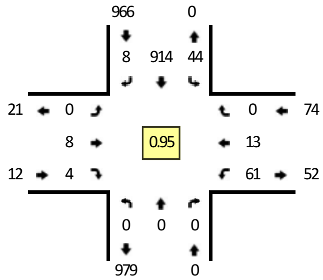
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	0	0	0	0	8	924	0	0	0	4	0	0	124	40	0	0	1100
Heavy Trucks	0	0	0		0	16	0		0	0	0		0	0	0		16
Pedestrians		12				0				0				4			16
Bicycles	0	0	0		0	0	0		0	0	0		1	0	0		1
Railroad																	
Stopped Buses																	

Comments:

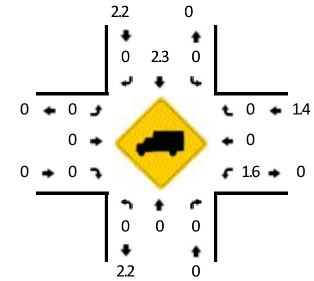
Report generated on 9/23/2019 4:43 PM — SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

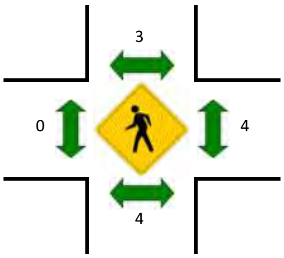
Type of peak hour being reported: System Peak | Method for determining peak hour: Total Entering Volume

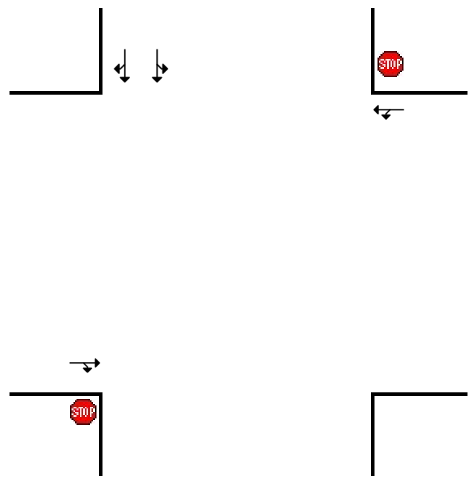
LOCATION: 13th St -- A St | **QC JOB #:** 15070414
CITY/STATE: Hood River, OR | **DATE:** Thu, Sep 12 2019

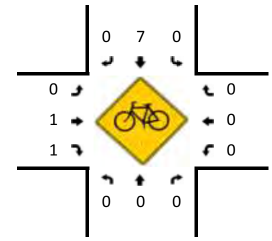


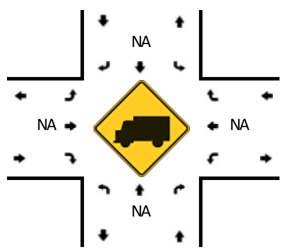
Peak-Hour: 4:20 PM -- 5:20 PM
Peak 15-Min: 5:05 PM -- 5:20 PM

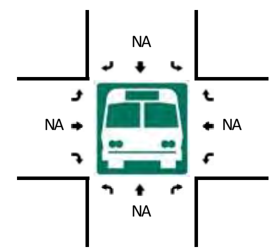












5-Min Count Period Beginning At	13th St (Northbound)				13th St (Southbound)				A St (Eastbound)				A St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	4	76	2	0	0	2	1	0	8	0	0	0	93	
4:05 PM	0	0	0	0	2	75	1	0	0	0	0	0	8	0	0	0	86	
4:10 PM	0	0	0	0	3	79	0	0	0	0	0	0	4	2	0	0	88	
4:15 PM	0	0	0	0	5	78	2	0	0	0	0	0	1	0	0	0	86	
4:20 PM	0	0	0	0	5	78	0	0	0	1	1	0	5	1	0	0	91	
4:25 PM	0	0	0	0	6	78	1	0	0	0	0	0	9	1	0	0	95	
4:30 PM	0	0	0	0	6	73	1	0	0	0	0	0	4	1	0	0	85	
4:35 PM	0	0	0	0	4	69	0	0	0	2	0	0	4	1	0	0	80	
4:40 PM	0	0	0	0	2	72	1	0	0	0	1	0	5	1	0	0	82	
4:45 PM	0	0	0	0	5	80	0	0	0	1	0	0	6	0	0	0	92	
4:50 PM	0	0	0	0	3	70	1	0	0	1	0	0	1	0	0	0	76	
4:55 PM	0	0	0	0	3	71	3	0	0	1	1	0	2	2	0	0	83	1037
5:00 PM	0	0	0	0	2	78	0	0	0	0	0	0	9	2	0	0	91	1035
5:05 PM	0	0	0	0	3	87	1	0	0	0	0	0	6	2	0	0	99	1048
5:10 PM	0	0	0	0	3	75	0	0	0	0	0	0	5	1	0	0	84	1044
5:15 PM	0	0	0	0	2	83	0	0	0	2	1	0	5	1	0	0	94	1052
5:20 PM	0	0	0	0	2	72	1	0	0	0	1	0	14	0	0	0	90	1051
5:25 PM	0	0	0	0	0	70	0	0	0	0	0	0	3	1	0	0	74	1030
5:30 PM	0	0	0	0	1	78	2	0	0	0	1	0	3	0	0	0	85	1030
5:35 PM	0	0	0	0	5	73	0	0	0	0	1	0	4	3	0	0	86	1036
5:40 PM	0	0	0	0	2	76	1	0	0	0	2	0	6	1	0	0	88	1042
5:45 PM	0	0	0	0	0	68	0	0	0	2	2	0	3	1	0	0	76	1026
5:50 PM	0	0	0	0	2	65	1	0	0	0	1	0	8	0	0	0	77	1027
5:55 PM	0	0	0	0	4	67	1	0	0	1	2	0	8	3	0	0	86	1030

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	32	980	4	0	0	8	4	0	64	16	0	0	1108
Heavy Trucks	0	0	0		0	20	0		0	0	0		0	0	0		20
Pedestrians		4				0				0				0			4
Bicycles	0	0	0		0	3	0		0	1	0		0	0	0		4
Railroad																	
Stopped Buses																	

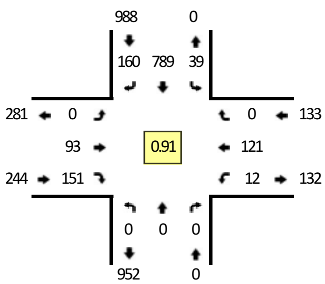
Comments:

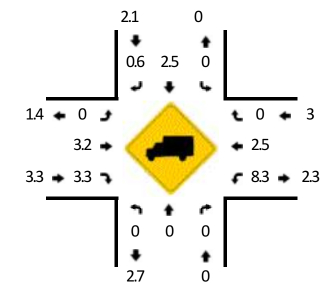
Report generated on 9/23/2019 4:43 PM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

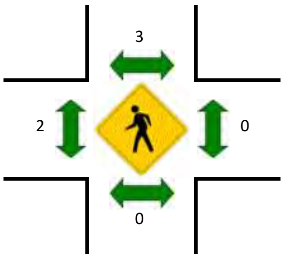
Type of peak hour being reported: System Peak | Method for determining peak hour: Total Entering Volume

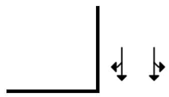
LOCATION: 13th St -- Belmont Ave | **QC JOB #:** 15070418
CITY/STATE: Hood River, OR | **DATE:** Thu, Sep 12 2019

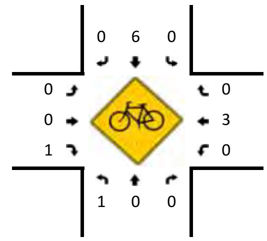
Peak-Hour: 4:20 PM -- 5:20 PM
Peak 15-Min: 5:05 PM -- 5:20 PM

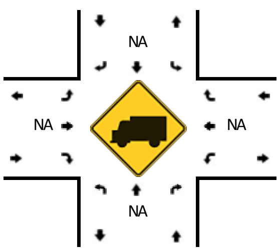


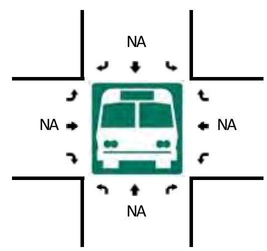












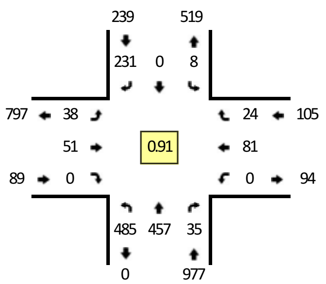
5-Min Count Period Beginning At	13th St (Northbound)				13th St (Southbound)				Belmont Ave (Eastbound)				Belmont Ave (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	6	69	9	0	0	5	12	0	0	10	0	0	111	
4:05 PM	0	0	0	0	4	74	9	0	0	6	17	0	1	10	0	0	121	
4:10 PM	0	0	0	0	4	73	11	0	0	6	7	0	2	9	0	0	112	
4:15 PM	0	0	0	0	5	65	9	0	0	5	8	0	0	14	0	0	106	
4:20 PM	0	0	0	0	5	72	9	0	0	5	11	0	1	8	0	0	111	
4:25 PM	0	0	0	0	4	71	12	0	0	5	11	0	0	14	0	0	117	
4:30 PM	0	0	0	0	7	57	14	0	0	4	12	0	0	15	0	0	109	
4:35 PM	0	0	0	0	2	63	7	0	0	5	12	0	1	11	0	0	101	
4:40 PM	0	0	0	0	4	58	14	0	0	7	11	0	0	9	0	0	103	
4:45 PM	0	0	0	0	5	76	6	0	0	7	20	0	2	7	0	0	123	
4:50 PM	0	0	0	0	3	55	16	0	0	9	18	0	1	3	0	0	105	
4:55 PM	0	0	0	0	3	54	15	0	0	6	15	0	0	8	0	0	101	1320
5:00 PM	0	0	0	0	2	69	19	0	0	12	7	0	2	9	0	0	120	1329
5:05 PM	0	0	0	0	2	76	17	0	0	11	12	0	4	14	0	0	136	1344
5:10 PM	0	0	0	0	1	67	13	0	0	9	14	0	0	11	0	0	115	1347
5:15 PM	0	0	0	0	1	71	18	0	0	13	8	0	1	12	0	0	124	1365
5:20 PM	0	0	0	0	3	67	18	0	0	9	8	0	0	15	0	0	120	1374
5:25 PM	0	0	0	0	1	64	10	0	0	9	9	0	1	7	0	0	101	1358
5:30 PM	0	0	0	0	1	68	13	0	0	5	10	0	0	12	0	0	109	1358
5:35 PM	0	0	0	0	4	68	12	0	0	7	8	0	1	8	0	0	108	1365
5:40 PM	0	0	0	0	3	61	13	0	0	5	10	0	1	5	0	0	98	1360
5:45 PM	0	0	0	0	4	61	10	0	0	6	11	0	0	8	0	0	100	1337
5:50 PM	0	0	0	0	5	56	12	0	0	6	14	0	0	4	0	0	97	1329
5:55 PM	0	0	0	0	3	58	16	0	0	6	11	0	0	14	0	0	108	1336

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	16	856	192	0	0	132	136	0	20	148	0	0	1500
Heavy Trucks	0	0	0		0	20	0		0	4	12		0	0	0		36
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	2	0		0	0	0		0	1	0		3
Railroad																	
Stopped Buses																	

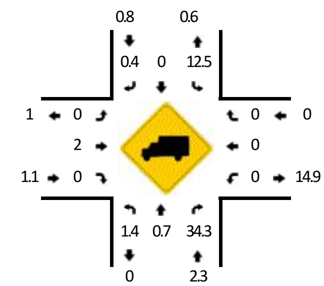
Comments:

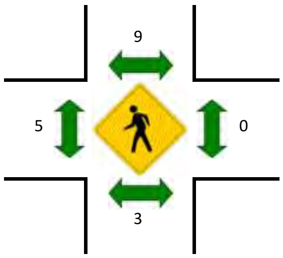
Report generated on 9/23/2019 4:43 PM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

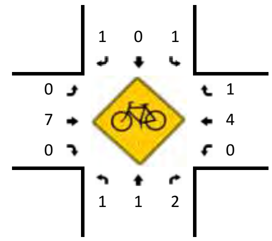
LOCATION: 12th St (offset) -- May St **QC JOB #:** 15070404
CITY/STATE: Hood River, OR **DATE:** Thu, Sep 12 2019

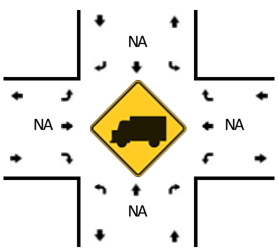


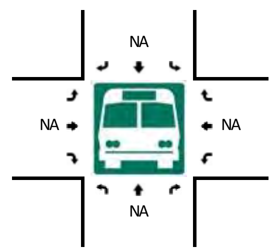
Peak-Hour: 4:20 PM -- 5:20 PM
Peak 15-Min: 5:00 PM -- 5:15 PM











5-Min Count Period Beginning At	12th St (offset) (Northbound)				12th St (offset) (Southbound)				May St (Eastbound)				May St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	29	28	3	0	1	0	16	0	3	4	0	0	0	11	0	0	95	
4:05 PM	31	38	3	0	0	0	13	0	1	1	0	0	0	4	1	0	92	
4:10 PM	36	36	2	0	0	0	21	0	0	1	0	0	0	10	2	0	108	
4:15 PM	26	31	5	0	0	0	20	0	4	2	0	0	0	7	1	0	96	
4:20 PM	40	54	0	0	1	0	17	0	1	4	0	0	0	2	3	0	122	
4:25 PM	31	30	6	0	0	0	21	0	3	2	0	0	0	7	4	0	104	
4:30 PM	34	24	3	0	2	0	14	0	3	3	0	0	0	5	2	0	90	
4:35 PM	44	41	1	0	0	0	26	0	5	8	0	0	0	0	2	0	127	
4:40 PM	31	41	3	0	1	0	17	0	5	5	0	0	0	9	1	0	113	
4:45 PM	51	34	1	0	0	0	12	0	4	3	0	0	0	3	2	0	110	
4:50 PM	45	33	3	0	0	0	22	0	3	5	0	0	0	11	2	0	124	
4:55 PM	46	36	11	0	1	0	14	0	3	3	0	0	0	6	0	0	120	1301
5:00 PM	44	43	4	0	2	0	18	0	2	9	0	0	0	5	2	0	129	1335
5:05 PM	40	41	1	0	1	0	24	0	2	2	0	0	0	15	1	0	127	1370
5:10 PM	50	41	1	0	0	0	25	0	1	5	0	0	0	5	3	0	131	1393
5:15 PM	29	39	1	0	0	0	21	0	6	2	0	0	0	13	2	0	113	1410
5:20 PM	35	33	1	0	0	0	14	0	2	2	0	0	0	8	0	0	95	1383
5:25 PM	37	44	1	0	1	0	8	0	5	1	0	0	0	9	3	0	109	1388
5:30 PM	27	35	0	0	0	0	18	0	3	2	0	0	0	3	0	0	88	1386
5:35 PM	32	36	1	0	1	0	16	0	0	3	0	0	0	1	0	0	90	1349
5:40 PM	25	27	0	0	0	0	11	0	1	3	0	0	0	9	0	0	76	1312
5:45 PM	32	35	1	0	0	0	16	0	2	2	0	0	0	3	0	0	91	1293
5:50 PM	26	33	0	0	0	0	10	0	6	5	0	0	0	6	0	0	86	1255
5:55 PM	29	29	1	0	0	0	9	0	3	5	0	0	0	4	0	0	80	1215

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	536	500	24	0	12	0	268	0	20	64	0	0	0	100	24	0	1548
Heavy Trucks	4	4	4		0	0	0		0	0	0		0	0	0		12
Pedestrians		0				20				4				0			24
Bicycles	0	0	0		0	0	1		0	2	0		0	1	0		4
Railroad																	
Stopped Buses																	

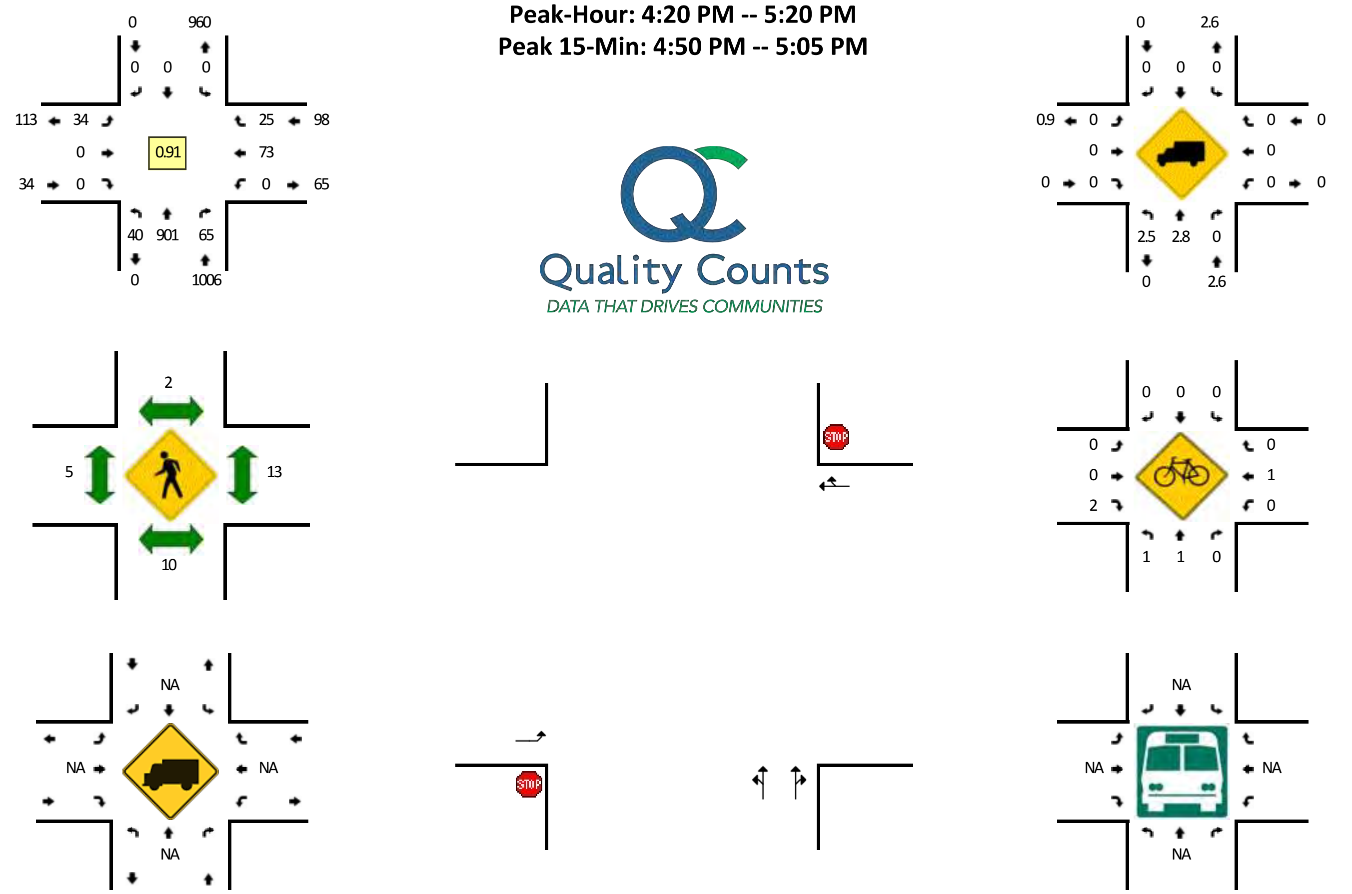
Comments:

Report generated on 9/23/2019 4:43 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

LOCATION: 12th St -- Taylor Ave/Pine St (offset) | **QC JOB #:** 15070408
CITY/STATE: Hood River, OR | **DATE:** Thu, Sep 12 2019

Peak-Hour: 4:20 PM -- 5:20 PM
Peak 15-Min: 4:50 PM -- 5:05 PM



5-Min Count Period Beginning At	12th St (Northbound) Left	Thru	Right	U	12th St (Southbound) Left	Thru	Right	U	Taylor Ave/Pine St (offset) (Eastbound) Left	Thru	Right	U	Taylor Ave/Pine St (offset) (Westbound) Left	Thru	Right	U	Total	Hourly Totals
4:00 PM	5	62	7	0	0	0	0	0	1	0	0	0	0	8	0	0	83	
4:05 PM	3	70	8	0	0	0	0	0	3	0	0	0	0	5	2	0	91	
4:10 PM	5	67	11	0	0	0	0	0	1	0	0	0	0	2	1	0	87	
4:15 PM	1	63	6	0	0	0	0	0	0	0	0	0	0	4	4	0	78	
4:20 PM	4	84	4	0	0	0	0	0	2	0	0	0	0	5	1	0	100	
4:25 PM	5	66	6	0	0	0	0	0	3	0	0	0	0	7	0	0	87	
4:30 PM	3	66	7	0	0	0	0	0	5	0	0	0	0	4	1	0	86	
4:35 PM	4	75	4	0	0	0	0	0	4	0	0	0	0	2	2	0	91	
4:40 PM	3	58	8	0	0	0	0	0	0	0	0	0	0	5	3	0	77	
4:45 PM	5	76	2	0	0	0	0	0	4	0	0	0	0	5	3	0	95	
4:50 PM	3	93	7	0	0	0	0	0	3	0	0	0	0	6	2	0	114	
4:55 PM	0	76	8	0	0	0	0	0	4	0	0	0	0	6	2	0	96	1085
5:00 PM	3	80	5	0	0	0	0	0	2	0	0	0	0	11	1	0	102	1104
5:05 PM	4	78	6	0	0	0	0	0	3	0	0	0	0	7	5	0	103	1116
5:10 PM	5	81	5	0	0	0	0	0	1	0	0	0	0	7	4	0	103	1132
5:15 PM	1	68	3	0	0	0	0	0	3	0	0	0	0	8	1	0	84	1138
5:20 PM	2	62	2	0	0	0	0	0	2	0	0	0	0	6	2	0	76	1114
5:25 PM	1	77	6	0	0	0	0	0	2	0	0	0	0	5	1	0	92	1119
5:30 PM	4	57	3	0	0	0	0	0	2	0	0	0	0	1	2	0	69	1102
5:35 PM	4	58	5	0	0	0	0	0	0	0	0	0	0	2	0	0	69	1080
5:40 PM	0	53	4	0	0	0	0	0	0	0	0	0	0	2	2	0	61	1064
5:45 PM	4	60	4	0	0	0	0	0	0	0	0	0	0	1	1	0	70	1039
5:50 PM	0	61	1	0	0	0	0	0	1	0	0	0	0	2	2	0	67	992
5:55 PM	2	57	8	0	0	0	0	0	2	0	0	0	0	2	2	0	73	969

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	24	996	80	0	0	0	0	0	36	0	0	0	0	92	20	0	1248
Heavy Trucks	0	20	0		0	0	0		0	0	0		0	0	0		20
Pedestrians		12				0				8				8			28
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

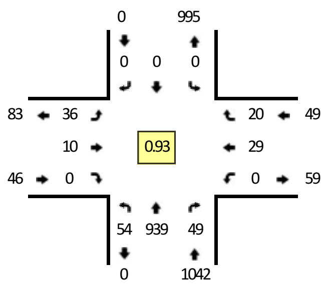
Comments:

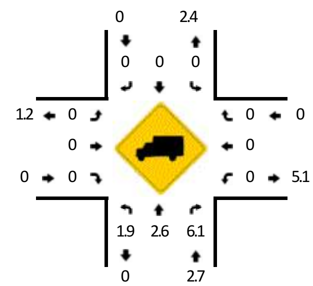
Report generated on 9/23/2019 4:43 PM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: System Peak — Method for determining peak hour: Total Entering Volume

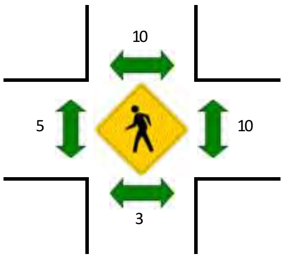
LOCATION: 12th St -- A St/Wilson St — **QC JOB #:** 15070412
CITY/STATE: Hood River, OR — **DATE:** Thu, Sep 12 2019

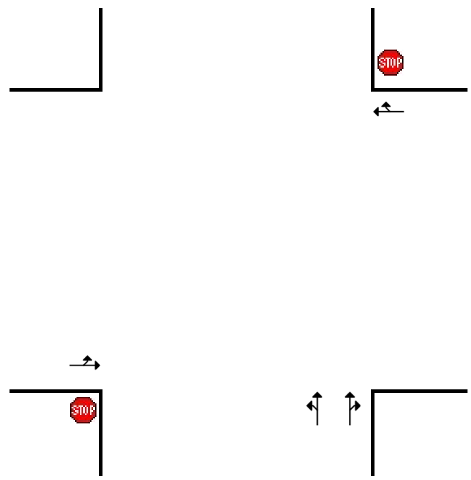
Peak-Hour: 4:20 PM -- 5:20 PM
Peak 15-Min: 4:45 PM -- 5:00 PM

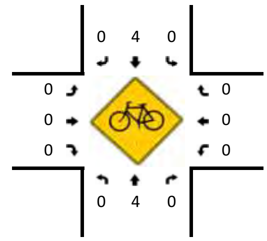


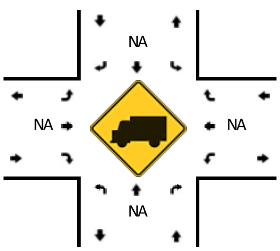


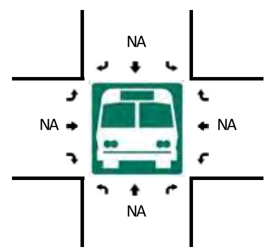
Quality Counts
DATA THAT DRIVES COMMUNITIES











5-Min Count Period Beginning At	12th St (Northbound)				12th St (Southbound)				A St/Wilson St (Eastbound)				A St/Wilson St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	3	71	6	0	0	0	0	0	3	3	0	0	0	5	2	0	93	
4:05 PM	3	78	6	0	0	0	0	0	4	0	0	0	0	3	0	0	94	
4:10 PM	5	75	3	0	0	0	0	0	2	1	0	0	0	1	1	0	88	
4:15 PM	1	71	7	0	0	0	0	0	5	1	0	0	0	0	0	0	85	
4:20 PM	4	84	3	0	0	0	0	0	4	0	0	0	0	3	2	0	100	
4:25 PM	7	77	2	0	0	0	0	0	6	1	0	0	0	4	1	0	98	
4:30 PM	2	70	5	0	0	0	0	0	3	2	0	0	0	1	0	0	83	
4:35 PM	5	85	3	0	0	0	0	0	4	2	0	0	0	1	1	0	101	
4:40 PM	5	55	6	0	0	0	0	0	4	0	0	0	0	1	2	0	73	
4:45 PM	5	77	11	0	0	0	0	0	3	1	0	0	0	1	4	0	102	
4:50 PM	2	97	3	0	0	0	0	0	1	1	0	0	0	0	2	0	106	
4:55 PM	4	87	1	0	0	0	0	0	1	0	0	0	0	5	0	0	98	1121
5:00 PM	4	76	4	0	0	0	0	0	0	1	0	0	0	5	1	0	91	1119
5:05 PM	7	81	3	0	0	0	0	0	4	2	0	0	0	5	2	0	104	1129
5:10 PM	3	80	6	0	0	0	0	0	2	0	0	0	0	2	2	0	95	1136
5:15 PM	6	70	2	0	0	0	0	0	4	0	0	0	0	1	3	0	86	1137
5:20 PM	7	66	0	0	0	0	0	0	3	1	0	0	0	4	0	0	81	1118
5:25 PM	4	76	4	0	0	0	0	0	1	0	0	0	0	1	0	0	86	1106
5:30 PM	2	65	6	0	0	0	0	0	0	1	0	0	0	2	0	0	76	1099
5:35 PM	5	57	2	0	0	0	0	0	3	2	0	0	0	3	1	0	73	1071
5:40 PM	2	62	4	0	0	0	0	0	0	0	0	0	0	3	0	0	71	1069
5:45 PM	6	64	2	0	0	0	0	0	2	2	0	0	0	2	1	0	79	1046
5:50 PM	4	60	4	0	0	0	0	0	4	0	0	0	0	4	2	0	78	1018
5:55 PM	9	61	2	0	0	0	0	0	3	3	0	0	0	3	1	0	82	1002

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	44	1044	60	0	0	0	0	0	20	8	0	0	0	24	24	0	1224
Heavy Trucks	0	12	0		0	0	0		0	0	0		0	0	0		12
Pedestrians		8				12				8				4			32
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

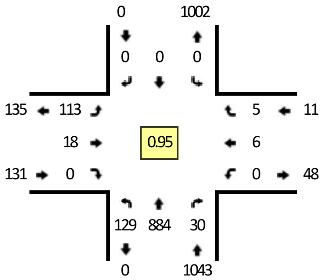
Comments:

Report generated on 9/23/2019 4:43 PM — SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

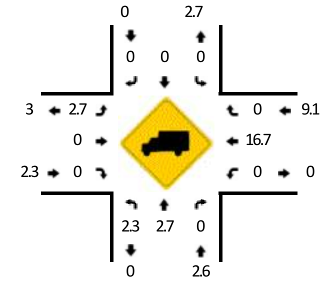
Type of peak hour being reported: System Peak | Method for determining peak hour: Total Entering Volume

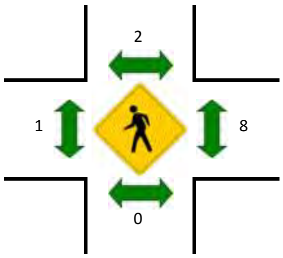
LOCATION: 12th St -- Belmont Ave/Union St | **QC JOB #:** 15070416
CITY/STATE: Hood River, OR | **DATE:** Thu, Sep 12 2019

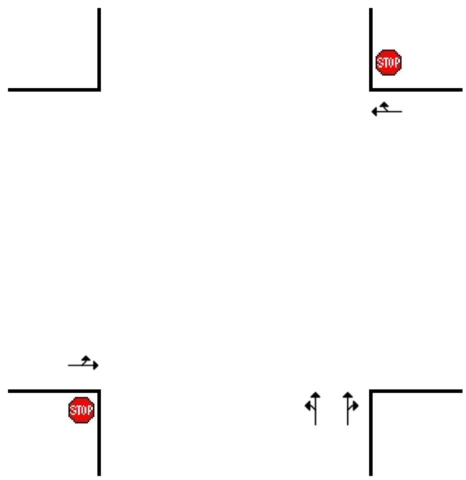
Peak-Hour: 4:20 PM -- 5:20 PM
Peak 15-Min: 4:55 PM -- 5:10 PM

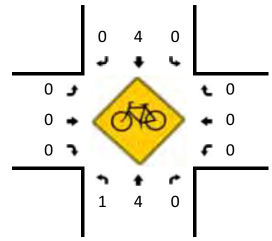


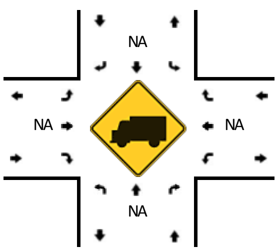
Quality Counts
DATA THAT DRIVES COMMUNITIES

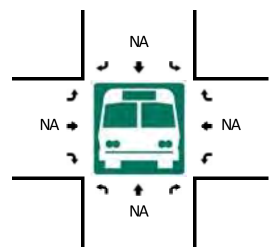












5-Min Count Period Beginning At	12th St (Northbound) Left	Thru	Right	U	12th St (Southbound) Left	Thru	Right	U	Belmont Ave/Union St (Eastbound) Left	Thru	Right	U	Belmont Ave/Union St (Westbound) Left	Thru	Right	U	Total	Hourly Totals
4:00 PM	14	72	4	0	0	0	0	0	9	3	0	0	0	1	0	0	103	
4:05 PM	11	72	1	0	0	0	0	0	6	1	0	0	0	0	0	0	91	
4:10 PM	11	72	4	0	0	0	0	0	10	2	0	0	0	0	0	0	99	
4:15 PM	8	64	2	0	0	0	0	0	8	3	0	0	0	0	0	0	85	
4:20 PM	12	82	2	0	0	0	0	0	7	2	0	0	0	1	0	0	106	
4:25 PM	16	76	4	0	0	0	0	0	8	1	0	0	0	0	0	0	105	
4:30 PM	12	62	1	0	0	0	0	0	7	4	0	0	0	0	0	0	86	
4:35 PM	11	84	3	0	0	0	0	0	4	0	0	0	0	0	0	0	102	
4:40 PM	8	56	3	0	0	0	0	0	11	2	0	0	0	1	0	0	81	
4:45 PM	10	79	3	0	0	0	0	0	11	1	0	0	0	0	0	0	104	
4:50 PM	4	87	1	0	0	0	0	0	10	1	0	0	0	1	0	0	104	
4:55 PM	12	79	1	0	0	0	0	0	9	0	0	0	0	0	1	0	102	1168
5:00 PM	8	72	3	0	0	0	0	0	12	3	0	0	0	2	1	0	101	1166
5:05 PM	13	75	7	0	0	0	0	0	9	2	0	0	0	1	2	0	109	1184
5:10 PM	8	68	0	0	0	0	0	0	12	1	0	0	0	0	1	0	90	1175
5:15 PM	15	64	2	0	0	0	0	0	13	1	0	0	0	0	0	0	95	1185
5:20 PM	12	59	3	0	0	0	0	0	11	1	0	0	0	0	0	0	86	1165
5:25 PM	9	68	3	0	0	0	0	0	10	1	0	0	0	1	0	0	92	1152
5:30 PM	10	62	2	0	0	0	0	0	6	0	0	0	0	1	0	0	81	1147
5:35 PM	10	53	0	0	0	0	0	0	8	2	0	0	0	0	1	0	74	1119
5:40 PM	6	58	3	0	0	0	0	0	7	2	0	0	0	1	0	0	77	1115
5:45 PM	7	62	4	0	0	0	0	0	7	4	0	0	0	0	0	0	84	1095
5:50 PM	8	57	2	0	0	0	0	0	7	3	0	0	0	0	2	0	79	1070
5:55 PM	14	58	2	0	0	0	0	0	7	2	0	0	0	0	0	0	83	1051

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	132	904	44	0	0	0	0	0	120	20	0	0	0	12	16	0	1248
Heavy Trucks	0	16	0		0	0	0		0	0	0		0	0	0		16
Pedestrians		0				0				0				4			4
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 9/23/2019 4:43 PM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

APPENDIX B
SYNCHRO RESULTS
2019 BASE – AM PEAK

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	83	245	270	90	202	101
Future Volume (vph)	83	245	270	90	202	101
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1792	1524	1719	1845	1736	1524
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1792	1524	1719	1845	1736	1524
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	95	282	310	103	232	116
RTOR Reduction (vph)	0	229	0	0	0	85
Lane Group Flow (vph)	95	53	310	103	232	31
Confl. Peds. (#/hr)		27	1		26	2
Heavy Vehicles (%)	6%	6%	5%	3%	4%	6%
Turn Type	NA	Prot	Prot	NA	Prot	Prot
Protected Phases	2	2	1	6	8	8
Permitted Phases						
Actuated Green, G (s)	9.2	9.2	14.8	28.0	12.9	12.9
Effective Green, g (s)	9.2	9.2	14.8	28.0	12.9	12.9
Actuated g/C Ratio	0.19	0.19	0.30	0.57	0.26	0.26
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	337	286	520	1056	457	402
v/s Ratio Prot	c0.05	0.03	c0.18	0.06	c0.13	0.02
v/s Ratio Perm						
v/c Ratio	0.28	0.19	0.60	0.10	0.51	0.08
Uniform Delay, d1	17.0	16.7	14.5	4.7	15.3	13.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	0.3	1.8	0.0	0.9	0.1
Delay (s)	17.5	17.0	16.3	4.8	16.2	13.6
Level of Service	B	B	B	A	B	B
Approach Delay (s)	17.1			13.5	15.3	
Approach LOS	B			B	B	

Intersection Summary			
HCM 2000 Control Delay	15.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	48.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	39.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	51.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	82	103	138	122	212	0	0	0	38	419	50
Future Vol, veh/h	0	82	103	138	122	212	0	0	0	38	419	50
Conflicting Peds, #/hr	0	0	4	0	0	43	0	0	0	43	0	47
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	Free	-	-	None	-	-	None
Storage Length	-	-	120	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	5	9	2	4	8	0	2	2	0	6	2
Mvmt Flow	0	91	114	153	136	236	0	0	0	42	466	56

Major/Minor	Minor2			Minor1						Major2		
Conflicting Flow All	-	668	545	728	696	-				43	0	0
Stage 1	-	625	-	43	43	-				-	-	-
Stage 2	-	43	-	685	653	-				-	-	-
Critical Hdwy	-	6.55	6.29	7.12	6.54	-				4.1	-	-
Critical Hdwy Stg 1	-	5.55	-	-	-	-				-	-	-
Critical Hdwy Stg 2	-	-	-	6.12	5.54	-				-	-	-
Follow-up Hdwy	-	4.045	3.381	3.518	4.036	-				2.2	-	-
Pot Cap-1 Maneuver	0	375	525	339	363	0				1579	-	-
Stage 1	0	473	-	-	-	0				-	-	-
Stage 2	0	-	-	438	461	0				-	-	-
Platoon blocked, %											-	-
Mov Cap-1 Maneuver	-	330	502	192	319	-				1514	-	-
Mov Cap-2 Maneuver	-	330	-	192	319	-				-	-	-
Stage 1	-	434	-	-	-	-				-	-	-
Stage 2	-	-	-	257	423	-				-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	16.8	175.3	0.6
HCM LOS	C	F	

Minor Lane/Major Mvmt	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	330	502	236	-	1514	-	-
HCM Lane V/C Ratio	0.276	0.228	1.224	-	0.028	-	-
HCM Control Delay (s)	20	14.3	175.3	0	7.4	0	-
HCM Lane LOS	C	B	F	A	A	A	-
HCM 95th %tile Q(veh)	1.1	0.9	14.2	-	0.1	-	-

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	11	25	55	14	0	0	0	0	14	647	5
Future Vol, veh/h	0	11	25	55	14	0	0	0	0	14	647	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	0	0	4	0	0	0	0	0	0	0	6	0
Mvmt Flow	0	13	28	63	16	0	0	0	0	16	735	6

Major/Minor	Minor2			Minor1						Major2		
Conflicting Flow All	-	770	371	406	773	-				0	0	0
Stage 1	-	770	-	0	0	-				-	-	-
Stage 2	-	0	-	406	773	-				-	-	-
Critical Hdwy	-	6.5	6.98	7.5	6.5	-				4.1	-	-
Critical Hdwy Stg 1	-	5.5	-	-	-	-				-	-	-
Critical Hdwy Stg 2	-	-	-	6.5	5.5	-				-	-	-
Follow-up Hdwy	-	4	3.34	3.5	4	-				2.2	-	-
Pot Cap-1 Maneuver	0	333	621	534	332	0				-	-	-
Stage 1	0	413	-	-	-	0				-	-	-
Stage 2	0	-	-	598	412	0				-	-	-
Platoon blocked, %											-	-
Mov Cap-1 Maneuver	-	333	621	495	332	-				-	-	-
Mov Cap-2 Maneuver	-	333	-	495	332	-				-	-	-
Stage 1	-	413	-	-	-	-				-	-	-
Stage 2	-	-	-	553	412	-				-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	13	14.7	
HCM LOS	B	B	

Minor Lane/Major Mvmt	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	491	450	-	-	-
HCM Lane V/C Ratio	0.083	0.174	-	-	-
HCM Control Delay (s)	13	14.7	-	-	-
HCM Lane LOS	B	B	-	-	-
HCM 95th %tile Q(veh)	0.3	0.6	-	-	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	6	3	44	4	0	0	0	0	9	710	3
Future Vol, veh/h	0	6	3	44	4	0	0	0	0	9	710	3
Conflicting Peds, #/hr	0	0	8	4	0	0	0	0	0	5	0	9
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	0	0	0	4	0	0	2	2	2	11	5	2
Mvmt Flow	0	7	3	51	5	0	0	0	0	10	826	3

Major/Minor	Minor2			Minor1						Major2		
Conflicting Flow All	-	862	432	450	863	-				5	0	0
Stage 1	-	857	-	5	5	-				-	-	-
Stage 2	-	5	-	445	858	-				-	-	-
Critical Hdwy	-	6.5	6.9	7.58	6.5	-				4.32	-	-
Critical Hdwy Stg 1	-	5.5	-	-	-	-				-	-	-
Critical Hdwy Stg 2	-	-	-	6.58	5.5	-				-	-	-
Follow-up Hdwy	-	4	3.3	3.54	4	-				2.31	-	-
Pot Cap-1 Maneuver	0	295	577	488	295	0				1552	-	-
Stage 1	0	377	-	-	-	0				-	-	-
Stage 2	0	-	-	557	376	0				-	-	-
Platoon blocked, %											-	-
Mov Cap-1 Maneuver	-	287	572	469	287	-				1545	-	-
Mov Cap-2 Maneuver	-	287	-	469	287	-				-	-	-
Stage 1	-	369	-	-	-	-				-	-	-
Stage 2	-	-	-	537	368	-				-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	15.8	14.2	0.1
HCM LOS	C	B	

Minor Lane/Major Mvmt	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	344	445	1545	-	-
HCM Lane V/C Ratio	0.03	0.125	0.007	-	-
HCM Control Delay (s)	15.8	14.2	7.3	0	-
HCM Lane LOS	C	B	A	A	-
HCM 95th %tile Q(veh)	0.1	0.4	0	-	-

Intersection	
Int Delay, s/veh	6.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	111	151	6	68	0	0	0	0	22	629	98
Future Vol, veh/h	0	111	151	6	68	0	0	0	0	22	629	98
Conflicting Peds, #/hr	0	0	2	0	0	0	0	0	0	4	0	6
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	100	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	0	1	3	0	2	0	0	0	0	0	6	1
Mvmt Flow	0	125	170	7	76	0	0	0	0	25	707	110

Major/Minor	Minor2			Minor1						Major2		
Conflicting Flow All	-	822	417	472	877	-				4	0	0
Stage 1	-	818	-	4	4	-				-	-	-
Stage 2	-	4	-	468	873	-				-	-	-
Critical Hdwy	-	6.52	6.96	7.5	6.54	-				4.1	-	-
Critical Hdwy Stg 1	-	5.52	-	-	-	-				-	-	-
Critical Hdwy Stg 2	-	-	-	6.5	5.54	-				-	-	-
Follow-up Hdwy	-	4.01	3.33	3.5	4.02	-				2.2	-	-
Pot Cap-1 Maneuver	0	309	582	480	285	0				1631	-	-
Stage 1	0	390	-	-	-	0				-	-	-
Stage 2	0	-	-	550	366	0				-	-	-
Platoon blocked, %											-	-
Mov Cap-1 Maneuver	-	297	579	223	274	-				1625	-	-
Mov Cap-2 Maneuver	-	297	-	223	274	-				-	-	-
Stage 1	-	376	-	-	-	-				-	-	-
Stage 2	-	-	-	252	353	-				-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	18.8	24.3	0.3
HCM LOS	C	C	

Minor Lane/Major Mvmt	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	297	579	269	1625	-	-
HCM Lane V/C Ratio	0.42	0.293	0.309	0.015	-	-
HCM Control Delay (s)	25.6	13.8	24.3	7.2	0.1	-
HCM Lane LOS	D	B	C	A	A	-
HCM 95th %tile Q(veh)	2	1.2	1.3	0	-	-

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	116	0	0	199	290	394
Future Volume (vph)	116	0	0	199	290	394
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	4.0
Lane Util. Factor	1.00			0.95	1.00	1.00
Frpb, ped/bikes	1.00			1.00	1.00	0.98
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	1827			3438	1703	1516
Flt Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	1827			3438	1703	1516
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	129	0	0	221	322	438
RTOR Reduction (vph)	0	0	0	0	0	262
Lane Group Flow (vph)	129	0	0	221	322	176
Confl. Peds. (#/hr)					8	5
Heavy Vehicles (%)	4%	0%	0%	5%	6%	4%
Turn Type	NA			NA	Prot	Perm
Protected Phases	4			4	2	
Permitted Phases						2
Actuated Green, G (s)	5.6			5.6	9.1	9.1
Effective Green, g (s)	5.6			5.6	9.1	9.1
Actuated g/C Ratio	0.25			0.25	0.40	0.40
Clearance Time (s)	4.0			4.0	4.0	4.0
Vehicle Extension (s)	0.2			0.2	0.2	0.2
Lane Grp Cap (vph)	450			848	682	607
v/s Ratio Prot	c0.07			0.06	c0.19	
v/s Ratio Perm						0.12
v/c Ratio	0.29			0.26	0.47	0.29
Uniform Delay, d1	6.9			6.9	5.0	4.6
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.1			0.1	0.2	0.1
Delay (s)	7.1			6.9	5.2	4.7
Level of Service	A			A	A	A
Approach Delay (s)	7.1			6.9	4.9	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	5.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	22.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	37.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection						
Int Delay, s/veh	1.5					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	25	0	73	676	0	0
Future Vol, veh/h	25	0	73	676	0	0
Conflicting Peds, #/hr	16	0	22	0	0	0
Sign Control	Stop	Stop	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	-	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	5	5	2	2
Mvmt Flow	28	0	83	768	0	0

Major/Minor	Minor2		Major1	
Conflicting Flow All	588	-	22	0
Stage 1	22	-	-	-
Stage 2	566	-	-	-
Critical Hdwy	6.84	-	4.2	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-
Follow-up Hdwy	3.52	-	2.25	-
Pot Cap-1 Maneuver	440	0	1570	-
Stage 1	-	0	-	-
Stage 2	532	0	-	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	382	-	1537	-
Mov Cap-2 Maneuver	382	-	-	-
Stage 1	-	-	-	-
Stage 2	521	-	-	-

Approach	EB	NB
HCM Control Delay, s	15.2	1
HCM LOS	C	

Minor Lane/Major Mvmt	NBL	NBT	EBLn1
Capacity (veh/h)	1537	-	382
HCM Lane V/C Ratio	0.054	-	0.074
HCM Control Delay (s)	7.5	0.3	15.2
HCM Lane LOS	A	A	C
HCM 95th %tile Q(veh)	0.2	-	0.2

Intersection	
Int Delay, s/veh	1.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	92	657	107	0	0
Future Vol, veh/h	0	92	657	107	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	-
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	0	5	5	3	0	0
Mvmt Flow	0	105	747	122	0	0

Major/Minor	Minor1		Major1	
Conflicting Flow All	-	435	0	0
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	7	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	3.35	-	-
Pot Cap-1 Maneuver	0	561	-	-
Stage 1	0	-	-	-
Stage 2	0	-	-	-
Platoon blocked, %			-	-
Mov Cap-1 Maneuver	-	561	-	-
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	WB	NB
HCM Control Delay, s	12.9	0
HCM LOS	B	

Minor Lane/Major Mvmt	NBT	NBR	WBLn1
Capacity (veh/h)	-	-	561
HCM Lane V/C Ratio	-	-	0.186
HCM Control Delay (s)	-	-	12.9
HCM Lane LOS	-	-	B
HCM 95th %tile Q(veh)	-	-	0.7

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	14	1	0	0	33	11	17	741	13	0	0	0
Future Vol, veh/h	14	1	0	0	33	11	17	741	13	0	0	0
Conflicting Peds, #/hr	7	0	0	0	0	16	4	0	13	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	0	0	0	0	3	0	0	5	0	0	0	0
Mvmt Flow	16	1	0	0	38	13	19	842	15	0	0	0

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	498	912	-	-	905	458	4	0	0
Stage 1	4	4	-	-	901	-	-	-	-
Stage 2	494	908	-	-	4	-	-	-	-
Critical Hdwy	7.5	6.5	-	-	6.56	6.9	4.1	-	-
Critical Hdwy Stg 1	-	-	-	-	5.56	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	-	-	4.03	3.3	2.2	-	-
Pot Cap-1 Maneuver	460	276	0	0	273	555	1631	-	-
Stage 1	-	-	0	0	353	-	-	-	-
Stage 2	531	357	0	0	-	-	-	-	-
Platoon blocked, %								-	-
Mov Cap-1 Maneuver	392	266	-	-	263	548	1625	-	-
Mov Cap-2 Maneuver	392	266	-	-	263	-	-	-	-
Stage 1	-	-	-	-	341	-	-	-	-
Stage 2	452	345	-	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	14.9	19.3	0.3
HCM LOS	B	C	

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1
Capacity (veh/h)	1625	-	-	380	302
HCM Lane V/C Ratio	0.012	-	-	0.045	0.166
HCM Control Delay (s)	7.2	0.1	-	14.9	19.3
HCM Lane LOS	A	A	-	B	C
HCM 95th %tile Q(veh)	0	-	-	0.1	0.6

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	112	18	0	0	5	2	73	628	18	0	0	0
Future Vol, veh/h	112	18	0	0	5	2	73	628	18	0	0	0
Conflicting Peds, #/hr	4	0	0	0	0	11	0	0	7	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	2	0	0	0	0	0	0	5	0	0	0	0
Mvmt Flow	127	20	0	0	6	2	83	714	20	0	0	0

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	537	907	-	-	897	385	0	0	0
Stage 1	0	0	-	-	897	-	-	-	-
Stage 2	537	907	-	-	0	-	-	-	-
Critical Hdwy	7.54	6.5	-	-	6.5	6.9	4.1	-	-
Critical Hdwy Stg 1	-	-	-	-	5.5	-	-	-	-
Critical Hdwy Stg 2	6.54	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4	-	-	4	3.3	2.2	-	-
Pot Cap-1 Maneuver	427	278	0	0	281	619	-	-	-
Stage 1	-	-	0	0	361	-	-	-	-
Stage 2	496	357	0	0	-	-	-	-	-
Platoon blocked, %								-	-
Mov Cap-1 Maneuver	419	276	-	-	279	615	-	-	-
Mov Cap-2 Maneuver	419	276	-	-	279	-	-	-	-
Stage 1	-	-	-	-	358	-	-	-	-
Stage 2	486	355	-	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	19.7	16.1	
HCM LOS	C	C	

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1
Capacity (veh/h)	-	-	-	391	331
HCM Lane V/C Ratio	-	-	-	0.378	0.024
HCM Control Delay (s)	-	-	-	19.7	16.1
HCM Lane LOS	-	-	-	C	C
HCM 95th %tile Q(veh)	-	-	-	1.7	0.1

APPENDIX C
SYNCHRO RESULTS
2019 BASE – PM PEAK

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	182	367	335	179	421	87
Future Volume (vph)	182	367	335	179	421	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1863	1583	1752	1881	1770	1538
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1863	1583	1752	1881	1770	1538
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	194	390	356	190	448	93
RTOR Reduction (vph)	0	307	0	0	0	62
Lane Group Flow (vph)	194	83	356	190	448	31
Confl. Peds. (#/hr)		2	1		1	2
Heavy Vehicles (%)	2%	2%	3%	1%	2%	5%
Turn Type	NA	Prot	Prot	NA	Prot	Prot
Protected Phases	2	2	1	6	8	8
Permitted Phases						
Actuated Green, G (s)	15.1	15.1	20.2	39.3	24.0	24.0
Effective Green, g (s)	15.1	15.1	20.2	39.3	24.0	24.0
Actuated g/C Ratio	0.21	0.21	0.28	0.55	0.34	0.34
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	394	335	496	1036	595	517
v/s Ratio Prot	c0.10	0.05	c0.20	0.10	c0.25	0.02
v/s Ratio Perm						
v/c Ratio	0.49	0.25	0.72	0.18	0.75	0.06
Uniform Delay, d1	24.7	23.4	23.0	8.0	21.0	16.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0	0.4	4.9	0.1	5.4	0.0
Delay (s)	25.7	23.8	27.9	8.1	26.4	16.1
Level of Service	C	C	C	A	C	B
Approach Delay (s)	24.4			21.0	24.6	
Approach LOS	C			C	C	

Intersection Summary			
HCM 2000 Control Delay	23.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	71.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	61.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	102.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	69	64	248	115	430	0	0	0	21	598	45
Future Vol, veh/h	0	69	64	248	115	430	0	0	0	21	598	45
Conflicting Peds, #/hr	0	0	3	1	0	7	0	0	0	7	0	9
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	Free	-	-	None	-	-	None
Storage Length	-	-	120	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	0	1	3	0	4	1	0	0	0	0	3	2
Mvmt Flow	0	73	68	264	122	457	0	0	0	22	636	48

Major/Minor	Minor2			Minor1			Major2		
Conflicting Flow All	-	720	672	785	744	-	7	0	0
Stage 1	-	713	-	7	7	-	-	-	-
Stage 2	-	7	-	778	737	-	-	-	-
Critical Hdwy	-	6.51	6.23	7.1	6.54	-	4.1	-	-
Critical Hdwy Stg 1	-	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	6.1	5.54	-	-	-	-
Follow-up Hdwy	-	4.009	3.327	3.5	4.036	-	2.2	-	-
Pot Cap-1 Maneuver	0	355	454	313	340	0	1627	-	-
Stage 1	0	437	-	-	-	0	-	-	-
Stage 2	0	-	-	392	422	0	-	-	-
Platoon blocked, %								-	-
Mov Cap-1 Maneuver	-	342	450	~ 217	327	-	1616	-	-
Mov Cap-2 Maneuver	-	342	-	~ 217	327	-	-	-	-
Stage 1	-	423	-	-	-	-	-	-	-
Stage 2	-	-	-	269	409	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	16.5	$ 320.2	0.2
HCM LOS	C	F	

Minor Lane/Major Mvmt	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	342	450	243	-	1616	-	-
HCM Lane V/C Ratio	0.215	0.151	1.589	-	0.014	-	-
HCM Control Delay (s)	18.4	14.4	$ 320.2	0	7.3	0	-
HCM Lane LOS	C	B	F	A	A	A	-
HCM 95th %tile Q(veh)	0.8	0.5	23.9	-	0	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	6	6	89	30	0	0	0	0	11	898	10
Future Vol, veh/h	0	6	6	89	30	0	0	0	0	11	898	10
Conflicting Peds, #/hr	0	0	11	8	0	0	0	0	0	2	0	5
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	2	0
Mvmt Flow	0	7	7	97	33	0	0	0	0	12	976	11

Major/Minor	Minor2			Minor1						Major2		
Conflicting Flow All	-	1013	510	529	1018	-				2	0	0
Stage 1	-	1011	-	2	2	-				-	-	-
Stage 2	-	2	-	527	1016	-				-	-	-
Critical Hdwy	-	6.5	6.9	7.5	6.5	-				4.1	-	-
Critical Hdwy Stg 1	-	5.5	-	-	-	-				-	-	-
Critical Hdwy Stg 2	-	-	-	6.5	5.5	-				-	-	-
Follow-up Hdwy	-	4	3.3	3.5	4	-				2.2	-	-
Pot Cap-1 Maneuver	0	241	514	437	239	0				1634	-	-
Stage 1	0	320	-	-	-	0				-	-	-
Stage 2	0	-	-	508	318	0				-	-	-
Platoon blocked, %											-	-
Mov Cap-1 Maneuver	-	235	512	416	234	-				1631	-	-
Mov Cap-2 Maneuver	-	235	-	416	234	-				-	-	-
Stage 1	-	313	-	-	-	-				-	-	-
Stage 2	-	-	-	483	311	-				-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	16.7	21.3	0.2
HCM LOS	C	C	

Minor Lane/Major Mvmt	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	322	348	1631	-	-
HCM Lane V/C Ratio	0.041	0.372	0.007	-	-
HCM Control Delay (s)	16.7	21.3	7.2	0.1	-
HCM Lane LOS	C	C	A	A	-
HCM 95th %tile Q(veh)	0.1	1.7	0	-	-

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	8	4	61	13	0	0	0	0	44	950	8
Future Vol, veh/h	0	8	4	61	13	0	0	0	0	44	950	8
Conflicting Peds, #/hr	0	0	4	8	0	0	0	0	0	7	0	3
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	2	0	0	0	0	0	0	2	0
Mvmt Flow	0	8	4	64	14	0	0	0	0	46	1000	8

Major/Minor	Minor2			Minor1						Major2		
Conflicting Flow All	-	1106	515	611	1110	-				7	0	0
Stage 1	-	1099	-	7	7	-				-	-	-
Stage 2	-	7	-	604	1103	-				-	-	-
Critical Hdwy	-	6.5	6.9	7.54	6.5	-				4.1	-	-
Critical Hdwy Stg 1	-	5.5	-	-	-	-				-	-	-
Critical Hdwy Stg 2	-	-	-	6.54	5.5	-				-	-	-
Follow-up Hdwy	-	4	3.3	3.52	4	-				2.2	-	-
Pot Cap-1 Maneuver	0	212	510	378	211	0				1627	-	-
Stage 1	0	291	-	-	-	0				-	-	-
Stage 2	0	-	-	452	290	0				-	-	-
Platoon blocked, %											-	-
Mov Cap-1 Maneuver	-	196	509	342	195	-				1616	-	-
Mov Cap-2 Maneuver	-	196	-	342	195	-				-	-	-
Stage 1	-	271	-	-	-	-				-	-	-
Stage 2	-	-	-	406	270	-				-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	20.4	21	0.5
HCM LOS	C	C	

Minor Lane/Major Mvmt	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	247	302	1616	-	-
HCM Lane V/C Ratio	0.051	0.258	0.029	-	-
HCM Control Delay (s)	20.4	21	7.3	0.2	-
HCM Lane LOS	C	C	A	A	-
HCM 95th %tile Q(veh)	0.2	1	0.1	-	-

Intersection	
Int Delay, s/veh	13.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	93	151	12	121	0	0	0	0	39	820	160
Future Vol, veh/h	0	93	151	12	121	0	0	0	0	39	820	160
Conflicting Peds, #/hr	0	0	2	0	0	0	0	0	0	3	0	5
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	100	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	0	3	3	8	2	0	0	0	0	0	2	1
Mvmt Flow	0	102	166	13	133	0	0	0	0	43	901	176

Major/Minor	Minor2			Minor1						Major2		
Conflicting Flow All	-	1083	546	593	1171	-				3	0	0
Stage 1	-	1080	-	3	3	-				-	-	-
Stage 2	-	3	-	590	1168	-				-	-	-
Critical Hdwy	-	6.56	6.96	7.66	6.54	-				4.1	-	-
Critical Hdwy Stg 1	-	5.56	-	-	-	-				-	-	-
Critical Hdwy Stg 2	-	-	-	6.66	5.54	-				-	-	-
Follow-up Hdwy	-	4.03	3.33	3.58	4.02	-				2.2	-	-
Pot Cap-1 Maneuver	0	214	479	377	191	0				1632	-	-
Stage 1	0	290	-	-	-	0				-	-	-
Stage 2	0	-	-	446	266	0				-	-	-
Platoon blocked, %											-	-
Mov Cap-1 Maneuver	-	198	477	138	176	-				1627	-	-
Mov Cap-2 Maneuver	-	198	-	138	176	-				-	-	-
Stage 1	-	269	-	-	-	-				-	-	-
Stage 2	-	-	-	168	246	-				-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	25.9	87.8	0.4
HCM LOS	D	F	

Minor Lane/Major Mvmt	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	198	477	172	1627	-	-
HCM Lane V/C Ratio	0.516	0.348	0.85	0.026	-	-
HCM Control Delay (s)	41.1	16.5	87.8	7.3	0.2	-
HCM Lane LOS	E	C	F	A	A	-
HCM 95th %tile Q(veh)	2.6	1.5	6	0.1	-	-

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	89	0	0	321	504	510
Future Volume (vph)	89	0	0	321	504	510
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	4.0
Lane Util. Factor	1.00			0.95	1.00	1.00
Frpb, ped/bikes	1.00			1.00	1.00	1.00
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	1863			3610	1787	1599
Flt Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	1863			3610	1787	1599
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	98	0	0	353	554	560
RTOR Reduction (vph)	0	0	0	0	0	311
Lane Group Flow (vph)	98	0	0	353	554	249
Confl. Peds. (#/hr)					8	
Heavy Vehicles (%)	2%	0%	0%	0%	1%	1%
Turn Type	NA			NA	Prot	Perm
Protected Phases	4			4	2	
Permitted Phases						2
Actuated Green, G (s)	6.5			6.5	11.6	11.6
Effective Green, g (s)	6.5			6.5	11.6	11.6
Actuated g/C Ratio	0.25			0.25	0.44	0.44
Clearance Time (s)	4.0			4.0	4.0	4.0
Vehicle Extension (s)	0.2			0.2	0.2	0.2
Lane Grp Cap (vph)	463			899	794	710
v/s Ratio Prot	0.05			c0.10	c0.31	
v/s Ratio Perm						0.16
v/c Ratio	0.21			0.39	0.70	0.35
Uniform Delay, d1	7.8			8.2	5.8	4.8
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.1			0.1	2.2	0.1
Delay (s)	7.9			8.3	8.0	4.9
Level of Service	A			A	A	A
Approach Delay (s)	7.9			8.3	6.4	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	6.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	26.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	43.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	34	0	113	961	0	0
Future Vol, veh/h	34	0	113	961	0	0
Conflicting Peds, #/hr	7	0	15	0	0	0
Sign Control	Stop	Stop	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	-	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	3	3	0	0
Mvmt Flow	37	0	124	1056	0	0

Major/Minor	Minor2		Major1	
Conflicting Flow All	798	-	15	0
Stage 1	15	-	-	-
Stage 2	783	-	-	-
Critical Hdwy	6.8	-	4.16	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-
Follow-up Hdwy	3.5	-	2.23	-
Pot Cap-1 Maneuver	328	0	1594	-
Stage 1	-	0	-	-
Stage 2	416	0	-	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	258	-	1571	-
Mov Cap-2 Maneuver	258	-	-	-
Stage 1	-	-	-	-
Stage 2	410	-	-	-

Approach	EB	NB
HCM Control Delay, s	21.3	1.3
HCM LOS	C	

Minor Lane/Major Mvmt	NBL	NBT	EBLn1
Capacity (veh/h)	1571	-	258
HCM Lane V/C Ratio	0.079	-	0.145
HCM Control Delay (s)	7.5	0.6	21.3
HCM Lane LOS	A	A	C
HCM 95th %tile Q(veh)	0.3	-	0.5

Intersection	
Int Delay, s/veh	1.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	98	976	65	0	0
Future Vol, veh/h	0	98	976	65	0	0
Conflicting Peds, #/hr	0	15	0	23	0	0
Sign Control	Stop	Stop	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	-
Grade, %	0	-	0	-	-	0
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	3	3	0	0
Mvmt Flow	0	108	1073	71	0	0

Major/Minor	Minor1		Major1	
Conflicting Flow All	-	610	0	0
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	6.9	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	3.3	-	-
Pot Cap-1 Maneuver	0	442	-	-
Stage 1	0	-	-	-
Stage 2	0	-	-	-
Platoon blocked, %			-	-
Mov Cap-1 Maneuver	-	432	-	-
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	WB	NB
HCM Control Delay, s	16.1	0
HCM LOS	C	

Minor Lane/Major Mvmt	NBT	NBR	WBLn1
Capacity (veh/h)	-	-	432
HCM Lane V/C Ratio	-	-	0.249
HCM Control Delay (s)	-	-	16.1
HCM Lane LOS	-	-	C
HCM 95th %tile Q(veh)	-	-	1

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	36	10	0	0	29	20	54	976	49	0	0	0
Future Vol, veh/h	36	10	0	0	29	20	54	976	49	0	0	0
Conflicting Peds, #/hr	15	0	0	0	0	20	8	0	13	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	0	0	0	3	0	2	3	6	0	0	0
Mvmt Flow	39	11	0	0	31	22	58	1049	53	0	0	0

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	684	1239	-	-	1213	584	8	0	0
Stage 1	8	8	-	-	1205	-	-	-	-
Stage 2	676	1231	-	-	8	-	-	-	-
Critical Hdwy	7.5	6.5	-	-	6.56	6.9	4.14	-	-
Critical Hdwy Stg 1	-	-	-	-	5.56	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	-	-	4.03	3.3	2.22	-	-
Pot Cap-1 Maneuver	339	177	0	0	179	460	1611	-	-
Stage 1	-	-	0	0	253	-	-	-	-
Stage 2	414	252	0	0	-	-	-	-	-
Platoon blocked, %								-	-
Mov Cap-1 Maneuver	253	157	-	-	159	454	1599	-	-
Mov Cap-2 Maneuver	253	157	-	-	159	-	-	-	-
Stage 1	-	-	-	-	226	-	-	-	-
Stage 2	308	225	-	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	25.7	27	0.6
HCM LOS	D	D	

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1
Capacity (veh/h)	1599	-	-	223	216
HCM Lane V/C Ratio	0.036	-	-	0.222	0.244
HCM Control Delay (s)	7.3	0.3	-	25.7	27
HCM Lane LOS	A	A	-	D	D
HCM 95th %tile Q(veh)	0.1	-	-	0.8	0.9

Intersection	
Int Delay, s/veh	6.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	113	18	0	0	6	5	129	918	30	0	0	0
Future Vol, veh/h	113	18	0	0	6	5	129	918	30	0	0	0
Conflicting Peds, #/hr	3	0	0	0	0	10	1	0	8	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	3	0	0	0	17	0	2	3	0	0	0	0
Mvmt Flow	119	19	0	0	6	5	136	966	32	0	0	0

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	769	1279	-	-	1263	517	1	0	0
Stage 1	1	1	-	-	1262	-	-	-	-
Stage 2	768	1278	-	-	1	-	-	-	-
Critical Hdwy	7.56	6.5	-	-	6.84	6.9	4.14	-	-
Critical Hdwy Stg 1	-	-	-	-	5.84	-	-	-	-
Critical Hdwy Stg 2	6.56	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.53	4	-	-	4.17	3.3	2.22	-	-
Pot Cap-1 Maneuver	289	167	0	0	149	509	1620	-	-
Stage 1	-	-	0	0	212	-	-	-	-
Stage 2	358	239	0	0	-	-	-	-	-
Platoon blocked, %								-	-
Mov Cap-1 Maneuver	234	134	-	-	120	505	1618	-	-
Mov Cap-2 Maneuver	234	134	-	-	120	-	-	-	-
Stage 1	-	-	-	-	170	-	-	-	-
Stage 2	276	192	-	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	49	25.9	1.4
HCM LOS	E	D	

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1
Capacity (veh/h)	1618	-	-	212	184
HCM Lane V/C Ratio	0.084	-	-	0.65	0.063
HCM Control Delay (s)	7.4	0.6	-	49	25.9
HCM Lane LOS	A	A	-	E	D
HCM 95th %tile Q(veh)	0.3	-	-	3.9	0.2

APPENDIX D
SYNCHRO RESULTS
2039 BASE – AM PEAK

HCM Signalized Intersection Capacity Analysis
1: 13th St & Oak St

02/07/2020

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	104	308	340	113	254	127
Future Volume (vph)	104	308	340	113	254	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1792	1524	1719	1845	1736	1524
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1792	1524	1719	1845	1736	1524
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	120	354	391	130	292	146
RTOR Reduction (vph)	0	289	0	0	0	106
Lane Group Flow (vph)	120	65	391	130	292	40
Confl. Peds. (#/hr)		27	1		26	2
Heavy Vehicles (%)	6%	6%	5%	3%	4%	6%
Turn Type	NA	Prot	Prot	NA	Prot	Prot
Protected Phases	2	2	1	6	8	8
Permitted Phases						
Actuated Green, G (s)	10.9	10.9	20.6	35.5	16.2	16.2
Effective Green, g (s)	10.9	10.9	20.6	35.5	16.2	16.2
Actuated g/C Ratio	0.18	0.18	0.35	0.59	0.27	0.27
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	327	278	593	1097	471	413
v/s Ratio Prot	c0.07	0.04	c0.23	0.07	c0.17	0.03
v/s Ratio Perm						
v/c Ratio	0.37	0.23	0.66	0.12	0.62	0.10
Uniform Delay, d1	21.4	20.8	16.6	5.3	19.1	16.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.4	2.7	0.0	2.4	0.1
Delay (s)	22.1	21.3	19.2	5.3	21.5	16.4
Level of Service	C	C	B	A	C	B
Approach Delay (s)	21.5			15.8	19.8	
Approach LOS	C			B	B	

Intersection Summary			
HCM 2000 Control Delay	18.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	59.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	47.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	210.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	103	130	174	153	267	0	0	0	48	527	63
Future Vol, veh/h	0	103	130	174	153	267	0	0	0	48	527	63
Conflicting Peds, #/hr	0	0	4	0	0	43	0	0	0	43	0	47
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	Free	-	-	None	-	-	None
Storage Length	-	-	120	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	5	9	2	4	8	0	2	2	0	6	2
Mvmt Flow	0	114	144	193	170	297	0	0	0	53	586	70

Major/Minor	Minor2			Minor1						Major2		
Conflicting Flow All	-	817	672	903	852	-				43	0	0
Stage 1	-	774	-	43	43	-				-	-	-
Stage 2	-	43	-	860	809	-				-	-	-
Critical Hdwy	-	6.55	6.29	7.12	6.54	-				4.1	-	-
Critical Hdwy Stg 1	-	5.55	-	-	-	-				-	-	-
Critical Hdwy Stg 2	-	-	-	6.12	5.54	-				-	-	-
Follow-up Hdwy	-	4.045	3.381	3.518	4.036	-				2.2	-	-
Pot Cap-1 Maneuver	0	308	444	258	295	0				1579	-	-
Stage 1	0	404	-	-	-	0				-	-	-
Stage 2	0	-	-	351	391	0				-	-	-
Platoon blocked, %											-	-
Mov Cap-1 Maneuver	-	266	424	~ 104	255	-				1514	-	-
Mov Cap-2 Maneuver	-	266	-	~ 104	255	-				-	-	-
Stage 1	-	364	-	-	-	-				-	-	-
Stage 2	-	-	-	~ 150	353	-				-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	22.5	$ 754.6	0.6
HCM LOS	C	F	

Minor Lane/Major Mvmt	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	266	424	144	-	1514	-	-
HCM Lane V/C Ratio	0.43	0.341	2.523	-	0.035	-	-
HCM Control Delay (s)	28.4	17.8	$ 754.6	0	7.5	0	-
HCM Lane LOS	D	C	F	A	A	A	-
HCM 95th %tile Q(veh)	2	1.5	31.7	-	0.1	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s   +: Computation Not Defined   *: All major volume in platoon

Intersection	
Int Delay, s/veh	2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	14	31	69	18	0	0	0	0	18	814	6
Future Vol, veh/h	0	14	31	69	18	0	0	0	0	18	814	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	0	0	4	0	0	0	0	0	0	0	6	0
Mvmt Flow	0	16	35	78	20	0	0	0	0	20	925	7

Major/Minor	Minor2			Minor1						Major2		
Conflicting Flow All	-	969	466	511	972	-				0	0	0
Stage 1	-	969	-	0	0	-				-	-	-
Stage 2	-	0	-	511	972	-				-	-	-
Critical Hdwy	-	6.5	6.98	7.5	6.5	-				4.1	-	-
Critical Hdwy Stg 1	-	5.5	-	-	-	-				-	-	-
Critical Hdwy Stg 2	-	-	-	6.5	5.5	-				-	-	-
Follow-up Hdwy	-	4	3.34	3.5	4	-				2.2	-	-
Pot Cap-1 Maneuver	0	256	538	450	254	0				-	-	-
Stage 1	0	334	-	-	-	0				-	-	-
Stage 2	0	-	-	519	333	0				-	-	-
Platoon blocked, %											-	-
Mov Cap-1 Maneuver	-	256	538	401	254	-				-	-	-
Mov Cap-2 Maneuver	-	256	-	401	254	-				-	-	-
Stage 1	-	334	-	-	-	-				-	-	-
Stage 2	-	-	-	462	333	-				-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	15.3	18.8	
HCM LOS	C	C	

Minor Lane/Major Mvmt	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	401	358	-	-	-
HCM Lane V/C Ratio	0.128	0.276	-	-	-
HCM Control Delay (s)	15.3	18.8	-	-	-
HCM Lane LOS	C	C	-	-	-
HCM 95th %tile Q(veh)	0.4	1.1	-	-	-

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	8	11	55	5	0	0	0	0	11	893	4
Future Vol, veh/h	0	8	11	55	5	0	0	0	0	11	893	4
Conflicting Peds, #/hr	0	0	8	4	0	0	0	0	0	5	0	9
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	0	0	0	4	0	0	2	2	2	11	5	2
Mvmt Flow	0	9	13	64	6	0	0	0	0	13	1038	5

Major/Minor	Minor2			Minor1						Major2		
Conflicting Flow All	-	1081	539	563	1083	-				5	0	0
Stage 1	-	1076	-	5	5	-				-	-	-
Stage 2	-	5	-	558	1078	-				-	-	-
Critical Hdwy	-	6.5	6.9	7.58	6.5	-				4.32	-	-
Critical Hdwy Stg 1	-	5.5	-	-	-	-				-	-	-
Critical Hdwy Stg 2	-	-	-	6.58	5.5	-				-	-	-
Follow-up Hdwy	-	4	3.3	3.54	4	-				2.31	-	-
Pot Cap-1 Maneuver	0	220	492	405	219	0				1552	-	-
Stage 1	0	298	-	-	-	0				-	-	-
Stage 2	0	-	-	477	297	0				-	-	-
Platoon blocked, %											-	-
Mov Cap-1 Maneuver	-	213	488	374	212	-				1545	-	-
Mov Cap-2 Maneuver	-	213	-	374	212	-				-	-	-
Stage 1	-	289	-	-	-	-				-	-	-
Stage 2	-	-	-	441	288	-				-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	17.2	17.7	0.2
HCM LOS	C	C	

Minor Lane/Major Mvmt	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	316	352	1545	-	-
HCM Lane V/C Ratio	0.07	0.198	0.008	-	-
HCM Control Delay (s)	17.2	17.7	7.3	0.1	-
HCM Lane LOS	C	C	A	A	-
HCM 95th %tile Q(veh)	0.2	0.7	0	-	-

Intersection	
Int Delay, s/veh	11.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	140	190	8	86	0	0	0	0	28	791	123
Future Vol, veh/h	0	140	190	8	86	0	0	0	0	28	791	123
Conflicting Peds, #/hr	0	0	2	0	0	0	0	0	0	4	0	6
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	100	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	0	1	3	0	2	0	0	0	0	0	6	1
Mvmt Flow	0	157	213	9	97	0	0	0	0	31	889	138

Major/Minor	Minor2			Minor1						Major2		
Conflicting Flow All	-	1030	522	591	1099	-				4	0	0
Stage 1	-	1026	-	4	4	-				-	-	-
Stage 2	-	4	-	587	1095	-				-	-	-
Critical Hdwy	-	6.52	6.96	7.5	6.54	-				4.1	-	-
Critical Hdwy Stg 1	-	5.52	-	-	-	-				-	-	-
Critical Hdwy Stg 2	-	-	-	6.5	5.54	-				-	-	-
Follow-up Hdwy	-	4.01	3.33	3.5	4.02	-				2.2	-	-
Pot Cap-1 Maneuver	0	234	497	395	211	0				1631	-	-
Stage 1	0	312	-	-	-	0				-	-	-
Stage 2	0	-	-	468	288	0				-	-	-
Platoon blocked, %											-	-
Mov Cap-1 Maneuver	-	221	494	92	199	-				1625	-	-
Mov Cap-2 Maneuver	-	221	-	92	199	-				-	-	-
Stage 1	-	296	-	-	-	-				-	-	-
Stage 2	-	-	-	119	273	-				-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	32.9	49.5	0.4
HCM LOS	D	E	

Minor Lane/Major Mvmt	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	221	494	181	1625	-	-
HCM Lane V/C Ratio	0.712	0.432	0.584	0.019	-	-
HCM Control Delay (s)	53.5	17.7	49.5	7.3	0.2	-
HCM Lane LOS	F	C	E	A	A	-
HCM 95th %tile Q(veh)	4.7	2.2	3.1	0.1	-	-

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	146	0	0	250	365	496
Future Volume (vph)	146	0	0	250	365	496
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	4.0
Lane Util. Factor	1.00			0.95	1.00	1.00
Frpb, ped/bikes	1.00			1.00	1.00	0.98
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	1827			3438	1703	1516
Flt Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	1827			3438	1703	1516
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	162	0	0	278	406	551
RTOR Reduction (vph)	0	0	0	0	0	331
Lane Group Flow (vph)	162	0	0	278	406	220
Confl. Peds. (#/hr)					8	5
Heavy Vehicles (%)	4%	0%	0%	5%	6%	4%
Turn Type	NA			NA	Prot	Perm
Protected Phases	4			4	2	
Permitted Phases						2
Actuated Green, G (s)	6.0			6.0	9.3	9.3
Effective Green, g (s)	6.0			6.0	9.3	9.3
Actuated g/C Ratio	0.26			0.26	0.40	0.40
Clearance Time (s)	4.0			4.0	4.0	4.0
Vehicle Extension (s)	0.2			0.2	0.2	0.2
Lane Grp Cap (vph)	470			885	679	605
v/s Ratio Prot	c0.09			0.08	c0.24	
v/s Ratio Perm						0.15
v/c Ratio	0.34			0.31	0.60	0.36
Uniform Delay, d1	7.0			7.0	5.5	4.9
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.2			0.1	0.9	0.1
Delay (s)	7.2			7.1	6.5	5.1
Level of Service	A			A	A	A
Approach Delay (s)	7.2			7.1	5.7	
Approach LOS	A			A	A	

Intersection Summary			
HCM 2000 Control Delay	6.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	23.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection						
Int Delay, s/veh	1.8					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	31	0	92	850	0	0
Future Vol, veh/h	31	0	92	850	0	0
Conflicting Peds, #/hr	16	0	22	0	0	0
Sign Control	Stop	Stop	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	-	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	2	2	5	5	2	2
Mvmt Flow	35	0	105	966	0	0

Major/Minor	Minor2		Major1	
Conflicting Flow All	731	-	22	0
Stage 1	22	-	-	-
Stage 2	709	-	-	-
Critical Hdwy	6.84	-	4.2	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-
Follow-up Hdwy	3.52	-	2.25	-
Pot Cap-1 Maneuver	357	0	1570	-
Stage 1	-	0	-	-
Stage 2	449	0	-	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	292	-	1537	-
Mov Cap-2 Maneuver	292	-	-	-
Stage 1	-	-	-	-
Stage 2	440	-	-	-

Approach	EB	NB
HCM Control Delay, s	19	1.2
HCM LOS	C	

Minor Lane/Major Mvmt	NBL	NBT	EBLn1
Capacity (veh/h)	1537	-	292
HCM Lane V/C Ratio	0.068	-	0.121
HCM Control Delay (s)	7.5	0.5	19
HCM Lane LOS	A	A	C
HCM 95th %tile Q(veh)	0.2	-	0.4

Intersection	
Int Delay, s/veh	1.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	116	827	135	0	0
Future Vol, veh/h	0	116	827	135	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	-
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	0	5	5	3	0	0
Mvmt Flow	0	132	940	153	0	0

Major/Minor	Minor1		Major1	
Conflicting Flow All	-	547	0	0
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	7	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	3.35	-	-
Pot Cap-1 Maneuver	0	473	-	-
Stage 1	0	-	-	-
Stage 2	0	-	-	-
Platoon blocked, %			-	-
Mov Cap-1 Maneuver	-	473	-	-
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	WB	NB
HCM Control Delay, s	15.5	0
HCM LOS	C	

Minor Lane/Major Mvmt	NBT	NBR	WBLn1
Capacity (veh/h)	-	-	473
HCM Lane V/C Ratio	-	-	0.279
HCM Control Delay (s)	-	-	15.5
HCM Lane LOS	-	-	C
HCM 95th %tile Q(veh)	-	-	1.1

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	18	1	0	0	42	14	21	932	16	0	0	0
Future Vol, veh/h	18	1	0	0	42	14	21	932	16	0	0	0
Conflicting Peds, #/hr	7	0	0	0	0	16	4	0	13	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	0	0	0	0	3	0	0	5	0	0	0	0
Mvmt Flow	20	1	0	0	48	16	24	1059	18	0	0	0

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	622	1142	-	-	1133	568	4	0	0
Stage 1	4	4	-	-	1129	-	-	-	-
Stage 2	618	1138	-	-	4	-	-	-	-
Critical Hdwy	7.5	6.5	-	-	6.56	6.9	4.1	-	-
Critical Hdwy Stg 1	-	-	-	-	5.56	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	-	-	4.03	3.3	2.2	-	-
Pot Cap-1 Maneuver	375	202	0	0	200	471	1631	-	-
Stage 1	-	-	0	0	275	-	-	-	-
Stage 2	448	279	0	0	-	-	-	-	-
Platoon blocked, %								-	-
Mov Cap-1 Maneuver	283	191	-	-	190	465	1625	-	-
Mov Cap-2 Maneuver	283	191	-	-	190	-	-	-	-
Stage 1	-	-	-	-	262	-	-	-	-
Stage 2	341	265	-	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	19.1	27.5	0.3
HCM LOS	C	D	

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1
Capacity (veh/h)	1625	-	-	276	223
HCM Lane V/C Ratio	0.015	-	-	0.078	0.285
HCM Control Delay (s)	7.2	0.1	-	19.1	27.5
HCM Lane LOS	A	A	-	C	D
HCM 95th %tile Q(veh)	0	-	-	0.3	1.1

Intersection	
Int Delay, s/veh	5.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	141	23	0	0	6	3	92	790	23	0	0	0
Future Vol, veh/h	141	23	0	0	6	3	92	790	23	0	0	0
Conflicting Peds, #/hr	4	0	0	0	0	11	0	0	7	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	2	0	0	0	0	0	0	5	0	0	0	0
Mvmt Flow	160	26	0	0	7	3	105	898	26	0	0	0

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	674	1141	-	-	1128	480	0	0	0
Stage 1	0	0	-	-	1128	-	-	-	-
Stage 2	674	1141	-	-	0	-	-	-	-
Critical Hdwy	7.54	6.5	-	-	6.5	6.9	4.1	-	-
Critical Hdwy Stg 1	-	-	-	-	5.5	-	-	-	-
Critical Hdwy Stg 2	6.54	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4	-	-	4	3.3	2.2	-	-
Pot Cap-1 Maneuver	340	202	0	0	206	537	-	-	-
Stage 1	-	-	0	0	282	-	-	-	-
Stage 2	410	278	0	0	-	-	-	-	-
Platoon blocked, %								-	-
Mov Cap-1 Maneuver	329	201	-	-	205	533	-	-	-
Mov Cap-2 Maneuver	329	201	-	-	205	-	-	-	-
Stage 1	-	-	-	-	280	-	-	-	-
Stage 2	397	276	-	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	34.4	19.5	
HCM LOS	D	C	

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1
Capacity (veh/h)	-	-	-	302	258
HCM Lane V/C Ratio	-	-	-	0.617	0.04
HCM Control Delay (s)	-	-	-	34.4	19.5
HCM Lane LOS	-	-	-	D	C
HCM 95th %tile Q(veh)	-	-	-	3.8	0.1

APPENDIX E
SYNCHRO RESULTS
2039 BASE – PM PEAK

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	229	462	421	225	530	109
Future Volume (vph)	229	462	421	225	530	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1863	1583	1752	1881	1770	1538
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1863	1583	1752	1881	1770	1538
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	244	491	448	239	564	116
RTOR Reduction (vph)	0	388	0	0	0	74
Lane Group Flow (vph)	244	103	448	239	564	42
Confl. Peds. (#/hr)		2	1		1	2
Heavy Vehicles (%)	2%	2%	3%	1%	2%	5%
Turn Type	NA	Prot	Prot	NA	Prot	Prot
Protected Phases	2	2	1	6	8	8
Permitted Phases						
Actuated Green, G (s)	18.3	18.3	26.1	48.4	31.8	31.8
Effective Green, g (s)	18.3	18.3	26.1	48.4	31.8	31.8
Actuated g/C Ratio	0.21	0.21	0.30	0.55	0.36	0.36
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	386	328	518	1032	638	554
v/s Ratio Prot	c0.13	0.07	c0.26	0.13	c0.32	0.03
v/s Ratio Perm						
v/c Ratio	0.63	0.32	0.86	0.23	0.88	0.08
Uniform Delay, d1	31.9	29.6	29.4	10.3	26.5	18.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.4	0.6	14.0	0.1	13.8	0.1
Delay (s)	35.2	30.2	43.4	10.4	40.2	18.6
Level of Service	D	C	D	B	D	B
Approach Delay (s)	31.9			31.9	36.5	
Approach LOS	C			C	D	

Intersection Summary			
HCM 2000 Control Delay	33.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	88.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	347.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	87	81	312	145	541	0	0	0	26	752	57
Future Vol, veh/h	0	87	81	312	145	541	0	0	0	26	752	57
Conflicting Peds, #/hr	0	0	3	1	0	7	0	0	0	7	0	9
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	Free	-	-	None	-	-	None
Storage Length	-	-	120	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	16974	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	0	1	3	0	4	1	0	0	0	0	3	2
Mvmt Flow	0	93	86	332	154	576	0	0	0	28	800	61

