MEMORANDUM

Parkdale Existing and Future Conditions (Task 3.2)
Parkdale Community Plan Update

DATE	October 10, 2023
TO	Eric Walker, Hood River County Community Development Director
FROM	Clinton "CJ" Doxsee, MIG	APG
CC	Jon Pheanis & Matt Hastie, MIG	APG

OVERVIEW

This memorandum presents information on current and forecasted conditions in the Parkdale community. The County and the MIG | APG consultant team – the project team –will use this information to develop the Parkdale Community Plan.

Background[1]

The Parkdale community is located in the upper Hood River Valley, approximately 15 miles south of the Columbia River in Hood River County, Oregon. The community is known for its picturesque landscapes, fruit orchards, and proximity to scenic Mt. Hood.

The local economy in Parkdale is primarily based in the agriculture industry, including fruit growing on surrounding farmlands and one fruit packing plant (Diamond Fruit). Parkdale's secondary economy is based on tourism. The community is also home to several businesses including a brew pub, general merchandise store, gas station, museum, and other commercial and industrial businesses. The Parkdale area also includes public or community-oriented uses such as the Parkdale Library/Community Center, Parkdale Elementary School, Parkdale Fire Station, and the Parkdale Grange Hall. Clear Creek Road is part of the Hood River Fruit Loop, a collection of agricultural businesses that promote tourist activities in Parkdale and other areas in the Hood River Valley. The Mt. Hood Railroad terminates in Parkdale adjacent to the Hutson Museum.

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[1] Parts of the information provided in this section are based on descriptions from the original Parkdale Community Plan planning effort initiated around 2004. This memorandum provides updates to these descriptions where changes have occurred or where new information is available.

Parkdale is accessible via OR-281 via OR 35 (Hood River Highway). The road provides access to nearby towns and recreational areas, including the Mt Hood National Forest.

Parkdale is served by the Parkdale Water Company and Parkdale Sanitary District. Additional information on each of the service providers is provided later in this memorandum.

Most of Parkdale's residents live there year-round, though the community includes several short-term rental homes, vacation homes, and other lodging.

The 2020 US Census identified a population of 299 people in the Parkdale Census Defined Place (CDP). The Parkdale CDP boundary is larger than the Parkdale unincorporated community boundary. The Parkdale CDP boundary includes land zoned for exclusive farm uses to the south and east of the unincorporated community boundary. Areas zoned for exclusive farm uses do not typically have housing on them unless it is used in conjunction with farming.

Table 1 provides a demographic summary for the population within the Parkdale CDP and for Hood River County as a whole. According to the 2020 US Census data, approximately 38% of the population within the Parkdale CDP and 30% of the overall County population are of Hispanic or Latino ethnicity. The concentration of Hispanic/Latino population is higher in Parkdale compared to the rest of the County. Conversely, the white population in the Parkdale CDP is lower than the rest of the County at 55% and 62% respectively. All other races, except for Black or African American populations, are present in small numbers within the Parkdale CDP and follow similar patterns as the overall County.

Table 1: Race & Ethnicity

Demographic Populations	Hood River County		Parkdale CDP	
Total Population	23,977		299	
Hispanic or Latino	7,148	30%	115	38%
White	14,935	62%	163	55%
Black or African American	47	0%	0	0%
Native American & Alaska Native	149	1%	2	1%
Asian	381	2%	5	2%
Native Hawaiian or Pacific Islander	33	0%	1	0%
Other	119	0%	1	0%
Two or More Races	1,165	5%	12	4%

Unincorporated Community Boundary

Provisions for developing and adopting a community plan are regulated by Oregon Administrative Rules (OAR). Specifically, OAR 660-022-0020 identifies requirements for lands that may be included within an unincorporated community boundary.

(3)   Only land meeting the following criteria may be included within an unincorporated community boundary:

       (a)   Land which has been acknowledged as a Goal 3 or 4 exception area and historically considered to be part of the community provided the land only includes existing, contiguous concentrations of:

              (A)   Commercial, industrial, or public uses; and/or

              (B)   Dwelling units and associated residential lots at a greater density than exception lands outside rural communities.

       (b)   Land planned and zoned for farm or forest use provided such land meets the criteria in section (4) of this rule.

    (4)   Community boundaries may include land that is designated for farm or forest use pursuant to Goals 3 and 4 if all the following criteria are met:

       (a)   The land is contiguous to Goal 3 or 4 exception lands included in the community boundary;

       (b)   The land was occupied on the date of this division (October 28, 1994) by one or more of the following uses considered to be part of the community: Church, cemetery, school, park, playground, community center, fire station, museum, golf course, or utility facility;

       (c)   Only the portion of the lot or parcel that is occupied by the use(s) in subsection (b) of this section is included within the boundary; and

       (d)   The land remains planned and zoned under Goals 3 or 4.

    (5)   Site specific unincorporated community boundaries that are shown on an acknowledged plan map on October 28, 1994, are deemed to comply with subsections (2) and (3) of this rule unless the boundary includes land designated for farm or forest use that does not meet the criteria in section (4) of this rule.

    (6)   Communities which meet the definitions in both OAR 660-022-0010(6) and (9) shall be classified and planned as either resort communities or urban unincorporated communities.

In Parkdale, these requirements translate into contiguous areas zoned for commercial, industrial, and residential uses (i.e., exception areas). Most of the residential land within the community boundary is within a long narrow strip of properties adjacent to Clear Creek Road, south of Baseline Drive and in the northeast corner of the community, north of Baseline Drive.

Commercial properties are located on either side of Baseline Drive both east and west of Clear Creek Road and 2nd Street. Land zoned for industrial uses is located northwest of the intersection at Clear Creek Road and Baseline. This includes the Diamond Fruit packing plant located beyond the commercial businesses. Additional industrial land is located in the east part of the community, north of Baseline Drive.

Most of this area is within the Parkdale Water District. Some properties in the southernmost portion of the community are within the Parkdale Water District but are served by the Crystal Springs Water District through a cooperative agreement between the two districts. All of this area is within Parkdale Sanitary District. The district boundaries for both the Parkdale Water District and the Parkdale Sanitary District are slightly larger than the community boundary.

Project History

In 1994, the State of Oregon's Land Conservation Development Commission (LCDC) adopted OAR 660, Division 22 (Unincorporated Communities Rule). The Unincorporated Communities Rule provides a framework for counties to identify and designate communities outside of established urban growth boundaries (UGBs), and to establish planning rules for those communities pertaining to development standards, allowed land uses, and public facilities.

The County formally identified unincorporated communities and rural service centers, including Oak Grove, Rockford, Windmaster, Van Horn (Pine Grove), and Mt. Hood in response to the Unincorporated Communities Rule.

Hood River County initiated a project in 2002 to plan for the Parkdale community. The planning effort included a community survey and community meetings. It also considered existing and future growth needs and identified potential changes to the County's development ordinances. The planning efforts were completed but adoption was delayed around 2008 because it was determined the Parkdale Sanitary District Wastewater Treatment Facility was out of compliance with DEQ discharge requirement, which had the potential to affect planned development densities and land uses. Consequently, the project was put on hold to give the Parkdale Sanitary District time to work with DEQ to correct system deficiencies.

The current planning effort is a continuation of the 2002 project. The current planning effort builds on the previous work and has updated applicable information in order to adopt the Parkdale Community Plan. This planning effort is providing a review of existing land uses and public facilities, conducting community engagement, and updating draft zoning ordinance amendments and accompanying maps from the 2002 project.

Plan Process

The planning process involves a technical analysis of existing and future conditions, as well as engagement with the local community to understand local values and preferences. The project team has been engaged in the following activities between the project start date in August 2022, leading to the development of the draft Community Plan for Parkdale.

- Reviewed and confirmed the preliminary community boundary from the 2002 planning effort.
- Obtained and analyzed planning level data related to existing land uses, capacity of public services, and current plan and zone designations.

- Reviewed existing zoning designations and zoning designations from the 2002 planning effort for compliance with the Unincorporated Communities Rule.
- Revised residential, commercial, industrial, and light industrial designations from existing zoning designations and zoning designations from the 2002 planning effort based on community feedback and public facility capacity findings.
- Analyzed current development and anticipated future buildout as compared to available planned public facilities capacity.
- Established requirements for future development to study impacts to public facilities and ensure future development does not exceed capacity of facilities.

In addition to the above activities, the project team has been involving the community to share information about the project and involve community members in the planning process. Additional information about the community engagement effort is provided in the following section.

Community Engagement

OAR 660-022-0060 provides requirements for citizen involvement as part of the development of a community plan. Relevant sections are included below.

(1)   Counties shall ensure that residents of unincorporated communities have adequate opportunities to participate in all phases of the planning process. Counties shall provide such opportunities in accordance with their acknowledged citizen involvement programs.

(2)   When a county proposes to designate an unincorporated community or to amend plan provisions or land use regulations that apply to such a community, the county shall specify the following:

(a)   How residents of the community and surrounding area will be informed about the proposal;

(b)   How far in advance of the final decision residents of the community and the surrounding area will be informed about the proposal;

(c)   Which citizen advisory committees will be notified of the proposal.

The community outreach strategy for this project sought to share information about the project and gather input from the community regarding their vision for the community's future and the need for specific types of land uses and services. This included the development of a bilingual survey (Spanish and English), hosting a community meeting and open house (planned), and providing project updates and FAQs to those who shared their contact information.

Bilingual survey: The project team developed a bilingual non-statistical survey to gather feedback from residents in and around Parkdale. The survey was developed using the survey associated with the original Parkdale Community Plan planning effort initiated around 2002. Like the 2002 survey, the updated survey asked respondents about how the community should grow from a residential

and commercial standpoint. The survey was mailed to more than 600 property owners in the Parkdale community and areas immediately surrounding the community. Project team members also conducted in-person surveys throughout the community through one-on-one interactions and by holding information sessions outside McIsaac's store in the community. Overall, the survey received 327 responses. Most respondents completed the survey in English (287), while the remainder completed it in Spanish (40).

Community meeting: The project team also held a community meeting on November 16, 2022, at the Parkdale Elementary School. The purpose of the meeting was to share information about the Community Plan and process and address questions and comments related to the project. More than 100 people from the community attended the meeting.

Community open house (planned): A second event is planned for October 26, 2023, where the project team will share additional information about existing and future growth in the community as well as potential changes to the County's development ordinances.

Land Use Planning

Existing Land Use and Zoning

Authorized land uses in an unincorporated community include those provided under OAR 660-022-0030. These regulations allow for a variety of industrial, commercial, and residential uses that are consistent with Statewide Planning Goals 3 and 4.

The Parkdale community includes a mix of land used and zoned for residential, commercial, and industrial land. The community also includes several community facilities. Table 2 provides a summary of existing zoning in the Parkdale area.

