



City of Oregon City

625 Center Street
Oregon City, OR 97045
503-657-0891

Meeting Agenda Planning Commission

Monday, November 25, 2019

7:00 PM

Commission Chambers

1. Call to Order

2. Public Comments

3. Public Hearing

3a. Planning Files: LEG 19-00003 - Beaver Creek Road Concept Plan- Code and Zoning Amendments- (Beaver Creek Road Design, Transportation Analysis, Speed Zones within the Concept Plan)

Attachments: [Commission Report](#)

[Memorandum for the November 25, 2019 Hearing](#)

[Question and Issues Matrix](#)

[Public Comment Matrix -Updated for 11.18.19 Meeting](#)

[FAQ- Transportation Planning Rule \(TPR\)](#)

[John Replinger Comment](#)

[November 18, 2019 ODOT Comment](#)

[Staff Memo- November 12, 2019 City Commission Work Session](#)

[Staff Presentation - November 12, 2019 City Commission Worksession](#)

[Roundabout Conceptual Study- November 12, 2019 City Commission Work Session](#)

[November 4, 2019 ODOT Comments](#)

[DKS Transportation Analysis Memo](#)

[DKS Beaver Creek Road Design Memo](#)

[DKS Appendix](#)

[Beaver Creek Road Design Survey Results](#)

[Beaver Creek Road Concept Plan Overlay Map](#)

[Beaver Creek Road Concept Plan Adopted 2008 \(readopted 2016\)](#)

[Vicinity Map](#)

[Applicant's Submittal](#)

[June 7, 2019 Draft Zoning Code Amendments](#)

[June 7, 2019 Revised Draft Zoning Map \(with and without major streets\)](#)

[June 7, 2019 Zoning Code Memo](#)

[June 7, 2019 Zoning Map Memo](#)

[Economic/Jobs Analysis Memo](#)

[Infrastructure Memo](#)

[Public Comment Tracker January 2019-June 2019](#)

4. General Business

4a. Planning Commission Yearly Update to the City Commission

Attachments: [2019 Planning Commission Agenda Items](#)

5. Communications

6. Adjournment

Public Comments: The following guidelines are given for citizens presenting information or raising issues relevant to the City but not listed on the agenda.

- *Complete a Comment Card prior to the meeting and submit it to the staff member.*
- *When the Chair calls your name, proceed to the speaker table and state your name and city of residence into the microphone.*
- *Each speaker is given 3 minutes to speak. To assist in tracking your speaking time, refer to the timer at the dais.*
- *As a general practice, Oregon City Officers do not engage in discussion with those making comments.*

Agenda Posted at City Hall, Pioneer Community Center, Library, and City Web site(oregon-city.legistar.com).

Video Streaming & Broadcasts: The meeting is streamed live on Oregon City's Web site at www.orcity.org and is available on demand following the meeting.

ADA: City Hall is wheelchair accessible with entry ramps and handicapped parking located on the east side of the building. Hearing devices may be requested from the City staff member prior to the meeting. Disabled individuals requiring other assistance must make their request known 48 hours preceding the meeting by contacting the City Recorder's Office at 503-657-0891.



City of Oregon City

625 Center Street
Oregon City, OR 97045
503-657-0891

Staff Report

File Number: PC 19-127

Agenda Date: 11/25/2019

Status: Agenda Ready

To: Planning Commission

Agenda #: 3a.

From: Sr. Planner Christina Robertson-Gardiner

File Type: Planning Item

SUBJECT:

Planning Files: LEG 19-00003 - Beavercreek Road Concept Plan- Code and Zoning Amendments- (Beavercreek Road Design, Transportation Analysis, Speed Zones within the Concept Plan)

RECOMMENDED ACTION (Motion):

Continuance of file LEG 19-00003 to the December 16, 2019 Planning Commission Hearing.

BACKGROUND:

The Planning Commission is reviewing the zoning and code amendments for the Beavercreek Road Concept Plan (BRCP) over multiple meetings during the late summer and fall of 2019.

Each meeting will be broken into 1-3 topics to allow the Planning Commission, staff and the public time to focus their energy. Please refer to the updated calendar attached to each Planning Commission packet for meeting topics.

The following topics were identified either by public comment or the Planning Commission for the November 25, 2019 Hearing. Staff will provide background and draft amendments on the following issues:

1. Beavercreek Road Design
2. Transportation Analysis
3. Speed Zones within the Concept Plan

Tentative Schedule

The dates and topics may change as the process moves forward.

August 12, 2019 Background on Project, Open Record

August 26, 2019: Introduce Tracking Matrices, An Overview Of 8.13.19 City Commission Work Session, Identify Future Topics /Calendar

September 9, 2019: Beavercreek Zones & Maps, Home Occupation

September 23, 2019: Master Planning Requirement, Upland Habitat, Geologic Hazards

October 14, 2019: Parks, Renaming Concept Plan, Home Occupation/Cottage Industry

November 18, 2019 PC Meeting- Parks Home Occupation/Cottage Industry

November 25, 2019: Transportation Roadway Width, Roundabout, Holly Lane, Local Street

Speed)

December 16, 2019: Tentative Planning Commission Recommendation

Other Meetings

November 12, 2019 - City Commission Beaver Creek Road Design Work Session-

August 29, 2019 Parks and Recreation Advisory Committee (PRAC)- Initial Presentation

October 9, 2019 Natural Resource Committee Upland Habitat

November 13, 2019 Natural Resource Committee Upland Habitat

TBD- Parks and Recreation Advisory Committee (PRAC) Recommendation To The Planning Commission

October 2019 - Additional Public Outreach on Transportation Questions

BUDGET IMPACT:

Amount:

FY(s):

Funding Source:



To: Planning Commission
From: Christina Robertson-Gardiner, Senior Planner
RE: LEG 19-0003-Beavercreek Road Concept Plan Zoning and Code Amendments
Date: November 18, 2019

Background

The Planning Commission is reviewing the zoning and code amendments for the Beavercreek Road Concept Plan (BRCP) over multiple meetings during the late summer and fall of 2019. Each meeting will be broken into 2-3 topics to allow the Planning Commission, staff, and the public time to focus their energies. Planning Commission comments and direction, as well as public comments, will be tracked throughout the hearings, and topics may be added to future meetings if new items are identified or issues have not been resolved. Please refer to the updated calendar attached to each Planning Commission packet for meeting topics.

The following topics were identified either by public comment or the Planning Commission for the November 25, 2019 Hearing.

Beavercreek Road Design

At the November 12, 2019 City Commission work session, staff **presented additional information** on **potential design options** for Beavercreek Road and looked for broad direction from the City Commission. Staff also shared the results of the **Public Survey**.

The purpose for holding the City Commission work session during the Planning Commission hearings process is to provide the City Commission the ability to provide their initial direction on the design of Beavercreek Road, which allows the Planning Commission an opportunity to incorporate that into the full code amendment package.

How many lanes should Beavercreek Road be within the Concept Plan corridor?

A transitional section extending the existing 5-lane section near Maple Lane and transitioning to a 3-lane section after the Meyers Road intersection.

What type of intersections should Beavercreek Road have within the Concept Plan corridor?

Traffic signals

Should the City renegotiate with ODOT to revise the Alternate Mobility Standard by removing Holly Lane connection projects from the Transportation System Plan (TSP)?

No

Should Beaver Creek Road along the Concept Plan corridor be constructed by developers incrementally as development is built or pursued as a capital improvement project all at once?

The city should investigate if a city-lead capital improvement project is feasible. Staff should return to a future meeting to review funding opportunities.

Staff Recommendation: Staff concurs with the transportation analysis performed by DKS and will be incorporating the City Commission recommended Beaver Creek Road Design into the code amendment package unless a different direction is given from the Planning Commission.

Beaver Creek Road Concept Plan- Transportation Analysis

The Beaver Creek Road Zone and Code Amendments project will also rezone properties located within the city limits and Concept Plan boundary. An approval criterion for rezoning property is a facilities analysis. For the transportation system, this is usually done by completing a Transportation Analysis (TA). The TA, dated June 21, 2019, was prepared under the direction of Kevin Chewuk and Amanda Deering of DKS Associates. It was reviewed by John Replinger, the city's contract Transportation Engineer. Both exhibits are attached to the November 25, 2019 Planning Commission agenda.

17.68.020 -Zone Change Criteria.

The criteria for a zone change are set forth as follows:

17.B. That public facilities and services (water, sewer, storm drainage, transportation, schools, police and fire protection) are presently capable of supporting the uses allowed by the zone, or can be made available prior to issuing a certificate of occupancy. Service shall be sufficient to support the range of uses and development allowed by the zone.

C. The land uses authorized by the proposal are consistent with the existing or planned function, capacity and level of service of the transportation system serving the proposed zoning district.

The focus of the analysis was to demonstrate that the requirements of [Oregon Administrative Rule \(OAR\) 660-012-0060](#), the [Transportation Planning Rule \(TPR\)](#), are met for the Beaver Creek Concept Plan area in Oregon City, Oregon. The Transportation Analysis (TA) shows adequacy of the current Oregon City Transportation System Plan (TSP) to accommodate development anticipated with the buildout of the Beaver Creek Concept Plan. The TA provides documentation that the key intersections will meet adopted mobility standards and that the proposed changes comply with the TPR.

He also concurs with DKS's findings that all study area intersections meet operational standards regardless of whether Holly Lane was included or excluded in the system and that Beaver Creek Road would meet mobility standards with the 3-lane configuration specified in the TSP. Additionally, the mobility standards would also be met if Beaver Creek Road were to be widened to five lanes in sections where three lanes had been specified.

Oregon Department of Transportation (ODOT)

Seth Brumley, Development Review Planner in a November 18, 2019 letter submitted comments concurring with DKS's findings that the proposal met the Transportation Planning Rule and reiterated that removal of Holly Lane connection projects from the Transportation System Plan (TSP) would necessitate the renegotiation of the alternate mobility targets for the Highway 213/Beaver Creek Intersection. This

was also discussed in this previous letter submitted November 4, 2019 which is also attached to the agenda packet..

“ODOT concurs with the conclusion that: “Overall, the current TSP includes adequate transportation system projects for the Beavercreek Concept Plan area to comply with the Transportation Planning Rule (TPR)” ODOT would like to emphasize that the City is able to make this finding based on the alternative mobility targets adopted by the City and the Oregon Transportation Commission, which includes the Holly Lane segment between Maple Lane Road and Thayer Road.”

Once properties are rezoned, additional project specific analysis will occur during any future development review onsite and specific and proportional conditions of approval for transportation system upgrades, such as abutting street improvements or signal installations will be required as part of a development’s approval.

Staff Recommendation: Staff concurs with the transportation analysis performed by DKS. No action is needed.

Speed Zones within the Concept Plan

Current law allows the City of Portland to designate the speed for a right of way under the City’s jurisdiction that is five miles per hour lower than the statutory speeds if the right of way is located in a residential district. All other cities and counties are required to have road authorities and make a formal request to the Department of Transportation.

Cities, other than Portland, with a state highway within city limits which have the road authority may a request to the Department’s Highway Division for a speed zone change. The request is forwarded to either the District Manager, Regional Manager or State Traffic-Roadway Engineer to conduct a speed zone investigation and make a recommendation to grant or deny the request. The recommendation is sent to the Traffic-Roadway Section for approval. The local road authority is notified of the decision. A speed zone order is issued if the local road authority concurs. If they do not concur, the case is sent to the Speed Zone Review Panel which will issue a final decision. Business districts can be signed as 20 miles per hour by statute and do not require a speed study.

Effective January 1, 2020, [Senate Bill 558](#) allows all cities and counties the authority to establish, by ordinance, a designated speed for a right of ways under their jurisdiction. The measure specifies that the designated speed must be five miles per hour lower than the statutory speed, the road be located in a residential district and not an arterial street, and that the city provide appropriate signage of the designated speed. Senate Bill 558 passed the Legislature and was signed by the Governor on June 27, 2019.

If the Planning Commission wishes to pursue 20 miles per hour signage on local residential streets in the Beavercreek Road Concept Plan boundary and the Glen Oak Main Street, they should include it in the formal recommendation to the City Commission.

Staff Recommendation: The Beavercreek Road Concept Plan is an ideal area to test the new option for reduced speed limits. Staff would support a Planning Commission recommendation for speed reduction in this area.

Date	Question/Comment	Topic	Staff Response / Recommendation	Planning Commission Action/Recommendation
8.12.19 Mike Mitchell	Provide more background on the decision to have a 20 foot setback at the north boundary of the concept plan areas and a 40 foot setback at the south boundary	Zones	Will be addressed at the September 9, 2019 Planning Commission Meeting.	Keep northern setback as written. Add accessory buildings and roads as permitted in the southern boundary.
8.12.19 Mike Mitchell	Concern that the definition of warehousing is not specific enough to allow ancillary use by permitted uses	Zones	Will be addressed at the September 9, 2019 Planning Commission Meeting.	Oregon City views the storage and distribution of materials that are constructed or assembled onsite to be part of the permitted use. No changes to the code are recommended.
8.12.19 Patti Gage	Provide additional background on the Geologic Hazard code- how does it affect development in the BRCP area and Holly Lane area?	Hazards/Natural Resources	Geologic Hazard Review within the city is subject to OCMC 17.44 Geologic Hazard Review . Areas near the Thimble Creek Conservation Area are subject to the Geologic Hazard code at time of Development Will be further addressed at the September 23, 2019 Planning Commission Meeting.	Planning Commission did provide staff with any direction on amendments to the existing 17.44 Geologic Hazards Overlay District
9.9.19 Planning Commission	Provide additional information on options for including additional job opportunities in the southern part of the Concept Plan area.	Cottage Industry/Home Occupation	This topic will be further addressed at the October 14, 2019 and November 8, 2019 Planning Commission Meetings	Planning Commission provided initial direction on special home occupation/cottage industry code.

Date	Question/Comment	Topic	Staff Response / Recommendation	Planning Commission Action/Recommendation
8.12.19 Dirk Schlagenhauser	Provide additional information on the pros and cons of roundabouts and crash statistics for the corridor.	Transportation	Additional information about intersection control measures (Roundabouts and signals) will be shared at the November 12, 2019 city Commission Work session and November 25, 2019 Planning Commission Meeting. See calendar in Commission report for details	
8.12.19 Dirk Schlagenhauser	Please expand on Comprehensive Plan Policy 9.8.7 as it relates to bicycles	Transportation	<i>Policy 9.8.7</i> <i>Assess methods to integrate the pedestrian, bicycle and elevator transportation modes into the mass transit system.</i> Additional information about intersection control measures (Roundabouts and signals) will be shared at the November 12, 2019 city Commission Work session and November 25, 2019 Planning Commission Meeting. See calendar in Commission report for details	
8.12.19 Tom Geil Vern Johnson	If the transportation study horizon is only 20-25 years how do we know we are sizing Beavercreek Road correctly?	Transportation	Additional information about traffic studies and planning for capacity will be shared in will be shared at the November 12, 2019 city Commission Work session and November 25, 2019 Planning Commission Meeting. See calendar in Commission report for details	
8.12.19 Mike Mitchell	Concern about categorizing shared and separated bike lines with at grade bike lanes in terms of safety and likeliness of being utilized	Transportation	Additional information about will be shared will be shared at the November 12, 2019 city Commission Work session and November 25, 2019 Planning Commission Meeting. See calendar in Commission report for details	
8.12.19 Tom Geil	Provide more information on the creation of the Beavercreek Blue Ribbon Committee	Other/Economic Development	Lori Bell, Economic Development Coordinator will provide a brief email explaining purposed of organization, which will be attached to public comments.	Non anticipated

Date	Question/Comment	Topic	Staff Response / Recommendation	Planning Commission Action/Recommendation
10.14.19 Full Planning Commission	Home Occupation direction Allow: Some retail, Some commercial vehicles onsite, some offsite employees	Home Occupation/Cottage Industry	Code revisions will be presented at the November 18, 2019 Planning Commission meeting.	
10.14.19 Mike Mitchell	Parks We might need to tweak the calculation to get the two parks acquired.	Parks	Code revisions will be presented at the November 18, 2019 PC meeting.	

Date	Topic	Issue / Comment / Concern	Staff Comment	Has this been Addressed? How?
7.3.19 Written Comment to Planning Commission Wendy Black	Natural Resources	Concerned that the area where home is located was in a protected natural area according to the first map they were sent, but now seems to be included in the industrial area. Concern about project impact to farm use.		This topic will be addressed at the September 23, 2019 Planning Commission Meeting
7.12.19 Written Comment to Planning Commission Clackamas River Water (CRW)	Infrastructure	Territory that is annexed to the City must be withdrawn from CRW and served by Oregon City services to the extent practicable. CRW assumes that future development will, in large part, be guided and coordinated consistent with the concepts provided in the Joint Engineering Study, June 11, 2018, by Murraysmith.	This is consistent with Staff's understanding. New development within the concept plan area (except for the previously approved Villages of Beavercreek) will utilize city water.	No response needed for this comment
7.15.19 Written Comment to Planning Commission Wes Rogers Oregon City School District	Infrastructure	Assuming that the BRCP is developed in stages over the next 5-10 years, the District currently believes that it has the current capacity and/or will be able to have time to add capacity to meet the long-term enrollment generated by the Beavercreek Road Concept Plan development.	The school property to the south of the Concept Plan area will have vehicular access to the Concept Plan and can connect to local streets when it is constructed.	No response needed for this comment

Date	Topic	Issue / Comment / Concern	Staff Comment	Has this been Addressed? How?
8.12.19 Testimony to Planning Commission Paul Edgar Entered into the record- Title 4 Map	Zoning Map	Request that the Planning Commission work with Metro to revise the Title 4 Industrial maps to remove a parcel owned by Terry Emmert to allow construction of housing for homeless veterans onsite.	https://www.oregonmetro.gov/industrial-and-employment-land Portions of the CI area in the BRCP are identified as Title 4 Industrial areas. Any change to the title 4 Map must be adopted by Metro and would need to be completed before the Code amendments are adopted by the City to remain consistent with Title 4.	This will be addressed at the September 9, 2019 Planning Commission Hearing
8.12.19 Testimony to Planning Commission Christine Kosinski	Geologic Hazards	Concerned about development in the Beavercreek concept Plan areas affecting homes on Holly Lane as Holly lane is in a historic landslide area. Does not support any connection of the concept plan area to Holly Lane-	Geologic Hazard Review within the city is subject to OCMC 17.44 Geologic Hazard Review . Areas near the Thimble Creek Conservation Area are subject to the Geologic Hazard code at time of Development.	This topic will be addressed at the September 23, 2019 Planning Commission Meeting
9.9.19 Jim Nicita	Cottage Industry	2011 City Commision Meeting voted to have additional job opportunities at the south of the concept plan. Encouraged PC to look at a hybrid district rather than a residential district with home occupation uses. Encourage implementing cottage industry.	Planning Commission requested staff to return at a future meeting with additional opportunities for jobs in the southern part of the Concept Plan area above and beyond the existing home occupation licence.	This topic will be further addressed at the October 14, 2019 Planning Commission Meeting

Date	Topic	Issue / Comment / Concern	Staff Comment	Has this been Addressed? How?
9.9.19 Elizabeth Grazer Lindsey	Cottage Industry	<p>This area was brought into the Urban Growth Boundary for jobs. There are many businesses that are currently in the county that would want to be involved in this use.</p> <p>Encourage allowing cottage industry as a way to promote incubator spaces.</p>	Planning Commission requested staff to return at a future meeting with additional opportunities for jobs in the southern part of the Concept Plan area above and beyond the existing home occupation license.	This topic will be further addressed at the October 14, 2019 and November 18, 2019 Planning Commission Meetings
Elizabeth Grazer Lindsey 10.14.19 Submitted 10.14	Cottage Industry/Enhanced Home Occupation	<p>Traffic congestion exists because of everybody leaving the city to work, Cottage Industry allows entrepreneurs to grow their business inside the city. Jobs in rural areas should be in city areas. The City is losing a lot by not allowing people to grow their own business. We should have a neighborhood where industrious people can have an opportunity to thrive. Fences can be used to make outdoor storage more compatible. The residential areas would benefit having a range of lot sizes to allow different cottage industry types. Think of this area as an attraction/brand. The Planning Commission needs to find more people to interview to see what meets their needs.</p>	Planning Commission will be reviewing draft code at the November 18, 2019 City Commission Meeting.	

Date	Topic	Issue / Comment / Concern	Staff Comment	Has this been Addressed? How?
9.23.19 Christine Kosinki Handouts	Geologic Hazards	Holly Lane Connection is not suitable for road connection to I-205 No insurance coverage is readable available for property owners If near a landslide area you cannot get landslide insurance. The City should provide additional information on landslides and protection people can take to protect their land. State Law requires people to educate about landslides. Oregon City has been derelict in educating the public.	Josh Wheeler, Assistant Engineer presented a background on the OCMC 17.44 Geologic Hazard Overlay District. He also recommended people attend the October 8, 2019 City Commission Worksession about Geologic Hazards.	Planning Commission did not provide staff with any direction on amending the existing 17.44 Geologic Hazards Overlay District.

From: [Lori Bell](#)
To: [Christina Robertson-Gardiner](#)
Subject: Beaver Creek Employment Area
Date: Monday, August 26, 2019 10:09:39 AM
Attachments: [image001.png](#)

Thank you for reaching out Christina. The Blue Ribbon Committee, created in 2016, is a community group working to increase awareness around available sites around Clackamas Community College.

Below are the answers to your questions.

1. Why was it created? – to attract targeted industry to the existing and zoned Industrial sites in the Beaver Creek Employment Area, near and around Clackamas Community College area by leveraging the education and training resources at Clackamas Community College.
2. Steering Committee -Lori Hall, CCC PIO, Lisa Davidson Executive Director of CCC Center for Business and Industry, Lori Bell Economic Development City of Oregon City, Current Executive Director Oregon City Chamber of Commerce Victoria, Jon Legarza – or other representative from Clackamas County Ec Dev Department, Kent Ziegler, OCBA representative.
3. Eric Underwood and Amber Holvek, previous Chamber Director, created the ad hoc committee.
4. It is not a public body and interested parties are welcome to attend. The group meets on an ad-hoc basis. Contact Lori Bell for more information.

Please let me know if you need anything else.

Lori Bell
Economic Development
lbell@orc.org



City of Oregon City
PO Box 3040
625 Center Street
Oregon City, Oregon 97045
503-974-5517 x 1588 Direct
503-657-0891 City Hall

From: [Wendy Black](#)
To: [Christina Robertson-Gardiner](#)
Subject: Beavercreek Road Concept Plan - Loder Rd Residents
Date: Wednesday, July 3, 2019 2:39:07 PM

Hello,

I live on Loder Road in the area that now seems to be planned for a Campus Industrial Zoning. Currently we are Rural Residential Farm/Forest 5 and we have a small farm that does include animals. This is significant source of food for our family. We also live on the ridge above the creek. I am concerned how the rezoning would impact our land use. Are you able to provide me further information? I've read through much of the information on the website. I am very concerned that the area where our home is was in a protected natural area according to the first map we were sent, but now seems to be included in the industrial area. I had trouble telling from all the other maps and information what was happening.

Thank you for your assistance in this matter. Kind regards,
Wendy Black
15060 S Loder Rd, Oregon City, OR 97045



Oregon City School District No. 62

Learning to be our Best

PO Box 2110 (1417 12th St.), Oregon City, Oregon 97045-5010

July 15, 2019

Community Development Department
City of Oregon City
698 Warner Parrott Road
Oregon City, OR 97045

RE: Beaver Creek Road Concept Plan - BRCP

The District has been asked to provide comments concerning the BRCP and the current proposal for zoning designations and code amendments. Comments are to address the ability of Oregon City School District to adequately provide public educational services to the area. Current impacted school enrollment areas are Gaffney Lane and Beaver Creek Elementary Schools, Ogden Middle School and Oregon City High School.

The District has limited short-term capacity available at both Gaffney Lane and Beaver Creek Elementary Schools, capacity available at Ogden Middle School and capacity at our three high schools. Recent residential developments in the District have yielded significantly less than one student per household across all grade levels. The District currently is in design and construction to replace/expand and update middle schools and add safety and security features to all District schools. Current enrollment projections show a gradually increasing elementary enrollment, a middle school enrollment that decreases in the short term and then gradually increases and high school enrollment that slightly decreases. Assuming that the BRCP is developed in stages over the next 5-10 years, the District currently believes that it has the current capacity and/or will be able to have time to add capacity to meet the long-term enrollment generated by the Beaver Creek Road Concept Plan development.

Sincerely,

A handwritten signature in blue ink that reads "Wes Rogers".

Wes Rogers
Bond Program Manager
503-785-8531, wes.rogers@orecity.k12.or.us

Oregon City Planning Commission
Hearing of September 23rd, 2019

RE: Testimony of Christine Kosinski, unincorporated Clackamas County

Agenda Item 3b – LEG19-0003 Beaver Creek Rd Concept Plan – Geology

Oregon City is comprised of some of the most difficult and dangerous topography in the State. I continue to be shocked that the City would even consider using Holly Lane as a freeway for motorists to reach the I-205. This is being done to preserve Beaver Creek Road, since it is at capacity, and the City has failed in the past to construct a grade separated intersection at Hwy 213 and Beaver Creek Rd which would have been the solution to its capacity issues at this intersection. Because the City failed, they pulled out Plan B from their pocket and decided to use Holly Lane which is a small 2 lane road that is riddled on both sides with landslides. The homeowners on Holly Lane have suffered previous landslides which demolished two homes and severely damaged four others. There was NO insurance coverage when the slides occurred in 1996 and the homeowners had to pay hundreds of thousands of dollars to fix and re-build their homes.

Case in point, the City has failed to fulfill its obligations to their people in providing adequate transportation infrastructure to support the large build out they are proposing, however using Holly Ln to carry some 70,000 plus vehicles per day is simply ludicrous. To make the people of Holly Lane pay for the errors of the City should never be done, rather the City must now go back to plan their way out of this difficult situation that they themselves have created.

Following are several Exhibits I am entering into the City record for the Beaver Creek Rd Concept Plan. These exhibits show that poor planning on the part of the City has created these traffic problems.

EXHIBIT ONE – One page of a new article where Scott Burns, Professor of Geology, PSU, was being interviewed after the OSO, WA Landslide Disaster. This is the statement he had about the poor people losing everything, **and there's no insurance covering them.**

EXHIBIT TWO – This is the first sheet of an application for Landslide Insurance, NOTE the question "Is the building in a known landslide area or have there been any incidents of landslide within ONE MILE of the property? It doesn't matter if you answer yes or no since the insurance company will look up your address on lidar landslide maps. If there has been a previous landslide within one mile of your property you will not get insured.

EXHIBIT THREE – There are extensive exclusions, in fact so many, that even if you could get landslide insurance, it would virtually never pay out.

EXHIBIT FOUR – Here is a copy of the denial my Husband and I received when we tried to obtain landslide insurance in 2015.

EXHIBIT FIVE – An e-mail from Professor Scott Burns speaking to the concerns of the Thayer Road landslides and that the road will not take large amounts of traffic.

EXHIBIT SIX – Oregon City's Comprehensive Plan for Landslides. If the City approves the use of Holly Lane, as well as the approving both the North and South extensions of Holly, they will be going against their own Comprehensive Plan, as well as the requirements of the State and LCDC.

EXHIBIT SEVEN – Oregon City “Trail News

EXHIBIT EIGHT - DOGAMI's Lidar Landslide Map. The location of the BRCP is highlighted. I want you to note that this map includes an extensive area of Oregon City because NO ONE in this entire area will be able to obtain Landslide Insurance. Many of them will not know this when they are purchasing homes and/or property. They need to be told the truth if they are moving into a landslide area, they need to know there will be no insurance coverage if a landslide hits their property. **This is STATE LAW – Property Disclosure Law.**

The City should not be using the people of Holly Lane to try and fix it's planning problem where the grade separated intersection, which should have been built way back before three very large concept plans were proposed. The City was wrong in doing this, and now must, once again, re-consider the grade separated intersection which is what should have happened years ago. We ask and ask again and again, take Holly Lane out of your TSP. It is a dangerous street with high susceptibility to future landslides. A City should NEVER compromise the SAFETY of the people!

A Call For Landslide Insurance For Homeowners

*Scott
Barnes*

By DAVID HYDE (/PEOPLE/DAVID-HYDE) & MARCIE SILLMAN (/PEOPLE/MARCIE-SILLMAN) •
MAR 26, 2014

Twitter (<http://twitter.com/intent/tweet?url=http%3A%2F%2Fwww.tinyurl.com%2Fk9hh9uk&text=A%20Call%20for%20Landslide%20Insurance%20For%20Homeowners>)



(http://mediad.publicbroadcasting.net/p/kuow/files/styles/x_large/public/201403/osomudslide-GovInsleeaerial1.jpg)

All those people who lost their houses in the Oso landslide have lost everything, and there's no insurance covering them. We lost lives. That is the worst thing. But then property is the second thing. Hopefully, this will be enough of an impetus to take us to the next level and put more pressure on insurance companies to possibly come forward with landslide insurance.

#1

Building Information

Foundation Type:	Crawl Space
Dwelling Type:	Owner Occupied Primary Residence
Year Built:	1971
Roof Update:	1998
Construction Type:	Wood Frame
Dwelling Value Declared at 100% Replacement Cost:	\$200,000.00
Total Square Footage:	1,410
Do you own this property?	Yes
Select the option that best describes the building:	Single-Family
Is this a split level home?	No

General Questions

Does the building have additions or extensions supported by posts, piers, or beams?	No
Is there existing cracking of wall or foundation?	No
Is there a garage attached to the building?	Yes
Is the sill plate permanently bolted to the foundation of the building?	No
What year was the roof last updated?	1998

Earthquake Questions

Have any buildings or personal property located on the premises been damaged from an incident of Earthquake Shock?	No
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Landslide Questions

Is the building in a known landslide area or have there been any incidents of landslide within 1 mile of the property?	Yes
Have any buildings or personal property located on the premises been damaged from an incident of landslide, earth movement, or land subsidence?	No

2

H.Premises means the real property at the address shown on the Coverage Declarations.

- I. Sinkhole** collapse means the settlement or systematic weakening of the land supporting the **building(s)**, when such settlement or systematic weakening results from movement or ravelling of soils, sediments, or rock materials into subterranean voids created by the effect of water on a limestone or similar rock formation.

III. Losses Excluded

A. This Policy does not insure against:

1. Loss or damage arising directly or indirectly out of nuclear reaction, nuclear radiation or radioactive contamination, however such nuclear reaction, nuclear radiation or radioactive contamination may have been caused.
2. Loss or damage arising directly or indirectly out of war, invasion, acts of foreign enemies, hostilities (whether war be declared or not) civil war, rebellion, revolution, insurrection, military or usurped power or martial law or confiscation or nationalization or requisition or destruction of or damage to property by or under the order of any government or public or local authority.
3. Loss, damage or increased cost arising directly or indirectly out of enforcement of any ordinance or law regulating the use, reconstruction, repair or demolition of any **building(s)** insured hereunder, nor any loss, damage, cost, expense, fine or penalty which is incurred, or sustained by or imposed on you at the order of any governmental agency, court or other authority arising from any cause whatsoever.
4. Loss or damage arising out of acts or decisions, including the failure to act or decide, of any person, group, organization or governmental body relating to faulty, inadequate or defective:
 - a. Planning, zoning, development, surveying, siting;
 - b. Design, specifications, workmanship, repair, construction, renovation, remodelling, grading, compaction;
 - c. Materials used in repair, construction, renovation or remodelling; or
 - d. Maintenance of all or part of any property on or off the **premises**.
5. Loss or damage arising out of normal settling, shrinking or expansion of land, **buildings**, structures or foundations; or erosion, gradual subsidence or the processes of erosion that take place over time, or any other gradually occurring loss or damage whether caused by **earthquake shock, flood or landslide** or not, or any loss or damage which commenced prior to the inception of this Policy.
6. Loss or damage arising out of fire regardless of any other event which contributes concurrently or in any sequence to the loss or damage.
7. Loss or damage arising out of exposure to weather conditions where any **personal property** is left in the open or not contained in **buildings** which are on permanent foundations and capable of secure storage.
8. Mysterious disappearance or inventory shortage, theft, fraud, or any kind of wrongful conversion or abstraction.
9. The costs for reconstruction of electronic data or other data.
10. Loss or damage arising out of cessation, fluctuation or variation in, or insufficiency of, water, gas or electricity supplies, or other public utility service supplying the **premises**.
11. Reduction in rental value, reduction in market value or the saleability of property insured by this Policy, or any costs or expenses related thereto.

B. Notwithstanding any provision in this Policy to the contrary (or within any Endorsement which forms part of this Policy), this Policy does not insure:

1. Any loss, damage, costs or expense, or
2. Any increase in insured loss, damage, cost or expense, or
3. Any loss, damage, cost, expense, fine or penalty, which is incurred, sustained or imposed by order, direction, instruction or request of, or by any agreement with, any court, government agency or any public, civil or military authority, or threat thereof, (and whether or not as a result of public or private litigation) which arises from "any kind of seepage or any kind of pollution and/or contamination," or threat thereof, whether or not caused by or resulting from a peril insured, or from

SPECIMEN

3

This exclusion applies regardless whether there is (i) any physical loss or damage to insured property; (ii) any insured peril or cause, whether or not contributing concurrently or in any sequence; (iii) any loss of use, occupancy, or functionality; or (iv) any action required, including but not limited to repair, replacement, removal, clean-up, abatement, disposal, relocation, or steps taken to address medical or legal concerns.

This exclusion replaces and supersedes any provision in the Policy that provides insurance, in whole or in part, for these matters.

- I. This Policy does not cover any costs and expenses, whether preventative, remedial or otherwise, arising out of or relating to change, alteration or modification of any computer system, hardware, program or software and/or any microchip, integrated circuit or similar device in computer equipment or non-computer equipment, whether the property of the insured or not.
- J. Notwithstanding any provision to the contrary within this insurance or any endorsement thereto it is agreed that this insurance excludes loss, damage, cost or expense of whatsoever nature directly or indirectly caused by, resulting from or in connection with any act of terrorism regardless of any other cause or event contributing concurrently or in any other sequence to the loss.

For the purpose of this Policy an act of terrorism means an act, including but not limited to the use of force or violence and/or the threat thereof, of any person or group(s) of persons, whether acting alone or on behalf of or in connection with any organization(s) or government(s), committed for political, religious, ideological or similar purposes including the intention to influence any government and/or to put the public, or any section of the public, in fear.


This also excludes loss, damage, cost or expense of whatsoever nature directly or indirectly caused by, resulting from or in connection with any action taken in controlling, preventing, suppressing or in any way relating to any act of terrorism.

If the underwriters allege that by reason of this exclusion, any loss, damage, cost or expense is not covered by this insurance the burden of proving the contrary shall be upon the insured.

In the event any portion of this endorsement is found to be invalid or unenforceable, the remainder shall remain in full force and effect.

IV. Property Excluded

A. This Policy does not cover:

1. Land, land values, soil, water, air, or any interest or right therein.
2. **Building(s)** and other structures used in whole or in part for any commercial, farming or manufacturing purposes, other than residences on the **premises** held for rental.
3. Mobile homes; but this exclusion does not apply to modular or manufactured housing permanently attached to foundations.
4. Paved areas, including but not limited to parking lots, terraces, driveways, walkways, sidewalks, pavements, paths, curbing and swimming pools. 
5. Bridges, steps and stairs; wharves, piers and jetties, unless physically attached to any **building(s)**.
6. Retaining walls whether or not necessary for the continuing stability of any part of the **premises**, and whether or not attached to any **building(s)**.
7. Fences; embankments and earthen structures, tanks, wells, ponds, dams, and dikes.
8. Trees, shrubs, lawns, plants, landscaping costs, animals, birds or fish.
9. Any aircraft or other aerial device, watercraft and their trailers, motorized and non-motorized vehicles other than motorized equipment used to maintain the **premises**.
10. Accounts, bills, currency, money, medals, notes, credit cards, securities, deeds, bullion, books of account, evidences of debt or title, manuscripts, passports, tickets, stamps and valuable papers.
11. Jewellery, watches, precious stones, precious metals, silverware, silver-plated ware, gold-ware, gold-plated ware, and pewter ware, fine art, objects d'art, firearms, sculpture and statuary, furs and garments trimmed with fur.
12. Loss or damage to the basement and/or real property and **personal property** suffering loss or damage within the basement where the basement has not been declared within the Policy Application for this insurance.

SPECIMEN

3

From: Jackie Goodman <jackie@huggins.com>
To: britenshin <britenshin@aol.com>
Subject: RE: Landslide and earthquake quote
Date: Wed, Oct 28, 2015 11:20 am

Hello Christine and John,

I received a response from the Underwriter and I am sorry to tell you that your application has been denied. Unfortunately you are ineligible for landslide coverage at this time. The comments from the Underwriter indicate the risk is surrounded by 6 large landslides and a recent fan of debris. The Catcoverage.com market is the only market that we have available for this type of coverage.

I am so sorry that I am unable to assist you. If you have any questions or concerns, please let me know.

Kindly,

Jackie Goodman
Account Manager
Huggins Insurance Services
jackie@huggins.com

#4

Subj: **Re: Thayer Road in Oregon City**
Date: 11/19/2007 6:20:35 A.M. Pacific Standard Time
From:
To:

Christine - great to hear from you!! Keep working at getting the county to change - it takes time! The Thayer Road problem is a big one - that slide keeps creeping. The road will not take large amounts of traffic and they definitely should not build on the site! Thanks for keeping me up on these things! Good luck,

Scott Burns, PSU Geology

Quoting Britenshin@aol.com:

> Dr. Burns: I was speaking with Sha Spady last week regarding the large
> landslide area on Thayer Road which sinks every year. Sha told me that you
> were recently here to inspect this part of the road and that I should
> contact you
> for your thoughts and concerns about this area.
>

#5

areas of concern are shown on other city, county, state and federal maps. These publications are available at the Oregon City Planning Department.

Development and construction in areas with unstable soils require that special development standards be met on a site-specific basis to prevent or minimize damage caused by unstable soils. Maintaining existing vegetation or revegetating may be required for excavation and road slopes in areas designated as landslide-prone.

Landslides. Landslides include rockslides, mudslides, debris flows, earthflows, and slumping. These phenomena are natural geologic processes that occur principally when soils and rock in steep areas become saturated with water, increasing weight and lubricating the mass. Gravity pulls the affected areas downhill. Landslides can be exacerbated by adding fill material to a slope, removing vegetation, altering drainage and runoff patterns, and undercutting a slope. Landslides can be triggered by heavy rains, groundshaking from earthquakes and heavy traffic, and undercutting the lower edge of a slope, which can be caused by erosion along stream banks, and by development, such as cuts in road construction.

Areas most susceptible to landslides in Oregon City are those with slopes of greater than 25 percent. These areas have been mapped by DOGAMI and are shown in the *Oregon City Hazard Mitigation Plan* (1998). The Unstable Soils and Hillside Constraint Overlay District requires geotechnical surveys of other potential hazard areas and provides standards that are used to determine the potential risk of landslides on slopes with various degrees of steepness in relation to the development.

Seismic Activity

Although predicting seismic events is extremely difficult, some prediction is possible by looking at the history of a particular region. Oregon is in a region with a history of intense seismic activity, generated by the subduction of the Juan de Fuca Plate under the North American Plate and by the collision of the Pacific Plate with the North American Plate along the San Andreas Fault and associated faults in California. Known catastrophic subduction-zone seismic events in the Pacific Northwest, which have occurred every 300 to 800 years, have caused a down-drop of land, generated enormous tsunamis along the coast, and triggered major landslides throughout the region. The last such event took place in 1700.

Tectonic uplift of the entire Pacific Northwest region, driven by subduction of the Juan de Fuca Plate far offshore, has spawned many faults throughout the region, including the West Hills Fault along the axis of the toe of Portland's West Hills. An earthquake in March of 1993 near Molalla just south of Oregon City, dubbed the "Spring Break Quake," had a magnitude of 5.6 on the Richter

#6

OREGON CITY TRAIL NEWS

Since April of 1996 until the Fall issue of this year, 2019 – There have been many articles in the Trail News on.....

City Sewers
City Streets
National Night Out
City Heritage Day
Water Safety
Stormwater Master Plan Update
Construction Projects
Many articles on living in the flood plain
Many articles on flood insurance
Many articles on the BRCP
The Pioneer Center

**BUT
NEVER ONE ARTICLE EVER IN THE PAST 23 YEARS
ABOUT LANDSLIDES!!!!!!**

Both Land Use Goals 7 and 2, as well as Oregon Statutes Chapter 195 – Local Government Planning Coordination – Section 195.260. All of these State laws call for local governments to educate their people about the risks of Landslides.

The people of Oregon City must know who to call, where to go for help when noticing things like cracks in their foundations, windows that won't go up or down due to shifting, cracks appearing in their ceilings, floors that begin to tilt and become unlevel. The people of Oregon City must be educated in reading the DOGAMI Lidar Landslide Maps, if they have questions, the City must be ready with answers and with help.

This is simply awful that Oregon City, with some of the worst topography in the State, has not reached out to their people through the Trail News, through newspaper articles, through mailers, through classes held within the community on the dangers of Landslides, Earthquakes and they must know about Emergency preparedness and the fact that Landslide Insurance does not exist at this time in the U.S. and that the Homeowner is responsible for all damages.

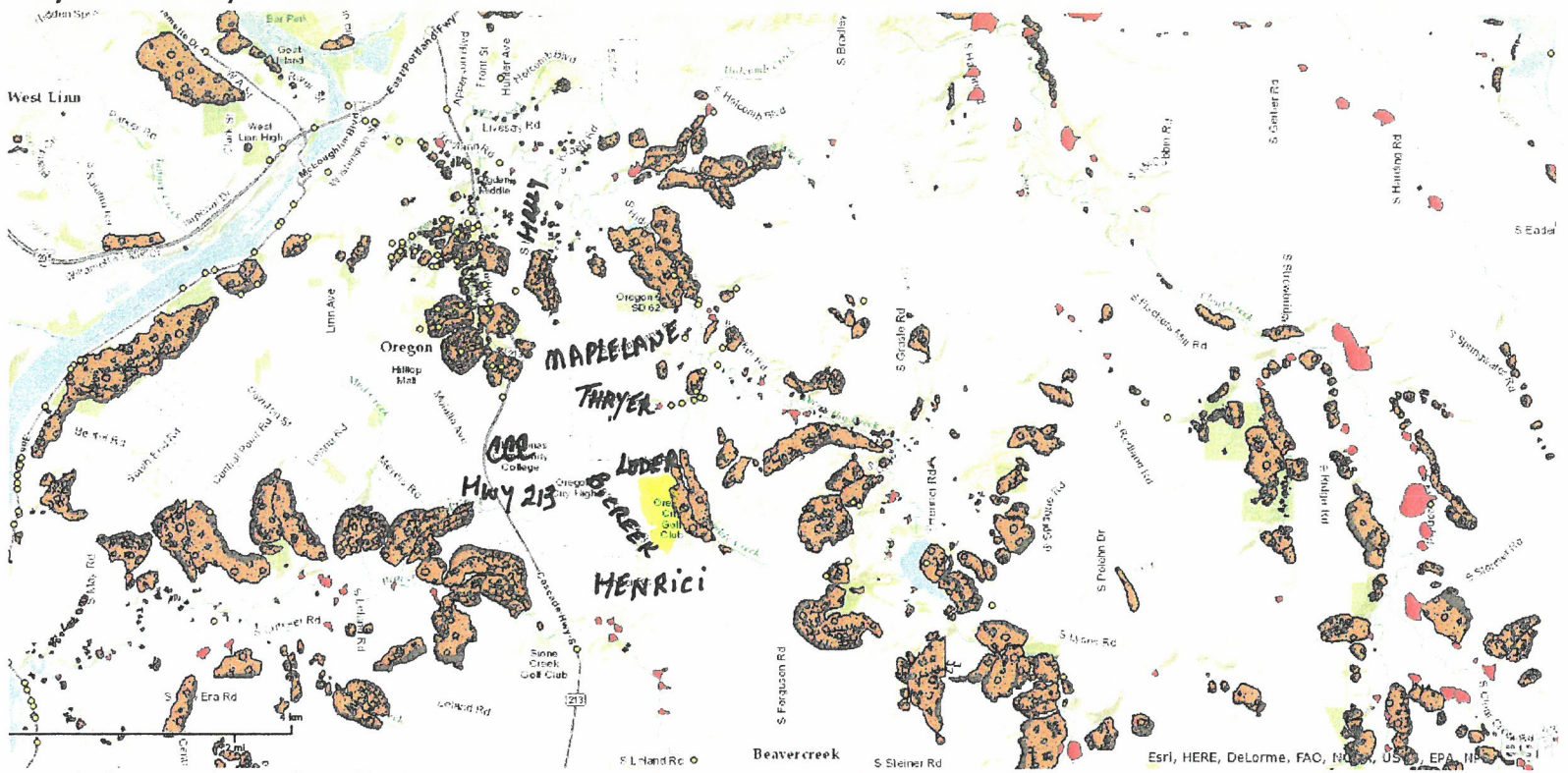
Oregon City has been derelict in it's duties to protect the lives and property of it's people, and must, by State law, begin an intensive plan to educate their people into the dangers and hazards of living in a landslide area, of which Oregon City is highly comprised of – difficult topography.

Christine Kosinski

#7

Map from DOGAMI S SLIDO viewer

olly Ln & Hwy 213 Landslides



#8

Planning Commission Meeting of Oct. 14, 2019-10-14

Testimony from Elizabeth Graser-Lindsey

I am grateful the Planning Commission requested further delving into cottage industry as the city commission requested some years ago and I appreciate the research and thought the staff has given the issue.

Oregon City is a middle-sized city, the county seat, the home of Clackamas Community College, a large and growing education center and a bedroom city for the region. Most residents have to commute to cities with more abundant jobs since Oregon City has a particularly-low jobs-to-housing ratio. All this driving by Oregon City commuters and people living further out to get to distant jobs causes traffic congestion. Because, currently the city's home occupation code is very limiting, it leads to potential city entrepreneurs, who are starting urban-connected businesses, to live in the rural area where the conditional use code is more permissive when the city won't let them in. This restrictiveness also leads to business income benefitting other local governments rather than Oregon City. The city should not lack a neighborhood where people can be industrious and start a business from their home. ~~You'd fill a pad of paper with all the home-occupation permits issued outside the city for city-related jobs. In my area~~

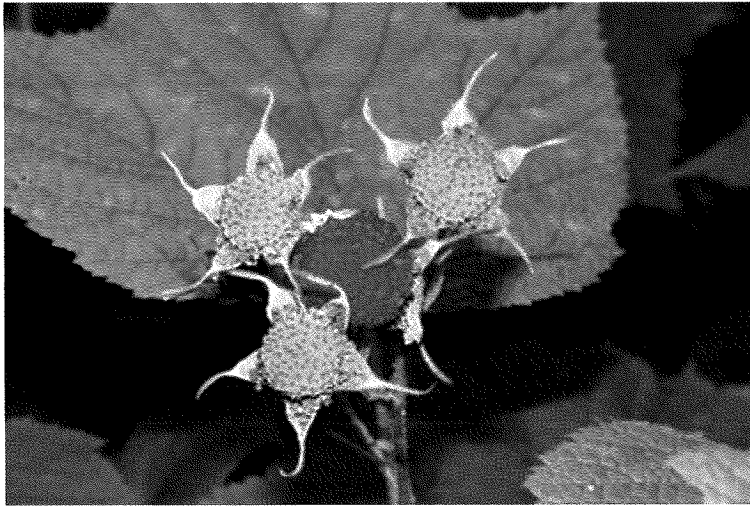
Oregon City needs to give its motivated and talented residents of ordinary means the opportunity to innovate, be productive, generate wealth, and grow a successful business in the spectrum of urban activities that serve cities. Even the proposed changes -- to establish a unique Beavercreek Road Concept Plan area home occupation code -- just cracks the door open a little. It still leaves many occupations for people to pursue somewhere else. This includes the would-be up-and-coming landscapers, the forklift business, the dump truck business, the caterer, the welder, the car repairer, the construction contractor, the gutter installer, the plumber, and so forth.

The Beavercreek Road Concept Plan area was brought into the Urban Growth Boundary for industry, to solve the shortage of family-wage jobs in the city and region; LUBA's remand confirmed that this is true. Oregon City still needs the jobs; it still needs the business revenue; and it needs relief from excess commuting impacts on its roads whether from its own residents or commuters from further out passing through to the good jobs. It's not enough to try to attract successful businesses to Oregon City.

Fully open up Oregon City to the city's own residents being the spark plugs of innovation, productivity and wealth-generation that power the city into the future.

These people need all the opportunities it takes to operate varied businesses – a few employees, a bit of sales and traffic, storage, business vehicles, out-growing invisibility. Instead of seeing industry and its evidences as a problem, embrace industry and see how code needs to be addressed to make industry a good neighbor. Maybe there can be a place for a bit of sound and storage, especially when all the ^{home} buyers are attracted to the opportunity. Why doesn't the city interview its own citizens participating in business to see what is necessary for success for a range of businesses? Maybe the Chamber of Commerce could help.

The Thimble Creek Concept Plan name has the advantages of being unique and connecting with the common thimble berry of our area.





MEMO

To: Laura Terway, Community Development Director, Oregon City
cc: files
From: Joseph D. Eskew, Engineering Manager
Date: 7/12/2019
RE: *Beavercreek Road Concept Plan – CRW Comments*

Thank you for this opportunity to provide comments regarding the Beavercreek Road Concept Plan and how Clackamas River Water (CRW) will be affected.

The area of interest (the Area) is located east of Beavercreek Rd, south of Thayer Rd and north of Henrici Rd. The area lies wholly within the Urban Growth Boundary (UGB) and partially within City limits.

Portions of the Area extend into current CRW jurisdictional territory that is served by CRW. Regarding these portions of the Area, CRW provides the following summary comments:

1. Existing CRW customers within the UGB and/or City limits, will remain customers until such time that the City has infrastructure and can provide water service.
2. CRW owns service mains that traverse through the Area to territory outside the UGB. Water mains must remain in service to provide water to customers outside the UGB. CRW is open to discussions regarding alternatives for maintaining service to customers outside the UGB.
3. Territory that is annexed to the City must be withdrawn from CRW and served by Oregon City services to the extent practicable.
4. An Intergovernmental Agreement between CRW and Oregon City, dated October, 13 2016 provides a mechanism to serve CRW water within Oregon City limits, on a limited basis, through a master meter for water sales to Oregon City. The IGA is focused specifically to provide interim water service for the proposed “Villages at Beavercreek” development. This agreement is in force and will be honored.
5. CRW lacks required storage and infrastructure to increase the amount of water sales for additional development over the flow rate designated in the IGA.
6. CRW assumes that future development will, in large part, be guided and coordinated consistent with the concepts provided in the Joint Engineering Study, June 11, 2018, by Murraysmith.

FREQUENTLY ASKED QUESTIONS ABOUT SECTION 0060 OF THE TRANSPORTATION PLANNING RULE

What is Section 0060 of the Transportation Planning Rule?

Section 0060 of the Transportation Planning Rule (TPR) is a statewide planning requirement that directs cities and counties to assess whether proposed plan amendments and zone changes will have a significant effect on the transportation system. In essence, this means that before approving plan or zone changes, cities and counties must determine whether existing transportation facilities and planned improvements will provide adequate capacity to support the new development that would be allowed by the proposed land use changes.

If there is not adequate planned capacity, a “significant effect” occurs. When a city or county finds there is a significant effect, it must take steps to put land use and transportation in balance. Ways to do this include: adding planned transportation facilities or improvements, limiting land use or modifying performance standards to tolerate additional congestion. Section 0060 outlines the process and standards for deciding whether a plan amendment or zone change has a significant effect, and appropriate remedies.

What is the purpose of Section 0060?

Section 0060 is intended to assure that when new land uses are allowed by plan or zone changes that there is adequate planned transportation capacity, usually roadway capacity, to serve the planned land uses. The potential for traffic and congestion from new development is a major concern in communities around the state. Section 0060 is a tool to help communities understand the traffic impacts of plan and zone changes and assure that growth is adequately planned for and does not result in excessive traffic congestion. Amendments to Section 0060 adopted in 2005 also help communities address whether funding plans and strategies for needed improvements are in place before plans or zoning are changed to allow more development.

What is the legal basis for Section 0060?

State law (ORS 197.646) requires that local governments comply with statewide planning goals and rules adopted to implement them when they consider plan amendments. The TPR implements Statewide Planning Goal 12 (Transportation) which requires local governments to plan for a safe, convenient, and adequate transportation system.

What decisions does TPR Section 0060 apply to?

This portion of the TPR applies to local plan and land use regulation amendments. These include plan and zoning map changes as well as changes to the list of allowed land uses in a zone or other provisions of a zoning district.

Does Section 0060 apply to building permits, subdivisions or conditional use permits or similar authorizations?

No. As described above, Section 0060 only applies where a plan amendment or zone change of some sort is involved. Approvals that are made under the terms of existing city and county plans and zoning ordinances are not subject to Section 0060. However, in some situations local governments may have adopted local standards that are equivalent to the TPR Section 0060 that do apply during site plan review.

Does Section 0060 affect all plan amendments and zone changes?

In practice, the TPR affects relatively few plan amendments and zone changes. Most plan amendments don't affect expected traffic one way or another; and those that do are often adequately served by existing or planned roadway improvements.

Do changes to land use regulation amendments other than zone changes need to be reviewed for compliance with Section 0060?

Yes. While most changes to zoning or development codes do not affect the transportation system, some relatively minor changes may allow new or expanded uses that would have a significant effect. For example, adding "sales of building materials" as an allowed use in an industrial zoning district could have the effect of allowing a large format retail use into an industrial zoning district that would generate much more traffic than allowed industrial development. Local governments need to evaluate each land use regulation amendment and assess whether or not it would allow uses that would generate more traffic than that generated by uses currently allowed in the zone.

Section 0060 is *part* of the Transportation Planning Rule. What are the other parts of the TPR?

The Transportation Planning Rule or TPR is an administrative rule adopted by the Land Conservation and Development Commission. The rule implements Statewide Planning Goal 12 (Transportation) and other statewide planning goals that provide guidance to local governments about how they conduct transportation planning. The major requirement in the TPR is that cities and counties adopt transportation system plans (TSPs) that include plan for future streets and roadway improvements and other transportation facilities and services needed to support future land use plans. The TPR was adopted in 1991. Since that time most of the cities and counties in the state have adopted TSPs to carry out the rule. Further information about the TPR including the full text of the rule is available on the DLCDC website. Information about TSPs is available from the respective city and county planning departments.

My city and county have adopted transportation plans (TSPs). Is additional review of plan amendments and zone changes for compliance with 0060 still required?

Yes. Generally, TSPs include planned facilities that are adequate to serve uses anticipated based on existing planning and zoning. Changes to comprehensive plans and zoning can create the need for additional street or roadway improvements. Section 0060 requires cities and counties to assess whether a plan amendment or zone change would create more traffic than the plan anticipates or that facilities called for in the plan are designed to handle. In many cases, local governments find that improvements called for in TSPs will be

adequate to support the planned land use change. Where this is the case, the requirements of 0060 are met. However, where expected new traffic would exceed the capacity of planned facilities, additional planning must be done to figure out how the traffic will be handled, usually by amending the TSP to account for the additional traffic.

How is Section 0060 applied?

Local governments considering plan or land use regulation amendments evaluate whether the proposed plan amendment or zoning change would "significantly effect" the planned transportation system. Most local governments ask applicants to address this in their application. The evaluation involves reviewing applicable city, county or state transportation plans and assessing whether the proposed plan or zone change will have a significant effect on the transportation system.

What is the standard for deciding whether a plan amendment or zone change has a "significant effect"?

The standards for determining whether or not a plan or land use regulation amendment has a significant effect are set out in OAR 660-012-0060(1).¹ In most situations, an 0060 "significant effect" occurs because the plan amendment or zone change would allow uses that would result in a level traffic that exceeds the adopted performance standards for a local street or state highway. (This is the standard in 0060(1) (B): where a plan amendment or zone change reduces "...the performance of an existing or planned transportation facility below the minimum acceptable performance standard identified in the TSP or comprehensive plan.")

Local governments determine whether there is a significant effect by:

- Assessing how much new traffic would be generated by the proposed plan or zone change
- Adding the potential new traffic to traffic that is otherwise expected to occur
- Assessing whether this additional traffic will cause roadways in the vicinity of the plan amendment to exceed adopted performance standards

How do local governments determine whether or not a plan amendment or zone results in a "significant effect"?

Typically some sort of traffic analysis or traffic impact study is prepared. In either case, the analysis compares traffic allowed under the existing and proposed plan or zoning designations. A proposed plan amendment or zone change has a "significant effect" if:
(1) it generates more traffic than allowed by existing plan and zoning AND

¹ There are three other circumstances where a plan amendment could trigger a "significant effect":

- Changes to the functional classification of an existing or planned transportation facility – an example would be where a local plan designation for a planned street is changed from a "minor arterial" to a "major collector".

- Changes to standards implementing a functional classification system. Examples of this type of change would include amendments to driveway or street spacing requirements.

- Allowing types or levels of uses which would result in levels of travel or access that are inconsistent with the functional classification of a transportation facility; or

(2) planned transportation improvements do not provide adequate capacity to support the allowed land uses.

Are there some simple guidelines for assessing whether a plan amendment is likely to trigger a significant effect?

Yes. In most cases the key question is whether the proposed plan designation or zoning will result in more traffic than is allowed by current zoning.

If the proposed plan amendment or zone change would generate the same or less traffic than is allowed by the current plan and zone designations, it generally is considered *not* to have a "significant effect" on the transportation system. In essence, the rule requires further review of transportation impacts only where a plan amendment or zone change would yield more traffic than is allowed by current zoning.

If a plan amendment would result in more traffic being allowed is it automatically considered to have a "significant effect" under the TPR?

No. The local government would first need to evaluate whether planned transportation facilities will be adequate to handle the additional traffic. If they are adequate, then there would not be a significant effect.

Is the evaluation of significant effect based on the applicants proposed use or other uses allowed by the proposed plan or zone change?

Generally speaking the evaluation of whether there is a significant effect must consider the range of uses allowed by the proposed plan and zoning changes, not just the particular use proposed by the applicant. This is because the resulting plan amendment or zone change, once approved, would allow any of the uses listed in the zoning district without further review for compliance with the TPR. Typically, plan amendments and zone changes do not prevent an applicant (or subsequent property owners) from pursuing more intense development than is contemplated in the original application.

As explained below, an applicant or local government can modify or limit the proposed plan or zone change to reduce its traffic generating impacts and possibly avoid triggering a significant effect. Where the application or approval is limited to specific uses or a particular level of traffic generation, it is possible to limit the scope of the analysis. In many situations this is adequate to avoid triggering a significant effect.

What happens when a local government concludes there is a "significant effect"? Can the plan amendment or zone change still be approved?

A finding of "significant effect" does not prevent approval of a plan amendment or zone change. It does trigger the requirement for local governments to take steps to put land use and transportation "in balance"; by assuring that planned land uses are consistent with the planned transportation system. Local governments have four options for putting land use and transportation "in balance" including one or a combination of the following:

- Adding planned transportation facilities or improvements
- Limiting allowed land uses to fit available facilities

- Changing the transportation performance standards to accept lower performance
- Adopting measures that reduce auto travel

Can local governments avoid triggering a significant effect by limiting the uses allowed by a proposed plan amendment or zone change?

Yes. In practice, applicants or local governments have done this by calculating either the capacity of the planned transportation system or the intensity of use allowed by existing plans and zoning, and then including zoning restrictions that cap allowed development to avoid a "significant effect". This can be done by adopting trip caps or limits on the allowed uses. Currently, thoughtful applicants, with assistance from their traffic consultants, will carefully calculate the capacity of the planned transportation system and adjust their plan amendment proposal to fit within the available the capacity. This may include proposing roadway improvements or other measures to make the proposal fit the available capacity.

How do local governments assess whether there is adequate planned transportation capacity to support proposed uses?

Evaluation is based on applicable adopted transportation plans. These include adopted city and county transportation system plans (TSPs), and the 1999 Oregon Highway Plan adopted by the Oregon Department of Transportation (ODOT).² Basically, local governments compare expected traffic under existing plans with additional traffic that would be allowed under the proposed plan amendment. They then assess whether improvements included in adopted plans will adequately serve the additional traffic. If the increased volume of traffic would cause a performance standard not to be met, there is a significant effect on the transportation system. This assessment is usually based on a traffic impact analysis prepared by a traffic engineer for the applicant.

Does the TPR require traffic impact studies?

While the TPR does not specifically require a traffic impact study, one may be needed to determine whether or not a plan amendment or zone change results in a significant effect. The need for a traffic impact study is usually decided by local government as it reviews a proposed plan amendment. Where a proposed amendment affects a state highway, the local government needs to consult with ODOT to determine whether a traffic impact study or some other analysis is needed.

Does the TPR require a "worst case" analysis - for example, where someone is proposing a zone change to allow a specific use, such as an auto dealership, but the proposed zoning allows other more intense uses, such as fast food restaurants?

No. However, the analysis must be based on the uses that would be allowed by the proposed zoning. An applicant or local government can limit the scope of analysis by limiting the request or approval to specific uses or to a particular level of traffic generation. One approach that is often used is to calculate the amount of traffic expected to be generated by the proposed use and to adopt land use regulations that limit uses in the zone to not exceed this amount.

² The Oregon Highway Plan also includes any specific implementing plans adopted by the Oregon Transportation Commission, such as Highway Corridor Plans or Interchange Area Management Plans. These specific "facility plans" often set different or additional standards for highway performance than are in the OHP document.

Is it possible to defer compliance with the TPR to a subsequent approval, such as a site plan or conditional use approval?

Technically no. However, local governments can achieve this result by limiting development and adopting a local ordinance that essentially mirrors the requirements of Section 0060. Several LUBA rulings³ have upheld local government decisions that, in effect, defer application of the TPR where the following conditions are met:

- (1) The plan amendment and zone change themselves do not allow additional development
- (2) the plan or zoning amendment include the substance of 0060 as a standard for approving any development - typically through a site plan approval process; and
- (3) the local implementation process provides for public review and a hearing including notice to ODOT and other affected transportation providers.

In addition, the Department of Justice has provided ODOT with informal guidance about requirements for local governments to accomplish deferral.

Does DLCD recommend "deferring" transportation analysis required by the TPR?

No. The department recommends against using this approach for several reasons:

- **It undermines the predictability that zoning is intended to provide.** Zoning or rezoning land implies that the land is suitable and appropriate for uses allowed in the zone. If lands are zoned "commercial", for example, property owners rightfully assume that the public has determined that the land is suitable for many commercial uses and can be developed for commercial uses without difficult or complicated reviews. Deferring evaluation of transportation impacts and mitigation to site review works against this objective, especially where expensive improvements are needed to mitigate traffic impacts.
- **It undermines public participation in zoning decisions.** Rezoning is a key opportunity for the public, including neighboring property owners, citizens and agencies, to comment on a proposed zone change. Traffic impacts are often a major concern which the public should understand *before* a zone change is approved. Deferring transportation analysis reduces the opportunity for meaningful public participation.
- **It creates tracking and enforcement problems for local governments.** Where transportation analysis is deferred, future land use decisions and approvals have to be adjusted to include the required transportation analysis. It several years pass between the time the original zone change is approved there is likely to be uncertainty or confusion about what is required – especially if local staff turnover or if property is sold.

³ The LUBA decisions on this issue are:

- Citizens for the Protection of Neighborhoods, LLC v. City of Salem and Sustainable Fairview Associates LLC, 47 OrLUBA 111 (2004): <http://www.oregon.gov/LUBA/docs/Opinions/2004/06-04/03201.pdf>
- *Concerned citizens of Malheur County v. Malheur County and Treasure Valley Renewable Resources, LLP*, 47 OrLUBA 208 (2004).... <http://www.oregon.gov/LUBA/docs/Orders/2004/04-04/04008.pdf>

Overall, local governments, property owners and the public are better served by conducting the traffic analysis as the zone change is considered and making a clear decision about whether the planned transportation system is adequate to serve the allowed uses as part of approving the zone change.

What qualifies as a "planned transportation facility" that local governments may rely upon in determining whether there are adequate facilities to support the planned land use?

Section 0060(4) lists the types of facilities, improvements and services that can be counted as "planned" for purposes of 0060 compliance. Typically, a facility or improvement must be included in the relevant TSP and have some level of funding commitment in place to be considered to be "planned" under section 0060. The rule also allows transportation providers to issue letters to confirm that certain improvements are "reasonably likely" to be provided by the end of the planning period. Where such letters are issued, the improvements may be considered as planned. The rule also allows for improvements that are provided by the applicant, typically as a condition of approval, to be counted as planned improvements.

A detailed list of list of facilities, improvements and services that are considered planned is outlined in Section 0060(4) and includes:

- ❑ Transportation facilities, improvements or services that are funded for construction or implementation in:
 - ❑ the Statewide Transportation Improvement Program
 - ❑ a locally or regionally adopted transportation improvement program or capital improvement plan, or,
 - ❑ program of a transportation service provider. (See OAR 660-012-0060(4)(b)(A).)
- ❑ Transportation facilities, improvements or services that are authorized in a local transportation system plan and for which a funding plan or mechanism is in place or approved. These include, but are not limited to, transportation facilities, improvements or services for which:
 - ❑ transportation systems development charge revenues are being collected;
 - ❑ a local improvement district or reimbursement district has been established or will be established prior to development;
 - ❑ a development agreement has been adopted; or
 - ❑ conditions of approval to fund the improvement have been adopted. (See OAR 660-012-0060(4)(b)(B)).
- ❑ Transportation facilities, improvements or services in a metropolitan planning organization (MPO) area that are part of the area's federally-approved, financially constrained regional transportation system plan. OAR 660-012-0060(4)(b)(C).

Who decides whether a planned facility or improvement is "reasonably likely" to be provided by the end of the planning period?

The decision is made by the relevant transportation facility provider. For example, for state highways, the decision about whether an improvement is reasonably likely is made by

ODOT. For county roads, the decision is made by the county. For city streets, the determination is made by the city. In each case, the entity making the determination may establish its own procedures to determine who is authorized to make reasonably likely determinations and how such determinations will be issued. ODOT's guidelines address this issue for state highways.

Are “reasonably likely” determinations “land use decisions”?

The Commission's intent is that reasonably likely determinations not be land use decisions. The determination is essentially evidence or a finding submitted by a third-party. The rule does not ask or direct that local governments decide as part of the land use proceeding whether an improvement is “reasonably likely” to be funded; that determination is made separately and only the result, not the substance of determination, is at issue in the land use proceeding.

Why does the rule require “reasonably likely” determinations for projects that are included in TSPs? Why aren't all of the projects included in TSPs considered “planned projects” for purposes of 0060?

The amendments to Section 0060 were adopted following a broad evaluation of the TPR and of transportation planning done by Oregon communities over the last 10-15 years conducted jointly by the Oregon Transportation Commission and LCDC. A major finding of the evaluation was that there is a substantial gap between likely funding and the improvements that are called for in TSPs. In short, the transportation improvements included in plans greatly exceeds revenue likely to be generated over the next 20 years, even if there are new or expanded sources of revenue.

The consequence of this funding gap is that many of the projects that TSPs call for in the next 20 years will not be built, and for many communities traffic congestion will worsen. To a large extent, this is a result of past land use decisions – that put in place development patterns that create a need for additional roadway improvements. While LCDC recognizes that more needs to be done to address this gap, the conclusion was that it was not prudent to ignore or worsen the imbalance between land use and transportation by allowing additional land use changes that depend upon improvements that are not likely to be built in the next 20 years.

The TPR says that transportation performance is measured at the “end of the planning period”. How is the applicable “planning period” determined?

The TPR defines planning period as “... the 20-year period beginning with the date of adoption of a TSP to meet the requirements ... of the rule.” (OAR 660-012-0005(18)). This date based on the date of adoption of the applicable city or county TSP. For state highways, the Oregon Highway Plan indicates that the planning period is the one specified in the relevant local TSP applies but not less than 15 years from the date of application.

Are there additional requirements for review of plan and zone changes around freeway interchanges?

Yes. Section 0060 includes additional requirements for review of plan amendments within ½ mile of interchanges on interstate freeways. This includes interchanges on I-5 and I-84, as well as interchanges on I-205, I-405 (in the Portland Metropolitan area) and I-105 in the

Eugene-Springfield area. Additional review was required because of the special significance of the interstate system to the state transportation system.

Within freeway interchange areas the list of “planned improvements” is limited to improvements that have some form of funding commitment and does not include projects that are “reasonably likely” to be funded. However, other improvements can be counted as planned if ODOT agrees that the proposed plan amendment will not adversely affect the interstate highway system. (This part of the rule and ODOTs process for assessing whether amendments will affect the interstate system are outlined in ODOTs Guidelines for implementing Section 0060. See below.)

Who sets the performance standards for deciding whether there is "adequate" transportation capacity and what are they?

Standards for capacity and transportation system performance are set by local governments and ODOT through their adopted transportation system plans (TSPs). For state highways, mobility standards are expressed as acceptable "volume-to-capacity" ratios for traffic. Most local governments use a comparable system that uses letter grades to define acceptable “level of service” or LOS. The system rates service from "A", light traffic and free flow conditions to "F" heavily congested, with significant delays at traffic lights or to make turn movements. Most set "D" or "E" as the acceptable performance standard.

Does 0060 effectively set a "concurrency requirement", i.e. that adequate facilities have to be built or funded before development can be allowed?

No. The rule does not create the kind of “concurrency” requirement that has been adopted in other states, where transportation facilities must be built before new development is approved. . The TPR requires local governments to assess whether planned facilities – that are expected to be constructed over the planning period – will – at the end of the planning period – be adequate to meet needs. This allows for development to occur in advance of needed transportation improvements being constructed.

Will Section 0060 delay the development of "shovel-ready" industrial sites?

No. Industrial sites are not certified as "shovel-ready" until and unless they have the necessary plan and zoning designations for the appropriate industrial uses and are served by adequate public facilities, including transportation facilities. Section 0060 does not apply to sites already designated as "shovel-ready" and, therefore, will not cause a delay in their development.

Can local governments adopt concurrency requirements or other standards that are stricter than those in 0060 standards?

Yes. The TPR is basically a minimum state standard for review of plan amendments and zone changes. Individual cities can adopt ordinances regulating new development to meet particular local needs or circumstances that are stricter than the TPR. Several local governments have adopted concurrency type standards, requiring that needed improvements be constructed or funded or in place at the same time new development occurs.

Can a local government change performance standards to accept greater levels of congestion?

Yes. Where a planned development will result in an exceedance of the applicable performance standard, the TPR authorizes local governments to amend their TSPs to modify the performance standards to accept greater motor vehicle congestion OAR 660-012-0060(2)(d). Where state highways are affected, local governments need to get ODOT to agree to change its performance standards as well. Metro in the Portland metropolitan area, in coordination with the Oregon Transportation Commission and ODOT, has adopted performance standards that accomplish this objective and support the implementation of the region's Metro 2040 plan.

Where can I get more information about Section 0060?

The full text of the Transportation Planning Rule, including Section 0060, is available on DLCD's website at www.lcd.state.or.us

ODOT has produced guidelines for use by its staff in applying Section 0060. The guidelines are available on the ODOT website at:

<http://www.oregon.gov/ODOT/TD/TP/docs/TPR/tprGuidelines.pdf>

While the guidelines are intended principally for use by ODOT staff, they can also provide useful guidance to help local governments and applicants understand and apply Section 0060. Key to the amended rule are decisions by ODOT (and local governments) about whether or not needed improvements are funded or "reasonably likely" to be funded during the planning period. The ODOT guidance provides direction about how ODOT staff are to make reasonably likely determinations.

Numerous LUBA decisions provide useful guidance in understanding details of applying the Section 0060. The text of LUBA opinions and headnotes summarizing LUBA decisions related to Goal 12 and the Transportation Planning Rule are available on LUBA's website at www.orldba.state.or.us

REPLINGER & ASSOCIATES LLC
TRANSPORTATION ENGINEERING

November 15, 2019

Ms. Christina Robertson-Gardiner
City of Oregon City
PO Box 3040
Oregon City, OR 97045

**SUBJECT: REVIEW OF TRANSPORTATION ANALYSIS – BEAVERCREEK CONCEPT
PLAN AND LEGISLATIVE AMENDMENTS – LEG19-03**

Dear Ms. Robertson-Gardiner:

In response to your request, I have reviewed the Transportation Analysis (TA) submitted in support of the Beaver Creek Concept Plan and proposed legislative amendments. The TA, dated June 21, 2019, was prepared under the direction of Kevin Chewuk and Amanda Deering of DKS Associates.

The focus of the analysis was to demonstrate that the requirements of Oregon Administrative Rule (OAR) 660-012-0060, the Transportation Planning Rule (TPR), are met for the Beaver Creek Concept Plan area in Oregon City, Oregon. The study area comprises the adopted 2008 Beaver Creek Concept Plan area, which established land use designations, design guidelines and future transportation infrastructure needs. The Beaver Creek Concept Plan area is roughly bounded by the Urban Growth Boundary to the east, Beaver Creek Road to the west, Old Acres Road to the south and Thayer Road to the north. The TA shows adequacy of the current Oregon City Transportation System Plan (TSP) to accommodate development specified in the Beaver Creek Concept Plan.

The analysis focused on assessing the transportation impact of a more intense development of the Concept Plan area than had been assumed for the development of the TSP. According to the TA, the net increase resulting from the implementation of the Concept Plan would be 750 new dwelling units and 4095 new jobs. The analysis is for the TSP horizon year as is typically performed for showing compliance with the TPR. No interim or intermediate years were analyzed.

Overall

I find the TA addresses the city's requirements and provides an adequate basis to demonstrate compliance with the TPR.

Comments

- 1. Trip Generation.** The TA presents information on PM peak hour trip generation from more intense development of the Concept Plan area. The authors calculate that under the plan designations and zoning proposed for Concept Plan that area would accommodate an additional 750 new dwelling units and 4095 new jobs above those assumed for the TSP. Trip generation characteristics were based on the rates the PM peak hour in modeling developed for the TSP. Based on the new dwelling units and new jobs, the net effect of the plan designations and zoning changes would be 925 PM peak hour trips being added to the regional street network. The trip generation calculations appear to be accurate and reasonable.
- 2. Transportation System Used for Analysis.** As described above, the focus was on demonstrating compliance with the TPR. The base transportation system used for the analysis included projects within and adjacent to the Concept Plan area. Specifically, the analysis assumed the following projects for both the baseline (TSP level development) and the more intense development consistent with the Beavercreek Concept Plan:

 - Roundabout at the **Beavercreek Road/Glen Oak Road** intersection (TSP Project D39)
 - Roundabout at the **Beavercreek Road/Loder Road** intersection (TSP Project D44)
 - **Meyers Road** extension from OR 213 to High School Avenue (TSP Project D46)
 - **Meyers Road** extension from Beavercreek Road to the Meadow Lane Extension (TSP Project D47)
 - **Clairmont Drive** extension from Beavercreek Road to the Holly Lane South Extension (TSP Project D54)
 - **Glen Oak Road** extension from Beavercreek Road to the Meadow Lane Extension (TSP Project D55)
 - **Timbersky Way** extension from Beavercreek Road to the Meadow Lane Extension (TSP Project D56)
 - **Holly Lane** extension from Thayer Road to the Meadow Lane Extension (TSP Projects D58 and D59)
 - **Meadow Lane** extension to the Urban Growth Boundary, north of Loder Road (TSP Projects D60 and D61)
 - **Loder Road** extension from Beavercreek Road to Glen Oak Road (TSP Project D64)

- **Beavercreek Road** improvements from Clairmont Drive to the Urban Growth Boundary, south of Old Acres Lane (TSP Projects D81 and D82)
- **Loder Road** improvements from Beavercreek Road to the Urban Growth Boundary (TSP Project D85)

The analysis included two scenarios for Holly Lane. The operational analysis described below was conducted both with and without the section of Holly Lane between Maplelane Road and Thayer Road.

3. Operational Analysis. The operational analysis of key intersections identified above and assuming the TSP projects listed above was conducted for the PM peak hour. The analysis was performed using appropriate traffic analysis tools including Synchro for signalized intersections and Sydra for roundabouts. The authors of the TA conclude:

“During the evening peak hour, all study intersections operate within adopted mobility targets under all scenarios after assuming the baseline transportation system improvements from the TSP.”

The authors’ conclusions about all study area intersections meeting operational standards applies regardless of whether Holly Lane was included or excluded in the system. It is also worth noting that the authors found Beavercreek Road would meet mobility standards with the configuration specified in the TSP. Mobility standards would also be met if Beavercreek Road were to widened to five lanes in sections where three lanes had been specified.

Appropriate tools and procedures appear to have been used to evaluate the study area intersections. I concur with the authors’ analysis and conclusions about meeting TSP mobility targets.

4. Conclusions. The authors of the TA conclude:

“Overall, the current TSP includes adequate transportation system projects for the Beavercreek Concept Plan area to comply with the Transportation Planning Rule (TPR). All transportation impacts as a result of the additional housing units and employees in the Beavercreek Concept Plan area are addressed by current TSP projects.”

I concur with the authors’ conclusion that the proposal is consistent with the TPR. The proposed plan designation changes and rezoning do not change the functional classification of any existing or planned transportation facility; do not degrade the performance of existing or planned facilities such that mobility standards are not met;

Ms. Christina Robertson-Gardiner
November 15, 2019
Page 4

and do not cause a significant effect as defined under the Transportation Planning Rule.

Conclusion and Recommendations

I find that the TA provides an adequate basis upon which impacts of the development can be assessed. The TA provides documentation that the key intersections will meet adopted mobility standards and that the proposed changes comply with the TPR.

If you have any questions or need any further information concerning this review, please contact me at replinger-associates@comcast.net.

Sincerely,

A handwritten signature in black ink that reads "John Replinger". The signature is written in a cursive, flowing style.

John Replinger, PE
Principal



Oregon

Kate Brown, Governor

Department of Transportation

Region 1 Headquarters
123 NW Flanders Street
Portland, Oregon 97209
(503) 731.8200
FAX (503) 731.8259

11/18/19

City of Oregon City
Community Development Division
PO Box 3040
698 Warner Parrott Rd.
Oregon City, OR 97045

ODOT Case No: 9386

Subject: LEG 19-00003: Beavercreek Road Concept Plan Implementation

Attn: Christina Robertson-Gardiner, Senior Planner

We have reviewed the applicant's proposal to amend various Chapters of the Oregon City Municipal Code, Zoning Map and Comprehensive Plan Map to implement the Beavercreek Road Concept Plan. The site is in the vicinity of the Highway 213/Beavercreek Road intersection. ODOT has permitting authority for this facility¹ and an interest in assuring that the proposed zone change/comprehensive plan amendment is consistent with the identified function, capacity and performance standard of this facility.

For zone changes and comprehensive plan amendments, local governments must make a finding that the proposed amendment complies with the Transportation Planning Rule (TPR), OAR 660-012-0060. There must be substantial evidence in the record to either make a finding of "no significant effect" on the transportation system, or if there is a significant effect, require assurance that the land uses to be allowed are consistent with the identified function, capacity, and performance standard of the transportation facility.

In order to determine whether or not there will be a significant effect Oregon City had DKS prepare a traffic impact study (TIS) dated June 21, 2019. ODOT concurs with the conclusion that:

"Overall, the current TSP includes adequate transportation system projects for the Beavercreek Concept Plan area to comply with the Transportation Planning Rule (TPR)"

ODOT would like to emphasize that the City is able to make this finding based on the alternative mobility targets adopted by the City and the Oregon Transportation Commission, which includes the Holly Lane segment between Maple Lane Road and Thayer Road.

Thank you for providing ODOT the opportunity to participate in this land use review. If you have any questions regarding this matter, please contact me at 503.731.8234.

¹ OAR 734-051 website: http://arcweb.sos.state.or.us/rules/OARS_700/OAR_734/734_051.html

Sincerely,

A handwritten signature in cursive script, reading "Seth Brumley".

Seth Brumley
Development Review Planner

C: Avi Tayar, P.E., ODOT Region 1 Traffic



To: Mayor Holladay and City Commission

From: Christina Robertson-Gardiner, Senior Planner
Dayna Webb, City Engineer
John Replinger, PE, Replinger & Associates LLC

RE: Beaver Creek Road Design

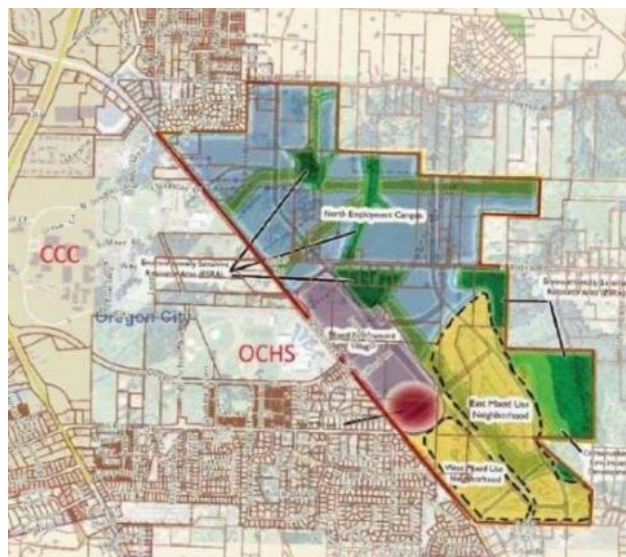
Date: November 5, 2019

The Beaver Creek Road Concept Plan (BRCP) is a guide to the creation of a new neighborhood in southeast Oregon City. The adopted plan provides a framework for urbanization of 453 acres within the urban growth boundary including a diverse mix of uses (an employment campus north of Loder Road, mixed-use districts along Beaver Creek Road, and two mixed-use neighborhoods), all woven together by open space, trails, a network of green streets, and sustainable development practices. The plan has been crafted to create a multi-use community linking Clackamas Community College, Oregon City High School, and adjacent neighborhoods together.

The city is currently updating the Comprehensive Plan and Oregon City Municipal Code (OCMC) to allow planned housing and mixed-use development in the Beaver Creek Road Concept Plan area. Development of each newly zoned parcel will be based on market conditions, which could take many years to build out fully. Transportation impacts will be addressed at the time of each development application, which requires compliance with the Concept Plan and city development standards. More information can be found at www.oregoncity.org/BeaverCreekRoadConceptPlan.

However, staff and City Commissioners were hearing from the public that 11 years after Concept Plan adoption, a fresh look may be needed to see if the adopted 3-lane design of Beaver Creek Road (roughly Old Acres Road to Clairmont Road) reflected the community vision compared to a 5-lane section and review the type of intersection control (roundabouts or traffic lights) along the corridor.

At the August 13, 2019 City Commission work session, the City Commission requested that staff return at a future work session with more detail about the cost and design impacts of roadway width and intersection control for



Beaver Creek Road Concept Plan Boundary

the area of Beavercreek Road that abuts the Beavercreek Road Concept Plan boundary as well as more feedback from the public.

The following memo and attachments will provide additional background on the different approaches to the road design of Beavercreek and provide options for next steps on this issue.

City Commission Direction

Staff is looking for direction from the City Commission on a variety of items. Depending on the design approach, an additional work session focused on funding strategies may be needed.

- **How many lanes should Beavercreek Road be within the Concept Plan corridor?**
 - 3 lanes
 - 5 lanes
 - A transition from 5 lane to 3 lanes at either Meyers or Loder Roads.
- **What type of intersections should Beavercreek Road have within the Concept Plan corridor?**
 - Traffic signals
 - Roundabouts
 - Both (Should the City further investigate roundabout designs at specific intersections?)
- **Should the City renegotiate with ODOT to revise the Alternate Mobility Standard by removing Holly Lane connection projects from the Transportation System Plan (TSP)?**
 - No
 - Yes
- **Should Beavercreek Road along the Concept Plan corridor be constructed by developers incrementally as development is built or pursued as a capital improvement project all at once?**
 - The roadway should be constructed incrementally as development occurs.
 - The City should create a funding mechanism for building the roadway as a single project.

Once the preferred cross-section and intersection control are identified, the Transportation System Plan (TSP), Transportation Capital Improvement Project list (CIP), and the Beavercreek Road Concept Plan will be amended to include the preferred projects. Considerations for the City Commission to inform the above is provided below.

Tradeoffs – Number of Lanes

Creating additional lanes help vehicles move quicker through areas during peak traffic periods. However, during off-peak periods there may be little effect on travel times. Additional lanes also generally allow turning movements to and from the minor streets to be made with less delay. Additional lanes, particularly near signalized intersection, will reduce the length of the vehicle queues allowing cars to stop closer to the intersection rather than stretching the congestion out in a longer line. This additional capacity that results from added lanes can erode over time; however, as other drivers chose the newly expanded street over their previous commute route, also known as [induced demand](#). Increasing the number of lanes generally results in increased travel speeds by motorists. The resulting increase in travel speed does not result in increased capacity as drivers feel the need to create additional buffer space in front and beside them. Increased travel speeds do result in more severe crashes that are particularly

devastating for pedestrians and bicyclists. More lanes and higher speeds also require longer intervals for pedestrian crossing signals and longer yellow times. These decrease the overall efficiency of signalized intersections.

Overall, increasing the number of lanes vary from no change in travel time during off-peak periods to real reductions in travel time at peak periods if regional growth is greater than predicted and if vehicle demand approaches or exceeds the capacity of the number of lanes provided on a road. It is difficult to provide definitive prediction of the travel time on a particular section of road as a three-lane or five-lane section because of the various factors that influence a prediction including use of alternative routes and the timing of completion of projects further along the corridor that reduce congestion such as the dedicated right turn lane to Highway 213 northbound.

Addressing Future Growth

Traffic models account for growth in other jurisdictions and their effects on Oregon City. Clackamas County, Oregon City, and the Oregon Department of Transportation all look at how growth is affecting their transportation network and create a list of funded projects that can address safety concerns or add system capacity. As you can imagine, this is not an easy task. Every year there are more project needs than budgeted funds. It is up to Oregon City to assure that all of the necessary projects are identified, even if we do not own the roadway.

Future Major Transportation Projects

Oregon City has identified a few automobile projects that will add connectivity and additional capacity to the road network in this area.

1. The [Meyers Road Extension Project](#) from 213 to the Oregon City High School
2. Extension of High School Avenue to Loder Road
3. Creation of a north/south road parallel to Beavercreek within the Concept Plan boundary
4. Improvements to Highway 213 and Beavercreek Road (conversion of the existing yield to free-flow right Turn lane onto northbound 213 from Beavercreek Road Northbound acceleration lane to merge into with traffic).

Adding more road connections, like Meyers Road, provides drivers alternate routes and decreases the dependency on using any one road. For example, currently most of the vehicles going to the high school from the west side of Hwy 213 are traveling on Hwy 213 to Beavercreek Road or Glen Oak Road, then to the High School. The Meyers Road extension will create a new east-west connection, removing a portion of the trips from both Hwy 213 and Beavercreek Road. In addition to the vehicular connections above, additional bicycle and pedestrian improvements are also identified.

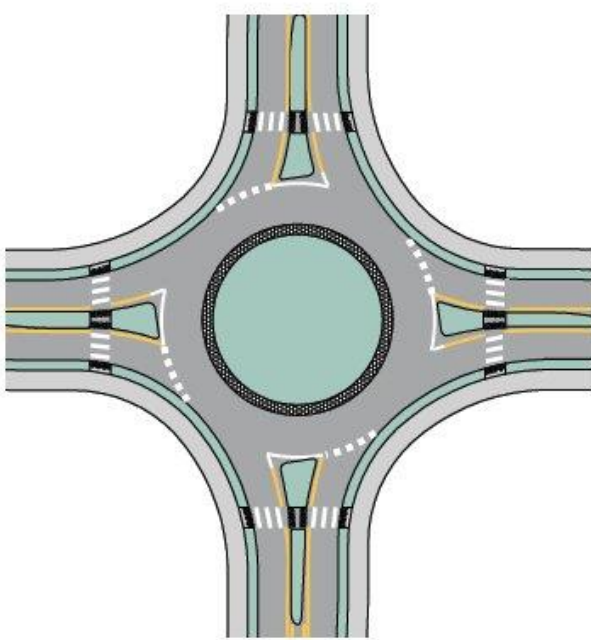
Access Management/Intersection Control (Roundabouts vs. Signals)

When the Concept Plan area is developed, access to Beavercreek Road will only occur through the existing intersections (Clairmont Drive, Loder Road, Meyers Road, and Glen Oak Road). No new driveways will be allowed on Beavercreek Road. The 2008 Concept Plan identified roundabouts as a good approach to intersections, but the Transportation System Plan (TSP) also identifies some traffic signals along the roadway.

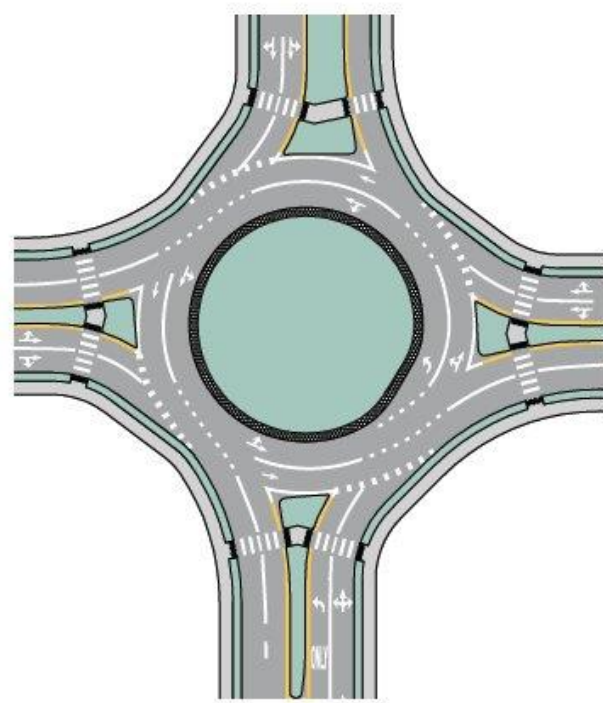
Roundabouts

Roundabouts are circular intersections designed to eliminate left turns by requiring traffic to exit to the right of the circle. Drivers travel counterclockwise around a center island. There are no traffic signals or

stop signs in a modern roundabout. Drivers yield at entry to traffic in the roundabout, then enter the intersection and exit at their desired street.



3- LANE ROUNDABOUT



5-LANE ROUNDABOUT

Think of roundabouts as a series of “T” intersections, where entering vehicles yield to one-way traffic coming from the left. A driver approaching a roundabout must slow down or stop for vehicles stopped ahead, yield to pedestrians in the crosswalk, and yield to traffic already in the roundabout. Roundabouts are designed to accommodate fire trucks and large vehicles. Large trucks may have to drive on the concrete apron around the central island in order to get through the roundabout.