Major/Minor	Minor2			Minor1						Major2		
Conflicting Flow All	-	903	843	986	933	-				7	0	0
Stage 1	-	896	-	7	7	-				-	-	-
Stage 2	-	7	-	979	926	-				-	-	-
Critical Hdwy	-	6.51	6.23	7.1	6.54	-				4.1	-	-
Critical Hdwy Stg 1	-	5.51	-	-	-	-				-	-	-
Critical Hdwy Stg 2	-	-	-	6.1	5.54	-				-	-	-
Follow-up Hdwy	-	4.009	3.327	3.5	4.036	-				2.2	-	-
Pot Cap-1 Maneuver	0	278	362	~ 229	264	0				1627	-	-
Stage 1	0	360	-	-	-	0				-	-	-
Stage 2	0	-	-	~ 304	345	0				-	-	-
Platoon blocked, %											-	-
Mov Cap-1 Maneuver	-	264	359	~ 123	251	-				1616	-	-
Mov Cap-2 Maneuver	-	264	-	~ 123	251	-				-	-	-
Stage 1	-	345	-	-	-	-				-	-	-
Stage 2	-	-	-	~ 163	330	-				-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	22.1	$ 1101.8	0.2
HCM LOS	C	F	

Minor Lane/Major Mvmt	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	264	359	147	-	1616	-	-
HCM Lane V/C Ratio	0.351	0.24	3.307	-	0.017	-	-
HCM Control Delay (s)	25.8	18.2	$ 1101.8	0	7.3	0	-
HCM Lane LOS	D	C	F	A	A	A	-
HCM 95th %tile Q(veh)	1.5	0.9	46.3	-	0.1	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	8	8	112	38	0	0	0	0	14	1130	13
Future Vol, veh/h	0	8	8	112	38	0	0	0	0	14	1130	13
Conflicting Peds, #/hr	0	0	11	8	0	0	0	0	0	2	0	5
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	2	0
Mvmt Flow	0	9	9	122	41	0	0	0	0	15	1228	14

Major/Minor	Minor2			Minor1						Major2		
Conflicting Flow All	-	1272	637	662	1279	-				2	0	0
Stage 1	-	1270	-	2	2	-				-	-	-
Stage 2	-	2	-	660	1277	-				-	-	-
Critical Hdwy	-	6.5	6.9	7.5	6.5	-				4.1	-	-
Critical Hdwy Stg 1	-	5.5	-	-	-	-				-	-	-
Critical Hdwy Stg 2	-	-	-	6.5	5.5	-				-	-	-
Follow-up Hdwy	-	4	3.3	3.5	4	-				2.2	-	-
Pot Cap-1 Maneuver	0	169	425	351	167	0				1634	-	-
Stage 1	0	241	-	-	-	0				-	-	-
Stage 2	0	-	-	423	239	0				-	-	-
Platoon blocked, %											-	-
Mov Cap-1 Maneuver	-	163	423	322	161	-				1631	-	-
Mov Cap-2 Maneuver	-	163	-	322	161	-				-	-	-
Stage 1	-	233	-	-	-	-				-	-	-
Stage 2	-	-	-	387	231	-				-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	21.5	40.5	0.2
HCM LOS	C	E	

Minor Lane/Major Mvmt	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	235	257	1631	-	-
HCM Lane V/C Ratio	0.074	0.634	0.009	-	-
HCM Control Delay (s)	21.5	40.5	7.2	0.1	-
HCM Lane LOS	C	E	A	A	-
HCM 95th %tile Q(veh)	0.2	3.9	0	-	-

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	10	5	77	16	0	0	0	0	55	1195	10
Future Vol, veh/h	0	10	5	77	16	0	0	0	0	55	1195	10
Conflicting Peds, #/hr	0	0	4	8	0	0	0	0	0	7	0	3
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	2	0	0	0	0	0	0	2	0
Mvmt Flow	0	11	5	81	17	0	0	0	0	58	1258	11

Major/Minor	Minor2			Minor1						Major2		
Conflicting Flow All	-	1390	646	766	1395	-				7	0	0
Stage 1	-	1383	-	7	7	-				-	-	-
Stage 2	-	7	-	759	1388	-				-	-	-
Critical Hdwy	-	6.5	6.9	7.54	6.5	-				4.1	-	-
Critical Hdwy Stg 1	-	5.5	-	-	-	-				-	-	-
Critical Hdwy Stg 2	-	-	-	6.54	5.5	-				-	-	-
Follow-up Hdwy	-	4	3.3	3.52	4	-				2.2	-	-
Pot Cap-1 Maneuver	0	144	419	292	143	0				1627	-	-
Stage 1	0	213	-	-	-	0				-	-	-
Stage 2	0	-	-	365	212	0				-	-	-
Platoon blocked, %											-	-
Mov Cap-1 Maneuver	-	125	418	243	124	-				1616	-	-
Mov Cap-2 Maneuver	-	125	-	243	124	-				-	-	-
Stage 1	-	186	-	-	-	-				-	-	-
Stage 2	-	-	-	299	186	-				-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	29.4	36.5	0.7
HCM LOS	D	E	

Minor Lane/Major Mvmt	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	163	209	1616	-	-
HCM Lane V/C Ratio	0.097	0.468	0.036	-	-
HCM Control Delay (s)	29.4	36.5	7.3	0.4	-
HCM Lane LOS	D	E	A	A	-
HCM 95th %tile Q(veh)	0.3	2.3	0.1	-	-

Intersection	
Int Delay, s/veh	14

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	117	190	15	152	0	0	0	0	49	1032	201
Future Vol, veh/h	0	117	190	15	152	0	0	0	0	49	1032	201
Conflicting Peds, #/hr	0	0	2	0	0	0	0	0	0	3	0	5
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	100	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	0	3	3	8	2	0	0	0	0	0	2	1
Mvmt Flow	0	129	209	16	167	0	0	0	0	54	1134	221

Major/Minor	Minor2			Minor1						Major2		
Conflicting Flow All	-	1361	685	745	1471	-				3	0	0
Stage 1	-	1358	-	3	3	-				-	-	-
Stage 2	-	3	-	742	1468	-				-	-	-
Critical Hdwy	-	6.56	6.96	7.66	6.54	-				4.1	-	-
Critical Hdwy Stg 1	-	5.56	-	-	-	-				-	-	-
Critical Hdwy Stg 2	-	-	-	6.66	5.54	-				-	-	-
Follow-up Hdwy	-	4.03	3.33	3.58	4.02	-				2.2	-	-
Pot Cap-1 Maneuver	0	146	388	292	~ 126	0				1632	-	-
Stage 1	0	213	-	-	-	0				-	-	-
Stage 2	0	-	-	360	190	0				-	-	-
Platoon blocked, %											-	-
Mov Cap-1 Maneuver	-	~ 123	386	-	~ 106	-				1627	-	-
Mov Cap-2 Maneuver	-	~ 123	-	-	~ 106	-				-	-	-
Stage 1	-	180	-	-	-	-				-	-	-
Stage 2	-	-	-	40	~ 161	-				-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	77.2		0.7
HCM LOS	F	-	

Minor Lane/Major Mvmt	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	123	386	-	1627	-	-
HCM Lane V/C Ratio	1.045	0.541	-	0.033	-	-
HCM Control Delay (s)	162.2	24.8	-	7.3	0.5	-
HCM Lane LOS	F	C	-	A	A	-
HCM 95th %tile Q(veh)	7.3	3.1	-	0.1	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	112	0	0	404	634	642
Future Volume (vph)	112	0	0	404	634	642
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	4.0
Lane Util. Factor	1.00			0.95	1.00	1.00
Frpb, ped/bikes	1.00			1.00	1.00	1.00
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	1863			3610	1787	1599
Flt Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	1863			3610	1787	1599
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	123	0	0	444	697	705
RTOR Reduction (vph)	0	0	0	0	0	343
Lane Group Flow (vph)	123	0	0	444	697	362
Confl. Peds. (#/hr)					8	
Heavy Vehicles (%)	2%	0%	0%	0%	1%	1%
Turn Type	NA			NA	Prot	Perm
Protected Phases	4			4	2	
Permitted Phases						2
Actuated Green, G (s)	8.2			8.2	17.1	17.1
Effective Green, g (s)	8.2			8.2	17.1	17.1
Actuated g/C Ratio	0.25			0.25	0.51	0.51
Clearance Time (s)	4.0			4.0	4.0	4.0
Vehicle Extension (s)	0.2			0.2	0.2	0.2
Lane Grp Cap (vph)	458			888	917	821
v/s Ratio Prot	0.07			c0.12	c0.39	
v/s Ratio Perm						0.23
v/c Ratio	0.27			0.50	0.76	0.44
Uniform Delay, d1	10.1			10.8	6.5	5.1
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.1			0.2	3.4	0.1
Delay (s)	10.2			10.9	9.8	5.2
Level of Service	B			B	A	A
Approach Delay (s)	10.2			10.9	7.5	
Approach LOS	B			B	A	

Intersection Summary			
HCM 2000 Control Delay	8.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	33.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	53.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	43	0	142	1209	0	0
Future Vol, veh/h	43	0	142	1209	0	0
Conflicting Peds, #/hr	7	0	15	0	0	0
Sign Control	Stop	Stop	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	-	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	3	3	0	0
Mvmt Flow	47	0	156	1329	0	0

Major/Minor	Minor2		Major1	
Conflicting Flow All	999	-	15	0
Stage 1	15	-	-	-
Stage 2	984	-	-	-
Critical Hdwy	6.8	-	4.16	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-
Follow-up Hdwy	3.5	-	2.23	-
Pot Cap-1 Maneuver	244	0	1594	-
Stage 1	-	0	-	-
Stage 2	327	0	-	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	147	-	1571	-
Mov Cap-2 Maneuver	147	-	-	-
Stage 1	-	-	-	-
Stage 2	322	-	-	-

Approach	EB	NB
HCM Control Delay, s	40.7	1.9
HCM LOS	E	

Minor Lane/Major Mvmt	NBL	NBT	EBLn1
Capacity (veh/h)	1571	-	147
HCM Lane V/C Ratio	0.099	-	0.321
HCM Control Delay (s)	7.5	1.2	40.7
HCM Lane LOS	A	A	E
HCM 95th %tile Q(veh)	0.3	-	1.3

Intersection	
Int Delay, s/veh	1.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	123	1228	82	0	0
Future Vol, veh/h	0	123	1228	82	0	0
Conflicting Peds, #/hr	0	15	0	23	0	0
Sign Control	Stop	Stop	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	-
Grade, %	0	-	0	-	-	0
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	3	3	0	0
Mvmt Flow	0	135	1349	90	0	0

Major/Minor	Minor1		Major1	
Conflicting Flow All	-	758	0	0
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	6.9	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	3.3	-	-
Pot Cap-1 Maneuver	0	354	-	-
Stage 1	0	-	-	-
Stage 2	0	-	-	-
Platoon blocked, %			-	-
Mov Cap-1 Maneuver	-	346	-	-
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	WB	NB
HCM Control Delay, s	21.9	0
HCM LOS	C	

Minor Lane/Major Mvmt	NBT	NBR	WBLn1
Capacity (veh/h)	-	-	346
HCM Lane V/C Ratio	-	-	0.391
HCM Control Delay (s)	-	-	21.9
HCM Lane LOS	-	-	C
HCM 95th %tile Q(veh)	-	-	1.8

Intersection	
Int Delay, s/veh	5.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	45	13	0	0	36	25	68	1228	62	0	0	0
Future Vol, veh/h	45	13	0	0	36	25	68	1228	62	0	0	0
Conflicting Peds, #/hr	15	0	0	0	0	20	8	0	13	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	0	0	0	3	0	2	3	6	0	0	0
Mvmt Flow	48	14	0	0	39	27	73	1320	67	0	0	0

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	854	1554	-	-	1521	727	8	0	0
Stage 1	8	8	-	-	1513	-	-	-	-
Stage 2	846	1546	-	-	8	-	-	-	-
Critical Hdwy	7.5	6.5	-	-	6.56	6.9	4.14	-	-
Critical Hdwy Stg 1	-	-	-	-	5.56	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	-	-	4.03	3.3	2.22	-	-
Pot Cap-1 Maneuver	256	114	0	0	116	371	1611	-	-
Stage 1	-	-	0	0	179	-	-	-	-
Stage 2	328	178	0	0	-	-	-	-	-
Platoon blocked, %								-	-
Mov Cap-1 Maneuver	133	89	-	-	90	366	1599	-	-
Mov Cap-2 Maneuver	133	89	-	-	90	-	-	-	-
Stage 1	-	-	-	-	140	-	-	-	-
Stage 2	175	140	-	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	63.7	58	1
HCM LOS	F	F	

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1
Capacity (veh/h)	1599	-	-	120	130
HCM Lane V/C Ratio	0.046	-	-	0.52	0.505
HCM Control Delay (s)	7.4	0.7	-	63.7	58
HCM Lane LOS	A	A	-	F	F
HCM 95th %tile Q(veh)	0.1	-	-	2.4	2.4

Intersection	
Int Delay, s/veh	36.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	142	23	0	0	8	6	162	1155	38	0	0	0
Future Vol, veh/h	142	23	0	0	8	6	162	1155	38	0	0	0
Conflicting Peds, #/hr	3	0	0	0	0	10	1	0	8	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	3	0	0	0	17	0	2	3	0	0	0	0
Mvmt Flow	149	24	0	0	8	6	171	1216	40	0	0	0

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	965	1607	-	-	1587	646	1	0	0
Stage 1	1	1	-	-	1586	-	-	-	-
Stage 2	964	1606	-	-	1	-	-	-	-
Critical Hdwy	7.56	6.5	-	-	6.84	6.9	4.14	-	-
Critical Hdwy Stg 1	-	-	-	-	5.84	-	-	-	-
Critical Hdwy Stg 2	6.56	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.53	4	-	-	4.17	3.3	2.22	-	-
Pot Cap-1 Maneuver	208	106	0	0	93	419	1620	-	-
Stage 1	-	-	0	0	144	-	-	-	-
Stage 2	272	166	0	0	-	-	-	-	-
Platoon blocked, %								-	-
Mov Cap-1 Maneuver	~ 133	68	-	-	59	416	1618	-	-
Mov Cap-2 Maneuver	~ 133	68	-	-	59	-	-	-	-
Stage 1	-	-	-	-	92	-	-	-	-
Stage 2	157	106	-	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	$ 324.9	50.9	1.7
HCM LOS	F	F	

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1
Capacity (veh/h)	1618	-	-	117	93
HCM Lane V/C Ratio	0.105	-	-	1.484	0.158
HCM Control Delay (s)	7.5	1	-	$ 324.9	50.9
HCM Lane LOS	A	A	-	F	F
HCM 95th %tile Q(veh)	0.4	-	-	12.4	0.5

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

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MEMORANDUM

DATE: December 11, 2020

TO: Nathan Polanski | MIG
Will Norris | City of Hood River

FROM: Rochelle Starrett, John Bosket | DKS

SUBJECT: Hood River Heights District Urban Design & Engineering Existing Traffic Analysis Addendum — Project #20203-000

The Hood River Heights Urban Renewal Agency is currently exploring opportunities to improve the 12th and 13th Street couplet (OR 281) in the Hood River Heights District. This memorandum supplements the previous traffic analysis memorandum, completed by Toole Design Group[1] with a discussion of historical safety trends, freight traffic patterns, and relevant traffic impact studies from recently proposed development.

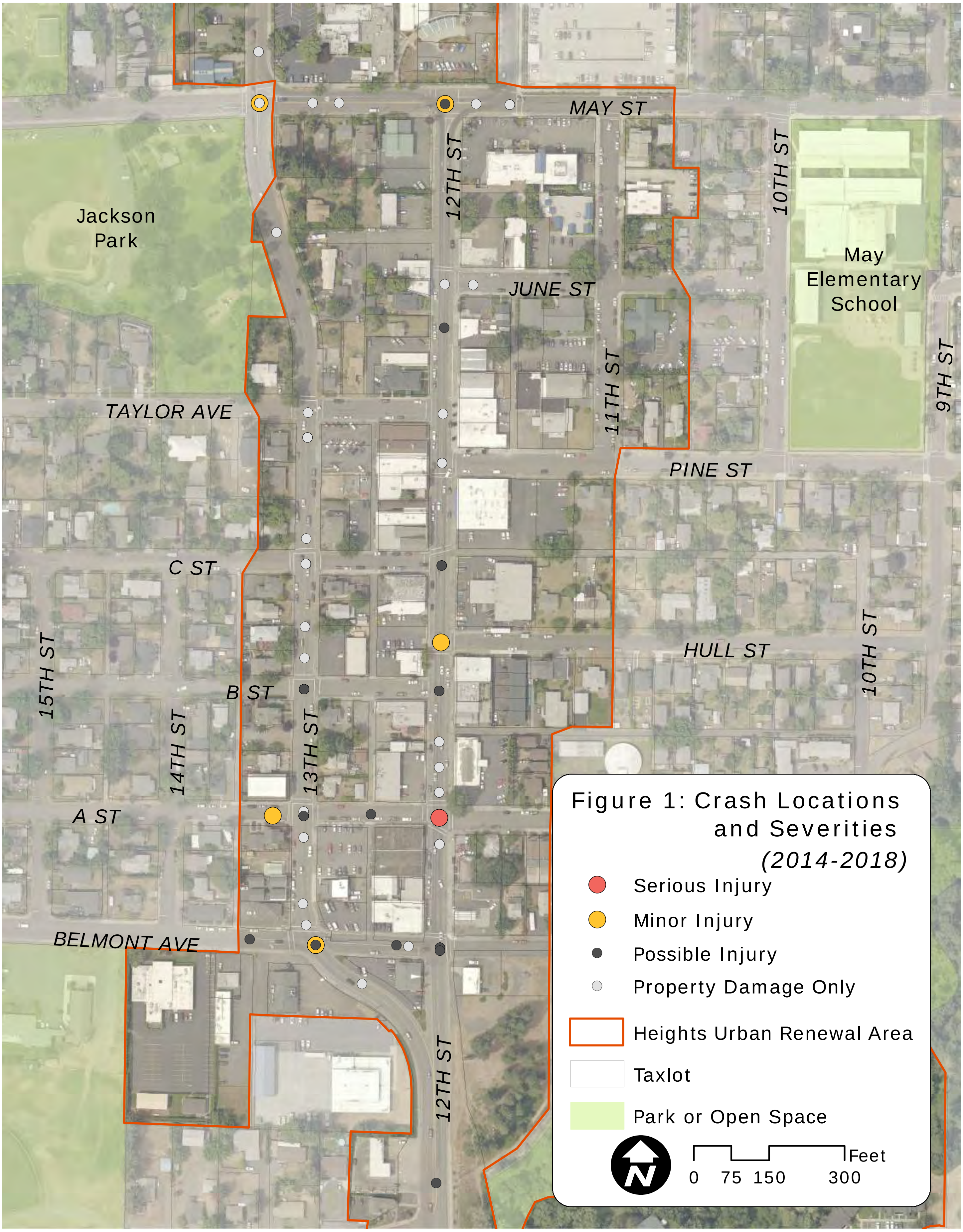
SAFETY TRENDS

The five most recent years of available crash data (2014 to 2018) was obtained from ODOT to identify crash trends in the 12th and 13th Street couplet project area. Between 2014 and 2018, 108 crashes occurred in the study area, an average of approximately 22 crashes each year.

CRASH LOCATIONS AND FREQUENCIES

The locations of crashes that occurred within the study area are shown in Figure 1. Nearly 80% of crashes occurred at intersections in the study area (83 of 108 crashes). Crashes were most common at the intersection of May Street/13th Street, which recorded 27 crashes between 2014 and 2018. The intersections of Belmont Avenue/13th Street, A Street/13th Street, and B Street/13th Street recorded 6 crashes each within the same time period. Crashes are more common on the couplet between Taylor Avenue and Belmont Avenue, on May Street approaching the 12th and 13th Street intersections, and on 13th Street approaching the May Street intersection compared to other local roads within the study area.

[1] Toole Design. *Hood River Heights Urban Renewal Area – Transportation Study.* February 2020.


MAY ST
12TH ST
Jackson Park
10TH ST
May Elementary School
JUNE ST
9TH ST
11TH ST
TAYLOR AVE
PINE ST
C ST
HULL ST
15TH ST
B ST
10TH ST
14TH ST
13TH ST
A ST
BELMONT AVE
12TH ST
Figure 1: Crash Locations and Severities (2014-2018)
Serious Injury
Minor Injury
Possible Injury
Property Damage Only
Heights Urban Renewal Area
Taxlot
Park or Open Space
N
Feet
0 75 150 300

CRASH TYPES AND CAUSES

Most crashes in the study area were either angle (32%), turning movement (25%), or rear end (19%) type crashes. A total of five crashes involved a pedestrian or bicyclist between 2014 and 2018. The frequency of crash types is summarized below in Figure 2.

All of the angle and turning crashes occurred at unsignalized intersections. Over 65% of the crashes (23 of 35 angle crashes) occurred when a driver did not yield after stopping at the stop sign which indicates poor visibility could be a contributing factor to these crashes. Most turning movement crashes were caused by either an improper turn (12 of 27 turning crashes) or failure to yield (12 of 27 crashes). In total, 6 of the turning movement crashes and 24 of the angle crashes occurred near the intersection of 13th Street/May Street which could be due to the unique geometry at this intersection.

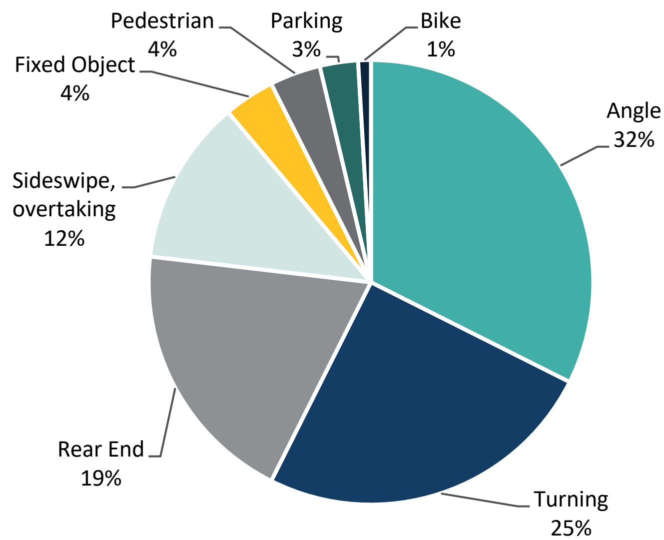


FIGURE 2: SUMMARY OF CRASH TYPES (2014-2018)

The four most common causes for crashes in the study area were:

1. Failure to Yield (40%)
2. Improper Turn (12%)
3. Following too Close (11%)
4. Passing a Stop Sign (8%)

CRASH SEVERITY

Crashes that occurred within the study area were generally not severe. Only one crash between 2014 and 2018 resulted in serious injuries while six crashes resulted in minor injuries; no fatalities were recorded in the study area. The majority of crashes resulted in only property damage (69 of 108 crashes) while another 32 crashes resulted in a possible injury. Figure 1 shows the location of all crashes within the study area classified by their severity.

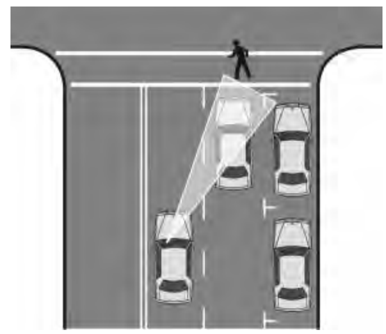
OTHER CRASH FACTORS

Weather was not a significant contributing cause to crashes within the study area. Over 80% of crashes took place during the day (90 of 108 crashes) while over 70% of crashes occurred when it was clear (79 of 108 crashes) or the roadway was dry (78 of 108 crashes). Only 11 crashes were reported during rainy conditions although 14 crashes occurred with wet roadway conditions.

Driver impairment did not play a significant role in study area crashes. Only 3 of 108 crashes involved alcohol use; no crashes involved drug use.

CRASH RISK FACTORS

The existing street system in the study area was also reviewed to identify other risk factors which could lead to crashes. Non-standard intersection geometries at the intersections of 12th Street/May Street and 13th Street/May Street could confuse drivers unfamiliar with the area or lead to risky behaviors. The 12th Street/May Street intersection is actually a pair of two closely spaced offset intersections. The west intersection is controlled by a traffic signal while the east intersection is unsignalized with stop-control for the southbound and westbound approaches. The 13th Street/May Street intersection is a two-way stop control intersection with turn restrictions enforced through a painted median delineated with tubular markers. The westbound right turn is uncontrolled (unless a pedestrian is crossing) while the westbound left turn has a dedicated receiving lane which could confuse drivers on appropriate yielding.



BY YIELDING CAR

Outside of these spot locations, on-street parking is allowed on the couplet which can decrease visibility for the stop-controlled side streets and could contribute to riskier driver behaviors. Having two through travel lanes on both 12th and 13th Street also creates an opportunity for "double threat" crashes where a stopped vehicle occludes a pedestrian crossing from vehicles in the adjacent travel lane, as illustrated in Figure 3.

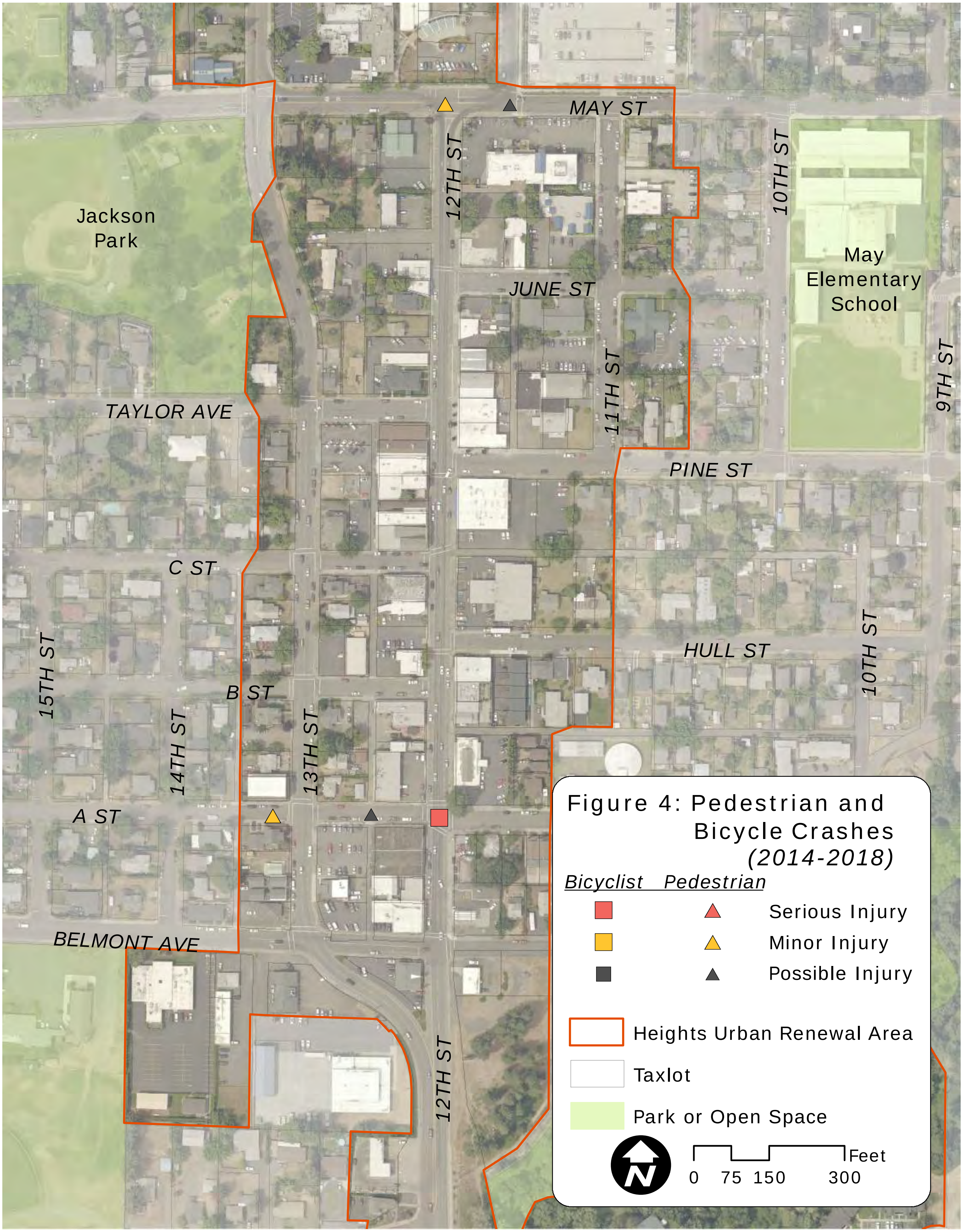
SAFETY PRIORITY INDEX SYSTEM

The Safety Priority Index System (SPIS) is a method developed by ODOT for identifying hazardous locations on and off state highways. The score for each 0.10-mile segment of highway is based on three years of crash data, considering crash frequency, rate, and severity. SPIS then ranks all segments throughout the state by score and identifies the top 5 percent and top 10 percent segments, which are generally prioritized for funding and mitigation. No roadway segments within the project area have been identified as top SPIS locations since 2015.

PEDESTRIAN & BICYCLE SAFETY

Crashes involving pedestrians and bicyclists were also flagged for further review. Between 2014 and 2018, four crashes involved a pedestrian and one crash involved a cyclist, identified below in Figure 4. Two pedestrian crashes occurred at the intersection of 12th Street/May Street and two pedestrian crashes occurred on A Street. The bicyclist crash took place at the intersection of 12th Street/Wilson Street. Contributing factors for each crash are identified below.

Two crashes involving pedestrians were recorded between 2014 and 2018 at the intersection of 12th Street/May Street; both crashes took place during the day. One crash occurred when a vehicle travelling on May Street disregarded the traffic signal and struck a pedestrian in the crosswalk, leading to minor injuries. An icy roadway surface might have contributed to this crash. The other crash occurred at the unsignalized crosswalk on the east leg of the offset intersection at May Street



MAY ST
12TH ST
10TH ST
Jackson Park
May Elementary School
JUNE ST
9TH ST
11TH ST
TAYLOR AVE
PINE ST
C ST
HULL ST
15TH ST
B ST
10TH ST
14TH ST
13TH ST
A ST
BELMONT AVE
12TH ST
Figure 4: Pedestrian and Bicycle Crashes (2014-2018)
Bicyclist Pedestrian
Serious Injury
Minor Injury
Possible Injury
Heights Urban Renewal Area
Taxlot
Park or Open Space
N
Feet
0 75 150 300

when a driver failed to yield right of way to a pedestrian in the crosswalk. This crash led to a possible injury.

The crashes involving pedestrians on A Street both occurred midblock. The crash to the west of 13th Street occurred during the day when a vehicle backing out of a driveway struck a pedestrian who was in the roadway. This crash led to a minor injury. A nighttime crash also occurred on A Street between 12th and 13th Street when a pedestrian crossed midblock and was struck by a vehicle travelling on A Street, leading to possible injury.

One crash involving a bicyclist took place at the intersection of 12th Street/Wilson Street. This crash occurred when a vehicle travelling northbound on 12th Street did not yield right of way to a cyclist crossing. Serious injuries were sustained in this crash.

FREIGHT TRAFFIC PATTERNS

Today, OR 281 is not a designated freight route in the Oregon Highway Plan or a Reduction Review Route. Heavy vehicles account for 2.4 percent of traffic on the OR 281 couplet on an average day, or less than 300 trucks per day per direction[2]. Traffic counts collected on September 12, 2019, provide a limited snapshot of freight patterns. These counts indicate that the proportion of freight traffic was higher during the AM peak on OR 281 where heavy vehicles accounted for between 5 and 6 percent of the traffic on the couplet. The existing counts are available as part of the previous traffic analysis completed by Toole Design Group that was previously referenced. Most City streets in the study area do not carry significant volumes of heavy vehicle traffic.

While the amount of freight traffic on OR 281 through the study area is not significantly high, freight vehicles do need to pass through the area and large trucks need to be able to make deliveries to businesses within the Heights. Therefore, freight traffic movement on OR 281 should be considered during the concept development process. Each identified concept should ensure that the proposed intersection geometry can accommodate freight through movements on OR 281, including any turns required to travel along the couplet (*e.g.,* northbound left turn at 12th Street/May Street, westbound right turn at 13th Street/May Street).

Furthermore, any proposed improvements at the intersection of 13th Street/May Street should also consider the existing uphill climb for southbound traffic approaching this intersection. While the construction of a traffic signal at this intersection has been identified as the long-term solution in the city's Transportation System Plan (TSP), it may be challenging for heavy vehicles to stop and start on the steep grade during inclement weather. Therefore, when developing solutions for this location consideration should be given to minimizing southbound vehicle queuing or the need for drivers to stop.

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[2] ODOT. *TransGIS*. https://gis.odot.state.or.us/transgis/

RECENT TRAFFIC IMPACT STUDIES

Four recent traffic studies were completed for proposed developments in the vicinity of the study area. Details of the proposed developments and their potential impact on traffic patterns within the study area were reviewed. These developments include:

- Indian Creek Townhomes located at 9th Street/9th Court constructed 30 townhouses and 9 single family homes in 2019, which added an estimated 26 PM peak hour trips to Hood River's transportation network. Many of the trips estimated to be generated from this development may have been captured in the 2019 traffic counts collected for the Hood River Heights traffic study.
- Parkside Mixed Use Development located at 13th Street/Taylor Avenue will include 1,000 square feet of retail and 32 apartment units with an estimated year of opening in 2021. The proposed development is expected to generate 28 PM peak hour trips.
- One Community Health located at 849 Pacific Avenue is planning to construct a new building. This project will replace the existing 16,494 square foot health facility with a 36,500 square foot building, anticipated to open in 2020. The expansion is expected to generate 72 net new vehicle trips during the PM peak.
- May Street Elementary School located at 911 May Street was recently replaced to increase the enrollment capacity from 505 students to 650 students. The increase in students was expected to generate 22 PM peak hour trips. The new school opened in Fall 2019, so trips generated from this development are captured in the Hood River Heights Urban Renewal Area traffic study.

In total, these developments are expected to add at least 100 trips to Hood River's transportation system during the PM peak hour which were not previously captured in the 2019 traffic counts used for the Hood River Heights Urban Renewal Area traffic study. Each of these studies did not identify significant transportation impacts due to the development, and in total these trips will not significantly increase traffic on the OR 281 couplet. These studies did reaffirm the need for identified TSP projects at the intersections of 13th Street/May Street, 13th Street/Belmont Avenue, and 12th Street/Belmont Avenue.

DKS

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TECHNICAL MEMORANDUM

DATE: February 28, 2022

TO: Nathan Polanski, PE | MIG

FROM: Alex Correa; Will McKenzie; Kayla Fleskes, PE; John Bosket, PE | DKS Associates

SUBJECT: Hood River Heights Streetscape Plan - Alternatives Transportation Evaluation — Project #20203-000

This memorandum evaluates transportation conditions associated with alternatives being considered for improving multimodal travel within the Hood River Heights District, especially 12th and 13th Streets between May Street and the end of the couplet south of Belmont Avenue/Union Street. It is anticipated that this evaluation will act as a supplement to a larger evaluation of each alternative's ability to meet the project goals. The following sections provide a comparison of each alternative's strengths and weaknesses from the perspectives of travelers driving, walking, biking, and using transit (in the future).

ALTERNATIVES EVALUATED

Concept drawings of the alternatives evaluated from the Heights Streetscape Plan project are included in Appendix A. Below is a summary of the major elements of each alternative and key assumptions made for the evaluation process that are not explicitly shown in the conceptual layouts.

- Design Alternative 1: Two-Lane, Two-Way Circulation
  - Both 12th Street and 13th Street are converted to two-lane, two-way streets. 13th Street includes a separated bike lane in both directions, but all on-street parking is removed.
  - 13th Street/May Street and 13th Street/Belmont Avenue were evaluated under conditions with a traffic signal and with a roundabout.
  - Under the assumption of a traffic signal, the westbound lane figuration at 13th Street/May Street is assumed to be a dedicated left turn lane and a through/right lane rather than as drawn with a dedicated right turn lane and a through/left lane. This would require the through lane alignment to be adjusted through the intersection.
- Design Alternative 2: One-Lane, One-Way Circulation
  - Both 12th Street and 13th Street remain as one-way streets but are reduced to one lane in each direction.

- 13th Street/May Street was evaluated under conditions with a traffic signal and with a roundabout.
- 12th Street/Belmont Avenue and 12th Street/13th Street were evaluated as a joined "dog bone" roundabout where both intersections are fed into the same roundabout (See concept drawings in Appendix A for details).
- Union Street is assumed to be changed to right in/right out access and does not directly tie into the roundabout.

- Design Alternative 3: Hybrid Circulation
  - 13th Street is a two-way, two-lane street with a center turn lane/median between 13th Street/Taylor Avenue and 13th Street/12th Street.
  - 13th Street/May Street and 13th Street/Belmont Avenue were evaluated under conditions with a traffic signal and with a roundabout.
  - Under the assumption of a traffic signal, the westbound lane configuration at 13th Street/May Street is assumed to be a dedicated left turn lane and a through/right lane rather than as drawn with a dedicated right turn lane and a through/left lane. This would require the through lane alignment to be adjusted through the intersection.

ALTERNATIVES EVALUATION

The alternatives were evaluated using performance metrics that describe conditions important to each of the major modes of travel in the corridor and that align with the goals of the project. The following sections describe conditions for people driving, walking, biking, and using transit – beginning with conditions for people driving since the alternatives being considered will significantly alter travel patterns and speeds by automobile, which will in turn influence comfort and safety for the other modes of travel.

CONDITIONS FOR PEOPLE DRIVING

The nature of all alternatives being considered involves a reallocation of the public right-of-way with the purpose of improving the balance of comfort and convenience for all modes of travel. **Each alternative lessens the amount of comfort and convenience for motor vehicle travel, which in the past has been given priority, but by varying degrees.** The alternatives were evaluated for motor vehicle mobility using the following three-step process:

1. Traffic Volume Development – Future year traffic volumes were re-distributed throughout the Hood River transportation system due to changes in circulation brought on by characteristics of each design alternative such as intersection lane configurations, one-way vs two-way streets, number of lanes on each street, etc. Each alternative has a unique traffic volume set based on the re-distribution of trips in the area.

2. Intersection Performance Evaluation - Performance for all intersections within the study area was evaluated, utilizing the volumes developed in Step 1. Signalized and stop-controlled intersection calculations were performed using Synchro 10th edition and Highway Capacity Manual 6th Edition methodology. Roundabout intersection calculations were performed using PTV Vistro 2021 and Highway Capacity Manual 6th Edition methodology.

Intersection delay, level of service, volume-to-capacity ratio (v/c), travel time, and vehicle queuing, were all used to evaluate mobility.

3. Alternative Mitigation – In cases where mobility deficiencies for motor vehicle travel were found to be significant, reasonable modifications to the original concept to improve conditions were tested.

Evaluation criteria for motor vehicle travel are not only limited to mobility. Accessibility for truck and emergency vehicles, impacts on property access, and safety were all evaluated for each alternative as well. For each alternative, the degree to which the criteria are supported by each of the main corridors along 12th Street and 13th Street has been rated, with brief descriptions provided below and a summary chart provided in Table 5.

TRAFFIC VOLUME DEVELOPMENT AND DIVERSION IMPACTS

12th and 13th Streets currently form a couplet through the Hood River Heights District. Each of the alternatives makes modifications to circulation on 12th Street, 13th Street, and May Street. To understand future traffic volume shifts based on the changes in circulation, each of the alternatives were coded into the Hood River travel forecasting model developed for the Hood River Transportation System Plan (TSP). Based on the changes in circulation identified in the model, the future 2039 "No-Build" traffic volumes[1] were adjusted at each intersection.

In general, the following adjustments were made for each alternative:

- Alternative 1
  - Both northbound and southbound traffic volumes were split between 12th Street and 13th Street with the conversion to two-way traffic. Approximately 55 percent of northbound traffic is expected to remain on 12th Street, with 45 percent utilizing 13th Street instead.
  - Southbound volumes on 12th Street are significantly lower than southbound volumes on 13th Street given the limited connectivity north of May Street, representing only 15 to 20 percent of all traffic traveling southbound.
  - There is a slight increase in eastbound trips along May Street to the west of 13th Street as the eastbound left turn at May Street/13th Street, which is not allowed today, is allowed under Alternative 1.
  - With northbound travel now allowed on 13th Street, the number of northbound left turning vehicles at May Street/12th Street that subsequently turn right at 13th Street is reduced by approximately 80 percent.
- Alternative 2
  - Alternative 2 results in more diversion to the east and west than the other alternatives, but the amount of diverted traffic is relatively minor due to the limited north-south connectivity in the vicinity. To the west, about 75 p.m. peak hour southbound trips could be expected to divert to 22nd Street and Belmont Avenue. This is expected to increase eastbound right turns at 13th Street/Belmont Avenue by nearly 90 percent. To the east, where connectivity is

[1] Hood River Heights Urban Renewal Area – Transportation Study, Toole Design, February 7, 2020.

significantly more limited, there is the potential for a small amount (up to 25 p.m. peak hour trips) of trips to divert to local streets like 7th Street and Pine Street.
    - There is a slight increase in eastbound trips along May Street to the west of 13th Street as the eastbound left turn at May Street/13th Street, which is not allowed today, is allowed under Alternative 1.
- Alternative 3
    - Alternative 3 sees a slightly higher shift in northbound traffic to 13th Street compared to Alternative 1, with approximately 65 percent utilizing 13th Street and 35 percent utilizing 12th Street.
    - There is a slight increase in eastbound trips along May Street to the west of 13th Street as the eastbound left turn at May Street/13th Street, which is not allowed today, is allowed under Alternative 1.

The average daily traffic volumes projected for the primary travel corridors of 12th Street, 13th Street, and May Street as a result of the circulation changes in each alternative are shown in Table 1. For reference, average daily traffic volumes today are approximately 9,700-10,600 on 12th and 13th Street and 9,400 on May Street[2].

Alternative 2 is expected to serve a similar amount of daily traffic on 12th Street and 13th Street as the No-Build conditions. Daily trips significantly increase on 13th Street in both Alternative 3 and Alternative 1 as 13th Street becomes the more natural through route. A corresponding decrease in daily traffic occurs on 12th Street in Alternatives 1 and 3. Daily trips increase more significantly on 13th Street in Alternative 3, as 13th Street serves both northbound and southbound traffic while 12th Street only serves northbound traffic and would be designed to be a slower "people street". Under both alternatives, 13th Street would serve a significant amount of daily traffic in a single lane per direction (for reference, Cascade Avenue today serves approximately 12,000-14,000 vehicles per day).

Traffic on May Street between 12th Street and 13th Street decreases in Alternative 1 and Alternative 3 as northbound traffic no longer needs to turn left at 12th Street and right on 13th Street to travel through the Heights.

[2] 2020 data obtained from ODOT TransGIS https://gis.odot.state.or.us/transGIS/

TABLE 1. APPROXIMATE 2039 DAILY TRAFFIC VOLUMES ON AREA STREETS

STREET	APPROXIMATE 2039 DAILY TRAFFIC VOLUMES			
	NO-BUILD	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3
12TH STREET (BELMONT TO MAY)	13,000	10,000	13,000	6,000
13TH STREET (MAY TO BELMONT)	13,000	16,000	13,000	20,000
MAY STREET (12TH TO 13TH)	9,500	6,500	11,000	8,000

INTERSECTION PERFORMANCE EVALUATION

Intersection operations were analyzed in Synchro/SimTraffic software and PTV Vistro 2021 using Highway Capacity Manual 6th Edition methodology to understand the impact of the various alternatives. Performance measures used for this analysis include volume-to-capacity (v/c) ratios, seconds of control delay, and levels of service (LOS). Intersection operations and queueing reports are included in Appendix B to E. Table 2 lists the intersection operations for each alternative, as well as the TSP Build alternative, which maintains the existing traffic circulation and lane configuration but adds a traffic signal at 13th Street/May Street and 13th Street/Belmont Avenue. Both roundabouts and traffic signals were tested at the major intersections for each of the alternatives, as specific intersection control is not necessarily a requirement of the broader circulation changes and active transportation improvements identified in each alternative.

13th Street, 12th Street, and May Street between 12th and 13th Streets are under the jurisdiction of the Oregon Department of Transportation (ODOT)[3], while all other streets analyzed in this study are under the jurisdiction of the City of Hood River. For the ODOT roadways, the adopted mobility target is a v/c ratio at or below 0.95[4]. For all other roadways, the City of Hood River's adopted mobility standard is LOS D or better.

While ODOT's adopted mobility target ($v/c \leq 0.95$) already allows for a considerable amount of congestion, ODOT would allow more ($v/c \leq 1.0$) if this area were designated as a Special Transportation Area. Special Transportation Areas are intended to be areas with compact, mixed-use development and well-developed transit, bicycle, and pedestrian facilities, which aligns with the vision for the Heights. Therefore, for planning purposes, a maximum v/c ratio threshold of 1.0 will be used to indicate when there is too much congestion at intersections. Similarly a LOS F condition

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[3] OR 281 is a state highway routed over a City street, where ODOT maintains jurisdiction between the curbs.

[4] Typically, ODOT would design to lower v/c ratios in the Highway Design Manual when planning for improvement projects. However, the v/c ratios in the 1999 Oregon Highway Plan are more consistent with the long-range vision for this area as expressed by the City. Therefore, for the purpose of this plan, it is assumed that ODOT would not require designing future improvements to meet the Highway Design Manual standards.

will be used to identify areas where delays would be excessively long, even where v/c ratios are less than 1.0.

As presented in Table 2, there are areas in each alternative where mobility deficiencies exist. The TSP Build alternative performs the best at the major bottlenecks at 13th Street/May Street and 13th Street/Belmont Avenue, as there are two southbound through lanes and no conflicting northbound traffic. Without additional capacity enhancements, neither roundabouts nor signalized intersections are able to serve the expected demand at those intersections in any of the alternatives, with v/c ratios above 1.0 (with the exception of a signalized intersection at 13th Street/Belmont Avenue in Alternative 3). 12th Street/May Street operates well below capacity, regardless of alternative.

TABLE 2. INTERSECTION OPERATIONS RESULTS (2039 WEEKDAY PM PEAK HOUR)

STUDY INTERSECTION	TSP BUILD			ALTERNATIVE 1			ALTERNATIVE 2			ALTERNATIVE 3		
	LOS	DELAY	V/C	LOS	DELAY	V/C	LOS	DELAY	V/C	LOS	DELAY	v/c
SIGNALIZED												
13TH STREET / MAY STREET	C	31	0.96	D	36	**1.11**	**F**	**96**	**1.47**	D	37	**1.12**
12TH STREET / MAY STREET	C	23	0.62	C	27	0.66	D	41	0.76	C	20	0.32
13TH STREET / BELMONT AVE	A	9	0.71	D	35	**1.55**	N/A	N/A	N/A	C	26	0.92
ROUNDABOUT												
13TH STREET / MAY STREET	N/A	N/A	N/A	E	50	**1.14**	E	45	**1.09**	**F**	**92**	**1.25**
13TH STREET / BELMONT AVE	N/A	N/A	N/A	E	47	**1.09**	N/A	N/A	N/A	**F**	**59**	**1.12**
13TH STREET / 12TH STREET / BELMONT AVE	N/A	N/A	N/A	N/A	N/A	N/A	**F**	**94**	**1.20**	N/A	N/A	N/A
TWO-WAY STOP-CONTROLLED												
13TH STREET / TAYLOR AVE	A/**F**	7/**400**	0.56/**1.68**	B/**F**	11/**73**	0.42/0.62	A/**F**	7/**135**	0.73/0.99	B/**F**	12/**291**	0.54/**1.21**
13TH STREET / A STREET	A/**F**	7/**246**	0.61/**1.24**	B/**F**	11/**208**	0.38/0.99	A/**F**	7/**84**	0.75/0.66	B/**F**	11/**642**	0.56/**1.89**
12TH STREET / TAYLOR AVE	A/**F**	8/**58**	0.72/0.48	A/C	8/17	0.53/0.18	A/**F**	8/**134**	0.86/0.71	A/C	7/15	0.36/0.06
12TH STREET / PINE STREET	A/**F**	0/**80**	0.63/0.86	B/D	10/27	0.16/0.40	A/**F**	0/**76**	0.81/0.79	A/B	0/14	0.34/0.22
12TH STREET / WILSON STREET	A/**F**	7/**368**	0.65/**1.40**	A/D	10/30	0.15/0.19	A/**F**	7/**138**	0.79/0.80	A/C	7/15	0.32/0.07
12TH STREET / UNION STREET	A/**F**	8/**1214**	0.68/**3.40**	A/E	10/48	0.14/0.49	N/A	N/A	N/A	A/C	7/18	0.34/0.21
13TH STREET / 12TH STREET	N/A	N/A	N/A	-/D	-/26	-/0.56	N/A	N/A	N/A	N/A	N/A	N/A

Bold and red indicates a "failing" condition, which could be a v/c ratio of 1.0 or greater or a LOS F.
For two-way stop-controlled intersections, results are shown for the major street/minor street approaches with the most congestion, where the minor street would be stop-controlled.

Key findings for the major intersections (as currently drawn in the concepts and without any additional mitigations) are discussed below:

- 13th Street/May Street
    - This intersection functions well under the TSP Build scenario. It would feel somewhat congested, but not excessively.
    - A single lane roundabout at this location is not expected to perform well, with the southbound approach operating over capacity in each of the three alternatives (ranging from a v/c of 1.09 to 1.25). Southbound queues would be expected to extend to Eugene Street. In Alternative 3, the westbound approach is also over capacity and would need further mitigation.
    - A traffic signal at this intersection is not expected to perform well under either Alternative 1, 2, or 3 as designed in the original concept. In particular, a single shared southbound lane is shown in each of the alternatives, which significantly increases queueing and delay on the southbound approach.
- 13th Street/Belmont Avenue
    - This intersection would operate very well under the TSP Build scenario.
    - A single lane roundabout would be unable to serve the demand at this intersection, with the southbound approach experiencing significant delay and queues expected to extend beyond C Street.
    - A traffic signal at this intersection is not expected to perform well in Alternative 1 with an expected intersection v/c ratio of 1.55. However, when a southbound left turn lane is added in Alternative 3, the intersection v/c ratio is significantly improved and operates below capacity.
    - The "dog bone" roundabout at 12th Street/13th Street/Belmont Avenue (shown in Alternative 2) also would not perform well with only a single lane to serve demand at the northbound and southbound approaches. The resulting vehicle queues on those approaches would be very long.
- 12th Street/May Street
    - The signalized intersection generally performs well under all alternatives, with a v/c ratio well below 1.0.
    - Under Alternative 2, there is only a single westbound through lane between the north and south leg of the intersection, which provides limited storage space and causes queue spillback on the southbound and westbound legs of the intersection.
- Two-way stop-controlled intersections
    - In general, many future two-way stop-controlled intersections operate with significant side-street delay, regardless of alternatives.
    - Side street delay is higher on 12th Street in Alternative 2 as there is significant northbound volume in a single through lane, leading to fewer gaps for side street vehicles to turn onto 12th Street.
    - Alternatives 1 and 3 experience less side street delay than the TSP Build scenario, with Alternative 1 having slightly better performance overall, especially on 13th Street.
    - The southbound connection from 12th Street to 13th Street in Alternative 2 is expected to function well as the southbound traffic only yields to a single northbound lane prior to turning into an added southbound lane shadowed by the pedestrian refuge island.

ALTERNATIVE MITIGATION

The key to identifying what aspects of which streetscape alternative work best and which have areas for improvement relies on looking closely at “bottleneck” intersections. To do this, an alternative-by-alternative analysis is performed, and reasonable mitigation measures are implemented to improve mobility while taking into account right-of-way limitations, topography, and the inclusion of improved pedestrian and bicycle facilities included in each alternative. The two main bottleneck intersections evaluated for mitigations for each alternative are 13th Street/May Street and 13th Street/Belmont Avenue. Table 3 summarizes the operational results for the proposed mitigations, described in more detail below.

13th Street/May Street

- A traffic signal at this intersection should include the addition of a dedicated southbound left turn lane8. This addition could be difficult due to topographical concerns in the northwest corner and right-of-way limitations with the hospital parking lot in the northeast corner of the intersection.
- A traffic signal is not expected to perform well in Alternative 2 without significant mitigation, such as converting May Street between 12th Street and 13th Street to westbound only and adding extra turn lanes (which would have a significant impact on connectivity in the area and to the hospital and the ability to maintain the pedestrian and cyclist improvements shown in Alternative 2 on May Street) or adding a second southbound through lane (which is inconsistent with the rest of the alternative, which includes a single southbound lane on 13th Street).
- A roundabout at this intersection should include an additional southbound through lane, making the roundabout a partial multilane roundabout. This mitigation would greatly increase the footprint of the intersection, have large impacts to adjacent properties and significantly increase costs (see concept drawing in Appendix F). Due to the circulation changes associated with Alternative 3, a westbound right turn slip lane would also be required to reduce to the westbound v/c ratio below 1.0.

13th Street/Belmont Avenue

- A traffic signal at this intersection could include varying levels of mitigations, depending on the alternative.
    - For the alternatives with two-way traffic on 13th Street (Alternatives 1 and 3), the following mitigations should be included to reduce southbound queueing and reduce the potential for queue spillback between 12th Street and 13th Street on Belmont Avenue:
        - Add a southbound left turn lane (already included in Alternative 3).
        - Close the northbound left turn, rerouting traffic along 12th Street to Belmont Avenue to become a westbound through movement instead.
        - Close the westbound left turn. The vehicle rerouting caused by this mitigation would be more easily accommodated in Alternative 1 as 12th Street connects directly to southbound 12th Street at the south end of the couplet.
    - For Alternative 2 with one-way traffic on 13th Street, dual southbound through lanes would be necessary at the intersection with a traffic signal (similar to what exists today) and an eastbound right turn lane would be needed to reduce excessive queueing eastbound. The dual southbound through lanes would minimally need to extend the block between A Street and Belmont Avenue.

- A roundabout at this intersection would function best with dual southbound through lanes, regardless of if the roundabout is a dog bone style, such as the one shown in Alternative 2 or a standard roundabout.
    - Even with dual southbound lanes approaching the roundabout, in Alternative 2 with the dog bone configuration, the northbound approach v/c would be 1.07, as shown in Table 3 below. To mitigate the northbound approach v/c, a second northbound through lane would need to be carried through the roundabout before being dropped as a turn lane at A Street or B Street.
    - In Alternative 1, instead of dual southbound through lanes, Belmont Avenue could be converted to eastbound only (i.e., only a roundabout exit) to reduce the southbound v/c ratio just below 1.0 as shown in Table 3.

TABLE 3: MITIGATED INTERSECTION OPERATIONAL RESULTS (2039 WEEKDAY PM PEAK HOUR)

STUDY INTERSECTION	ALTERNATIVE 1			ALTERNATIVE 2			ALTERNATIVE 3		
	LOS	DELAY	V/C	LOS	DELAY	V/C	LOS	DELAY	V/C
SIGNALIZED									
13TH STREET / MAY STREET	C	29	0.92	D	38	0.71	C	30	0.92
13TH STREET / BELMONT AVE	C	20	0.80	A	9	0.68	C	23	0.83
ROUNDABOUT									
13TH STREET / MAY STREET	C	17	0.83	C	17	0.87	C	18	0.86
13TH STREET / BELMONT AVE	D	33	0.97	N/A	N/A	N/A	D	27	0.97
13TH STREET / 12TH STREET / BELMONT AVE	N/A	N/A	N/A	D	32	**1.07**	N/A	N/A	N/A

Bold and red indicates a "failing" condition, which could be a v/c ratio of 1.0 or greater or a LOS F.
For two-way stop-controlled intersections, results are shown for the major street/minor street approaches with the most congestion, where the minor street would be stop-controlled.

With the mitigations listed above, intersection operations can be significantly improved compared to the original concept drawings. However, each of the mitigations come with various tradeoffs related to property impacts, costs, and impacts to other modes of travel. These tradeoffs will need to be weighed before deciding on a preferred concept. In general, the following summarizes the operational performance of each alternative:

- **Alternative 1** performs the best between alternatives, as two-way traffic allows the demand to spread across both 12th and 13th Street. With mitigation, there would still be significant queueing southbound, with 95th percentile queues[5] extending from Belmont Avenue nearly to May Street.
- **Alternative 2** is expected to perform poorly, even with mitigation, as there is only a single northbound and southbound through lane to serve the traffic demand, resulting in significant queueing and spillback between intersections, particularly at 13th Street/May Street
- **Alternative 3** performs slightly better than Alternative 2, but since there is still only a single southbound through lane to serve the demand, it does not perform as well as Alternative 1, and experiences significant southbound queue spillback on 13th Street.

SIDE STREET DELAY

Side street delay (i.e., how long it takes to turn onto 12th and 13th Streets from stop-controlled side streets) is another performance measure used to describe levels of congestion associated with each alternative. Based on the performance listed in Table 2, the following summarizes key findings related to side street delay.

- Overall, side street delay is the lowest on Alternative 1 with moderate delays on 13th Street and low delays on 12th Street.
- Side street delay is generally the worst with Alternative 2. The is especially true along 12th Street, where there is significant northbound volume in a single through lane leading to fewer gaps for side street vehicles to turn onto 12th Street.
- With Alternative 3, side street delay on 13th Street is significant, as 13th Street is serving far more traffic than under the other alternatives and the street crossing is wider. However, side street delays on 12th Street are low.

TRAVEL TIME

Travel time is a practical measure of mobility that can help to contextualize the performance of a system and can be used to make high-level comparisons between alternatives. For the Hood River Heights, travel time from the north end of the area (12th or 13th Street bounded by May Street) and the south end of the area (where the couplet converges) is of particular importance for local and regional connectivity.

The change in travel time for each alternative with the traffic signal mitigations relative to the TSP Build scenario is shown below in Table 4. Tavel times were calculated using SimTraffic software for comparison purposes only between scenarios, as this model was not calibrated to existing conditions travel times.

Alternative 1 experiences reasonable increases in travel times compared to the TSP Build scenario, with about 30 seconds or fewer of added time in either direction. Travel times under Alternative 2 increase significantly, taking more than 90 seconds longer to travel southbound (13th Street) and 60 seconds longer to travel northbound (12th Street). Southbound travel times under Alternative 3

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[5] 95th percentile queues represent queue lengths that have a five percent probability of being exceeded during the analysis period and are typically used when designing appropriate storage lengths at intersections.

also take about 90 seconds longer (13th Street) but northbound travel times (also 13th Street) are reasonable and increase by less than 30 seconds.

TABLE 4. TRAVEL TIMES ALONG 12TH AND 13TH STREETS

DIRECTION	STREET	CHANGE IN TRAVEL TIME RELATIVE TO TSP BUILD SCENARIO (SECONDS / PERCENT CHANGE)		
		ALTERNATIVE 1 W/ SIGNAL MITIGATIONS	**ALTERNATIVE 2** W/ SIGNAL MITIGATIONS	**ALTERNATIVE 3** W/ SIGNAL MITIGATIONS
NORTHBOUND (SOUTH COUPLET END TO MAY ST)	12th Street	+ 33s / 43%	+ 60s / 78%	+ 63s / 82%
	13th Street	+ 18s / 23%	-	+ 23s / 30%
SOUTHBOUND (MAY ST TO SOUTH COUPLET END)	12th Street	- 100s / - 57% [A]	-	-
	13th Street	+ 35s / 20%	+ 95s / 54%	+ 90s / 51%

[A] Southbound travel time in Alternative 1 on 12th Street is compared to the TSP Build southbound travel time on 13th Street. The Alternative 1 travel time does not include any signal delay at May Street/12th Street while the TSP Build southbound travel time on 13th Street does include the signal delay at May Street/13th Street, making it appear as if there is a decrease in travel time.

TRUCK ACCESIBILITY AND EMERGENCY SERVICE NEEDS

Given the location of the hospital on the north end of the couplet, it is critical that emergency vehicles can easily pass through this corridor. Alternatives that include multiple travel lanes on each street provide more opportunities for emergency vehicles to pass around stopped traffic. In addition, the presence of parallel parking may provide more space for vehicles to pull over, as long as there are a sufficient number of empty spaces. Parallel parking also provides opportunities for loading zones, so parallel parking in close proximity to businesses would be beneficial for delivery truck access.

With multiple travel lanes on both 13th and 12th Streets, Alternative 1 provides opportunities for emergency vehicles to pass around stopped traffic. The parallel parking on 12th Street may make this easier at times and also creates opportunities for truck loading zones. With only single travel lanes on both 13th and 12th Streets, emergency vehicle access could be restricted under Alternative 2, though the parallel parking may create opportunities if empty. Having parallel parking on both streets under Alternative 2 creates many opportunities for loading zones close to businesses. 13th Street may be the most accessible for emergency vehicles under Alternative 3, but 12th Street could be the most restricted. Loading zones could be located on one side of 13th Street, but may not be possible on 12th Street without losing many parking spaces.

One freight concern identified along 13th Street is the ability for trucks to travel up the hill just north of May Street, particularly during icy conditions. If a roundabout was installed at that intersection instead of a traffic signal, it could provide an opportunity for trucks to continue with less stopping (as roundabouts often have rolling queues). Trucks would occasionally have to stop on the hill if a traffic signal was installed, although a technology application that detects oncoming trucks and extends the signal green time could be used to reduce the need to stop during inclement weather.

Consideration will need to be given to intersections where truck turning needs are more common when designing and locating curb extensions. Even with reduced size curb extensions, larger trucks may be required to encroach upon adjacent lanes when making turns. Alternatives with wider space between curbs typically allows for trucks to more easily make turns.

IMPACTS ON PROPERTY ACCESS

Each alternative may have different levels of impact to property access. While much won't be known until a project advances to engineering design, at the concept level it is assumed that most impacts to property access would occur from: 1) the need for additional right-of-way to build wider streets and intersections and 2) changes to street designs that could make direct connections for driveways infeasible or undesirable.

The conceptual improvements under consideration generally maintain existing right-of-way widths along street corridors, but all alternatives will require improvements around the major intersections (primarily 13th Street/May Street and 13th Street/Belmont Avenue) that will need additional right-of-way. At the current level of concept design it is not known if there would be a significant difference in right-of-way needs and associated property access impacts between the alternatives.

However, the alternatives do include fairly different street designs that could impact the ability or desire to have direct driveway connections. The primary street element that could impact property access is the type and design of bicycle facility. The main conflicts between bicycle facilities and driveways include:

- **Two-way bicycle facilities and driver expectations** – Drivers pulling out of driveways may not expect to have cyclists approaching from both directions when crossing a bicycle facility like a shared use path or two-way cycle track. It is generally preferred to minimize the number of driveway crossings with two-way bicycle facilities for safety reasons, and also to preserve the high level of comfort that these types of facilities are intended to provide for people biking. Where these conflicts cannot be avoided, design treatments can be applied to make drivers aware that they need to look both ways for people biking.
- **Off-street bicycle facilities and driveway designs** – Because sidewalks are higher than street level, driveways must be designed to comfortably allow vehicles to transition between these high and low points within a relatively short distance. Ideally, the area where the driveway crosses the sidewalk would be level to maintain a comfortable crossing for people with mobility devices. However, maintaining a level sidewalk requires some separation between the sidewalk and street – ideally about five feet. While there are various driveway designs that can accommodate vehicle passage with little to no separation between the sidewalk and street, such designs will include partial to full cross slopes in the sidewalk or require the sidewalk to ramp down and back up across the driveway. These designs are not fatally flawed, but may not provide an ideal walking or biking environment.

In both cases, closing driveways where feasible should be considered to eliminate these conflicts and provide a low-stress bikeway. However, design treatments are possible to mitigate conflicts in lieu of driveway closures.

Alternative 1 includes the most potential conflicts with driveways and new bicycle facilities (about 17 in total). Four of these conflicts are on May Street, but the proposed street design includes the five-foot buffer between the raised bike lane and street needed for a comfortable design. However, there are about 13 driveways on 13th Street and Belmont Avenue where the bicycle facility is anticipated to be next to the curb with very little separation from the street.

Alternative 2 has the fewest potential conflicts with driveways and new bicycle facilities (about 13 in total). Similar to Alternative 1, there are four conflicts on May Street, but the proposed street design includes a sufficient buffer between the raised bike lane and street. Because the bike facility is only on one side of the street, there are only nine conflicts along 13th Street and Belmont Avenue. However, while there may be sufficient space between the bike facility and street, Alternative 2 includes a two-way bikeway that will require special signing and pavement markings to alert drivers.

Alternative 3 includes 12 potential driveway/bike facility conflicts, with seven on 12th Street, three on May Street, and two on Belmont Avenue. A small, three-foot buffer is provided between the bikeway and street, but the two-way bikeways on May Street and 12th Street will require special signing and pavement markings to alert drivers.

SAFETY

Several factors influence safety along the corridor, as discussed in more detail below.

Active Transportation

Each of the alternatives are expected to enhance safety for active transportation compared to current conditions. For example, all of the alternatives are expected to add curb extensions and enhance pedestrian crossings to improve safety and visibility of people walking. Each of the alternatives include bike enhancements (bike lanes, cycle tracks or buffered bike lanes) that would improve the safety of people biking.

Turning Movement Conflicts and Predictable Routing

Alternative 2 is the only alternative that maintains one-way traffic on the couplet. Converting to two-way traffic (like in Alternative 1 and Alternative 3) increases the number of conflicting turning movements. While the higher number of potential conflicts could result in more crashes, it may also have a calming effect on traffic and could result in lower travel speeds that counteract the impact of having more potential conflicts.

Adding left turn lanes and adding protected left turn phasing (such as the ones proposed in the mitigations) could also reduce potential conflicts. Alternative 3 also adds a center left turn lane on 13th Street, providing a space for left turning vehicles to wait for an appropriate gap in conflicting traffic before turning.

In general, Alternatives 1 and 2 provide more predictable routing for drivers who may be unfamiliar with the area. Alternative 3 only includes northbound traffic on 12th Street, which could be confusing to unfamiliar drivers.

Intersection Control

In general, roundabouts have great potential to reduce the severity of crashes at intersections and have the potential to reduce injury crashes by up to 82 percent[6] and also reduce vehicle speeds. Traffic signals would improve safety compared to the existing two-way stop-control, but not as greatly as roundabouts. Any alternative could include roundabouts or traffic signals at the major intersections. Therefore, this factor does not help in the selection of a preferred alternative.

TABLE 5. SUMMARY OF PERFORMANCE FOR PEOPLE DRIVING

PERFORMANCE CRITERIA	13TH STREET			12TH STREET		
	ALT 1	ALT 2	ALT 3	ALT 1	ALT 2	ALT 3
GOAL 1: CALM TRAFFIC AND IMPROVE INTERSECTIONS TO IMPROVE SAFETY FOR PEOPLE DRIVING, WALKING, BIKING, TAKING TRANSIT AND SUPPORTING LOCAL BUSINESSES.						
INTERSECTION OPERATIONS	|	↓↓	|	↑	↑	↑
TRAVEL TIME THROUGH THE HEIGHTS	|	↓↓	↓↓	|	↓	↓
SIDE STREET DELAY	|	↓	↓↓	↑	↓↓	↑
FIRE/EMERGENCY SERVICE NEEDS	↑	↓	↑↑	↑↑	↓	↓↓
TRUCK ACCESSIBILITY	↓	|	|	↑	↑	↓
SAFETY	↑	↑↑	↑	↑	↑↑	↑
GOAL 2: PRESERVE AND PROMOTE A LIVABLE COMMUNITY AND ECONOMY THROUGH STREETSCAPE IMPROVEMENTS THAT INCREASES SAFETY FOR PEOPLE WALKING AND BIKING AND ADDRESSES PARKING NEEDS TO SUPPORT LOCAL BUSINESS ACCESS, AND FUTURE MIXED-USE DEVELOPMENT.						
DIVERSION IMPACTS	↑	|	↑	↑	|	↑
IMPACTS ON PROPERTY ACCESS	|	|	↑	↑	↑	|

[6] ODOT Crash Reduction Factor List, 2020, CMF ID: 228

CONDITONS FOR PEOPLE WALKING

Today, 12th and 13th Streets are challenging for pedestrians to navigate. The existing two-lane cross section of both busy streets have unmarked crossings, several skewed or offset intersections, and on-street parking with no curb extensions. All of these conditions increase pedestrian exposure, reduce pedestrian visibility, and introduces risk for "double threat" crashes - where a vehicle which has stopped for a pedestrian then blocks that same pedestrian from view of the adjacent travel lane (see Figure 1). Although there are painted "continental" pedestrian crossings at some intersections, these treatments do not warn or control on-coming traffic and there are no pedestrian median refuges in the corridor other than at the intersection of 13th Street and May Street.

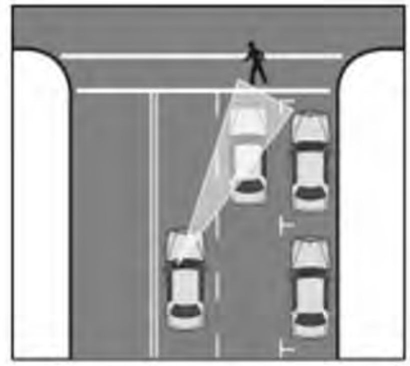


FIGURE 1: ILLUSTRATION OF THE "DOUBLE THREAT" RISK

To enhance conditions for people walking on either 12th or 13th Streets, each of the three alternatives contain elements such as additional separation from vehicle traffic (via landscaping or bicycle facilities), wider sidewalks, and signal or roundabout control at the intersections along 13th Street at May Street and Belmont Avenue. While not explicitly shown in the concept drawings, the alternatives are also assumed to include ADA improvements, curb extensions to shorten crossing distances and improve pedestrian visibility, pedestrian-scale lighting, and enhanced crossings that could include treatments such as flashing beacons and pedestrian refuge islands. Appendix G documents analysis for level of pedestrian treatment may be warranted within each alternative.

Corridor conditions for people walking were evaluated for each alternative using the criteria described below. These will be considered alongside additional criteria related to each alternative's ability to complete connections to area destinations that are being evaluated by others. For each alternative, the degree to which the criteria is supported by each of the main corridors along 12th Street and 13th Street has been rated, with brief descriptions provided below and a summary chart provided in Table 6.

- **Visibility at crossings** was assessed qualitatively by considering factors that could increase pedestrian visibility (e.g., curb extensions or median refuges) and factors that could decrease pedestrian visibility (e.g., landscaping, on-street parking). Each alternative was also evaluated for its ability to reduce the potential risk for "double threat" crashes where a stopped vehicle blocks a crossing pedestrian from view of the adjacent travel lane.

Alternative 1

13th Street: No on-street parking improves visibility but pedestrians are still set back from the corner due to the presence of the bicycle facility.

12th Street: On-street parking is present but it is assumed that curb extensions will be used to enhance visibility. With no bicycle facilities, pedestrians waiting to cross are close to the street and easily within a driver's field of vision.

Alternative 2

13th Street: Parked cars with curb extensions on one side, no obstructions on the other side.

12th Street: Parked cars with curb extensions on both sides.

Alternative 3

13th Street: Parked cars with curb extensions on one side, no obstructions on the other side.

12th Street: Parked cars with curb extensions on one side. On the other side, there are no visibility obstructions but pedestrians are still set back from the corner due to the presence of the bicycle facility.

- **Time exposed to vehicular traffic at crossings** was assessed by considering factors along 12th and 13th streets such as the number of vehicle lanes to cross as well as curb extensions and pedestrian median refuges, which shorten the pedestrian crossing distance and reduce vehicle exposure.

Alternative 1

13th Street: The street crossing is 22 feet wide. The bicycle facilities must also be crossed, adding another 16 feet.

12th Street: The street crossing is 24 feet wide (similar to existing conditions if curb extensions were provided).

Alternative 2

13th Street: The street crossing is 12 feet wide, with only one direction of travel to cross.

12th Street: The street crossing is 12 feet wide, with only one direction of travel to cross

Alternative 3

13th Street: If no median refuge islands are provided, this alternative has the widest crossings at 32 feet. If median refuge islands are provided, crossing distances are reduced to about 11 feet (twice).

12th Street: The street crossing is 12 feet with only one direction of travel to cross. The cycle track crossing is 10 feet.

- **Access to low-stress crossings** was assessed by considering the total potential number of low-stress, unsignalized pedestrian crossings and the distance between low-stress crossings along the corridor. Providing evenly spaced crossings minimizes out-of-direction travel for pedestrians. The ongoing Hood River Safe Routes to School project identification program has identified key routes along May Street, 12th Street, Taylor Avenue, B Street, Pine Street, A Street, and Wilson Street. To connect these routes, enhanced street crossings are being called for at the following intersections:
  - 13th Street / May Street
  - 13th Street / Taylor Avenue
  - 13th Street / A Street

- 12th Street / May Street
- 12th Street / Taylor Avenue
- 12th Street / Pine Street
- 12th Street / B Street
- 12th Street / Wilson Street

All alternatives can accommodate enhanced crossing improvements at these locations. However, some alternatives may result in lower stress, easier crossings, as noted below.

Alternative 1

13th Street: Accommodates enhanced crossings, but the 22-foot crossing distance will reduce comfort.

12th Street: Accommodates enhanced crossings, but the 24-foot crossing distance will reduce comfort.

Alternative 2

13th Street: Accommodates enhanced crossings and the single-lane crossings will significantly improve comfort.

12th Street: Accommodates enhanced crossings and the single-lane crossings will significantly improve comfort.

Alternative 3

13th Street: Median refuge islands should be provided to create low-stress crossings. This may require prohibiting left turns from 13 Street at alternating intersections (i.e., prohibiting southbound lefts at one intersection and northbound lefts at the next) to create space in the center lane for a refuge island. Where median refuge islands are provided, the ability to cross one lane at a time will improve comfort.

12th Street: Accommodates enhanced crossings and the single-lane crossings will significantly improve comfort.

- **Width of walkways** was assessed by simply measuring the width of provided pedestrian facilities and accounting for space shared with street furniture and landscaping zones or people biking. Wider spaces dedicated solely for people walking were rated more highly.

Alternative 1

13th Street: 10 feet but includes the furniture/landscaping zone (about the same as the no build condition).

12th Street: 10 feet but includes the furniture/landscaping zone (about the same as the no build condition).

Alternative 2

13th Street: 14 feet but shared with people biking on one side, 8 feet on the other side.

12th Street: 9 feet on one side, 10 feet on the other side.

Alternative 3

13th Street: 10 feet but includes the furniture/landscaping zone (about the same as the no build condition).

12th Street: 10 feet on one side, 8 feet on the other but includes the furniture/landscaping zone.

- **Buffer from traffic and bikes** was assessed by the horizontal separation from traffic and bikes as well as the presence of any physical barrier such as a curb.

Alternative 1

13th Street: Adjacent to raised bike lanes on both sides, which provide a buffer from traffic.

12th Street: Buffered by parking on both sides. Bikes would be in the street.

Alternative 2

13th Street: Mixed with bikes on one side. Buffered from traffic by a landscape strip on one side and by parking and a landscape strip on the other.

12th Street: Buffered by parking and landscaping on both sides. Bikes would be in the street.

Alternative 3

13th Street: Buffered by parking on one side but adjacent to the travel lane on the other. Bikes would be in the street.

12th Street: Buffered by parking on one side. Buffered from traffic on the other side by the cycle track, but would be adjacent to the cycle track (uncertain if any barrier would be present).

TABLE 6. SUMMARY OF PERFORMANCE FOR PEOPLE WALKING

PERFORMANCE CRITERIA	13TH STREET			12TH STREET		
	ALT 1	ALT 2	ALT 3	ALT 1	ALT 2	ALT 3
GOAL 1: CALM TRAFFIC AND IMPROVE INTERSECTIONS TO IMPROVE SAFETY FOR PEOPLE DRIVING, WALKING, BIKING, TAKING TRANSIT AND SUPPORTING LOCAL BUSINESSES.						
VISIBILITY AT CROSSINGS	▲	▲▲	▲▲	▲▲	▲▲	▲
EXPOSURE TIME	!	▲▲	▼▼ / ▲ (no refuge islands / refuge islands)	!	▲▲	▲
GOAL 2: PRESERVE AND PROMOTE A LIVABLE COMMUNITY AND ECONOMY THROUGH STREETSCAPE IMPROVEMENTS THAT INCREASES SAFETY FOR PEOPLE WALKING AND BIKING AND ADDRESSES PARKING NEEDS TO SUPPORT LOCAL BUSINESS ACCESS, AND FUTURE MIXED-USE DEVELOPMENT.						
ACCESS TO LOW-STRESS CROSSINGS	▲	▲▲	▲	▲	▲▲	▲▲
GOAL 4: CREATE STREETS AND GATHERING SPACES THAT PROVIDE SAFE, COMFORTABLE PLACES FOR PEOPLE WALKING, ACCESSING TRANSIT, AND BIKING ALONG AND ACROSS THE CORRIDOR AND THAT CONNECTS AREA RECREATION AND COMMERCIAL DESTINATIONS AND NEIGHBORHOODS.						
WIDTH OF WALKWAYS	▲▲	▲	▲▲	▲▲	▲▲	!
BUFFER FROM TRAFFIC AND BIKES	▲	▼	!	▲▲	▲▲	▲
ACCESS TO LOW-STRESS CROSSINGS – ALSO IN GOAL 2	▲	▲▲	▲	▲	▲▲	▲▲

CONDITONS FOR PEOPLE BIKING

Today, people biking on 13th, 12th, and May Streets, as well as Belmont Avenue, must share a travel lane with motor vehicles, which is a high-stress environment that can limit use to more experienced riders. These conditions create a significant gaps in bicycle facilities that otherwise could facilitate a safe, low-stress, multimodal connections within the corridor to local businesses, nearby schools, recreation, and healthcare. Furthermore, needing to cross two lanes of uncontrolled traffic can be discouraging and with both lanes traveling in the same direction, there is the risk of “double threat” crashes.

To enhance conditions for people biking along the corridor, each of the three alternatives contain:

- Various bicycle facilities along May Street plus Belmont Avenue, and either along 12th or 13th Streets, ranging from traditional bicycle lanes, a raised dedicated cycle track, and a raised shared use path.
- Different bicycle crossing treatments at the ends of the corridor, including use of bicycle traffic signals.
- Improvements for bicycle connectivity, extending facilities the full length of the project corridor with attention to future connections such as to the Indian Creek Trail and other proposed bike lane upgrades to May Street.

Corridor conditions for people biking were evaluated for each alternative using the criteria described below. These will be considered alongside additional criteria related to each alternative’s ability to complete connections to area destinations and other planned bike routes and ease of use by riders unfamiliar to the area that are being evaluated by others. For each alternative, the degree to which the criteria is supported by each of the main corridors along 12th Street and 13th Street has been rated, with brief descriptions provided below and a summary chart provided in Table 7.

- **Visibility at crossings** was assessed based on the type of crossing provided and the type of bicycle facility, such as a two-way cycle track or a separated one-way bicycle lane. Factors that could decrease bicyclist visibility (e.g., landscaping, on-street parking) were also considered, though thoughtful landscaping can restrict vehicle movement while still allowing access for people biking which generally reduces conflicts, increases visibility, and provides safer crossings for bicyclists.

<u>Alternative 1</u>

13th Street: No on-street parking improves visibility but crossing cyclists are still set back from the corner due to the presence of the bicycle facility (though they are likely to wait in the bike lane if no oncoming bikes are present).

12th Street: On-street parking is present but it is assumed that curb extensions will be used to enhance visibility. With no bicycle facilities, cyclists waiting to cross are close to the street and easily within a driver’s field of vision.

<u>Alternative 2</u>

13th Street: Parked cars with curb extensions on one side, no obstructions on the other side. Drivers may not expect to encounter people biking from both directions along the shared use path. However, design treatments at street crossings can be applied to improve awareness.

12th Street: Parked cars with curb extensions on both sides.

Alternative 3

13th Street: Parked cars with curb extensions on one side, no obstructions on the other side.

12th Street: Parked cars with curb extensions on one side. On the other side, there are no visibility obstructions but crossing cyclists are still set back from the corner due to the presence of the bicycle facility (though they are likely to wait in the bike lane if no oncoming bikes are present).

- **Access to low-stress crossings** was assessed by considering the total potential number of low-stress, unsignalized crossings and the distance between low-stress crossings along the corridor. Providing evenly spaced crossings minimizes out-of-direction travel for people biking. The ongoing Hood River Safe Routes to School project identification program has identified key routes along May Street, 12th Street, Taylor Avenue, B Street, Pine Street, A Street, and Wilson Street (previously mentioned under Conditions for People Walking).

All alternatives can accommodate enhanced crossing improvements at these locations. However, some alternatives may result in lower stress, easier crossings, as noted below.

Alternative 1

13th Street: Accommodates enhanced crossings, but the 22-foot crossing distance will reduce comfort.

12th Street: Accommodates enhanced crossings, but the 24-foot crossing distance will reduce comfort.

Alternative 2

13th Street: Accommodates enhanced crossings and the single-lane crossings will significantly improve comfort.

12th Street: Accommodates enhanced crossings and the single-lane crossings will significantly improve comfort.

Alternative 3

13th Street: Median refuge islands should be provided to create low-stress crossings. This may require prohibiting left turns from 13 Street at alternating intersections (i.e., prohibiting southbound lefts at one intersection and northbound lefts at the next) to create space in the center lane for a refuge island. Where median refuge islands are provided, the ability to cross one lane at a time will improve comfort.

12th Street: Accommodates enhanced crossings and the single-lane crossings will significantly improve comfort.

- **Width of bikeways** was assessed by simply measuring the width of provided bicycle facilities and accounting for space shared with people walking. Wider spaces dedicated solely for people biking were rated more highly.

Alternative 1

13th Street: 8-foot separated bike lanes.

12th Street: No bike facilities are provided on this street.

Alternative 2

13th Street: 14 feet on one side but must accommodate both directions of travel and would be shared with people. 8 feet on the other side.

12th Street: No bike facilities are provided on this street.

Alternative 3

13th Street: No bike facilities are provided on this street.

12th Street: The 10-foot width of the two-way cycle track is less than the desired 12-foot width but more than the minimum with of 8 feet for constrained areas.

- **Buffer from traffic and pedestrians** was assessed by the horizontal separation from traffic and people walking, as well as the presence of any physical barrier such as a curb.

Alternative 1

13th Street: The raised bike lanes keep people biking off of the street. The bikeways are adjacent to walkways.

12th Street: No bike facilities are provided on this street.

Alternative 2

13th Street: Mixed with people walking on a shared use path.

12th Street: No bike facilities are provided on this street.

Alternative 3

13th Street: No bike facilities are provided on this street.

12th Street: The two-way cycle track is physically separated from traffic and pedestrians.

TABLE 7. SUMMARY OF PERFORMANCE FOR PEOPLE BIKING

PERFORMANCE CRITERIA	13TH STREET			12TH STREET		
	ALT 1	ALT 2	ALT 3	ALT 1	ALT 2	ALT 3
GOAL 1: CALM TRAFFIC AND IMPROVE INTERSECTIONS TO IMPROVE SAFETY FOR PEOPLE DRIVING, WALKING, BIKING, TAKING TRANSIT AND SUPPORTING LOCAL BUSINESSES.						
VISIBILITY AT CROSSINGS						
GOAL 2: PRESERVE AND PROMOTE A LIVABLE COMMUNITY AND ECONOMY THROUGH STREETSCAPE IMPROVEMENTS THAT INCREASES SAFETY FOR PEOPLE WALKING AND BIKING AND ADDRESSES PARKING NEEDS TO SUPPORT LOCAL BUSINESS ACCESS, AND FUTURE MIXED-USE DEVELOPMENT.						
ACCESS TO LOW-STRESS CROSSINGS						
GOAL 4: CREATE STREETS AND GATHERING SPACES THAT PROVIDE SAFE, COMFORTABLE PLACES FOR PEOPLE WALKING, ACCESSING TRANSIT, AND BIKING ALONG AND ACROSS THE CORRIDOR AND THAT CONNECTS AREA RECREATION AND COMMERCIAL DESTINATIONS AND NEIGHBORHOODS.						
WIDTH OF BIKEWAYS			NA	NA	NA	
BUFFER FROM TRAFFIC AND PEDESTRIANS			NA	NA	NA	

CONDITONS FOR PEOPLE USING TRANSIT

There are currently no transit stops in the Heights District, though Columbia Area Transit (CAT) has expressed interest in establishing stops in this area in the future. The project team has coordinated with CAT to identify potential future stops along 12th and 13th Streets. Specific locations of interest vary by alternative and could include (note, this does not include stops outside of the project area, such as north of May Street):

<u>Alternative 1</u>

13th Street: No stops proposed; assumes buses would operate along 12th Street.

12th Street: Northbound, north of June Street; Southbound, north of A Street or south of Belmont Avenue.

<u>Alternative 2</u>

13th Street: Southbound, north of A Street

12th Street: Northbound, north of June Street

Alternative 3

13th Street: Southbound, north of A Street; Northbound, north of Taylor Street (OR the northbound stop on 12th Street)

12th Street: Northbound, north of June Street (OR the northbound stop on 13th Street)

The accessibility of each of the stops (given the proximity to enhanced pedestrian crossings proposed by the Safe Routes to School program) is summarized below:

- All proposed bus stops along 13th Street (Alternatives 2 and 3) would be sited near enhanced crossings proposed by the Safe Routes to School program.
- The proposed stop on 12th Street north of June Street in all alternatives would not be located adjacent to an enhanced crossing already proposed by the Safe Routes to School program, but would be within one block of the signalized crossing at May Street and just over a block from the proposed crossing at Taylor Avenue.
- The proposed stop on 12th Street at A Street (Alternative 1) would align with a proposed enhanced crossing.
- The proposed stop on 12th Street south of Belmont Avenue (Alternative 1) would be more than a block from the proposed enhanced crossing at A Street.