Table 2: Zone Descriptions

Zone	Description
R-1 7500: Residential	The R-1 7500 zone was established as part of the County Comprehensive Plan to allow for single-family residential development on lots of at least 7,500 square feet in size. However, in 2000, OAR 660-004-0040(6) went into effect requiring all residential zones located outside of a designated urban growth area, unincorporated community, or rural service center be considered rural land and subject to a two-acre minimum lot size. The Parkdale community is subject to this requirement until an unincorporated community plan – such as this planning effort – is adopted.
C-1: Commercial	The C-1 zone allows for a variety of residential and commercial uses. Permitted residential uses in the C-1 zone include single-family, duplex, or multi-family dwellings. Permitted commercial uses include a variety of retail and commercial/professional service establishments. Uses that are permitted conditionally in the R-1 zone are also allowed in the C-1 zone.

Zone	Description
M-1: Industrial	The M-1 zone allows for more intensive industrial uses. The zone permits industrial uses for the manufacturing, repairing, compounding, processing, packing, or storage of goods, as well as wholesale distributions. With some exceptions, the zone also allows all non-residential uses permitted in the C-1 zone, including retail and commercial/professional services.

Proposed Zoning

The County is proposing new zones for the community as part of adoption of the Parkdale Community Plan. The proposed zoning is similar to existing zoning with some key differences. Table 3 below provides a summary of the differences.

Table 3: Proposed Zoning

Proposed Zone	Description
P-R1	The proposed P-R1 zone would replace the existing R1 zone in the community. Key differences between the zone include the following: - Duplex removed as a conditional use. - Minimum lot size at 2 acres. The differences are necessary based on findings that the Parkdale Wastewater Treatment Plant does not currently have capacity to serve additional dwellings besides those that could be developed on existing vacant property. See the Public Facilities section below for additional information. The County is required to ensure that the cumulative development of the area will not exceed the carrying capacity of public facilities pursuant to OAR 660-022-0030(8)(b).
P-C1	The proposed P-C1 zone would replace the existing C-1 zone. Key differences between the zone include the following: - Single-family dwellings limited to when in conjunction with an onsite business. - Duplex or multi-family dwelling not a permitted use. - Establishes a maximum building size limit of either 4,000 or 8,000 square feet for certain new buildings, depending on the type of business. - Requirement to provide an engineering assessment for all new development in the P-C1 zone to ensure the use will not exceed the sewage capacity.
P-M1	The proposed P-M1 zone replaces the existing M1 zone. Key differences between the zone include the following: - Commercial uses not allowed outright unless accessory to and connected with an onsite industrial use.

Proposed Zone	Description
	- Allow for indoor recreational sport facilities as a conditional use. - Requirement to provide an engineering assessment for all new development in the P-M1 zone to ensure the use will not exceed the sewage capacity. - Establish a maximum building height of 45 feet.
P-M2	The P-M2 zone would be a new zone for the Parkdale community and some properties currently zoned M1 would be rezoned to the P-M2. The P-M2 zone is based on the County's existing M2 zone, which are generally more compatible with nearby residential, commercial, and farm zones. Key differences between the P-M2 and M2 zone include: - Allows commercial uses outright instead of in conjunction with an onsite industrial use. - Allow for indoor recreational sport facilities as a conditional use. - Requirement to provide an engineering assessment for all new development in the P-M1 zone to ensure the use will not exceed the sewage capacity.

Buildable Land Inventory

The project team completed a preliminary buildable land inventory (BLI) to assess the capacity of land within the Parkdale community boundary. Attachment A provides the methodology and detailed results of the BLI.

Overall, there is approximately 139 acres of land within the Parkdale community boundary. Most of the land is zoned for residential uses (about 72%), followed by land zoned for industrial uses (21%), and land zoned for commercial uses (about 6%).

Table 4: Gross Acreage in Parkdale Land Inventory

Zone	Number of Tax Lots	Gross Acres	Proportion
R-1 7500: Residential	137	100.4	72.3%
C-1: Commercial	19	9.0	6.5%
M-1: Industrial	21	29.4	21.2%
Total	**177**	**138.8**	**100.0%**

The project team designated each tax lot within the Parkdale Community Boundary with a "development status" of either vacant, partially vacant, or developed. These designations are based on County tax assessor's data and aerial photography.

Table 5 shows the acreage of tax lots within each status category by the respective zoning. Figure 2 illustrates the location and development status of these tax lots.

Table 5: Tax Lot Development Status (in acres)

Zone	Vacant		Partially Vacant		Developed		Total	
	Count	Acres	Count	Acres	Count	Acres	Count	Acres
R-1 7500: Residential	13	10.6	5	14.0	119	75.7	137	100.4
C-1: Commercial	2	1.9	1	4.1	16	3.0	19	9.0
M-1: Industrial	7	2.6	0	0	14	26.8	21	29.4
Total	**22**	**15.2**	**6**	**18.1**	**149**	**105.5**	**177**	**138.8**

The capacity of residential development is estimated based on a two-acre minimum lot size. Housing densities were assumed to be 0.5 dwelling units per acre with a minimum capacity of one dwelling for vacant lots. After deductions for existing development and future public improvements (i.e., right-of-way improvements), there is an estimated 21 acres of land that could potentially support development of 21 additional dwelling units. Most of this potential capacity is associated with vacant lots. The actual level of future development on these lots will depend on a variety of factors, including land values, construction and infrastructure costs, and property owners' desires to develop addition homes or divide their properties for future development. Ultimately, the amount of development could be less than the potential capacity and could take some time to fully develop.

Table 6: Buildable Acres and Housing

Zoning	Projected Density	Vacant	Partially Vacant	Total
R-1 7500: Residential	0.5 DU/acre	13	8	21

After deductions for existing development and future public improvements, there is an estimated 5 acres of commercial and industrial land available for employment. Table 7 provides a summary for each zone. Most of the development potential for commercially zoned areas are primarily associated with two tax lots (See Figure 1) which have the greatest capacity to support new commercial development due to their overall size.

Figure 1: Vacant and Partially Vacant Commercial Areas
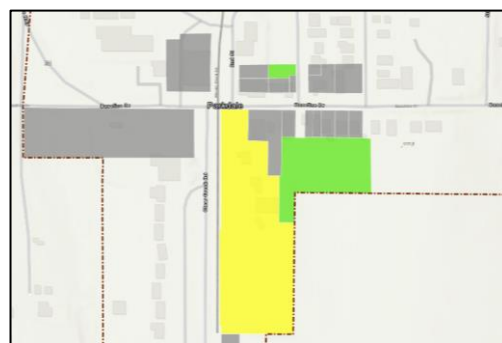
Table 7: Net Developable Acres of Employment Land

Zoning	Vacant Acres	Partially Vacant Acres	Total Acres
C-1: Commercial	1.1	1.5	2.7
M-1: Industrial	2.3	0.0	2.3
Total	**3.4**	**1.5**	**4.9**

Figure 2: Parkdale Buildable Land Inventory
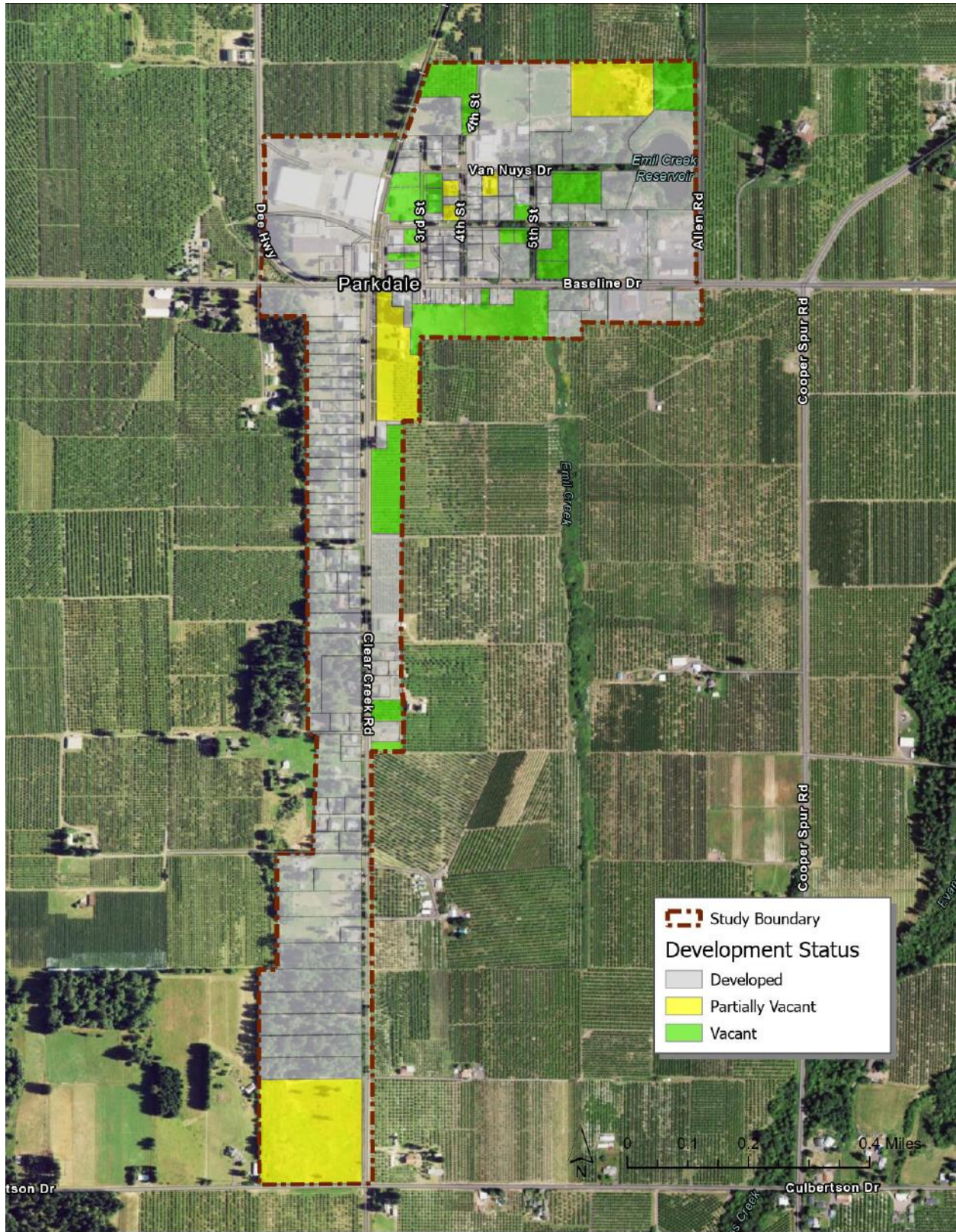
Population and Growth Forecasts

Historical and forecasted growth information for the Parkdale community is based on the Parkdale Census Designation Place (CDP) from the 2020 US Census. The US Census provides statistical information for the Parkdale CDP. The Parkdale CDP boundary is similar to the proposed Parkdale community boundary. Figure 3 provides a comparison of the two boundaries. As shown in the Figure, the CDP boundary is larger than the community boundary. Both boundaries have overlap along portions of OR 281 and Clear Creek Road. The CDP boundary extends further south and east and includes areas zoned for farm uses. The community boundary extends further southwest, northwest, and north. It includes areas zoned for residential and industrial uses.

Areas outside of the CDP boundary but inside the community boundary are located in the northern and southwestern portions of the boundary. Overall, there are 22 residentially zoned lots in these areas. Of those, one is developed with a religious facility, two are vacant, and an additional two instances where adjoining lots are under the same ownership. The remainder is an estimated 17 lots developed with residential dwellings that are not factored in the US Census CDP Boundary.