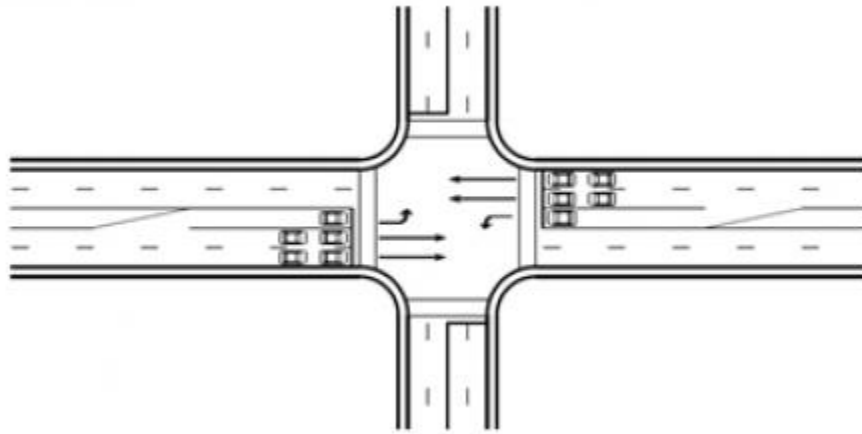
What are the advantages and disadvantages of roundabouts?

- Greater safety is achieved primarily by slower speeds and elimination of left turns which can greatly decrease the number & severity of accidents.
- Operation is improved by smooth flowing traffic (with less stop and go than a signalized intersection).
- Aesthetics are enhanced by landscaping.
- Roundabouts can distinguish the Concept Plan area as different than others in the City.
- Additional landscaping requires a long-term maintenance commitment but normally costs less in the long run than signal maintenance.
- Drivers must pay attention; pedestrians don't have a signal to help them cross and bicyclists must merge with motor vehicles to enter the roundabout or utilize a larger shared-use ped/bike sidewalk. This can be intimidating for people trying to cross the road.
- In general, multi-lane roundabouts are not recommended in areas with high levels of pedestrian and bicycle activity due to safety concerns of multiple threat crashes for pedestrians, especially those with visual impairments, and bicyclists.

- The process to acquire additional needed property can require more time and money compared to a signal installation in an existing urban intersection. Though once built, the long-term maintenance cost for roundabout can be less than traditional signal maintenance, assuming slow growing and low maintenance landscaping amenities are provided.
- Legs of a signalized intersection can be built in phases, whereas roundabouts need to be substantially built in the first phase of construction.
- Repaving or utility construction through an established roundabout is complicated and often more impactful to the traveling public than it would be through a signalized intersection due to the site limitations that result from curved lanes and medians.

Signalized Intersections (Traffic Signals)

Traffic signals are designed to allow for the safe and efficient passage of road users when demand exists.



What are the advantages and disadvantages of signalized intersections?

- Legs of a signalized intersection can be built in phases, whereas roundabouts need to be substantially built in the first phase of construction.
- Pedestrians have priority when crossing signalized intersections. However, accidents can prove more fatal from cars running intersections at full speed compared to cars that slow down to yield at a roundabout.
- Construction costs can be less for standard intersections, but long-term signal timing and maintenance will increase the overall cost.
- Multi-lane intersections create a longer crossing distance but can be configured to allow additional pedestrian crossing time, whereas multi-lane roundabouts can create confusion between pedestrians, bikes, and vehicles on who has the right of way.
- Signalized intersections do not create a unique sense of place.
- Cars often speed up and slow down between intersections, especially on a wider road.

Roundabout Conceptual Study

Attached are conceptual overlays of 3 and 5 lane roundabouts along existing intersections that abut the Concept Plan boundary. This was an inhouse exercise that took standard roundabout designs and overlaid them to the existing city maps, centered at the existing intersections, to allow the City Commission to see how different approaches to intersection design could affect neighboring properties.

Though this is just a high-level exercise to see the comparative difference in scale between the size of a 3 and 5 lane roundabout, one can see that a 5 lane roundabout requires much more land than a 3 lane roundabout and that the land around many of the intersections on Beavercreek Road is constrained with existing homes. In the event Commission directs staff to move forward with roundabouts more work would be required to identify the exact location, shape, and configuration of the roundabout at each intersection to minimize conflicts with adjacent properties.

Survey

A survey was released on October 24, 2019 to get an understanding of public opinion about Beavercreek Road design along the Concept Plan Corridor. The questions were set to be more of a value-based approach to understanding priorities and perception of using roundabouts and signals at intersections. While this was shared widely including through the project eblast list, Neighborhood Associations, Oregon City School District, Chamber of Commerce, Hamlet of Beavercreek, social media platforms, etc., it should not be viewed as a statistically significant sample. Rather, the results of this survey allow the City Commission to get a pulse of community members who may not have time to attend a Commission hearing or send in public comment but are interested in the topic. The survey closes on November 11, 2019 and a final analysis will be shared with the City Commission at the November 12th work session.

Jurisdictional Transfer

The portion of Beavercreek Road within the Concept Plan boundary is owned by Clackamas County, though much of it is within the city limits of Oregon City. Through the Clackamas County Coordinating Committee (C4) and discussions about the Clackamas County Vehicle Registration Fee (VRF), the County has agreed to set aside a “Strategic Investment Fund” which would allocate 10% of the revenues collected from the VRF for projects like jurisdictional transfers and other joint agency interest roadway capital projects. The details of this are currently under consideration by the County and C4. In those discussions Beavercreek Road is tentatively identified as Oregon City’s priority Road/project.

City staff began conversations with Clackamas County about a jurisdictional transfer of the roadway so that it may be design and maintained to City standards. In order to move forward with this, staff would need to let the County formally know we are interested in taking jurisdiction of Beavercreek Road. If that is desired, the two agencies will create an Intergovernmental Agreement or Memo of Understanding, related to the future transfer of the roadway. This document will lay out the interim terms of the ownership and maintenance between now and the formal transfer of jurisdiction in the future. This would include who maintains the pavement, ditches, street lighting, traffic signals, and who will have permitting authority for franchise permits and development along the corridor.

Holly Lane

During the [Transportation System Plan \(TSP\)](#) update in 2012, it was determined that the intersection of Hwy 213 & Beavercreek Road would be too congested in the future and would not meet Oregon Highway Plan mobility standards through the TSP planning horizon year of 2035. The TSP recommended the City move forward with a project to address the need for a refinement plan at the intersections.

Over the next 3 years, the City worked with ODOT and a Technical Advisory Group and a Community Advisory Group identified a variety of reasonable improvements to increase the capacity and/or safety of the intersection along with alternative mobility targets for measuring congestion which was adopted by the City and the Oregon Transportation Commission. Holly Lane and its long-term connection to the Concept Plan area through Maple Lane and Thayer Road was identified as an alternate route to the intersection of Beavercreek and Highway 213. Seth Brumley, Region 1 Planner with the Oregon

Department of Transportation (ODOT) submitted a letter identifying that removing Holly Lane extension projects from the TSP would require the City to revise the alternate mobility target and provide an alternate project that meets or exceeds the benefit of the Holly Lane extension. Staff is currently unable to identify an alternate project which is affordable and has not allocated funding or staff time towards the creation of such an alternative. The city is currently working with Clackamas County on the implementation of the Holly Lane connection and believes that the project is an important alternate route to the system to ease congestion in this area.

Conceptual Cost Estimates

Staff has completed the following order of magnitude cost estimate of the options being discussed. The following cost estimates of the initial construction of various road width and intersection controls were created utilizing the methodology from the Transportation System Plan (TSP) and are based on conceptual designs only with the assumptions noted below. The costing exercise looks at the adopted 3-lane street section and a more standard urban 3 and 5-lane configuration. Please note that the assumptions were used for a costing exercise and the final cross-section may be different than identified below.

Beavercreek Road Options	Adopted 3-Lane 90 feet wide ROW	Optimal 3-Lane Roadway 76 feet wide ROW	Optimal 5-Lane Roadway 100 feet wide ROW
Signals	\$26M	\$22M	\$34M
Roundabouts	\$32M	\$29M	\$48M

The following assumptions were used in creating the conceptual cost estimates:

Adopted 3-lane (90 feet ROW)

- 6' sidewalks, 10' planter, 6' bike lane + 2' bike buffer each side, 12' travel lanes (2) and an 18' center turn lane/median
- Approximately 15 tax lots would be impacted by property acquisition along the corridor. Acquisition cost assumptions vary along the corridor.

Optimal 3-lane Roadway (76 feet ROW)

- 6' sidewalks, 6' planter, 6' bike lane + 2' bike buffer each side, 12' travel lanes (2) and a 12' center turn lane/median
- Approximately 15 tax lots would be impacted by property acquisition along the corridor. Acquisition cost assumptions vary along the corridor.

Optimal 5-lane Roadway (100 feet ROW)

- 6' sidewalks, 6' planter, 6' bike lane + 2' bike buffer each side, 12' travel lanes (4) and a 12' center turn lane/median
- Over 40 tax lots would be impacted by property acquisitions along the corridor, many of these are along the west side of the corridor
- Acquisition cost assumptions vary along the corridor, some parcels include full acquisition.

Options to mitigate the total project cost:

- The order of magnitude cost estimates are based on traditional lane widths, we could identify slightly narrower lane widths, which would provide a small cost savings in both right of way acquisitions and construction costs.
- The footprint of roundabouts is much larger than a signalized intersection, due to this larger right of way requirement, a roundabout is more expensive than a signalized intersection to construct.
- If a 5-lane cross-section is selected, it will be expensive and difficult to construct the second southbound lane due to the existing development along the west side of the roadway. One option that would decrease the overall cost of the 5-lane project is shifting the centerline of the roadway. This decreases the cost as the land on the east side is undeveloped, and the price per square foot of undeveloped land is less than developed land. The downside to this option is that the downsides to this option are:
 1. It utilizes more of the land allocated to job creation.
 2. It impacts a planned and land use approved live-work development at Beavercreek Road and Meyers Road
 3. It still impacts a few existing homes but would reduce the number of home acquisitions
 4. This option also requires the project be built all as one, not incrementally by development
- Creating additional refined details for the preferred design on this corridor will require additional funding and a timeline for completion. This work would be completed in cooperation with a contracted consulting firm, and the level of design work would be matched with the needed level of certainty of the design. Without further refinement of the question being asked and the level of detailed needed to answer the question, the cost for preliminary design work could be anywhere from \$50,000 to \$300,000 for this corridor.

Funding Large Scale Improvements

Many agencies struggle with how to transition from a two-lane roadway to fully built roadway. If a roadway is built as development occurs, it can and will be piece-meal. Often not occurring linearly along a corridor, which creates difficulties in implementing a center turn lane. If the city wants to build this before development occurs, we will need to identify how we fund a project of this magnitude.

Current Approach

- The adopted TSP project cost for Beavercreek Road was solely based on repaving and for a standard two-lane section with some sidewalk additions. The cost for the Beavercreek Corridor is identified as \$8.6 million, assuming 2 lane roundabouts at Glen Oak Road and Loder Road, leaving existing signals at Clairmont Drive and Meyers Road.
- Currently, our transportation SDC methodology identifies projects in the Beavercreek Road corridor that total \$8.6 million, of which \$3.8 million is attributed to growth and therefore would be funded by SDC's. The remaining \$4.8 million, would come from other sources.
- This \$8.6 Million is insufficient to fund all the improvements called for in a 3 lane configuration and well under the need for a 5 lane configuration. However, identified capital improvement projects within the Beavercreek Concept area total a growth share of nearly \$50 Million. Similar to the bond supported LID option, a capital funding bond could be authorized and reimbursed through future SDC revenues after the project is funded and built. The City would need to take a more detailed look into the entire Beavercreek Concept area project list and determine how onsite funding for transportation projects might be allocated less to the internal streets and more toward Beavercreek Road

Other Funding Options

- Another option to fund the improvements is the implementation of a Local Improvement District. A Local Improvement District (LID) is a method by which a group of property owners can share in the cost of infrastructure improvements. The LID is a method of providing public financing for the construction of public works improvement projects that benefit private properties. The property owners within the LID benefit area are responsible for repaying the costs of the project. If the project also benefits the general public, in addition to private property within the LID, the City can assist with those costs.
- LID's are a good way to share the cost amongst several benefitting property owners and in this case, the LID generated funds would be one element of the financial leverage plan contributing to the overall project costs which would include developer funding, SDC's, and possibly other smaller funding options. LID's are typically funded using existing City funds which are reimbursed over time which in this case would complicate the City's cash flow unless supported via a capital improvement bond.
- Urban Renewal is a mechanism that can assist in funding the development of a growing area. The creation of an Urban Renewal District is complex and requires voter approval.
- Projects that abut mixed-use or low-density residential along the urban fringe do not score well for state and federal grants. The highest scoring projects provide safety improvements, congestion relief along existing urban corridors, are in areas of historically underrepresented communities that are regionally important and leverage other funding sources. Currently, this corridor is not likely to score well with these criteria.
- Another option to fund the transportation improvements in the Beavercreek Concept Plan area is the creation of an area-specific Transportation System Development Fee (SDC). Typically, these additional SDCs are collected in an overlay area, that is intended to only be used in that area. Depending on the size of the area and the cost of the additional projects, the resulting Transportation SDC increase could have a negative effect on attracting new businesses and keeping housing affordable. The Bethany and Witch Hazel Village South (Hillsboro) Concept Plan areas utilize this approach.
- Beavercreek Road is a multi-jurisdictional roadway that is currently under the authority of Clackamas County, and a significant volume of traffic using Beavercreek Road is generated from outside the City. A meaningful Clackamas County contribution to the full development of Beavercreek Road is a policy issue that should be raised with the Board of County Commissioners (BCC). It is common for the BCC to support multi-jurisdictional roadway improvements in other cities within the County

Staff Recommendation

- **How many lanes should Beavercreek Road be within the Concept Plan corridor?**
 - A transitional section extending the existing 5 lane section near Maple Lane and transitioning to a 3 lane section at Loder Road.
- **What type of intersections should Beavercreek Road have within the Concept Plan corridor?**
 - Traffic signals
- **Should the City renegotiate with ODOT to revise the Alternate Mobility Standard by removing Holly Lane connections from Transportation System Plan (TSP)?**

- No
- **Should Beaver Creek Road along the Concept Plan corridor be constructed by developers incrementally as development is built or pursued as a capital improvement project all at once?**
 - The roadway should be constructed incrementally as development occurs.

Additional Design Considerations

- To be able to utilize a fully built out 5-lane Beaver Creek Road, staff recommends that the center lane of the road is shifted to the east. This approach also is very hard to build incrementally and should be pursued as a capital improvement project.
- A 3-lane Beaver Creek Road can be built as a capital improvement project or incrementally.
- Roundabouts (3 or 5-lane) should be pursued as a capital improvement project.
- If the City Commission wishes a transition from 5 to 3-lanes through incremental development, staff suggest transitioning from 5 lanes to 3 lanes at Loder Road. Existing patterns at Meyers Road and Glen Oak Roads would result in only the northbound section of Beaver Creek Road to be built out over time, in effect having 2 lanes northbound and 1 lane southbound at Concept Plan buildout.
- The adopted 90 feet wide 3-lane cross-section shows a large inverted crown stormwater section in the middle of the road. Abutting grades and the location of existing utilities make this design very difficult to implement. Staff recommends moving the stormwater area to the outside planter section of the road for both the 3 and 5-lane configurations.
- Keeping the adopted 90-foot width for the 3-lane section would allow for an increased width of the pedestrian/bikeway, which could include a separated bike lane on the eastside. A standard 12 feet planter medium can remain in the center turn lane.

Transportation System Plan (TSP) Consistency and Transportation Planning Rule (TPR) Compliance

Overall, the current TSP includes projects in and around the Beaver Creek Road Concept Plan area, including the 3-lane segment along Beaver Creek Road comply with the Statewide Transportation Planning Rule (TPR) and best practice congestion standards and planned intersection management solutions at key locations. These are required to be met when rezoning property within the city. If the City Commission would like to add additional lanes on Beaver Creek Road or replace traffic signals identified in the TSP with roundabouts identified in the Concept Plan, those would also meet the TPR requirements. The Legislative file ([LEG 19-00003](#)) implementing the Zoning in the Concept Plan area can move forward concurrently with the Beaver Creek Road design refinement process without delaying the adoption process. A final condition of approval could even be added that limits development until a final Beaver Creek Road design is adopted.

Next Steps

Staff is looking for broad direction with the questions found at the front of the memo. All of the proposed configurations have cost implications that will need further City Commission direction and may require some additional engineering studies. Depending on the design approach – an additional work session focused on funding strategies is recommended.



Beavercreek Road Design

November 12, 2019 City Commission Work
Session

Beavercreek Background



Project Purpose- Implement the Beavercreek Concept Plan by adopting new Zoning and Comprehensive Plan Maps and creating development code to implement vision of the plan



Grant- Department of Land Conservation and Development (DLCD)



Build upon existing public process that adopted the Concept plan in 2008 and readopted in 2016



Public Comments Spring 2019- 11 years later a fresh look may be needed to see if the adopted 3-lane design of Beavercreek Road reflected the community vision



Presented initial findings

DKS Associates-all potential road configurations met the requirements for rezoning, including the Transportation Planning Rule (TPR)



City Commission asked for additional information on Holly Lane Extension projects, roundabout design and lane costs



Staff reached out to the public with Beaver Creek Road Design Survey and mailed information to abutting property owners



Staff ready to present additional information-looking for broad direction on design approach.

August 13, 2019 City Commission
Worksession

City Commission Direction

How many lanes should Beaver Creek Road be within the Concept Plan corridor?

- 3 lanes
- 5 lanes
- A transition from 5 lane to 3 lanes at either Meyers or Loder Roads.

What type of intersections should Beaver Creek Road have within the Concept Plan corridor?

- Traffic signals
- Roundabouts
- Both

City Commission Direction

Should the City renegotiate with ODOT to revise the Alternate Mobility Standard by removing Holly Lane connection projects from the Transportation System Plan (TSP)?

- No
- Yes

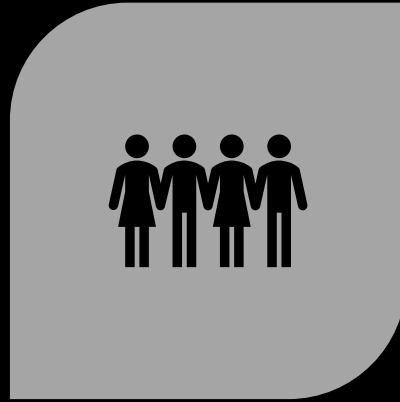
Should Beaver Creek Road along the Concept Plan corridor be constructed by developers incrementally as development is built or pursued as a capital improvement project all at once?

- The roadway should be constructed incrementally as development occurs.
- The City should create a funding mechanism for building the roadway as a single project.

What We Learned



COST IMPLICATIONS



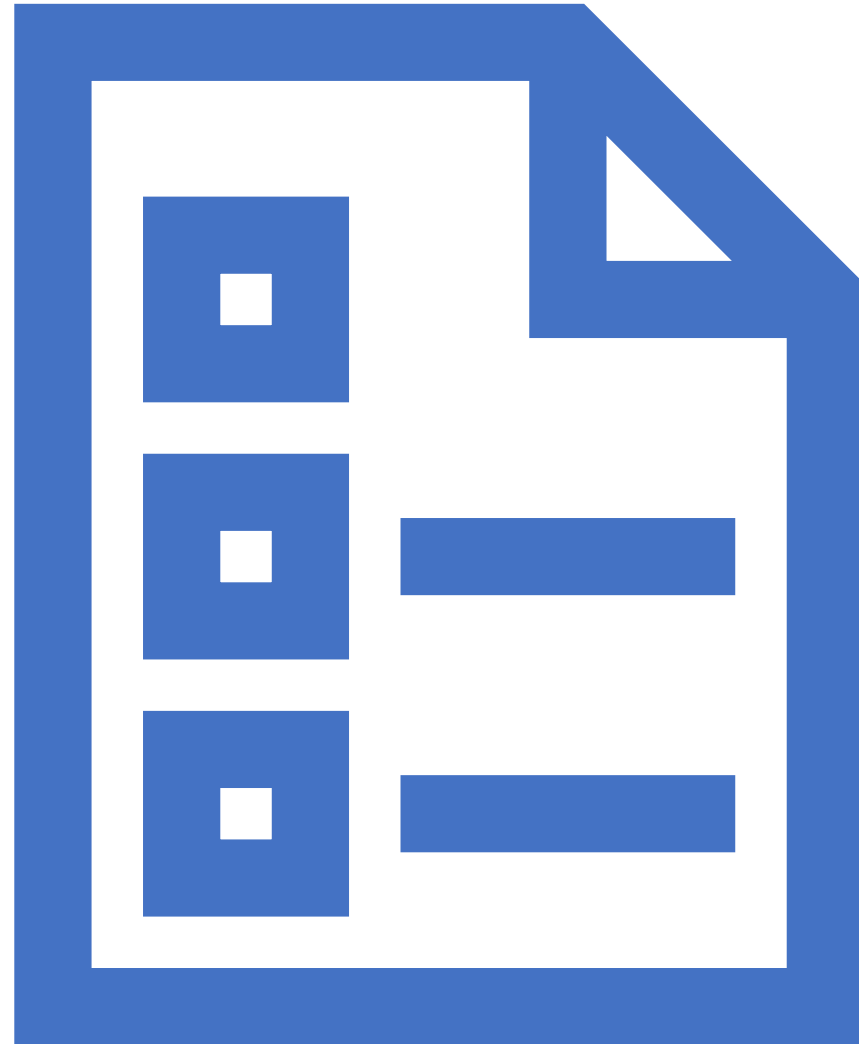
NEIGHBOR IMPACT



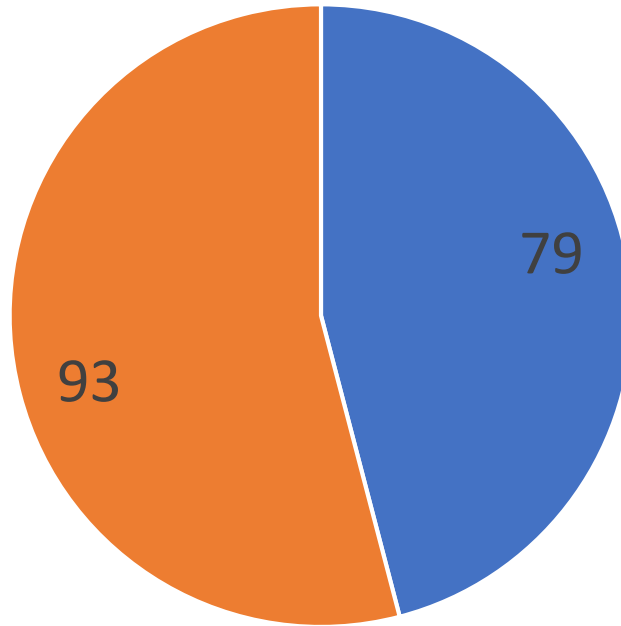
PROCESS TO BUILD

Survey Results

**October 24, 2019 to
November 11, 2019**

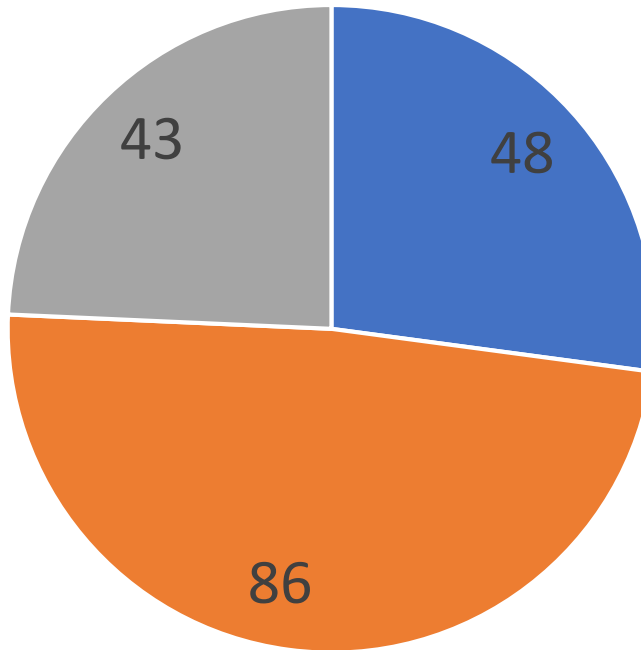


Would you prefer using roundabouts or traffic signals along this section of Beavercreek Road?



■ Traffic signals ■ Roundabouts

Would you prefer seeing a 3-lane section, 5-lane section or a transition from 5-lanes to 3 lanes along this section of Beaver Creek Road?



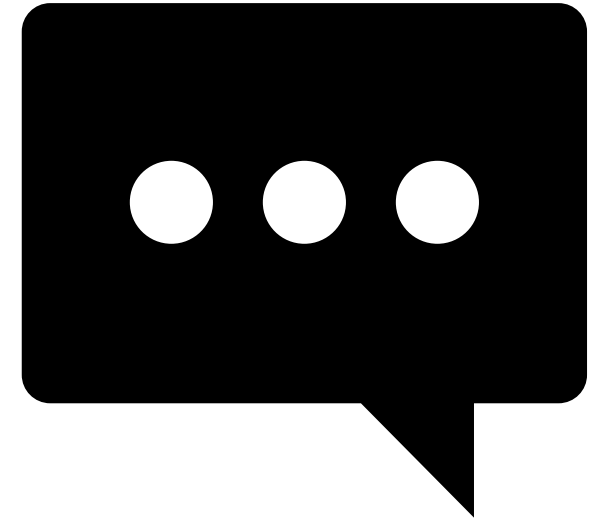
■ 3 - Lane ■ 5-Lane ■ Transition

Transportation decisions often involve tradeoffs, knowing that price may be a limiting factor, what elements of Beaver Creek Road are important to you?

	Very Import	Somewhat Important	Important	Not Important	Not Important At All
Pedestrian safety	106	20	32	4	3
Bike safety	77	30	37	11	8
Aesthetics/creating a sense of place	36	36	51	30	6
Reducing vehicle congestion	121	31	15	3	1
Ease of long-term maintenance	54	44	56	10	2
Ease of crossing Beaver Creek Road	70	39	37	12	4

Selected Comments

- “Move the traffic and make it happen. Roundabouts work great, people just need a little time to figure them out.”
- “Traffic signals will allow for safer pedestrian and bicycle traffic. Will also allow for safer methods to cross Beavercreek Rd. especially in the school zone at the high school.”
- “OC is not going to stop future growth along BC Rd. There are no other access roads to get to 213 from Beavercreek due to topography and existing housing. This road will only get busier. Build it out for the future, not just for today.”
- “It sounds as if the traffic studies completed do not recommend a 5-lane cross section. This seems overkill, especially given the future transportation projects mentioned above. I do feel that the posted 20 mph speed limit during 7-5 p.m. on school days is one of the major causes of congestion.”
- “Mostly DON'T want a transition from 5 to 3 lane since it creates such a bottleneck and as a resident of the area already have to deal with that on 213 which is most unpleasant.”



Considerations



Tradeoffs – Number of Lanes

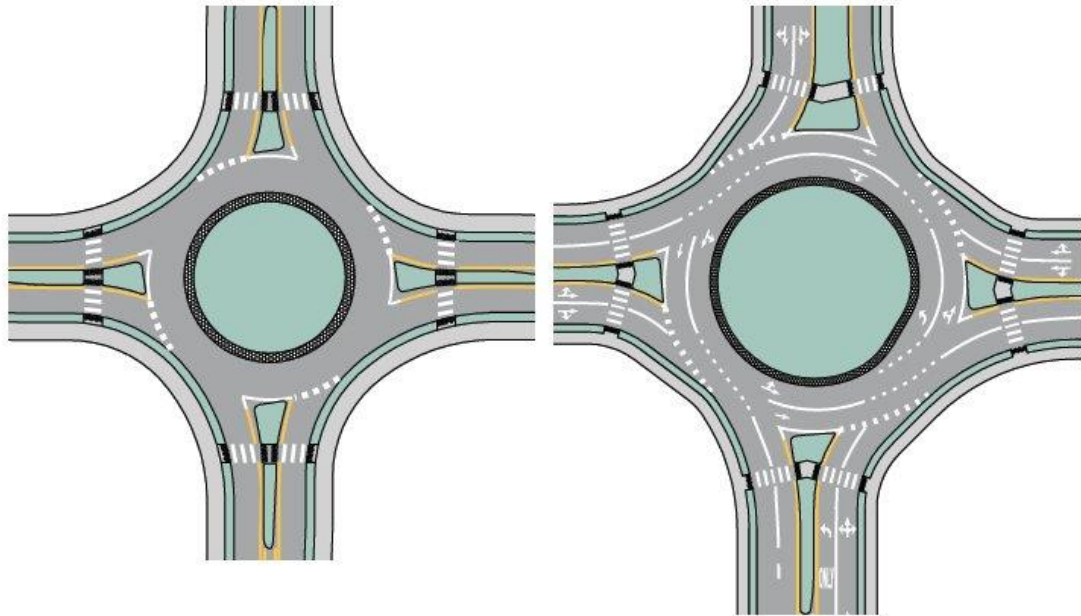
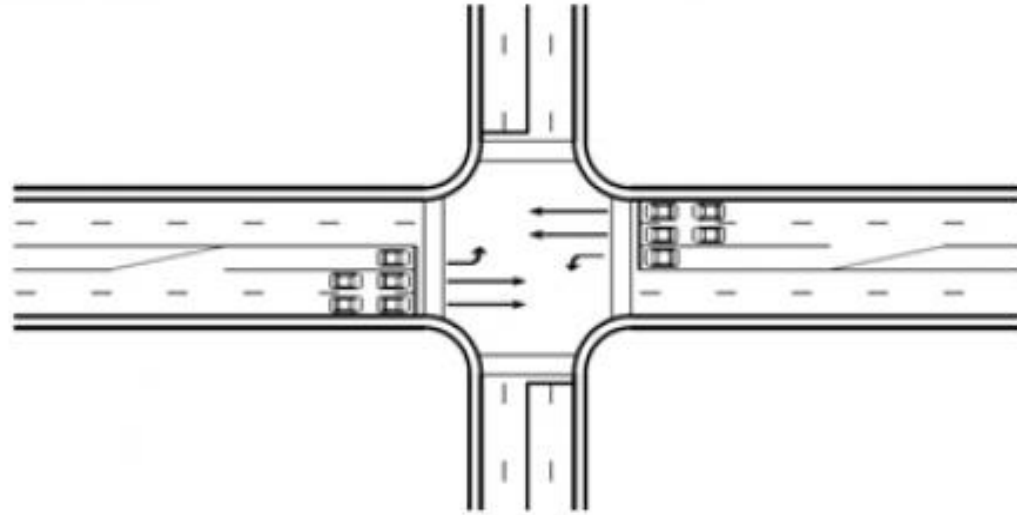


Addressing Future Growth



**Future Major Transportation
Projects**

Intersection Control

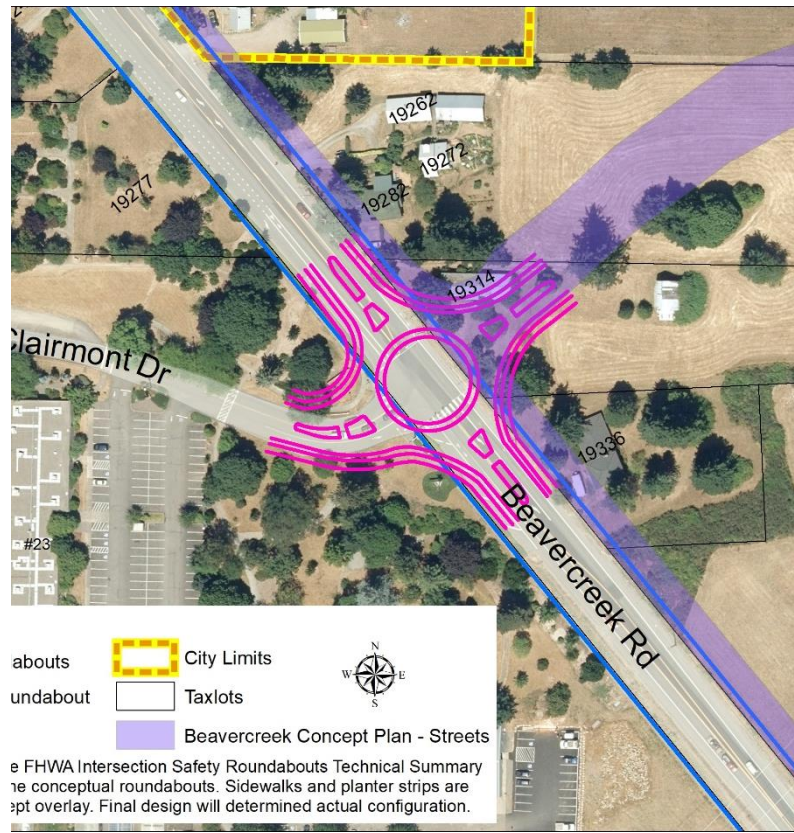


3- LANE ROUNDABOUT

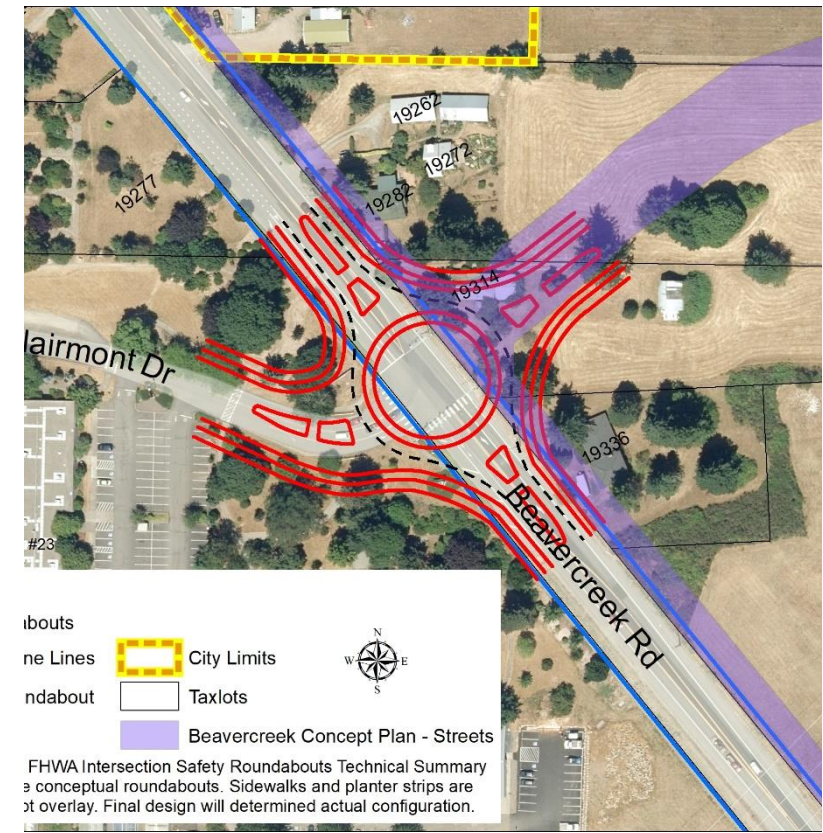
5-LANE ROUNDABOUT



Existing



3-Lane

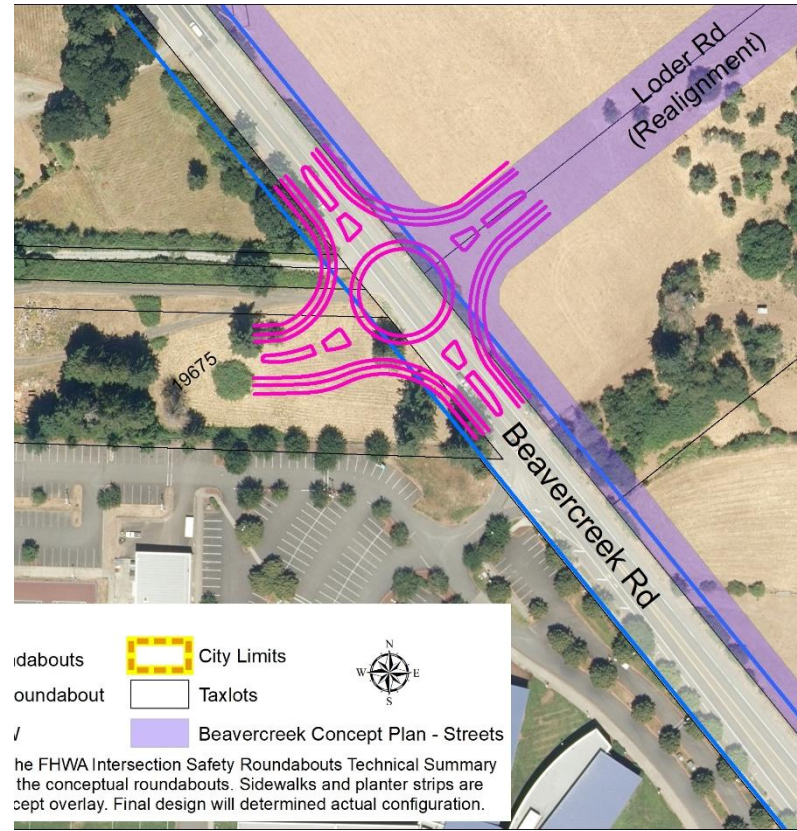


5-Lane

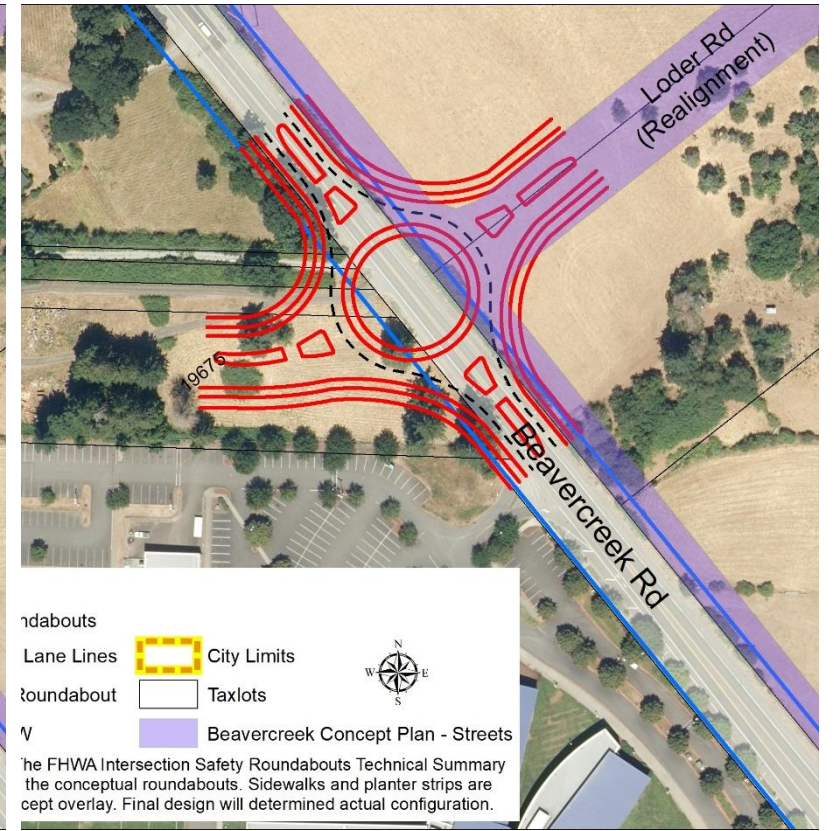
Clairmont Drive and Beaver Creek Road



Existing



3-Lane

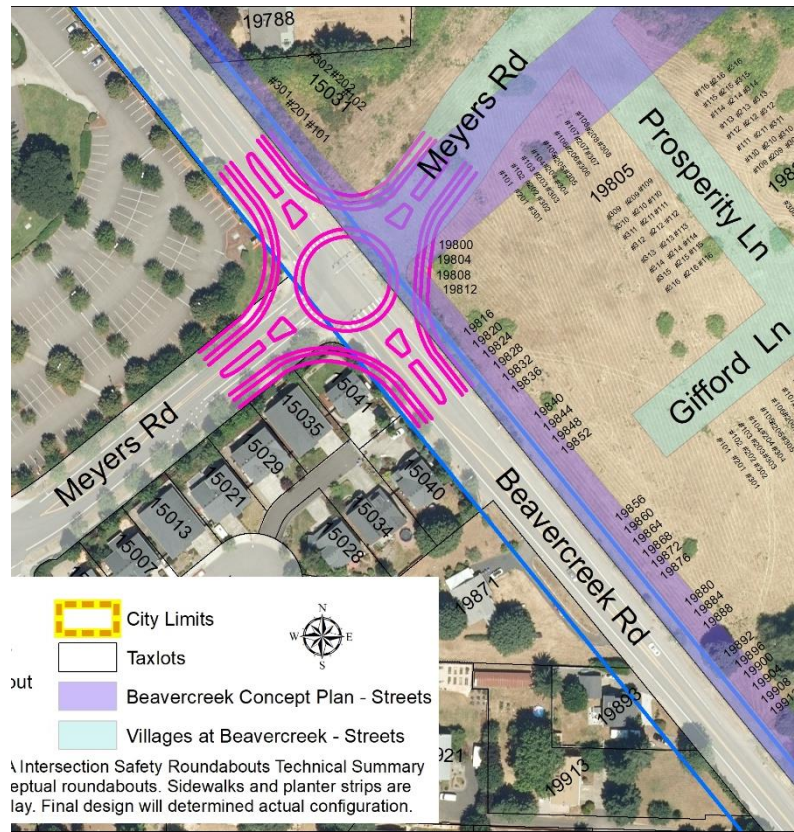


5-Lane

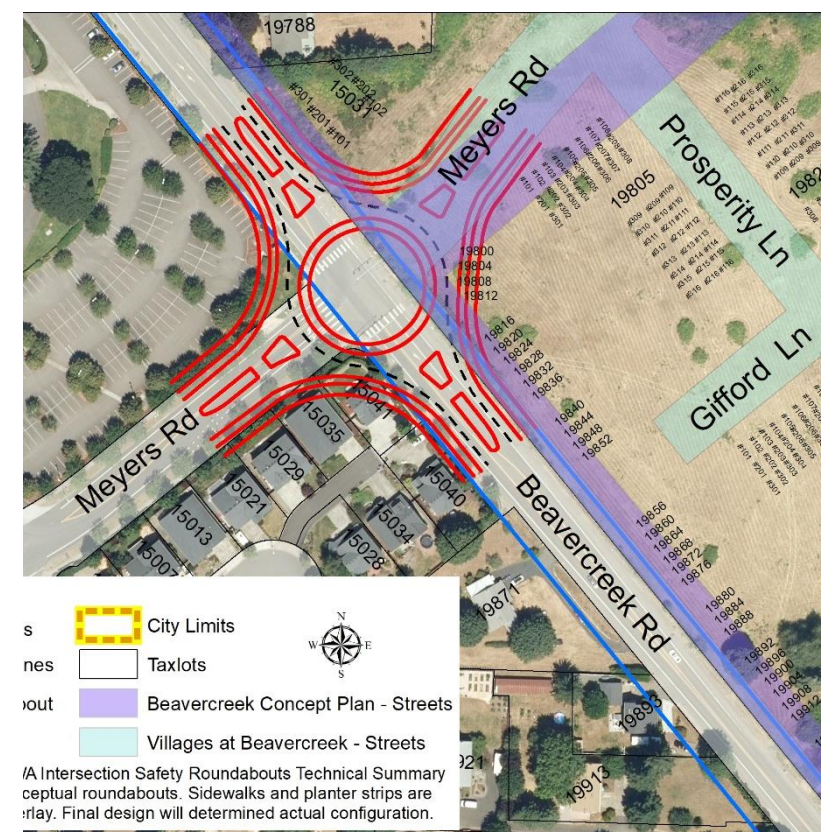
Loder Road and Beaver Creek Road



Existing



3-Lane

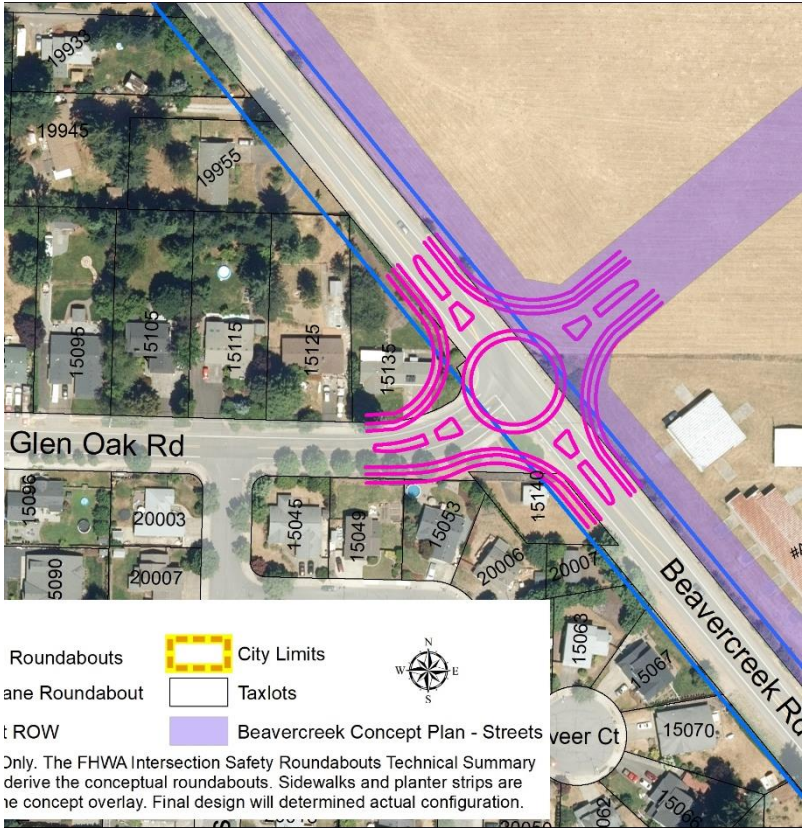


5-Lane

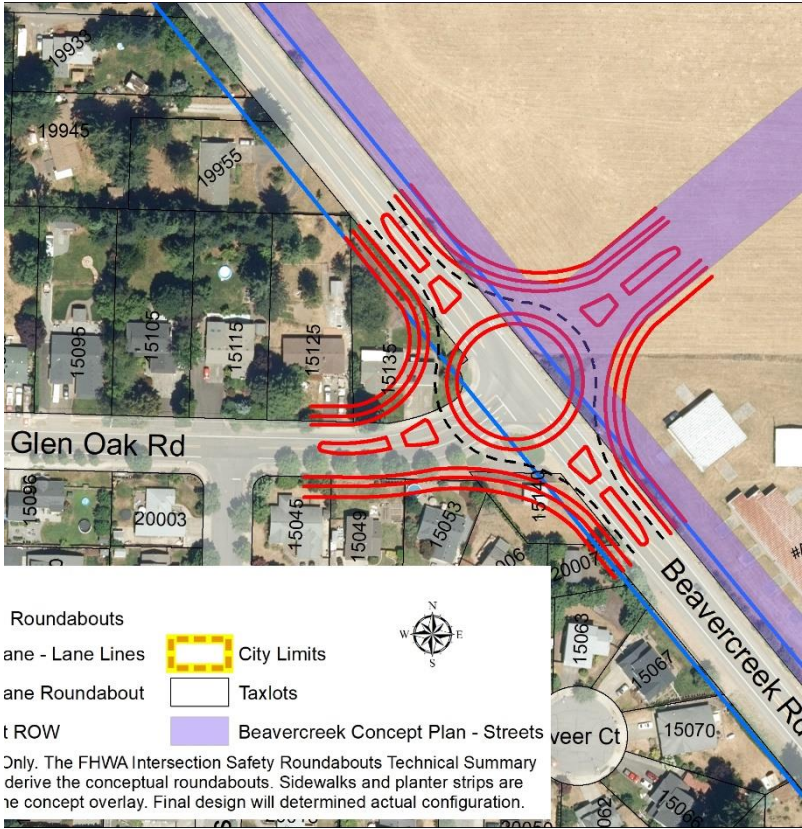
Meyers Road and Beaver Creek Road



Existing



3-Lane



5-Lane

Glen Oak Road and Beaver Creek Road

Conceptual Cost Estimates

Beavercreek Road Options

Adopted 3-Lane
90 feet wide ROW

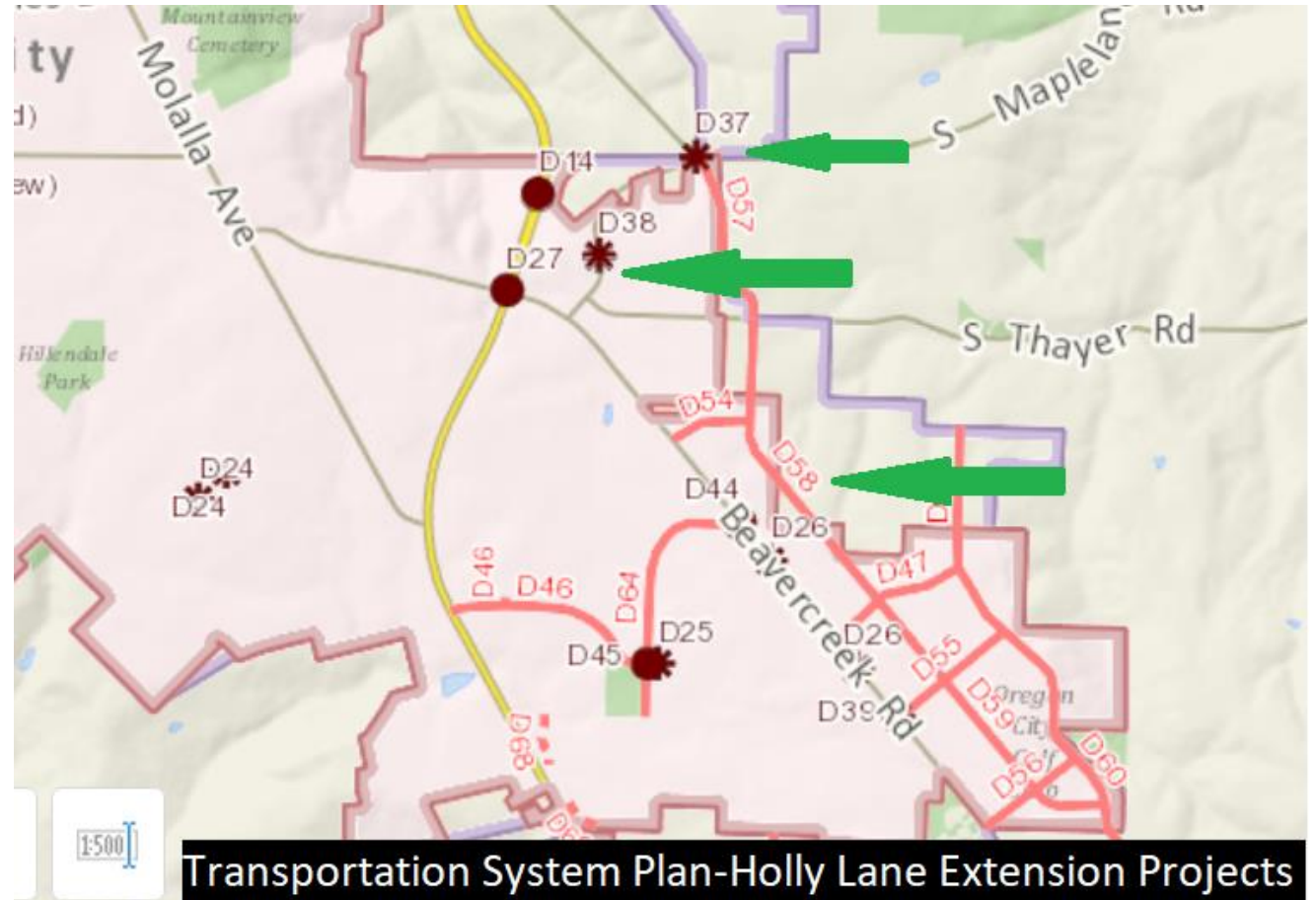
Optimal 3-Lane Roadway
76 feet wide ROW

Optimal 5-Lane Roadway
100 feet wide ROW

Signals	\$26M	\$22M	\$34M
Roundabouts	\$32M	\$29M	\$48M

Holly Lane Extension- Alternate Mobility

- Removing Holly Lane extension projects from the TSP would require the City to revise the alternate mobility target and provide an alternate project that meets or exceeds the benefit of the Holly Lane extension.
- Staff is currently unable to identify an alternate project which is affordable and has not allocated funding or staff time towards the creation of such an alternative.
- The city must continue work with Clackamas County on the implementation of the Holly Lane connection and believes that the project is an important alternate route to the system to ease congestion in this area.



D37- roundabout at Maple Lane and Holly Lane
D83- Holly Lane -improve cross-section from Redland Road to Maple Lane
(joint County TSP project)
D57 & D58 new collector road

Funding Large Scale Improvements



Developer Funded



Local Improvement District (LID)



Urban Renewal



Grants



Area-specific Transportation System Development Fee (SDC).



Jurisdictional Transfer

Staff Recommendation



**How many lanes should
Beavercreek Road be within the
Concept Plan corridor?**

**A transitional section extending the
existing 5 lane section near Maple Lane
and transitioning to a 3- lane section at
Loder Road.**

Staff Recommendation



**What type of intersections should
Beavercreek Road have within the
Concept Plan corridor?**

Traffic signal

Staff Recommendation



Should the City renegotiate with ODOT to revise the Alternate Mobility Standard by removing Holly Lane connections from Transportation System Plan (TSP)?

No

Staff Recommendation

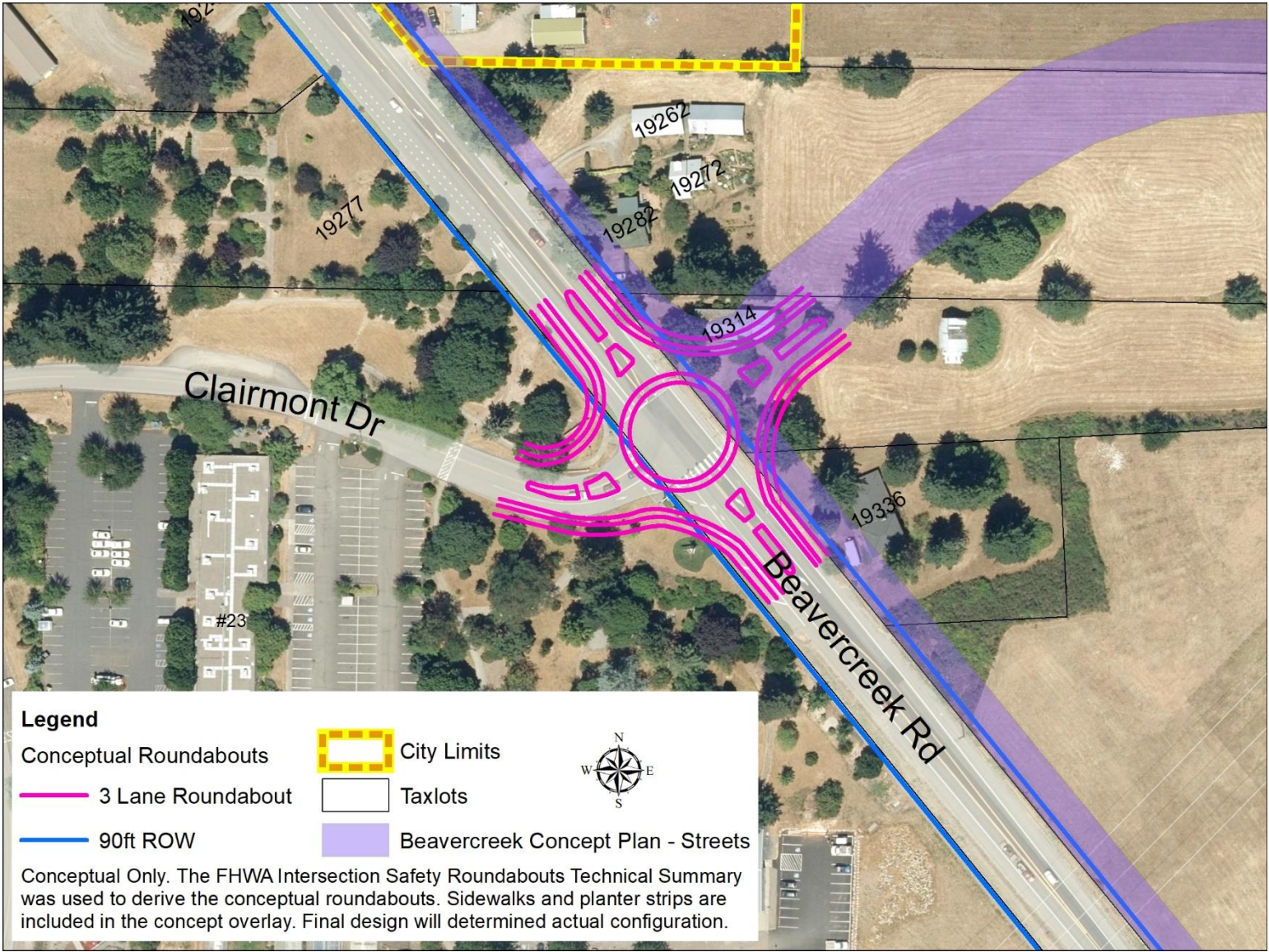


Should Beaver Creek Road along the Concept Plan corridor be constructed by developers incrementally as development is built or pursued as a capital improvement project all at once?

The roadway should be constructed incrementally as development occurs.

Questions and Next Steps

Clairmont Drive and Beaver Creek Road

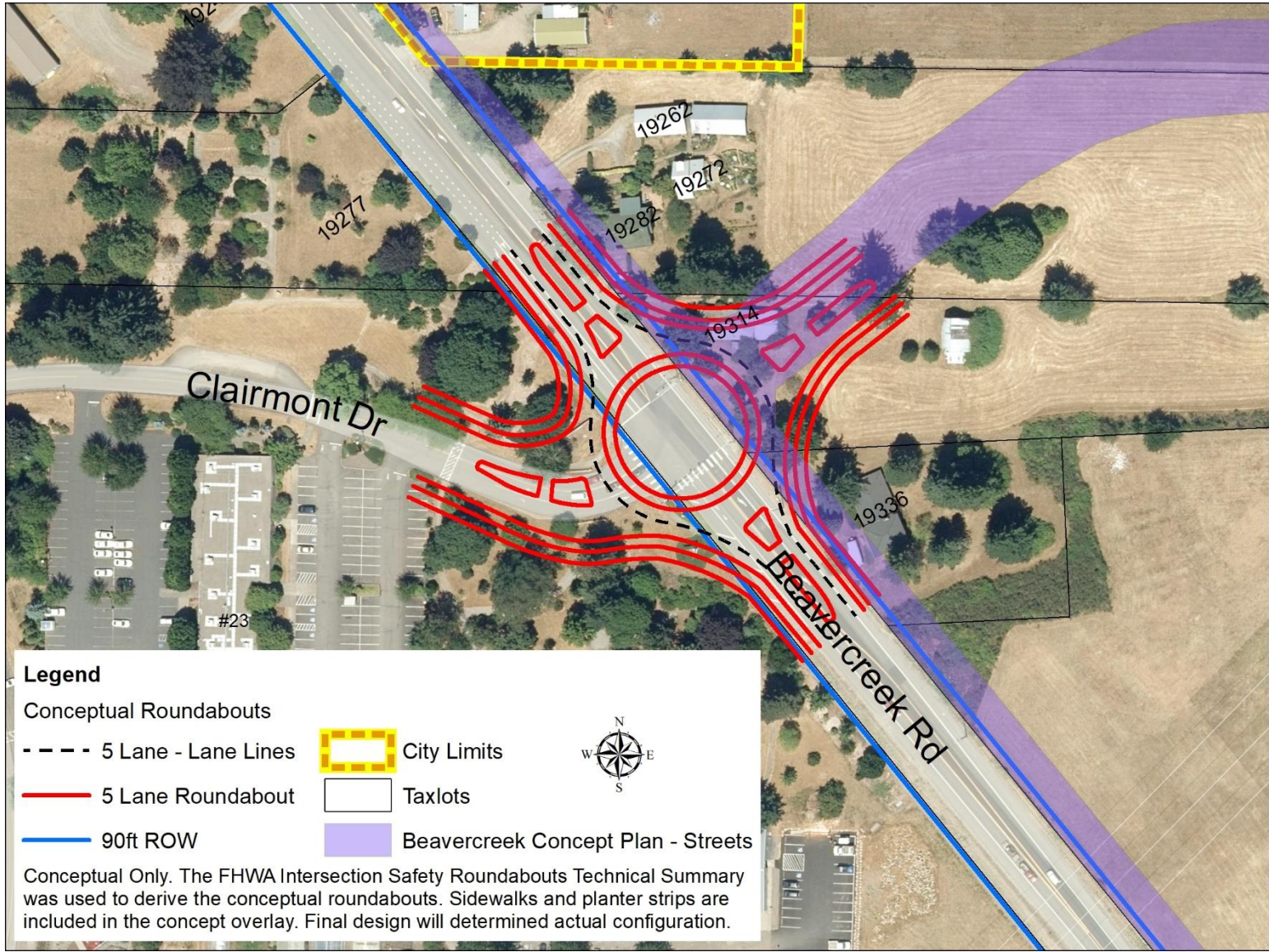


3-Lane Roundabout

Land acquisition implications: Property not part of a land use application would need to be acquired prior to construction. These could include portions of Clackamas Community College Property abutting Clairmont Drive & 19314 Beaver Creek Road.

Alignment considerations: The roundabout is currently centered on the intersection. The Clairmont Drive intersection is currently not built out, which provides more opportunities to identify a design and construct a roundabout without impacting existing development and structures.

Cost considerations: The footprint and property required for a 3 lane roundabout is larger than is required for a signalized intersection. The cost is also greater for a 3 lane roundabout than a signalized intersection.



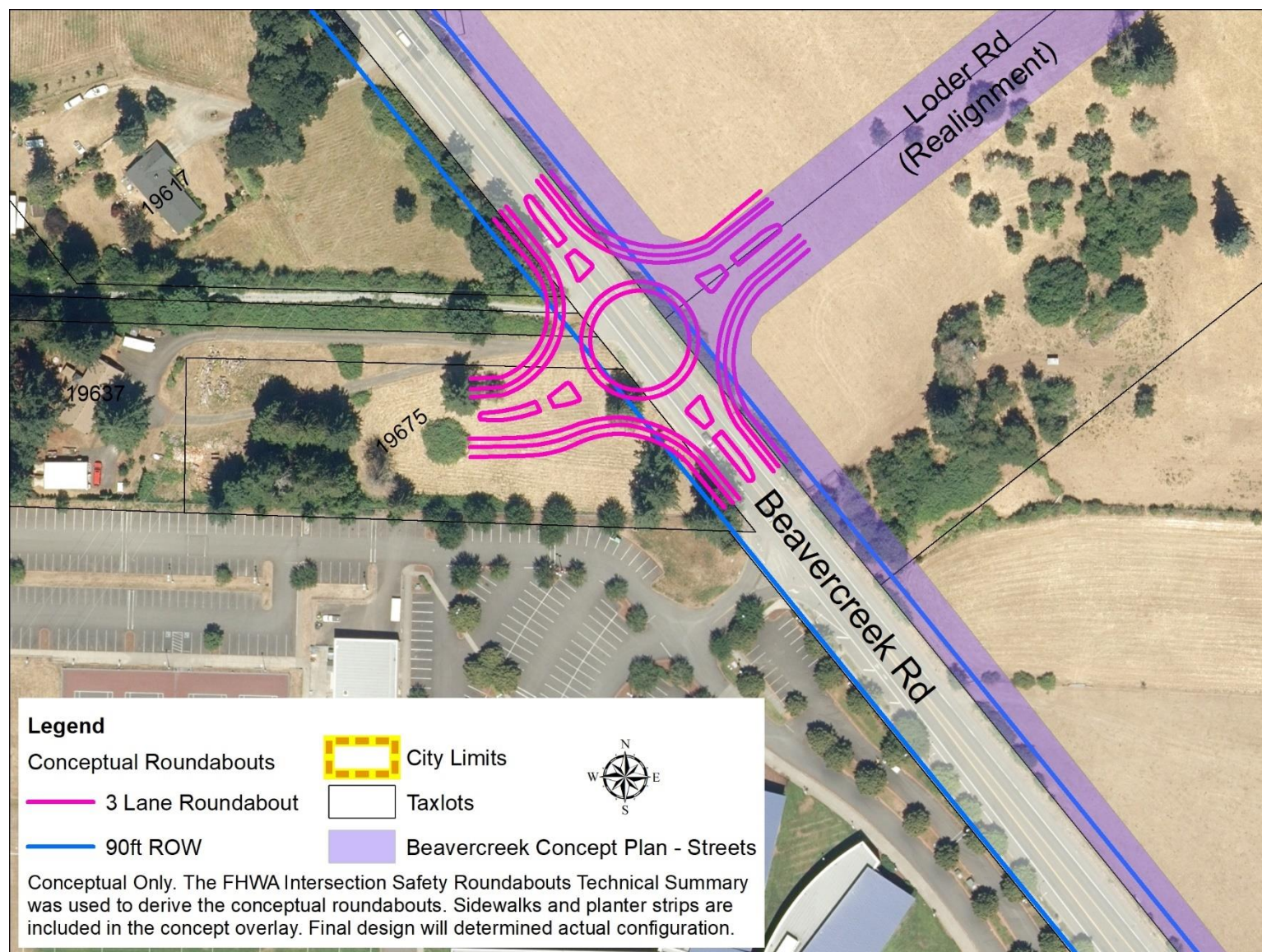
5-Lane Roundabout

Land acquisition implications: Property not part of a land use application would need to be acquired prior to construction. These could include portions of Clackamas Community College Property abutting Clairmont Drive & 19314 Beaver Creek Road.

Alignment considerations: The roundabout is currently centered on the intersection. The Clairmont Drive intersection is currently not built out, which provides more opportunities to identify a design and construct a roundabout without impacting existing development and structures.

Cost considerations: The footprint and property required for a 5 lane roundabout is larger than is required for a 3 lane roundabout. The cost is also greater for a 5 lane roundabout than a 3 lane roundabout or signalized intersection.

Loder Road and Beaver Creek Road

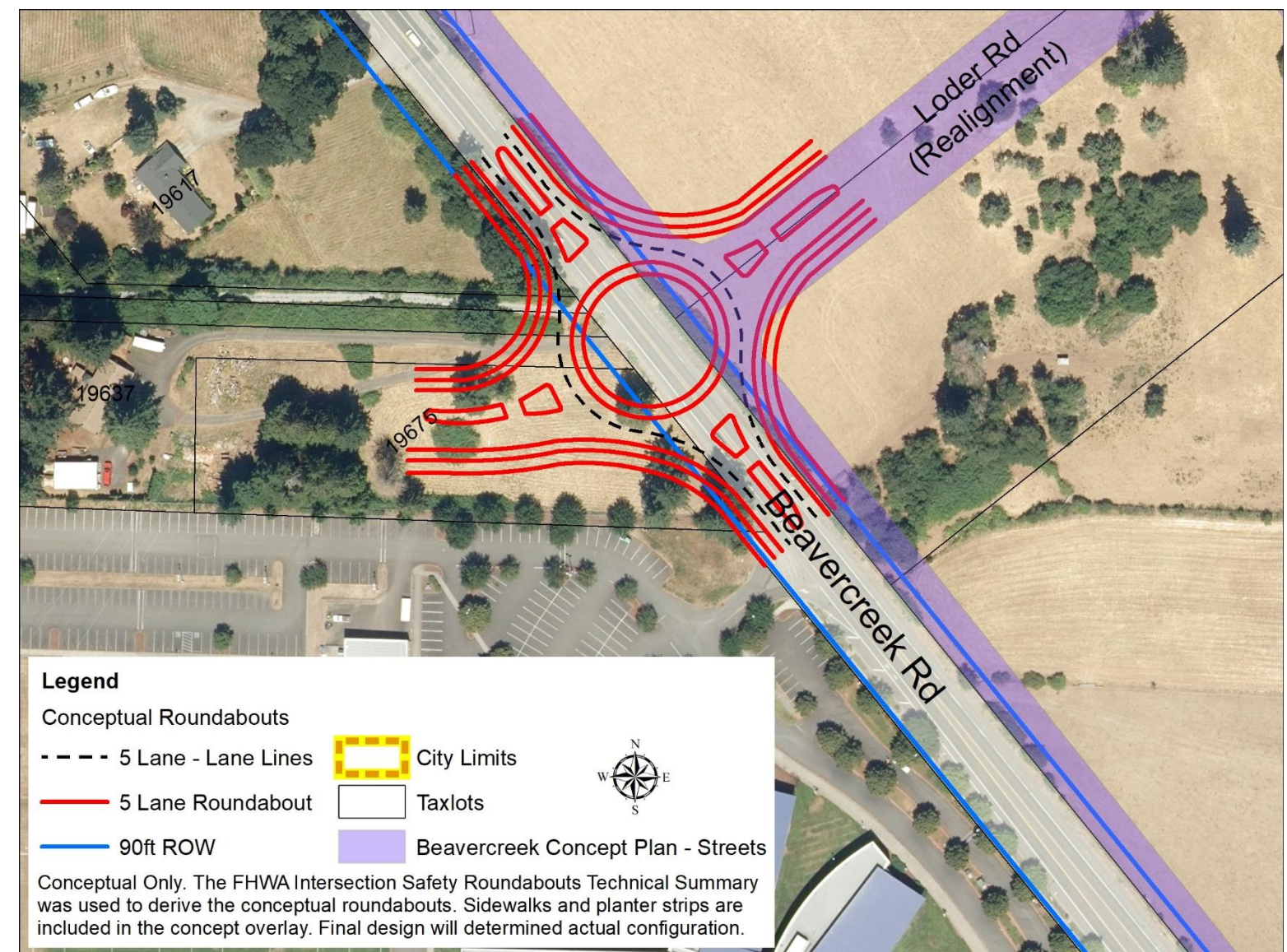


3-Lane Roundabout

Land acquisition implications: Property not part of a land use application would need to be acquired prior to construction.

Alignment considerations: The roundabout is currently centered on the intersection. The Loder Road intersection is currently not built out, which provides more opportunities to identify a design and construct a roundabout without impacting existing development and structures.

Cost considerations: The footprint and property required for a 3 lane roundabout is larger than is required for a signalized intersection. The cost is also greater for a 3 lane roundabout than a signalized intersection.



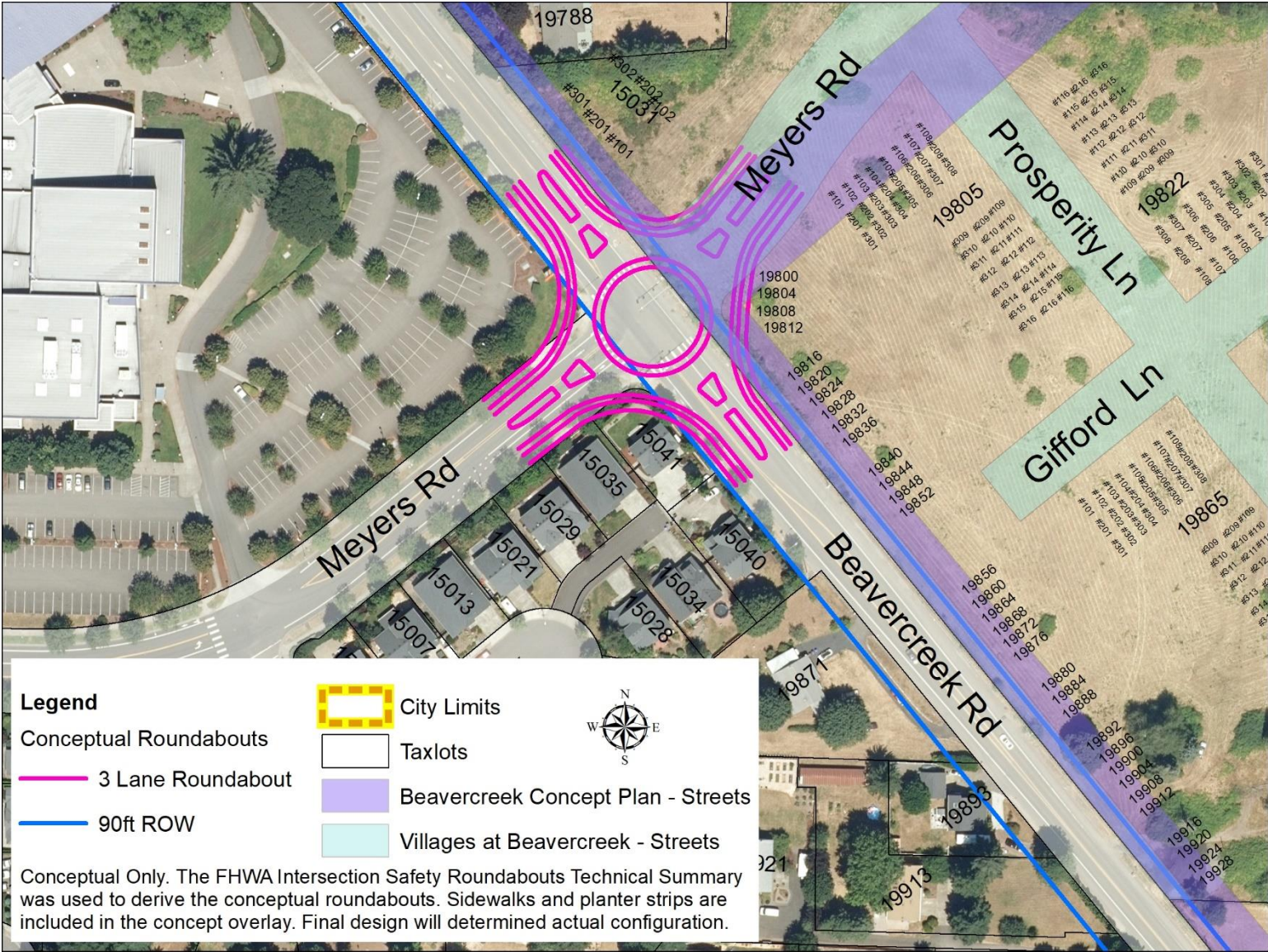
5-Lane Roundabout

Land acquisition implications: Property not part of a land use application would need to be acquired prior to construction.

Alignment considerations: The roundabout is currently centered on the intersection. The Loder Road intersection is currently not built out, which provides more opportunities to identify a design and construct a roundabout without impacting existing development and structures.

Cost considerations: The footprint and property required for a 5 lane roundabout is larger than is required for a 3 lane roundabout. The cost is also greater for a 5 lane roundabout than a 3 lane roundabout or signalized intersection.

Meyers Road and Beaver Creek Road

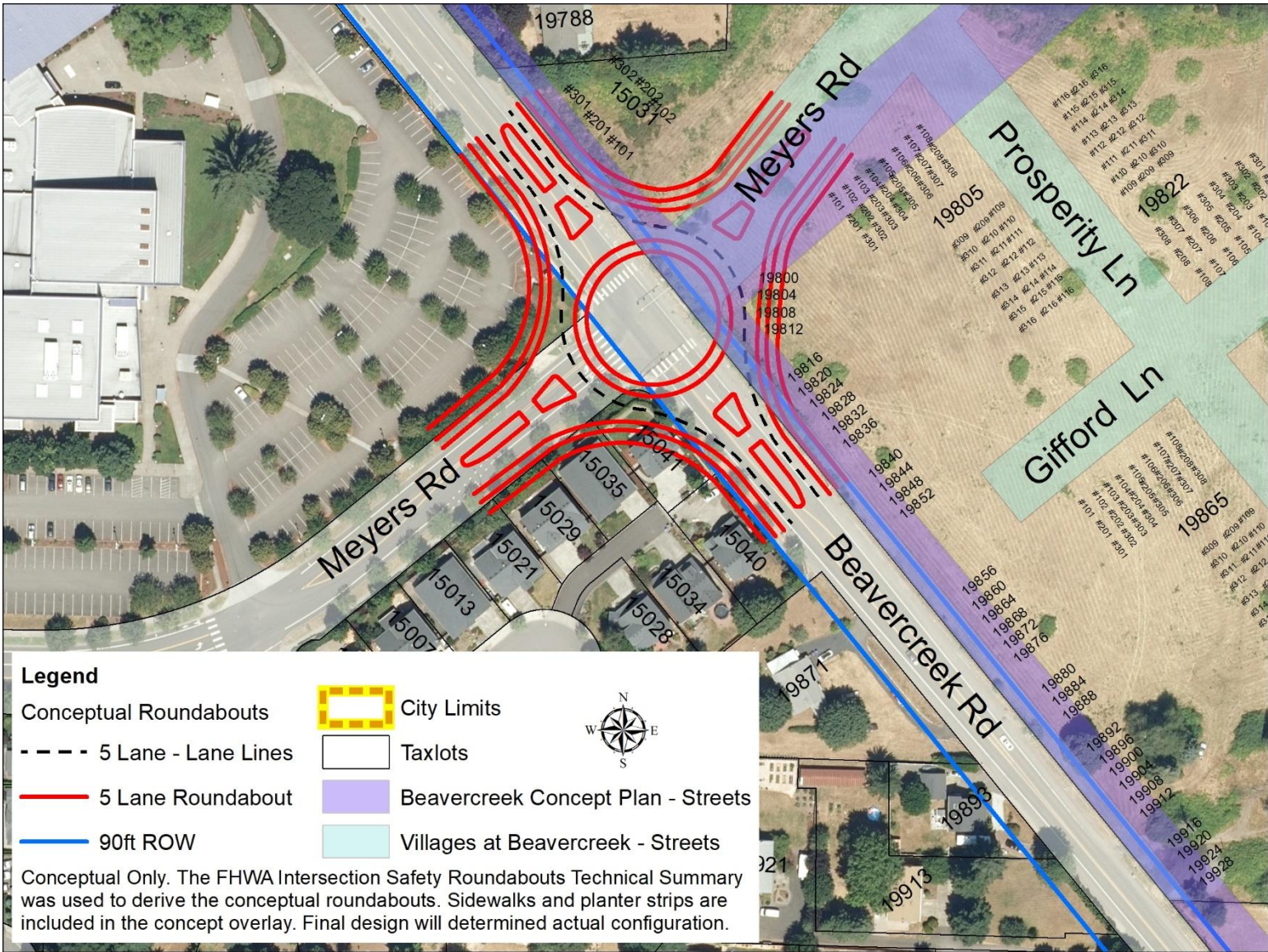


3-Lane Roundabout

Land acquisition implications: Property not part of a land use application would need to be acquired prior to construction these could include portions of Oregon City High School parking lot, 15041 & 15035 Emerson Court, and some portions of approved but not built Villages at Beavercreek Apartments located southeast of the intersection.

Alignment considerations: The roundabout is currently centered on the intersection. The Meyers Road intersection is fairly built out, which provides few opportunities to identify a design and construct a roundabout without impacting existing development and structures.

Cost considerations: The footprint and property required for a 3 lane roundabout is larger than what is currently available with the signalized intersection. The cost is also greater for a 3 lane roundabout than a signalized intersection.



5-Lane Roundabout

Land acquisition implications: Property not part of a land use application would need to be acquired prior to construction these could include portions of Oregon City High School parking lot, 15040, 15041 & 15035 Emerson Court, and some portions of approved but not built Villages at Beavercreek Apartments located southeast of the intersection.

Alignment considerations: The roundabout is currently centered on the intersection. The Meyers Road intersection is fairly built out, which provides few opportunities to identify a design and construct a roundabout without impacting existing development and structures.

Cost considerations: The footprint and property required for a 5 lane roundabout is larger than is required for a 3 lane roundabout and a signalized intersection. The cost is also greater for a 5 lane roundabout than a 3 lane roundabout and a signalized intersection.

Glen Oak Road and Beaver Creek Road



3-Lane Roundabout

Land acquisition implications: Property not part of a land use application would need to be acquired prior to construction. These could include portions of 15135 & 15140 Glen Oak Road (CRW Pump Station), 15053 & 15049 Homestead Drive.

Alignment considerations: The roundabout is currently centered on the intersection. The Glen Oak Road intersection is fairly built out, which provides few opportunities to identify a design and construct a roundabout without impacting existing development and structures.

Cost considerations: The footprint and property required for a 3 lane roundabout is larger than what is currently available with the signalized intersection. The cost is also greater for a 3 lane roundabout than a signalized intersection.



5-Lane Roundabout

Land acquisition implications: Property not part of a land use application would need to be acquired prior to construction. These could include portions of 15125, 15135 & 15140 Glen Oak Road (CRW Pump Station), 15045, 15053 & 15049 Homestead Drive and 20007 Beaver Creek Road.

Alignment considerations: The roundabout is currently centered on the intersection. The Glen Oak Road intersection is fairly built out, which provides few opportunities to identify a design and construct a roundabout without impacting existing development and structures.

Cost considerations: The footprint and property required for a 5 lane roundabout is larger than is required for a 3 lane roundabout and a signalized intersection. The cost is also greater for a 5 lane roundabout than a 3 lane roundabout and a signalized intersection.



Oregon

Kate Brown, Governor

Department of Transportation

Region 1 Headquarters
123 NW Flanders Street
Portland, Oregon 97209
(503) 731.8200
FAX (503) 731.8259

11/4/19

City of Oregon City
Community Development Division
PO Box 3040
698 Warner Parrott Rd.
Oregon City, OR 97045

ODOT Case No: 9386

Subject: Beaver Creek Road Concept Plan Traffic Analysis

Attn: Christina Robertson-Gardiner, Senior Planner

We have reviewed the applicant's proposed Oregon City Beaver Creek Analysis from DKS Associates dated August 6, 2019. The Oregon City Commission is holding a work session on November 12th and ODOT would like to provide some context regarding the Holly Lane extension between Maple Lane Rd and Thayer Rd.

The traffic study relies on an alternative mobility target for the Highway 213/Beaver Creek Rd intersection to show that the transportation system can accommodate proposed land use changes in the Beaver Creek Road Concept Plan area. The Transportation Planning Rule (OAR 660-012) requires Cities to adopt transportation system plans to support the planned land uses in their comprehensive plans. The adequacy of the transportation system is measured with mobility targets found in the Oregon Highway Plan (OHP). OHP policy 1F.3 allows Cities to adopt alternative mobility targets "where it is infeasible or impractical to meet the mobility targets".

Oregon City and the Oregon Transportation Commission adopted an alternative mobility target for the Highway 213/Beaver Creek Rd intersection in 2018. That target relies on the Holly Lane extension as a key parallel route in the Highway 213 corridor. If this connection is not included in future plans, the alternative mobility target would be jeopardized, the transportation system plan would need to be updated, and development in the area, including the Beaver Creek Road Concept Plan, may not be able to be implemented as envisioned. While this connection may be difficult to complete in the near term, in the future it will provide essential connectivity for all modes of transportation in the community.

Thank you for providing ODOT the opportunity to participate in this review. If you have any questions regarding this matter, please contact me at 503.731.8234.

Sincerely,

A handwritten signature in cursive script, reading "Seth Brumley".

Seth Brumley
ODOT Senior Planner

C: Avi Tayar, P.E., ODOT Region 1 Traffic



720 SW Washington St.
Suite 500
Portland, OR 97205
503.243.3500
www.dksassociates.com

DRAFT MEMORANDUM

DATE: June 21, 2019

TO: Christina Robertson-Gardiner, City of Oregon City

FROM: Kevin Chewuk, DKS Associates
Amanda Deering, DKS Associates

SUBJECT: Oregon City Beaver Creek Land Use Review

P19082-001

This memorandum summarizes how the requirements of Oregon Administrative Rule (OAR) 660-012-0060, the Transportation Planning Rule (TPR), are met for the Beaver Creek Concept Plan area in Oregon City, Oregon. The study area comprises the adopted 2008 Beaver Creek Concept Plan area which established land use designations, design guidelines and future transportation infrastructure needs. The Beaver Creek Concept Plan area is roughly bounded by the Urban Growth Boundary to the east, Beaver Creek Road to the west, Old Acres Road to the south and Thayer Road to the north. The following sections describe the consistency of the Beaver Creek Concept Plan with the current Oregon City Transportation System Plan (TSP).

Land Use Assumptions

The Beaver Creek Concept Plan area includes about 5,700 new jobs and 1,100 new housing units. Table 1 describes the assumptions that were used. For the Oregon City TSP, vehicle trips within the Beaver Creek Concept Plan area were estimated based on around 1,639 new jobs and 355 new households. The Beaver Creek Concept Plan was held up in the Oregon Land Use Board of Appeals (LUBA) during the recent update to the Oregon City TSP, thus the zoning in the Beaver Creek Concept Plan area did not reflect the rezoned land resulting from the plan.

Land Use and Motor Vehicle Trip Generation Assumptions

The impact of the increased vehicle trip generation on the surrounding transportation system, as a result of the Beaver Creek Concept Plan, will be evaluated through the year 2035 (consistent with the horizon year of the current TSP).

For the current Oregon City TSP, vehicle trips were estimated based on the existing land use assumptions (see Table 1). These trips are included in the 2035 TSP Baseline scenario. For the TPR analysis, the Beaver Creek Concept Plan was estimated to accommodate 750 more housing units and 4,095 more employees than the current TSP.

Vehicle trips that would be generated by the increased housing units and employees were estimated by applying the Metro Regional Travel Forecast model trip generation rates by land use type. Overall, the Beavercreek Concept Plan is expected to generate about 2,584 motor vehicle trips during the p.m. peak hour, or 925 more than what was assumed in the current TSP.

Table 1: Land Use Assumptions			
Scenario	New Housing Units	New Employees	Forecasted Weekday PM Peak Hour Vehicle Trip End Growth
TSP Baseline (without Beavercreek Concept Plan)	355	1,639	1,659
Beavercreek Concept Plan	1,105	5,734	2,584
Change (With Beavercreek Concept Plan – Without Beavercreek Concept Plan)	+750	+4,095	+925

2035 Motor Vehicle Operations

Future p.m. peak hour traffic forecasts were prepared for two land use scenarios, including:

- **TSP Baseline (without Beavercreek Concept Plan)** – This scenario assumes the land use within the Beavercreek Concept Plan will be built out consistent with the prior TSP analysis. It includes the improvement projects listed in the “Baseline Transportation System Improvements” section.
- **Beavercreek Concept Plan** – This scenario assumes full buildout of Beavercreek Concept Plan area. It includes the improvement projects listed in the “Baseline Transportation System Improvements” section.

With each of these two land use scenarios, a sensitivity option was tested that assumed the planned segment of Holly Lane between Maple Lane Road and Thayer Road would not be completed. The forecast will include 2035 volumes to match the TSP horizon year.

Baseline Transportation System Improvements

The starting point for the future operations analysis relied on a list of street system improvement projects contained in the Oregon City TSP. These projects represent only those that are expected to be reasonably funded, and therefore can be included in the Baseline scenario. Many of the projects in the Beavercreek Concept Plan area will be constructed as private development occurs. Others will be

constructed as part of public infrastructure improvements or concurrent with adjacent private developments. The improvements assumed include:

- Roundabout installation at the **Beavercreek Road/Glen Oak Road** intersection (TSP Project D39)
- Roundabout installation at the **Beavercreek Road/Loder Road** intersection (TSP Project D44)
- **Meyers Road** extension from OR 213 to High School Avenue (TSP Project D46)
- **Meyers Road** extension from Beavercreek Road to the Meadow Lane Extension (TSP Project D47)
- **Clairmont Drive** extension from Beavercreek Road to the Holly Lane South Extension (TSP Project D54)
- **Glen Oak Road** extension from Beavercreek Road to the Meadow Lane Extension (TSP Project D55)
- **Timbersky Way** extension from Beavercreek Road to the Meadow Lane Extension (TSP Project D56)
- **Holly Lane** extension from Thayer Road to the Meadow Lane Extension (TSP Projects D58 and D59)
- **Meadow Lane** extension to the Urban Growth Boundary, north of Loder Road (TSP Projects D60 and D61)
- **Loder Road** extension from Beavercreek Road to Glen Oak Road (TSP Project D64)
- **Beavercreek Road** improvements from Clairmont Drive to the Urban Growth Boundary, south of Old Acres Lane (TSP Projects D81 and D82)
- **Loder Road** improvements from Beavercreek Road to the Urban Growth Boundary (TSP Project D85)

Intersection Operations

During the evening peak hour, all study intersections operate within adopted mobility targets under all scenarios after assuming the baseline transportation system improvements from the TSP. The traffic analysis results are summarized in a separate memorandum.

TPR Findings

Overall, the current TSP includes adequate transportation system projects for the Beavercreek Concept Plan area to comply with the Transportation Planning Rule (TPR). All transportation impacts as a result of the additional housing units and employees in the Beavercreek Concept Plan area are

addressed by current TSP projects. This includes the widening of Beaver Creek Road through the project area to a 3 or 5-lane cross-section (to be determined in separate memorandum) and intersection control improvements to the Loder Road and Glen Oak Road intersections with Beaver Creek Road (roundabout or traffic signals, to be determined in separate memorandum).



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DRAFT MEMORANDUM

DATE: August 6, 2019

TO: Christina Robertson-Gardiner, City of Oregon City

FROM: Kevin Chewuk, DKS Associates
Amanda Deering, DKS Associates

SUBJECT: Oregon City Beaver Creek Analysis

P19082-000

This memorandum summarizes a traffic study for the Oregon City Beaver Creek Road Concept Plan. The study area comprises the adopted 2008 Beaver Creek Road Concept Plan area. The objective of this traffic study is to:

1. Compare future development and infrastructure recommendations in the Beaver Creek Road Concept Plan to that of the 2013 Transportation System Plan (TSP) and Municipal Code
2. Ensure Transportation Planning Rule consistency
3. Provide responses to three questions asked by city staff in response to public comments during the public engagement phase of the Beaver Creek Road Concept Plan Zoning and Code amendments project. The responses contained in this memo address staff's questions from a transportation capacity and design lens. Additional legal, fiscal, construction, or maintenance factors may be part of the larger discussion and are not identified in this report

Staff Questions

1. **Holly Lane Connection.** How important is the Holly Lane connection to the transportation model? What if it does not connect for a very long time, or is removed?
2. **Intersection Control Analysis.** What is the optimal design for intersection control along the Beaver Creek Road Concept Plan boundary- traffic signals or roundabouts?
3. **Road Network Evaluation.** What is the optimal cross section for Beaver Creek Road?

Findings

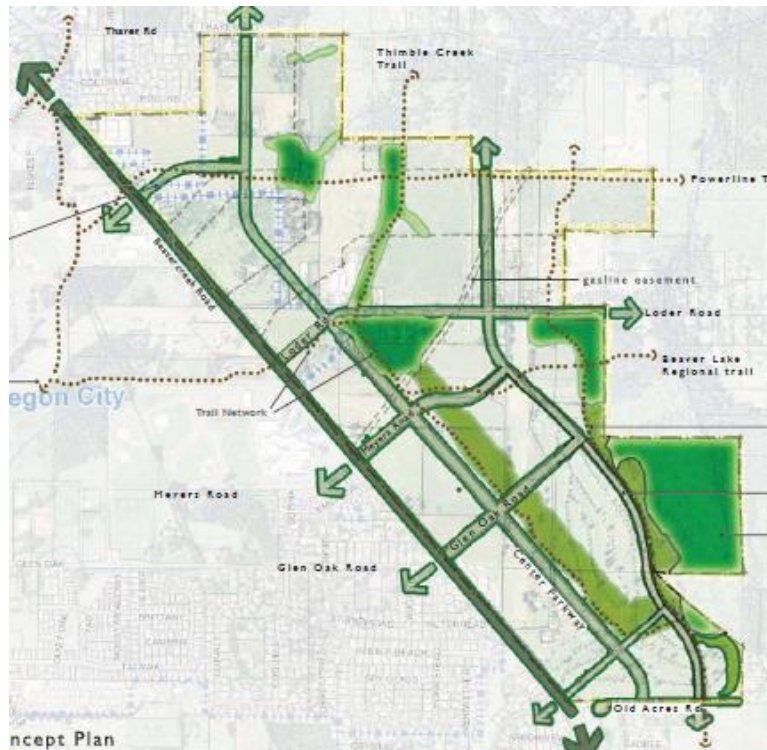
Overall, the current TSP includes adequate transportation system projects for the Beaver Creek Road Concept Plan area to comply with the Transportation Planning Rule (TPR) as adopted (3 lane section with roundabouts). All transportation impacts as a result of the projected 2019 housing units and employees in the Beaver Creek Road Concept Plan (5,700 new jobs and 1,100 new dwelling units) area are addressed by current TSP projects.