The ability to accommodate transit amenities at the proposed bus stops is primarily driven by two factors: the presence of a raised bicycle lane or cycle track that would conflict with any transit stops and the width of sidewalk, buffer, and parking lanes (space which could be used for transit amenities). Alternative 3 includes a cycle track on the east side of 12th Street, which would need to be designed to minimize conflicts with a proposed bus stop on 12th Street.

To allow for transit shelters, a minimum of 10 feet is needed (four-foot shelter, five-foot clear zone and one-foot buffer to the curb), although a wider clear zone of eight-feet and buffer to the curb of 18 inches are generally preferred[7]. All of the alternatives can accommodate the minimum width for a shelter, with Alternative 2 providing the most potential space for amenities.

Table 8 summarizes the performance of the alternatives for people using transit based on the accessibility of transit stops and the ability to accommodate transit amenities.

[7] https://nacto.org/publication/transit-street-design-guide/station-stop-elements/stop-elements/small-transit-shelter/

TABLE 8. SUMMARY OF PERFORMANCE FOR PEOPLE USING TRANSIT

PERFORMANCE CRITERIA	13TH STREET			12TH STREET		
	ALT 1	ALT 2	ALT 3	ALT 1	ALT 2	ALT 3
GOAL 4: CREATE STREETS AND GATHERING SPACES THAT PROVIDE SAFE, COMFORTABLE PLACES FOR PEOPLE WALKING, ACCESSING TRANSIT, AND BIKING ALONG AND ACROSS THE CORRIDOR AND THAT CONNECTS AREA RECREATION AND COMMERCIAL DESTINATIONS AND NEIGHBORHOODS.						
STOP ACCESSIBILITY – PROXIMITY TO ENHANCED CROSSINGS	NA					
ABILITY TO ACCOMMODATE AMENITIES AT STOPS	NA					

SUMMARY OF FINDINGS

This section provides a summary of the key findings for the major modes of travel evaluated.

CONDITIONS FOR PEOPLE DRIVING

- The 12th Street/13th Street corridor is forecast to serve about 26,000 vehicle trips per day by 2039 (it serves about 20,000 today). As this area becomes congested there may be some diversion of traffic to other routes but such diversion is expected to be minimal because regional and local street connectivity is limited.
- Overall, Alternative 1 performs the best for people driving as two-way traffic allows the demand to spread across both 12th and 13th Streets. As a result, Alternative 1 will provide the least amount of congestion at the key bottleneck intersections, will have the least amount of side street delay for drivers turning onto 12th and 13th Streets, will result in the least amount of added travel time to drive through the Heights, and would experience the shortest vehicle queues.
- Alternative 3 performs better than Alternative 2, but since there is still only a single southbound through lane to serve the demand, it does not perform as well as Alternative 1. While Alternative 3 can provide comparable levels of congestion relief at the key bottleneck intersections, side street delay for drivers turning onto 13th Street will be much longer, southbound travel times through the Heights will be about one minute longer, and vehicle queues will extend farther.
- Alternative 2 is expected to perform poorly as there is only a single northbound and southbound through lane to serve the traffic demand, resulting in significant queueing and spillback between intersections, particularly at 13th Street/May Street. This alternative is expected to have the worst side street delay for drivers turning onto 12th and 13th Streets and the longest travel times through the Heights.
- Roundabouts can provide good congestion relief at the key bottleneck intersections on 13th Street at May Street and Belmont Avenue but are expected to have greater right-of-way impacts than traffic signals would at those same locations.

- Alternative 1 provides opportunities for emergency vehicles to pass around stopped traffic on both 12th and 13th Streets, with multiple travel lanes on each.
- With only single travel lanes on both 13th and 12th Streets, emergency vehicle access could be restricted under Alternative 2, though the parallel parking may create opportunities for bypassing traffic, if empty.
- 13th Street may be the most accessible for emergency vehicles under Alternative 3, but 12th Street could be the most restricted.
- Under Alternative 1, the lack of parking on 13th Street will place loading zones farther from businesses.
- Having parallel parking on both streets under Alternative 2 creates good opportunities for loading zones close to businesses.
- Loading zones in Alternative 3 could be located on one side of 13th Street but may not be possible on 12th Street without losing many parking spaces.

CONDITIONS FOR PEOPLE WALKING

- All alternatives can be designed to provide good visibility of pedestrians at street crossings and will eliminate the "double threat" environment currently present with two lanes of one-way traffic on each street.
- Alternative 2 mixes people walking with people biking on a shared-use path along 13th Street, which may be less comfortable than having a separate, designated space.
- There are many opportunities to provide enhanced, low-stress street crossings on 12th and 13th Streets under all alternatives.
- Alternative 2 significantly reduces street crossing times and exposure to traffic with only one lane of one-way traffic on each street.
- Alternative 1 may provide the longest street crossings on 12th and 13th Streets, with exposure to traffic approaching from two directions.

CONDITIONS FOR PEOPLE BIKING

- All alternatives can be designed to provide good visibility of people biking at street crossings and will eliminate the "double threat" environment currently present with two lanes of one-way traffic on each street.
- Alternative 2 mixes people walking with people biking on a shared-use path along 13th Street, which may be less comfortable and efficient than having a separate, designated space.
- There are many opportunities to provide enhanced, low-stress street crossings on 12th and 13th Streets under all alternatives.
- Under Alternative 3, the 10-foot width of the two-way cycle track on 12th Street is less than the desired 12-foot width but more than the minimum width of 8 feet for constrained areas.
- Drivers may not expect to encounter people biking from both directions when crossing two-way bikeways, such as those in Alternatives 2 and 3. This can be a safety concern, but appropriate design treatments can be applied to improve driver awareness and cyclist visibility.

CONDITIONS FOR PEOPLE USING TRANSIT

- The locations of nearly all proposed future bus stops align well with proposed low-stress street crossings with the exception of the bus stop on 12th Street south of Belmont Avenue (Alternative 1) would be more than a block from the proposed enhanced crossing at A Street.
- It is anticipated that all alternatives could accommodate bus stops where proposed, however, the cycle track on the east side of 12th Street in Alternative 3 presents conflicts that must be addressed.

APPENDIX

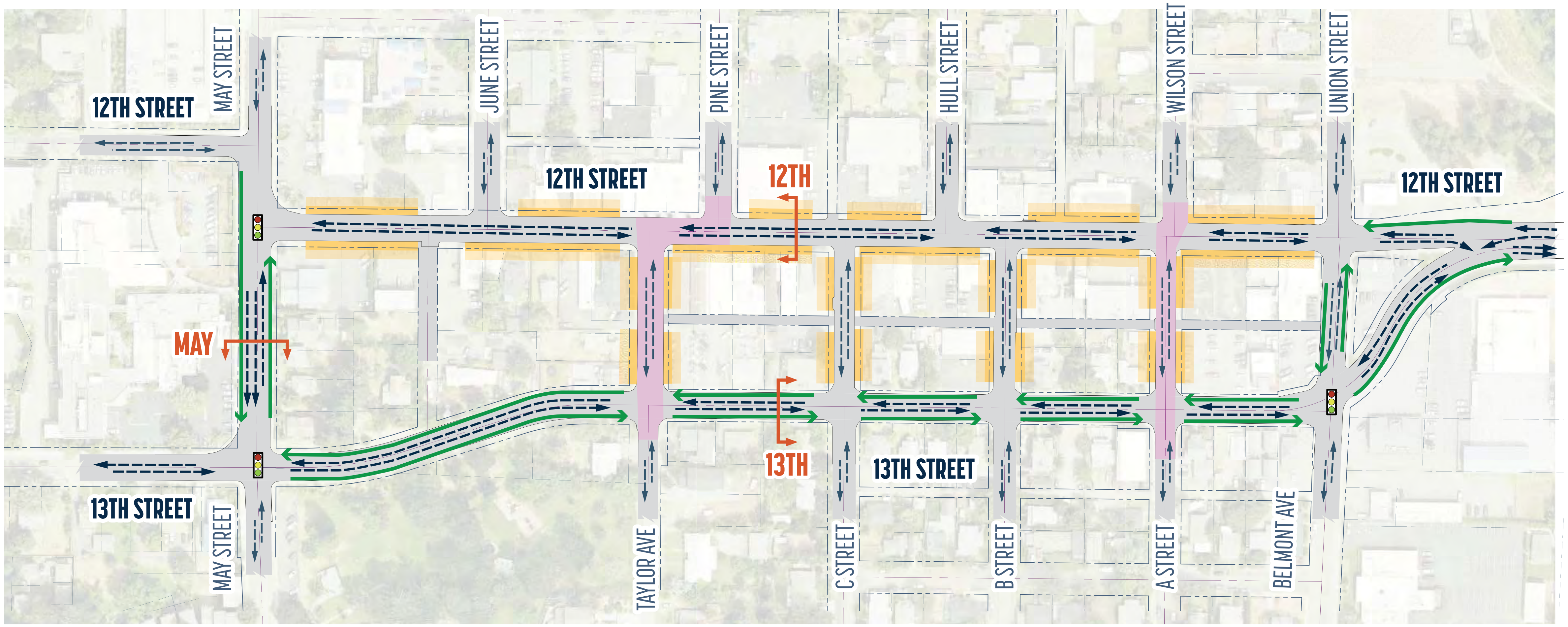
- Appendix A – Alternative Concept Drawings
- Appendix B – TSP Build Traffic Operations
- Appendix C – Alternative Traffic Operations (Unmitigated)
- Appendix D – Alternative Traffic Operations (Mitigated)
- Appendix E – SimTraffic Reports
- Appendix F – Mitigated Roundabout Concept at May Street/13th Street
- Appendix G – NCHRP 562 Pedestrian Crossing Treatment

APPENDIX A: ALTERNATIVE CONCEPT DRAWINGS

THEHEIGHTS STREETSCAPE PLAN

DESIGN ALTERNATIVE 1 - TWO LANE, TWO-WAY CIRCULATION + STREET SECTIONS

DRAFT FOR PRELIMINARY DISCUSSION ONLY



LEGEND

- Right of Way
- Parcels
- Travel Lane - City Street
- Travel Lane - ODOT
- Bike Lane
- Parallel Street Parking
- Traffic Signal, See Note 1
- Enhancement to Improve East/West Connections

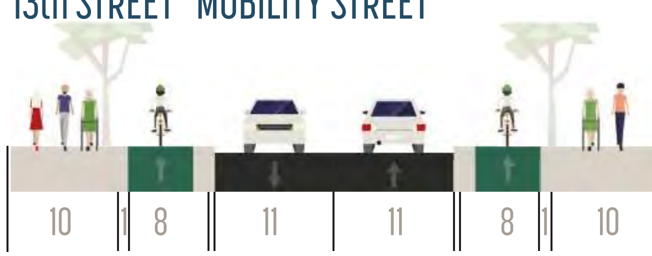
NOTES

1. See intersection concepts for channelization at intersections.

0 50 100 200 400 feet

N

13th STREET "MOBILITY STREET"

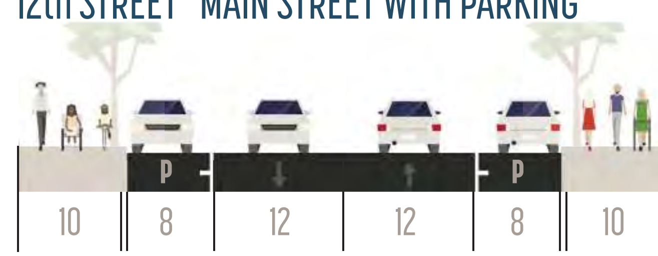


(50' R/W + (2) 5' Utility Easements)

EXAMPLE OF RAISED SEPARATED BIKE LANE - 13TH STREET

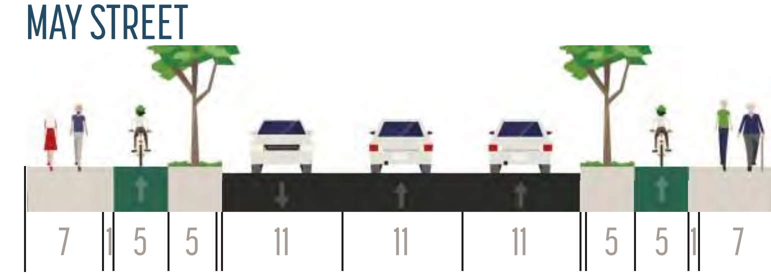
Source: MIG

12th STREET "MAIN STREET WITH PARKING"



(60' R/W)

MAY STREET



(60' R/W + 10' Easement)

EXAMPLE OF RAISED SEPARATED BIKE LANE - MAY STREET

Source: pedbikeimages.com, Carl Sundstrom

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DESIGN ALTERNATIVE 1 - TWO LANE, TWO-WAY INTERSECTION CONCEPT

12TH AND 13TH STREETS AT MAY STREET

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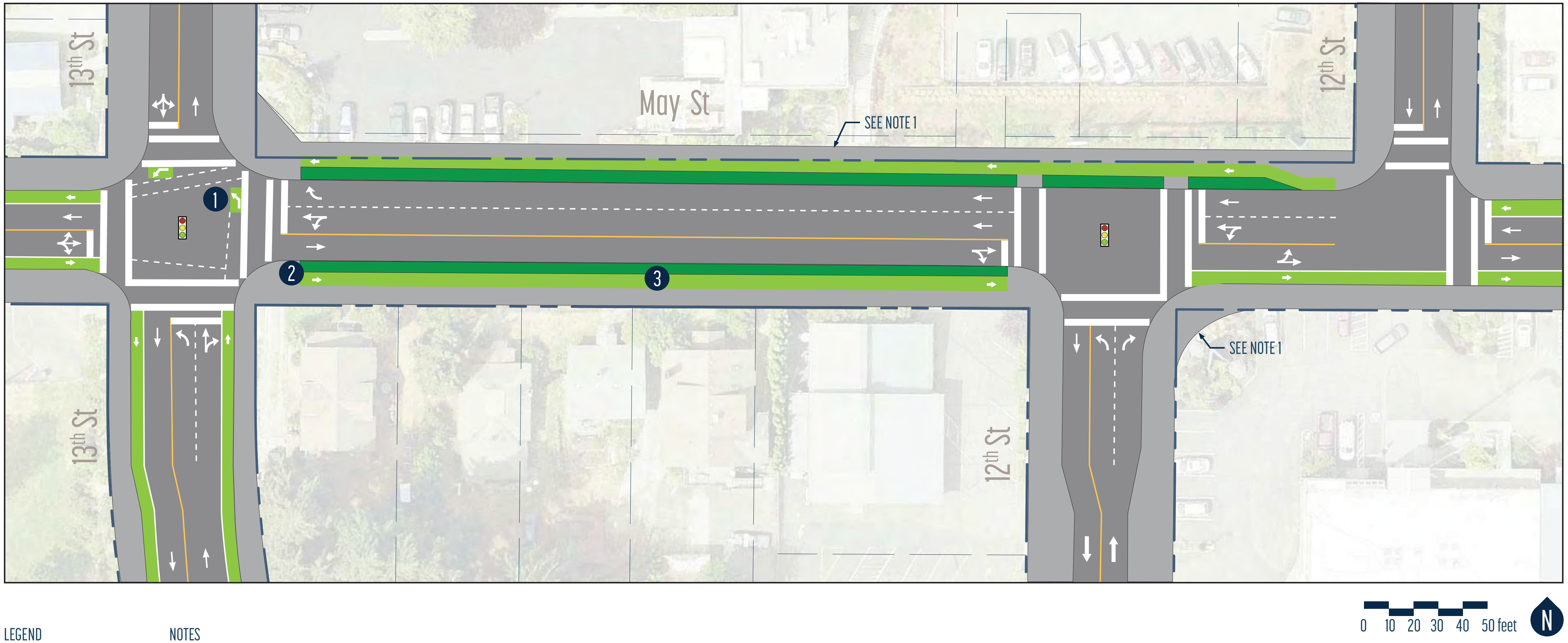

LEGEND

- Right of Way
- Parcel Lines
- Roadway
- Sidewalk
- Planting
- Bike Lane

NOTES

1. Limits of sidewalk extend to R/W or existing back of walk, whichever is further.
2. Trees to be located in a later design phase.
3. Existing driveway locations are not shown and will be incorporated in a later design phase.

1 Two Stage Bicycle Turn Box

Source: Creative Commons

2 Separated Bike Lane at Intersection

Source: Google Maps

3 Raised, Vegetation Separated Bike Lane

Source: MIG

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THE HEIGHTS STREETSCAPE PLAN

DESIGN ALTERNATIVE 1 - TWO LANE, TWO-WAY INTERSECTION CONCEPT

12TH AND 13TH STREETS AT BELMONT AVENUE

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1 Raised, Vegetated Separated Bike Lane

Source: MIG

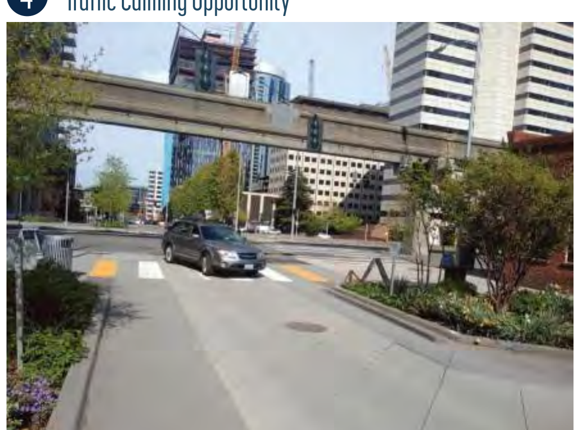
2 Bike Box

Source: bikepedimages.org, Toole Group

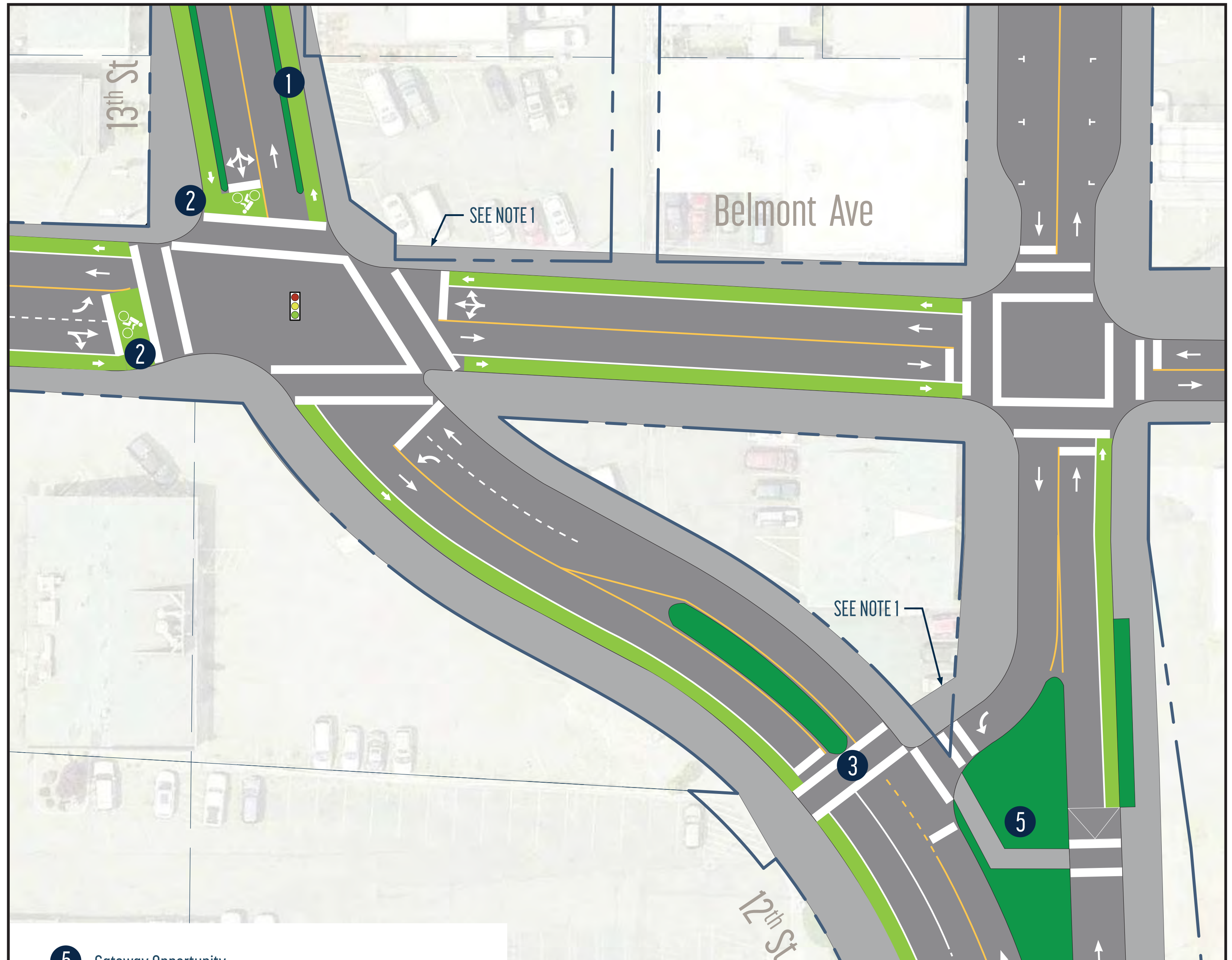
3 Enhanced Crosswalk

Source: MIG

4 Traffic Calming Opportunity



Source: The Urbanist



5 Gateway Opportunity

Source: Visit Bend

LEGEND

- Right of Way
- Parcel Lines
- Roadway
- Sidewalk
- Planting
- Bike Lane

NOTES

1. Limits of sidewalk extend to R/W or existing back of walk, whichever is further.
2. Trees to be located in a later design phase.
3. Existing driveway locations are not shown and will be incorporated in a later design phase.

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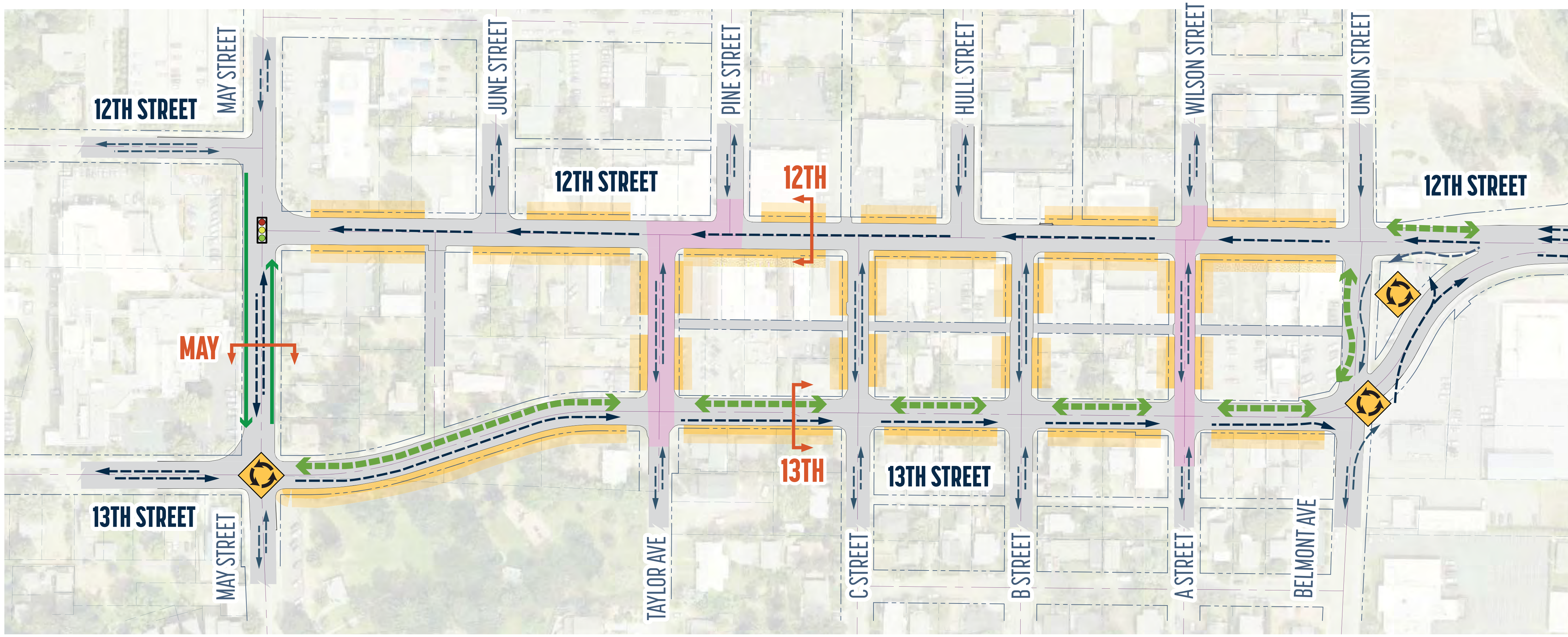
THE HEIGHTS STREETSCAPE PLAN

DESIGN ALTERNATIVE 2 - ONE LANE, ONE-WAY CIRCULATION + STREET SECTIONS

DRAFT FOR PRELIMINARY DISCUSSION ONLY



LEGEND

- Right of Way
- Parcels
- Center Line
- Travel Lane - City Street
- Travel Lane - ODOT
- Traffic Signal, See Note 1
- Bike Lane
- Shared Use Path
- Parallel Street Parking
- Roundabout
- Enhancement to Improve East/West Connections

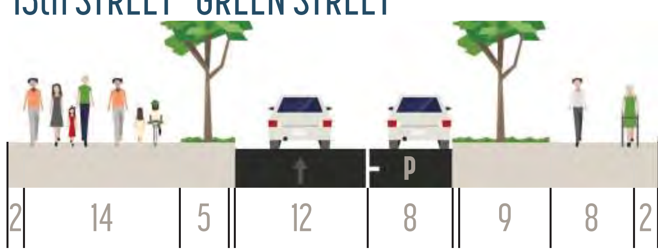
NOTES

1. See intersection concepts for channelization at intersections.

0 50 100 200 400 feet

N

13th STREET "GREEN STREET"

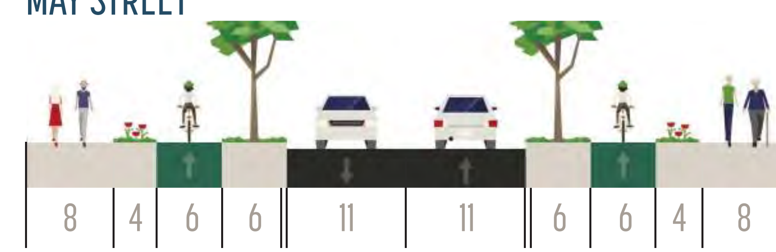


(50' R/W + (2) 5' Utility Easements)

12th STREET "PARKING STREET"

(60' R/W)

MAY STREET



(60' R/W + 10' Easement)

EXAMPLE OF SHARED USE PATH- 13TH STREET

Source: MAG

EXAMPLE OF RAISED VEGETATION SEPARATED BIKE LANE - MAY STREET

Source: Google Maps

MIG

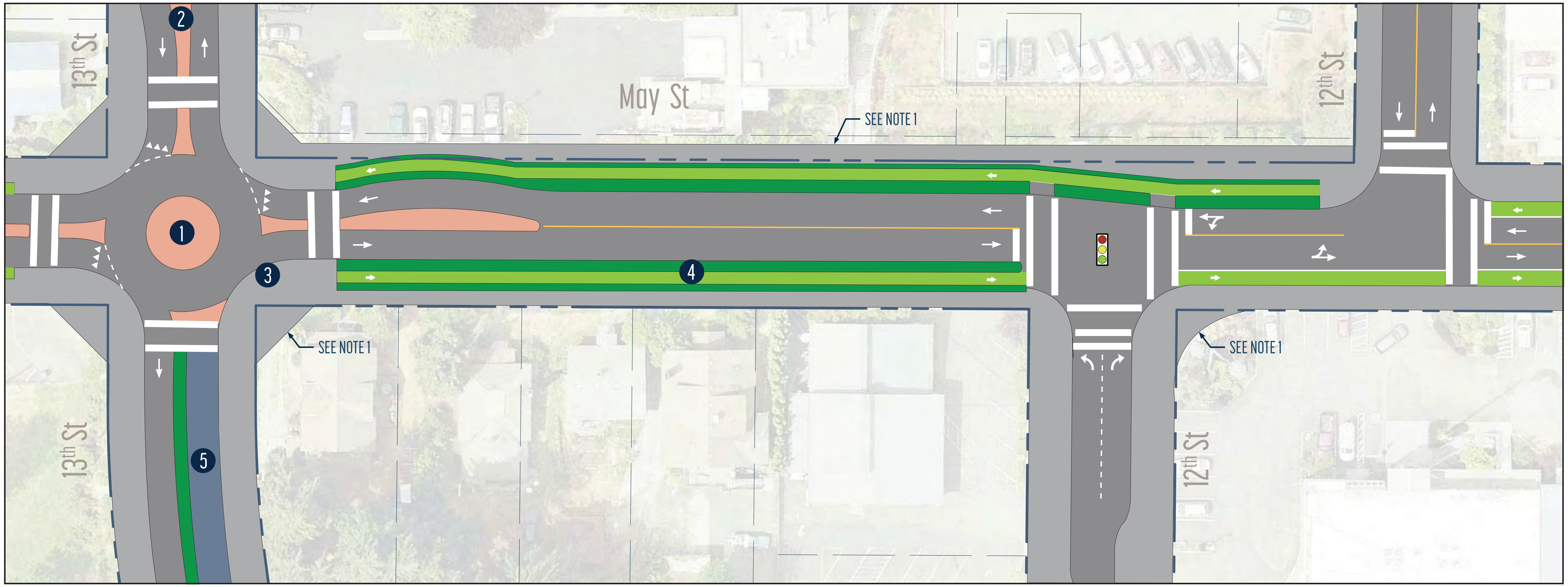
October 2021

THE HEIGHTS STREETSCAPE PLAN

DESIGN ALTERNATIVE 2 - ONE LANE, ONE-WAY INTERSECTION CONCEPT

12TH AND 13TH STREETS AT MAY STREET

DRAFT FOR PRELIMINARY DISCUSSION ONLY

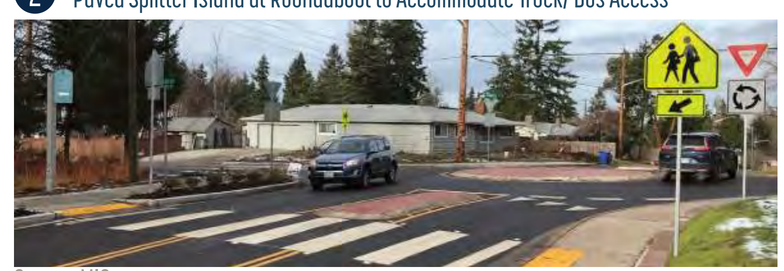


0 10 20 30 40 50 feet N

1 Roundabout with Paved Center Circle

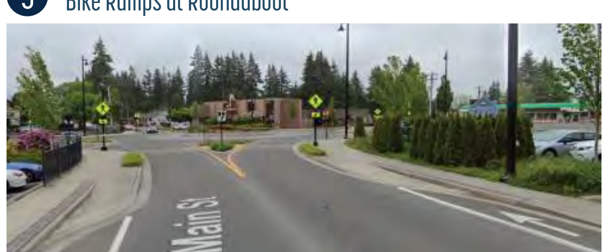
Source: MIG

2 Paved Splitter Island at Roundabout to Accommodate Truck/ Bus Access



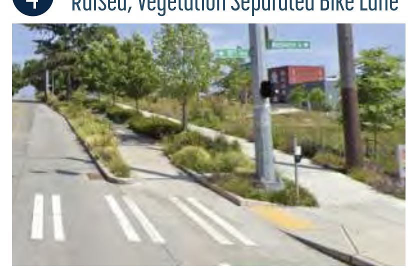
Source: MIG

3 Bike Ramps at Roundabout



Source: MIG

4 Raised, Vegetation Separated Bike Lane



Source: Google Maps

5 Shared Use Path Along Road

Source: MAG

LEGEND

- Right of Way
- Parcel Lines
- Roadway
- Raised Pavement for Truck Access
- Sidewalk
- Planting
- Bike Lane
- Shared Use Path

NOTES

1. Limits of sidewalk extend to R/W or existing back of walk, whichever is further.
2. Trees to be located in a later design phase.
3. Existing driveway locations are not shown and will be incorporated in a later design phase.

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DESIGN ALTERNATIVE 2 - ONE LANE, ONE-WAY INTERSECTION CONCEPT

12TH AND 13TH STREETS AT BELMONT AVENUE

DRAFT FOR PRELIMINARY DISCUSSION ONLY

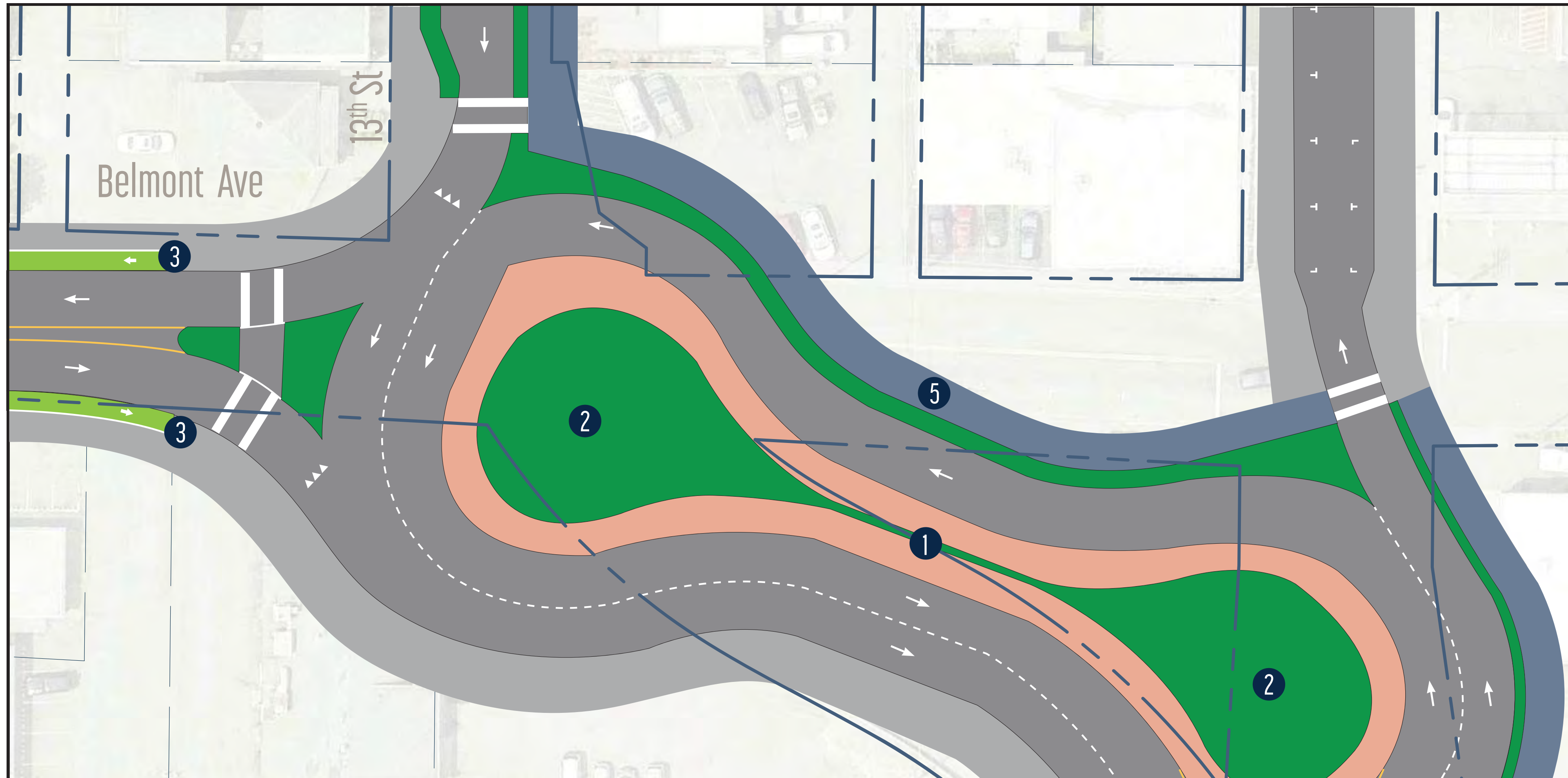
THE HEIGHTS STREETSCAPE PLAN

LEGEND

- Right of Way
- Parcel Lines
- Roadway
- Raised Pavement for Truck Access
- Sidewalk
- Planting
- Bike Lane
- Shared Use Path

NOTES

1. Trees to be located in a later design phase.
2. Existing driveway locations are not shown and will be incorporated in a later design phase.



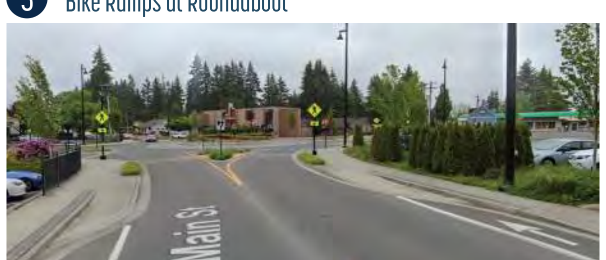
1 Double Roundabout (See discussion below)

Source: MassDOT

2 Placemaking Opportunity

Source: DeepRoot

3 Bike Ramps at Roundabout



Source: Google maps streetview

4 Rectangular Rapid Flash Beacon (RRFB) at Crosswalk

Source: Carmanah.com

5 Shared Use Path Along Road

Source: MAG

0 10 20 30 40 50 feet

N

ROUNDABOUT DISCUSSION

1. The design shown for the double roundabout is conceptual and should only be considered an illustration of potential traffic flow. The actual extents of the roundabout design and potential property impacts will be refined if recommended as part of a refined concept and traffic analysis.

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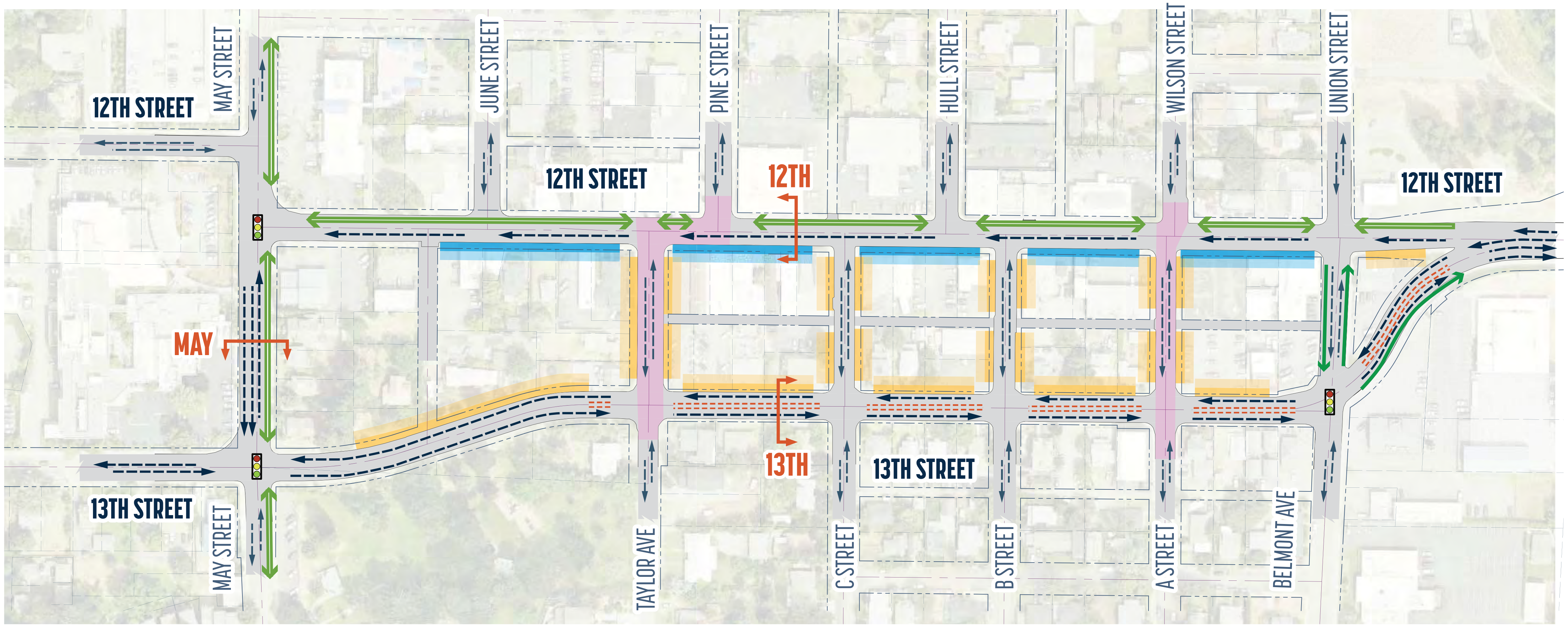
THE HEIGHTS STREETSCAPE PLAN

DESIGN ALTERNATIVE 3 - HYBRID CIRCULATION + STREET SECTIONS

DRAFT FOR PRELIMINARY DISCUSSION ONLY



LEGEND

- Right of Way
- Parcels
- Center Line
- Travel Lane - City Street
- Travel Lane - ODOT
- Center Turn Lane
- Bike Lane
- Cycle Track (Two-Way)
- Traffic Signal, See Note 1
- Parallel Street Parking
- Angled Street Parking
- Enhancement to Improve East/West Connections

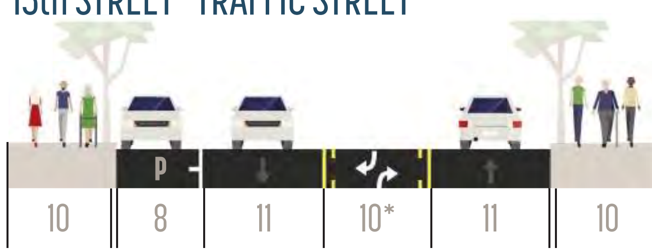
NOTES

1. See intersection concepts for channelization at intersections.

0 50 100 200 400 feet

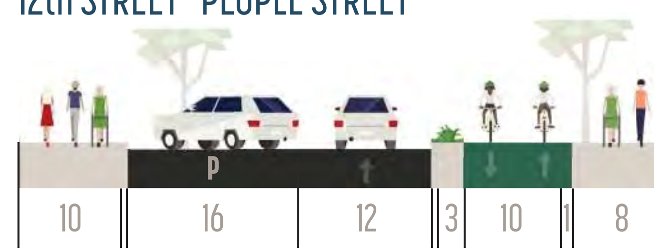
N

13th STREET "TRAFFIC STREET"



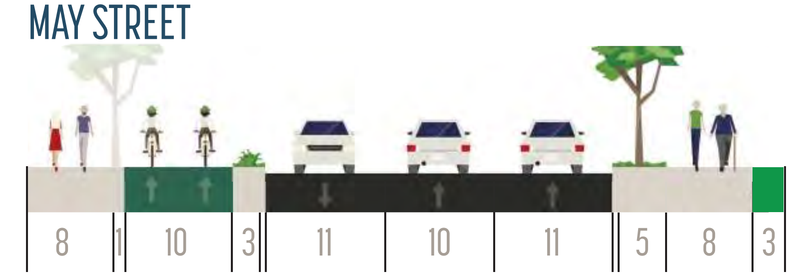
(50' R/W + (2) 5' Utility Easements) * Provide center median between May St and Taylor Ave

12th STREET "PEOPLE STREET"



(60' R/W)

MAY STREET



(60' R/W + 10' Easement)

EXAMPLE OF TWO WAY CYCLE TRACK - 12TH STREET AND MAY STREET

Source: Philadelphia magazine, NV5

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DESIGN ALTERNATIVE 3 - HYBRID INTERSECTION CONCEPT

12TH AND 13TH STREETS AT MAY STREET

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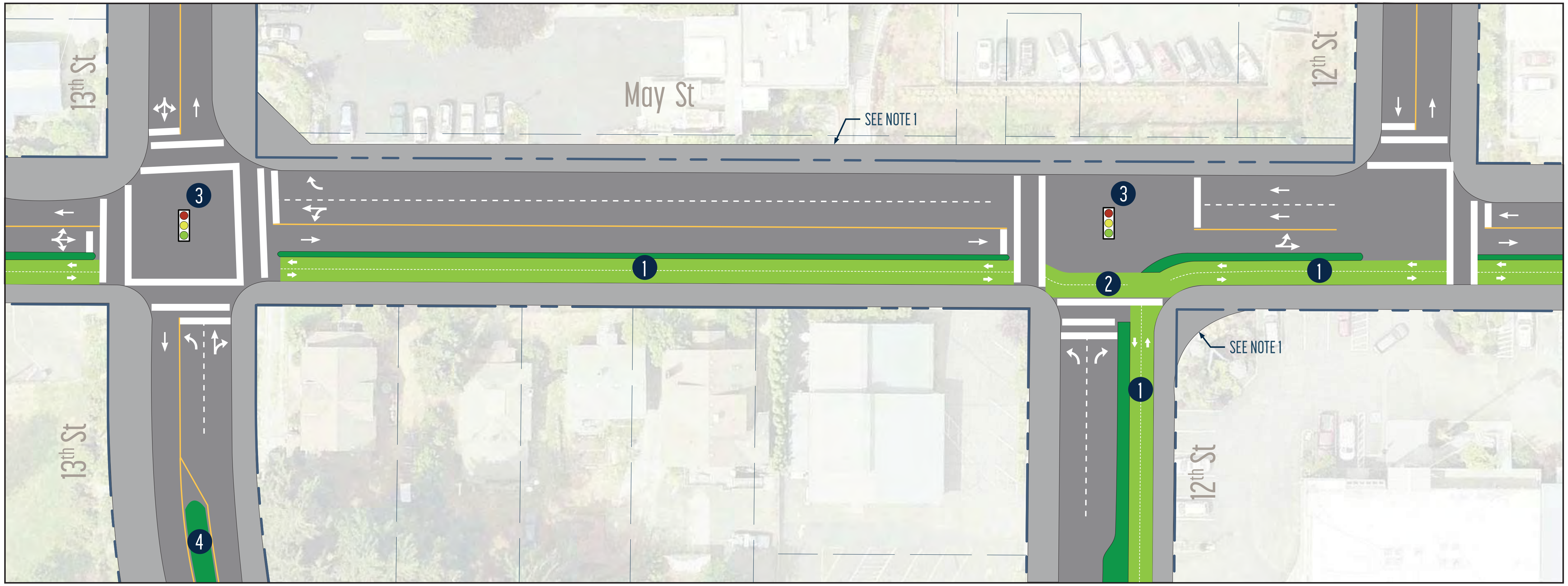

LEGEND

- Right of Way
- Parcel Lines
- Roadway
- Sidewalk
- Planting
- Bike Lane

NOTES

1. Limits of sidewalk extend to R/W or existing back of walk, whichever is further.
2. Trees to be located in a later design phase.
3. Existing driveway locations are not shown and will be incorporated in a later design phase.

1 Two Way Cycle Track

Source: Philadelphia Magazine, NV5

2 Two-Way Cycle Track at Intersection

Source: Roy Symons

3 Bicycle Traffic Signal

Source: SDOT

4 PLANTED MEDIAN

Source: MIG

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THEHEIGHTS STREETSCAPE PLAN

DESIGN ALTERNATIVE 3 - HYBRID INTERSECTION CONCEPT

12TH AND 13TH STREETS AT BELMONT AVENUE

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1 Two Way Cycle Track

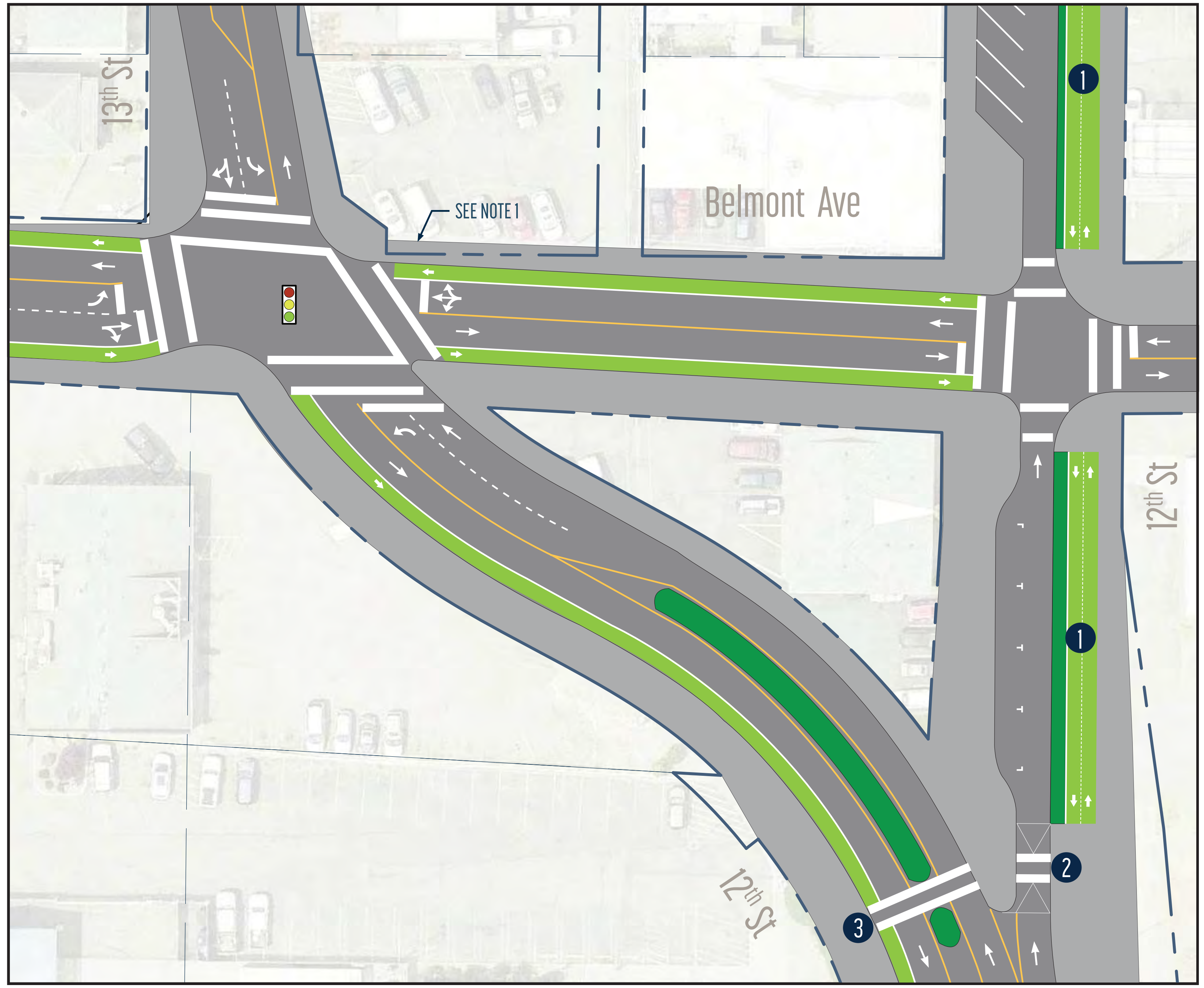
Source: Philadelphia Magazine, NV5

2 Traffic Calming - Raised Crosswalk

Source: Creative Commons

3 Enhanced Crosswalk at Planted Median

Source: MIG



LEGEND

- Right of Way
- Parcel Lines
- Roadway
- Sidewalk
- Planting
- Bike Lane

NOTES

1. Limits of sidewalk extend to R/W or existing back of walk, whichever is further.
2. Trees to be located in a later design phase.
3. Existing driveway locations are not shown and will be incorporated in a later design phase.

N 0 10 20 30 40 50 feet

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APPENDIX B: TSP BUILD TRAFFIC OPERATIONS

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	229	462	421	225	530	109
Future Volume (vph)	229	462	421	225	530	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1863	1583	1752	1881	1770	1538
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1863	1583	1752	1881	1770	1538
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	244	491	448	239	564	116
RTOR Reduction (vph)	0	59	0	0	0	73
Lane Group Flow (vph)	244	432	448	239	564	43
Confl. Peds. (#/hr)		2	2		1	2
Heavy Vehicles (%)	2%	2%	3%	1%	2%	5%
Turn Type	NA	pt+ov	Prot	NA	Prot	Prot
Protected Phases	2	2 8	1	6	8	8
Permitted Phases						
Actuated Green, G (s)	18.0	54.8	26.5	48.5	32.8	32.8
Effective Green, g (s)	18.0	54.8	26.5	48.5	32.8	32.8
Actuated g/C Ratio	0.20	0.61	0.30	0.54	0.37	0.37
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	375	971	519	1021	650	564
v/s Ratio Prot	c0.13	0.27	c0.26	0.13	c0.32	0.03
v/s Ratio Perm						
v/c Ratio	0.65	0.44	0.86	0.23	0.87	0.08
Uniform Delay, d1	32.8	9.2	29.7	10.7	26.2	18.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.0	0.3	13.9	0.1	11.8	0.1
Delay (s)	36.8	9.5	43.5	10.8	38.0	18.4
Level of Service	D	A	D	B	D	B
Approach Delay (s)	18.5			32.2	34.7	
Approach LOS	B			C	C	

Intersection Summary			
HCM 2000 Control Delay	28.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	89.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	87	81	312	145	541	0	0	0	26	752	57
Future Volume (veh/h)	0	87	81	312	145	541	0	0	0	26	752	57
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	0.99		1.00				1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1885	1856	1900	1841	1885				1900	1856	1870
Adj Flow Rate, veh/h	0	93	86	332	154	0				28	800	61
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94				0.94	0.94	0.94
Percent Heavy Veh, %	0	1	3	0	4	1				0	3	2
Cap, veh/h	0	673	557	400	145					30	870	66
Arrive On Green	0.00	0.36	0.36	0.60	0.60	0.00				0.53	0.53	0.53
Sat Flow, veh/h	0	1885	1559	878	407	1598				58	1646	125
Grp Volume(v), veh/h	0	93	86	486	0	0				889	0	0
Grp Sat Flow(s),veh/h/ln	0	1885	1559	1285	0	1598				1829	0	0
Q Serve(g_s), s	0.0	2.3	2.6	22.7	0.0	0.0				31.2	0.0	0.0
Cycle Q Clear(g_c), s	0.0	2.3	2.6	25.0	0.0	0.0				31.2	0.0	0.0
Prop In Lane	0.00		1.00	0.68		1.00				0.03		0.07
Lane Grp Cap(c), veh/h	0	673	557	545	0					967	0	0
V/C Ratio(X)	0.00	0.14	0.15	0.89	0.00					0.92	0.00	0.00
Avail Cap(c_a), veh/h	0	673	557	545	0					967	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.67	1.67	1.67				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	0.77	0.00	0.00				0.70	0.00	0.00
Uniform Delay (d), s/veh	0.0	15.2	15.3	15.9	0.0	0.0				15.1	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.4	0.6	15.7	0.0	0.0				11.4	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.0	1.0	7.5	0.0	0.0				14.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	15.6	15.9	31.7	0.0	0.0				26.5	0.0	0.0
LnGrp LOS	A	B	B	C	A					C	A	A
Approach Vol, veh/h		179			486	A					889	
Approach Delay, s/veh		15.8			31.7						26.5	
Approach LOS		B			C						C	

Timer - Assigned Phs				4		6		8				
Phs Duration (G+Y+Rc), s				29.0		41.0		29.0				
Change Period (Y+Rc), s				4.0		4.0		4.0				
Max Green Setting (Gmax), s				25.0		37.0		25.0				
Max Q Clear Time (g_c+I1), s				4.6		33.2		27.0				
Green Ext Time (p_c), s				0.7		2.2		0.0				

Intersection Summary		
HCM 6th Ctrl Delay		26.9
HCM 6th LOS		C

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	8	8	112	38	0	0	0	0	14	1130	13
Future Vol, veh/h	0	8	8	112	38	0	0	0	0	14	1130	13
Conflicting Peds, #/hr	8	0	11	11	0	8	5	0	2	2	0	5
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	2	0
Mvmt Flow	0	9	9	122	41	0	0	0	0	15	1228	14

Major/Minor	Minor2			Minor1						Major2		
Conflicting Flow All	-	1272	637	662	1279	-				2	0	0
Stage 1	-	1270	-	2	2	-				-	-	-
Stage 2	-	2	-	660	1277	-				-	-	-
Critical Hdwy	-	6.5	6.9	7.5	6.5	-				4.1	-	-
Critical Hdwy Stg 1	-	5.5	-	-	-	-				-	-	-
Critical Hdwy Stg 2	-	-	-	6.5	5.5	-				-	-	-
Follow-up Hdwy	-	4	3.3	3.5	4	-				2.2	-	-
Pot Cap-1 Maneuver	0	169	425	351	167	0				1634	-	-
Stage 1	0	241	-	-	-	0				-	-	-
Stage 2	0	-	-	423	239	0				-	-	-
Platoon blocked, %											-	-
Mov Cap-1 Maneuver	-	163	423	322	161	-				1631	-	-
Mov Cap-2 Maneuver	-	163	-	322	161	-				-	-	-
Stage 1	-	233	-	-	-	-				-	-	-
Stage 2	-	-	-	387	231	-				-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	21.5	40.5	0.2
HCM LOS	C	E	

Minor Lane/Major Mvmt	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	235	257	1631	-	-
HCM Lane V/C Ratio	0.074	0.634	0.009	-	-
HCM Control Delay (s)	21.5	40.5	7.2	0.1	-
HCM Lane LOS	C	E	A	A	-
HCM 95th %tile Q(veh)	0.2	3.9	0	-	-

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	10	5	77	16	0	0	0	0	55	1195	10
Future Vol, veh/h	0	10	5	77	16	0	0	0	0	55	1195	10
Conflicting Peds, #/hr	8	0	4	4	0	8	3	0	7	7	0	3
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	2	0	0	0	0	0	0	2	0
Mvmt Flow	0	11	5	81	17	0	0	0	0	58	1258	11

Major/Minor	Minor2			Minor1						Major2		
Conflicting Flow All	-	1390	642	762	1395	-				7	0	0
Stage 1	-	1383	-	7	7	-				-	-	-
Stage 2	-	7	-	755	1388	-				-	-	-
Critical Hdwy	-	6.5	6.9	7.54	6.5	-				4.1	-	-
Critical Hdwy Stg 1	-	5.5	-	-	-	-				-	-	-
Critical Hdwy Stg 2	-	-	-	6.54	5.5	-				-	-	-
Follow-up Hdwy	-	4	3.3	3.52	4	-				2.2	-	-
Pot Cap-1 Maneuver	0	144	422	294	143	0				1627	-	-
Stage 1	0	213	-	-	-	0				-	-	-
Stage 2	0	-	-	367	212	0				-	-	-
Platoon blocked, %											-	-
Mov Cap-1 Maneuver	-	125	421	245	124	-				1616	-	-
Mov Cap-2 Maneuver	-	125	-	245	124	-				-	-	-
Stage 1	-	186	-	-	-	-				-	-	-
Stage 2	-	-	-	300	186	-				-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	29.4	36.3	0.7
HCM LOS	D	E	

Minor Lane/Major Mvmt	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	163	210	1616	-	-
HCM Lane V/C Ratio	0.097	0.466	0.036	-	-
HCM Control Delay (s)	29.4	36.3	7.3	0.4	-
HCM Lane LOS	D	E	A	A	-
HCM 95th %tile Q(veh)	0.3	2.3	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	117	190	15	152	0	0	0	0	49	1032	201
Future Volume (veh/h)	0	117	190	15	152	0	0	0	0	49	1032	201
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1856	1856	1781	1870	0				1900	1870	1885
Adj Flow Rate, veh/h	0	129	209	16	167	0				54	1134	221
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91				0.91	0.91	0.91
Percent Heavy Veh, %	0	3	3	8	2	0				0	2	1
Cap, veh/h	0	391	330	112	368	0				79	1717	352
Arrive On Green	0.00	0.21	0.21	0.21	0.21	0.00				0.59	0.59	0.59
Sat Flow, veh/h	0	1856	1568	75	1746	0				134	2897	594
Grp Volume(v), veh/h	0	129	209	183	0	0				754	0	655
Grp Sat Flow(s),veh/h/ln	0	1856	1568	1821	0	0				1864	0	1761
Q Serve(g_s), s	0.0	2.4	4.9	0.0	0.0	0.0				11.3	0.0	9.8
Cycle Q Clear(g_c), s	0.0	2.4	4.9	3.5	0.0	0.0				11.3	0.0	9.8
Prop In Lane	0.00		1.00	0.09		0.00				0.07		0.34
Lane Grp Cap(c), veh/h	0	391	330	480	0	0				1105	0	1043
V/C Ratio(X)	0.00	0.33	0.63	0.38	0.00	0.00				0.68	0.00	0.63
Avail Cap(c_a), veh/h	0	857	725	925	0	0				1521	0	1437
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	0.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	13.6	14.6	14.0	0.0	0.0				5.7	0.0	5.4
Incr Delay (d2), s/veh	0.0	0.5	2.0	0.5	0.0	0.0				0.8	0.0	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.9	1.7	1.3	0.0	0.0				2.7	0.0	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	14.1	16.6	14.5	0.0	0.0				6.4	0.0	6.0
LnGrp LOS	A	B	B	B	A	A				A	A	A
Approach Vol, veh/h		338			183						1409	
Approach Delay, s/veh		15.7			14.5						6.2	
Approach LOS		B			B						A	
Timer - Assigned Phs				4		6		8				
Phs Duration (G+Y+Rc), s				12.6		28.1		12.6				
Change Period (Y+Rc), s				4.0		4.0		4.0				
Max Green Setting (Gmax), s				18.8		33.2		18.8				
Max Q Clear Time (g_c+I1), s				6.9		13.3		5.5				
Green Ext Time (p_c), s				1.4		10.9		0.7				
Intersection Summary												
HCM 6th Ctrl Delay			8.7									
HCM 6th LOS			A									

Intersection	
Int Delay, s/veh	22

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	113	23	0	0	8	6	162	1130	38	0	0	0
Future Vol, veh/h	113	23	0	0	8	6	162	1130	38	0	0	0
Conflicting Peds, #/hr	13	0	0	0	0	13	1	0	8	8	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	3	0	0	0	17	0	2	3	0	0	0	0
Mvmt Flow	119	24	0	0	8	6	171	1189	40	0	0	0

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	955	1580	-	-	1560	636	1	0	0
Stage 1	1	1	-	-	1559	-	-	-	-
Stage 2	954	1579	-	-	1	-	-	-	-
Critical Hdwy	7.56	6.5	-	-	6.84	6.9	4.14	-	-
Critical Hdwy Stg 1	-	-	-	-	5.84	-	-	-	-
Critical Hdwy Stg 2	6.56	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.53	4	-	-	4.17	3.3	2.22	-	-
Pot Cap-1 Maneuver	211	110	0	0	96	425	1620	-	-
Stage 1	-	-	0	0	149	-	-	-	-
Stage 2	276	171	0	0	-	-	-	-	-
Platoon blocked, %								-	-
Mov Cap-1 Maneuver	138	72	-	-	63	422	1618	-	-
Mov Cap-2 Maneuver	138	72	-	-	63	-	-	-	-
Stage 1	-	-	-	-	98	-	-	-	-
Stage 2	165	112	-	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	216.8	47.6	1.8
HCM LOS	F	E	

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1
Capacity (veh/h)	1618	-	-	119	99
HCM Lane V/C Ratio	0.105	-	-	1.203	0.149
HCM Control Delay (s)	7.5	1	-	216.8	47.6
HCM Lane LOS	A	A	-	F	E
HCM 95th %tile Q(veh)	0.4	-	-	9	0.5

Intersection	
Int Delay, s/veh	5.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	45	13	0	0	36	25	68	1228	62	0	0	0
Future Vol, veh/h	45	13	0	0	36	25	68	1228	62	0	0	0
Conflicting Peds, #/hr	15	0	20	20	0	15	8	0	13	13	0	8
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	0	0	0	3	0	2	3	6	0	0	0
Mvmt Flow	48	14	0	0	39	27	73	1320	67	0	0	0

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	849	1554	-	-	1521	722	8	0	0
Stage 1	8	8	-	-	1513	-	-	-	-
Stage 2	841	1546	-	-	8	-	-	-	-
Critical Hdwy	7.5	6.5	-	-	6.56	6.9	4.14	-	-
Critical Hdwy Stg 1	-	-	-	-	5.56	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	-	-	4.03	3.3	2.22	-	-
Pot Cap-1 Maneuver	258	114	0	0	116	374	1611	-	-
Stage 1	-	-	0	0	179	-	-	-	-
Stage 2	330	178	0	0	-	-	-	-	-
Platoon blocked, %								-	-
Mov Cap-1 Maneuver	134	89	-	-	90	369	1599	-	-
Mov Cap-2 Maneuver	134	89	-	-	90	-	-	-	-
Stage 1	-	-	-	-	140	-	-	-	-
Stage 2	176	140	-	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	63.7	58	1
HCM LOS	F	F	

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1
Capacity (veh/h)	1599	-	-	120	130
HCM Lane V/C Ratio	0.046	-	-	0.52	0.505
HCM Control Delay (s)	7.4	0.7	-	63.7	58
HCM Lane LOS	A	A	-	F	F
HCM 95th %tile Q(veh)	0.1	-	-	2.4	2.4

Intersection						
Int Delay, s/veh	1.8					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	123	1228	82	0	0
Future Vol, veh/h	0	123	1228	82	0	0
Conflicting Peds, #/hr	15	0	0	23	23	0
Sign Control	Stop	Stop	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	-
Grade, %	0	-	0	-	-	0
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	3	0	0	0
Mvmt Flow	0	135	1349	90	0	0

Major/Minor	Minor1		Major1	
Conflicting Flow All	-	743	0	0
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	6.9	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	3.3	-	-
Pot Cap-1 Maneuver	0	362	-	-
Stage 1	0	-	-	-
Stage 2	0	-	-	-
Platoon blocked, %			-	-
Mov Cap-1 Maneuver	-	354	-	-
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	WB	NB
HCM Control Delay, s	21.3	0
HCM LOS	C	

Minor Lane/Major Mvmt	NBT	NBR	WBLn1
Capacity (veh/h)	-	-	354
HCM Lane V/C Ratio	-	-	0.382
HCM Control Delay (s)	-	-	21.3
HCM Lane LOS	-	-	C
HCM 95th %tile Q(veh)	-	-	1.7

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	43	0	142	1209	0	0
Future Vol, veh/h	43	0	142	1209	0	0
Conflicting Peds, #/hr	7	0	15	0	0	15
Sign Control	Stop	Stop	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	-	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	3	3	0	0
Mvmt Flow	47	0	156	1329	0	0

Major/Minor	Minor2		Major1	
Conflicting Flow All	999	-	15	0
Stage 1	15	-	-	-
Stage 2	984	-	-	-
Critical Hdwy	6.8	-	4.16	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-
Follow-up Hdwy	3.5	-	2.23	-
Pot Cap-1 Maneuver	244	0	1594	-
Stage 1	-	0	-	-
Stage 2	327	0	-	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	147	-	1571	-
Mov Cap-2 Maneuver	147	-	-	-
Stage 1	-	-	-	-
Stage 2	322	-	-	-

Approach	EB	NB
HCM Control Delay, s	40.7	1.9
HCM LOS	E	

Minor Lane/Major Mvmt	NBL	NBT	EBLn1
Capacity (veh/h)	1571	-	147
HCM Lane V/C Ratio	0.099	-	0.321
HCM Control Delay (s)	7.5	1.2	40.7
HCM Lane LOS	A	A	E
HCM 95th %tile Q(veh)	0.3	-	1.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	112	0	0	404	634	642
Future Volume (veh/h)	112	0	0	404	634	642
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	0	0	1900	1885	1885
Adj Flow Rate, veh/h	123	0	0	444	697	705
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	0	0	0	1	1
Cap, veh/h	755	0	0	1457	866	770
Arrive On Green	0.81	0.00	0.00	0.40	0.48	0.48
Sat Flow, veh/h	1870	0	0	3800	1795	1598
Grp Volume(v), veh/h	123	0	0	444	697	705
Grp Sat Flow(s),veh/h/ln	1870	0	0	1805	1795	1598
Q Serve(g_s), s	1.0	0.0	0.0	5.9	23.0	28.6
Cycle Q Clear(g_c), s	1.0	0.0	0.0	5.9	23.0	28.6
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	755	0	0	1457	866	770
V/C Ratio(X)	0.16	0.00	0.00	0.30	0.81	0.92
Avail Cap(c_a), veh/h	755	0	0	1457	1129	1004
HCM Platoon Ratio	2.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	4.1	0.0	0.0	14.2	15.3	16.8
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.5	2.5	9.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.0	2.4	9.0	11.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	4.6	0.0	0.0	14.7	17.8	26.0
LnGrp LOS	A	A	A	B	B	C
Approach Vol, veh/h	123			444	1402	
Approach Delay, s/veh	4.6			14.7	21.9	
Approach LOS	A			B	C	

Timer - Assigned Phs	2	4	8
Phs Duration (G+Y+Rc), s	37.8	32.2	32.2
Change Period (Y+Rc), s	4.0	4.0	4.0
Max Green Setting (Gmax), s	44.0	18.0	18.0
Max Q Clear Time (g_c+I1), s	30.6	7.9	3.0
Green Ext Time (p_c), s	3.1	2.3	0.5

Intersection Summary	
HCM 6th Ctrl Delay	19.2
HCM 6th LOS	B

APPENDIX C: ALTERNATIVE TRAFFIC OPERATIONS (UNMITIGATED)

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	230	460	420	225	530	110
Future Volume (vph)	230	460	420	225	530	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1863	1583	1752	1881	1770	1538
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1863	1583	1752	1881	1770	1538
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	245	489	447	239	564	117
RTOR Reduction (vph)	0	379	0	0	0	75
Lane Group Flow (vph)	245	110	447	239	564	42
Confl. Peds. (#/hr)		2	2		1	2
Heavy Vehicles (%)	2%	2%	3%	1%	2%	5%
Turn Type	NA	Prot	Prot	NA	Prot	Prot
Protected Phases	2	2	1	6	8	8
Permitted Phases						
Actuated Green, G (s)	19.5	19.5	26.1	49.6	31.9	31.9
Effective Green, g (s)	19.5	19.5	26.1	49.6	31.9	31.9
Actuated g/C Ratio	0.22	0.22	0.29	0.55	0.36	0.36
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	405	344	510	1042	630	548
v/s Ratio Prot	c0.13	0.07	c0.26	0.13	c0.32	0.03
v/s Ratio Perm						
v/c Ratio	0.60	0.32	0.88	0.23	0.90	0.08
Uniform Delay, d1	31.5	29.4	30.2	10.2	27.2	19.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.5	0.5	15.5	0.1	15.2	0.1
Delay (s)	34.1	30.0	45.7	10.3	42.4	19.1
Level of Service	C	C	D	B	D	B
Approach Delay (s)	31.3			33.4	38.4	
Approach LOS	C			C	D	

Intersection Summary			
HCM 2000 Control Delay	34.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	89.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	35	80	310	145	40	125	500	10	75	625	55
Future Volume (veh/h)	50	35	80	310	145	40	125	500	10	75	625	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.97	1.00		0.98	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1885	1856	1870	1841	1885	1870	1870	1870	1870	1856	1870
Adj Flow Rate, veh/h	53	37	85	330	154	30	133	532	11	80	665	59
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	1	3	2	4	1	2	2	2	2	3	2
Cap, veh/h	86	58	87	364	478	93	322	1078	22	106	695	60
Arrive On Green	0.17	0.17	0.17	0.03	0.11	0.11	0.06	0.59	0.59	0.48	0.49	0.48
Sat Flow, veh/h	193	334	498	1781	1492	291	1781	1825	38	128	1431	123
Grp Volume(v), veh/h	175	0	0	330	0	184	133	0	543	804	0	0
Grp Sat Flow(s),veh/h/ln	1025	0	0	1781	0	1783	1781	0	1863	1682	0	0
Q Serve(g_s), s	6.6	0.0	0.0	6.8	0.0	8.6	3.1	0.0	15.2	33.4	0.0	0.0
Cycle Q Clear(g_c), s	15.2	0.0	0.0	6.8	0.0	8.6	3.1	0.0	15.2	42.8	0.0	0.0
Prop In Lane	0.30		0.49	1.00		0.16	1.00		0.02	0.10		0.07
Lane Grp Cap(c), veh/h	225	0	0	364	0	572	322	0	1100	851	0	0
V/C Ratio(X)	0.78	0.00	0.00	0.91	0.00	0.32	0.41	0.00	0.49	0.94	0.00	0.00
Avail Cap(c_a), veh/h	225	0	0	364	0	572	323	0	1101	851	0	0
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.96	0.00	0.96	1.00	0.00	1.00	0.54	0.00	0.00
Uniform Delay (d), s/veh	37.7	0.0	0.0	38.4	0.0	31.2	9.1	0.0	10.7	22.6	0.0	0.0
Incr Delay (d2), s/veh	22.7	0.0	0.0	24.5	0.0	1.4	0.8	0.0	0.3	12.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.3	0.0	0.0	10.1	0.0	4.2	1.2	0.0	5.9	18.7	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	60.4	0.0	0.0	63.0	0.0	32.6	9.9	0.0	11.0	34.5	0.0	0.0
LnGrp LOS	E	A	A	E	A	C	A	A	B	C	A	A
Approach Vol, veh/h		175			514			676			804	
Approach Delay, s/veh		60.4			52.1			10.8			34.5	
Approach LOS		E			D			B			C	

Timer - Assigned Phs		2	3	4	5	6		8
Phs Duration (G+Y+Rc), s		57.2	13.1	19.7	9.5	47.7		32.8
Change Period (Y+Rc), s		4.5	4.5	4.5	4.5	4.5		4.5
Max Green Setting (Gmax), s		52.7	8.6	15.2	5.0	43.2		28.3
Max Q Clear Time (g_c+I1), s		17.2	8.8	17.2	5.1	44.8		10.6
Green Ext Time (p_c), s		4.3	0.0	0.0	0.0	0.0		0.9

Intersection Summary			
HCM 6th Ctrl Delay			33.4
HCM 6th LOS			C

Intersection	
Int Delay, s/veh	4.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	10	10	10	20	40	30	565	10	5	990	15
Future Vol, veh/h	5	10	10	10	20	40	30	565	10	5	990	15
Conflicting Peds, #/hr	8	0	11	11	0	8	5	0	2	2	0	5
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	11	11	11	22	43	33	614	11	5	1076	16

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1825	1792	1100	1804	1795	630	1097	0	0	627	0	0
Stage 1	1099	1099	-	688	688	-	-	-	-	-	-	-
Stage 2	726	693	-	1116	1107	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	59	81	258	61	80	482	636	-	-	955	-	-
Stage 1	258	288	-	436	447	-	-	-	-	-	-	-
Stage 2	416	445	-	252	286	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	38	73	254	48	72	477	633	-	-	953	-	-
Mov Cap-2 Maneuver	38	73	-	48	72	-	-	-	-	-	-	-
Stage 1	236	283	-	400	410	-	-	-	-	-	-	-
Stage 2	327	409	-	227	281	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	70.4	73	0.5	0
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	633	-	-	81	123	953	-	-
HCM Lane V/C Ratio	0.052	-	-	0.335	0.619	0.006	-	-
HCM Control Delay (s)	11	0	-	70.4	73	8.8	0	-
HCM Lane LOS	B	A	-	F	F	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	1.3	3.2	0	-	-

Intersection	
Int Delay, s/veh	8.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	10	5	35	15	15	5	600	5	35	995	10
Future Vol, veh/h	5	10	5	35	15	15	5	600	5	35	995	10
Conflicting Peds, #/hr	8	0	4	4	0	8	3	0	7	7	0	3
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	11	5	37	16	16	5	632	5	37	1047	11

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1799	1784	1060	1791	1787	650	1061	0	0	644	0	0
Stage 1	1130	1130	-	652	652	-	-	-	-	-	-	-
Stage 2	669	654	-	1139	1135	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	62	82	272	63	81	469	657	-	-	941	-	-
Stage 1	248	279	-	457	464	-	-	-	-	-	-	-
Stage 2	447	463	-	245	277	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	45	72	270	50	72	462	655	-	-	935	-	-
Mov Cap-2 Maneuver	45	72	-	50	72	-	-	-	-	-	-	-
Stage 1	244	251	-	448	455	-	-	-	-	-	-	-
Stage 2	409	454	-	207	250	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	72	207.9	0.1	0.3
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	655	-	-	74	69	935	-	-
HCM Lane V/C Ratio	0.008	-	-	0.284	0.992	0.039	-	-
HCM Control Delay (s)	10.5	0	-	72	207.9	9	0	-
HCM Lane LOS	B	A	-	F	F	A	A	-
HCM 95th %tile Q(veh)	0	-	-	1	5	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	45	200	45	50	5	125	565	5	50	930	60
Future Volume (veh/h)	70	45	200	45	50	5	125	565	5	50	930	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1856	1856	1781	1870	1870	1870	1870	1870	1870	1870	1885
Adj Flow Rate, veh/h	77	49	72	49	55	5	137	621	5	55	1022	66
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	3	3	8	2	2	2	2	2	2	2	1
Cap, veh/h	206	92	135	93	91	7	330	1466	12	77	1134	72
Arrive On Green	0.14	0.14	0.13	0.13	0.14	0.13	0.05	0.79	0.79	0.70	0.71	0.70
Sat Flow, veh/h	1337	675	992	333	670	48	1781	1853	15	60	1608	102
Grp Volume(v), veh/h	77	0	121	109	0	0	137	0	626	1143	0	0
Grp Sat Flow(s),veh/h/ln	1337	0	1668	1051	0	0	1781	0	1868	1770	0	0
Q Serve(g_s), s	0.0	0.0	7.4	4.7	0.0	0.0	2.1	0.0	11.6	37.4	0.0	0.0
Cycle Q Clear(g_c), s	8.2	0.0	7.4	12.2	0.0	0.0	2.1	0.0	11.6	58.8	0.0	0.0
Prop In Lane	1.00		0.60	0.45		0.05	1.00		0.01	0.05		0.06
Lane Grp Cap(c), veh/h	206	0	227	186	0	0	330	0	1478	1275	0	0
V/C Ratio(X)	0.37	0.00	0.53	0.59	0.00	0.00	0.42	0.00	0.42	0.90	0.00	0.00
Avail Cap(c_a), veh/h	328	0	379	325	0	0	372	0	1478	1275	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	44.6	0.0	44.4	46.8	0.0	0.0	3.1	0.0	3.6	13.1	0.0	0.0
Incr Delay (d2), s/veh	0.4	0.0	0.7	1.1	0.0	0.0	0.3	0.0	0.9	10.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	0.0	3.2	3.0	0.0	0.0	0.7	0.0	3.9	24.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.0	0.0	45.1	47.9	0.0	0.0	3.4	0.0	4.5	23.1	0.0	0.0
LnGrp LOS	D	A	D	D	A	A	A	A	A	C	A	A
Approach Vol, veh/h		198			109			763			1143	
Approach Delay, s/veh		45.1			47.9			4.3			23.1	
Approach LOS		D			D			A			C	

Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		91.0		19.0	9.4	81.6		19.0				
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s		86.5		24.5	7.5	74.5		24.5				
Max Q Clear Time (g_c+I1), s		13.6		10.2	4.1	60.8		14.2				
Green Ext Time (p_c), s		5.4		0.5	0.1	8.6		0.2				

Intersection Summary			
HCM 6th Ctrl Delay			19.8
HCM 6th LOS			B

Intersection	
Int Delay, s/veh	4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	45	25	5	5	10	5	60	750	40	5	185	30
Future Vol, veh/h	45	25	5	5	10	5	60	750	40	5	185	30
Conflicting Peds, #/hr	13	0	0	0	0	13	1	0	8	8	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	3	2	2	2	17	2	2	3	2	2	2	2
Mvmt Flow	47	26	5	5	11	5	63	789	42	5	195	32

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1179	1187	212	1181	1182	831	228	0	0	839	0	0
Stage 1	222	222	-	944	944	-	-	-	-	-	-	-
Stage 2	957	965	-	237	238	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.52	6.22	7.12	6.67	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.13	5.52	-	6.12	5.67	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.52	-	6.12	5.67	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.018	3.318	3.518	4.153	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	167	188	828	167	178	370	1340	-	-	796	-	-
Stage 1	778	720	-	315	322	-	-	-	-	-	-	-
Stage 2	308	333	-	766	681	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	143	169	827	135	160	363	1339	-	-	790	-	-
Mov Cap-2 Maneuver	143	169	-	135	160	-	-	-	-	-	-	-
Stage 1	709	714	-	285	291	-	-	-	-	-	-	-
Stage 2	264	301	-	728	676	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	47.6	28.1	0.6	0.2
HCM LOS	E	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1339	-	-	160	177	790	-	-
HCM Lane V/C Ratio	0.047	-	-	0.493	0.119	0.007	-	-
HCM Control Delay (s)	7.8	0	-	47.6	28.1	9.6	0	-
HCM Lane LOS	A	A	-	E	D	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	2.4	0.4	0	-	-

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	15	5	5	35	20	30	730	50	10	210	5
Future Vol, veh/h	10	15	5	5	35	20	30	730	50	10	210	5
Conflicting Peds, #/hr	15	0	20	20	0	15	8	0	13	13	0	8
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	3	2	2	3	6	2	2	2
Mvmt Flow	11	16	5	5	38	22	32	785	54	11	226	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1180	1175	257	1170	1150	840	239	0	0	852	0	0
Stage 1	259	259	-	889	889	-	-	-	-	-	-	-
Stage 2	921	916	-	281	261	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.53	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.027	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	167	192	782	170	197	365	1328	-	-	787	-	-
Stage 1	746	694	-	338	360	-	-	-	-	-	-	-
Stage 2	324	351	-	726	690	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	123	177	761	145	181	355	1318	-	-	777	-	-
Mov Cap-2 Maneuver	123	177	-	145	181	-	-	-	-	-	-	-
Stage 1	706	677	-	318	339	-	-	-	-	-	-	-
Stage 2	254	331	-	679	673	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	30.3	29.4	0.3	0.4
HCM LOS	D	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1318	-	-	174	211	777	-	-
HCM Lane V/C Ratio	0.024	-	-	0.185	0.306	0.014	-	-
HCM Control Delay (s)	7.8	0	-	30.3	29.4	9.7	0	-
HCM Lane LOS	A	A	-	D	D	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.7	1.2	0	-	-

Intersection	
Int Delay, s/veh	2.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	35	65	745	80	10	225
Future Vol, veh/h	35	65	745	80	10	225
Conflicting Peds, #/hr	15	0	0	23	23	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	3	2	2	2
Mvmt Flow	38	71	819	88	11	247

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1170	886	0	0	930	0
Stage 1	886	-	-	-	-	-
Stage 2	284	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	213	343	-	-	736	-
Stage 1	403	-	-	-	-	-
Stage 2	764	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	202	335	-	-	720	-
Mov Cap-2 Maneuver	202	-	-	-	-	-
Stage 1	394	-	-	-	-	-
Stage 2	740	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	26.9	0	0.4
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	272	720	-
HCM Lane V/C Ratio	-	-	0.404	0.015	-
HCM Control Delay (s)	-	-	26.9	10.1	0
HCM Lane LOS	-	-	D	B	A
HCM 95th %tile Q(veh)	-	-	1.9	0	-

Intersection						
Int Delay, s/veh	1.3					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	20	40	50	760	195	30
Future Vol, veh/h	20	40	50	760	195	30
Conflicting Peds, #/hr	7	0	15	0	0	15
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	3	3	2	2
Mvmt Flow	22	44	55	835	214	33

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1198	246	262	0	-	0
Stage 1	246	-	-	-	-	-
Stage 2	952	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.13	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.227	-	-	-
Pot Cap-1 Maneuver	205	793	1296	-	-	-
Stage 1	795	-	-	-	-	-
Stage 2	375	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	183	782	1277	-	-	-
Mov Cap-2 Maneuver	183	-	-	-	-	-
Stage 1	721	-	-	-	-	-
Stage 2	370	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.7	0.5	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1277	-	374	-	-
HCM Lane V/C Ratio	0.043	-	0.176	-	-
HCM Control Delay (s)	7.9	0	16.7	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.6	-	-

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	60	50	100	385	135	590
Future Volume (veh/h)	60	50	100	385	135	590
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1885	1885
Adj Flow Rate, veh/h	66	55	110	423	148	648
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	1	1
Cap, veh/h	442	368	317	1199	784	698
Arrive On Green	0.15	0.15	0.47	0.47	0.44	0.44
Sat Flow, veh/h	943	786	555	2643	1795	1598
Grp Volume(v), veh/h	0	121	271	262	148	648
Grp Sat Flow(s),veh/h/ln	0	1729	1496	1617	1795	1598
Q Serve(g_s), s	0.0	5.5	6.9	9.3	4.6	34.6
Cycle Q Clear(g_c), s	0.0	5.5	12.3	9.3	4.6	34.6
Prop In Lane		0.45	0.41		1.00	1.00
Lane Grp Cap(c), veh/h	0	810	758	758	784	698
V/C Ratio(X)	0.00	0.15	0.36	0.35	0.19	0.93
Avail Cap(c_a), veh/h	0	810	758	758	987	879
HCM Platoon Ratio	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.40	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	22.5	16.1	15.2	15.6	24.0
Incr Delay (d2), s/veh	0.0	0.2	1.3	1.3	0.1	13.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.3	3.9	3.6	1.9	15.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	22.7	17.4	16.4	15.7	37.8
LnGrp LOS	A	C	B	B	B	D
Approach Vol, veh/h	121			533	796	
Approach Delay, s/veh	22.7			16.9	33.7	
Approach LOS	C			B	C	