Figure 3: Parkdale Community Boundary and US Census CDP Boundary
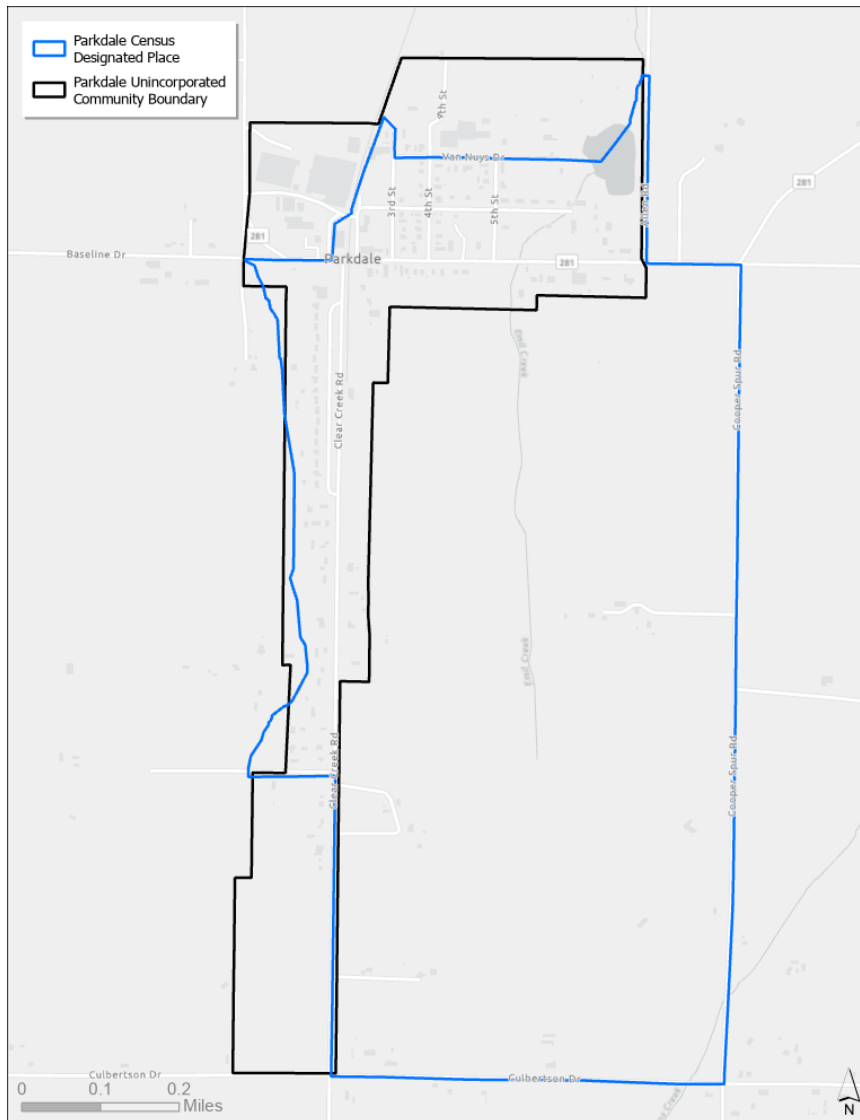
Historical Growth

Historic and current population estimates were gathered from 2010 and 2020 US Census data. Table 8 presents historic population levels for the Parkdale CDP. Between 2010 and 2020, population in the Parkdale CDP area dropped by 12 people, representing an average annual growth rate (AAGR) of -0.4%. By contrast, the overall population in Hood River County increased by 1,631 people over the same time period, an average annual growth rate of 0.7%.

Table 8: Historic Population Growth

Area	Population (2010)	Population (2020)	Change (2010 – 2020)	AAGR (2010-2020)
Parkdale CDP	311	299	-12	-0.4%
Hood River County	22,346	23,977	1,631	0.7%

Source: US Census 2010, 2020 Decennial Data

Projected Growth

Population estimates and forecasts have been developed to identify likely future growth and development patterns. Population forecasts prepared for this project are based on growth rates established by the Population Research Center (PRC) at Portland State University. The PRC provides 50-year forecasts for each county and its subareas. Subareas include individual UGB's and a single category for all areas outside of UGB's.

Projections for the Parkdale community are based on the PRC's forecast estimate for all areas outside of UGB's in Hood River County. According to growth rates projected by the PRC, the population in Hood River County is projected to grow at an average of approximately 0.8% per year through the year 2045.[2] Under this assumption, the County would have a population of 29,702 in 2045.

In estimating how much growth will occur in Parkdale, the PRC assumed that urban areas would absorb a larger share of the County's forecasted growth than rural areas. In 2020, approximately 52% of the County's population lived in areas outside of Hood River City and Cascade Locks. This portion of the County's population is projected to grow at a slower rate. As a result, the PRC forecasts a 0.4% AAGR between 2020 and 2045 in rural parts of the County.

Table 9: Population Forecast, Hood River County and Sub-areas

Area	Population (2020)	Population (2045)	Change (2020 – 2045)	AAGR (2020-2045)
Cascade Locks	1,534	1,729	195	0.6%
Hood River City	10,177	13,924	3,747	1.3%
Outside UGBs	12,905	14,244	1,339	0.4%
Hood River County	**24,406**	**29,702**	**5,296**	**0.8%**

Source: Population Research Center

PRC's population forecast growth estimate of 0.4% is applied to the Parkdale CDP population count from the US Census. Using the 0.4% AAGR, the Parkdale area is forecasted to add an estimated 30 people by the year 2045. This represents a 10% increase in the overall Parkdale CDP population over this time period.

Persons per household (PPH) data was gathered from PRC resources and 2021 5-year American Community Survey data. As shown in Table 10, PPH across Hood River County increased by 4%. PPH in rural areas increased over this time period from 2.8 to 3.0, an increase of 7%. PPH in urban areas decreased over the same time period, with decreases between 4-8%.

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[2] Although not required for unincorporated communities, future growth is estimated using a 20-year planning horizon. A 20-year planning horizon is consistent with state requirements for several other long-range planning efforts which require a minimum 20-year time span (i.e., urban growth boundary amendments, transportation planning rule requirements, scenario planning, etc.)

Table 10: Hood River County and Sub-areas – Persons per Household (PPH) (2010 and 2017-2021)

Area	PPH (2010)	PPH (2017-2021)	Change (2010 – 2017-2021)
Cascade Locks	2.6	2.4	-8%
Hood River City	2.4	2.3	-4%
Outside UGBs	2.8	3.0	7%
Hood River County	**2.6**	**2.7**	**4%**

Source: Population Research Center and 2021 5-year American Community Survey

Assuming no changes to PPH for rural areas, there would be an estimated need for an additional 16 houses to support projected growth in Parkdale and maintain a five-percent vacancy rate over the next 20 years

Table 11: Expected Housing Units, Parkdale Community

Estimated (2020) Population	Forecasted 2045 Population	Projected Avg Household Size	Projected Households	Vacancy Rate	Expected Housing Units
299	331	3.0	110	5%	116

Public Facilities

The State of Oregon's rules related to unincorporated community planning require consideration of the capacity of local water, sewer, and transportation systems to meet the service needs of any new developments approved in the community or allowed under changes to the local zoning code. For example, OAR 660-022-0030(3)(e) says that county plans and land use regulations may only authorize new industrial uses that "will not exceed the capacity of water and sewer service available to the site." Additionally, OAR 660-022-0030(8)(b) requires the zoning of lands within unincorporated communities to ensure that the cumulative development of the area "will not exceed the carrying capacity of the soil or of existing water supply resources and sewer services."

Sanitary Systems

Sanitary services in Parkdale are provided by the Parkdale Sanitary District. The District owns and operates the Parkdale Wastewater Treatment Plant (WWTP) which manages and treats wastewater from homes, businesses, and other sources in Parkdale.

The available capacity of the WWTP was calculated in terms of level of service (Equivalent Dwelling Units, or EDUs) by a certified civil engineer. See Attachment A for the report. The level of service is based on current flow and maximum flow capacity and, using the estimated flow per EDU, calculating the available capacity in EDUs. The estimated level of service at the treatment plant is 269 EDUs. The level of service is 231 EDUs based on the most recent available data from 2015. The capacity at that time was approximately 38 EDUs. There have been six new dwellings constructed since 2015, resulting in a remaining capacity of 32 EDUs in the community.

In summary, about 32 new homes would be able to connect to the treatment plant before it reaches its permitted capacity. Any industrial or commercial development would need to be

evaluated to identify the projected number of EDU's to ensure the available capacity of the WWTP is not exceeded.

Based on this information and in order to be consistent with state requirements, the County will need to ensure future development does not exceed the capacity of the treatment plant until the Parkdale Sanitary District increases the overall capacity. To this end, proposed zoning in Parkdale will require a two-acre minimum lot size and commercial and industrial development will be required to conduct a sewage capacity study prior to approval. The BLI analysis summarized in a previous section of this memo evaluated the remaining potential development capacity of vacant and partially vacant land in Parkdale assuming a two-acre minimum lot size requirement. The BLI analysis found that there would be an estimated potential to build 21 additional dwellings, which would not exceed the available capacity of the treatment plant. Any new commercial or industrial development, including the approximate 5 acres of vacant or partially vacant land, would need to produce an analysis of its impact on the sanitary system to ensure it would not exceed the treatment plant's capacity.

Water Systems

The Parkdale Water Company serves both residential and commercial/industrial customers within the Parkdale community boundary. Overall, there are 172 residential customers and 29 commercial/industrial customers within the District. The largest estimated users are the school and fruit processing plant. The Parkdale unincorporated community area is a subset of the overall District.

The Parkdale Water Company is permitted to draw 1.5 cubic feet per second (CFS) from their "A" Spring, which is located at the south end of the service area, south of Baseline Drive and west of Clear Creek Road. Water use and demands using an estimated usage for the District results in an average flow rate of between 0.06 and 0.19 CFS. Assuming the population in the District grows at an AAGR of 0.4%,[3] water demand is expected to be between 0.07 and 0.21 CFS. This is well below the permitted 1.5 CFS.

Transportation Systems

The available capacity of the roads in Parkdale was calculated in terms of level of service by a certified traffic engineer. See Attachment B for the report.

The Parkdale community is served by a network of local roads and OR 281 (Dee Highway). Local roads in Parkdale connect residences, businesses, and institutions (Parkdale Elementary) with OR 281. OR 281 is classified as a District Highway under ODOT jurisdiction. District Highways function largely as arterials and collectors, providing links between small, urbanized areas, rural centers and

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[3] The 0.4% AAGR is based on Portland State University's Population Research Center population forecast estimate for areas in Hood River County located outside of an urban growth boundary.

urban hubs, and also serve local access and traffic. The highway crosses east-west along Baseline Road and provides a regional connection between the City of Hood River and Parkdale and other rural communities in the upper and middle valleys.

An analysis of traffic impacts associated with potential development was completed as part of this project. The analysis included a review of existing conditions and land use impacts.