Likewise, a revised 5-lane cross-section and replacement of signals for roundabouts as intersection control also meets the TPR requirements. In addition, with the recommended intersection improvements, classifications and cross-sections listed later in this document, no additional provisions are needed beyond current TSP projects to accommodate potential growth in the Beaver Creek Road Concept Plan area without the Holly Lane extension between Maple Lane Road to Thayer Road.

Study Area

The study area (see Figure 1) comprises the adopted 2008 Beaver Creek Road Concept Plan area which established land use designations, design guidelines and future transportation infrastructure needs. The Beaver Creek Road Concept Plan area is roughly bounded by the Urban Growth Boundary to the east, Beaver Creek Road to the west, Old Acres Road to the south and Thayer Road to the north. The following list provides the study intersections with existing and future control, as applicable:

1. Highway 213 / Beaver Creek Road (existing signalized intersection)
2. Beaver Creek Road / Maple Lane Road (existing signalized intersection)
3. Beaver Creek Road / Clairmont Drive (existing signalized intersection)
4. Beaver Creek Road / Loder Road (existing unsignalized intersection; planned future roundabout)
5. Beaver Creek Road / Meyers Road (existing signalized intersection)
6. Beaver Creek Road / Glen Oak Road (existing unsignalized intersection; planned future roundabout)

Figure 1: Study Area

Land Use Assumptions

The Beaver Creek Road Concept Plan area includes about 5,700 new jobs and 1,100 new housing units based on the current analysis prepared by EcoNW and 3J Consulting (2019) as part of current zoning and code amendment project. These numbers are consistent with the initial 2008 Concept Plan projection of 5,000 jobs and 1,023 housing units. Table 1 describes the assumptions that were used.

For the Oregon City TSP, vehicle trips within the Beaver Creek Road Concept Plan area were estimated based on around 1,639 new jobs and 355 new households. The Beaver Creek Road Concept Plan was being litigated by the Oregon Land Use Board of Appeals (LUBA) during the 2013 update to the Oregon City TSP, thus the zoning in the Beaver Creek Road Concept Plan area reflected existing conditions and did not reflect the projected housing and jobs resulting from the plan. Once the Concept Plan was readopted in 2016, the regional transportation model was updated to include 2008 Beaver Creek Road Concept Plan jobs and housing projections (5,000 jobs and 1,023 housing units).

Land Use and Motor Vehicle Trip Generation Assumptions

The impact of the increased vehicle trip generation on the surrounding transportation system, as a result of the Beaver Creek Road Concept Plan, was evaluated through the year 2035 (consistent with the horizon year of the current TSP).

For the current Oregon City TSP, vehicle trips were estimated based on the existing land use assumptions (see Table 1). These trips are included in the 2035 TSP Baseline scenario. For the TPR analysis, the Beavercreek Road Concept Plan utilized the projected 2019 numbers which was estimated to accommodate 750 more housing units and 4,095 more employees than the current TSP.

Vehicle trips that would be generated by the increased housing units and employees were estimated by applying the Metro Regional Travel Forecast model trip generation rates by land use type. This model assumes development and redevelopment within Oregon City as well as throughout the region and thus accounts for consequences of development outside Oregon City. Overall, the Beavercreek Road Concept Plan is expected to generate about 2,584 motor vehicle trips during the p.m. peak hour, or 925 more than what was assumed in the current TSP.

Table 1: Land Use Assumptions

Scenario	New Housing Units	New Employees	Forecasted Weekday PM Peak Hour Vehicle Trip End Growth
TSP Baseline (without Beavercreek Road Concept Plan)	355	1,639	1,659
Beavercreek Road Concept Plan <i>2019 Code and Zoning Amendments Projection</i>	1,105	5,734	2,584
Change (With Beavercreek Road Concept Plan – Without Beavercreek Road Concept Plan)	+750	+4,095	+925

Traffic Forecasting

Future p.m. peak hour traffic forecasts were prepared for two land use scenarios, with and without the Beavercreek Road Concept Plan to provide a baseline for identifying new transportation improvement needs beyond those included in the TSP; these scenarios include:

- **TSP Baseline (without Beavercreek Road Concept Plan)** – This scenario assumes the land use within the Beavercreek Road Concept Plan will be built out consistent with the prior TSP analysis (1,639 new jobs and 355 new households). It includes the improvement projects listed in the “Baseline Transportation System Improvements” section as envisioned in the Beavercreek Road Concept Plan.
- **Beavercreek Road Concept Plan** – This scenario assumes full buildout of Beavercreek Road Concept Plan area (5,700 new jobs and 1,100 new housing units). It includes the improvement projects listed in the “Baseline Transportation System Improvements” section as envisioned in the Beavercreek Road Concept Plan.

With each of these two land use scenarios, a sensitivity option was tested that assumed the planned segment of Holly Lane between Maple Lane Road and Thayer Road would not be completed. The forecast will include 2035 volumes to match the TSP horizon year.

Baseline Transportation System Improvements

The starting point for the future operations analysis relied on a list of street system improvement projects contained in the Oregon City TSP. These projects represent only those that are expected to be reasonably funded, and therefore can be included in the Baseline scenario. Many of the projects in the Beavercreek Road Concept Plan area will be constructed as private development occurs. Others will be constructed as part of public infrastructure improvements or concurrent with adjacent private developments. The improvements assumed include:

- Roundabout installation at the **Beavercreek Road/Glen Oak Road** intersection (TSP Project D39)
- Roundabout installation at the **Beavercreek Road/Loder Road** intersection (TSP Project D44)
- **Meyers Road** extension from OR 213 to High School Avenue (TSP Project D46)
- **Meyers Road** extension from Beavercreek Road to the Meadow Lane Extension (TSP Project D47)
- **Clairmont Drive** extension from Beavercreek Road to the Holly Lane South Extension (TSP Project D54)

- **Glen Oak Road** extension from Beaver Creek Road to the Meadow Lane Extension (TSP Project D55)
- **Timbersky Way** extension from Beaver Creek Road to the Meadow Lane Extension (TSP Project D56)
- **Holly Lane** extension from Thayer Road to the Meadow Lane Extension (TSP Projects D58 and D59)
- **Meadow Lane** extension to the Urban Growth Boundary, north of Loder Road (TSP Projects D60 and D61)
- **Loder Road** extension from Beaver Creek Road to Glen Oak Road (TSP Project D64)
- **Beaver Creek Road** improvements from Clairmont Drive to the Urban Growth Boundary, south of Old Acres Lane (TSP Projects D81 and D82)
- **Loder Road** improvements from Beaver Creek Road to the Urban Growth Boundary (TSP Project D85)
- Construct westbound right-turn merge lane at the **Highway 213 / Beaver Creek Road** intersection (Highway 213 Corridor Alternative Mobility Targets Study)

Estimating Driving Trips

Determining future street network needs requires the ability to forecast traffic volumes resulting from estimates of future population and employment for the Beaver Creek Road Concept Plan area, and the rest of the City and Metro region. The objective of the transportation planning process is to provide the information necessary for making decisions about how and where improvements should be made to create a safe and efficient transportation system that provides travel options.

Metro Regional Travel Demand Model

The travel demand forecasting process generally involves estimating travel patterns for new development based on the decisions and preferences demonstrated by existing residents, employers and institutions around the region. Travel demand models are mathematical tools that help us understand future commuter, school and recreational travel patterns including information about the length, mode and time of day a trip will be made. The latest travel models are suitable for motor vehicle and transit planning purposes, and can produce total volumes for autos, trucks and buses on each street and highway in the system.

Land use data for the entire Metro region is split into geographical areas called transportation analysis zones (TAZs), which represent the sources of vehicle trip generation in the Metro Regional Travel Forecast model. The TAZs extend beyond the current UGB and include land use assumptions

for the entire region and rural communities surrounding Oregon City. The Beavercreek Road Concept Plan area includes one TAZ, which was updated with land use data from Table 1. Vehicle trips that would be generated by the proposed land use was estimated by applying the Metro Regional Travel Forecast model trip generation rates by land use type. Model forecasts are refined by comparing outputs with observed counts and behaviors on the local system. This refinement step is completed before any evaluation of system performance is made. Once the traffic forecasting process is complete, the future volumes are used to determine the areas of the street network that are expected to be congested and that may need future investments to accommodate growth.

The modeling and volume forecasting performed for the previous 2013 TSP was based on the year 2010 (existing) and year 2035 (horizon) Metro models. The current Metro travel demand models are for years 2015 and 2040. These models have updated land uses that assume less growth than the previous 2010-2035 land use growth. In addition, the new Metro models have "peak spreading" built into them, which means the peak period of two hours is modeled, rather than just the single peak hour. When comparing the 2010 and 2015 base years, the 2010 model year shows higher volumes than the 2015 model. This is due to a correction that happened after the 2008 recession. The recent 2019 counts collected for this project more closely match the magnitude of the 2015 volumes. Due to this correction and the lower land use growth assumptions, the Metro 2040 model shows notably lower volumes along the Beavercreek Road corridor and the surrounding region. As a result, the new forecasted 2035 volumes are lower than the 2035 TSP volume set.

2035 Motor Vehicle Operations

Motor vehicle conditions were evaluated for each future scenario during the p.m. peak hour at the study intersections (see Table 2). The future conditions include the improvements summarized in the "Baseline Transportation System Improvements" section.

During the evening peak hour, a few study intersections are expected to exceed standards under each scenario, including the Beavercreek Road / Loder Road and Beavercreek Road / Glen Oak Road intersections. These intersections are currently unsignalized and the side street approach is over capacity given the limited gaps to turn onto Beavercreek Road in the future. Transportation solutions for these intersections are identified later in this report.

The Highway 213 / Beavercreek Road has an adopted alternative mobility target that changes the standard analysis parameters used or the time period to which the targets/standards apply from the

design hour¹ to an average weekday, which better represents traffic volumes experienced throughout the majority of the year. The intersection is expected to meet the alternative mobility target with the Beaver Creek Road Concept Plan.

Holly Lane Extension

The portion of the proposed Holly Lane extension project between Maple Lane Road and Thayer Road (TSP project D57) is blocked by existing development and therefore the proposed alignment must divert outside of the Urban Growth Boundary. To ensure the future roadway network can accommodate potential growth, the future volumes and study intersection operations under the 2035 Beaver Creek Road Concept Plan without this segment of the Holly Lane Extension scenario were reviewed.

As shown in Table 2, the re-routed traffic associated with removing the segment of the proposed Holly Lane extension is expected to have little impact on intersection operations when compared to the scenario with the segment. The greatest impact would be expected at the two existing unsignalized intersections, Loder Road and Glen Oak Road, since more traffic would be utilizing these intersections to enter and exit the Beaver Creek Road Concept Plan area without the segment of the Holly Lane extension. However, this issue is resolved once the recommended traffic signal is assumed at these intersections. Overall, with the recommended intersection improvements, classifications and cross-sections listed later in this document, no additional provisions are needed to accommodate potential growth in the Beaver Creek Road Concept Plan area without the Holly Lane extension between Maple Lane Road to Thayer Road. However, this segment of the Holly Lane extension project is still recommended long-term to provide an alternative route to Highway 213 and option for local motor vehicle, pedestrian and bicycle circulation.

¹ On state highways in Oregon City, the design hour volume generally occurs during the summer season when traffic volumes are higher than typical weekday peaks hours.

Table 2: Future Intersections Operations (2035 PM Peak Hour)

Intersection (traffic control)	Mobility Target	TSP Baseline (without Beaver Creek Road Concept Plan)	Beaver Creek Road Concept Plan (with Holly Lane Extension)	Beaver Creek Road Concept Plan (without Holly Lane Extension)
Highway 213 / Beaver Creek Road (signalized intersection)	1.00 v/c AWD	-	0.99 (AWD)	0.99 (AWD)
Beaver Creek Road / Maple Lane Road (signalized intersection)	0.99 v/c	0.80	0.94	0.95
Beaver Creek Road / Clairmont Drive (signalized intersection)	0.99 v/c	0.99	0.75	0.75
Beaver Creek Road / Loder Road (unsignalized intersection)	0.99 v/c	1.12	>2.00	>2.00
Beaver Creek Road / Meyers Road (signalized intersection)	0.99 v/c	1.05	0.80	0.82
Beaver Creek Road / Glen Oak Road (unsignalized intersection)	0.99 v/c	0.82	1.50	1.70
Bolded red values indicate intersection exceeding the mobility target				

Intersection Control Analysis

The traffic control at the Beaver Creek Road / Loder Road and Beaver Creek Road / Glen Oak Road intersections was assessed with a traffic signal and a roundabout. A signal warrant analysis was performed for these study intersections to determine if side-street volumes are high enough to justify (i.e. warrant) the construction of a traffic signal. For this analysis, ODOT's preliminary traffic signal warrants form² was utilized. This warrant is based on the MUTCD Signal Warrant 1, Case A and Case B, which deals primarily with high volumes on the intersecting minor roadway and high volumes on the major roadway. The result of the analysis found that a traffic signal would be warranted at both intersections by 2035.

These intersections are expected to meet mobility targets through 2035 with either a traffic signal or roundabout. Although both options would work, signals are recommended at these intersections. Existing intersections along the corridor surrounding Loder Road and Glen Oak Road are signalized,

² Analysis Procedures Manual, ODOT TPAU

including Clairmont Drive and Meyers Road. Installation of traffic signals at these two intersections would create for consistency along the corridor. The traffic signals could also be interconnected and timed to allow for traffic to flow smoothly along the corridor with minimal delay. Installation of a roundabout at one or both intersections would break up the flow of traffic and cause random arrivals of vehicles and more delay at the existing signalized intersections along the corridor.

If the cross-section of Beavercreek Road was expanded to incorporate a 5-lane section the design of future intersections is easier with signals over roundabouts. Existing and future signalized intersections along a corridor could be designed to accommodate a 5-lane section without requiring the full roadway width to be constructed. A roadway can be built with a 3-lane section and widened later to a 5-lane section with only minor changes needed at the intersections. Conversely, a roundabout must be designed and constructed to the expected future width of the roadway to avoid having to rebuild the intersection. For example, if you build the roundabout to only accommodate 3-lanes and ultimately need 5-lanes in the future, the roundabout would have to be rebuilt. This is further complicated by portions of the west side of Beavercreek Road near Glen Oak Road that are built out or not likely to be redeveloped any time soon.

A traffic signal also allows for flexibility in improving the intersection over time as adjacent parcels are developed. Each individual approach can be improved incrementally over time without any modifications to the other approaches to the intersection. The flexibility is lost when constructing a roundabout as the entire intersection must be built at once.

With the through volume of traffic forecasted to be over 1,500 vehicles during the peak hour, and with travel speeds up to 40 miles per hour along this segment of Beavercreek Road, a traffic signal would provide a controlled pedestrian crossing opportunity for pedestrians and cyclists. A center median could provide refuge between the vehicle traffic lanes for those crossing with either a 3-lane or 5-lane section.

Pedestrians and cyclists must use an unsignalized crossing in a roundabout, however, they are designed for vehicles to travel at a slower rate of speed when compared to a signalized intersection. In a roundabout, crosswalks are set further back from vehicle traffic, allowing drivers more time to react to people in the roadway before merging into or out of the roundabout. Triangular islands between lanes of vehicle traffic give people moving through the roundabout a safe place to wait if they choose to cross only one direction of traffic at a time. People on bikes can choose to ride through the roundabout with traffic or walk their bicycles through the pedestrian crosswalks.

Roadway Network Evaluation

Streets in the plan area were sized based on future capacity needs with full buildout of the Beaver Creek Road Concept Plan. Forecasted volumes along Beaver Creek Road can be accommodated with a 3-lane or 5-lane section within the adopted 90-foot road right-of-way.

A 5-lane section provides more capacity but could draw more traffic to Beaver Creek Road from Highway 213 and reduce the benefit of the added capacity. This is referred to by the term induced demand. Whereby additional lane capacity is filled by drivers who previously chose to travel on different routes or at different times but changed their behavior upon the creation of new capacity on a specific road segment.

A 5-lane section would be supportive of more population growth beyond the planning horizon when compared to a 3-lane section. However, the timing of growth is uncertain. Alternatively, a 3-lane section is built to meet the needs of the adjacent development, provides less capacity for through traffic and helps keep more traffic with destinations outside of Oregon City on Highway 213.

A 3-lane section would encourage slower travel speeds, would be more inviting to pedestrians and cyclists and would reduce the crossing distance of Beaver Creek Road, especially for students traveling between the neighborhoods on the east side and the school on the west side. A 3-lane section could also allow for a larger buffer between the roadway and sidewalk and allow for wider travel lanes to better facilitate the large trucks expected at the northern end of the Concept Plan area.

Given the City's standards, the projection of traffic volumes on area streets, and overall circulation needs, the recommended TSP classifications and cross-sections are to be maintained, as follows:

- Maintain classification of Beaver Creek Road as a major arterial, provide three-lane cross-section with 90-feet of right-of-way
- Maintain classification of the Meyers Road extension as a minor arterial, provide three-lane cross-section
- Maintain classification of the Clairmont Drive extension as a collector, provide a three-lane cross-section
- Maintain classification of the Glen Oak Road extension as a collector, provide two-lane cross-section
- Maintain classification of the Timbersky Way extension as a collector, provide two-lane cross-section
- Maintain classification of the Holly Lane extension as a collector, provide three-lane cross-section

- Maintain classification of the Meadow Lane extension as a collector, provide two-lane cross-section
- Maintain classification of Loder Road as a collector, provide three-lane cross-section
- Classify all remaining streets in the Beaver Creek Road Concept Plan area as local streets

Recommended Improvements

The recommended improvements for the intersections that are expected to exceed mobility targets in the 2035 Beaver Creek Road Concept Plan scenarios can be seen in Table 3. Overall, the current TSP includes adequate transportation system projects for the Beaver Creek Road Concept Plan area to comply with the Transportation Planning Rule (TPR). All transportation impacts as a result of the additional housing units and employees in the Beaver Creek Road Concept Plan area are addressed by current TSP projects. This includes the widening of Beaver Creek Road through the project area to a 3-lane cross-section and intersection control improvements to the Loder Road and Glen Oak Road intersections with Beaver Creek Road.

If a 5-lane section is desired along a portion of Beaver Creek Road adjacent to the Concept Plan boundary, a logical transition point back to a 3-lane section could be the Loder Road intersection. This location will serve as a primary access point to the industrial employment and the associated heavy vehicle traffic at the northern end of the Beaver Creek Road Concept Plan area. South of this intersection, the land use transitions to a mixed use neighborhood. In any case, the City should design intersections and obtain right-of-way to accommodate the ultimate cross-section in the future.

Table 3: Operations with Beaver Creek Road Concept Plan and Recommended Improvements (2035 PM Peak Hour)

Intersection (traffic control)	Mobility Target	Beaver Creek Road Concept Plan (with Holly Lane Extension)	Beaver Creek Road Concept Plan (without Holly Lane Extension)	Recommended Improvements
Beaver Creek Road / Loder Road (unsignalized intersection)	0.99 v/c	0.89	0.89	Install a traffic signal
Beaver Creek Road / Glen Oak Road (unsignalized intersection)	0.99 v/c	0.71	0.72	Install a traffic signal
Bolded red values indicate intersection exceeds the mobility target				

Appendix

Turning Movement Counts

Synchro HCM Reports

Sidra Reports

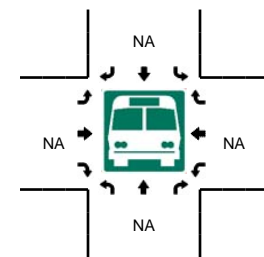
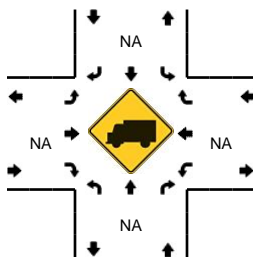
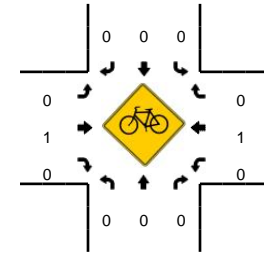
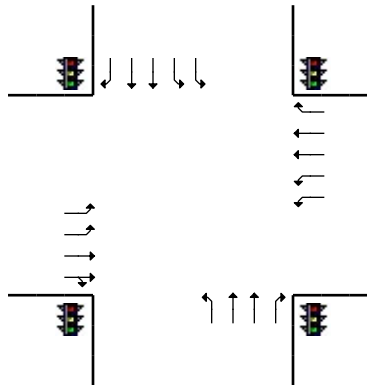
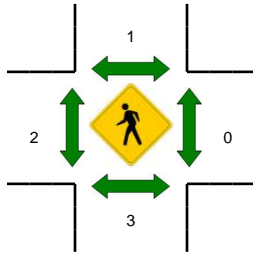
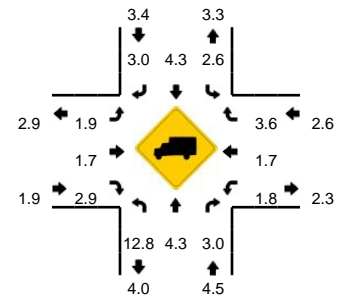
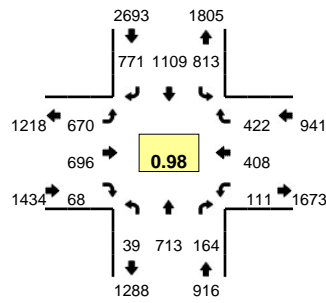
Preliminary Signal Warrants

Turning Movement Counts

LOCATION: Cascade Hwy -- S Beavercreek Rd
CITY/STATE: Oregon City, OR

QC JOB #: 14414702
DATE: Tue, May 16 2017

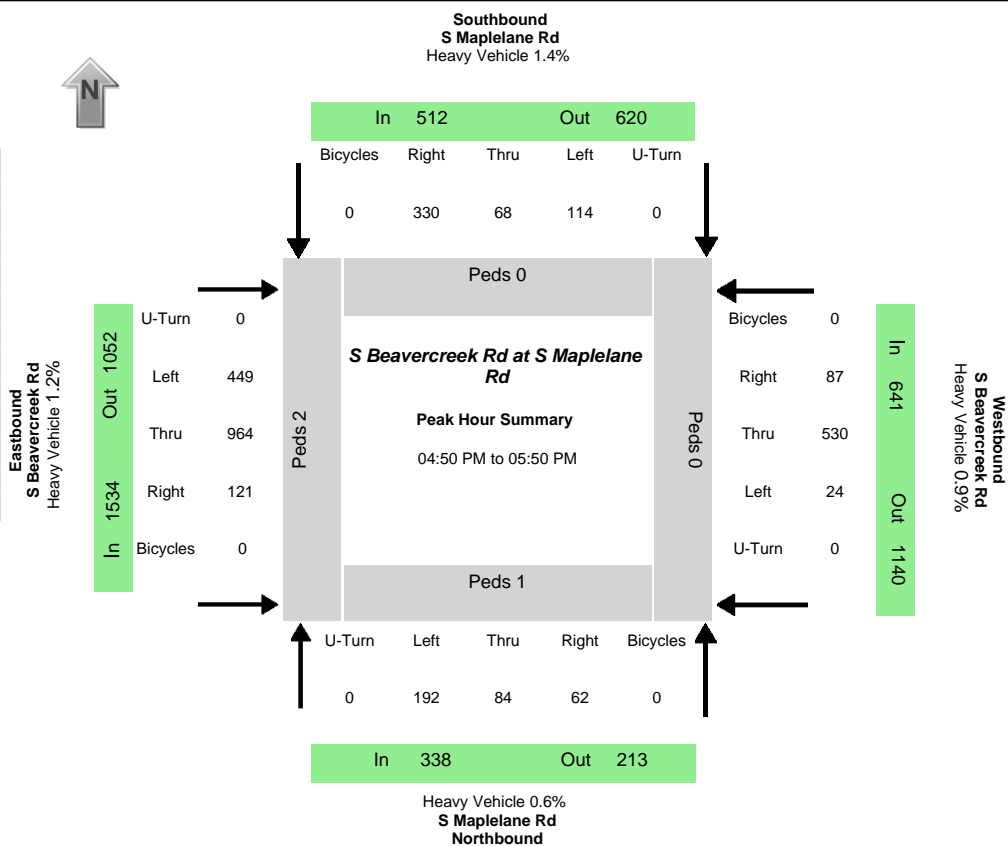
Peak-Hour: 4:30 PM -- 5:30 PM
Peak 15-Min: 5:05 PM -- 5:20 PM



5-Min Count Period Beginning At	Cascade Hwy (Northbound)				Cascade Hwy (Southbound)				S Beavercreek Rd (Eastbound)				S Beavercreek Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	3	63	14	0	45	74	63	0	59	55	8	0	9	41	33	0	467	5599
4:05 PM	3	45	12	0	63	83	76	0	54	63	10	0	6	32	34	0	481	5635
4:10 PM	3	70	11	0	46	104	66	0	52	52	8	1	4	33	40	0	490	5692
4:15 PM	1	58	10	0	58	86	56	1	61	53	3	0	21	26	29	0	463	5702
4:20 PM	2	44	12	0	57	87	65	0	44	56	7	0	17	51	36	0	478	5719
4:25 PM	4	46	14	0	71	78	68	0	44	72	7	0	16	27	36	0	483	5724
4:30 PM	5	62	19	0	65	79	63	0	49	62	4	0	7	32	25	0	472	5735
4:35 PM	2	58	11	0	66	118	60	0	49	55	7	0	7	32	41	0	506	5801
4:40 PM	6	54	17	0	63	70	64	0	61	64	4	0	15	35	35	0	488	5761
4:45 PM	3	59	14	0	68	102	69	0	68	61	7	0	12	26	46	0	535	5842
4:50 PM	4	51	16	0	59	97	58	0	55	58	6	0	10	45	31	0	490	5856
4:55 PM	5	67	9	0	56	112	63	0	47	56	10	0	14	33	24	0	496	5849
5:00 PM	5	52	13	0	88	81	62	0	48	65	8	0	6	35	27	0	490	5872
5:05 PM	0	67	17	0	55	59	78	0	78	61	4	0	7	34	29	0	489	5880
5:10 PM	2	57	8	0	76	102	67	0	62	63	6	0	9	30	50	0	532	5922
5:15 PM	4	56	18	0	74	91	48	0	57	61	3	0	10	41	48	0	511	5970
5:20 PM	3	64	12	0	68	95	68	0	45	51	7	0	4	33	36	0	486	5978
5:25 PM	0	66	10	0	75	103	71	0	51	39	2	0	10	32	30	0	489	5984
5:30 PM	3	48	12	0	70	84	44	0	50	54	10	0	6	30	33	0	444	5956
5:35 PM	1	70	8	0	64	102	72	0	56	49	8	0	11	29	32	0	502	5952
5:40 PM	6	36	14	0	76	73	55	0	62	70	2	0	11	40	44	0	489	5953
5:45 PM	3	59	20	0	66	97	53	0	52	65	2	0	15	33	19	0	484	5902
5:50 PM	4	71	15	0	56	93	57	0	35	53	5	0	6	28	27	0	450	5862
5:55 PM	6	45	11	0	61	70	51	0	47	54	5	0	11	30	24	0	415	5781
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	720	172	0	820	1008	772	0	788	740	52	0	104	420	508	0	6128	
Heavy Trucks	0	36	4		24	60	20		0	8	0		4	12	12		180	
Pedestrians		8				0				4				0			12	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Railroad																		
Stopped Buses																		

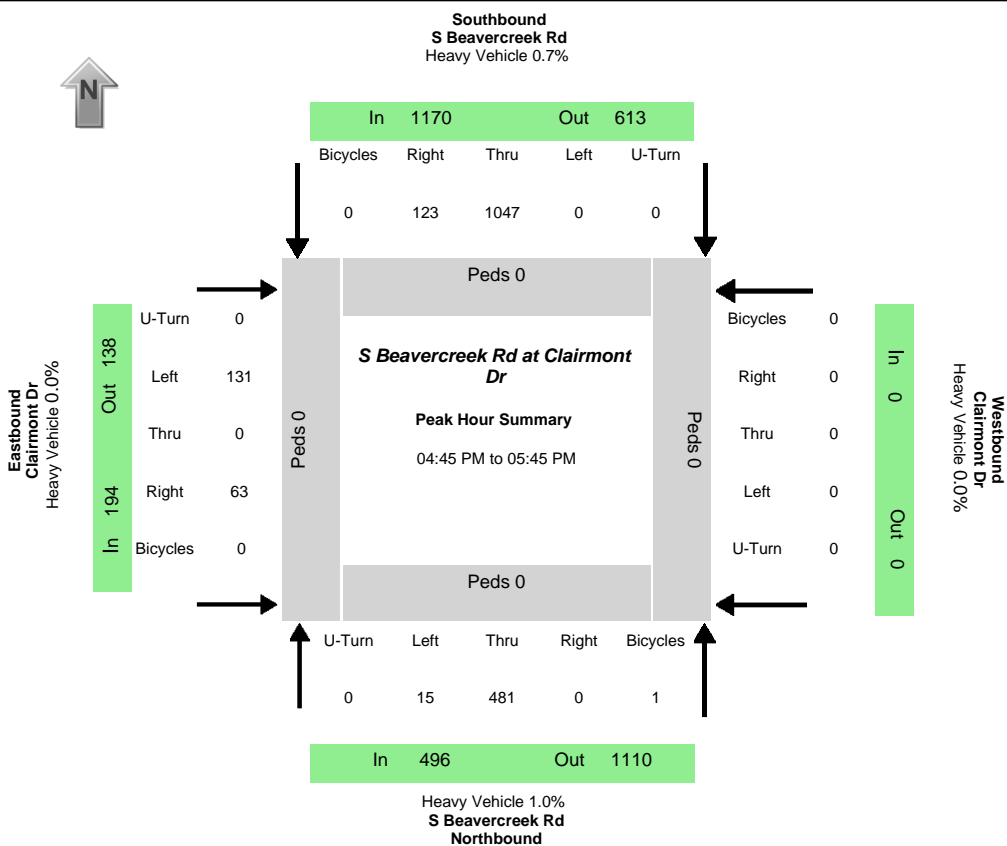
Comments:

Data Provided by K-D-N.com 503-594-4224	
N/S street	S Mapelane Rd
E/W street	S Beavercreek Rd
City, State	Oregon City OR
Site Notes	
Location	45.331096 - -122.572045
Start Date	Tuesday, April 23, 2019
Start Time	04:00:00 PM
Weather	
Study ID #	
Peak Hour Start	04:50:00 PM
Peak 15 Min Start	05:05:00 PM
PHF (15-Min Int)	0.96



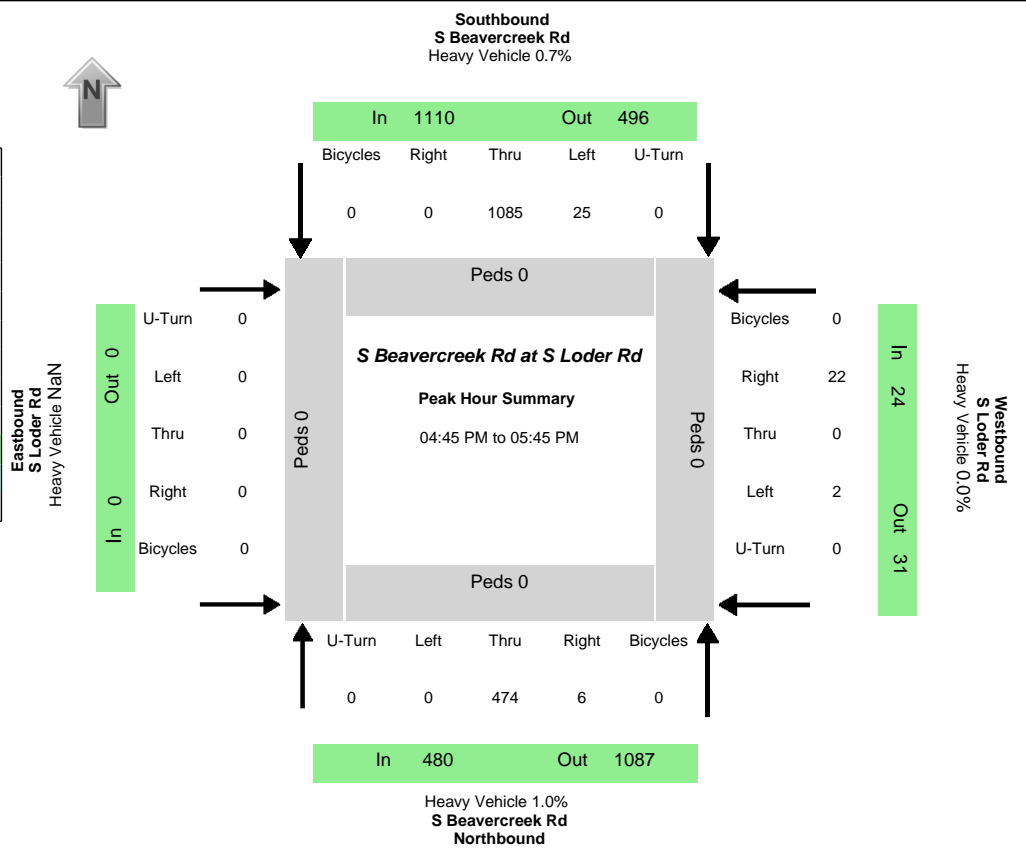
Peak-Hour Volumes (PHV)																							
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
192	84	62	0	114	68	330	0	449	964	121	0	24	530	87	0	338	512	1534	641	213	620	1052	1140
Percent Heavy Vehicles																							
0.0%	1.2%	1.6%	0.0%	5.3%	0.0%	0.3%	0.0%	0.9%	1.3%	0.8%	0.0%	0.0%	1.1%	0.0%	0.0%	0.6%	1.4%	1.2%	0.9%	0.5%	0.8%	0.7%	1.8%
PHV- Bicycles																PHV - Pedestrians							
Northbound				Southbound				Eastbound				Westbound				Sum	in Crosswalk				Sum		
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn		NB	SB	EB	WB			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	1	0	2		0	3
All Vehicle Volumes																							
Time	Northbound S Mapelane Rd				Southbound S Mapelane Rd				Eastbound S Beavercreek Rd				Westbound S Beavercreek Rd				15 Min Sum	1 HR Sum					
	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn							
04:00:00 PM	13	1	2	0	7	5	22	0	36	93	11	0	2	46	6	0							
04:05:00 PM	23	5	3	0	8	6	19	0	26	58	9	0	5	38	8	0							
04:10:00 PM	16	10	2	0	11	6	23	0	48	93	10	0	0	39	3	0	713						
04:15:00 PM	19	2	5	0	6	5	21	0	35	56	7	0	0	38	8	0	671						
04:20:00 PM	15	4	3	0	7	6	25	0	34	91	7	0	0	34	6	0	695						
04:25:00 PM	14	4	7	0	10	2	18	0	22	61	4	0	1	37	5	0	619						
04:30:00 PM	10	3	4	0	3	5	23	0	37	85	16	0	1	38	6	0	648						
04:35:00 PM	14	3	2	0	4	2	20	0	45	66	10	0	4	54	7	0	647						
04:40:00 PM	16	6	11	0	9	5	40	0	29	84	11	0	0	44	4	0	721						
04:45:00 PM	12	7	5	0	5	3	24	0	35	100	6	0	1	42	8	0	738						
04:50:00 PM	15	4	3	0	5	5	21	0	36	76	7	0	3	56	12	0	750						
04:55:00 PM	15	6	6	0	11	12	18	0	28	79	15	0	1	37	12	0	731	2784					
05:00:00 PM	36	6	6	0	2	2	20	0	39	87	10	0	0	42	3	0	736	2793					
05:05:00 PM	19	11	5	0	18	3	32	0	37	56	4	0	4	49	9	0	740	2832					
05:10:00 PM	10	8	2	0	14	8	32	0	35	87	12	0	2	64	8	0	782	2853					
05:15:00 PM	17	6	6	0	7	2	29	0	50	82	9	0	2	41	8	0	788	2910					
05:20:00 PM	6	7	6	0	5	0	40	0	54	84	4	0	0	34	3	0	784	2921					
05:25:00 PM	14	8	4	0	10	10	32	0	34	92	8	0	3	51	6	0	774	3008					
05:30:00 PM	11	10	9	0	10	4	21	0	41	60	11	0	0	32	4	0	728	2990					
05:35:00 PM	13	2	4	0	7	6	28	0	33	90	14	0	1	36	9	0	728	3002					
05:40:00 PM	22	9	9	0	13	10	29	0	30	83	11	0	4	36	5	0	717	3004					
05:45:00 PM	14	7	2	0	12	6	28	0	32	88	16	0	4	52	8	0	773	3025					
05:50:00 PM	15	11	4	0	7	3	23	0	28	69	11	0	0	44	2	0	747	2999					
05:55:00 PM	20	5	7	0	8	5	27	0	37	62	6	0	0	29	5	0	697	2970					

Data Provided by K-D-N.com 503-594-4224	
N/S street	S Beavercreek Rd
E/W street	Clairmont Dr
City, State	Oregon City OR
Site Notes	
Location	45.326787 - -122.566487
Start Date	Tuesday, April 23, 2019
Start Time	04:00:00 PM
Weather	
Study ID #	
Peak Hour Start	04:45:00 PM
Peak 15 Min Start	04:45:00 PM
PHF (15-Min Int)	0.95



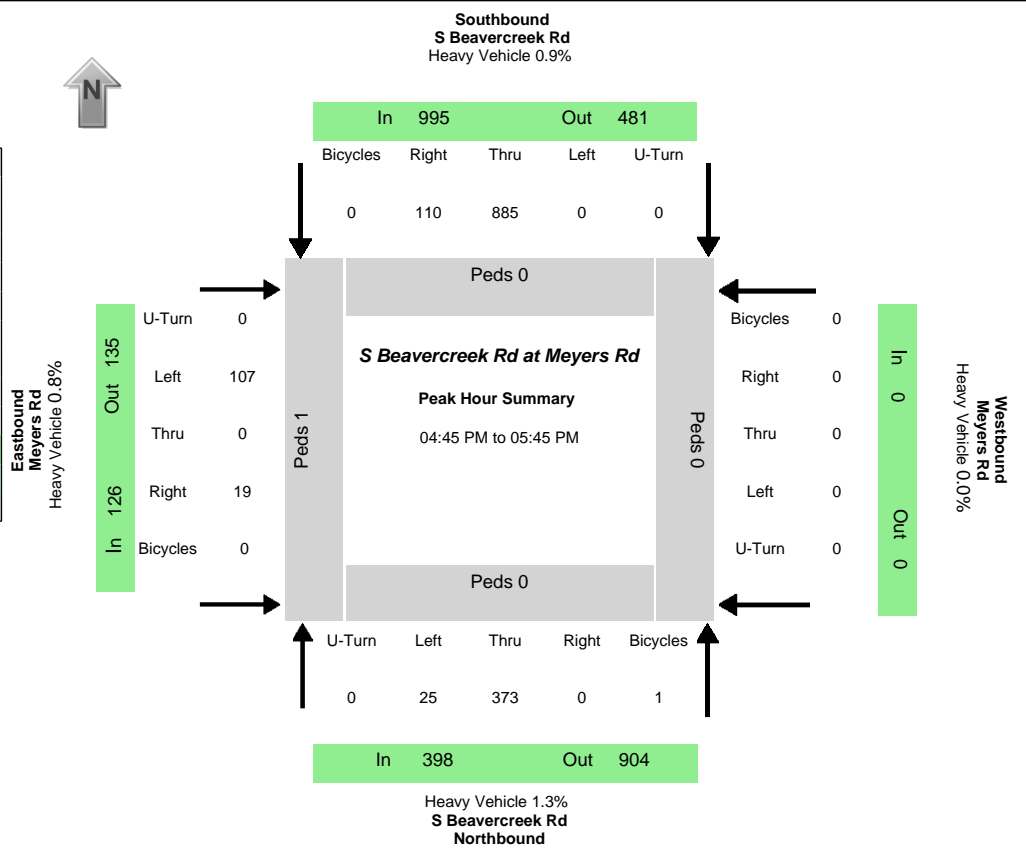
Peak-Hour Volumes (PHV)																							
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
15	481	0	0	0	1047	123	0	131	0	63	0	0	0	0	0	496	1170	194	0	1110	612	138	0
Percent Heavy Vehicles																							
0.0%	1.0%	0.0%	0.0%	0.0%	0.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.0%	0.7%	0.0%	0.0%	0.7%	0.8%	0.0%	0.0%
PHV - Bicycles																PHV - Pedestrians							
Northbound				Southbound				Eastbound				Westbound				Sum	in Crosswalk				Sum		
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn		NB	SB	EB	WB			
0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0		
All Vehicle Volumes																							
Time	Northbound S Beavercreek Rd				Southbound S Beavercreek Rd				Eastbound Clairmont Dr				Westbound Clairmont Dr				15 Min Sum	1 HR Sum					
	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn							
04:00:00 PM	3	43	0	0	0	74	7	0	8	0	7	0	0	0	0	0							
04:05:00 PM	2	33	0	0	0	87	8	0	14	0	4	0	0	0	0	0							
04:10:00 PM	2	43	0	0	0	99	5	0	6	0	2	0	0	0	0	0	447						
04:15:00 PM	1	36	0	0	0	66	13	0	4	0	1	0	0	0	0	0	426						
04:20:00 PM	1	39	0	0	0	78	6	0	6	0	4	0	0	0	0	0	412						
04:25:00 PM	1	30	0	0	0	76	8	0	2	0	3	0	0	0	0	0	375						
04:30:00 PM	1	45	0	0	0	74	7	0	9	0	4	0	0	0	0	0	394						
04:35:00 PM	1	32	0	0	0	78	4	0	18	0	1	0	0	0	0	0	394						
04:40:00 PM	3	42	0	0	0	88	8	0	8	0	5	0	0	0	0	0	428						
04:45:00 PM	0	47	0	0	0	96	13	0	11	0	6	0	0	0	0	0	461						
04:50:00 PM	2	51	0	0	0	93	12	0	8	0	9	0	0	0	0	0	502						
04:55:00 PM	0	31	0	0	0	85	4	0	14	0	6	0	0	0	0	0	488	1738					
05:00:00 PM	3	41	0	0	0	87	9	0	8	0	4	0	0	0	0	0	467	1748					
05:05:00 PM	0	42	0	0	0	70	10	0	31	0	3	0	0	0	0	0	448	1756					
05:10:00 PM	2	40	0	0	0	87	11	0	9	0	4	0	0	0	0	0	461	1752					
05:15:00 PM	1	38	0	0	0	90	8	0	7	0	4	0	0	0	0	0	457	1779					
05:20:00 PM	1	41	0	0	0	89	13	0	7	0	5	0	0	0	0	0	457	1801					
05:25:00 PM	1	31	0	0	0	88	4	0	9	0	3	0	0	0	0	0	440	1817					
05:30:00 PM	0	35	0	0	0	73	11	0	9	0	7	0	0	0	0	0	427	1812					
05:35:00 PM	1	42	0	0	0	87	9	0	6	0	3	0	0	0	0	0	419	1826					
05:40:00 PM	4	42	0	0	0	102	19	0	12	0	9	0	0	0	0	0	471	1860					
05:45:00 PM	2	36	0	0	0	87	13	0	4	0	3	0	0	0	0	0	481	1832					
05:50:00 PM	2	40	0	0	0	97	12	0	6	0	2	0	0	0	0	0	492	1816					
05:55:00 PM	6	36	0	0	0	71	11	0	8	0	3	0	0	0	0	0	439	1811					

Data Provided by K-D-N.com 503-594-4224	
N/S street	S Beavercreek Rd
E/W street	S Loder Rd
City, State	Oregon City OR
Site Notes	
Location	45.323869 - -122.562808
Start Date	Tuesday, April 23, 2019
Start Time	04:00:00 PM
Weather	
Study ID #	
Peak Hour Start	04:45:00 PM
Peak 15 Min Start	04:45:00 PM
PHF (15-Min Int)	0.94



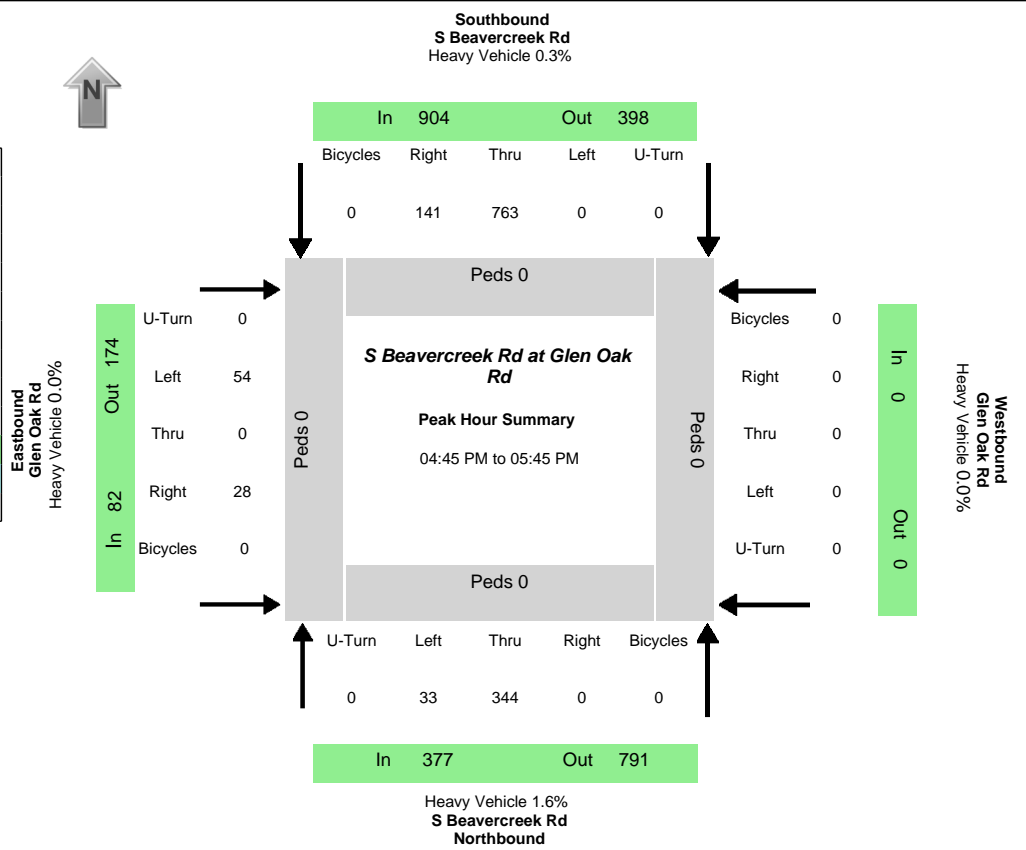
Peak-Hour Volumes (PHV)																							
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
0	474	6	0	25	1085	0	0	0	0	0	0	2	0	22	0	480	1110	0	24	1087	496	0	31
Percent Heavy Vehicles																							
0.0%	1.1%	0.0%	0.0%	8.0%	0.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.0%	0.7%	NaN	0.0%	0.6%	1.0%	NaN	6.5%
PHV - Bicycles																PHV - Pedestrians							
Northbound				Southbound				Eastbound				Westbound				Sum	in Crosswalk				Sum		
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn		NB	SB	EB	WB			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
All Vehicle Volumes																							
Time	Northbound S Beavercreek Rd				Southbound S Beavercreek Rd				Eastbound S Loder Rd				Westbound S Loder Rd				15 Min Sum	1 HR Sum					
	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn							
04:00:00 PM	0	44	1	0	1	80	0	0	0	0	0	0	1	0	2	0							
04:05:00 PM	0	34	1	0	0	91	0	0	0	0	0	0	0	0	1	0							
04:10:00 PM	0	44	0	0	3	98	0	0	0	0	0	0	1	0	1	0	403						
04:15:00 PM	0	37	1	0	1	66	0	0	0	0	0	0	0	0	0	0	379						
04:20:00 PM	0	39	1	0	2	80	0	0	0	0	0	0	1	0	1	0	376						
04:25:00 PM	0	30	0	0	3	76	0	0	0	0	0	0	0	0	1	0	339						
04:30:00 PM	0	43	1	0	0	78	0	0	0	0	0	0	0	0	3	0	359						
04:35:00 PM	0	31	0	0	1	78	0	0	0	0	0	0	0	0	2	0	347						
04:40:00 PM	0	43	0	0	5	88	0	0	0	0	0	0	0	0	2	0	375						
04:45:00 PM	0	43	1	0	1	101	0	0	0	0	0	0	0	0	4	0	400						
04:50:00 PM	0	51	1	0	1	101	0	0	0	0	0	0	0	0	2	0	444						
04:55:00 PM	0	29	0	0	2	89	0	0	0	0	0	0	0	0	2	0	428	1545					
05:00:00 PM	0	42	1	0	2	89	0	0	0	0	0	0	0	0	2	0	414	1552					
05:05:00 PM	0	41	1	0	2	71	0	0	0	0	0	0	0	0	1	0	374	1541					
05:10:00 PM	0	41	0	0	1	90	0	0	0	0	0	0	0	0	1	0	385	1527					
05:15:00 PM	0	38	0	0	4	90	0	0	0	0	0	0	0	0	1	0	382	1555					
05:20:00 PM	0	41	1	0	1	93	0	0	0	0	0	0	0	0	1	0	403	1568					
05:25:00 PM	0	28	0	0	2	89	0	0	0	0	0	0	2	0	4	0	395	1583					
05:30:00 PM	0	33	1	0	3	77	0	0	0	0	0	0	0	0	2	0	378	1574					
05:35:00 PM	0	43	0	0	0	90	0	0	0	0	0	0	0	0	0	0	374	1595					
05:40:00 PM	0	44	0	0	6	105	0	0	0	0	0	0	0	0	2	0	406	1614					
05:45:00 PM	0	38	0	0	3	87	0	0	0	0	0	0	0	0	0	0	418	1592					
05:50:00 PM	0	39	0	0	3	96	0	0	0	0	0	0	0	0	3	0	426	1577					
05:55:00 PM	0	41	1	0	2	72	0	0	0	0	0	0	0	0	1	0	386	1572					

Data Provided by K-D-N.com 503-594-4224	
N/S street	S Beavercreek Rd
E/W street	Meyers Rd
City, State	Oregon City OR
Site Notes	
Location	45.319726 - -122.557943
Start Date	Tuesday, April 23, 2019
Start Time	04:00:00 PM
Weather	
Study ID #	
Peak Hour Start	04:45:00 PM
Peak 15 Min Start	04:45:00 PM
PHF (15-Min Int)	0.95



Peak-Hour Volumes (PHV)																							
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
25	373	0	0	0	885	110	0	107	0	19	0	0	0	0	0	398	995	126	0	904	480	135	0
Percent Heavy Vehicles																							
8.0%	0.8%	0.0%	0.0%	0.0%	0.2%	6.4%	0.0%	0.0%	0.0%	5.3%	0.0%	0.0%	0.0%	0.0%	0.0%	1.3%	0.9%	0.8%	0.0%	0.3%	0.6%	6.7%	0.0%
PHV- Bicycles																PHV - Pedestrians							
Northbound				Southbound				Eastbound				Westbound				Sum	in Crosswalk				Sum		
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn		NB	SB	EB	WB			
0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0		1	
All Vehicle Volumes																							
Time	Northbound S Beavercreek Rd				Southbound S Beavercreek Rd				Eastbound Meyers Rd				Westbound Meyers Rd				15 Min Sum	1 HR Sum					
	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn							
04:00:00 PM	1	35	0	0	0	63	13	0	11	0	4	0	0	0	0	0							
04:05:00 PM	0	18	0	0	0	74	12	0	14	0	0	0	0	0	0	0							
04:10:00 PM	1	29	0	0	0	79	12	0	11	0	2	0	0	0	0	0	379						
04:15:00 PM	0	30	0	0	0	67	5	0	8	0	2	0	0	0	0	0	364						
04:20:00 PM	0	25	0	0	0	70	9	0	5	0	1	0	0	0	0	0	356						
04:25:00 PM	2	25	0	0	0	64	12	0	9	0	4	0	0	0	0	0	338						
04:30:00 PM	2	33	0	0	0	66	7	0	10	0	0	0	0	0	0	0	344						
04:35:00 PM	2	28	0	0	0	70	15	0	8	0	0	0	0	0	0	0	357						
04:40:00 PM	0	38	0	0	0	57	15	0	4	0	0	0	0	0	0	0	355						
04:45:00 PM	2	45	0	0	0	78	8	0	8	0	0	0	0	0	0	0	378						
04:50:00 PM	7	36	0	0	0	74	10	0	6	0	3	0	0	0	0	0	391						
04:55:00 PM	4	20	0	0	0	73	14	0	10	0	2	0	0	0	0	0	400	1472					
05:00:00 PM	2	28	0	0	0	76	1	0	15	0	1	0	0	0	0	0	382	1468					
05:05:00 PM	0	34	0	0	0	49	15	0	8	0	1	0	0	0	0	0	353	1457					
05:10:00 PM	1	28	0	0	0	79	7	0	11	0	1	0	0	0	0	0	357	1450					
05:15:00 PM	3	31	0	0	0	75	10	0	5	0	1	0	0	0	0	0	359	1463					
05:20:00 PM	4	32	0	0	0	63	13	0	10	0	5	0	0	0	0	0	379	1480					
05:25:00 PM	0	28	0	0	0	89	7	0	3	0	0	0	0	0	0	0	379	1491					
05:30:00 PM	1	22	0	0	0	77	8	0	6	0	1	0	0	0	0	0	369	1488					
05:35:00 PM	1	35	0	0	0	57	8	0	14	0	2	0	0	0	0	0	359	1482					
05:40:00 PM	0	34	0	0	0	95	9	0	11	0	2	0	0	0	0	0	383	1519					
05:45:00 PM	2	22	0	0	0	69	13	0	10	0	0	0	0	0	0	0	384	1494					
05:50:00 PM	3	36	0	0	0	76	11	0	8	0	1	0	0	0	0	0	402	1493					
05:55:00 PM	3	32	0	0	0	61	9	0	8	0	0	0	0	0	0	0	364	1483					

Data Provided by K-D-N.com 503-594-4224	
N/S street	S Beavercreek Rd
E/W street	Glen Oak Rd
City, State	Oregon City OR
Site Notes	
Location	45.317037 - -122.554661
Start Date	Tuesday, April 23, 2019
Start Time	04:00:00 PM
Weather	
Study ID #	
Peak Hour Start	04:45:00 PM
Peak 15 Min Start	04:45:00 PM
PHF (15-Min Int)	0.95


























Peak-Hour Volumes (PHV)																							
Northbound				Southbound				Eastbound				Westbound				Entering				Leaving			
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	NB	SB	EB	WB	NB	SB	EB	WB
33	344	0	0	0	763	141	0	54	0	28	0	0	0	0	0	377	904	82	0	791	398	174	0
Percent Heavy Vehicles																							
3.0%	1.5%	0.0%	0.0%	0.0%	0.3%	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.6%	0.3%	0.0%	0.0%	0.3%	1.3%	1.1%	0.0%
PHV - Bicycles																PHV - Pedestrians							
Northbound				Southbound				Eastbound				Westbound				Sum	in Crosswalk				Sum		
Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn		NB	SB	EB	WB			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
All Vehicle Volumes																							
Time	Northbound S Beavercreek Rd				Southbound S Beavercreek Rd				Eastbound Glen Oak Rd				Westbound Glen Oak Rd				15 Min Sum	1 HR Sum					
	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn	Left	Thru	Right	Uturn							
04:00:00 PM	3	34	0	0	0	55	12	0	2	0	1	0	0	0	0	0							
04:05:00 PM	4	18	0	0	0	63	11	0	0	0	5	0	0	0	0	0							
04:10:00 PM	1	26	0	0	0	69	12	0	4	0	1	0	0	0	0	0	321						
04:15:00 PM	4	26	0	0	0	61	8	0	4	0	3	0	0	0	0	0	320						
04:20:00 PM	2	20	0	0	0	59	12	0	5	0	1	0	0	0	0	0	318						
04:25:00 PM	5	26	0	0	0	63	5	0	1	0	0	0	0	0	0	0	305						
04:30:00 PM	1	32	0	0	0	57	9	0	3	0	1	0	0	0	0	0	302						
04:35:00 PM	3	28	0	0	0	63	7	0	2	0	0	0	0	0	0	0	306						
04:40:00 PM	2	32	0	0	0	50	7	0	6	0	2	0	0	0	0	0	305						
04:45:00 PM	2	34	0	0	0	56	22	0	13	0	1	0	0	0	0	0	330						
04:50:00 PM	2	41	0	0	0	66	11	0	2	0	2	0	0	0	0	0	351						
04:55:00 PM	3	22	0	0	0	63	12	0	2	0	3	0	0	0	0	0	357	1288					
05:00:00 PM	2	24	0	0	0	77	0	0	6	0	3	0	0	0	0	0	341	1293					
05:05:00 PM	3	30	0	0	0	37	13	0	4	0	3	0	0	0	0	0	307	1282					
05:10:00 PM	2	24	0	0	0	70	10	0	5	0	3	0	0	0	0	0	316	1283					
05:15:00 PM	3	29	0	0	0	66	10	0	5	0	2	0	0	0	0	0	319	1292					
05:20:00 PM	3	32	0	0	0	63	5	0	4	0	2	0	0	0	0	0	338	1302					
05:25:00 PM	1	25	0	0	0	71	18	0	3	0	4	0	0	0	0	0	346	1324					
05:30:00 PM	4	20	0	0	0	64	14	0	3	0	2	0	0	0	0	0	338	1328					
05:35:00 PM	3	30	0	0	0	46	13	0	6	0	2	0	0	0	0	0	329	1325					
05:40:00 PM	5	33	0	0	0	84	13	0	1	0	1	0	0	0	0	0	344	1363					
05:45:00 PM	0	22	0	0	0	55	14	0	2	0	3	0	0	0	0	0	333	1331					
05:50:00 PM	2	32	0	0	0	65	12	0	7	0	3	0	0	0	0	0	354	1328					
05:55:00 PM	4	30	0	0	0	56	5	0	5	0	0	0	0	0	0	0	317	1323					

Synchro HCM Reports

HCM Signalized Intersection Capacity Analysis

16: OR 213 & Beaver Creek Road






















2035 TSP planned base -withHolly ext

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	490	950	70	110	665	535	65	765	130	980	1510	665
Future Volume (vph)	490	950	70	110	665	535	65	765	130	980	1510	665
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	0.97	0.95		0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	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	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3495		3433	3539	1553	1597	3471	1568	3400	3471	1568
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3495		3433	3539	1553	1597	3471	1568	3400	3471	1568
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	500	969	71	112	679	546	66	781	133	1000	1541	679
RTOR Reduction (vph)	0	5	0	0	0	386	0	0	106	0	0	268
Lane Group Flow (vph)	500	1035	0	112	679	160	66	781	27	1000	1541	411
Confl. Peds. (#/hr)	1		3	3		1			2	2		
Confl. Bikes (#/hr)			1			1						
Heavy Vehicles (%)	2%	2%	3%	2%	2%	4%	13%	4%	3%	3%	4%	3%
Turn Type	Prot	NA		Prot	NA	Prot	Prot	NA	Prot	Prot	NA	Prot
Protected Phases	7	4		3	8	8	1	6	6	5	2	2
Permitted Phases												
Actuated Green, G (s)	14.7	31.1		4.1	20.5	20.5	4.0	20.8	20.8	32.5	49.3	49.3
Effective Green, g (s)	15.2	31.6		4.6	21.0	21.0	4.5	22.8	22.8	33.0	51.3	51.3
Actuated g/C Ratio	0.14	0.28		0.04	0.19	0.19	0.04	0.20	0.20	0.29	0.46	0.46
Clearance Time (s)	5.5	5.5		5.5	5.5	5.5	5.5	7.0	7.0	5.5	7.0	7.0
Vehicle Extension (s)	2.3	2.3		2.3	2.3	2.3	2.3	4.7	4.7	2.3	4.7	4.7
Lane Grp Cap (vph)	465	986		140	663	291	64	706	319	1001	1589	718
v/s Ratio Prot	0.15	c0.30		0.03	c0.19	0.10	0.04	c0.22	0.02	c0.29	0.44	0.26
v/s Ratio Perm												
v/c Ratio	1.08	1.05		0.80	1.02	0.55	1.03	1.11	0.08	1.00	0.97	0.57
Uniform Delay, d1	48.4	40.2		53.2	45.5	41.2	53.8	44.6	36.1	39.5	29.6	22.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	63.4	42.6		26.0	41.2	1.6	121.5	66.8	0.2	28.0	16.0	1.6
Delay (s)	111.8	82.8		79.3	86.7	42.8	175.2	111.4	36.4	67.5	45.6	23.9
Level of Service	F	F		E	F	D	F	F	D	E	D	C
Approach Delay (s)		92.2			68.2			105.5			47.8	
Approach LOS		F			E			F			D	
Intersection Summary												
HCM 2000 Control Delay			69.3									
HCM 2000 Volume to Capacity ratio			1.07									
Actuated Cycle Length (s)			112.0									
Intersection Capacity Utilization			98.1%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

17: Beaver Creek Road & Maple Lane Road




















2035 TSP planned base -withHolly ext

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	475	1440	115	30	815	55	180	110	110	60	70	315
Future Volume (vph)	475	1440	115	30	815	55	180	110	110	60	70	315
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	0.99		1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1787	3535		1805	3537		1805	1718		1717	1900	1615
Flt Permitted	0.95	1.00		0.95	1.00		0.46	1.00		0.45	1.00	1.00
Satd. Flow (perm)	1787	3535		1805	3537		882	1718		806	1900	1615
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	485	1469	117	31	832	56	184	112	112	61	71	321
RTOR Reduction (vph)	0	4	0	0	3	0	0	26	0	0	0	80
Lane Group Flow (vph)	485	1582	0	31	885	0	184	198	0	61	71	241
Confl. Peds. (#/hr)	1					1			2	2		
Heavy Vehicles (%)	1%	1%	1%	0%	1%	0%	0%	1%	2%	5%	0%	0%
Turn Type	Prot	NA		Prot	NA		pm+pt	NA		pm+pt	NA	pm+ov
Protected Phases	5	2		1	6		3	8		7	4	5
Permitted Phases							8			4		4
Actuated Green, G (s)	37.2	81.0		2.8	46.6		29.5	17.9		16.4	9.3	46.5
Effective Green, g (s)	37.2	81.5		2.8	47.1		30.0	18.4		17.4	9.8	46.5
Actuated g/C Ratio	0.29	0.65		0.02	0.37		0.24	0.15		0.14	0.08	0.37
Clearance Time (s)	4.0	4.5		4.0	4.5		4.5	4.5		4.5	4.5	4.0
Vehicle Extension (s)	2.5	4.0		2.5	4.0		2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)	526	2281		40	1319		327	250		165	147	594
v/s Ratio Prot	c0.27	c0.45		0.02	0.25		c0.07	c0.12		0.02	0.04	0.12
v/s Ratio Perm							0.06			0.03		0.03
v/c Ratio	0.92	0.69		0.78	0.67		0.56	0.79		0.37	0.48	0.41
Uniform Delay, d1	43.1	14.4		61.4	33.1		41.0	52.1		48.7	55.8	29.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	21.8	1.8		59.7	2.7		1.8	15.3		1.0	1.8	0.3
Delay (s)	64.9	16.2		121.1	35.8		42.8	67.4		49.7	57.6	30.0
Level of Service	E	B		F	D		D	E		D	E	C
Approach Delay (s)		27.6			38.7			56.3			37.0	
Approach LOS		C			D			E			D	
Intersection Summary												
HCM 2000 Control Delay			34.4				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.80									
Actuated Cycle Length (s)			126.3				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			80.1%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

21: Beaver Creek Road & Glen Oak Road





















2035 TSP planned base -withHolly ext

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	20	10	10	10	60	10	485	45	15	1145	125
Future Volume (vph)	60	20	10	10	10	60	10	485	45	15	1145	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	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	1.00	
Frt	1.00	0.95			0.90		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1805			1696		1752	1859		1805	1870	
Flt Permitted	0.69	1.00			0.96		0.10	1.00		0.44	1.00	
Satd. Flow (perm)	1306	1805			1639		190	1859		842	1870	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	61	20	10	10	10	61	10	495	46	15	1168	128
RTOR Reduction (vph)	0	9	0	0	55	0	0	2	0	0	3	0
Lane Group Flow (vph)	61	21	0	0	26	0	10	539	0	15	1293	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	3%	1%	0%	0%	0%	1%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	7.8	7.8			7.8		66.8	66.8		66.8	66.8	
Effective Green, g (s)	7.8	7.8			7.8		66.8	66.8		66.8	66.8	
Actuated g/C Ratio	0.09	0.09			0.09		0.81	0.81		0.81	0.81	
Clearance Time (s)	4.0	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	3.0	
Lane Grp Cap (vph)	123	170			154		153	1503		680	1512	
v/s Ratio Prot		0.01						0.29			c0.69	
v/s Ratio Perm	c0.05				0.02		0.05			0.02		
v/c Ratio	0.50	0.12			0.17		0.07	0.36		0.02	0.86	
Uniform Delay, d1	35.5	34.3			34.4		1.6	2.1		1.5	4.9	
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.1	0.3			0.5		0.2	0.1		0.0	5.0	
Delay (s)	38.7	34.6			34.9		1.8	2.3		1.6	9.9	
Level of Service	D	C			C		A	A		A	A	
Approach Delay (s)		37.3			34.9			2.3			9.8	
Approach LOS		D			C			A			A	
Intersection Summary												
HCM 2000 Control Delay			10.0									A
HCM 2000 Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			82.6								8.0	
Intersection Capacity Utilization			86.0%								E	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

90: Clairmont Dr & Beaver Creek Road

2035 TSP planned base -withHolly ext

















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	190	85	65	70	65	40	20	785	95	75	1350	190
Future Volume (vph)	190	85	65	70	65	40	20	785	95	75	1350	190
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95			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	1.00	1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.94			0.97		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	0.99			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1715	1693			1805		1805	1849		1805	1881	1615
Flt Permitted	0.55	0.94			0.62		0.06	1.00		0.23	1.00	1.00
Satd. Flow (perm)	988	1608			1150		116	1849		432	1881	1615
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	194	87	66	71	66	41	20	801	97	77	1378	194
RTOR Reduction (vph)	0	24	0	0	12	0	0	5	0	0	0	28
Lane Group Flow (vph)	169	154	0	0	166	0	20	893	0	77	1378	166
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	1%	0%
Turn Type	custom	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases					8			2			6	
Permitted Phases	4	4		8			2			6		6
Actuated Green, G (s)	16.7	16.7			16.7		65.5	65.5		65.5	65.5	65.5
Effective Green, g (s)	16.7	16.7			16.7		65.5	65.5		65.5	65.5	65.5
Actuated g/C Ratio	0.19	0.19			0.19		0.73	0.73		0.73	0.73	0.73
Clearance Time (s)	4.0	4.0			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	3.0	3.0
Lane Grp Cap (vph)	182	297			212		84	1342		313	1365	1172
v/s Ratio Prot								0.48			c0.73	
v/s Ratio Perm	c0.17	0.10			0.14		0.17			0.18		0.10
v/c Ratio	0.93	0.52			0.78		0.24	0.67		0.25	1.01	0.14
Uniform Delay, d1	36.2	33.1			35.0		4.1	6.5		4.1	12.4	3.8
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	46.1	1.5			16.9		1.5	1.3		0.4	26.7	0.1
Delay (s)	82.2	34.7			51.9		5.6	7.8		4.5	39.1	3.8
Level of Service	F	C			D		A	A		A	D	A
Approach Delay (s)		57.8			51.9			7.8			33.3	
Approach LOS		E			D			A			C	
Intersection Summary												
HCM 2000 Control Delay			29.5				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.99									
Actuated Cycle Length (s)			90.2				Sum of lost time (s)			8.0		
Intersection Capacity Utilization			100.3%				ICU Level of Service			G		
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

126: Beaver Creek Rd & Loder Rd





















2035 TSP planned base -withHolly ext

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	105	80	10	110	60	45	780	20	50	1295	140
Future Volume (vph)	60	105	80	10	110	60	45	780	20	50	1295	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.96			0.95			1.00			0.99	
Flt Protected		0.99			1.00			1.00			1.00	
Satd. Flow (prot)		1794			1810			1872			1852	
Flt Permitted		0.75			0.97			0.86			0.95	
Satd. Flow (perm)		1368			1764			1608			1763	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	61	107	82	10	112	61	46	796	20	51	1321	143
RTOR Reduction (vph)	0	20	0	0	20	0	0	1	0	0	4	0
Lane Group Flow (vph)	0	230	0	0	163	0	0	861	0	0	1511	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	0%	8%	1%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		16.0			16.0			66.5			66.5	
Effective Green, g (s)		16.0			16.0			66.5			66.5	
Actuated g/C Ratio		0.18			0.18			0.73			0.73	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		241			311			1181			1295	
v/s Ratio Prot												
v/s Ratio Perm		c0.17			0.09			0.54			c0.86	
v/c Ratio		0.96			0.52			0.73			1.17	
Uniform Delay, d1		36.9			33.8			6.9			12.0	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		45.2			1.6			2.3			83.7	
Delay (s)		82.1			35.4			9.1			95.7	
Level of Service		F			D			A			F	
Approach Delay (s)		82.1			35.4			9.1			95.7	
Approach LOS		F			D			A			F	
Intersection Summary												
HCM 2000 Control Delay		64.0			HCM 2000 Level of Service			E				
HCM 2000 Volume to Capacity ratio		1.12										
Actuated Cycle Length (s)		90.5			Sum of lost time (s)			8.0				
Intersection Capacity Utilization		126.5%			ICU Level of Service			H				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

129: Meyers Rd & Beaver Creek Rd
























2035 TSP planned base -withHolly ext

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	110	20	20	180	25	280	25	505	75	170	1085	130
Future Volume (vph)	110	20	20	180	25	280	25	505	75	170	1085	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	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	1.00	
Frpb, ped/bikes	1.00	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	1.00	
Frt	1.00	0.93			0.92		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1715			1720		1671	1841		1803	1857	
Flt Permitted	0.37	1.00			0.86		0.06	1.00		0.37	1.00	
Satd. Flow (perm)	712	1715			1508		114	1841		706	1857	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	112	20	20	184	26	286	26	515	77	173	1107	133
RTOR Reduction (vph)	0	16	0	0	54	0	0	6	0	0	5	0
Lane Group Flow (vph)	112	24	0	0	442	0	26	586	0	173	1235	0
Confl. Peds. (#/hr)									1	1		
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	0%	5%	0%	0%	0%	8%	1%	0%	0%	0%	6%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	20.0	20.0			20.0		62.0	62.0		62.0	62.0	
Effective Green, g (s)	20.0	20.0			20.0		62.0	62.0		62.0	62.0	
Actuated g/C Ratio	0.22	0.22			0.22		0.69	0.69		0.69	0.69	
Clearance Time (s)	4.0	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	3.0	
Lane Grp Cap (vph)	158	381			335		78	1268		486	1279	
v/s Ratio Prot		0.01						0.32			c0.67	
v/s Ratio Perm	0.16				c0.29		0.23			0.25		
v/c Ratio	0.71	0.06			1.32		0.33	0.46		0.36	0.97	
Uniform Delay, d1	32.3	27.6			35.0		5.7	6.4		5.8	13.0	
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	13.6	0.1			162.7		11.1	1.2		2.0	18.2	
Delay (s)	45.9	27.7			197.7		16.8	7.6		7.8	31.2	
Level of Service	D	C			F		B	A		A	C	
Approach Delay (s)		41.1			197.7			8.0			28.4	
Approach LOS		D			F			A			C	
Intersection Summary												
HCM 2000 Control Delay			55.7				HCM 2000 Level of Service			E		
HCM 2000 Volume to Capacity ratio			1.05									
Actuated Cycle Length (s)			90.0				Sum of lost time (s)			8.0		
Intersection Capacity Utilization			113.5%				ICU Level of Service			H		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

16: OR 213 & Beaver Creek Road






















07/30/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	735	825	80	165	585	730	40	695	170	855	1145	750
Future Volume (vph)	735	825	80	165	585	730	40	695	170	855	1145	750
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	0.97	0.95		0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	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	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3482		3433	3539	1553	1597	3471	1568	3400	3471	1568
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3482		3433	3539	1553	1597	3471	1568	3400	3471	1568
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	750	842	82	168	597	745	41	709	173	872	1168	765
RTOR Reduction (vph)	0	6	0	0	0	385	0	0	135	0	0	277
Lane Group Flow (vph)	750	918	0	168	597	360	41	709	38	872	1168	488
Confl. Peds. (#/hr)	1		3	3		1			2	2		
Confl. Bikes (#/hr)			1			1						
Heavy Vehicles (%)	2%	2%	3%	2%	2%	4%	13%	4%	3%	3%	4%	3%
Turn Type	Prot	NA		Prot	NA	Prot	Prot	NA	Prot	Prot	NA	Prot
Protected Phases	7	4		3	8	8	1	6	6	5	2	2
Permitted Phases												
Actuated Green, G (s)	14.7	31.1		4.1	20.5	20.5	3.2	22.3	22.3	30.7	49.8	49.8
Effective Green, g (s)	15.2	31.6		4.6	21.0	21.0	3.7	24.3	24.3	31.2	51.8	51.8
Actuated g/C Ratio	0.14	0.28		0.04	0.19	0.19	0.03	0.22	0.22	0.28	0.46	0.46
Clearance Time (s)	5.5	5.5		5.5	5.5	5.5	5.5	7.0	7.0	5.5	7.0	7.0
Vehicle Extension (s)	2.3	2.3		2.3	2.3	2.3	2.3	4.7	4.7	2.3	4.7	4.7
Lane Grp Cap (vph)	467	985		141	665	291	52	755	341	949	1609	727
v/s Ratio Prot	c0.22	0.26		0.05	0.17	c0.23	0.03	c0.20	0.02	c0.26	0.34	0.31
v/s Ratio Perm												
v/c Ratio	1.61	0.93		1.19	0.90	1.24	0.79	0.94	0.11	0.92	0.73	0.67
Uniform Delay, d1	48.2	39.0		53.6	44.3	45.4	53.6	43.0	35.0	39.0	24.2	23.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	282.6	14.8		136.4	14.7	132.8	51.6	19.7	0.3	13.4	2.0	3.0
Delay (s)	330.8	53.8		189.9	59.0	178.2	105.2	62.7	35.3	52.4	26.2	26.3
Level of Service	F	D		F	E	F	F	E	D	D	C	C
Approach Delay (s)		177.9			132.3			59.4			34.4	
Approach LOS		F			F			E			C	
Intersection Summary												
HCM 2000 Control Delay			93.9									
HCM 2000 Volume to Capacity ratio			1.11									
Actuated Cycle Length (s)			111.7									
Intersection Capacity Utilization			98.0%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis








17: Beaver Creek Road & Maple Lane Road

07/30/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	465	970	315	75	755	115	380	130	95	105	135	350
Future Volume (vph)	465	970	315	75	755	115	380	130	95	105	135	350
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.96		1.00	0.98		1.00	0.94		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1787	3443		1805	3497		1805	1743		1717	1900	1615
Flt Permitted	0.95	1.00		0.95	1.00		0.31	1.00		0.41	1.00	1.00
Satd. Flow (perm)	1787	3443		1805	3497		594	1743		740	1900	1615
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	474	990	321	77	770	117	388	133	97	107	138	357
RTOR Reduction (vph)	0	21	0	0	8	0	0	18	0	0	0	29
Lane Group Flow (vph)	474	1290	0	77	879	0	388	212	0	107	138	328
Confl. Peds. (#/hr)	1					1			2	2		
Heavy Vehicles (%)	1%	1%	1%	0%	1%	0%	0%	1%	2%	5%	0%	0%
Turn Type	Prot	NA		Prot	NA		pm+pt	NA		pm+pt	NA	pm+ov
Protected Phases	5	2		1	6		3	8		7	4	5
Permitted Phases							8			4		4
Actuated Green, G (s)	38.7	79.6		5.0	45.9		37.8	21.9		25.7	14.3	53.0
Effective Green, g (s)	38.7	80.1		5.0	46.4		38.3	22.4		26.7	14.8	53.0
Actuated g/C Ratio	0.29	0.59		0.04	0.34		0.28	0.17		0.20	0.11	0.39
Clearance Time (s)	4.0	4.5		4.0	4.5		4.5	4.5		4.5	4.5	4.0
Vehicle Extension (s)	2.5	4.0		2.5	4.0		2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)	510	2036		66	1198		342	288		231	207	632
v/s Ratio Prot	c0.27	0.37		0.04	c0.25		c0.16	0.12		0.04	0.07	0.15
v/s Ratio Perm							c0.16			0.05		0.05
v/c Ratio	0.93	0.63		1.17	0.73		1.13	0.73		0.46	0.67	0.52
Uniform Delay, d1	47.0	18.1		65.2	39.1		44.9	53.7		46.6	57.9	31.5
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	23.4	1.5		162.9	4.0		90.3	8.8		1.1	7.1	0.5
Delay (s)	70.4	19.6		228.1	43.1		135.2	62.5		47.7	65.0	32.0
Level of Service	E	B		F	D		F	E		D	E	C
Approach Delay (s)		33.1			57.9			108.2			42.4	
Approach LOS		C			E			F			D	
Intersection Summary												
HCM 2000 Control Delay			52.2			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.94									
Actuated Cycle Length (s)			135.4			Sum of lost time (s)				16.0		
Intersection Capacity Utilization			91.8%			ICU Level of Service				F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th TWSC
21: Beaver Creek Road & Glen Oak Road

07/30/2019

Intersection												
Int Delay, s/veh	62.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	65	30	30	60	35	175	35	355	40	85	740	140
Future Vol, veh/h	65	30	30	60	35	175	35	355	40	85	740	140
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	-	-	-	115	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	98	98	98	98	98	98	98	98	98
Heavy Vehicles, %	0	0	0	0	0	0	3	1	0	0	0	1
Mvmt Flow	66	31	31	61	36	179	36	362	41	87	755	143

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1563	1476	827	1487	1527	383	898	0	0	403	0	0
Stage 1	1001	1001	-	455	455	-	-	-	-	-	-	-
Stage 2	562	475	-	1032	1072	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.13	-	-	4.1	-	-
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	3.5	4	3.3	3.5	4	3.3	2.227	-	-	2.2	-	-
Pot Cap-1 Maneuver	92	127	375	104	119	669	752	-	-	1167	-	-
Stage 1	295	323	-	589	572	-	-	-	-	-	-	-
Stage 2	515	561	-	284	299	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 45	112	375	69	105	669	752	-	-	1167	-	-
Mov Cap-2 Maneuver	~ 45	112	-	69	105	-	-	-	-	-	-	-
Stage 1	281	299	-	561	545	-	-	-	-	-	-	-
Stage 2	336	534	-	217	277	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	249.5		296.8		0.8		0.7	
HCM LOS	F		F					

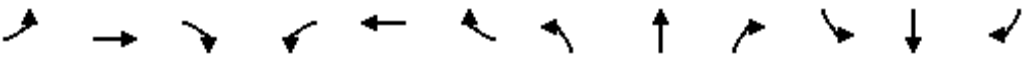








Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	752	-	-	45	172	184	1167	-	-
HCM Lane V/C Ratio	0.047	-	-	1.474	0.356	1.497	0.074	-	-
HCM Control Delay (s)	10	-	-	\$ 445.5	37.1	296.8	8.3	-	-
HCM Lane LOS	B	-	-	F	E	F	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	6.5	1.5	17.4	0.2	-	-

Notes			
-: Volume exceeds capacity	\$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

HCM Signalized Intersection Capacity Analysis





90: Clairmont Dr & Beaver Creek Road

07/30/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	10	75	70	10	155	65	800	35	70	985	140
Future Volume (vph)	125	10	75	70	10	155	65	800	35	70	985	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95			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	1.00	1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.89			0.91		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.99			0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1715	1592			1705		1805	1868		1805	1881	1615
Flt Permitted	0.49	0.94			0.87		0.14	1.00		0.22	1.00	1.00
Satd. Flow (perm)	882	1511			1505		267	1868		427	1881	1615
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	128	10	77	71	10	158	66	816	36	71	1005	143
RTOR Reduction (vph)	0	61	0	0	76	0	0	2	0	0	0	34
Lane Group Flow (vph)	111	43	0	0	163	0	66	850	0	71	1005	109
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	1%	0%
Turn Type	custom	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases					8			2			6	
Permitted Phases	4	4		8			2			6		6
Actuated Green, G (s)	13.2	13.2			13.2		42.9	42.9		42.9	42.9	42.9
Effective Green, g (s)	13.2	13.2			13.2		42.9	42.9		42.9	42.9	42.9
Actuated g/C Ratio	0.21	0.21			0.21		0.67	0.67		0.67	0.67	0.67
Clearance Time (s)	4.0	4.0			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	3.0	3.0
Lane Grp Cap (vph)	181	311			309		178	1250		285	1258	1080
v/s Ratio Prot								0.45			c0.53	
v/s Ratio Perm	c0.13	0.03			0.11		0.25			0.17		0.07
v/c Ratio	0.61	0.14			0.53		0.37	0.68		0.25	0.80	0.10
Uniform Delay, d1	23.1	20.8			22.7		4.7	6.4		4.2	7.5	3.8
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	6.0	0.2			1.6		1.3	1.5		0.5	3.6	0.0
Delay (s)	29.2	21.0			24.3		6.0	8.0		4.7	11.2	3.8
Level of Service	C	C			C		A	A		A	B	A
Approach Delay (s)		25.2			24.3			7.8			9.9	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay			11.8				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			64.1				Sum of lost time (s)			8.0		
Intersection Capacity Utilization			85.4%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th TWSC
126: Beaver Creek Rd & Loder Rd









07/30/2019

Intersection												
Int Delay, s/veh	645.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	35	30	50	25	180	30	695	40	90	1015	30
Future Vol, veh/h	25	35	30	50	25	180	30	695	40	90	1015	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
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	98	98	98	98	98	98	98	98	98	98	98	98
Heavy Vehicles, %	0	0	0	0	0	0	0	1	0	8	1	0
Mvmt Flow	26	36	31	51	26	184	31	709	41	92	1036	31
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	2133	2048	1052	2061	2043	730	1067	0	0	750	0	0
Stage 1	1236	1236	-	792	792	-	-	-	-	-	-	-
Stage 2	897	812	-	1269	1251	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.18	-	-
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	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.272	-	-
Pot Cap-1 Maneuver	36	57	278	~ 41	57	426	661	-	-	833	-	-
Stage 1	218	250	-	385	404	-	-	-	-	-	-	-
Stage 2	337	395	-	208	246	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	~ 7	38	278	~ 5	38	426	661	-	-	833	-	-
Mov Cap-2 Maneuver	~ 7	38	-	~ 5	38	-	-	-	-	-	-	-
Stage 1	200	182	-	354	371	-	-	-	-	-	-	-
Stage 2	164	363	-	108	179	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, \$ 2005.6			\$ 4968.2		0.4		0.8					
HCM LOS	F		F									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	661	-	-	20 23	833	-	-					
HCM Lane V/C Ratio	0.046	-	-	4.592 11.313	0.11	-	-					
HCM Control Delay (s)	10.7	0	\$ 2005.6	\$ 4968.2	9.9	0	-					
HCM Lane LOS	B	A	-	F F	A	A	-					
HCM 95th %tile Q(veh)	0.1	-	-	11.9 32.6	0.4	-	-					
Notes												
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined				*: All major volume in platoon				

HCM Signalized Intersection Capacity Analysis

129: Meyers Rd & Beaver Creek Rd
























07/30/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	150	15	25	105	30	165	60	485	45	110	835	140
Future Volume (vph)	150	15	25	105	30	165	60	485	45	110	835	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	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	1.00	
Frpb, ped/bikes	1.00	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	1.00	
Frt	1.00	0.90			0.93		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1666			1729		1671	1855		1803	1843	
Flt Permitted	0.41	1.00			0.87		0.17	1.00		0.41	1.00	
Satd. Flow (perm)	784	1666			1526		293	1855		777	1843	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	153	15	26	107	31	168	61	495	46	112	852	143
RTOR Reduction (vph)	0	21	0	0	50	0	0	4	0	0	6	0
Lane Group Flow (vph)	153	20	0	0	256	0	61	537	0	112	989	0
Confl. Peds. (#/hr)									1	1		
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	0%	5%	0%	0%	0%	8%	1%	0%	0%	0%	6%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	17.9	17.9			17.9		62.2	62.2		62.2	62.2	
Effective Green, g (s)	17.9	17.9			17.9		62.2	62.2		62.2	62.2	
Actuated g/C Ratio	0.20	0.20			0.20		0.71	0.71		0.71	0.71	
Clearance Time (s)	4.0	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	3.0	
Lane Grp Cap (vph)	159	338			310		206	1309		548	1301	
v/s Ratio Prot		0.01						0.29			c0.54	
v/s Ratio Perm	c0.20				0.17		0.21			0.14		
v/c Ratio	0.96	0.06			0.83		0.30	0.41		0.20	0.76	
Uniform Delay, d1	34.8	28.3			33.6		4.8	5.4		4.4	8.2	
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	59.8	0.1			16.2		3.6	1.0		0.8	4.2	
Delay (s)	94.5	28.4			49.8		8.4	6.3		5.3	12.4	
Level of Service	F	C			D		A	A		A	B	
Approach Delay (s)		80.6			49.8			6.5			11.7	
Approach LOS		F			D			A			B	
Intersection Summary												
HCM 2000 Control Delay			21.6									HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio			0.80									
Actuated Cycle Length (s)			88.1									Sum of lost time (s) 8.0
Intersection Capacity Utilization			90.0%									ICU Level of Service E
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

16: OR 213 & Beaver Creek Road











07/30/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	735	825	80	165	585	740	40	695	170	865	1140	750
Future Volume (vph)	735	825	80	165	585	740	40	695	170	865	1140	750
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	0.97	0.95		0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	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	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3482		3433	3539	1553	1597	3471	1568	3400	3471	1568
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3482		3433	3539	1553	1597	3471	1568	3400	3471	1568
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	750	842	82	168	597	755	41	709	173	883	1163	765
RTOR Reduction (vph)	0	6	0	0	0	385	0	0	136	0	0	276
Lane Group Flow (vph)	750	918	0	168	597	370	41	709	37	883	1163	489
Confl. Peds. (#/hr)	1		3	3		1			2	2		
Confl. Bikes (#/hr)			1			1						
Heavy Vehicles (%)	2%	2%	3%	2%	2%	4%	13%	4%	3%	3%	4%	3%
Turn Type	Prot	NA		Prot	NA	Prot	Prot	NA	Prot	Prot	NA	Prot
Protected Phases	7	4		3	8	8	1	6	6	5	2	2
Permitted Phases												
Actuated Green, G (s)	14.7	31.1		4.1	20.5	20.5	3.2	22.2	22.2	30.9	49.9	49.9
Effective Green, g (s)	15.2	31.6		4.6	21.0	21.0	3.7	24.2	24.2	31.4	51.9	51.9
Actuated g/C Ratio	0.14	0.28		0.04	0.19	0.19	0.03	0.22	0.22	0.28	0.46	0.46
Clearance Time (s)	5.5	5.5		5.5	5.5	5.5	5.5	7.0	7.0	5.5	7.0	7.0
Vehicle Extension (s)	2.3	2.3		2.3	2.3	2.3	2.3	4.7	4.7	2.3	4.7	4.7
Lane Grp Cap (vph)	466	984		141	664	291	52	751	339	954	1611	727
v/s Ratio Prot	c0.22	0.26		0.05	0.17	c0.24	0.03	c0.20	0.02	c0.26	0.34	0.31
v/s Ratio Perm												
v/c Ratio	1.61	0.93		1.19	0.90	1.27	0.79	0.94	0.11	0.93	0.72	0.67
Uniform Delay, d1	48.3	39.1		53.6	44.4	45.4	53.7	43.1	35.2	39.1	24.1	23.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	284.1	14.9		136.4	14.8	146.4	51.6	20.7	0.3	14.2	1.9	3.0
Delay (s)	332.4	54.0		190.0	59.2	191.8	105.3	63.8	35.4	53.3	26.0	26.3
Level of Service	F	D		F	E	F	F	E	D	D	C	C
Approach Delay (s)		178.7			139.5			60.4			34.7	
Approach LOS		F			F			E			C	
Intersection Summary												
HCM 2000 Control Delay			95.9									
HCM 2000 Volume to Capacity ratio			1.12									
Actuated Cycle Length (s)			111.8									
Intersection Capacity Utilization			98.6%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis








17: Beaver Creek Road & Maple Lane Road

07/30/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	475	970	305	75	775	125	365	130	95	105	140	360
Future Volume (vph)	475	970	305	75	775	125	365	130	95	105	140	360
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.96		1.00	0.98		1.00	0.94		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1787	3446		1805	3493		1805	1743		1717	1900	1615
Flt Permitted	0.95	1.00		0.95	1.00		0.30	1.00		0.41	1.00	1.00
Satd. Flow (perm)	1787	3446		1805	3493		576	1743		747	1900	1615
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	485	990	311	77	791	128	372	133	97	107	143	367
RTOR Reduction (vph)	0	20	0	0	9	0	0	18	0	0	0	28
Lane Group Flow (vph)	485	1281	0	77	910	0	372	212	0	107	143	339
Confl. Peds. (#/hr)	1					1			2	2		
Heavy Vehicles (%)	1%	1%	1%	0%	1%	0%	0%	1%	2%	5%	0%	0%
Turn Type	Prot	NA		Prot	NA		pm+pt	NA		pm+pt	NA	pm+ov
Protected Phases	5	2		1	6		3	8		7	4	5
Permitted Phases							8			4		4
Actuated Green, G (s)	39.2	79.6		5.0	45.4		38.1	22.2		26.0	14.6	53.8
Effective Green, g (s)	39.2	80.1		5.0	45.9		38.6	22.7		27.0	15.1	53.8
Actuated g/C Ratio	0.29	0.59		0.04	0.34		0.28	0.17		0.20	0.11	0.40
Clearance Time (s)	4.0	4.5		4.0	4.5		4.5	4.5		4.5	4.5	4.0
Vehicle Extension (s)	2.5	4.0		2.5	4.0		2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)	516	2034		66	1181		340	291		233	211	640
v/s Ratio Prot	c0.27	0.37		0.04	c0.26		c0.16	0.12		0.04	0.08	0.15
v/s Ratio Perm							c0.15			0.05		0.06
v/c Ratio	0.94	0.63		1.17	0.77		1.09	0.73		0.46	0.68	0.53
Uniform Delay, d1	47.1	18.1		65.3	40.2		44.8	53.6		46.5	58.0	31.3
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	25.1	1.5		162.9	4.9		76.4	8.2		1.0	7.6	0.6
Delay (s)	72.2	19.6		228.2	45.1		121.3	61.8		47.6	65.6	31.9
Level of Service	E	B		F	D		F	E		D	E	C
Approach Delay (s)		33.9			59.2			98.5			42.4	
Approach LOS		C			E			F			D	
Intersection Summary												
HCM 2000 Control Delay			51.2			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.95									
Actuated Cycle Length (s)			135.7			Sum of lost time (s)				16.0		
Intersection Capacity Utilization			92.7%			ICU Level of Service				F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th TWSC
21: Beaver Creek Road & Glen Oak Road