Timer - Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		46.2				46.2		43.8
Change Period (Y+Rc), s		4.0				4.0		4.5
Max Green Setting (Gmax), s		32.0				32.0		49.5
Max Q Clear Time (g_c+I1), s		7.5				14.3		36.6
Green Ext Time (p_c), s		0.1				0.6		2.7

Intersection Summary			
HCM 6th Ctrl Delay			26.6
HCM 6th LOS			C

Intersection						
Int Delay, s/veh	2.9					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	195	0	685	850	0	0
Future Vol, veh/h	195	0	685	850	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	0	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	212	0	745	924	0	0

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	746	-	0	0	-	-
Stage 1	745	-	-	-	-	-
Stage 2	1	-	-	-	-	-
Critical Hdwy	6.42	-	-	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	-	-	-	-	-
Pot Cap-1 Maneuver	381	0	-	-	0	-
Stage 1	469	0	-	-	0	-
Stage 2	1022	0	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	381	-	-	-	-	-
Mov Cap-2 Maneuver	381	-	-	-	-	-
Stage 1	469	-	-	-	-	-
Stage 2	1022	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	25.7	0	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	381	-
HCM Lane V/C Ratio	-	-	0.556	-
HCM Control Delay (s)	-	-	25.7	-
HCM Lane LOS	-	-	D	-
HCM 95th %tile Q(veh)	-	-	3.3	-

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Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	13th/Belmont	Roundabout	HCM 6th Edition	SB Thru		46.8	E

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

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Intersection Level Of Service Report
Intersection 1: 13th/Belmont

Control Type:	Roundabout	Delay (sec / veh):	46.8
Analysis Method:	HCM 6th Edition	Level Of Service:	E
Analysis Period:	15 minutes		

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Thru	Right	Right2	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	125	565	5	50	930	60	70	45	200	45	50	5
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	1.00	2.00	3.00	3.00	8.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	125	565	5	50	930	60	70	45	200	45	50	5
Peak Hour Factor	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	34	155	1	14	255	16	19	12	55	12	14	1
Total Analysis Volume [veh/h]	137	621	5	55	1022	66	77	49	220	49	55	5
Pedestrian Volume [ped/h]	2			0			5			3		

Intersection Settings

Number of Conflicting Circulating Lanes	1			1			1			1		
Circulating Flow Rate [veh/h]	185			249			1151			852		
Exiting Flow Rate [veh/h]	1322			717			263			112		
Demand Flow Rate [veh/h]	125	565	5	50	930	60	70	45	200	45	50	5
Adjusted Demand Flow Rate [veh/h]	137	621	5	55	1022	66	77	49	220	49	55	5

Lanes

Overwrite Calculated Critical Headway	No	No	No	No
User-Defined Critical Headway [s]	4.00	4.00	4.00	4.00
Overwrite Calculated Follow-Up Time	No	No	No	No
User-Defined Follow-Up Time [s]	3.00	3.00	3.00	3.00
A (intercept)	1380.00	1380.00	1380.00	1380.00
B (coefficient)	0.00102	0.00102	0.00102	0.00102
HV Adjustment Factor	0.98	0.98	0.97	0.96
Entry Flow Rate [veh/h]	779	1166	356	115
Capacity of Entry and Bypass Lanes [veh/h]	1143	1071	427	579
Pedestrian Impedance	1.00	1.00	1.00	1.00
Capacity per Entry Lane [veh/h]	1120	1051	415	554
X, volume / capacity	0.68	1.09	0.83	0.20

Movement, Approach, & Intersection Results

Lane LOS	B	F	E	A
95th-Percentile Queue Length [veh]	5.69	27.29	7.87	0.73
95th-Percentile Queue Length [ft]	142.22	682.23	196.81	18.17
Approach Delay [s/veh]	13.19	73.80	43.70	9.08
Approach LOS	B	F	E	A
Intersection Delay [s/veh]	46.81			
Intersection LOS	E			

Vistro File: C:\...\Scen 1_HoodRiver OR281 RABs.vistro — Scenario 1 1-lane
Report File: X:\...\Scenario 1.pdf — 1/13/2022

Turning Movement Volume: Summary

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Thru	Right	2	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
1	13th/Belmont	125	565	5	50	930	60	70	45	200	45	50	5	2150

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Turning Movement Volume: Detail

ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
			Thru	Right	2	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
1	13th/Belmont	Final Base	125	565	5	50	930	60	70	45	200	45	50	5	2150
		Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**125**	**565**	**5**	**50**	**930**	**60**	**70**	**45**	**200**	**45**	**50**	**5**	**2150**

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	230	460	420	225	530	110
Future Volume (vph)	230	460	420	225	530	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1863	1583	1752	1881	1770	1538
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1863	1583	1752	1881	1770	1538
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	245	489	447	239	564	117
RTOR Reduction (vph)	0	379	0	0	0	75
Lane Group Flow (vph)	245	110	447	239	564	42
Confl. Peds. (#/hr)		2	2		1	2
Heavy Vehicles (%)	2%	2%	3%	1%	2%	5%
Turn Type	NA	Prot	Prot	NA	Prot	Prot
Protected Phases	2	2	1	6	8	8
Permitted Phases						
Actuated Green, G (s)	19.5	19.5	26.1	49.6	31.9	31.9
Effective Green, g (s)	19.5	19.5	26.1	49.6	31.9	31.9
Actuated g/C Ratio	0.22	0.22	0.29	0.55	0.36	0.36
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	405	344	510	1042	630	548
v/s Ratio Prot	c0.13	0.07	c0.26	0.13	c0.32	0.03
v/s Ratio Perm						
v/c Ratio	0.60	0.32	0.88	0.23	0.90	0.08
Uniform Delay, d1	31.5	29.4	30.2	10.2	27.2	19.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.5	0.5	15.5	0.1	15.2	0.1
Delay (s)	34.1	30.0	45.7	10.3	42.4	19.1
Level of Service	C	C	D	B	D	B
Approach Delay (s)	31.3			33.4	38.4	
Approach LOS	C			C	D	

Intersection Summary			
HCM 2000 Control Delay	34.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	89.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	35	80	335	170	540	0	0	0	25	700	55
Future Volume (veh/h)	50	35	80	335	170	540	0	0	0	25	700	55
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99				1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	1870	1885	1856	1870	1841	1885				1870	1856	1870
Adj Flow Rate, veh/h	53	37	85	356	181	211				27	745	59
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94				0.94	0.94	0.94
Percent Heavy Veh, %	2	1	3	2	4	1				2	3	2
Cap, veh/h	52	46	43	288	113	704				27	754	60
Arrive On Green	0.45	0.45	0.45	0.74	0.75	0.74				0.45	0.46	0.45
Sat Flow, veh/h	0	102	96	491	250	1580				59	1639	130
Grp Volume(v), veh/h	175	0	0	537	0	211				831	0	0
Grp Sat Flow(s),veh/h/ln	198	0	0	740	0	1580				1828	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	4.0				40.5	0.0	0.0
Cycle Q Clear(g_c), s	40.1	0.0	0.0	40.1	0.0	4.0				40.5	0.0	0.0
Prop In Lane	0.30		0.49	0.66		1.00				0.03		0.07
Lane Grp Cap(c), veh/h	140	0	0	396	0	704				841	0	0
V/C Ratio(X)	1.25	0.00	0.00	1.35	0.00	0.30				0.99	0.00	0.00
Avail Cap(c_a), veh/h	140	0	0	396	0	704				841	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.67	1.67	1.67				1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.59	0.00	0.59				0.54	0.00	0.00
Uniform Delay (d), s/veh	23.2	0.0	0.0	14.7	0.0	6.9				24.1	0.0	0.0
Incr Delay (d2), s/veh	157.5	0.0	0.0	169.4	0.0	0.6				20.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.9	0.0	0.0	26.0	0.0	1.3				21.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	180.7	0.0	0.0	184.0	0.0	7.5				44.3	0.0	0.0
LnGrp LOS	F	A	A	F	A	A				D	A	A
Approach Vol, veh/h		175			748						831	
Approach Delay, s/veh		180.7			134.2						44.3	
Approach LOS		F			F						D	

Timer - Assigned Phs			4		6		8					
Phs Duration (G+Y+Rc), s			44.6		45.4		44.6					
Change Period (Y+Rc), s			4.5		4.5		4.5					
Max Green Setting (Gmax), s			40.1		40.9		40.1					
Max Q Clear Time (g_c+I1), s			42.1		42.5		42.1					
Green Ext Time (p_c), s			0.0		0.0		0.0					

Intersection Summary		
HCM 6th Ctrl Delay		96.3
HCM 6th LOS		F

Intersection	
Int Delay, s/veh	13.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	10	10	85	40	0	0	0	0	15	1105	15
Future Vol, veh/h	0	10	10	85	40	0	0	0	0	15	1105	15
Conflicting Peds, #/hr	8	0	11	11	0	8	5	0	2	2	0	5
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	11	11	92	43	0	0	0	0	16	1201	16

Major/Minor	Minor2			Minor1						Major2		
Conflicting Flow All	-	1248	1225	1265	1256	-				2	0	0
Stage 1	-	1246	-	2	2	-				-	-	-
Stage 2	-	2	-	1263	1254	-				-	-	-
Critical Hdwy	-	6.52	6.22	7.12	6.52	-				4.12	-	-
Critical Hdwy Stg 1	-	5.52	-	-	-	-				-	-	-
Critical Hdwy Stg 2	-	-	-	6.12	5.52	-				-	-	-
Follow-up Hdwy	-	4.018	3.318	3.518	4.018	-				2.218	-	-
Pot Cap-1 Maneuver	0	173	218	146	171	0				1620	-	-
Stage 1	0	246	-	-	-	0				-	-	-
Stage 2	0	-	-	208	243	0				-	-	-
Platoon blocked, %											-	-
Mov Cap-1 Maneuver	-	166	217	128	165	-				1617	-	-
Mov Cap-2 Maneuver	-	166	-	128	165	-				-	-	-
Stage 1	-	237	-	-	-	-				-	-	-
Stage 2	-	-	-	183	234	-				-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	26.6	135.2	0.1
HCM LOS	D	F	

Minor Lane/Major Mvmt	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	188	138	1617	-	-
HCM Lane V/C Ratio	0.116	0.985	0.01	-	-
HCM Control Delay (s)	26.6	135.2	7.2	0	-
HCM Lane LOS	D	F	A	A	-
HCM 95th %tile Q(veh)	0.4	7	0	-	-

Intersection	
Int Delay, s/veh	5.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	10	5	55	15	0	0	0	0	55	1145	10
Future Vol, veh/h	0	10	5	55	15	0	0	0	0	55	1145	10
Conflicting Peds, #/hr	8	0	4	4	0	8	3	0	7	7	0	3
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	11	5	58	16	0	0	0	0	58	1205	11

Major/Minor	Minor2			Minor1						Major2		
Conflicting Flow All	-	1337	1218	1346	1342	-				7	0	0
Stage 1	-	1330	-	7	7	-				-	-	-
Stage 2	-	7	-	1339	1335	-				-	-	-
Critical Hdwy	-	6.52	6.22	7.12	6.52	-				4.12	-	-
Critical Hdwy Stg 1	-	5.52	-	-	-	-				-	-	-
Critical Hdwy Stg 2	-	-	-	6.12	5.52	-				-	-	-
Follow-up Hdwy	-	4.018	3.318	3.518	4.018	-				2.218	-	-
Pot Cap-1 Maneuver	0	153	220	128	152	0				1614	-	-
Stage 1	0	224	-	-	-	0				-	-	-
Stage 2	0	-	-	188	223	0				-	-	-
Platoon blocked, %											-	-
Mov Cap-1 Maneuver	-	134	219	107	134	-				1603	-	-
Mov Cap-2 Maneuver	-	134	-	107	134	-				-	-	-
Stage 1	-	198	-	-	-	-				-	-	-
Stage 2	-	-	-	154	197	-				-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	31	84.4	0.3
HCM LOS	D	F	

Minor Lane/Major Mvmt	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	154	112	1603	-	-
HCM Lane V/C Ratio	0.103	0.658	0.036	-	-
HCM Control Delay (s)	31	84.4	7.3	0	-
HCM Lane LOS	D	F	A	A	-
HCM 95th %tile Q(veh)	0.3	3.4	0.1	-	-

Intersection	
Int Delay, s/veh	8.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	45	15	0	0	35	25	40	1140	60	0	0	0
Future Vol, veh/h	45	15	0	0	35	25	40	1140	60	0	0	0
Conflicting Peds, #/hr	15	0	20	20	0	15	8	0	13	13	0	8
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	3	2	2	3	6	2	2	2
Mvmt Flow	48	16	0	0	38	27	43	1226	65	0	0	0

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	1400	1398	-	-	1366	1287	8	0	0
Stage 1	8	8	-	-	1358	-	-	-	-
Stage 2	1392	1390	-	-	8	-	-	-	-
Critical Hdwy	7.12	6.52	-	-	6.53	6.22	4.12	-	-
Critical Hdwy Stg 1	-	-	-	-	5.53	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	-	-	4.027	3.318	2.218	-	-
Pot Cap-1 Maneuver	118	141	0	0	146	201	1612	-	-
Stage 1	-	-	0	0	216	-	-	-	-
Stage 2	176	209	0	0	-	-	-	-	-
Platoon blocked, %								-	-
Mov Cap-1 Maneuver	73	125	-	-	129	199	1600	-	-
Mov Cap-2 Maneuver	73	125	-	-	129	-	-	-	-
Stage 1	-	-	-	-	193	-	-	-	-
Stage 2	111	186	-	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	137.9	45.5	0.2
HCM LOS	F	E	

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1
Capacity (veh/h)	1600	-	-	81	151
HCM Lane V/C Ratio	0.027	-	-	0.796	0.427
HCM Control Delay (s)	7.3	0	-	137.9	45.5
HCM Lane LOS	A	A	-	F	E
HCM 95th %tile Q(veh)	0.1	-	-	4	1.9

Intersection						
Int Delay, s/veh	6.9					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	125	1200	60	0	0
Future Vol, veh/h	0	125	1200	60	0	0
Conflicting Peds, #/hr	15	0	0	23	23	0
Sign Control	Stop	Stop	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	-
Grade, %	0	-	0	-	-	0
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	3	2	2	2
Mvmt Flow	0	137	1319	66	0	0

Major/Minor	Minor1		Major1	
Conflicting Flow All	-	1375	0	0
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	6.22	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	3.318	-	-
Pot Cap-1 Maneuver	0	178	-	-
Stage 1	0	-	-	-
Stage 2	0	-	-	-
Platoon blocked, %			-	-
Mov Cap-1 Maneuver	-	174	-	-
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	WB		NB
HCM Control Delay, s	76.3		0
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1
Capacity (veh/h)	-	-	174
HCM Lane V/C Ratio	-	-	0.789
HCM Control Delay (s)	-	-	76.3
HCM Lane LOS	-	-	F
HCM 95th %tile Q(veh)	-	-	5.2

Intersection	
Int Delay, s/veh	5.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	45	0	140	1185	0	0
Future Vol, veh/h	45	0	140	1185	0	0
Conflicting Peds, #/hr	7	0	15	0	0	15
Sign Control	Stop	Stop	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	-	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	3	3	2	2
Mvmt Flow	49	0	154	1302	0	0

Major/Minor	Minor2		Major1	
Conflicting Flow All	1632	-	15	0
Stage 1	15	-	-	-
Stage 2	1617	-	-	-
Critical Hdwy	6.42	-	4.13	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-
Follow-up Hdwy	3.518	-	2.227	-
Pot Cap-1 Maneuver	111	0	1596	-
Stage 1	-	0	-	-
Stage 2	178	0	-	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	70	-	1573	-
Mov Cap-2 Maneuver	70	-	-	-
Stage 1	-	-	-	-
Stage 2	176	-	-	-

Approach	EB	NB
HCM Control Delay, s	134.3	0.8
HCM LOS	F	

Minor Lane/Major Mvmt	NBL	NBT	EBLn1
Capacity (veh/h)	1573	-	70
HCM Lane V/C Ratio	0.098	-	0.706
HCM Control Delay (s)	7.5	0	134.3
HCM Lane LOS	A	A	F
HCM 95th %tile Q(veh)	0.3	-	3.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↰	↱
Traffic Volume (veh/h)	60	0	0	435	635	640
Future Volume (veh/h)	60	0	0	435	635	640
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	0	0	1870	1885	1885
Adj Flow Rate, veh/h	66	0	0	478	698	703
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	0	0	2	1	1
Cap, veh/h	517	0	0	517	816	726
Arrive On Green	0.55	0.00	0.00	0.28	0.45	0.45
Sat Flow, veh/h	1870	0	0	1870	1795	1598
Grp Volume(v), veh/h	66	0	0	478	698	703
Grp Sat Flow(s),veh/h/ln	1870	0	0	1870	1795	1598
Q Serve(g_s), s	1.5	0.0	0.0	22.4	31.2	38.6
Cycle Q Clear(g_c), s	1.5	0.0	0.0	22.4	31.2	38.6
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	517	0	0	517	816	726
V/C Ratio(X)	0.13	0.00	0.00	0.92	0.86	0.97
Avail Cap(c_a), veh/h	727	0	0	727	938	834
HCM Platoon Ratio	2.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.95	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.9	0.0	0.0	31.7	21.9	23.9
Incr Delay (d2), s/veh	0.0	0.0	0.0	24.8	6.3	21.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	0.0	13.5	14.0	18.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	14.9	0.0	0.0	56.4	28.2	45.4
LnGrp LOS	B	A	A	E	C	D
Approach Vol, veh/h	66			478	1401	
Approach Delay, s/veh	14.9			56.4	36.9	
Approach LOS	B			E	D	

Timer - Assigned Phs	2	6	8
Phs Duration (G+Y+Rc), s	28.9	28.9	44.9
Change Period (Y+Rc), s	4.0	4.0	4.0
Max Green Setting (Gmax), s	35.0	35.0	47.0
Max Q Clear Time (g_c+I1), s	3.5	24.4	40.6
Green Ext Time (p_c), s	0.1	0.5	0.3

Intersection Summary	
HCM 6th Ctrl Delay	40.9
HCM 6th LOS	D

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Intersection Level Of Service Report

Intersection 1: 13th/Belmont

Control Type:	Roundabout	Delay (sec / veh):	94.0
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes		

Intersection Setup

Name						
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Thru	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00		25.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name						
Base Volume Input [veh/h]	1010	200	0	375	165	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	8.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1010	200	0	375	165	0
Peak Hour Factor	0.9100	0.9100	1.0000	0.9100	0.9100	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	277	55	0	103	45	0
Total Analysis Volume [veh/h]	1110	220	0	412	181	0
Pedestrian Volume [ped/h]	0		3		0	

Intersection Settings

Number of Conflicting Circulating Lanes	1		1		1	
Circulating Flow Rate [veh/h]	195		1132		0	
Exiting Flow Rate [veh/h]	0		420		1552	
Demand Flow Rate [veh/h]	1010	200	0	375	165	0
Adjusted Demand Flow Rate [veh/h]	1110	220	0	412	181	0

Lanes

Overwrite Calculated Critical Headway	No	No	No
User-Defined Critical Headway [s]	4.00	4.00	4.00
Overwrite Calculated Follow-Up Time	No	No	No
User-Defined Follow-Up Time [s]	3.00	3.00	3.00
A (intercept)	1380.00	1380.00	1380.00
B (coefficient)	0.00102	0.00102	0.00102
HV Adjustment Factor	0.98	0.98	0.93
Entry Flow Rate [veh/h]	1357	421	196
Capacity of Entry and Bypass Lanes [veh/h]	1131	435	1380
Pedestrian Impedance	1.00	1.00	1.00
Capacity per Entry Lane [veh/h]	1109	427	1278
X, volume / capacity	1.20	0.97	0.14

Movement, Approach, & Intersection Results

Lane LOS	F	F	A
95th-Percentile Queue Length [veh]	40.13	11.57	0.49
95th-Percentile Queue Length [ft]	1003.29	289.17	12.33
Approach Delay [s/veh]	114.70	66.79	3.99
Approach LOS	F	F	A
Intersection Delay [s/veh]	94.02		
Intersection LOS	F		

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Intersection Level Of Service Report

Intersection 2: 13th/12th

Control Type:	Roundabout	Delay (sec / veh):	26.8
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes		

Intersection Setup

Name						
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00		30.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		No	

Volumes

Name						
Base Volume Input [veh/h]	160	1225	125	85	115	1385
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	160	1225	125	85	115	1385
Peak Hour Factor	0.9500	0.9500	0.9100	0.9100	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	42	322	34	23	30	364
Total Analysis Volume [veh/h]	168	1289	137	93	121	1458
Pedestrian Volume [ped/h]	0		13		0	

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Intersection Settings

Number of Conflicting Circulating Lanes	2		1		2	
Circulating Flow Rate [veh/h]	123		171		0	
Exiting Flow Rate [veh/h]	1487		1438		171	
Demand Flow Rate [veh/h]	160	1225	0	0	115	1385
Adjusted Demand Flow Rate [veh/h]	168	1289	0	0	121	1458

Lanes

Overwrite Calculated Critical Headway	No	No		No	No
User-Defined Critical Headway [s]	4.00	4.00		4.00	4.00
Overwrite Calculated Follow-Up Time	No	No		No	No
User-Defined Follow-Up Time [s]	3.00	3.00		3.00	3.00
A (intercept)	1350.00	1420.00		1350.00	1420.00
B (coefficient)	0.00092	0.00085		0.00092	0.00085
HV Adjustment Factor	0.98	0.98		0.98	0.98
Entry Flow Rate [veh/h]	172	1315		757	854
Capacity of Entry and Bypass Lanes [veh/h]	1206	1279		1350	1420
Pedestrian Impedance	1.00	1.00		1.00	1.00
Capacity per Entry Lane [veh/h]	1182	1254		1324	1393
X, volume / capacity	0.14	1.03		0.56	0.60

Movement, Approach, & Intersection Results

Lane LOS	A	F		A	A
95th-Percentile Queue Length [veh]	0.50	24.32		3.65	4.26
95th-Percentile Queue Length [ft]	12.38	607.89		91.16	106.50
Approach Delay [s/veh]	45.83		0.00	9.19	
Approach LOS	E		A	A	
Intersection Delay [s/veh]	26.77				
Intersection LOS	D				

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	230	460	420	225	530	110
Future Volume (vph)	230	460	420	225	530	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1863	1583	1752	1881	1770	1538
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1863	1583	1752	1881	1770	1538
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	245	489	447	239	564	117
RTOR Reduction (vph)	0	379	0	0	0	75
Lane Group Flow (vph)	245	110	447	239	564	42
Confl. Peds. (#/hr)		2	2		1	2
Heavy Vehicles (%)	2%	2%	3%	1%	2%	5%
Turn Type	NA	Prot	Prot	NA	Prot	Prot
Protected Phases	2	2	1	6	8	8
Permitted Phases						
Actuated Green, G (s)	19.5	19.5	26.1	49.6	31.9	31.9
Effective Green, g (s)	19.5	19.5	26.1	49.6	31.9	31.9
Actuated g/C Ratio	0.22	0.22	0.29	0.55	0.36	0.36
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	405	344	510	1042	630	548
v/s Ratio Prot	c0.13	0.07	c0.26	0.13	c0.32	0.03
v/s Ratio Perm						
v/c Ratio	0.60	0.32	0.88	0.23	0.90	0.08
Uniform Delay, d1	31.5	29.4	30.2	10.2	27.2	19.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.5	0.5	15.5	0.1	15.2	0.1
Delay (s)	34.1	30.0	45.7	10.3	42.4	19.1
Level of Service	C	C	D	B	D	B
Approach Delay (s)	31.3			33.4	38.4	
Approach LOS	C			C	D	

Intersection Summary			
HCM 2000 Control Delay	34.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	89.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	35	80	310	195	140	100	650	110	25	725	55
Future Volume (veh/h)	50	35	80	310	195	140	100	650	110	25	725	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.98	1.00		0.98	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1885	1856	1870	1841	1885	1870	1870	1870	1870	1856	1870
Adj Flow Rate, veh/h	53	37	85	330	207	116	106	691	117	27	771	59
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	1	3	2	4	1	2	2	2	2	3	2
Cap, veh/h	87	69	98	330	361	202	275	908	154	55	768	58
Arrive On Green	0.20	0.21	0.20	0.12	0.55	0.55	0.06	0.58	0.58	0.48	0.48	0.48
Sat Flow, veh/h	166	329	468	1781	1101	617	1781	1557	264	28	1595	120
Grp Volume(v), veh/h	175	0	0	330	0	323	106	0	808	857	0	0
Grp Sat Flow(s),veh/h/ln	963	0	0	1781	0	1718	1781	0	1820	1743	0	0
Q Serve(g_s), s	5.6	0.0	0.0	6.2	0.0	11.2	2.5	0.0	30.0	22.0	0.0	0.0
Cycle Q Clear(g_c), s	16.8	0.0	0.0	6.2	0.0	11.2	2.5	0.0	30.0	42.9	0.0	0.0
Prop In Lane	0.30		0.49	1.00		0.36	1.00		0.14	0.03		0.07
Lane Grp Cap(c), veh/h	248	0	0	330	0	563	275	0	1062	871	0	0
V/C Ratio(X)	0.71	0.00	0.00	1.00	0.00	0.57	0.39	0.00	0.76	0.98	0.00	0.00
Avail Cap(c_a), veh/h	248	0	0	330	0	563	282	0	1062	871	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.67	1.67	1.67	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.92	0.00	0.92	1.00	0.00	1.00	0.54	0.00	0.00
Uniform Delay (d), s/veh	34.8	0.0	0.0	34.7	0.0	16.2	9.2	0.0	14.1	23.6	0.0	0.0
Incr Delay (d2), s/veh	15.6	0.0	0.0	47.3	0.0	3.9	0.9	0.0	5.1	18.8	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.9	0.0	0.0	10.8	0.0	4.1	1.0	0.0	12.8	22.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.4	0.0	0.0	82.1	0.0	20.1	10.1	0.0	19.2	42.5	0.0	0.0
LnGrp LOS	D	A	A	F	A	C	B	A	B	D	A	A
Approach Vol, veh/h		175			653			914			857	
Approach Delay, s/veh		50.4			51.4			18.2			42.5	
Approach LOS		D			D			B			D	

Timer - Assigned Phs		2	3	4	5	6		8				
Phs Duration (G+Y+Rc), s		56.5	10.7	22.8	9.1	47.4		33.5				
Change Period (Y+Rc), s		4.5	4.5	4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s		52.0	6.2	18.3	5.0	42.5		29.0				
Max Q Clear Time (g_c+I1), s		32.0	8.2	18.8	4.5	44.9		13.2				
Green Ext Time (p_c), s		6.5	0.0	0.0	0.0	0.0		1.9				

Intersection Summary			
HCM 6th Ctrl Delay			36.7
HCM 6th LOS			D

Intersection	
Int Delay, s/veh	12.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	10	10	10	20	40	30	830	10	15	1105	15
Future Vol, veh/h	5	10	10	10	20	40	30	830	10	15	1105	15
Conflicting Peds, #/hr	8	0	11	11	0	8	5	0	2	2	0	5
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	10	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	11	11	11	22	43	33	902	11	16	1201	16

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2260	2227	1225	2239	2230	918	1222	0	0	915	0	0
Stage 1	1246	1246	-	976	976	-	-	-	-	-	-	-
Stage 2	1014	981	-	1263	1254	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	29	43	218	30	43	329	570	-	-	745	-	-
Stage 1	213	246	-	302	329	-	-	-	-	-	-	-
Stage 2	288	328	-	208	243	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	13	39	215	21	39	326	567	-	-	744	-	-
Mov Cap-2 Maneuver	13	39	-	21	39	-	-	-	-	-	-	-
Stage 1	200	239	-	284	309	-	-	-	-	-	-	-
Stage 2	217	308	-	183	236	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	242.2	291.2	0.4	0.1
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	567	-	-	36	63	744	-	-
HCM Lane V/C Ratio	0.058	-	-	0.755	1.208	0.022	-	-
HCM Control Delay (s)	11.7	-	-	242.2	291.2	9.9	-	-
HCM Lane LOS	B	-	-	F	F	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	2.7	6.2	0.1	-	-

Intersection	
Int Delay, s/veh	22.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	10	5	35	15	20	5	900	5	25	1095	10
Future Vol, veh/h	5	10	5	35	15	20	5	900	5	25	1095	10
Conflicting Peds, #/hr	8	0	4	4	0	8	3	0	7	7	0	3
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	10	-	-	10	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	11	5	37	16	21	5	947	5	26	1153	11

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2200	2183	1166	2190	2186	965	1167	0	0	959	0	0
Stage 1	1214	1214	-	967	967	-	-	-	-	-	-	-
Stage 2	986	969	-	1223	1219	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	32	46	236	~ 33	46	309	599	-	-	717	-	-
Stage 1	222	254	-	306	333	-	-	-	-	-	-	-
Stage 2	298	332	-	219	253	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	21	44	234	~ 25	44	305	597	-	-	712	-	-
Mov Cap-2 Maneuver	21	44	-	~ 25	44	-	-	-	-	-	-	-
Stage 1	220	244	-	301	328	-	-	-	-	-	-	-
Stage 2	260	327	-	197	243	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	163	$ 641.7	0.1	0.2
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	597	-	-	41	39	712	-	-
HCM Lane V/C Ratio	0.009	-	-	0.513	1.889	0.037	-	-
HCM Control Delay (s)	11.1	-	-	163	$ 641.7	10.2	-	-
HCM Lane LOS	B	-	-	F	F	B	-	-
HCM 95th %tile Q(veh)	0	-	-	1.8	7.9	0.1	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	45	200	15	20	5	120	855	5	50	1000	100
Future Volume (veh/h)	70	45	200	15	20	5	120	855	5	50	1000	100
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1856	1856	1781	1870	1870	1870	1870	1870	1870	1870	1885
Adj Flow Rate, veh/h	77	49	71	16	22	5	132	940	5	55	1099	110
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	3	3	8	2	2	2	2	2	2	2	1
Cap, veh/h	183	69	100	61	70	11	266	1394	7	431	1242	124
Arrive On Green	0.10	0.10	0.10	0.10	0.10	0.10	0.05	0.75	0.75	0.04	0.74	0.74
Sat Flow, veh/h	1375	680	986	162	687	112	1781	1859	10	1781	1672	167
Grp Volume(v), veh/h	77	0	120	43	0	0	132	0	945	55	0	1209
Grp Sat Flow(s),veh/h/ln	1375	0	1666	960	0	0	1781	0	1869	1781	0	1840
Q Serve(g_s), s	0.0	0.0	7.8	0.1	0.0	0.0	1.9	0.0	28.5	0.8	0.0	55.1
Cycle Q Clear(g_c), s	7.7	0.0	7.8	7.9	0.0	0.0	1.9	0.0	28.5	0.8	0.0	55.1
Prop In Lane	1.00		0.59	0.37		0.12	1.00		0.01	1.00		0.09
Lane Grp Cap(c), veh/h	183	0	169	137	0	0	266	0	1401	431	0	1366
V/C Ratio(X)	0.42	0.00	0.71	0.31	0.00	0.00	0.50	0.00	0.67	0.13	0.00	0.89
Avail Cap(c_a), veh/h	275	0	281	242	0	0	298	0	1401	447	0	1366
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	48.5	0.0	48.7	46.3	0.0	0.0	21.7	0.0	7.1	6.5	0.0	10.8
Incr Delay (d2), s/veh	1.5	0.0	5.4	1.3	0.0	0.0	1.4	0.0	2.6	0.1	0.0	8.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	0.0	3.5	1.2	0.0	0.0	2.4	0.0	10.7	0.3	0.0	22.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.0	0.0	54.1	47.6	0.0	0.0	23.1	0.0	9.7	6.6	0.0	19.5
LnGrp LOS	D	A	D	D	A	A	C	A	A	A	A	B
Approach Vol, veh/h		197			43			1077			1264	
Approach Delay, s/veh		52.5			47.6			11.3			18.9	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.6	87.6		15.3	9.4	86.8		15.3
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5
Max Green Setting (Gmax), s	5.1	83.1		18.3	6.9	81.3		18.3
Max Q Clear Time (g_c+I1), s	2.8	30.5		9.8	3.9	57.1		9.9
Green Ext Time (p_c), s	0.0	10.9		0.5	0.1	13.5		0.1

Intersection Summary			
HCM 6th Ctrl Delay			18.8
HCM 6th LOS			B

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	45	25	0	0	10	5	60	450	40	0	0	0
Future Vol, veh/h	45	25	0	0	10	5	60	450	40	0	0	0
Conflicting Peds, #/hr	13	0	0	0	0	13	1	0	8	8	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	3	2	2	2	17	2	2	3	2	2	2	2
Mvmt Flow	47	26	0	0	11	5	63	474	42	0	0	0

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	643	651	-	-	630	516	1	0	0
Stage 1	1	1	-	-	629	-	-	-	-
Stage 2	642	650	-	-	1	-	-	-	-
Critical Hdwy	7.13	6.52	-	-	6.67	6.22	4.12	-	-
Critical Hdwy Stg 1	-	-	-	-	5.67	-	-	-	-
Critical Hdwy Stg 2	6.13	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.018	-	-	4.153	3.318	2.218	-	-
Pot Cap-1 Maneuver	385	388	0	0	380	559	1622	-	-
Stage 1	-	-	0	0	453	-	-	-	-
Stage 2	461	465	0	0	-	-	-	-	-
Platoon blocked, %								-	-
Mov Cap-1 Maneuver	357	364	-	-	356	555	1620	-	-
Mov Cap-2 Maneuver	357	364	-	-	356	-	-	-	-
Stage 1	-	-	-	-	424	-	-	-	-
Stage 2	421	436	-	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	17.6	14.3	0.8
HCM LOS	C	B	

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1
Capacity (veh/h)	1620	-	-	359	404
HCM Lane V/C Ratio	0.039	-	-	0.205	0.039
HCM Control Delay (s)	7.3	0	-	17.6	14.3
HCM Lane LOS	A	A	-	C	B
HCM 95th %tile Q(veh)	0.1	-	-	0.8	0.1

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	15	0	0	35	20	30	430	50	0	0	0
Future Vol, veh/h	10	15	0	0	35	20	30	430	50	0	0	0
Conflicting Peds, #/hr	15	0	20	20	0	15	8	0	13	13	0	8
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	3	2	2	3	6	2	2	2
Mvmt Flow	11	16	0	0	38	22	32	462	54	0	0	0

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	606	601	-	-	574	517	8	0	0
Stage 1	8	8	-	-	566	-	-	-	-
Stage 2	598	593	-	-	8	-	-	-	-
Critical Hdwy	7.12	6.52	-	-	6.53	6.22	4.12	-	-
Critical Hdwy Stg 1	-	-	-	-	5.53	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	-	-	4.027	3.318	2.218	-	-
Pot Cap-1 Maneuver	409	414	0	0	428	558	1612	-	-
Stage 1	-	-	0	0	506	-	-	-	-
Stage 2	489	493	0	0	-	-	-	-	-
Platoon blocked, %								-	-
Mov Cap-1 Maneuver	355	395	-	-	408	551	1600	-	-
Mov Cap-2 Maneuver	355	395	-	-	408	-	-	-	-
Stage 1	-	-	-	-	486	-	-	-	-
Stage 2	421	473	-	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	15.3	14.2	0.4
HCM LOS	C	B	

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1
Capacity (veh/h)	1600	-	-	378	451
HCM Lane V/C Ratio	0.02	-	-	0.071	0.131
HCM Control Delay (s)	7.3	0	-	15.3	14.2
HCM Lane LOS	A	A	-	C	B
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.4

Intersection	
Int Delay, s/veh	2.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	105	450	80	0	0
Future Vol, veh/h	0	105	450	80	0	0
Conflicting Peds, #/hr	15	0	0	23	23	0
Sign Control	Stop	Stop	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	16979
Grade, %	0	-	0	-	-	0
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	3	2	2	2
Mvmt Flow	0	115	495	88	0	0

Major/Minor	Minor1		Major1	
Conflicting Flow All	-	562	0	0
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	6.22	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	3.318	-	-
Pot Cap-1 Maneuver	0	526	-	-
Stage 1	0	-	-	-
Stage 2	0	-	-	-
Platoon blocked, %			-	-
Mov Cap-1 Maneuver	-	514	-	-
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	WB	NB
HCM Control Delay, s	14	0
HCM LOS	B	

Minor Lane/Major Mvmt	NBT	NBR	WBLn1
Capacity (veh/h)	-	-	514
HCM Lane V/C Ratio	-	-	0.224
HCM Control Delay (s)	-	-	14
HCM Lane LOS	-	-	B
HCM 95th %tile Q(veh)	-	-	0.9

Intersection						
Int Delay, s/veh	1.4					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	20	0	65	485	0	0
Future Vol, veh/h	20	0	65	485	0	0
Conflicting Peds, #/hr	7	0	15	0	0	15
Sign Control	Stop	Stop	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	16965	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	3	3	2	2
Mvmt Flow	22	0	71	533	0	0

Major/Minor	Minor2		Major1	
Conflicting Flow All	697	-	15	0
Stage 1	15	-	-	-
Stage 2	682	-	-	-
Critical Hdwy	6.42	-	4.13	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-
Follow-up Hdwy	3.518	-	2.227	-
Pot Cap-1 Maneuver	407	0	1596	-
Stage 1	-	0	-	-
Stage 2	502	0	-	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	370	-	1573	-
Mov Cap-2 Maneuver	370	-	-	-
Stage 1	-	-	-	-
Stage 2	495	-	-	-

Approach	EB	NB
HCM Control Delay, s	15.3	0.9
HCM LOS	C	

Minor Lane/Major Mvmt	NBL	NBT	EBLn1
Capacity (veh/h)	1573	-	370
HCM Lane V/C Ratio	0.045	-	0.059
HCM Control Delay (s)	7.4	0	15.3
HCM Lane LOS	A	A	C
HCM 95th %tile Q(veh)	0.1	-	0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	160	0	0	435	235	315
Future Volume (vph)	160	0	0	435	235	315
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	4.0
Lane Util. Factor	1.00			0.95	1.00	1.00
Frpb, ped/bikes	1.00			1.00	1.00	1.00
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	1863			3539	1787	1599
Flt Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	1863			3539	1787	1599
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	176	0	0	478	258	346
RTOR Reduction (vph)	0	0	0	0	0	283
Lane Group Flow (vph)	176	0	0	478	258	63
Confl. Peds. (#/hr)					8	
Heavy Vehicles (%)	2%	2%	2%	2%	1%	1%
Turn Type	NA			NA	Prot	Perm
Protected Phases	2			6	3	
Permitted Phases						8
Actuated Green, G (s)	65.6			65.6	16.4	16.4
Effective Green, g (s)	65.6			65.6	16.4	16.4
Actuated g/C Ratio	0.73			0.73	0.18	0.18
Clearance Time (s)	4.0			4.0	4.0	4.0
Vehicle Extension (s)	0.2			0.2	0.2	0.2
Lane Grp Cap (vph)	1357			2579	325	291
v/s Ratio Prot	0.09			c0.14	c0.14	
v/s Ratio Perm						0.04
v/c Ratio	0.13			0.19	0.79	0.22
Uniform Delay, d1	3.7			3.8	35.2	31.3
Progression Factor	0.54			1.00	1.00	1.00
Incremental Delay, d2	0.1			0.2	11.7	0.1
Delay (s)	2.1			4.0	46.9	31.5
Level of Service	A			A	D	C
Approach Delay (s)	2.1			4.0	38.1	
Approach LOS	A			A	D	

Intersection Summary			
HCM 2000 Control Delay	20.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	34.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

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Scenario 1 1-lane

1/13/2022

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	13th/Belmont	Roundabout	HCM 6th Edition	SB Thru		59.3	F

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: 13th/Belmont

Control Type:	Roundabout	Delay (sec / veh):	59.3
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes		

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Thru	Right	Right2	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	120	855	5	50	1000	100	70	45	200	15	20	5
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	1.00	2.00	3.00	3.00	8.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	120	855	5	50	1000	100	70	45	200	15	20	5
Peak Hour Factor	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	33	235	1	14	275	27	19	12	55	4	5	1
Total Analysis Volume [veh/h]	132	940	5	55	1099	110	77	49	220	16	22	5
Pedestrian Volume [ped/h]	2			0			5			3		

Intersection Settings

Number of Conflicting Circulating Lanes	1			1			1			1		
Circulating Flow Rate [veh/h]	185			174			1194			1172		
Exiting Flow Rate [veh/h]	1365			1042			268			112		
Demand Flow Rate [veh/h]	120	855	5	50	1000	100	70	45	200	15	20	5
Adjusted Demand Flow Rate [veh/h]	132	940	5	55	1099	110	77	49	220	16	22	5

Lanes

Overwrite Calculated Critical Headway	No	No	No	No
User-Defined Critical Headway [s]	4.00	4.00	4.00	4.00
Overwrite Calculated Follow-Up Time	No	No	No	No
User-Defined Follow-Up Time [s]	3.00	3.00	3.00	3.00
A (intercept)	1380.00	1380.00	1380.00	1380.00
B (coefficient)	0.00102	0.00102	0.00102	0.00102
HV Adjustment Factor	0.98	0.98	0.97	0.96
Entry Flow Rate [veh/h]	1099	1289	356	45
Capacity of Entry and Bypass Lanes [veh/h]	1143	1156	409	418
Pedestrian Impedance	1.00	1.00	1.00	1.00
Capacity per Entry Lane [veh/h]	1120	1134	398	401
X, volume / capacity	0.96	1.12	0.87	0.11

Movement, Approach, & Intersection Results

Lane LOS	E	F	F	B
95th-Percentile Queue Length [veh]	17.60	31.41	8.64	0.36
95th-Percentile Queue Length [ft]	439.90	785.17	215.90	8.94
Approach Delay [s/veh]	37.69	81.68	50.74	10.59
Approach LOS	E	F	F	B
Intersection Delay [s/veh]	59.29			
Intersection LOS	F			

Vistro File: C:\...\Scen 3_HoodRiver OR281 RABs updated.vistro

Scenario 1 1-lane

Report File: X:\...\Scenario 3.pdf

1/13/2022

Turning Movement Volume: Summary

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Thru	Right	2	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
1	13th/Belmont	120	855	5	50	1000	100	70	45	200	15	20	5	2485

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Report File: X:\...\Scenario 3.pdf

Scenario 1 1-lane

1/13/2022

Turning Movement Volume: Detail

ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
			Thru	Right	2	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
1	13th/Belmont	Final Base	120	855	5	50	1000	100	70	45	200	15	20	5	2485
		Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**120**	**855**	**5**	**50**	**1000**	**100**	**70**	**45**	**200**	**15**	**20**	**5**	**2485**

APPENDIX D: ALTERNATIVE TRAFFIC OPERATIONS (MITIGATED)

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	230	460	420	225	530	110
Future Volume (vph)	230	460	420	225	530	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1863	1583	1752	1881	1770	1538
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1863	1583	1752	1881	1770	1538
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	245	489	447	239	564	117
RTOR Reduction (vph)	0	59	0	0	0	74
Lane Group Flow (vph)	245	430	447	239	564	43
Confl. Peds. (#/hr)		2	2		1	2
Heavy Vehicles (%)	2%	2%	3%	1%	2%	5%
Turn Type	NA	pt+ov	Prot	NA	Prot	Prot
Protected Phases	2	2 8	1	6	8	8
Permitted Phases						
Actuated Green, G (s)	17.9	54.7	26.5	48.4	32.8	32.8
Effective Green, g (s)	17.9	54.7	26.5	48.4	32.8	32.8
Actuated g/C Ratio	0.20	0.61	0.30	0.54	0.37	0.37
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	373	970	520	1020	650	565
v/s Ratio Prot	c0.13	0.27	c0.26	0.13	c0.32	0.03
v/s Ratio Perm						
v/c Ratio	0.66	0.44	0.86	0.23	0.87	0.08
Uniform Delay, d1	32.8	9.2	29.6	10.7	26.2	18.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.1	0.3	13.3	0.1	11.8	0.1
Delay (s)	37.0	9.5	42.9	10.8	38.0	18.4
Level of Service	D	A	D	B	D	B
Approach Delay (s)	18.7			31.7	34.6	
Approach LOS	B			C	C	

Intersection Summary			
HCM 2000 Control Delay	28.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	89.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	85	80	310	145	40	125	500	10	75	625	55
Future Volume (veh/h)	0	85	80	310	145	40	125	500	10	75	625	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.96	1.00		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	0	1885	1856	1870	1841	1885	1870	1870	1870	1870	1856	1870
Adj Flow Rate, veh/h	0	90	45	330	154	30	133	532	11	80	665	59
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	1	3	2	4	1	2	2	2	2	3	2
Cap, veh/h	0	148	74	364	571	111	188	608	13	376	718	64
Arrive On Green	0.00	0.13	0.12	0.20	0.38	0.38	0.06	0.33	0.33	0.15	0.43	0.42
Sat Flow, veh/h	0	1167	584	1781	1493	291	1781	1825	38	1781	1678	149
Grp Volume(v), veh/h	0	0	135	330	0	184	133	0	543	80	0	724
Grp Sat Flow(s),veh/h/ln	0	0	1751	1781	0	1784	1781	0	1863	1781	0	1827
Q Serve(g_s), s	0.0	0.0	6.5	16.0	0.0	6.3	2.4	0.0	24.3	0.0	0.0	33.3
Cycle Q Clear(g_c), s	0.0	0.0	6.5	16.0	0.0	6.3	2.4	0.0	24.3	0.0	0.0	33.3
Prop In Lane	0.00		0.33	1.00		0.16	1.00		0.02	1.00		0.08
Lane Grp Cap(c), veh/h	0	0	223	364	0	682	188	0	621	376	0	782
V/C Ratio(X)	0.00	0.00	0.61	0.91	0.00	0.27	0.71	0.00	0.87	0.21	0.00	0.93
Avail Cap(c_a), veh/h	0	0	365	392	0	855	192	0	872	376	0	834
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	36.7	34.4	0.0	18.9	39.6	0.0	27.8	31.6	0.0	24.0
Incr Delay (d2), s/veh	0.0	0.0	1.0	22.2	0.0	0.1	10.5	0.0	6.6	0.2	0.0	15.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	2.8	9.1	0.0	2.6	3.3	0.0	11.7	1.5	0.0	17.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	37.7	56.6	0.0	18.9	50.0	0.0	34.5	31.8	0.0	39.6
LnGrp LOS	A	A	D	E	A	B	D	A	C	C	A	D
Approach Vol, veh/h		135			514			676			804	
Approach Delay, s/veh		37.7			43.1			37.5			38.8	
Approach LOS		D			D			D			D	
Timer - Assigned Phs	1	2	3	4	5	6		8				
Phs Duration (G+Y+Rc), s	17.2	33.5	22.6	15.3	8.8	42.0		37.9				
Change Period (Y+Rc), s	4.0	4.5	4.5	4.5	4.0	4.5		4.5				
Max Green Setting (Gmax), s	4.0	41.0	19.5	18.0	5.0	40.0		42.0				
Max Q Clear Time (g_c+I1), s	12.0	26.3	18.0	8.5	4.4	35.3		8.3				
Green Ext Time (p_c), s	0.0	2.7	0.1	0.2	0.0	2.2		0.8				
Intersection Summary												
HCM 6th Ctrl Delay			39.4									
HCM 6th LOS			D									

Intersection	
Int Delay, s/veh	4.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	10	10	10	20	40	30	565	10	5	990	15
Future Vol, veh/h	5	10	10	10	20	40	30	565	10	5	990	15
Conflicting Peds, #/hr	8	0	11	11	0	8	5	0	2	2	0	5
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	11	11	11	22	43	33	614	11	5	1076	16

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1825	1792	1100	1804	1795	630	1097	0	0	627	0	0
Stage 1	1099	1099	-	688	688	-	-	-	-	-	-	-
Stage 2	726	693	-	1116	1107	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	59	81	258	61	80	482	636	-	-	955	-	-
Stage 1	258	288	-	436	447	-	-	-	-	-	-	-
Stage 2	416	445	-	252	286	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	38	73	254	48	72	477	633	-	-	953	-	-
Mov Cap-2 Maneuver	38	73	-	48	72	-	-	-	-	-	-	-
Stage 1	236	283	-	400	410	-	-	-	-	-	-	-
Stage 2	327	409	-	227	281	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	70.4	73	0.5	0
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	633	-	-	81	123	953	-	-
HCM Lane V/C Ratio	0.052	-	-	0.335	0.619	0.006	-	-
HCM Control Delay (s)	11	0	-	70.4	73	8.8	0	-
HCM Lane LOS	B	A	-	F	F	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	1.3	3.2	0	-	-

Intersection	
Int Delay, s/veh	8.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	10	5	35	15	15	5	600	5	35	995	10
Future Vol, veh/h	5	10	5	35	15	15	5	600	5	35	995	10
Conflicting Peds, #/hr	8	0	4	4	0	8	3	0	7	7	0	3
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	11	5	37	16	16	5	632	5	37	1047	11

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1799	1784	1060	1791	1787	650	1061	0	0	644	0	0
Stage 1	1130	1130	-	652	652	-	-	-	-	-	-	-
Stage 2	669	654	-	1139	1135	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	62	82	272	63	81	469	657	-	-	941	-	-
Stage 1	248	279	-	457	464	-	-	-	-	-	-	-
Stage 2	447	463	-	245	277	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	45	72	270	50	72	462	655	-	-	935	-	-
Mov Cap-2 Maneuver	45	72	-	50	72	-	-	-	-	-	-	-
Stage 1	244	251	-	448	455	-	-	-	-	-	-	-
Stage 2	409	454	-	207	250	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	72	207.9	0.1	0.3
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	655	-	-	74	69	935	-	-
HCM Lane V/C Ratio	0.008	-	-	0.284	0.992	0.039	-	-
HCM Control Delay (s)	10.5	0	-	72	207.9	9	0	-
HCM Lane LOS	B	A	-	F	F	A	A	-
HCM 95th %tile Q(veh)	0	-	-	1	5	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	45	200	0	170	5	0	565	5	50	930	60
Future Volume (veh/h)	70	45	200	0	170	5	0	565	5	50	930	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1856	1856	0	1870	1870	0	1870	1870	1870	1870	1885
Adj Flow Rate, veh/h	77	49	72	0	187	5	0	621	5	55	1022	66
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	3	3	0	2	2	0	2	2	2	2	1
Cap, veh/h	208	127	186	0	340	9	0	1327	11	579	1245	80
Arrive On Green	0.19	0.19	0.18	0.00	0.19	0.18	0.00	0.72	0.71	0.71	0.72	0.71
Sat Flow, veh/h	1293	676	994	0	1813	48	0	1853	15	868	1737	112
Grp Volume(v), veh/h	77	0	121	0	0	192	0	0	626	55	0	1088
Grp Sat Flow(s),veh/h/ln	1293	0	1670	0	0	1862	0	0	1868	868	0	1850
Q Serve(g_s), s	4.8	0.0	5.3	0.0	0.0	7.8	0.0	0.0	11.9	2.4	0.0	33.7
Cycle Q Clear(g_c), s	12.6	0.0	5.3	0.0	0.0	7.8	0.0	0.0	11.9	14.3	0.0	33.7
Prop In Lane	1.00		0.60	0.00		0.03	0.00		0.01	1.00		0.06
Lane Grp Cap(c), veh/h	208	0	313	0	0	349	0	0	1338	579	0	1325
V/C Ratio(X)	0.37	0.00	0.39	0.00	0.00	0.55	0.00	0.00	0.47	0.10	0.00	0.82
Avail Cap(c_a), veh/h	323	0	462	0	0	515	0	0	1997	885	0	1978
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	36.3	0.0	29.8	0.0	0.0	30.6	0.0	0.0	5.0	8.3	0.0	8.1
Incr Delay (d2), s/veh	0.8	0.0	0.6	0.0	0.0	1.0	0.0	0.0	0.2	0.1	0.0	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	2.2	0.0	0.0	3.5	0.0	0.0	3.7	0.4	0.0	10.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	37.1	0.0	30.3	0.0	0.0	31.6	0.0	0.0	5.2	8.4	0.0	9.6
LnGrp LOS	D	A	C	A	A	C	A	A	A	A	A	A
Approach Vol, veh/h		198			192			626			1143	
Approach Delay, s/veh		33.0			31.6			5.2			9.6	
Approach LOS		C			C			A			A	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	63.6	19.6	63.6	19.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	88.5	22.5	88.5	22.5
Max Q Clear Time (g_c+I1), s	13.9	14.6	35.7	9.8
Green Ext Time (p_c), s	7.0	0.5	23.4	0.6

Intersection Summary	
HCM 6th Ctrl Delay	12.4
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	45	25	5	5	10	5	150	750	40	5	175	30
Future Vol, veh/h	45	25	5	5	10	5	150	750	40	5	175	30
Conflicting Peds, #/hr	13	0	0	0	0	13	1	0	8	8	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	3	2	2	2	17	2	2	3	2	2	2	2
Mvmt Flow	47	26	5	5	11	5	158	789	42	5	184	32

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1358	1366	201	1360	1361	831	217	0	0	839	0	0
Stage 1	211	211	-	1134	1134	-	-	-	-	-	-	-
Stage 2	1147	1155	-	226	227	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.52	6.22	7.12	6.67	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.13	5.52	-	6.12	5.67	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.52	-	6.12	5.67	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.018	3.318	3.518	4.153	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	125	147	840	126	138	370	1353	-	-	796	-	-
Stage 1	789	728	-	246	260	-	-	-	-	-	-	-
Stage 2	241	271	-	777	689	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	93	113	839	85	106	363	1352	-	-	790	-	-
Mov Cap-2 Maneuver	93	113	-	85	106	-	-	-	-	-	-	-
Stage 1	615	722	-	191	202	-	-	-	-	-	-	-
Stage 2	174	210	-	739	683	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	104.8	41.3	1.3	0.2
HCM LOS	F	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1352	-	-	105	120	790	-	-
HCM Lane V/C Ratio	0.117	-	-	0.752	0.175	0.007	-	-
HCM Control Delay (s)	8	0	-	104.8	41.3	9.6	0	-
HCM Lane LOS	A	A	-	F	E	A	A	-
HCM 95th %tile Q(veh)	0.4	-	-	4.1	0.6	0	-	-

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	15	5	5	35	20	30	730	50	10	210	5
Future Vol, veh/h	10	15	5	5	35	20	30	730	50	10	210	5
Conflicting Peds, #/hr	15	0	20	20	0	15	8	0	13	13	0	8
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	3	2	2	3	6	2	2	2
Mvmt Flow	11	16	5	5	38	22	32	785	54	11	226	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1180	1175	257	1170	1150	840	239	0	0	852	0	0
Stage 1	259	259	-	889	889	-	-	-	-	-	-	-
Stage 2	921	916	-	281	261	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.53	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.027	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	167	192	782	170	197	365	1328	-	-	787	-	-
Stage 1	746	694	-	338	360	-	-	-	-	-	-	-
Stage 2	324	351	-	726	690	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	123	177	761	145	181	355	1318	-	-	777	-	-
Mov Cap-2 Maneuver	123	177	-	145	181	-	-	-	-	-	-	-
Stage 1	706	677	-	318	339	-	-	-	-	-	-	-
Stage 2	254	331	-	679	673	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	30.3	29.4	0.3	0.4
HCM LOS	D	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1318	-	-	174	211	777	-	-
HCM Lane V/C Ratio	0.024	-	-	0.185	0.306	0.014	-	-
HCM Control Delay (s)	7.8	0	-	30.3	29.4	9.7	0	-
HCM Lane LOS	A	A	-	D	D	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.7	1.2	0	-	-

Intersection	
Int Delay, s/veh	2.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	35	65	745	80	10	225
Future Vol, veh/h	35	65	745	80	10	225
Conflicting Peds, #/hr	15	0	0	23	23	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	3	2	2	2
Mvmt Flow	38	71	819	88	11	247

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1170	886	0	0	930	0
Stage 1	886	-	-	-	-	-
Stage 2	284	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	213	343	-	-	736	-
Stage 1	403	-	-	-	-	-
Stage 2	764	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	202	335	-	-	720	-
Mov Cap-2 Maneuver	202	-	-	-	-	-
Stage 1	394	-	-	-	-	-
Stage 2	740	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	26.9	0	0.4
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	272	720	-
HCM Lane V/C Ratio	-	-	0.404	0.015	-
HCM Control Delay (s)	-	-	26.9	10.1	0
HCM Lane LOS	-	-	D	B	A
HCM 95th %tile Q(veh)	-	-	1.9	0	-

Intersection						
Int Delay, s/veh	1.3					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	20	40	50	760	195	30
Future Vol, veh/h	20	40	50	760	195	30
Conflicting Peds, #/hr	7	0	15	0	0	15
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	3	3	2	2
Mvmt Flow	22	44	55	835	214	33

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1198	246	262	0	-	0
Stage 1	246	-	-	-	-	-
Stage 2	952	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.13	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.227	-	-	-
Pot Cap-1 Maneuver	205	793	1296	-	-	-
Stage 1	795	-	-	-	-	-
Stage 2	375	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	183	782	1277	-	-	-
Mov Cap-2 Maneuver	183	-	-	-	-	-
Stage 1	721	-	-	-	-	-
Stage 2	370	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.7	0.5	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1277	-	374	-	-
HCM Lane V/C Ratio	0.043	-	0.176	-	-
HCM Control Delay (s)	7.9	0	16.7	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.6	-	-

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	120	50	100	385	135	590
Future Volume (veh/h)	120	50	100	385	135	590
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1885	1885
Adj Flow Rate, veh/h	132	55	110	423	148	339
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	1	1
Cap, veh/h	365	152	346	789	596	530
Arrive On Green	0.29	0.29	0.29	0.29	0.33	0.33
Sat Flow, veh/h	1254	522	432	2797	1795	1598
Grp Volume(v), veh/h	0	187	292	241	148	339
Grp Sat Flow(s),veh/h/ln	0	1776	1526	1617	1795	1598
Q Serve(g_s), s	0.0	1.9	2.1	2.8	1.4	4.1
Cycle Q Clear(g_c), s	0.0	1.9	3.9	2.8	1.4	4.1
Prop In Lane		0.29	0.38		1.00	1.00
Lane Grp Cap(c), veh/h	0	517	664	470	596	530
V/C Ratio(X)	0.00	0.36	0.44	0.51	0.25	0.64
Avail Cap(c_a), veh/h	0	1419	1479	1292	1474	1312
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	6.3	7.0	6.7	5.5	6.4
Incr Delay (d2), s/veh	0.0	0.2	0.2	0.3	0.2	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.4	0.6	0.5	0.3	0.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	6.5	7.2	7.0	5.7	7.7
LnGrp LOS	A	A	A	A	A	A
Approach Vol, veh/h	187			533	487	
Approach Delay, s/veh	6.5			7.1	7.1	
Approach LOS	A			A	A	

Timer - Assigned Phs	2	6	8
Phs Duration (G+Y+Rc), s	10.6	10.6	12.0
Change Period (Y+Rc), s	4.0	4.0	4.5
Max Green Setting (Gmax), s	18.0	18.0	18.5
Max Q Clear Time (g_c+I1), s	3.9	5.9	6.1
Green Ext Time (p_c), s	0.2	0.6	1.4

Intersection Summary	
HCM 6th Ctrl Delay	7.0
HCM 6th LOS	A

Intersection						
Int Delay, s/veh	36.3					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	150	0	560	975	0	1220
Future Vol, veh/h	150	0	560	975	0	1220
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	0	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	163	0	609	1060	0	1326

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1935	-	0	0	-	-
Stage 1	609	-	-	-	-	-
Stage 2	1326	-	-	-	-	-
Critical Hdwy	6.42	-	-	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	-	-	-	-	-
Pot Cap-1 Maneuver	~ 72	0	-	-	0	-
Stage 1	543	0	-	-	0	-
Stage 2	248	0	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 72	-	-	-	-	-
Mov Cap-2 Maneuver	~ 72	-	-	-	-	-
Stage 1	543	-	-	-	-	-
Stage 2	248	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	$ 702.7	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	72	-
HCM Lane V/C Ratio	-	-	2.264	-
HCM Control Delay (s)	-	-	$ 702.7	-
HCM Lane LOS	-	-	F	-
HCM 95th %tile Q(veh)	-	-	15.4	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

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Report File: X:\...\Scenario 1 - Mit v2.pdf

Scenario 1 Scen1 - Mit
2/21/2022

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	13th/Belmont	Roundabout	HCM 6th Edition	EB Right		33.4	D
3	13th / May	Roundabout	HCM 6th Edition	WB Left		16.5	C

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

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Intersection Level Of Service Report

Intersection 1: 13th/Belmont

Control Type:	Roundabout	Delay (sec / veh):	33.4
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes		

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Thru	Right	Right2	Left2	Left	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	125	565	5	50	930	60	115	45	200	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	1.00	2.00	3.00	3.00	8.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	125	565	5	50	930	60	115	45	200	0	0	0
Peak Hour Factor	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	34	155	1	14	255	16	32	12	55	0	0	0
Total Analysis Volume [veh/h]	137	621	5	55	1022	66	126	49	220	0	0	0
Pedestrian Volume [ped/h]	2			0			5			3		

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Intersection Settings

Number of Conflicting Circulating Lanes	1			1			1			1		
Circulating Flow Rate [veh/h]	235			140			1099			902		
Exiting Flow Rate [veh/h]	1269			762			206			112		
Demand Flow Rate [veh/h]	125	565	5	50	930	60	115	45	200	0	0	0
Adjusted Demand Flow Rate [veh/h]	137	621	5	55	1022	66	126	49	220	0	0	0

Lanes

Overwrite Calculated Critical Headway	No	No	No	
User-Defined Critical Headway [s]	4.00	4.00	4.00	
Overwrite Calculated Follow-Up Time	No	No	No	
User-Defined Follow-Up Time [s]	3.00	3.00	3.00	
A (intercept)	1380.00	1380.00	1380.00	
B (coefficient)	0.00102	0.00102	0.00102	
HV Adjustment Factor	0.98	0.98	0.97	
Entry Flow Rate [veh/h]	779	1166	406	
Capacity of Entry and Bypass Lanes [veh/h]	1086	1197	451	
Pedestrian Impedance	1.00	1.00	1.00	
Capacity per Entry Lane [veh/h]	1065	1174	439	
X, volume / capacity	0.72	0.97	0.90	

Movement, Approach, & Intersection Results

Lane LOS	C	E	F	
95th-Percentile Queue Length [veh]	6.48	18.86	9.76	
95th-Percentile Queue Length [ft]	162.08	471.57	244.05	
Approach Delay [s/veh]	15.03	39.15	52.34	0.00
Approach LOS	C	E	F	A
Intersection Delay [s/veh]	33.41			
Intersection LOS	D			

Intersection Level Of Service Report
Intersection 3: 13th / May

Control Type:	Roundabout	Delay (sec / veh):	16.5
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes		

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	-4.50			4.50			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	125	500	10	75	625	55	50	35	80	310	145	40
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	3.00	2.00	2.00	2.00	2.00	3.00	1.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	125	500	10	75	625	55	50	35	80	310	145	40
Peak Hour Factor	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	33	133	3	20	166	15	13	9	21	82	39	11
Total Analysis Volume [veh/h]	133	532	11	80	665	59	53	37	85	330	154	43
Pedestrian Volume [ped/h]	10			1			9			7		

Intersection Settings

Number of Conflicting Circulating Lanes	1			1			1			1		
Circulating Flow Rate [veh/h]	173			631			1106			732		
Exiting Flow Rate [veh/h]	1112			641			351			131		
Demand Flow Rate [veh/h]	125	500	10	75	625	55	50	35	80	310	145	40
Adjusted Demand Flow Rate [veh/h]	133	532	11	80	665	59	53	37	85	330	154	43

Lanes

Overwrite Calculated Critical Headway	No	No	No	No	No
User-Defined Critical Headway [s]	4.00	4.00	4.00	4.00	4.00
Overwrite Calculated Follow-Up Time	No	No	No	No	No
User-Defined Follow-Up Time [s]	3.00	3.00	3.00	3.00	3.00
A (intercept)	1380.00	1420.00	1420.00	1380.00	1380.00
B (coefficient)	0.00102	0.00091	0.00091	0.00102	0.00102
HV Adjustment Factor	0.98	0.97	0.97	0.98	0.98
Entry Flow Rate [veh/h]	690	389	439	179	540
Capacity of Entry and Bypass Lanes [veh/h]	1157	800	800	447	654
Pedestrian Impedance	1.00	1.00	1.00	1.00	1.00
Capacity per Entry Lane [veh/h]	1133	777	777	438	639
X, volume / capacity	0.60	0.49	0.55	0.40	0.83

Movement, Approach, & Intersection Results

Lane LOS	B	B	B	C	D
95th-Percentile Queue Length [veh]	4.15	2.70	3.39	1.89	8.73
95th-Percentile Queue Length [ft]	103.63	67.41	84.65	47.25	218.17
Approach Delay [s/veh]	10.76	12.17		15.60	30.82
Approach LOS	B	B		C	D
Intersection Delay [s/veh]	16.51				
Intersection LOS	C				

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Turning Movement Volume: Summary

ID	Intersection Name	Northbound			Southbound			Eastbound			Total Volume
		Thru	Right	2	2	Left	Right	Left	Thru	Right	
1	13th/Belmont	125	565	5	50	930	60	115	45	200	2095

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
3	13th / May	125	500	10	75	625	55	50	35	80	310	145	40	2050

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Report File: X:\...\Scenario 1 - Mit v2.pdf

Scenario 1 Scen1 - Mit
2/21/2022

Turning Movement Volume: Detail

ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Total Volume
			Thru	Right	2	2	Left	Right	Left	Thru	Right	
1	13th/Belmont	Final Base	125	565	5	50	930	60	115	45	200	2095
		Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0
		Future Total	**125**	**565**	**5**	**50**	**930**	**60**	**115**	**45**	**200**	**2095**

ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
3	13th / May	Final Base	125	500	10	75	625	55	50	35	80	310	145	40	2050
		Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**125**	**500**	**10**	**75**	**625**	**55**	**50**	**35**	**80**	**310**	**145**	**40**	**2050**

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	230	460	420	225	530	110
Future Volume (vph)	230	460	420	225	530	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1863	1583	1752	1881	1770	1538
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1863	1583	1752	1881	1770	1538
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	245	489	447	239	564	117
RTOR Reduction (vph)	0	59	0	0	0	74
Lane Group Flow (vph)	245	430	447	239	564	43
Confl. Peds. (#/hr)		2	2		1	2
Heavy Vehicles (%)	2%	2%	3%	1%	2%	5%
Turn Type	NA	pt+ov	Prot	NA	Prot	Prot
Protected Phases	2	2 8	1	6	8	8
Permitted Phases						
Actuated Green, G (s)	17.9	54.7	26.5	48.4	32.8	32.8
Effective Green, g (s)	17.9	54.7	26.5	48.4	32.8	32.8
Actuated g/C Ratio	0.20	0.61	0.30	0.54	0.37	0.37
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	373	970	520	1020	650	565
v/s Ratio Prot	c0.13	0.27	c0.26	0.13	c0.32	0.03
v/s Ratio Perm						
v/c Ratio	0.66	0.44	0.86	0.23	0.87	0.08
Uniform Delay, d1	32.8	9.2	29.6	10.7	26.2	18.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.1	0.3	13.3	0.1	11.8	0.1
Delay (s)	37.0	9.5	42.9	10.8	38.0	18.4
Level of Service	D	A	D	B	D	B
Approach Delay (s)	18.7			31.7	34.6	
Approach LOS	B			C	C	

Intersection Summary			
HCM 2000 Control Delay	28.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	89.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	85	0	80	335	170	540	0	0	0	0	725	55
Future Volume (veh/h)	85	0	80	335	170	540	0	0	0	0	725	55
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	1870	0	1856	1870	1841	1885				0	1856	1900
Adj Flow Rate, veh/h	90	0	47	356	181	211				0	771	59
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94				0.94	0.94	0.94
Percent Heavy Veh, %	2	0	3	2	4	1				0	3	0
Cap, veh/h	0	0	0	1701	1767	1518				0	0	0
Arrive On Green	0.00	0.00	0.00	0.32	0.32	0.32				0.00	0.00	0.00
Sat Flow, veh/h		0		1781	1841	1589					0	
Grp Volume(v), veh/h		0.0		356	181	211					0.0	
Grp Sat Flow(s),veh/h/ln				1781	1841	1589						
Q Serve(g_s), s				14.7	6.9	9.5						
Cycle Q Clear(g_c), s				14.7	6.9	9.5						
Prop In Lane				1.00		1.00						
Lane Grp Cap(c), veh/h				1701	1767	1518						
V/C Ratio(X)				0.21	0.10	0.14						
Avail Cap(c_a), veh/h				1701	1767	1518						
HCM Platoon Ratio				0.33	0.33	0.33						
Upstream Filter(I)				0.65	0.65	0.65						
Uniform Delay (d), s/veh				6.6	3.7	4.8						
Incr Delay (d2), s/veh				0.2	0.1	0.1						
Initial Q Delay(d3),s/veh				0.0	0.0	0.0						
%ile BackOfQ(50%),veh/ln				3.2	0.0	0.1						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				6.7	3.8	4.9						
LnGrp LOS				A	A	A						
Approach Vol, veh/h					748							
Approach Delay, s/veh					5.5							
Approach LOS					A							

Timer - Assigned Phs	8
Phs Duration (G+Y+Rc), s	100.0
Change Period (Y+Rc), s	4.5
Max Green Setting (Gmax), s	21.9
Max Q Clear Time (g_c+I1), s	16.7
Green Ext Time (p_c), s	1.6

Intersection Summary	
HCM 6th Ctrl Delay	5.5
HCM 6th LOS	A

Intersection	
Int Delay, s/veh	18.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	10	10	85	40	0	0	0	0	40	1105	15
Future Vol, veh/h	0	10	10	85	40	0	0	0	0	40	1105	15
Conflicting Peds, #/hr	8	0	11	11	0	8	5	0	2	2	0	5
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	11	11	92	43	0	0	0	0	43	1201	16

Major/Minor	Minor2			Minor1						Major2		
Conflicting Flow All	-	1302	1225	1319	1310	-				2	0	0
Stage 1	-	1300	-	2	2	-				-	-	-
Stage 2	-	2	-	1317	1308	-				-	-	-
Critical Hdwy	-	6.52	6.22	7.12	6.52	-				4.12	-	-
Critical Hdwy Stg 1	-	5.52	-	-	-	-				-	-	-
Critical Hdwy Stg 2	-	-	-	6.12	5.52	-				-	-	-
Follow-up Hdwy	-	4.018	3.318	3.518	4.018	-				2.218	-	-
Pot Cap-1 Maneuver	0	161	218	134	159	0				1620	-	-
Stage 1	0	231	-	-	-	0				-	-	-
Stage 2	0	-	-	194	229	0				-	-	-
Platoon blocked, %											-	-
Mov Cap-1 Maneuver	-	147	217	112	145	-				1617	-	-
Mov Cap-2 Maneuver	-	147	-	112	145	-				-	-	-
Stage 1	-	211	-	-	-	-				-	-	-
Stage 2	-	-	-	160	209	-				-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	28.5	188.1	0.3
HCM LOS	D	F	

Minor Lane/Major Mvmt	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	175	121	1617	-	-
HCM Lane V/C Ratio	0.124	1.123	0.027	-	-
HCM Control Delay (s)	28.5	188.1	7.3	0	-
HCM Lane LOS	D	F	A	A	-
HCM 95th %tile Q(veh)	0.4	8.1	0.1	-	-

Intersection												
Int Delay, s/veh	5.2											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	10	5	55	15	0	0	0	0	55	1145	10
Future Vol, veh/h	0	10	5	55	15	0	0	0	0	55	1145	10
Conflicting Peds, #/hr	8	0	4	4	0	8	3	0	7	7	0	3
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	11	5	58	16	0	0	0	0	58	1205	11

Major/Minor	Minor2			Minor1					Major2			
Conflicting Flow All	-	1337	1218	1346	1342	-				7	0	0
Stage 1	-	1330	-	7	7	-				-	-	-
Stage 2	-	7	-	1339	1335	-				-	-	-
Critical Hdwy	-	6.52	6.22	7.12	6.52	-				4.12	-	-
Critical Hdwy Stg 1	-	5.52	-	-	-	-				-	-	-
Critical Hdwy Stg 2	-	-	-	6.12	5.52	-				-	-	-
Follow-up Hdwy	-	4.018	3.318	3.518	4.018	-				2.218	-	-
Pot Cap-1 Maneuver	0	153	220	128	152	0				1614	-	-
Stage 1	0	224	-	-	-	0				-	-	-
Stage 2	0	-	-	188	223	0				-	-	-
Platoon blocked, %											-	-
Mov Cap-1 Maneuver	-	134	219	107	134	-				1603	-	-
Mov Cap-2 Maneuver	-	134	-	107	134	-				-	-	-
Stage 1	-	198	-	-	-	-				-	-	-
Stage 2	-	-	-	154	197	-				-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	31	84.4	0.3
HCM LOS	D	F	

Minor Lane/Major Mvmt	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	154	112	1603	-	-
HCM Lane V/C Ratio	0.103	0.658	0.036	-	-
HCM Control Delay (s)	31	84.4	7.3	0	-
HCM Lane LOS	D	F	A	A	-
HCM 95th %tile Q(veh)	0.3	3.4	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	80	200	15	150	0	0	0	0	20	1010	200
Future Volume (veh/h)	0	80	200	15	150	0	0	0	0	20	1010	200
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1856	1856	1781	1870	0				1870	1870	1885
Adj Flow Rate, veh/h	0	88	220	16	165	0				22	1110	220
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91				0.91	0.91	0.91
Percent Heavy Veh, %	0	3	3	8	2	0				2	2	1
Cap, veh/h	0	379	320	102	357	0				35	1827	382
Arrive On Green	0.00	0.20	0.20	0.20	0.20	0.00				0.62	0.62	0.62
Sat Flow, veh/h	0	1856	1568	76	1748	0				57	2951	617
Grp Volume(v), veh/h	0	88	220	181	0	0				725	0	627
Grp Sat Flow(s),veh/h/ln	0	1856	1568	1824	0	0				1868	0	1756
Q Serve(g_s), s	0.0	1.8	5.9	0.0	0.0	0.0				11.0	0.0	9.6
Cycle Q Clear(g_c), s	0.0	1.8	5.9	3.9	0.0	0.0				11.0	0.0	9.6
Prop In Lane	0.00		1.00	0.09		0.00				0.03		0.35
Lane Grp Cap(c), veh/h	0	379	320	459	0	0				1156	0	1088
V/C Ratio(X)	0.00	0.23	0.69	0.39	0.00	0.00				0.63	0.00	0.58
Avail Cap(c_a), veh/h	0	1147	969	1193	0	0				2638	0	2481
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	0.00	0.00				1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	15.1	16.7	15.9	0.0	0.0				5.4	0.0	5.1
Incr Delay (d2), s/veh	0.0	0.3	2.6	0.6	0.0	0.0				0.6	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.7	2.1	1.5	0.0	0.0				2.7	0.0	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	15.4	19.3	16.4	0.0	0.0				5.9	0.0	5.6
LnGrp LOS	A	B	B	B	A	A				A	A	A
Approach Vol, veh/h		308			181						1352	
Approach Delay, s/veh		18.2			16.4						5.8	
Approach LOS		B			B						A	

Timer - Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				13.3		32.1		13.3
Change Period (Y+Rc), s				4.0		4.0		4.0
Max Green Setting (Gmax), s				28.0		64.0		28.0
Max Q Clear Time (g_c+I1), s				7.9		13.0		5.9
Green Ext Time (p_c), s				1.1		15.1		0.9

Intersection Summary			
HCM 6th Ctrl Delay			8.9
HCM 6th LOS			A

Intersection	
Int Delay, s/veh	23

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	75	25	0	0	15	5	160	1225	65	0	0	0
Future Vol, veh/h	75	25	0	0	15	5	160	1225	65	0	0	0
Conflicting Peds, #/hr	13	0	0	0	0	13	1	0	8	8	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	3	2	2	2	17	2	2	3	2	2	2	2
Mvmt Flow	79	26	0	0	16	5	168	1289	68	0	0	0

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	1003	1702	-	-	1668	700	1	0	0
Stage 1	1	1	-	-	1667	-	-	-	-
Stage 2	1002	1701	-	-	1	-	-	-	-
Critical Hdwy	7.56	6.54	-	-	6.84	6.94	4.14	-	-
Critical Hdwy Stg 1	-	-	-	-	5.84	-	-	-	-
Critical Hdwy Stg 2	6.56	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.53	4.02	-	-	4.17	3.32	2.22	-	-
Pot Cap-1 Maneuver	195	91	0	0	82	382	1620	-	-
Stage 1	-	-	0	0	130	-	-	-	-
Stage 2	258	146	0	0	-	-	-	-	-
Platoon blocked, %								-	-
Mov Cap-1 Maneuver	95	51	-	-	46	379	1618	-	-
Mov Cap-2 Maneuver	95	51	-	-	46	-	-	-	-
Stage 1	-	-	-	-	73	-	-	-	-
Stage 2	112	82	-	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	$ 314.8	96.6	1.9
HCM LOS	F	F	

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1
Capacity (veh/h)	1618	-	-	78	59
HCM Lane V/C Ratio	0.104	-	-	1.35	0.357
HCM Control Delay (s)	7.5	1.3	-	$ 314.8	96.6
HCM Lane LOS	A	A	-	F	F
HCM 95th %tile Q(veh)	0.3	-	-	8.2	1.3

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	7.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	45	15	0	0	35	25	40	1140	60	0	0	0
Future Vol, veh/h	45	15	0	0	35	25	40	1140	60	0	0	0
Conflicting Peds, #/hr	15	0	20	20	0	15	8	0	13	13	0	8
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	0	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	-	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	3	2	2	3	6	2	2	2
Mvmt Flow	48	16	0	0	38	27	43	1226	65	0	0	0

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	1400	1398	-	-	1366	1287	8	0	0
Stage 1	8	8	-	-	1358	-	-	-	-
Stage 2	1392	1390	-	-	8	-	-	-	-
Critical Hdwy	7.12	6.52	-	-	6.53	6.22	4.12	-	-
Critical Hdwy Stg 1	-	-	-	-	5.53	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	-	-	4.027	3.318	2.218	-	-
Pot Cap-1 Maneuver	118	141	0	0	146	201	1612	-	-
Stage 1	-	-	0	0	216	-	-	-	-
Stage 2	176	209	0	0	-	-	-	-	-
Platoon blocked, %								-	-
Mov Cap-1 Maneuver	79	135	-	-	139	199	1600	-	-
Mov Cap-2 Maneuver	79	135	-	-	139	-	-	-	-
Stage 1	-	-	-	-	208	-	-	-	-
Stage 2	121	201	-	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	116.6	42.3	0.2
HCM LOS	F	E	

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1
Capacity (veh/h)	1600	-	-	88	159
HCM Lane V/C Ratio	0.027	-	-	0.733	0.406
HCM Control Delay (s)	7.3	-	-	116.6	42.3
HCM Lane LOS	A	-	-	F	E
HCM 95th %tile Q(veh)	0.1	-	-	3.7	1.8

Intersection	
Int Delay, s/veh	6.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	125	1200	60	0	0
Future Vol, veh/h	0	125	1200	60	0	0
Conflicting Peds, #/hr	15	0	0	23	23	0
Sign Control	Stop	Stop	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	-
Grade, %	0	-	0	-	-	0
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	3	2	2	2
Mvmt Flow	0	137	1319	66	0	0

Major/Minor	Minor1		Major1	
Conflicting Flow All	-	1375	0	0
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	6.22	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	3.318	-	-
Pot Cap-1 Maneuver	0	178	-	-
Stage 1	0	-	-	-
Stage 2	0	-	-	-
Platoon blocked, %			-	-
Mov Cap-1 Maneuver	-	174	-	-
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	WB	NB
HCM Control Delay, s	76.3	0
HCM LOS	F	

Minor Lane/Major Mvmt	NBT	NBR	WBLn1
Capacity (veh/h)	-	-	174
HCM Lane V/C Ratio	-	-	0.789
HCM Control Delay (s)	-	-	76.3
HCM Lane LOS	-	-	F
HCM 95th %tile Q(veh)	-	-	5.2

Intersection	
Int Delay, s/veh	5.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	45	0	140	1185	0	0
Future Vol, veh/h	45	0	140	1185	0	0
Conflicting Peds, #/hr	7	0	15	0	0	15
Sign Control	Stop	Stop	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	-	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	3	3	2	2
Mvmt Flow	49	0	154	1302	0	0

Major/Minor	Minor2		Major1	
Conflicting Flow All	1632	-	15	0
Stage 1	15	-	-	-
Stage 2	1617	-	-	-
Critical Hdwy	6.42	-	4.13	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-
Follow-up Hdwy	3.518	-	2.227	-
Pot Cap-1 Maneuver	111	0	1596	-
Stage 1	-	0	-	-
Stage 2	178	0	-	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	70	-	1573	-
Mov Cap-2 Maneuver	70	-	-	-
Stage 1	-	-	-	-
Stage 2	176	-	-	-

Approach	EB	NB
HCM Control Delay, s	134.3	0.8
HCM LOS	F	

Minor Lane/Major Mvmt	NBL	NBT	EBLn1
Capacity (veh/h)	1573	-	70
HCM Lane V/C Ratio	0.098	-	0.706
HCM Control Delay (s)	7.5	0	134.3
HCM Lane LOS	A	A	F
HCM 95th %tile Q(veh)	0.3	-	3.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	435	635	640
Future Volume (veh/h)	0	0	0	435	635	640
Initial Q (Qb), veh			0	0	0	0
Ped-Bike Adj(A_pbT)			1.00		1.00	1.00
Parking Bus, Adj			1.00	1.00	1.00	1.00
Work Zone On Approach				No	No	
Adj Sat Flow, veh/h/ln			0	1870	1885	1885
Adj Flow Rate, veh/h			0	478	698	703
Peak Hour Factor			0.91	0.91	0.91	0.91
Percent Heavy Veh, %			0	2	1	1
Cap, veh/h			0	513	0	0
Arrive On Green			0.00	0.27	0.00	0.00
Sat Flow, veh/h			0	1870	0	
Grp Volume(v), veh/h			0	478	0.0	
Grp Sat Flow(s),veh/h/ln			0	1870		
Q Serve(g_s), s			0.0	24.9		
Cycle Q Clear(g_c), s			0.0	24.9		
Prop In Lane			0.00			
Lane Grp Cap(c), veh/h			0	513		
V/C Ratio(X)			0.00	0.93		
Avail Cap(c_a), veh/h			0	711		
HCM Platoon Ratio			1.00	1.00		
Upstream Filter(I)			0.00	1.00		
Uniform Delay (d), s/veh			0.0	35.4		
Incr Delay (d2), s/veh			0.0	13.3		
Initial Q Delay(d3),s/veh			0.0	0.0		
%ile BackOfQ(50%),veh/ln			0.0	13.1		
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh			0.0	48.7		
LnGrp LOS			A	D		
Approach Vol, veh/h				478		
Approach Delay, s/veh				48.7		
Approach LOS				D		

Timer - Assigned Phs	6
Phs Duration (G+Y+Rc), s	31.4
Change Period (Y+Rc), s	4.0
Max Green Setting (Gmax), s	38.0
Max Q Clear Time (g_c+I1), s	26.9
Green Ext Time (p_c), s	0.5

Intersection Summary	
HCM 6th Ctrl Delay	48.7
HCM 6th LOS	D

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Scenario 1 Scen2 - Mit
1/13/2022

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	13th/Belmont	Roundabout	HCM 6th Edition	EB Thru		21.6	C
2	13th/12th	Roundabout	HCM 6th Edition	NB Thru		32.4	D
3	13th/May	Roundabout	HCM 6th Edition	WB Right		16.8	C

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: 13th/Belmont

Control Type:	Roundabout	Delay (sec / veh):	21.6
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes		

Intersection Setup

Name						
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00		25.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name						
Base Volume Input [veh/h]	1010	200	0	375	165	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	8.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1010	200	0	375	165	0
Peak Hour Factor	0.9100	0.9100	1.0000	0.9100	0.9100	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	277	55	0	103	45	0
Total Analysis Volume [veh/h]	1110	220	0	412	181	0
Pedestrian Volume [ped/h]	0		3		0	

Intersection Settings

Number of Conflicting Circulating Lanes	1		1		1	
Circulating Flow Rate [veh/h]	195		1132		0	
Exiting Flow Rate [veh/h]	0		420		1552	
Demand Flow Rate [veh/h]	1010	200	0	375	165	0
Adjusted Demand Flow Rate [veh/h]	1110	220	0	412	181	0