The existing conditions portion of the analysis reviewed existing traffic volumes at two intersections. The analysis found the intersections meet the current operating conditions. Table 12 provides a summary of each study intersection.

Table 12: Existing (2023) Weekday PM Peak Hour Intersection Operations.

Intersection	Traffic Control	Mobility Target	Intersection Operations		
			V/C Ratio	Delay (secs)	LOS
Baseline Dr & Cleark Creek Rd	Two-way Stop-controlled	v/c ≤ 0.80	0.06/0.00	7.5/10.2	A/B
Baseline Dr & Allen Rd	Two-way Stop-controlled	v/c ≤ 0.80	0.06/0.00	7.5/10.1	A/B

The land use impact portion of the analysis reviewed the potential impacts of a worst-case development scenario to understand future year traffic volumes and operating conditions for the study intersections. Future intersection operations under the worst-case development scenario would continue to meet ODOT intersection operation requirements, indicating Parkdale has adequate transportation facilities to support growth. Table 13 provides a summary of each intersection.

Table 13: Future (2043) Weekday PM Peak Hour Intersection Operations

Intersection	Traffic Control	Mobility Target	2043 Background			2043 Build		
			V/C Ratio	Delay (secs)	LOS	V/C Ratio	Delay (secs)	LOS
Baseline Dr & Cleark Creek Rd	Two-way Stop-controlled	v/c ≤ 0.80	0.06/0.00	7.5/10.2	A/B	0.27/0.01	8.1/22.6	A/C
Baseline Dr & Allen Rd	Two-way Stop-controlled	v/c ≤ 0.80	0.06/0.00	7.5/10.1	A/B	0.21/0.00	8.1/16.8	A/C

Additional local roads may need to be constructed to serve future development. Road standards for Parkdale are specified in the County's zoning ordinance. Street design standards in the zoning ordinance require all new streets built in Parkdale to provide right-of-way between 30-70 feet, with varying road surface widths depending on the type and amount of development proposed. The street design standards ensure streets built to serve future development will provide adequate access and mobility for the community.

Columbia Area Transit (CAT) provides public transit service within Hood River County. Service for Parkdale is provided as part of CAT's Upper Valley route, which provides service between Hood

River and the communities of Odell and Parkdale. CAT provides five round trips during weekdays with a stop located at McIsaac's Store. Deviations up to a ¼ mile are available with advance notice to transport people closer to their destinations. CAT is in the process of updating its Transit Master Plan which is reviewing potential ways to improve service throughout the transit service area, including Parkdale.

Emergency Services

Emergency services are provided by the Parkdale Rural Fire Protection District and the Hood River County Sheriff's Department. The Parkdale Rural Fire Protection District is responsible for ensuring the safety and well-being of the community by responding to emergencies, including fires, medical incidents, and other public safety concerns.

In tandem, the Hood River County Sheriff's Department serves as the primary law enforcement agency in the Parkdale community. Their responsibilities encompass maintaining public safety, enforcing local laws, responding to emergencies, and engaging in community policing efforts to foster a secure environment for residents.

Both organizations work collaboratively to ensure the Parkdale community receives comprehensive emergency response and public safety services. Both organizations are expected to have the capacity to continue serving the area, including any potential growth.

Conclusion

- The Parkdale Community Plan is a continuation of the planning effort initiated in 2002 by the County.
- Current zoning includes R-1 7500, C-1 Commercial, and M-1 Industrial, which allow for a variety of uses.
- New zoning will be proposed as part of adoption of the Parkdale Community Plan. New zones include P-R1, P-C1, P-M1, and P-M2. The new zones will be similar to existing zones, but will include requirements to ensure compliance with OAR 660-022-0030(3)(e) and (8)(b).
- Aspects of the current zoning are not implementable until Parkdale is designated as an unincorporated community. Land is considered rural land and residential uses are currently subject to 2-acre minimum lot size requirements.
- The proposed unincorporated community boundary is based off of contiguous areas zoned for commercial, industrial, and residential uses and is consistent with the requirements of OAR 660-022-0020.
- A buildable land inventory of residential, commercial, and industrial land was completed. It finds there is approximately 33 acres of vacant or partially vacant land to support growth under current zoning regulations, including a 2-acre minimum lot requirement. This results in a potential capacity to support 21 additional dwelling units.
- Population growth in Parkdale decreased between 2010 and 2020. Population growth is forecasted to grow to at an average annual growth rate of 0.4% through the year 2045.
- There is a need for an additional 16 dwelling units to support growth forecasts.

- There are adequate public facilities to support the potential development of 32additional dwelling units. Capacity for additional dwelling units would require an expansion of the Parkdale Sanitary District's overall capacity.
- Additional commercial and industrial development should evaluate potential impacts to the sanitary systems prior to receiving approval.

ATTACHMENT A: PARKDALE WASTEWATER TREATMENT PLANT (WWTP) CAPACITY ASSESSMENT

Memo

To:	CJ Doxsee, Project Manager - MIG
From:	John Grim P.E.
CC:	Eric Walker, Hood River County - Planning Director
Date:	August 16th, 2023
Re:	Parkdale Wastewater Treatment Plant (WWTP) Capacity Assessment

Project Background

This Technical Memorandum (TM) documents the results of a capacity assessment of the Parkdale Wastewater Treatment Plant (WWTP) owned and operated by the Parkdale Sanitary District (District). Hood River County is developing a Community Plan for Parkdale in compliance with Oregon Statewide Goal 14. This capacity assessment is being done to facilitate the completion of the Parkdale Community Plan. The Plan is being done by MIG Inc. for Hood River County's Planning Department. The project manager for MIG is CJ Doxsee. The owner's representative is Eric Walker, Planning Director. JGA conducted the capacity assessment as a subconsultant to MIG.

The County's goal is to identify zoning density in the community of Parkdale that is consistent with the capacity of the sanitary sewer system. To be consistent, the County must ensure the infrastructure serving the community has the capacity to serve the proposed zoning density or can reasonably be expanded to serve the proposed zoning density.

Project Approach

Several engineering and permit documents were reviewed to identify the design criteria used in permitting, planning and design of the recently upgraded WWTP. These documents are comprised of:

- The 2014 WWTP Facilities Plan – Murray Smith & Assoc. This document formed the basis for subsequent NPDES permit and design engineering work.

- The 2015 Preliminary Engineering Report (PER) – Murray Smith & Assoc. The PER revisited design criteria presented in the Facilities Plan and formed the basis for the sizing of the 2018 WWTP improvement project.
- 2018 WWTP Design Drawings – Murray Smith & Assoc. and Cloacina. The drawings itemize design criteria used to design the improvements. The criteria used are consistent with previous planning documents. The improvements were completed in 2020.
- The 2023 NPDES Permit (DEQ) – Adopted on July 1st, 2023. This permit and fact sheet set the regulated WWTP discharge limits based on the as-constructed 2020 WWTP improvements. This permit is consistent with the design drawings and previous planning documents.

Design parameters and criteria from these documents were summarized in spreadsheet format and compared to identify the basis for sizing of the current improvements. Generally, the design parameters and criteria were consistent throughout all documents.

The approach to calculating the available capacity in terms of level of service (Equivalent Dwelling Units – EDUs) is based on identifying the current flow and maximum flow capacity and, using the estimated flow per EDU, calculating the available capacity in EDUs. The most current level of service data that is available is in the 2015 Preliminary Engineering Report (PER). The PER level of service data therefore formed the basis for the estimate of available capacity in EDUs. This is a reasonable approach because the data, although 8 years old, still closely represents the 2023 level of service.

Capacity Assessment

Summary

Calculating the capacity of a WWTP in terms of EDUs must be carefully qualified due to the numerous variables that affect treatment plant capacity. In summary, this capacity analysis is based on the compliance limits as specified in the NPDES permit – See Worksheet No. 1. Specifically, the compliance limits are designated in Schedule A of the 2023 NPDES permit. Generally, the maximum flow is limited by the TSS and BOD total daily load limit in pounds per day. The maximum flow allowed, based on these limits, is approximately 70,000 gpd. **This limits the available capacity of the current treatment plant, as constructed and operated, to 38 new homes.**

However, it's important to emphasize that the capacity of this WWTP is subject to change due to unanticipated events such as new regulations, improvements to the plant, changes in wastewater quality, etc. It may be possible to significantly increase the treatment plant capacity in the future if there is a demonstrated need and adequate resources.

Capacity Variables

The maximum daily flow of 70,000 gpd is based on the treatment plant operating as designed. It's important to emphasize the WWTP capacity can be significantly lower if it's not operating efficiently; e.g., if the percent removal is the minimum required by permit – that being 85 percent - then the flow capacity is less than 70,000 gpd. The flow capacity as determined by the permit requires the treatment plant perform at removal efficiencies higher than 85 percent.

Other factors may also affect the treatment plant efficiency and capacity in the future; such as regulated limits on effluent temperature, minimum dilution ratio, ammonia, pH, increases in the BOD/TSS loadings, problems with infiltration and inflow, etc. These water quality parameters may change and result in reduced capacity.

NPDES Permit Constraint

The NPDES permit was recently issued on July 1, 2023. Permit limits are described in Schedule A of the permit and supported by the NPDES Fact Sheet. The relevant permit limits used in this assessment are shown in Worksheet No. 1.

Anti-backsliding rules have resulted in stricter permit limits during the winter than are typically required in Oregon. Anti-backsliding ultimately constrains the total flow capacity of the treatment plant until the District can successfully propose there will be no degradation in receiving water quality if the limits are increased. If Trout Creek will remain the receiving water, this evaluation will be necessary to expand the capacity of the treatment plant.

The permit fact sheet suggests that expansion of the treatment plant capacity beyond its current limits may be difficult unless the District proposes a new discharge location. New discharge locations could include; the Hood River, subsurface discharge, recycled wastewater, etc. An evaluation of alternative discharge locations will require significant analysis and expense. Its possible none of these options will be feasible.

Ultimately, an increase in the NPDES permit limits and the treatment plant capacity will probably require an update to the Facilities Plan. The primary objective of the Facilities Plan

update is to evaluate alternatives to expand the treatment plant capacity including alternative discharge locations. Following approval of the Facilities Plan by DEQ, the District must construct the preferred improvements and apply for an update to its NPDES permit. This is a long process (5 to 10 years) which will require significant grant funding.

As-Constructed Treatment Plant Constraint

Worksheet No. 2 shows the criteria and calculations used to identify the flow capacity constraint based on the planning and design criteria used to design and construct the treatment plant improvements as completed in 2020. This worksheet demonstrates that the treatment plant design loading in BOD and TSS exceeds that forecasted at the design flow. Therefore, the treatment plant is designed to remove more BOD and TSS than forecasted to occur at the design level of service in 2035. For this reason, the design/permitted flow will not result in BOD/TSS exceedances. This evaluation confirms the design is consistent with the Facilities Plan and the NPDES permit.