07/30/2019

Intersection												
Int Delay, s/veh	78.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	65	30	30	60	35	190	35	355	40	100	750	145
Future Vol, veh/h	65	30	30	60	35	190	35	355	40	100	750	145
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	-	-	-	115	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	98	98	98	98	98	98	98	98	98
Heavy Vehicles, %	0	0	0	0	0	0	3	1	0	0	0	1
Mvmt Flow	66	31	31	61	36	194	36	362	41	102	765	148

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1613	1518	839	1529	1572	383	913	0	0	403	0	0
Stage 1	1043	1043	-	455	455	-	-	-	-	-	-	-
Stage 2	570	475	-	1074	1117	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.13	-	-	4.1	-	-
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	3.5	4	3.3	3.5	4	3.3	2.227	-	-	2.2	-	-
Pot Cap-1 Maneuver	85	120	369	97	111	669	742	-	-	1167	-	-
Stage 1	280	309	-	589	572	-	-	-	-	-	-	-
Stage 2	510	561	-	269	285	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	~ 39	104	369	62	96	669	742	-	-	1167	-	-
Mov Cap-2 Maneuver	~ 39	104	-	62	96	-	-	-	-	-	-	-
Stage 1	266	282	-	560	544	-	-	-	-	-	-	-
Stage 2	322	534	-	201	260	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	\$ 312.5		\$ 364		0.8		0.8	
HCM LOS	F		F					





















Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	742	-	-	39	162	176	1167	-	-
HCM Lane V/C Ratio	0.048	-	-	1.701	0.378	1.652	0.087	-	-
HCM Control Delay (s)	10.1	-	-	\$ 564	40.1	\$ 364	8.4	-	-
HCM Lane LOS	B	-	-	F	E	F	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	7	1.6	19.8	0.3	-	-

Notes												
-: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined		*: All major volume in platoon						

HCM Signalized Intersection Capacity Analysis

90: Clairmont Dr & Beaver Creek Road

07/30/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	5	70	70	10	155	65	820	35	70	990	140
Future Volume (vph)	125	5	70	70	10	155	65	820	35	70	990	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95			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	1.00	1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.89			0.91		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.99			0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1715	1592			1705		1805	1869		1805	1881	1615
Flt Permitted	0.48	0.90			0.87		0.14	1.00		0.22	1.00	1.00
Satd. Flow (perm)	873	1449			1506		269	1869		411	1881	1615
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	128	5	71	71	10	158	66	837	36	71	1010	143
RTOR Reduction (vph)	0	57	0	0	77	0	0	2	0	0	0	33
Lane Group Flow (vph)	105	42	0	0	162	0	66	871	0	71	1010	110
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	1%	0%
Turn Type	custom	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases					8			2			6	
Permitted Phases	4	4		8			2			6		6
Actuated Green, G (s)	12.8	12.8			12.8		43.0	43.0		43.0	43.0	43.0
Effective Green, g (s)	12.8	12.8			12.8		43.0	43.0		43.0	43.0	43.0
Actuated g/C Ratio	0.20	0.20			0.20		0.67	0.67		0.67	0.67	0.67
Clearance Time (s)	4.0	4.0			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	3.0	3.0
Lane Grp Cap (vph)	175	290			302		181	1259		277	1267	1088
v/s Ratio Prot								0.47			c0.54	
v/s Ratio Perm	c0.12	0.03			0.11		0.25			0.17		0.07
v/c Ratio	0.60	0.15			0.54		0.36	0.69		0.26	0.80	0.10
Uniform Delay, d1	23.2	21.0			22.8		4.5	6.4		4.1	7.3	3.6
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	5.5	0.2			1.8		1.3	1.7		0.5	3.6	0.0
Delay (s)	28.6	21.2			24.7		5.7	8.0		4.6	10.9	3.7
Level of Service	C	C			C		A	A		A	B	A
Approach Delay (s)		25.0			24.7			7.9			9.7	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay			11.6				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			63.8				Sum of lost time (s)			8.0		
Intersection Capacity Utilization			85.4%				ICU Level of Service			E		
Analysis Period (min)			15									

c Critical Lane Group

HCM 6th TWSC
126: Beaver Creek Rd & Loder Rd




















07/30/2019

Intersection												
Int Delay, s/veh	432.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	25	30	25	50	25	175	30	720	40	90	1015	30
Future Vol, veh/h	25	30	25	50	25	175	30	720	40	90	1015	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
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	98	98	98	98	98	98	98	98	98	98	98	98
Heavy Vehicles, %	0	0	0	0	0	0	0	1	0	8	1	0
Mvmt Flow	26	31	26	51	26	179	31	735	41	92	1036	31
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	2156	2074	1052	2082	2069	756	1067	0	0	776	0	0
Stage 1	1236	1236	-	818	818	-	-	-	-	-	-	-
Stage 2	920	838	-	1264	1251	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.18	-	-
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	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.272	-	-
Pot Cap-1 Maneuver	35	54	278	~ 40	55	411	661	-	-	814	-	-
Stage 1	218	250	-	373	393	-	-	-	-	-	-	-
Stage 2	327	384	-	210	246	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	~ 6	36	278	~ 8	36	411	661	-	-	814	-	-
Mov Cap-2 Maneuver	~ 6	36	-	~ 8	36	-	-	-	-	-	-	-
Stage 1	200	180	-	342	360	-	-	-	-	-	-	-
Stage 2	158	352	-	114	177	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, \$	2322.8		3154.7		0.4		0.8					
HCM LOS	F		F									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	661	-	-	16	34	814	-	-	-	-	-	-
HCM Lane V/C Ratio	0.046	-	-	5.102	7.503	0.113	-	-	-	-	-	-
HCM Control Delay (s)	10.7	0	\$	2322.8	3154.7	10	0	-	-	-	-	-
HCM Lane LOS	B	A	-	F	F	A	A	-	-	-	-	-
HCM 95th %tile Q(veh)	0.1	-	-	11	30.7	0.4	-	-	-	-	-	-
Notes												
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon												

HCM Signalized Intersection Capacity Analysis

129: Meyers Rd & Beaver Creek Rd

07/30/2019
























												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	155	15	25	115	30	175	55	505	45	110	855	140
Future Volume (vph)	155	15	25	115	30	175	55	505	45	110	855	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	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	1.00	
Frpb, ped/bikes	1.00	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	1.00	
Frt	1.00	0.90			0.93		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1666			1729		1671	1856		1803	1844	
Flt Permitted	0.41	1.00			0.86		0.15	1.00		0.39	1.00	
Satd. Flow (perm)	779	1666			1522		266	1856		750	1844	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	158	15	26	117	31	179	56	515	46	112	872	143
RTOR Reduction (vph)	0	21	0	0	49	0	0	3	0	0	6	0
Lane Group Flow (vph)	158	20	0	0	278	0	56	558	0	112	1009	0
Confl. Peds. (#/hr)									1	1		
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	0%	5%	0%	0%	0%	8%	1%	0%	0%	0%	6%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	18.6	18.6			18.6		62.0	62.0		62.0	62.0	
Effective Green, g (s)	18.6	18.6			18.6		62.0	62.0		62.0	62.0	
Actuated g/C Ratio	0.21	0.21			0.21		0.70	0.70		0.70	0.70	
Clearance Time (s)	4.0	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	3.0	
Lane Grp Cap (vph)	163	349			319		186	1298		524	1290	
v/s Ratio Prot		0.01						0.30			c0.55	
v/s Ratio Perm	c0.20				0.18		0.21			0.15		
v/c Ratio	0.97	0.06			0.87		0.30	0.43		0.21	0.78	
Uniform Delay, d1	34.7	28.0			33.8		5.1	5.7		4.7	8.8	
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	60.6	0.1			22.0		4.1	1.0		0.9	4.8	
Delay (s)	95.3	28.1			55.8		9.2	6.8		5.6	13.6	
Level of Service	F	C			E		A	A		A	B	
Approach Delay (s)		81.5			55.8			7.0			12.8	
Approach LOS		F			E			A			B	
Intersection Summary												
HCM 2000 Control Delay			23.4									
HCM 2000 Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			88.6									
Intersection Capacity Utilization			92.2%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

16: OR 213 & Beaver Creek Road

see alternate
mobility target
option






















08/01/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	735	825	80	165	585	740	40	695	170	865	1140	750
Future Volume (vph)	735	825	80	165	585	740	40	695	170	865	1140	750
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	3.5	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	0.97	0.95		0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	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	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3482		3433	3539	1533	1597	3471	1568	3400	3471	1568
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3482		3433	3539	1533	1597	3471	1568	3400	3471	1568
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	750	842	82	168	597	755	41	709	173	883	1163	765
RTOR Reduction (vph)	0	6	0	0	0	0	0	0	135	0	0	275
Lane Group Flow (vph)	750	918	0	168	597	755	41	709	38	883	1163	490
Confl. Peds. (#/hr)	1		3	3		1			2	2		
Confl. Bikes (#/hr)			1			1						
Heavy Vehicles (%)	2%	2%	3%	2%	2%	4%	13%	4%	3%	3%	4%	3%
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA	Prot	Prot	NA	Prot
Protected Phases	7	4		3	8		1	6	6	5	2	2
Permitted Phases						Free						
Actuated Green, G (s)	14.7	30.6		4.1	20.0	111.2	3.1	22.2	22.2	30.8	49.9	49.9
Effective Green, g (s)	15.2	31.1		4.6	20.5	111.2	3.6	24.2	24.2	31.3	51.9	51.9
Actuated g/C Ratio	0.14	0.28		0.04	0.18	1.00	0.03	0.22	0.22	0.28	0.47	0.47
Clearance Time (s)	5.5	5.5		5.5	5.5		5.5	7.0	7.0	5.5	7.0	7.0
Vehicle Extension (s)	2.3	2.3		2.3	2.3		2.3	4.7	4.7	2.3	4.7	4.7
Lane Grp Cap (vph)	469	973		142	652	1533	51	755	341	957	1620	731
v/s Ratio Prot	c0.22	c0.26		0.05	c0.17		0.03	c0.20	0.02	c0.26	0.34	0.31
v/s Ratio Perm						0.49						
v/c Ratio	1.60	0.94		1.18	0.92	0.49	0.80	0.94	0.11	0.92	0.72	0.67
Uniform Delay, d1	48.0	39.2		53.3	44.5	0.0	53.4	42.8	34.9	38.8	23.8	23.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	279.5	16.7		133.1	17.4	1.1	57.2	19.7	0.3	13.9	1.8	3.0
Delay (s)	327.5	55.9		186.4	61.9	1.1	110.7	62.5	35.1	52.7	25.6	26.0
Level of Service	F	E		F	E	A	F	E	D	D	C	C
Approach Delay (s)		177.6			45.5			59.5			34.2	
Approach LOS		F			D			E			C	
Intersection Summary												
HCM 2000 Control Delay			74.7			HCM 2000 Level of Service			E			
HCM 2000 Volume to Capacity ratio			1.04									
Actuated Cycle Length (s)			111.2			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			97.7%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

17: Beaver Creek Road & Maple Lane Road









08/01/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	475	970	305	75	775	125	365	130	95	105	140	360
Future Volume (vph)	475	970	305	75	775	125	365	130	95	105	140	360
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.96		1.00	0.98		1.00	0.94		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1787	3446		1805	3493		1805	1743		1716	1900	1615
Flt Permitted	0.95	1.00		0.95	1.00		0.30	1.00		0.62	1.00	1.00
Satd. Flow (perm)	1787	3446		1805	3493		566	1743		1111	1900	1615
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	485	990	311	77	791	128	372	133	97	107	143	367
RTOR Reduction (vph)	0	20	0	0	9	0	0	18	0	0	0	50
Lane Group Flow (vph)	485	1281	0	77	910	0	372	212	0	107	143	317
Confl. Peds. (#/hr)	1					1			2	2		
Heavy Vehicles (%)	1%	1%	1%	0%	1%	0%	0%	1%	2%	5%	0%	0%
Turn Type	Prot	NA		Prot	NA		pm+pt	NA		pm+pt	NA	pm+ov
Protected Phases	5	2		1	6		3	8		7	4	5
Permitted Phases							8			4		4
Actuated Green, G (s)	38.7	70.4		8.5	40.2		43.2	27.7		25.3	14.3	53.0
Effective Green, g (s)	38.7	70.9		8.5	40.7		43.7	28.2		26.3	14.8	53.0
Actuated g/C Ratio	0.29	0.52		0.06	0.30		0.32	0.21		0.19	0.11	0.39
Clearance Time (s)	4.0	4.5		4.0	4.5		4.5	4.5		4.5	4.5	4.0
Vehicle Extension (s)	2.5	4.0		2.5	4.0		2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)	511	1808		113	1052		411	363		267	208	633
v/s Ratio Prot	c0.27	0.37		0.04	c0.26		c0.17	0.12		0.03	0.08	0.14
v/s Ratio Perm							c0.13			0.04		0.05
v/c Ratio	0.95	0.71		0.68	0.86		0.91	0.58		0.40	0.69	0.50
Uniform Delay, d1	47.2	24.3		62.0	44.6		39.5	48.2		46.7	57.9	31.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	27.2	2.4		14.4	9.5		22.9	2.0		0.7	8.3	0.5
Delay (s)	74.4	26.7		76.3	54.1		62.4	50.1		47.4	66.3	31.5
Level of Service	E	C		E	D		E	D		D	E	C
Approach Delay (s)		39.6			55.8			57.7			42.3	
Approach LOS		D			E			E			D	
Intersection Summary												
HCM 2000 Control Delay			46.8			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.93									
Actuated Cycle Length (s)			135.1			Sum of lost time (s)				16.0		
Intersection Capacity Utilization			92.7%			ICU Level of Service				F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

21: Beaver Creek Road & Glen Oak Road





















08/01/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	30	30	60	35	190	35	355	40	100	750	145
Future Volume (vph)	65	30	30	60	35	190	35	355	40	100	750	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	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	1.00	
Frt	1.00	0.93			0.91		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1758			1711		1752	1854		1805	1851	
Flt Permitted	0.42	1.00			0.92		0.17	1.00		0.50	1.00	
Satd. Flow (perm)	801	1758			1592		322	1854		944	1851	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	66	31	31	61	36	194	36	362	41	102	765	148
RTOR Reduction (vph)	0	24	0	0	80	0	0	5	0	0	9	0
Lane Group Flow (vph)	66	38	0	0	211	0	36	398	0	102	904	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	3%	1%	0%	0%	0%	1%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	12.8	12.8			12.8		37.3	37.3		37.3	37.3	
Effective Green, g (s)	12.8	12.8			12.8		37.3	37.3		37.3	37.3	
Actuated g/C Ratio	0.22	0.22			0.22		0.64	0.64		0.64	0.64	
Clearance Time (s)	4.0	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	3.0	
Lane Grp Cap (vph)	176	387			350		206	1190		606	1188	
v/s Ratio Prot		0.02						0.21			c0.49	
v/s Ratio Perm	0.08				c0.13		0.11			0.11		
v/c Ratio	0.38	0.10			0.60		0.17	0.33		0.17	0.76	
Uniform Delay, d1	19.3	18.0			20.4		4.2	4.7		4.2	7.3	
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.3	0.1			2.9		0.4	0.2		0.1	2.9	
Delay (s)	20.6	18.2			23.3		4.6	4.9		4.3	10.2	
Level of Service	C	B			C		A	A		A	B	
Approach Delay (s)		19.4			23.3			4.9			9.6	
Approach LOS		B			C			A			A	
Intersection Summary												
HCM 2000 Control Delay			11.3			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			58.1			Sum of lost time (s)				8.0		
Intersection Capacity Utilization			85.1%			ICU Level of Service				E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

90: Clairmont Dr & Beaver Creek Road

















08/01/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	5	70	70	10	155	65	820	35	70	990	140
Future Volume (vph)	125	5	70	70	10	155	65	820	35	70	990	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95			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	1.00	1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.89			0.91		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.99			0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1715	1592			1705		1805	1869		1805	1881	1615
Flt Permitted	0.49	0.91			0.87		0.13	1.00		0.21	1.00	1.00
Satd. Flow (perm)	887	1463			1510		256	1869		400	1881	1615
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	128	5	71	71	10	158	66	837	36	71	1010	143
RTOR Reduction (vph)	0	56	0	0	76	0	0	2	0	0	0	34
Lane Group Flow (vph)	105	43	0	0	163	0	66	871	0	71	1010	109
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	1%	0%
Turn Type	custom	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases					8			2			6	
Permitted Phases	4	4		8			2			6		6
Actuated Green, G (s)	13.8	13.8			13.8		43.5	43.5		43.5	43.5	43.5
Effective Green, g (s)	13.8	13.8			13.8		43.5	43.5		43.5	43.5	43.5
Actuated g/C Ratio	0.21	0.21			0.21		0.67	0.67		0.67	0.67	0.67
Clearance Time (s)	4.0	4.0			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	3.0	3.0
Lane Grp Cap (vph)	187	309			319		170	1245		266	1253	1075
v/s Ratio Prot								0.47			c0.54	
v/s Ratio Perm	c0.12	0.03			0.11		0.26			0.18		0.07
v/c Ratio	0.56	0.14			0.51		0.39	0.70		0.27	0.81	0.10
Uniform Delay, d1	23.0	20.9			22.8		4.9	6.8		4.4	7.9	3.9
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	3.8	0.2			1.4		1.5	1.7		0.5	3.9	0.0
Delay (s)	26.9	21.1			24.2		6.4	8.6		5.0	11.7	3.9
Level of Service	C	C			C		A	A		A	B	A
Approach Delay (s)		24.1			24.2			8.4			10.4	
Approach LOS		C			C			A			B	
Intersection Summary												
HCM 2000 Control Delay			12.0				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			65.3				Sum of lost time (s)			8.0		
Intersection Capacity Utilization			85.4%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

126: Beaver Creek Rd & Loder Rd




















08/01/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	30	25	50	25	175	30	720	40	90	1015	30
Future Volume (vph)	25	30	25	50	25	175	30	720	40	90	1015	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.96			0.91			0.99			1.00	
Flt Protected		0.98			0.99			1.00			1.00	
Satd. Flow (prot)		1792			1704			1866			1857	
Flt Permitted		0.67			0.93			0.94			0.88	
Satd. Flow (perm)		1216			1597			1750			1648	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	26	31	26	51	26	179	31	735	41	92	1036	31
RTOR Reduction (vph)	0	19	0	0	96	0	0	2	0	0	1	0
Lane Group Flow (vph)	0	64	0	0	160	0	0	805	0	0	1158	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	0%	8%	1%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		12.2			12.2			63.0			63.0	
Effective Green, g (s)		12.2			12.2			63.0			63.0	
Actuated g/C Ratio		0.15			0.15			0.76			0.76	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		178			234			1325			1247	
v/s Ratio Prot												
v/s Ratio Perm		0.05			0.10			0.46			0.70	
v/c Ratio		0.36			0.68			0.61			0.93	
Uniform Delay, d1		32.0			33.7			4.5			8.3	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.3			7.9			0.8			11.9	
Delay (s)		33.2			41.6			5.3			20.2	
Level of Service		C			D			A			C	
Approach Delay (s)		33.2			41.6			5.3			20.2	
Approach LOS		C			D			A			C	
Intersection Summary												
HCM 2000 Control Delay			17.8									B
HCM 2000 Volume to Capacity ratio			0.89									
Actuated Cycle Length (s)			83.2								8.0	
Intersection Capacity Utilization			115.7%								H	
ICU Level of Service												
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

129: Meyers Rd & Beaver Creek Rd

08/01/2019
























												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	155	15	25	115	30	175	55	505	45	110	855	140
Future Volume (vph)	155	15	25	115	30	175	55	505	45	110	855	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	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	1.00	
Frpb, ped/bikes	1.00	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	1.00	
Frt	1.00	0.90			0.93		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1666			1729		1671	1856		1803	1844	
Flt Permitted	0.41	1.00			0.86		0.15	1.00		0.39	1.00	
Satd. Flow (perm)	786	1666			1522		262	1856		747	1844	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	158	15	26	117	31	179	56	515	46	112	872	143
RTOR Reduction (vph)	0	20	0	0	49	0	0	3	0	0	6	0
Lane Group Flow (vph)	158	21	0	0	278	0	56	558	0	112	1009	0
Confl. Peds. (#/hr)									1	1		
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	0%	5%	0%	0%	0%	8%	1%	0%	0%	0%	6%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	19.0	19.0			19.0		62.0	62.0		62.0	62.0	
Effective Green, g (s)	19.0	19.0			19.0		62.0	62.0		62.0	62.0	
Actuated g/C Ratio	0.21	0.21			0.21		0.70	0.70		0.70	0.70	
Clearance Time (s)	4.0	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	3.0	
Lane Grp Cap (vph)	167	355			324		182	1292		520	1284	
v/s Ratio Prot		0.01						0.30			c0.55	
v/s Ratio Perm	c0.20				0.18		0.21			0.15		
v/c Ratio	0.95	0.06			0.86		0.31	0.43		0.22	0.79	
Uniform Delay, d1	34.5	27.9			33.7		5.2	5.9		4.8	9.0	
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	53.4	0.1			19.6		4.3	1.1		0.9	4.9	
Delay (s)	87.9	27.9			53.3		9.5	6.9		5.8	13.9	
Level of Service	F	C			D		A	A		A	B	
Approach Delay (s)		75.6			53.3			7.1			13.1	
Approach LOS		E			D			A			B	
Intersection Summary												
HCM 2000 Control Delay			22.8									HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			89.0									Sum of lost time (s) 8.0
Intersection Capacity Utilization			92.2%									ICU Level of Service F
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

16: OR 213 & Beaver Creek Road

see alternate
mobility target
option






















08/02/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	735	825	80	165	585	730	40	695	170	855	1145	750
Future Volume (vph)	735	825	80	165	585	730	40	695	170	855	1145	750
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	3.5	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	0.97	0.95		0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	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	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3482		3433	3539	1533	1597	3471	1568	3400	3471	1568
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3482		3433	3539	1533	1597	3471	1568	3400	3471	1568
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	750	842	82	168	597	745	41	709	173	872	1168	765
RTOR Reduction (vph)	0	6	0	0	0	0	0	0	135	0	0	275
Lane Group Flow (vph)	750	918	0	168	597	745	41	709	38	872	1168	490
Confl. Peds. (#/hr)	1		3	3		1			2	2		
Confl. Bikes (#/hr)			1			1						
Heavy Vehicles (%)	2%	2%	3%	2%	2%	4%	13%	4%	3%	3%	4%	3%
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA	Prot	Prot	NA	Prot
Protected Phases	7	4		3	8		1	6	6	5	2	2
Permitted Phases						Free						
Actuated Green, G (s)	14.8	30.6		4.1	19.9	111.1	3.1	22.3	22.3	30.6	49.8	49.8
Effective Green, g (s)	15.3	31.1		4.6	20.4	111.1	3.6	24.3	24.3	31.1	51.8	51.8
Actuated g/C Ratio	0.14	0.28		0.04	0.18	1.00	0.03	0.22	0.22	0.28	0.47	0.47
Clearance Time (s)	5.5	5.5		5.5	5.5		5.5	7.0	7.0	5.5	7.0	7.0
Vehicle Extension (s)	2.3	2.3		2.3	2.3		2.3	4.7	4.7	2.3	4.7	4.7
Lane Grp Cap (vph)	472	974		142	649	1533	51	759	342	951	1618	731
v/s Ratio Prot	c0.22	c0.26		0.05	c0.17		0.03	c0.20	0.02	c0.26	0.34	0.31
v/s Ratio Perm						0.49						
v/c Ratio	1.59	0.94		1.18	0.92	0.49	0.80	0.93	0.11	0.92	0.72	0.67
Uniform Delay, d1	47.9	39.1		53.2	44.5	0.0	53.4	42.6	34.7	38.7	23.9	23.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	275.0	16.5		133.1	18.0	1.1	57.2	18.9	0.3	13.1	1.9	2.9
Delay (s)	322.9	55.6		186.3	62.6	1.1	110.6	61.5	35.0	51.9	25.8	25.9
Level of Service	F	E		F	E	A	F	E	D	D	C	C
Approach Delay (s)		175.4			46.0			58.7			33.9	
Approach LOS		F			D			E			C	
Intersection Summary												
HCM 2000 Control Delay			74.1			HCM 2000 Level of Service			E			
HCM 2000 Volume to Capacity ratio			1.04									
Actuated Cycle Length (s)			111.1			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			97.4%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

17: Beaver Creek Road & Maple Lane Road




















08/02/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	465	970	315	75	755	115	380	130	95	105	135	350
Future Volume (vph)	465	970	315	75	755	115	380	130	95	105	135	350
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.96		1.00	0.98		1.00	0.94		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1787	3443		1805	3497		1805	1743		1716	1900	1615
Flt Permitted	0.95	1.00		0.95	1.00		0.31	1.00		0.62	1.00	1.00
Satd. Flow (perm)	1787	3443		1805	3497		586	1743		1111	1900	1615
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	474	990	321	77	770	117	388	133	97	107	138	357
RTOR Reduction (vph)	0	21	0	0	8	0	0	18	0	0	0	50
Lane Group Flow (vph)	474	1290	0	77	879	0	388	212	0	107	138	307
Confl. Peds. (#/hr)	1					1			2	2		
Heavy Vehicles (%)	1%	1%	1%	0%	1%	0%	0%	1%	2%	5%	0%	0%
Turn Type	Prot	NA		Prot	NA		pm+pt	NA		pm+pt	NA	pm+ov
Protected Phases	5	2		1	6		3	8		7	4	5
Permitted Phases							8			4		4
Actuated Green, G (s)	38.2	70.4		8.5	40.7		43.4	27.9		25.1	14.1	52.3
Effective Green, g (s)	38.2	70.9		8.5	41.2		43.9	28.4		26.1	14.6	52.3
Actuated g/C Ratio	0.28	0.52		0.06	0.30		0.32	0.21		0.19	0.11	0.39
Clearance Time (s)	4.0	4.5		4.0	4.5		4.5	4.5		4.5	4.5	4.0
Vehicle Extension (s)	2.5	4.0		2.5	4.0		2.5	2.5		2.5	2.5	2.5
Lane Grp Cap (vph)	504	1804		113	1064		418	365		265	205	624
v/s Ratio Prot	c0.27	0.37		0.04	c0.25		c0.17	0.12		0.03	0.07	0.14
v/s Ratio Perm							c0.13			0.04		0.05
v/c Ratio	0.94	0.71		0.68	0.83		0.93	0.58		0.40	0.67	0.49
Uniform Delay, d1	47.4	24.5		62.1	43.7		39.9	48.1		47.0	58.1	31.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	25.9	2.5		14.4	7.3		26.6	1.9		0.7	7.7	0.4
Delay (s)	73.4	27.0		76.4	51.0		66.5	50.0		47.7	65.7	31.9
Level of Service	E	C		E	D		E	D		D	E	C
Approach Delay (s)		39.3			53.1			60.4			42.5	
Approach LOS		D			D			E			D	
Intersection Summary												
HCM 2000 Control Delay			46.4			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.92									
Actuated Cycle Length (s)			135.3			Sum of lost time (s)				16.0		
Intersection Capacity Utilization			91.8%			ICU Level of Service				F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

21: Beaver Creek Road & Glen Oak Road

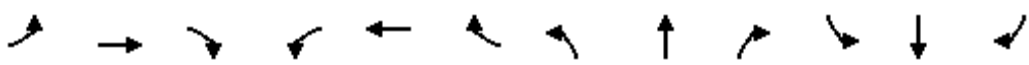








08/02/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	30	30	60	35	175	35	355	40	85	740	140
Future Volume (vph)	65	30	30	60	35	175	35	355	40	85	740	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	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	1.00	
Frt	1.00	0.93			0.91		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1758			1715		1752	1854		1805	1852	
Flt Permitted	0.45	1.00			0.92		0.18	1.00		0.50	1.00	
Satd. Flow (perm)	858	1758			1589		332	1854		944	1852	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	66	31	31	61	36	179	36	362	41	87	755	143
RTOR Reduction (vph)	0	24	0	0	74	0	0	5	0	0	9	0
Lane Group Flow (vph)	66	38	0	0	202	0	36	398	0	87	889	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	3%	1%	0%	0%	0%	1%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	12.5	12.5			12.5		35.9	35.9		35.9	35.9	
Effective Green, g (s)	12.5	12.5			12.5		35.9	35.9		35.9	35.9	
Actuated g/C Ratio	0.22	0.22			0.22		0.64	0.64		0.64	0.64	
Clearance Time (s)	4.0	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	3.0	
Lane Grp Cap (vph)	190	389			352		211	1180		600	1178	
v/s Ratio Prot		0.02						0.21			c0.48	
v/s Ratio Perm	0.08				c0.13		0.11			0.09		
v/c Ratio	0.35	0.10			0.57		0.17	0.34		0.14	0.75	
Uniform Delay, d1	18.5	17.5			19.6		4.2	4.7		4.1	7.2	
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.1	0.1			2.3		0.4	0.2		0.1	2.8	
Delay (s)	19.6	17.6			21.8		4.6	4.9		4.2	10.0	
Level of Service	B	B			C		A	A		A	A	
Approach Delay (s)		18.6			21.8			4.9			9.5	
Approach LOS		B			C			A			A	
Intersection Summary												
HCM 2000 Control Delay			10.9			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			56.4			Sum of lost time (s)				8.0		
Intersection Capacity Utilization			83.4%			ICU Level of Service				E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

90: Clairmont Dr & Beaver Creek Road

08/02/2019


												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	10	75	70	10	155	65	800	35	70	985	140
Future Volume (vph)	125	10	75	70	10	155	65	800	35	70	985	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.95	0.95			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	1.00	1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.89			0.91		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.99			0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1715	1592			1705		1805	1868		1805	1881	1615
Flt Permitted	0.50	0.95			0.87		0.13	1.00		0.22	1.00	1.00
Satd. Flow (perm)	898	1519			1510		250	1868		413	1881	1615
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	128	10	77	71	10	158	66	816	36	71	1005	143
RTOR Reduction (vph)	0	60	0	0	75	0	0	2	0	0	0	35
Lane Group Flow (vph)	111	44	0	0	164	0	66	850	0	71	1005	108
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	1%	0%
Turn Type	custom	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases					8			2			6	
Permitted Phases	4	4		8			2			6		6
Actuated Green, G (s)	14.5	14.5			14.5		43.6	43.6		43.6	43.6	43.6
Effective Green, g (s)	14.5	14.5			14.5		43.6	43.6		43.6	43.6	43.6
Actuated g/C Ratio	0.22	0.22			0.22		0.66	0.66		0.66	0.66	0.66
Clearance Time (s)	4.0	4.0			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	3.0	3.0
Lane Grp Cap (vph)	196	333			331		164	1232		272	1240	1065
v/s Ratio Prot								0.45			c0.53	
v/s Ratio Perm	c0.12	0.03			0.11		0.26			0.17		0.07
v/c Ratio	0.57	0.13			0.50		0.40	0.69		0.26	0.81	0.10
Uniform Delay, d1	23.0	20.7			22.6		5.2	7.0		4.6	8.2	4.1
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	3.7	0.2			1.2		1.6	1.6		0.5	4.1	0.0
Delay (s)	26.7	20.9			23.8		6.8	8.7		5.1	12.3	4.1
Level of Service	C	C			C		A	A		A	B	A
Approach Delay (s)		23.9			23.8			8.5			11.0	
Approach LOS		C			C			A			B	
Intersection Summary												
HCM 2000 Control Delay			12.4				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			66.1				Sum of lost time (s)			8.0		
Intersection Capacity Utilization			85.4%				ICU Level of Service			E		
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

126: Beaver Creek Rd & Loder Rd




















08/02/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	25	35	30	50	25	180	30	695	40	90	1015	30
Future Volume (vph)	25	35	30	50	25	180	30	695	40	90	1015	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.95			0.90			0.99			1.00	
Flt Protected		0.99			0.99			1.00			1.00	
Satd. Flow (prot)		1789			1703			1866			1857	
Flt Permitted		0.69			0.92			0.93			0.89	
Satd. Flow (perm)		1252			1587			1746			1655	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	26	36	31	51	26	184	31	709	41	92	1036	31
RTOR Reduction (vph)	0	20	0	0	99	0	0	2	0	0	1	0
Lane Group Flow (vph)	0	73	0	0	162	0	0	779	0	0	1158	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	0%	8%	1%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		12.3			12.3			62.2			62.2	
Effective Green, g (s)		12.3			12.3			62.2			62.2	
Actuated g/C Ratio		0.15			0.15			0.75			0.75	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		186			236			1316			1247	
v/s Ratio Prot												
v/s Ratio Perm		0.06			0.10			0.45			0.70	
v/c Ratio		0.39			0.69			0.59			0.93	
Uniform Delay, d1		31.7			33.3			4.5			8.3	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.4			8.1			0.7			11.9	
Delay (s)		33.1			41.3			5.2			20.3	
Level of Service		C			D			A			C	
Approach Delay (s)		33.1			41.3			5.2			20.3	
Approach LOS		C			D			A			C	
Intersection Summary												
HCM 2000 Control Delay			18.1									
HCM 2000 Volume to Capacity ratio			0.89									
Actuated Cycle Length (s)			82.5									
Intersection Capacity Utilization			116.0%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

129: Meyers Rd & Beaver Creek Rd

08/02/2019
























												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	150	15	25	105	30	165	60	485	45	110	835	140
Future Volume (vph)	150	15	25	105	30	165	60	485	45	110	835	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	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	1.00	
Frpb, ped/bikes	1.00	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	1.00	
Frt	1.00	0.90			0.93		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1666			1729		1671	1855		1803	1843	
Flt Permitted	0.42	1.00			0.87		0.16	1.00		0.41	1.00	
Satd. Flow (perm)	799	1666			1526		284	1855		772	1843	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	153	15	26	107	31	168	61	495	46	112	852	143
RTOR Reduction (vph)	0	21	0	0	50	0	0	4	0	0	7	0
Lane Group Flow (vph)	153	20	0	0	256	0	61	537	0	112	988	0
Confl. Peds. (#/hr)									1	1		
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	0%	0%	5%	0%	0%	0%	8%	1%	0%	0%	0%	6%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	18.7	18.7			18.7		62.1	62.1		62.1	62.1	
Effective Green, g (s)	18.7	18.7			18.7		62.1	62.1		62.1	62.1	
Actuated g/C Ratio	0.21	0.21			0.21		0.70	0.70		0.70	0.70	
Clearance Time (s)	4.0	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	3.0	
Lane Grp Cap (vph)	168	350			321		198	1297		539	1288	
v/s Ratio Prot		0.01						0.29			c0.54	
v/s Ratio Perm	c0.19				0.17		0.21			0.15		
v/c Ratio	0.91	0.06			0.80		0.31	0.41		0.21	0.77	
Uniform Delay, d1	34.2	28.0			33.3		5.1	5.7		4.7	8.7	
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	44.4	0.1			12.9		4.0	1.0		0.9	4.4	
Delay (s)	78.7	28.1			46.2		9.1	6.6		5.6	13.1	
Level of Service	E	C			D		A	A		A	B	
Approach Delay (s)		68.0			46.2			6.9			12.3	
Approach LOS		E			D			A			B	
Intersection Summary												
HCM 2000 Control Delay			20.4									C
HCM 2000 Volume to Capacity ratio			0.80									
Actuated Cycle Length (s)			88.8							8.0		
Intersection Capacity Utilization			90.0%								E	
ICU Level of Service												
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

16: OR 213 & Beaver Creek Road

alternate
mobility target
option

08/02/2019
























												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	715	800	80	60	565	720	40	675	165	840	1105	730
Future Volume (vph)	715	800	80	60	565	720	40	675	165	840	1105	730
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	3.5	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	0.97	0.95		0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	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	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3481		3433	3539	1533	1597	3471	1568	3400	3471	1568
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3481		3433	3539	1533	1597	3471	1568	3400	3471	1568
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	715	800	80	60	565	720	40	675	165	840	1105	730
RTOR Reduction (vph)	0	6	0	0	0	0	0	0	129	0	0	281
Lane Group Flow (vph)	715	874	0	60	565	720	40	675	36	840	1105	449
Confl. Peds. (#/hr)	1		3	3		1			2	2		
Confl. Bikes (#/hr)			1			1						
Heavy Vehicles (%)	2%	2%	3%	2%	2%	4%	13%	4%	3%	3%	4%	3%
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA	Prot	Prot	NA	Prot
Protected Phases	7	4		3	8		1	6	6	5	2	2
Permitted Phases						Free						
Actuated Green, G (s)	16.0	32.3		3.2	19.5	111.1	3.1	22.3	22.3	29.8	49.0	49.0
Effective Green, g (s)	16.5	32.8		3.7	20.0	111.1	3.6	24.3	24.3	30.3	51.0	51.0
Actuated g/C Ratio	0.15	0.30		0.03	0.18	1.00	0.03	0.22	0.22	0.27	0.46	0.46
Clearance Time (s)	5.5	5.5		5.5	5.5		5.5	7.0	7.0	5.5	7.0	7.0
Vehicle Extension (s)	2.3	2.3		2.3	2.3		2.3	4.7	4.7	2.3	4.7	4.7
Lane Grp Cap (vph)	509	1027		114	637	1533	51	759	342	927	1593	719
v/s Ratio Prot	c0.21	0.25		0.02	c0.16		0.03	c0.19	0.02	c0.25	0.32	0.29
v/s Ratio Perm						0.47						
v/c Ratio	1.40	0.85		0.53	0.89	0.47	0.78	0.89	0.11	0.91	0.69	0.62
Uniform Delay, d1	47.3	36.8		52.8	44.4	0.0	53.4	42.1	34.7	39.0	23.9	22.8
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	193.7	6.7		2.8	13.9	1.0	51.7	13.0	0.3	12.1	1.6	2.3
Delay (s)	241.0	43.6		55.6	58.3	1.0	105.0	55.1	35.0	51.1	25.4	25.0
Level of Service	F	D		E	E	A	F	E	C	D	C	C
Approach Delay (s)		132.1			27.5			53.6			33.4	
Approach LOS		F			C			D			C	
Intersection Summary												
HCM 2000 Control Delay			59.2			HCM 2000 Level of Service			E			
HCM 2000 Volume to Capacity ratio			0.99									
Actuated Cycle Length (s)			111.1			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			95.3%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

16: OR 213 & Beaver Creek Road

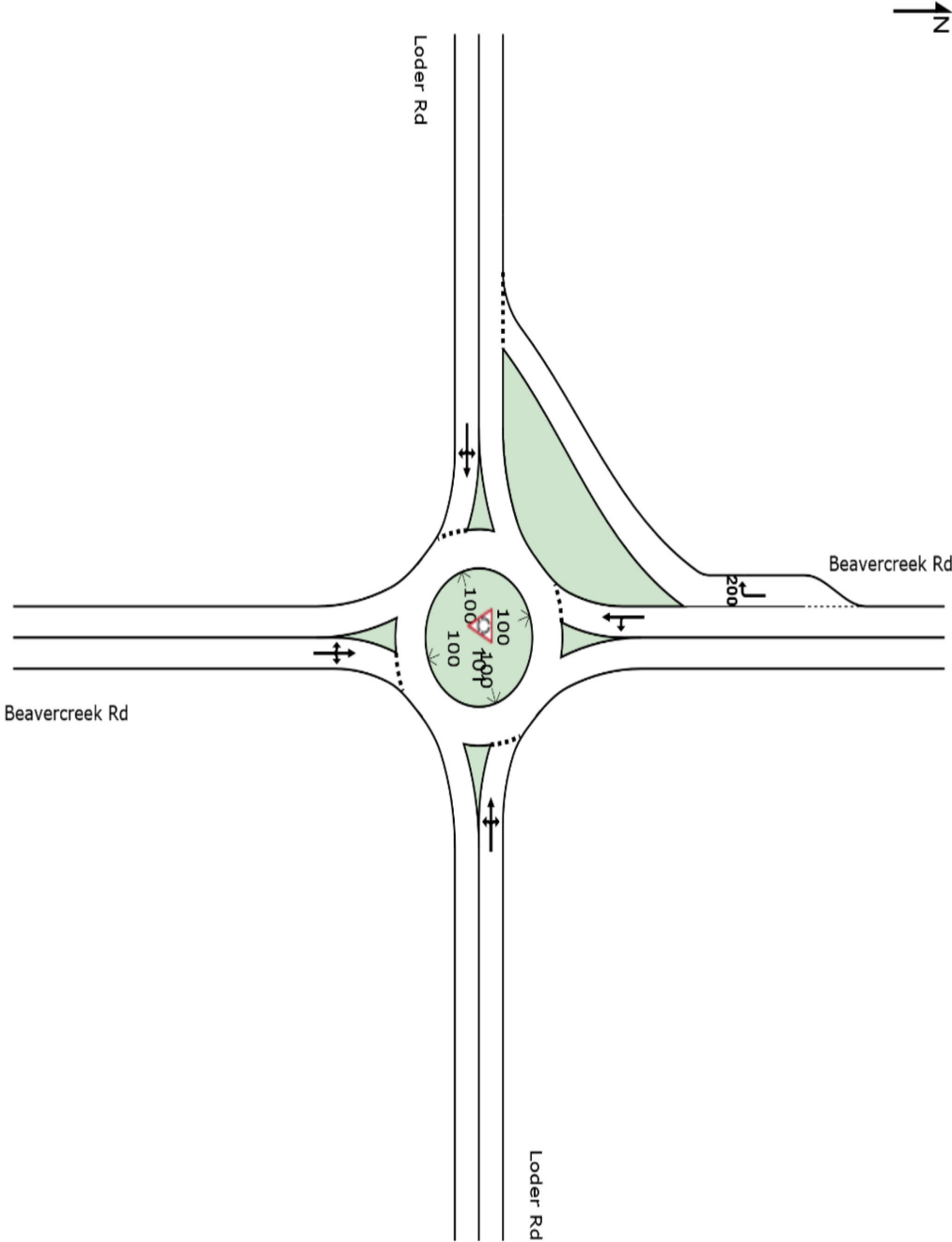
alternate
mobility target
option

07/30/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	715	800	80	160	565	710	40	675	165	830	1110	730
Future Volume (vph)	715	800	80	160	565	710	40	675	165	830	1110	730
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	3.5	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	0.97	0.95		0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	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	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3481		3433	3539	1533	1597	3471	1568	3400	3471	1568
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3481		3433	3539	1533	1597	3471	1568	3400	3471	1568
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	715	800	80	160	565	710	40	675	165	830	1110	730
RTOR Reduction (vph)	0	6	0	0	0	0	0	0	128	0	0	278
Lane Group Flow (vph)	715	874	0	160	565	710	40	675	37	830	1110	452
Confl. Peds. (#/hr)	1		3	3		1			2	2		
Confl. Bikes (#/hr)			1			1						
Heavy Vehicles (%)	2%	2%	3%	2%	2%	4%	13%	4%	3%	3%	4%	3%
Turn Type	Prot	NA		Prot	NA	Free	Prot	NA	Prot	Prot	NA	Prot
Protected Phases	7	4		3	8		1	6	6	5	2	2
Permitted Phases						Free						
Actuated Green, G (s)	14.7	30.1		4.1	19.5	109.7	3.1	22.5	22.5	29.5	48.9	48.9
Effective Green, g (s)	15.2	30.6		4.6	20.0	109.7	3.6	24.5	24.5	30.0	50.9	50.9
Actuated g/C Ratio	0.14	0.28		0.04	0.18	1.00	0.03	0.22	0.22	0.27	0.46	0.46
Clearance Time (s)	5.5	5.5		5.5	5.5		5.5	7.0	7.0	5.5	7.0	7.0
Vehicle Extension (s)	2.3	2.3		2.3	2.3		2.3	4.7	4.7	2.3	4.7	4.7
Lane Grp Cap (vph)	475	970		143	645	1533	52	775	350	929	1610	727
v/s Ratio Prot	c0.21	c0.25		0.05	c0.16		0.03	c0.19	0.02	c0.24	0.32	0.29
v/s Ratio Perm						0.46						
v/c Ratio	1.51	0.90		1.12	0.88	0.46	0.77	0.87	0.11	0.89	0.69	0.62
Uniform Delay, d1	47.2	38.1		52.6	43.6	0.0	52.6	41.1	33.9	38.3	23.2	22.1
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	238.1	11.2		110.7	12.5	1.0	46.4	11.2	0.2	10.8	1.5	2.2
Delay (s)	285.4	49.3		163.3	56.2	1.0	99.0	52.3	34.1	49.1	24.7	24.3
Level of Service	F	D		F	E	A	F	D	C	D	C	C
Approach Delay (s)		155.1			40.8			51.0			32.2	
Approach LOS		F			D			D			C	
Intersection Summary												
HCM 2000 Control Delay			66.4			HCM 2000 Level of Service			E			
HCM 2000 Volume to Capacity ratio			0.99									
Actuated Cycle Length (s)			109.7			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			95.0%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

Sidra Reports

Site Category: (None)
Roundabout



MOVEMENT SUMMARY

 Site: 101 [Beavercreek and Loder]

Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: Beavercreek Rd												
3	L2	30	2.0	0.708	13.8	LOS B	8.5	215.1	0.69	0.51	0.76	31.0
8	T1	745	2.0	0.708	13.8	LOS B	8.5	215.1	0.69	0.51	0.76	30.9
18	R2	40	2.0	0.708	13.8	LOS B	8.5	215.1	0.69	0.51	0.76	30.1
Approach		815	2.0	0.708	13.8	LOS B	8.5	215.1	0.69	0.51	0.76	30.9
East: Loder Rd												
1	L2	55	2.0	0.459	13.5	LOS B	2.6	64.8	0.75	0.85	1.06	30.6
6	T1	25	2.0	0.459	13.5	LOS B	2.6	64.8	0.75	0.85	1.06	30.6
16	R2	190	2.0	0.459	13.5	LOS B	2.6	64.8	0.75	0.85	1.06	29.8
Approach		270	2.0	0.459	13.5	LOS B	2.6	64.8	0.75	0.85	1.06	30.0
North: Beavercreek Rd												
7	L2	95	2.0	0.943	31.8	LOS D	47.9	1216.3	1.00	1.01	1.60	24.8
4	T1	1090	2.0	0.943	31.8	LOS D	47.9	1216.3	1.00	1.01	1.60	24.8
14	R2	30	2.0	0.023	2.9	LOS A	0.1	2.2	0.15	0.05	0.15	35.3
Approach		1215	2.0	0.943	31.1	LOS D	47.9	1216.3	0.98	0.98	1.56	25.0
West: Loder Rd												
5	L2	25	2.0	0.242	13.9	LOS B	0.9	22.2	0.78	0.78	0.78	30.4
2	T1	35	2.0	0.242	13.9	LOS B	0.9	22.2	0.78	0.78	0.78	30.3
12	R2	30	2.0	0.242	13.9	LOS B	0.9	22.2	0.78	0.78	0.78	29.5
Approach		90	2.0	0.242	13.9	LOS B	0.9	22.2	0.78	0.78	0.78	30.1
All Vehicles		2390	2.0	0.943	22.6	LOS C	47.9	1216.3	0.85	0.80	1.20	27.5

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 Sign Control.

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: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

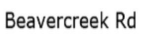
Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Organisation: DKS ASSOCIATES | Processed: Tuesday, July 30, 2019 5:29:37 PM

Project: X:\Projects\2019\P19082-000 (Oregon City Beavercreek CP Analysis)\Analysis\Sidra\2040 Metro with Holly ext RABs NEW LU.sip8



MOVEMENT SUMMARY

 **Site: 101 [Beavercreek and Glen Oak]**

Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: Beavercreek Rd												
3	L2	35	2.0	0.437	7.9	LOS A	2.7	68.4	0.49	0.34	0.49	33.6
8	T1	380	2.0	0.437	7.9	LOS A	2.7	68.4	0.49	0.34	0.49	33.5
18	R2	70	2.0	0.437	7.9	LOS A	2.7	68.4	0.49	0.34	0.49	32.6
Approach		485	2.0	0.437	7.9	LOS A	2.7	68.4	0.49	0.34	0.49	33.4
East: Glen Oak Rd												
1	L2	60	2.0	0.349	8.5	LOS A	1.7	42.6	0.63	0.60	0.63	32.9
6	T1	40	2.0	0.349	8.5	LOS A	1.7	42.6	0.63	0.60	0.63	32.8
16	R2	185	2.0	0.349	8.5	LOS A	1.7	42.6	0.63	0.60	0.63	31.9
Approach		285	2.0	0.349	8.5	LOS A	1.7	42.6	0.63	0.60	0.63	32.2
North: Beavercreek Rd												
7	L2	90	2.0	0.721	13.7	LOS B	7.1	180.9	0.63	0.41	0.63	30.9
4	T1	795	2.0	0.721	13.7	LOS B	7.1	180.9	0.63	0.41	0.63	30.9
14	R2	150	2.0	0.116	3.7	LOS A	0.5	12.3	0.19	0.08	0.19	34.8
Approach		1035	2.0	0.721	12.2	LOS B	7.1	180.9	0.57	0.36	0.57	31.4
West: Glen Oak Rd												
5	L2	70	2.0	0.257	10.8	LOS B	1.0	25.5	0.70	0.70	0.70	31.1
2	T1	30	2.0	0.257	10.8	LOS B	1.0	25.5	0.70	0.70	0.70	31.0
12	R2	30	2.0	0.257	10.8	LOS B	1.0	25.5	0.70	0.70	0.70	30.2
Approach		130	2.0	0.257	10.8	LOS B	1.0	25.5	0.70	0.70	0.70	30.8
All Vehicles		1935	2.0	0.721	10.5	LOS B	7.1	180.9	0.57	0.41	0.57	31.9

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 Sign Control.

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: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: X:\Projects\2019\P19082-000 (Oregon City Beavercreek CP Analysis)\Analysis\Sidra\2040 Metro with Holly ext RABs NEW LU.sip8

Preliminary Signal Warrants

Oregon Department of Transportation Transportation Development Branch Transportation Planning Analysis Unit					
Preliminary Traffic Signal Warrant Analysis ¹					
Major Street: Beavercreek Rd			Minor Street: Glen Oak Rd		
Project: Beavercreek Concept Plan			City/County: Oregon City		
Year: 2040			Alternative: Metro model w Holly ext		
Preliminary Signal Warrant Volumes					
Number of Approach lanes		ADT on major street approaching from both directions		ADT on minor street, highest approaching volume	
Major Street	Minor Street	Percent of standard warrants 100	70	Percent of standard warrants 100	70
Case A: Minimum Vehicular Traffic					
1	1	8850	6200	2650	1850
2 or more	1	10600	7400	2650	1850
2 or more	2 or more	10600	7400	3550	2500
1	2 or more	8850	6200	3550	2500
Case B: Interruption of Continuous Traffic					
1	1	13300	9300	1350	950
2 or more	1	15900	11100	1350	950
2 or more	2 or more	15900	11100	1750	1250
1	2 or more	13300	9300	1750	1250
X	100 percent of standard warrants				
	70 percent of standard warrants ²				
Preliminary Signal Warrant Calculation					
	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	1	8850	15200	Y
	Minor	1	2650	2900	
Case B	Major	1	13300	15200	Y
	Minor	1	1350	2900	
Analyst and Date:			Reviewer and Date:		

¹ Meeting preliminary signal warrants does **not** guarantee that a signal will be installed. When preliminary signal warrants are met, project analysts need to coordinate with Region Traffic to initiate the traffic signal engineering investigation as outlined in the Traffic Manual. Before a signal can be installed, the engineering investigation must be conducted or reviewed by the Region Traffic Manager who will forward signal recommendations to headquarters. Traffic signal warrants must be met and the State Traffic Engineer's approval obtained before a traffic signal can be installed on a state highway.

² Used due to 85th percentile speed in excess of 40 mph or isolated community with population of less than 10,000.

Oregon Department of Transportation Transportation Development Branch Transportation Planning Analysis Unit					
Preliminary Traffic Signal Warrant Analysis ¹					
Major Street: Beavercreek Rd			Minor Street: Loder Rd		
Project: Beavercreek Concept Plan			City/County: Oregon City		
Year: 2040			Alternative: Metro model w Holly ext		
Preliminary Signal Warrant Volumes					
Number of Approach lanes		ADT on major street approaching from both directions		ADT on minor street, highest approaching volume	
Major Street	Minor Street	Percent of standard warrants 100	70	Percent of standard warrants 100	70
Case A: Minimum Vehicular Traffic					
1	1	8850	6200	2650	1850
2 or more	1	10600	7400	2650	1850
2 or more	2 or more	10600	7400	3550	2500
1	2 or more	8850	6200	3550	2500
Case B: Interruption of Continuous Traffic					
1	1	13300	9300	1350	950
2 or more	1	15900	11100	1350	950
2 or more	2 or more	15900	11100	1750	1250
1	2 or more	13300	9300	1750	1250
X	100 percent of standard warrants				
	70 percent of standard warrants ²				
Preliminary Signal Warrant Calculation					
	Street	Number of Lanes	Warrant Volumes	Approach Volumes	Warrant Met
Case A	Major	1	8850	20300	N
	Minor	1	2650	1434	
Case B	Major	1	13300	20300	Y
	Minor	1	1350	1434	
Analyst and Date:			Reviewer and Date:		



Beavercreek Road Concept Plan- Beavercreek Road Design Survey

October 24, 2019 to November 11, 2019

Transportation decisions often involve tradeoffs, knowing that price may be a limiting factor, what elements of Beavercreek Road are important to you?

	Very Import	Somewhat Important	Important	Not Important	Not Important At All
Pedestrian safety	106	20	32	4	3
Bike safety	77	30	37	11	8
Aesthetics/creating a sense of place	36	36	51	30	6
Reducing vehicle congestion	121	31	15	3	1
Ease of long term maintenance	54	44	56	10	2
Ease of crossing Beavercreek Road	70	39	37	12	4

Would you prefer using roundabouts or traffic signals along this section of Beavercreek Road?

Traffic signals 79

Roundabouts 93

Would you prefer seeing a 3-lane section, 5-lane section or a transition from 5-lanes to 3 lanes along this section of Beavercreek Road?

3-lane section the length of the Concept Plan boundary (Clairmont to southern golf course boundary) 48

5-lane section the length of the Concept Plan boundary (Clairmont to southern golf course boundary) 86

A transition from a 5-lane section to a 3-lane section somewhere along the length of the Concept Plan boundary (Clairmont to southern golf course boundary) 33

Tell us some information about you (click all that apply).

I am a resident of Oregon City	120
I am a resident of Clackamas County	116
I am a resident of the Caufield Neighborhood	38
I have a child enrolled in the Oregon City School District	49

(*Please note that the 1st 25 respondents were unable to chose more than once option)

Can you let us know what factors led to your decision (# of Lanes)?

The 5 lane transition would be a nightmare in congestion at the transition point. Oregon City residence have yet to absorb the zipper concept as you can see on Hwy 213 at Meyers.

Beavercreek needs a full 5 lanes for current and future traffic. Traffic only backs up when transitioning to fewer lanes. Learn from ORE 213.

Transition from 5 lane to 3 lane at Glen Oak. Most of the traffic on Beavercreek goes to the school and Glen Oak. If there is a round a bout at Glen oak and it transitions down to three anes going forward from glen Oak that would make the most sense. Trying to transition down to two lanes at the southern end by the gulf course would cause a major backup with the light at Henrici.

Overall traffic congestion improvements, including high school, CCC and daily commuter flow

Minimize the adverse impact that the overall Plan will have to traffic.

Due to the present and anticipated traffic volumes, vehicle left turns off of Beavercreek will be a problem. Referencing the experience with Molalla from Warner Milne to Division, when it was four lanes (with no center turn lane) rear end accident rate was high. The three lane section reduced that rate.

Also with 4 travel lanes it encourages drivers to "lane shift" to maintain a higher overall velocity.

1. The solution should respect the pre-existing through traffic that predates this concept plan proposal and even predates much south Oregon City development. Staff has on occasion called slowed traffic a solution -- the public does NOT agree; both neighborhood and regional traffic does not like wasting time nor wasting carbon dioxide in an inefficient transportation system. Slow downs also affect emergency vehicles like police, fire and ambulances and put people's lives in danger.
2. Cost should not be a factor as it is in the introduction "Every year there are more projects than budgeted funds." Really this statement means that the governments being discussed have not properly adjusted their System Development Charges for local and regional road improvements although Oregon law provides for both. Adjust the System Development Charges so that the road system is NOT degraded by this development. Growth should pay its own way. It should be a net benefit to the city. It should not require the subsidies and the life deterioration of the city's residents.
3. A 5-lane road, when needed, can have a "sense of place", a sense of beauty and tranquility e.g. if the landscaping is so construed.
4. If road speeds make bicyclists uncomfortable, as stated, (and many unwilling to bike), then the bike lane separation needs to be increased (whether by a greater distance or by a hump or curb or whatever it takes) especially in this area where cycling is supposed to increase.
5. Ordinary speakers of English interpret the City Comprehensive Plan and Code to require that "livability" in the city is protected; this potential development should not make life more inconvenient nor time-consuming or hazardous or frustrating or unpleasant for road way users.
6. Road way users should not have the continuous feeling that the road is over-crowded, over-capacity, that

they are put upon, that life is annoying frustrating, a headache, that the city staff didn't do their job, that they should throw them all out. The traffic experience should not even be noticeable "livable" so the person can focus on the rest of their day.

7. The Oregon City Code provides for 5 lane roads for major arterials for a reason and that reason is valid here. Unless necessary I don't see the need for five lanes across the entire plan. If the traffic demand increases I would expect the plan to be expanded to be all five lanes. Having five lanes I would expect to have less congestion as there's no flow restriction other than the traffic light.

Reduce speeding

I am fine with either a 3 lane or 5 lane as long as the idea is also for long term growth in that area and the ability to allow cross streets like Glen Oak to be able to turn and sidewalks for pedestrians.

I used to live near a four lane road. That one was changed to one lane in each direction, a center turn lane (and bike lanes.). Traffic, surprisingly, moved better after that change as the left turners were out of the way.

I would not like to see Beavercreek become a high speed highway.

It sounds as if the traffic studies completed do not recommend a 5-lane cross section. This seems overkill, especially given the future transportation projects mentioned above. I do feel that the posted 20 mph speed limit during 7-5 p.m. on school days is one of the major causes of congestion. I also think that a traffic study that is 11 years old, should be revisited and refreshed before making a decision. Perhaps the High School speed zone can be reevaluated when the study is revisited?

It seems like it would be confusing to transition the lanes from 3 - 5 lanes.

There would be better visibility with 3 lanes, and less potential for accidents. the current traffic loads at 630a-8a and 3p-5p can be significant between 213 and Henrici and if more traffic is going to be dumped in this area more lanes are needed

I have a bias toward prioritizing bike and pedestrian facilities and safety. 3 lanes is ideal for a safe road that is a real destination rather than a stroad.

Too busy as it is right now. Traffic congestion will increase shortly

traffic is already a problem by the high school to 213. The number of vehicles joining the traffic flow from the new development will make it impossible to get to 213 in the mornings without several more lanes including merging lanes onto 213.

from OCHS to Hwy 213 needs 5 lanes with all the growth planned in that corridor.

Having to wait 30 - 45 seconds for traffic to clear during morning commute hours and having to be in long lines of cars and missing traffic lights (chiefly at Meyers Road). And I remind you, that this is BEFORE any development of businesses or retail stores in the Thimble Creek Business Park. Why did Kruse Way in Lake Oswego have to be 5 lanes? I submit that it was because it was a main thoroughway from I-5/Hwy 217 into Lake Oswego. Beavercreek Road is a similar thoroughway.

Build for the future not the next 10 years.

Less land used and less traffic

Mostly DON'T want a transition from 5 to 3 lane since it creates such a bottleneck and as a resident of the area already have to deal with that on 213 which is most unpleasant. If a protected ped/bike lane is incorporated and other improvements are actually made such as the free flow right turn lane, this might be enough.

I don't think 5 lanes are necessary the entire distance given the increased speed issue stated in your concerns above and with the Myers Rd adjustment, there should be alternate routes to get where you want to go. I am all for promoting walking and biking!

Traffic is already at a standstill during main commute hours

Please see my additional comments. I am concerned that there is little language in your plan thus far to include making the area a neighborhood that is not only safe but enjoyable to walk and bike around. With the parklike setting of CCC and the high school fields, you should consider ways to provide community walking access across beavercreek road.

Making a compromise between traffic congestion and the cost of construction and maintenance

This section of Beavercreek has substantial backups in peak hours due to the lack of lanes. This could prohibit freight along this corridor. A 5 lane section will provide opportunity for freight. It may be reasonable to transition to a 3 lane road at some point depending on projections that a traffic consultant could provide.

Increase density with apartment, truck traffic, bike and walking paths

I guess I need to leave that to the traffic experts.

Threat of even more than current congestion.

Consistency seems to help the flow

OC is not going to stop future growth along BC Rd. There are no other access roads to get to 213 from Beavercreek due to topography and existing housing. This road will only get busier. Build it out for the future, not just for today.

Since I drive daily on Beavercreek Road and time my driving to avoid school congestion, I believe the road from Clairmont to Glen Oak really must be five lanes wide. South of Glen Oak towards Henrici there should be a transition to three-lanes. The right-of-way there seems to be adequate for future expansion if it become necessary. The 20-mile-an-hour speed limit in front of the High School during school days significantly hampers traffic on Beavercreek Road. The bottlenecks on Beavercreek Road occur at Meyers Road during school hours (7am to 5pm) September-June, and at Marjorie Lane north of Clairmont due to stacking at Maple Lane and Highway 213 in the mornings, from 7:00 to 9:30 am all year. I have lived here for twelve years and do not witness excessive speed on Beavercreek Road, except when school lets out and the teenagers are turned loose.

A 3-lane section could reduce the amount of total traffic that uses Beavercreek Rd. A 3-lane section will also allow for more space for sidewalks and bike lanes improving the overall safety of the corridor.

Do not want more people driving along here. Want pedestrian, bike safety (alternate transportation than cars) to be safe. Would like better shoulder especially by the golf course but not more lanes. More lanes are much more dangerous for pedestrians and bikes.

As a cyclist and pedestrian, a 3-lane section is safer for me than a 5-lane section. The 3-lane section is also safer for all other road users. While motorists may think widening the road to a 5-lane section will speed up their trip, induced demand has shown repeatedly that the long-term result of widening the road is a similar or worse level of service. Please do not widen the road to 5 lanes!

Whenever there is lane merge/reductions traffic congestion's and if we can mitigate the reduction more smoothly traffic will flow better.

Building for the future, not for right now

Seeing what works

I don't want to see any more left hook pedestrian fatalities. They are life changing events and we can not have any more simply because people fear change.

Construct as 3-lane but allow room for future 5-lane development as growth increases.

the transitions can be tricky for traffic backup.....ie, the "Zipper" on 213.

This is a busy road and congestion is a problem.

This is a busy road and congestion is a problem.

I would prefer that any roads be over-built for the plan rather than having to be redone in 10 years so my initial thought was the 5 lanes all the way but it seems silly to go from 5 lanes to two so a gradual transition seems best.

Plan for the future! As the area develops be prepared for the increased traffic/congestion
Agree that more lanes, while convenient, would lead to more people choosing that route. Let the new upcoming road connectors take care of the congestion.

Because the more lanes the better. Transition lanes just creates back up and bottlenecks. OC is already getting crowded.

Portland epitomizes how to underlane development. Thats all the evidence needed. Take a look at Division st, Holgate Blvd, and so many other examples. Don't do that.

Beavercreek Road is already very busy and traffic is horrible around the time I pick up my high school student. Having more lanes would help with the congestion of cars.

I would like to see more consideration on Hwy 213 improved flow. If Beavercreek Road is changed to a 5 lane road then it will become the desired route instead of Hwy 213.

I think 5 lane at least to the high school. Traffic decreases south of Myers Road, so could go either way from there.

The new developments in the BCDP will lead to higher population density in the planned area. In addition, Beavercreek Hamlet is also increasing in size with new developments. This section of road will be utilized heavily in the coming 10 years and we should reduce overhead of continued expansion projects by getting the appropriate intersections and lane sizing correct during this initial project. I believe a 3 lane or 5 to 3 lane convergence will need to be upgraded in less than 10 years and the overall cost at that point will be larger than just doing it now.

No feelings.

Provides opportunity for dedicated left and right turn lanes to allow through traffic to be maintained.

Growth will happen, plan for it now.

The area is already congested and backs up from the light at 213 in the morning. More lane options would allow better flow.

this would likely cause more congestion than 5 lanes, but would slow people down and make it faster to cross at crosswalks.

If you go 5 lanes, then it's going to be a bottleneck at the golf course to go back down to less lanes. I live in Beavercreek and would prefer not to have that.

More road and possible bike lanes

Property backs to Beavercreek road in the noted area. Preference to not reduce green spaces between home and road

The 5 lane section will help the most busy area which would allow traffic to better flow through. However, The city has to account for the new business park to get a lot more traffic. Commercial as well as the new residential building on the golf course will warrant 5 lanes.

Speed! Traffic rips along Beavercreek now, I can only imagine how it would be with 5 lanes. How would 5 lanes impact the 20 mph at the High School. Doesn't sound again very bike or pedestrian friendly.

Merging into less lanes causes accidents and slows traffic down even more.

I visualize future grow down Beavercreek Road and if not now, in the future a need for a 5 lane road. If we reduce the road to three lanes at the end of the golf course it would be expectable and future expansion could be added when and if it becomes necessary in the future.

hope to avoid bottlenecks like the one at Meyers and 213 which is a daily occurrence

Traffic is getting heavier and needs more lanes.

It seems to often cities start with the 3 lane, and down the road they need to add lanes. the community is growing fast, development in the proposed corridor, plus the growth outside the city limits warrants a need to move more traffic from point A to point B with less congestion and back up of traffic during rush hours. Single lane with turn lanes backs traffic up for blocks, which tends to irritate drivers and make at times for unsafe conditions.

We need to create enough capacity in the Beavercreek Road Design Plan, that eliminates any and all justification for directing traffic (incidents of travel) in any way to Holly Lane. Holly Lanes cannot be improved to meet the standards of a major arterial, going through multiple known landslide areas. Additionally, incidents of travel are growing exponentially fast east of the Beavercreek Plan area at this time, where a 3 lane Beavercreek Road would have an inadequate capacity as soon as it was built. I have been on the Clackamas County Transportation Commission as part of creating their TSP.

More lanes just make things more complicated

Want to keep traffic flowing but do not want to induce demand for more traffic on an already congested road. An very worried that reading will increase to the point that area becomes unlivable. Do not want to lose the rural/natural areas of Beavercreek road.

I don't want to see Beavercreek road speed up.

No note, just opinion

Expected volume of traffic

Volume of vehicles at slow "School Zone" speeds.

Turning left from a street that isn't at a light is way better with 3 lanes than 5. As long as cars can pull to middle to wait to turn left, it would be better than current.
Traffic congestion currently.

the definitions of roundabouts and number of lane explanations.
Traffic is already heavy along Beavercreek Road. 5 lanes with traffic signals would move traffic well.

Long-term costs. It will only be more expensive to expand from 3 to 5 lanes in the future.

While more complex, I have seen them in place in other areas of Portland and they are functional while allowing more traffic.

Better traffic flow and works with existing roads near 213.

Volume forecasts for Beavercreek Road, especially south of Clairmont, do not warrant a five-lane cross-section, which would significantly reduce safety and ensure the long tradition of car-centric neighborhoods in Oregon City. There are schools and parks west of Beavercreek that should be accessed by families that walk or bike from the new neighborhoods in the concept plan area.

Less pavement is better.

Take a drive on a school day at 7:45am on beavercreek rd starting at the college and driving south. Let me know what you think. It would be great to have that insight when planning your design. Don't let a builder go in and permit him to design a parking lot like oc point. The parking spaces are too cramped.

I've experienced near accidents in 5-lane section roundabouts and think that the 3-lane would be safer and more cost effective all around.

Creating a large shoulder for five lanes would be a happy medium to allow for future expansion to five lanes and start with three lanes the entire length to see how it goes and lower initial investment cost of improvements. Plan for a 5-lane section regardless in terms of right-of-way. Build a 3-lane section where possible if cost is a factor.

Build to road you need for the future today vs going back and widening it later when the Hamlett of Beavercreek becomes the next area to boom.

5 lane has to be very expensive. They would encourage high speeds.

It would add unwanted congestion if traffic went from 5 to 3 lanes...example is the 205 congestion's OC bridge! at th

Hopefully, a transition back to three lanes would be help to some extent to keep development from spreading further towards Beavercreek.

as stated above.

Traffic flow is important.

My kids going to OCHS. Traffic is already bad there at drop off and pick up. I don't want my kids sitting forever in cars waiting to get to and from school.

"the great intellectual black hole in city planning, the one professional certainty that everyone thoughtful seems to acknowledge, yet almost no one is willing to act upon."

3 lanes is just going to extend the morning backup that already exists from 213 back to CCC each morning.

The increased speed issue is more important than the congestion issue.

There is sooo much traffic using that corridor now that a round about would not necessarily, in our opinion, allow for merging in a timely manner to facilitate movement of the less than main traffic flow. And the pedestrian/bike traffic would not necessarily be safer using this area.
Necking down lanes only backs up traffic needlessly.
Ease of driving

We need to think we'll into the future. 5 lanes are needed. If there's a transition then there will be bottle necks.

Obviously with what is planned, Beavercreek will need to be widened, but it should be done incrementally with development and structured to impact the fewest current residents.

For the amount of construction/congestion being proposed, a 5 lane will be needed in order to keep traffic moving... THAT IS ONLY IF THE HWY 213 AND BEAVERCREEK ROAD INTERSECTION IS FIXED WITH A GRADE SEPARATION. Otherwise 5 lanes will go to a bottleneck and not be helpful at all.

I think consistency is important and reduces confusion.

Can you let us know what factors led to your decision? (Intersection)

There is too much traffic passing through on BC Road and the round about is going to cause congestion. Beavercreek Rd has far too much traffic and delays already, only to install more traffic signals that back up traffic more than it is already.

More traffic lights on beavercreek will not ease congestion, will only make it worse.

Continuous flow of traffic; better flow on stretch between Henrici and Clairmont intersections

Constantly moving traffic.

pedestrians and bikes are slower and need more thought to allow their movement safely across and along the streets.

Roundabouts are not good for this area because 1) they seem more for local traffic as they slow things and they don't respect pre-existing through traffic; 2) make the travel distance longer which people-powered transportation cares about; 3) this area is supposed to increase walking and bicycling; 4) they are confusing and unsafe for pedestrians and bicyclists and the pedestrian feels lost and wants to walk the shortest distance (across the island) and many people are kept from biking by the thought of having to mix with traffic.

I find roundabouts to be effective at reducing congestion and increases driver alertness to yield and look for cars as well as pedestrians.

Roundabouts, as used in Oregon, appear to reduce congestion and are more pleasant than traffic signals. However, for very high traffic flows, roundabouts appear to increase congestion in my experience. Roundabout also are more aesthetically pleasing and encourage a greater sense of community.

I am having a hard time visualizing the roundabouts along Beavercreek with so many driveways. Also, there is so much traffic on Beavercreek that there are times that I can't turn in either direction (also slightly hard to see cars coming from high school towards Henrici because of where the stop line is) for quite some time. If Beaver creek is backed up because of the High School, no one will be able to turn left from Glen Oak to Beavercreek with a round about. Also, there needs to be more of a connection sidewalk for pedestrians. I have seen groups of

High Schoolers running along Beavercreek for track or cross country training and there is no sidewalk or safety space.

Experience with roundabouts. Lights are safer for pedestrians and bikes and easier for drivers when traffic is heavy. If we add the number of people in the plan area to what we already have, we will have heavy traffic...at least at certain times of the day.

Creating a sense of place and 'parkway' feel to Beavercreek Road would be desirable via a roundabout instead of traffic lights. I do have concerns about how pedestrians and bicycles are safely incorporated into a roundabout design. It almost seems as if these two components should be separated from a roundabout design by providing a wide, multi-use path/trail that stretches from the southern extents of the concept plan (S Old Acres Ln) to at least Hwy 213. It could connect to the future Newel Creek Canyon, to other amenities and natural areas within the City, eventually to downtown and the Willamette Falls Riverwalk via the Oregon City Loop Trail!

In some ways the roundabouts seem safer.

the current traffic loads at 630a-8a and 3p-5p can be significant between 213 and Henrici.

I have a general belief that roundabouts are more effective all around. I would defer to experts though. There is presently very little to no pedestrian or bike traffic. Driver ease is better with traffic lights. roundabouts require very more concentration of surrounding traffic.

really might need both what with all the school bus traffic around OCHS.

This is a main throughway (along with Hwy 213) for residents living beyond Henrici Road. Roundabouts are fine on feeder or back road intersections, but not on main throughways - they slow down traffic way too much.

TIMED lights would be appropriate. Keep them few, but of longer length (i.e., only 2 or 3 main intersections with lights, but make them so many cars could get through at the rush hour peaks); If you have 5 lanes (with a turning lane) commuters should be able to use the turning lanes without impeding traffic flow.

Future growth and inclusion of urban reserves first to UGB and then to the city to the south of Beavercreek concept plan will only increase traffic flow through the concept plan. Build for the future not now. Roundabouts take up more land.

I would like to see both. Pedestrian safety by the high school is hugely important and roundabout would not address this, but may be better for traffic flow. If current signal at Meyers Rd is kept for busses and residents of Glen Oak to get in and out but put roundabouts at other road crossings Roundabouts keep traffic flow moving and I would like to see more infrastructure encouraging walking and biking.

in your own words:

"In general, multi-lane roundabouts are not recommended in areas with high levels of pedestrian and bicycle activity because of safety concerns of multiple threat crashes for pedestrians, especially those with visual impairments, and bicyclists."

with the high school adjacent to Beavercreek Rd there will be a large number of pedestrians and bicycles along the roadways during school hours especially if the new complex will house restaurants and coffee shops.

We have got to plan ahead beyond the next ten years towards a time when more and more people will need to walk and bike places. Pedestrian safety is our future, but also our present. I am a daily walker, jogger, who often must cross traffic at bad spots or be on the road without a sidewalk or bike lane. Please plan for people

like myself, and plan for the future and make this a neighborhood area that will attract people who want to live and walk and bicycle here!

Safety for non-motorized travelers is important to me.

A roundabout will negatively impact freight which is necessary for economic development and jobs. Beaver Creek is a road that should have as much through traffic as possible without delays. With the amount of crossings that may occur between potential residential, school and jobs - pedestrians will have safety issues with roundabouts whereas they will have signalized safe opportunities if signalized. Roundabouts do not provide proper safe crossings for bikes or pedestrians especially in heavy traffic volume or speeds which Beaver Creek will have.

Power outages and maintenance

Need to slow traffic at intersection

Safety - though you can't put crosswalk on a roundabout, can you?

Clarity of a signalized intersection is needed for safety especially considering inexperienced High School-age drivers ... in cars & on bicycles; & pedestrians, too.

5-Lanes on Beaver Creek Rd is absolutely needed to address congestion of future area development growth, College & High School traffic, & much more attractive to prospective buyers of commercial property in this Beaver Creek Rd Concept area.

More attractive and has a community feel

Roundabouts allow for ease of traffic and reduce speeds. Pedestrians will still be able to use the crossing at Meyers Rd to get to/from HS and any shops across the street.

I drive regularly up Stafford Road through the roundabout at Borland Rd. I very rarely encounter excess vehicle stacking at that site. However, the roundabout at Stafford and Rosemont seems to be always difficult to negotiate. At peak times between 3:00 pm and 6:00 pm the traffic headed north on Stafford Road can be stacked up past Johnson Road to the south. This occurs because the majority of traffic coming south on Stafford from Lake Oswego/High School area has priority traveling west to Rosemont and the West Linn housing/business area. Traffic going north on Stafford simply sits waiting for a break. I see this exact problem happening on Beaver Creek Road at /Henrici/Glen Oak/Meyers/Loder if roundabouts are used. My driveway onto Beaver Creek Road is between Meyers and Glen Oak. I sometimes have to wait up to 4-5 minutes to get a break to turn north. Without the traffic lights moderating the flow, I might never get out. With a roundabout at Glen Oak, I am assuming there will be no option to turn north out of my driveway and I will be forced to turn right to go around the roundabout in order to continue north. This would be exactly the problem at the Stafford/Rosemont roundabout.

Traffic signals will allow for safer pedestrian and bicycle traffic. Will also allow for safer methods to cross Beaver Creek Rd. especially in the school zone at the high school.

I do not like roundabouts. I don't think it would work very well on Beaver Creek Road because there is too much traffic.

A well-designed roundabout can improve safety, operations and aesthetics of the intersection.

Roundabouts work better.

Roundabouts are much more efficient for vehicle traffic and would reduce congestion
Roundabouts work very well in Central Oregon

It is already congested Trying to go from 213 to Glen Oak on Beavercreek Road. We need more lanes to help the congestion. Need more lights, especially a light or a roundabout at Glen Oak road. It is going to be difficult to get out with the increased traffic

As a world traveler I see first hand the tremendous safety inherent to roundabouts. They all but eliminate fatalities both traffic related and pedestrian. There is a misconception of confusion associated with roundabouts but they are quickly adapted to. Fear and an anxiety should not be factors associated with road design. The citizens need good leadership and part of that is designing what's best for the citizens.

A 5-lane roundabout seems confusing and would create accidents.

They work well in western Washington County and in the Bend area.

Close to Highschool, so less need to slow down traffic in addition to school zone. Do need access to Beavercreek to Glen Echo signaled for safety.

Traffic signals i feel are a better option. They're less confusing and people usually know how to navigate them.

It's bad enough when people run stop signs and signals. Can you imagine what they'll do when faced with a roundabout!?! The average driver is not accustomed to roundabouts, so be ready for more accidents than normal.

It would really depend on what type of building there will be across from the high school and CCC. If there will be only houses, then most people will use their cars to get places and roundabouts would be better. But if it is going to be mixed use buildings ie mostly houses but some businesses, small stores, fast food places, then lights would be a better option because of the pedestrian traffic from the schools and houses.

roundabouts keep traffic moving reducing backups
Experience driving that road, and experience with roundabouts in other areas.

When people know how to use roundabouts they ease waiting and keep the flow going. It's just a steep learning curve and with a lot of new drivers along Beavercreek due to the HS some community education needs to happen.

Because there is always flowing traffic. Beavercreek Rd & 213 get too backed up ie signal lights. In my whole driving life I have never seen a backup through a roundabout. I have also never seen a crash at a roundabout. They are safer.

Roundabouts are remarkably efficient and convenient. Traffic flows constantly by design as opposed to lighted intersections. Having driven through western Europe, I am a roundabout fan.

Roundabouts are confusing sometimes on which way you can turn. That could slow down traffic even more on Beavercreek Road.

The traffic now on Beavercreek road is very congested in the AM and PM commutes. The right turn lane from Beavercreek Rd to Hwy 213 should have a lane to merge which would reduce congestion in the area. Also the left turn from Hwy 213 onto Beavercreek Road is dangerous in the commute as the left turn onto Maple Lane backs up onto Hwy 213. These items should be addressed before adding additional traffic on Beavercreek Road. The Loder Road area is currently unsafe and if additional traffic is added it will need to be addressed with a stop light and turn lanes. Also, many people use Beavercreek Road as Hwy 213 between Clackamas Community College and Myers Road due to the traffic on Hwy 213 which is heavily congested during commute hours. If the lane that ends at Meyers Road were extended out to Leland Road your traffic flow would be much better and reduce the need to use Beavercreek Road. If you choose to increase the number of lanes on Beavercreek Road then careful consideration needs to be made around the High School area. I have witnessed too many close calls

with Pedestrians as people do not adhere to the school zone in that area. Additionally, it is dark in that area during the Winter and visibility is poor.

Pedestrian and bicycle safety. There are many kids in the neighborhoods along Glen Oak and also more coming with the new apartments that will be built across the street from the high school.

Roundabouts provide a smoother flow of traffic, are easier to maintain long term, and are more aesthetically pleasing. Additionally, roundabouts REDUCE the types of crashes where people are seriously hurt or killed by 78-82% when compared to conventional stop-controlled and signalized intersections, per the AASHTO Highway Safety Manual. Given these statistics and my priorities, roundabouts make the most sense for Beaver Creek road.

There will be no broadside impacts since all the traffic will be going in the same direction. I like the idea of landscaping. Traffic flow will have to be slower too.

It doesn't seem that development will have frontage focused on the highway. While peds and bikes will use Beaver Creek Rd., this area is not really a town center, even with the High School, that would generate an abundance of ped traffic.

You have young teen drivers in the area getting to the High School. Traffic lights are less confusing which would then make them safer.

I've experienced the positive effect of roundabouts. I think they are the best choice.

Flow of traffic is more efficient and there is already so much congestion near the High School. Less waiting around with a roundabout.

I have used roundabouts and have found them to provide smoother traffic flow.

You get such crazy people that don't understand roundabouts and they don't yield correctly. I think it would cause more accidents, especially the two lane ones.

Roundabouts are so successful in Europe and I would love to see more here
Smoother transition

I feel that this section of Beaver Creek Rd is way too busy for a roundabout. I would be very concerned about pedestrian safety and cyclists on the road.

I believe there is too much traffic on Beaver Creek Road for a roundabout. I usually turn left from Glen Oak onto Beaver Creek. It would seem that the roundabout would only take one car at a time entering the roundabout to turn left. That car would have to wait for traffic before entering Beaver Creek Road. I think there would be a back-up of cars on Glen Oak. Also this is supposed to be a bike and pedestrian friendly development, but roundabouts are not friendly for them.

More signals mean more traffic back up! Roundabouts makes traffic move better.

Pedestrian traffic crossing Beaver Creek Road safely is a real concern with the development of a downtown area across from Glen Oak. I see many on the West side of Beaver Creek Road walking to this downtown area and I believe a signal would be a safer crossing. Other intersections may work better with Roundabouts.
long term maintenance and power outages affecting signals

Ease of travel.

I agree that traffic signals will move more traffic at a given time and with heavy traffic people tend to be confused with roundabouts, there not sure when to yield, stop, or go, which then creates a slow down or back up.

Roundabouts are far too expensive, take up too much land on critical corners and reduce their value and ability to develop them. New traffic lights are becoming more affordable and more reliable. Traffic Lights work better and are less problematic for emergency vehicles. Pedestrians have a better and safer route crossing intersection with traffic lights.

There is already so much vehicle congestion and the use of roundabouts can help eliminate that traffic.

Roundabouts improve traffic flow

We lived overseas for four years and roundabouts keep traffic moving. (One is needed at Glen Oak onto Beavercreek. I don't know how those residents get out at that intersection)

The teenage drivers and community college young adults are not mature or experienced to responsibly operate roundabouts, additionally it poses a risk to pedestrians. My husband also added the the high schoolers will probably make a game of the round about practicing drifting and other reckless maneuvers

Expected volume of traffic

There is already a school zone for the High School, so traffic is already slowed. 5 lanes would be preferable.

I was originally thinking a light at Glen Oak would be better, but I think a light would back traffic up even more so. Exiting Fairway Downs subdivision is going to be difficult enough without a line of cars. Maybe a roundabout will keep traffic moving. I do think that the morning commute and the evening after work drive is going to be especially affected.

For pedestrians, this is a no brainer. Intersection for sure. I wouldn't allow my preteen to cross a roundabout by himself!

i have a current high school freshman and an incoming freshman in 2 yrs. They will be traveling on Beavercreek a lot.

Lots of high school kids walk home on Beavercreek Road -- needs to be safe. Traffic signals seem safer for the kids.

It is contradicting to say that roundabouts are more aesthetic with landscaping, although large trucks have to drive through the center area. I think this is a nightmare for large trucks. Also, many people do not stop at a roundabout and it is dangerous for the car behind you as they may hit you if you cant get in (having to yield) also, during high traffic periods, it could become very difficult to get into the round about.

1. Safety
2. Environmental impacts; air quality, fuel consumption, etc. not mentioned above.
3. Long-term costs

Roundabouts remove the 'straightaway' where cars race up and down Beaver Creek road today. With the existing signals I believe they could be synchronized. and take up less land.

I would not make a blanket recommendation for one or the other at all major intersections along the route. Selection should be location-specific.

Do less transportation planning for cars and more planning for people and bikes. Roundabouts keep traffic moving but also tend to be fairly pedestrian friendly when designed with pedestrians in mind.

Experience.

Put a school traffic light on beavercreek rd like the light on molalla ave by carus grade school slowing traffic to 20mph in the morning when children are arriving and afternoon when they're departing. The old high school had many drop off sites on every side of the building and never a wait to drop off students. The current high school has always been a congested mess when dropping off or picking up students and is the main problem of congestion on beavercreek rd. More entry and exit choices around the school and a driving route thru ccc from beavercreek rd to ochs for student drop off and pickup. Take some of the lawn out between beavercreek rd and the high school and add additional space for cars to pull in to drop off students

Roundabouts cause traffic because of unfamiliar with merging.

To encourage free-flowing traffic and fewer delays.

Long term vision is important to me. If there are fewer lanes to begin with, can we plan for the additional lanes in the future with ease of making improvements?

Aesthetics are important as visual appeals brings pride in community and creates a culture of positive reinforcement. Safety for pedestrians and bicyclists can be achieved with great visual appeal.

Roundabouts are a better long term solution with better aesthetic appeal and no left turn safety concerns. A roundabout also requires less maintenance than timing traffic control devices.

Roundabouts keep traffic moving and does not hold up vehicles unnecessarily.

Move the traffic and make it happen. Roundabouts work great, people just need a little time to figure them out.

Traffic flow, less major crashes, safety

I feel round abouts lessen congestion and do keep speed down

Prior experience with roundabouts

It will allow ease of traffic during peak times of student release from CCC and OCHS. Also possibly reduce the speeding of teen drivers which is very common.

I believe the cons outweigh the pros

Better flow

Experience.

Roundabouts will be too expensive and will require the city too condemn property that is integral to the land use component of the concept plan.

Lights cause unnecessary delays.

Because of the high school, there are MANY first and second year drivers using this exact section of Beaver creek road daily. Any changes to the area need to take student safety and ease of navigation into consideration.

I feel much more safe on single lane roundabouts than I do the double lane roundabouts.

I feel the roundabouts are much safer than traffic signals.

Roundabouts, hands down handle traffic congestion better than traffic signals. Traffic lights only back up traffic, in some cases to the point of traffic grid lock. Case in point, Beavercreek Rd & HW 213 intersection.

Roundabouts do not work. Look what happened to the 213 road at the bottom of the hill leading to the hardware store. Heavy traffic and people afraid of the situation of using a roundabout. Not the way to go.

Have you driven this section of road at peak volume? A Round-about will slow things down you say. There needs to be a solution that relieves this traffic congestion, not creating more.

There are a number of pedestrians, particularly students from the high school and college who walk on that road. It is already unsafe.

Personal preference

I have seen many accidents in round about a. I don't believe they are safe. Beavercreek rd is already backed up at times. With more traffic there is a definite need for more lanes.

Roundabouts are ok in higher traffic areas, but should not be in residential neighborhoods and by schools where you have a lot of pedestrian traffic.

Keeps traffic moving

Under the existing conditions

If we are to help encourage commuters to walk or bicycle to their destinations, thereby reducing the number of vehicles on the road, we MUST make travel safer.

In addition, there may be individuals who do not own a vehicle, and need to walk or cycle to their destination. We should be able to encourage and help those individuals who have employment but no vehicle.

Do you have any additional comments/ideas/concerns that should be part of the discussion?

Yes, everywhere I see roundabouts, the municipality feels the need to landscape the crap out of the middle, only reducing the visibility and safety of the traffic entering and already in the circle. Please don't plant anything that grows higher than 18". Anything higher makes it difficult for drivers, especially those not in a jacked up 4X4, to see traffic entering and already in the circle. This is basic common sense! Kind of like feeling the need to plant trees along the sidewalks, only to later have to replace sidewalks after the root structure has damaged the concrete. A waste of taxpayer dollars!

I live off of Beavercreek Rd, next to the golfcourse, and have to deal with this traffic mess every day. It starts at 5:30am out here! In the afternoon, I've waited for several traffic signal changes at the high school just to get from the Chevron station to Golf course... sometimes over 20 minutes. I'm sure the city and county can improve on this!

Scrap the whole idea.

Traffic congestion that this development would contribute to and interact with should be solved e.g. Beaver Creek Rd./Hwy 213 intersection, Hwy 213 itself, and the regional system. It is not enough to say, "if there is congestion ahead, additional lanes can help stack cars closer to the congestion." This plan should have some expectation and adequate mechanisms to correct known problems that will diminish area livability, or it should not proceed.

The Hwy 213 "free flow" right turn lane ignores bicyclists and pedestrians and their safety which is already a problem. The staff (including the attorney) should be required to walk and bike through this situation before recommending it (defending it). This concept plan is supposed to increase pedestrians and bicyclists in this area, but this "solution" works against both and makes most people too uncomfortable to walk or bike.

There should not be parallel parking off of Beaver Creek Rd. e.g. at the development opposite the high school. Parallel parking could be handled like in the Willamette area where it is separated from the street by a sidewalk.

The high school speed zone is unnecessary and affects the BRCP situation. This needs to be solved in the plan.

I live off of Glen Oak, I ride my bike, run and so do others along Beaver Creek Rd, to get anywhere. There is no safe space to run longer than 2 miles or if people want to walk/bike to Beaver Creek or more into town (Berry Hill and other side of 213). I would like to see the stretch of Beaver Creek that is in the Concept Plan have more walk ability and the ability for cars pulling into Beaver Creek from their driveways and other road.

I live at xxxxx Old Acres Ln and even though I am technically a Clackamas County resident, I am directly impacted by the Beaver Creek Road Concept Plan, as my house abuts the southern extents of the golf course. I bought my house in 2016, knowingly in support of this project. I appreciate the City's communication and project updates. Keep up the great work!

do not limit access of Old Acres Lane on to Beaver Creek Rd. this is due to both our ability to come and go from our neighborhood and access of life safety equipment (our only fire hydrant is located at this intersection).

I think this is a complete waste of time I hate to see that this is happening!!!!

I am not looking forward to the nightmare of traffic for the many years during the building phase. Build out the road improvements before any actual construction!

I think that the intersection flow of Hwy 213/Beaver Creek Road should be solved very soon by the city/county/state. If 5 lanes are not considered for development in the first phases of the development of businesses in Thimble Creek Business Park and only 3 lanes are considered, then AT A MINIMUM, the city should REQUIRE an easement of the equivalent of 2 more lanes on the vacant land side (East side??) of the entirety of Beaver Creek Road. This would assure a low amount of disruption to businesses and homes when the other 2 lanes would go in. Business could use the area for parking or some other use that would not cause great disruption when uprooted for the new 2 lanes.