Lanes

Overwrite Calculated Critical Headway	No	No	No	No
User-Defined Critical Headway [s]	4.00	4.00	4.00	4.00
Overwrite Calculated Follow-Up Time	No	No	No	No
User-Defined Follow-Up Time [s]	3.00	3.00	3.00	3.00
A (intercept)	1420.00	1420.00	1380.00	1380.00
B (coefficient)	0.00091	0.00091	0.00102	0.00102
HV Adjustment Factor	0.98	0.98	0.98	0.93
Entry Flow Rate [veh/h]	638	719	421	196
Capacity of Entry and Bypass Lanes [veh/h]	1189	1189	435	1380
Pedestrian Impedance	1.00	1.00	1.00	1.00
Capacity per Entry Lane [veh/h]	1166	1166	427	1278
X, volume / capacity	0.54	0.60	0.97	0.14

Movement, Approach, & Intersection Results

Lane LOS	A	B	F	A
95th-Percentile Queue Length [veh]	3.31	4.28	11.57	0.49
95th-Percentile Queue Length [ft]	82.73	106.89	289.17	12.33
Approach Delay [s/veh]	10.05		66.79	3.99
Approach LOS	B		F	A
Intersection Delay [s/veh]	21.63			
Intersection LOS	C			

Intersection Level Of Service Report
Intersection 2: 13th/12th

Control Type:	Roundabout	Delay (sec / veh):	32.4
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes		

Intersection Setup

Name						
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00		30.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		No	

Volumes

Name						
Base Volume Input [veh/h]	160	1290	125	85	100	1385
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	160	1290	125	85	100	1385
Peak Hour Factor	0.9500	0.9500	0.9100	0.9100	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	42	339	34	23	26	364
Total Analysis Volume [veh/h]	168	1358	137	93	105	1458
Pedestrian Volume [ped/h]	0		13		0	

Intersection Settings

Number of Conflicting Circulating Lanes	2		1		1	
Circulating Flow Rate [veh/h]	107		171		0	
Exiting Flow Rate [veh/h]	1487		1492		171	
Demand Flow Rate [veh/h]	160	1290	0	0	100	1385
Adjusted Demand Flow Rate [veh/h]	168	1358	0	0	105	1458

Lanes

Overwrite Calculated Critical Headway	No	No		No	No
User-Defined Critical Headway [s]	4.00	4.00		4.00	4.00
Overwrite Calculated Follow-Up Time	No	No		No	No
User-Defined Follow-Up Time [s]	3.00	3.00		3.00	3.00
A (intercept)	1350.00	1420.00		1420.00	1420.00
B (coefficient)	0.00092	0.00085		0.00091	0.00091
HV Adjustment Factor	0.98	0.98		0.98	0.98
Entry Flow Rate [veh/h]	172	1386		750	845
Capacity of Entry and Bypass Lanes [veh/h]	1224	1297		1420	1420
Pedestrian Impedance	1.00	1.00		1.00	1.00
Capacity per Entry Lane [veh/h]	1200	1272		1393	1393
X, volume / capacity	0.14	1.07		0.53	0.60

Movement, Approach, & Intersection Results

Lane LOS	A	F		A	A
95th-Percentile Queue Length [veh]	0.49	28.65		3.23	4.16
95th-Percentile Queue Length [ft]	12.17	716.21		80.63	104.06
Approach Delay [s/veh]	56.72		0.00	8.72	
Approach LOS	F		A	A	
Intersection Delay [s/veh]	32.43				
Intersection LOS	D				

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Intersection Level Of Service Report

Intersection 3: 13th/May

Control Type:	Roundabout	Delay (sec / veh):	16.8
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes		

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			25.00			25.00			25.00		
Grade [%]	0.00			-4.50			4.50			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	0	0	0	25	700	55	50	35	80	335	170	540
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	3.00	2.00	2.00	1.00	3.00	2.00	4.00	1.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	25	700	55	50	35	80	335	170	540
Peak Hour Factor	1.0000	1.0000	1.0000	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	7	186	15	13	9	21	89	45	144
Total Analysis Volume [veh/h]	0	0	0	27	745	59	53	37	85	356	181	574
Pedestrian Volume [ped/h]	10			1			9			7		

Intersection Settings

Number of Conflicting Circulating Lanes	1			1			2			1		
Circulating Flow Rate [veh/h]	119			551			1158			54		
Exiting Flow Rate [veh/h]	1218			634			248			65		
Demand Flow Rate [veh/h]	0	0	0	25	700	55	50	35	80	335	170	540
Adjusted Demand Flow Rate [veh/h]	0	0	0	27	745	59	53	37	85	356	181	574

Lanes

Overwrite Calculated Critical Headway		No	No	No	No
User-Defined Critical Headway [s]		4.00	4.00	4.00	4.00
Overwrite Calculated Follow-Up Time		No	No	No	No
User-Defined Follow-Up Time [s]		3.00	3.00	3.00	3.00
A (intercept)		1420.00	1420.00	1420.00	1380.00
B (coefficient)		0.00091	0.00091	0.00085	0.00102
HV Adjustment Factor		0.97	0.97	0.98	0.98
Entry Flow Rate [veh/h]		403	454	179	1131
Capacity of Entry and Bypass Lanes [veh/h]		860	860	531	1306
Pedestrian Impedance		1.00	1.00	1.00	1.00
Capacity per Entry Lane [veh/h]		835	835	519	1282
X, volume / capacity		0.47	0.53	0.34	0.87

Movement, Approach, & Intersection Results

Lane LOS		B	B	B	C
95th-Percentile Queue Length [veh]		2.52	3.15	1.48	12.36
95th-Percentile Queue Length [ft]		63.11	78.72	36.90	309.09
Approach Delay [s/veh]	0.00	11.06		12.11	21.83
Approach LOS	A	B		B	C
Intersection Delay [s/veh]	16.80				
Intersection LOS	C				

Vistro File: C:\...\Scen 2_HoodRiver OR281 RABs_Mit.vistro
Report File: X:\...\Scenario 2 - Mit.pdf

Scenario 1 Scen2 - Mit
1/13/2022

Turning Movement Volume: Summary

ID	Intersection Name	Southbound		Eastbound		Westbound		Total Volume
		Thru	Right	Left	Thru	Left	Thru	
1	13th/Belmont	1010	200	0	375	165	0	1750

ID	Intersection Name	Northbound		Eastbound		Total Volume
		Left	Thru	Left	Right	
2	13th/12th	160	1290	100	1385	2935

ID	Intersection Name	Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
3	13th/May	25	700	55	50	35	80	335	170	540	1990

Vistro File: C:\...\Scen 2_HoodRiver OR281 RABs_Mit.vistro
Report File: X:\...\Scenario 2 - Mit.pdf

Scenario 1 Scen2 - Mit
1/13/2022

Turning Movement Volume: Detail

ID	Intersection Name	Volume Type	Southbound		Eastbound		Westbound		Total Volume
			Thru	Right	Left	Thru	Left	Thru	
1	13th/Belmont	Final Base	1010	200	0	375	165	0	1750
		Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0
		Future Total	**1010**	**200**	**0**	**375**	**165**	**0**	**1750**

ID	Intersection Name	Volume Type	Northbound		Eastbound		Total Volume
			Left	Thru	Left	Right	
2	13th/12th	Final Base	160	1290	100	1385	2935
		Growth Factor	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0
		Net New Trips	0	0	0	0	0
		Other	0	0	0	0	0
		Future Total	**160**	**1290**	**100**	**1385**	**2935**

ID	Intersection Name	Volume Type	Southbound			Eastbound			Westbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
3	13th/May	Final Base	25	700	55	50	35	80	335	170	540	1990
		Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0
		Future Total	**25**	**700**	**55**	**50**	**35**	**80**	**335**	**170**	**540**	**1990**

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	230	460	420	225	530	110
Future Volume (vph)	230	460	420	225	530	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1863	1583	1752	1881	1770	1538
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1863	1583	1752	1881	1770	1538
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	245	489	447	239	564	117
RTOR Reduction (vph)	0	59	0	0	0	74
Lane Group Flow (vph)	245	430	447	239	564	43
Confl. Peds. (#/hr)		2	2		1	2
Heavy Vehicles (%)	2%	2%	3%	1%	2%	5%
Turn Type	NA	pt+ov	Prot	NA	Prot	Prot
Protected Phases	2	2 8	1	6	8	8
Permitted Phases						
Actuated Green, G (s)	17.9	54.7	26.5	48.4	32.8	32.8
Effective Green, g (s)	17.9	54.7	26.5	48.4	32.8	32.8
Actuated g/C Ratio	0.20	0.61	0.30	0.54	0.37	0.37
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	373	970	520	1020	650	565
v/s Ratio Prot	c0.13	0.27	c0.26	0.13	c0.32	0.03
v/s Ratio Perm						
v/c Ratio	0.66	0.44	0.86	0.23	0.87	0.08
Uniform Delay, d1	32.8	9.2	29.6	10.7	26.2	18.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.1	0.3	13.3	0.1	11.8	0.1
Delay (s)	37.0	9.5	42.9	10.8	38.0	18.4
Level of Service	D	A	D	B	D	B
Approach Delay (s)	18.7			31.7	34.6	
Approach LOS	B			C	C	

Intersection Summary			
HCM 2000 Control Delay	28.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	89.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	35	80	310	195	140	100	650	110	25	725	55
Future Volume (veh/h)	50	35	80	310	195	140	100	650	110	25	725	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.97	0.99		0.99	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1885	1856	1870	1841	1885	1870	1870	1870	1870	1856	1870
Adj Flow Rate, veh/h	53	37	13	330	207	116	106	691	117	27	771	59
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	1	3	2	4	1	2	2	2	2	3	2
Cap, veh/h	176	116	34	542	384	215	202	905	153	170	825	63
Arrive On Green	0.19	0.20	0.19	0.15	0.46	0.46	0.06	0.58	0.58	0.48	0.49	0.48
Sat Flow, veh/h	609	581	172	1781	1102	617	1781	1557	264	675	1701	130
Grp Volume(v), veh/h	103	0	0	330	0	323	106	0	808	27	0	830
Grp Sat Flow(s),veh/h/ln	1362	0	0	1781	0	1719	1781	0	1820	675	0	1831
Q Serve(g_s), s	4.2	0.0	0.0	11.0	0.0	13.4	0.3	0.0	33.5	3.6	0.0	42.7
Cycle Q Clear(g_c), s	6.0	0.0	0.0	11.0	0.0	13.4	0.3	0.0	33.5	37.0	0.0	42.7
Prop In Lane	0.51		0.13	1.00		0.36	1.00		0.14	1.00		0.07
Lane Grp Cap(c), veh/h	319	0	0	542	0	600	202	0	1058	170	0	888
V/C Ratio(X)	0.32	0.00	0.00	0.61	0.00	0.54	0.52	0.00	0.76	0.16	0.00	0.93
Avail Cap(c_a), veh/h	319	0	0	542	0	600	202	0	1058	170	0	888
HCM Platoon Ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.77	0.00	0.77	1.00	0.00	1.00	0.70	0.00	0.70
Uniform Delay (d), s/veh	34.4	0.0	0.0	27.4	0.0	21.0	43.8	0.0	15.8	38.0	0.0	24.3
Incr Delay (d2), s/veh	2.7	0.0	0.0	1.5	0.0	2.7	2.5	0.0	5.2	1.4	0.0	13.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	0.0	0.0	6.7	0.0	5.3	2.6	0.0	14.6	0.7	0.0	21.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	37.1	0.0	0.0	28.9	0.0	23.7	46.2	0.0	21.1	39.4	0.0	38.1
LnGrp LOS	D	A	A	C	A	C	D	A	C	D	A	D
Approach Vol, veh/h		103			653			914			857	
Approach Delay, s/veh		37.1			26.3			24.0			38.2	
Approach LOS		D			C			C			D	

Timer - Assigned Phs		2	3	4	5	6		8
Phs Duration (G+Y+Rc), s		61.6	15.0	23.4	9.6	52.0		38.4
Change Period (Y+Rc), s		4.0	4.0	4.0	4.0	4.0		4.0
Max Green Setting (Gmax), s		57.6	11.0	19.4	5.6	48.0		34.4
Max Q Clear Time (g_c+I1), s		35.5	13.0	8.0	2.3	44.7		15.4
Green Ext Time (p_c), s		6.8	0.0	0.4	0.1	1.9		2.0

Intersection Summary			
HCM 6th Ctrl Delay			29.9
HCM 6th LOS			C

Intersection	
Int Delay, s/veh	12.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	10	10	10	20	40	30	830	10	15	1105	15
Future Vol, veh/h	5	10	10	10	20	40	30	830	10	15	1105	15
Conflicting Peds, #/hr	8	0	11	11	0	8	5	0	2	2	0	5
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	11	11	11	22	43	33	902	11	16	1201	16

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2260	2227	1225	2239	2230	918	1222	0	0	915	0	0
Stage 1	1246	1246	-	976	976	-	-	-	-	-	-	-
Stage 2	1014	981	-	1263	1254	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	29	43	218	30	43	329	570	-	-	745	-	-
Stage 1	213	246	-	302	329	-	-	-	-	-	-	-
Stage 2	288	328	-	208	243	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	13	39	215	21	39	326	567	-	-	744	-	-
Mov Cap-2 Maneuver	13	39	-	21	39	-	-	-	-	-	-	-
Stage 1	200	239	-	284	309	-	-	-	-	-	-	-
Stage 2	217	308	-	183	236	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	242.2	291.2	0.4	0.1
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	567	-	-	36	63	744	-	-
HCM Lane V/C Ratio	0.058	-	-	0.755	1.208	0.022	-	-
HCM Control Delay (s)	11.7	-	-	242.2	291.2	9.9	-	-
HCM Lane LOS	B	-	-	F	F	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	2.7	6.2	0.1	-	-

Intersection	
Int Delay, s/veh	33.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	10	5	45	15	20	5	900	5	25	1095	10
Future Vol, veh/h	5	10	5	45	15	20	5	900	5	25	1095	10
Conflicting Peds, #/hr	8	0	4	4	0	8	3	0	7	7	0	3
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	10	-	-	100	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	11	5	47	16	21	5	947	5	26	1153	11

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2200	2183	1166	2190	2186	965	1167	0	0	959	0	0
Stage 1	1214	1214	-	967	967	-	-	-	-	-	-	-
Stage 2	986	969	-	1223	1219	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	32	46	236	~ 33	46	309	599	-	-	717	-	-
Stage 1	222	254	-	306	333	-	-	-	-	-	-	-
Stage 2	298	332	-	219	253	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	21	44	234	~ 25	44	305	597	-	-	712	-	-
Mov Cap-2 Maneuver	21	44	-	~ 25	44	-	-	-	-	-	-	-
Stage 1	220	244	-	301	328	-	-	-	-	-	-	-
Stage 2	260	327	-	197	243	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	163	$ 849.1	0.1	0.2
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	597	-	-	41	36	712	-	-
HCM Lane V/C Ratio	0.009	-	-	0.513	2.339	0.037	-	-
HCM Control Delay (s)	11.1	-	-	163	$ 849.1	10.2	-	-
HCM Lane LOS	B	-	-	F	F	B	-	-
HCM 95th %tile Q(veh)	0	-	-	1.8	9.4	0.1	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	45	200	0	140	5	0	855	5	50	1010	100
Future Volume (veh/h)	70	45	200	0	140	5	0	855	5	50	1010	100
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1856	1856	0	1870	1870	0	1870	1870	1870	1870	1885
Adj Flow Rate, veh/h	77	49	72	0	154	5	0	940	5	55	1110	110
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	3	3	0	2	2	0	2	2	2	2	1
Cap, veh/h	176	128	188	0	194	6	0	1242	7	327	1242	123
Arrive On Green	0.05	0.19	0.19	0.00	0.11	0.10	0.00	0.67	0.66	0.04	0.74	0.74
Sat Flow, veh/h	1781	676	994	0	1801	58	0	1859	10	1781	1674	166
Grp Volume(v), veh/h	77	0	121	0	0	159	0	0	945	55	0	1220
Grp Sat Flow(s),veh/h/ln	1781	0	1670	0	0	1860	0	0	1869	1781	0	1840
Q Serve(g_s), s	4.4	0.0	7.4	0.0	0.0	9.8	0.0	0.0	39.8	1.0	0.0	59.4
Cycle Q Clear(g_c), s	4.4	0.0	7.4	0.0	0.0	9.8	0.0	0.0	39.8	1.0	0.0	59.4
Prop In Lane	1.00		0.60	0.00		0.03	0.00		0.01	1.00		0.09
Lane Grp Cap(c), veh/h	176	0	317	0	0	200	0	0	1249	327	0	1365
V/C Ratio(X)	0.44	0.00	0.38	0.00	0.00	0.80	0.00	0.00	0.76	0.17	0.00	0.89
Avail Cap(c_a), veh/h	176	0	358	0	0	246	0	0	1249	340	0	1365
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	42.5	0.0	41.6	0.0	0.0	51.0	0.0	0.0	13.0	12.8	0.0	11.6
Incr Delay (d2), s/veh	1.7	0.0	0.8	0.0	0.0	13.5	0.0	0.0	2.7	0.2	0.0	9.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	0.0	3.2	0.0	0.0	5.3	0.0	0.0	16.5	0.6	0.0	24.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	44.2	0.0	42.4	0.0	0.0	64.5	0.0	0.0	15.8	13.0	0.0	20.8
LnGrp LOS	D	A	D	A	A	E	A	A	B	B	A	C
Approach Vol, veh/h		198			159			945			1275	
Approach Delay, s/veh		43.1			64.5			15.8			20.5	
Approach LOS		D			E			B			C	

Timer - Assigned Phs	1	2		4		6	7	8
Phs Duration (G+Y+Rc), s	8.7	82.2		26.2		90.9	9.6	16.6
Change Period (Y+Rc), s	4.5	4.5		4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	76.9		24.6		86.4	5.1	15.0
Max Q Clear Time (g_c+I1), s	3.0	41.8		9.4		61.4	6.4	11.8
Green Ext Time (p_c), s	0.0	10.1		0.5		14.0	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	23.2
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	45	25	0	0	10	5	130	460	40	0	0	0
Future Vol, veh/h	45	25	0	0	10	5	130	460	40	0	0	0
Conflicting Peds, #/hr	13	0	0	0	0	13	1	0	8	8	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	3	2	2	2	17	2	2	3	2	2	2	2
Mvmt Flow	47	26	0	0	11	5	137	484	42	0	0	0

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	801	809	-	-	788	526	1	0	0
Stage 1	1	1	-	-	787	-	-	-	-
Stage 2	800	808	-	-	1	-	-	-	-
Critical Hdwy	7.13	6.52	-	-	6.67	6.22	4.12	-	-
Critical Hdwy Stg 1	-	-	-	-	5.67	-	-	-	-
Critical Hdwy Stg 2	6.13	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.018	-	-	4.153	3.318	2.218	-	-
Pot Cap-1 Maneuver	301	314	0	0	306	552	1622	-	-
Stage 1	-	-	0	0	382	-	-	-	-
Stage 2	377	394	0	0	-	-	-	-	-
Platoon blocked, %								-	-
Mov Cap-1 Maneuver	262	274	-	-	267	548	1620	-	-
Mov Cap-2 Maneuver	262	274	-	-	267	-	-	-	-
Stage 1	-	-	-	-	333	-	-	-	-
Stage 2	318	344	-	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	23.6	16.8	1.5
HCM LOS	C	C	

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1
Capacity (veh/h)	1620	-	-	266	322
HCM Lane V/C Ratio	0.084	-	-	0.277	0.049
HCM Control Delay (s)	7.4	0	-	23.6	16.8
HCM Lane LOS	A	A	-	C	C
HCM 95th %tile Q(veh)	0.3	-	-	1.1	0.2

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	15	0	0	35	20	40	430	50	0	0	0
Future Vol, veh/h	10	15	0	0	35	20	40	430	50	0	0	0
Conflicting Peds, #/hr	15	0	20	20	0	15	8	0	13	13	0	8
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	3	2	2	3	6	2	2	2
Mvmt Flow	11	16	0	0	38	22	43	462	54	0	0	0

Major/Minor	Minor2			Minor1			Major1		
Conflicting Flow All	628	623	-	-	596	517	8	0	0
Stage 1	8	8	-	-	588	-	-	-	-
Stage 2	620	615	-	-	8	-	-	-	-
Critical Hdwy	7.12	6.52	-	-	6.53	6.22	4.12	-	-
Critical Hdwy Stg 1	-	-	-	-	5.53	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	-	-	4.027	3.318	2.218	-	-
Pot Cap-1 Maneuver	395	402	0	0	416	558	1612	-	-
Stage 1	-	-	0	0	494	-	-	-	-
Stage 2	476	482	0	0	-	-	-	-	-
Platoon blocked, %								-	-
Mov Cap-1 Maneuver	339	379	-	-	392	551	1600	-	-
Mov Cap-2 Maneuver	339	379	-	-	392	-	-	-	-
Stage 1	-	-	-	-	469	-	-	-	-
Stage 2	405	458	-	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	15.7	14.5	0.6
HCM LOS	C	B	

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1
Capacity (veh/h)	1600	-	-	362	438
HCM Lane V/C Ratio	0.027	-	-	0.074	0.135
HCM Control Delay (s)	7.3	0	-	15.7	14.5
HCM Lane LOS	A	A	-	C	B
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.5

Intersection						
Int Delay, s/veh	2.3					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	105	450	80	0	0
Future Vol, veh/h	0	105	450	80	0	0
Conflicting Peds, #/hr	15	0	0	23	23	0
Sign Control	Stop	Stop	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	16979
Grade, %	0	-	0	-	-	0
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	3	2	2	2
Mvmt Flow	0	115	495	88	0	0

Major/Minor	Minor1		Major1	
Conflicting Flow All	-	562	0	0
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	6.22	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	3.318	-	-
Pot Cap-1 Maneuver	0	526	-	-
Stage 1	0	-	-	-
Stage 2	0	-	-	-
Platoon blocked, %			-	-
Mov Cap-1 Maneuver	-	514	-	-
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	WB	NB
HCM Control Delay, s	14	0
HCM LOS	B	

Minor Lane/Major Mvmt	NBT	NBR	WBLn1
Capacity (veh/h)	-	-	514
HCM Lane V/C Ratio	-	-	0.224
HCM Control Delay (s)	-	-	14
HCM Lane LOS	-	-	B
HCM 95th %tile Q(veh)	-	-	0.9

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	20	0	65	485	0	0
Future Vol, veh/h	20	0	65	485	0	0
Conflicting Peds, #/hr	7	0	15	0	0	15
Sign Control	Stop	Stop	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	16965	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	3	3	2	2
Mvmt Flow	22	0	71	533	0	0

Major/Minor	Minor2		Major1	
Conflicting Flow All	697	-	15	0
Stage 1	15	-	-	-
Stage 2	682	-	-	-
Critical Hdwy	6.42	-	4.13	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-
Follow-up Hdwy	3.518	-	2.227	-
Pot Cap-1 Maneuver	407	0	1596	-
Stage 1	-	0	-	-
Stage 2	502	0	-	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	370	-	1573	-
Mov Cap-2 Maneuver	370	-	-	-
Stage 1	-	-	-	-
Stage 2	495	-	-	-

Approach	EB		NB
HCM Control Delay, s	15.3		0.9
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1
Capacity (veh/h)	1573	-	370
HCM Lane V/C Ratio	0.045	-	0.059
HCM Control Delay (s)	7.4	0	15.3
HCM Lane LOS	A	A	C
HCM 95th %tile Q(veh)	0.1	-	0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	160	0	0	435	235	315
Future Volume (vph)	160	0	0	435	235	315
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	4.0
Lane Util. Factor	1.00			0.95	1.00	1.00
Frpb, ped/bikes	1.00			1.00	1.00	1.00
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	1863			3539	1787	1599
Flt Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	1863			3539	1787	1599
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	176	0	0	478	258	346
RTOR Reduction (vph)	0	0	0	0	0	84
Lane Group Flow (vph)	176	0	0	478	258	262
Confl. Peds. (#/hr)					8	
Heavy Vehicles (%)	2%	2%	2%	2%	1%	1%
Turn Type	NA			NA	Prot	Perm
Protected Phases	2			6	3	
Permitted Phases						8
Actuated Green, G (s)	16.4			16.4	75.6	75.6
Effective Green, g (s)	16.4			16.4	75.6	75.6
Actuated g/C Ratio	0.16			0.16	0.76	0.76
Clearance Time (s)	4.0			4.0	4.0	4.0
Vehicle Extension (s)	0.2			0.2	0.2	0.2
Lane Grp Cap (vph)	305			580	1350	1208
v/s Ratio Prot	0.09			c0.14	0.14	
v/s Ratio Perm						c0.16
v/c Ratio	0.58			0.82	0.19	0.22
Uniform Delay, d1	38.6			40.4	3.5	3.6
Progression Factor	1.33			1.00	1.00	1.00
Incremental Delay, d2	1.3			8.8	0.3	0.0
Delay (s)	52.6			49.2	3.8	3.6
Level of Service	D			D	A	A
Approach Delay (s)	52.6			49.2	3.7	
Approach LOS	D			D	A	

Intersection Summary			
HCM 2000 Control Delay	27.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	34.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

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Scenario 1 Scen3 - Mit

1/13/2022

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	13th/Belmont	Roundabout	HCM 6th Edition	EB Right		26.5	D
3	13th/May	Roundabout	HCM 6th Edition	WB Left		18.3	C

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

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Version 2021 (SP 0-6)

Intersection Level Of Service Report

Intersection 1: 13th/Belmont

Control Type:	Roundabout	Delay (sec / veh):	26.5
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes		

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Thru	Right	Right2	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	120	865	5	50	1000	100	70	45	200	15	20	5
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	1.00	2.00	3.00	3.00	8.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	120	865	5	50	1000	100	70	45	200	15	20	5
Peak Hour Factor	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	33	238	1	14	275	27	19	12	55	4	5	1
Total Analysis Volume [veh/h]	132	951	5	55	1099	110	77	49	220	16	22	5
Pedestrian Volume [ped/h]	2			0			5			3		

Intersection Settings

Number of Conflicting Circulating Lanes	1			1			1			1		
Circulating Flow Rate [veh/h]	185			174			1194			1183		
Exiting Flow Rate [veh/h]	1365			1054			268			112		
Demand Flow Rate [veh/h]	120	865	5	50	1000	100	70	45	200	15	20	5
Adjusted Demand Flow Rate [veh/h]	132	951	5	55	1099	110	77	49	220	16	22	5

Lanes

Overwrite Calculated Critical Headway	No	No	No	No	No
User-Defined Critical Headway [s]	4.00	4.00	4.00	4.00	4.00
Overwrite Calculated Follow-Up Time	No	No	No	No	No
User-Defined Follow-Up Time [s]	3.00	3.00	3.00	3.00	3.00
A (intercept)	1380.00	1420.00	1420.00	1380.00	1380.00
B (coefficient)	0.00102	0.00091	0.00091	0.00102	0.00102
HV Adjustment Factor	0.98	0.98	0.98	0.97	0.96
Entry Flow Rate [veh/h]	1110	606	683	356	45
Capacity of Entry and Bypass Lanes [veh/h]	1143	1212	1212	409	413
Pedestrian Impedance	1.00	1.00	1.00	1.00	1.00
Capacity per Entry Lane [veh/h]	1120	1188	1189	398	397
X, volume / capacity	0.97	0.50	0.56	0.87	0.11

Movement, Approach, & Intersection Results

Lane LOS	E	A	A	F	B
95th-Percentile Queue Length [veh]	18.31	2.89	3.66	8.64	0.36
95th-Percentile Queue Length [ft]	457.66	72.22	91.62	215.90	9.05
Approach Delay [s/veh]	39.71	9.14		50.74	10.73
Approach LOS	E	A		F	B
Intersection Delay [s/veh]	26.55				
Intersection LOS	D				

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Intersection Level Of Service Report

Intersection 3: 13th/May

Control Type:	Roundabout	Delay (sec / veh):	18.3
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes		

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	-4.50			4.50			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	100	650	110	25	725	55	50	35	80	310	195	140
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	3.00	2.00	2.00	1.00	3.00	2.00	4.00	1.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	100	650	110	25	725	55	50	35	80	310	195	140
Peak Hour Factor	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	27	173	29	7	193	15	13	9	21	82	52	37
Total Analysis Volume [veh/h]	106	691	117	27	771	59	53	37	85	330	207	149
Pedestrian Volume [ped/h]	10			1			9			7		

Intersection Settings

Number of Conflicting Circulating Lanes	1			1			2			1		
Circulating Flow Rate [veh/h]	119			660			1158			867		
Exiting Flow Rate [veh/h]	1218			909			384			184		
Demand Flow Rate [veh/h]	100	650	110	25	725	55	50	35	80	310	195	140
Adjusted Demand Flow Rate [veh/h]	106	691	117	27	771	59	53	37	85	330	207	149

Lanes

Overwrite Calculated Critical Headway	No	No	No	No	No	No
User-Defined Critical Headway [s]	4.00	4.00	4.00	4.00	4.00	4.00
Overwrite Calculated Follow-Up Time	No	No	No	No	No	No
User-Defined Follow-Up Time [s]	3.00	3.00	3.00	3.00	3.00	3.00
A (intercept)	1380.00	1420.00	1420.00	1420.00	1420.00	1420.00
B (coefficient)	0.00102	0.00091	0.00091	0.00085	0.00091	0.00091
HV Adjustment Factor	0.98	0.97	0.97	0.98	0.97	0.99
Entry Flow Rate [veh/h]	933	415	468	179	552	151
Capacity of Entry and Bypass Lanes [veh/h]	1223	779	779	531	646	646
Pedestrian Impedance	1.00	1.00	1.00	1.00	1.00	1.00
Capacity per Entry Lane [veh/h]	1197	757	757	519	628	639
X, volume / capacity	0.76	0.53	0.60	0.34	0.86	0.23

Movement, Approach, & Intersection Results

Lane LOS	C	B	B	B	D	A
95th-Percentile Queue Length [veh]	7.92	3.19	4.07	1.48	9.63	0.90
95th-Percentile Queue Length [ft]	198.08	79.75	101.77	36.91	240.65	22.51
Approach Delay [s/veh]	15.80	13.74		12.12	29.02	
Approach LOS	C	B		B	D	
Intersection Delay [s/veh]	18.33					
Intersection LOS	C					

Vistro File: C:\...\Scen 3_HoodRiver OR281 RABs_Mit updated.vistro

Scenario 1 Scen3 - Mit

Report File: X:\...\Scenario 3 - Mit.pdf

1/13/2022

Turning Movement Volume: Summary

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Thru	Right	2	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
1	13th/Belmont	120	865	5	50	1000	100	70	45	200	15	20	5	2495

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
3	13th/May	100	650	110	25	725	55	50	35	80	310	195	140	2475

Vistro File: C:\...\Scen 3_HoodRiver OR281 RABs_Mit updated.vistro

Scenario 1 Scen3 - Mit

Report File: X:\...\Scenario 3 - Mit.pdf

1/13/2022

Turning Movement Volume: Detail

ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
			Thru	Right	2	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
1	13th/Belmont	Final Base	120	865	5	50	1000	100	70	45	200	15	20	5	2495
		Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**120**	**865**	**5**	**50**	**1000**	**100**	**70**	**45**	**200**	**15**	**20**	**5**	**2495**

ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
3	13th/May	Final Base	100	650	110	25	725	55	50	35	80	310	195	140	2475
		Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**100**	**650**	**110**	**25**	**725**	**55**	**50**	**35**	**80**	**310**	**195**	**140**	**2475**

APPENDIX E: SIMTRAFFIC REPORTS (MITIGATED AND TSP BUILD)

Summary of All Intervals

Run Number	1	10	2	3	4	5	7
Start Time	6:57	6:57	6:57	6:57	6:57	6:57	6:57
End Time	8:07	8:07	8:07	8:07	8:07	8:07	8:07
Total Time (min)	70	70	70	70	70	70	70
Time Recorded (min)	60	60	60	60	60	60	60
# of Intervals	3	3	3	3	3	3	3
# of Recorded Intervals	2	2	2	2	2	2	2
Vehs Entered	4370	4233	4319	4273	4228	4255	4363
Vehs Exited	4342	4226	4333	4231	4239	4308	4429
Starting Vehs	194	188	195	160	218	194	222
Ending Vehs	222	195	181	202	207	141	156
Travel Distance (mi)	2805	2752	2796	2723	2725	2749	2800
Travel Time (hr)	199.8	194.6	206.5	202.0	208.0	199.7	199.7
Total Delay (hr)	78.9	76.2	86.8	84.8	90.8	81.4	79.1
Total Stops	6966	7077	7866	6746	7615	7196	7301
Fuel Used (gal)	114.4	112.0	116.3	113.1	114.9	113.5	114.5

Summary of All Intervals

Run Number	9	Avg
Start Time	6:57	6:57
End Time	8:07	8:07
Total Time (min)	70	70
Time Recorded (min)	60	60
# of Intervals	3	3
# of Recorded Intervals	2	2
Vehs Entered	4265	4287
Vehs Exited	4246	4294
Starting Vehs	211	194
Ending Vehs	230	191
Travel Distance (mi)	2757	2764
Travel Time (hr)	200.9	201.4
Total Delay (hr)	82.5	82.6
Total Stops	7245	7251
Fuel Used (gal)	113.5	114.0

Interval #0 Information Seeding

Start Time	6:57
End Time	7:07
Total Time (min)	10

Volumes adjusted by PHF, Growth Factors.

No data recorded this interval.

Interval #1 Information Recording1

Start Time	7:07
End Time	7:22
Total Time (min)	15

Volumes adjusted by PHF, Growth Factors.

Run Number	1	10	2	3	4	5	7
Vehs Entered	1156	1214	1173	1176	1193	1189	1218
Vehs Exited	1152	1181	1168	1109	1163	1156	1226
Starting Vehs	194	188	195	160	218	194	222
Ending Vehs	198	221	200	227	248	227	214
Travel Distance (mi)	719	734	722	711	734	728	751
Travel Time (hr)	51.1	53.7	53.9	48.8	60.6	56.9	58.4
Total Delay (hr)	20.0	22.2	22.9	18.2	29.0	25.5	26.0
Total Stops	1760	2014	2035	1778	2175	2005	2137
Fuel Used (gal)	29.5	30.4	30.4	28.6	31.9	31.1	31.6

Interval #1 Information Recording1

Start Time	7:07
End Time	7:22
Total Time (min)	15

Volumes adjusted by PHF, Growth Factors.

Run Number	9	Avg
Vehs Entered	1163	1183
Vehs Exited	1129	1161
Starting Vehs	211	194
Ending Vehs	245	222
Travel Distance (mi)	723	728
Travel Time (hr)	56.1	54.9
Total Delay (hr)	25.1	23.6
Total Stops	1966	1982
Fuel Used (gal)	30.6	30.5

Interval #2 Information Recording2

Start Time	7:22
End Time	8:07
Total Time (min)	45

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	10	2	3	4	5	7
Vehs Entered	3214	3019	3146	3097	3035	3066	3145
Vehs Exited	3190	3045	3165	3122	3076	3152	3203
Starting Vehs	198	221	200	227	248	227	214
Ending Vehs	222	195	181	202	207	141	156
Travel Distance (mi)	2086	2019	2074	2012	1992	2021	2050
Travel Time (hr)	148.6	140.9	152.6	153.2	147.4	142.9	141.3
Total Delay (hr)	58.8	54.0	63.9	66.6	61.8	55.8	53.0
Total Stops	5206	5063	5831	4968	5440	5191	5164
Fuel Used (gal)	84.9	81.6	86.0	84.5	82.9	82.4	82.9

Interval #2 Information Recording2

Start Time	7:22
End Time	8:07
Total Time (min)	45

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	9	Avg
Vehs Entered	3102	3104
Vehs Exited	3117	3133
Starting Vehs	245	222
Ending Vehs	230	191
Travel Distance (mi)	2034	2036
Travel Time (hr)	144.8	146.5
Total Delay (hr)	57.5	58.9
Total Stops	5279	5265
Fuel Used (gal)	82.9	83.5

Arterial Level of Service: NB 13th St

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Oak St	1	41.8	63.2	0.3	19
Total		41.8	63.2	0.3	19

Arterial Level of Service: SB 13th St

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
May St	2	68.6	113.0	0.3	10
	13	1.0	9.2	0.1	22
Taylor	3	0.5	9.4	0.1	24
A St	4	2.0	23.2	0.1	23
Belmont	5	8.0	14.7	0.0	11
	25	1.0	5.2	0.0	20
Total		81.0	174.7	0.7	14

Arterial Level of Service: NB 12th St

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Union	6	1.0	10.0	0.1	23
Wilson	7	1.2	7.8	0.0	22
Pine	8	1.7	20.0	0.1	23
Taylor	9	0.4	3.7	0.0	21
May St	10	18.4	35.8	0.1	12
Total		22.7	77.3	0.4	18

Intersection: 1: 13th St & Oak St

Movement	EB	EB	WB	WB	NB	NB
Directions Served	T	R	L	T	L	R
Maximum Queue (ft)	657	175	224	856	778	255
Average Queue (ft)	276	153	218	455	455	130
95th Queue (ft)	582	213	246	878	794	295
Link Distance (ft)	833			898	1624	
Upstream Blk Time (%)	1			3		
Queuing Penalty (veh)	0			0		
Storage Bay Dist (ft)		150	200			230
Storage Blk Time (%)	15	7	38	0	33	0
Queuing Penalty (veh)	71	17	87	1	36	1

Intersection: 2: 13th St & May St

Movement	EB	EB	WB	WB	SB
Directions Served	T	R	LT	R	LTR
Maximum Queue (ft)	105	98	352	280	1354
Average Queue (ft)	47	38	258	13	806
95th Queue (ft)	94	79	382	118	1379
Link Distance (ft)	804		316	316	1624
Upstream Blk Time (%)			5	0	0
Queuing Penalty (veh)			24	1	0
Storage Bay Dist (ft)		120			
Storage Blk Time (%)	0	0			
Queuing Penalty (veh)	0	0			

Intersection: 3: 13th St & Taylor

Movement	EB	WB	SB	SB
Directions Served	TR	LT	LT	TR
Maximum Queue (ft)	57	164	60	69
Average Queue (ft)	18	69	8	8
95th Queue (ft)	50	127	37	39
Link Distance (ft)	591	229	271	271
Upstream Blk Time (%)		0		
Queuing Penalty (veh)		0		
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: 13th St & A St

Movement	EB	WB	SB	SB
Directions Served	TR	LT	LT	TR
Maximum Queue (ft)	51	133	125	140
Average Queue (ft)	16	53	15	29
95th Queue (ft)	47	103	75	97
Link Distance (ft)	745	215	731	731
Upstream Blk Time (%)		0		
Queuing Penalty (veh)		0		
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: 13th St & Belmont

Movement	EB	EB	WB	SB	SB
Directions Served	T	R	LT	LT	TR
Maximum Queue (ft)	214	124	163	200	213
Average Queue (ft)	65	70	75	133	154
95th Queue (ft)	161	121	130	202	216
Link Distance (ft)	887		206	186	186
Upstream Blk Time (%)			0	1	3
Queuing Penalty (veh)			0	9	17
Storage Bay Dist (ft)		100			
Storage Blk Time (%)	3	2			
Queuing Penalty (veh)	6	3			

Intersection: 6: 12th St & Belmont/Union

Movement	EB	WB	NB	NB
Directions Served	LT	TR	LT	TR
Maximum Queue (ft)	209	63	89	68
Average Queue (ft)	93	14	8	5
95th Queue (ft)	178	46	48	32
Link Distance (ft)	206	693	287	287
Upstream Blk Time (%)	2			
Queuing Penalty (veh)	4			
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 7: 12th St & A St/Wilson

Movement	EB	WB	NB	NB
Directions Served	LT	TR	LT	TR
Maximum Queue (ft)	119	132	127	124
Average Queue (ft)	48	46	26	22
95th Queue (ft)	100	103	88	78
Link Distance (ft)	215	700	197	197
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 8: 12th St & Pine

Movement	WB	NB	NB
Directions Served	R	T	TR
Maximum Queue (ft)	134	65	94
Average Queue (ft)	57	8	15
95th Queue (ft)	98	36	61
Link Distance (ft)	838	616	616
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 9: 12th St & Taylor

Movement	EB	NB	NB
Directions Served	L	LT	T
Maximum Queue (ft)	81	75	63
Average Queue (ft)	33	7	4
95th Queue (ft)	70	39	28
Link Distance (ft)	229	64	64
Upstream Blk Time (%)		0	0
Queuing Penalty (veh)		3	1
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 10: 12th St & May St

Movement	EB	WB	WB	NB	NB
Directions Served	T	T	T	L	R
Maximum Queue (ft)	94	156	162	460	383
Average Queue (ft)	34	114	100	261	142
95th Queue (ft)	76	162	171	417	284
Link Distance (ft)	316	87	87	567	567
Upstream Blk Time (%)		29	16	0	0
Queuing Penalty (veh)		60	33	0	0
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 11: May St

Movement	EB	WB	SB	B27	B26
Directions Served	LT	TR	LR	T	T
Maximum Queue (ft)	141	385	267	154	116
Average Queue (ft)	33	172	141	36	20
95th Queue (ft)	117	390	266	171	146
Link Distance (ft)	87	1326	170	184	654
Upstream Blk Time (%)	3		21	7	
Queuing Penalty (veh)	22		0	0	
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 14: 12th St

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 396

Summary of All Intervals

Run Number	1	10	2	3	4	5	6
Start Time	6:57	6:57	6:57	6:57	6:57	6:57	6:57
End Time	8:07	8:07	8:07	8:07	8:07	8:07	8:07
Total Time (min)	70	70	70	70	70	70	70
Time Recorded (min)	60	60	60	60	60	60	60
# of Intervals	3	3	3	3	3	3	3
# of Recorded Intervals	2	2	2	2	2	2	2
Vehs Entered	4595	3091	4475	4560	4510	4510	4538
Vehs Exited	4592	2820	4453	4577	4496	4518	4529
Starting Vehs	243	273	198	243	202	208	238
Ending Vehs	246	544	220	226	216	200	247
Travel Distance (mi)	2978	1767	2927	2963	2934	2925	2945
Travel Time (hr)	232.5	763.8	215.2	242.6	222.9	213.8	317.4
Total Delay (hr)	107.2	689.3	92.2	117.9	99.2	90.8	193.3
Total Stops	9021	7341	8201	9467	8289	8165	9655
Fuel Used (gal)	125.5	217.2	120.0	127.1	121.9	119.8	144.1

Summary of All Intervals

Run Number	7	8	9	Avg
Start Time	6:57	6:57	6:57	6:57
End Time	8:07	8:07	8:07	8:07
Total Time (min)	70	70	70	70
Time Recorded (min)	60	60	60	60
# of Intervals	3	3	3	3
# of Recorded Intervals	2	2	2	2
Vehs Entered	4589	4655	4609	4409
Vehs Exited	4516	4619	4506	4362
Starting Vehs	222	219	206	217
Ending Vehs	295	255	309	269
Travel Distance (mi)	2938	3025	2949	2835
Travel Time (hr)	279.1	258.5	259.9	300.6
Total Delay (hr)	155.3	131.1	135.8	181.2
Total Stops	10510	8513	9026	8821
Fuel Used (gal)	134.3	131.7	130.4	137.2

Interval #0 Information Seeding

Start Time	6:57
End Time	7:07
Total Time (min)	10

Volumes adjusted by PHF, Growth Factors.
No data recorded this interval.

Interval #1 Information Recording1

Start Time	7:07
End Time	7:22
Total Time (min)	15

Volumes adjusted by PHF, Growth Factors.

Run Number	1	10	2	3	4	5	6
Vehs Entered	1236	1167	1212	1277	1249	1250	1213
Vehs Exited	1221	1068	1159	1271	1179	1223	1187
Starting Vehs	243	273	198	243	202	208	238
Ending Vehs	258	372	251	249	272	235	264
Travel Distance (mi)	777	708	757	797	765	777	754
Travel Time (hr)	57.9	75.9	61.0	66.2	58.9	55.4	69.1
Total Delay (hr)	25.1	46.2	29.3	32.7	26.6	22.7	37.2
Total Stops	2192	2453	2207	2651	2189	2035	2442
Fuel Used (gal)	32.2	34.5	31.9	34.5	32.0	31.5	34.1

Interval #1 Information Recording1

Start Time	7:07
End Time	7:22
Total Time (min)	15

Volumes adjusted by PHF, Growth Factors.

Run Number	7	8	9	Avg
Vehs Entered	1254	1325	1236	1242
Vehs Exited	1224	1281	1198	1202
Starting Vehs	222	219	206	217
Ending Vehs	252	263	244	256
Travel Distance (mi)	781	816	771	770
Travel Time (hr)	66.7	67.7	54.4	63.3
Total Delay (hr)	33.7	33.4	22.2	30.9
Total Stops	2723	2344	1971	2317
Fuel Used (gal)	34.3	35.3	31.2	33.1

Interval #2 Information Recording2

Start Time	7:22
End Time	8:07
Total Time (min)	45

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	10	2	3	4	5	6
Vehs Entered	3359	1924	3263	3283	3261	3260	3325
Vehs Exited	3371	1752	3294	3306	3317	3295	3342
Starting Vehs	258	372	251	249	272	235	264
Ending Vehs	246	544	220	226	216	200	247
Travel Distance (mi)	2201	1059	2171	2166	2169	2147	2192
Travel Time (hr)	174.7	687.9	154.2	176.4	164.0	158.4	248.3
Total Delay (hr)	82.1	643.1	63.0	85.2	72.5	68.1	156.1
Total Stops	6829	4888	5994	6816	6100	6130	7213
Fuel Used (gal)	93.3	182.7	88.2	92.6	89.8	88.4	110.0

Interval #2 Information Recording2

Start Time	7:22
End Time	8:07
Total Time (min)	45

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	7	8	9	Avg
Vehs Entered	3335	3330	3373	3171
Vehs Exited	3292	3338	3308	3161
Starting Vehs	252	263	244	256
Ending Vehs	295	255	309	269
Travel Distance (mi)	2157	2209	2178	2065
Travel Time (hr)	212.3	190.8	205.5	237.2
Total Delay (hr)	121.6	97.7	113.7	150.3
Total Stops	7787	6169	7055	6492
Fuel Used (gal)	100.0	96.4	99.2	104.0

Arterial Level of Service: NB 13th St

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Belmont	5	13.7	22.6	0.1	10
A St	4	2.4	9.2	0.0	18
Taylor	3	11.6	32.8	0.1	16
May St	2	31.8	49.4	0.1	9
Oak St	1	49.6	91.7	0.3	13
Total		109.1	205.7	0.7	12

Arterial Level of Service: SB 13th St

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
May St	2	104.1	144.9	0.3	8
Taylor	3	9.5	26.5	0.1	16
A St	4	30.1	54.8	0.1	10
Belmont	5	9.4	16.3	0.0	11
	25	1.8	10.4	0.1	20
Total		155.0	252.8	0.7	10

Arterial Level of Service: NB 12th St

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Union	6	4.7	13.5	0.1	17
Wilson	7	2.6	9.6	0.0	18
Pine	8	7.2	26.8	0.1	19
Taylor	9	0.6	3.1	0.0	18
May St	10	16.6	34.2	0.1	13
Total		31.7	87.3	0.4	16

Arterial Level of Service: SB 12th St

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Taylor	9	4.2	22.7	0.1	19
Pine	8	1.0	3.5	0.0	16
A St	7	16.4	34.2	0.1	14
Belmont	6	7.3	14.0	0.0	12
	14	25.7	35.3	0.1	6
Total		54.7	109.9	0.4	12

Intersection: 1: 13th St & Oak St

Movement	EB	EB	WB	WB	NB	NB
Directions Served	T	R	L	T	L	R
Maximum Queue (ft)	629	175	225	813	757	255
Average Queue (ft)	286	150	214	467	414	133
95th Queue (ft)	594	217	251	956	751	304
Link Distance (ft)	826			892	1618	
Upstream Blk Time (%)	3			14		
Queuing Penalty (veh)	0			0		
Storage Bay Dist (ft)		150	200			230
Storage Blk Time (%)	14	14	43	0	30	0
Queuing Penalty (veh)	63	31	95	1	33	2

Intersection: 2: 13th St & May St

Movement	EB	WB	WB	NB	NB	SB	SB
Directions Served	TR	L	TR	L	TR	L	TR
Maximum Queue (ft)	301	320	309	275	560	124	1485
Average Queue (ft)	137	244	131	167	315	66	1041
95th Queue (ft)	335	340	273	322	585	143	1774
Link Distance (ft)	812	297	297		560		1618
Upstream Blk Time (%)	2	10	2		3		5
Queuing Penalty (veh)	0	26	4		21		42
Storage Bay Dist (ft)				250		100	
Storage Blk Time (%)				11	12	3	57
Queuing Penalty (veh)				58	16	18	42

Intersection: 3: 13th St & Taylor

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	94	155	527	425
Average Queue (ft)	29	60	129	102
95th Queue (ft)	75	139	411	360
Link Distance (ft)	600	194	732	560
Upstream Blk Time (%)		3	0	4
Queuing Penalty (veh)		3	1	36
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: 13th St & A St

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	80	151	178	730
Average Queue (ft)	23	59	31	453
95th Queue (ft)	64	128	130	818
Link Distance (ft)	744	191	179	732
Upstream Blk Time (%)		1	2	5
Queuing Penalty (veh)		1	11	48
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: 13th St & Belmont

Movement	EB	EB	WB	NB	B25	SB	SB
Directions Served	L	TR	TR	TR	T	L	TR
Maximum Queue (ft)	222	403	185	314	122	93	224
Average Queue (ft)	69	214	106	175	14	37	186
95th Queue (ft)	163	538	187	311	75	102	256
Link Distance (ft)		892	175	236	70	179	179
Upstream Blk Time (%)		6	3	8	6	4	16
Queuing Penalty (veh)		0	5	46	33	22	84
Storage Bay Dist (ft)	200						
Storage Blk Time (%)	0	14					
Queuing Penalty (veh)	1	10					

Intersection: 6: 12th St & Belmont/Union

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	161	75	268	111
Average Queue (ft)	73	24	86	21
95th Queue (ft)	160	63	222	99
Link Distance (ft)	175	705	268	196
Upstream Blk Time (%)	7		3	5
Queuing Penalty (veh)	7		28	10
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 7: 12th St & A St/Wilson

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	62	122	195	150
Average Queue (ft)	25	43	40	42
95th Queue (ft)	59	92	129	251
Link Distance (ft)	191	712	196	644
Upstream Blk Time (%)			2	4
Queuing Penalty (veh)			17	9
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 8: 12th St & Pine

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	322	413	35
Average Queue (ft)	102	79	12
95th Queue (ft)	303	287	39
Link Distance (ft)	848	644	35
Upstream Blk Time (%)	0	2	6
Queuing Penalty (veh)	0	14	13
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 9: 12th St & Taylor

Movement	EB	NB	SB
Directions Served	LR	LT	TR
Maximum Queue (ft)	84	43	129
Average Queue (ft)	38	17	22
95th Queue (ft)	74	47	119
Link Distance (ft)	194	35	565
Upstream Blk Time (%)		4	
Queuing Penalty (veh)		37	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 10: 12th St & May St

Movement	EB	WB	WB	NB	NB
Directions Served	TR	LT	T	L	R
Maximum Queue (ft)	172	103	104	124	310
Average Queue (ft)	67	80	76	69	128
95th Queue (ft)	135	102	105	136	257
Link Distance (ft)	297	75	75		565
Upstream Blk Time (%)		21	10		0
Queuing Penalty (veh)		52	25		0
Storage Bay Dist (ft)				100	
Storage Blk Time (%)				3	9
Queuing Penalty (veh)				18	12

Intersection: 11: May St

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (ft)	92	252	669
Average Queue (ft)	9	97	362
95th Queue (ft)	47	265	881
Link Distance (ft)	75	664	891
Upstream Blk Time (%)	0	1	12
Queuing Penalty (veh)	1	0	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 14: 12th St

Movement	WB	NB	NB	SB
Directions Served	L	T	R	T
Maximum Queue (ft)	165	489	576	76
Average Queue (ft)	72	120	133	22
95th Queue (ft)	161	653	674	63
Link Distance (ft)	268	1032	1032	70
Upstream Blk Time (%)	5	8	8	0
Queuing Penalty (veh)	9	0	0	2
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 1007

Summary of All Intervals

Run Number	10	2	4	5	6	7	8
Start Time	6:57	6:57	6:57	6:57	6:57	6:57	6:57
End Time	8:07	8:07	8:07	8:07	8:07	8:07	8:07
Total Time (min)	70	70	70	70	70	70	70
Time Recorded (min)	60	60	60	60	60	60	60
# of Intervals	3	3	3	3	3	3	3
# of Recorded Intervals	2	2	2	2	2	2	2
Vehs Entered	4134	4198	1990	4083	4063	4096	3841
Vehs Exited	4050	4082	1711	4010	4002	4084	3711
Starting Vehs	208	218	196	244	215	224	250
Ending Vehs	292	334	475	317	276	236	380
Travel Distance (mi)	2361	2366	983	2318	2306	2363	2140
Travel Time (hr)	348.0	340.7	1160.1	444.6	415.7	324.8	541.4
Total Delay (hr)	245.5	237.6	1117.4	344.2	315.5	222.4	448.7
Total Stops	9336	9397	3787	9022	9750	8605	10237
Fuel Used (gal)	138.5	137.4	288.8	159.3	153.5	133.6	178.1

Summary of All Intervals

Run Number	9	Avg
Start Time	6:57	6:57
End Time	8:07	8:07
Total Time (min)	70	70
Time Recorded (min)	60	60
# of Intervals	3	3
# of Recorded Intervals	2	2
Vehs Entered	4112	3813
Vehs Exited	4075	3718
Starting Vehs	179	218
Ending Vehs	216	312
Travel Distance (mi)	2359	2150
Travel Time (hr)	303.5	484.9
Total Delay (hr)	200.9	391.5
Total Stops	7975	8512
Fuel Used (gal)	128.1	164.7

Interval #0 Information Seeding

Start Time	6:57
End Time	7:07
Total Time (min)	10

Volumes adjusted by PHF, Growth Factors.

No data recorded this interval.

Interval #1 Information Recording1

Start Time	7:07
End Time	7:22
Total Time (min)	15

Volumes adjusted by PHF, Growth Factors.

Run Number	10	2	4	5	6	7	8
Vehs Entered	1151	1134	927	1119	1144	1129	1130
Vehs Exited	1059	1058	880	1021	1018	1060	1030
Starting Vehs	208	218	196	244	215	224	250
Ending Vehs	300	294	243	342	341	293	350
Travel Distance (mi)	613	601	505	598	595	609	583
Travel Time (hr)	69.4	72.8	78.3	78.8	70.7	74.9	87.5
Total Delay (hr)	42.8	46.5	56.2	52.9	44.9	48.4	62.5
Total Stops	2449	2243	1760	2349	2398	2488	2651
Fuel Used (gal)	31.4	31.7	30.8	33.1	30.9	32.6	34.8

Interval #1 Information Recording1

Start Time	7:07
End Time	7:22
Total Time (min)	15

Volumes adjusted by PHF, Growth Factors.

Run Number	9	Avg
Vehs Entered	1140	1108
Vehs Exited	1037	1018
Starting Vehs	179	218
Ending Vehs	282	301
Travel Distance (mi)	594	587
Travel Time (hr)	58.7	73.9
Total Delay (hr)	32.8	48.4
Total Stops	2008	2289
Fuel Used (gal)	28.3	31.7

Interval #2 Information Recording2

Start Time	7:22
End Time	8:07
Total Time (min)	45

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	10	2	4	5	6	7	8
Vehs Entered	2983	3064	1063	2964	2919	2967	2711
Vehs Exited	2991	3024	831	2989	2984	3024	2681
Starting Vehs	300	294	243	342	341	293	350
Ending Vehs	292	334	475	317	276	236	380
Travel Distance (mi)	1748	1765	479	1719	1711	1754	1557
Travel Time (hr)	278.6	267.9	1081.9	365.8	345.0	249.9	453.9
Total Delay (hr)	202.7	191.1	1061.2	291.3	270.6	173.9	386.2
Total Stops	6887	7154	2027	6673	7352	6117	7586
Fuel Used (gal)	107.1	105.6	257.9	126.3	122.5	101.0	143.3

Interval #2 Information Recording2

Start Time	7:22
End Time	8:07
Total Time (min)	45

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	9	Avg
Vehs Entered	2972	2708
Vehs Exited	3038	2692
Starting Vehs	282	301
Ending Vehs	216	312
Travel Distance (mi)	1765	1562
Travel Time (hr)	244.7	411.0
Total Delay (hr)	168.0	343.1
Total Stops	5967	6224
Fuel Used (gal)	99.8	133.0

Arterial Level of Service: NB 13th St

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Oak St	1	18.0	29.7	0.3	40
Total		18.0	29.7	0.3	40

Arterial Level of Service: SB 13th St

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
May St	2	131.4	172.3	0.3	7
	13	5.1	13.6	0.1	15
Taylor	3	8.1	18.6	0.1	13
A St	4	20.6	43.7	0.1	13
Belmont	5	9.9	17.2	0.0	10
	25	1.0	5.6	0.0	20
Total		176.1	271.0	0.7	9

Arterial Level of Service: NB 12th St

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Union	6	14.1	28.7	0.1	10
Wilson	7	4.9	11.7	0.0	15
Pine	8	17.5	40.6	0.1	13
Taylor	9	1.3	3.7	0.0	15
May St	10	26.6	52.0	0.1	10
Total		64.6	136.7	0.4	11

Intersection: 1: 13th St & Oak St

Movement	EB	EB	WB	WB	NB	NB
Directions Served	T	R	L	T	L	R
Maximum Queue (ft)	772	175	225	915	566	255
Average Queue (ft)	387	161	221	710	286	103
95th Queue (ft)	794	215	239	1184	509	258
Link Distance (ft)	833			898	1603	
Upstream Blk Time (%)	11			40		
Queuing Penalty (veh)	0			0		
Storage Bay Dist (ft)		150	200			230
Storage Blk Time (%)	16	22	60	0	18	0
Queuing Penalty (veh)	76	51	133	1	19	1

Intersection: 2: 13th St & May St

Movement	EB	EB	WB	WB	WB	SB
Directions Served	L	R	L	T	R	TR
Maximum Queue (ft)	259	139	223	315	218	1593
Average Queue (ft)	106	59	156	136	104	1266
95th Queue (ft)	351	120	244	277	187	1927
Link Distance (ft)	816			316	316	1603
Upstream Blk Time (%)	3			7	0	10
Queuing Penalty (veh)	0			38	0	83
Storage Bay Dist (ft)		120	200			
Storage Blk Time (%)	2	6	12	0		
Queuing Penalty (veh)	2	5	20	1		

Intersection: 3: 13th St & Taylor

Movement	EB	WB	SB	B13
Directions Served	TR	LT	LTR	T
Maximum Queue (ft)	107	210	322	224
Average Queue (ft)	30	96	95	44
95th Queue (ft)	96	194	319	204
Link Distance (ft)	603	229	271	234
Upstream Blk Time (%)		2	11	9
Queuing Penalty (veh)		3	126	102
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: 13th St & A St

Movement	EB	WB	SB
Directions Served	TR	LT	LTR
Maximum Queue (ft)	67	126	569
Average Queue (ft)	17	45	225
95th Queue (ft)	52	99	735
Link Distance (ft)	743	209	732
Upstream Blk Time (%)			11
Queuing Penalty (veh)			126
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: 13th St & Belmont

Movement	EB	EB	WB	SB	SB
Directions Served	T	R	LT	LT	TR
Maximum Queue (ft)	371	174	177	219	236
Average Queue (ft)	199	71	76	133	134
95th Queue (ft)	710	163	161	221	237
Link Distance (ft)	886		196	186	186
Upstream Blk Time (%)	14		0	12	4
Queuing Penalty (veh)	0		1	73	25
Storage Bay Dist (ft)		200			
Storage Blk Time (%)	17	1			
Queuing Penalty (veh)	33	1			

Intersection: 6: 12th St & Belmont/Union

Movement	EB	WB	NB	NB
Directions Served	LT	TR	LT	TR
Maximum Queue (ft)	205	188	325	335
Average Queue (ft)	114	73	112	169
95th Queue (ft)	226	220	336	382
Link Distance (ft)	196	693	287	287
Upstream Blk Time (%)	22		13	17
Queuing Penalty (veh)	22		91	119
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 7: 12th St & A St/Wilson

Movement	EB	WB	NB	NB
Directions Served	LT	TR	L	TR
Maximum Queue (ft)	203	451	112	228
Average Queue (ft)	102	264	7	95
95th Queue (ft)	218	640	64	239
Link Distance (ft)	209	706	196	196
Upstream Blk Time (%)	9	11	1	3
Queuing Penalty (veh)	6	0	4	21
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 8: 12th St & Pine

Movement	WB	NB
Directions Served	R	TR
Maximum Queue (ft)	874	631
Average Queue (ft)	767	252
95th Queue (ft)	1133	623
Link Distance (ft)	850	650
Upstream Blk Time (%)	77	1
Queuing Penalty (veh)	0	16
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 9: 12th St & Taylor

Movement	EB	NB
Directions Served	L	LT
Maximum Queue (ft)	177	82
Average Queue (ft)	68	28
95th Queue (ft)	173	70
Link Distance (ft)	229	30
Upstream Blk Time (%)	2	9
Queuing Penalty (veh)	1	113
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 10: 12th St & May St

Movement	WB	NB	NB
Directions Served	T	L	R
Maximum Queue (ft)	109	560	125
Average Queue (ft)	88	319	111
95th Queue (ft)	99	603	166
Link Distance (ft)	74	558	
Upstream Blk Time (%)	50	6	
Queuing Penalty (veh)	219	69	
Storage Bay Dist (ft)			100
Storage Blk Time (%)		22	6
Queuing Penalty (veh)		140	39

Intersection: 11: May St

Movement	EB	WB	SB	B27	B26
Directions Served	LT	TR	LR	T	T
Maximum Queue (ft)	66	270	313	314	405
Average Queue (ft)	5	104	272	270	340
95th Queue (ft)	32	311	305	332	469
Link Distance (ft)	74	664	183	184	331
Upstream Blk Time (%)	0	3	99	97	87
Queuing Penalty (veh)	0	0	0	0	0
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 14: 12th St

Movement	NB	NB	B25
Directions Served	T	T	T
Maximum Queue (ft)	175	198	7
Average Queue (ft)	73	90	0
95th Queue (ft)	207	223	7
Link Distance (ft)	151	151	102
Upstream Blk Time (%)	22	28	
Queuing Penalty (veh)	0	0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 1779

Summary of All Intervals

Run Number	1	10	2	3	5	7	8
Start Time	6:57	6:57	6:57	6:57	6:57	6:57	6:57
End Time	8:07	8:07	8:07	8:07	8:07	8:07	8:07
Total Time (min)	70	70	70	70	70	70	70
Time Recorded (min)	60	60	60	60	60	60	60
# of Intervals	3	3	3	3	3	3	3
# of Recorded Intervals	2	2	2	2	2	2	2
Vehs Entered	4289	4156	4120	4198	4280	4324	4272
Vehs Exited	4190	4006	4063	4149	4167	4275	4192
Starting Vehs	206	230	220	216	232	231	238
Ending Vehs	305	380	277	265	345	280	318
Travel Distance (mi)	2606	2486	2523	2595	2640	2643	2602
Travel Time (hr)	341.7	371.5	318.8	262.8	377.1	288.6	375.5
Total Delay (hr)	229.5	264.4	210.4	151.0	263.7	174.8	263.6
Total Stops	10101	9350	9299	7515	11636	9995	10306
Fuel Used (gal)	142.1	146.9	135.5	124.6	151.9	130.9	151.1

Summary of All Intervals

Run Number	9	Avg
Start Time	6:57	6:57
End Time	8:07	8:07
Total Time (min)	70	70
Time Recorded (min)	60	60
# of Intervals	3	3
# of Recorded Intervals	2	2
Vehs Entered	4297	4242
Vehs Exited	4242	4161
Starting Vehs	214	213
Ending Vehs	269	299
Travel Distance (mi)	2649	2593
Travel Time (hr)	345.1	335.1
Total Delay (hr)	231.2	223.6
Total Stops	10551	9847
Fuel Used (gal)	144.0	140.9

Interval #0 Information Seeding

Start Time	6:57
End Time	7:07
Total Time (min)	10

Volumes adjusted by PHF, Growth Factors.

No data recorded this interval.

Interval #1 Information Recording1

Start Time	7:07
End Time	7:22
Total Time (min)	15

Volumes adjusted by PHF, Growth Factors.

Run Number	1	10	2	3	5	7	8
Vehs Entered	1176	1202	1114	1159	1229	1153	1127
Vehs Exited	1083	1135	1013	1132	1133	1113	1067
Starting Vehs	206	230	220	216	232	231	238
Ending Vehs	299	297	321	243	328	271	298
Travel Distance (mi)	672	697	642	693	706	686	638
Travel Time (hr)	68.4	58.3	70.9	61.4	70.0	63.4	77.3
Total Delay (hr)	39.4	28.4	43.3	31.5	39.6	33.8	49.8
Total Stops	2551	2150	2538	2003	2762	2314	2523
Fuel Used (gal)	32.3	30.7	32.1	31.4	33.4	31.1	33.6

Interval #1 Information Recording1

Start Time	7:07
End Time	7:22
Total Time (min)	15

Volumes adjusted by PHF, Growth Factors.

Run Number	9	Avg
Vehs Entered	1219	1170
Vehs Exited	1115	1098
Starting Vehs	214	213
Ending Vehs	318	294
Travel Distance (mi)	696	679
Travel Time (hr)	72.5	67.8
Total Delay (hr)	42.5	38.6
Total Stops	2721	2444
Fuel Used (gal)	33.4	32.2

Interval #2 Information Recording2

Start Time	7:22
End Time	8:07
Total Time (min)	45

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	1	10	2	3	5	7	8
Vehs Entered	3113	2954	3006	3039	3051	3171	3145
Vehs Exited	3107	2871	3050	3017	3034	3162	3125
Starting Vehs	299	297	321	243	328	271	298
Ending Vehs	305	380	277	265	345	280	318
Travel Distance (mi)	1934	1789	1881	1902	1935	1956	1964
Travel Time (hr)	273.3	313.2	247.9	201.4	307.1	225.2	298.2
Total Delay (hr)	190.1	236.1	167.1	119.5	224.1	140.9	213.8
Total Stops	7550	7200	6761	5512	8874	7681	7783
Fuel Used (gal)	109.8	116.2	103.4	93.2	118.5	99.8	117.5

Interval #2 Information Recording2

Start Time	7:22
End Time	8:07
Total Time (min)	45

Volumes adjusted by Growth Factors, Anti PHF.

Run Number	9	Avg
Vehs Entered	3078	3064
Vehs Exited	3127	3063
Starting Vehs	318	294
Ending Vehs	269	299
Travel Distance (mi)	1953	1914
Travel Time (hr)	272.6	267.4
Total Delay (hr)	188.7	185.0
Total Stops	7830	7397
Fuel Used (gal)	110.5	108.6

Arterial Level of Service: NB 13th St

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Belmont	5	9.9	15.7	0.0	9
A St	4	2.0	8.8	0.0	19
Taylor	3	8.5	29.4	0.1	18
	13	10.1	19.1	0.1	12
May St	2	19.2	27.1	0.1	8
Oak St	1	38.1	83.9	0.3	14
Total		87.7	184.0	0.7	13

Arterial Level of Service: SB 13th St

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
May St	2	109.0	151.4	0.3	8
	13	4.4	12.8	0.1	16
Taylor	3	9.2	19.0	0.1	12
A St	4	34.7	58.7	0.1	10
Belmont	5	9.8	17.3	0.0	10
	25	1.5	7.5	0.0	19
Total		168.6	266.7	0.7	9

Arterial Level of Service: NB 12th St

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed
Union	6	12.0	21.0	0.1	11
Wilson	7	12.1	19.4	0.0	9
Pine	8	35.8	69.7	0.1	9
Taylor	9	0.4	2.8	0.0	20
May St	10	11.6	28.5	0.1	15
Total		71.9	141.4	0.4	11

Intersection: 1: 13th St & Oak St

Movement	EB	EB	WB	WB	NB	NB
Directions Served	T	R	L	T	L	R
Maximum Queue (ft)	790	175	225	898	622	255
Average Queue (ft)	370	160	217	557	341	126
95th Queue (ft)	772	215	253	1087	590	291
Link Distance (ft)	826			892	1618	
Upstream Blk Time (%)	5			24		
Queuing Penalty (veh)	0			0		
Storage Bay Dist (ft)		150	200			230
Storage Blk Time (%)	22	12	48	0	22	0
Queuing Penalty (veh)	100	28	108	1	24	1

Intersection: 2: 13th St & May St

Movement	EB	WB	WB	NB	NB	B13	SB	SB
Directions Served	LTR	L	TR	L	TR	T	L	TR
Maximum Queue (ft)	850	326	321	175	328	335	123	1545
Average Queue (ft)	752	214	210	115	275	162	42	1158
95th Queue (ft)	984	333	336	205	397	375	113	1926
Link Distance (ft)	810	310	310		235	271		1618
Upstream Blk Time (%)	62	4	2		23	6		3
Queuing Penalty (veh)	0	12	7		206	52		27
Storage Bay Dist (ft)				150			100	
Storage Blk Time (%)				7	26		7	47
Queuing Penalty (veh)				55	26		55	12

Intersection: 3: 13th St & Taylor

Movement	EB	WB	NB	NB	SB	SB	B13
Directions Served	LTR	LTR	L	TR	L	TR	T
Maximum Queue (ft)	147	206	119	524	102	360	273
Average Queue (ft)	57	123	30	119	13	183	59
95th Queue (ft)	132	243	84	411	58	422	230
Link Distance (ft)	597	211		732		271	235
Upstream Blk Time (%)		20		0		9	2
Queuing Penalty (veh)		13		2		99	19
Storage Bay Dist (ft)			100		100		
Storage Blk Time (%)			0	7	0	15	
Queuing Penalty (veh)			2	2	0	2	

Intersection: 4: 13th St & A St

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	L	TR	L	TR
Maximum Queue (ft)	220	208	34	170	119	754
Average Queue (ft)	98	128	5	30	24	610
95th Queue (ft)	268	237	24	116	75	930
Link Distance (ft)	751	197		180		732
Upstream Blk Time (%)		17		0		4
Queuing Penalty (veh)		13		1		44
Storage Bay Dist (ft)			10		100	
Storage Blk Time (%)			4	1	0	29
Queuing Penalty (veh)			40	0	0	7

Intersection: 5: 13th St & Belmont

Movement	EB	EB	WB	NB	B25	SB	SB
Directions Served	L	TR	TR	TR	T	L	TR
Maximum Queue (ft)	124	543	196	236	240	124	219
Average Queue (ft)	71	244	113	197	131	47	202
95th Queue (ft)	144	472	204	296	292	112	239
Link Distance (ft)		892	187	146	149		180
Upstream Blk Time (%)		0	3	19	11		22
Queuing Penalty (veh)		0	5	165	93		248
Storage Bay Dist (ft)	100					100	
Storage Blk Time (%)	4	46				2	26
Queuing Penalty (veh)	9	32				17	13

Intersection: 6: 12th St & Belmont/Union

Movement	EB	WB	NB
Directions Served	LT	TR	LTR
Maximum Queue (ft)	148	70	243
Average Queue (ft)	55	18	98
95th Queue (ft)	123	55	299
Link Distance (ft)	187	705	266
Upstream Blk Time (%)	2		15
Queuing Penalty (veh)	2		97
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 7: 12th St & A St/Wilson

Movement	EB	WB	NB
Directions Served	LT	TR	LTR
Maximum Queue (ft)	77	187	209
Average Queue (ft)	23	67	82
95th Queue (ft)	61	178	242
Link Distance (ft)	197	712	197
Upstream Blk Time (%)			17
Queuing Penalty (veh)			86
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 8: 12th St & Pine

Movement	WB	NB
Directions Served	R	TR
Maximum Queue (ft)	275	464
Average Queue (ft)	109	183
95th Queue (ft)	294	632
Link Distance (ft)	850	650
Upstream Blk Time (%)		12
Queuing Penalty (veh)		53
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 9: 12th St & Taylor

Movement	EB	NB
Directions Served	L	LT
Maximum Queue (ft)	45	66
Average Queue (ft)	17	20
95th Queue (ft)	46	63
Link Distance (ft)	211	30
Upstream Blk Time (%)		18
Queuing Penalty (veh)		97
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 10: 12th St & May St

Movement	EB	WB	WB	NB	NB
Directions Served	T	T	T	L	R
Maximum Queue (ft)	121	92	101	297	125
Average Queue (ft)	51	65	77	92	79
95th Queue (ft)	97	96	105	226	138
Link Distance (ft)	310	74	74	566	
Upstream Blk Time (%)		7	12		
Queuing Penalty (veh)		14	26		
Storage Bay Dist (ft)					100
Storage Blk Time (%)				4	2
Queuing Penalty (veh)				12	4

Intersection: 11: May St

Movement	EB	WB	SB	B27	B26
Directions Served	LT	TR	LR	T	T
Maximum Queue (ft)	58	120	255	114	3
Average Queue (ft)	4	57	114	8	0
95th Queue (ft)	26	97	219	63	2
Link Distance (ft)	74	664	169	184	331
Upstream Blk Time (%)	0		8	0	
Queuing Penalty (veh)	0		0	0	
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

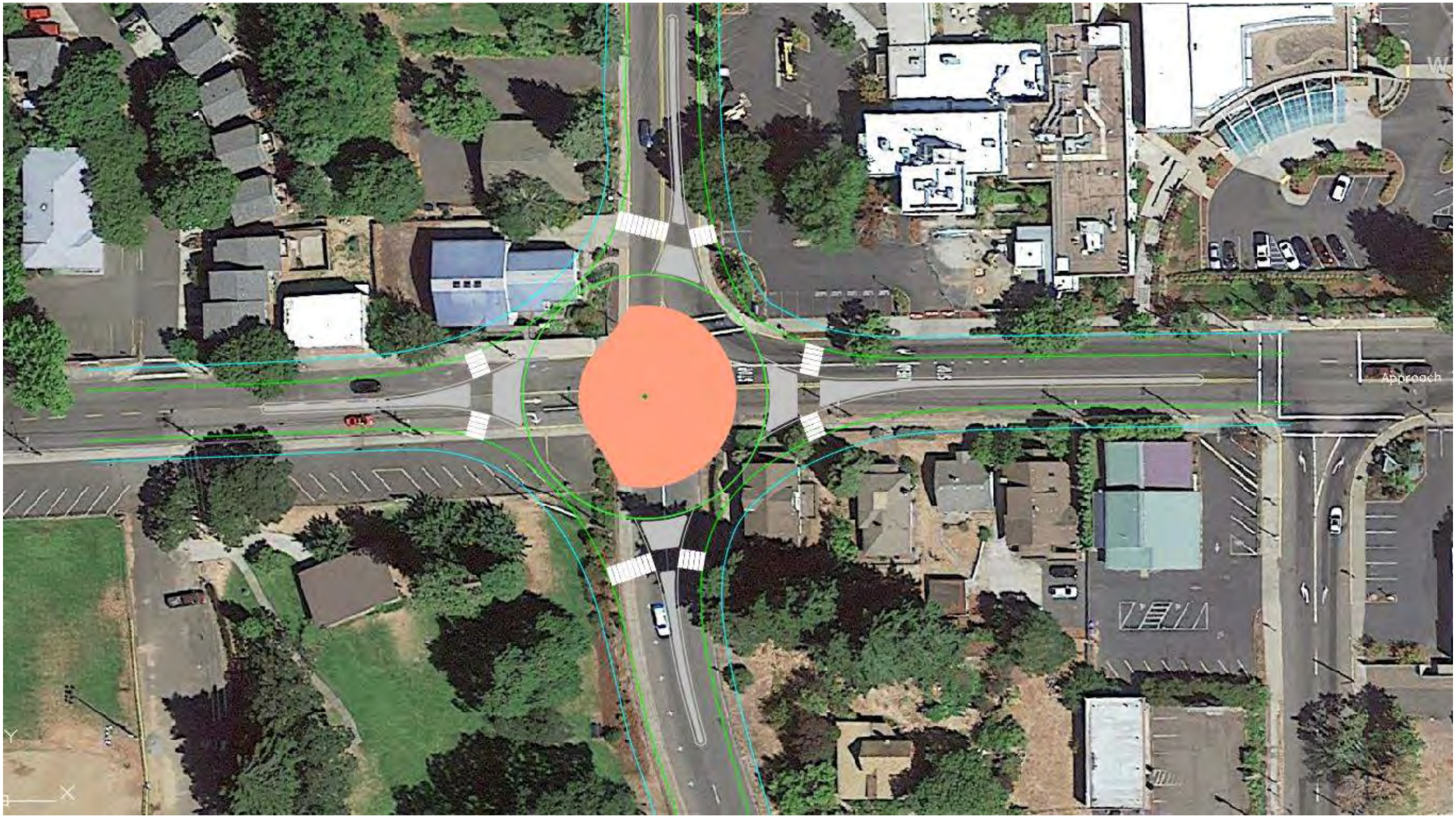
Intersection: 14: 12th/12th St

Movement	NB	NB	SE
Directions Served	L	T	R
Maximum Queue (ft)	459	467	7
Average Queue (ft)	220	197	0
95th Queue (ft)	601	597	7
Link Distance (ft)	503	503	149
Upstream Blk Time (%)	13	13	
Queuing Penalty (veh)	0	0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 1931

APPENDIX F: MITIGATED ROUNDABOUT CONCEPT



- Hybrid multi-lane (dual SBT, single lane all other lanes)
- 140’ ICD
  - ODOT standard single lane: 165’
  - 140’ provides minimal opportunity for central landscaped island. Changing May St. design vehicle to WB-40 would increase central island landscape/art opportunity.
- Design Vehicle: WB-67
- Footprint offset of 12’ for bike/ped
- *Does not show bike facility transitions on approaches

APPENDIX G: NCHRP 562 PEDESTRIAN CROSSING EVALUATION

GUIDELINES FOR PEDESTRIAN CROSSING TREATMENTS

This spreadsheet combines Worksheet 1 and Worksheet 2 (Appendix A, pages 69-70) of TCRP Report 112/NCHRP Report 562 (*Improving Pedestrian Safety at Unsignalized Intersections*) into an electronic format. This spreadsheet should be used in conjunction with, and not independent of, Appendix A documentation.

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Key

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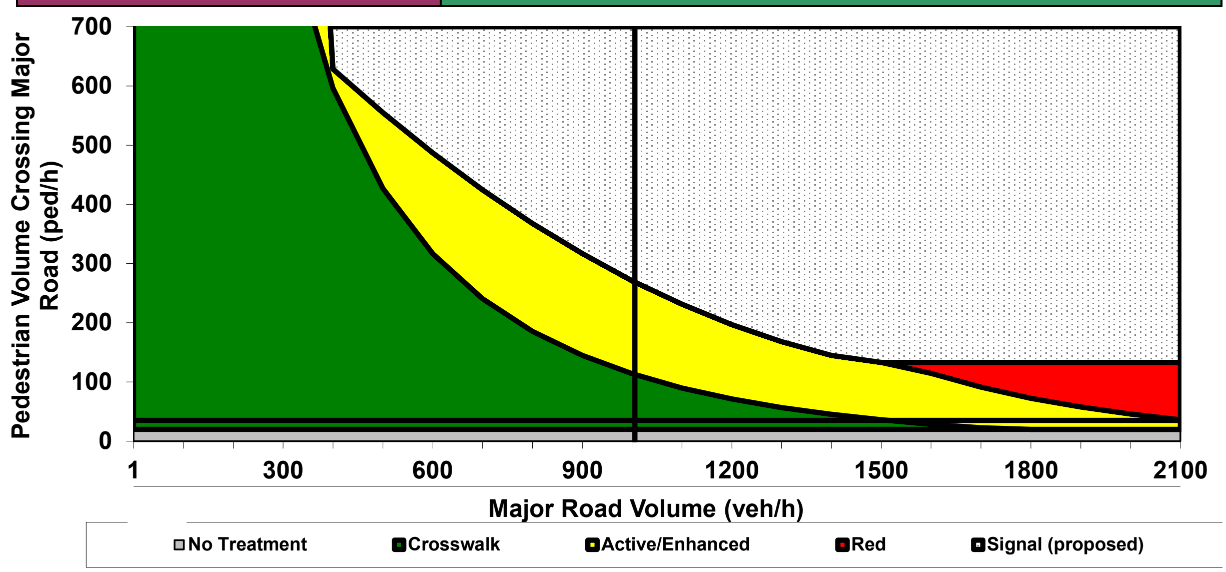
Analyst and Site Information			
Analyst	ALC	Major Street	12th St - Scenario 1
Analysis Date	Dec-21	Minor Street or Location	Varies
Data Collection Date	N/A	Peak Hour	N/A

Step 1: Select worksheet:			
Posted or statutory speed limit (or 85th percentile speed) on the major street (mph)		*1a*	25
Is the population of the surrounding area <10,000? (enter ***YES*** or ***NO***)		*1b*	NO
Step 2: Does the crossing meet minimum pedestrian volumes to be considered for a traffic control device?			
Peak-hour pedestrian volume (ped/h), V_p		*2a*	35
Result: Go to step 3.			
Step 3: Does the crossing meet the pedestrian warrant for a traffic signal?			
Major road volume, total of both approaches during peak hour (veh/h), V_{maj-s}		*3a*	1006
[Calculated automatically] Preliminary (before min. threshold) peak hour pedestrian volume to meet warrant		*3b*	269
[Calculated automatically] Minimum required peak hour pedestrian volume to meet traffic signal warrant		*3c*	269
Is 15th percentile crossing speed of pedestrians less than 3.5 ft/s (1.1 m/s)? (enter ***YES*** or ***NO***)		*3d*	NO
If 15th percentile crossing speed of pedestrians is less than 3.5 ft/s (1.1 m/s), then reduce *3c* by up to 50%.	% rate of reduction for *3c* (up to 50%)	*3e*	0%
	Reduced value or *3c*	*3f*	269
Result: The signal warrant is not met. Go to step 4.			
Step 4: Estimate pedestrian delay.			
Pedestrian crossing distance, curb to curb (ft), L		*4a*	24
Pedestrian walking speed (ft/s), S_p (suggested speed = 3.5 ft/s)		*4b*	3.5
Pedestrian start-up time and end clearance time (s), t_s (suggested start-up time = 3 sec)		*4c*	3
[Calculated automatically] Critical gap required for crossing pedestrian (s), t_c		*4d*	10
Major road volume, total both approaches OR approach being crossed if raised median island is present, during peak hour (veh/h), V_{maj-d}		*4e*	1006
Major road flow rate (veh/s), v		*4f*	0.28
Average pedestrian delay (s/person), d_p		*4g*	43
Total pedestrian delay (h), D_p The value in 4h is the calculated estimated delay for all pedestrians crossing the major roadway without a crossing treatment (assumes 0% compliance). If the actual total pedestrian delay has been measured at the site, that value can be entered in 4i to replace the calculated value in 4h.		*4h*	0.4
		4i	
Step 5: Select treatment based up on total pedestrian delay and expected motorist compliance.			
Expected motorist compliance at pedestrian crossings in region: enter ***HIGH for High Compliance*** or ***LOW for Low Compliance***		*5a*	LOW
Treatment Category:	**CROSSWALK**		



This worksheet provides general recommendations on pedestrian crossing treatments to consider at unsignalized intersections; in all cases, engineering judgment should be used in selecting a specific treatment for installation. This worksheet does not apply to school crossings. In addition to the results provided by this worksheet, users should consider whether a pedestrian treatment could present an increased safety risk to pedestrians, such as where there is poor sight distance, complex geometrics, or nearby traffic signals.