Capacity Calculation

The calculation of the peak level of service that can be served by the WWTP is shown in Worksheet No. 3. The first step was to calculate the design flow criterion in gpd/EDU. This criterion is based on the known flow in gpd and the number of EDUs in 2015 as documented in the PER. The design criterion is 260 gpd/EDU. This is the flow contribution from each equivalent dwelling unit at the maximum month dry weather flow[1] design period. The flow criterion is used to project the number of EDUs that can be served at the maximum capacity of the WWTP. The estimated level of service at the treatment plant capacity is 269 EDUs. The existing level of service is 231 EDUs, resulting in an available capacity today of about 38 EDUs. This is based on the assumption there have been no new connections since 2015.

In summary, about 38 new homes can connect to the treatment plant before it reaches it's permitted capacity. Any industrial or commercial development should be evaluated to identify the projected number of EDUs to ensure the available level of service in EDUs is not exceeded.

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[1] The maximum month dry weather flow was used by DEQ to set the waste discharge limits in the NPDES permit.

Worksheet No. 1

Design Flow Capacity Calculation based on Permit

Capacity Analysis Formula to Estimate Max. Avg. Monthly Flow		Criteria and Capacity Items	Value	Description
BOD or TSS in lbs/day = Q (mgd) x Conc (mg/l) x 8.34		Max. TSS/BOD load (lbs/day) effluent =	6.1	NPDES Standard (summer - avg. monthly)
or Q (mgd) = BOD or TSS in lbs/day/(conc (mg/l) x 8.34)		Max. TSS/BOD concentration (mg/l) effluent =	10	NPDES Standard (summer - avg. monthly)
		Min. Avg. Monthly % Removal =	85%	NPDES Standard
		Max. Avg. Monthly TSS/BOD influent (lbs/day) =	40.7	Calculated at 85% removal
		Max. Avg. Monthly TSS/BOD influent (mg/l) =	66.7	Calculated at 85% removal
		Max. Avg. Daily Flow (mgd) =	0.073	Calculated
		Max. Flow (gpd) =	**73,141**	Calculated

The design flow was calculated based on the permit limits to confirm the criterion used in the treatment plant design are consistant with the Facilities Plan, the PER and the Design Dwgs.

Worksheet No. 2

Summary of Design Criteria from All Sources

Design Criterion Item	Value	Source	Comments
Average Daily Flow (mgd) =	0.073	Table 5-9 WWTP FP, 2035 projected flow. [1]	*Design flow criterion is the same from all sources. Plant designed for year 2035 projected flows per FP.*
	0.073	Calculated avg. monthly flow from permit. See above	
	0.073	Design criterion, sheet 1, design drawings.	
BOD Loading (lbs/day) =	217	Table 5-9 WWTP FP, 2035 projected loading.	*The design loading exceeds the projected loading.*
BOD Loading (lbs/day) =	244	Calculated based on design dwg criterion below.	*Therefore there is excess capacity for BOD loading at the*
BOD Loading (mg/l) =	400	Design criterion (avg.), sheet 1, design drawings (300 to 500)	*design flow.*
TSS Loading (lbs/day) =	255	Table 5-9 WWTP FP, 2035 projected loading.	*The design loading exceeds the projected loading.*
TSS Loading (lbs/day) =	304	Calculated based on design dwg criterion below.	*Therefore there is excess capacity for TSS loading at the*
TSS Loading (mg/l) =	500	Design criterion (avg.), sheet 1, design drawings (400 to 600)	*design flow.*

[1] *The projected MMWWF in 2035 is 117,000 gpd and the PDF in 2035 is 195,000 gpd (see Facilities Plan- Table 5-9) which coincides with the design criterion for the MBR per Sheet 1 of the design drawings and with the NPDES permit. These comparisons demonstrate that the treatment plant was sized based on the 2014 Facilities Plan. BOD and TSS loadings were checked to ensure the treatment plant was designed to remove loads in excess of those predicted.*

Worksheet No. 3

Calculation of Treatment Plant Capacity in EDUs

Design Criterion Item	Value	Source	Comments
Year 2015 Level of Service (EDUs) =	230.5	2015 PER	*In Jan of 2015 the PER estimated a total of 230.5 EDUs*
Year 2015 MMDWF (gpd) =	60,000	Table 5-9 Facilities Plan.	*which included 137.5 residential, 92 commercial and 1*
Population Forecasting Flow Criterion (gpd/EDU) =	260.3	Calculated based on above data	*industrial.*
Maximimum Level of Service (EDUs) =	268.9	Calculated based on ADWF in year 2035	*Dry weather flow criterion is used to forecast capacity in EDUs. New homes do not contribute I/I.*
Year 2035 MMDWF (gpd) =	70,000	Table 5-9 Facilities Plan.	
Available Capacity (EDUs) =	**38.4**	One home = One EDU	*The District should estimate and track the number of EDUs for non-residential development proposals.*

The treatment plant is flow limited because the design loading (lbs/day) exceeds the estimated load in 2035. Actual capacity is governed by treatment plant performance. This analysis is based on the assumptions that the treatment plant performance conforms to the design criteria and permit conditions. The capacity analysis does not consider the temperature water quality limit or the required dilution factor. In addition it is independant of hydraulic constraints such as pipe and pump station capacity. The treatment plant was improved in 2020 and is permitted based on the current improvements.

ATTACHMENT B: HOOD RIVER COUNTY PARKDALE UNINCORPORATED COMMUNITY PLAN TRAFFIC ANALYSIS

MEMORANDUM

DATE: September 5, 2023

TO: Clinton "CJ" Doxsee | MIG

FROM: John Bosket, PE | DKS Associates
          Dock Rosenthal, PE | DKS Associates
          Hallie Turk, EI | DKS Associates

SUBJECT: Hood River County Parkdale Unincorporated Community Plan   P24116-000
          Traffic Analysis
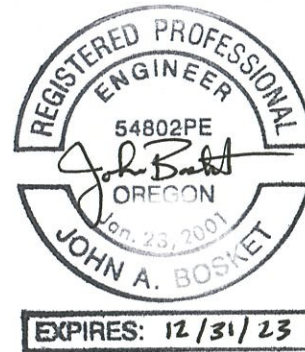
This memorandum presents an evaluation of traffic impacts associated with potential development outlined in the Parkdale Unincorporated Community Plan update in Parkdale, Oregon. This work will help determine if adequate public facilities exist to accommodate future development and growth within the community.

EXISTING CONDITIONS

This section provides documentation of existing traffic conditions in Parkdale, including identification of study intersections and their operating conditions.

STUDY AREA

The traffic impact analysis is focused on two study intersections, which are listed below and shown in Figure 1.

- Baseline Drive (OR 281) & Clear Creek Road
- Baseline Drive (OR 281) & Allen Road

Baseline Drive (OR 281) is a state highway, classified as a District Highway by the Oregon Department of Transportation (ODOT).
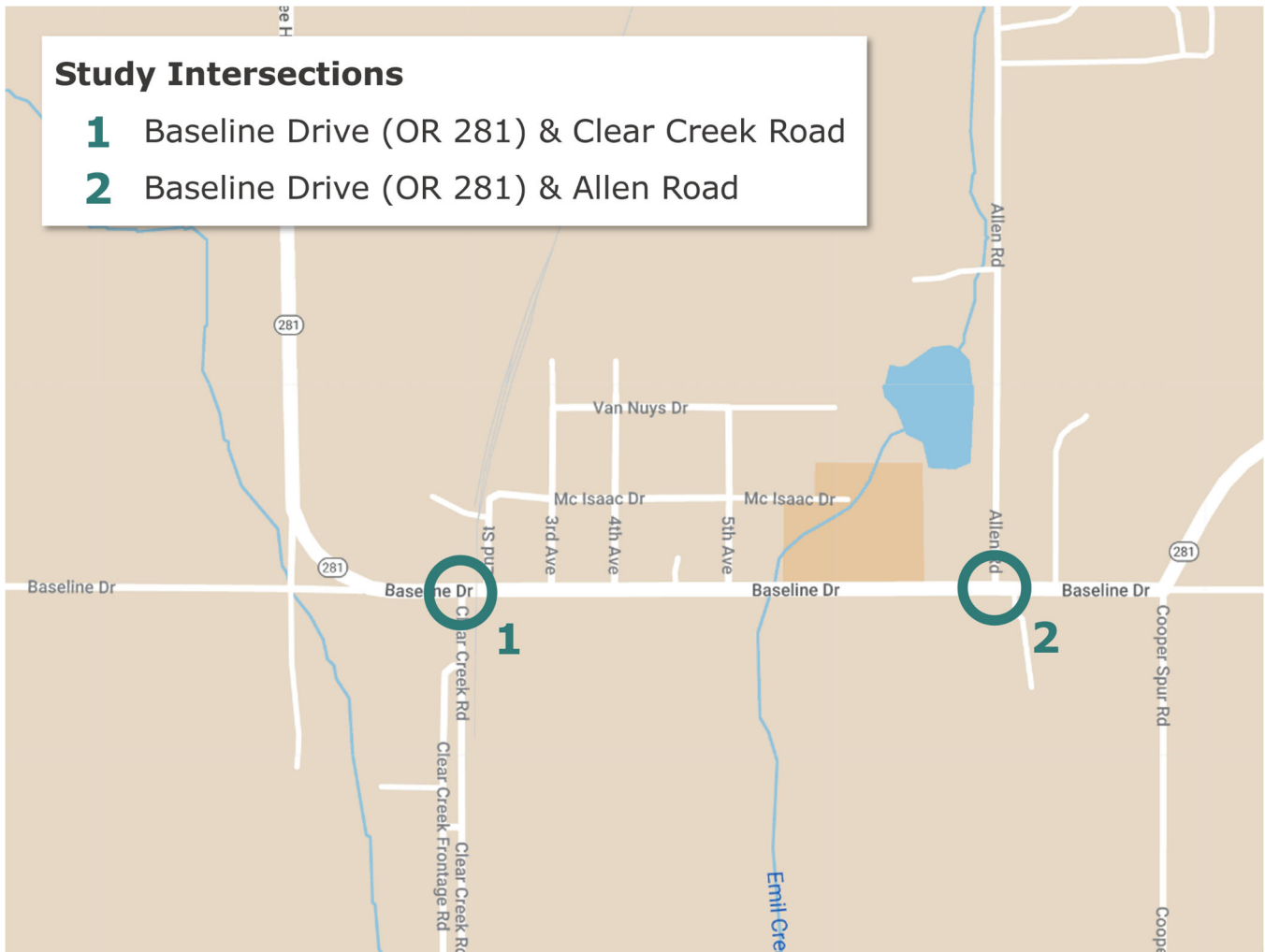
FIGURE 1. PARKDALE STUDY AREA

EXISTING TRAFFIC VOLUMES

According to ODOT TransGIS, average daily traffic (ADT) on Baseline Drive (OR 281) is about 2,600 vehicles, indicating that OR 281 is a low-volume highway.