P.S. I could only click on one item below; not "all that apply"

Please take into consideration the extra traffic also to be added as the property at the corner of Beaver Creek & 213 (the old bus barn) gets ready to be developed and how that will further slow down Beaver Creek.

I would like to see more infrastructure encouraging walking and biking. People who live along Beaver Creek should not be REQUIRED to get into their vehicles to run daily errands. My hope is that it can all be done on foot or by bike. Grocery shopping, eating out, doctor visits, vet visits, gym visits etc would ideally all be non-driving activities. More walking and biking cuts down on long term maintenance of roads because there are simply less cars than there otherwise would be.

Don't build multi-story (4 or 5 story) buildings like in Portland and Milwaukie. These buildings do not provide for a sense of community instead they create congestion.

I believe that we can relieve traffic congestion with this plan, HOWEVER please consider ways to include pedestrian and bicycle safety. This might include new highway crossing areas with pedestrian lights for neighbors to cross Beaver Creek to access the trails at CCC. If you are going to expand traffic considerations, you should find a way to do the same to make this area a place people can enjoy walking through.

I hope that the businesses in the "employment Par" or whatever you called it are small local businesses. I would love a food cart pod with the safe ability to cross (maybe a pedestrian bridge) from the high school (they don't have the capacity to channel all those kids through on-site meals, and they take off in cars over lunch to get junk food elsewhere. Healthier choices, please. . No Walmarts, McDonalds, Targets, Panda Expresses, national or international chains. It's already tacky enough up "on the Hill" and we are all mourning the addition of Hobby Lobby in our community. Take the hill the way Main Street is going, and please let international food carts into our community for we can get a little ethnic variety!! Safety of crossing Beaver Creek Rd will need to be high on list of considerations with new residential housing being planned with kids crossing to attend OCHS & CCC; also, current residents will be walking across Beaver Creek Rd to get new centralized town businesses & cafes at corner of Glen Oak Rd. You all are going great!

Build the road before you approve building permits. Remember what they did on Sunnyside Road by allowing a buildout past 132nd and then decided to widen the road - it was a nightmare. Insist that the developers pay their share of the road improvements before they are allowed to break ground on development.

There is significant heavy equipment, tractor-trailers, log trucks and commercial vehicle traffic along Beaver Creek Road all day long. The idea of a fully-loaded log truck barreling north on Beaver Creek Road at 6:00 am and delicately driving around a cute little roundabout at Glen Oak Road is positively ludicrous. There is virtually no pedestrian traffic along Beaver Creek Road from Clairmont to Glen Oak, except just before and after High School sessions, and then only on the west side. There are perhaps 3 people who bike along the road on a daily basis. Should the Beaver Creek Apartments project ever really come to be, the idea of parallel parking on Beaver Creek Road to allow more housing units to be built in that development is an insane proposition. There should never be any kind of parking along Beaver Creek Road. Ever. Parallel or otherwise.

The speed limit of the Beaver Creek Rd. corridor is currently too high. I would suggest that the highest speed limit should be 35 mph. I would also suggest installing automatic school zone flashers for the high school. This will make it easier for drivers to know when school zone hours are in effect and will help to improve the overall safety of Beaver Creek Rd. for students.

pedestrian bridge?

I reviewed the traffic study and I could not find transit data in the intersection counts. TriMet and the CCC Xpress Shuttle should have data in the Beaver Creek Road and Highway 213 intersection. The CCC Xpress Shuttle also operates on Beaver Creek Road to Clairmont Hall on the Oregon City campus. Transit data needs to be included in the traffic study.

We need bike lanes or trails as motorists are hostile to cyclists on the existing roads.

The traffic will increase tremendously, what are you planning to do for the additional noise for the houses in the Caufield neighborhood whose backyards line Beaver Creek road? Beaver Creek is going to become a highway more or less and the vehicle noise is going to double if not triple the current noise. What is the plan for the intersection at Glen Oak and Beaver Creek? It is hard to cross as is, with the increased traffic, it will become unsafe to cross. It is already hard to see the oncoming traffic as it is.

We need roundabouts

Is the city using eminent domain for the 51 (unsure) properties needed for this development?

I hope that this plan will be similar to the Happy Valley area with mostly houses but some stores and small strip malls strategically placed so that there is some incentive to live there because there is everything you need in your neighborhood. The housing developments off of Holcomb hold no appeal for me because it's a food desert. It's very inconvenient for a quick run to the store because I forgot one ingredient for dinner. Or a quick run to a restaurant because I don't want to cook dinner. Mixed use geared towards people being able to have everything they need in their neighborhood appeals to me.

The school zone by the high school needs to have the school zone signal lights. Because people who don't have kids in school don't always know when there isn't school = don't need to drive 20mph in the zone. Would help with traffic flow as well if we only had to drive 20mph when the lights are flashing vs. 7-5pm.

Please make sure there is a time specific school zone signal for the High School. The system now is as frustrating as it can be.

Several areas need improvement before additional development should be considered. Sidewalks, sidewalks, sidewalks!! I get so nervous for the kids I see walking along Beaver Creek Road and Glen Oak Road where they have to walk in the street. It's so dangerous.....especially now that kids are looking down at their phones rather than at the traffic coming towards them.

No.

I am definitely concerned about the addition of so many homes in an area that already has such bad traffic congestion.

Just getting out to Beaver Creek is getting to be a traffic mess. There are so many people that go farther out than Henrici now. Don't forget about us. There is also more developing going on out there. Also can you get a flashing high school light with their speed showing to slow people down only during times the kids are actually around?

Also can something be done to help the Beaver Creek, Leland, Kamrath intersection? I'm surprised there aren't more accidents there. It's very unsafe.

My biggest concern is that we do just enough to satisfy needs for today and not consider future growth that would add major additional costs that we could have because of thinking about today and not tomorrow.

There is a need for a "Separated Bike and Pedestrian Path" extending on the south side of Beaver Creek Road at Highway 213 and the Berry Hill Shopping Center to and just past Oregon City High School. This requirement is to provide enhanced and thus expanded use of multi-mode options and development that does not require a car.

A roundabout on the intersection of 213 and Beavercreek would be great. I know this isn't about that but it would cut wait times immensely.

Traffic has changed in the last few years on Beavercreek rd. More traffic, more congestion. Please tell me you look at models in other areas with similar development has occurred with like establishments. I would like to see it stay more neighborhood friendly, not warehouses.

Video surveillance

Need lights at each intersection...Loder, Meyers, Glen Oak and Clairmont

Nothing matters if the intersection of 213 and Beavercreek is not addressed first. Need to create the right hand passthru lane first before any work on the concept plan.

I would not be in favor of 2 lane roundabouts. It sounds confusing and dangerous for pedestrians.

Non-residents of Oregon City should not influence this decision - unless they want to pay for what they use.

Yes I would eliminate the parallel road in the concept plan that runs along Beavercreek. It takes up way too much land for what it gains. The cost benefit is just not there.

I can appreciate the desire for public and stakeholder engagement, but most of these questions should not be put to a popularity contest. These are technical considerations that people build careers to consider and address. The general public opinion, particularly in suburban areas and particularly in Clackamas County is that more lanes, higher speeds, and free flow car travel is the gold standard. The City of Oregon City has been pretty progressive for a suburban community, so I hope that this practice will continue on Beavercreek Road.

I would love to go to a concert or movie in the park. Walking trails are important and giving as many houses and businesses as possible, thru your design, to enjoy the beautiful view of mt hood. Beautiful natural spaces are important

Create sustainable value in the improvements that can be maintained well with current resources is my goal. If resources increase then we can use them to maintain what we have sustainably.

Property owners abutting Beavercreek Road need to participate and let their thoughts be known now or never.

Please take seriously the unique use of this road with busses and students. I am also concerned that Beavercreek citizens are not identified on the last section of this survey. Beavercreek road is our main access out of the hamlet. 213 at Meyers gets very backed up where it switches to 2 lanes and making the trip to I-205 even longer is a significant lifestyle impact.

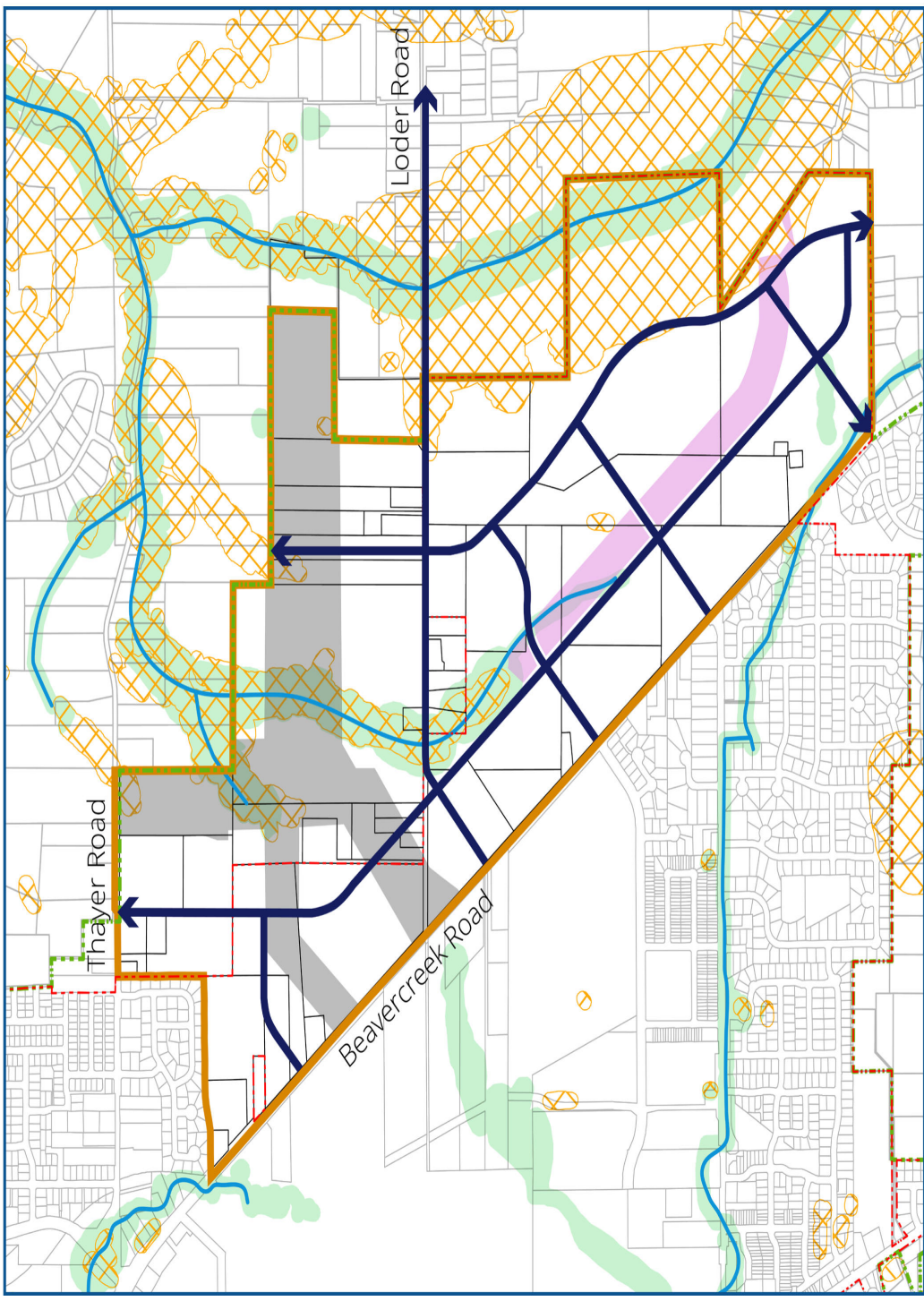
Call me in and let me give you my comments

I would like to have more information from the college as to if they actually intend to purchase property outside of the current campus that would lead to expansion across Beavercreek. I would also like to hear about real businesses and development companies willing to take on these projects. Given that there is already undeveloped land for businesses within the current city boundaries it seems strange to me that this development down Beavercreek is necessary.

I think this area should be left as is with no development. Leave the green space alone.

I agree with the committee's recommendations in regards to traffic signals over roundabouts and the Holly lane connector should be implemented. Growth is an unknown commodity, where assumptions can be made, but economics and preferences still play a large role in how accurate predictions are. The greatest impact of road design should be factored into the new development and not destroy homes and land values of people that chose this area 10-20 years ago.

Please consider to set up the BUMP at the long straight street in the residential area.



Legend

Natural Resources Overlay District (NROD)

Geologic Hazard Overlay District (GHOD)

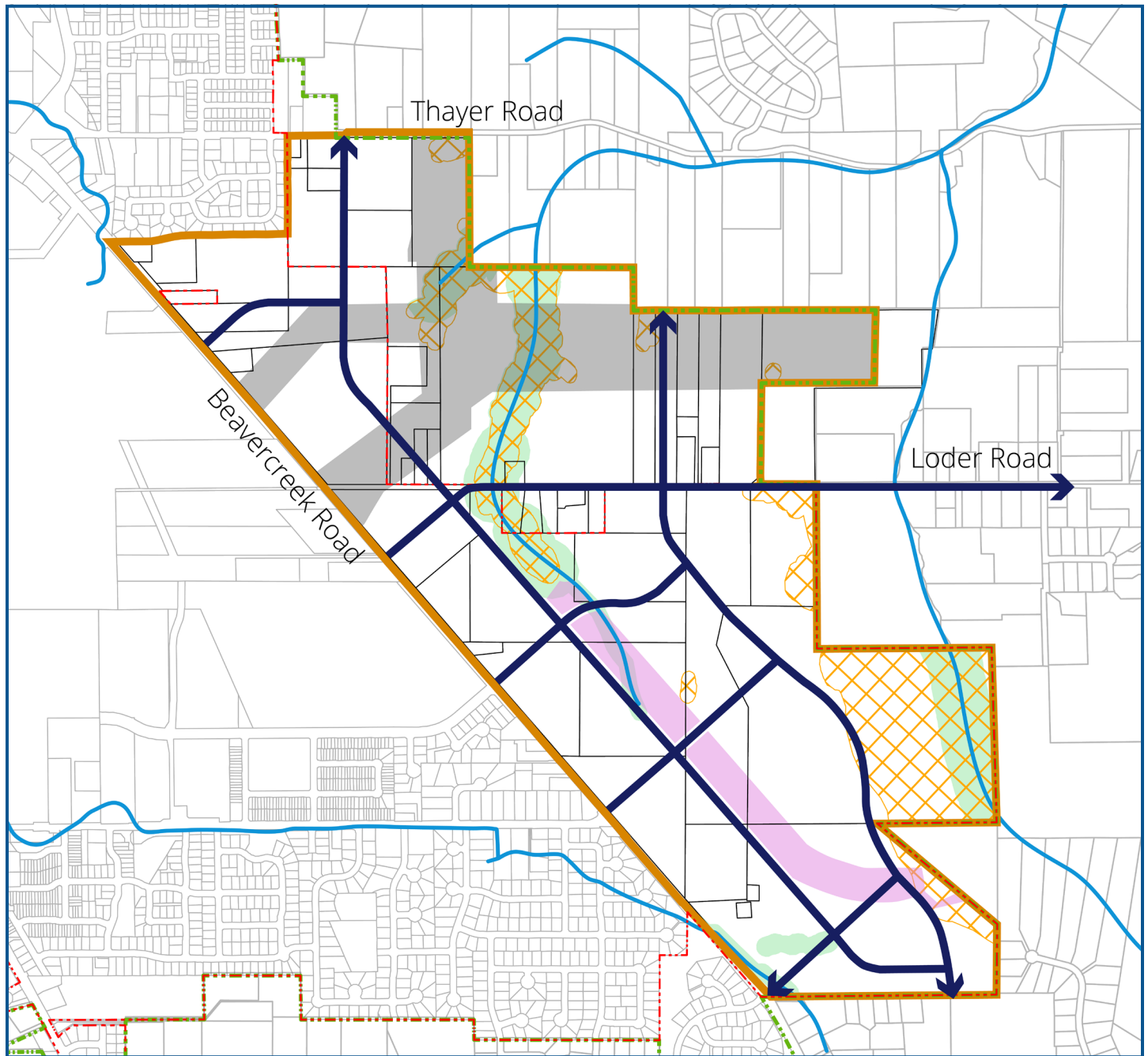
BRCP Boundary

Urban Growth Boundary





City Limits








Beavercreek Road Concept Plan

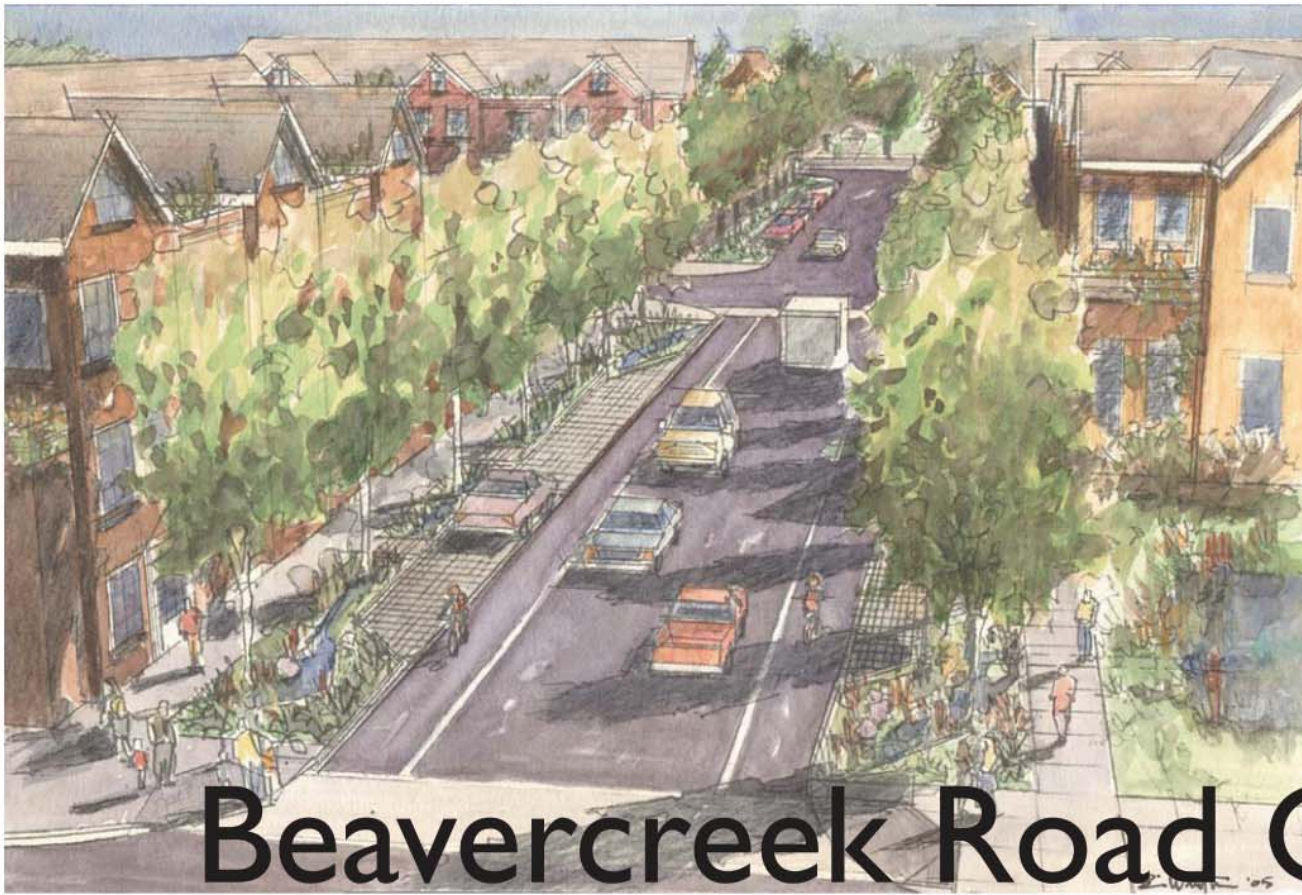
Development Constraints



Legend

-  Natural Resources Overlay District (NROD)
-  Geologic Hazard Overlay District (GHOD)
-  South-Central Open Space Network
-  Powerline Corridor

-  N
-  0' 1,200' 2,400'
-  BRCP Boundary
-  Urban Growth Boundary
-  City Limits
-  Conceptual Road Network
-  Streams



Beavercreek Road Concept Plan

Envisioning a Complete and Sustainable Community

Concept Plan Report, Summary and Recommendations

Final Plan August 2008



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Lower, right – illustration by Jim Longstreth

Beavercreek Road Concept Plan

Summary and Recommendations

Final Plan - August 2008

Funding provided by:

City of Oregon City

Oregon Department of Transportation -
Transportation and Growth Management Program

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Appendix

- 1. Project Goals with Objectives, March 13, 2007
- 2. Concept Plan Alternatives
- 3. GIS Analysis Map
- 4. Job and Housing Estimates

Technical Appendix (Under Separate Cover)

- A. Public Involvement Plan
 - B. Goals and Evaluation Criteria
 - C. Existing Conditions, Opportunities and Constraints Reports
 - 1. Land use
 - 2. Transportation
 - 3. Sustainability
 - 4. Market
 - 5. Natural resources
 - 6. Infrastructure
 - D. Focus Group Summaries
 - E. Summaries of Community Events
 - 1. Open House No. 1
 - 2. Design Workshop
 - 3. Open House No. 2
- F. Alternatives Evaluation Report
 - G. Final Transportation Evaluation
 - H. Infrastructure Reports
 - 1. Water
 - 2. Sewer
 - 3. Storm Water/Water Quality
 - I. Fiscal Impact Analysis
 - J. Draft Code

I. Introduction

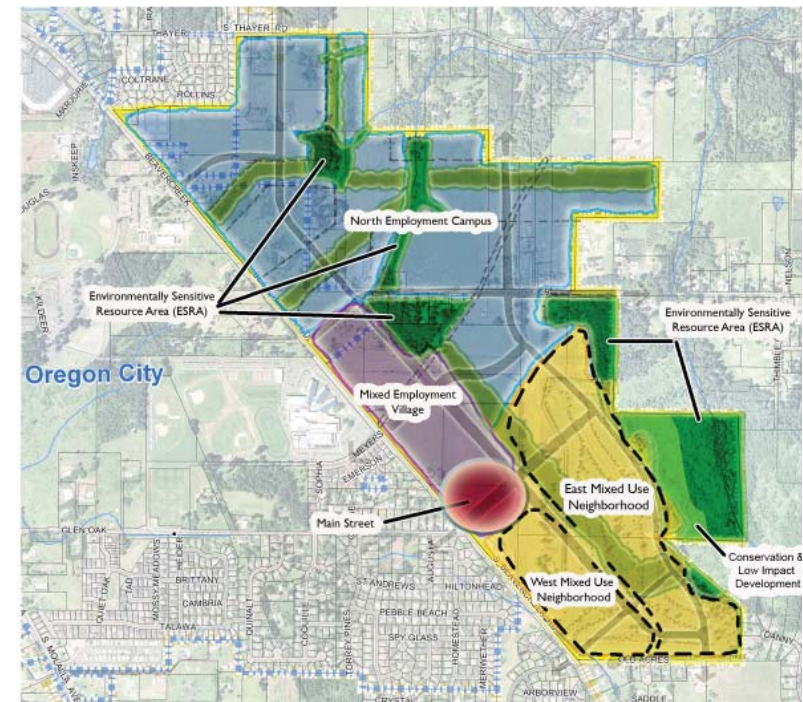
Summary

The Beaver Creek Road Concept Plan is a guide to the creation of a complete and sustainable community in southeast Oregon City. Most of the 453 acre site along Beaver Creek Road was added to the regional urban growth boundary by Metro in 2002 and 2004. The plan envisions a diverse mix of uses (an employment campus north of Loder Road, mixed use districts along Beaver Creek Road, and two mixed use neighborhoods) all woven together by open space, trails, a network of green streets, and sustainable development practices. Transit-oriented land uses have been strategically located to increase the feasibility of transit service in the future. The plan has been carefully crafted to create a multi-use community that has synergistic relationships with Clackamas Community College, Oregon City High School, and adjacent neighborhoods.

Key features of the Concept Plan are:

- *A complete mix of land uses, including:*
 - A North Employment Campus for tech flex and campus industrial uses, consistent with Metro requirements for industrial and employment areas.
 - A Mixed Employment Village along Beaver Creek Road, between Meyers Road and Glen Oak Road, located as a center for transit-oriented densities, mixed use, 3-5 story building scale, and active street life.
 - A 10-acre Main Street area at Beaver Creek Road and Glen Oak Road, located to provide local shops and services adjacent neighborhoods and Beaver Creek sub-districts.

- A West Mixed Use Neighborhood along Beaver Creek Road, intended for medium to high density (R-2) housing and mixed use.
- An East Mixed Use Neighborhood, intended for low density residential (R-5) and appropriate mixed use. The East Neighborhood has strong green edges and the potential for a fine grain of open space and walking routes throughout.



Proposed Land Use Sub-districts

- *Policy support for employment and program connections with Clackamas Community College.*
- *Sustainability strategies, including:*
 - Mixed and transit supportive land uses.
 - A sustainable stormwater management plan that supports low impact development, open conveyance systems, regional detention, and adequate sizing to avoid downstream flooding.
 - Green street design for all streets, including the three lane boulevard design for Beaver Creek Road.
 - A preliminary recommendation supporting LEED certification or equivalent for all commercial and multi-family buildings, with Earth Advantage or equivalent certification for single family buildings. This recommendation includes establishment of a Green Building Work Group to work collaboratively with the private sector to establish standards.
 - Open spaces and natural areas throughout the plan. North of Loder Road, these include the power line corridors, the tributary to Thimble Creek, and a mature tree grove. South of Loder Road, these include an 18-acre Central Park, the east ridge area, and two scenic view points along the east ridge.
- *A trail framework that traverses all sub-districts and connects to city and regional trails.*
- *A street framework that provides for a logical and connected street pattern, parallel routes to Beaver Creek Road, and connections at Clairmont, Meyers, Glen Oak, and the southern entrance to the site.*
- *A draft Beaver Creek Road Zone development code to implement the plan.*

Purpose of this Report and Location of Additional Information

This report is a summary of the Plan, with emphasis on describing key elements and recommendations. Many of the recommendations are based on technical reports and other information that is available in the Technical Appendix to this report.



Beaver Creek Road Concept Plan Area - Existing Conditions

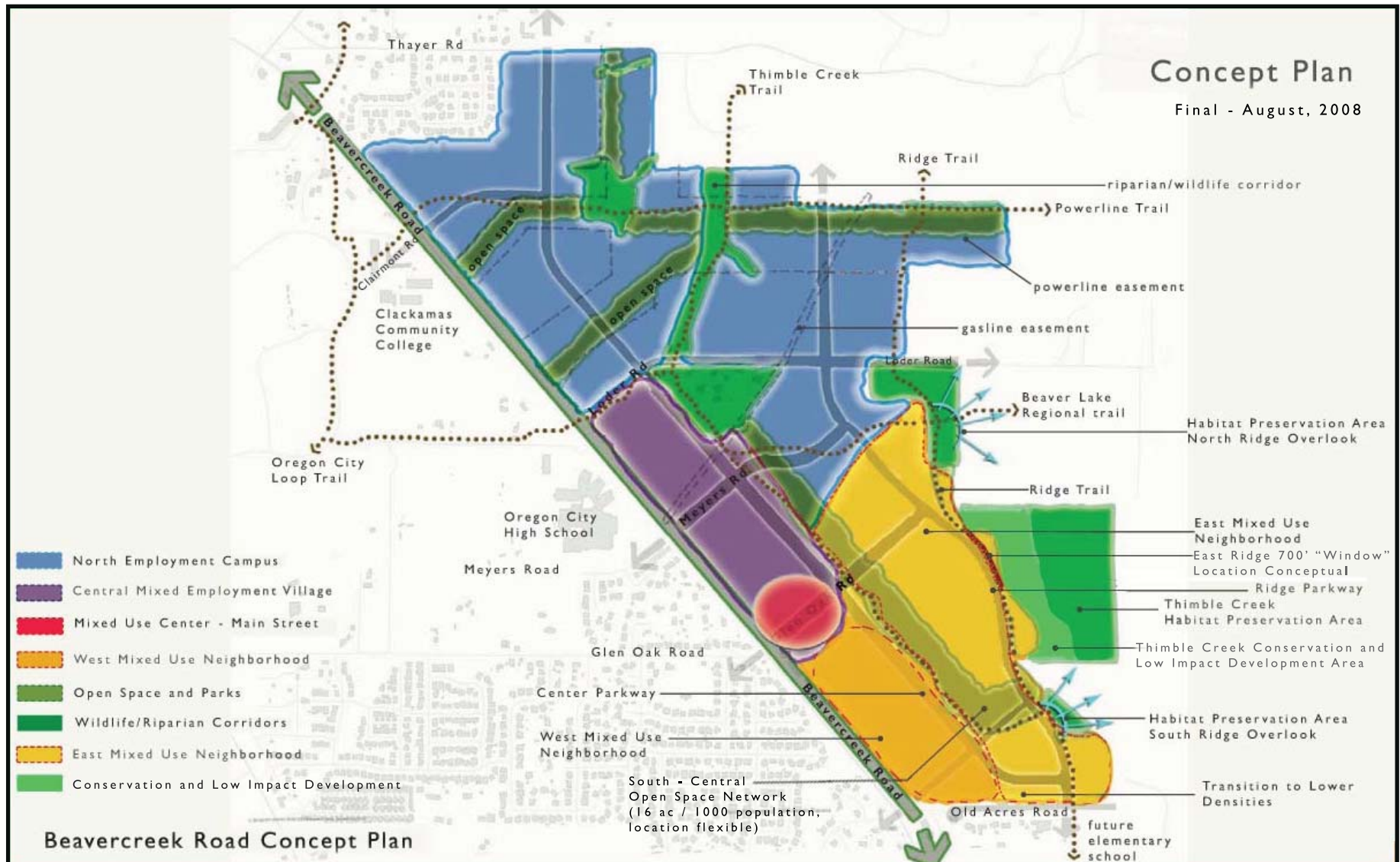


Figure 1 - Composite Concept Plan

II. Purpose and Process

The purpose of the Beavercreek Road Concept Plan is to provide a conceptual master plan to be adopted as an ancillary document to the City of Oregon City's Comprehensive Plan. As such, it provides a comprehensive and cohesive guide to future development, in three parts:

- Framework plan maps, goals and policies – These elements will be adopted as part of the Oregon City Comprehensive Plan. Compliance will be required for all land use permits and development.
- Ancillary report materials – The descriptive text, graphics and technical appendix of this report will be adopted as an “ancillary document” to the Comprehensive Plan, which provides “operational guidance to city departments in planning and carrying out city services” (Oregon City Comprehensive Plan, page 4). These documents include information for updating the City's utility master plans and Transportation System Plan.
- Draft development code – A working draft development code was prepared as part of the Concept Plan. Once final, it will be adopted as part of the Oregon City Code. Compliance will be required for all land use permits and development. The Beavercreek Zone code relies on master planning to implement the concepts in the Plan.

The Concept Plan was developed by a 15-member Citizen Advisory Committee (CAC) and 9-member Technical Advisory Committee (TAC) (see Project Participants list at the beginning of this report). The committees met twelve times between June 2006 and July 2007.



Design Workshop Participants

In addition to the Committee meetings, additional process steps and community involvement included:

- Study area tour for CAC and TAC members
- Two public open houses
- Market focus group
- Sustainability focus group
- Employment lands coordination with Metro
- Community design workshop
- Website
- Project posters, site sign, email notice, and extensive mailing prior to each public event

The major steps in the process were:

- Inventory of base conditions, opportunities, constraints for land use, transportation, natural resources, market conditions, infrastructure and sustainability.
- Establishment of project goals.
- Extensive discussion of employment lands questions: how much, what type and where?
- Following the community workshop, preparation of three alternative concept plans (sketch level), addition of a fourth plan, prepared by a CAC member, and narrowing of the alternatives to two for further analysis.
- Evaluation of the alternatives (including transportation modeling) and preparation of a hybrid Concept Plan (framework level).
- Preparation of detailed plans for water, sewer, storm water, and transportation facilities.
- Preparation of a draft development code.
- Committee action to forward the Concept Plan package to the Planning Commission and City Commission.

For additional information please see Technical Appendix, Sections A, D, E, and F.



Design Workshop Plan

III. Vision, Goals and Principles

The overall vision for the Beavercreek Concept Plan is to create “A Complete and Sustainable Community”. The images shown on this page were displayed throughout the process to convey the project’s intent for this vision statement.

Regarding the meaning of sustainability, the vision statement is based in part on the definition of sustainability originally developed by the United Nations Brandtland Commission: “A sustainable society meets the needs of the present without sacrificing the ability of future generations to meet their own needs”.

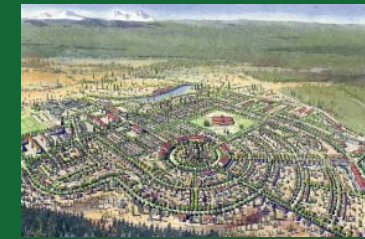
The following project goals were developed by the Citizen Advisory Committee. The Committee also added objectives to each of the goals – please see Appendix 1 for the objectives.

The Beavercreek Road Concept Plan Area will:

- Create a complete and sustainable community, in conjunction with the adjacent land uses, that integrates a diverse mix of uses, including housing, services, and public spaces that are necessary to support a thriving employment center;
- Be a model of sustainable design, development practices, planning, and innovative thinking;
- Attract “green” jobs that pay a living wage;
- Maximize opportunities for sustainable industries that serve markets beyond the Portland region and are compatible with the site’s unique characteristics;
- Incorporate the area’s natural beauty into an ecologically compatible built environment;
- Provide multi-modal transportation links (such as bus routes, trails, bike-ways, etc.) that are connected within the site as well as to the surrounding areas;

Complete Means

- Live
- Work
- Shop
- Play
- Garden
- Lifelong Learning
- (What does “complete” mean to you?)

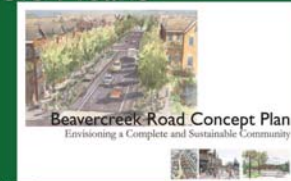


Northwest Crossing, Bend, Oregon

BEAVERCREEK ROAD
CONCEPT PLAN

Sustainable Means

- Walkable
- Green
- Energy Efficient
- Water Efficient
- Non-Resource Depleting
- Clean Employment
- Non-Polluting
- (What does “sustainable” mean to you?)



Beavercreek Road Concept Plan
Envisioning a Complete and Sustainable Community

BEAVERCREEK ROAD
CONCEPT PLAN

Community Means

- A Place for People



BEAVERCREEK ROAD
CONCEPT PLAN

- Implement design solutions along Beavercreek Road that promote pedestrian safety, control traffic speeds and access, and accommodate projected vehicular demand;
- Promote connections and relationships with Oregon City High School and Clackamas Community College;
- Have a unique sense of place created by the mix of uses, human scale design, and commitment to sustainability; and
- Ecological Health – Manage water resources on site to eliminate pollution to watersheds and lesson impact on municipal infrastructure by integrating ecological and man-made systems to maximize function, efficiency and health.

The following 10 Principles of Sustainable Community Design were submitted by a CAC member, supported by the committee, and used throughout the development of the Concept Plan:

1. Mix Land Uses - Promote a mix of land uses that support living wage jobs and a variety of services.
2. Housing Types - Create a range of housing choices for all ages and incomes.
3. Walk-ability - Make the Neighborhood “walkable” and make services “walk-to-able.”
4. Transportation - Provide a range of transportation options using a connected network of streets and paths.
5. Open Space - Protect and maintain a functioning green space network for a variety of uses.
6. Integrate Systems - Integrate ecological and man-made systems to maximize function, efficiency and health.
7. Watershed Health - Manage water resources on site to eliminate pollution to watershed and lesson impact on municipal infrastructures.

8. Reuse, Recycle, Regenerate - Reuse existing resources, regenerate existing development areas
9. Green Buildings - Build compact, innovative structures that use less energy and materials
10. Work Together - Work with community members and neighbors to design and develop.



Thimble Creek Tributary

There are relatively limited employment centers within this area of

There are relatively limited employment centers within this area of Oregon City and Clackamas County. This imbalance of jobs and housing contributes to Clackamas County's pattern of approximately 60% of the work force traveling outside of the County to work.

The site is surrounded by residential and undeveloped properties within the city limits, including the Hamlet of Beavercreek, and rural Clackamas County. The nearest commercial area is the Berry Hill Shopping Center at the intersection of Beavercreek Road and Highway 213. Clackamas Community College (CCC) and Oregon City High School are across Beavercreek Highway adjacent to the site. These institutional uses offer a unique opportunity to plan synergistic land uses that connect the properties, reinforce an identity for the area, and help localize trips. A Tri-Met transit hub is located on the CCC property.

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Figure 2 - Regional C

Like all additions to the Portland Metropolitan Area Urban Growth Boundary, the Beaver Creek Road area is inextricably tied to its place in the region and its place within Oregon City. The Concept Plan responds to this context in multiple ways.

From a regional perspective, the Beaver Creek Road area is currently a transition point from urban to rural use. Whether this “hard line” of transition will remain in the future cannot be established with certainty. The CAC openly acknowledged this issue in its discussions and sought to balance the needs of creating a great urban addition to Oregon City with sensitivity to adjacent areas. Examples of this balance include:

- The plan has land use and transportation connections that support future transit. This will link the Beaver Creek Road area, via alternative transportations, to Clackamas Community College (CCC), the Oregon City Regional Center (downtown and adjacent areas) and the rest of the region.
- Trails and green spaces have been crafted to link into the broader regional network.
- The plan recommends lower densities and buffer treatments along Old Acres Road.
- The north south collector roads are coalesced to one route that could (if needed) be extended south of Old Acres Road.
- The recommended street framework provides for a street that parallels Beaver Creek Road, connecting Thayer Road to Old Acres Road, and potentially north and south in the future. This keeps options open: if the UGB extends south, the beginning of a street network is in place. If it does not, the connection is available for rural to urban connectivity if desired.
- As with the street network described above, the East Ridge trail is extended all the way to Old Acres Road, and therefore, potentially beyond.

This will provide a connection from rural areas to the open spaces and trail network of Beaver Creek Road area and the rest of the region.

From a City and local neighborhood perspective, the Beaver Creek Road area offers an opportunity to establish a new complete and sustainable community within Oregon City. Specific linkages include the following:

- Oregon City needs employment land. The Beaver Creek Concept Plan provides 156 net acres of it in two forms: 127 net acres of tech flex campus industrial land, 29 acres of more vertical mixed use village and main street. Additional employment will be available on the Main Street and as mixed use in the two southern neighborhoods.
- The street framework connects to all of the logical adjacent streets. This includes Thayer, Clairmont, Meyers, Glen Oak, and Old Acres Roads. This connectivity will disperse traffic to many routes, but equally important, make Beaver Creek Road connected to, rather than isolated from, adjacent neighborhoods, districts and corridors.
- The plan provides for a complete community: jobs, varied housing, open space, trails, mixed use, focal points of activity, trails, and access to nature.
- The plan provides for a sustainable community, in line with the City’s

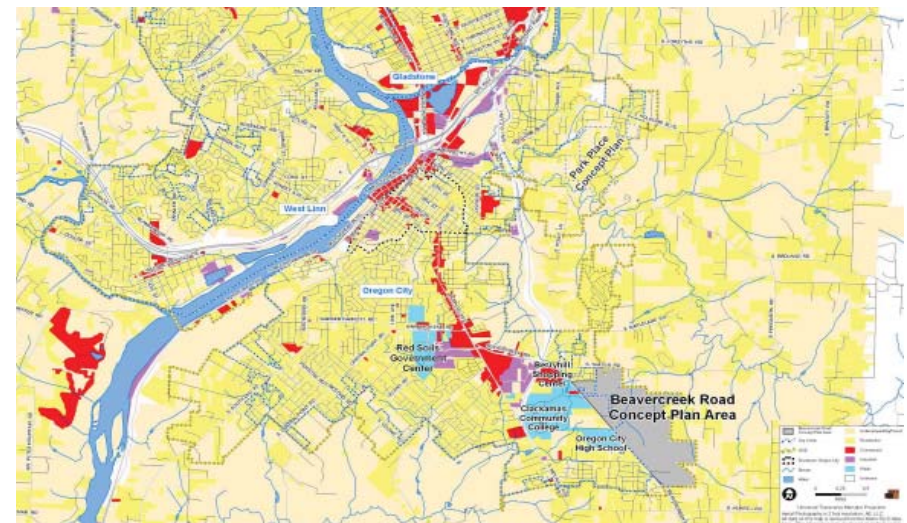


Figure 3 - Oregon City Context

Comprehensive Plan support for sustainability. This takes the form of mixed land uses, transportation options, green streets, sustainable storm water systems, and LEED or equivalent certification for buildings. Much more can certainly be done – the Concept Plan offers an initial platform to work from.

- Physical linkages have been provided to Oregon City High School and Clackamas Community College. These take the form of the planned 3-lane green street design for Beaver Creek Road and the intersections and trails at Clairmont, Loder and Meyers Roads. The physical linkages are only the beginning – the City, School District and College need to work together to promote land uses on the east side of Beaver Creek Road that truly create an institutional connection.

For additional information, see Existing Conditions, Opportunities and Constraints Reports, Technical Appendix C.



Figure 4 - Existing Conditions

Site Conditions and Buildable Lands

A portion of the study area (approximately 50 acres) is currently within the existing city limits and zoned Campus Industrial (CI). The study area's northern boundary is Thayer Road and the southern boundary is Old Acres Lane. Loder Road is the only existing road that runs through the project area.

Currently, the project area is largely undeveloped, which has allowed the site to retain its natural beauty. There are 448 gross acres in the project area, not including the right-of-way for Loder Road (approximately five acres). The existing land uses are primarily large-lot residential with agricultural and undeveloped rural lands occupying approximately 226 acres of the project area. The Oregon City Golf Club (OCGC) and private airport occupy the remaining 222 acres.

There are several large power line and natural gas utility easements within the project boundaries. These major utility easements crisscross the northern and central areas of the site. The utility easements comprise approximately 97 acres or 20% of the project area.

There are 51 total properties ranging in size from 0.25 acres to 63.2 acres. Many of these properties are under single ownership, resulting in only 42 unique property owner names (Source: Clackamas County Assessor). There are several existing homes and many of the properties have outbuildings such as, sheds, greenhouses, barns, etc. , which result in 127 existing structures on the site (Source: Clackamas County Assessor).

A key step in the concept planning process is the development of a Buildable Lands Map. The Buildable Lands Map was the base map from which the concept plan alternatives and the final recommended plan were. "Buildable" lands, for the purpose of the Beaver Creek Road Concept Plan, are defined as the gross site area minus wetlands, steep slopes, other Goal 5 resources, public utility easements, road rights-of-way, and committed properties (developed properties with an assessed improvement value

greater than \$350,000). Properties with an assessed improvement value of less than \$350,000 (based on County assessment data) are considered redevelopable over the long-term as the existing structures are converted to higher value uses. The OCGC has an improvement value over \$350,000, but has been included as buildable lands (minus the clubhouse) because the owners may wish to redevelop the property in coordination with the recommended concept plan over time. The private airport has also been included as buildable over the long-term, recognizing that the owners may choose to continue the airport's use for many years.

When land for power lines, the natural gas line, natural resources, and committed structures are removed the net draft buildable acreage is approximately 292 acres. The CAC reviewed the Preliminary Buildable Lands map and approved a three-tier system to define the buildable lands. Tier A or "Unconstrained" has approximately 292 acres, Tier B or "Low Impact Development Allowed with Review" has approximately 28 acres, and Tier C "Constrained" has approximately 131 acres. The "Low Impact" area was later further evaluated and recommended for conservation under a Environmentally Sensitive and Resource Area designation on the plan.

The Buildable Lands Map was reviewed at the July 20th and August 17th Citizen and Technical Advisory Committee (CAC/TAC) meetings, as well as at the August 24th, 2006 Open House. The draft buildable land boundaries and acreages shown in Figure 6 reflect the input received from the advisory committee members, property owners, and citizen input.

For additional information, see Existing Conditions, Opportunities and Constraints Reports, Technical Appendix C.

Figure 6 - Natural Resource Inventory

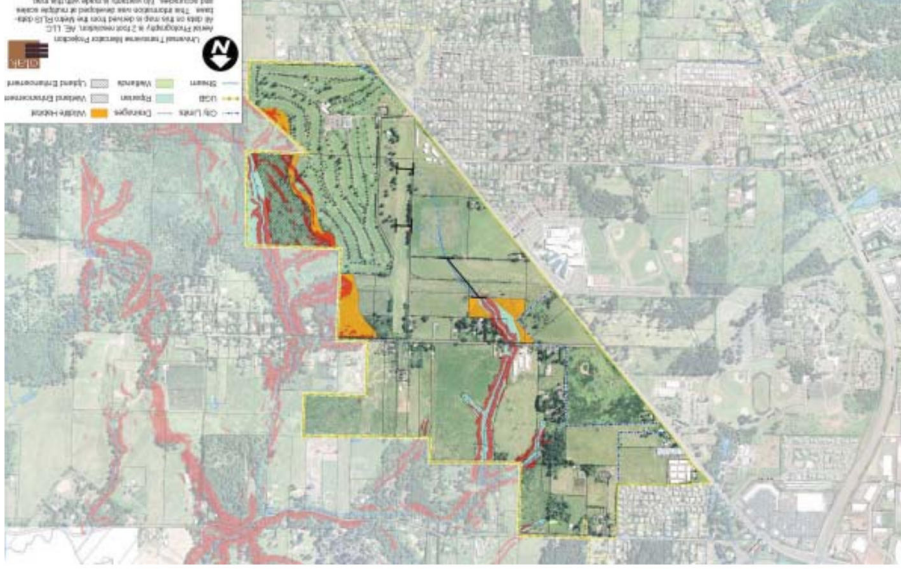
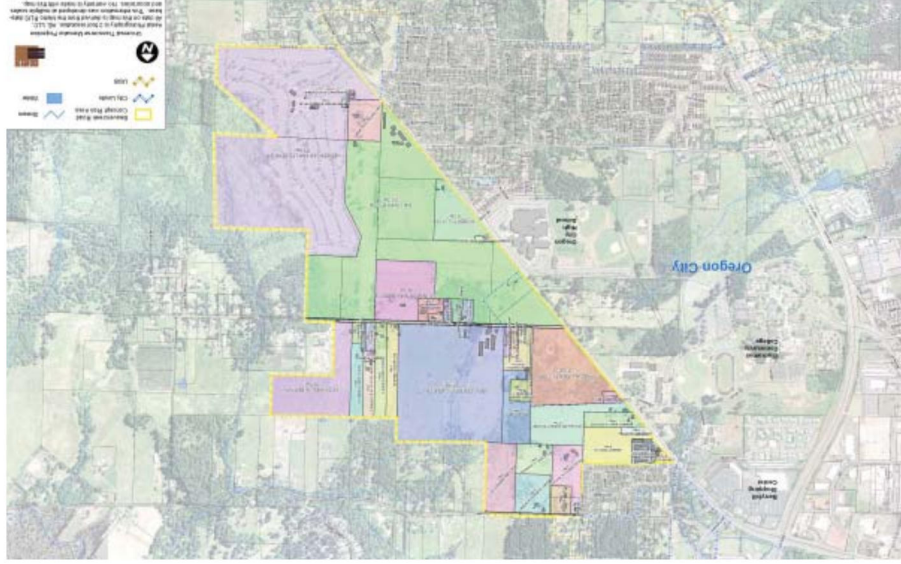


Figure 5 - Ownerships



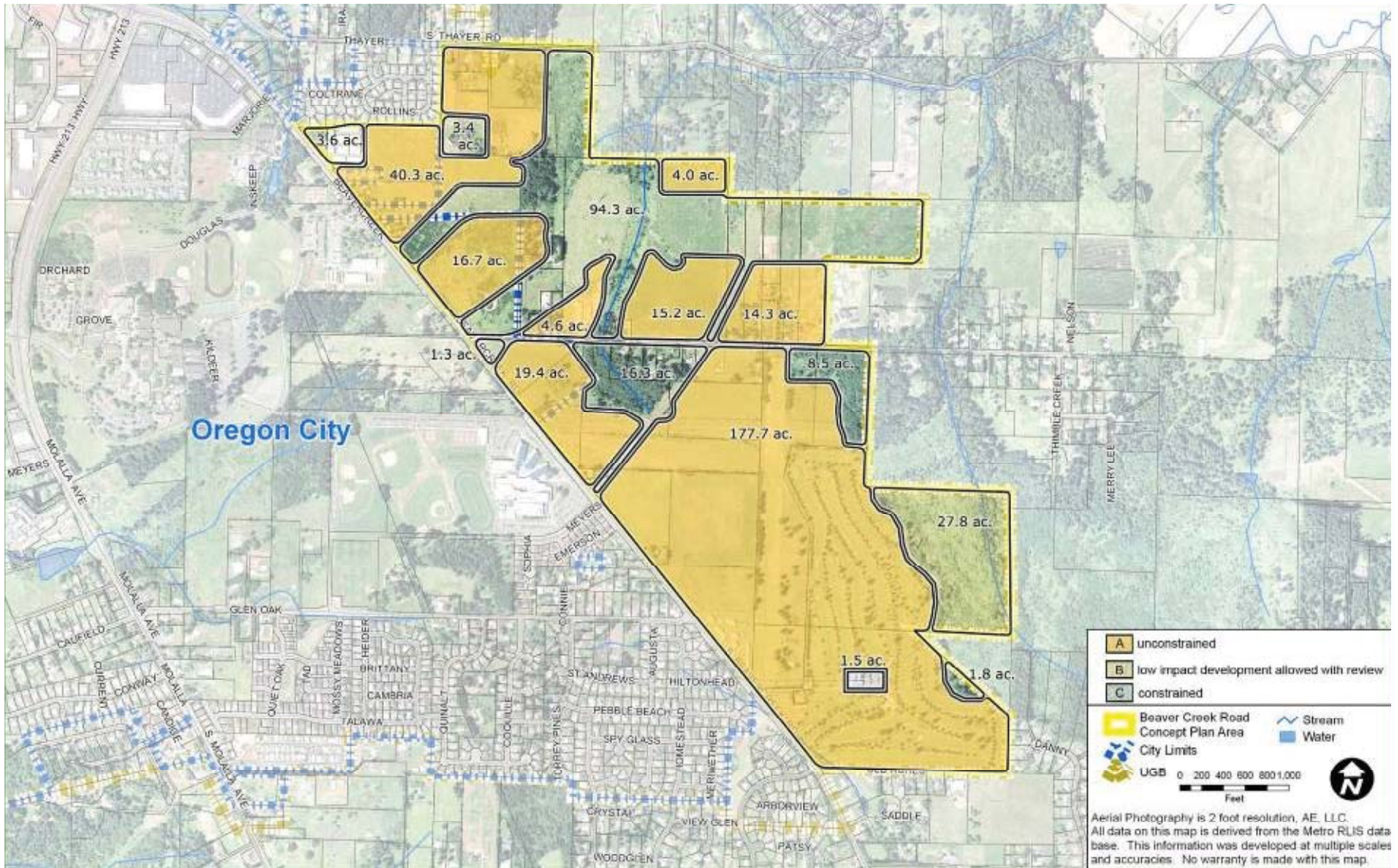


Figure 7 - Buildable Lands

Employment – A Key Issue

How much employment? What type? And where? These questions were extensively discussed during the development of the Concept Plan. Three perspectives emerged as part of the discussion:

Oregon City Perspective

Prior to initiating the Concept Plan process, the City adopted a comprehensive plan policy which emphasizes family wage employment on the site. The policy reads: “Require lands east of Clackamas Community College that are designated as Future Urban Holding to be the subject of concept plans, which is approved as an amendment to the Comprehensive Plan, [and will] guide zoning designations. The majority of these lands should be designated in a manner that encourages family-wage jobs in order to generate new jobs and move towards meeting the City’s employment goals.” Oregon City Comprehensive Plan, Policy 2.6.8.

Metro Perspective

Metro brought the majority of the concept plan area (245 gross acres) into the UGB in 2002 and 2004 to fulfill regional industrial employment needs. These areas (308 gross acres) are designated as the Industrial Design Type on Metro’s 2040 Growth Concept Map. As part of its land need metrics reported to the region and state, Metro estimated 120 net acres of the Beaver Creek Road Concept Plan’s land would be used for employment uses. Metro representatives met with the Concept Plan CAC and emphasized: (1) it was important to Metro for the Concept Plan to fulfill their original intent for providing Industrial land; and, (2) that there was flexibility, from Metro’s perspective, for the local process to evaluate creative ways to meet that intent.

Citizen Advisory Committee Perspective

The CAC discussed extensively the issues and options for employment lands. Many sources of information were consulted: a market analysis by ECONorthwest (See Appendix __), a developer focus group, land inventory and expert testimony submitted by property owners, the Metro perspective cited above, and concerns of neighbors. The advice ranged from qualified optimism about long term employment growth to strong opposition based on shorter term market factors and location considerations. Some members of the CAC advocated for a jobs target (as opposed to an acreage target) to be the basis for employment planning.

At its meeting on September 14th, 2006, the CAC developed a set of “bookends” for the project team to use while creating the plan alternatives.

- a. At least one plan alternative will be consistent with the Metro Regional Growth Concept.
- b. At least one plan alternative (may be the same as above) would be designed consistent with Policy 2.6.8.
- c. Other alternatives would have the freedom to vary from “a” and “b” above, but would also include employment.
- d. No alternative would have heavy industrial, regional warehousing or similar employment uses”.

After evaluating alternatives, the CAC ultimately chose a hybrid employment strategy. The recommended Concept Plan includes: (1) about 127 net acres of land as North Employment Campus, which is consistent with Metro’s intent and similar to Oregon City’s Campus Industrial designation; (2) about 29 acres as Mixed Employment Village and Main Street, which allows a variety of uses in a village-oriented transit hub; and, (3) mixed use neighborhoods to the south that also provide for jobs tailored to their neighborhood setting.

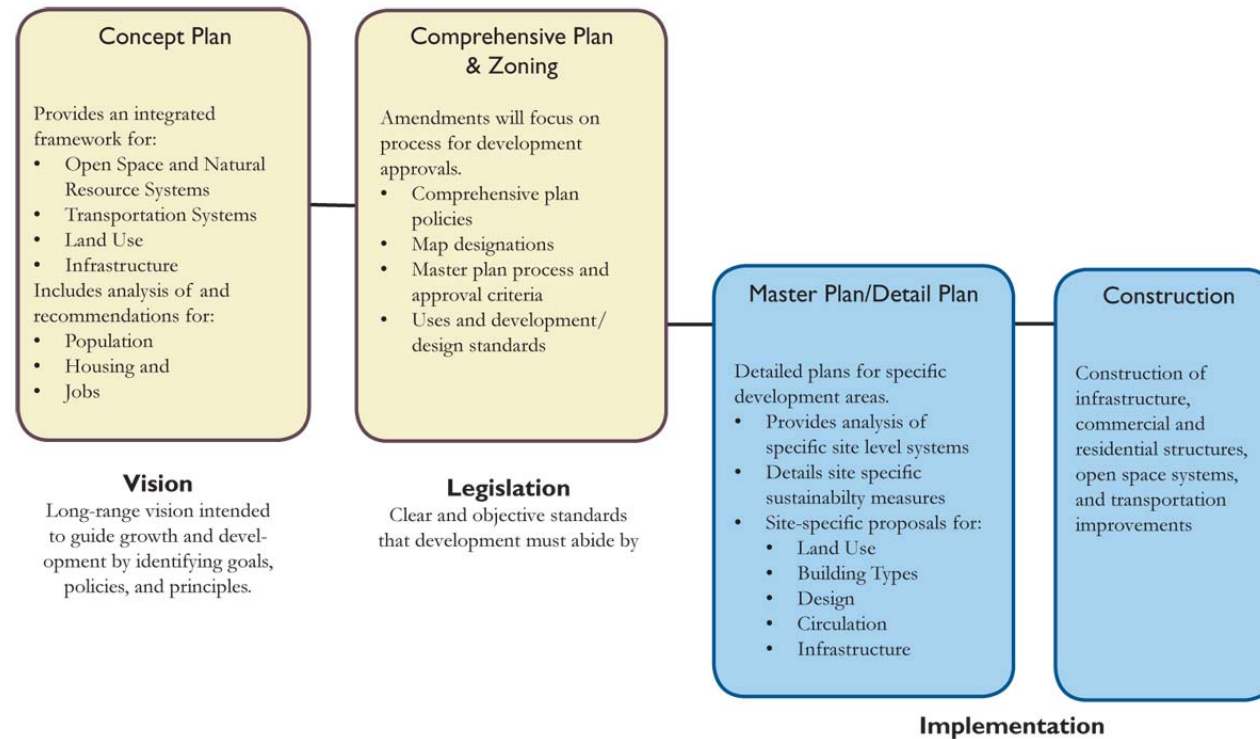
V. Concept Plan Summary

The Framework Plan Approach

The Beaver Creek Road Concept Plan is a framework for a new, urban community. The plan is comprised of generalized maps and policies that integrate land use, transportation, open space, and green infrastructure. The framework maps and policies are supported by detailed code and requirements for master planning and design review. The approach here is to set the broad framework and intent on the figures and text in this Plan. Detailed development plans demonstrating compliance with the Concept Plan are required in the implementing code.

The framework plan approach is intended to:

- Ensure the vision, goals and standards are requirements in all land use decisions
- Provide for flexibility in site specific design and implementation of the Plan and code
- Allow for phased development over a long period of time (20+ years)



The code describes many detailed requirements such as street connectivity, block configuration, pocket parks, building scale, pedestrian connections, low impact development features, tree preservation, and sustainable buildings. These design elements will be essential to the success of the area as a walkable, mixed use community. The expectation of this Plan is that the flexibility is coupled with a high standard for sustainable and pedestrian-oriented design.

Land Use Sub-Districts

Figure 8 illustrates the five land-use “sub-districts” of the concept plan area. Each has a specific focus of land use and intended relationship to its setting and the plan’s transportation and open space systems. Each is briefly described below and illustrated on Figures 9 through 12.

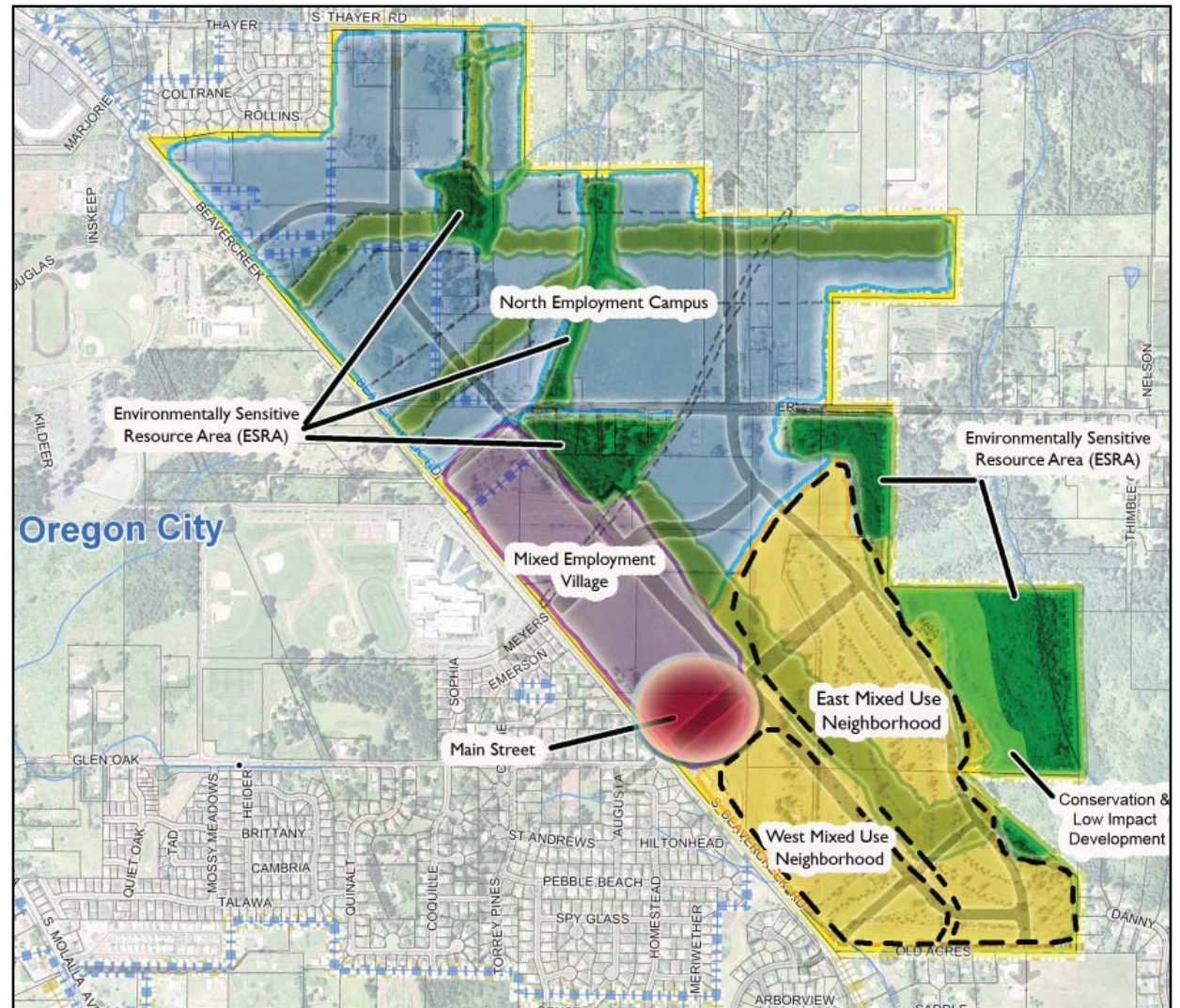


Figure 8 - Land Use Sub-districts

North Employment Campus – NEC

The purpose of the North Employment Campus is to provide for the location of family wage employment that strengthens and diversifies the economy. The NEC allows a mix of clean industries, offices serving industrial needs, light industrial uses, research and development and large corporate headquarters. The uses permitted are intended to improve the region's economic climate, promote sustainable and traded sector businesses, and protect the supply of sites for employment by limiting incompatible uses. The sub-district is intended to comply with Metro's

Title 4 regulations. Site and building design will create pedestrian-friendly areas and utilize cost effective green development practices. Business and program connections to Clackamas Community College (CCC) are encouraged to help establish a positive identity for the area and support synergistic activity between CCC and NEC properties. Businesses making sustainable products and utilizing sustainable materials and practices are encouraged to reinforce the identity of the area and promote the overall vision for the Beavercreek Road area.

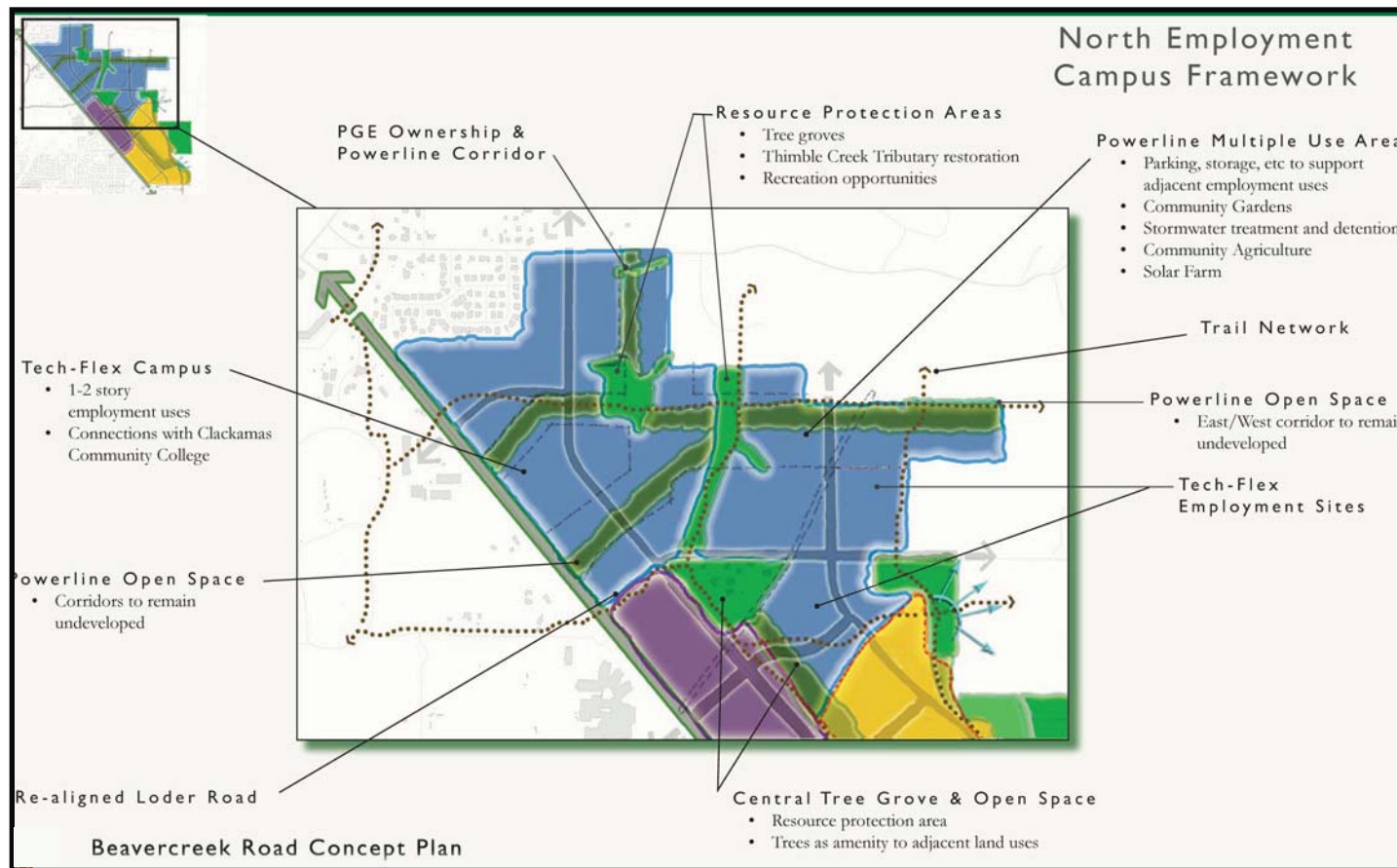


Figure 9 - North Employment Campus Framework

Mixed Employment Village – MEV

The purpose of the Mixed Employment Village is to provide employment opportunities in an urban, pedestrian friendly, and mixed use setting. The MEV is intended to be transit supportive in its use mix, density, and design so that transit remains an attractive and feasible option. The MEV allows a mix of retail, office, civic and residential uses that make up an active urban district and serve the daily needs of adjacent neighborhoods and Beaver Creek Road sub-districts. Site and building design will create

pedestrian-friendly areas and utilize cost effective green development practices. Business and program connections to Clackamas Community College and Oregon City High School are encouraged. Businesses making sustainable products and utilizing sustainable materials and practices are encouraged to reinforce the identity of the area and promote the overall vision for the Beaver Creek Road area.



Figure 10 - Central Mixed Employment Village Framework

Main Street – MS

The purpose of this small mixed-use center is to provide a focal point of pedestrian activity. The MS allows small scale commercial, mixed use and services that serve the daily needs of the surrounding area. “Main Street” design will include buildings oriented to the street, an minimum of 2 story building scale, attractive streetscape, active ground floor uses and other elements that reinforce pedestrian oriented character and vitality of the area.



Figure 11 - Main Street Framework

West Mixed Use Neighborhood – WMU

The West Mixed Use Neighborhood will be a walkable, transit-oriented neighborhood. This area allows a transit supportive mix of housing, live/work units, mixed use buildings and limited commercial uses. A variety of housing and building forms is required, with the overall average of residential uses not exceeding 22 dwelling units per acre. The WMU area's uses, density and design will support the multi-modal transportation system and provide good access for pedestrians, bicycles, transit and vehicles. Site and building design will create a walkable area and utilize cost effective green development practices.

East Mixed Use Neighborhood – EMU

The East Mixed Use Neighborhood will be a walkable and tree-lined neighborhood with a variety of housing types. The EMU allows for a variety of housing types while maintaining a low density residential average not exceeding densities permitted in the R-5 zone. Limited non-residential uses are permitted to encourage a unique identity, sustainable community, and in-home work options. The neighborhood's design will celebrate open space, trees, and relationships to public open spaces. The central open space, ridge open space scenic viewpoints, and a linked system of open spaces and trails are key features of the EMU. Residential developments will provide housing for a range of income levels, sustainable building design, and green development practices.

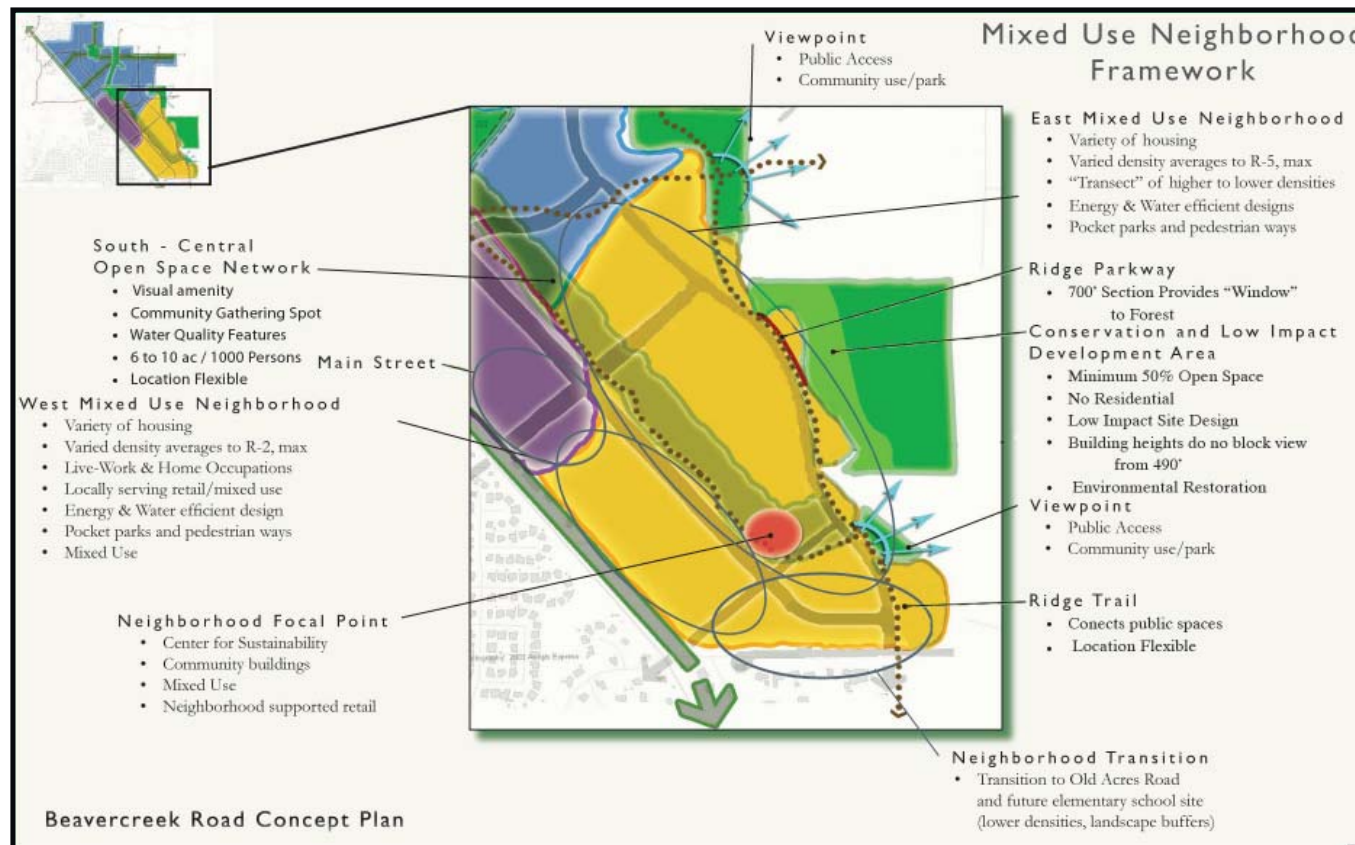


Figure 12 - West and East Mixed Use Neighborhoods

Open Space

The Open Space Framework illustrated on Figure 13 provides a network of green spaces intended to provide:

- A connected system of parks, open spaces and natural areas that link together and link to the Environmentally Sensitive Resource Areas.
- Scenic and open space amenities and community gathering places
- Access to nature
- Tree and natural area preservation
- Locations where storm water and water quality facilities can be combined with open space amenities, and opportunities to implement sustainable development and infrastructure
- Green spaces near the system of trails and pedestrian connections
- Open spaces which complement buildings and the urban, built environment

Power Line Open Spaces

The power line corridors and gas line corridor comprise 97 acres of land. The power line corridors north of Loder Road are a dominant feature. They are a dominant feature because they define open corridors and have a significant visual impact related to the towers. They also have an influence on the pattern of land use and transportation connections. In response to these conditions, the Concept Plan includes four main strategies for the use of the power line corridors:

- Provide publicly accessible open spaces. The implementing code includes a minimum 100 foot-wide open space and public access easement would be required at the time of development reviews, or, obtained through cooperative agreements with the utilities and property owners.
- Provide trails. A new east-west trail is shown on Figure 13 that follows the main east-west corridor. This corridor has outstanding views of Mt. Hood.

- Allow a broad array of uses. Ideas generated by the CAC, and permitted by the code, include: community gardens, urban agriculture, environmental science uses by CCC, storage and other “non-building” uses by adjacent industries, storm water and water quality features, plant nurseries, and solar farms.
- Link to the broader open space network. The power line corridors are linked to the open spaces and trail network in the central and southern areas of the plan.

South-Central Open Space Network

Park spaces in the central and southern areas of the plan will be important to the livability and sustainability goals for the plan. The basic concept is to assure parks are provided, provide certainty for the total park acreage, guide park planning to integrate with other elements, and provide flexibility for the design and distribution of parks.

The following provisions will apply during master planning and other land use reviews:

- Park space will be provided consistent with the City’s Park and Recreation Master Plan standard of 6 to 10 acres per 1000 population.
- The required acreage may be proposed to be distributed to a multiple park spaces, consistent with proposed land uses and master plan design.
- A central park will be provided. The location and linearity of the park was first indicated by Metro’s Goal 5 mapping. It was illustrated by several citizen groups during the design workshop held in October, 2006. This open space feature is intended as a connected, continuous and central green space that links the districts and neighborhoods south of Loder Road. The code provides for flexibility in its width and shape, provided there remains a clearly identifiable and continuous open space. It may be designed as a series of smaller spaces that are clearly connected by open space. It may be designed

as a series of smaller spaces that are clearly connected by open space. If buildings are incorporated as part of the central park, they must include primary uses which are open to the public. Civic buildings are encouraged adjacent to the central park. Streets may cross the park as needed. The park is an opportunity to locate and design low impact storm water facilities as an amenity for adjacent urban uses.

East Ridge

The East Ridge is a beautiful edge to the site that should be planned as a publicly accessible amenity and protected resource area. The natural resource inventory identified important resources and opportunities for habitat restoration in the riparian areas of Thimble Creek. In addition, Lidar mapping and slope analysis identified steeper slopes (greater than 15%) that are more difficult to develop than adjacent flat areas of the concept plan. The sanitary sewer analysis noted that lower areas on the east

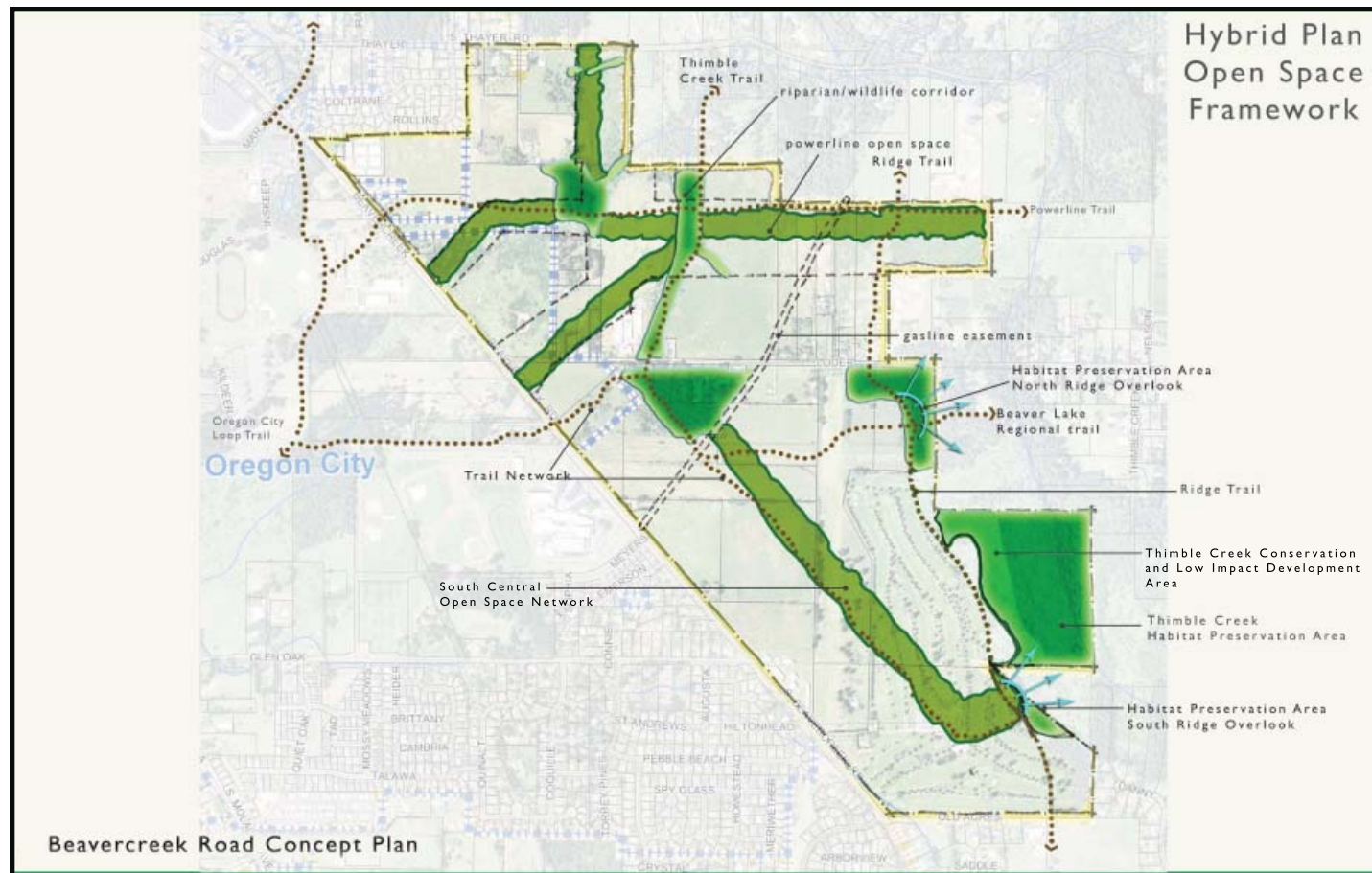


Figure 13 - Open Space Framework

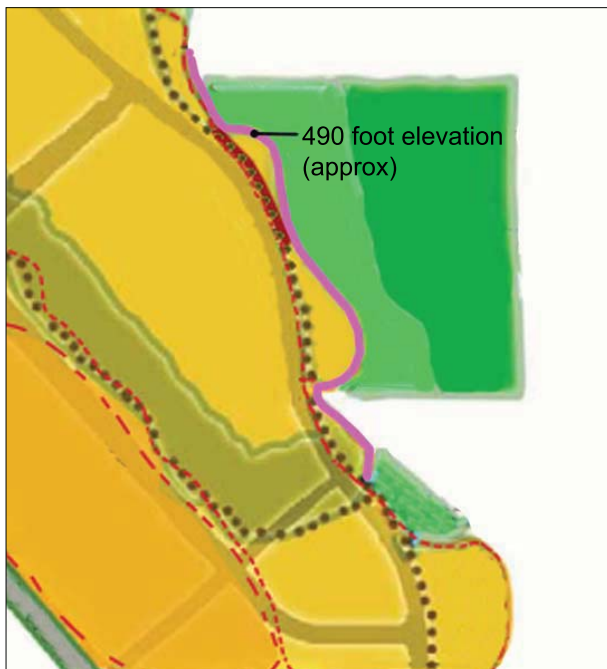
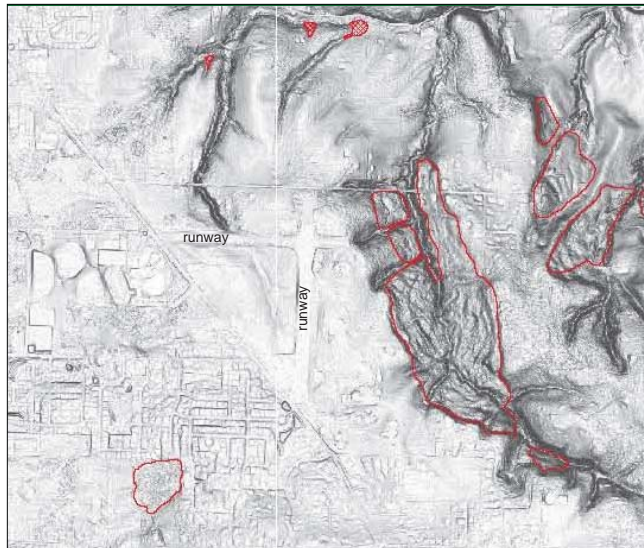


Figure 13A - East Ridge Lidar and 490 foot elevation

ridge could not be readily served with gravity systems - they would require private pump facilities. For all of these reasons, it is recommended here that an East Ridge open space and conservation area be designated.

The plan and code call for:

- Establishing the Class I and II Riparian area (per Metro mapping) plus 200 feet as a protected open space area. No development is permitted, except for very limited uses such as trails.
- Between the west edge of the above referenced protected open space area and the 490 foot elevation (MSL), establish a conservation area within which the following provisions apply:
 - a. A minimum of 50% of the conservation area must be open space. No residential uses are permitted.
 - b. All development must be low impact with respect to grading, site design, storm water management, energy management, and habitat.
 - c. Building heights must not obscure views from the 490 foot elevation of the ridge.
 - d. Open space areas must be environmentally improved and restored.
- Establishing a limit of development that demarks the clear edge of urban uses and a “window” to adjacent natural areas. In the central area of the est ridge, the “window” must be a minimum of 700 feet of continuous area and publicly accessible. The specific location of the “window” is flexible and will be establishing as part of a master plan.
- Creating two scenic view points that are small public parks, located north and south of the central area.
- Creating an East Ridge Trail - the location of the trail is flexible and will be established during master planning. It will be located so as to be safe, visible, and connect the public areas along the ridge. Along the “window” area described above, it will be coordinated with the location of the adjacent East Ridge Parkway.

Transportation

In summary, the key elements of the Concept Plan transportation strategy are to:

- Plan a mixed use community that provides viable options for internal trip making (i.e. many daily needs provided on-site), transit use, maximized walking and biking, and re-routed trips within the Oregon City area.
- Improve Beavercreek Road as a green street boulevard.
- Create a framework of collector streets that serve the Beavercreek Road Concept Plan area.
- Require local street and pedestrian way connectivity.
- Require a multimodal network of facilities that connect the Beavercreek Road Concept Plan area with adjacent areas and surrounding transportation facilities.
- Provide an interconnected street system of trails and bikeways.
- Provide transit-attractive destinations.
- Provide a logical network of roadways that support the extension of transit services into the Beavercreek Road Concept Plan area.
- Use green street designs throughout the plan.
- Update the Oregon City Transportation System Plan to include the projects identified in the Beavercreek Road Concept Plan, provide necessary off-site improvements, and, assure continued compliance with Oregon's Transportation Planning Rule.

Streets

Figure 14 illustrates the street plan. Highlights of the plan include:

- *Beavercreek as a green boulevard.* The cross-section will be a 5 lane arterial to Clairmont, then a 3 lane arterial (green street boulevard) from Clairmont to UGB. The signalization of key intersections is illustrated on the Street Plan.
- *Center Parkway as a parallel route to Beavercreek Road.* This new north-south route provides the opportunity to completely avoid use of Beavercreek Road for trips between Old Acres and Thayer Road. This provides a much-needed separation of local and through trips, as well as an attractive east-side walking and biking route. Major cross-street intersections, such as Loder, Meyers and Glen Oak may be treated with roundabouts or other treatments to help manage average speeds on this street. Minor intersections are likely to be stop-controlled on the side street approaches. The alignment of Center Parkway along the central open space is intended to provide an open edge to the park. The cross-section for Center Parkway includes a multi-use path on the east side and green street swale. Center Parkway is illustrated as a three-lane facility. Depending on land uses and block configurations, it may be able to function well with a two lane section and left turn pockets at selected locations.
- *Ridge Parkway as a parallel route to Center Parkway and Beavercreek Road.* The section of Ridge Parkway south of the Glen Oak extension is intended as the green edge of the neighborhood. This will provide a community "window" and public walkway adjacent to the undeveloped natural areas east of the parkway. Ridge Parkway should be two lanes except where left turn pockets are needed. Major intersections south of Loder are likely to only require stop control of the side street, if configured as "tee" intersections. Mini roundabouts could serve as a suitable option, particularly if a fourth leg is added.
- *Ridge Parkway.* Ridge Parkway was chosen to extend as the through-connection south of the planning area to Henrici Road. Center Parkway and Ridge Parkway are both recommended for extension to the north as long-term consideration for Oregon City and Clackamas County during the update of respective Transportation System Plans. It is beyond the scope of this study to identify and determine each route and the feasibility of such extensions. Fatal flaws to one or both may be discovered during subsequent planning. Nonetheless, it is prudent at this level of study, in this area of the community, to identify opportunities to efficiently and systematically expand the transportation system to meet existing and future needs.

- *Extensions of Clairmont, Meyers, Glen Oak Roads and the south entrance through to the Ridge Parkway.* These connections help complete the network and tie all parts of the community to adjacent streets and neighborhoods.
- *Realignment of Loder Road at its west end. Loder is recommended for re-configuration to create a safer “T” intersection.* The specific location of the intersection is conceptual and subject to more site specific planning.

The streets of the Concept Plan area are recommended to be green streets. This is an integral part of the storm water plan and overall identity and vision planned for the area. The green street cross-sections utilize a combination of designs: vegetated swales, planter islands, curb extensions, and porous pavement. Figures 15 – 19 illustrate the recommended green street cross-sections. These are intended as a starting point for more detailed design.

Trails

Figure 14 also illustrates the trail network. The City’s existing Thimble Creek Trail and Metro’s Beaver Lake Regional Trail have been incorporated into the plan. New trails include the Powerline Corridor Trail, multi-use path along Center Parkway, and the Ridge Trail.

Transit

The Concept Plan sets the stage for future transit, recognizing that how that service is delivered will play out over time. Specifics of transit service will depend on the actual rate and type of development built, Tri-Met resources and policies, and, consideration of local options. Three options have been identified:

1. A route modification is made to existing bus service to Clackamas Community College (CCC) that extends the route through CCC to Beaver Creek Road via Clairmont, then south to Meyers or Glen Oak, back to HWY 213, and back onto Molalla to complete the normal route down to the Oregon City Transit Center. To date, CCC has identified Meyers Road as a future transit connection to the college.
2. A new local loop route that connects to the CCC transit center and serves the Beaver Creek Road Concept Planning area, the High School, the residential areas between Beaver Creek and HWY 213, and the residential areas west of HWY 213 (south of Warner Milne).
3. A new “express” route is created from the Oregon City Transit Center, up/down HWY 213 to major destinations (CCC, the Beaver Creek Road Employment area, Red Soils, Hilltop Shopping Center, etc.).

It is the recommendation of this Plan that the transit-oriented (and Use mix), density, and design of the Beaver Creek Road area be implemented so that transit remains a viable option over the long term. The City should work with Tri-Met, CCC, Oregon City High School, and developers within the Concept Plan area to facilitate transit.

Connectivity

The street network described above will be supplemented by a connected local street network. Consistent with the framework plan approach, connectivity is required by policy and by the standards in the code. The specific design for the local street system is flexible and subject to master plan and design review. Figure 20 illustrates different ways to organize the street and pedestrian systems. These are just three examples, and are not intended to suggest additional access to Beaver Creek Road beyond what is recommended in Figure 14. The Plan supports innovative ways to configure the streets that are consistent with the goals and vision for the Beaver Creek Concept Plan area.