GUIDELINES FOR PEDESTRIAN CROSSING TREATMENTS

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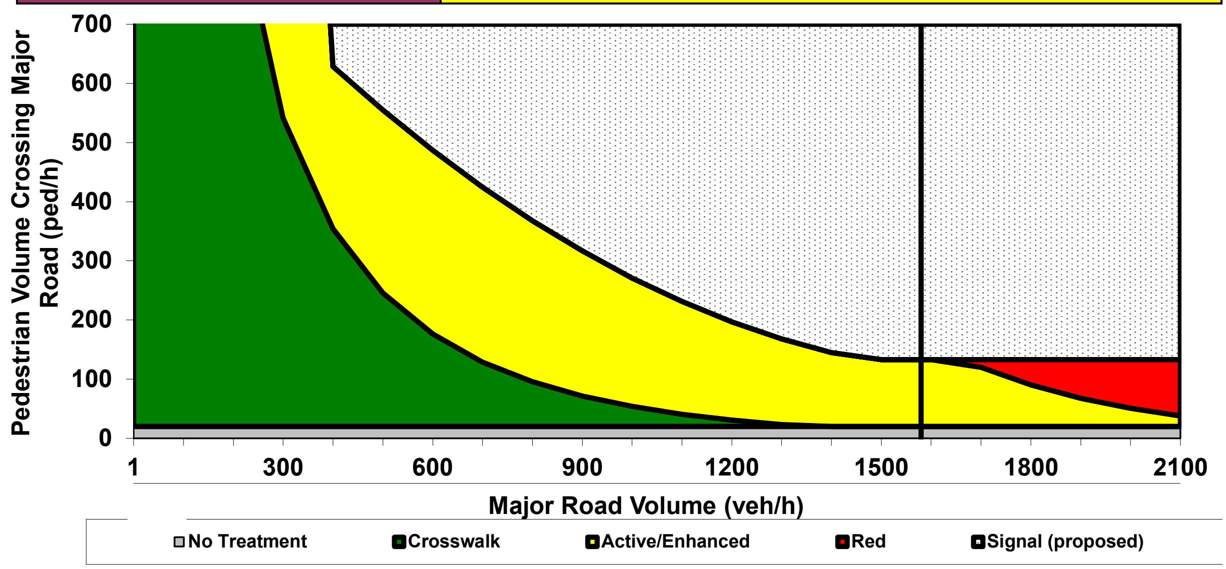
Analyst and Site Information			
Analyst	ALC	Major Street	13th St - Scenario 1
Analysis Date	Dec-21	Minor Street or Location	Varies
Data Collection Date	N/A	Peak Hour	N/A

Step 1: Select worksheet:		
Posted or statutory speed limit (or 85th percentile speed) on the major street (mph)	*1a*	25
Is the population of the surrounding area <10,000? (enter ***YES*** or ***NO***)	*1b*	NO
Step 2: Does the crossing meet minimum pedestrian volumes to be considered for a traffic control device?		
Peak-hour pedestrian volume (ped/h), V_p	*2a*	20
Result: Go to step 3.		
Step 3: Does the crossing meet the pedestrian warrant for a traffic signal?		
Major road volume, total of both approaches during peak hour (veh/h), V_{maj-s}	*3a*	1580
[Calculated automatically] Preliminary (before min. threshold) peak hour pedestrian volume to meet warrant	*3b*	133
[Calculated automatically] Minimum required peak hour pedestrian volume to meet traffic signal warrant	*3c*	133
Is 15th percentile crossing speed of pedestrians less than 3.5 ft/s (1.1 m/s)? (enter ***YES*** or ***NO***)	*3d*	NO
If 15th percentile crossing speed of pedestrians is less than 3.5 ft/s (1.1 m/s), then reduce *3c* by up to 50%. — % rate of reduction for *3c* (up to 50%)	*3e*	0%
Reduced value or *3c*	*3f*	133
Result: The signal warrant is not met. Go to step 4.		
Step 4: Estimate pedestrian delay.		
Pedestrian crossing distance, curb to curb (ft), L	*4a*	32
Pedestrian walking speed (ft/s), S_p (suggested speed = 3.5 ft/s)	*4b*	3.5
Pedestrian start-up time and end clearance time (s), t_s (suggested start-up time = 3 sec)	*4c*	3
[Calculated automatically] Critical gap required for crossing pedestrian (s), t_c	*4d*	12
Major road volume, total both approaches OR approach being crossed if raised median island is present, during peak hour (veh/h), V_{maj-d}	*4e*	1580
Major road flow rate (veh/s), v	*4f*	0.44
Average pedestrian delay (s/person), d_p	*4g*	461
Total pedestrian delay (h), D_p The value in 4h is the calculated estimated delay for all pedestrians crossing the major roadway without a crossing treatment (assumes 0% compliance). If the actual total pedestrian delay has been measured at the site, that value can be entered in 4i to replace the calculated value in 4h.	*4h*	2.6
	4i	
Step 5: Select treatment based up on total pedestrian delay and expected motorist compliance.		
Expected motorist compliance at pedestrian crossings in region: enter ***HIGH for High Compliance*** or ***LOW for Low Compliance***	*5a*	HIGH
Treatment Category:	**ACTIVE OR ENHANCED**	



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GUIDELINES FOR PEDESTRIAN CROSSING TREATMENTS

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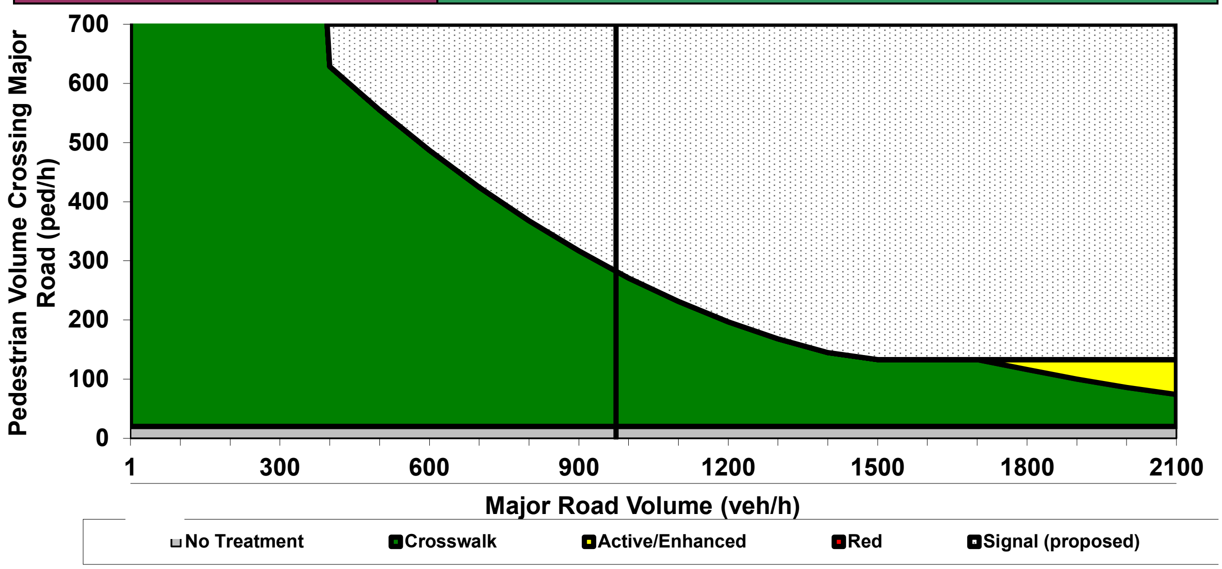
Analyst and Site Information			
Analyst	ALC	Major Street	13th St - Scenario 1 (Two Stage)
Analysis Date	Dec-21	Minor Street or Location	Varies
Data Collection Date	N/A	Peak Hour	N/A

Step 1: Select worksheet:		
Posted or statutory speed limit (or 85th percentile speed) on the major street (mph)	*1a*	25
Is the population of the surrounding area <10,000? (enter ***YES*** or ***NO***)	*1b*	NO
Step 2: Does the crossing meet minimum pedestrian volumes to be considered for a traffic control device?		
Peak-hour pedestrian volume (ped/h), V_p	*2a*	20
Result: Go to step 3.		
Step 3: Does the crossing meet the pedestrian warrant for a traffic signal?		
Major road volume, total of both approaches during peak hour (veh/h), V_{maj-s}	*3a*	1580
[Calculated automatically] Preliminary (before min. threshold) peak hour pedestrian volume to meet warrant	*3b*	133
[Calculated automatically] Minimum required peak hour pedestrian volume to meet traffic signal warrant	*3c*	133
Is 15th percentile crossing speed of pedestrians less than 3.5 ft/s (1.1 m/s)? (enter ***YES*** or ***NO***)	*3d*	NO
If 15th percentile crossing speed of pedestrians is less than 3.5 ft/s (1.1 m/s), then reduce *3c* by up to 50%. — % rate of reduction for *3c* (up to 50%)	*3e*	0%
Reduced value or *3c*	*3f*	133
Result: The signal warrant is not met. Go to step 4.		
Step 4: Estimate pedestrian delay.		
Pedestrian crossing distance, curb to curb (ft), L	*4a*	12
Pedestrian walking speed (ft/s), S_p (suggested speed = 3.5 ft/s)	*4b*	3.5
Pedestrian start-up time and end clearance time (s), t_s (suggested start-up time = 3 sec)	*4c*	3
[Calculated automatically] Critical gap required for crossing pedestrian (s), t_c	*4d*	6
Major road volume, total both approaches OR approach being crossed if raised median island is present, during peak hour (veh/h), V_{maj-d}	*4e*	975
Major road flow rate (veh/s), v	*4f*	0.27
Average pedestrian delay (s/person), d_p	*4g*	11
Total pedestrian delay (h), D_p The value in 4h is the calculated estimated delay for all pedestrians crossing the major roadway without a crossing treatment (assumes 0% compliance). If the actual total pedestrian delay has been measured at the site, that value can be entered in 4i to replace the calculated value in 4h.	*4h*	0.1
	4i	
Step 5: Select treatment based up on total pedestrian delay and expected motorist compliance.		
Expected motorist compliance at pedestrian crossings in region: enter ***HIGH for High Compliance*** or ***LOW for Low Compliance***	*5a*	HIGH
Treatment Category:		**CROSSWALK**



Because the volume in Step 4e is different from the volume in Step 3a, the graph may show a different result than the Treatment Category above.

This worksheet provides general recommendations on pedestrian crossing treatments to consider at unsignalized intersections; in all cases, engineering judgment should be used in selecting a specific treatment for installation. This worksheet does not apply to school crossings. In addition to the results provided by this worksheet, users should consider whether a pedestrian treatment could present an increased safety risk to pedestrians, such as where there is poor sight distance, complex geometrics, or nearby traffic signals.

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Analyst and Site Information

Analyst	ALC	Major Street	12th St - Scenario 2
Analysis Date	Dec-21	Minor Street or Location	Varies
Data Collection Date	N/A	Peak Hour	N/A

Step 1: Select worksheet:

Posted or statutory speed limit (or 85th percentile speed) on the major street (mph)	*1a*	25
Is the population of the surrounding area <10,000? (enter ***YES*** or ***NO***)	*1b*	NO

Step 2: Does the crossing meet minimum pedestrian volumes to be considered for a traffic control device?

Peak-hour pedestrian volume (ped/h), V_p	*2a*	35

Result: Go to step 3.

Step 3: Does the crossing meet the pedestrian warrant for a traffic signal?

Major road volume, total of both approaches during peak hour (veh/h), V_{maj-s}		*3a*	1360
[Calculated automatically] Preliminary (before min. threshold) peak hour pedestrian volume to meet warrant		*3b*	154
[Calculated automatically] Minimum required peak hour pedestrian volume to meet traffic signal warrant		*3c*	154
Is 15th percentile crossing speed of pedestrians less than 3.5 ft/s (1.1 m/s)? (enter ***YES*** or ***NO***)		*3d*	NO
If 15th percentile crossing speed of pedestrians is less than 3.5 ft/s (1.1 m/s), then reduce *3c* by up to 50%.	% rate of reduction for *3c* (up to 50%)	*3e*	0%
	Reduced value or *3c*	*3f*	154

Result: The signal warrant is not met. Go to step 4.

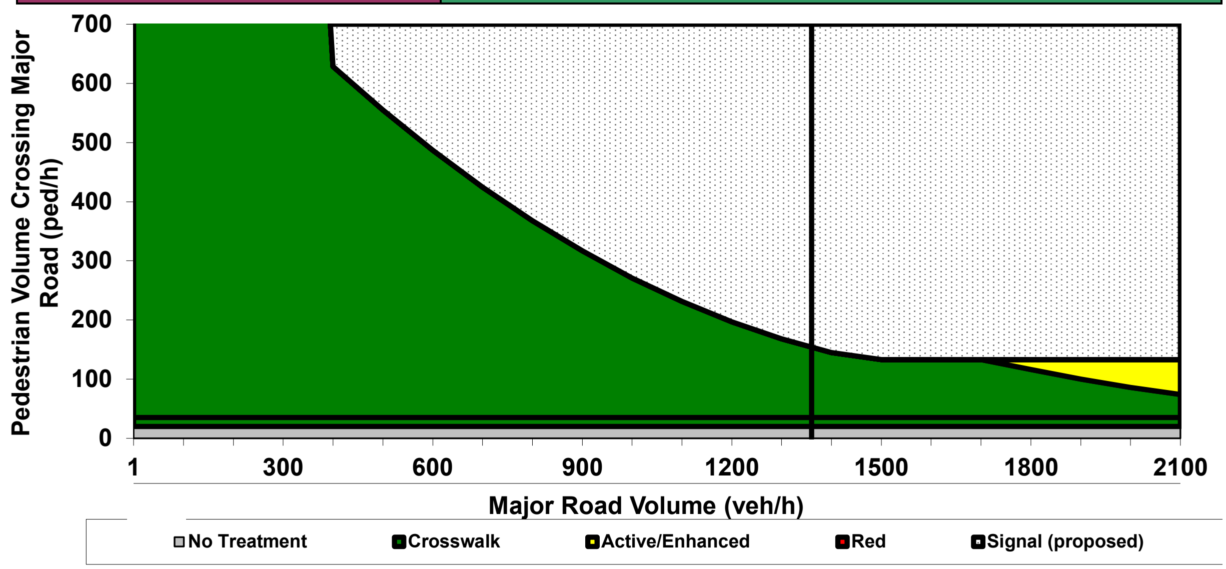
Step 4: Estimate pedestrian delay.

Pedestrian crossing distance, curb to curb (ft), L	*4a*	12
Pedestrian walking speed (ft/s), S_p (suggested speed = 3.5 ft/s)	*4b*	3.5
Pedestrian start-up time and end clearance time (s), t_s (suggested start-up time = 3 sec)	*4c*	3
[Calculated automatically] Critical gap required for crossing pedestrian (s), t_c	*4d*	6
Major road volume, total both approaches OR approach being crossed if raised median island is present, during peak hour (veh/h), V_{maj-d}	*4e*	1360
Major road flow rate (veh/s), v	*4f*	0.38
Average pedestrian delay (s/person), d_p	*4g*	21
Total pedestrian delay (h), D_p The value in 4h is the calculated estimated delay for all pedestrians crossing the major roadway without a crossing treatment (assumes 0% compliance). If the actual total pedestrian delay has been measured at the site, that value can be entered in 4i to replace the calculated value in 4h.	*4h*	0.2
	4i	

Step 5: Select treatment based up on total pedestrian delay and expected motorist compliance.

Expected motorist compliance at pedestrian crossings in region: enter ***HIGH for High Compliance*** or ***LOW for Low Compliance***	*5a*	HIGH

Treatment Category: **CROSSWALK**



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Analyst and Site Information

Analyst	ALC	Major Street	13th St - Scenario 2
Analysis Date	Dec-21	Minor Street or Location	Varies
Data Collection Date	N/A	Peak Hour	N/A

Step 1: Select worksheet:

Posted or statutory speed limit (or 85th percentile speed) on the major street (mph)	*1a*	25
Is the population of the surrounding area <10,000? (enter ***YES*** or ***NO***)	*1b*	NO

Step 2: Does the crossing meet minimum pedestrian volumes to be considered for a traffic control device?

Peak-hour pedestrian volume (ped/h), V_p	*2a*	20

Result: Go to step 3.

Step 3: Does the crossing meet the pedestrian warrant for a traffic signal?

Major road volume, total of both approaches during peak hour (veh/h), V_{maj-s}	*3a*	1135
[Calculated automatically] Preliminary (before min. threshold) peak hour pedestrian volume to meet warrant	*3b*	219
[Calculated automatically] Minimum required peak hour pedestrian volume to meet traffic signal warrant	*3c*	219
Is 15th percentile crossing speed of pedestrians less than 3.5 ft/s (1.1 m/s)? (enter ***YES*** or ***NO***)	*3d*	NO
If 15th percentile crossing speed of pedestrians is less than 3.5 ft/s (1.1 m/s), then reduce *3c* by up to 50%. — % rate of reduction for *3c* (up to 50%)	*3e*	0%
Reduced value or *3c*	*3f*	219

Result: The signal warrant is not met. Go to step 4.

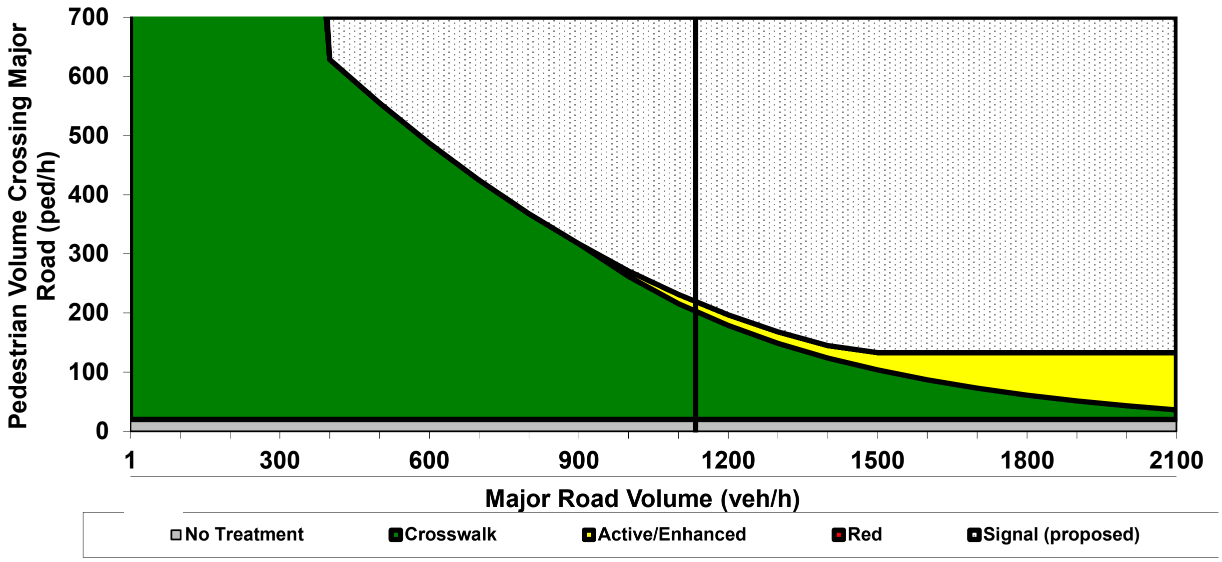
Step 4: Estimate pedestrian delay.

Pedestrian crossing distance, curb to curb (ft), L	*4a*	16
Pedestrian walking speed (ft/s), S_p (suggested speed = 3.5 ft/s)	*4b*	3.5
Pedestrian start-up time and end clearance time (s), t_s (suggested start-up time = 3 sec)	*4c*	3
[Calculated automatically] Critical gap required for crossing pedestrian (s), t_c	*4d*	8
Major road volume, total both approaches OR approach being crossed if raised median island is present, during peak hour (veh/h), V_{maj-d}	*4e*	1135
Major road flow rate (veh/s), v	*4f*	0.32
Average pedestrian delay (s/person), d_p	*4g*	25
Total pedestrian delay (h), D_p The value in 4h is the calculated estimated delay for all pedestrians crossing the major roadway without a crossing treatment (assumes 0% compliance). If the actual total pedestrian delay has been measured at the site, that value can be entered in 4i to replace the calculated value in 4h.	*4h*	0.1
	4i	

Step 5: Select treatment based up on total pedestrian delay and expected motorist compliance.

Expected motorist compliance at pedestrian crossings in region: enter ***HIGH for High Compliance*** or ***LOW for Low Compliance***	*5a*	HIGH

Treatment Category: **CROSSWALK**



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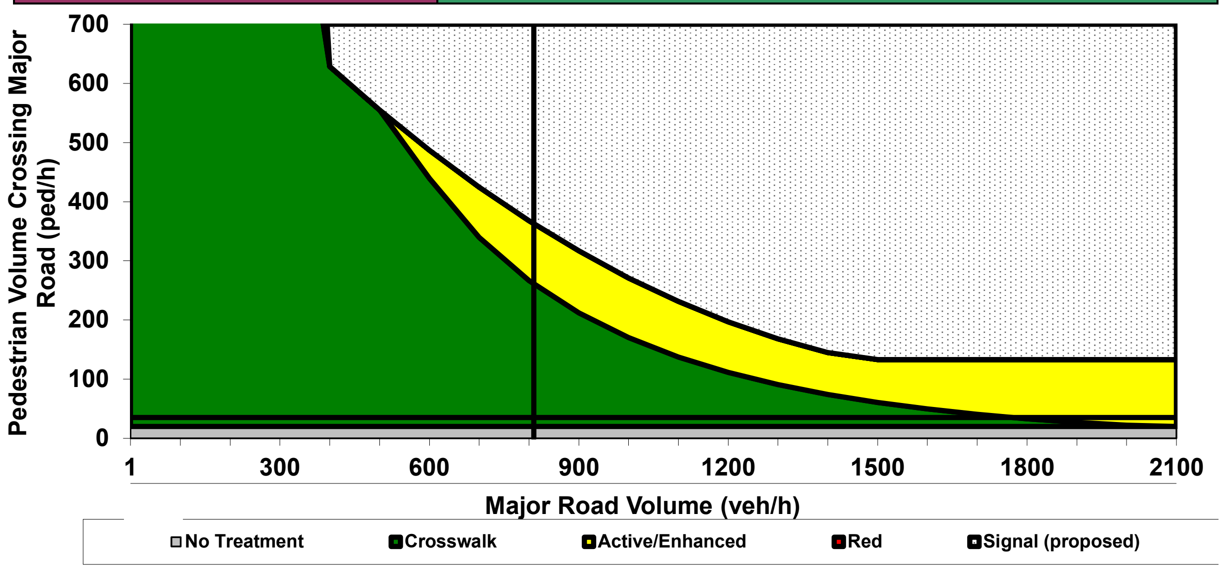
Analyst and Site Information			
Analyst	ALC	Major Street	12th St - Scenario 3
Analysis Date	Dec-21	Minor Street or Location	Varies
Data Collection Date	N/A	Peak Hour	N/A

Step 1: Select worksheet:		
Posted or statutory speed limit (or 85th percentile speed) on the major street (mph)	*1a*	25
Is the population of the surrounding area <10,000? (enter ***YES*** or ***NO***)	*1b*	NO
Step 2: Does the crossing meet minimum pedestrian volumes to be considered for a traffic control device?		
Peak-hour pedestrian volume (ped/h), V_p	*2a*	35
Result: Go to step 3.		
Step 3: Does the crossing meet the pedestrian warrant for a traffic signal?		
Major road volume, total of both approaches during peak hour (veh/h), V_{maj-s}	*3a*	810
[Calculated automatically] Preliminary (before min. threshold) peak hour pedestrian volume to meet warrant	*3b*	363
[Calculated automatically] Minimum required peak hour pedestrian volume to meet traffic signal warrant	*3c*	363
Is 15th percentile crossing speed of pedestrians less than 3.5 ft/s (1.1 m/s)? (enter ***YES*** or ***NO***)	*3d*	NO
If 15th percentile crossing speed of pedestrians is less than 3.5 ft/s (1.1 m/s), then reduce *3c* by up to 50%. — % rate of reduction for *3c* (up to 50%)	*3e*	0%
Reduced value or *3c*	*3f*	363
Result: The signal warrant is not met. Go to step 4.		
Step 4: Estimate pedestrian delay.		
Pedestrian crossing distance, curb to curb (ft), L	*4a*	20
Pedestrian walking speed (ft/s), S_p (suggested speed = 3.5 ft/s)	*4b*	3.5
Pedestrian start-up time and end clearance time (s), t_s (suggested start-up time = 3 sec)	*4c*	3
[Calculated automatically] Critical gap required for crossing pedestrian (s), t_c	*4d*	9
Major road volume, total both approaches OR approach being crossed if raised median island is present, during peak hour (veh/h), V_{maj-d}	*4e*	810
Major road flow rate (veh/s), v	*4f*	0.23
Average pedestrian delay (s/person), d_p	*4g*	19
Total pedestrian delay (h), D_p The value in 4h is the calculated estimated delay for all pedestrians crossing the major roadway without a crossing treatment (assumes 0% compliance). If the actual total pedestrian delay has been measured at the site, that value can be entered in 4i to replace the calculated value in 4h.	*4h*	0.2
	4i	
Step 5: Select treatment based up on total pedestrian delay and expected motorist compliance.		
Expected motorist compliance at pedestrian crossings in region: enter ***HIGH for High Compliance*** or ***LOW for Low Compliance***	*5a*	HIGH
Treatment Category:		**CROSSWALK**



This worksheet provides general recommendations on pedestrian crossing treatments to consider at unsignalized intersections; in all cases, engineering judgment should be used in selecting a specific treatment for installation. This worksheet does not apply to school crossings. In addition to the results provided by this worksheet, users should consider whether a pedestrian treatment could present an increased safety risk to pedestrians, such as where there is poor sight distance, complex geometrics, or nearby traffic signals.

GUIDELINES FOR PEDESTRIAN CROSSING TREATMENTS

This spreadsheet combines Worksheet 1 and Worksheet 2 (Appendix A, pages 69-70) of TCRP Report 112/NCHRP Report 562 (*Improving Pedestrian Safety at Unsignalized Intersections*) into an electronic format. This spreadsheet should be used in conjunction with, and not independent of, Appendix A documentation.

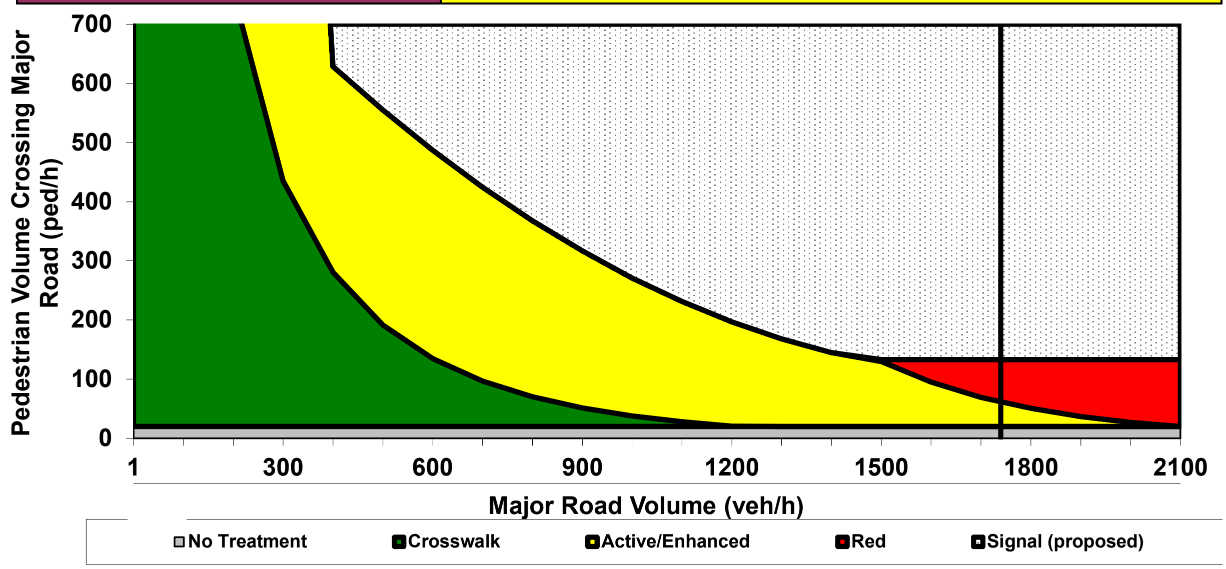
This spreadsheet is still under development, please inform TTI if errors are identified.

Key

- Blue fields contain descriptive information.
- Green fields are required and must be completed.
- Tan fields are adjustments that are filled out only under certain conditions (follow instructions to the left of the cell).
- Gray fields are automatically calculated and should not be edited.

Analyst and Site Information			
Analyst	ALC	Major Street	13th St - Scenario 3
Analysis Date	Dec-21	Minor Street or Location	Varies
Data Collection Date	N/A	Peak Hour	N/A

Step 1: Select worksheet:		
Posted or statutory speed limit (or 85th percentile speed) on the major street (mph)	*1a*	25
Is the population of the surrounding area <10,000? (enter ***YES*** or ***NO***)	*1b*	NO
Step 2: Does the crossing meet minimum pedestrian volumes to be considered for a traffic control device?		
Peak-hour pedestrian volume (ped/h), V_p	*2a*	20
Result: Go to step 3.		
Step 3: Does the crossing meet the pedestrian warrant for a traffic signal?		
Major road volume, total of both approaches during peak hour (veh/h), V_{maj-s}	*3a*	1740
[Calculated automatically] Preliminary (before min. threshold) peak hour pedestrian volume to meet warrant	*3b*	133
[Calculated automatically] Minimum required peak hour pedestrian volume to meet traffic signal warrant	*3c*	133
Is 15th percentile crossing speed of pedestrians less than 3.5 ft/s (1.1 m/s)? (enter ***YES*** or ***NO***)	*3d*	NO
If 15th percentile crossing speed of pedestrians is less than 3.5 ft/s (1.1 m/s), then reduce *3c* by up to 50%. — % rate of reduction for *3c* (up to 50%)	*3e*	0%
Reduced value or *3c*	*3f*	133
Result: The signal warrant is not met. Go to step 4.		
Step 4: Estimate pedestrian delay.		
Pedestrian crossing distance, curb to curb (ft), L	*4a*	36
Pedestrian walking speed (ft/s), S_p (suggested speed = 3.5 ft/s)	*4b*	3.5
Pedestrian start-up time and end clearance time (s), t_s (suggested start-up time = 3 sec)	*4c*	3
[Calculated automatically] Critical gap required for crossing pedestrian (s), t_c	*4d*	13
Major road volume, total both approaches OR approach being crossed if raised median island is present, during peak hour (veh/h), V_{maj-d}	*4e*	1740
Major road flow rate (veh/s), v	*4f*	0.48
Average pedestrian delay (s/person), d_p	*4g*	1210
Total pedestrian delay (h), D_p The value in 4h is the calculated estimated delay for all pedestrians crossing the major roadway without a crossing treatment (assumes 0% compliance). If the actual total pedestrian delay has been measured at the site, that value can be entered in 4i to replace the calculated value in 4h.	*4h*	6.7
	4i	
Step 5: Select treatment based up on total pedestrian delay and expected motorist compliance.		
Expected motorist compliance at pedestrian crossings in region: enter ***HIGH for High Compliance*** or ***LOW for Low Compliance***	*5a*	HIGH
Treatment Category:		**ACTIVE OR ENHANCED**



This worksheet provides general recommendations on pedestrian crossing treatments to consider at unsignalized intersections; in all cases, engineering judgment should be used in selecting a specific treatment for installation. This worksheet does not apply to school crossings. In addition to the results provided by this worksheet, users should consider whether a pedestrian treatment could present an increased safety risk to pedestrians, such as where there is poor sight distance, complex geometrics, or nearby traffic signals.

GUIDELINES FOR PEDESTRIAN CROSSING TREATMENTS

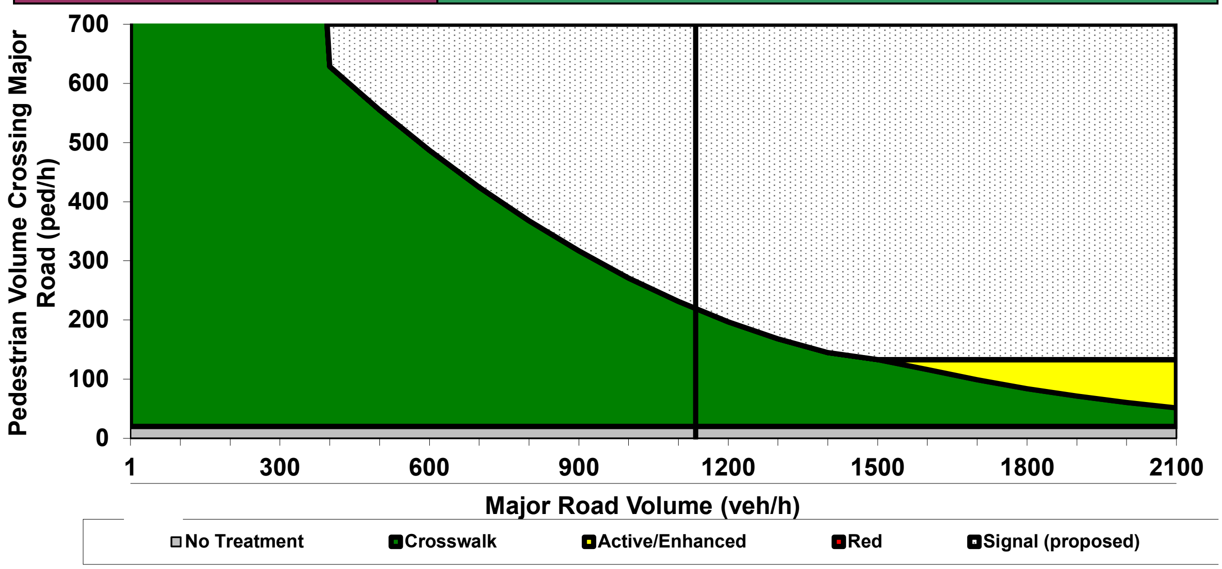
This spreadsheet combines Worksheet 1 and Worksheet 2 (Appendix A, pages 69-70) of TCRP Report 112/NCHRP Report 562 (*Improving Pedestrian Safety at Unsignalized Intersections*) into an electronic format. This spreadsheet should be used in conjunction with, and not independent of, Appendix A documentation.

This spreadsheet is still under development, please inform TTI if errors are identified.

Key
- Blue fields contain descriptive information.
- Green fields are required and must be completed.
- Tan fields are adjustments that are filled out only under certain conditions (follow instructions to the left of the cell).
- Gray fields are automatically calculated and should not be edited.

Analyst and Site Information			
Analyst	ALC	Major Street	13th St - Scenario 3 (Two Stage)
Analysis Date	Dec-21	Minor Street or Location	Varies
Data Collection Date	N/A	Peak Hour	N/A

Step 1: Select worksheet:		
Posted or statutory speed limit (or 85th percentile speed) on the major street (mph)	*1a*	25
Is the population of the surrounding area <10,000? (enter ***YES*** or ***NO***)	*1b*	NO
Step 2: Does the crossing meet minimum pedestrian volumes to be considered for a traffic control device?		
Peak-hour pedestrian volume (ped/h), V_p	*2a*	20
Result: Go to step 3.		
Step 3: Does the crossing meet the pedestrian warrant for a traffic signal?		
Major road volume, total of both approaches during peak hour (veh/h), V_{maj-s}	*3a*	1740
[Calculated automatically] Preliminary (before min. threshold) peak hour pedestrian volume to meet warrant	*3b*	133
[Calculated automatically] Minimum required peak hour pedestrian volume to meet traffic signal warrant	*3c*	133
Is 15th percentile crossing speed of pedestrians less than 3.5 ft/s (1.1 m/s)? (enter ***YES*** or ***NO***)	*3d*	NO
If 15th percentile crossing speed of pedestrians is less than 3.5 ft/s (1.1 m/s), then reduce *3c* by up to 50%. — % rate of reduction for *3c* (up to 50%)	*3e*	0%
Reduced value or *3c*	*3f*	133
Result: The signal warrant is not met. Go to step 4.		
Step 4: Estimate pedestrian delay.		
Pedestrian crossing distance, curb to curb (ft), L	*4a*	14
Pedestrian walking speed (ft/s), S_p (suggested speed = 3.5 ft/s)	*4b*	3.5
Pedestrian start-up time and end clearance time (s), t_s (suggested start-up time = 3 sec)	*4c*	3
[Calculated automatically] Critical gap required for crossing pedestrian (s), t_c	*4d*	7
Major road volume, total both approaches OR approach being crossed if raised median island is present, during peak hour (veh/h), V_{maj-d}	*4e*	1135
Major road flow rate (veh/s), v	*4f*	0.32
Average pedestrian delay (s/person), d_p	*4g*	19
Total pedestrian delay (h), D_p The value in 4h is the calculated estimated delay for all pedestrians crossing the major roadway without a crossing treatment (assumes 0% compliance). If the actual total pedestrian delay has been measured at the site, that value can be entered in 4i to replace the calculated value in 4h.	*4h*	0.1
	4i	
Step 5: Select treatment based up on total pedestrian delay and expected motorist compliance.		
Expected motorist compliance at pedestrian crossings in region: enter ***HIGH for High Compliance*** or ***LOW for Low Compliance***	*5a*	HIGH
Treatment Category:		**CROSSWALK**



Because the volume in Step 4e is different from the volume in Step 3a, the graph may show a different result than the Treatment Category above.

This worksheet provides general recommendations on pedestrian crossing treatments to consider at unsignalized intersections; in all cases, engineering judgment should be used in selecting a specific treatment for installation. This worksheet does not apply to school crossings. In addition to the results provided by this worksheet, users should consider whether a pedestrian treatment could present an increased safety risk to pedestrians, such as where there is poor sight distance, complex geometrics, or nearby traffic signals.

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BELMONT AVENUE CONFIGURATION OPTIONS

Consider options for signalizing the 13th Street/ Belmont Avenue to achieve the following objectives:

- Manage congestion to keep motor vehicle delay within reasonable limits for the Heights (e.g., $v/c < 1.0$)
- Manage southbound vehicle queues on 13th Street from the Belmont Avenue intersection to keep them from reaching May Street and interfering with intersection operations.
- Minimize roadway widening needs and provide low-stress walking and biking street crossing opportunities.
- Maintain accessibility of businesses.
- Maintain accessibility of surrounding neighborhoods.
- Protect the future function of A Street west of the Heights as a neighborhood greenway.

OPTION 1 – ONE-WAY EASTBOUND

Description:

- Convert Belmont Avenue to one-way eastbound.
- Convert A Street to one-way westbound.

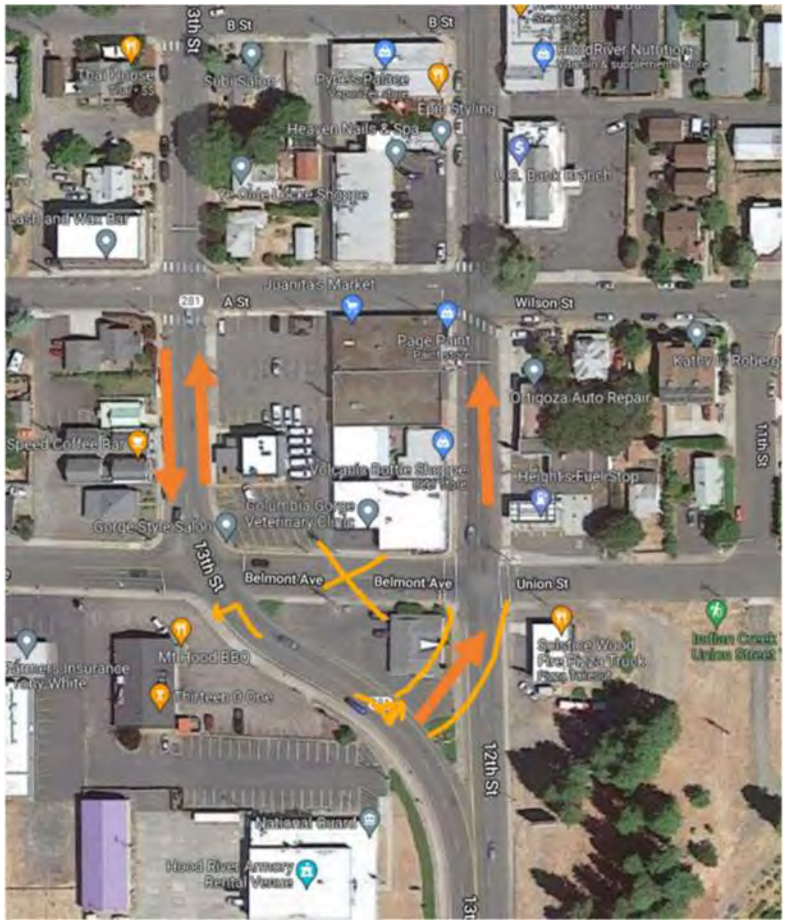
Opportunities:

- Eliminating westbound traffic simplifies signal operation.
- Provides a turnaround at the south end of the Heights to proceed northbound on 12th Street, making businesses on 12th Street between Belmont Avenue and Wilson Street accessible.
- Queues expected back to Taylor Avenue but not May Street.

Constraints:

- Limited flexibility for one-way street configuration between 12th Street and 13th Street (sets orientation for other one-way streets).
- Union Street to Belmont Avenue west trips must route around Wilson Street and A Street.

OPTION 2 – CLOSE BELMONT



Description:

- Close Belmont Avenue between 12th Street and 13th Street.
- Realign 12th Street as one-way T-intersection (assumed unsignalized).

Opportunities:

- Eliminating the east approach and relocating the southbound left turn significantly simplifies signal operation.
- Queues expected back to Taylor Avenue but not May Street.
- Flexibility for one-way street configuration between 12th Street and 13th Street (A Street could be eastbound or westbound only).
- Opportunity for re-envisioning of public space with vacation of Belmont Avenue between 12th Street and 13th Street and property acquisition.
- Slows northbound traffic on 12th Street before entering the Heights.
- Provides a turnaround at the south end of the Heights to proceed northbound on 12th Street, making businesses on 12th Street between Belmont Avenue and Wilson Street accessible.

Constraints:

- Property impact with realignment.
- Limited queue storage for back-to-back left turn lanes on 13th Street between Belmont Avenue and 12th Street.
- Union Street to Belmont Avenue west trips must route around Wilson Street and A Street.

OPTION 3 – WIDEN 13TH STREET FOR TWO SOUTHBOUND THROUGH LANES

Description:

- Remove parking and widen 13th Street between A Street and southern end of existing couplet to allow for two southbound lanes, a left turn lane and a northbound lane (four-lane cross section instead of three-lane).

Opportunities:

- Significantly mitigates queueing concerns (queues approximately to B Street).
- Flexibility for one-way street configuration between 12th Street and 13th Street (A Street could be eastbound or westbound only).
- Two-way traffic can be maintained on Belmont Avenue between 13th Street and 12th Street.
- Provides a turnaround at the south end of the Heights to proceed northbound on 12th Street, making businesses on 12th Street between Belmont Avenue and Wilson Street accessible.

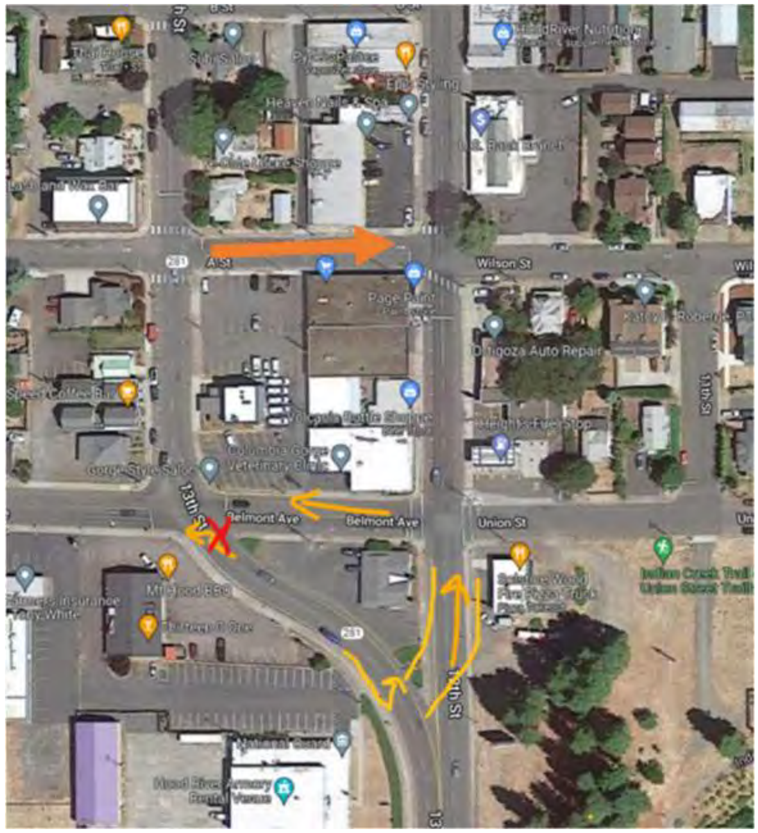
Constraints:

- Requires removal of parking between A Street and Belmont.
- Requires significant street widening.
- Creates a wide crossing for people walking and biking.

OPTION 4 – ONE-WAY WESTBOUND

Description:

- Convert Belmont Avenue to one-way westbound.
- Convert A Street to one-way eastbound.
- Close the northbound left turn at 13th Avenue/Belmont Avenue (served by westbound Belmont Avenue instead).
- Realign 12th Street as one-way T-intersection.



Opportunities:

- Eliminating eastbound traffic and the northbound left turn simplifies signal operation.
- Maintains westbound access from Union Street.
- Provides a turnaround at the south end of the Heights to proceed northbound on 12th Street, making businesses on 12th Street between Belmont Avenue and Wilson Street accessible.
- Slows northbound traffic on 12th Street before entering the Heights.

Constraints:

- Queueing spills back to May Street and increases risk of westbound queues on Belmont Avenue blocking 12th Street (this is the worst option from a congestion standpoint).
- Westbound lefts challenging to make at 13th Street/ Belmont Avenue due to intersection geometry, could limit connectivity.
- Property impact with realignment.
- Limited flexibility for one-way street configuration between 12th Street and 13th Street (sets orientation for other one-way streets).

Table 1: 13th Street/ Belmont Avenue Intersection Congestion

OPTION	CYCLE LENGTH	LOS	DELAY (SEC)	V/C
OPTION 1 – ONE-WAY EB	100s	C	20	0.98
OPTION 2 – CLOSE BELMONT	110s	B	17	0.83
OPTION 3 – TWO LANES SB	120s	B	18	0.92
OPTION 4 – ONE-WAY WB [A]	140s	D	39	0.92

Analysis represents year 2039 weekday PM peak hour in the summer

[A] Based on HCM 2000

Table 2: 13th Street/ Belmont Avenue Vehicle Queue Lengths

OPTION	HCM CALCULATED QUEUE LENGTH	
	Southbound	**Northbound**
OPTION 1 – ONE-WAY EB	1000′	650′
OPTION 2 – CLOSE BELMONT	1125′	450′
OPTION 3 – TWO LANES SB	375′	650′
OPTION 4 – ONE-WAY WB	1375′	850′

Analysis represents year 2039 weekday PM peak hour in the summer

*To the south: Nix Dr – 600′; Pacific Ave – 1100′,

*To the north: B Street 450′; Taylor Ave – 1000′; May St - 1400′

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TECHNICAL MEMORANDUM

DATE: June 23, 2023

TO: Nathan Polanski | MIG

FROM: John Bosket, PE; Kayla Fleskes-Lane, PE | DKS Associates

SUBJECT: Hood River Heights Streetscape Plan – Union Street PM Peak Hour Travel Time Delay

Project #20203-000

This memorandum responds to a question raised during the April 24, 2023, Urban Renewal Advisory Board meeting regarding potential out-of-direction travel time delay for trips starting in the neighborhood along Union Street east of the Heights that want to turn south if Belmont Avenue is closed at 13th Street. Under this scenario (previously referred to as Option 2 for Belmont Avenue and east-west street configurations), these trips could make a left turn onto 13th Street from B Street or could choose to route to 13th Street via May Street.

FIGURE 1. ROUTES OF SCENARIOS EVALUATED FOR TRAVELING FROM UNION ST. TO SOUTH OF BELMONT AVE.

To help inform this discussion, the following three scenarios were evaluated (routes illustrated in Figure 1):

Scenario A: Option 2 (east Belmont Avenue approach to 13th Street is closed) with Union Street traffic turning at B Street.

Scenario B: Option 2 (east Belmont Avenue approach to 13th Street is closed) with Union Street traffic turning left at May Street.

Scenario C: Option 4 (Belmont Avenue is one-way westbound between 12th and 13th Streets) with Union Street traffic turning left from Belmont.

For each scenario, the travel time to start from Union Street (from a point one block east of 12th Street) and reach a point on 13th Street just south of Belmont Avenue was estimated using the year 2039 weekday p.m. peak hour traffic analysis model previously used to evaluate circulation alternatives for this project. Travel time estimates included the time to travel along each street segment, as well as the estimated amount of average delay that would be experienced making the required moves through each intersection. It was assumed that average travel speeds on 13th Street would be 25 mph, while average travel speeds would be 20 mph on all other streets.

Table 1 summarizes the results of this evaluation. This includes the estimated average travel time per trip as well as the cumulative delay experienced during the one-hour peak period from all trips assumed to be making that movement.

Key observations from the results in Table 1 include:

- Given the short length of Union Street, the number of peak hour trips forecast to make the westbound to southbound trip down 12th Street south of the Heights is fairly small. There would be more of these trips coming from the neighborhood north of Union Street, but their route options would be very similar to what they can do today. The difference for these trips would be the higher delay experienced while attempting to turn left onto 13th Street, which is estimated to be just under two minutes on average during the peak hour. However, this is a result of the 13th Street configuration selected (i.e., conversion to two-way traffic with limited traffic on 12th Street), not the choice of circulation options at Belmont Avenue.

- The travel time for Union Street traffic increases by 35 percent (or about 45 seconds) when turning left from B Street instead of directly from Belmont Avenue. When turning left from May Street, the travel time increases by 130 percent (or about 2-1/2 minutes)

- Adding the east Belmont Avenue approach back to the intersection with 13th Street (as in Scenario C) results in a significant 123 percent increase in delay for traffic traveling northbound on 13th Street. While this only equates to about 13 seconds per vehicle, because of the high number of northbound trips during the peak hour this results in a cumulative increase in delay of more than three vehicle-hours.

- When totaling all vehicle delay experienced by northbound and southbound traffic on 13th Street as well as all Union Street trips making a southbound left turn onto 13th Street, Scenario A results in the least amount of system delay. Scenario B results in a 3 percent increase in delay over Scenario A, while Scenario C results in a 19 percent increase.

TABLE 1. TRAVEL TIME AND DELAY ESTIMATES FOR ROUTES FROM UNION ST. TO SOUTH OF 13TH ST. (2039 WEEKDAY PM PEAK HOUR)

	TRAFFIC FROM UNION STREET			NORTHBOUND 13TH STREET TRAFFIC		SOUTHBOUND 13TH STREET TRAFFIC		ALL TRAFFIC
Circulation Scenario	Vehicles	Total Travel Time (min)	Total Veh Delay (veh-min)	Vehicles	Total Veh Delay (veh-min)	Vehicles	Total Veh Delay (veh-min)	Overall Veh Delay (veh-min)
Scenario A: Option 2 (Close Belmont), turn south from B Street	20	2.6	52	855	151	1,040	768	971
Scenario B: Option 2 (Close Belmont), turn south from May Street	20	4.3	85	855	151	1,040	768	1,004
Scenario C: Option 4 (One-way WB Belmont), turn south from Belmont Avenue	20	1.9	37	855	336	1,040	778	1,152

Notes: veh = vehicle; min = minutes

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M E M O R A N D U M

DATE: May 31, 2022

TO: Dustin Nilsen, AICP, Director of Planning & Zoning, City of Hood River

FROM: Gannon Grimmer, PE, Traffic Project Manager, American Structurepoint

CC: Hardik Shah, PE, PTOE, Traffic Services Director, American Structurepoint

RE: Roundabout Peer Review – City of Hood River, Oregon

Introduction

American Structurepoint, Inc. performed a peer review for two (2) proposed roundabouts in the City of Hood River, OR. The purpose of this memorandum is to document the traffic analysis and findings, and to document the anticipated roadway impacts based upon the proposed conceptual layouts.

Study Area

The following two (2) intersections were evaluated as candidates for proposed roundabouts:

1. May Street & 13th Street
2. Belmont Avenue & 13th Street/12th Street
    A. Belmont Avenue & 13th Street
    B. Belmont Avenue & 12th Street

The intersection locations are shown on **Figure 1**.

Design & Conceptual Layouts

The proposed conceptual layouts for both roundabouts are provided in the figures shown on the following pages. For each location, there is a roundabout exhibit to show the design geometry and a roundabout exhibit to show the anticipated right-of-way impacts. The exhibit descriptions are listed as follows:

- **Figure 2 – May Street & 13th Street Roundabout Exhibit (Design Geometry)**
- **Figure 3 – Belmont Avenue & 13th Street/12th Street Roundabout Exhibit (Design Geometry)**
- **Figure 4 – May Street & 13th Street Roundabout Exhibit (Right-of-Way Impacts)**
- **Figure 5 – Belmont Avenue & 13th Street/12th Street Roundabout Exhibit (Right-of-Way Impacts)**

The design for each roundabout location considered all potential right-of-way impacts and primarily focused on avoiding right-of-way acquisition for select parcels based on discussions with the City of Hood River. Consideration was also given to maintaining accessibility through the intersections for larger design vehicles, while working in a largely confined urban footprint.

In general, the roundabouts were designed with the following parameters:

<u>May Street & 13th Street:</u>

- Inscribed Circle Diameter (ICD) = 150’
- Circulating Lane Width = 14’
- Pedestrian crossings, ADA ramps, and sidewalks for all pedestrian movements
- Mountable center island and truck aprons
- Retaining walls, where required, to minimize right-of-way impacts

<u>Belmont Avenue & 13th Street/12th Street:</u>

- Minimum Inscribed Circle Diameter (ICD) = 140’
- Circulating Lane Width = 14’
- Pedestrian crossings, ADA ramps, and sidewalks for all pedestrian movements
- Mountable center island and outside-curb truck aprons, as necessary
- Retaining walls, where required, to minimize right-of-way impacts
- Residential and Commercial drive access maintained to adjacent properties

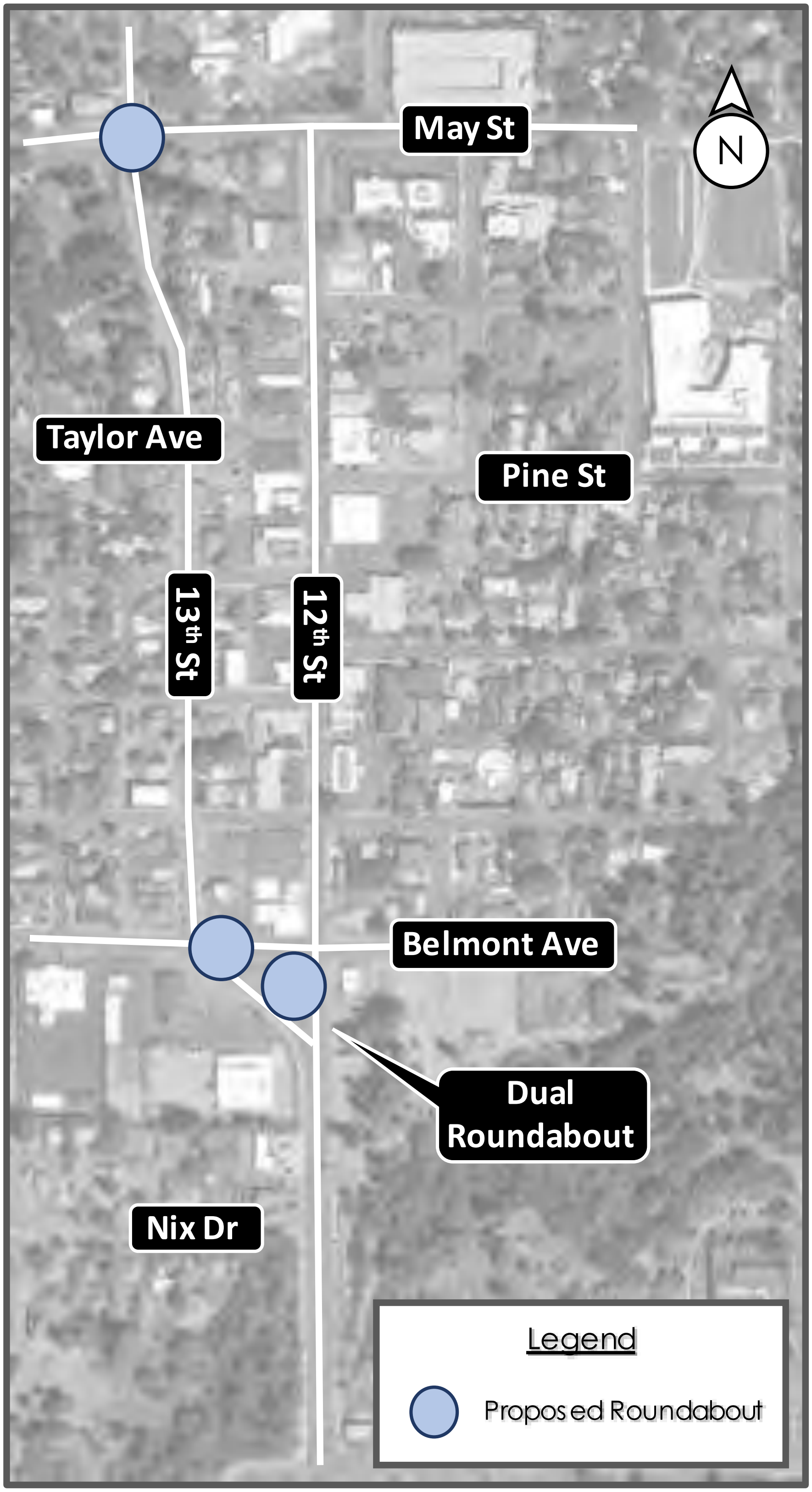


Figure 1 – Study Area

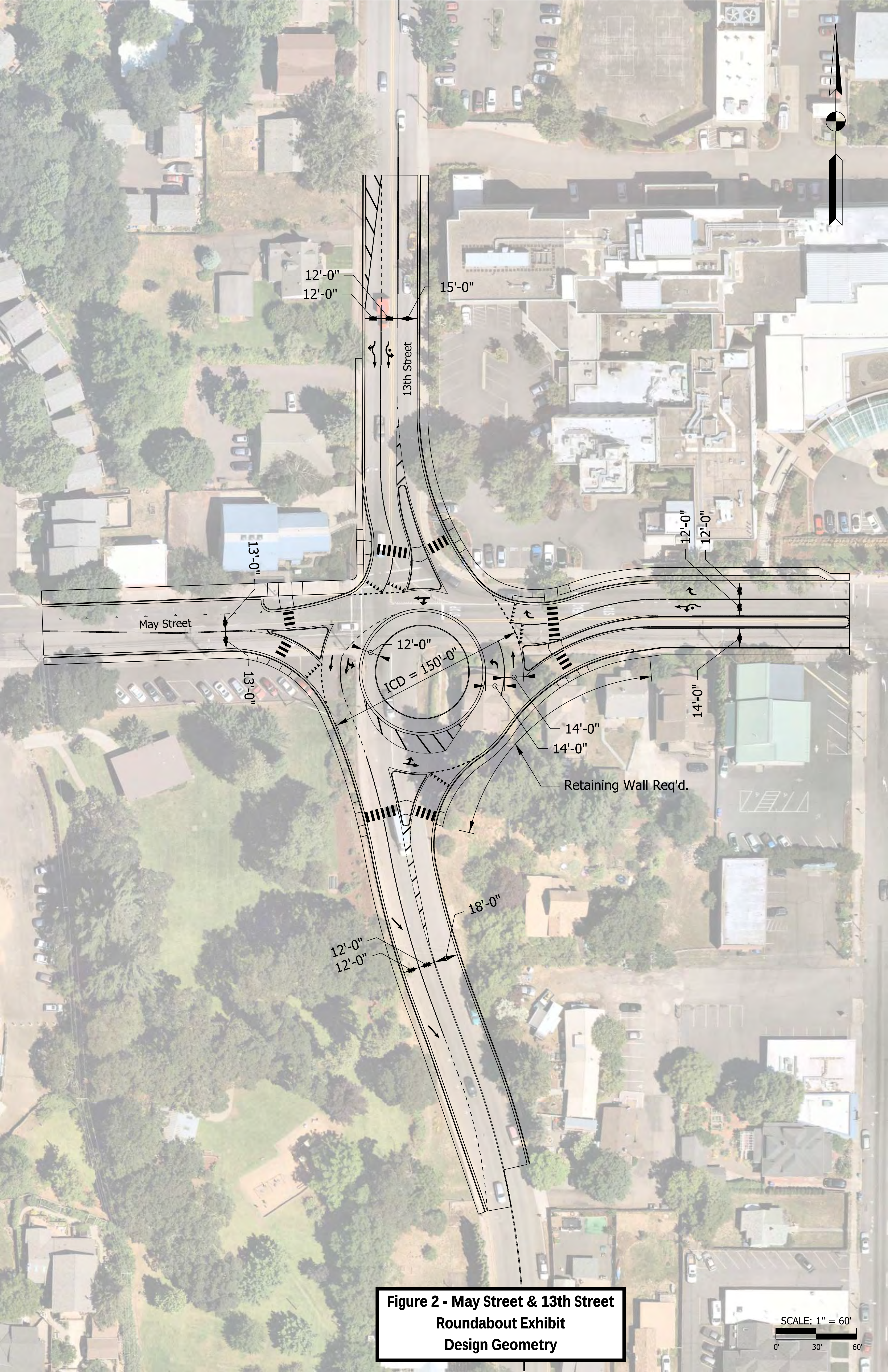


Figure 2 - May Street & 13th Street Roundabout Exhibit Design Geometry

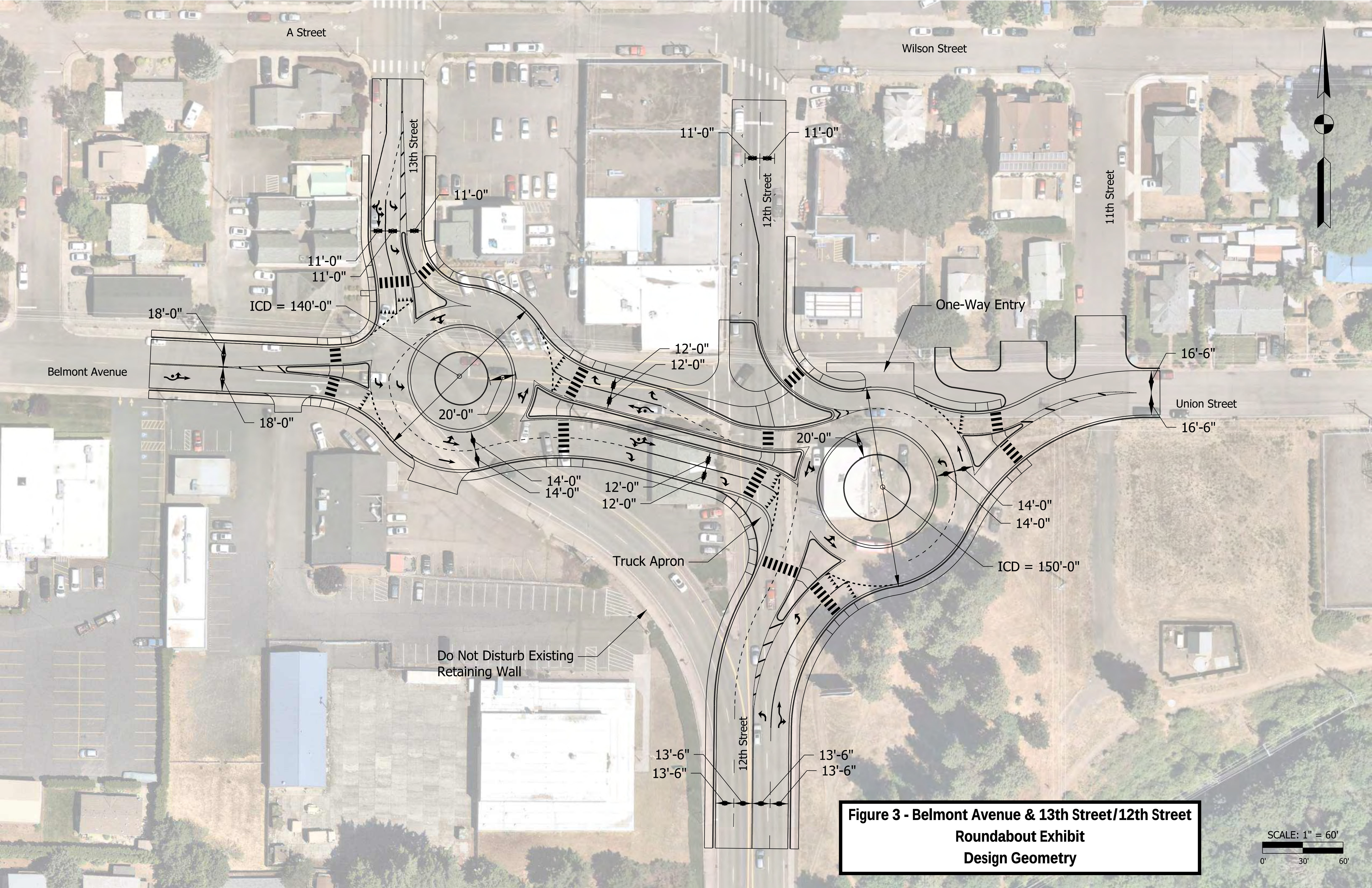
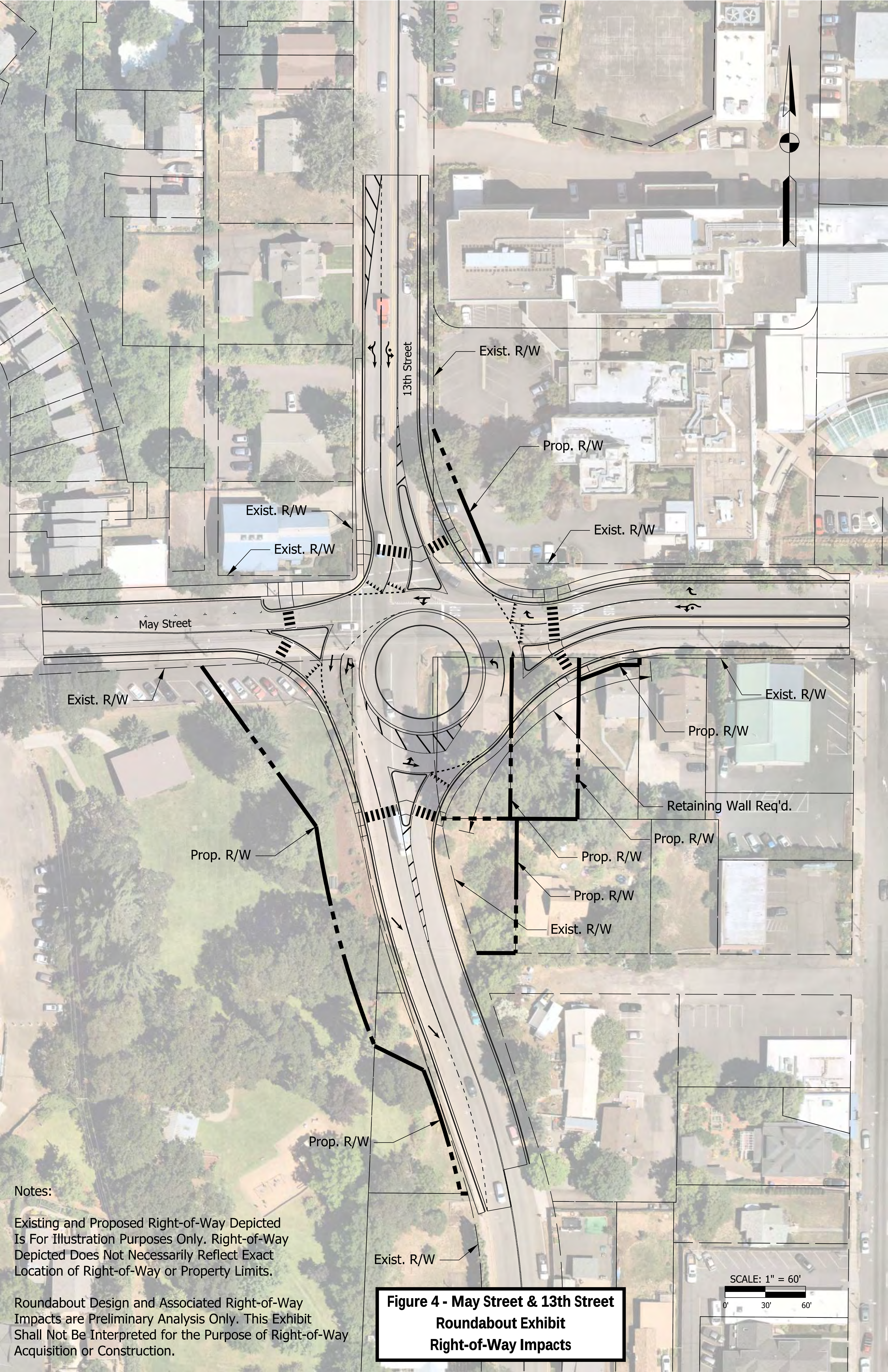


Figure 3 - Belmont Avenue & 13th Street/12th Street
Roundabout Exhibit
Design Geometry



Notes:

Existing and Proposed Right-of-Way Depicted Is For Illustration Purposes Only. Right-of-Way Depicted Does Not Necessarily Reflect Exact Location of Right-of-Way or Property Limits.

Roundabout Design and Associated Right-of-Way Impacts are Preliminary Analysis Only. This Exhibit Shall Not Be Interpreted for the Purpose of Right-of-Way Acquisition or Construction.

Figure 4 - May Street & 13th Street Roundabout Exhibit Right-of-Way Impacts

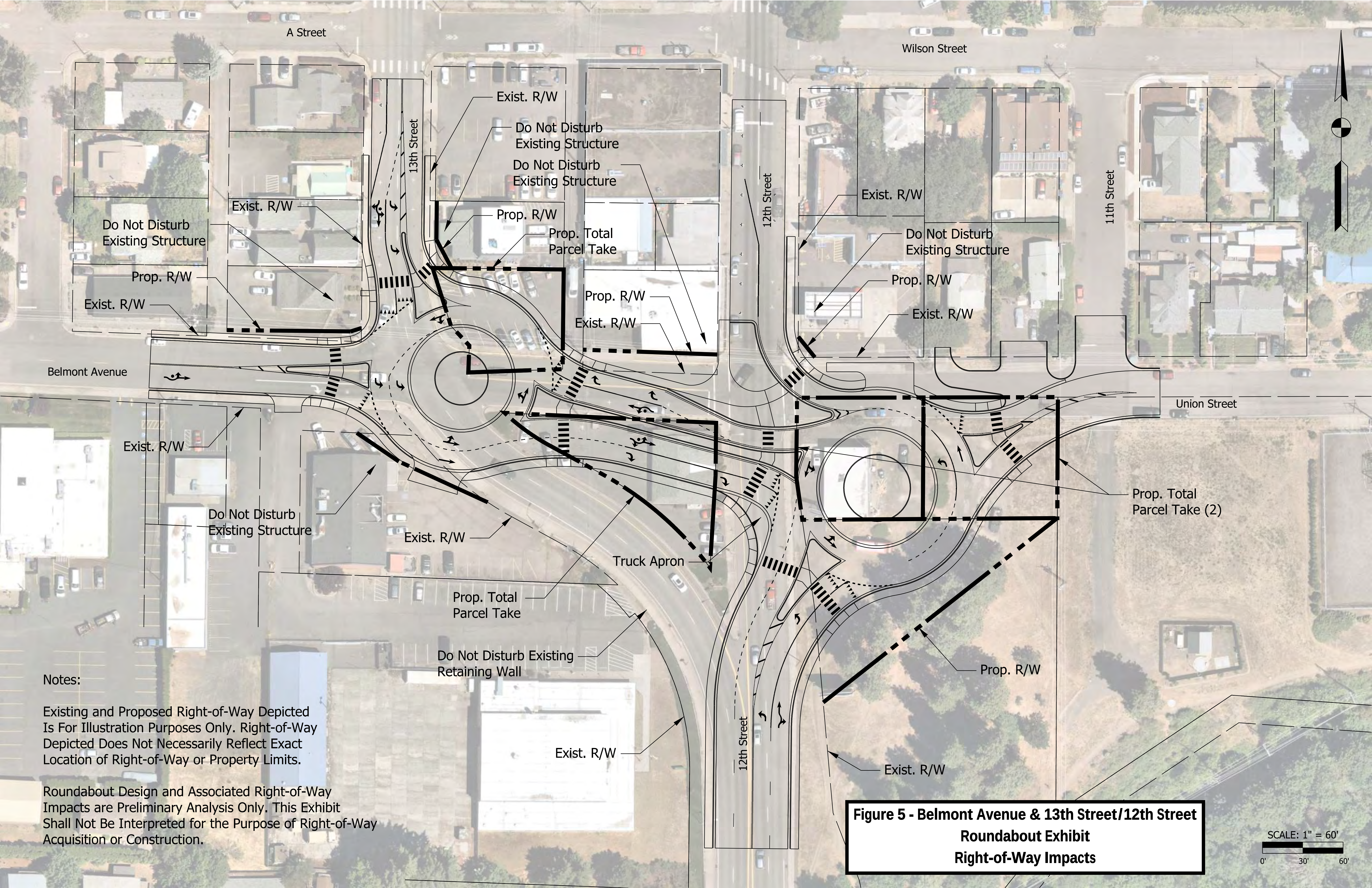


Figure 5 - Belmont Avenue & 13th Street/12th Street
Roundabout Exhibit
Right-of-Way Impacts

Notes:

Existing and Proposed Right-of-Way Depicted Is For Illustration Purposes Only. Right-of-Way Depicted Does Not Necessarily Reflect Exact Location of Right-of-Way or Property Limits.

Roundabout Design and Associated Right-of-Way Impacts are Preliminary Analysis Only. This Exhibit Shall Not Be Interpreted for the Purpose of Right-of-Way Acquisition or Construction.

Traffic Data

Traffic volumes for this analysis were obtained from the *Hood River Heights Streetscape Plan – Alternatives Transportation Evaluation - DRAFT* prepared by DKS Associates in January 2022. The traffic volumes utilized for the analysis in this memorandum were based on Alternative 3 identified in the DKS technical memorandum. The 2039 PM peak hour traffic volumes are provided in **Table 2**.

Table 2 – 2039 PM Peak Hour Traffic Volumes

ID	Intersection	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
1	May St & 13th St	100	650	110	25	725	55	50	35	80	310	195	140
2A	Belmont Ave & 13th St				1050		100	70	245			120	860
2B	Belmont Ave & 12th St	980	450	40				45	50	1200	10	10	10

Capacity Analysis

A capacity analysis was performed for the roundabouts using SIDRA Intersection (Version 9.0), utilizing the SIDRA Standard Module and following the methodology outlined in the *Highway Capacity Manual*.

The standard parameter used to evaluate traffic operating conditions is referred to as the level of service. There are six LOS (A through F) which relate to driving conditions. LOS for signalized intersections is defined in terms of control delay per vehicle, which is a direct correlation to driver discomfort, frustration, fuel consumption, and lost travel time. **Table 3** provides the LOS criteria for intersections as defined in the *Highway Capacity Manual*.

The operating conditions of intersections are generally considered to be acceptable if found to operate at LOS D or better for the overall intersection, with no approach operating worse than LOS E. The 95th percentile queue lengths were also evaluated to determine if queuing has an adverse impact on an upstream intersection, i.e., spillback queuing into an adjacent major intersection.

Table 3 – LOS Thresholds

LOS	Control Delay per Vehicle (seconds)
A	≤ 10
B	> 10 and ≤ 20
C	> 20 and ≤ 35
D	> 35 and ≤ 55
E	> 55 and ≤ 80
F	> 80

The capacity analysis results are summarized in **Table 4** for the PM peak hour. The SIDRA analysis output is provided in **Attachment A**.

Table 4 – Capacity Analysis Results: 2039 PM Peak Hour

ID	Intersection	Approach	Capacity Analysis			
			Delay (sec/veh)	LOS	95th % Queue Length (ft)	v/c
1	May St & 13th St	NB	2.1	A	250	0.70
		SB	7.0	A	150	0.53
		EB	9.4	A	50	0.33
		WB	13.5	B	250	0.67
		Overall	*7.2*	*A*	--	--
2A	Belmont Ave & 13th St	SB	9.9	A	100	0.43
		EB	9.8	A	75	0.50
		WB	4.0	A	175	0.56
		Overall	*7.6*	*A*	--	--
2B	Belmont Ave & 12th St	NB	4.4	A	200	0.66
		EB	1.2	A	125	0.44
		WB	12.9	B	25	0.07
		Overall	*3.0*	*A*	--	--

The capacity analysis results show that the proposed roundabout configurations will be able to accommodate the 2039 PM peak hour traffic volumes. All approaches are expected to operate at LOS B or better, and the 95th percentile queue lengths are not anticipated to have an adverse impact on upstream intersections.

For the proposed roundabouts at Belmont Avenue & 13th Street and Belmont Avenue & 12th Street, the 95th percentile queue lengths between the roundabout entries/exits was a critical component to the capacity analysis. Due to the right-of-way constraints with where each roundabout node can be located, the spacing between the roundabout entries/exits was limited to approximately 200 feet. This limitation required additional capacity (added turn lanes) at each roundabout such that the queuing for Belmont Avenue & 13th Street (WB approach) and Belmont Avenue & 12th Street (EB approach) would be less than 200 feet in both respective directions. The capacity analysis results indicated a 95th percentile queue length of 175 feet and 125 feet, respectively, during the 2039 PM peak hour.

Sensitivity Analysis

A sensitivity analysis was performed for the roundabouts to show how the capacity analysis results look without adding turn lanes to certain approaches. The sensitivity analysis results are summarized in **Table 5** for the 2039 PM peak hour. The SIDRA analysis output for the sensitivity analysis is provided in **Attachment B**.

Table 5 – Sensitivity Analysis Results: 2039 PM Peak Hour

ID	Intersection	Approach	Capacity Analysis			
			Delay (sec/veh)	LOS	95th % Queue Length (ft)	v/c
1	May St & 13th St	NB	2.1	A	225	0.70
		SB	5.0	A	125	0.49
		EB	6.8	A	50	0.31
		WB	84.5	F	1,125	1.10
		Overall	*24.8*	*C*	--	--
2A	Belmont Ave & 13th St	SB	9.9	A	100	0.43
		EB	9.9	A	100	0.51
		WB	4.5	A	325	0.76
		Overall	*7.7*	*A*	--	--
2B	Belmont Ave & 12th St	NB	93.5	F	3,325	1.19
		EB	1.2	A	125	0.44
		WB	28.5	C	50	0.16
		Overall	*50.1*	*D*	--	--

The sensitivity analysis results indicate in **red** how the roundabout approaches would operate without an added turn lane to a given approach. The "removed" turn lanes were analyzed as follows:

May Street & 13th Street (without westbound right-turn lane)

The sensitivity analysis results show that the westbound approach would be expected to operate at LOS F if only a single entry lane was provided. This indicates that a dedicated right-turn lane for the westbound approach is required to meet the criteria for acceptable traffic operations.

Belmont Avenue & 13th Street (without westbound right-turn lane)

The sensitivity analysis results show that the westbound approach would be expected to operate at LOS A if only a single entry lane was provided; however, the 95th percentile queue length of 325 feet exceeds the maximum-allowable queue length requirement of 200 feet between the roundabouts. This indicates that a dedicated right-turn lane for the westbound approach is required to meet the criteria for acceptable traffic operations.

Belmont Avenue & 12th Street (without northbound left-turn lane)

The sensitivity analysis results show that the northbound approach would be expected to operate at LOS F if only a single entry lane was provided. This indicates that a dedicated left-turn lane for the northbound approach is required to meet the criteria for acceptable traffic operations.

Attachment A

[Capacity Analysis Output]

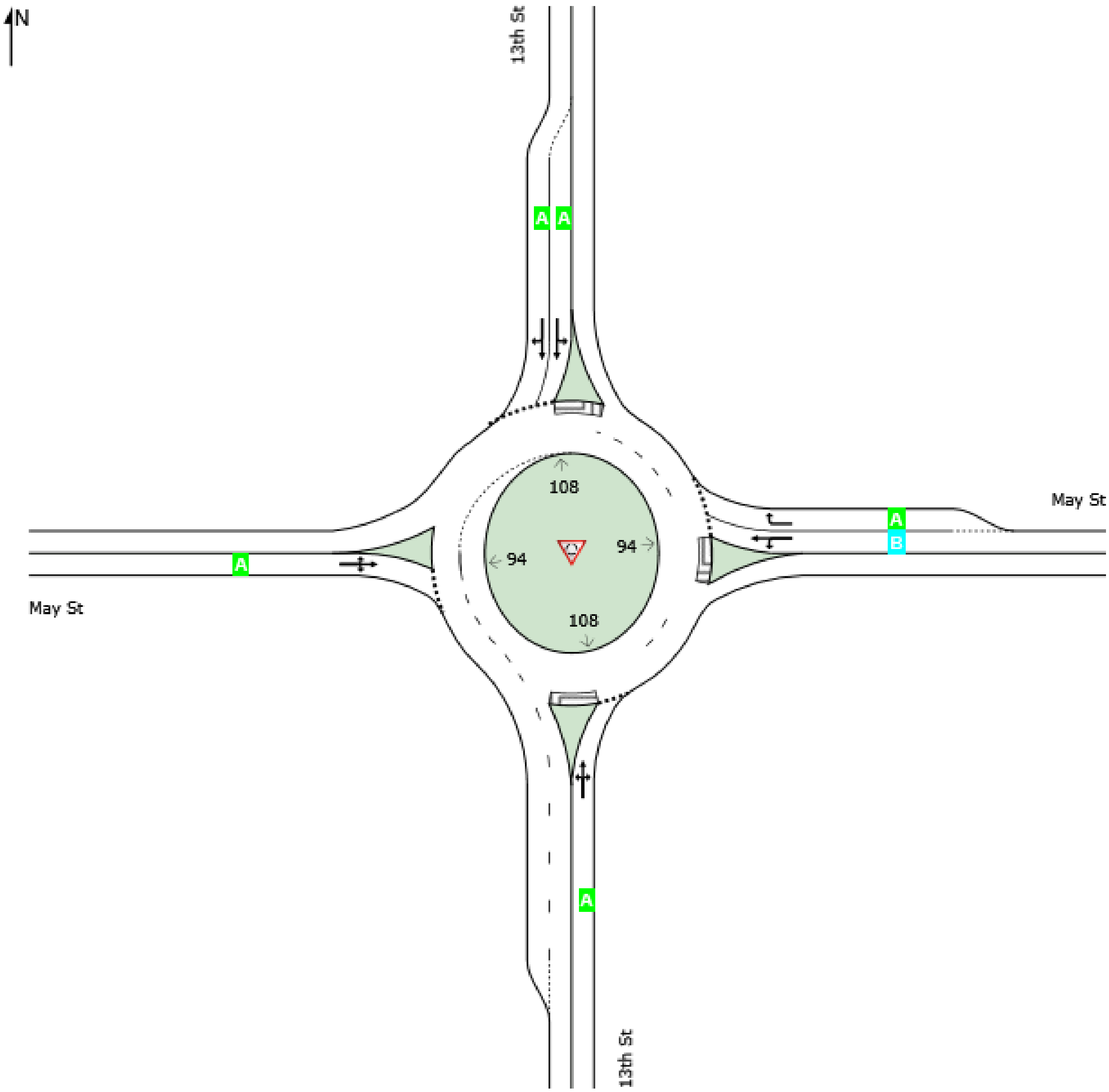
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [13th St & May St - 2 SBT, 1 WBR (Site Folder: Proposed RAB - Alt. 3)]

2039 PM Peak Hour
Site Category: Proposed Design
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	A	B	A	A	A



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: SIDRA Standard (Geometric Delay is included).