Weekday p.m. peak hour turning movement counts (4:00-6:00 p.m.) were collected at the two study intersections on Tuesday, July 11, 2023. The 2023 existing traffic volumes are shown in Figure 2 below.
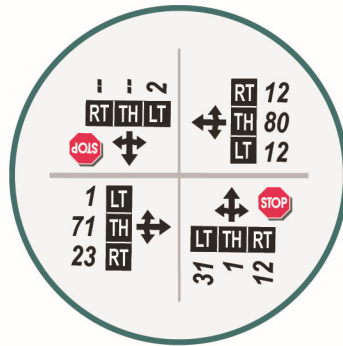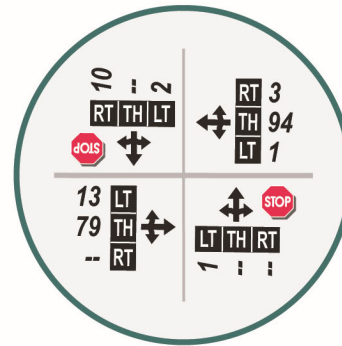
FIGURE 2. EXISTING 2023 TRAFFIC VOLUMES

INTERSECTION PERFORMANCE MEASURES

Level of service (LOS) ratings and volume-to-capacity (v/c) ratios are two commonly used performance measures that provide a good picture of intersection operations.

- **Level of Service (LOS):** A "report card" rating (A through F) based on the average delay experienced by vehicles at the intersection. LOS A, B, and C indicate conditions where traffic moves without significant delays over periods of peak hour travel demand. LOS D and E are progressively worse operating conditions. LOS F represents conditions where average vehicle delay has become excessive, and demand has exceeded capacity.

- **Volume-to-capacity (v/c) ratio:** A decimal representation (typically between 0.00 and 1.00) of the proportion of capacity that is being used at a turn movement, approach leg, or intersection. It is determined by dividing the peak hour traffic volume by the hourly capacity of a given intersection or movement. A lower ratio indicates smooth operations and minimal delays. As the ratio approaches 1.00, congestion increases, and performance is reduced. If the ratio is greater than 1.00, the turn movement, approach leg, or intersection is oversaturated and usually results in excessive queues and long delays.

REQUIRED OPERATING STANDARDS

Although both study intersections are located within Hood River County's jurisdiction, they are under ODOT's jurisdiction because Baseline Drive (OR 281) is an ODOT facility. According to the Oregon Highway Plan,[1] the mobility target at both study intersections is a maximum v/c ratio of 0.80.

EXISTING OPERATING CONDITIONS

Existing traffic operations at the study intersections were determined for the weekday p.m. peak hour based on the Highway Capacity Manual (HCM) 6th Edition methodology.[2] The results were then compared with ODOT's minimum acceptable operating targets. Table 1 lists the estimated v/c ratio, delay, and LOS of each study intersection.

TABLE 1: EXISTING (2023) WEEKDAY P.M. PEAK HOUR INTERSECTION OPERATIONS

INTERSECTION	TRAFFIC CONTROL	MOBILITY TARGET	INTERSECTION OPERATIONS		
			V/C RATIO	DELAY (SECS)	LOS
BASELINE DRIVE & CLEAR CREEK ROAD	Two-Way Stop-Controlled	v/c ≤ 0.80	0.06/0.00	7.5/10.2	A/B
BASELINE DRIVE & ALLEN ROAD	Two-Way Stop-Controlled	v/c ≤ 0.80	0.06/0.00	7.5/10.1	A/B

Two-Way Stop Controlled:
v/c = Volume-to-Capacity Ratio (Major/Minor Road)
Delay = Average Delay, secs (Major/Minor Road)
LOS = Level of Service (Major/Minor Road)

As shown, both study intersections meet ODOT mobility targets and experience very little delay.

LAND USE IMPACTS

This section reviews the impacts that the worst-case development may have on the transportation system within the study area, including a description of zoning designations, trip generation, trip distribution, future year traffic volumes, and operating conditions for the two study intersections.

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[1] Table 6: Volume to Capacity Ratio Targets for Peak Hour Operating Conditions. 1999 Oregon Highway Plan, Oregon Department of Transportation. Revised January 2023.

[2] Highway Capacity Manual, 6th Edition, Transportation Research Board, 2016.

ZONING AND GROWTH ASSUMPTIONS

All land in Parkdale is classified as residential, commercial, or industrial zoning, except for one parcel at 4953 Baseline Drive between Clear Creek Road and Allen Road which is designated as split-zoned commercial and residential. In addition to examining the maximum amount of development that the community can sustain under existing zoning, this study accounts for zone changes to two parcels within community boundaries. The tax lots at 4935 Van Nuys Drive and 7225 3rd Street are proposed to change from industrial zoning to residential zoning.

To determine the potential for future trips, tax lots with "vacant" or "partially vacant" statuses were assigned an area of buildable land, which was converted to a number of new households in residential zones or an area in square feet in commercial and industrial zones. The number of new households and area of new employment development was used to determine future trip generation. Under reasonable worst-case development conditions, there would be 227 new households, 116,570 square feet of new commercial development, and 101,240 square feet of new industrial development.

TRIP GENERATION

Trip generation is the method used to estimate the number of vehicles added to site roadways and the adjacent roadway network by a development during a specified period (i.e., the weekday p.m. peak hour). For this study, ITE 11th Edition average trip generation data was used, which is based on national land use data.[3]

A pass-by reduction was applied to the total generated trips. A pass-by reduction accounts for vehicles that were already traveling along the adjacent street and decided to visit the new place of interest before resuming their previous route. Even if the new place of interest were not there, the vehicles would still be traveling on the adjacent street system. ITE's 11th Edition provides recommended percentages for pass-by reductions for various land uses. For the Shopping Plaza land use, a pass-by reduction of 40 percent was applied to the weekday p.m. peak hour trip generation.

Each zoning designation has several permitted land uses. However, for the purposes of identifying the reasonable worst-case trip generation, one land use was considered for each zoning designation. A summary of the trip generation rates for residential, commercial, and industrial land uses are presented in Table 2

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[3] Trip Generation Manual, 11th Edition, Institute of Transportation Engineers, 2021.

TABLE 2: TRIP GENERATION RATES FOR NEW DEVELOPMENT LAND USES

LAND USE (ITE CODE)	UNITS [A]	WEEKDAY PM PEAK HOUR TRIP GENERATION RATES [B]		
		TOTAL	PERCENT IN	PERCENT OUT
RESIDENTIAL SINGLE-FAMILY DETACHED HOMES (210)	Households	0.94	63%	37%
COMMERCIAL SHOPPING PLAZA (821)	KSF	9.03	48%	52%
INDUSTRIAL GENERAL LIGHT INDUSTRIAL (110)	KSF	0.65	14%	86%

[A] KSF = 1,000 square-feet

[B] Trip generation rates are from the Institute of Transportation Engineers Trip Generation Manual, 11th Edition. Average trip generation rates were used for all land uses.

Table 3 presents the weekday p.m. peak hour trip generation for the reasonable worst-case development scenario and includes reductions for pass-by trips.

TABLE 3. TRIP GENERATION UNDER WORST-CASE DEVELOPMENT SCENARIO

LAND USE (ITE CODE)	SIZE	AVERAGE WEEKDAY TRIP GENERATION
		PM PEAK HOUR
SINGLE-FAMILY DETACHED RESIDENTIAL (210)	227 Households	225
SHOPPING PLAZA (821)	116.6 KSF	1,053
PASS-BY TRIPS (40%)		*(421)*
GENERAL LIGHT INDUSTRIAL (110)	101.2 KSF	67
TOTAL TRIPS GENERATED		1,345
PASS-BY TRIPS		*(421)*
NET NEW TRIPS		**924**

As shown, new development in Parkdale may generate up to 924 net new weekday p.m. peak hour trips.

TRIP DISTRIBUTION

Trip distribution provides an estimate of where project-related trips would be coming from and going to. For this traffic analysis, trip distribution was estimated using existing turning movement count proportions. Approximately 10 percent of new trips travel to and from Allen Road to the north, 35 percent to and from OR 35 to the east, 25 percent to and from OR 281 to the west, and 35 percent to and from Clear Creek Drive to the south.

ANALYSIS SCENARIOS

Future operating conditions were analyzed at the two study intersections for the following future traffic scenarios. The comparison of the following scenarios enables the assessment of project impacts:

- 2043 Background Conditions (includes only growth that would occur without the proposed land use changes)

- 2043 Build (Background Conditions + Generated Trips from Reasonable Worst-Case Development and Zone Changes)

To analyze 2043 vehicle conditions, background growth was estimated using historical trends from ODOT.[4] In this method, traffic volumes from previous years are used to estimate future volumes, which are listed in ODOT's Future Highway Volume Table. According to this methodology, a background growth rate of 0.73 percent per year was applied to existing eastbound right volumes turning into Clear Creek Road and northbound left volumes out of Clear Creek Road. For the remaining existing volumes, a background growth rate of 0.19 percent per year was applied.

FUTURE TRAFFIC VOLUMES

The traffic volumes for the two future analysis scenarios are shown in Figure 3.

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[4] Analysis Procedures Manual, Chapter 6.5, Oregon Department of Transportation.
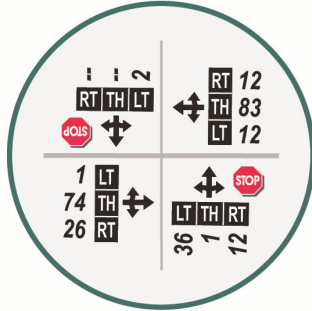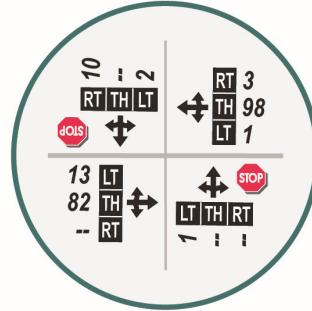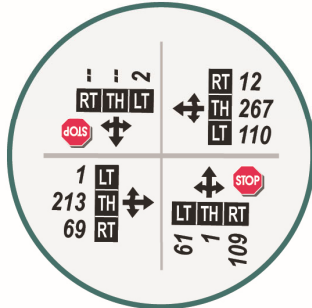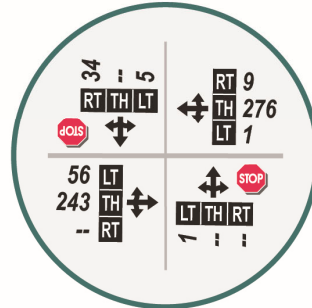
FIGURE 3. FUTURE 2043 TRAFFIC VOLUMES

ODOT's Future Highway Volume Table indicates an ADT of 2,500 vehicles west of Clear Creek Road in the year 2041. However, with a K factor[5] of approximately 13, the future build peak hour volumes forecasted would result in an ADT of over 4,600 at the same location in 2043. This ADT increase is due to the number of trips generated by potential development on buildable lands in

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[5] The K factor, or design hour factor, is defined as the ratio of p.m. peak hour traffic to the annual average daily traffic (AADT). K factor estimations are provided at all AADT locations on ODOT's TransGIS.

Parkdale. It should be noted that the 4,600 ADT reflects the most conservative trip generation estimate developing the entire area of buildable land in Parkdale.

FUTURE INTERSECTION OPERATIONS

Future traffic operations at the study intersections were determined for the p.m. peak hour based on the Highway Capacity Manual (HCM) 6th Edition methodology for unsignalized intersections.[6] Table 4 lists the vehicle operations at both study intersections.