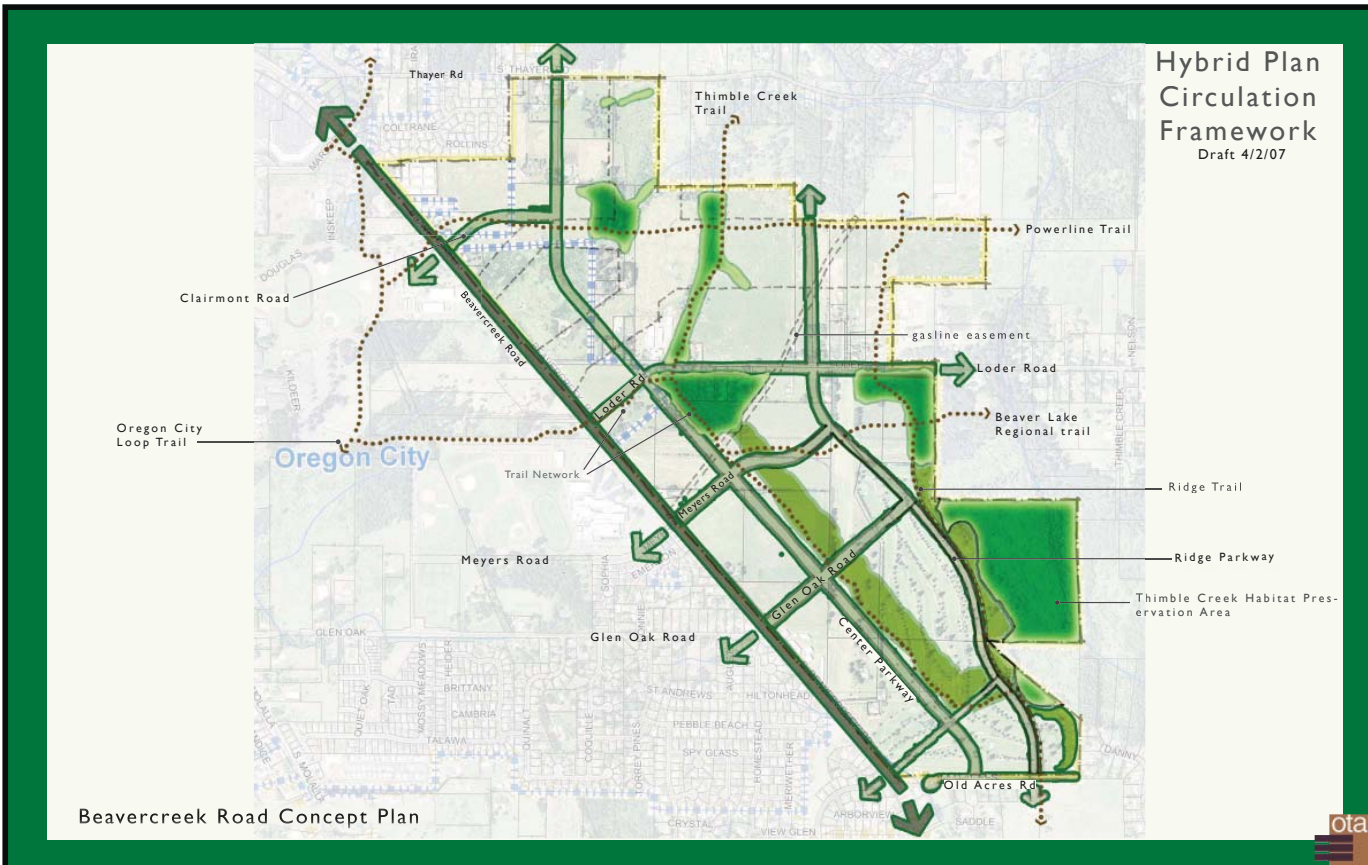


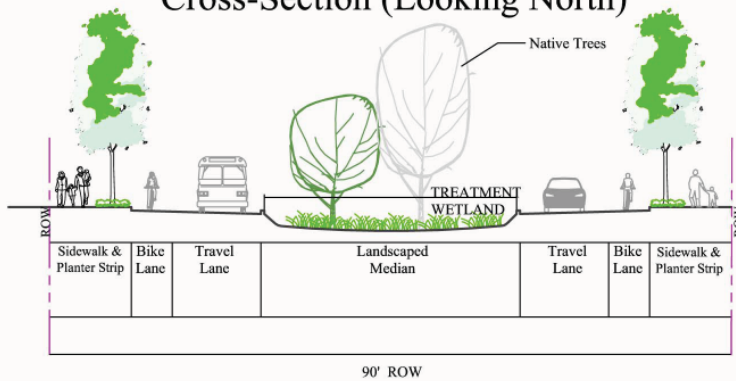
Figure 14 - Circulation Framework



Figure 20 - Connectivity Diagrams

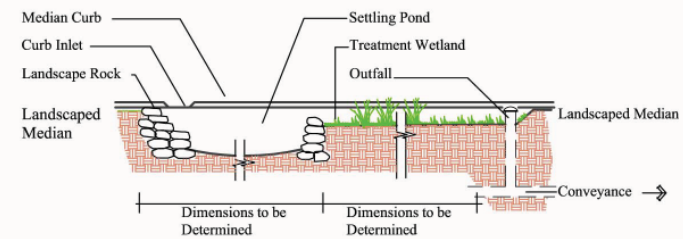
Conceptual only - See Figure 14 for recommended access points to Beaver Creek Road.

Beavercreek Road Greenstreet - Option 1 3-lane Right-of-way Cross-Section (Looking North)



Beavercreek Road Concept Plan

Median Treatment Wetland Conceptual Detail



Beavercreek Road - Option 1 3-lane Right-of-way Plan Concept

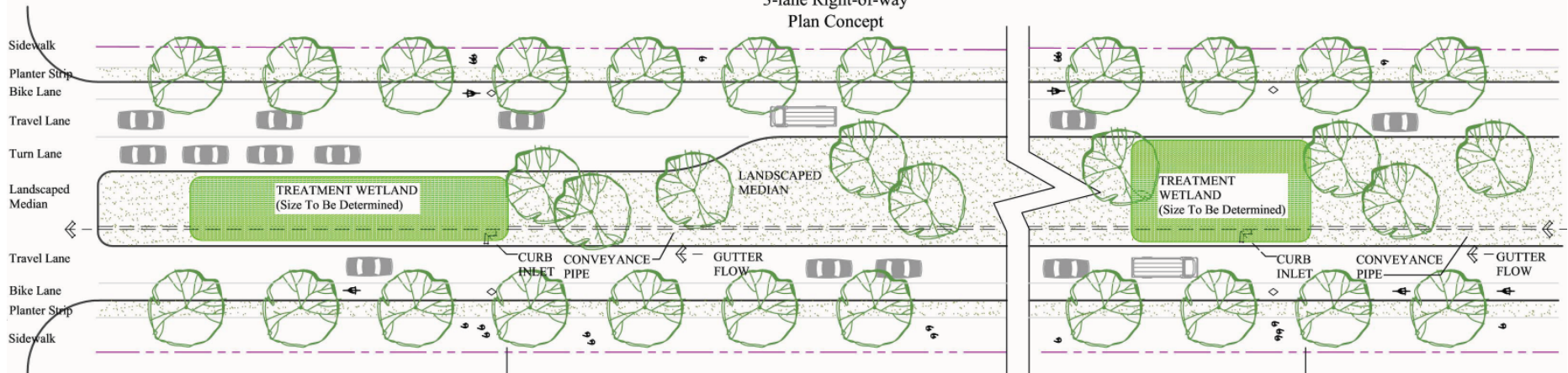


Figure 15 - Beavercreek Road Green Street

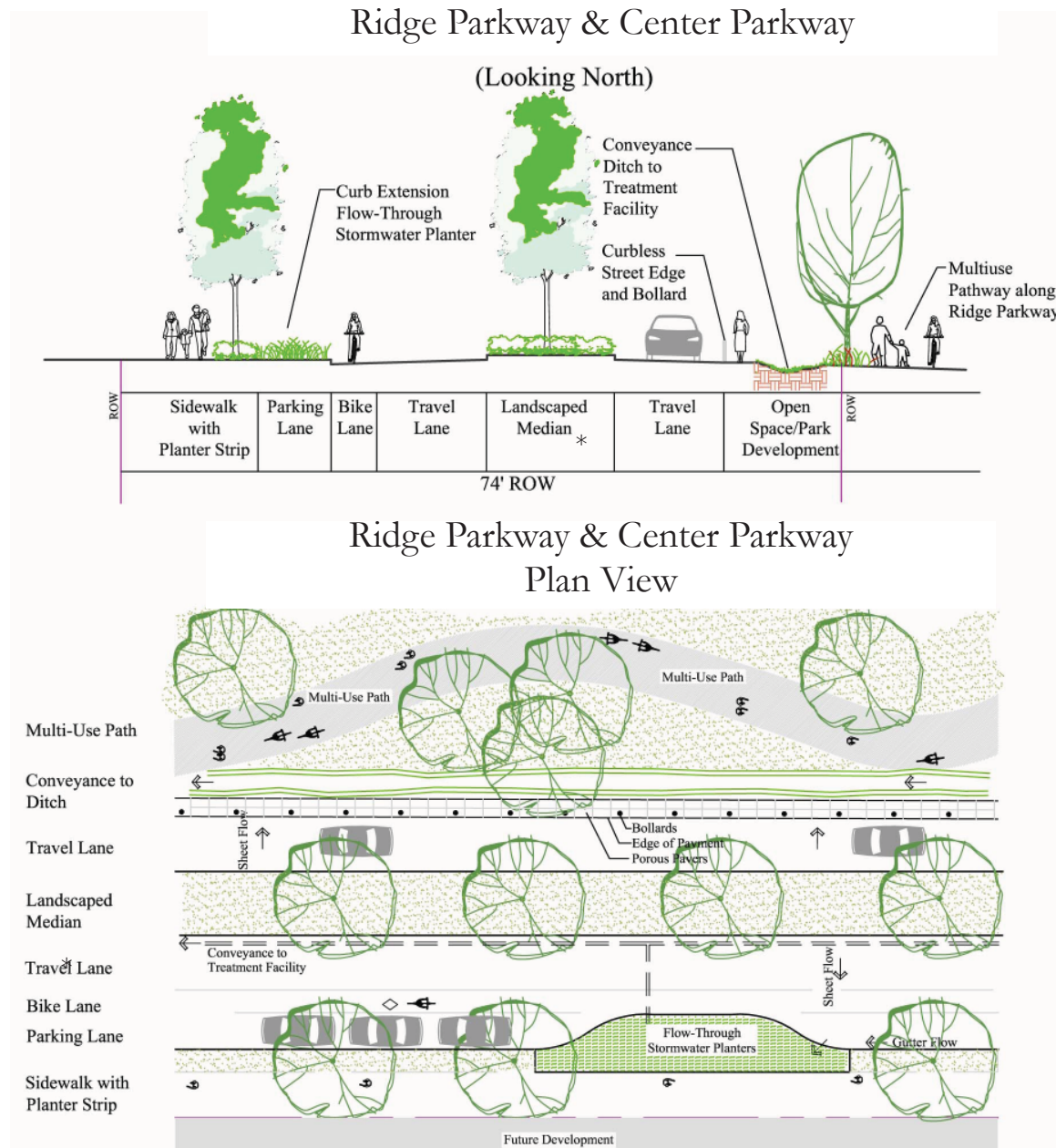
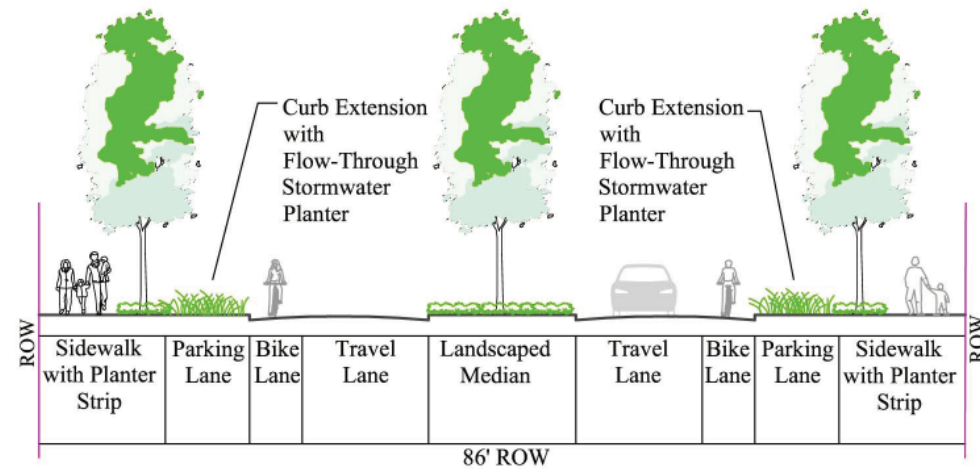


Figure 16 - Ridge Parkway and Central Parkway Green Streets

*Center median is optional for Ridge Parkway.

Collector Greenstreet (Looking North)



Collector Greenstreet Plan View

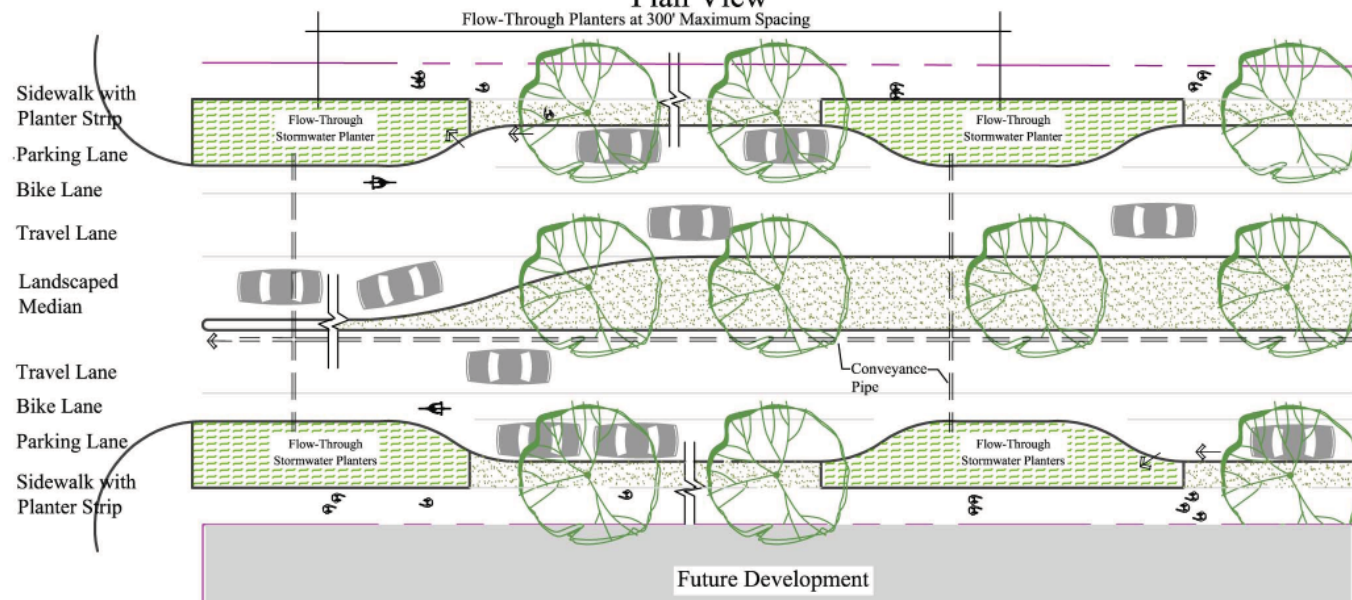
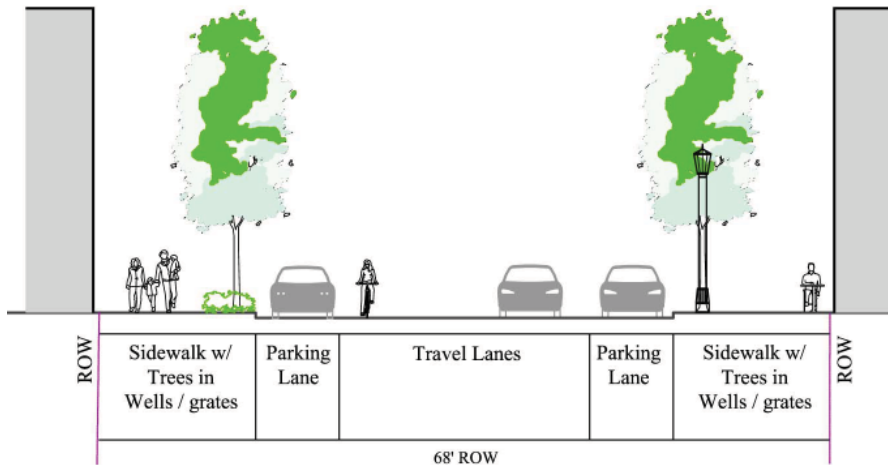


Figure 17 - Collector Green Street

Main Street Collector

Potential Building
Frontage with Future
Development



Main Street Collector Plan View

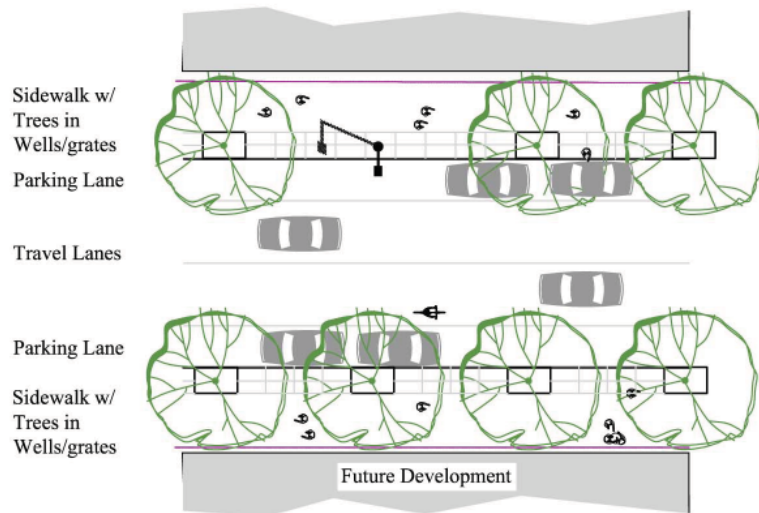
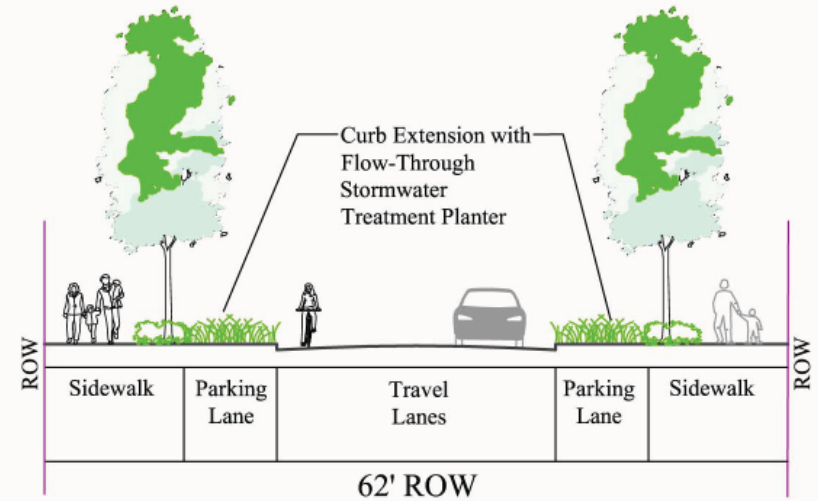


Figure 18 - Main Street Green Street

Neighborhood Greenstreet



Neighborhood Greenstreet Plan View

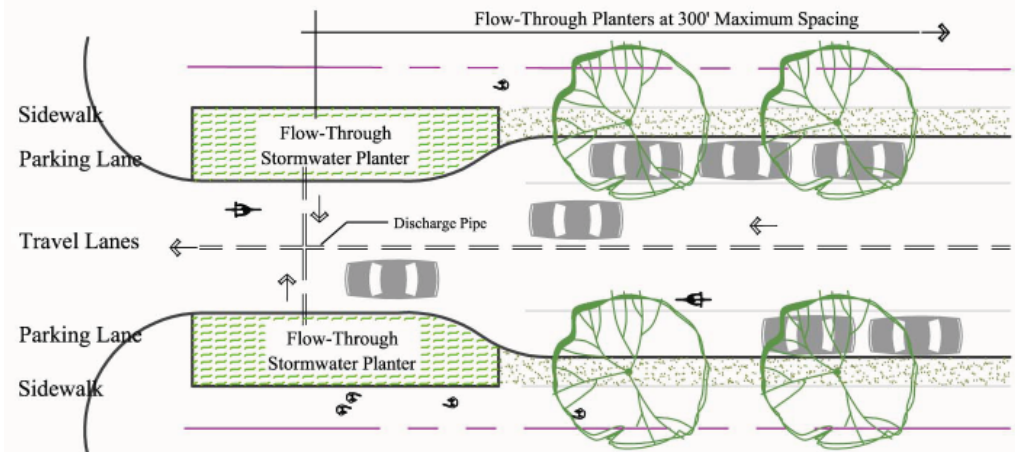


Figure 19 - Neighborhood Green Street

Cost Estimate

A planning-level cost estimate analysis was conducted in order to approximate the amount of funding that will be needed to construct the needed improvements to the local roadway system, with the build-out of the Beaver Creek Road Concept Plan. The table below lists these improvements and their estimated costs. These generalized cost estimates include assumptions for right-of-way, design, and construction.

For additional information, please see Technical Appendix, Sections C2 and G.

Roadway Improvements	Improvement	Estimated Cost
Beaver Creek Road: Marjorie Lane to Clairmont Drive	Construct 5-lane cross-section to City standards	\$6,300,000
Beaver Creek Road: Clairmont Drive to Henrici Road	Construct 3-lane cross-section to City standards	\$12,300,000
Clairmont Drive: Beaver Creek Road – Center Parkway	Construct new 3-lane collector to City standards and modify signal at Beaver Creek Road	\$2,400,000
Loder Road: Beaver Creek Road to Center Parkway	Construct 3-lane cross-section to City standards and signalize Beaver Creek Road intersection	\$1,400,000
Loder Road: Center Parkway – East Site Boundary	Construct 3-lane cross-section to City standards	\$4,200,000
Meyers Road: Beaver Creek Road – Ridge Parkway	Construct new 3-lane collector to City standards and modify signal at Beaver Creek Road	\$3,500,000
Glean Oak Road: Beaver Creek Road – Ridge Parkway	Construct new 3-lane collector to City standards and modify signal at Beaver Creek Road	\$3,400,000
Center Parkway	Construct new 3-lane collector with 12' multi-use path	\$17,700,000
Ridge Parkway	Construct new 3-lane collector	\$9,800,000
Total Roadway Improvements		\$61,000,000
Intersection Only Improvements	Improvement	Estimated Cost
Beaver Creek Road/Maplelane	Road Construct new WB right-turn lane	\$250,000
Beaver Creek Road/ Meyers Road	Construct new NB and SB through lanes	\$5,000,000
Total Intersection Improvements		\$5,250,000
TOTAL IMPROVEMENTS		\$66,250,000

Transportation Cost Estimate



Figure 21 - Sustainable Stormwater Plan

Storm Water and Water Quality

This Beavercreek Road stormwater infrastructure plan embraces the application of low-impact development practices that mimic natural hydrologic processes and minimize impacts to existing natural resources. It outlines and describes a stormwater hierarchy focused on managing stormwater in a naturalistic manner at three separate scales: site, street, and neighborhood.

Tier 1 – Site Specific Stormwater Management Facilities (Site)

All property within the study area will have to utilize on-site best management practices (BMPs) to reduce the transport of pollutants from their site. Non-structural BMPs, such as source control (e.g. using less water) are the best at eliminating pollution. Low-impact structural BMPs such as rain gardens, vegetated swales, pervious surface treatments, etc. can be designed to treat stormwater runoff and reduce the quantity (flow and volume) by encouraging retention/infiltration. They can also provide beneficial habitat for wildlife and aesthetic enhancements to a neighborhood. These low-impact BMP's are preferred over other structural solutions such as underground tanks and filtration systems. Most of these facilities will be privately maintained.

Tier 2 – Green Street Stormwater Management Facilities (Street)

Green Streets are recommended for the entire Beavercreek Concept Plan area. The recommended green street design in Figures 15 - 19 use a combination of vegetated swales or bioretention facilities adjacent to the street with curb cuts that allow runoff to enter. Bioretention facilities confined within a container are recommended in higher density locations where space is limited or is needed for other urban design features, such as on-street parking or wide sidewalks. The majority of the site is underlain with silt loam and silty clay loam. Both soils are categorized as Hydrologic Soil Group C and have relatively slow infiltration rates.

The recommended green streets will operate as a collection and conveyance system to transport stormwater from both private property and streets to regional stormwater facilities. The conveyance facilities need to be capable of managing large storm events that exceed the capacity of the swales. For this reason, the storm water plan's conveyance system is a combination of open channels, pipes, and culverts. Open channels should be used wherever feasible to increase the opportunity for stormwater to infiltrate and reduce the need for piped conveyance.

Tier 3 – Regional Stormwater Management Facilities (Neighborhood)

Regional stormwater management facilities are recommended to manage stormwater from larger storms that pass through the Tier 1 and Tier 2 facilities. Figure 21 illustrates seven regional detention pond locations. Coordinating the use of these for multiple properties will require land owner cooperation during development reviews, and/or, City initiative in advance of development.

The regional facilities should be incorporated into the open space areas wherever possible to reduce land costs, and reduce impacts to the buildable land area. Regional stormwater facilities should be designed to blend with the other uses of the open space area, and can be designed as a water feature that offers educational or recreational opportunities. Stormwater runoff should be considered as a resource, rather than a waste stream. The collection and conveyance of stormwater runoff to regional facilities can offer an opportunity to collect the water for re-use.



Large Locations

development stormwater runoff rates from the Beaver Creek Road Plan Area will need to match pre-development rates at the existing large locations, per City Stormwater Design Standards. Since there are small discharge locations to Thimble Creek, flow control facilities that be feasible at all discharge locations. In this situation, over- is needed at some discharge locations to compensate for the und areas so that flows in Thimble Creek at the downstream point of ance meet City Stormwater Design Standards for flow control.

stormwater structure for the creek Road Plan Area ated to cost n \$7.8 million 4 million for nstruction. onstruction gencies, soft ngineering, ings action ment), and quisation, the st is estimated o \$23 million.

Water

The proposed water infrastructure plan creates a network of water pipelines as the “backbone” system. In addition, as individual parcels developed, a local service network of water mains will be needed at individual lots.

Since there are two pressure zones in the concept plan area, there to be a network of pipes for each of the two zones. These systems illustrated on Figure 22. The Fairway Downs Pressure Zone will south one-third of the concept plan area. This zone receives water from the system

But, because the zone is at a higher elevation in the water system from the rest, the system is in need to maintain pressure to this part of the system. The pressure is maintained by using a lift pump station at the intersection of Glen Oak Road and Beaver Creek Road.

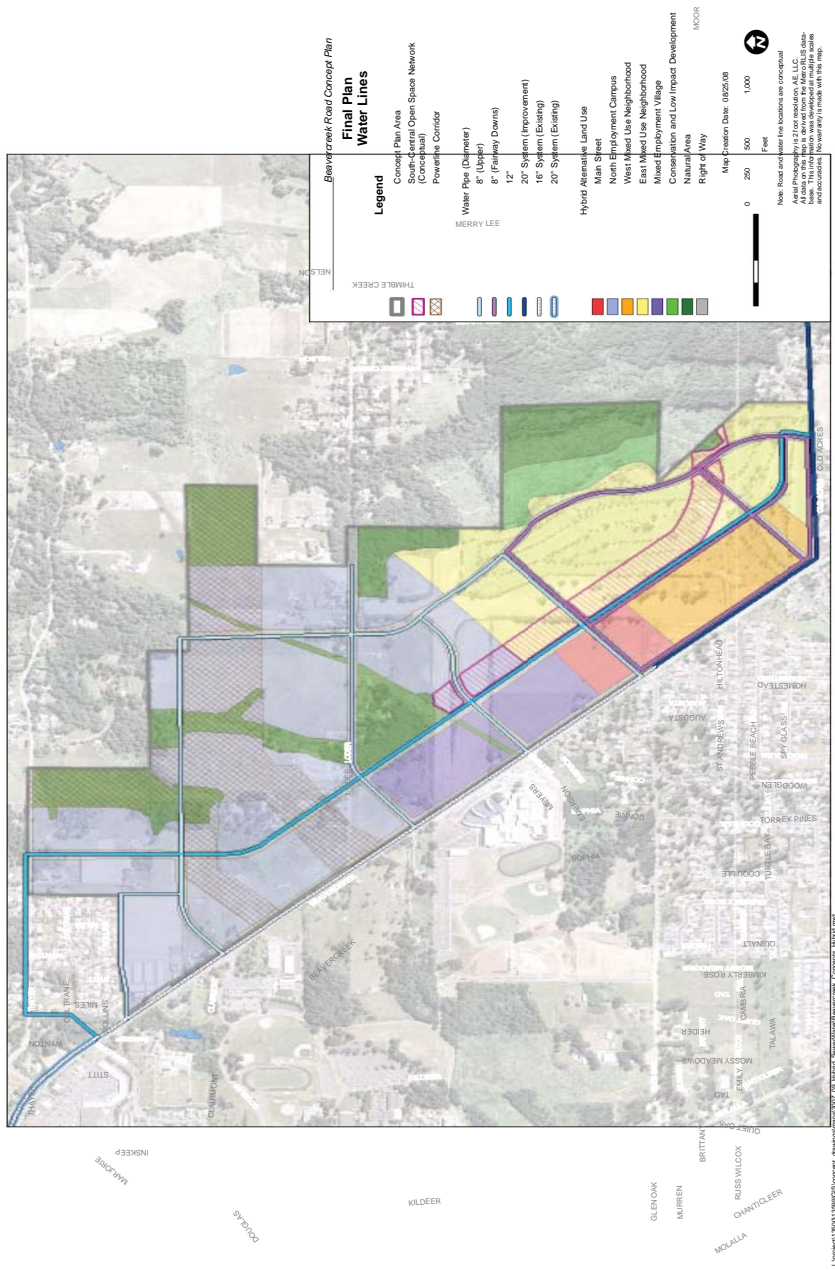


Figure 22 - Water Plan

In the Fairway Downs Pressure Zone, the majority of the water mains will be installed in the proposed public rights-of-way. However, a small portion of the system may need to be in strip easements along the perimeter of the zone at the far southeast corner of the concept plan area. The system layout shown is preliminary and largely dependent on future development and the final system of internal (local) streets. Additional mains may be needed or some of the water mains shown may need to be removed. For instance, if the development of the residential area located at the southeast end of the site, adjacent to Old Acres Road, includes internal streets, the water mains shown along the perimeter of the site may be deleted because service will be provided from pipes that will be installed in the internal street system.

Some of the planned streets in the Fairway Downs Pressure Zone will contain two water mains. One water main will provide direct water service to the area from the booster pump system. The other water main will carry water to the lower elevation areas in the Upper Pressure Zone.

The Upper Pressure Zone will serve the north two-thirds of the concept plan area. The “backbone” network for the Upper Pressure Zone will have water mains that are pressured from the Henrici and Boynton reservoirs. A single 12-inch water main will run parallel with Beaver Creek Road through the middle of concept plan area. This water conduit will serve as the “spine” for the Upper Pressure Zone. A network of 8-inch water pipes will be located in the public rights-of-way and will provide water to the parcels that are identified for development. The system can be extended easterly on Loder Road, if needed.

The preliminary design ensures that the system is looped so that there are no dead-end pipes in the system. Along a portion of the north perimeter, approximately 1,600 feet of water pipe will be needed to complete a system loop and provide water service to adjacent lots. This pipe will share

a utility easement with a gravity sanitary sewer and a pressure sewer. There may also be stormwater facilities in this same alignment.

In the Water Master Plan, under pipeline project P-201, there is a system connection in a strip easement between Thayer Road and Beaver Creek Road at the intersection with Marjorie Lane. Consideration should be given to routing this connection along Thayer Road to Maple Lane Road and then onto Beaver Creek Road. This will keep this proposed 12-inch main in the public street area where it can be better accessed.

The estimated total capital cost for the “backbone” network within the concept plan area will be in the area of \$5,400,000. This estimate is based on the one derived for Alternative D, which for concept planning purposes, is representative of the plan and costs for the final Concept Plan. This is in addition to the \$6.9 million of programmed capital improvement projects that will extend the water system to the concept plan area. All estimates are based on year 2003 dollars. Before the SDC can be established, the estimates will need to be adjusted for the actual programmed year of construction.

For additional information, please see Technical Appendix, Sections C6 and H3.



Sanitary Sewer

The majority of the concept area drains generally to the north and is the natural land contours formed by the uppermost portion of Timber Creek. The proposed sanitary sewer system in the vicinity of Bevercreek Road will follow the north-south street rights-of-way. This part of the system will terminate at the low point of the concept plan area in a sanitary lift station over the wetwell will pump the wastewater in a westerly direction to a point that it can be discharged into a sewer that will flow west to the trunk sewer in Bevercreek Road. The lift station and pressure sewer project has been identified in the City Sewer Master Plan as projects BC-COL-5 and 6. A utility bridge will carry the pressure pipe and gravity sewer pipe over Thimble Creek.

The anticipated road access to the pump station that will also be

The majority of the southern half of the concept area will have a sanitary sewer system that will convey waste water to the existing foot long trunk sewer in Bevercreek Road, which currently extends Highway 213 to approximately 800 feet south of Marjorie Lane. The portion of the system can be built in the planned roadways and in existing Bevercreek Road right-of-way. This portion of the system will be built in the planned roadways. A portion of the system, approximately 400 feet long, will need to be built in the current alignment of Loder Road. The gravity sewer can be connected to the trunk sewer in Bevercreek Road. The circulation plan includes a realignment of Loder Road. Therefore, a sewer easement will need to be retained across the full parcel that now includes the current Loder Road alignment.

The approximate elevation of 490 (MSL) is important for the southern half of the concept plan relative to gravity service. Roadways and developed areas constructed above 490 ft will most likely allow for gravity service. If land requiring sanitary service (or roadways with sewer under) are located lower than 490 ft, individual stations and pressure services may be required.

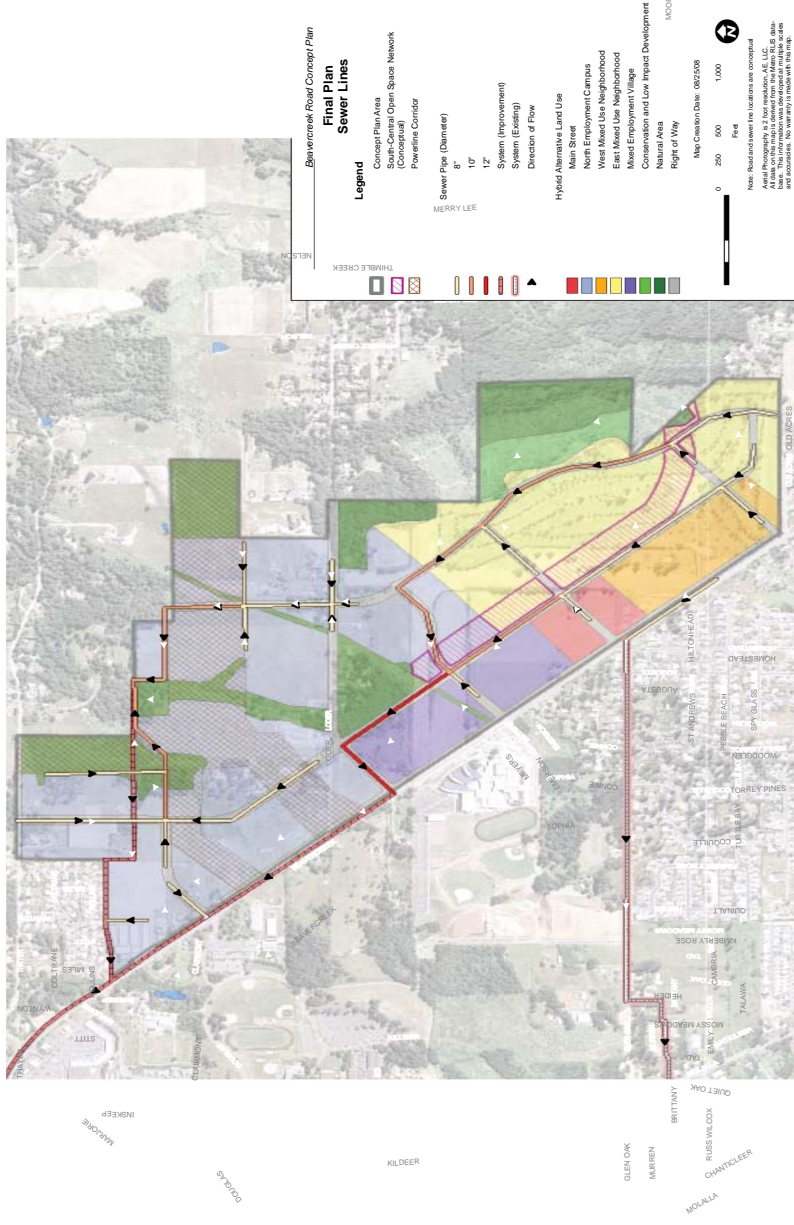


Figure 23 - Sewer Plan

The estimated total capital cost will be in the vicinity of \$4,400,000. This estimate is based on the cost analysis for Alternative D, which is comparable. This is in addition to the \$2.3 million in sanitary sewer master plan capital costs that needed to bring the sanitary sewers to the concept plan area. These estimates are based on year 2003 dollars. The estimates will need to be adjusted for the programmed year of construction.

For additional information, please see Technical Appendix, Sections C6 and H2.

Funding strategies

For water, sewer, storm water and parks, there are five primary funding sources and strategies that can be used:

- *System development charges (SDCs)*– Oregon City requires developers to pay SDCs for new development. Developers pay these charges up front based on the predicted impact of the new development on the existing infrastructure and the requirements it creates for new improvements. Although the charges are paid by the developer, the developer may pass on some of these costs to buyers of newly developed property. Thus, SDCs allocate costs of development to the developer and buyers of the new homes or new commercial or industrial buildings.
- *Urban renewal/tax increment financing* - Tax increment financing is the primary funding vehicle used within urban renewal areas (URA). The tax increment revenue is generated within a URA when a designated area is established and the normal property taxes within that area are ‘frozen’ (often called the frozen base). Any new taxes generated within that area through either property appreciation or new investment becomes the increment. Taxing jurisdictions continue to collect income from the frozen base but agree to release assessed value above the base to the URA. The URA then can issue bonds to pay for identified public improvements. The tax increment is used to pay off the bonds.

Oregon City has the authority to establish an URA. The Beavercreek Road Concept Plan Area would have to meet the definition of ‘blight’ as defined in ORS 457. It is likely to meet ‘blight’ standards because its existing ratios of improvement-to-land values are likely low enough to meet that standard.

- *Local Improvement Districts* - Local Improvement Districts (LIDs) are formed for the purpose of assessing local property owners an amount sufficient to pay for a project deemed to be of local benefit. LIDs are a specific type of special assessment district, which more broadly includes any district that is formed within an existing taxing district to assess specific property owners for some service that is not available throughout the larger district. The revenues from the LID assessments are used to pay the debt payments on a special assessment bond or a note payable issued for the capital improvements.

LID assessments increase costs for property owners. Under a LID the improvements must increase the value of the taxed properties by more than the properties are taxed. LIDs are typically used to fund improvements that primarily benefit residents and property owners within the LID.

- *Bonds* - Bonds provide a financing mechanism for local governments to raise millions of dollars for parks and other capital projects. The City could back a bond with revenue from a LID, the Urban Renewal Districts, or property taxes citywide. General obligation (GO) bonds issued by local governments are secured by a pledge of the issuer’s power to levy real and personal property taxes. Property taxes necessary to repay GO bonds are not subject to limitation imposed by recent property tax initiatives. Oregon law requires GO bonds to be authorized by popular vote.

Bond levies are used to pay principal and interest for voter-approved bonded debt for capital improvements. Bond levies typically are approved in terms of dollars, and the tax rate is calculated as the total levy divided by the assessed value in the district.

- *Developer funded infrastructure* – The City conditions land use approvals and permits to include required infrastructure. Beyond

the sources cited above, developers cover the remaining costs for the infrastructure required for their development.

Additional funding tools that could be investigated and implemented within the Concept Plan area include a Road District, a County Service District, Intergovernmental Agreements, an Advance Finance District, a Certificate of Participation, and a Utility Fee. There are benefits and limitations associated with each of the funding options that should be reviewed carefully before implementing.

For transportation infrastructure, the same sources as cited above are available. For larger facilities, such as Beavercreek Road, additional funds may be available. They include Metro-administered federal STP and CMAQ funding, and, regional Metro Transportation Improvement Plan funding. These sources are limited and extremely competitive. County funding via County SCSs should also be considered a potential source for Beavercreek Road. Facilities like Beavercreek Road are often funded with a combination of sources, where one source leverages the availability of another.

Sustainability

One of the adopted goals is: The Beavercreek Road Concept Plan Area will be a model of sustainable design, development practices, planning, and innovative thinking.

Throughout the development of the concept plan, sustainability has been paramount in guiding the CAC, the City, and the consultant team. The final plan assumes that sustainable practices will be a combination of private initiatives (such as LEED certified buildings), public requirements (green streets and low impact development policies), and public-private partnerships. It is recommended that City use incentives, education and policy support as much as possible for promoting sustainability at Beavercreek Road. Some initiatives will require regulation and City mandates, but caution and balance should be used. At the end of the

day, it is up to the private sector to invest in sustainable development. The Beavercreek Road's site's legacy as a model of sustainable design will depend, in large part on the built projects that are successful in the marketplace and help generate the type of reputation that the community desires and deserves.

The key to fulfilling the above-listed goal will be in the implementation. For the City's part, implementation strategies that support sustainable design will be included within the Oregon City Comprehensive Plan policies and Code provisions. They will be applied during master plan and design review permitting. Some of these strategies will be "required" while other are appropriate to "encourage." These sustainability strategies include:

- Energy efficiency
- Water conservation
- Compact development
- Solar orientation
- Green streets/infrastructure
- Adaptive reuse of existing buildings/infrastructure
- Alternative transportation
- Pedestrian/Cyclist friendly developments
- Natural drainage systems
- Tree preservation and planting to "re-establish" a tree canopy
- Minimizing impervious surfaces
- Sustainability education (builder, residents, businesses and visitors)
- Collaboration with "local" institutional and economic partners, particularly Clackamas Community College and Oregon City High School
- Community-based sustainable programs and activities

Principles for Sustainable Community Design

The CAC discussed Principles for Sustainable Community Design that were offered by one of the members. These provide a good framework for how the Concept Plan is addressing sustainability.

Mix Land Uses - Promote a mix of land uses that support living wage jobs and a variety of services.

All of the sub-districts are, to some degree, mixed use districts. The Mixed Use Village, Main Street and West Mixed Use Neighborhood allow a rich mix of employment, housing, and services. Taken together, the entire 453 acre area will be a complete community.

Housing Types - Create a range of housing choices for all ages and incomes.

The concept plan includes housing in many forms: mixed use formats in the 3-5 story buildings, high density apartments and condominiums, live-work units, townhomes, small cottage lots, and low density single family homes.

Walk-ability - Make the Neighborhood “walkable” and make services “walk-to-able.”

The plan provides a street and trail framework. The code will require a high level of connectivity and maximum block sizes for most sub-districts. Services are provided throughout the plan as part of mixed use areas and a broad range of permitted uses.

Transportation - Provide a range of transportation options using a connected network of streets and paths.

The plan provides for all modes: walking, biking, driving and transit. Transit-supportive land use is specifically required in the Mixed Employment Village, Main Street and West Mixed Use Neighborhoods. The framework of connected streets and paths will be supplemented by a

further-connected system of local streets and walking routes.

Open Space - Protect and maintain a functioning green space network for a variety of uses.

Open space is distributed throughout the plan. New green spaces are connected with existing higher-value natural areas.

Integrate Systems - Integrate ecological and man-made systems to maximize function, efficiency and health.

Infrastructure systems (green storm water, multi-modal transportation) are highly integrated with the open space network and array of land uses. It will be important for the implementation of the plan to further integrate heating, cooling, irrigation and other man-made systems with the Concept Plan framework.

Ecological Health - Manage natural resources to eliminate pollution to watersheds and lessen impact on habitat and green infrastructure.

Methods to achieve this principle are identified in the Stormwater Infrastructure Report. Additionally, the code requires measures to preserve natural resources and eliminate pollution to watersheds necessary to achieve this principle.

Reuse, Recycle, Regenerate - Reuse existing resources, regenerate existing development areas.

The principle will be applied primarily at time of development and beyond.

Green Buildings - Build compact, innovative structures that use less energy and materials.

The draft code includes provisions for green buildings. This is a new area for the City to regulate, so a public-private Green Building Work Group is recommend to explore issues, build consensus, and develop specific code recommendations.

Work Together - Work with community members and neighbors to design and develop.

The development of the alternatives and the recommended plan has been a collaborative process with all project partners. The concept plan process through implementation and subsequent project area developments will continue to be a collaborative process where all stakeholders are invited to participate.

For additional information, please see Technical Appendix, Sections C3, D, and F.

Metrics

Land Use

The following table summarizes the acreages for major land uses on the Concept Plan.

Land Use Category (acres)	Hybrid
North Employment Campus (adjusted gross acreage)*	149
Mixed Employment Village	26
Main Street	10
West Mixed Use Neighborhood	22
East Mixed Use Neighborhood	77
Total Acres of "built" land use	284
Other Land Uses (not "built")	
Parks/Open Space/Natural Areas (Total)**	113
Major ROW+	56
Existing Uses (unbuildable)	0
Total Project Area Gross Acres	453

*Adjusted gross acreage is the sum of 50% of the employment land use shown under the powerline easement plus all other unconstrained employment land use areas. Calculations shown below:

Land Use Category (acres)	Hybrid
Total North Employment Campus	175
Unconstrained NEC	123
Employment with powerline overlay	52
Useable portion of powerline overlay (50%)	26
North Employment Campus (adjusted gross acreage)*	149

Housing and Employment Estimates

The Concept Plan has an estimated capacity for approximately 5000 jobs and 1000 dwellings. The following table displays the estimates and assumptions used to estimate jobs and housing. On a net acreage, these averages are 33 jobs/ net developable acre and 10.3 dwellings/ net developable acre.

Land Use Category	Hybrid Gross Acres	Hybrid Net Acres*	FAR/Acre**	SF/Job**	# of Jobs***	Avg. Units/Acre	# of Units+
North Employment Campus (adjusted gross acreage)	149	127	0.3	450	3,678		
Mixed Employment Village	26	21	0.44	350	1,139		
Main Street****	10	8	0.44	350	219	25	100
West Mixed Use Neighborhood	22	18			15	22	387
East Mixed Use Neighborhood	77	62			21	8.7	536
Total # of Jobs					5,073		
Total # of Housing Units							1,023
Total Acres of Developed Land++	284	235					

*For Hybrid - Net acres equals gross acres minus 15% for local roads and easements in Employment. Mixed Employment, Mixed Use, and residential areas assume 20% for local roads and easements

*Based on Metro 2002-2022 Urban Growth Report: An Employment Land Need Analysis. Includes total on site employment (full and part time). Mixed Employment FAR and job density reflects a mix of office, tech/flex, and ground floor retail.

***Number of Jobs in Employment, Mixed Employment, Mixed Use calculated by multiplying total acres by the FAR; Converting to square feet; and dividing by number of jobs/square foot. Jobs in residential areas (Work at Home Jobs) estimated at 4% (potential could be as high as 15%).

**** Mixed Use land use assumes 50% of acreage devoted to commercial uses and the remaining 50% devoted to vertical mixed use.

+Number of units calculated by multiplying total net acres of residential land use by average units per acre

++Includes 50% of useable power line corridor (26 acres total) as part of developed land (included in Employment land area)

+++Does not include powerline corridor acreage as part of developed land

VI. Goals and Policies

The following goals and policies are recommended for adoption into the Oregon City Comprehensive Plan. The goal statements are those developed by the Citizen Advisory Committee as goals for the plan.

Goal 1 Complete and Sustainable Community

Create a complete and sustainable community, in conjunction with the adjacent land uses, that integrates a diverse mix of uses, including housing, services, and public spaces that are necessary to support a thriving employment center.

Policy 1.1

Adopt new comprehensive plan and zone designations, and development code, that implement the Beavercreek Concept Plan. Require all development to be consistent with the Concept Plan and implementing code.

Policy 1.2

Establish sub-districts to implement the Concept Plan. The sub-districts are:

North Employment Campus – NEC

The purpose of the North Employment Campus is to provide for the location of family wage employment that strengthens and diversifies the economy. The NEC allows a mix of clean industries, offices serving industrial needs, light industrial uses, research and development and large corporate headquarters. The uses permitted are intended to improve the region's economic climate, promote sustainable and traded sector businesses, and protect the supply of sites for employment by limiting

incompatible uses. The sub-district is intended to comply with Metro's Title 4 regulations. Site and building design will create pedestrian-friendly areas and utilize cost effective green development practices. Business and program connections to Clackamas Community College (CCC) are encouraged to help establish a positive identity for the area and support synergistic activity between CCC and NEC properties. Businesses making sustainable products and utilizing sustainable materials and practices are encouraged to reinforce the identity of the area and promote the overall vision for the Beavercreek Road area.

Mixed Employment Village – MEV

The purpose of the Mixed Employment Village is to provide employment opportunities in an urban, pedestrian friendly, and mixed use setting. The MEV is intended to be transit supportive in its use mix, density, and design so that transit remains an attractive and feasible option. The MEV allows a mix of retail, office, civic and residential uses that make up an active urban district and serve the daily needs of adjacent neighborhoods and Beavercreek Road sub-districts. Site and building design will create pedestrian-friendly areas and utilize cost effective green development practices. Business and program connections to Clackamas Community College and Oregon City High School are encouraged. Businesses making sustainable products and utilizing sustainable materials and practices are encouraged to reinforce the identity of the area and promote the overall vision for the Beavercreek Road area.

Main Street – MS

The purpose of this small mixed-use center is to provide a focal point of pedestrian activity. The MS allows small scale commercial, mixed use and services that serve the daily needs of the surrounding area. "Main Street" design will include buildings oriented to the street, and minimum of 2 story building scale, attractive streetscape, active ground floor uses and other elements that reinforce pedestrian oriented character and vitality of the area.

West Mixed Use Neighborhood – WMU

The West Mixed Use Neighborhood will be a walkable, transit-oriented neighborhood. This area allows a transit supportive mix of housing, live/work units, mixed use buildings and limited commercial uses. A variety of housing and building forms is required, with the overall average of residential uses not exceeding 22 dwelling units per acre. The WMU area's uses, density and design will support the multi-modal transportation system and provide good access for pedestrians, bicycles, transit and vehicles. Site and building design will create a walkable area and utilize cost effective green development practices.

East Mixed Use Neighborhood – EMU

The East Mixed Use Neighborhood will be a walkable and tree-lined neighborhood with a variety of housing types. The EMU allows for a variety of housing types while maintaining a low density residential average not exceeding the densities permitted in the R-5 zone. Limited non-residential uses are permitted to encourage a unique identity, sustainable community, and in-home work options. The neighborhood's design will celebrate open space, trees, and relationships to public open spaces. The central open space, ridge open space scenic viewpoints, and a linked system of open spaces and trails are key features of the EMU. Residential developments will provide housing for a range of income levels, sustainable building design, and green development practices.

Policy 1.3

Within the Northern Employment Campus sub-district, support the attraction of family wage jobs and connections with Clackamas Community College.

Policy 1.4

Within the Mixed Employment Village and Main Street sub-districts, promote job creation, mixed use and transit oriented development. Adopt minimum densities, limitations on stand-alone residential developments, and other standards that implement this policy.

Policy 1.5

The Main Street sub-district may be located along the extension of Glen Oak Road and not exceed 10 gross acres. The specific configuration of the MS sub-district may be established as part of a master plan.

Policy 1.6

Within the West and East Mixed Use Neighborhoods, require a variety of housing types. Allow lot size averaging and other techniques that help create housing variety while maintaining overall average density.

Policy 1.7

Within the MEV, MS, WMU and EMU sub-districts, require master plans to ensure coordinated planning and excellent design for relatively large areas (e.g. 40 acres per master plan). Master plans are optional in the NEC due to the larger lot and campus industrial nature of the area.

Goal 2 Model of Sustainable Design

Be a model of sustainable design, development practices, planning, and innovative thinking.

Policy 2.1

Implement the Sustainable Storm Water plan recommended in the Concept Plan. During site specific design, encourage innovative system design and require low impact development practices that manage water at the site, street and neighborhood scales.

Policy 2.2

Storm water facilities will be designed so they are amenities and integrated into the overall community design.

Policy 2.3

Support public and private sector initiatives to promote sustainable design, development practices and programs, including but not limited to:

- Energy efficiency
- Water conservation
- Compact development
- Solar orientation
- Green streets/infrastructure
- Adaptive reuse of existing buildings/infrastructure
- Alternative transportation
- Pedestrian/Cyclist friendly developments
- Natural drainage systems
- Tree preservation and planting to “re-establish” a tree canopy
- Minimizing impervious surfaces

- Sustainability education (builder, residents, businesses and visitors)
- Collaboration with “local” institutional and economic partners, particularly Clackamas Community College and Oregon City High School
- Community based sustainable programs and activities

Policy 2.4

Work with stakeholders and the community to develop LEED or equivalent green building standards and guidelines to apply in the Concept Plan area.

Goal 3 Green Jobs

Attract “green” jobs that pay a living wage.

Policy 3.1

Coordinate with county, regional and state economic development representatives to recruit green industry to the Concept Plan area.

Policy 3.2

Promote the Concept Plan area as a place for green industry.

Policy 3.3

Work with Clackamas Community College to establish programs and education that will promote green development within the Concept Plan area.

Goal 4 Sustainable Industries

Maximize opportunities for sustainable industries that serve markets beyond the Portland region and are compatible with the site's unique characteristics.

Policy 4.1

As master plans are approved, ensure there is no net loss of land designated North Employment Campus.

Policy 4.2

Coordinate with County, regional and state economic development representatives to recruit sustainable industries that serve markets beyond the Portland region.

Goal 5 Natural Beauty

Incorporate the area's natural beauty into an ecologically compatible built environment.

Policy 5.1

Incorporate significant trees into master plans and site specific designs. Plant new trees to establish an extensive tree canopy as part of the creation of an urban community.

Policy 5.2

Provide scenic viewpoints and public access along the east ridge.

Policy 5.3

Protect views of Mt Hood and locate trails and public areas so Mt Hood can be viewed within the community

Policy 5.4

Establish open space throughout the community consistent with the Open Space Framework Plan. Allow flexibility in site specific design of open space, with no net loss of total open space area.

Policy 5.5

Protect steeply sloped and geologically sensitive areas along the east ridge from development.

Goal 6 Multi-modal Transportation

Provide multi-modal transportation links (such as bus routes, trails, bike-ways, etc.) that are connected within the site as well as to the surrounding areas.

Policy 6.1

Work with Tri-Met and stakeholders to provide bus service and other alternatives to the Concept Plan area.

Policy 6.2

As land use reviews and development occur prior to extension of bus service, ensure that the mix of land uses, density and design help retain transit as an attractive and feasible option in the future.

Policy 6.3

Ensure that local street connectivity and off-street pedestrian routes link together into a highly connected pedestrian system that is safe, direct, convenient, and attractive to walking.

Policy 6.4

The "walkability" of the Concept Plan area will be one of its distinctive qualities. The density of walking routes and connectivity should mirror

the urban form – the higher the density and larger the building form, the “finer” the network of pedestrian connections.

Policy 6.5

Require trails to be provided consistent with the Concept Plan Circulation Framework.

Policy 6.6

Provide bike lanes on Beavercreek Road and all collector streets, except for Main Street. The City may consider off-street multi-use paths and similar measures in meeting this policy. Bike routes will be coordinated with the trails shown on the Circulation Framework.

Goal 7 Safety Along Beavercreek Road

Implement design solutions along Beavercreek Road that promote pedestrian safety, control traffic speeds and access, and accommodate projected vehicular demand.

Policy 7.1

Design Beavercreek Road to be a green street boulevard that maximizes pedestrian safety.

Policy 7.2

Work with the County and State to establish posted speeds that are safe for pedestrians and reinforce the pedestrian-oriented character of the area.

Policy 7.3

Control access along the east side of Beavercreek Road so that full access points are limited to the intersections shown on the Circulation Framework. Right in-Right-out access points may be considered as part of master plans or design review.

Goal 8 Oregon City High School and Clackamas Community College

Promote connections and relationships with Oregon City High School and Clackamas Community College.

Policy 8.1

Coordinate with OCHS and CCC when recruiting businesses and promoting sustainability. Within one year of adoption of the Concept Plan, the City will convene dialogue with OCHS, CCC and other relevant partners to identify target industries and economic development strategies that are compatible with the vision for the Concept Plan. Encourage curricula that are synergistic with employment and sustainability in the Concept Plan area.

Policy 8.2

Prior to application submittal, require applicants to contact OCHS and CCC to inform them and obtain early comment for master plans and design review applications.

Policy 8.3

Improving the level-of-service and investing in the Highway 213 corridor improves the freight mobility along Highway 213, which provides access to Beavercreek Road and the Concept Plan area. Protecting the corridor and intersections for freight furthers the City goal of providing living-wage employment opportunities in the educational, and research opportunities to be created with CCC and OCHS.

Goal 9 Unique Sense of Place

Have a unique sense of place created by the mix of uses, human scale design, and commitment to sustainability.

Policy 9.1

Utilize master plans and design review to ensure detailed and coordinated design. Allow flexibility in development standards and the configuration of land uses when they are consistent with the comprehensive plan, development code, and vision to create a complete and sustainable community.

Policy 9.2

Implement human scale design through building orientation, attractive streetscapes, building form/architecture that is matched to the purpose of the sub-district, location of parking, and other techniques. The design qualities of the community should mirror the urban form – the higher the density and larger the buildings, the higher the expectation for urban amenities and architectural details.

Policy 9.3

Density should generally transition from highest on the west to lowest in the eastern part of the site.

Policy 9.4

Promote compatibility with existing residential areas at the north and south end of the Concept Plan area. Transition to lower densities, setbacks, buffers and other techniques shall be used.

Goal 10 Ecological Health

Manage water resources on site to eliminate pollution to watersheds and lessen impact on municipal infrastructure by integrating ecological and man-made systems to maximize function, efficiency and health.

Policy 10.1


Utilize low impact development practices and stormwater system designs that mimic natural hydrologic processes, minimize impacts to natural resources and eliminate pollution to watersheds.

Policy 10.2

Prepare the Environmentally Sensitive Resource Area overlay to protect, conserve and enhance natural areas identified on the Concept Plan. Apply low-density base zoning that allows property owners to cluster density outside the ESRA and transfer to other sites.

Appendix

1. Project Goals
2. Concept Plan Alternatives
3. GIS Analysis Map
4. Job and Housing Estimates

	<p>To: Beaver Creek Road Concept Plan Citizens and Technical Advisory Committees</p> <p>From: Tony Konkol</p> <p>Date: March 13, 2007</p> <p>Subject: Project Goals with Objectives</p>
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The following project goals and supplemental objectives were prepared using the *Ideas we Like*, *Principles of Sustainable Development*, and the Advisory Committees' long-term vision for the project area. This update reflects input by the Citizens and Technical Advisory Committees at their March 8th, 2007 meeting.

The Beaver Creek Road Concept Plan Area will:

Goal

1. Create a **complete community**, in conjunction with the adjacent land uses, that integrates a diverse mix of uses, including housing, services, and public spaces that are necessary to support a thriving employment center;

Objective 1.1

Allow a variety of employment uses that may integrate and utilize the surrounding city and rural economies.

Objective 1.2

Develop plans that consider the existing rural lands and uses around the Urban Growth Boundary.

Objective 1.3

Continue to coordinate with the Oregon City School District and Clackamas Community College to identify partnerships, land needs and programs that would be beneficial to all parties and contribute to the community.

Objective 1.4

Encourage neighborhood-oriented and scaled mixed-use centers that provide goods, services, and housing for local workers and residents of all ages and incomes.

Objective 1.5

Become a model of sustainability that may be implemented throughout the City.

Objective 1.6

Allow the integration of housing and employment uses where practicable.

Objective 1.7

Work with Metro to ensure that there is enough land available within the Beaver Creek Road Study Area to meet the need for employment/industrial development and reduce the jobs to housing imbalance in the sub-region.

2. Be a **model of sustainable design**, development practices, planning, and innovative thinking;

Objective 2.1

Allow a variety of employment uses that may integrate and utilize the surrounding city and rural economies.

Objective 2.2

Develop plans that consider the existing rural lands and uses around the Urban Growth Boundary.

Objective 2.3

Encourage neighborhood-oriented and scaled mixed-use centers that provide goods, services and housing for local workers and residents of all ages and incomes.

Objective 2.4

Encourage environmentally responsible developments that are economically feasible, enhance livability of neighborhoods and enhance the natural environment.

Objective 2.5

Investigate development standards that offer incentives for developments that exceed energy efficiency standards and meets green development requirements and goals.

3. Attract **“green” jobs** that pay a living wage;

Objective 3.1

Allow a variety of employment uses that may integrate and utilize the surrounding city and rural economies.

Objective 3.2

Develop plans that consider the existing rural lands and uses around the Urban Growth Boundary.

Objective 3.3

Encourage neighborhood-oriented and scaled mixed-use centers that provide goods, services and housing for local workers and residents of all ages and incomes.

Objective 3.4

Allow the integration of housing and employment uses where practicable.

Objective 3.5

Work with Metro to ensure that there is enough land available within the Beavercreek Road Study Area to meet the need for employment/industrial development and reduce the jobs to housing imbalance in the sub-region.

Objective 3.6

Create a “brand” for the area that reflects the desire for sustainable development that will serve as the theme to attract and recruit businesses and developers as well as guide the design standards and build-out of the area.

4. Maximize opportunities for **sustainable industries that serve markets beyond the Portland region** and are compatible with the site’s unique characteristics;

Objective 4.1

Create a “brand” for the area that reflects the desire for sustainable development that will serve as the theme to attract and recruit businesses and developers as well as guide the design standards and build-out of the area.

Objective 4.2

Work with Metro to ensure that there is enough land available within the Beavercreek Road Study Area to meet the need for employment/industrial development and reduce the jobs to housing imbalance in the sub-region.

Objective 4.3

Support locally based and founded employers that provide living wages jobs.

Objective 4.4

Support the development of sustainable industries that utilize green design standards and development practices.

5. Incorporate the area’s **natural beauty** into an ecologically compatible built environment;

Objective 5.1

Design the adjacent land-uses to Beavercreek Road in such a manner to ensure that the pedestrian experience is not diminished through the development of fences, parking lots, backs of buildings, or other impediments to pedestrian access and circulation.

Objective 5.2

Allow a variety of employment uses that may integrate and utilize the surrounding city and rural economies.

Objective 5.3

Develop plans that consider the existing rural lands and uses around the Urban Growth Boundary.

Objective 5.4

Work with Metro to ensure that there is enough land available within the Beavercreek Road Study Area to meet the need for employment/industrial development and reduce the jobs to housing imbalance in the sub-region.

6. Provide **multi-modal transportation links** (such as bus routes, trails, bike-ways, etc.) that are connected within the site as well as to the surrounding areas;

Objective 6.1

Provide public connectivity routes for bicycles and pedestrians that encourage non-vehicular trips to employment, retail and recreational areas within the study area and to the communities beyond.

Objective 6.2

Provide an integrated street system that is designed as practicable to minimize the impacts to the environment through the use of green streets, swales and other natural stormwater systems that provide water quality and quantity control and contribute to the natural beauty of the area.

Objective 6.3

Explore local and regional transit opportunities that will increase non-single occupancy vehicle travel.

7. Implement **design solutions along Beavercreek Road** that promote pedestrian safety, control traffic speeds and access, and accommodate projected vehicular demand;

Objective 7.1

Develop and maintain a multi-modal transportation system that is safe for all users and will minimize conflict points between different modes of travel, especially across Beavercreek Road to the existing neighborhoods, Clackamas Community College, Oregon City High School and the Berry Hill Shopping Center.

Objective 7.2

Design the adjacent land-uses to Beavercreek Road in such a manner to ensure that the pedestrian experience is not diminished through the development of fences, parking lots, backs of buildings, or other impediments to pedestrian access and circulation.

8. Promote connections and relationships with **Oregon City High School and Clackamas Community College;**

Objective 8.1

Allow a variety of employment uses that may integrate and utilize the surrounding city and rural economies.

Objective 8.2

Develop plans that consider the existing rural lands and uses around the Urban Growth Boundary.

Objective 8.3

Continue to coordinate with the Oregon City School District and Clackamas Community College to identify partnerships, land needs and programs that would be beneficial to all parties and contribute to the community.

9. Have a **unique sense of place** created by the mix of uses, human scale design, and commitment to sustainability.

Objective 9.1

Provide public connectivity routes for bicycles and pedestrians that encourage non-vehicular trips to employment, retail and recreational areas within the study area and to the communities beyond.

Objective 9.2

Provide an integrated street system that is designed as practicable to minimize the impacts to the environment through the use of green streets, swales and other natural stormwater systems that provide water quality and quantity control and contribute to the natural beauty of the area.

Objective 9.3

Allow a variety of employment uses that may integrate and utilize the surrounding city and rural economies.

Objective 9.4

Develop plans that consider the existing rural lands and uses around the Urban Growth Boundary.

Objective 9.5

Encourage neighborhood-oriented and scaled mixed-use centers that provide goods, services and housing for local workers and residents of all ages and incomes.

Objective 9.6

Allow the integration of housing and employment uses where practicable.

Objective 9.7

Work with Metro to ensure that there is enough land available within the Beavercreek Road Study Area to meet the need for employment/industrial development and reduce the jobs to housing imbalance in the sub-region.

Objective 9.8

Create a “brand” for the area that reflects the desire for sustainable development that will serve as the theme to attract and recruit businesses and developers as well as guide the design standards and build-out of the area.

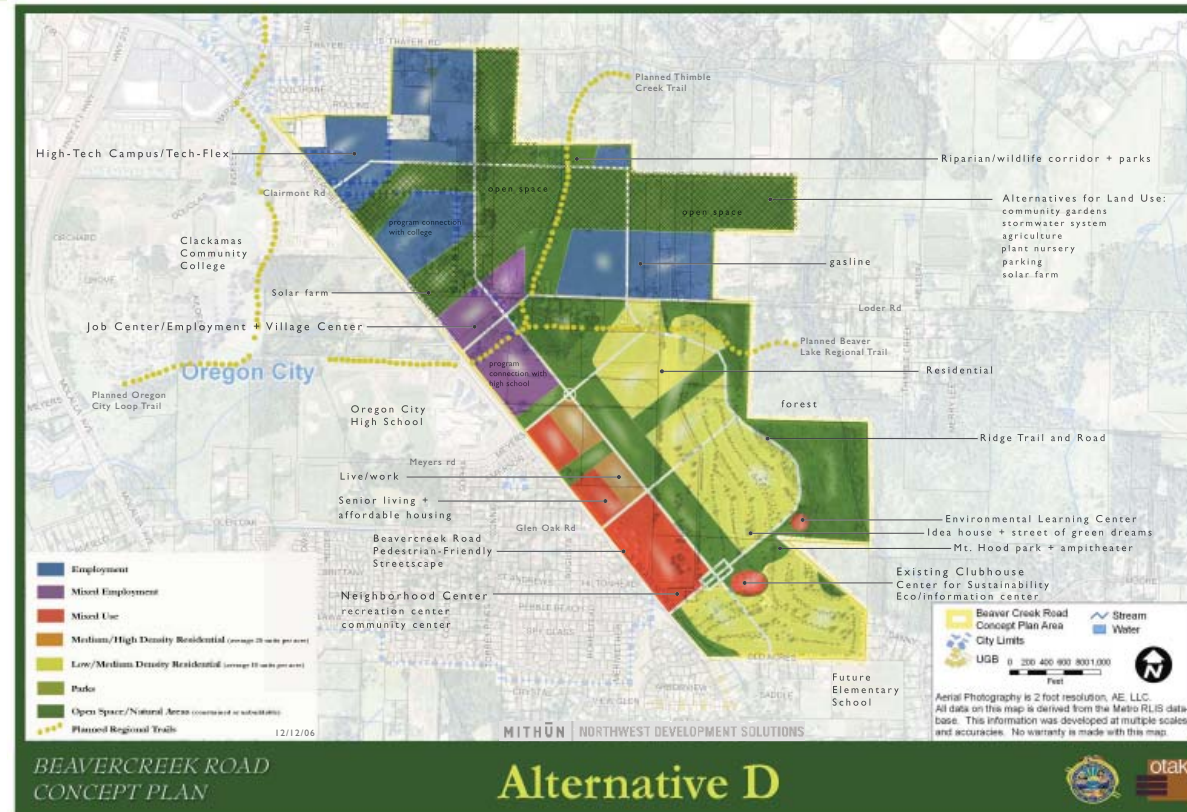
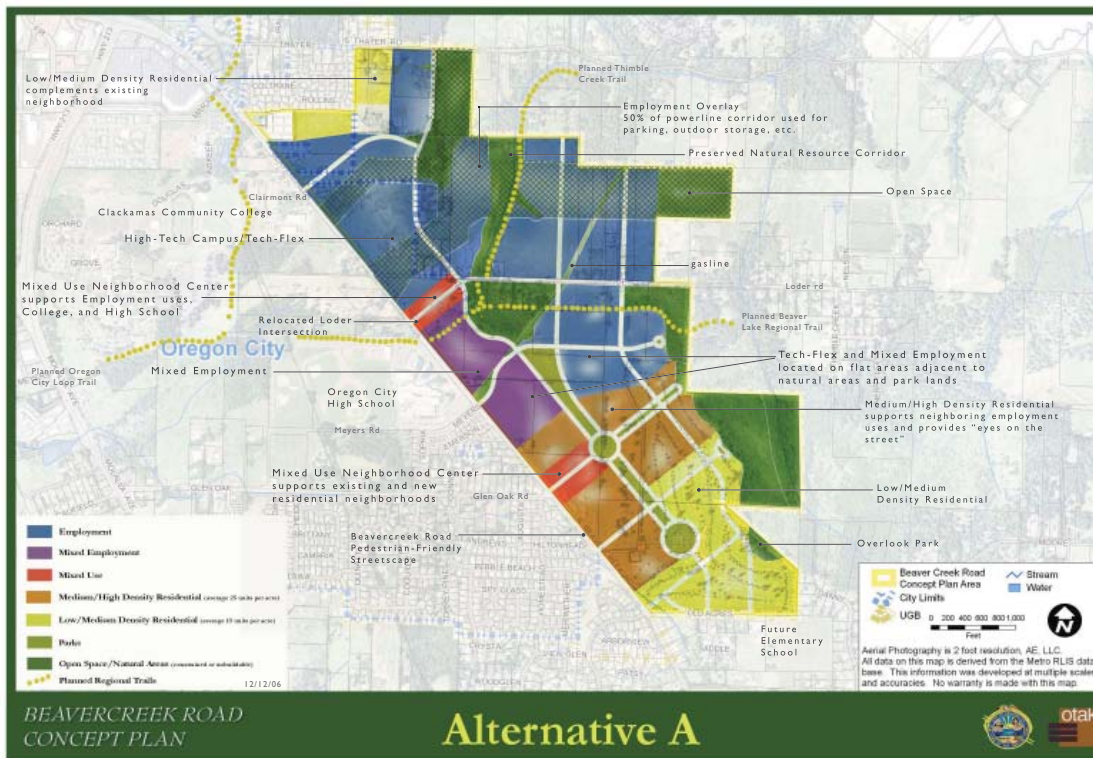
Objective 9.9

Design the adjacent land-uses to Beavercreek Road in such a manner to ensure that the pedestrian experience is not diminished through the development of fences, parking lots, backs of buildings, or other impediments to pedestrian access and circulation.

10. Ecological Health – Manage water resources on site to **eliminate pollution to watersheds** and lessen impact on municipal infrastructure by integrating ecological and man-made systems to maximize function, efficiency and health.

Objective 10.1

Provide an integrated street system that is designed as practicable to minimize the impacts to the environment through the use of green streets, swales and other natural stormwater systems that provide water quality and quantity control and contribute to the natural beauty of the area.



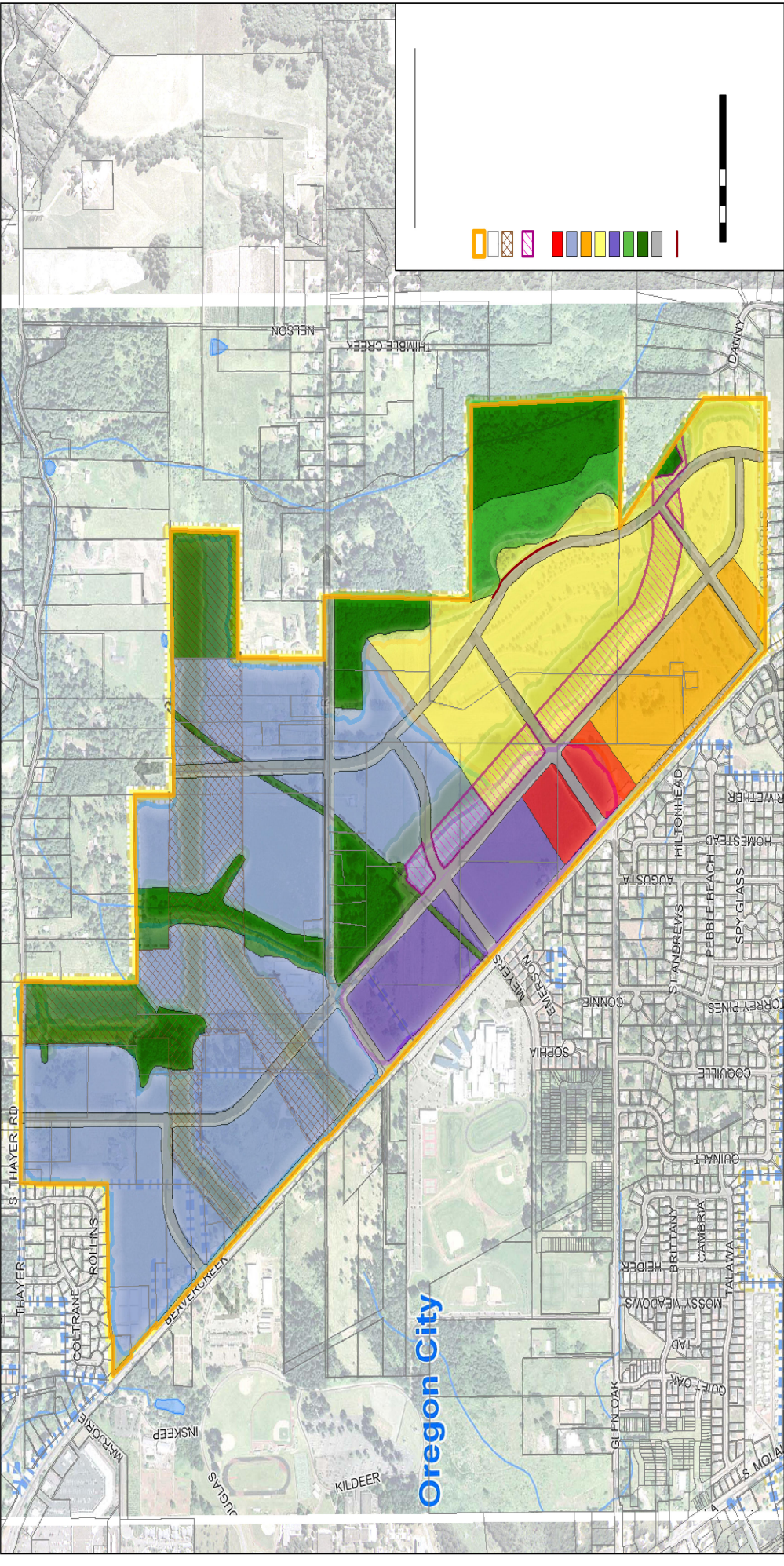


Table 2
Beavercreek Concept Plan Job & Housing Density Assumptions
Revised - 7/10/07

Land Use Category	Hybrid Gross Acres	Hybrid Net Acres*	FAR/Acre**	SF/Job**	# of Jobs***	Avg. Units/Acre	# of Units+
North Employment Campus (adjusted gross acreage)	149	127	0.3	450	3,678		
Mixed Employment Village	26	21	0.44	350	1,139		
Main Street****	10	8	0.44	350	219	25	100
West Mixed Use Neighborhood	22	18			15	22	387
East Mixed Use Neighborhood	77	62			21	8.7	536
Total # of Jobs					5,073		
Total # of Housing Units							1,023
Total Acres of Developed Land++	284	235					
Land Use Category	Plan A Gross Acres	Plan A Net Acres*	FAR/Acre**	SF/Job**	# of Jobs***	Avg. Units/Acre	# of Units+
Employment (adjusted gross acreage)	139	118	0.3	450	3,431		
Mixed Employment	24	20	0.44	350	1,117		
Mixed Use****	10	9	0.44	350	233	25	106
Medium/High Density Residential	50	43			43	25	1,063
Low/Medium Density Residential	53	45			18	10	451
Total # of Jobs					4,841		
Total # of Housing Units							1,619
Total Acres of Developed Land++	276	235					
Land Use Category	Plan D Gross Acres	Plan D Net Acres*	FAR/Acre**	SF/Job**	# of Jobs***	Avg. Units/Acre	# of Units+
Employment (adjusted gross acreage)	84	71	0.3	450	2,073		
Mixed Employment	25	21	0.44	350	1,164		
Mixed Use****	29	25	0.44	350	675	25	308
Medium/High Density Residential	9	8			8	25	191
Low/Medium Density Residential	99	84			34	10	842
Total # of Jobs					3,953		
Total # of Housing Units							1,341
Total Acres of Developed Land+++	246	209					

*For Hybrid - Net acres equals gross acres minus 15% for local roads and easements in Employment. Mixed Employment, Mixed Use, and residential areas assume 20% for local roads and easements

* *Based on Metro 2002-2022 Urban Growth Report: An Employment Land Need Analysis. Includes total on site employment (full and part time). Mixed Employment FAR and job density reflects a mix of office, tech/flex, and ground floor retail.

***Number of Jobs in Employment, Mixed Employment, Mixed Use calculated by multiplying total acres by the FAR; Converting to square feet; and dividing by number of jobs/square foot. Jobs in residential areas (Work at Home Jobs) estimated at 4% (potential could be as high as 15%).

**** Mixed Use land use assumes 50% of acreage devoted to commercial uses and the remaining 50% devoted to vertical mixed use.

+Number of units calculated by multiplying total net acres of residential land use by average units per acre

++Includes 50% of useable power line corridor (26 acres total) as part of developed land (included in Employment land area)

+++Does not include powerline corridor acreage as part of developed land

Table 3
Land Use Metrics/Assumptions - HYBRID
Revised - 7/10/07

Land Use Category (acres)	Hybrid	Alt. A	Alt. D
North Employment Campus (adjusted gross acreage)*	149	139	84
Mixed Employment Village	26	24	25
Main Street	10	10	29
West Mixed Use Neighborhood	22	50	9
East Mixed Use Neighborhood	77	53	99
Total Acres of "built" land use	284	276	246
Other Land Uses (not "built")			
Parks/Open Space/Natural Areas (Total)**	113	132	166
Major ROW+	56	36	30
Existing Uses (unbuildable)	0	7	7
Total Project Area Gross Acres	453	~450	~450

***Adjusted gross acreage** is the sum of 50% of the employment land use shown under the powerline easement plus all other unconstrained employment land use areas. Calculations shown below:

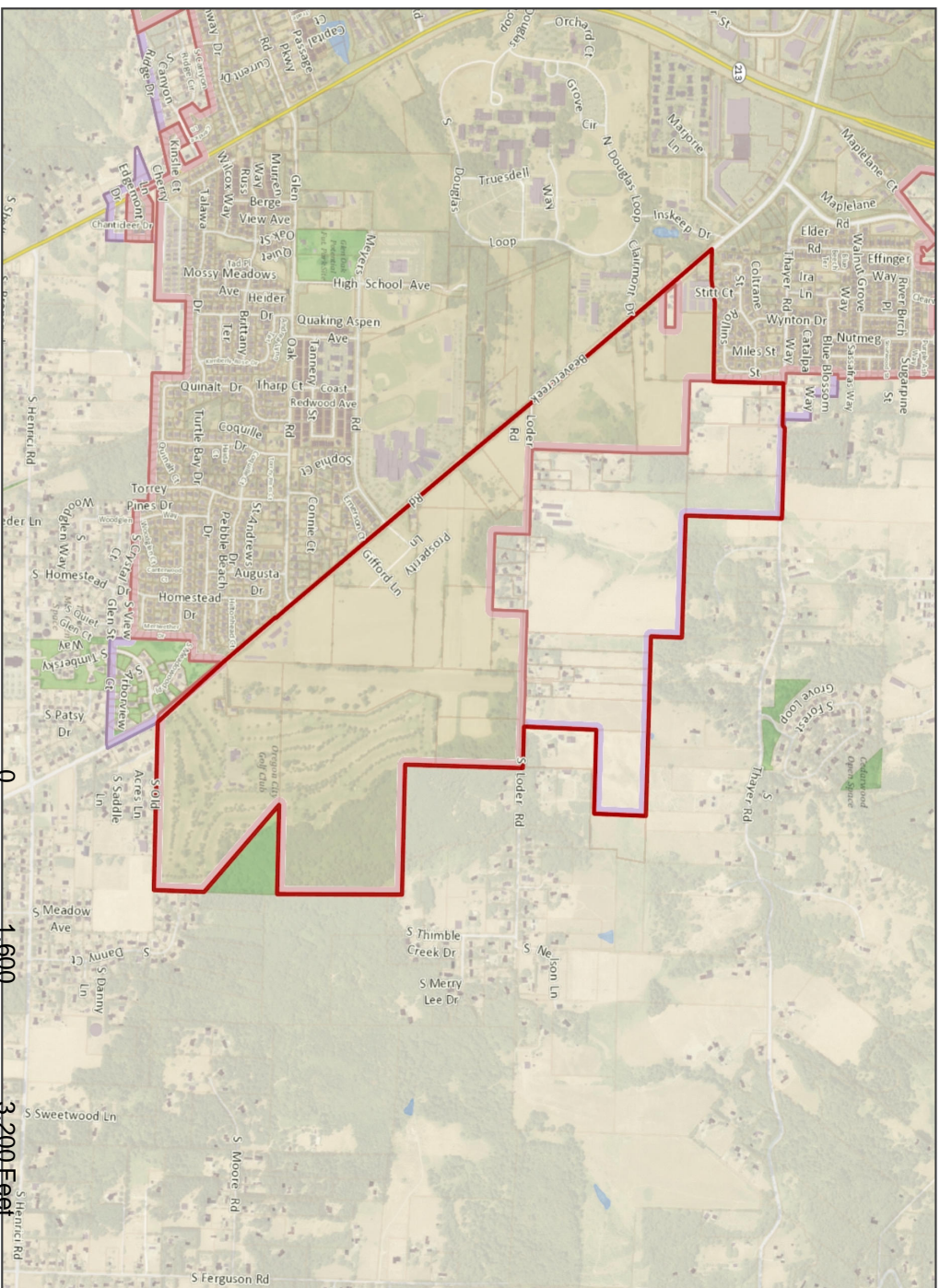
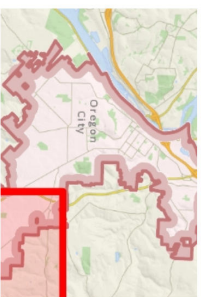
<u>Land Use Category (acres)</u>	<u>Hybrid</u>	<u>Alt. A</u>	<u>Alt. D</u>
Total North Employment Campus	175	166	84
Unconstrained NEC	123	111	84
Employment with powerline overlay	52	55	0
Useable portion of powerline overlay (50%)	26	28	na
North Employment Campus (adjusted gross acreage)*	149	139	84

** Open Space/Natural areas is the sum of all "unbuildable lands" as shown on the *Buildable Lands Map* plus two areas under the powerlines. Calculations shown below.

<u>Open Space/Natural Areas Break-Out</u>	<u>Hybrid</u>	<u>Alt. A</u>	<u>Alt. D</u>
Open Space -Gas Overlay	3	4	4
Open Space - Unbuildable Powerlines***	48	49	0
Environmental Resources/ <i>Buildable Lands Map</i>	61	61	61
Parks	na	12	na
Other Open Space Areas	18	6	101
Open Space/Natural Areas (Total)	130	132	166

*****For Hybrid** - Unbuildable Powerlines area includes 12 acres on east edge of site under powerlines plus 50% of employment area under powerlines (~26 acres) and the PGE parcel (10 acres). **For Alt. A** - Unbuildable Powerlines area includes 12 acres on east edge of site under powerlines and 10 acres of the PGE Parcel and 50% of powerline area (27 acres).

+Major ROW are approximate location & acreage (may be shown as crossing natural resource areas. Actual location and size of ROW will be addressed during development review/master planning). Includes 2 acre adjustment for GIS polygon alignment.



The City of Oregon City makes no representations, express or implied, as to the accuracy, completeness and timeliness of the information displayed. This map is not suitable for legal, engineering, surveying or navigation purposes. Notification of any errors is appreciated.



MEMO

Date: June 26, 2019
To: Laura Terway & Christina Robertson-Gardiner, City of Oregon City
CC: Steve Faust, 3J Consulting
From: Elizabeth Decker, JET Planning
Subject: Beaver Creek Road Concept Plan Map and Code Implementation Project

I. PROJECT DESCRIPTION AND BACKGROUND

I.a. CONCEPT PLAN SUMMARY

The Beaver Creek Road Concept Plan (BRCP) establishes the goal of creating a complete and sustainable community in southeast Oregon City within a 453-acre district along Beaver Creek Road. The district is intended to provide for a mix of uses including an employment campus north of Loder Road, mixed-use districts along Beaver Creek Road, and two mixed-use neighborhoods woven together by open space, trails, a network of green streets, and sustainable development practices. District development will help to provide 1000 to 1,600 diverse housing options and to realize the City's economic development goals, including creation of up to 5,000 family-wage jobs. The five subdistricts that support these development goals include:

- ***North Employment Campus:*** The largest subdistrict, located north of Loder Road and is intended for tech flex and campus industrial uses.
- ***Mixed Employment Village:*** Located along Beaver Creek Road between Meyers Road and Glen Oak Road, and intended for mixed-use, 3-5 story building scale, active street life.
- ***Main Street:*** A node located Beaver Creek Road and Glen Oak Road, intended for mixed-use, local shops and services.
- ***West Mixed-Use Neighborhood:*** Located along Beaver Creek Road south of Glen Oak Road and the Main Street subdistrict, and intended for medium to high density housing and limited community uses.
- ***East Mixed-Use Neighborhood:*** Located in the southeast end of concept plan area, and is intended for low-density residential and green space throughout.

- ***Parks, Open Spaces and Resource Areas:*** Includes a connected system of parks, open spaces and natural areas that link together and link to the environmentally sensitive areas throughout the district, including the undevelopable portion of the powerline overlay.

The Beaver Creek Road Concept Plan was initially adopted in 2008 and re-adopted in 2016, following legal and legislative findings that affirmed the plan's consistency with Metro regional employment goals. (See File No. LE-15-0003.) While approximately half of the district has been annexed to the City, mapping and zoning regulations need to be developed and applied for the annexed areas and the remainder of the district to fully implement the BRCP.

I.b. IMPLEMENTATION PROJECT SUMMARY

Oregon City aims to further implementation of the Beaver Creek Road Concept Plan (BRCP) through comprehensive plan designation and zone mapping, and development code amendments. The specific tasks for this project will be to develop comprehensive plan map and zoning map designations to implement the Beaver Creek Road Concept Plan map, and supporting development code regulations for each implementing zone. The existing Concept Plan map was the guide for mapping implementation. Existing city zoning, bolstered by recent Amendments to the Oregon City Municipal Code (including the Equitable Housing Project recommendations) code amendments, generally lines up with the desired land use concepts within the plan and will facilitate implementation with minor amendments. Additional plan goals beyond land use implementation are outside the scope of this project, including infrastructure, transportation and economic development measures that have already been completed or planned for the concept plan area. Additional items will be pursued separately from this land use implementation project.

I.c. PROJECT PUBLIC ENGAGEMENT

The BRCP implementation project engaged a range of stakeholders in multiple venues and formats over eight months, with each successive round of engagement used to inform project refinements in subsequent phases.

The first round of engagement consisted of four stakeholder interviews with property owners, economic development representatives, and local educational institutions to understand current conditions and priorities for the implementation project. This initial round also included three presentations to the following community groups to update them on the status of the BRCP concept plan and hear their priorities for the implementation process:

- Caulfield Neighborhood Association- January 22, 2019

- The Hamlet of Beavercreek- January 23, 2019
- Beavercreek Blue Ribbon Committee- January 17, 2019

Three public meetings were held at the Oregon City High School, near the concept plan area, and at City Hall during the course of the project to provide information and discussion opportunities on the evolving maps and code amendments:

- Tuesday, January 29, 2019- Oregon City High School Library- 7:00-8:30 PM
- Tuesday, April 9, 2019- Oregon City High School Library- 7:00-8:30 PM
- Monday, June 10, 2019- City Hall Commission Chambers - 5:00-7:00 PM

For all meetings, materials were also available online including comment forms to allow community members to participate virtually if they were not able to attend the meetings in person.

Additional presentations were held at the following City meetings to detail the implementation project elements:

- Citizen Involvement Committee- January 7, 2019
- Transportation Advisory Committee- March 19, 2019

The proposed map and code amendments were discussed at the two work sessions this spring:

- Planning Commission Work Session- May 13, 2019
- City Commission Work Session- June 11, 2019

Throughout the project, ongoing methods used to engage citizens in the process have included:

- Project website with regular updates
(<https://www.orcity.org/Beavercreekconceptplan>)
- Email Updates announcing upcoming meetings and events
- Mailing List
- Public comment tracker, compiling feedback from all engagements with responses from staff, updated throughout the project
- Online comment forms
- Naming survey for renaming the concept plan area
- Notice board posted within the concept plan area

The following meetings are anticipated as of the date of this report as part of the adoption process.

- 1st Planning Commission Hearing: August 12, 2019- 7:00 PM
- City Commission Work Session (Beavercreek Road Street Design): August 13, 2019
- Additional Planning Commission and City Commission public hearings and work sessions to be scheduled.

All meetings will be properly noticed and advertised through the project's mailing list and website.

II. PROPOSED AMENDMENTS

II.a. AMENDMENT SUMMARY

The implementation project includes map and text amendments consistent with BRCP including:

1. *Comprehensive plan text amendments:* Proposed clarification in the Parks Master Plan (ancillary document to the Comprehensive Plan) as well as amendments to the Transportation System Plan (ancillary document to the Comprehensive Plan) as needed.
2. *Comprehensive plan map amendments:* Proposed amendments to the comprehensive plan map implement the five subdistricts identified in the BRCP consistent with the concept plan maps throughout the concept plan area.
3. *Zoning map amendments:* Proposed amendments to the zoning map implement the five subdistricts consistent with the concept plan and comprehensive plan designations for properties within the concept plan area that have been annexed into the city limits. Zoning for properties within the Concept Plan boundary but not annexed into the City will be applied at the time of annexation, consistent with the adopted comprehensive plan map.
4. *Zoning text amendments:* Code amendments to the Oregon City Municipal Code include geographically specific provisions to supplement the base zoning district provisions to fully implement the concept plan goals for each subdistrict. Limited amendments to subdivision and site plan review standards are also proposed to ensure concept plan standards are implemented at the time of development.

The BRCP subdistricts are proposed to be implemented with existing city comprehensive plan designations and zoning districts for proposed maps, with proposed code amendments building on existing district standards.

<i>Subdistrict</i>	<i>Comprehensive plan designation</i>	<i>Zone</i>
North Employment Campus	Industrial (I)	Campus Industrial (CI)
Mixed Employment Village	Mixed-Use Corridor (MUC)	Mixed-Use Corridor (MUC-2)
Main Street	Mixed-Use Corridor (MUC)	Neighborhood Commercial (NC)
West Mixed-Use Neighborhood	High-Density Residential (HDR)	High-Density Residential (R-2)
East Mixed-Use Neighborhood	Medium-Density Residential (MDR)	Medium-Density Residential (R-5)
Environmentally Sensitive Restoration Area		Natural Resources Overlay District (NROD) Geological Hazard Overlay District (GHOD)

II.b. SUMMARY OF ZONING TEXT AMENDMENTS

The proposed code amendments specific to each subdistrict are described below, and supplement rather than supplant the base zone standards.

OCMC 16.08, Land Divisions – Process and Standards

- Proposed code amendments include additional public park requirements or fee-in-lieu option for certain properties to ensure land for the South Central Open Space Network is reserved and dedicated to the city at the time of residential subdivisions. This is expected to largely apply to development in the R-5 district.

OCMC 17.10, R-5 Medium Density Residential District (East Mixed-Use Neighborhood subdistrict)

- No changes are proposed to the mix of uses or dimensional standards in the zone beyond those proposed in the Amendments to the Oregon City Municipal Code (including the Equitable Housing Project recommendations).

- Standards for the Low-Impact Conservation Area implement the plan goals for the area upslope of Thimble Creek, on the eastern edge of the Beavercreek Road district. The proposed standards limit development to two units per acre, require open space preservation and restoration, and require view corridors to preserve views.
- A 40-foot perimeter buffer is proposed along the southern edge of the district including landscaping, setbacks and fencing, to manage the transition to lower-density residential development outside City limits along Old Acres Lane to the south.