MOVEMENT SUMMARY

Site: 101 [13th St & May St - 2 SBT, 1 WBR (Site Folder: Proposed RAB - Alt. 3)]

2039 PM Peak Hour
Site Category: Proposed Design
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: 13th St														
3	L2	100	2.0	106	2.0	0.704	6.7	LOS A	8.9	226.4	0.66	0.30	0.66	25.4
8	T1	650	2.0	691	2.0	0.704	1.4	LOS A	8.9	226.4	0.66	0.30	0.66	23.8
18	R2	110	2.0	117	2.0	0.704	2.3	LOS A	8.9	226.4	0.66	0.30	0.66	24.2
Approach		860	2.0	915	2.0	0.704	2.1	LOS A	8.9	226.4	0.66	0.30	0.66	24.1
East: May St														
1	L2	310	2.0	330	2.0	0.666	17.1	LOS B	9.0	229.0	1.00	1.18	1.41	22.6
6	T1	195	4.0	207	4.0	0.666	11.9	LOS B	9.0	229.0	1.00	1.18	1.41	21.5
16	R2	140	1.0	149	1.0	0.253	7.6	LOS A	1.8	46.1	0.89	0.83	0.89	23.3
Approach		645	2.4	686	2.4	0.666	13.5	LOS B	9.0	229.0	0.98	1.11	1.30	22.4
North: 13th St														
7	L2	25	2.0	27	2.0	0.525	10.0	LOS B	5.3	135.7	0.94	0.81	1.02	24.7
4	T1	725	3.0	771	3.0	0.525	6.9	LOS A	5.3	135.7	0.93	0.86	1.02	24.2
14	R2	55	2.0	59	2.0	0.501	7.3	LOS A	4.5	114.4	0.92	0.92	1.03	23.6
Approach		805	2.9	856	2.9	0.525	7.0	LOS A	5.3	135.7	0.93	0.86	1.02	24.2
West: May St														
5	L2	50	2.0	53	2.0	0.332	10.8	LOS B	1.8	46.8	0.82	0.88	0.84	24.4
2	T1	35	1.0	37	1.0	0.332	5.7	LOS A	1.8	46.8	0.82	0.88	0.84	23.9
12	R2	80	3.0	85	3.0	0.332	10.1	LOS B	1.8	46.8	0.82	0.88	0.84	23.3
Approach		165	2.3	176	2.3	0.332	9.4	LOS A	1.8	46.8	0.82	0.88	0.84	23.8
All Vehicles		2475	2.4	2633	2.4	0.704	7.2	LOS A	9.0	229.0	0.84	0.73	0.95	23.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

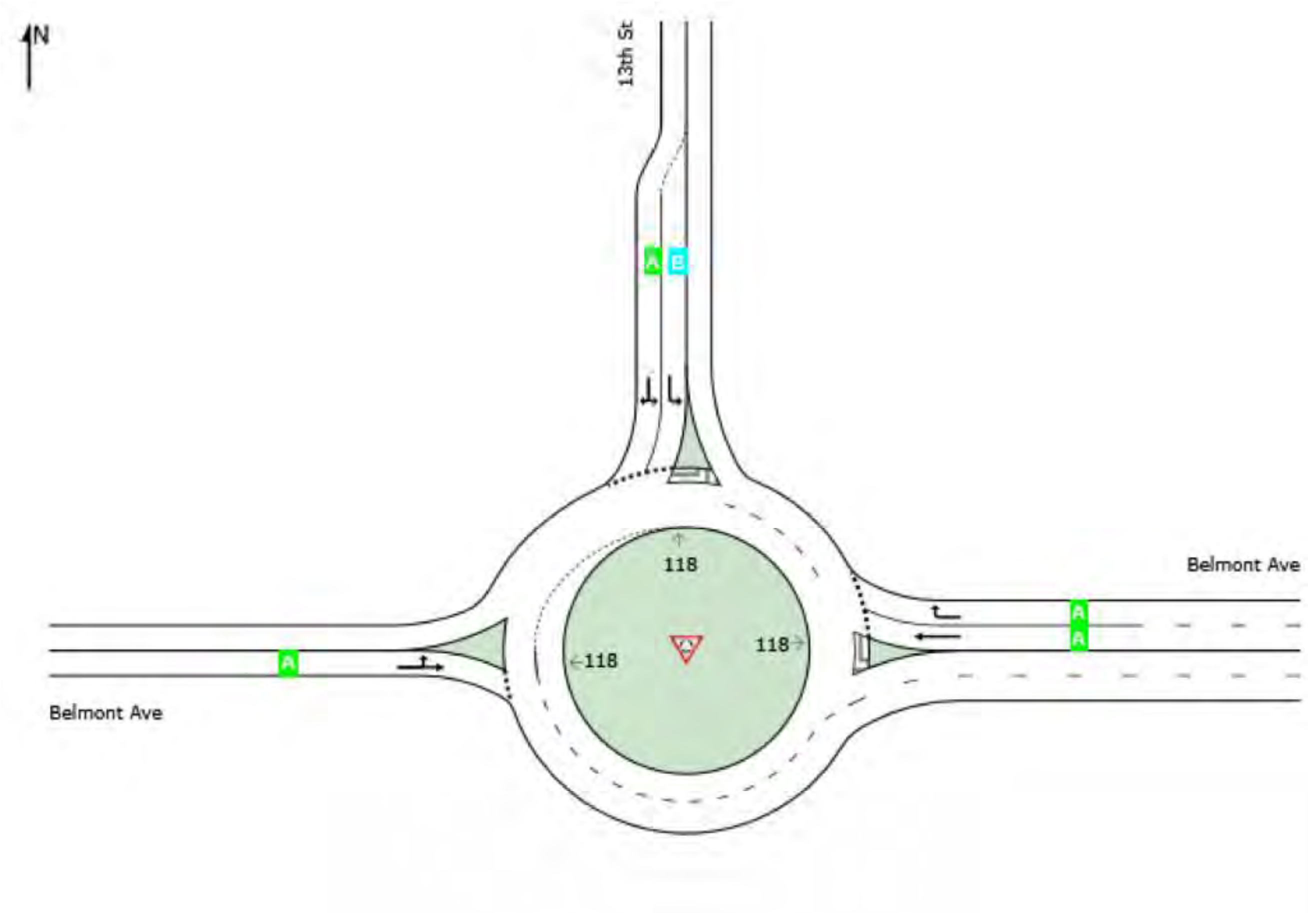
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 102 [13th St & Belmont Ave (Site Folder: Proposed RAB - Alt. 3 (Dual RAB))]

2039 PM Peak Hour
Site Category: Proposed Design
Roundabout

	Approaches			Intersection
	East	North	West	
LOS	A	A	A	A



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: SIDRA Standard (Geometric Delay is included).

MOVEMENT SUMMARY

Site: 102 [13th St & Belmont Ave (Site Folder: Proposed RAB - Alt. 3 (Dual RAB))]

2039 PM Peak Hour
Site Category: Proposed Design
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: Belmont Ave														
6	T1	120	2.0	130	2.0	0.107	3.5	LOS A	0.7	17.0	0.28	0.35	0.28	38.0
16	R2	860	2.0	935	2.0	0.555	4.1	LOS A	6.1	155.2	0.40	0.44	0.40	36.2
Approach		980	2.0	1065	2.0	0.555	4.0	LOS A	6.1	155.2	0.39	0.43	0.39	36.4
North: 13th St														
7	L2	1050	2.0	1141	2.0	0.427	10.7	LOS B	3.4	85.5	0.41	0.60	0.41	33.9
14	R2	100	2.0	110	2.0	0.427	1.6	LOS A	3.4	85.5	0.39	0.57	0.39	27.1
Approach		1150	2.0	1251	2.0	0.427	9.9	LOS A	3.4	85.5	0.41	0.59	0.41	33.1
West: Belmont Ave														
5	L2	70	2.0	77	2.0	0.498	10.7	LOS B	2.9	73.7	0.77	0.94	0.95	28.4
2	T1	245	2.0	266	2.0	0.498	9.5	LOS A	2.9	73.7	0.77	0.94	0.95	32.9
Approach		315	2.0	343	2.0	0.498	9.8	LOS A	2.9	73.7	0.77	0.94	0.95	31.7
All Vehicles		2445	2.0	2660	2.0	0.555	7.6	LOS A	6.1	155.2	0.45	0.57	0.47	34.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

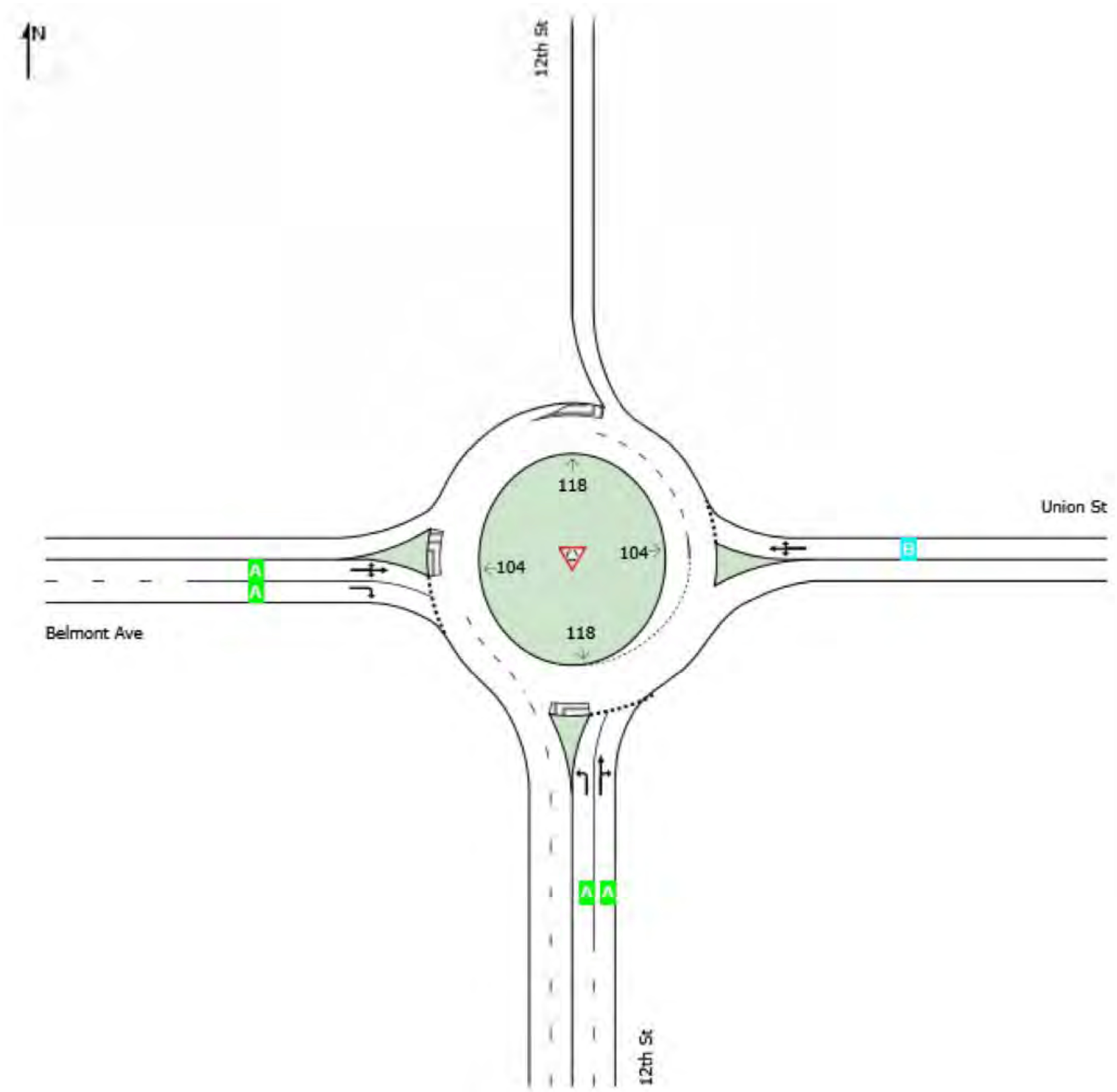
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 102 [12th St & Belmont Ave (Site Folder: Proposed RAB - Alt. 3 (Dual RAB))]

2039 PM Peak Hour
Site Category: Proposed Design
Roundabout

	Approaches			Intersection
	South	East	West	
LOS	A	B	A	A



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: SIDRA Standard (Geometric Delay is included).

MOVEMENT SUMMARY

Site: 102 [12th St & Belmont Ave (Site Folder: Proposed RAB - Alt. 3 (Dual RAB))]

2039 PM Peak Hour
Site Category: Proposed Design
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: 12th St														
3	L2	980	2.0	1077	2.0	0.659	6.1	LOS A	7.0	178.1	0.46	0.51	0.46	24.6
8	T1	450	2.0	495	2.0	0.414	0.8	LOS A	3.1	77.5	0.37	0.16	0.37	25.7
18	R2	40	2.0	43	2.0	0.414	4.6	LOS A	3.1	77.5	0.37	0.16	0.37	29.7
Approach		1470	2.0	1615	2.0	0.659	4.4	LOS A	7.0	178.1	0.43	0.39	0.43	25.1
East: Union St														
1	L2	10	2.0	11	2.0	0.070	16.9	LOS B	0.3	8.8	0.79	0.87	0.79	33.5
6	T1	10	2.0	11	2.0	0.070	10.8	LOS B	0.3	8.8	0.79	0.87	0.79	33.3
16	R2	10	2.0	11	2.0	0.070	11.0	LOS B	0.3	8.8	0.79	0.87	0.79	32.3
Approach		30	2.0	33	2.0	0.070	12.9	LOS B	0.3	8.8	0.79	0.87	0.79	33.0
West: Belmont Ave														
5	L2	45	2.0	49	2.0	0.440	5.3	LOS A	4.3	110.3	0.13	0.22	0.13	26.7
2	T1	50	2.0	54	2.0	0.440	3.3	LOS A	4.3	110.3	0.13	0.22	0.13	31.1
12	R2	1200	2.0	1319	2.0	0.440	1.0	LOS A	4.4	112.3	0.13	0.19	0.13	25.1
Approach		1295	2.0	1422	2.0	0.440	1.2	LOS A	4.4	112.3	0.13	0.19	0.13	25.3
All Vehicles		2795	2.0	3070	2.0	0.659	3.0	LOS A	7.0	178.1	0.29	0.31	0.29	25.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Attachment B

[Sensitivity Analysis Output]

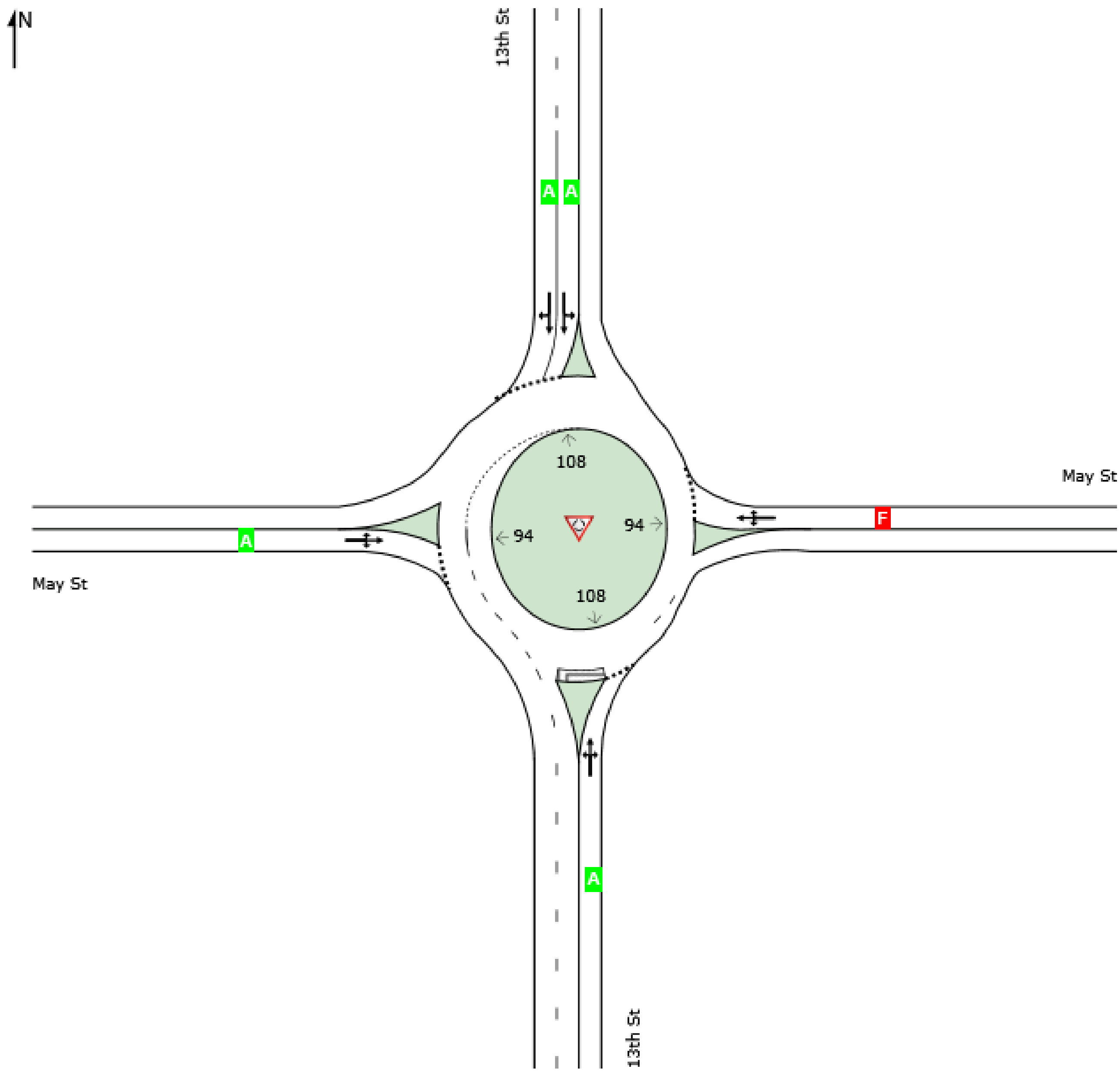
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [13th St & May St - 2 SBT (Site Folder: Proposed RAB - Alt. 3)]

2039 PM Peak Hour
Site Category: Proposed Design
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	A	F	A	A	C



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: SIDRA Standard (Geometric Delay is included).

MOVEMENT SUMMARY

Site: 101 [13th St & May St - 2 SBT (Site Folder: Proposed RAB - Alt. 3)]

2039 PM Peak Hour
Site Category: Proposed Design
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: 13th St														
3	L2	100	2.0	106	2.0	0.703	6.7	LOS A	8.8	224.8	0.65	0.30	0.65	25.4
8	T1	650	2.0	691	2.0	0.703	1.4	LOS A	8.8	224.8	0.65	0.30	0.65	23.9
18	R2	110	2.0	117	2.0	0.703	2.3	LOS A	8.8	224.8	0.65	0.30	0.65	24.2
Approach		860	2.0	915	2.0	0.703	2.1	LOS A	8.8	224.8	0.65	0.30	0.65	24.1
East: May St														
1	L2	310	2.0	330	2.0	1.099	87.0	LOS F	43.5	1107.9	1.00	2.89	4.33	13.4
6	T1	195	4.0	207	4.0	1.099	81.9	LOS F	43.5	1107.9	1.00	2.89	4.33	12.9
16	R2	140	1.0	149	1.0	1.099	82.5	LOS F	43.5	1107.9	1.00	2.89	4.33	13.0
Approach		645	2.4	686	2.4	1.099	84.5	LOS F	43.5	1107.9	1.00	2.89	4.33	13.2
North: 13th St														
7	L2	25	2.0	27	2.0	0.491	10.7	LOS B	4.2	108.1	0.89	0.87	0.97	24.8
4	T1	725	3.0	771	3.0	0.491	4.8	LOS A	4.5	116.0	0.89	0.75	0.94	24.3
14	R2	55	2.0	59	2.0	0.491	4.8	LOS A	4.5	116.0	0.90	0.65	0.92	23.8
Approach		805	2.9	856	2.9	0.491	5.0	LOS A	4.5	116.0	0.89	0.74	0.94	24.3
West: May St														
5	L2	50	2.0	53	2.0	0.311	9.8	LOS A	1.6	40.6	0.78	0.83	0.78	24.6
2	T1	35	1.0	37	1.0	0.311	4.7	LOS A	1.6	40.6	0.78	0.83	0.78	24.1
12	R2	80	3.0	85	3.0	0.311	5.8	LOS A	1.6	40.6	0.78	0.83	0.78	23.5
Approach		165	2.3	176	2.3	0.311	6.8	LOS A	1.6	40.6	0.78	0.83	0.78	24.0
All Vehicles		2475	2.4	2633	2.4	1.099	24.8	LOS C	43.5	1107.9	0.83	1.15	1.71	19.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

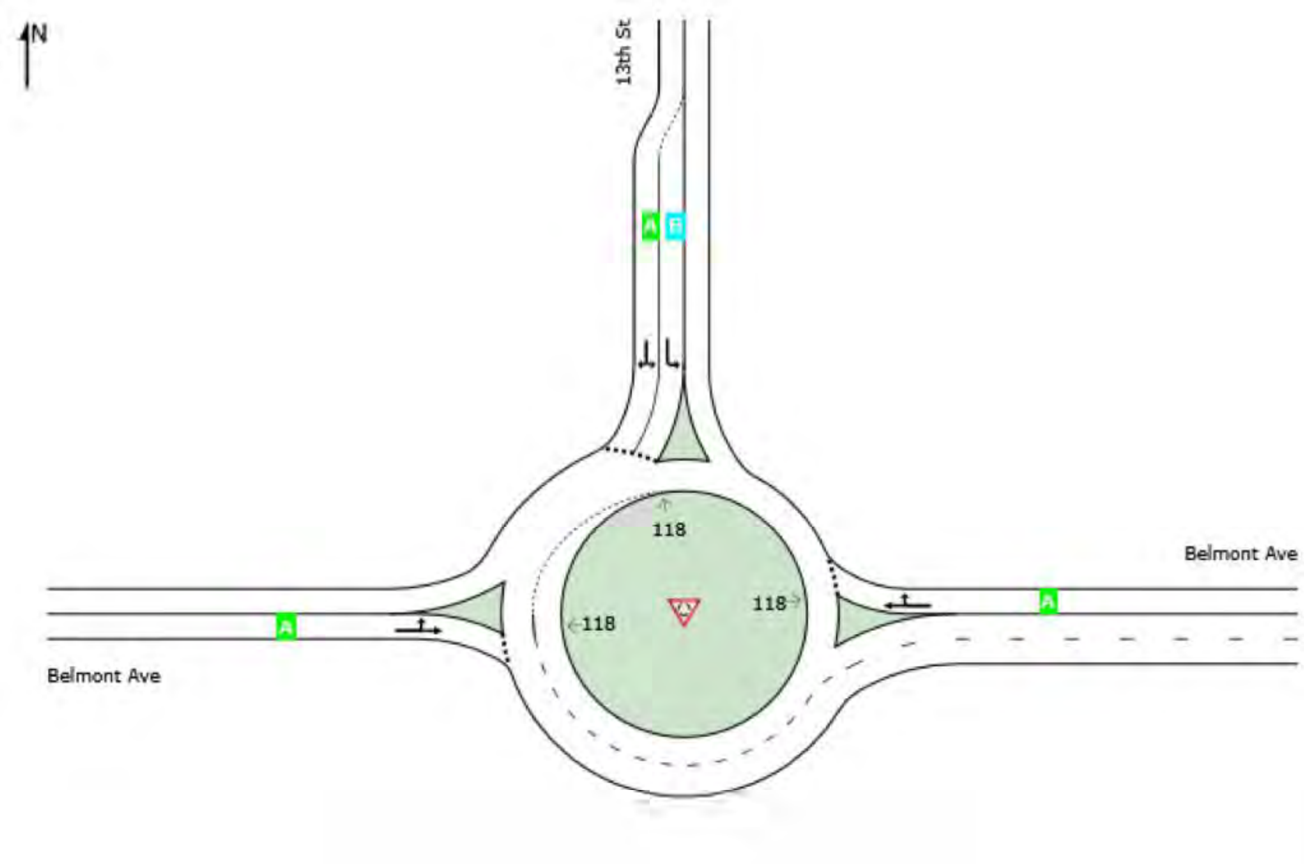
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 102 [13th St & Belmont Ave (Site Folder: Sensitivity Analysis - Alt. 3 (Dual RAB))]

2039 PM Peak Hour
Site Category: Proposed Design
Roundabout

	Approaches			Intersection
	East	North	West	
LOS	A	A	A	A



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: SIDRA Standard (Geometric Delay is included).

MOVEMENT SUMMARY

Site: 102 [13th St & Belmont Ave (Site Folder: Sensitivity Analysis - Alt. 3 (Dual RAB))]

2039 PM Peak Hour
Site Category: Proposed Design
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: Belmont Ave														
6	T1	120	2.0	130	2.0	0.759	4.2	LOS A	12.2	310.1	0.64	0.46	0.64	36.9
16	R2	860	2.0	935	2.0	0.759	4.6	LOS A	12.2	310.1	0.64	0.46	0.64	35.6
Approach		980	2.0	1065	2.0	0.759	4.5	LOS A	12.2	310.1	0.64	0.46	0.64	35.8
North: 13th St														
7	L2	1050	2.0	1141	2.0	0.433	10.7	LOS B	3.8	95.8	0.45	0.59	0.45	33.8
14	R2	100	2.0	110	2.0	0.433	1.6	LOS A	3.8	95.8	0.43	0.56	0.43	27.0
Approach		1150	2.0	1251	2.0	0.433	9.9	LOS A	3.8	95.8	0.45	0.59	0.45	33.1
West: Belmont Ave														
5	L2	70	2.0	77	2.0	0.507	10.8	LOS B	3.0	75.9	0.78	0.94	0.97	28.3
2	T1	245	2.0	266	2.0	0.507	9.6	LOS A	3.0	75.9	0.78	0.94	0.97	32.8
Approach		315	2.0	343	2.0	0.507	9.9	LOS A	3.0	75.9	0.78	0.94	0.97	31.7
All Vehicles		2445	2.0	2660	2.0	0.759	7.7	LOS A	12.2	310.1	0.57	0.59	0.59	33.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

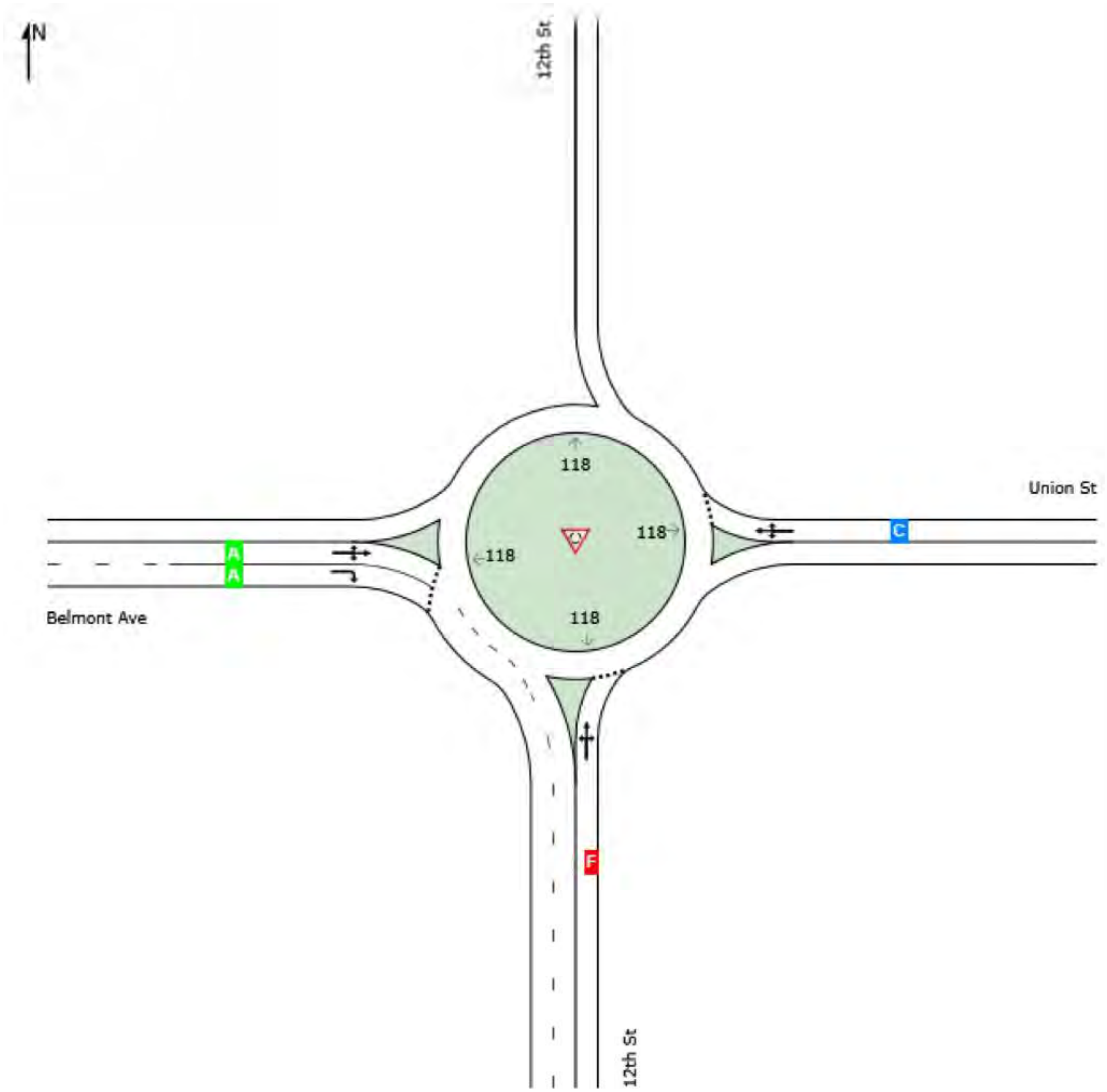
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 102 [12th St & Belmont Ave (Site Folder: Sensitivity Analysis - Alt. 3 (Dual RAB))]

2039 PM Peak Hour
Site Category: Proposed Design
Roundabout

	Approaches			Intersection
	South	East	West	
LOS	F	C	A	D



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: SIDRA Standard (Geometric Delay is included).

MOVEMENT SUMMARY

Site: 102 [12th St & Belmont Ave (Site Folder: Sensitivity Analysis - Alt. 3 (Dual RAB))]

2039 PM Peak Hour
Site Category: Proposed Design
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
South: 12th St														
3	L2	980	2.0	1077	2.0	1.187	95.1	LOS F	130.5	3315.0	1.00	1.96	2.74	12.9
8	T1	450	2.0	495	2.0	1.187	90.0	LOS F	130.5	3315.0	1.00	1.96	2.74	12.5
18	R2	40	2.0	43	2.0	1.187	93.6	LOS F	130.5	3315.0	1.00	1.96	2.74	13.6
Approach		1470	2.0	1615	2.0	1.187	93.5	LOS F	130.5	3315.0	1.00	1.96	2.74	12.8
East: Union St														
1	L2	10	2.0	11	2.0	0.163	32.8	LOS C	1.4	35.0	1.00	0.91	1.00	27.3
6	T1	10	2.0	11	2.0	0.163	26.1	LOS C	1.4	35.0	1.00	0.91	1.00	27.2
16	R2	10	2.0	11	2.0	0.163	26.5	LOS C	1.4	35.0	1.00	0.91	1.00	26.5
Approach		30	2.0	33	2.0	0.163	28.5	LOS C	1.4	35.0	1.00	0.91	1.00	27.0
West: Belmont Ave														
5	L2	45	2.0	49	2.0	0.440	5.3	LOS A	4.6	116.7	0.14	0.22	0.14	26.7
2	T1	50	2.0	54	2.0	0.440	3.3	LOS A	4.6	116.7	0.14	0.22	0.14	31.0
12	R2	1200	2.0	1319	2.0	0.440	1.0	LOS A	4.7	119.7	0.13	0.19	0.13	25.1
Approach		1295	2.0	1422	2.0	0.440	1.2	LOS A	4.7	119.7	0.13	0.19	0.13	25.3
All Vehicles		2795	2.0	3070	2.0	1.187	50.1	LOS D	130.5	3315.0	0.60	1.13	1.51	16.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

DKS

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TECHNICAL MEMORANDUM

DATE: December 20, 2022

TO: Nathan Polanski | MIG

FROM: John Bosket, PE; Kayla Fleskes-Lane, PE | DKS Associates

SUBJECT: Hood River Heights Streetscape Plan – 13th Street/ May Street Intersection Design Refinement

Project #20203-000

This memorandum provides support for design refinement of concepts to improve the intersection on 13th Street at May Street with either a traffic signal or a roundabout, in combination with surrounding improvements to implement Design Concept 3 (Hybrid).

INTERSECTION CONFIGURATION

Figures 1 and 2 show concept drawings of the 13th Street at May Street intersection under traffic signal control and roundabout control[1], respectively. The lane configuration needs were based on forecasted weekday p.m. peak hour traffic volumes for the year 2039, representing summertime conditions. Both drawings assume the surrounding streets have been reconfigured to implement Design Concept 3, which includes converting 13th Street to two-way travel south of May Street and 12th Street to one-way northbound travel south of May Street. This also includes the construction of two-way cycle tracks on the south side of May Street and the east side of 12th Street. There would be no bicycle facilities on 13th Street south of May Street, but it is assumed there would be buffered bike lanes on 13th Street north of May Street as shown in the City's Transportation System Plan (TSP). The left turn lanes under the signalized configuration have been widened to 12 feet in response to comments from ODOT.[2]

[1] The roundabout concept drawing was provided by American Structurepoint, Inc. as part of a May 31, 2022 memorandum to the City of Hood River.

[2] ODOT Concept Review Meeting, August 8, 2022.

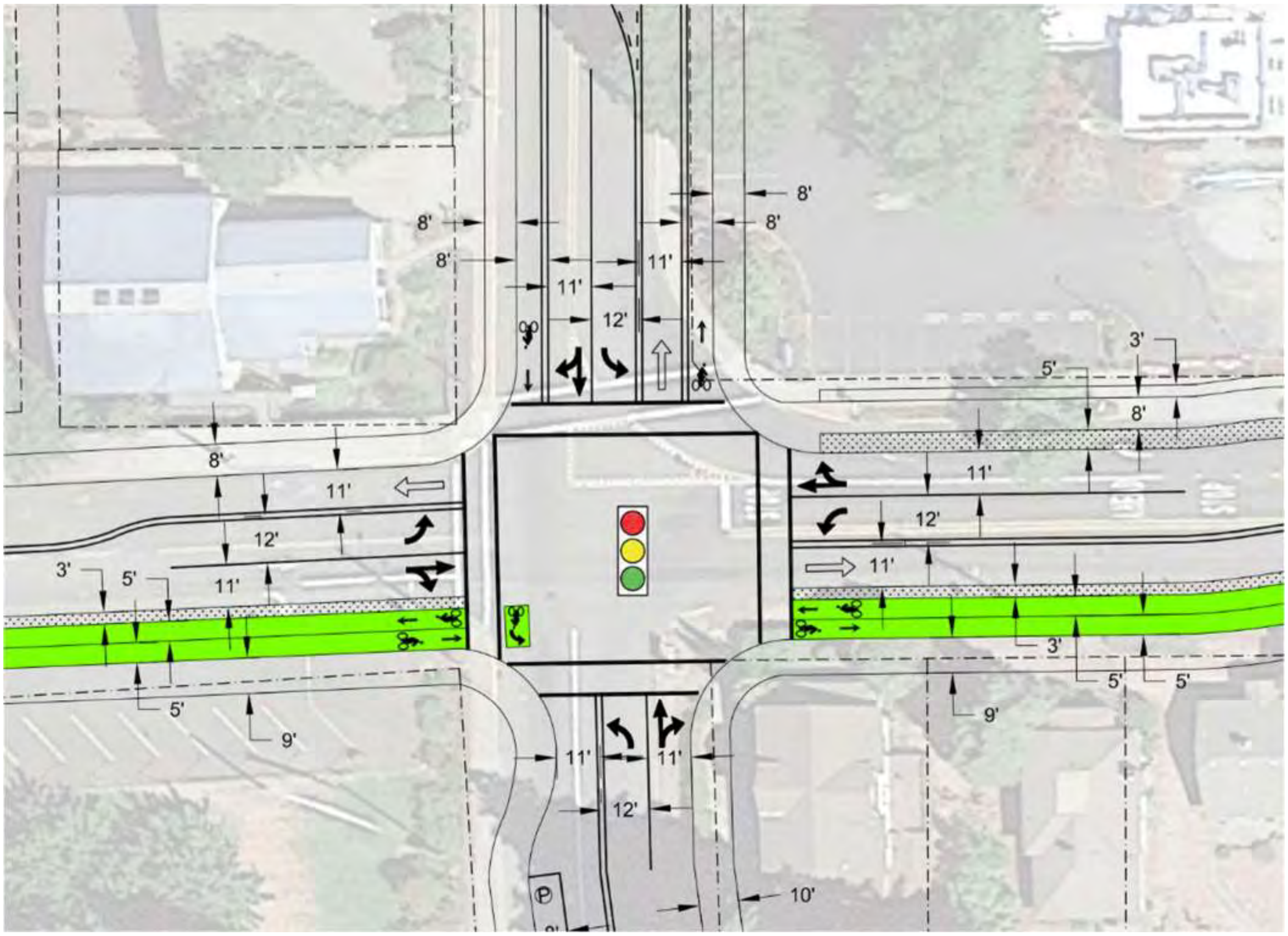


FIGURE 1. 13TH STREET/ MAY STREET SIGNALIZED INTERSECTION CONFIGURATION

Source: DKS Associates

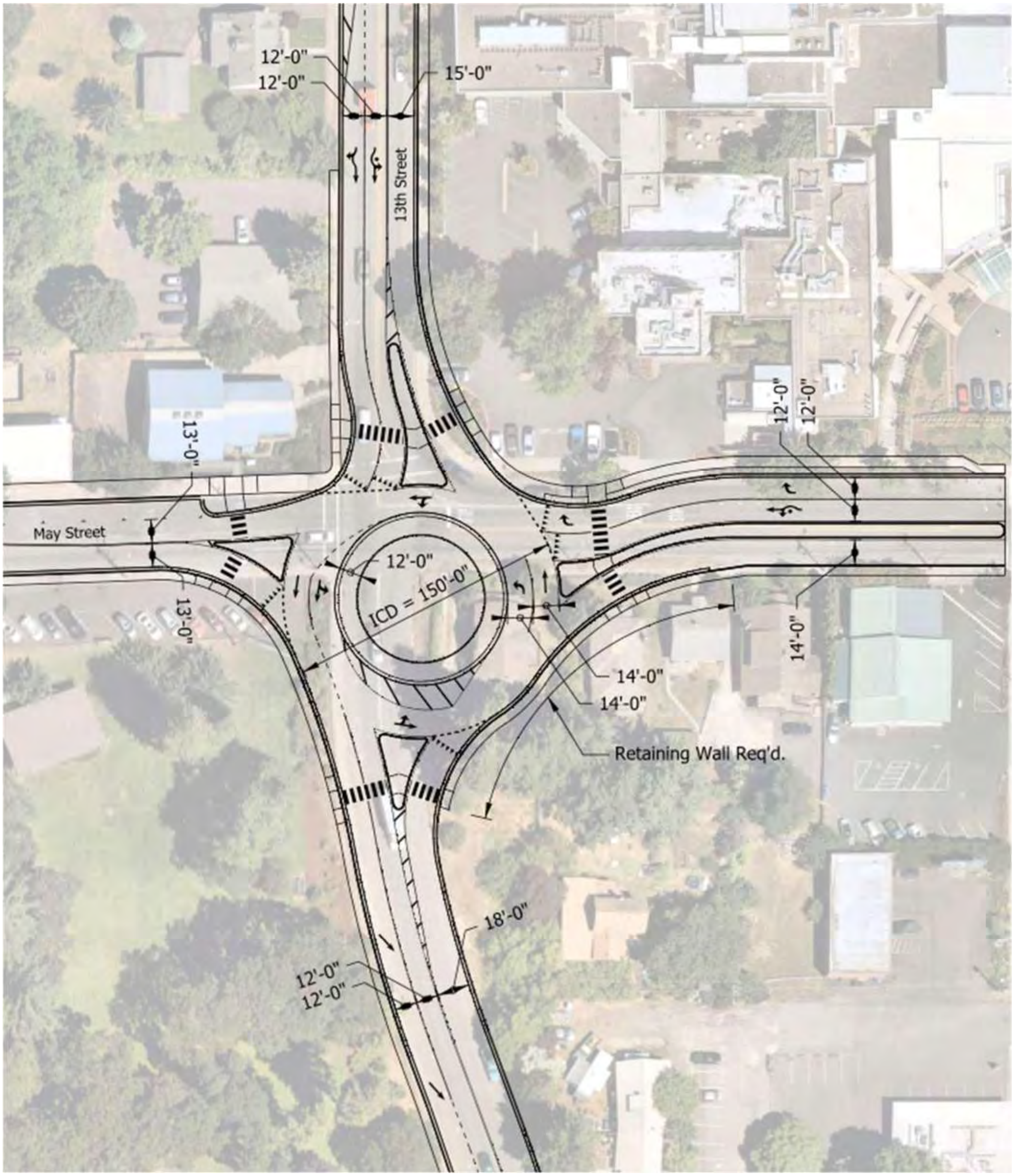


FIGURE 2. 13TH STREET/ MAY STREET ROUNDABOUT INTERSECTION CONFIGURATION

Source: American Structurepoint, Roundabout Peer Review – City of Hood River, Oregon; May 31, 2022

A peer review of the roundabout concept was conducted that yielded the following comments and potential design refinements.

1. There should not be a need for two circulating lanes in the roundabout on the east side (from the northbound entrance to the northbound exit).
2. The westbound through/left entry lane alignment looks off and would guide entering traffic into the island rather than the circulating roadway.
3. The westbound right turn lane should not enter the roundabout circulating roadway.
4. The drawing does not include the desired bicycle facilities and only includes narrow sidewalks on most approaches. In particular, if a two-way cycle track is desired on the south leg, an enhanced crossing should be considered. One option could be a protected intersection design, similar to the roundabout at 9th Street/Wilson Avenue in Bend, Oregon[3].
5. Two-lane entries and exits may need supplemental pedestrian actuated flashing beacons and warning signs for safety (impacts cost but not footprint).
6. Truck turning templates and fastest path analysis should be completed for all approaches.

When comparing the general footprints and potential right-of-way impacts between the two designs, it should be noted that the roundabout concept does not include bicycle facilities on May Street or 13th Street north of May Street, which underrepresents the needed width of those streets. In addition, the City may want to provide an additional 8 feet of width on of 13th Street, south of May Street, to provide on-street parking.

INTERSECTION OPERATIONS

Based on ODOT's preliminary signal warrant form, a traffic signal is likely to be warranted at 13th Street/ May Street in the future. Given that a traffic signal is a potential solution, the prior traffic analysis was refined to better match the current concept. These refinements include:

- an eastbound left turn lane at the intersection to provide greater flexibility for protected pedestrian crossings,
- the removal of any bottleneck at the 13th Street/ Belmont Avenue intersection (which previously influenced signal progression and vehicle queueing at 13th Street/ May Street), and
- enhanced signal coordination between the 12th Street and 13th Street intersections to better mitigate queueing impacts (does not assume the north leg of 12th Street is signalized).

In addition, the community identified a two-way cycle track as the preferred bicycle treatment on May Street, pending feasibility. To implement a two-way cycle track on the south side of May Street, bicycle-specific signal phasing and some right turn on red restrictions would be required at 13th Street/ May Street. Therefore, the intersection was tested with and without that phasing.

Based on these refinements, Table 1 compares the level of service (LOS), delay, and volume-to-capacity (v/c) ratio between TSP Build conditions (maintaining one-way traffic on 13th Street), a

[3] https://www.youtube.com/watch?v=sCa5VpenG5Y

refined traffic signal, and a roundabout at 13th Street/ May Street. As listed in the table, the roundabout is expected to operate with similar levels of delay as the TSP Build alternative. Both of the signalized alternatives are expected to operate with more delay than the TSP Build alternative. With the additional delay associated with some right turn on red restrictions and exclusive bicycle phasing, the signal with the two-way cycle track is expected to have insufficient capacity to meet demand, with nearly 80 seconds of average vehicle delay.

TABLE 1. REFINED INTERSECTION OPERATIONS RESULTS AT 13TH STREET/ MAY STREET (2039 WEEKDAY PM PEAK HOUR)

SCENARIO [A]	LOS	DELAY (SEC)	V/C
TSP BUILD	C	31	0.96
SIGNAL (WITHOUT TWO-WAY CYCLE TRACK)	D	44	0.94 [B]
SIGNAL (WITH TWO-WAY CYCLE TRACK)	E	80	**1.03**
ROUNDABOUT	C	18 [C]	0.86

Bold and red indicates a "failing" condition, which could be a v/c ratio of 1.0 or greater or a LOS F.

For signalized intersections, results are shown for the overall intersection. For roundabouts, delay and LOS are shown for the overall intersection while the v/c ratio is shown for the worst approach.

[A] Signal with two-way cycle track results reported using HCM 2000 methodology, otherwise results reported using HCM 6th edition methodology. Note that roundabout results reported by American Structurepoint utilize the Sidra methodology, which is less conservative and generally shows less delay compared to HCM 6th edition methodology.

[B] Note that the signal results show more delay than prior Design Concept 3 analysis due to changes in left turn signal phasing and cycle length at the intersection with the refined design.

[C] Note that delay at the roundabout does not take into account delay associated with an enhanced cycle track crossing (such as the use of a rectangular rapid-flashing beacon) on the south leg.

The following summarizes the expected vehicle queuing impacts with the refined concepts:

- Without the two-way cycle track, long queues are expected in the northbound and southbound directions under signal control.
  - Southbound queues are expected to extend to approximately State Street.
  - Northbound queues are expected to extend to approximately A Street.
- With the two-way cycle track, even longer queues are expected in the northbound and southbound directions under signal control.
  - Southbound queues spillback beyond Oak Street, causing long queues on Oak Street.
  - Northbound queues spillback beyond Belmont Street.
  - This results in approximately 75 percent more system-wide delay than the scenario without the two-way cycle track.
- Queueing at the roundabout is expected to be significantly lower than the signalized alternatives.

- Southbound queues are expected to extend approximately 100 feet.
- Northbound queues are expected to extend approximately 200 feet.

Beyond intersection operations and queuing, it should be noted that the southbound approach to the intersection requires climbing a steep grade (approximately 6 percent). This is typically approaching the maximum grade that can be accommodated at a roundabout. Today, the southbound approach is uncontrolled, so during icy conditions vehicles (and heavy trucks in particular) do not have to stop on the hill unless there is a pedestrian crossing.

While roundabout queues are generally rolling queues that would allow vehicles to continue forward momentum, a traffic signal would require vehicles to come to a complete stop. Without the two-way cycle track, it is expected that any given southbound through vehicle would have approximately a 95 percent chance of having to stop at the signal. With the two-way cycle track, the southbound approach is over capacity so it is likely that during peak hours, all southbound through vehicles would be required to come to a stop at the traffic signal. It should be noted that pedestrian crossings and bicyclist crossings on the cycle track may require vehicles to stop with the roundabout concept as well.

While the roundabout with an added westbound right turn lane and dual southbound through lanes is expected to perform well with future traffic volumes, single lane roundabouts generally perform better with respect to safety compared to dual lane approaches and exits at roundabouts. Consideration could be given to designing the intersection as a single lane roundabout in the near term with the intent to widen to a dual lane roundabout in the long term, pending an analysis of interim year (i.e. between today and year 2039) traffic operations.

THEHEIGHTS STREETSCAPE PLAN

memo

to Urban Renewal Agency Board

cc. Urban Renewal Advisory Committee

from Nathan Polanski, PE, MIG; Dustin Nilsen, City of Hood River Planning Director

re The Heights Streetscape Plan – Phase 3 Additional Design Studies

date April 7, 2023

This memorandum summarizes findings and project team recommendations from the additional design studies requested by the Urban Renewal Agency as part of the Heights Streetscape Phase 3 contract. The additional design studies include:

- Additional study for the design of key intersections at 13th Street/May Street and 13th Street/ Belmont Avenue/12th Street.
- The design of East/West streets in the Heights (Taylor Avenue to A Street) to identify opportunities for integrating these into the final streetscape plan.
- Refinements to the typical street cross sections of 12th and 13th Streets to reflect the distinct needs of each street and traffic calming measures for 13th Street.
- Alternatives for extending the two-way cycle on 12th Street south of the project area to Pacific Avenue.

The project team's recommendations are based on findings from these additional design studies. To continue with the development of a final concept plan the project team needs approval of the design direction for each of the additional design studies listed above.

Executive Summary

Based on our studies and the findings presented in this memo the project team's recommendations are:

Key intersections

13th Street/May Street – Roundabout: The additional cost and property impact of a roundabout compared to a traffic signal are offset by largely improved traffic operations, in particular vehicle queue lengths, which could otherwise extend onto Oak Street during 2039 summer PM peak hours, and reduced impacts for trucks coming up the hill in winter weather anticipated to worsen with a signalized intersection

13th Street/Belmont Avenue/12th Street – Traffic signal: Although a traffic signal is projected to create more delay for people travelling by car and vehicles will back up multiple blocks along 13th Street during 2039 summer PM peak hours traffic modeling does not project impacts to nearby intersections at May Street or Pacific Avenue. Compared to a roundabout, a traffic signal will also have a fraction of the impact to adjacent properties, provide more direct access for people walking and biking, and create a placemaking opportunity with the closure of Belmont between 12th and 13th Streets.

East/West Streets

The project team recommends alternating one-way streets from Taylor Avenue to A Street with parallel parking on both sides of the street, except along Taylor where angle parking may be possible on one side of the street. One-way streets are anticipated to provide more flexibility for a variety of vehicle sizes (e.g., pickup trucks, sprinter vans, delivery vehicles, etc.) for people parking and moving through the Heights and more space for people walking and biking. If increased access for people biking along Taylor Avenue and A Street are desired, "sharrows" and contra-flow bike lanes are recommended to provide bike access for people biking eastbound and westbound.

Typical street cross sections for 12th and 13th Streets

The project team has identified several refinements to the typical street cross sections developed during Phase 2 for the final concept plan. Refinements along 12th Street focus on right sizing the allocation of the 60-foot right-of-way way for: access to parking for people driving, the sidewalk experience for people walking, and providing a comfortable, dedicated place for people biking. Refinements along 13th Street focus on mitigating the impact of the center turn lane, removal of parking, and existing constraints along the edge of the right-of-way and within existing easements.

Working through these refinements has highlighted the limitation of the existing 60-foot rights-of-way and the trade-offs and sacrifices required to work within the available right-of-way. Recognizing the design of 12th and 13th Streets are constrained by the existing right of way, the project team recommends the city pursue opportunities for additional walkway space by acquiring easement or right-of-way when possible, to incorporate a 12-foot sidewalk zone into the approved cross section with the understanding and disclosure that currently this right-of-way does not exist; 12-foot sidewalk zones would increase the available space for street improvements from 60-feet to 64-feet.

Opportunities for extending a bike connection south to Pacific Avenue

The project team recommends coordinating with ODOT to explore the possibility of narrowing existing travel lanes and expanding the sidewalk zone to provide a shared use path and landscape buffer along the east side of 12th Street. A shared use path can be accommodated in a narrower space than it would take to provide separate spaces for walking and biking and would provide more comfortable separation from the roadway. At the Shell gas station and Dutch Bros. Coffee drive-thru it may not be possible to acquire an easement or expand the right-of-way to continue the 12-foot shared use path and a solution will be needed to connect to Pacific Avenue.

On-Street Parking Update

Based on recommended changes identified in this memo the future parking supply within the Heights is projected to be within 5% (~20 parking stalls) of the estimated 657 on- and off-street parking stalls needed to accommodate the 2040 peak summertime parking demand identified by the November 2021 parking study. However, it should be noted this does not account for potential parking loss at Jackson Park or the hospital based on the implementation of a roundabout at 13th/May, nor does it account for a mode shifts that the city has previously approved for increased non-vehicle traffic through the installation of pedestrian and bicycle facilities, nor the development of parking developed as part of private property redevelopment requests.

Design of Key Intersections

The goal of this study is to help identify a preferred approach for the design of key intersections at 13th Street/May Street and 13th Street/Belmont Avenue/12th Street to support the approved design concept, which, includes converting 13th Street to two-way travel south of May Street and maintaining 12th Street as one-way northbound travel south of May Street.

This study included:

- Verifying the conceptual roundabout designs for traffic operations,
- Updating roundabout concepts to incorporate bicycle facilities,
- Updating signalized intersection designs, to a similar level of detail as the roundabout concepts, and
- Comparing operational and property impacts and construction cost differences between the updated roundabout and signalized intersection concepts.

Decoding terms for traffic operations

As part of the study to verify operational impacts at key intersections the project team reviewed the traffic models for each intersection design. This included reviewing key outputs from traffic models against applicable design standards. The key outputs presented on the following pages include:

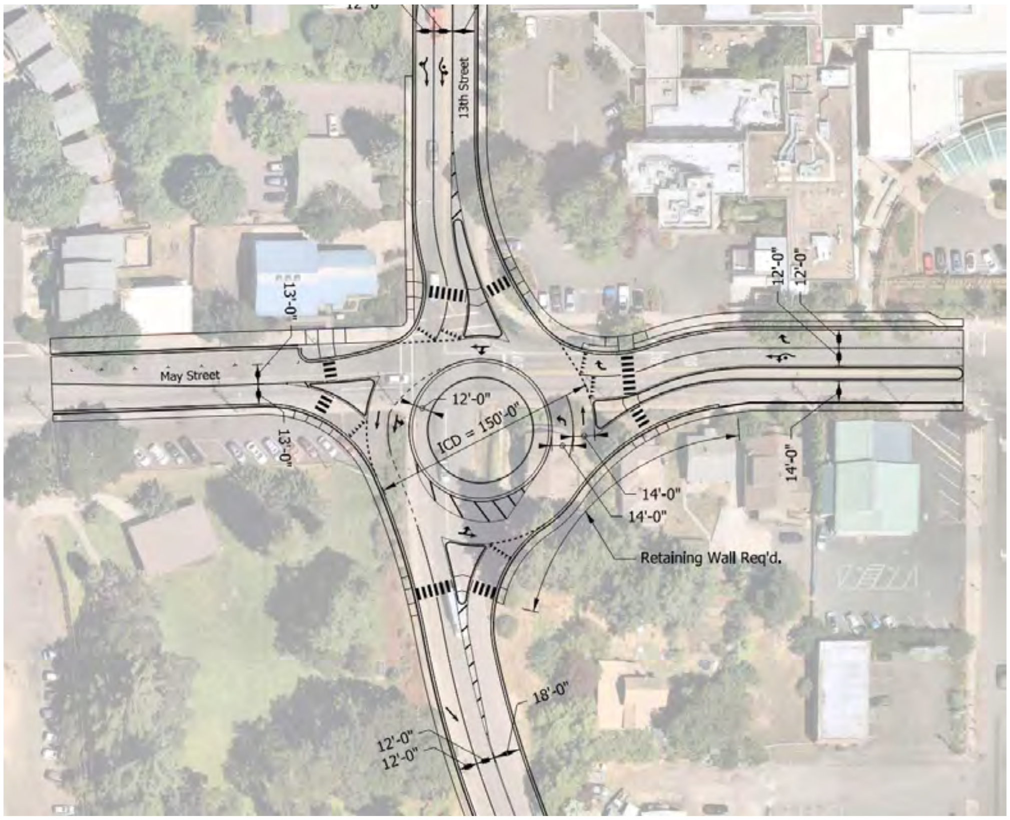
- Level of Service (LOS): how well vehicle traffic flows along a street and is expressed in letters A to F. LOS A provides the highest level of service for vehicles (e.g. free-flow traffic) but does not consider the resulting street environment for people walking or biking. LOS F provides the lowest level of service and is characterized by stop and go traffic, poor travel times, and low convenience for people driving. The city's mobility standard requires LOS E.
- Volume to capacity ratio (v/c): a measure of roadway congestion, calculated by dividing the number of vehicles passing through a section of roadway by the peak hour capacity of the roadway. ODOT's standards require a v/c ratio less than 1.0.
- Vehicle queue lengths: the distance from the stop line to the end of the last vehicle stopped in a single lane. For this analysis, queue lengths are 95th-percentile lengths for the weekday PM peak hour traffic in 2039 (i.e. this length has a 5% probability of being exceeded during the analysis period).

13th Street/May Street

Intersection Layout

The project team reviewed the roundabout layout (Figure 1) developed by the City's roundabout design consultant to identify potential design refinements and incorporate bicycle facilities into the layout.

Figure 1: Roundabout layout for May Street/13th Street by American Structurepoint



Design refinements include:

- the removal of the second circulating lane on the east side of the intersection, which was found to be in excess of the needed intersection capacity,
- modifications to May Street east and west of the roundabout to accommodate a two-way cycle track on the south side of May Street, and
- narrowing travel lanes on 13th Street north of the roundabout to accommodate bike lanes as shown in the City's Transportation System Plan (TSP).

The project team also reviewed and refined a signalized intersection concept to compare to the roundabout to understand property impacts, operational impacts, and construction cost differences.

Figures 2 and 3 below show the refined concepts for a roundabout and traffic signal.

Figures 2 and 3: Refined intersection concepts for May Street/13th Street

Operational Impacts

The refined intersection layouts were also reviewed for operational impacts to vehicular traffic for each concept based on forecasted weekday p.m. peak hour traffic volumes for the year 2039, representing summertime conditions. The following tables compare the level of service (LOS), delay, and volume-to-capacity (v/c) ratio between a traffic signal and a roundabout at 13th Street/ May Street.

As shown in Table 1, the roundabout is expected to operate with similar levels of delay as the TSP Build alternative. A signalized alternative is expected to operate with more delay, nearly 80 seconds on average, due to right turn on red restrictions and exclusive bicycle phasing for a two-way cycle track.

Table 1: Refined Intersection operations results at 13th Street/May Street

SCENARIO	LOS	DELAY (SEC)	V/C
TSP BUILD	C	31	0.96
SIGNAL (WITHOUT TWO-WAY CYCLE TRACK)	D	44	0.94
SIGNAL (WITH TWO-WAY CYCLE TRACK)	E	80	**1.03**
ROUNDABOUT	C	18 [A]	0.86

- Analysis represents year 2039 weekday PM peak hour in the summer.
- **Bold and red** indicates a "failing" condition, which could be a v/c ratio of 1.0 or greater or a LOS F.
[A] Note that delay at the roundabout does not take into account delay associated with an enhanced cycle track crossing (such as the use of a rectangular rapid-flashing beacon) on the south leg.

Looking at vehicle queue lengths (Table 2) a roundabout has significantly shorter queue lengths, whereas a traffic signal with a two-way cycle track is projected to back up traffic to Oak Street and beyond during summer p.m. peak periods, which is an unacceptable outcome that could not be recommended by the project team.

Table 2: 13th Street/May Street Vehicle Queue Lengths

INTERSECTION CONTROL	SOUTHBOUND	NORTHBOUND
SIGNAL W/O 2-WAY CYCLE TRACK	approx. to State St	approx. to A St
SIGNAL W/ 2-WAY CYCLE TRACK	beyond Oak St with queues on Oak St	beyond Belmont Ave
ROUNDABOUT	approx. 100'	approx. 200'

- Analysis represents year 2039 weekday PM peak hour in the summer

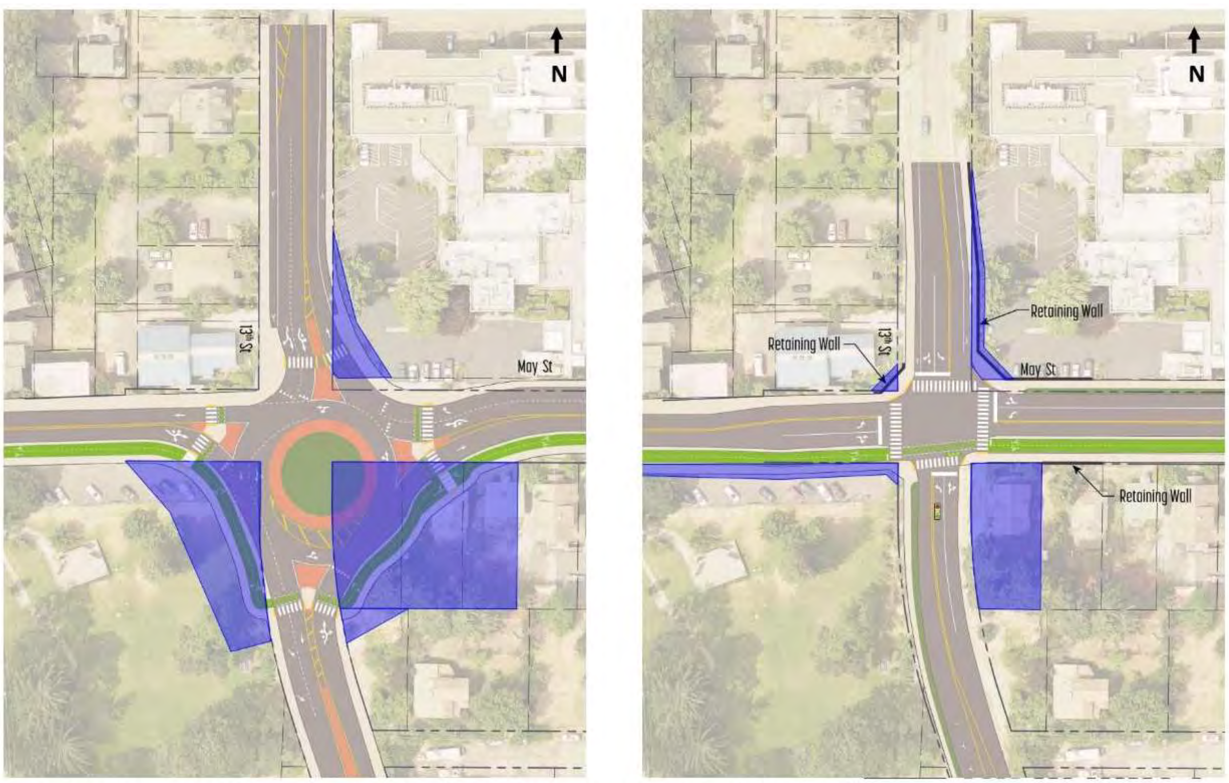
Property Impacts

Figure 4 shows potential property impacts based on the refined intersection concepts shown in Figure 2 and 3. The potential impacts to existing properties at each corner include:

- NW Corner of intersection (Behavioral health building):
    - Roundabout – it appears a roundabout could be sited without impacting this property.
    - Traffic signal – a corner of the property and the existing retaining wall at the back of sidewalk are anticipated to be impacted.
- NE Corner of intersection (Main hospital campus):
    - Roundabout – impacts to the existing hospital parking area are anticipated. Impacts include loss of parking (~7-9 stalls based on Figure 4), however, reconfiguration of the parking lot is not anticipated to change circulation within the parking lot.

- o Traffic signal – impacts to the existing hospital parking area are anticipated. Impacts include loss of parking (~8-11 stalls based on Figure 4); however, reconfiguration of the parking lot is not anticipated to change circulation within the parking lot.
- SE Corner of intersection (Residential Lots):
  - o Roundabout – impacts three full residential parcels and requires driveway access to be modified for a fourth parcel. A fifth parcel is partially impacted.
  - o Traffic signal – impacts one full residential parcel (due to loss of driveway access) and likely requires a retaining wall along the front of a second residential parcel.
- SE Corner of intersection (Jackson Park):
  - o Roundabout – impacts are expected to an area of the park including the slope up to the roadway and a portion of the existing parking lot at the corner including the driveway near 13th Street to accommodate the cycle track. Retaining walls may be able to reduce the overall impact.
  - o Traffic signal – impacts a portion of the existing parking lot at the corner and the existing driveway, however in a different configuration than a roundabout to accommodate intersection channelization on May Street.

Figure 4: Potential property impacts at 13th Street/May Street for future intersection improvements.



Note: Property impacts depicted are for illustration purposes only and do not reflect exact locations. Actual locations will be identified as a part of future intersection design.

Cost Considerations

Using the refined intersection layouts for a roundabout and traffic signal we have also examined the potential construction costs for future intersection improvements. This cost analysis focuses only on surface level features (i.e., paving and landscape restoration), does not include costs for utility relocations, right-of-way acquisition, or soft costs, and is not intended to reflect or provide a future project cost; instead, this analysis has been prepared to help compare future intersection improvements.

The comparative level cost analysis for a roundabout and traffic signal are based on the itemization and quantity tabulation of expected surface improvements as shown in Figures 2 and 3. Based on this analysis we anticipate the construction cost, in 2023 dollars, of a future roundabout could be $4M-$6.5M whereas a traffic signal could be $3M-$5M.

A roundabout will also require more additional cost for right-of-way acquisition, which could include costs for land purchase, relocation, administrative costs, legal costs, and condemnation.

We also anticipate a roundabout may require more costs to relocate existing utilities (public – e.g., water lines; private – e.g., electrical and communication distribution lines)

Project Team Recommendation – 13th Street/May Street Intersection

Based on the findings summarized above and in the context of the community's priority goals established during Phase 1 the project team recommends a roundabout for intersection control.

The key factor in this determination is the projected traffic impact for a traffic signal. Although a roundabout will cost more to implement, have greater impact on adjacent properties, and require a longer path of travel for people walking and biking through the intersection, the potential traffic delays for a roundabout are considerably less when compared to a traffic signal. A roundabout will also have less impact on freight and delivery trucks coming up the hill in winter than a signal, which was an issue raised by emergency service providers and local businesses.

13th Street/Belmont Avenue/12th Street

Intersection Concepts

The project team reviewed the double roundabout layouts developed during Phase 2 to:

- identify how bike facilities can be incorporated,
- understand how the double roundabout impacts on-street parking, and
- explore opportunities for placemaking.

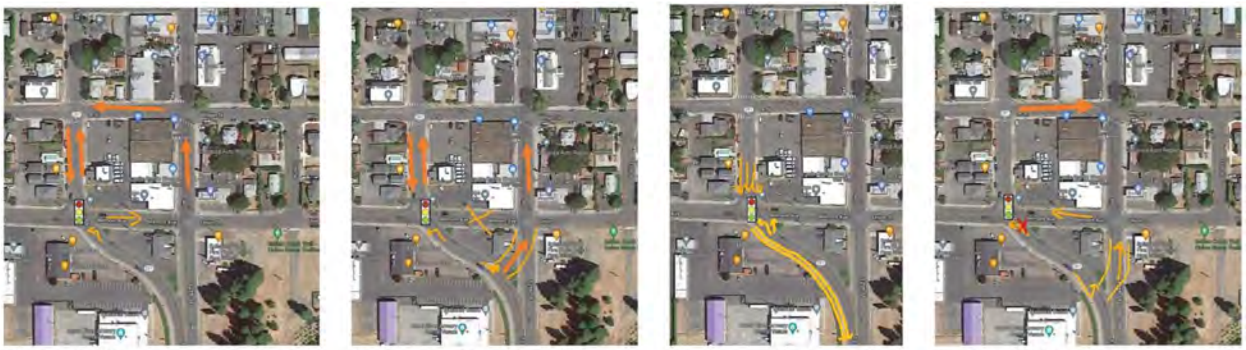
An updated double roundabout layout is shown in Figure 5.

Figure 5: Updated double roundabout at 13th Street/Belmont Ave/12th Street

The team also developed a signalized intersection concept to provide a more comparable alternative to the double roundabout for this set of intersections to compare operational impacts, property impacts, placemaking opportunities, and cost differences.

To develop a comparable signalized intersection concept, the project team explored four different intersection configurations to manage traffic through the intersections on Belmont Avenue (Figure 6).

Figure 6: Signalized intersections configurations considered at 13th Street/Belmont Ave/12th Street



Option 1 - One-way eastbound traffic on Belmont | Option 2 – Close Belmont | Option 3 – Widen 13th for 2 SB lanes | Option 4 – One-way westbound traffic on Belmont

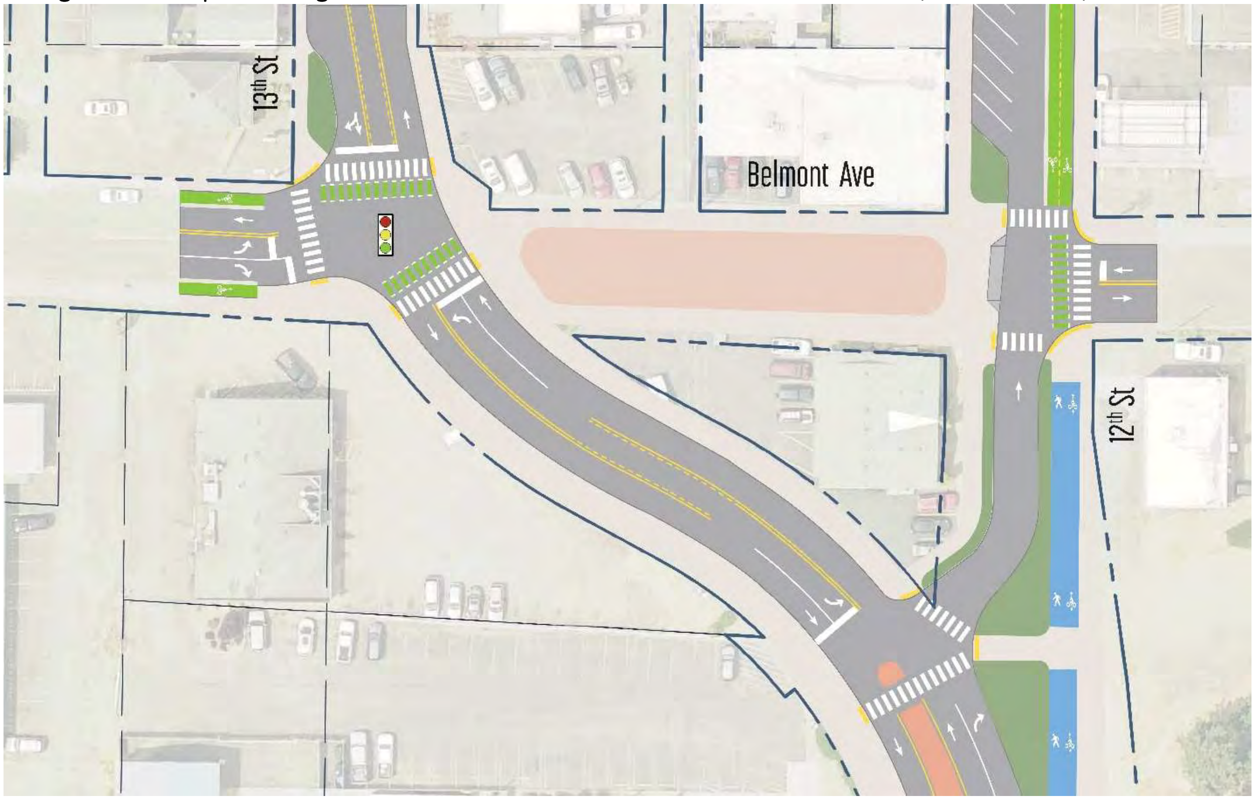
These intersection configurations provide different ways to manage traffic on Belmont Avenue with a traffic signal at 13th Street and come with a variety of pros, cons, and opportunities related to on-street parking, neighborhood circulation, and placemaking. Each configuration was evaluated for traffic operations and a summary of the analysis is shown in Table 3.

Table 3: Traffic Signal Configurations - Intersection Congestion and Vehicle Queue Lengths

CONFIGURATION	LOS	DELAY (SEC)	V/C	CALCULATED QUEUE LENGTHS (NORTHBOUND)	CALCULATED QUEUE LENGTHS (SOUTHBOUND)
OPTION 1 – ONE-WAY EB	C	20	0.98	1,000’	650’
OPTION 2 – CLOSE BELMONT	B	17	0.83	1,125’	450’
OPTION 3 – TWO LANES SB	B	18	0.92	375’	650’
OPTION 4 – ONE-WAY WB	D	39	0.92	1,375’	850’

Although Option 3 results in the shortest queue lengths it requires an additional lane that for pedestrians to cross and eliminates all parking in proximity to Belmont. Of the remaining configurations, Option 2, which closes Belmont Avenue between 13th Street and 12th Street, performs as well or better than the others from an operations standpoint, simplifies traffic movements to improve safety for all users, has less impact to parking on 13th Street, and creates a significant placemaking opportunity. Option 2 is also similar to a configuration discussed with ODOT staff during a review of the preliminary design alternatives toward the end of Phase 2. A rendered plan of Option 2 is shown in Figure 7.

Figure 7: Comparable signalized intersection for intersections at 13th Street/Belmont Ave/12th Street



Operational Impacts

Using these refined intersection layouts for a double roundabout and signalized intersection, we reviewed and compared the operational impacts to vehicular traffic based on forecasted weekday p.m. peak hour traffic volumes for the year 2039, representing summertime conditions. Table 4 compares the level of service (LOS), delay, volume-to-capacity (v/c) ratio, and vehicle queue lengths between a traffic signal and a double roundabout at 13th Street/Belmont Avenue/12th Street.

As shown in Table 4, the traffic signal and double roundabout are both expected to operate at Level of Service B or better with limited delay, however, the vehicle queue lengths for southbound traffic are much longer for a signalized intersection and extend to Taylor Avenue. Although longer than the roundabout the anticipated backup does not extend far enough north or south to impact nearby intersections at May Street or Pacific Avenue during summer p.m. peak periods.

Table 4: Intersection Congestion and Vehicle Queue Lengths

OPTION	LOS	DELAY (SEC)	V/C	CALCULATED QUEUE LENGTHS (NORTHBOUND)	(SOUTHBOUND)
TRAFFIC SIGNALS (13TH STREET)				Southbound	Northbound
OPTION 2 – CLOSE BELMONT	B	17	0.83	1,125'	450'
ROUNDABOUTS					
13TH STREET/ BELMONT AVENUE	A	8	0.56	100'	-
12TH STREET/ BELMONT AVENUE	A	3	0.66	-	200'

Roundabout analysis completed by American Structurepoint, Inc, May 31, 2022
*To the south: Nix Dr – 600'; Pacific Ave – 1100',
*To the north: B Street 450'; Taylor Ave – 1000'; May St - 1400'

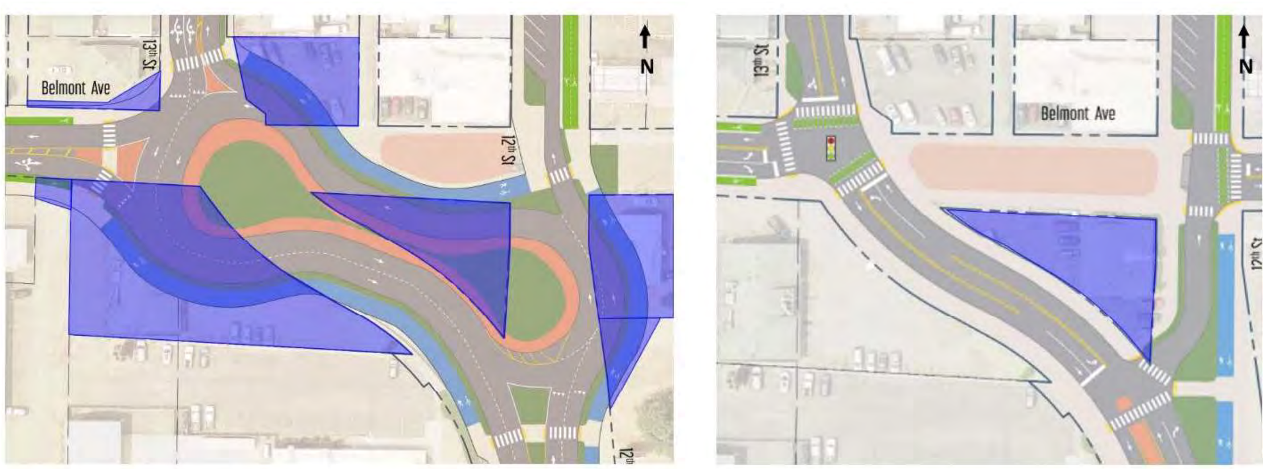
Property Impacts

Potential property impacts for the refined intersection concepts at Belmont Ave are shown in Figure 8.

A double roundabout could impact up to five full parcels, including three buildings with existing businesses, and parts of two additional parcels. It should be noted there are other ways to layout a double roundabout depending on specific constraints and design parameters given, however, it is our opinion that the general footprint is likely to be similar in size, and impacts to adjacent properties will be significant particularly when compared to a signalized alternative.

A signalized intersection could be developed to limit property impacts to only the central parcel south of Belmont Avenue between 12th and 13th Streets, which would be impacted by construction and significant limitation of access points in proximity to new intersections.

Figure 8: Potential property impacts at Belmont intersections for future intersection improvements.



Note: Property impacts depicted are for illustration purposes only and do not reflect exact locations. Actual locations will be identified as a part of future intersection design.

Cost Considerations

Using the refined intersection layouts for a double roundabout and traffic signal the project team examined the potential construction costs for future intersection improvements. This cost analysis focuses on surface level features (i.e., paving and landscape restoration), does not include costs for utility relocations, right-of-way acquisition, or soft costs, and is not intended to reflect or provide a future project cost; instead, this analysis has been prepared to help guide compare future intersection improvements.

The comparative level cost analysis for a double roundabout and traffic signal are based on the itemization and quantity tabulation of expected surface improvements as shown in Figures 2 and 3. Based on this analysis we anticipate the construction cost, in 2023 dollars, of a future double roundabout could be $6M-$9.5M whereas a traffic signal could be $3.5M-$5.5M.

A double roundabout will require additional cost for right-of-way acquisition, which include costs for land purchase, relocation, administrative costs, legal costs, and condemnation.

The project team also anticipates a double roundabout may require more costs to relocate existing utilities (public – e.g., water lines; private – e.g., electrical and communication distribution lines).

Project Team Recommendation – 13th Street/Belmont Ave/12th Street Intersection

Based on the findings summarized above and in context of the community's priority goals established in Phase 1 the project team recommends a signalized intersection for intersection control.

Although a double roundabout has less traffic delay and a fraction of the queueing length for vehicles when compared to a signalized intersection, it comes at a significant cost to acquire property and impact to existing businesses. A signalized intersection allows more direct access for people walking and biking through this set of intersections when compared to a double roundabout. With a signalized intersection, vehicle backups are not anticipated to impact traffic at May Street or Pacific Avenue. Closing Belmont also creates a placement opportunity at the south entrance to the Heights.

East/West Street Design

The project team explored two scenarios for the design and circulation of East/West Streets between May Street and Belmont Avenue. One scenario uses a combination of one- and two-way streets to move local traffic while a second scenario relies only on one-way streets. In addition to considerations for vehicle circulation, the scenarios explored opportunities to maximize on-street parking and provide enhanced access for people walking and biking along Taylor Avenue and B Street.

Existing Conditions

Taylor Avenue is a 60' right-of-way, with two-way travel and parking on both sides of the street.

A, B, and C Streets are 50' rights-of-ways, with two-way travel and parking on one side of the street, except C Street, which has parking on both sides of the street.

Contra-flow Bike Lane

To improve access for people biking, each scenario provides a place for people biking on Taylor Avenue and A Street in the east and west directions regardless of the direction of vehicle traffic. To accomplish this within the existing right-of-way while providing parking on both sides of the street, each scenario introduces a new type of bike lane – a contra-flow bike lane.

"Contra-flow bicycle lanes are bicycle lanes designed to allow bicyclists to ride in the opposite direction of motor vehicle traffic. They convert a one-way traffic street into a two-way street: one direction for motor vehicles and bikes, and the other for bikes only." (NACTO's Urban Bikeway Design Guide)

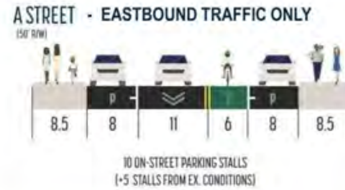
Although contra-flow bike lanes "introduce new design challenges and may create additional conflict points" (NACTO) between people driving and biking they allow direct access to destinations for people biking in both directions. Contra-flow bike lanes typically work best on low-speed, low-volume streets.

To provide enhanced access for people biking on Taylor Avenue and A Street and recognizing that these streets are low-volume, low-speed streets, contra flow bike lanes have been considered as a way to enhance connectivity and decrease the distance and time it takes for people biking to move east and west across the Heights.

Scenario A: One- and Two-Way Streets

This scenario maintains two-way traffic on B and C Streets but changes to one-way traffic on Taylor Avenue and A Street. One-way traffic allows space for space on-street parking on both sides of the street and bike facilities in both directions. On Taylor Avenue and A Street "sharrows" are provided with the direction of vehicle traffic and contra-flow bike lanes against the direction of traffic. On both streets the contra-flow bike lane is located adjacent to on-street parking (angle parking on Taylor Ave and parallel parking on A St). Figure 9 shows the proposed cross sections for each street and a real-world example of a similar street.

Figure 9: Typical cross sections for East/West Streets (looking west) with one- and two-way streets



Contra flow bike lane example with angle parking (Tacoma, WA)

Example of 34' curb to curb width parking both sides

Contra flow bike lane example with parallel parking (Washington DC)

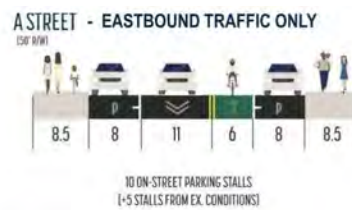
The project team anticipates a combination of one- and two-way streets could be less predictable for people driving, particularly for people who are new to the area.

However, providing on-street parking on both sides of the street in Scenario A could add up to 12 additional parking stalls compared to the existing condition.

Scenario B: One-Way Streets

This alternative scenario provides alternating one-way streets. Because the East/West street intersections are offset along 12th Street the priority for establishing the direction of traffic is to maintain westbound traffic on Taylor Avenue. Similar to Scenario A, each street has parking on both sides of the streets. Similarly, bike facilities on Taylor Avenue and A Street are "sharrows" with the direction or vehicle traffic and contra-flow bike lanes against traffic. Figure 10 shows the proposed cross sections for each street and a real-world example of a similar street.

Figure 10: Typical cross sections for East/West Streets (looking west) with one- and two-way streets



Contra flow bike lane example with angle parking (Tacoma, WA)

Example parking area with parallel and angle parking (note: example is ~3' wider curb to curb)

Contra flow bike lane example with parallel parking (Washington DC)

Alternating one-way streets are anticipated to be more predictable for people driving. Providing parking on both sides of each street could add up to 15 additional parking stalls compared to the existing condition.

The narrow travel lanes for each scenario, which range from 12’-18’ when including the adjacent bike lane, have been reviewed with local fire and emergency response officials. Although the travel lanes are less than the desired 20’ width, local emergency response officials understand the project constraints and considerations and take no exceptions to the proposed cross sections included with Scenarios A or B.

Project Team Recommendation – East/West Street Design

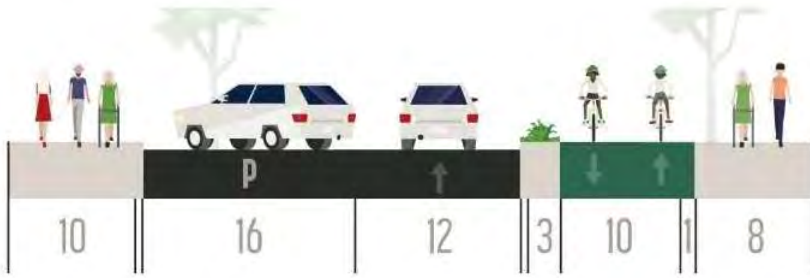
The project team recommends alternating one-way streets for the predictability of one-way streets but recommends modifications to the sections in Scenario B above. To provide more flexibility for a variety of vehicle sizes (e.g., pickup trucks, sprinter vans, etc.) we recommend parallel parking on both sides of the street to provide more flexibility for people parking. If direct access for people biking along Taylor Avenue and A Street are desired a combination of “sharrows” and a contra-flow bike lane are recommended to provide bike direct access for people biking eastbound and westbound.

Design considerations for Streetscape Character on 12th and 13th Streets

12th Street

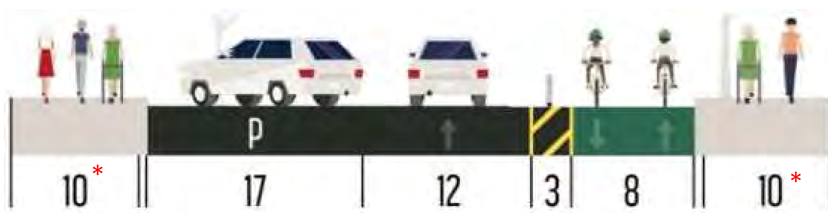
The project team reviewed the typical street cross section developed during Phase 2 for 12th Street (Figure 11) to explore how the allocation of the 60-foot right-of-way best balances access and comfort for all users. This includes people who drive and park to access businesses and people walking and biking through the Heights.

Figure 11: Typical 12th Street cross section developed during Phase 2 (looking north)



As part of this design review, we explored design standards and design guidance for the size of parking stalls (depth and width), the width of a two-way cycle track, the width and type of separation between cycle track and travel lane and the sidewalk, the anticipated use and level of comfort/access that is provided for each user group, and considerations for emergency access, implementation, and maintenance. Based on our review we have developed an updated typical street cross section (Figure 12) that will continue to be refined as we develop the final preferred concept design.

Figure 12: Updated typical 12th Street cross section (looking north)



This cross section increases the depth of the angle parking stall, increases the width of the east sidewalk, decreases the width of the two-way cycle track, and lowers the cycle-track to be at street grade. These refinements are proposed to improve access to parking for people driving, reduce conflicts at intersections for people walking and biking (particularly related to implementing ADA curb ramps at intersections), and to maintain the sidewalk experience for people walking. A key element that is still being explored is the type of delineation to provide separation between the cycle-track and adjacent travel lane; Figure 12 shows a three-foot striped buffer with delineator post. We are continuing to explore how best to provide separation (visual and physical separation if possible) while considering long-term impacts for operations and maintenance of the street throughout the year (e.g., impacts for winter conditions and snow plowing).

*The City should also explore opportunities to pursue additional walkway space by acquiring easement and or right-of-way when possible to incorporate a 12-foot sidewalk zone into the approved cross section. While the refinements above maintain the existing 10' sidewalk zone, 10' is the bare minimum recommended for a street in a central business district context; the ODOT Blueprint for Design characterizes the urban context along 12th Street as a Central Business District and recommends a 10.5’-20’ sidewalk zone (Figure 13).

Figure 13: Excerpt from Table 3-11 from ODOT’s Blueprint for Urban Design

Table 3-11: Design Element Recommendations for Traditional Downtown/CBD

Design Element		Guidance
Pedestrian Realm	Frontage Zone	4' to 2'
	Pedestrian Zone	10' to 8'
	Buffer Zone	6' to 0'
	Curb/Gutter[1]	2' to 0.5'

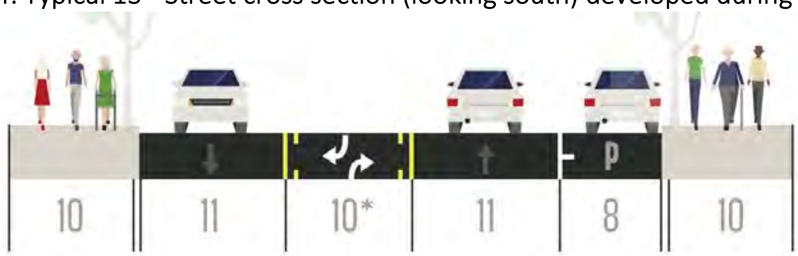
13th Street

Additional studies for the design of 13th Street include:

1. reviewing the typical street cross section developed during Phase 2 to understand how existing constraints might impact future improvements along 13th Street, and
2. exploring ways to mitigate the traffic impacts of a three-lane street cross section design through traffic calming measures.