TABLE 4. FUTURE (2043) WEEKDAY P.M. PEAK HOUR INTERSECTION OPERATIONS

INTERSECTION	TRAFFIC CONTROL	MOBILITY TARGET	2043 BACKGROUND			2043 BUILD		
			V/C RATIO	DELAY (SECS)	LOS	V/C RATIO	DELAY (SECS)	LOS
BASELINE DR & CLEAR CREEK RD	Two-Way Stop-Controlled	v/c ≤ 0.80	0.06/0.00	7.5/10.2	A/B	0.27/0.01	8.1/22.6	A/C
BASELINE DR & ALLEN RD	Two-Way Stop-Controlled	v/c ≤ 0.80	0.06/0.00	7.5/10.1	A/B	0.21/0.00	8.1/16.8	A/C

Two-Way Stop Controlled:
v/c = Volume-to-Capacity Ratio (Major/Minor Road)
Delay = Average Delay, secs (Major/Minor Road)
LOS = Level of Service (Major/Minor Road)

As shown, all future 2043 background and build operations at the study intersections meet the ODOT mobility target, indicating that adequate public facilities exist to accommodate future development and growth within the community.

SUMMARY

Based on the reasonable worst-case trip generation evaluation, it can be concluded that the most conservative development scenario will not significantly impact the transportation system in Parkdale and that adequate public facilities exist to accommodate future development and growth.

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[6] Highway Capacity Manual, 6th Edition, Transportation Research Board, 2016.

APPENDIX

CONTENTS

APPENDIX A: TRAFFIC COUNTS

JULY 2023

LOCATION: Clear Creek Rd -- Baseline Dr   **QC JOB #:** 16250001
CITY/STATE: Parkdale, OR   **DATE:** Tue, Jul 11 2023

Peak-Hour: 4:00 PM -- 5:00 PM
Peak 15-Min: 4:15 PM -- 4:30 PM

5-Min Count Period Beginning At	Clear Creek Rd (Northbound)				Clear Creek Rd (Southbound)				Baseline Dr (Eastbound)				Baseline Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	2	0	5	0	0	0	0	0	0	9	1	0	2	6	2	0	27	
4:05 PM	1	0	0	0	0	0	0	0	0	6	2	0	1	7	2	0	19	
4:10 PM	2	1	0	0	1	0	0	0	0	1	3	0	1	6	0	0	15	
4:15 PM	4	0	0	0	0	0	0	0	0	6	1	0	1	8	1	0	21	
4:20 PM	5	0	0	0	0	0	0	0	0	3	3	0	2	9	0	0	22	
4:25 PM	3	0	1	0	0	0	0	0	1	10	1	0	1	6	0	0	23	
4:30 PM	1	0	0	0	0	0	0	0	0	1	1	0	0	7	1	0	11	
4:35 PM	3	0	3	0	0	0	0	0	0	9	3	0	1	9	0	0	28	
4:40 PM	3	0	0	0	0	0	0	0	0	9	2	0	0	2	2	0	18	
4:45 PM	2	0	0	0	1	0	0	0	0	2	1	0	0	6	1	0	13	
4:50 PM	3	0	3	0	0	0	0	0	0	7	3	0	2	7	1	0	26	
4:55 PM	2	0	0	0	0	0	0	0	0	8	2	0	1	7	2	0	22	245
5:00 PM	0	0	1	0	0	0	0	0	0	9	1	0	3	7	2	0	23	241
5:05 PM	2	0	0	0	1	0	0	0	0	8	2	0	1	3	0	1	18	240
5:10 PM	0	1	0	0	1	0	0	0	0	7	1	0	1	3	2	0	16	241
5:15 PM	2	0	0	0	0	0	0	0	0	5	1	0	2	4	1	0	15	235
5:20 PM	2	0	0	0	0	2	0	0	0	2	7	0	2	4	0	0	19	232
5:25 PM	1	0	5	0	0	0	0	0	0	4	2	0	2	4	1	0	19	228
5:30 PM	0	0	1	0	0	0	0	0	0	12	2	0	0	3	2	0	20	237
5:35 PM	0	0	2	0	0	0	0	0	0	6	3	0	1	4	0	0	16	225
5:40 PM	1	1	1	0	0	0	0	0	0	2	0	0	2	3	0	0	10	217
5:45 PM	0	0	1	0	0	0	0	0	0	6	2	0	2	7	1	0	19	223
5:50 PM	1	0	1	0	0	1	0	0	0	6	0	0	0	3	1	0	13	210
5:55 PM	0	0	1	0	1	0	0	0	0	2	0	0	1	8	0	0	13	201

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	48	0	4	0	0	0	0	0	4	76	20	0	16	92	4	0	264
Heavy Trucks	0	0	0		0	0	0		0	8	0		0	4	0		12
Buses																	
Pedestrians		0				36				0				4			40
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

LOCATION: Allen Rd -- Baseline Dr
CITY/STATE: Parkdale, OR

QC JOB #: 16250004
DATE: Tue, Jul 11 2023

Peak-Hour: 4:30 PM -- 5:30 PM
Peak 15-Min: 4:50 PM -- 5:05 PM

Quality Counts
DATA THAT DRIVES COMMUNITIES
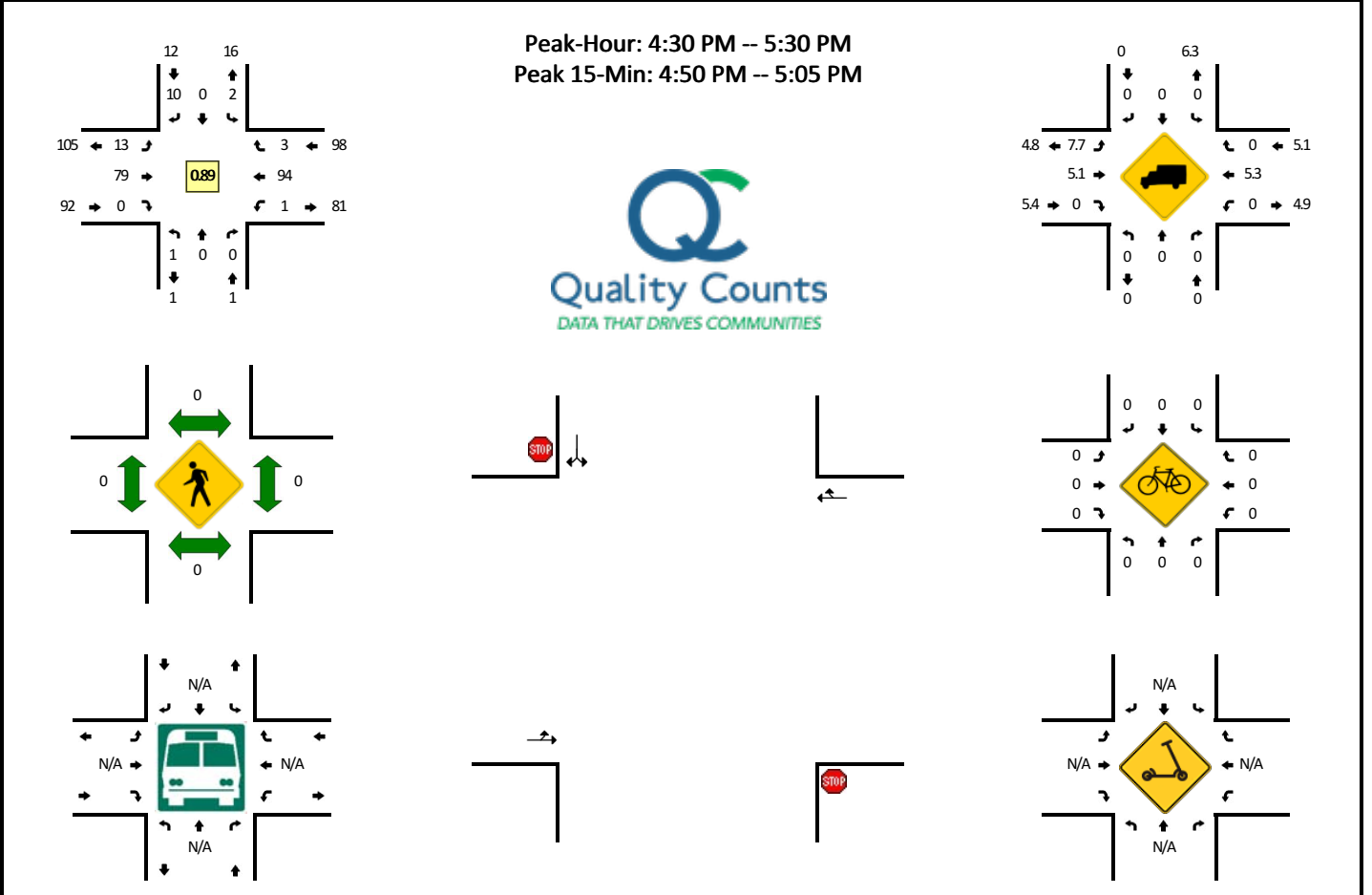
5-Min Count Period Beginning At	Allen Rd (Northbound)				Allen Rd (Southbound)				Baseline Dr (Eastbound)				Baseline Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	0	0	2	0	1	8	0	0	0	7	0	0	18	
4:05 PM	0	0	0	0	0	0	0	0	1	5	0	0	0	6	1	0	13	
4:10 PM	0	0	0	0	0	0	1	0	1	7	0	0	0	6	0	0	15	
4:15 PM	0	0	0	0	0	0	0	0	1	8	0	0	0	6	0	0	15	
4:20 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	9	
4:25 PM	0	0	0	0	0	0	1	0	1	8	0	0	0	6	1	0	17	
4:30 PM	0	0	0	0	0	0	1	0	1	8	0	0	0	6	0	0	16	
4:35 PM	0	0	0	0	0	0	0	0	1	7	0	0	0	10	0	0	18	
4:40 PM	0	0	0	0	0	0	1	0	0	12	0	0	1	5	1	0	20	
4:45 PM	1	0	0	0	1	0	0	0	2	5	0	0	0	7	1	0	17	
4:50 PM	0	0	0	0	0	0	1	0	0	4	0	0	0	11	0	0	16	
4:55 PM	0	0	0	0	0	0	2	0	1	6	0	0	0	13	0	0	22	196
5:00 PM	0	0	0	0	1	0	2	0	2	5	0	0	0	8	1	0	19	197
5:05 PM	0	0	0	0	0	0	0	0	3	9	0	0	0	2	0	0	14	198
5:10 PM	0	0	0	0	0	0	1	0	1	7	0	0	0	8	0	0	17	200
5:15 PM	0	0	0	0	0	0	1	0	0	5	0	0	0	8	0	0	14	199
5:20 PM	0	0	0	0	0	0	0	0	1	3	0	0	0	6	0	0	10	200
5:25 PM	0	0	0	0	0	0	1	0	1	8	0	0	0	10	0	0	20	203
5:30 PM	0	0	0	0	0	0	0	0	1	10	0	0	0	5	0	0	16	203
5:35 PM	0	0	0	0	0	0	0	0	2	4	0	0	0	3	0	0	9	194
5:40 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	8	0	0	10	184
5:45 PM	0	0	0	0	0	0	0	0	0	9	0	0	0	8	0	0	17	184
5:50 PM	0	0	0	0	0	0	2	0	0	5	0	0	0	7	0	0	14	182
5:55 PM	0	0	0	0	1	0	1	0	0	4	0	0	0	8	0	0	14	174