OCMC 17.12, R-2 High Density Residential District (West Mixed-Use Neighborhood subdistrict)

- Allows additional uses consistent with the Concept Plan include live/work dwellings and limited commercial/mixed-use spaces.
- Provides up to a 20% density bonus for development incorporating sustainability features.
- Additional changes in Site Plan and Design Review standards to add requirement for additional public park dedication or fee-in-lieu, consistent with requirement for new subdivisions.

OCMC 17.24, MC Neighborhood Commercial District (Main Street subdistrict)

- Limits uses to a 10,000 SF building footprint to encourage pedestrian-scale, main street businesses. Limits residential uses to 50% of the project floor area, and prohibits ground-floor residential uses within 150 feet of Glen Oak Road (which will be the “main street.”) Adds a new use category for artisan and specialty goods production to allow limited manufacturing type uses.
- Increase dimensional standards to match scale proposed in the Concept Plan, including a five-story height limit and 0.5 FAR minimum.
- Improves building presence and interaction along the street by requiring parking to be located behind building facades.

OCMC 17.29, MUC Mixed-Use Corridor District (Mixed Employment Village subdistrict)

- Light industrial uses are permitted to implement the employment aspect of the vision for this subdistrict. Retail and service uses, including food service, are limited to 20% of a site to maintain the focus on employment uses generating family-wage jobs. Residential uses are limited to upper stories only.

- One parcel with an in-progress residential development is permitted outright, to avoid creating a nonconforming use.
- An additional dimensional standard implements a minimum 0.35 FAR for new development to ensure efficient use of land.

OCMC 17.31, CI Campus Industrial District (North Employment Campus subdistrict)

- Retail and professional service uses are limited consistent with Metro Title 4 requirements to preserve land for industrial uses. Offices are permitted consistent with uses outlined in the Concept Plan, whereas distribution and warehouse uses are prohibited because they create relatively few jobs per acre inconsistent with the plan goals.
- Several parcels with existing single-family residential development are permitted outright, to avoid creating nonconforming uses. (These parcels are outside of Title 4 lands, so there is no conflict with employment requirements.)
- Additional standards require landscaping, berms and fences within the required 25-foot transition area between industrial and residential uses.
- Outdoor storage is limited to a maximum of 25% of the developable area to avoid inefficient use of land that does not support employment plan goals.
- A minimum 30-foot open space and trail corridor is required along the powerline corridor. Additional parks, trails, urban agriculture and community garden uses are permitted consistent with the plan goals for uses within the powerline easement.
- Sustainable development features are required for all development to implement the plan's sustainability goals.

OCMC 17.44, US - Geologic Hazards and OCMC 17.49 - Natural Resources Overlay District

- No changes are proposed to the geologic hazard or natural Resources Overlay District standards for this district; resource areas within the concept plan area will be protected consistent with existing standards.

OCMC 17.62, Site Plan and Design Review

- Proposed code amendments include additional public park requirements or fee-in-lieu option to ensure land for the South Central Open Space Network is reserved and dedicated to the city at the time of residential subdivisions.

This is intended to apply to any residential development in the R-2 or the mixed-use districts that does not get developed through subdivision.

III. COMPLIANCE

III.a. CHAPTER 17.68 ZONING CHANGES AND AMENDMENTS

17.68.010 Initiation of the amendment.

A text amendment to this title or the comprehensive plan, or an amendment to the zoning map or the comprehensive plan map, may be initiated by:

A. A resolution by the commission;

B. An official proposal by the planning commission;

C. An application to the planning division presented on forms and accompanied by information prescribed by the planning commission.

All requests for amendment or change in this title shall be referred to the planning commission.

Response: This request is for amendments to the zoning map, amendments to the comprehensive plan map, and text amendments to the Oregon City Municipal Code and was initiated by the Planning Division.

17.68.020 Criteria.

The criteria for a zone change are set forth as follows:

A. The proposal shall be consistent with the goals and policies of the comprehensive plan.

Response: Consistency with the Oregon City Comprehensive Plan (OCCP) Goals and Policies follow starting on page 11.

B. That public facilities and services (water, sewer, storm drainage, transportation, schools, police and fire protection) are presently capable of supporting the uses allowed by the zone, or can be made available prior to issuing a certificate of occupancy. Service shall be sufficient to support the range of uses and development allowed by the zone.

Response: The capacity of the respective public facilities and services to support the proposal is addressed below.

Water and Sewer Capacity

Please refer to the attached memorandum from 3J Consulting. The memorandum provides an assessment of the water and sanitary sewer system implications of the map and code amendments proposed with the BRCP implementation project.

Wastewater treatment is provided by the Tri-City Sewer District, which the project contacted for comment.

The 3J memorandum concludes that development of 1,105 dwelling units and 5,734 jobs within the BRCP area have been adequately planned for in infrastructure master plans and sufficient capacity will be available to serve development. The Sanitary Sewer (2014) and Water Distribution (2012) Master Plans were all created subsequent to initial adoption of the Beavercreek Road Concept Plan (2008). Each master plan incorporated the BRCP area into future capital improvement projections and will ensure adequate water and sewer capacity is developed.

South Fork Water Board (SFWB), Oregon City's water provider was contacted for comment.

Schools

The proposal was sent to the Oregon City School District (OCSD) for comment.

Police and Fire Protection

Oregon City Police Department and Clackamas Fire District capacity would not be affected by the proposal, since the proposal does not change existing service areas. They have been contacted for comment.

Wastewater Treatment

Tri-City Sewer District was contacted for comment.

Storm Drainage

This proposal does not change the city's adopted policies and technical documents related to storm water management and erosion control. The Draft 2019 Oregon City Stormwater Master Plan includes the BRCP area, which is part of the Newell Creek Basin, but does not identify any capital improvement projects specifically needed to serve the BRCP district. The Plan states that the eventual layout of the stormwater conveyance systems and management facilities will be crafted through the preliminary and final design process for development projects within the BRCP district.

Transportation

Impacts to the transportation system are addressed under (C) below.

Based on the various analyses provided, public facilities and services are presently capable of supporting the uses allowed by the proposal, or can be made available prior to issuing a certificate of occupancy. **This criterion is met.**

C. The land uses authorized by the proposal are consistent with the existing or planned function, capacity and level of service of the transportation system serving the proposed zoning district.

Response: The impacts of the proposal on the transportation system were reviewed by a transportation consultant, DKS. Please refer to the DLS analysis and memorandum which is attached to this narrative. The memorandum provides an assessment of the transportation implications of the project proposal. The memorandum assesses whether the proposed amendments trigger a finding of significant effect that would require further analysis to determine transportation impacts under OAR 660-12-0060 (Transportation Planning Rule or “TPR”).

The memo concludes that the proposed map and code amendments do not result in a significant change in the number of trips resulting from the dwelling units and jobs anticipated within the BRCP district compared to the traffic anticipated and planned for in Oregon City’s Transportation System Plan (TSP) adopted in 2013. Therefore, the proposed amendments do not have a significant effect on the transportation system and that the city may adopt findings to that effect when adopting the proposed amendments. **This criterion is met.**

D. Statewide planning goals shall be addressed if the comprehensive plan does not contain specific policies or provisions which control the amendment.

Response: The acknowledged Oregon City Comprehensive Plan (OCCP) addresses all of the applicable Statewide Planning goals unless the Statewide Goal is inapplicable. The relevant sections of the OCCP implemented by this proposal, and the applicable Statewide Goals, is indicated below.

Statewide Planning Goal	OCCP Section / Goal(s) Implemented by this Proposal
1: Citizen Involvement	1. Citizen Involvement / Goals 1.2, 1.4
2: Land Use Planning	2. Land Use Planning / Goals 2.1, 2.3, 2.4, 2.5, 2.6, 2.7
3: Agricultural Lands	3. Not applicable within UGB
4: Forest Lands	4. Not applicable within UGB
5: Natural Resources, Scenic and Historic Areas, and Open Spaces	5. Open Spaces, Scenic and Historic Areas, and Natural Resources / Goals 5.1, 5.4
6: Air, Water and Land Resources Quality	6. Quality of Air, Water, and Land Resources / Goals 6.1, 6.2
7: Areas Subject to Natural Hazards	7. Natural Hazards / Goal 7.1
8: Recreation Needs	8. Parks and Recreation / Goal 8.1,

9: Economic Development	9. Economic Development / Goals 9.1, 9.3, 9.5, 9.7, 9.8
10: Housing	10. Housing / Goals 10.1, 10.2
11: Public Facilities and Services.	11. Public Facilities / Goals 11.1, 11.6, 11.7
12: Transportation	12. Transportation / Goal 12.1
13: Energy Conservation	13. Energy Conservation / Goal 13.1
14: Urbanization	14. Urbanization / Goal 14.3
15: Willamette River Greenway	Not affected by this proposal.
16: Estuarine Resources	Not applicable.
17: Coastal Shorelands	Not applicable.
18: Beaches and Dunes	Not applicable.
19: Ocean Resources	Not applicable.

Detailed responses to the OCCP goals and policies are provided in Section III.b below.

III.b. OREGON CITY COMPREHENSIVE PLAN GOALS AND POLICIES

Goal 1.2 Community and Comprehensive Planning

Ensure that citizens, neighborhood groups, and affected property owners are involved in all phases of the comprehensive planning program.

Policy 1.2.1

Encourage citizens to participate in appropriate government functions and land-use planning.

Goal 1.4 Community Involvement

Provide complete information for individuals, groups, and communities to participate in public policy planning and implementation of policies.

Policy 1.4.1

Notify citizens about community involvement opportunities when they occur.

Response: The proposal is consistent with these Goals and Policies. The project provided numerous opportunities for citizen involvement, including engagement with the Citizen Involvement Committee, the Caufield Neighborhood Association, property owners, and other stakeholders through multiple avenues throughout the eight-month project planning process with multiple notification and participation options provided. See Section I.c for full summary of citizen involvement efforts.

2.1 Efficient Use of Land

Ensure that property planned for residential, commercial, office, and industrial uses is used efficiently and that land is developed following principles of sustainable development.

Response: The proposal maps and supplements existing zoning district standards for the R-5, R-2, NC, MUC-II, and CI zones that have been found to support efficient and sustainable development. The BRCP envisions the area developed with vibrant, walkable, amenity rich neighborhoods with active community centers, as mapped and implemented by this proposal. The proposed code amendments further support efficient land use by providing residential density bonuses, FAR minimums for mixed-use development, and requiring sustainable design features for industrial development. **The proposal is consistent with this Goal.**

Policy 2.1.1

Create incentives for new development to use land more efficiently, such as by having minimum floor area ratios and maximums for parking and setbacks.

Response: The proposed code amendments create additional incentives for efficient land use in the BRCP district beyond the existing code standards, including higher minimum FARs for development in the two mixed-use zones and reduced setbacks and landscaping area for the NC zone applied to the Main Street subdistrict. The OCMC already includes parking maximums in OCMC 17.52.020. **The proposal is consistent with this Policy.**

Policy 2.1.2

Encourage the vertical and horizontal mixing of different land-use types in selected areas of the city where compatible uses can be designed to reduce the overall need for parking, create vibrant urban areas, reduce reliance on private automobiles, create more business opportunities and achieve better places to live.

Response: The proposed map amendments apply two existing mixed-use zones with the BRCP area, the MUC-II and NC zones. In addition to the mix of office, commercial and residential uses allowed in the base zones, the proposed code amendments expand the mix of uses including allowing light manufacturing uses in the MUC-II zone. The proposed code amendments limit the scale and percentages of different categories of uses, including limiting residential uses to upper stories or ground-floor uses set back a minimum distance from the main roadways, to provide for a greater mix of uses. The proposed code amendments also introduce opportunities for small-scale commercial uses in the R-2 zone for additional opportunities for mixed-use development. **The proposal is consistent with this Policy.**

Goal 2.3 Corridors

Focus transit-oriented, higher intensity, mixed-use development along selected transit corridors.

Response: The proposed map amendments apply two existing mixed-use zones with the BRCP area, the MUC-II and NC zones, along Beaver Creek Road, which has potential to be a future transit corridor as development increases potential ridership numbers. The higher-intensity residential development zoned R-2 is also located along Beaver Creek Road, compared to medium-density residential areas zoned R-5 located further east away from major roads. In addition, the site is near the Clackamas Community College which has a transit center for Tri-Met. **The proposal is consistent with this Goal.**

Policy 2.4.2

Strive to establish facilities and land uses in every neighborhood that help give vibrancy, a sense of place, and a feeling of uniqueness; such as activity centers and points of interest.

Response: The essence of the BRCP is to establish a district with interconnected, vibrant neighborhoods. The proposed map amendments support a mix of uses throughout the district, included a district focal point in the Main Street subdistrict zoned NC that will serve as the hub for the district's neighborhoods. The proposed code amendments also support development of smaller-scale activity centers throughout the district, such as permitting small-scale commercial uses with the East Mixed-Use Neighborhood zoned R-2 and supporting creation of the South-Central Open Space Network through required parkland dedications. **The proposal is consistent with this Policy.**

Policy 2.4.3

Promote connectivity between neighborhoods and neighborhood commercial centers through a variety of transportation modes.

Response: The BRCP plans for multimodal transportation networks throughout the district, as supported by the proposed map and code amendments. The proposed code amendments support creation of the South-Central Open Space Network through required parkland dedications, which will form a linear park and multimodal trail connecting multiple subdistricts. **The proposal is consistent with this Policy.**

Goal 2.5 Retail and Neighborhood Commercial

Encourage the provision of appropriately scaled services to neighborhoods.

Response: The map amendments, consistent with the BRCP map, provide for a Main Street subdistrict zoned NC in close proximity to the residential East and West Mixed-Use Neighborhoods. In addition, the proposed code amendments add opportunities to integrate small-scale commercial uses in the West Mixed-Use Neighborhood zoned R-2. **The proposal is consistent with this Goal.**

Policy 2.5.4

Encourage the development of successful commercial areas organized as centers surrounded by higher density housing and office uses, rather than as commercial strips adjacent to low-density housing.

Response: The map amendments, consistent with the BRCP map, provide for a Main Street subdistrict zoned NC in close proximity to the higher-density West Mixed-Use Neighborhood zoned R-2 and the Mixed Employment Village subdistrict zoned MUC-II that will support office uses. There are no commercial strips proposed adjacent to lower-density housing in the East Mixed-Use Neighborhood zoned R-5. **The proposal is consistent with this Policy.**

Policy 2.5.5

Encourage commercial and industrial development that enhances livability of neighborhoods through the design of attractive LEEDTM-certified buildings and environmentally responsible landscaping that uses native vegetation wherever possible, and by ensuring that development is screened and buffered from adjoining residential neighborhoods and access is provided by a variety of transportation modes.

Response: The proposed code amendments include requirements for sustainable design features for industrial development within the North Employment Campus zoned CI; the menu of features includes LEEDTM-certified buildings and use of native vegetation. The proposed code amendments also provide for an enhanced landscaping buffer incorporating berms and fencing between the industrial subdistrict and adjacent residential development in the East Mixed-Use Neighborhood. The BRCP includes plans for a multimodal transportation network that will be built out as development occurs. **The proposal is consistent with this Policy.**

Goal 2.6 Industrial Land Development

Ensure an adequate supply of land for major industrial employers with family-wage jobs.

Response: The map amendments designate 236.1 gross acres, estimated at 132.1 net acres for Industrial designation and Campus Industrial zoning; the North Employment Campus is the largest of all the BRCP subdistricts. All Metro Title 4

land protected for employment use has been designated and zoned CI. The existing CI zone allows a range of uses that support family-wage jobs, such as light manufacturing; the proposed code amendments further protect job generation potential by limiting the amount of site area that can be used for outdoor storage areas and prohibiting distribution and warehouse uses, which typically do not generate significant job opportunities. **The proposal is consistent with this Goal.**

Policy 2.6.2

Ensure that land zoned or planned for industrial use is used for industrial purposes, and that exceptions are allowed only where some other use supports industrial development. New non-industrial uses should especially be restricted in already developed, active industrial sites.

Response: The map amendments ensure that land planned for industrial use is protected for industrial purposes by zoning it CI. The CI zoning code standards limit non-industrial uses, and the proposed code amendments further limit the size of any supporting retail or office to 5,000 SF per establishment or 20,000 per development. Existing residential uses on a handful of parcels within the North Employment Campus are permitted outright, rather than rendered nonconforming uses, but no new residential uses are permitted. **The proposal is consistent with this Policy.**

Policy 2.6.3

Protect the city's supply of undeveloped and underdeveloped land zoned for industrial uses by limiting non-industrial community uses, such as schools, parks, and churches on such properties and by limiting larger commercial uses within those areas.

Response: The CI zoning code standards already prohibit schools and churches; parks, trails and urban agriculture uses are proposed as permitted uses in the code amendments for the North Employment Campus subdistrict, intended to apply within the powerline easement areas that would otherwise be undevelopable for industrial use. The proposed code amendments limit the size of any supporting commercial use to 5,000 SF per establishment or 20,000 per development. **The proposal is consistent with this Policy.**

Policy 2.6.4

Protect existing and planned undeveloped and underdeveloped industrial lands from incompatible land uses, and minimize deterrents to desired industrial development.

Response: Much of the North Employment Campus industrial lands are currently undeveloped. The map amendments applying the CI zone will protect these lands from incompatible development through existing CI use standards. The CI zoning

code standards limit non-industrial uses, and the proposed code amendments further limit the size of any supporting retail or office to 5,000 SF per establishment or 20,000 per development. Existing residential uses on a handful parcels within the North Employment Campus are permitted outright, rather than rendered nonconforming uses, but no new residential uses are permitted. The CI zoning code standards also prohibit schools and churches; parks, trails and urban agriculture uses are proposed as permitted uses in the code amendments for the North Employment Campus subdistrict, intended to apply within the powerline easement areas that would otherwise be undevelopable for industrial use. **The proposal is consistent with this Policy.**

Policy 2.6.5

Ensure that land-use patterns create opportunities for citizens to live closer to their workplace.

Response: A central feature of the BRCP is the integration of residential and employment opportunities to create possibilities to live, work and play in the district. The proposed map amendments will create residential and employment districts in close proximity, including two mixed-use districts with both residential and employment opportunities. **The proposal is consistent with this Policy.**

Policy 2.6.6

Identify industrial uses that could partner with Clackamas Community College as training centers and future employers of students graduating from CCC.

Response: CCC was identified as a stakeholder in the implementation project, and was engaged in the map and code development. The proximity of the North Employment Campus and the CCC campus create an exciting opportunity for future industrial developments in the BRCP area that partner with CCC as training centers and future employers. The existing CI use standards permit a wide range of industrial uses, including light manufacturing and research and development, that could accommodate future industrial uses within the BRCP district. **The proposal is consistent with this Policy.**

Policy 2.6.7

Establish priorities to ensure that adequate public facilities are available to support the desired industrial development.

Response: Public facility master planning has been completed for the district, and planned water, sewer, stormwater, and transportation facilities have been shown to support the full 5,734 jobs projected with this implementation project. See response to approval criteria 17.68.020.B and C in Section III.a. All proposed industrial

development will be reviewed through the Site Plan and Design Review process in OCMC 17.62 that includes a criteria for approval for any new development that public facilities are adequate to support the proposal. **The proposal is consistent with this Policy.**

Policy 2.6.8

Require lands east of Clackamas Community College that are designated as Future Urban Holding to be the subject of concept plans, which if approved as an amendment to the Comprehensive Plan, would guide zoning designations. The majority of these lands should be designated in a manner that encourages family-wage jobs in order to generate new jobs and move towards meeting the city's employment goals.

Response: The lands east of CCC have been incorporated into the BRCP and envisioned for industrial development that encourages family-wage jobs. The proposed map amendments, guided by the approved concept plan, designate this area for Industrial designation and Campus Industrial zoning. The existing CI zone allows a range of uses that support family-wage jobs, such as light manufacturing; the proposed code amendments further protect job generation potential by limiting the amount of site area that can be used for outdoor storage areas and prohibiting distribution and warehouse uses, which typically do not generate significant job opportunities. **The proposal is consistent with this Policy.**

Goal 2.7 Oregon City Comprehensive Plan Land-Use Map

Maintain the Oregon City Comprehensive Plan Land-Use Map as the official long-range planning guide for land-use development of the city by type, density and location.

Response: The proposal includes amendments to the official Comprehensive Plan Land-Use Map as part of on-going maintenance to update designations for the BRCP area. **The proposal is consistent with this Goal.**

Policy 2.7.2

Use the following 11 land-use classifications on the Oregon City Comprehensive Plan Land-Use Map to determine the zoning classifications that may be applied to parcels:

- *Low Density Residential (LR)*
- *Medium Density Residential (MR)*
- *High Density Residential (HR)*
- *Commercial (C)*
- *Mixed Use Corridor (MUC)*
- *Mixed Use Employment (MUE)*

- *Mixed Use Downtown (MUD)*
- *Industrial (I)*
- *Public and Quasi-Public (QP)*
- *Parks (P)*
- *Future Urban Holding (FUH)*

Response: The proposed comprehensive plan map amendments apply the Medium Density Residential, High Density Residential, Mixed Use Corridor, and Industrial designations to the BRCP area, with zoning classifications that are consistent with these designations. **The proposal is consistent with this Policy.**

Goal 5.1 Open Space

Establish an open space system that conserves fish and wildlife habitat and provides recreational opportunities, scenic vistas, access to nature and other community benefits.

Response: The BRCP prioritizes an open space network that preserves identified environmental resource areas, parks, trails, and viewpoints, including the South-Central Open Space Network and the Low Impact Conservation Area upslope of Thimble Creek on the eastern edge of the district. The map amendments will include mapping and applying the Natural Resources Overlay District (NROD) – OCMC 17.49 and Geologic Hazards – OCMC 17.44 to habitat areas. The proposed code amendments will create the South-Central Open Space Network through required parkland dedication at the time of development, protect trail corridors throughout the district’s open space system by requiring dedication of easements at the time of development, and protect the Low Impact Conservation Area by limiting development to two units per acre and protecting view corridors. **The proposal is consistent with this Goal.**

Policy 5.1.1

Conserve open space along creeks, urban drainage ways, steep hillsides, and throughout Newell Creek Canyon.

Response: The existing Natural Resources Overlay District (NROD) will be applied to all riparian corridors and the Geologic Hazards standards will be applied to all steep hillsides to conserve those areas. **The proposal is consistent with this Policy.**

Goal 5.4 Natural Resources

Identify and seek strategies to conserve and restore Oregon City’s natural resources, including air, surface and subsurface water, geologic features, soils, vegetation, and fish and wildlife, in order to sustain quality of life for current and future citizens and visitors, and the long-term viability of the ecological systems.

Response: The proposed amendments do not include any changes to OCMC 17.44, Natural Resources Overlay District, or to OCMC 17.49 – Geologic Hazards. These acknowledged codes are intended to conserve, protect and restore inventoried natural resources within the City’s Urban Growth Boundary. **The proposal is consistent with this policy.**

Policy 5.4.16

Protect surfacewater quality by:

- *providing a vegetated corridor to separate protected water features from development*
- *maintaining or reducing stream temperatures with vegetative shading*
- *minimizing erosion and nutrient and pollutant loading into water*
- *providing infiltration and natural water purification by percolation through soil and vegetation*

Response: The proposed amendments do not include any changes to OCMC 17.44, Natural Resources Overlay District, which provides for a vegetated corridor and shading along street corridors, or to the City’s recently adopted stormwater and erosion control standards, design manuals or review processes. **The proposal is consistent with this policy.**

Goal 6.1 Air Quality

Promote the conservation, protection and improvement of the quality of the air in Oregon City.

Response: The proposed amendments will not affect any codes or policies that implement Goal 6. The City’s overlay districts, such as the Natural Resource Overlay District, Flood Management Overlay, and Geologic Hazards Overlay will apply regardless of the proposed changes. All engineering standards and building code standards for storm drainage, grading, erosion control, water quality facilities will continue to apply to development. Oregon Dept. of Environmental Quality (DEQ) air and water quality permits are required separately for new development. **The proposal is consistent with this Goal.**

Policy 6.1.2

Ensure that development practices comply with or exceed regional, state, and federal standards for air quality.

Response: Oregon Dept. of Environmental Quality (DEQ) air and water quality permits are required separately for new development. Oregon City planning and

engineering staff are included in the coordination of these permits prior to issuance by DEQ. **The proposal is consistent with this Policy.**

Goal 6.2 Water Quality

Control erosion and sedimentation associated with construction and development activities to protect water quality.

Response: Oregon Dept. of Environmental Quality (DEQ) air and water quality permits are required separately for new development. Oregon City planning and engineering staff are included in the coordination of these permits prior to issuance by DEQ. **The proposal is consistent with this Policy.**

Policy 6.2.1

Prevent erosion and restrict the discharge of sediments into surface- and groundwater by requiring erosion prevention measures and sediment control practices.

Response: All engineering standards and building code standards for storm drainage, grading, erosion control, and water quality facilities will continue to apply to development. **The proposal is consistent with this Policy.**

Policy 6.2.2

Where feasible, use open, naturally vegetated drainage ways to reduce stormwater and improve water quality.

Response: All engineering standards and building code standards for storm drainage, grading, erosion control, and water quality facilities will continue to apply to development. **The proposal is consistent with this policy.**

Goal 7.1

Natural Hazards Protect life and reduce property loss from the destruction associated with natural hazards.

Response: Development within the Natural Resources Overlay District and Geologic Hazards Overlay District (which includes sloped and historic landslide areas) is limited by development standards in the Municipal Code to protect the public.

Policy 7.1.1 Limit loss of life and damage to property from natural hazards by regulating or prohibiting development in areas of known or potential hazards.

Response: Development within the Natural Resources Overlay District and Geologic Hazards Overlay District (which includes sloped and historic landslide areas) is limited by development standards in the Municipal Code to protect the public.

8.1 Developing Oregon City's Park and Recreation System

Maintain and enhance the existing park and recreation system while planning for future expansion to meet residential growth.

Response: The BRCP prioritizes a network of parks, trails, and open spaces, including the South-Central Open Space Network. The proposed code amendments will support creation of the South-Central Open Space Network through required parkland dedication at the time of development and protect trail corridors throughout the district's open space system by requiring dedication of easements at the time of development. **The proposal is consistent with this Goal.**

Policy 8.1.1

Provide an active neighborhood park-type facility and community park-type facility within a reasonable distance from residences, as defined by the Oregon City Park and Recreation Master Plan, to residents of Oregon City.

Response: The South-Central Open Space Network will create park facilities within proposed neighborhoods; all residences will be within approximately 1/4 mile of the network, which will include multiple elements including features similar to a neighborhood park-type facility and a multipurpose trail. The proposed code amendments will create the South-Central Open Space Network through required parkland dedication at the time of development. **The proposal is consistent with this Policy.**

Policy 8.1.2

When property adjacent to an existing neighborhood or community park becomes available, consider adding property to the park and developing it to meet the current needs of existing neighborhoods.

Response: There are no existing parks in the BRCP area, however, future park facilities in the South-Central Open Space Network will be expanded over time as the properties in the district are developed. The proposed code amendments will create the South-Central Open Space Network through required parkland dedication at the time of development, and include provisions for dedication of land within the mapped South-Central Open Space Network to allow the facility to expand and maintain connectivity throughout the district. **The proposal is consistent with this Policy.**

Policy 8.1.5

Identify and construct a network of off-street trails throughout the city for walking and jogging.

Response: The BRCP identifies a network of off-street trails including regional trails throughout the district. The proposed code amendments will protect identified trail corridors by requiring dedication of easements at the time of development. **The proposal is consistent with this Goal.**

Policy 8.1.9

Emphasize retaining natural conditions and the natural environment in proposed passive recreation areas.

Response: Passive recreation areas will include open space areas and environmental resource areas. The Natural Resources Overlay District (NROD) – OCMC 17.49 and Geologic Hazards – OCMC 17.44 will be applied to habitat areas which promote retention of natural conditions. In addition, the proposed code amendments include provisions for the Low Impact Conservation Area that require environmental restoration as a condition of any adjacent development. **The proposal is consistent with this Policy.**

Policy 8.1.12

Identify and protect land for parks and recreation within the Urban Growth Boundary.

Response: The BRCP identifies and prioritizes a network of parks, trails, and open spaces, including the South-Central Open Space Network. The proposed code amendments will support creation of the South-Central Open Space Network through required parkland dedication at the time of development and protect trail corridors throughout the district's open space system by requiring dedication of easements at the time of development. **The proposal is consistent with this Policy.**

Policy 8.1.14

Require or encourage developers to dedicate park sites as part of the subdivision review process. When possible, require or encourage developers to build parks to City standards and give them to the City to operate and maintain.

Response: The proposed code amendments will require parkland dedication to create the South-Central Open Space Network as part of subdivision review process. **The proposal is consistent with this Policy.**

Goal 9.1 Improve Oregon City's Economic Health

Provide a vital, diversified, innovative economy including an adequate supply of goods and services and employment opportunities to work toward an economically reasonable, ecologically sound and socially equitable economy.

Response: A core aspect of the BRCP is to create economic opportunities, and the proposed map and code amendments implement three distinct subdistricts focused on employment opportunities. The North Employment Campus, proposed for CI zoning, will provide family-wage employment opportunities. The two mixed-use subdistricts in the Mixed Employment Village and Main Street will provide goods and services, and additional jobs in those sectors. In total, the proposal is estimated to support up to 5,734 jobs, exceeding the BRCP goal of 5,000 jobs. The proposed code amendments include provisions such as sustainable design elements for industrial development and the inherent efficiencies of mixing uses within the district and individual subdistricts to reduce distances travelled to live, work, shop and eat, which will support ecologically sound economic growth. **The proposal is consistent with this Goal.**

Policy 9.1.1

Attract high-quality commercial and industrial development that provides stable, high-paying jobs in safe and healthy work environments, that contributes to a broad and sufficient tax base, and that does not compromise the quality of the environment.

Response: Three of the BRCP subdistricts, proposed to be implemented through map and code amendments, will support commercial and industrial development. The North Employment Campus, proposed for CI zoning, will support primarily industrial development with family-wage employment opportunities. The Mixed Employment Village subdistrict will provide support high-quality commercial and office employment, with similar opportunities in the Main Street subdistrict. In total, the proposal is estimated to support up to 5,734 jobs, exceeding the BRCP goal of 5,000 jobs. The proposed code amendments include provisions such as sustainable design elements for industrial development and the inherent efficiencies of mixing uses within the district and individual subdistricts to reduce distances travelled to live, work, shop and eat, which will support ecologically sound economic growth. Natural resources will be protected through the Natural Resources Overlay District (NROD) – OCMC 17.49 and Geologic Hazards – OCMC 17.44 to habitat areas to ensure development does not compromise the quality of the environment. As discussed in response to Goals 6.1 and 6.2 above, compliance with existing state and local air and water standards will ensure protection of those resources at the time of future development. **The proposal is consistent with this Policy.**

Policy 9.1.2

Contribute to the health of the regional and state economy by supporting efforts to attract “traded sector industries” such as high technology and production of metals, machinery, and transportation equipment. (Traded sector industries compete in multi-state, national, and international markets and bolster the state’s economy by bringing money in from sales of goods and services outside of the state.)

Response: The BRCP prioritizes recruitment of sustainable industries, which could include traded sector industries. The proposed map and code amendments support this goal by creating development opportunities for such industries within the proposed North Employment Campus and Mixed Employment Village subdistrict. Additional recruitment efforts will be led by the City’s Economic Development Department. **The proposal is consistent with this Policy.**

Goal 9.3 Retention of Existing Employers

Retain existing employers, both public and private, and encourage them to expand their operations within the City.

Response: The proposed map and code amendments will create significant new acreage for industrial and employment growth, which could be acquired and developed by existing employers looking to expand their operations. **The proposal is consistent with this Policy.**

Policy 9.3.1

Protect existing industries from encroachment by incompatible land uses, and ensure that expansion options are available to them wherever possible.

Response: The proposed map amendments will not create any incompatible land uses near existing industries. The proposed map and code amendments will create significant new acreage for industrial and employment growth, which could be acquired and developed by existing employers looking to expand their operations. **The proposal is consistent with this Policy.**

Goal 9.5 Retail Service

Allow a variety of retail outlets and shopping areas to meet the needs of the community and nearby rural areas.

Response: The proposed map and code amendments will support the creation of the Main Street subdistrict along Glen Oak Road providing retail and shopping opportunities for the immediate BRCP district and nearby areas. The code amendments specifically support retail development by limiting residential uses to upper stories and the rear portion of sites, to ensure commercial development remains the priority. Limited retail outlets are also permitted under the proposed

code amendments for the Mixed Employment Village to support those who work and live in the subdistrict. **The proposal is consistent with this Goal.**

Policy 9.5.1

Develop local neighborhood or specific plans, when appropriate, to blend infill development along linear commercial areas into existing neighborhoods.

Response: The BRCP district is undeveloped and as such, does not have existing commercial or existing neighborhoods; the plan as implemented by the proposed map and code amendments proactively creates opportunities to blend commercial development within neighborhoods. The proposed map and code amendments create opportunities for retail and commercial development primarily within the Main Street subdistrict, which is located along Glen Oak Road interior to the district, rather than strung out as a linear commercial development along Beaver Creek Road. The proposed code amendments also allow small-scale retail and commercial development within the West Mixed-Use Neighborhood to the south of the Main Street subdistrict. **The proposal is consistent with this Policy.**

Policy 9.5.2

Develop plans to provide necessary public services to surrounding rural industrial lands for future development.

Response: No changes are proposed to adopted infrastructure master plans for water, sewer and stormwater and the Transportation System Plan (TSP) which will ensure provision of necessary services to industrial lands within and outside of the BRCP district. **The proposal is consistent with this Policy.**

Goal 9.7 Home-Based Businesses

Provide a supportive climate for home-based businesses.

Response: The City has already adopted standards and permitting processes for home occupations, defined by OCMC 17.04.580 and permitted in all residential zones. The City has developed a worksheet to support owners of home occupations to comply with business licensing and zoning requirements. (See https://www.orcity.org/sites/default/files/fileattachments/economic_development/page/4592/2016_home_occupation_worksheet_-_fillable.pdf) Home-based businesses will similarly be allowed and supported within residential areas of the BRCP district. **The proposal is consistent with this Goal.**

Policy 9.7.1

Encourage home-based businesses that are low impact and do not disrupt the residential character of the neighborhoods in which they are located.

Response: No changes are proposed to adopted home occupation standards in OCMC 17.04.580, which limit disruptions to neighborhood residential character by prohibiting non-resident employees, prohibiting retail sales onsite, prohibiting off-site sound impacts, prohibiting outdoor uses, and requiring that uses are secondary to the residential purpose of the dwelling. During the development of the code amendments, a “cottage industry” concept was explored to permit small-scale manufacturing based businesses as home occupations within the BRCP neighborhoods, such as welding or cabinet making. Some small-scale manufacturing could be permitted under the existing home occupations code, provided it was conducted indoors and did not generate off-site sound impacts, however, changes to the home occupation standards to promote such uses or loosen current restrictions are not recommended based on citizen feedback concerning potential disruptions to residential neighborhood character. During the April 9, 2019 public workshop, citizens shared concerns that noise and visual impacts from potential cottage manufacturing uses could be a conflict with residential neighborhoods, as well as concern that the smaller homes and dwelling types proposed in the BRCP neighborhoods would not have sufficient room for such uses or sufficient buffering between residences. Therefore, existing home occupation standards are proposed for BRCP neighborhoods to encourage home-based businesses while limiting disruptions to residential neighborhoods. **The proposal is consistent with this Policy.**

Policy 9.7.2

Encourage the support services that home-based businesses need.

Response: No changes are proposed to adopted home occupation standards in OCMC 17.04.580 or City policies to support business owners. The City will continue to work with business owners to support them in obtaining business licenses. The plan provides nearby mixed use and employment districts to support home based businesses. **The proposal is consistent with this Policy.**

Goal 9.8 Transportation System

Recognize the importance of the land use-transportation link and encourage businesses to locate in areas already served by the type of transportation system they need.

Response: The adopted BRCP transportation strategy includes elements such as planning a mixed-use community that will increase options for internal trip making, developing a framework of collector streets, improving Beaver Creek Road itself to accommodate trips within and through the district, and developing off-site transportation connections guided by the Transportation System Plan; the transportation strategy was developed to serve the intended industrial and

commercial development in each subdistrict. The proposed map and code amendments provide for the intended types of development in each subdistrict, that will be served by existing and planned transportation elements. **The proposal is consistent with this Goal.**

Policy 9.8.1

Through coordination with TriMet and local employers, encourage and promote the use of mass transit to travel between residential areas and employment areas.

Response: The adopted BRCP sets the stage for future transit by providing transit-attractive destinations, such as high-density employment and residential nodes, and a logical network of roadways that would support future transit routes. The proposed map and code amendments support future transit improvements by implementing the plan subdistricts that concentrate job and housing densities near Beaver Creek Road and the transit center at Clackamas Community College. **The proposal is consistent with this Policy.**

Policy 9.8.4

Promote “shared parking” and transportation demand management techniques such as transit vouchers, car or van pooling, and flexible schedules and telecommuting options to reduce peak hour trips.

Response: The adopted parking standards permit shared parking facilities per OCMC 17.52.020.B.2, and will apply to development within the BRCP area. Additional transportation demand management techniques are more appropriate for individual businesses to develop, and can be implemented at the time of development. **The proposal is consistent with this Policy.**

Policy 9.8.6

Encourage the provision of multi-modal transportation to support major existing employers.

Response: There are no existing employers within the BRCP area that will be affected by the proposed map and code amendments. However, the amendments will support development of a multimodal transportation system throughout the BRCP area consistent with adopted transportation strategies, including transit, sidewalks, bike routes, and off-street trail network that will serve future employers in the North Employment Campus and throughout the district. **The proposal is consistent with this Policy.**

Policy 9.8.7

Assess methods to integrate the pedestrian, bicycle and elevator transportation modes into the mass transit system.

Response: The adopted transportation strategies in the BRCP include development of on and off-street pedestrian and bicycle facilities throughout the district; an elevator mode is not proposed because it is not suitable for the district's topography. The proposed map and code amendments support future development of these facilities by requiring facilities to be constructed at the time of site development. **The proposal is consistent with this Policy.**

Goal 10.1 Diverse Housing Opportunities

Provide for the planning, development and preservation of a variety of housing types and lot sizes.

Response: The BRCP prioritizes a variety of housing types for a range of income levels across the different subdistricts. The proposed map and code amendments support these goals by implementing the West and East Mixed Use Neighborhoods, with additional residential opportunities in the mixed-use Main Street and Mixed Employment Village subdistricts. The proposed zoning districts for the West and East Mixed-Use Neighborhoods are R-2 and R-5, respectively; these districts were significantly revised as part of the Amendments to the Oregon City Municipal Code (including the Equitable Housing Project recommendations) earlier in 2019 to better meet this goal. The housing code amendments allow for a broad range of housing options collectively referred to as "missing middle housing," defined as a range of multi-unit or clustered housing types compatible in scale with single-family homes that help meet the growing demand for housing choices at a variety of scales across a variety of neighborhoods, encouraging a more diverse housing stock in residential zones that are currently dominated by single-family residential homes. The proposed map and code changes with this proposal implement these zones and will guide planning and development of a variety of housing types and lot sizes. **The proposal is consistent with this Goal.**

Policy 10.1.1

Maintain the existing residential housing stock in established older neighborhoods by maintaining existing Comprehensive Plan and zoning designations where appropriate.

Response: There are no established older neighborhoods in the BRCP area, however, there are a handful of existing residences. The proposed code amendments will permit existing homes with proposed CI zoning to remain permitted uses rather than making them nonconforming uses. **The proposal is consistent with this Policy.**

Policy 10.1.2

Ensure active enforcement of the City of Oregon City Municipal Code regulations to ensure maintenance of housing stock in good condition and to protect neighborhood character and livability.

Response: No changes are proposed to the code enforcement standards or policies with this proposal. As neighborhoods are developed in the BRCP area, code enforcement will ensure housing and neighborhoods are maintained in good condition. **The proposal is consistent with this Policy.**

Policy 10.1.3

Designate residential land for a balanced variety of densities and types of housing, such as single-family attached and detached, and a range of multi-family densities and types, including mixed-use development.

Response: The proposed map amendments designate land for a variety of densities and types of housing as follows: 25.1 gross acres of High Density Residential with R-2 zoning, 136.7 gross acres of Medium Density Residential with R-5 zoning, and 13.5 gross acres of Mixed-Use Corridor with NC zoning for mixed-use residential development. The existing zoning standards for these districts permit a range of densities for different housing types ranging from a minimum of 7.0 units per net acre for single-family detached homes in the R-5 zone to a maximum of 21.8 units per net acre for townhouse and multifamily development in the R-2 zone, or up to 26.2 units per net acre for projects that incorporate sustainability features in the proposed code amendments. **The proposal is consistent with this Policy.**

Policy 10.1.4

Aim to reduce the isolation of income groups within communities by encouraging diversity in housing types within neighborhoods consistent with the Clackamas County Consolidated Plan, while ensuring that needed affordable housing is provided.

Response: The proposed map and code amendments apply the revised R-5 and R-2 zoning district standards that were developed as part of the Equitable Housing Project specifically to provide greater variety of affordable housing options, both regulated, income-restricted housing options and market-rate housing options that are lower priced and thus affordable to housing with lower household incomes. The variety of housing types allowed in both zones will provide opportunities to integrate affordable housing into the BRCP neighborhoods as they are developed. **The proposal is consistent with this Policy.**

Policy 10.1.5

Allow Accessory Dwelling Units under specified conditions in single-family residential designations with the purpose of adding affordable units to the housing inventory and

providing flexibility for homeowners to supplement income and obtain companionship and security.

Response: Accessory Dwelling Units (ADUs) are permitted in both the R-5 and R-2 zoning districts proposed for the BRCPP neighborhoods with this proposal; no further changes to the ADU regulations are included with this proposal. Code revisions adopted with the Amendments to the Oregon City Municipal Code (including the Equitable Housing Project recommendations) included a provision in OCMC 16.08.095 that restricts new subdivisions from applying code, covenants, and restrictions (CC&Rs) that prohibit ADUs, which will ensure that new developments within the BRCPP are not restricted by public zoning code or private CC&Rs from developing ADUs. **The proposal is consistent with this Policy.**

Policy 10.1.6

Allow site-built manufactured housing on individual lots in single-family residential zones to meet the requirements of state and federal law. (Pursuant to state law, this policy does not apply to land within designated historic districts or residential land immediately adjacent to a historic landmark.)

Response: The Oregon City Municipal Code does not differentiate between manufactured housing and other housing types on individual lots and the proposed code amendments do not propose to change this; an individual manufactured house is permitted on any lot where a single-family detached, site-built house would be permitted in the BRCPP neighborhoods under the proposed R-5 and R-2 zoning. **The proposal is consistent with this Policy.**

Policy 10.1.7

Use a combination of incentives and development standards to promote and encourage well-designed single-family subdivisions and multi-family developments that result in neighborhood livability and stability.

Response: The proposed map amendments apply the R-2 and R-5 zoning districts within the BRCPP, which already incorporate numerous incentives and development standards to support livability and stability. The proposed code amendments further support livable neighborhoods by requiring parkland dedication or fee-in-lieu for all new subdivisions and multifamily developments, to create the South-Central Open Space Network with park and trail facilities serving the BRCPP neighborhoods. The proposed amendments also include a density bonus option as an incentive for multifamily development to incorporate sustainability features. **The proposal is consistent with this Policy.**

Goal 10.2 Supply of Affordable Housing

Provide and maintain an adequate supply of affordable housing.

Response: The proposed map amendments add significant buildable residential land to the City's inventory, including 12.1 net acres of buildable land zoned R-2 in the West Mixed Use Neighborhood and 64.5 net acres of buildable land plus 15.9 acres of constrained land zoned R-5 in the East Mixed Use Neighborhood and additional opportunities in the two mixed-use subdistricts with a combined estimated potential for 1,105 new housing units. Maintaining an adequate supply of buildable land will help keep housing prices affordable by reducing land scarcity. These areas will be developed under the R-5 and R-2 zoning district standards recently amended with the Amendments to the Oregon City Municipal Code (including the Equitable Housing Project recommendations) project that expand the range of housing types permitted, decrease minimum lot sizes for many types, and increase density for some missing middle housing types. Together, these standards create opportunities to build market-rate housing that is more affordable than traditional single-family detached, large-lot subdivisions. **The proposal is consistent with this Policy.**

Policy 10.2.1

Retain affordable housing potential by evaluating and restricting the loss of land reserved or committed to residential use. When considering amendments to the Comprehensive Plan Land-Use Map, ensure that potential loss of affordable housing is replaced.

Response: The proposed map amendments commit a total of 161.8 gross acres of land for residential use, consistent with the BRCP map; no existing residential land or affordable housing will be lost with this proposal. **The proposal is consistent with this Policy.**

Policy 10.2.2

Allow increases in residential density (density bonuses) for housing development that would be affordable to Oregon City residents earning less than 50 percent of the median income for Oregon City.

Response: The proposed map amendments apply the R-2 zone to the West Mixed Use Neighborhood, and existing R-2 code standards provide up to a 20% density bonus for affordable units at 80% AMI for a minimum term of 30 years for apartment projects. No further changes to the affordable housing density bonus is proposed with this project. **The proposal is therefore consistent with this policy.**

Policy 10.2.3

Support the provision of Metro's Title 7 Voluntary Affordable Housing Production Goals.

Response: (From Comprehensive Plan, P. 77):

In 2001, Metro adopted amendments to Title 7 of the Urban Growth Management Functional Plan to implement the Regional Affordable Housing Strategy (2000), which identifies measures to provide adequate affordable housing in the Metro region. The amendments require local jurisdictions to consider adopting a number of tools and strategies for promoting the creation and retention of affordable housing. Metro defines an affordable housing unit as one that requires no more than 30 percent of household income for people earning 50 percent of the median household income in their jurisdiction. By that definition, an affordable housing unit in Oregon City in 2000 would cost \$570 per month or less. The 2002 housing inventory and analysis showed that the number of lower-cost units in Oregon City was inadequate to meet both the current (2002) and projected housing needs of the city's lower-income residents. Title 7 tools and strategies have been adopted as Goal 10.2 and Policies 10.2.1 through 10.2.4.

The proposed map and code amendments support affordable housing creation consistent with Title 7 through compliance with Goal 10.2 and Policies 10.2.1 through 10.2.4, as demonstrated in this section. **The proposal is consistent with this Policy.**

Policy 10.2.4

Provide incentives that encourage the location of affordable housing developments near public transportation routes. Incentives could include reduction of development-related fees and/or increases in residential density (density bonuses).

Response: As mentioned in Policy 10.1.4, the West Mixed Use Neighborhood will be zoned R-2 under the proposed map amendments and the R-2 standards include a 20% density bonus for affordable units at 80% AMI for a minimum term of 30 years. The West Mixed Use Neighborhood is located along Beavercreek Road and the future Center Parkway which have been identified as potential future public transportation routes. **The proposal is consistent with this Policy.**

Goal 11.1 Provision of Public Facilities

Serve the health, safety, education, welfare, and recreational needs of all Oregon City residents through the planning and provision of adequate public facilities.

Policy 11.1.1

Ensure adequate public funding for the following public facilities and services, if feasible:

- *Transportation infrastructure*
- *Wastewater collection*
- *Stormwater management*
- *Police protection*
- *Fire protection*
- *Parks and recreation*
- *Water distribution*

Response: As demonstrated within this report the aforementioned systems can accommodate the impact anticipated in the Concept Plan.

Policy 11.1.7

Develop and maintain a coordinated Capital Improvements Plan that provides a framework, schedule, prioritization, and cost estimate for the provision of public facilities and services within the City of Oregon City and its Urban Growth Boundary

Response: As demonstrated within this report the aforementioned systems can accommodate the impact anticipated in the Concept Plan.

Goal 12.1 Land Use-Transportation Connection

Ensure that the mutually supportive nature of land use and transportation is recognized in planning for the future of Oregon City.

Response: The adopted BRCP includes interconnected land use and transportation elements that ensure appropriately scaled multimodal facilities will serve future development. The plan establishes a variety of interconnected subdistricts with a mix of uses that increase opportunities for local trips while decreasing total trips utilizing the broader transportation network. The proposed map and code amendments implement this vision to balance land use and transportation goals; the proposal is supported by a transportation memo prepared by DKS that concludes that development associated with the proposal can be served by the planned City-wide transportation system. **The proposal is consistent with this Goal.**

Policy 12.1.1

Maintain and enhance citywide transportation functionality by emphasizing multi-modal travel options for all types of land uses.

Response: The adopted BRCP includes multimodal transportation provisions. As development occurs, on-street and off-street pedestrian and bicycle facilities will be required to be constructed as outlined in the plan. The proposed map and code amendments are consistent with the BRCP and will support expanded multimodal facilities throughout the district serving all the different land uses from industrial to residential. **The proposal is consistent with this Policy.**

Policy 12.1.3

Support mixed uses with higher residential densities in transportation corridors and include a consideration of financial and regulatory incentives to upgrade existing buildings and transportation systems.

Response: The proposed map and code amendments create mixed-use subdistricts including the NC-zoned Main Street and MUC-II-zoned Mixed Employment Village that permit high-density residential development, as well as a mix of uses within the district as a whole across the five subdistricts. The map and code amendments will facilitate a mix of uses at higher residential densities along Beaver Creek Road, including the two aforementioned mixed-use districts and the R-2-zoned West mixed Use Neighborhood. There are no significant existing buildings within the BRCP area affected by this policy. **The proposal is consistent with this Policy.**

Policy 12.1.4

Provide walkable neighborhoods. They are desirable places to live, work, learn and play, and therefore a key component of smart growth.

Response: Walkability is a central goal of all the BRCP neighborhoods, and is supported by the proposed map and code amendments. Neighborhoods will be built around blocks with a maximum block length of 530 feet, except for the industrial areas in the North Employment Campus, consistent with zoning standards in OCMC 16.12.030 for implementing districts that create easily walkable neighborhoods that minimize out-of-direction travel by pedestrians. On-street pedestrian facilities will be required consistent with green street cross-sections which create a desirable walking environment, in addition to an off-street trail network. The proposed code amendments support a compelling, walkable Main Street subdistrict along Glen Oak Road by requiring building presence along a minimum percentage of the site and limiting parking areas to the rear of the site. **The proposal is consistent with this Policy.**

Goal 13.1 Energy Sources

Conserve energy in all forms through efficient land-use patterns, public transportation, building siting and construction standards, and city programs, facilities, and activities.

Response: The Concept Plan includes an efficient mix of uses to allow those that leave in or near the site to also obtain amenities and employment nearby.

Goal 14.3 Orderly Provision of Services to Growth Areas

Plan for public services to lands within the Urban Growth Boundary through adoption of a concept plan and related Capital Improvement Program, as amendments to the Comprehensive Plan.

Response: The proposed map and code amendments implement an adopted concept plan for Beaver Creek Road. The Sanitary Sewer Master Plan (2014), Water Distribution Master Plan (2012), Stormwater Master Plan (2019 Draft), and Transportation System Plan (2013) were all created subsequent to initial adoption of the BRCP in 2008 and plan for public services to serve residential and employment growth forecasted for the concept plan area. The proposed map and code amendments are estimated to support 1,105 dwellings and 5,734 jobs, consistent with demand forecasted and planned for in adopted capital improvements plans. **The proposal is consistent with this Goal.**

Policy 14.3.1

Maximize new public facilities and services by encouraging new development within the Urban Growth Boundary at maximum densities allowed by the Comprehensive Plan.

Response: The proposed map and code amendments provide for higher densities in the BRCP area to maximize utility of new public facilities developed to serve the area. Residential development will be subject to high and medium-density residential standards in the R-2 and R-5 districts respectively. Both zones have minimum density standards equal to 80% of the maximum allowed density, to ensure higher density development, as well as opportunities for types like cluster housing, duplexes, and 3-4 plexes in the R-5 zone that allow higher densities than would otherwise be permitted for single-family detached residential uses. Employment development in the two mixed-use districts will be subject to FAR minimums under the proposed code amendments to ensure efficient use of land and public facilities. **The proposal is consistent with this Policy.**

Policy 14.3.2

Ensure that the extension of new services does not diminish the delivery of those same services to existing areas and residents in the city.

Response: The adopted Sanitary Sewer Master Plan (2014), Water Distribution Master Plan (2012), Stormwater Master Plan (2019 Draft), and Transportation System Plan (2013) ensure that public facilities are extended to new areas, including the BRCP area and development anticipated through the proposed map and code amendments, without compromising the ability to provide services to existing areas and residents of the city that meet adopted service standards. **The proposal is consistent with this Policy.**

Policy 14.3.3

Oppose the formation of new urban services districts and oppose the formation of new utility districts that may conflict with efficient delivery of city utilities within the Urban Growth Boundary.

Response: The BRCP area is within the future service area of city utility providers and no new urban service districts or utility districts are proposed. **The proposal is consistent with this Policy.**

Policy 14.3.4

Ensure the cost of providing new public services and improvements to existing public services resulting from new development are borne by the entity responsible for the new development to the maximum extent possible.

Response: All development proposed with the BRCP area under the proposed map and code amendments will be subject to development review, which requires that new development provide for on-site and off-site public services needed to serve the development. The City has also adopted System Development Charges (SDCs) that are assessed at the time of development to pay for the costs of expanding public services. **The proposal is consistent with this Policy.**

III.c. BEAVERCREEK ROAD CONCEPT PLAN GOALS AND POLICIES

Goal 1 Complete and Sustainable Community

Create a complete and sustainable community, in conjunction with the adjacent land uses, that integrates a diverse mix of uses, including housing, services, and public spaces that are necessary to support a thriving employment center.

Response: The proposal implements the plan vision for a mix of uses within the district and within individual subdistricts, notably the Mixed Employment Village and the Main Street subdistricts. Housing is provided for in all subdistricts except the North Employment Campus. Services are permitted through proposed zoning standards in all subdistricts except the East Mixed Use Neighborhood. Public spaces

are provided for consistent with the BRCP, including the South Central Open Space Network, powerline corridor and trail network. Many of the zoning standards, particularly the expanded residential zones, support compact development, coupled with resource protection standards for sensitive environmental areas. Much of the sustainable infrastructure planning, including LID stormwater and green street designs, was done with the BRCP and can be implemented at the time of site development. **The proposal is consistent with this Goal.**

Policy 1.1

Adopt new comprehensive plan and zone designations, and development code, that implement the Beavercreek Concept Plan. Require all development to be consistent with the Concept Plan and implementing code.

Response: The proposal applies comprehensive plan and zone designations to implement the BRCP, with development code amendments that supplement existing zoning district standards for each subdistrict to fully implement the BRCP vision for those subdistricts. Development will be reviewed for conformity with the implementing code through the development review process; discretionary development applications, such as master plans, will be required to comply with the Concept Plan as well. **The proposal is consistent with this Policy.**

Policy 1.2

Establish sub-districts to implement the Concept Plan. The sub-districts are:

North Employment Campus – NEC

The purpose of the North Employment Campus is to provide for the location of family wage employment that strengthens and diversifies the economy. The NEC allows a mix of clean industries, offices serving industrial needs, light industrial uses, research and development and large corporate headquarters. The uses permitted are intended to improve the region's economic climate, promote sustainable and traded sector businesses, and protect the supply of sites for employment by limiting incompatible uses. The sub-district is intended to comply with Metro's Title 4 regulations. Site and building design will create pedestrian-friendly areas and utilize cost effective green development practices. Business and program connections to Clackamas Community College (CCC) are encouraged to help establish a positive identity for the area and support synergistic activity between CCC and NEC properties. Businesses making sustainable products and utilizing sustainable materials and practices are encouraged to reinforce the identity of the area and promote the overall vision for the Beavercreek Road area.

Response: The NEC subdistrict will be implemented with the Industrial comprehensive plan designation and the Campus Industrial (CI) zoning district. The permitted uses in OCMC 17.37.020 include a range of industrial, light manufacturing, research and development, and corporate headquarters uses that support family-wage employment. The proposed additional code standards for the NEC include limitations on retail and service uses to 5,000 SF per use or 20,000 SF total per site to limit incompatible uses. The proposed code standards and subdistrict boundaries have been reviewed against Metro Title 4 maps and code requirements. Site and building design for development in the subdistrict will be required to implement green design features from a menu proposed in OCMC 17.37.060.G. Outside of the code and map implementation projects, supporting efforts to build relationships with CCC and to recruit businesses with sustainable practices will be led by the City's Economic Development department. **The proposal is consistent with this Policy.**

Mixed Employment Village – MEV

The purpose of the Mixed Employment Village is to provide employment opportunities in an urban, pedestrian friendly, and mixed use setting. The MEV is intended to be transit supportive in its use mix, density, and design so that transit remains an attractive and feasible option. The MEV allows a mix of retail, office, civic and residential uses that make up an active urban district and serve the daily needs of adjacent neighborhoods and Beaver Creek Road sub-districts. Site and building design will create pedestrian-friendly areas and utilize cost effective green development practices. Business and program connections to Clackamas Community College and Oregon City High School are encouraged. Businesses making sustainable products and utilizing sustainable materials and practices are encouraged to reinforce the identity of the area and promote the overall vision for the Beaver Creek Road area.

Response: The MEV subdistrict will be implemented with the Mixed Use Corridor comprehensive plan designation and the Mixed Use Corridor-2 (MUC-2) zoning district. The permitted uses in OCMC 17.29.020, with refinements in proposed OCMC 17.29.080.C, include a range of retail, office, civic and residential uses. Proposed use standards also limit the percentage of building area that can be used for retail, service, and residential uses, to ensure that employment uses are also integrated into site development. Minimum FAR standards will support higher intensity development that will support future transit service. Site and building design for development in the subdistrict will be support an urban, pedestrian friendly setting through a height limit of 60 feet to permit multistory construction, maximum setbacks to bring development up to the street, and prohibition on

ground floor residential uses to support active ground floor uses. (See existing OCMC 17.29 and proposed 17.29.080.) Additional building and site development standards in OCMC 17.62.050 will apply at the time of development. Outside of the code and map implementation projects, supporting efforts to build relationships with CCC and to recruit businesses with sustainable practices will be led by the City's Economic Development department. **The proposal is consistent with this Policy.**

Main Street – MS

The purpose of this small mixed-use center is to provide a focal point of pedestrian activity. The MS allows small scale commercial, mixed use and services that serve the daily needs of the surrounding area. "Main Street" design will include buildings oriented to the street, and minimum of 2 story building scale, attractive streetscape, active ground floor uses and other elements that reinforce pedestrian oriented character and vitality of the area.

Response: The MC subdistrict will be implemented with the Mixed Use Corridor comprehensive plan designation and the Neighborhood Commercial (NC) zoning district. The permitted uses in OCMC 17.24.020, with refinements in proposed OCMC 17.24.050.C, include a range of retail, service and residential uses, capped at 10,000 square feet per establishment to create a small-scale character for the subdistrict. Proposed dimensional standards include a minimum height of two stories, maximum five-foot front setbacks to ensure that development engages with the street, minimum FAR of 0.5 to create more intensive development, requirement for parking areas to be located behind buildings, standards for planter boxes and urban plazas as part of required landscaping, and prohibition on ground floor residential uses to support active ground floor uses. (See existing OCMC 17.24 and proposed 17.24.050.) Additional building and site development standards in OCMC 17.62.050 will apply at the time of development. **The proposal is consistent with this Policy.**

West Mixed Use Neighborhood – WMU

The West Mixed Use Neighborhood will be a walkable, transit-oriented neighborhood. This area allows a transit supportive mix of housing, live/ work units, mixed use buildings and limited commercial uses. A variety of housing and building forms is required, with the overall average of residential uses not exceeding 22 dwelling units per acre. The WMU area's uses, density and design will support the multi-modal transportation system and provide good access for pedestrians, bicycles, transit and vehicles. Site and building design will create a walkable area and utilize cost effective green development practices.

Response: The WMU subdistrict will be implemented with the High-Density Residential comprehensive plan designation and the R-2 High-Density Residential (R-2) zoning district. Permitted residential uses, as recently expanded in the Amendments to the Oregon City Municipal Code (including the Equitable Housing Project recommendations), provide for a variety of multifamily residential, single-family attached, cluster housing, duplexes, triplexes and quadplexes. (See OCMC 17.12.020.) The proposed code amendments add live/work units as conditional uses and permit small-scale commercial and mixed-use development as part of a master plan. (See proposed OCMC 17.12.060.C.) The minimum and maximum density permitted in the R-2 district is 17.4 to 21.8 units per acre. (See OCMC 17.12.050) Up to a 20% density bonus can be earned for affordable housing or, in the WMU, for projects incorporating sustainable design features. (See proposed OCMC 17.12.D.) The base density and density bonuses together will not exceed an overall average of 22 units per acre. The density of development will support transit use, and site design will integrate pedestrian and bicycle facilities at the time of development. **The proposal is consistent with this Policy.**

East Mixed Use Neighborhood – EMU

The East Mixed Use Neighborhood will be a walkable and tree-lined neighborhood with a variety of housing types. The EMU allows for a variety of housing types while maintaining a low density residential average not exceeding the densities permitted in the R-5 zone. Limited non-residential uses are permitted to encourage a unique identity, sustainable community, and in-home work options. The neighborhood's design will celebrate open space, trees, and relationships to public open spaces. The central open space, ridge open space scenic viewpoints, and a linked system of open spaces and trails are key features of the EMU. Residential developments will provide housing for a range of income levels, sustainable building design, and green development practices.

Response: The EMU subdistrict will be implemented with the Medium-Density Residential comprehensive plan designation and the R-5 Medium-Density Residential (R-5) zoning district. Streets will be developed with sidewalks and street trees per adopted street standards, and may not exceed a maximum block length of 530 feet to ensure a robust, connected street network supporting walkability. (See OCMC 12.08, Street Trees; OCMC Table 16.12.016 for sidewalk widths; OCMC 16.12.030 for block spacing.) Permitted residential uses, as recently expanded in the Amendments to the Oregon City Municipal Code (including the Equitable Housing Project recommendations), provide for a variety of single-family detached, single-family attached, accessory dwelling units, cluster housing, duplexes, triplexes and quadplexes. (See OCMC 17.10.020.) The R-5 density standards will apply in the

EMU zone. (See OCMC 17.10.050.) The variety of residential uses, including smaller lot sizes for selected types, will support housing for a wider range of income levels. The smaller lot sizes and home sizes will inherently increase the efficiency and sustainability of residential development, for example, reducing heating and cooling needs, and the mix of uses in the BRCP district will support green living by reducing the need for vehicle trips. Home occupations will be permitted to provide in-home work options; see response to OCCP Policy 9.7.1 for further discussion. New development will be required to dedicate parkland for the South-Central Open Space, and view points will be created along the ridgeline through view corridor standards. (See proposed OCMC 16.12.042 and 17.10.070.C, respectively.) Trail corridors will be identified and reserved through the subdivision review process. (See OCMC 16.08.025.E.) **The proposal is consistent with this Policy.**

Policy 1.3

Within the Northern Employment Campus sub-district, support the attraction of family wage jobs and connections with Clackamas Community College.

Response: Under the proposed code amendments, the NEC subdistrict permits a range of industrial, light manufacturing, research and development, and corporate headquarters uses that support family-wage employment. Outside of the code and map implementation projects, supporting efforts to build relationships with CCC and to recruit businesses with family-wage jobs will be led by the City's Economic Development department. **The proposal is consistent with this Policy.**

Policy 1.4

Within the Mixed Employment Village and Main Street sub-districts, promote job creation, mixed use and transit oriented development. Adopt minimum densities, limitations on stand-alone residential developments, and other standards that implement this policy.

Response: Under the proposed code amendments, the MEV and MS subdistricts permit a range of employment opportunities including light manufacturing (MEV only), office, retail and service uses. Proposed code standards require that residential uses be proposed as part of a mixed-use project, rather than stand-alone residential developments, and limit residential uses to upper-stories in both the MS and MEV subdistricts. (See proposed OCMC 17.24.050.E and 17.29.080.E.) In the MS subdistrict, ground-floor residential uses may also be permitted on the rear of sites, set back a minimum of 150 feet from the front property line and not to exceed 50% of the total building site area, with a minimum density of 17.4 units per acre. (See proposed OCMC 17.24.050.E.) **The proposal is consistent with this Policy.**

Policy 1.5

The Main Street sub-district may be located along the extension of Glen Oak Road and not exceed 10 gross acres. The specific configuration of the MS sub-district may be established as part of a master plan.

Response: The proposed map amendments designate the MS subdistrict along Glen Oak Road, totaling 13.5 gross acres or 6.6 net acres. The gross acre numbers that we have include the ROW along Glen Oak and Center/Holly, which may be inflating this figure. **The proposal is consistent with this Policy.**

Policy 1.6

Within the West and East Mixed Use Neighborhoods, require a variety of housing types. Allow lot size averaging and other techniques that help create housing variety while maintaining overall average density.

Response: Permitted residential uses in R-5 and R-2 zoning districts, proposed to implement the EMU and WMU subdistricts, provide for a variety of single-family detached, single-family attached, accessory dwelling units, multifamily, cluster housing, duplexes, triplexes and quadplexes. (See OCMC 17.10.020 and 17.12.020.) Lot size averaging is permitted per OCMC 16.08.065. **The proposal is consistent with this Policy.**

Policy 1.7

Within the MEV, MS, WMU and EMU sub-districts, require master plans to ensure coordinated planning and excellent design for relatively large areas (e.g. 40 acres per master plan). Master plans are optional in the NEC due to the larger lot and campus industrial nature of the area.

Response: Master planning is permitted in all subdistricts as a discretionary review alternative. (OCMC 17.65.) Mandatory master planning is not proposed in light of state standards requiring clear and objective residential development standards and proposed amendments which address concerns generally reserved for Master Plans, such as required park acquisition. Since 2008 when the BRCP was developed, state law has been strengthened to require a clear and objective review option for all residential and mixed-use development to provide greater certainty for housing development. (ORS 197.303, 197.307.) Master planning provisions are generally discretionary, and so should not be made mandatory for residential or mixed-use areas. Many of the concept plan provisions, such as green streets and LID stormwater development, can be implemented by existing or proposed code standards and thereby meet the master planning intent. Master planning can provide an alternative review path, with incentives such as higher densities or modifications to base zone standards like minimum lot sizes. The City could also

require master planning as a condition of annexation or zone change. **The proposal is consistent with this Policy.**

Goal 2 Model of Sustainable Design

Be a model of sustainable design, development practices, planning, and innovative thinking.

Response: The greatest strength of the BRCP, as implemented by the proposed map and code changes, is the mix of uses that will support a vibrant, interconnected district. Much of the sustainable infrastructure planning, including LID stormwater and green street designs, was done with the BRCP and subsequent utility master planning, will can be implemented at the time of site development. Many of the zoning standards, particularly the expanded uses in the residential zones, support compact development, coupled with resource protection standards for sensitive environmental areas. The proposed code amendments include site-specific sustainable design features required in the NEC subdistrict through the implementing CI standards, and incentivized in the WMU subdistrict through the implementing R-2 standards in the form of a density bonus. Future implementation efforts will continue building partnerships with private and institutional stakeholders to further support sustainable development and economic development. **The proposal is consistent with this Goal.**

Policy 2.1

Implement the Sustainable Storm Water plan recommended in the Concept Plan. During site specific design, encourage innovative system design and require low impact development practices that manage water at the site, street and neighborhood scales.

Response: Since the BRCP was initially written in 2008, the City has adopted the Stormwater and Grading Design Standards (2015), emphasize low-impact development (LID) practices, source controls for higher pollutant generating activities, erosion prevention and sediment controls, and operation and maintenance practices designed to properly manage stormwater runoff and protect our water resources. Some of the LID techniques permitted include porous pavement, green roofs, filtration planters, infiltration planters, swales, and rain gardens. (See <https://www.orcity.org/publicworks/stormwater-and-grading-design-standards>) **The proposal is consistent with this Policy.**

Policy 2.2

Storm water facilities will be designed so they are amenities and integrated into the

overall community design.

Response: LID techniques such as green roofs, filtration planters, infiltration planters, swales, and rain gardens, consistent with the 2015 Stormwater and Grading Design Standards, will serve as amenities integrated into the community.

The proposal is consistent with this Policy.

Policy 2.3

Support public and private sector initiatives to promote sustainable design, development practices and programs, including but not limited to:

- Energy efficiency
- Water conservation
- Compact development
- Solar orientation
- Green streets/infrastructure
- Adaptive reuse of existing buildings/infrastructure
- Alternative transportation
- Pedestrian/Cyclist friendly developments
- Natural drainage systems
- Tree preservation and planting to “re-establish” a tree canopy
- Minimizing impervious surfaces
- Sustainability education (builder, residents, businesses and visitors)
- Collaboration with “local” institutional and economic partners, particularly Clackamas Community College and Oregon City High School
- Community based sustainable programs and activities

Response: Many of these initiatives are ongoing and involve multiple stakeholders, which the City will continue to support. The proposed map and code amendments will directly and indirectly support a number of them. The proposed residential standards in particular support compact development by allowing a variety of residential units at higher density than permitted density for single-family detached residential uses. The City has adopted green street standards with the 2013 Transportation System Plan and the low impact development stormwater and grading design standards that will be applied to all new development. Sidewalks and bicycle lanes will be built with new roadways at the time of development to

provide alternative transportation infrastructure, as well as off-street trails. Bicycle parking will be required in new developments per OCMC 17.52.040. Tree protection, preservation, removal and replanting is regulated per OCMC 17.41 to support tree preservation. Impervious surfaces can be minimized through application of the low impact development stormwater standards, and supported by recent reductions to off-street parking required for residential uses in OCMC 17.52 with the Amendments to the Oregon City Municipal Code (including the Equitable Housing Project recommendations). **The proposal is consistent with this Policy.**

Policy 2.4

Work with stakeholders and the community to develop LEED or equivalent green building standards and guidelines to apply in the Concept Plan area.

Response: As part of the proposed code amendments, industrial development in the NEC subdistrict will be required to incorporate sustainable design features; one option is to propose a LEED certified building. (See proposed OCMC 17.37.060.G.8.) Similarly, WMU development may elect to build to LEED standards as one option to qualify for a density bonus. (See proposed OCMC 17.12.060.D.12.) The existing site development standards in OCMC 17.62 that apply to all new development except low-density residential already include green building standards and guidelines that supports sustainability. For example, 15% site landscaping is required along with conservation of natural resource areas which, along with adopted LID stormwater standards, minimizes impervious surface and treats stormwater runoff. Mandatory green building standards for all development, beyond the sustainable features for industrial and high-density residential, are not recommended. Requiring compliance with a third-party set of standards, such as LEED, is inherently problematic because it outsources City decision-making to a third party, with standards that are updated more frequently than City code is updated. **The proposal is consistent with this Policy.**

Goal 3 Green Jobs

Attract “green” jobs that pay a living wage.

Response: The proposed map and code amendments lay the foundation for future “green” job and green industry recruitment by designating 135.1 net acres for industrial development under the CI standards, and permitting a wide range of industrial, research and development, and corporate headquarters uses. Further business recruitment efforts will be led by the City’s Economic Development department and community partners to promote the BRCP area, building off the existing Beaver Creek Employment Area efforts that already include a portion of the

BRCP area. (See <https://www.orcity.org/economicdevelopment/beavercreek-employment-area>) **The proposal is consistent with this Goal.**

Policy 3.1

Coordinate with county, regional and state economic development representatives to recruit green industry to the Concept Plan area.

Response: The proposed map and code amendments will support business recruitment efforts for the BRCP area that will be led by the City's Economic Development department and county, regional and state economic development representatives. The City can expand current partnerships such as the Beavercreek Employment Area Blue Ribbon Committee that include city, county and regional representatives. (See https://www.orcity.org/sites/default/files/fileattachments/economic_development/page/11230/beavercreek_employment_area_-_marketing_and_recruitment_strategy.pdf) The Committee was identified as a stakeholder in this implementation project and provided their input at a meeting held January 17, 2019. **The proposal is consistent with this Policy.**

Policy 3.2

Promote the Concept Plan area as a place for green industry.

Response: The proposed map and code amendments will support business promotion efforts for the BRCP area that will be led by the City's Economic Development department. The City can promote the BRCP area, building off the existing Beavercreek Employment Area efforts that already include a portion of the BRCP area. (See <https://www.orcity.org/economicdevelopment/beavercreek-employment-area>) **The proposal is consistent with this Policy.**

Policy 3.3

Work with Clackamas Community College to establish programs and education that will promote green development within the Concept Plan area.

Response: Clackamas Community College was identified as a stakeholder in this implementation project and interviewed early in the process to incorporate their ideas into the map and code amendments. The College has participated in the Beavercreek Employment Area efforts to date as a member of the Blue Ribbon Committee and the City will continue working with the College. **The proposal is consistent with this Policy.**

Goal 4 Sustainable Industries

Maximize opportunities for sustainable industries that serve markets beyond the

Portland region and are compatible with the site's unique characteristics.

Response: The proposed map and code amendments lay the foundation for sustainable industries by designating 135.1 net acres for industrial development under the CI standards, and permitting a wide range of industrial, research and development, and corporate headquarters uses. Further business recruitment efforts will be led by the City's Economic Development department and community partners to promote the BRCP area, building off the existing Beaver Creek Employment Area efforts that already include a portion of the BRCP area. (See <https://www.orcity.org/economicdevelopment/beavercreek-employment-area>)

The proposal is consistent with this Goal.

Policy 4.1

As master plans are approved, ensure there is no net loss of land designated North Employment Campus.

Response: The proposed map amendments designate 236.1 gross acres with an estimated 135.1 net acres with the Industrial comprehensive plan designation and CI zoning district. Any rezoning proposal will have to show compliance with the BRCP, including this policy, which will prevent any net loss of NEC land. Much of the NEC land is designated Industrial land consistent with Metro Title 4 regulations, and is further protected from conversion to non-industrial uses by Metro standards.

(See https://www.orcity.org/sites/default/files/fileattachments/planning/page/12700/title_4_map_-_employment_and_industrial_land.pdf) **The proposal is consistent with this Policy.**

Policy 4.2

Coordinate with County, regional and state economic development representatives to recruit sustainable industries that serve markets beyond the Portland region.

Response: The proposed map and code amendments will support business recruitment efforts for the BRCP area that will be led by the City's Economic Development department and county, regional and state economic development representatives. The City can expand current partnerships such as the Beaver Creek Employment Area Blue Ribbon Committee that include city, county and regional representatives. (See https://www.orcity.org/sites/default/files/fileattachments/economic_development/page/11230/beavercreek_employment_area_-_marketing_and_recruitment_strategy.pdf) The Committee was identified as a stakeholder in this implementation project and provided their input at a meeting held January 17, 2019. **The proposal is consistent with this Policy.**

Goal 5 Natural Beauty

Incorporate the area's natural beauty into an ecologically compatible built environment.

Response: The proposed map and code amendments will protect natural resources within the future built environment of the district by requiring dedication of parkland to create the South-Central Open Space Network, requiring dedication of trail corridors identified in the BRCP, protecting trees per OCMC 17.41, and protecting riparian habitat and geologic hazard areas from development through application of the Natural Resources Overlay District in OCMC 17.49 and the Geologic Hazards Overlay Zone in OCMC 17.44. **The proposal is consistent with this Goal.**

Policy 5.1

Incorporate significant trees into master plans and site specific designs. Plant new trees to establish an extensive tree canopy as part of the creation of an urban community.

Response: All future development in the areas affected by this proposal will be required to comply with tree protection standards in OCMC 17.41, which include replanting standards with development. **The proposal is consistent with this Policy.**

Policy 5.2

Provide scenic viewpoints and public access along the east ridge.

Response: Under the proposed map and code amendment, the east ridge area will be zoned R-5. Proposed R-5 standards for the BRCP area in proposed OCMC 17.10.070 include view protection standards along the ridgeline requiring view corridors. (See proposed OCMC 17.10.070.C.) An additional viewpoint is incorporated in the South Central Open Space extent; those parklands will be required to be dedicated at the time of residential development. (See proposed OCMC 16.12.042.) The east ridge trail corridor as identified in the Trails Master Plan will be identified and reserved through the subdivision review process, ensuring public access. (See OCMC 16.08.025.E.) **The proposal is consistent with this Policy.**

Policy 5.3

Protect views of Mt Hood and locate trails and public areas so Mt Hood can be viewed within the community.

Response: Under the proposed map and code amendment, trails and public areas identified in the BRCP will be acquired by the City and protected from

development, which will protect views of Mt Hood from those facilities. Parkland within the South Central Open Space Network will be required to be dedicated at the time of residential development. (See proposed OCMC 16.12.042 and 17.62.058.) Trail corridors as identified in the Trails Master Plan will be identified and reserved through the development review process, including a 30-foot corridor through the powerline easement area identified in the BRCP as providing Mt Hood views. (See OCMC 16.08.025.E and proposed 17.37.060.F.) **The proposal is consistent with this Policy.**

Policy 5.4

Establish open space throughout the community consistent with the Open Space Framework Plan. Allow flexibility in site specific design of open space, with no net loss of total open space area.

Response: Under the proposed map and code amendment, open spaces identified in the BRCP will be protected from development and/or acquired by the City. Parkland within the South Central Open Space Network will be required to be dedicated at the time of residential development. (See proposed OCMC 16.12.042 and 17.62.058.) Trail corridors as identified in the Trails Master Plan will be identified and reserved through the development review process. (See OCMC 16.08.025.E.) Additional natural, undeveloped open space will be protected through application of the Natural Resources Overlay District in OCMC 17.49 and the Geologic Hazards Overlay Zone in OCMC 17.44 which restrict development in sensitive areas. **The proposal is consistent with this Policy.**

Policy 5.5

Protect steeply sloped and geologically sensitive areas along the east ridge from development.

Response: Through the proposed code amendments, the steeply sloped areas along the east ridge will be protected through the application of the Geologic Hazards Overlay Zone in OCMC 17.44, which limits development on slopes 25 to 35% and prohibits all development on slopes over 35%. The east ridge will be further protected through application of the proposed Low Impact Conservation Area standards, which limit development density and development area and require mitigation. (See proposed OCMC 17.10.070.C.) **The proposal is consistent with this Policy.**

Goal 6 Multi-modal Transportation

Provide multi-modal transportation links (such as bus routes, trails, bike- ways, etc.)

that are connected within the site as well as to the surrounding areas.

Response: The proposed map and code amendments will support the provision of multi-modal transportation links within the site and to surrounding areas at the time of development. The transportation network of major arterials and collectors within the BRCP area have been adopted in the City's Transportation System Plan (2013); the projects must be complete or completed by the developer at the time of development. Improvement of these major rights-of-way will meet green street standards with multimodal elements. The trails network, as part of the Trails Master Plan, will be required to be built prior to or as a condition of development as well. Bus routes will be planned with Tri-Met as part of ongoing coordination efforts. **The proposal is consistent with this Goal.**

Policy 6.1

Work with Tri-Met and stakeholders to provide bus service and other alternatives to the Concept Plan area.

Response: Bus service will be planned with Tri-Met as part of ongoing coordination efforts outside of the proposed map and code amendments. **The proposal is consistent with this Policy.**

Policy 6.2

As land use reviews and development occur prior to extension of bus service, ensure that the mix of land uses, density and design help retain transit as an attractive and feasible option in the future.

Response: The proposed map and code amendments support development of a mix of uses both across the district and within individual subdistricts that include employment, commercial and residential uses that can support future transit service. Minimum densities will be applied to residential development in the EMU and WMU subdistricts, at 7.0 units per acre and 17.4 units per acre respectively; any ground-floor residential uses in the MS subdistrict will also be required to meet a minimum density of 17.4 units per acre. Minimum FARs are also proposed for the MEV and MS subdistricts to guide intensive design supportive of future transit options. **The proposal is consistent with this Policy.**

Policy 6.3

Ensure that local street connectivity and off-street pedestrian routes link together into a highly connected pedestrian system that is safe, direct, convenient, and attractive to walking.

Response: The proposed map and code amendments will require local street connectivity and off-street pedestrian routes to be developed with all new development. OCMC 16.12, which applies to new subdivisions and site plan reviews, requires a maximum block length of 530 feet to maintain connectivity except in the CI zone, discourages cul-de-sacs and dead ends, and requires public off-street pedestrian and bicycle accessways when through streets cannot be provided; together these provisions provide for a highly connected pedestrian system. (See OCMC 16.12.025, 16.12.030, 16.12.032.) Additionally, development under the proposed map and code amendments will be required to reserve trail corridors supporting completion of the off-street trails network established in the Trails Master Plan. **The proposal is consistent with this Policy.**

Policy 6.4

The “walkability” of the Concept Plan area will be one of its distinctive qualities. The density of walking routes and connectivity should mirror the urban form – the higher the density and larger the building form, the “finer” the network of pedestrian connections.

Response: The proposed map and code amendments will require pedestrian connectivity that mirrors the urban form. A maximum block length of 530 feet applies in all proposed zones except the CI-zoned NEC subdistrict, where greater spacing between streets is appropriate for industrial campus development. (See OCMC 16.12.030.) Within the “finer” grained residential and mixed-use subdistricts, code standards to be applied through these proposed map amendments will also require provision of a well-marked, continuous and protected on-site pedestrian circulation system within development sites per OCMC 17.62.050.C. **The proposal is consistent with this Policy.**

Policy 6.5

Require trails to be provided consistent with the Concept Plan Circulation Framework.

Response: Development under the proposed map and code amendments will be required to reserve trail corridors supporting completion of the off-street trails network established in the Trails Master Plan. **The proposal is consistent with this Policy.**

Policy 6.6

Provide bike lanes on Beaver Creek Road and all collector streets, except for Main Street. The City may consider off-street multi-use paths and similar measures in meeting this policy. Bike routes will be coordinated with the trails shown on the

Circulation Framework.

Response: Streets, including Beaver Creek Road, will be built prior to or as a condition of development, and will be required to be constructed to the City's adopted green street standards that include bike lanes except on Glen Oak Road which will serve as the Main Street. Off-street multiuse paths may be developed along Center Parkway (Holly) within an expanded right-of-way as part of the South Central Open Space Network. **The proposal is consistent with this Policy.**

Goal 7 Safety Along Beaver Creek Road

Implement design solutions along Beaver Creek Road that promote pedestrian safety, control traffic speeds and access, and accommodate projected vehicular demand.

Response: The proposed map and code amendments will not affect the design of Beaver Creek Road, which will be built as planned in the BRCP and the adopted TSP. **The proposal is consistent with this Goal.**

Policy 7.1

Design Beaver Creek Road to be a green street boulevard that maximizes pedestrian safety.

Response: The proposed map and code amendments will not affect the design of Beaver Creek Road, which will be built as planned in the BRCP and the adopted TSP as a green street boulevard. **The proposal is consistent with this Policy.**

Policy 7.2

Work with the County and State to establish posted speeds that are safe for pedestrians and reinforce the pedestrian-oriented character of the area.

Response: Future coordination with the County and the State about the posted speeds is outside of the scope of the proposed map and code amendments. **The proposal is consistent with this Policy.**

Policy 7.3

Control access along the east side of Beaver Creek Road so that full access points are limited to the intersections shown on the Circulation Framework. Right in-Right-out access points may be considered as part of master plans or design review.

Response: The proposed map and code amendments will support limited access along the east side of Beaver Creek Road. At the time of development, driveway spacing and access limitations will be applied to individual lots including standards that require a minimum of 175 feet per driveway along an arterial like Beaver Creek Road, that limit access to one driveway per frontage, and that require access to be

provided from the lowest classification street. (See OCMC 16.12.035.) Requirements to develop an alley network in all subdistricts except the NEC will also limit access needs for individual lots. (See OCMC 16.12.025.) The City may adopt additional access limitations specific to Beaver Creek Road. **The proposal is consistent with this Policy.**

Goal 8 Oregon City High School and Clackamas Community College

Promote connections and relationships with Oregon City High School and Clackamas Community College.

Response: Both OCHS and CCC were identified as stakeholders in this implementation project, and engaged through initial interviews and invitations to all public meetings throughout the project; OCHS hosted two public open houses on January 29 and April 9, 2019. Future implementation efforts will continue to engage OCHS and CCC. **The proposal is consistent with this Goal.**

Policy 8.1

Coordinate with OCHS and CCC when recruiting businesses and promoting sustainability. Within one year of adoption of the Concept Plan, the City will convene dialogue with OCHS, CCC and other relevant partners to identify target industries and economic development strategies that are compatible with the vision for the Concept Plan. Encourage curricula that are synergistic with employment and sustainability in the Concept Plan area.

Response: Both OCHS and CCC are members of the Beaver Creek Employment Area Blue Ribbon Committee that includes city, county and regional representatives to discuss economic development strategies for the area incorporating the two institutions and portions of the BRCP area. (See https://www.orcity.org/sites/default/files/fileattachments/economic_development/page/11230/beaver_creek_employment_area_-_marketing_and_recruitment_strategy.pdf) Future implementation efforts will continue to engage OCHS and CCC. **The proposal is consistent with this Policy.**

Policy 8.2

Prior to application submittal, require applicants to contact OCHS and CCC to inform them and obtain early comment for master plans and design review applications.

Response: The City will develop internal policies to ensure that OCHS and CCC are engaged at the time of pre-application conferences required before all subdivision,

master plan, and site plan review applications are submitted, to inform OCHS and CCC and provide opportunity for early comment. **The proposal is consistent with this Policy.**

Policy 8.3

Improving the level-of-service and investing in the Highway 213 corridor improves the freight mobility along Highway 213, which provides access to Beaver Creek Road and the Concept Plan area. Protecting the corridor and intersections for freight furthers the City goal of providing living-wage employment opportunities in the educational, and research opportunities to be created with CCC and OCHS.

Response: Alternative Mobility Targets were adopted for Highway 213 in 2018, including the Highway 213 and Beaver Creek Road intersection, which will support freight mobility along Highway 213 to support employment opportunities in the BRCP area. OCHS and CC are encouraged to continue to implement TDM strategies. **The proposal is consistent with this Policy.**

Goal 9 Unique Sense of Place

Have a unique sense of place created by the mix of uses, human scale design, and commitment to sustainability.

Response: The essence of the BRCP area is the mix of uses both across the district as a whole and within individual subdistricts, which will be fully implemented by the proposed map and code amendments to create the five subdistricts including mixed-use zoning for the MEV and MS subdistricts. Design elements implemented through the proposed code amendments include maximum square footages for individual business establishments, minimum FARs, and maximum setbacks in the MS and MEV subdistricts; pedestrian connectivity within sites, subdistricts, the district and beyond; and building design standards, as discussed elsewhere in this narrative. Sustainability will be integrated into the fabric of the district as discussed in response to Goal 2 and related policies, including sustainable infrastructure, mix of uses, natural resources protection, and sustainable building and site design elements for industrial development and multifamily development in the R-2 zoned WMU zone. **The proposal is consistent with this Goal.**

Policy 9.1

Utilize master plans and design review to ensure detailed and coordinated design. Allow flexibility in development standards and the configuration of land uses when they are consistent with the comprehensive plan, development code, and vision to create a complete and sustainable community.

Response: Under the proposed map and code amendments, new development will be reviewed through site plan design review, subdivision, and/or master plans. Development standards can be modified through minor and major variances if they are consistent with the comprehensive plan including the BRCP vision. (See OCMC 17.60.) The configuration of land uses will be established by the proposed map amendments and can be modified through future map amendments consistent with OCMC 17.68, though the range of uses allowed in each subdistrict through the proposed code amendments is intended to be flexible and potentially reduce the need for map amendments, such as the R-2 standards for small-scale commercial and mixed-use in the primarily residential EMU subdistrict. **The proposal is consistent with this Policy.**

Policy 9.2

Implement human scale design through building orientation, attractive streetscapes, building form/architecture that is matched to the purpose of the sub-district, location of parking, and other techniques. The design qualities of the community should mirror the urban form – the higher the density and larger the buildings, the higher the expectation for urban amenities and architectural details.

Response: Design elements implemented through the proposed code amendments that support human-scale design include maximum square footages for individual business establishments, minimum FARs, and maximum setbacks in the MS and MEV subdistricts; pedestrian connectivity within sites, subdistricts, the district and beyond; and requirements for parking to be located at the rear of sites served by alley access. The proposed code amendments also apply the building design standards in OCMC 17.62.055 for all development, except industrial development, requiring quality building materials, siting of structures along the front property line, buildings oriented towards the street, entryways, façade modulation and articulation, and fenestration. The proposed code amendments will support attractive streetscapes through both design standards for private development along the street, such as maximum setbacks and provisions for pedestrian plazas and outdoor café seating within the setbacks, and the green street standards for the public right-of-way development. **The proposal is consistent with this Policy.**

Policy 9.3

Density should generally transition from highest on the west to lowest in the eastern part of the site.

Response: Generally, the proposed map and code amendments support graduated density across the district from west to east. Density transitions from highest in the west along Beaver Creek Road, with the R-2 zoning for the WMU subdistrict that

allows development up to 21.8 units an acre, transitioning to medium density at a maximum density of 8.7 units per acre for single-family detached homes in the east with the R-5 zoning for the EMU subdistrict. The density transitions to very low density on the eastern edge of the site within the Low Impact Conservation Area, limited to two units per acre. (See proposed OCMC 17.10.070.C.) **The proposal is consistent with this Policy.**

Policy 9.4

Promote compatibility with existing residential areas at the north and south end of the Concept Plan area. Transition to lower densities, setbacks, buffers and other techniques shall be used.

Response: The proposed code amendments support compatibility with existing residential areas to the north and south of the BRCP area by requiring buffers and setbacks. Under the proposed map and code amendments, the northern edge of the district is zoned CI and industrial development within the zone that is adjacent to residential is required to provide a 25-foot-wide buffer including landscaping, trees, berms, and fencing. (See proposed OCMC 17.37.060.D.) At the southern edge of the district, the proposed code requires a perimeter transition requiring larger 6,000 square foot lots restricted to single-family detached uses, a 40-foot setback from the edge of the district, and a combination of landscaping, trees and fencing. (See proposed OCMC 17.10.070.D.) **The proposal is consistent with this Policy.**

Goal 10 Ecological Health

Manage water resources on site to eliminate pollution to watersheds and lesson impact on municipal infrastructure by integrating ecological and man-made systems to maximize function, efficiency and health.

Response: The City has adopted the Stormwater and Grading Design Standards (2015) that emphasize low-impact development (LID) practices, which will be applied to new development within the BRCP area under the proposed map and code amendments. The Natural Resources Overlay District (NROD) in OCMC 17.49 will also be applied to stream corridors and riparian habitat through the proposed map and code amendments to protect water resources on site. **The proposal is consistent with this Goal.**

Policy 10.1

Utilize low impact development practices and stormwater system designs that mimic natural hydrologic processes, minimize impacts to natural resources and eliminate pollution to watersheds.

Response: Since the BRCP was initially written in 2008, the City has adopted the Stormwater and Grading Design Standards (2015), emphasize low-impact development (LID) practices, source controls for higher pollutant generating activities, erosion prevention and sediment controls, and operation and maintenance practices designed to properly manage stormwater runoff and protect our water resources. Some of the permitted LID techniques, some of which mimic natural hydrologic processes, include porous pavement, green roofs, filtration planters, infiltration planters, swales, and rain gardens. (See <https://www.orcity.org/publicworks/stormwater-and-grading-design-standards>) **The proposal is consistent with this Policy.**

Policy 10.2

Prepare the Environmentally Sensitive Resource Area overlay to protect, conserve and enhance natural areas identified on the Concept Plan. Apply low-density base zoning that allows property owners to cluster density outside the ESRA and transfer to other sites.