The typical street cross section developed during Phase 2 (Figure 14) utilized the full 50-foot right-of-way and the five-foot sidewalk and utility easements on each side of the street.

Figure 14: Typical 13th Street cross section (looking south) developed during Phase 2



The existing sidewalk location varies along 13th Street. In some locations the existing sidewalk stops at the limit of the 50-foot right-of-way resulting in a five-foot sidewalk, and in other locations the sidewalk extends into and through the five-foot sidewalk and utility easement providing a 10-foot sidewalk (including curb), see Figure 15. There are also locations where private structures and access ramps that provide access to adjacent buildings are in the five-foot easement (Figure 15). These constraints limit a future sidewalk width if the ramps or structures cannot be easily relocated.

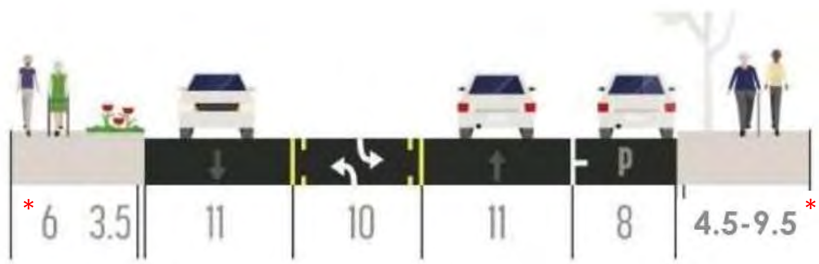
Figure 15: Example of varying sidewalk conditions and constraints along 13th Street

Where these existing constraints prevent the sidewalk from being widened to 10-feet (including curb) the project team recommends the city and agency explore opportunities to require building setbacks or sidewalk easements as properties redevelop so the existing five-foot sidewalk can be widened to 12-feet.

Another challenge for the streetscape environment along 13th Street is the proposed northbound travel lane that will be located next to the sidewalk. On-street parking will be removed, which eliminates the separation between the sidewalk and travel lane and results in a narrower effective sidewalk width and reduced comfort for people walking on the east side of 13th Street.

To help mitigate this condition and to work within the existing right of way the project team acknowledges that the city and agency may be required to narrow the proposed east sidewalk from 10-feet (including curb) to six-feet to provide a landscape buffer between the travel lane and sidewalk (Figure 16); this condition is similar to the existing sidewalk on the north side of May Street between 12th and 13th Streets.

Figure 16: Typical 13th Street cross section (looking south) developed during Phase 2



*Again, the project team recommends the city and agency pursue opportunities to obtain easements or rights-of-way to expand the sidewalk zone from 10' to 12' to accommodate an appropriate buffer and create space for pedestrians along the corridor. Similar to 12th Street, the ODOT Blueprint for Design characterizes the urban context along 13th Street as Central Business District and recommends a 10.5'-20' sidewalk zone.

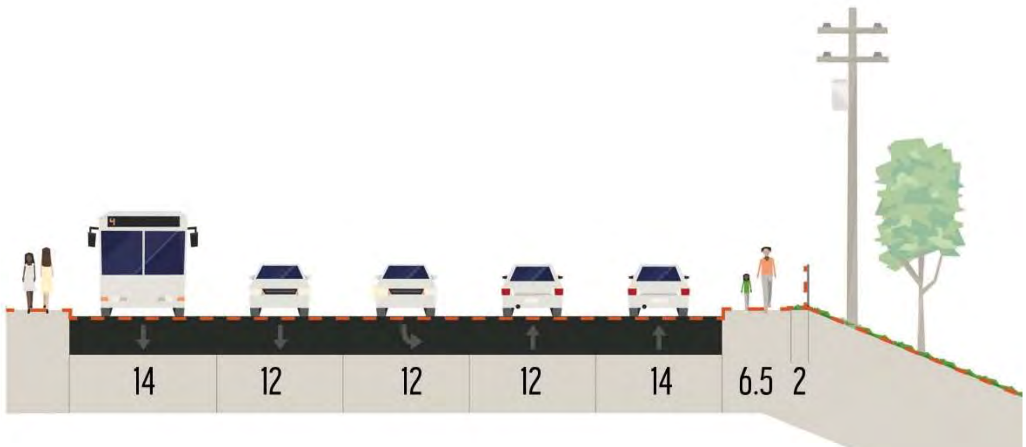
In addition to refinements to the proposed street cross section the project team is identifying opportunities for traffic calming features on 13th Street. Traffic calming features being considered include: curb extensions at intersections where there is on-street parking, medians where they do not conflict with/support future traffic movements (locations are dependent on the circulation of traffic on East/West streets), and pedestrians refuge islands and rectangular rapid flashing beacons (RRFBs) at enhanced East/West crossings at Taylor Avenue and A Street.

Combined these measures should help to slow traffic on 13th Street and improve the streetscape environment for people walking along 13th Street.

Opportunities for a Bicycle Connection to Pacific Avenue

The project team explored opportunities for extending the proposed two-way cycle track south of Belmont Ave along 12th Street to provide a bicycle connection to Pacific Avenue. The existing street cross section south of Nix Drive is shown in Figure 17.

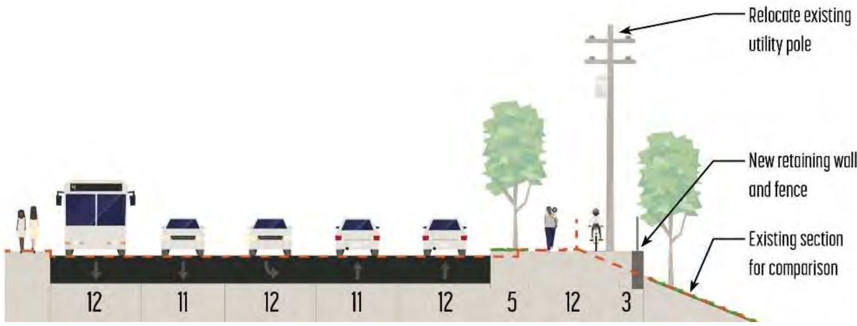
Figure 17: Existing 12th Street cross section south of Nix Dr (looking north)

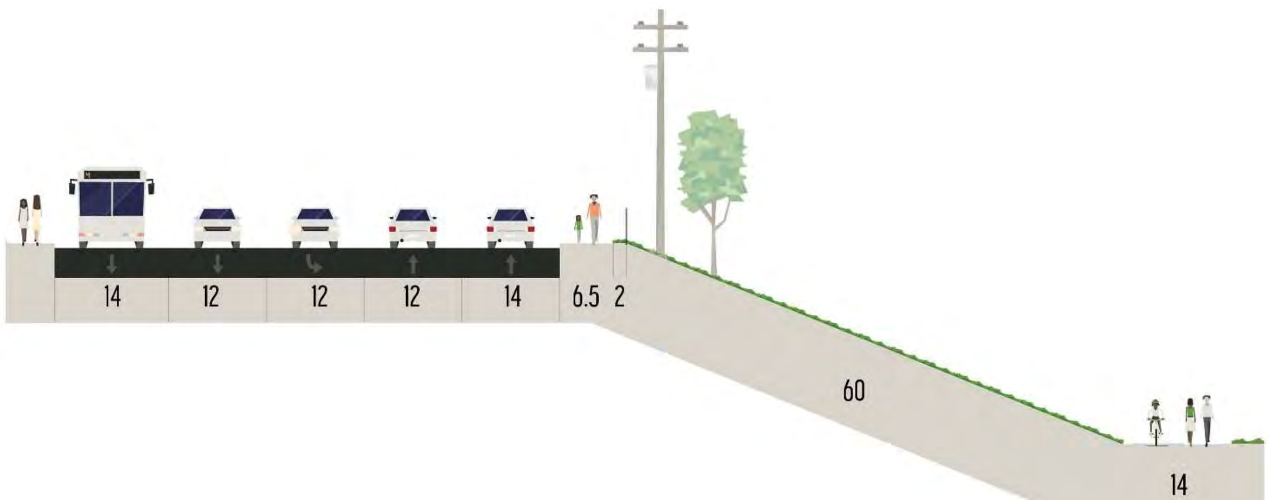


Given the relatively high-speed, high-volume type street environment along 12th Street the project team only considered scenarios with off-street separated bike facilities. However, rather than continuing a two-way cycle-track the project team explored layouts for a shared use path, which provides a shared space for people walking and biking and takes less space to implement compared to separate, dedicated cycle track and sidewalk facilities.

Based on existing site constraints, including the number and width of travel lanes and slope along the east side of roadway, the project team explored two scenarios for locating the shared use path (Figure 18). One scenario narrows the existing travel lanes and proposes a new retaining wall to widen the existing sidewalk area and provide a shared path alongside the roadway. A second scenario proposes shifting the bike connection away from the roadway, widening the Indian Creek Trail, to provide a bike connection that does not follow the roadway but descends down to Indian Creek and back up 12th Street; this alignment requires path users to descend and climb approximately 30-feet of grade change.

Figure 18: Scenarios of typical cross sections for providing a bicycle south to Pacific Avenue





The project team recommends the first scenario, providing a path alongside the roadway, to provide more direct access for people biking.

With either scenario the city will need to develop a solution that works at the parcel with the Shell gas station and Dutch Bros. Coffee drive-thru. At this parcel it may be necessary to acquire an easement or expand the right-of-way to continue the 12-foot shared use path. A solution will also be needed to provide a safe pathway across the existing driveway.

Coordination with ODOT and further study of this concept is not part of current scope of this project, but will not be necessary at this time to propose the connection be incorporated into the City's TSP.

Heights Parking Summary Update

As the project has progressed, the project team continues to track potential changes to parking in the study area to evaluate impacts for proposed changes and refinements. Parking counts over the past two years have shown that parking in the study area is underutilized even without active management or strategy. The following table summarizes existing and proposed parking scenarios compared to a forecasted demand for a high development growth scenario.

Table 5 provides an updated parking summary for the Heights based on the project team's current recommendations.

Table 5: Parking comparison for existing and future scenarios

	Approx. On-street Parking along 12th and 13th Streets	Approx. On-street District Parking on all E/W streets (parking within one block of 12th and 13th Streets)	Approx. Off-Street Parking C (per Sept. 2021 parking study)	Total Parking (on- and off-street)
Existing (2021)	156	148	410	714
2011 TSP Proposed	70	148	410	628
Proposed with current recommendations	80	155	399[A, B]	634
Estimated 2040 Peak Summertime Parking Demand (from 2021 Parking Study)				657

A. This number reflects the loss of 11 parking stalls that could be removed with the acquisition of the private parcel located between Belmont Avenue/12th Street/13th Street.

B. This number does not include impacts to off-street parking at Jackson Park and the hospital as those parking areas were not included in parking study completed during Phase 2.

C. Numbers do not include additional parking constructed as part of private property redevelopment.

Next Steps – Phase 3

Once the URA confirms direction for these additional design studies the project team will begin developing the final preferred concept plan for the study area streets. At the next review meeting the project team will present the final concept plan. The purpose of this review is to present the final concept plan, identify minor refinements that may be needed, and begin discussing potential considerations for developing an implementation plan.

Attached

Appendix A – 13th Street/ May Street Intersection Design Refinement Technical Memo from DKS (Dec 20, 2023)

Appendix B – Belmont Avenue Configuration Options for a Signalized Intersection (Jan 2023)

Appendix C – Design and Layout Considerations for the conceptual double roundabout design developed by the American Structurepoint (Jan 2023)

Appendix D – On-Street Parking Counts

DKS 720 SW WASHINGTON STREET, SUITE 500, PORTLAND, OR 97205 • 503.243.3500 • DKSASSOCIATES.COM

TECHNICAL MEMORANDUM

DATE: December 20, 2022

TO: Nathan Polanski | MIG

FROM: John Bosket, PE; Kayla Fleskes-Lane, PE | DKS Associates

SUBJECT: Hood River Heights Streetscape Plan – 13th Street/ May Street Intersection Design Refinement

Project #20203-000

This memorandum provides support for design refinement of concepts to improve the intersection on 13th Street at May Street with either a traffic signal or a roundabout, in combination with surrounding improvements to implement Design Concept 3 (Hybrid).

INTERSECTION CONFIGURATION

Figures 1 and 2 show concept drawings of the 13th Street at May Street intersection under traffic signal control and roundabout control[1], respectively. The lane configuration needs were based on forecasted weekday p.m. peak hour traffic volumes for the year 2039, representing summertime conditions. Both drawings assume the surrounding streets have been reconfigured to implement Design Concept 3, which includes converting 13th Street to two-way travel south of May Street and 12th Street to one-way northbound travel south of May Street. This also includes the construction of two-way cycle tracks on the south side of May Street and the east side of 12th Street. There would be no bicycle facilities on 13th Street south of May Street, but it is assumed there would be buffered bike lanes on 13th Street north of May Street as shown in the City's Transportation System Plan (TSP). The left turn lanes under the signalized configuration have been widened to 12 feet in response to comments from ODOT.[2]

[1] The roundabout concept drawing was provided by American Structurepoint, Inc. as part of a May 31, 2022 memorandum to the City of Hood River.

[2] ODOT Concept Review Meeting, August 8, 2022.

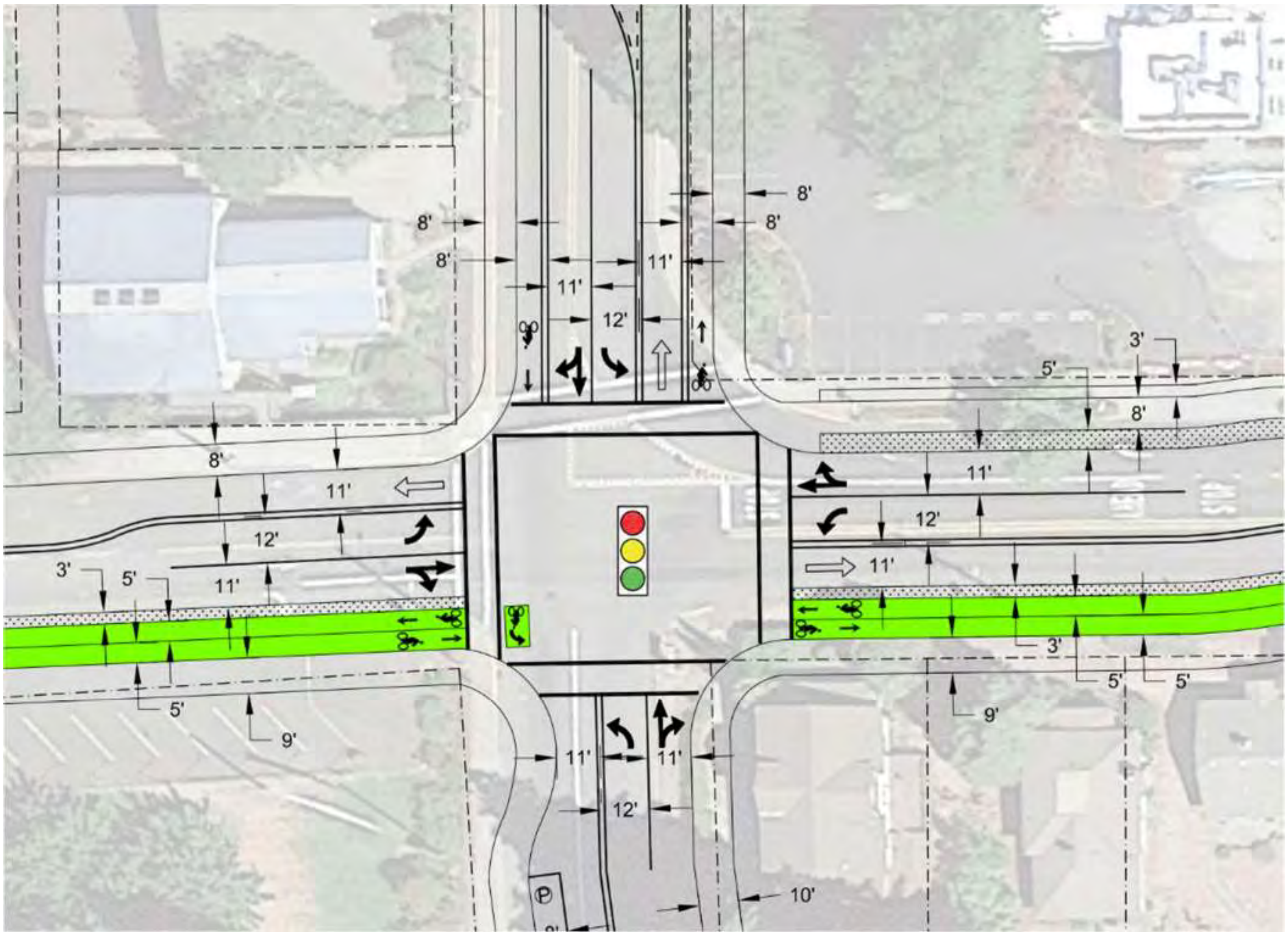


FIGURE 1. 13TH STREET/ MAY STREET SIGNALIZED INTERSECTION CONFIGURATION

Source: DKS Associates

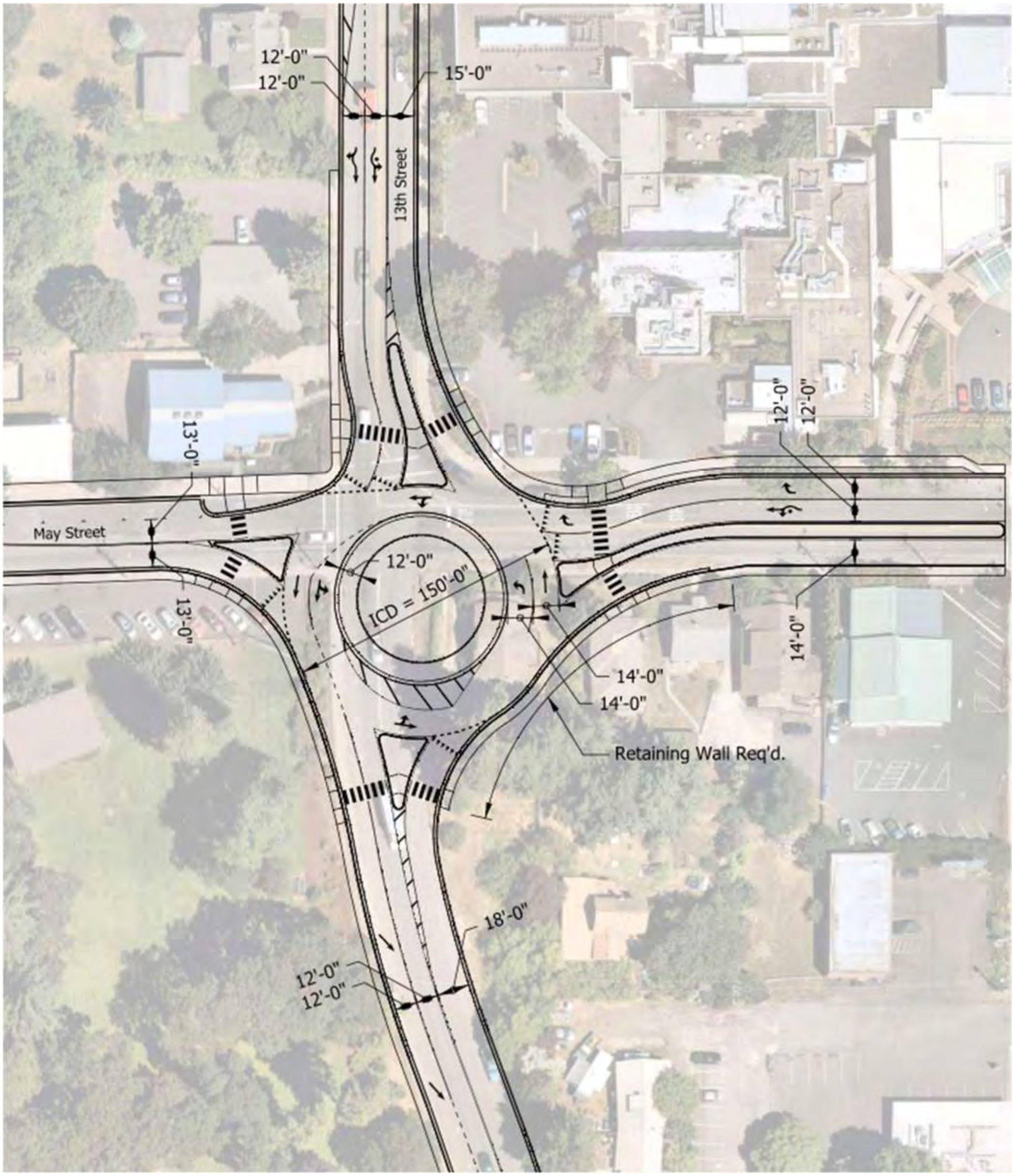


FIGURE 2. 13TH STREET/ MAY STREET ROUNDABOUT INTERSECTION CONFIGURATION

Source: American Structurepoint, Roundabout Peer Review – City of Hood River, Oregon; May 31, 2022

A peer review of the roundabout concept was conducted that yielded the following comments and potential design refinements.

1. There should not be a need for two circulating lanes in the roundabout on the east side (from the northbound entrance to the northbound exit).
2. The westbound through/left entry lane alignment looks off and would guide entering traffic into the island rather than the circulating roadway.
3. The westbound right turn lane should not enter the roundabout circulating roadway.
4. The drawing does not include the desired bicycle facilities and only includes narrow sidewalks on most approaches. In particular, if a two-way cycle track is desired on the south leg, an enhanced crossing should be considered. One option could be a protected intersection design, similar to the roundabout at 9th Street/Wilson Avenue in Bend, Oregon[3].
5. Two-lane entries and exits may need supplemental pedestrian actuated flashing beacons and warning signs for safety (impacts cost but not footprint).
6. Truck turning templates and fastest path analysis should be completed for all approaches.

When comparing the general footprints and potential right-of-way impacts between the two designs, it should be noted that the roundabout concept does not include bicycle facilities on May Street or 13th Street north of May Street, which underrepresents the needed width of those streets. In addition, the City may want to provide an additional 8 feet of width on of 13th Street, south of May Street, to provide on-street parking.

INTERSECTION OPERATIONS

Based on ODOT's preliminary signal warrant form, a traffic signal is likely to be warranted at 13th Street/ May Street in the future. Given that a traffic signal is a potential solution, the prior traffic analysis was refined to better match the current concept. These refinements include:

- an eastbound left turn lane at the intersection to provide greater flexibility for protected pedestrian crossings,
- the removal of any bottleneck at the 13th Street/ Belmont Avenue intersection (which previously influenced signal progression and vehicle queueing at 13th Street/ May Street), and
- enhanced signal coordination between the 12th Street and 13th Street intersections to better mitigate queueing impacts (does not assume the north leg of 12th Street is signalized).

In addition, the community identified a two-way cycle track as the preferred bicycle treatment on May Street, pending feasibility. To implement a two-way cycle track on the south side of May Street, bicycle-specific signal phasing and some right turn on red restrictions would be required at 13th Street/ May Street. Therefore, the intersection was tested with and without that phasing.

Based on these refinements, Table 1 compares the level of service (LOS), delay, and volume-to-capacity (v/c) ratio between TSP Build conditions (maintaining one-way traffic on 13th Street), a

[3] https://www.youtube.com/watch?v=sCa5VpenG5Y

refined traffic signal, and a roundabout at 13th Street/ May Street. As listed in the table, the roundabout is expected to operate with similar levels of delay as the TSP Build alternative. Both of the signalized alternatives are expected to operate with more delay than the TSP Build alternative. With the additional delay associated with some right turn on red restrictions and exclusive bicycle phasing, the signal with the two-way cycle track is expected to have insufficient capacity to meet demand, with nearly 80 seconds of average vehicle delay.

TABLE 1. REFINED INTERSECTION OPERATIONS RESULTS AT 13TH STREET/ MAY STREET (2039 WEEKDAY PM PEAK HOUR)

SCENARIO [A]	LOS	DELAY (SEC)	V/C
TSP BUILD	C	31	0.96
SIGNAL (WITHOUT TWO-WAY CYCLE TRACK)	D	44	0.94 [B]
SIGNAL (WITH TWO-WAY CYCLE TRACK)	E	80	**1.03**
ROUNDABOUT	C	18 [C]	0.86

Bold and red indicates a "failing" condition, which could be a v/c ratio of 1.0 or greater or a LOS F.

For signalized intersections, results are shown for the overall intersection. For roundabouts, delay and LOS are shown for the overall intersection while the v/c ratio is shown for the worst approach.

[A] Signal with two-way cycle track results reported using HCM 2000 methodology, otherwise results reported using HCM 6th edition methodology. Note that roundabout results reported by American Structurepoint utilize the Sidra methodology, which is less conservative and generally shows less delay compared to HCM 6th edition methodology.

[B] Note that the signal results show more delay than prior Design Concept 3 analysis due to changes in left turn signal phasing and cycle length at the intersection with the refined design.

[C] Note that delay at the roundabout does not take into account delay associated with an enhanced cycle track crossing (such as the use of a rectangular rapid-flashing beacon) on the south leg.

The following summarizes the expected vehicle queuing impacts with the refined concepts:

- Without the two-way cycle track, long queues are expected in the northbound and southbound directions under signal control.
  - Southbound queues are expected to extend to approximately State Street.
  - Northbound queues are expected to extend to approximately A Street.
- With the two-way cycle track, even longer queues are expected in the northbound and southbound directions under signal control.
  - Southbound queues spillback beyond Oak Street, causing long queues on Oak Street.
  - Northbound queues spillback beyond Belmont Street.
  - This results in approximately 75 percent more system-wide delay than the scenario without the two-way cycle track.
- Queueing at the roundabout is expected to be significantly lower than the signalized alternatives.

- Southbound queues are expected to extend approximately 100 feet.
- Northbound queues are expected to extend approximately 200 feet.

Beyond intersection operations and queuing, it should be noted that the southbound approach to the intersection requires climbing a steep grade (approximately 6 percent). This is typically approaching the maximum grade that can be accommodated at a roundabout. Today, the southbound approach is uncontrolled, so during icy conditions vehicles (and heavy trucks in particular) do not have to stop on the hill unless there is a pedestrian crossing.

While roundabout queues are generally rolling queues that would allow vehicles to continue forward momentum, a traffic signal would require vehicles to come to a complete stop. Without the two-way cycle track, it is expected that any given southbound through vehicle would have approximately a 95 percent chance of having to stop at the signal. With the two-way cycle track, the southbound approach is over capacity so it is likely that during peak hours, all southbound through vehicles would be required to come to a stop at the traffic signal. It should be noted that pedestrian crossings and bicyclist crossings on the cycle track may require vehicles to stop with the roundabout concept as well.

While the roundabout with an added westbound right turn lane and dual southbound through lanes is expected to perform well with future traffic volumes, single lane roundabouts generally perform better with respect to safety compared to dual lane approaches and exits at roundabouts. Consideration could be given to designing the intersection as a single lane roundabout in the near term with the intent to widen to a dual lane roundabout in the long term, pending an analysis of interim year (i.e. between today and year 2039) traffic operations.

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BELMONT AVENUE CONFIGURATION OPTIONS

Consider options for signalizing the 13th Street/ Belmont Avenue to achieve the following objectives:

- Manage congestion to keep motor vehicle delay within reasonable limits for the Heights (e.g., v/c < 1.0)
- Manage southbound vehicle queues on 13th Street from the Belmont Avenue intersection to keep them from reaching May Street and interfering with intersection operations.
- Minimize roadway widening needs and provide low-stress walking and biking street crossing opportunities.
- Maintain accessibility of businesses.
- Maintain accessibility of surrounding neighborhoods.
- Protect the future function of A Street west of the Heights as a neighborhood greenway.

OPTION 1 – ONE-WAY EASTBOUND

Description:

- Convert Belmont Avenue to one-way eastbound.
- Convert A Street to one-way westbound.

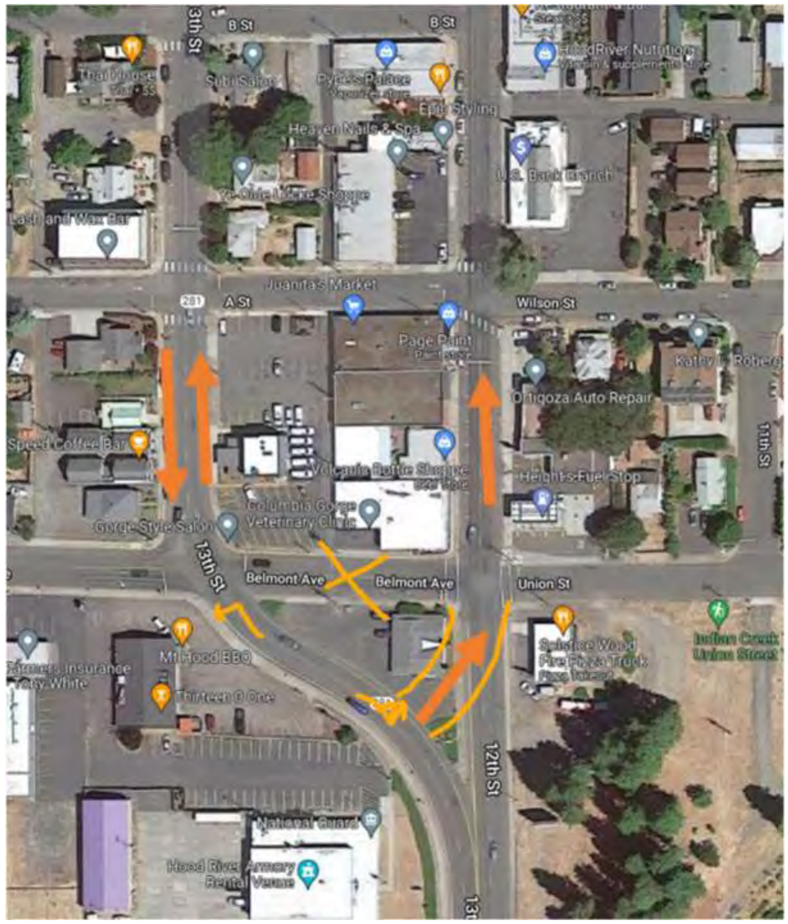
Opportunities:

- Eliminating westbound traffic simplifies signal operation.
- Provides a turnaround at the south end of the Heights to proceed northbound on 12th Street, making businesses on 12th Street between Belmont Avenue and Wilson Street accessible.
- Queues expected back to Taylor Avenue but not May Street.

Constraints:

- Limited flexibility for one-way street configuration between 12th Street and 13th Street (sets orientation for other one-way streets).
- Union Street to Belmont Avenue west trips must route around Wilson Street and A Street.

OPTION 2 – CLOSE BELMONT



Description:

- Close Belmont Avenue between 12th Street and 13th Street.
- Realign 12th Street as one-way T-intersection (assumed unsignalized).

Opportunities:

- Eliminating the east approach and relocating the southbound left turn significantly simplifies signal operation.
- Queues expected back to Taylor Avenue but not May Street.
- Flexibility for one-way street configuration between 12th Street and 13th Street (A Street could be eastbound or westbound only).
- Opportunity for re-envisioning of public space with vacation of Belmont Avenue between 12th Street and 13th Street and property acquisition.
- Slows northbound traffic on 12th Street before entering the Heights.
- Provides a turnaround at the south end of the Heights to proceed northbound on 12th Street, making businesses on 12th Street between Belmont Avenue and Wilson Street accessible.

Constraints:

- Property impact with realignment.
- Limited queue storage for back-to-back left turn lanes on 13th Street between Belmont Avenue and 12th Street.
- Union Street to Belmont Avenue west trips must route around Wilson Street and A Street.

OPTION 3 – WIDEN 13TH STREET FOR TWO SOUTHBOUND THROUGH LANES

Description:

- Remove parking and widen 13th Street between A Street and southern end of existing couplet to allow for two southbound lanes, a left turn lane and a northbound lane (four-lane cross section instead of three-lane).

Opportunities:

- Significantly mitigates queueing concerns (queues approximately to B Street).
- Flexibility for one-way street configuration between 12th Street and 13th Street (A Street could be eastbound or westbound only).
- Two-way traffic can be maintained on Belmont Avenue between 13th Street and 12th Street.
- Provides a turnaround at the south end of the Heights to proceed northbound on 12th Street, making businesses on 12th Street between Belmont Avenue and Wilson Street accessible.

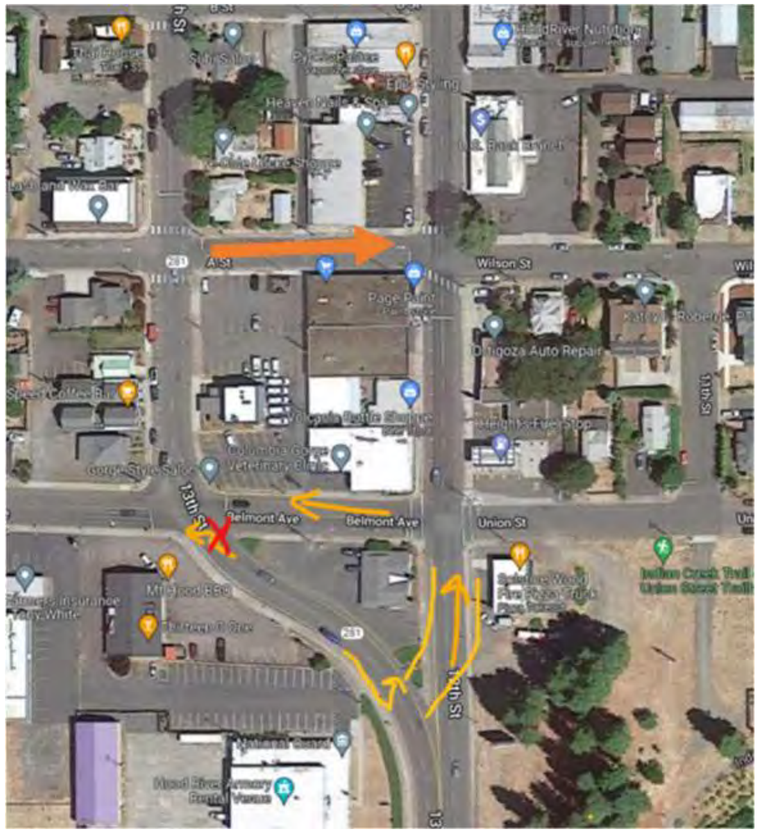
Constraints:

- Requires removal of parking between A Street and Belmont.
- Requires significant street widening.
- Creates a wide crossing for people walking and biking.

OPTION 4 – ONE-WAY WESTBOUND

Description:

- Convert Belmont Avenue to one-way westbound.
- Convert A Street to one-way eastbound.
- Close the northbound left turn at 13th Avenue/Belmont Avenue (served by westbound Belmont Avenue instead).
- Realign 12th Street as one-way T-intersection.



Opportunities:

- Eliminating eastbound traffic and the northbound left turn simplifies signal operation.
- Maintains westbound access from Union Street.
- Provides a turnaround at the south end of the Heights to proceed northbound on 12th Street, making businesses on 12th Street between Belmont Avenue and Wilson Street accessible.
- Slows northbound traffic on 12th Street before entering the Heights.

Constraints:

- Queueing spills back to May Street and increases risk of westbound queues on Belmont Avenue blocking 12th Street (this is the worst option from a congestion standpoint).
- Westbound lefts challenging to make at 13th Street/ Belmont Avenue due to intersection geometry, could limit connectivity.
- Property impact with realignment.
- Limited flexibility for one-way street configuration between 12th Street and 13th Street (sets orientation for other one-way streets).

Table 1: 13th Street/ Belmont Avenue Intersection Congestion

OPTION	CYCLE LENGTH	LOS	DELAY (SEC)	V/C
OPTION 1 – ONE-WAY EB	100s	C	20	0.98
OPTION 2 – CLOSE BELMONT	110s	B	17	0.83
OPTION 3 – TWO LANES SB	120s	B	18	0.92
OPTION 4 – ONE-WAY WB [A]	140s	D	39	0.92

Analysis represents year 2039 weekday PM peak hour in the summer

[A] Based on HCM 2000

Table 2: 13th Street/ Belmont Avenue Vehicle Queue Lengths

OPTION	HCM CALCULATED QUEUE LENGTH	
	Southbound	Northbound
OPTION 1 – ONE-WAY EB	1000′	650′
OPTION 2 – CLOSE BELMONT	1125′	450′
OPTION 3 – TWO LANES SB	375′	650′
OPTION 4 – ONE-WAY WB	1375′	850′

Analysis represents year 2039 weekday PM peak hour in the summer

*To the south: Nix Dr – 600′; Pacific Ave – 1100′,

*To the north: B Street 450′; Taylor Ave – 1000′; May St - 1400′

APPENDIX C - Design and layout considerations for the conceptual double roundabout design developed by the American Structurepoint. Jan 2023

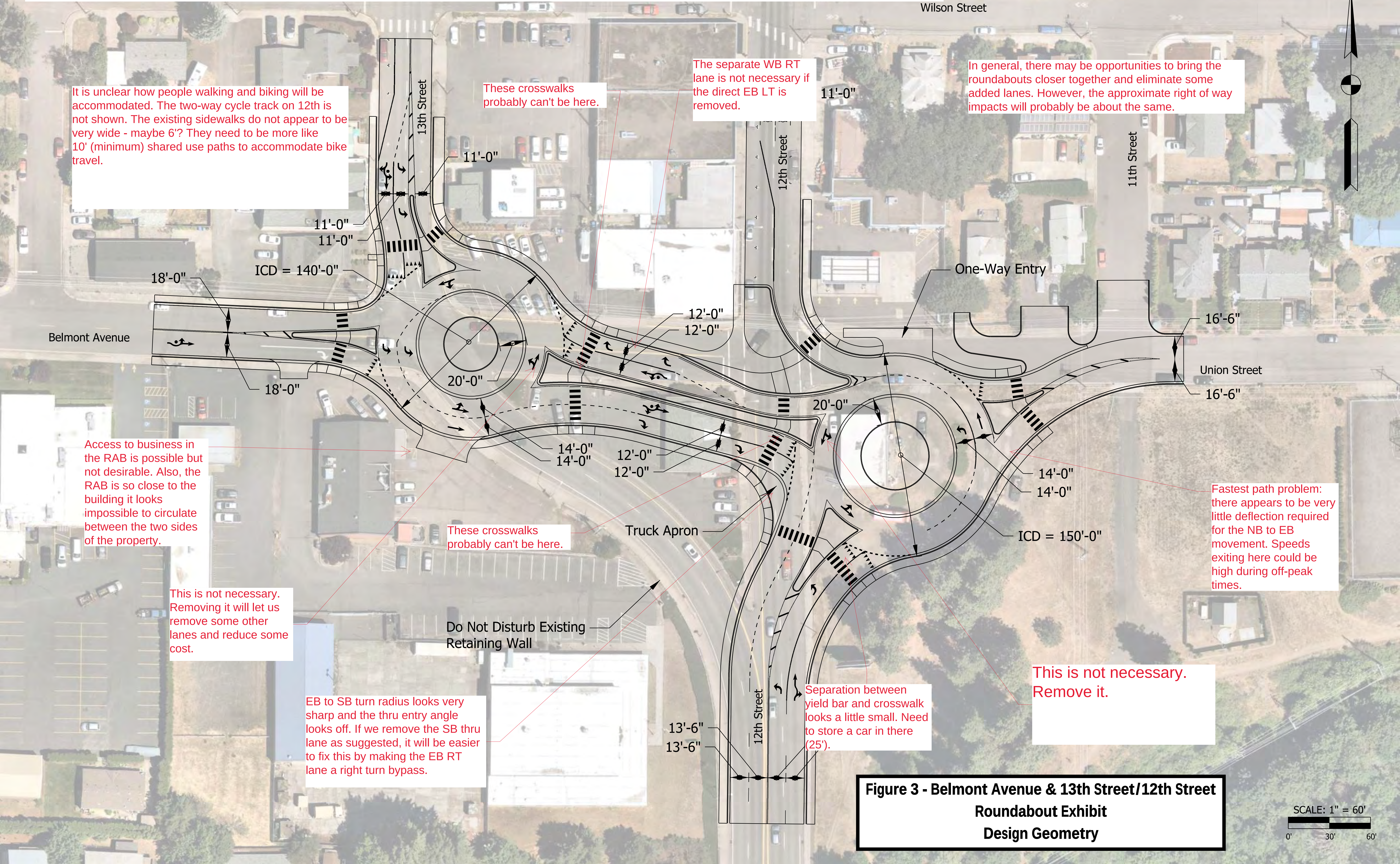


Figure 3 - Belmont Avenue & 13th Street/12th Street
Roundabout Exhibit
Design Geometry

APPENDIX D - ON-STREET PARKING COUNTS (2 pages)

EXISTING

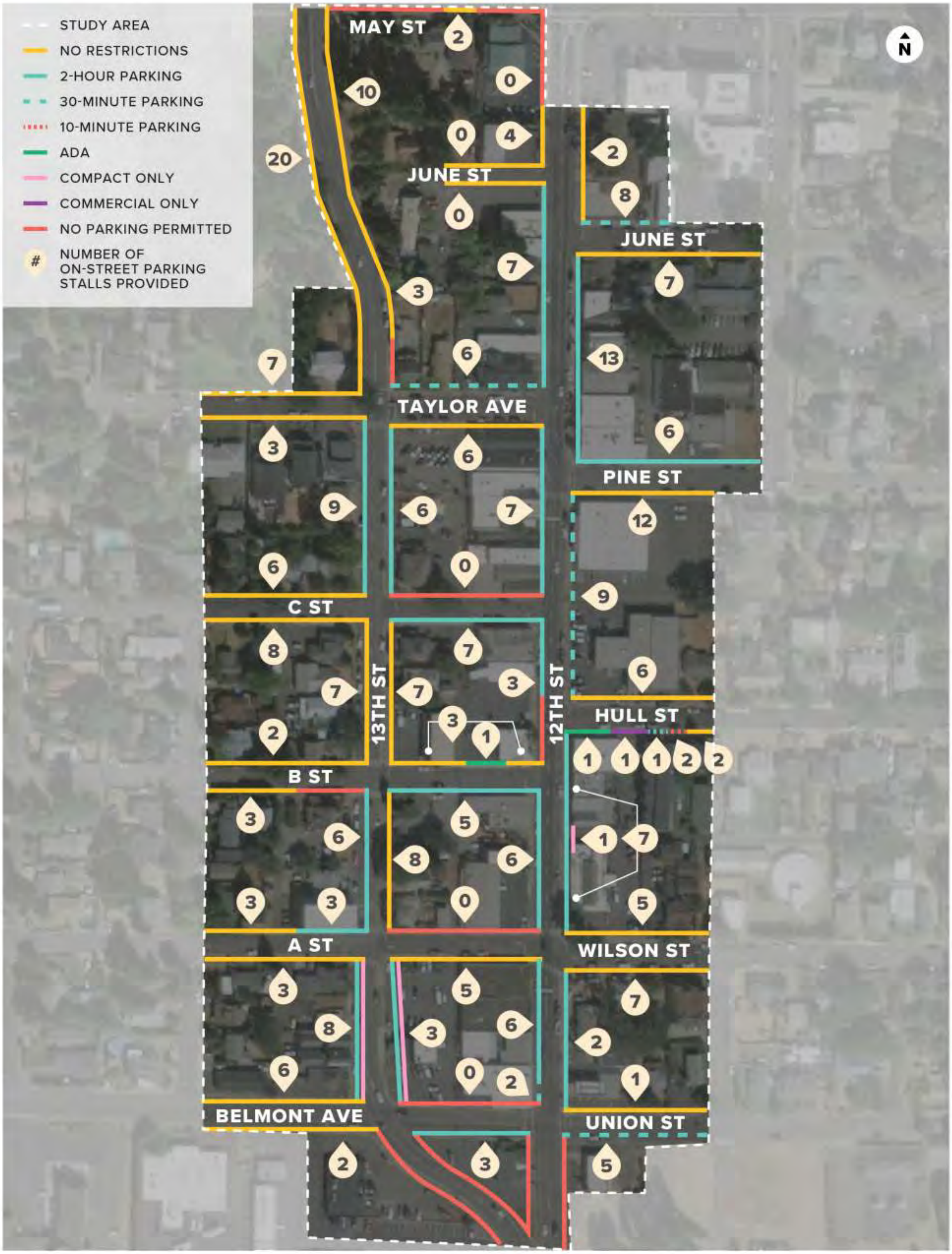


Figure 1: On-Street Parking Locations and Restrictions from November 2021 Parking Study by DKS

PROPOSED

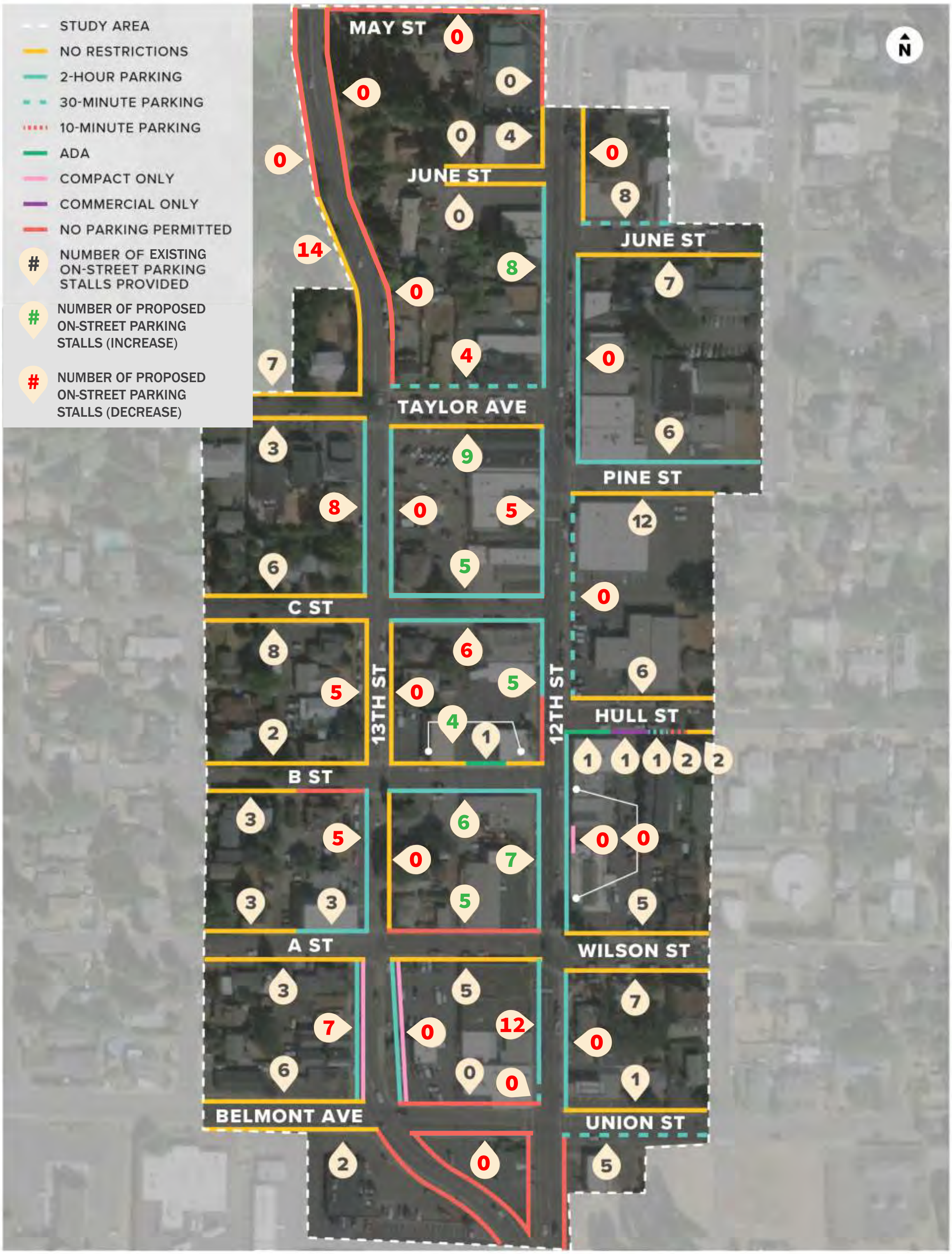


Figure 2: Planning level estimate for potential future on-street parking for recommended design (as of design studies completed March 2023)

memo

to	Urban Renewal Board and Advisory Committee
from	Nathan Polanski, PE, MIG
re	The Heights Streetscape Plan – Preliminary Preferred Concept Plan
date	July 26, 2023

This memorandum presents the preliminary preferred concept plan for the Heights Streetscape study area. The preliminary preferred concept plan has been developed based on Urban Renewal Agency (URA) feedback from the additional Phase 3 design studies that were completed and presented to the URA Advisory Committee (URAC) and Board (URAB) in April 2023.

The memorandum includes a summary of what we heard from the URA and how feedback has been incorporated into the design to develop the preferred concept plan. Elements of the preliminary preferred concept plan covered in this memo include:

- Design of key intersections
- Design of 12th and 13th Streets
- Design of east/west streets
- Bicycle connection to Pacific Avenue
- Heights Parking Summary Update

The attached preliminary preferred concept plan and typical street cross sections (Attachments A and B) show how the individual components come together to create a comprehensive streetscape design for the streets and intersections in the Heights that aligns with the project goals.

On July 12, 2023 the project team also received ODOT comments on the materials presented to the URA in April 2023; the materials ODOT reviewed were the April 7, 2023 memo to the URA and the April 2023 PowerPoint slides documenting findings from the Phase 3 Additional Design Studies. Key takeaways from ODOT's comments are included at the end of this memo.

Design of Key Intersections

13th Street/May Street

The project team recommended and the URAB approved a roundabout for the intersection at 13th Street/May Street. URA feedback included a request for the project team to explore opportunities for additional traffic control measures at crosswalk to improve safety. The attached preferred concept plan incorporates rectangular rapid flashing beacons (RRFBs) at each crosswalk as an additional traffic control device to increase driver awareness at pedestrian crossings.

13th Street/Belmont Avenue/12th Street

The project team recommended and the URAB approved closing Belmont Avenue to through traffic between 12th and 13th Streets and providing a traffic signal for the intersection at 13th Street/Belmont Avenue. URA feedback included a request for the project team to:

1. Explore opportunities for maintaining business and alley access between 12th and 13th Streets along Belmont Avenue.
2. Document the delay in travel time for residents who live east of 12th Street to travel around the Belmont Avenue street closure and head south on 12th Street.

The preferred concept plan includes a driveway ramp at the west side of the Belmont Avenue/12th Street intersection to allow vehicle access to the alley and businesses along Belmont Avenue (Figure 1). The design intent is that Belmont Avenue would be designed as a flexible, curbless street that operates as a shared space and/or plaza to accommodate community events and support community placemaking goals while allowing access to the alley and local businesses.

Figure 1: Driveway ramp at Belmont/12th Street intersection and placemaking/shared street opportunity.

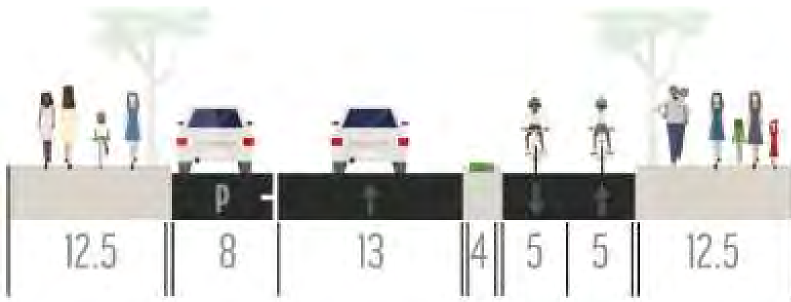
Attachment C summarizes potential out-of-direction travel delay for trips starting in the neighborhood along Union Street east of the Heights that want to turn south if Belmont Avenue is closed at 13th Street. The study found travel time for Union Street traffic increases by about 45 seconds when turning left from B Street instead of directly from Belmont Avenue. See Attachment C for additional discussion and findings.

Design of 12th Street

URA feedback included a request for the project team to widen the two-way cycle track to prioritize a safe, comfortable space for people biking over additional parking stalls that could squeezed into the street by using angle parking instead of parallel parking.

The preferred concept plan incorporates the revised typical street cross section shown in Figure 2 below. This street cross section allows for a 10-foot two-way cycle track, four-foot raised buffer between the cycle track and travel lane, and wider sidewalks on both sides of the street (increasing from 10-feet to 12.5-feet). A 13-foot travel lane also allows more maneuvering space for people entering/existing parking stalls, which in turn provides more flexibility for incorporating a raised median or planting to provide physical protection between the travel lane and cycle track.

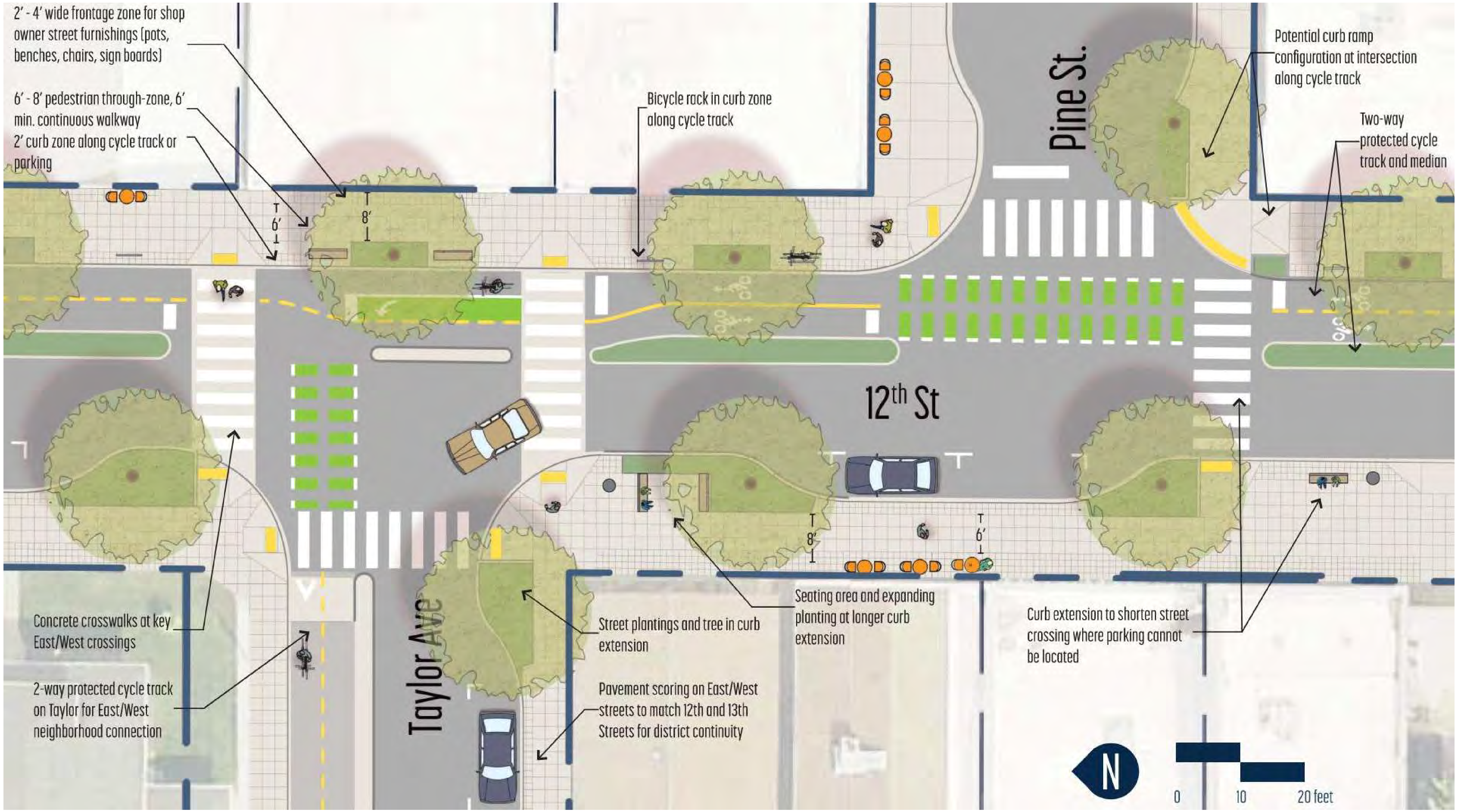
Figure 2: Revised typical street cross section for 12th Street (looking north).



The removal of angle parking eliminated opportunities for wide (15') curb extensions that could be programmed as amenity areas or gathering spaces along 12th Street. In lieu of these wider curb extensions the preferred concept plan incorporates a few opportunities for longer curb extensions to create additional space for seating and streetscape amenities. These longer curb extensions, which would replace a single parking stall, could be permanent installations built into the street design or temporary installations (e.g. parklets) that can moved or located as desired by local businesses; for the purposes of the attached graphic we have shown the expanded curb extensions as permanent installations.

A detailed plan view rendering for a segment of 12th Street has been developed to show how a "typical" intersection and stretch of sidewalk along both sides of the street could be designed to support pedestrian and business access for all users (Figure 3).

Figure 3: Detailed plan view rendering for an intersection and segment of street along 12th Street

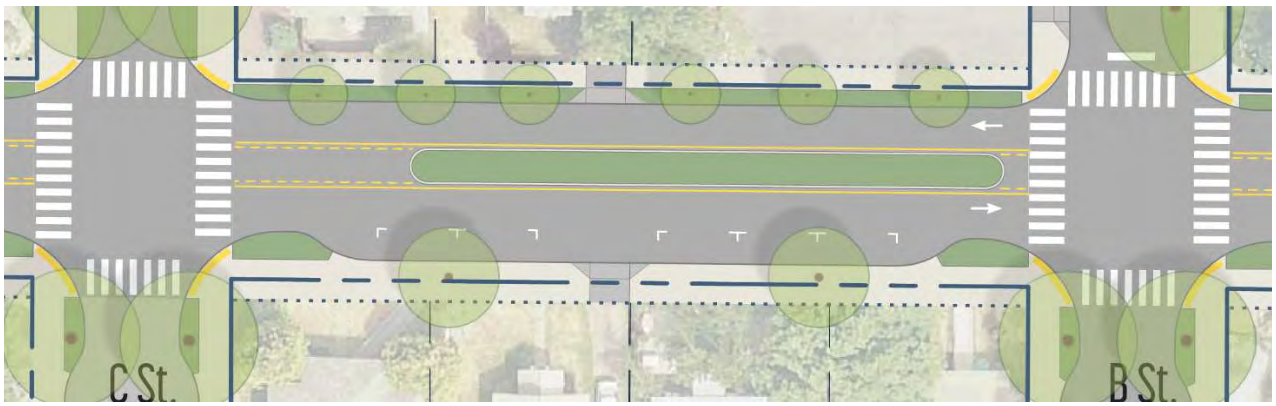


Design of 13th Street

URA feedback for 13th Street included a request to continue exploring opportunities for traffic calming to mitigate the traffic impacts of a three-lane street cross section design. The preferred concept plan incorporates additional and expanded medians along 13th Street and RRFBs at key east/west streets to improve access for people walking and biking across the Heights.

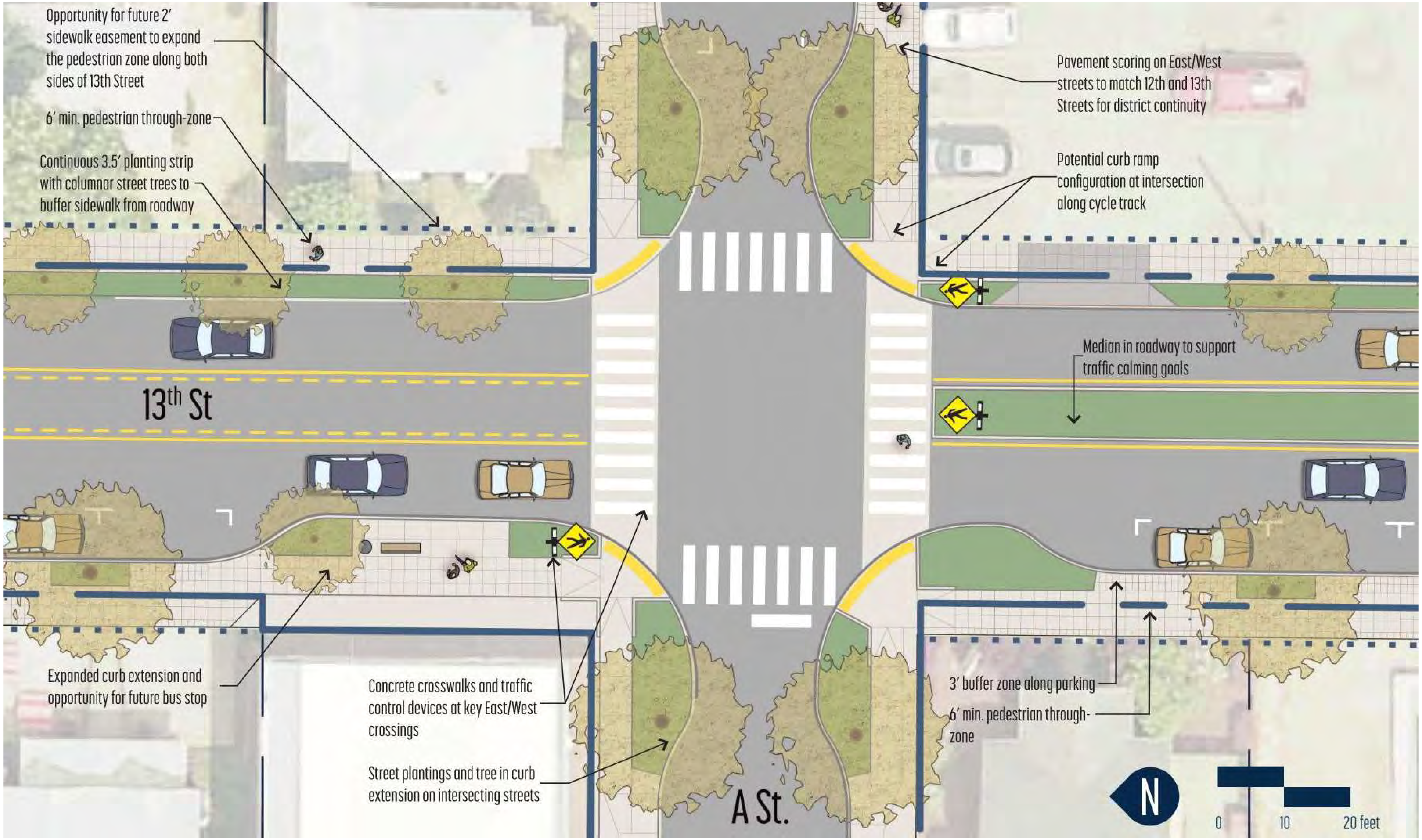
An additional median between B and C Streets provides additional traffic calming but would restrict existing driveway access in two locations to right in-right out access (see Figure 4); note, as part of the final concept report the project team plans to conduct a review of existing driveway locations along 12th and 13th Streets to identify opportunities for safety and operational improvements for the preferred concept plan (see Next Steps below for more discussion).

Figure 4: Existing driveways along 13th Street that would have access limited to right-in/right-out and/or should be relocated to the alley as part of future street improvements.



A detailed plan view rendering for a segment of 13th Street has been developed to show how a "typical" intersection and stretch of sidewalk along both sides of the street could be designed to balance access for all street users (Figure 5).

Figure 5: Detailed plan view rendering for an intersection and segment of street along 13th Street

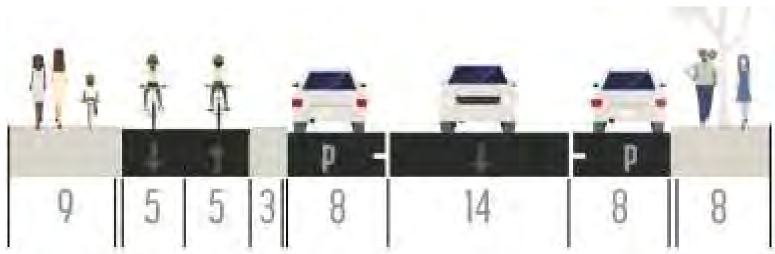


Design of East/West Streets

The project team recommended and the URAB approved alternating one-way streets between A Street and Taylor Avenue with parallel parking on both sides of the street. URA feedback included a request for the project team to explore alternatives to contra-flow bike lanes on Taylor Avenue and A Street.

The preferred concept plan incorporates a two-way cycle track along Taylor Avenue on the sidewalk side of parallel parking (Figure 6). On-street parking was changed from angle parking to parallel parking to create space for the two-way cycle track.

Figure 6: Revised typical street cross section for Taylor Avenue (looking east).



The existing 50-foot right-of-way along A Street does not allow for parking and bike facilities on both sides of the street. With the closure of Belmont Avenue between 12th and 13th Streets and planned bike lanes on Belmont Avenue (as part of the City's Transportation System Plan), it was determined that east/west bike access at the south end of the Heights could be shifted to Belmont Avenue. A Street can instead be focused on improving access for people walking east/west across the Heights, with sidewalks widened to 10-feet and maintaining parking on both sides of the street (Figure 7).

Figure 7: Revised typical street cross section for A Street (looking west).

Bicycle Connection to Pacific

The project team recommended and the URAB approved coordinating with ODOT to explore the possibility of narrowing existing travel lanes south of Belmont Ave to expand the sidewalk zone to provide a shared use path and landscape buffer along the east side of 12th Street. The attached preferred concept plan shows a shared use path extending south from Belmont Avenue.

Heights Parking Summary Update

The project team continues to track potential changes to parking as the preferred concept plan is developed. This includes changes based on URA direction to change from angle parking to parallel parking along 12th Street and Taylor Avenue to provide more space for people biking as well as other details related to curb extensions for traffic calming and creating spaces for people to gather.

Table 1 provides an updated parking summary for the Heights based on the preferred concept plan (Attachment A) and includes existing and proposed parking scenarios compared to a forecasted demand in 2040 for a high development growth scenario.

Table 1: Parking comparison for existing and future scenarios

	Approx. On-street Parking along 12th and 13th Streets	Approx. On-street District Parking on all E/W streets (parking within one block of 12th and 13th Streets)	Approx. Off-Street Parking [E] (per Sept. 2021 parking study)	Total Parking (on- and off-street)
Existing (2021)	156	148	410	714
2011 TSP Proposed	70	148	410	628
Preferred Concept Design	72[A]	148[B]	399[C, D]	619
Estimated 2040 Peak Summertime Parking Demand (from 2021 Parking Study)				657

A. On-street parking along 12th and 13th Streets has been reduced from 80 to 72 based on changes shown in the preferred concept plan.

B. On-street parking on all E/W streets has been reduced from 155 to 148 based on changes shown in the preferred concept plan.

C. This number reflects the loss of 11 parking stalls that could be removed with the acquisition of the private parcel located between Belmont Avenue/12th Street/13th Street.

D. This number does not include impacts to off-street parking at Jackson Park and the hospital as those parking areas were not included in parking study completed during Phase 2.

E. Numbers do not include additional parking constructed as part of private property redevelopment.

ODOT Comments on Findings from Additional Phase 3 Studies

Key takeaways from ODOT comments on the April 7, 2023 memo to the URA (and accompanying PowerPoint slides), which documented project team recommendations from the Phase 3 Additional Design Studies, as they relate to the preferred design are summarized below. These takeaways are focused on highlighting issues the city and URA should anticipate during future stages of design development.

- <u>Future design and approvals (General)</u> – Suggest compiling a list of elements and features that may require design exceptions/approvals. Any dimensions outside the recommended ranges for the ODOT approved Central Business District/Main Street urban context designation will require a design exception (e.g. sidewalk widths on 12th and 13th Streets, lane widths on 13th Street)
- <u>Intersections (General)</u> – If remaining under ODOT jurisdiction an Intersection Control Evaluation study/document will be required to establish evidence for design approvals. ODOT recommends getting approval on this before proceeding too far with design. ODOT staff will review intersection layout detail after the concept is approved by the State-Traffic Roadway Engineer.
- <u>Traffic analysis</u> – current horizon year for traffic analysis is 2039; horizon year should be minimum 20 years from plan adoption (25-30 years is recommended to increase the life of the plan).
- <u>Roundabout</u>
    - Environmental processes and reviews associated with U.S. DOT Act of 1966, Section 4(f) are significant and relevant and should be considered at the planning phase to understand the probability of approval for the roundabout, which impacts the Jackson Park property. U.S. DOT Section 4(f) considers impacts to parks and recreation lands and requires that there is no feasible and prudent alternative to avoid impacts to Section 4(f) properties (i.e. Jackson Park); or, requires a finding to be made that the project has a *de minimis* impact on the park property; a *de minimis* impact is one that will not adversely affect the activities, features, or attributes of the Section 4(f) property. USDOT Section 4(f) applies to projects that receive funding from or require approval an agency of the U.S. DOT (i.e. ODOT).
    - At this stage it may be helpful to reference potential design modifications, e.g. oval approach, that could help mitigate some of the more significant impacts.
- <u>Right of way acquisition</u> – Right of way issues tend to be significant with respect to project risk compared to other common project issues.
- <u>13th Street</u> –
    - A 10-foot center turn lane will be difficult to approve.
    - Northbound lane on 13th needs to exclude the gutter/consider drainage design.
- <u>South bike connection to Pacific</u> – ODOT noted the narrowing of travel lanes has merit to explore further. Reduced lane widths will also need to consider drainage design.

Next Steps

The project team is looking for confirmation that we have incorporated previous URA comments so that we can begin developing the final concept report and implementation plan.

Final Concept Report

The project team will document the preferred concept plan in a final report. This report will also include additional streetscape character design considerations such as:

- Potential types of street trees appropriate for the redesigned streets.
- Examples of street furnishing styles that may be appropriate based on the character of the Heights and community feedback from the Phase 2 open house.
- Opportunities for integrating green stormwater infrastructure based on existing topography and streetscape space available.
- Opportunities for placemaking at key intersections.

The report will also explore where access management might benefit safety and traffic operations along 12th and 13th Streets. Access management is the practice of managing the location and design of vehicular connections to a roadway. It is an effective tool for improving the safety and efficiency of travel along a corridor by reducing the number of potential conflict points and making the environment less stressful for all users.

The project team will conduct a review of existing driveway locations along 12th and 13th Streets to identify opportunities for safety and operational improvements for the preferred concept plan. This will include identifying existing driveways that may not be desirable to remain due to safety considerations (i.e. proximity to the intersection), driveways that do not meet current code (i.e. existing driveways are too wide), or driveways that could be relocated to have alternate access from the alley or side street.

Specific recommendations for changes to individual property access points will not be included as part of the final concept plan; decisions about changes to individual property access points will occur through future land use applications and/or the engineering Design Phase once funding for implementation becomes available. If 12th or 13th Street remains an ODOT facility the guidelines of OAR 734-051-7010 will be applicable; OAR 734-051-7010 describes outreach to property owners that may be affected by property access decisions as part of a planning process for a state highway.

Implementation Plan

An implementation plan will also be developed to evaluate how street and intersection improvements might be implemented over time. This plan will include a variety of elements including:

- A final planning level range of probable construction costs for future street improvements.
- Funding strategies and potential grant opportunities to support project implementation.
- A potential phasing plan for designing and constructing street and intersection improvements over time. This could include:
  - identifying opportunities for near-term safety improvements (e.g. curb extensions on the west side of 13th Street and RRFBs to support safety crossings at Taylor Avenue and A Street),
  - how the design and operations of key intersections will drive and impact implementation over time,
  - how updates to existing utility infrastructure might impact phasing, and
  - how street improvements might be implemented over time depending on availability of funding.

The first step of the phasing discussion will need to be with ODOT to discuss whether a potential Jurisdictional Transfer of 12th, 13th, and May Streets might be desired.

ODOT comments on the design suggest the possibility for a potential future Jurisdictional Transfer and future updates to the City's Transportation System Plan (TSP).

Attachments

Attachment A: Preferred Concept Plan – Preliminary (July 2023)

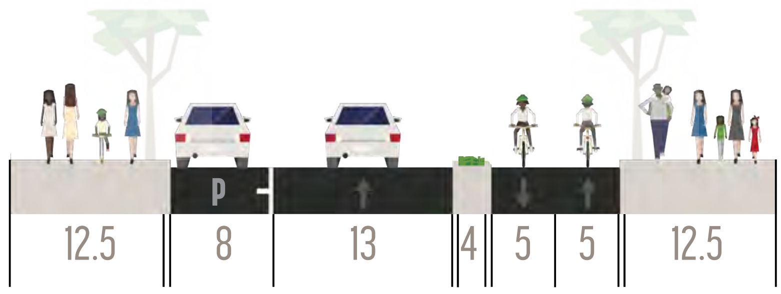
Attachment B: Typical Street Cross Sections (July 2023)

Attachment C: Union Street PM Peak Hour Travel Time Delay Technical Memorandum (June 23, 2023)

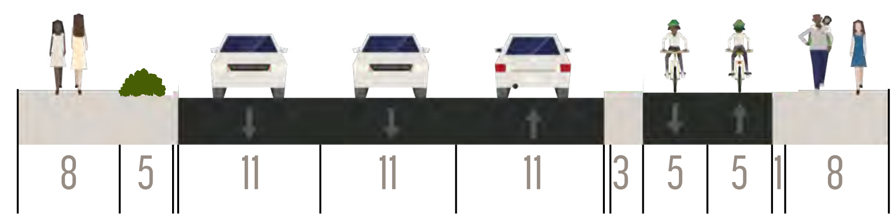
Appendix A

PRELIMINARY PREFERRED CONCEPT PLAN
July 2023
THE HEIGHTS
STREETSCAPE PLAN
12th St
June St.
Pine St.
Hull St.
Wilson St.
Union St.
12th St
12th St
12th St
June St.
Taylor Ave
C St.
B St.
A St.
Belmont Ave
Placemaking/ Shared Street Opportunity
Placemaking Opportunity
13th St
Taylor Ave
C St.
B St.
Belmont Ave
LEGEND
Existing Right of Way, See Note 1
Parcel Lines
Existing Easement
Roadway
Driveway
Raised pavement for truck access
Sidewalk
Planting
Street tree
NOTES
1. Right of way shown is existing. Extents of property acquisition to be determined during design.
N
0
50
100
200 feet

12th ST
(60' R/W)

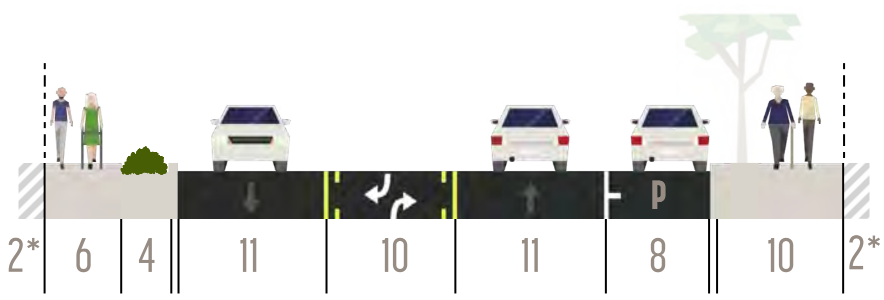


MAY ST
(60' R/W and 10' easement on north side of street)



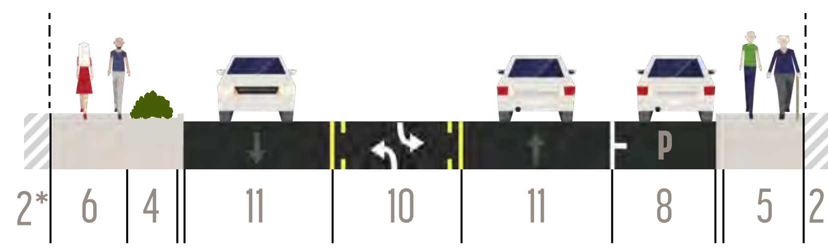
13th ST - Section A

Section A applies where the full 60' (50' R/W and existing 5' easements) is available for street improvements



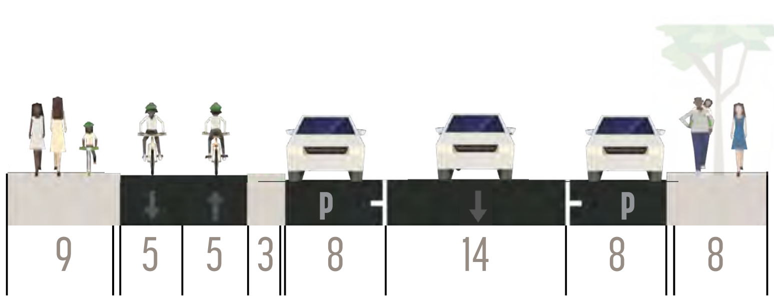
13th ST - Section B

Section B applies where existing structures and ramps to buildings are located within the existing 5' utility easement on the west side of 13th Street

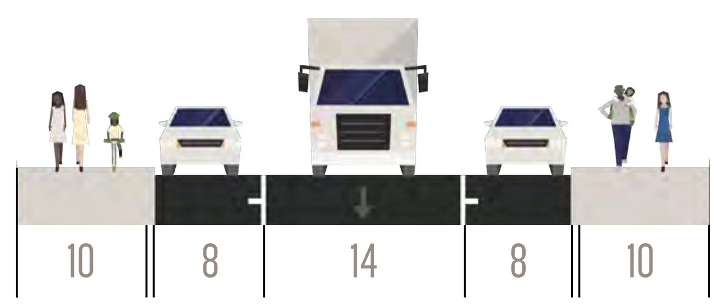


*Future sidewalk easement to be provided as properties redevelop to allow for additional sidewalk space in the pedestrian realm.

TAYLOR AVE
(60' R/W)

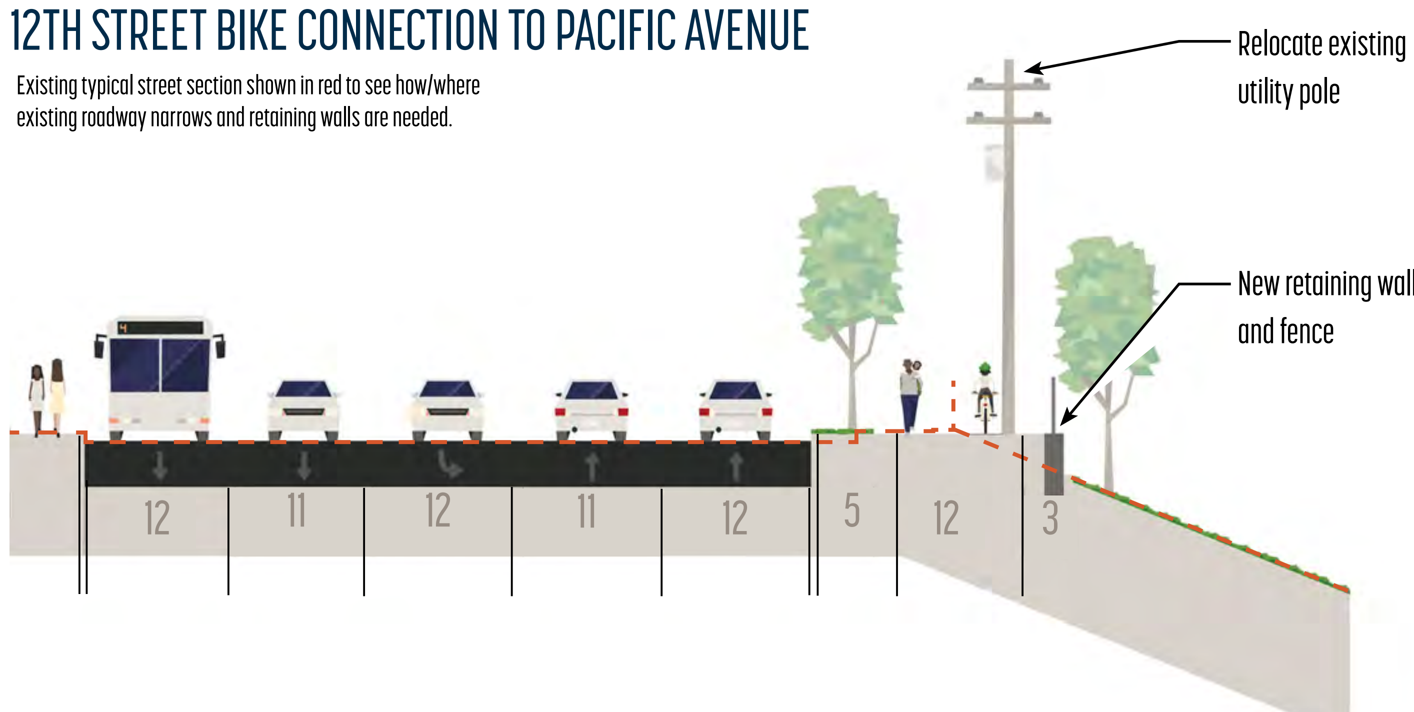


A, B AND C STREETS
(50' R/W)



12TH STREET BIKE CONNECTION TO PACIFIC AVENUE

Existing typical street section shown in red to see how/where existing roadway narrows and retaining walls are needed.



PRELIMINARY

July 2023

Appendix C (3 pages)

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TECHNICAL MEMORANDUM

DATE: June 23, 2023

TO: Nathan Polanski | MIG

FROM: John Bosket, PE; Kayla Fleskes-Lane, PE | DKS Associates

SUBJECT: Hood River Heights Streetscape Plan – Union Street PM Peak Hour Travel Time Delay

Project #20203-000

This memorandum responds to a question raised during the April 24, 2023, Urban Renewal Advisory Board meeting regarding potential out-of-direction travel time delay for trips starting in the neighborhood along Union Street east of the Heights that want to turn south if Belmont Avenue is closed at 13th Street. Under this scenario (previously referred to as Option 2 for Belmont Avenue and east-west street configurations), these trips could make a left turn onto 13th Street from B Street or could choose to route to 13th Street via May Street.

To help inform this discussion, the following three scenarios were evaluated (routes illustrated in Figure 1):

Scenario A: Option 2 (east Belmont Avenue approach to 13th Street is closed) with Union Street traffic turning at B Street.

Scenario B: Option 2 (east Belmont Avenue approach to 13th Street is closed) with Union Street traffic turning left at May Street.

Scenario C: Option 4 (Belmont Avenue is one-way westbound between 12th and 13th Streets) with Union Street traffic turning left from Belmont.

For each scenario, the travel time to start from Union Street (from a point one block east of 12th Street) and reach a point on 13th Street just south of Belmont Avenue was estimated

FIGURE 1. ROUTES OF SCENARIOS EVALUATED FOR TRAVELING FROM UNION ST. TO SOUTH OF BELMONT AVE.

using the year 2039 weekday p.m. peak hour traffic analysis model previously used to evaluate circulation alternatives for this project. Travel time estimates included the time to travel along each street segment, as well as the estimated amount of average delay that would be experienced making the required moves through each intersection. It was assumed that average travel speeds on 13th Street would be 25 mph, while average travel speeds would be 20 mph on all other streets.

Table 1 summarizes the results of this evaluation. This includes the estimated average travel time per trip as well as the cumulative delay experienced during the one-hour peak period from all trips assumed to be making that movement.

Key observations from the results in Table 1 include:

- Given the short length of Union Street, the number of peak hour trips forecast to make the westbound to southbound trip down 12th Street south of the Heights is fairly small. There would be more of these trips coming from the neighborhood north of Union Street, but their route options would be very similar to what they can do today. The difference for these trips would be the higher delay experienced while attempting to turn left onto 13th Street, which is estimated to be just under two minutes on average during the peak hour. However, this is a result of the 13th Street configuration selected (i.e., conversion to two-way traffic with limited traffic on 12th Street), not the choice of circulation options at Belmont Avenue.

- The travel time for Union Street traffic increases by 35 percent (or about 45 seconds) when turning left from B Street instead of directly from Belmont Avenue. When turning left from May Street, the travel time increases by 130 percent (or about 2-1/2 minutes)

- Adding the east Belmont Avenue approach back to the intersection with 13th Street (as in Scenario C) results in a significant 123 percent increase in delay for traffic traveling northbound on 13th Street. While this only equates to about 13 seconds per vehicle, because of the high number of northbound trips during the peak hour this results in a cumulative increase in delay of more than three vehicle-hours.

- When totaling all vehicle delay experienced by northbound and southbound traffic on 13th Street as well as all Union Street trips making a southbound left turn onto 13th Street, Scenario A results in the least amount of system delay. Scenario B results in a 3 percent increase in delay over Scenario A, while Scenario C results in a 19 percent increase.

TABLE 1. TRAVEL TIME AND DELAY ESTIMATES FOR ROUTES FROM UNION ST. TO SOUTH OF 13TH ST. (2039 WEEKDAY PM PEAK HOUR)

	TRAFFIC FROM UNION STREET			NORTHBOUND 13TH STREET TRAFFIC		SOUTHBOUND 13TH STREET TRAFFIC		ALL TRAFFIC
Circulation Scenario	Vehicles	Total Travel Time (min)	Total Veh Delay (veh-min)	Vehicles	Total Veh Delay (veh-min)	Vehicles	Total Veh Delay (veh-min)	Overall Veh Delay (veh-min)
Scenario A: Option 2 (Close Belmont), turn south from B Street	20	2.6	52	855	151	1,040	768	971
Scenario B: Option 2 (Close Belmont), turn south from May Street	20	4.3	85	855	151	1,040	768	1,004
Scenario C: Option 4 (One-way WB Belmont), turn south from Belmont Avenue	20	1.9	37	855	336	1,040	778	1,152

Notes: veh = vehicle; min = minutes