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	4	0	20	0	12	60	0	0	0	128	4	0	228
Heavy Trucks	0	0	0		0	0	0		4	4	0		0	8	0		16
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

APPENDIX B: EXISTING HCM REPORTS

HCM 6$^{\text{TH}}$ EDITION

Parkdale Traffic Analysis
Operations Results

ID	Software/Method	Summary Table				
		Intersection	Control Type	V/C Ratio	Delay	LOS
1	Synchro HCM 6th Stop Control	Clear Creek Road & Baseline Drive - Existing PM Peak	TWSC	0.06/0.00	7.5/10.2	A/B
2	Synchro HCM 6th Stop Control	Baseline Drive & Allen Road - Existing PM Peak	TWSC	0.06/0.00	7.5/10.1	A/B
3	Synchro HCM 6th Stop Control	Clear Creek Road & Baseline Drive - Background PM Peak	TWSC	0.06/0.00	7.5/10.2	A/B
4	Synchro HCM 6th Stop Control	Baseline Drive & Allen Road - Background PM Peak	TWSC	0.06/0.00	7.5/10.1	A/B
5	Synchro HCM 6th Stop Control	Clear Creek Road & Baseline Drive - Build PM Peak	TWSC	0.27/0.01	8.1/22.6	A/C
6	Synchro HCM 6th Stop Control	Baseline Drive & Allen Road - Build PM Peak	TWSC	0.21/0.00	8.1/16.8	A/C

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	1	71	23	12	80	12	31	1	12	2	0	0
Future Vol, veh/h	1	71	23	12	80	12	31	1	12	2	0	0
Conflicting Peds, #/hr	15	0	1	1	0	15	2	0	1	1	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
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, %	0	4	0	0	5	0	0	0	8	0	0	0
Mvmt Flow	1	76	25	13	86	13	33	1	13	2	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	114	0	0	102	0	0	213	232	91	233	238	110
Stage 1	-	-	-	-	-	-	92	92	-	134	134	-
Stage 2	-	-	-	-	-	-	121	140	-	99	104	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.28	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.372	3.5	4	3.3
Pot Cap-1 Maneuver	1488	-	-	1503	-	-	748	672	950	726	666	949
Stage 1	-	-	-	-	-	-	920	823	-	874	789	-
Stage 2	-	-	-	-	-	-	888	785	-	912	813	-
Platoon blocked, %		-	-		-	-		-			-	
Mov Cap-1 Maneuver	1467	-	-	1502	-	-	741	655	948	699	649	934
Mov Cap-2 Maneuver	-	-	-	-	-	-	741	655	-	699	649	-
Stage 1	-	-	-	-	-	-	918	821	-	861	771	-
Stage 2	-	-	-	-	-	-	878	767	-	897	811	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	0.1		0.9		9.9		10.2	
HCM LOS					A		B	

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	785	1467	-	-	1502	-	-	699
HCM Lane V/C Ratio	0.06	0.001	-	-	0.009	-	-	0.003
HCM Control Delay (s)	9.9	7.5	0	-	7.4	0	-	10.2
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0

Intersection

Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	13	79	0	1	94	3	1	0	0	2	0	10
Future Vol, veh/h	13	79	0	1	94	3	1	0	0	2	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	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, %	8	5	0	0	5	0	0	0	0	0	0	0
Mvmt Flow	15	89	0	1	106	3	1	0	0	2	0	11

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	109	0	0	89	0	0	234	230	89	229	229	108
Stage 1	-	-	-	-	-	-	119	119	-	110	110	-
Stage 2	-	-	-	-	-	-	115	111	-	119	119	-
Critical Hdwy	4.18	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.272	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1445	-	-	1519	-	-	725	673	975	730	674	951
Stage 1	-	-	-	-	-	-	890	801	-	900	808	-
Stage 2	-	-	-	-	-	-	895	807	-	890	801	-
Platoon blocked, %		-	-		-	-		-			-	
Mov Cap-1 Maneuver	1445	-	-	1519	-	-	710	665	975	723	666	951
Mov Cap-2 Maneuver	-	-	-	-	-	-	710	665	-	723	666	-
Stage 1	-	-	-	-	-	-	880	792	-	890	807	-
Stage 2	-	-	-	-	-	-	884	806	-	880	792	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.1	0.1	10.1	9
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	710	1445	-	-	1519	-	-	904
HCM Lane V/C Ratio	0.002	0.01	-	-	0.001	-	-	0.015
HCM Control Delay (s)	10.1	7.5	0	-	7.4	0	-	9
HCM Lane LOS	B	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0

APPENDIX C: FUTURE BACKGROUND HCM REPORTS

HCM 6TH EDITION

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	1	74	26	12	83	12	36	1	12	2	0	0
Future Vol, veh/h	1	74	26	12	83	12	36	1	12	2	0	0
Conflicting Peds, #/hr	15	0	1	1	0	15	2	0	1	1	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
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, %	0	4	0	0	5	0	0	0	8	0	0	0
Mvmt Flow	1	80	28	13	89	13	39	1	13	2	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	117	0	0	109	0	0	221	240	96	241	248	113
Stage 1	-	-	-	-	-	-	97	97	-	137	137	-
Stage 2	-	-	-	-	-	-	124	143	-	104	111	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.28	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.372	3.5	4	3.3
Pot Cap-1 Maneuver	1484	-	-	1494	-	-	739	665	944	717	658	945
Stage 1	-	-	-	-	-	-	914	819	-	871	787	-
Stage 2	-	-	-	-	-	-	885	782	-	907	807	-
Platoon blocked, %		-	-		-	-		-			-	
Mov Cap-1 Maneuver	1463	-	-	1493	-	-	732	648	942	690	642	930
Mov Cap-2 Maneuver	-	-	-	-	-	-	732	648	-	690	642	-
Stage 1	-	-	-	-	-	-	912	817	-	858	769	-
Stage 2	-	-	-	-	-	-	875	764	-	892	805	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.8	10	10.2
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	772	1463	-	-	1493	-	-	690
HCM Lane V/C Ratio	0.068	0.001	-	-	0.009	-	-	0.003
HCM Control Delay (s)	10	7.5	0	-	7.4	0	-	10.2
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0

Intersection											
Int Delay, s/veh	1.1										

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		♣			♣			♣			♣	
Traffic Vol, veh/h	13	82	0	1	98	3	1	0	0	2	0	10
Future Vol, veh/h	13	82	0	1	98	3	1	0	0	2	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	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, %	8	5	0	0	5	0	0	0	0	0	0	0
Mvmt Flow	15	92	0	1	110	3	1	0	0	2	0	11

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	113	0	0	92	0	0	241	237	92	236	236	112
Stage 1	-	-	-	-	-	-	122	122	-	114	114	-
Stage 2	-	-	-	-	-	-	119	115	-	122	122	-
Critical Hdwy	4.18	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.272	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1440	-	-	1515	-	-	717	667	971	723	668	947
Stage 1	-	-	-	-	-	-	887	799	-	896	805	-
Stage 2	-	-	-	-	-	-	890	804	-	887	799	-
Platoon blocked, %		-	-		-	-		-			-	
Mov Cap-1 Maneuver	1440	-	-	1515	-	-	702	659	971	716	660	947
Mov Cap-2 Maneuver	-	-	-	-	-	-	702	659	-	716	660	-
Stage 1	-	-	-	-	-	-	877	790	-	886	804	-
Stage 2	-	-	-	-	-	-	879	803	-	877	790	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	1		0.1		10.1		9.1	
HCM LOS					B		A	

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	702	1440	-	-	1515	-	-	899
HCM Lane V/C Ratio	0.002	0.01	-	-	0.001	-	-	0.015
HCM Control Delay (s)	10.1	7.5	0	-	7.4	0	-	9.1
HCM Lane LOS	B	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0

APPENDIX D: FUTURE BUILD HCM REPORTS

HCM 6TH EDITION

Intersection

Int Delay, s/veh	4.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		♣			♣			♣			♣	
Traffic Vol, veh/h	1	213	69	110	267	12	61	1	109	2	0	0
Future Vol, veh/h	1	213	69	110	267	12	61	1	109	2	0	0
Conflicting Peds, #/hr	15	0	1	1	0	15	2	0	1	1	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
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, %	0	4	0	0	5	0	0	0	8	0	0	0
Mvmt Flow	1	229	74	118	287	13	66	1	117	2	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	315	0	0	304	0	0	801	820	268	873	851	311
Stage 1	-	-	-	-	-	-	269	269	-	545	545	-
Stage 2	-	-	-	-	-	-	532	551	-	328	306	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.28	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.372	3.5	4	3.3
Pot Cap-1 Maneuver	1257	-	-	1268	-	-	305	312	756	273	299	734
Stage 1	-	-	-	-	-	-	741	690	-	526	522	-
Stage 2	-	-	-	-	-	-	535	519	-	689	665	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1239	-	-	1267	-	-	278	273	755	207	261	722
Mov Cap-2 Maneuver	-	-	-	-	-	-	278	273	-	207	261	-
Stage 1	-	-	-	-	-	-	740	689	-	518	457	-
Stage 2	-	-	-	-	-	-	474	455	-	580	664	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	2.3	17.7	22.6
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	465	1239	-	-	1267	-	-	207
HCM Lane V/C Ratio	0.395	0.001	-	-	0.093	-	-	0.01
HCM Control Delay (s)	17.7	7.9	0	-	8.1	0	-	22.6
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	1.9	0	-	-	0.3	-	-	0

Intersection

Int Delay, s/veh	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	56	243	0	1	276	9	1	0	0	5	0	34
Future Vol, veh/h	56	243	0	1	276	9	1	0	0	5	0	34
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	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, %	8	5	0	0	5	0	0	0	0	0	0	0
Mvmt Flow	63	273	0	1	310	10	1	0	0	6	0	38

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	320	0	0	273	0	0	735	721	273	716	716	315
Stage 1	-	-	-	-	-	-	399	399	-	317	317	-
Stage 2	-	-	-	-	-	-	336	322	-	399	399	-
Critical Hdwy	4.18	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.272	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1207	-	-	1302	-	-	338	356	771	348	358	730
Stage 1	-	-	-	-	-	-	631	606	-	698	658	-
Stage 2	-	-	-	-	-	-	682	655	-	631	606	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1207	-	-	1302	-	-	305	334	771	331	335	730
Mov Cap-2 Maneuver	-	-	-	-	-	-	305	334	-	331	335	-
Stage 1	-	-	-	-	-	-	592	568	-	655	657	-
Stage 2	-	-	-	-	-	-	646	654	-	592	568	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.5	0	16.8	11.1
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	305	1207	-	-	1302	-	-	632
HCM Lane V/C Ratio	0.004	0.052	-	-	0.001	-	-	0.069
HCM Control Delay (s)	16.8	8.1	0	-	7.8	0	-	11.1
HCM Lane LOS	C	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0	0.2	-	-	0	-	-	0.2