Response: Areas identified within the Environmentally Sensitive Resource Area will be protected by a variety of strategies through the proposed map and code amendments. Most importantly, the Natural Resources Overlay District (NROD) in OCMC 17.49 will be applied to stream corridors and riparian habitat, including Thimble Creek on the eastern edge of the site. The Geologic Hazards Overlay District will be applied to steep slopes per OCMC 17.44, limiting development on slopes 25 to 35% to two units per acre and prohibiting development on slopes above 35%. The key ESRAs identified on page 1 of the BRCP are generally protected through the combination of these two overlays, however, there are minor discrepancies in the extent of individual nodes. In 2008 when the BRCP was being drafted, there was discussion that upland habitat areas could be protected through the NROD as well, however, subsequent development of the NROD standards elected to exclude upland habitat areas because there is no mechanism for such in Metro's Title 13. The exclusion of the upland habitat areas slightly reduces the extent of some of the identified ESRA nodes, but the NROD and geologic hazard overlays together protect the core of each resource area. The NROD includes density transfer provisions in OCMC 17.49.240. **The proposal is consistent with this Policy.**



Oregon City Municipal Code Beavercreek Road Concept Plan Implementing Code June 7, 2019 Draft

Chapter 16.08, Land Divisions - Process and Standards

16.08.025 - Preliminary plat—Required information.

- A. Site Plan. A detailed site development plan drawn to scale by a licensed professional based on an existing conditions plan drawn by a licensed surveyor. The site plan shall include the location and dimensions of lots, streets, existing and proposed street names, pedestrian ways, transit stops, common areas, parks, trails and open space, building envelopes and setbacks, all existing and proposed utilities and improvements including sanitary sewer, stormwater and water facilities, total impervious surface created (including streets, sidewalks, etc.), all areas designated as being within an overlay district and an indication of existing and proposed land uses for the site. (...)

16.08.040 – Park and open space requirements.

Where a proposed park, open space, playground, public facility, or other public use shown in a plan adopted by the city is located in whole or in part in a land division, the City may require the dedication or reservation of this area on the final plat for the partition or subdivision.

16.08.042 - Additional Public Park Requirements in Beavercreek Road Concept Plan area.

- A. Each development within the Beavercreek Road Concept Plan area that includes residential development must provide for land for neighborhood parks which meets the requirements of this section.
- B. The minimum amount of land in acres dedicated for a park shall be calculated according to the following calculation: (2.6 persons per dwelling units) x (total number of dwelling units proposed in the development) x (8.0 acres) / (1,000 persons).
- C. The entire acreage must be dedicated prior to approval or as part of the final plat or site plan development approval for the first phase of development.
- D. If a larger area for a neighborhood park is proposed than is required based on the per-unit calculation described in subsection (A), the City must reimburse the applicant for the value of the amount of land that exceeds the required dedication based on the fee-in-lieu formula expressed in subsection (E)(1).

- E. The City may accept a fee-in-lieu as an alternative to this dedication at its discretion or may require a fee-in-lieu if a suitable site meeting the criteria described in subsection (F) of these provisions is not available with the development site. The calculation of the fee-in-lieu or other monetary contribution must meet the following standards.
 - 1. The amount of the fee in lieu or other monetary contribution is set in dollars per acre of required dedication and is equivalent to the appraised cost of land within the development, as provided by a certified appraiser chosen by the City and with the assumption that zoning and other land use entitlement are in place.
 - 2. The fee-in-lieu or other monetary contribution must be paid prior to approval of the final plat or development approval for each phase of development.
- F. Neighborhood park sites proposed for dedication must meet the following criteria.
 - 1. Located within the South Central Open Space Network as shown in Figure 16.08.042-1. *Figure 16.08.042-1 (To be provided, will show the South Central Open Space Network as mapped on the Development Constraints Map.)*
 - 2. Met either of the following standards:
 - a. Pearl standard. *(To be developed with Parks input.)*
 - b. String standard. *(To be developed with Parks input.)*

Chapter 17.10, R-5 Medium Density Residential District (East Mixed-Use Neighborhood subdistrict)

17.10.070 – Additional Standards for Beaver Creek Road Concept Plan Area

- A. Applicability. This section applies to all development in the R-5 district within the Beaver Creek Road Concept Plan area.
- B. Relationship of Standards. These standards apply in addition to and supersede the standards of the R-5 zone within the Beaver Creek Road Concept Plan area. In the event of a conflict, the standards of this section control.
- C. Low-Impact Conservation Area. Between the west edge of the designated Natural Resources Overlay District extent required along Thimble Creek extending east to the 490-foot elevation (MSL), additional standards apply to create a low-impact conservation area as depicted in Figure 17.10.070-1 and preserve views to adjacent natural areas.

Figure 17.10.070-1 Extent of Low-Impact Conservation Area (To be provided based on Concept Plan.)

- 1. The standards of this section apply in addition to the requirements of OCMC 17.44, US—Geologic Hazards, if applicable. In the event of a conflict, the more restrictive shall apply.
- 2. Development intensity shall be limited as follows:
 - a. The maximum residential density shall be limited to two dwelling units per acre;

1. For all lots adjacent to the southern boundary and within 20 feet of the southern boundary, uses shall be limited to single-family detached residential and parks, trails and open space.
2. For all lots adjacent to the southern boundary and within 20 feet of the southern boundary, minimum lot size for residential uses shall be 6,000 square feet.
3. All structures shall be set back a minimum of 40 feet from the southern boundary for all lots adjacent to the southern boundary and within 20 feet of the southern boundary.
4. Within the 40-foot wide setback, a combination of landscaping and screening shall be provided to buffer the perimeter. The landscaping and screening shall meet one of the two standards:
 - a. Utilize existing vegetation in compliance with OCMC 17.41 resulting in preservation or replanting of a minimum of 12 inches of tree diameter inches per lot with trees spaced an average of one tree for every 30 linear feet along the southern property line. These trees may be located on the residential lots or an abutting tract created for tree preservation consistent with OCMC 17.41.050.B or other similar landscaping or open space purpose.
 - b. Provide a combination of landscaping and screening to include:
 - (i) A minimum of 12 inches of tree diameter inches per lot, or a minimum of an average of one tree with minimum caliper of two inches DBH for every 30 linear feet along the southern property line, whichever is greater; and
 - (ii) A minimum six-foot tall, decorative, sight-obscuring fence or wall running parallel to the southern boundary. The fence or wall shall be constructed of wood, stone, rock, or brick. Other durable materials may be substituted with Planning Director's approval. Chainlink fencing with slats shall be not allowed to satisfy this standard.
5. An alternative southern perimeter transition may be proposed as part of a Master Plan per OCMC 17.65, provided it is consistent with the goals of the adopted Beaver Creek Road Concept Plan.

Chapter 17.12, R-2 High Density Residential District (West Mixed-Use Neighborhood subdistrict)

17.12.060 – Additional Standards for Beaver Creek Road Concept Plan Area

- A. Applicability. This section applies to all development in the R-2 district within the Beaver Creek Road Concept Plan area.
- B. Relationship of Standards. These standards apply in addition to and supersede the standards of the R-2 zone within the Beaver Creek Road Concept Plan area. In the event of a conflict, the standards of this section control.
- C. Uses.
 1. Live/work dwellings are a permitted use.
 2. As part of a master plan when authorized by and in accordance with the standards contained in OCMC 17.65, up to five thousand square feet of commercial space as a stand-alone building or part of a larger mixed-use building, to be used for:
 - a. Restaurants, eating and drinking establishments without a drive through;

- b. Services, including personal, professional, educational and financial services; laundry and dry-cleaning; or
 - c. Retail trade, including grocery, hardware and gift shops, bakeries, delicatessens, florists, pharmacies, specialty stores, and similar.
- D. Sustainability density bonus. The maximum net density allowed in 17.12.050.B may be increased by up to twenty percent, or a maximum net density of 26.2 du/acre, for projects incorporating the following sustainability features. For every feature provided below, net density may be increased by up to five percent, with a maximum twenty percent bonus available.
 - 1. A vegetated ecoroof for a minimum of thirty percent of the total roof surface.
 - 2. For a minimum of seventy-five percent of the total roof surface, a white roof with a Solar Reflectance Index (SRI) of 78 or higher if the roof has a 3/12 roof pitch or less, or SRI of 29 or higher if the roof has a roof pitch greater than 3/12.
 - 3. A system that collects rainwater for reuse on-site (e.g., site irrigation) designed to capture an amount of rainwater equivalent to the amount of stormwater anticipated to be generated by 50% of the total roof surface.
 - 4. An integrated solar panel system for a minimum of thirty percent of the total roof or building surface.
 - 5. Orientation of the long axis of the building within thirty degrees of the true east-west axis, with unobstructed solar access to the south wall and roof.
 - 6. Windows located to take advantage of passive solar collection and include architectural shading devices (such as window overhangs) that reduce summer heat gain while encouraging passive solar heating in the winter.
 - 7. Fifty percent or more of landscaped area covered by native plant species selected from the Oregon City Native Plant List.
 - 8. Provision of pedestal or wall-mounted Level 2, two hundred forty-volt electric vehicle chargers, or similar alternative fueling stations as approved by the planning director, at a minimum ratio of one station per fifty vehicle parking spaces up to a maximum of five such stations.
 - 9. Building energy efficiency measures that will reduce energy consumption by thirty percent based on HERS rating for building, including efficient lighting and appliances, efficient hot water systems, solar orientation or solar water heating, solar photovoltaic panels, geothermal, and offsetting energy consumption with alternative energy.
 - 10. Use of Forest Stewardship Council certified wood Reclaimed Wood for a minimum of thirty percent of wood products used in the site development.
 - 11. Permeable paving, which may include porous concrete, permeable pavers, or other pervious materials as approved by the city engineer, for a minimum of thirty percent of all paved surfaces.
 - 12. Buildings LEED-certified by the U.S. Green Building Council at any level shall be allowed to increase net density by the full twenty percent.
 - 13. Or an alternative the meets or exceeds the intent of the above code as approved by the Community Development Director through a Type II review.

Chapter 17.24, NC Neighborhood Commercial District (Main Street subdistrict)

17.24.050 – Additional Standards for Beaver Creek Road Concept Plan Area

- A. Applicability. This section applies to all development in the NC district within the Beaver Creek Road Concept Plan area.
- B. Relationship of Standards. These standards apply in addition to and supersede the standards of the NC zone within the Beaver Creek Road Concept Plan area. In the event of a conflict, the standards of this section control.
- C. Uses.
 - 1. All uses permitted per OCMC 17.24.020.A and B, including grocery stores, are limited to a maximum footprint for a stand alone building with a single store or multiple buildings with the same business not to exceed ten thousand square feet, unless otherwise restricted in this chapter.
 - 2. Residential uses are permitted subject to limitations in OCMC 17.24.050.E, and are not subject to OCMC 17.29.020.M, OCMC 17.29.020.N, and OCMC 17.24.020.D.
 - 3. Artisan and specialty goods production is permitted, constituting small-scale businesses that manufacture artisan goods or specialty foods and makes them available for purchase and/or consumption onsite, with an emphasis on direct sales rather than the wholesale market. Examples include: candy, fruit and vegetable preserving and specialty foods, bakeries and tortilla manufacturing; artisan leather, glass, cutlery, hand tools, wood, paper, ceramic, textile and yarn products; microbreweries, microdistilleries, and wineries. All uses shall provide either:
 - a. A public viewing area that includes windows or glass doors covering at least twenty-five percent of the front of the building face abutting the street or indoor wall, allowing direct views of manufacturing; or
 - b. A customer service space that includes a showroom, tasting room, restaurant, or retail space.
 - 4. Drive-throughs are prohibited.
 - 5. Gas stations are prohibited.
- D. Dimensional standards.
 - 1. Maximum building height shall be sixty feet or five stories, whichever is less.
 - 2. Minimum building height shall be twenty-five feet or two stories, whichever is less, except for accessory structures or buildings under one thousand square feet.
 - 3. Maximum corner side yard setback abutting a street shall be five feet.
 - 4. Minimum floor area ratio (FAR) shall be 0.5.
 - a. Required minimum FARs shall be calculated on a project-by-project basis and may include multiple contiguous blocks. In mixed-use developments, residential floor space will be included in the calculations of floor area ratio to determine conformance with minimum FAR.

1. Light industrial uses limited to the design, light manufacturing, processing, assembly, packaging, fabrication and treatment of products made from previously prepared or semi-finished materials are permitted.
 2. The following permitted uses, alone or in combination, shall not exceed twenty percent of the total gross floor area of all of the other permitted and conditional uses within the development site. The total gross floor area of two or more buildings may be used, even if the buildings are not all on the same parcel or owned by the same property owner, as long as they are part of the same development site, as determined by the community development director.
 - a. Restaurants, eating and drinking establishments;
 - b. Services, including personal, professional, educational and financial services; laundry and dry-cleaning;
 - c. Retail trade, including grocery, hardware and gift shops, bakeries, delicatessens, florists, pharmacies, specialty stores, marijuana, and similar, provided the maximum footprint for a stand-alone building with a single store does not exceed twenty thousand square feet; and
 - d. Grocery stores provided the maximum footprint for a stand-alone building does not exceed forty thousand square feet.
 3. Drive-throughs are prohibited.
 4. Gas stations are prohibited.
 5. Bed and breakfast and other lodging facilities for up to ten guests per night are a conditional use.
 6. Tax Lot 00800, located on Clackamas County Map #32E10C has a special provision to allow the multifamily residential use permitted as of (Ordinance effective date) as a permitted use. This property may only maintain and expand the current use.
- D. Dimensional standards.
1. Minimum floor area ratio (FAR) shall be 0.35.
 2. Maximum allowed setback for corner side yard abutting street shall be five feet.
- E. Residential uses. All residential uses, except live/work units, are limited to upper stories only, and may only be proposed as part of a single development application incorporating nonresidential uses allowed in the MUC-2 district on the ground floor.

Chapter 17.37, CI Campus Institutional District (North Employment Campus subdistrict)

17.37.060 – Additional Standards for Beaver Creek Road Concept Plan Area

- A. Applicability. This section applies to all development in the CI district within the Beaver Creek Road Concept Plan area.
- B. Relationship of Standards. These standards apply in addition to and supersede the standards of the CI zone within the Beaver Creek Road Concept Plan area. In the event of a conflict, the standards of this section control.

C. Uses.

1. The following permitted use supersedes the use allowed in OCMC 17.37.020.L. Retail sales and services, including but not limited to eating establishments for employees (i.e. a cafe or sandwich shop) or retail sales of marijuana pursuant to OCMC 17.54.110, located in a single building or in multiple buildings that are part of the same development shall be limited to a maximum of five thousand square feet in a single outlet or twenty thousand square feet in multiple outlets that are part of the same development project.
2. The following permitted use supersedes the use allowed in OCMC 17.37.020.M. Retail and professional services including but not limited to financial, insurance, real estate and legal offices limited to a maximum of five thousand square feet in a single outlet or twenty thousand square feet in multiple outlets that are part of the same development project. Financial institutions shall primarily serve the needs of businesses and employees within the development, and drive-throughs are prohibited.
3. Offices as an accessory to a permitted use are permitted.
4. Parks, trails, urban agriculture and community garden uses are permitted.
5. Distribution and warehousing are prohibited.
6. Tax Lots 00300, 00301, 00302, 00303, 00400 and 00401, located on Clackamas County Map #32E10C have a special provision to allow single-family detached residential use as a permitted use. This property may only maintain and expand the current use.

D. Buffer zone treatment required in OCMC 17.37.040.D shall include:

1. Landscaping shall be installed to provide screening of views of parking, loading and vehicle maneuvering areas, refuse/recycling collection areas, outdoor storage, and building façades. Buffer zone treatment may substitute for perimeter parking lot landscaping required per OCMC 17.52.060.C. Landscaping shall include:
 - a Trees a minimum of two caliper inches dbh planted on average 30 feet on center. Existing mature vegetation may be used to meet this standard if it achieves a similar level of screening as determined by the Planning Director.
 - b An evergreen hedge screen of thirty to forty-two inches high or shrubs spaced no more than 4 four feet apart on average.
 - c Ground cover plants, which includes grasses covering all landscaping areas. Mulch (as a ground cover) shall only be allowed underneath plants at full growth and within two feet of the base of a tree and is not a substitute for ground cover.
2. Buffer shall incorporate a berm no less than three feet in height above the existing grade, constructed with a slope no steeper than 3:1 on all sides. The berm shall be planted with plant materials to prevent erosion.
3. A minimum six-foot tall, decorative, sight-obscuring fence or wall. The fence or wall shall be constructed of materials commonly used in the construction of fences and walls, such as wood, stone, rock, brick, or other durable materials. Chainlink fencing with slats shall be not allowed to satisfy this standard.

E. Outdoor storage permitted per OCMC 17.37.050.D shall be limited to a maximum of twenty-five percent of the net developable area.

F. Power line corridors. A distinct feature of this district is the power line corridors north of Loder Road that define open corridors.

1. Within the power line corridors, a minimum 30-foot wide open space and public access easement shall be granted to the City. The easement shall run parallel to the power line corridor and align with easements on abutting properties to create a continuous corridor.
 2. The easement may be shown on the final plat or recorded as a separate easement document. In either case, the easement must be recorded prior to issuance of a certificate of occupancy.
 3. Open spaces within the power line corridors, including the open space easements, may be counted as landscaping satisfying the requirements of OCMC 17.62.050.A.
 4. Additional uses encouraged in the power line corridors include community gardens, urban agriculture, stormwater and water quality features, plant nurseries, and solar farms.
- G. Sustainability features. Each development must incorporate six of the following sustainability features.
1. A vegetated ecoroof for stormwater management. An ecoroof covering twenty to forty percent of the total roof area shall count as one feature, and a roof covering more than forty percent of the total roof area shall count as two features.
 2. A white roof with a Solar Reflectance Index (SRI) of 78 or higher if the roof has a 3/12 roof pitch or less, or SRI of 29 or higher if the roof has a roof pitch greater than 3/12 covering a minimum of seventy-five percent of the total roof area.
 3. A system that collects rainwater for reuse on-site (e.g., site irrigation) designed to capture an amount of rainwater equivalent to the amount of stormwater anticipated to be generated by 50% of the total roof surface.
 4. An integrated solar panel system mounted on the roof or anywhere on site. A solar system with surface area equivalent to a minimum of twenty to forty percent of the total roof area shall count as one feature, and a solar system with surface area equivalent to forty percent or more of the total roof area shall count as two features.
 5. Use of native plant species selected from the Oregon City Native Plant List. Native plantings that cover twenty to thirty percent of the total landscaped area shall count as one feature, and plantings that cover thirty percent or more of the total landscaped area shall count as two features.
 6. Provision of pedestal or wall-mounted Level 2, two hundred forty-volt electric vehicle chargers, or similar alternative fueling stations as approved by the planning director, at a minimum ratio of one station per fifty vehicle parking spaces up to a maximum of five such stations.
 7. Permeable paving, which may include porous concrete, permeable pavers, or other pervious materials as approved by the city engineer. Permeable paving totaling twenty to forty percent of all paved surfaces shall count as one feature, and permeable paving of forty percent or more of all paved surfaces shall count as two features.
 8. Buildings LEED-certified by the U.S. Green Building Council at any level shall be counted as three features.
 9. Or an alternative that meets or exceeds the intent of the above code as approved by the Community Development Director through a Type II review.

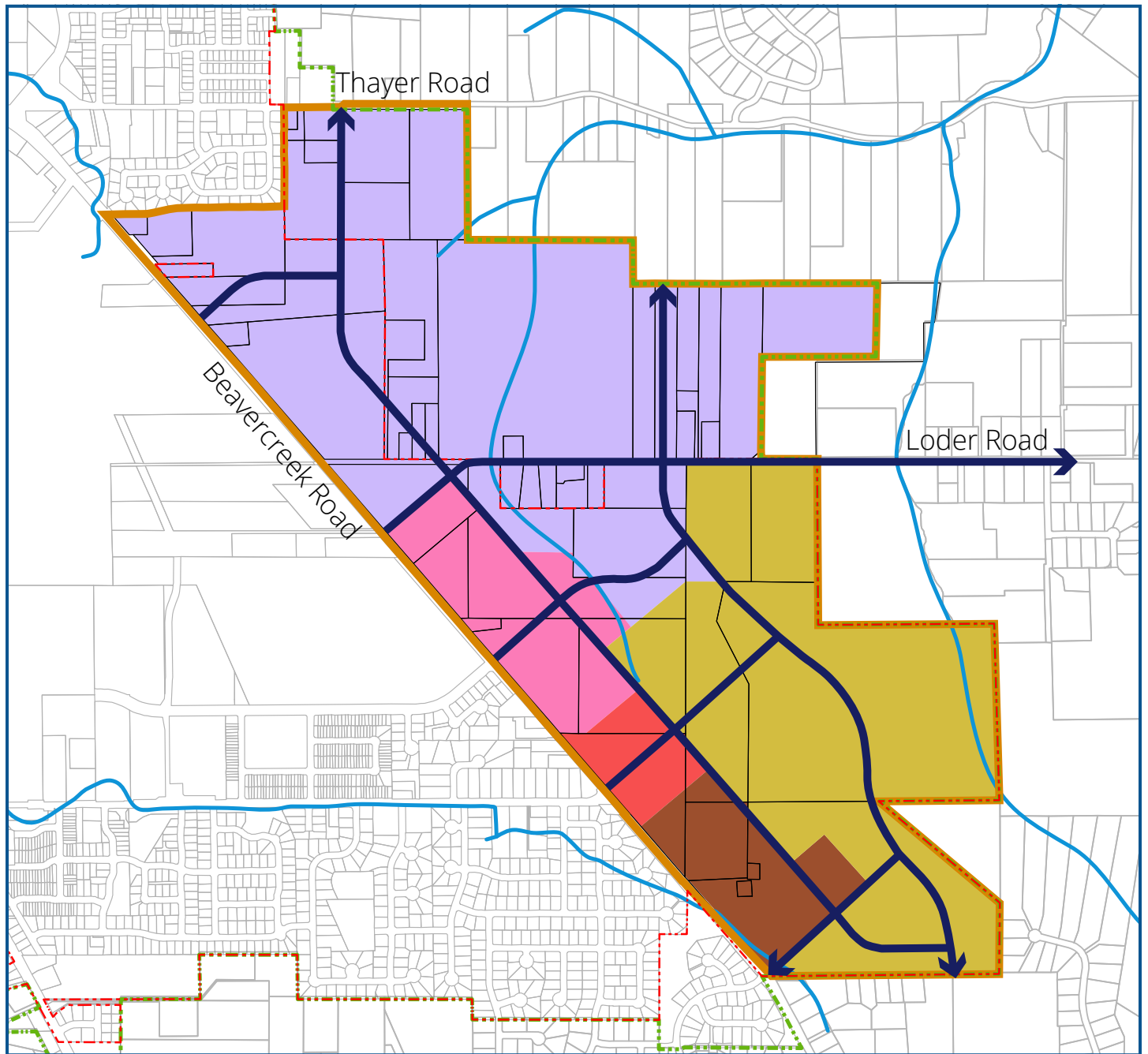
Chapter 17.62 Site Plan and Design Review

17.62.058 - Additional Public Park Requirements in Beavercreek Road Concept Plan area.

- A. Each development within the Beavercreek Road Concept Plan area that includes residential development must provide for land for neighborhood parks which meets the requirements of this section.
- B. The amount of land in acres dedicated for a park shall equal at least the following calculation: (2.6 persons per dwelling units) x (total number of dwelling units proposed in the development) x (8.0 acres) / (1,000 persons).
- C. The entire acreage must be dedicated prior to approval or as part of the site plan development approval for the first phase of development.
- D. If a larger area for a neighborhood park is proposed than is required based on the per-unit calculation described in subsection (A), the City must reimburse the applicant for the value of the amount of land that exceeds the required dedication based on the fee-in-lieu formula expressed in subsection (E)(1).
- E. The Planning Director may accept a fee-in-lieu as an alternative to this dedication at its discretion or may require a fee-in-lieu if a suitable site meeting the criteria described in subsection (F) of these provisions is not available with the development site. The calculation of the fee-in-lieu or other monetary contribution must meet the following standards.
 - 1. The amount of the fee in lieu or other monetary contribution is set in dollars per acre of required dedication and is equivalent to the appraised cost of land within the development site, as provided by a certified appraiser chosen by the City and with the assumption that zoning and other land use entitlement are in place.
 - 2. The fee-in-lieu or other monetary contribution must be paid prior to approval of the final development approval for each phase of development.
- F. Neighborhood park sites proposed for dedication must meet the following criteria.
 - 1. Located within the South Central Open Space Network as shown in Figure 16.08.042-1. Figure 17.62.058-1 (Same as proposed in OCMC 16.08.042.)
 - 2. Met either of the following standards:
 - a. Pearl standard. (To be developed.)
 - b. String standard. (To be developed.)

Beavercreek Road Concept Plan

Proposed Zoning and Comprehensive Plan Designations



Legend



BRCP Subdistrict	Comp Plan Designation	Zoning Designation	
West Mixed Use Neighborhood	High Density Residential	High Density Residential	R-2
East Mixed Use Neighborhood	Medium Density Residential	Medium Density Residential	R-5
Main Street	Mixed Use Corridor	Neighborhood Commercial	NC
Mixed Employment Village	Mixed Use Corridor	Mixed Use Corridor	MUC-2
North Employment Campus	Industrial	Campus Industrial	CI
			BRCP Boundary
			Urban Growth Boundary
			City Limits
			Future Road Connections
			Streams

Proposed Zoning and Comprehensive Plan Designations





MEMO

Date: June 7, 2019
To: Laura Terway & Christina Robertson-Gardiner, City of Oregon City
From: Elizabeth Decker, JET Planning
Subject: Beaver Creek Road Concept Plan Implementing Zoning Code

Overview: Oregon City aims to further implementation of the Beaver Creek Road Concept Plan (BRCP) through comprehensive plan designation and zone mapping, and development code amendments, to complement the public vision, infrastructure, and economic development measures that have already been completed or planned east of Beaver Creek Road generally between Thayer Road and Old Acres Lane. Development of the 453-acre BRCP area is intended to create around 1,000 housing units and up to 5,000 family-wage jobs as part of a complete and sustainable community.

The overall strategy for implementing code is to use existing zones, rather than create a Beaver Creek Road area-specific overlay. The practice has been used to implement the City's other two concept plans. Several of the implementing zones proposed here were developed for concept plan areas, including the Neighborhood Commercial and the Residential Medium Density R-5 zone. Proposed zoning districts for each concept plan subdistrict include:

<i>Concept Plan Subdistrict</i>	<i>Zone</i>
North Employment Campus	Campus Institutional (CI)
Mixed Employment Village	Mixed-Use Corridor (MUC-2)
Main Street	Neighborhood Commercial (NC)
West Mixed-Use Neighborhood	High-Density Residential (R-2)
East Mixed-Use Neighborhood	Medium-Density Residential (R-5)
Environmentally Sensitive Restoration Area	Natural Resources Overlay District (NROD) Geological Hazard Overlay District (GHOD)

This memo provides a short introduction to the draft code amendments to implement the Concept Plan provisions. All of the base zone standards apply, in addition to the proposed code standards specific to each subdistrict described

below. Note that the proposed amendments incorporate the most recent code language from the Equitable Housing and other development code amendments currently under review by the City Commission.

OCMC 16.08, Land Divisions – Process and Standards

- Proposed code amendments include additional public park requirements or fee-in-lieu option to ensure land for the South Central Open Space Network is reserved and dedicated to the city at the time of residential subdivisions. This is expected to largely apply to development in the R-5 district.

OCMC 17.10, R-5 Medium Density Residential District (East Mixed-Use Neighborhood subdistrict)

- No changes are proposed to the mix of uses or dimensional standards in the zone beyond those proposed in the Equitable Housing code amendments.
- Standards for the Low-Impact Conservation Area implement the plan goals for the area upslope of Thimble Creek, on the eastern edge of the Beavercreek Road district. The proposed standards limit development to two units per acre, require open space preservation and restoration, and require view corridors to preserve views.
- A 40-foot perimeter buffer is proposed along the southern edge of the district including landscaping, setbacks and fencing, to manage the transition to lower-density residential development outside City limits along Old Acres Lane to the south.

OCMC 17.12, R-2 High Density Residential District (West Mixed-Use Neighborhood subdistrict)

- Allows additional uses consistent with the Concept Plan include live/work dwellings and limited commercial/mixed-use spaces.
- Provides up to a 20% density bonus for development incorporating sustainability features.
- Additional changes in 17.62 add requirement for additional public park dedication or fee-in-lieu, consistent with requirement for new subdivisions.

OCMC 17.24, MC Neighborhood Commercial District (Main Street subdistrict)

- Limits uses to a 10,000 SF building footprint to encourage pedestrian-scale, main street businesses. Limits residential uses to 50% of the project floor area, and prohibits ground-floor residential uses within 150 feet of Glen Oak Road (which will be the “main street.”) Adds a new use category for artisan and specialty goods production to allow limited manufacturing type uses.

- Increase dimensional standards to match scale proposed in the Concept Plan, including a five-story height limit and 0.5 FAR minimum.
- Improves building presence and interaction along the street by requiring parking to be located behind building facades.

OCMC 17.29, MUC Mixed-Use Corridor District (Mixed Employment Village subdistrict)

- Light industrial uses are permitted to implement the employment aspect of the vision for this subdistrict. Retail and service uses, including food service, are limited to 20% of a site to maintain the focus on employment uses generating family-wage jobs. Residential uses are limited to upper stories only.
- One parcel with an in-progress residential development is permitted outright, to avoid creating a nonconforming use.
- An additional dimensional standard implements a minimum 0.35 FAR for new development to ensure efficient use of land.

OCMC 17.31, CI Campus Institutional District (North Employment Campus subdistrict)

- Retail and professional service uses are limited consistent with Metro Title 4 requirements to preserve land for industrial uses. Offices are permitted consistent with uses outlined in the Concept Plan, whereas distribution and warehouse uses are prohibited because they create relatively few jobs per acre inconsistent with the plan goals.
- Several parcels with existing single-family residential development are permitted outright, to avoid creating nonconforming uses. (These parcels are outside of Title 4 lands, so there is no conflict with employment requirements.)
- Additional standards require landscaping, berms and fences within the required 25-foot transition area between industrial and residential uses.
- Outdoor storage is limited to a maximum of 25% of the developable area to avoid inefficient use of land that does not support employment plan goals.
- A minimum 30-foot open space and trail corridor is required along the powerline corridor. Additional parks, trails, urban agriculture and community garden uses are permitted consistent with the plan goals for uses within the powerline easement.
- Sustainable development features are required for all development to implement the plan's sustainability goals.

**OCMC 17.44, US – Geologic Hazards and OCMC 17.49 – Natural Resources
Overlay District**

- No changes are proposed to the geologic hazard or NROD standards for this district; resource areas within the concept plan area will be protected consistent with existing standards.

OCMC 17.62, Site Plan and Design Review

- Proposed code amendments include additional public park requirements or fee-in-lieu option to ensure land for the South Central Open Space Network is reserved and dedicated to the city at the time of residential subdivisions. This is intended to apply to any residential development in the R-2 or the mixed-use districts that does not get developed through subdivision.

MEMORANDUM

To: Christina Robertson Gardiner, AICP
Planner
City of Oregon City
698 Warner Parrott Rd
Oregon City, Oregon 97045

From: Steve Faust, AICP
Project Manager

Date: June 7, 2019

Project Name: Beaver Creek Road Concept Plan Implementation

Project No: 18510

RE: BRCP Land Use Map Changes

The City of Oregon City (City) has initiated a project to update the Oregon City Comprehensive Plan Map, Zoning Map and Municipal Code to allow planned housing and mixed-use development to occur in the 2008 Beaver Creek Road Concept Plan (BRCP) area. Updates will apply zoning and map designations for properties within the BRCP area. The City, through a grant from the Oregon Department of Land Conservation and Development, has contracted with 3J Consulting to assist with this effort.

As part of the BRCP Implementation project, 3J Consulting has been tasked with applying and mapping zoning districts to implement the land use categories in the Concept Plan Map found on page 3 of the Beaver Creek Road Concept Plan (Attachment A).

An initial Land Use Map approximating the lines on the 2008 Concept Plan Map was prepared on April 9, 2019 (Attachment B). This map was used as a starting point for making employment and dwelling unit projections for the BRCP area. Several modifications have been made to the June 7, 2019 Land Use Map to reflect taxlot and development realities while maintaining substantial compliance with the Concept Plan Map and the public comments heard to date. The following is a summary and justification of the changes made to the June 7, 2019 Land Use Map (Attachment C).

Legend

BRCP Subdistrict	Comp Plan Designation	Zoning Designation	
 West Mixed Use Neighborhood	High Density Residential	High Density Residential	R-2
 East Mixed Use Neighborhood	Medium Density Residential	Medium Density Residential	R-5
 Main Street	Mixed Use Corridor	Neighborhood Commercial	NC
 Mixed Employment Village	Mixed Use Corridor	Mixed Use Corridor	MUC-2
 North Employment Campus	Industrial	Campus Industrial	CI
			 BRCP Boundary
			 Urban Growth Boundary
			 City Limits
			 Future Road Connections
			 Streams

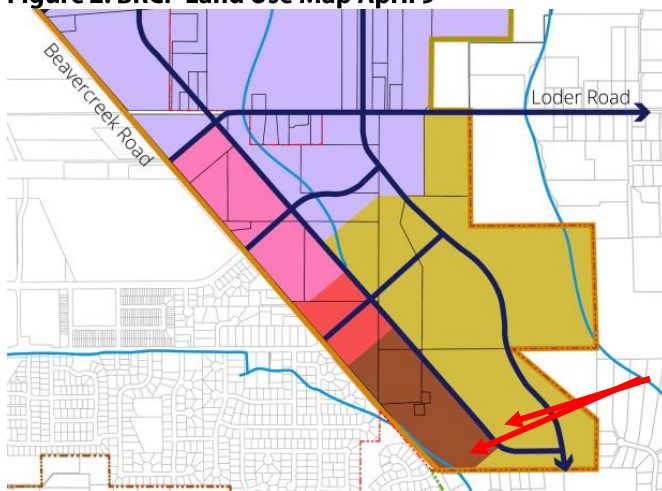


1. North of Old Acres Road – In response to concern from property owners about high-density residential development adjacent to Old Acres Road, the map is adjusted such that R-5 single family development is adjacent to that road. Additionally, some lands on the east edge of the R-2 district is extended across the street to allow for a "Neighborhood Focal Point" as identified in the plan.

Figure 1. BRCP Land Use Map Changes between April 9 and June 7, 2019



Figure 2. BRCP Land Use Map April 9



2. South of the Natural Resource Overlay District (NROD) in the South Central Open Space – the area north of the road parallel to Beaver Creek Road was originally zoned North Employment Campus (CI), but with the NROD and South Central Open Space overlays, there were two remnants that would be too small for industrial uses. The plan identifies this area as part of the Mixed-Employment district (MUC-2), so the boundaries are adjusted to make these remnants part of the MUC-2 district to better conform with the plan and avoid creating unusable lot remnants. Adjusted lines also conform with Title 4 identified lands to avoid conflict.

Figure 3. BRCP Land Use Map Changes between April 9 and June 7, 2019

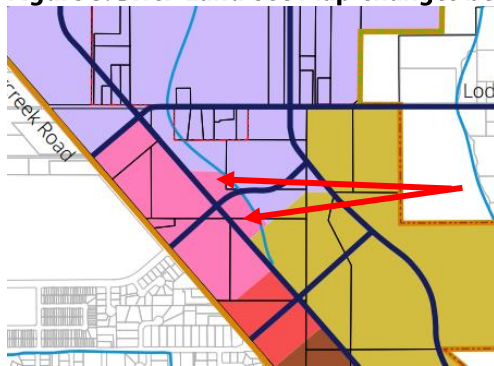
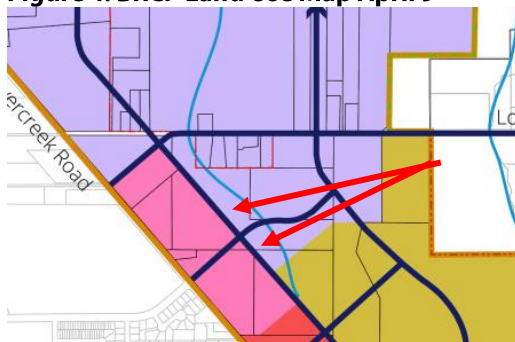


Figure 4. BRCP Land Use Map April 9



3. South of Loder towards the eastern edge of the BRCP area – In response to concern from the public about the prevalence and location of industrial lands near residential areas, lands zoned CI south of Loder Road and northeast of the easternmost north-south connector are adjusted to R-5. There is a small area that is Title 4 identified lands and is not adjusted.

Figure 5. BRCP Land Use Map Changes between April 9 and June 7, 2019

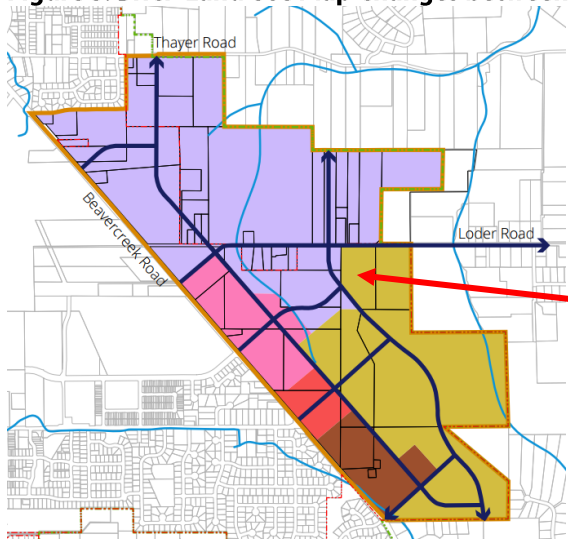
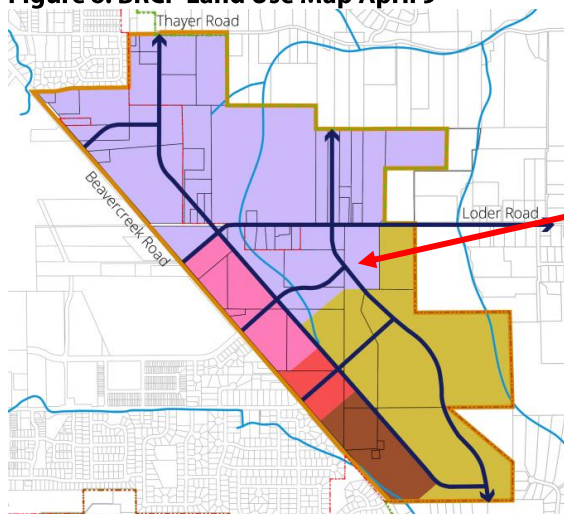


Figure 6. BRCP Land Use Map April 9



At the request of land owners with property north of Loder Road, 3J examined the possibility of changing zoning designations from employment to residential. Lands in the BRCP area north of Loder Road are designated as Metro Title 4 Industrial Lands (<https://www.oregonmetro.gov/industrial-and-employment-land>) which prohibit residential uses and thus this request could not be considered.

- - - END OF DOCUMENT - - -

DATE: June 21, 2019
TO: Christina Robertson-Gardner, City of Oregon City; Steve Faust, 3J Consulting
FROM: Bob Parker and Matt Craigie, ECONorthwest
SUBJECT: Beavercreek Road Concept Plan - Zoned Capacity Analysis - REVISED

The City of Oregon City contracted ECONorthwest to review and verify previous analyses conducted for the Beavercreek Road Concept Plan. The purpose of the project is to determine if the Beavercreek Road Planning Area—as planned—will have the future zoned capacity to accommodate the Plan’s projected number of jobs. In its simplest terms, this analysis is about fit and capacity. The key question is whether the zoning regulations that are being put in place over the Planning Area will actually allow for the 5,000 estimated jobs to occupy future buildings in the area. This analysis does not account for current or projected future market trends; it is exclusively focused on the examination of land use regulations and their implications for job capacity.

Findings

Our analysis shows that the Beavercreek Road Planning Area will have sufficient zoned capacity to accommodate estimated future employment growth. Under current zoning standards, the Planning Area at full build-out will be able to accommodate between 5,700 and 11,700 jobs (Exhibit 1, Rounded). These capacity levels are 15% to 131% more than the targeted 5,000 jobs for the Planning Area. Economic conditions will determine how the area is eventually built out, but zoned capacity is adequate to allow for a range of future job numbers that are at or above desired employment levels as described in the Beavercreek Road Concept Plan.

Exhibit 1. Beavercreek Planning Area, Zoned Capacity.

Sub-District	Maximum Zoned Job Capacity	Zoned Job Capacity with Market Considerations
Main Street	727	352
Mixed Employment Village	2,827	1,399
North Employment Campus	8,169	3,983
Total	11,723	5,734

Source: ECONorthwest

Our zoned capacity model was built using Oregon City’s current zoning standards. Here we present two capacity estimates:

- First, **the maximum job capacity** for the area shows the total number of jobs that could fit in the area under current regulations.
- Second, the lower estimate—**Job Capacity with Market Considerations**—illustrates another interpretation of Oregon City’s zoning regulations. In this second scenario, we have further restricted the scale of allowable development by: (1) modeling an underbuilt of total development as a result of insufficient parking areas, and (2) dedicating a higher percentage of area on individual parcels to internal rights of way,

ingress/egress space, and private streets. This is intended to reflect potential market conditions that would reduce the amount of built space, and as a result, the number of employees.

The maximum zoned capacity scenario is a true maximum; meaning that this estimate is modeling the highest density of employment permissible by zoning regulations and standards, without any consideration for how employment areas generally get developed. For example, the maximum scenario assumes over 8,000 jobs in the North Employment Campus area. To accomplish this scale of development would require the development of acres upon acres of four-story office buildings that have relatively little parking area. Although permissible, this scenario is unlikely to occur and therefore is a poor estimate of the actual zoned capacity of the Planning Area.

The more restrictive scenario presents a situation where development scale is linked to our observations of the density of other similar industrial areas across the Portland region and therefore better reflects what one could expect to happen in the Beavercreek Planning Area. For this scenario, we have adapted parking ratios to those generally demanded in the marketplace and deducted some internal area of parcels for circulation space and other rights of way. The large size of some parcels, especially inside the North Employment Campus (NEC), would warrant these internal spaces dedicated to transportation flow and parking.

For example, many flex-industrial buildings—a desired development type for the NEC—are two story buildings with multiple tenants. These “flex” buildings are built to flexibly adapt to the needs of different tenants. They are built with adaptable internal build-outs (e.g. varying amounts of office and warehouse space) and feature enough parking for employees as well as truck loading/unloading, circulation, and outdoor storage. Therefore, it is common to see flex buildings with not just enough parking and circulation space for employees that are coming and going from work, but to accommodate a wider variety of truck space, outdoor storage space, and general circulation space. In our model, we reflect these common observations by both increasing the parking ratio and reducing the number of stories for buildings in the NEC. These changes bring the potential development scale for the NEC in line with the maximum build-out observed in other industrial areas of the region.

With these changes, the restrictive—and more realistic—scenario shows a zoned capacity of the Planning Area to be reduced from the maximum scenario (11,723 down to 5,734). Despite the reduction, there still is adequate space to accommodate the 5,000 projected jobs.

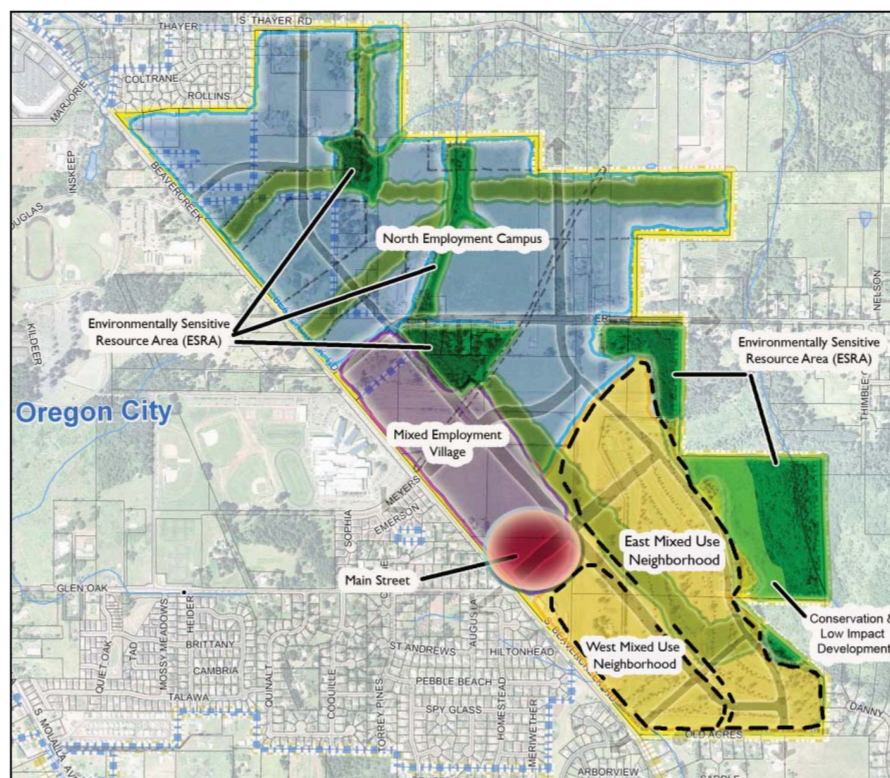
Economic and market trends will inform the type, scale, and demands of future development of the Beavercreek Planning Area. Whatever development does eventually get built in the area, our analysis shows that zoning regulations and standards will allow for enough developable space for the desired amount of employment.

Background

In 2008, Oregon City contracted the consulting firm Otak, in collaboration with several consultants (including ECONorthwest), to develop a concept plan¹ for a 453-acre site in the southeast area Oregon City. The Plan envisioned a diverse mix of uses, organized by five sub-districts (see Exhibit 2).

Exhibit 2. Land Use Sub-Districts for Beavercreek Road Concept Plan

Source: Beavercreek Road Concept Plan, Envision a Complete and Sustainable Community, 2008.



The five subareas are summarized as follows:

1. **North Employment Campus (NEC)** allows clean industries, offices servicing industrial needs, light industrial uses, research and development, and large corporate headquarters.
2. **Mixed Employment Village (MEV)** allows retail and offices (including civic and residential uses).
3. **Main Street (MS)** allows small scale commercial and mixed-use services.
4. **West Mixed-Use Neighborhood (WMU)** allows live/work units, mixed use buildings, limited commercial uses, and—to a larger extent—housing.

¹ Beavercreek Road Concept Plan, Envision a Complete and Sustainable Community, 2008.

5. East Mixed-Use Neighborhood (EMU) primarily allows housing.

At present, Oregon City is revisiting the concept plan as a step toward the Plan's implementation. The City has asked several consultants to review and analyze select parts of the concept plan to verify the veracity of its underlying analyses. A key aspect of this effort is to understand whether the Planning Area will have the zoned capacity to accommodate the Plan's stated number of future jobs. ECONorthwest was assigned this task. To answer this key question of zoned capacity, we reviewed the findings of the 2008 work and conducted additional analyses. Our approach and a description of our analysis is outlined in the next section.

Approach

Our approach to this analysis had a few steps. These included:

- **Collecting and verifying data.** The first step involved gathering applicable data from the Plan, from the City, and other sources. Employment projections come directly from The Plan. The Plan identified an estimated capacity for approximately 5,000 jobs (for reference, the output table from the Plan is presented in Appendix A).

We also compiled an organized list of Oregon City's development codes, standards, and regulations from the City's current municipal code. These regulatory standards were used to create our zoned capacity model.

- **Developing a zoned capacity model.** Using Oregon City's development code and standards, we generated a catalogue of zoning requirements and limitations for each zoning designation that comprises the five sub-districts of the Planning Area. With this information, we developed a model that calculates the maximum job capacity for each sub-district. To calibrate the model to likely future outcomes, we relied on planning and development assumptions taken from our observations of similar fully built-out areas around the Portland Metropolitan region.²
- **Reconciling zoned capacity model output with future employment projections.** This step formed the central part of our analysis. In this step, we used the output of the zoned capacity model—the job capacity for each subarea of the Planning Area—and matched those outputs to future employment projections.

A more detailed description of our analysis is presented in the next section.

² Key assumptions for this analysis, include: actual parking ratios, percent of parcels that achieve full build-out, common building to land ratios, among others.

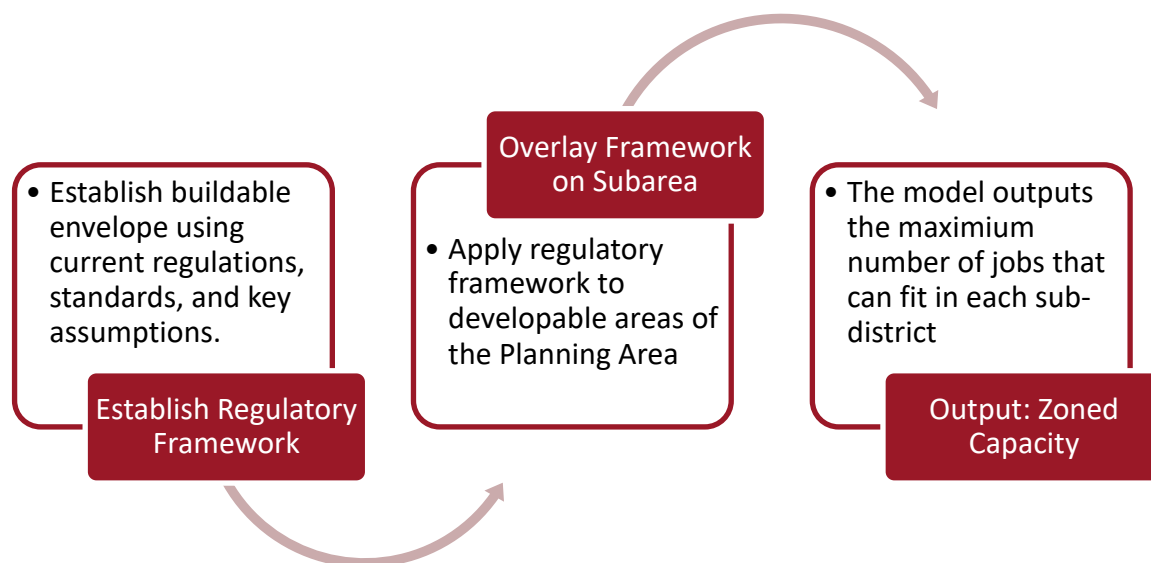
Description of Zoned Capacity Analysis

The Model

To understand the future capacity of jobs in the Beavercreek Road Planning Area, we built a model that mimics zoning regulations and standards for the expected land use zones to be applied to the Planning Area sub-districts. The model works by taking key inputs and assumptions about the regulatory framework that will govern land uses in the Planning Area and overlaying them across the developable land of the area. The output of the model is the maximum zoned capacity for jobs within the Planning Area (See Exhibit 3).

Exhibit 3: Zoned Capacity Model Process

Source: ECONorthwest.



Key Model Inputs and Assumptions

To arrive at an accurate understanding of the zoned capacity for jobs of any to-be-developed area requires a large set of inputs and assumptions. For this type of analysis, the type of inputs and assumptions are related to regulations and standards that will guide the development of new buildings and their supportive elements (e.g. parking). Some inputs are rigid and unlikely to change, such as maximum building heights or setbacks. Assumptions are more qualitative and require specialized knowledge about aspects of how real estate gets developed. Inputs and assumptions also have a varied impact on the output of the model. Some, like parking ratios, have a strong influence on the model's output. Others have less of an impact. Below we describe inputs and assumptions that have a major impact on the model's output.

-
- **Dimensional standards.** Dimensional standards define the maximum “box” that a building can fill on a parcel. These standards are determined through setbacks, maximum building heights, landscaping requirements, and other restrictions.

Source: City of Oregon City Development Code.

- **Employment density.** This assumption describes the relationship between build-area (area inside buildings) and the number of jobs that fill those spaces. This assumption is typically described as jobs per square feet of building area. This is a key metric for this analysis. The smaller the number, the higher the job density. Larger numbers mean fewer jobs per building area, and therefore fewer jobs overall.

Source: Metro Employment Density Study, ECONorthwest.

- **Parking ratios.** The amount of automobile parking that is available for a new development is a key factor in determining its viability. Whether capped by regulations or demanded by the market, new developments need a certain amount of parking to attract funding and become economically successful land uses. Most cities, Oregon City included, provide regulations about the minimum and maximum amount of parking for new developments. Sometimes these regulations are perceived to be out of sync with what the real estate market demands. This can happen when urban, transit served developments are required to have “too much” parking. Or when suburban areas with little accessibility do not have sufficient land for necessary parking to support new development.

In our observations of real estate development, one of the primary reasons that development projects get “under-built”, or do not achieve the building height or scale otherwise permissible by development regulations, is too little provision of on-site parking. For this analysis, we have used Oregon City’s parking regulations as a general guide for the amount of parking that will be required to accompany new developments in the Planning Area.

Source: City of Oregon City, ECONorthwest.

- **Parcel size and building to land ratios.** The Beavercreek Planning Area of tomorrow is expected to look remarkably different than it does today. As it develops, property owners will sell to developers who, in many cases, will aggregate several parcels of land to create a “developable parcel” for their specific desired land use. To understand what size these future parcels may be and to what extent they will be covered with a building footprint, we observed several areas of the Portland region that contain similar land uses to those proposed for the Planning Area. These observations, combined with our knowledge of specific types of development elsewhere, formed our assumptions for future parcels sizes and building to land ratios.

Source: ECONorthwest.

- **Maximum build-out and “under-build”.** Each developable piece of land has an invisible envelope or “box” that forms the vertical area in space that a building can

occupy. This box is determined by the zoning regulations and standards that govern the land use of that property. Building to full capacity would mean that this box is entirely filled with building area. Many times, developers “under-build” or chose to not fully take advantage of all of the vertical buildable space available to them. In an economic sense, it would be advantageous for a developer to build as much building area as she could lease or sell. If some of this building area does not contribute economically to her pro forma or if it is hard to lease or sell, she may choose to build a smaller building. As stated in the parking ratios description, we commonly observe that developers chose to under-build their properties when they are unable to secure access to a sufficient level of parking.

For this analysis, we have assumed that many of the future developable parcels will under-build for lack of parking or other reasons. This is in-line with our observations of developed areas that are similar to the Planning Area in other parts of the Portland region.

- **Source:** ECONorthwest

Key Data

This analysis is focused on one key question: Will the future regulatory environment of the Beavercreek Planning Area allow enough buildable area to accommodate the projected number of future jobs for this area. To answer this question, we relied upon data from the several sources. Key data to this analysis are as follows:

- **Projected Jobs for the Planning Area.** We have relied on the projected number of jobs for the Beavercreek Planning Area as stated in The Plan. The Plan identified an estimated capacity for approximately 5,000 jobs (for reference, the output table from the Plan is presented in Appendix A).

This number of jobs—5,000—is a key data point for this work. It is the number of jobs that we are trying to fit into the Beavercreek Planning Area.

- **Planning Area Size and Developable Acres.** The Planning Area is approximately 449 acres in total size (gross size). Per the Plan, of this 449, there are 241 net developable acres. The difference between 449 and 241 includes roads, easements, wetlands, and other undevelopable lands.

Together the (1) projected job numbers, and (2) the developable area within the Planning Area form the two key data points for this analysis. These data can be further divided by sub-district of the Planning Area (See Exhibit 4). This is an important point; each sub-district has its own employment projections and will have its own zoning regulations.

Exhibit 4. Beavercreek Planning Area Sub-Districts: Estimated Jobs and Net Areas (Acres)³⁴

Source: City of Oregon City, ECONorthwest.

Planning Area Sub-District	Estimated Jobs	Net Developable Acres
North Employment Campus (NEC)	3,678	132
Mixed Employment Village (MEV)	1,139	26
Main Street	219	7
West Mixed-Use Neighborhood	15	12
East Mixed-use Neighborhood	21	65
Totals	5,073	241

Findings

See the first page of this report for a discussion of our findings.

³ Rounding of numbers may result in approximate totals. *Note: The acreage estimates do not exactly align with those in Exhibit 6. Acreages in Exhibit 6 have been reevaluated since the time of The Plan. In our analysis, we are using the latest size estimates provided by the City of Oregon City.*

⁴ We concentrated our analyses on the three sub-districts with significant employment projections. The mixed-use neighborhoods have been excluded from our analyses.

Appendix A. Employment Estimates, 2008

The Beavercreek Road Concept plan estimated employment capacity at approximately 5,000 jobs (33 jobs per net acre).

Exhibit 5. Employment Estimates, Beavercreek Road Planning Area

Source: Beavercreek Road Concept Plan, Envision a Complete and Sustainable Community (pg. 42), 2008.

Land Use Category	Hybrid Gross Acres	Hybrid Net Acres*	FAR/Acre**	SF/Job**	# of Jobs***	Avg. Units/Acre	# of Units+
North Employment Campus (adjusted gross acreage)	149	127	0.3	450	3,678		
Mixed Employment Village	26	21	0.44	350	1,139		
Main Street****	10	8	0.44	350	219	25	100
West Mixed Use Neighborhood	22	18			15	22	387
East Mixed Use Neighborhood	77	62			21	8.7	536
Total # of Jobs					5,073		
Total # of Housing Units							1,023
Total Acres of Developed Land++	284	235					

*For Hybrid - Net acres equals gross acres minus 15% for local roads and easements in Employment. Mixed Employment, Mixed Use, and residential areas assume 20% for local roads and easements

**Based on Metro 2002-2022 Urban Growth Report: An Employment Land Need Analysis. Includes total on site employment (full and part time). Mixed Employment FAR and job density reflects a mix of office, tech/flex, and ground floor retail.

***Number of Jobs in Employment, Mixed Employment, Mixed Use calculated by multiplying total acres by the FAR; Converting to square feet; and dividing by number of jobs/square foot. Jobs in residential areas (Work at Home Jobs) estimated at 4% (potential could be as high as 15%).

**** Mixed Use land use assumes 50% of acreage devoted to commercial uses and the remaining 50% devoted to vertical mixed use.

+Number of units calculated by multiplying total net acres of residential land use by average units per acre

++Includes 50% of useable power line corridor (26 acres total) as part of developed land (included in Employment land area)

+++Does not include powerline corridor acreage as part of developed land



TECHNICAL MEMORANDUM

To: Christina Robertson-Gardiner, AICP
Oregon City Senior Planner

John M. Lewis
Oregon City Public Works Director

From: Aaron Murphy, P.E.
Steve Faust, AICP

Date: June 19, 2019

Project Name: Beaver Creek Road Concept Plan Implementation –
Zoning and Code Amendments
Project No: 18510.70
RE: Infrastructure Memo

The City of Oregon City (City) has initiated a project to update the Oregon City Comprehensive Plan Map, Zoning Map and Municipal Code to allow planned housing and mixed-use development to occur in the Beaver Creek Road Concept Plan (BRCP) area. Updates will apply zoning and map designations for properties within the BRCP area.

As part of the BRCP Implementation project, 3J Consulting has been tasked to review the City's water distribution, sanitary sewer and stormwater master plans and comment on the adequacy of current and planned infrastructure to support the number of new dwelling units and employees that are projected in the BRCP and will be formalized through the zone change.

Beaver Creek Road Master Plan

The Beaver Creek Road Concept Plan (BRCP) is a guide to the creation of a complete and sustainable neighborhood in southeast Oregon City. The plan, adopted in 2008 and again in 2016, provides a framework for urbanization of 453 acres within the urban growth boundary including a diverse mix of uses (an employment campus north of Loder Road, mixed use districts along Beaver Creek Road, and two mixed use neighborhoods), all woven together by open space, trails, a network of green streets, and sustainable development practices. The plan has been carefully crafted to create a multi-use community linking Clackamas Community College, Oregon City High School, and adjacent neighborhoods together.

The BRCP includes Housing and Employment Estimates for the various land use categories:

Land Use Category	Number of Jobs	Number of Dwelling Units
North Employment Campus	3,678	-----
Mixed Employment Village	1,139	-----
Main Street	219	100
West Mixed Use Neighborhood	15	387
East Mixed Use Neighborhood	21	536
Total	5,073	1,023

Updated projections based on land use maps developed for this project to implement the BRCP estimate the number of dwelling units at 1,105 and jobs at 5,734. We do not consider the change reflected in the revisions to be significant and therefore do not impact the findings of this memorandum.

Zone Change Criteria

The relevant criteria (17.68.020) for a zone change are set forth as follows:

B. That public facilities and services (water, sewer, storm drainage, transportation, schools, police and fire protection) are presently capable of supporting the uses allowed by the zone, or can be made available prior to issuing a certificate of occupancy. Service shall be sufficient to support the range of uses and development allowed by the zone.

This memorandum reflects a first look at the adequacy of current and planned infrastructure to meet the needs of future development. A more detailed look at existing conditions will be needed at the time of development to identify capital improvements needed to show consistency with the Master Plan.

Major Findings

The Sanitary Sewer (2014), Stormwater (2019 Draft) and Water Distribution (2012) Master Plans were all created subsequent to initial adoption of the Beavercreek Road Concept Plan (2008). Each master plan incorporates the BRCP area into future capital improvement projections, but methodologies vary among plans. This conclusion was confirmed through a conversation with Oregon City Public Works Director, John Lewis.

Sanitary Sewer Master Plan (SSMP)

Figure 5-8 on page 5-11 of the 2014 Sanitary Sewer Master Plan refers specifically to the projected Housing and Employment Estimates on page 42 of the BRCP.

Stormwater Master Plan (SWMP)

The Draft 2019 Oregon City Stormwater Master Plan includes the BRCP area, which is part of the Newell Creek Basin, but does not identify any capital improvement projects specifically related to the BRCP. The Plan states that the eventual layout of the stormwater conveyance systems and management facilities will be crafted through the preliminary and final design process for the BRCP area.

Water Distribution Master Plan (WDMP)

The 2019 Technical Memorandum - Oregon City Water Distribution System Capital Improvement Program Update was prepared to provide an update to the 2012 WDMP, including a list of capital improvements. Page 21 of the memo specifically discusses Beavercreek Road development and defines the City's pressure zones that encompass the BRCP.

Economic, Social, Environmental and Energy (ESEE) Analysis

The ESEE consequences that can occur within the proposed MUC, NC, CI, R-5 and R-2 zoning will not result in a greater conflict to the Goal 5 resource mapped on the site over the current FU-10 zoning. The change in zoning from FU-10 to MUC, NC, CI, R-5 and R-2 may result in lesser amounts of environmental and energy consequences; however, MUC, NC, CI, R-5 and R-2 has opportunity to provide increased economic and social benefits. Mixed use centers allow City residents to live near their work, which tends to reduce vehicle use, which minimizes potential air, water and energy quality impacts.

The Goal 5 resources mapped on the site is protected under Chapter 17.49 Natural Resource Overlay District of the City's code of ordinances, regardless of site zoning. Chapter 17.49 of Oregon City code is compliant with Metro's Title 3 and 13 lands and the Statewide Planning Goal 5. Therefore, the potential for increased levels of impervious surfaces and vegetation loss associated with MUC, NC, CI, R-5 and R-2 development activities will be protected and if necessary mitigated through local permitting compliant with Chapter 17.49.



Master Plan Summaries

Sanitary Sewer Master Plan

A Sanitary Sewer Master Plan (SSMP) was prepared by Brown & Caldwell in November 2014. Section 5.2.3.4 of the SSMP focuses on the BRCP area. Table 5-8 of the SSMP references land use designations and the associated gross areas of the BRCP area to calculate sanitary flows to ultimately size pipe diameters and slopes.

Table 5-9 of the SSMP identifies the BRCP area Estimated Improvement Costs for Capital Improvement Plan (CIP) projects is \$15,580,000. This amount includes a 50% allowance for construction contingencies.

The CIP list specifically related to the BRCP area includes:

- Gravity Sewer Extensions (8"-15")
- Two (2) pump stations and associated force mains (BR-1 & BR-2)

Since the SSMP was published, improvements have been completed according to an email provided by Bob Balgos from the City dated March 25, 2019. These improvements include:

- 12" sanitary sewer extension south along Beavercreek Road near the north-end of the Oregon City High School property boundary.

Also identified in the email, City staff have identified construction proposed in 2019-2020:

- 12" sanitary sewer extension in conjunction with the Villages at Beavercreek Development located opposite Meyers Road on the east side of Beavercreek Road. The extension will be completed from the north-end of the Oregon City High School through the entire frontage of Villages at Beavercreek.

Further assessment of the CIP project amount will be necessary to include:

- Completed infrastructure upgrades such as Capital Improvement Projects (CIP), development etc.
- Anticipated infrastructure upgrades such as CIP projects or development such as Villages at Beavercreek
- Inflation and construction cost increases to current dollars.

Stormwater Master Plan

Five (5) Stormwater Master Plans (SWMP) were reviewed:

- Drainage Master Plan, OTAK 1988
- South End Basin Master Plan, Kampe Associates, Inc. 1997
- Caulfield Basin Master Plan, Kampe Associates, Inc. 1997
- Park Place Basin Master Plan, Kampe Associates, Inc. 1997
- Draft Oregon City Stormwater Master Plan. Brown and Caldwell, 2019

The BRCP area largely falls within the Newell Creek Basin. The Draft 2019 SWMP does not specifically reference the BRCP area, but the overall assessment does include recommendations for improvements for the Newell Creek Basin. The City's stormwater treatment and detention methods apply for all current and future development of the BRCP area.

Page 2-7 references the Beaver Creek Road Concept Plan and states that the concept plan "outlines basic assumptions for the type and quantities of stormwater infrastructure that may be required to develop the planning area. These assumptions are useful for fiscal planning, but the eventual layout of the stormwater conveyance systems and management facilities will be crafted through the preliminary and final design process for [the BRCP] area."



Low Impact Development (LID) Green Streets are identified for the Beavercreek Road Concept Plan area. The City is currently working on creating green street standards that will be applicable for both the South End and Beavercreek Concept Plan areas. These standards will be based on the identified street sections found in the Concept Plans and are being designed to meet the standards of the draft Storm water Manual. Adoption of these standards will occur in Fall 2019.

Water Distribution Master Plan

A Water Distribution Master Plan (WDMP) was prepared by West Yost Associates in January 2012. Although the WDMP does not specifically reference the BRCP area, the overall assessment does include recommendations for improvements that includes the UGB boundary that encompasses BRCP.

A Technical Memorandum - Oregon City Water Distribution System Capital Improvement Program Update (TM) was prepared by Murraysmith in March 2019. The TM was prepared to provide an update to the WMP produced in 2012, including a list of capital improvements and updated costs from 2009 to 2018 dollars. Page 21 of the memo specifically discusses BRCP area development and defines the City's pressure zones that encompass this area as Upper Zone and Fairway Downs Zone.

Table 17 of the TM identifies the updated CIP list and cost estimate including the improvements required for the City's Upper and Fairway Downs Zones for the BRCP area. The total estimated cost for CIP projects specific to BRCP area total \$14,018,000.

The CIP project list includes:

- New Upper Zone distribution
- New Fairway Downs distribution
- New PRV between Fairway Downs and Upper Zone
- New Fairway Downs Reservoir
- New Fairway Downs Pump Station
- New Fairway Downs Transmission
- Transfer existing Henrici transmission to Fairway Downs transmission

The City and Clackamas River Water (CRW) share the need to serve current and future customers at adjoining service area boundaries within the BRCP area.

A Technical Memorandum – Clackamas River Water / City of Oregon City Joint Engineering Analysis Water Service Dual Interest Area Technical Analysis (TM2) was prepared by Murraysmith in June 2018. TM2 identifies opportunities for shared infrastructure partnerships which could ultimately provide a more cost-effective solution to both the City and CRW, see Table 3 of TM2.

The City is preparing a concurrent study to ensure the City can serve the BRCP area in the case that the City and CRW are not able to agree on a partnership to serve the area.

Economic, Social, Environmental and Energy (ESEE) Analysis

As part of a Zone Change analysis, the city requires substantial evidence that the possibility of land use development activities allowed under the new zoning (MUC, NC, CI, R-5 and R-2) will not result in a greater impact on the Goal 5 resources mapped on the site over the existing Future Urban (FU-10) land use development activities.

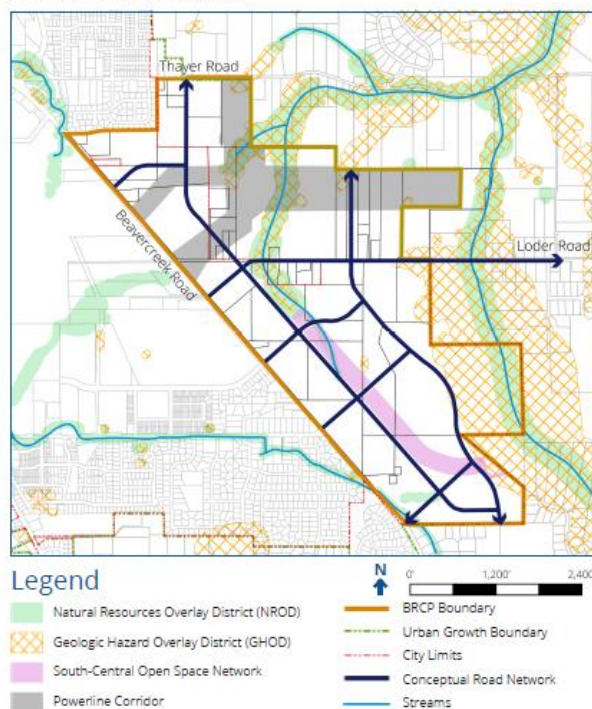
The ESEE analysis involves evaluating the potential tradeoffs associated with different levels of natural resource protection that could be established by the City. As required by the Goal 5 rule (OAR 660-015-0000(5)), the evaluation process involves identifying the consequences of allowing, limiting or prohibiting conflicting uses in areas containing significant natural resources. The rule requires that this analysis be completed before actions are taken to protect or not protect natural resources that are identified in inventory and determined to be significant. Specifically, the rule requires the following steps:



1. Identify conflicting uses – A conflicting use is a land use or activity that may negatively impact natural resources.
2. Determine impact area – The impact area represents the extent to which land uses or activities in areas adjacent to natural resources could negatively impact those resources. The impact area identifies the geographic limits within which to conduct the ESEE analysis.
3. Analyze the ESEE consequences – The ESEE analysis considers the consequences of a decision to either fully protect natural resources; fully allow conflicting uses; or limit the conflicting uses. The analysis looks at the consequences of these options for both development and natural resources.
4. Develop a program – The results of the ESEE analysis are used to generate recommendations or an “ESEE decision.” The ESEE decision sets the direction for how and under what circumstances the local program will protect significant natural resources.

Beavercreek Road Concept Plan

Development Constraints



Based on information provided in Exhibit 3 Economic, Social, Environmental and Energy (ESEE) Phase 1 Analysis of Metro's April 2005 UGB Growth Management Functional Plan ordinance, the section below describes the potential conflicting uses associated with the proposed zone designations could have the greater potential to have an adverse effect on the functions and values of the Goal 5 resource mapped on properties located within the Beavercreek Road Concept Plan area which include Thimble Creek and an unnamed tributary to Thimble Creek. Note the zoning themselves are not conflicting uses.

It is the development activities and other disturbances permitted under the zoning that potentially conflicts with the functions and values associated with the Goal 5 resource. The City of Oregon City developed their Chapter 17.49 Title 13 regulations based on Metro's UGB Management Function Plan. Therefore, the ESEE analysis provided below is consistent with Oregon City's Goal 5 ordinance.

Economic Consequences

FU-10 – May provide increased adjacent property value. Large Lots associated with FU 10 zoning will retain more vegetation and tree cover than the new zones associated with the Beavercreek Road Concept Plan activities; however, does not provide an overall economic value to the community.

R-5 & R-2- These medium density and high density zones can provide a response to the known regional problem of limited housing supply and skyrocketing housing prices affecting the Portland Metro Area and Oregon City. There is a mismatch between supply and demand of housing that is leading to limited availability and affordability challenges for many households. Looking at the latest census data, in Oregon City, 71% of residential units are single-family detached homes, dominating the housing market. All other housing types make up 29% of the housing options, combined, ranging from manufactured homes and floating homes to 20-unit apartment complexes.

Housing prices are increasingly unaffordable, which is typically defined as spending more than 35% of household income on housing. Almost 24% of homeowners with a mortgage have unaffordable costs, and over 40% of renters can't afford housing costs. Overall, one in four households are struggling to pay for housing. Single-family detached homes, a traditional free-standing house with a yard and space for 3.2 children, dominate the supply but comes at a high cost that is increasingly out of reach, leading to homelessness in some cases. With smaller households more and more common, the city's needs don't match the homes available. Additional housing choices that include duplexes, tri-plexes, townhomes, apartments and cluster housing can provide alternatives to the predominate single family housing model found in Oregon City.

MUC, NC and CI – Enhances the potential for local economic development. The zone change supports Metro's Growth Concept Plan underlying goals to provide employment, income, and related tax benefits to local community.

Summary: While FU-10 may result in less vegetation removal, the MUC, ND, CI, R-2 and R-5 land uses provides a greater economic benefit to the community through increased housing options, employment and educational opportunities and reduced transportation facilities and utilities. These zones promote more efficient use of land, minimizing urban sprawl.

Therefore, the conflicting uses associated with MUC, NC, CI, R-5 and R-2 development activities provides a greater economic benefit, outweighing the FU-10 conflicting uses.

Social Consequences

FU-10 —Goal 5 resource provides natural stress relief to employment occupants. The R-2, R-5, ND, CI and MUC-2 land uses may also provide potential public educational and recreational benefit though passive open space viewing and the ability to dedicate future park space as development occurs within the BRCP area; however, there is a potential to reduce the scenic value.

Summary- Change in conflicting use zoning from FU-10 may provide an increased social benefit to Oregon City.

Environmental Consequences

FU-10—Impacts to Goal 5 resources and associated Impact Area (buffer) for FU-10 development may require: removal of native vegetation; non-native landscaping; pesticide and fertilizer use; and pets which tend to degrade habitat and water quality.

MUC, NC, CI, R-5 and R-2 can create larger building footprints than FU-10 which may result in increased vegetation removal; however, MUC, NC and CI offer decreased VMT (vehicle miles traveled) which reduces overall water quality impacts in the local watershed. Minimal light and glare into Goal 5 resource and buffer. Provides overall moderate to high imperviousness, low infrastructure requirements, and low to moderate overall natural landcover.

Summary: Due to smaller development footprints, disturbance activities associated with FU-10 conflicting uses may provide a lesser degree of impact to the Goal 5 resource and associated buffer than MUC, NC, CI, R-5 and R-2 conflicting use development activities. However, MUC, NC, CI, R-5 and R-2 stricter water quality standards, providing potential for overall lesser amounts of impact to the local watershed.

Energy Consequences

FU-10- Tends to retain more trees than other zoning, reducing air quality and temperature impacts. However, tends to create more infrastructure (utilities and roads) and greater travel distances which can have a negative energy consequence.

MUC, NC, CI, R-5 and R-2 - Energy efficient zoning because it decreases VMT (vehicle miles traveled) and overall infrastructure requirements. Potential to reduces the amount of overall development through shared



parking. Shared parking areas have vegetated islands reducing imperviousness and negative energy consequences associated with temperature regulation.

Summary: MUC, NC, CI, R-5 and R-2 conflicting use development activities for energy consequences may result in lesser impact on the Goal 5 resource and associated buffer over FU-10 development activities.

- - - E N D O F D O C U M E N T - - -



Beavercreek Road Concept Plan - Zoning and Code Amendments

Consolidated Comment Tracker January 2019-June 2019

Transportation	
Ensure that traffic flow is efficient and safe around the BRCP area (roundabouts or traffic signals), considering school drop off/pickup, different uses (e.g. Industrial-type traffic near residential areas) and trips generated outside the study area. Concern about emergency access to the area.	Currently preparing an assessment of transportation facilities and will present preliminary findings on road capacity and traffic control at the June 10 public meeting.
If Beavercreek Road is widened, will it be expanded to the east?	Efforts are made to expand equally in each direction from the road center line, assuming street rights-of-way allow for it.
How many road connections will be made to Beavercreek Road?	Currently the only road connections will be at existing intersections (Loder Road, Meyers Road and Glen
Require transportation infrastructure improvements before development begins.	We are considering the timing of infrastructure as development comes online. Development applications are required to build infrastructure to support their development. There are state and local land use requirements that look at the proportionality a project has to the city's infrastructure network both on and offsite of a development proposal. In some cases, development can be required to provide an offsite improvement as a condition of development, other times, they pay system development fees that help pay for larger capital improvement projects. The city is also looking at ways we can apply for grants, or work with developers to create local improvement districts or advance finance districts to better coordinate the timing of infrastructure.
Meyer Road or Glen Oak as the main street? Meyer is the bigger street and closer to CCC and high school.	Will explore Main Street options and provide an opportunity for further discussion at the April 9 public meeting.
Ensure that there is adequate parking to accommodate uses without congestion, especially around residential areas, but this should be balanced with creating pedestrian-friendly environments, especially around the MUC. Will the City pursue or require structured parking in the Main Street or Mixed Use areas?	Oregon City Development Code OCMC 17.52 requires minimum and maximum parking standards per use. It is not anticipated that this project will recommend any revisions to those requirements. All new development in Oregon City requires parking to be located to the side or rear of commercial uses. The project team is currently looking at how to encourage or require parking to be located to the rear of the commercial uses in the Glen Oak Mixed Use Center to better add in the pedestrian feel of the street and strategies for customers to minimize customers using the on-street parking in nearby neighborhoods.
Pursue adequate transit service in the BRCP will require coordination between jurisdictions to properly plan and secure funding.	City participates in ongoing conversations with TriMet, Clackamas County, Clackamas Community College, and Public Works about transit service. Ultimately, mass transit service is driven by population/jobs demand, though shuttle services can be more flexible.
Ensure adequate infrastructure and amenities to support safe bike and pedestrian movement within the BRCP, especially crossings of Beavercreek Road.	Concept Plan includes provisions for multi-modal transportation options which will be implemented through this Zoning and Code Amendments process. Certain streets will contain on-street or off-street bike paths and connect with a larger bicycle system as identified in the Transportation System Plan. Commercial and multi-family uses will also have bike parking requirements.
Parks, Trails and Open Space	
BRCP should ensure safe and aesthetic walking paths and trails to support pedestrians, especially school children.	Concept Plan includes provisions for sidewalks and off-street pathways which will be implemented through the Zoning and Code Amendments process. The design of Beavercreek Road and zoning should consider the proximity to the high school and potentially a future school south of the plan area.
Adequate green spaces, open spaces, and recreational areas, especially in the industrial area, are desirable.	Provisions will be made for open spaces, parks and trails throughout the Concept Plan area. The plan calls for parks and existing requirements in the code identify buffers around streams and wetlands and steep slopes.
When will proposed parks and trails be developed?	Land acquisition for parks will occur as part of development reviews. The construction of the parks is based on the Community Services (Parks Department) Capital Construction timeline/prioritization.
Residential	
Prioritize residential before other types of development.	Once the area had been rezoned, the timing and location of development will be left to the market and property owner to decide when to develop their property. The City will not do any development of homes or businesses. However, any development is required to make sure the proper infrastructure is in place to support proposed development.
Residents would like to see high-quality and well-designed residential units with sufficient open space and street trees and a maximum height of 3 stories.	The design team are looking at design standards, open space, landscaping and building height limits which will be addressed through this Zoning and Code Amendments process.
Support a broad variety of housing types, denser in the West Mixed Use area.	The plan envisions a higher density in the West Mixed Use area. Project staff is looking at code amendments to implement a mix of commercial and residential uses.
Non-residential uses in the residential area should have impacts on the surrounding neighborhood that are consistent with the zone. These impacts are lower in residential-only areas and increase when approaching non-residential zones. Prefer live/work and home occupations.	The design team is looking at identifying an appropriate type of non-residential uses and ways to mitigate their impacts.
Include affordable housing and alternative housing options in the BRCP.	Affordable housing is housing which is deemed affordable to those with a median household income or below as rated by the national or local recognized housing affordability index. Affordable housing development is generally done through cooperation with government and non-profit funding to subsidize the rental or ownership cost of a unit. The zoning code regulates uses and does not regulate the pricing of the housing. What zoning codes can do, is allow multiple types of housing to be allowed in a zone such as duplexes, cluster housing and row housing which can offer more option to the consumer than just a single family house. The City Commission is currently considering adding these types of uses to residential zones citywide. Visit https://www.orcity.org/planning/housing-and-other-development-and-zoning-code-amendments to learn more about this process. The plan will consider a variety of housing types which may have less expensive housing options.
Prefer sidewalks over alleys. Alleys create more burdens than benefits.	In areas where alleys are required by current city code-sidewalk are also required in the front of the properties. The City Commission is currently considering if existing alley requirements should remain.
There should be a gradual tapering of density at the edge of residential areas. Buffers with surrounding areas should primarily be setbacks or open space, not a physical wall or barrier.	Increased buffering and screening requirements are currently being looked at for development at the edge of the Beavercreek Road Concept Plan boundary when abutting residential uses. Requiring a tapering of density at the edge of a project is often more difficult and initially envisioned through a clear and objective code process and still meet the other required city goals of block length, lot size and street connectivity. The Concept plan zones identify a general tapering of densities.
There should be more than 25 feet between residential and industrial uses.	
What types of barriers/screening between industrial and residential uses are allowed? Cyclone fencing? Concrete wall? Trees along the wall? A rotating park? Maintain row of trees that run east-west along the edge of the golf course.	
Consider integrating a bike/pedestrian trail into the landscaping setback along the southern perimeter to make better use of the space and keep it active.	
Concern about compatibility of R-2 development along the BRCP southern boundary. Especially in regards to natural resources/stormwater/flooding.	In response to comments during the public process, the revised June Zoning Map slightly shifted the multi family portions near the south border. The total number of projected housing units remain the same.

<p>Cottage Industries.</p> <p>New homes in BRCP area might be too small to incorporate square footage for cottage industries, like a large shop.</p> <p>Concerns about noise impacts from more industrial-type uses, such as woodworking.</p> <p>Consider whether potential impacts from cottage industries, like on-street parking and traffic are compatible with residential uses.</p> <p>Cottage industry uses might be better located in mixed-use and industrial areas.</p> <p>Maintain access to Old Acres Lane for existing residents to use. Access should not be shared with BRCP area development.</p>	<p>Through the public engagement process, we heard from many folks that were concerned about allowing additional uses in the home occupation code for the Beavercreek Concept Plan Area, though there was some support for the concept. The Concept Plan calls for allowing job creation in residential zones.</p> <p>During the 2016 re-adoption of the Concept Plan, the City Commission made a finding that the existing city-wide home occupation code allows for a breath of opportunities for people to start starter businesses in their residences. As part of the hearings process, staff will look for additional guidance from the Planning and City commission on this topic.</p> <p>Old Acre Road is a private driveway that can restrict public access- No part of the Concept Plan area will connect to Old Acres Road.</p>
Mixed Use Center	
The MUC should consist of small, easily accessible shops with residential on the 2nd and 3rd floors if the market allows it.	The MUC zone allows for this type of use, but also allows properties to be developed as exclusively residential or commercial. The project team is currently looking at the balance of how much minimum commercial or residential to require for these area to ensure that the code does not over or underregulate the vision.
Smaller scale development. Do not require retail. Permit ground floor residential.	The MUC zone allows for this type of use, but also allows properties to be developed as exclusively residential or commercial. The project team is currently looking at the balance of how much minimum commercial or residential to require for these area to ensure that the code does not over or underregulate the vision.
Street design in the MUC should use landscaping, lighting, to ensure a pleasant pedestrian environment.	The project team is looking at what type of dimensional standards and enhanced landscape requirements, beyond what is already required city-wide, will be needed to ensure a pedestrian-friendly, walkable commercial node. The concept plan identifies some street design.
10,000 square foot limit seems appropriate for anchor retail spaces or stand-alone buildings. Square footage limit should be large enough to accommodate a non-big box grocery store (Trader Joes, Zupans). Consider a 6,000 to 8,000 square foot range for the other tenant spaces.	The city has generally not prescribed that level of detail between varying permitted uses. The proposed code looks at minimizing the size of each building to ensure that the massing of the neighborhood commercial area is complementary to and compatibly with the neighboring residential uses. The NC zones proposes the following language: All uses permitted per OCMC 17.24.020.A and B, including grocery stores, are limited to a maximum footprint for a standalone building with a single store or multiple buildings with the same business not to exceed ten thousand square feet, unless otherwise restricted in this chapter.
Upper-level residential should be allowed. In addition to traditional apartments, incorporate affordable units for underserved populations (transitional housing, micro housing/dormitory housing.)	Upper level residential is allowed in the MUE and NC Zones when coupled with commercial development.
Provide parking lots near the Main Street area to support local businesses. Ensure parking for a grocery store doesn't occupy all available parking.	Development applications will be required to provide for their own off-street parking per their specific use. The Plan and city encourages shared lots for ease of access but each use must be accounted for.
People will not walk or take shuttles from the Industrial area to the Main Street area if there is ample parking.	As part of the public engagement process, staff and the project consultant team looked at the possibility of moving the Main Street area to the Meyers Road intersection to bringing it closer to employment locations. However, there was a pre-existing multi-family project located at the intersection of Meyers Road and Beavercreek Road that is currently in the Building Permit review process. This limited the ability to move the Main Street area of the Concept Plan.
Industrial	
Uses in the Industrial area should minimize impacts on adjacent residential areas through uses that are quiet, clean, and minimize pollution. There should be adequate buffers and transitions to other zones.	The project team is looking at ensuring uses with outside components be required to obtain a conditional use permit or be limited in scope and ensure adequate landscape buffering from abutting residential uses.
Focusing residential and mixed-use zoning south of Loder Rd and employment/business zoning north of Loder. There are many physical barriers to development south of Loder Road.	We have heard from some property owners south of Loder Road that this is a concern coupled with the location of the existing lot lines and proposed street locations and natural features. There may be an opportunity to slightly tweak the proposed zoning map to address these concerns, but the final proposed zoning map will need to show compliance with the goals of the Concept Plan and projected housing and job targets. We are working with the owners on this issue and will provide more updates at the April 9, 2019 public meeting.
Avoid allowing marijuana-related activity in the industrial area, due to the nearby schools and family housing.	This project does not anticipate revising the existing city-wide marijuana regulation, which can be found at the following link https://www.orcity.org/planning/marijuana-regulation-oregon-city .
Can the areas under the power lines be developed? How many acres of the total are subject to power line restrictions?	No new buildings can be constructed under the powerlines. Outdoor storage, pedestrian accessways and parking are all allowed under the easements.
Do not make the area comfortable for transients. Specifically, how to address area behind golf course to back of Thayer and Loder roads.	This is not a concern that can be addressed through the zoning process. Oregon City has, however, created a homeless liaison officer position. This position works with residents, homeowners, and business
What are the goals and restrictions for targeting certain industries? Define targeted jobs clearly; what type of business and give examples. Do not restrict industries yet. Target jobs to high school kids transitioning to the work force.	While the Beavercreek Road Concept Plan envisions green or green technology type of businesses as the optimal tenant, the zoning code is not really the tool to regulate specific sectors of businesses or number of employees. Planning staff and the consultant team worked to create general zoning designation that are consistent with existing city-wide zoning use designations. If the city wants to encourage green
Do not place size limitations. Focus on design. Use clear, easy-to-find and understand design standards.	The project team is looking at proposing a code that touches on uses, sizes and some design aspects. Our goal is to not underregulate nor overregulate the product. Please stay involved and let us know if you think the proposed zoning code amendments achieved this goal or if it should be further amended.
25% is pretty restrictive for what can be stored outside.	One of the major goals of the Concept Plan is to bring jobs to Oregon City. Large outdoor storage areas (not parking lots) can greatly reduce the jobs/acre projections. Utilizing 25% of the building square footage as a ratio for outdoor storage seemed to be a reasonable compromise.
Is trucking allowed? How will freight to the industrial area be accommodated?	Freight needs, freight hours and freight turning radii needs will be included in the final street designs and
Is live/work space allowable in the Industrial area?	
Where will employees park?	Development applications will be required to provide for their own off-street parking per their specific use. The Plan and city encourages shared lots for ease of access but each use must be accounted for.
Economic Development	
Commercial uses, including professional services and services that allow workers and students to meet their daily needs.	The existing MUE and MUC zones allow professional services.
Desire for small businesses/employment and building footprints, but balance with attracting larger employers. Target local businesses in mixed use area, but anchor stores should be national chains that people are familiar with and that are well-received (Chipotle, Trader Joes, etc.)	We have heard a need for a mix of sizing of commercial and industrial uses. Some of these goals can be minimally achieved by the zoning code. Others, are more aligned with economic development goals and programs that City Commission may employ to work collaboratively with property owners to achieve this mix.

Proactive and effective economic development to ensure vibrant economic activity and growth within the BRCP.	While this is a zoning code amendments process, any comments that relate to a need for larger city involvement in the development of the Concept Plan area will be forwarded to the Planning and City Commission through this comment matrix and any public comments that arise through the public hearing process later this summer. The Economic Development department has been working on a nearby Beavercreek Employment Area with a variety of stakeholders.
Land Use and Infrastructure	
What role do residents have in approving the Concept Plan or future development?	The Concept Plan was adopted as an ancillary document to the city's comprehensive plan by the City Commission at a Public Hearing in 2008 and readopted through a public hearing in 2016. These Beavercreek Road code amendments will need to show consistency with the adopted Concept Plan and will be adopted through a noticed public hearing before the Planning and City Commissions later this year. Once adopted, all new development will be processed through the city's land use process depending on the type of development requested: https://library.municode.com/or/oregon_city/codes/code_of_ordinances?nodeId=TIT17ZO_CH17.50ADP_R_17.50.030SUDEKIPR
Use a fast permitting process, ensure infrastructure is readily available to serve development areas, and barriers to development are minimized.	The design team is considering which process development is subject to and the Public Works and Economic Development departments will be working together to consider larger infrastructure. Generally developers install infrastructure needed to serve their development.
Analyze electricity capacity to serve new development since existing neighborhoods in the area already experience "brown-outs".	Coordination with private utilities occurs during the private development review process. Private utility providers such as power, phone and cable have been sent notice of this application.
Zone designations should be separated by streets, not individual property lines. What do the property owners of those properties think?	Street location provide general direction and are finalized at time of development. Staff tried to find a balance of utilizing existing property lines and anticipated road locations.
The East Mixed Use Neighborhood should be more of a square rather than strung out along Beavercreek Road itself. Move it further north and center it around the mixed-use areas including Main Street and the industrial	While that sounds like an intriguing idea, staff felt that it was too divergent from the adopted plan. Staff's direction was to implement the adopted plan and only amend as needed to implement the intent of the
Education	
The anticipated extension of Clackamas Community College provides significant opportunity for professional training and economic development.	We agree and encourage all property owners to work with Clackamas Community College and the city's Economic Development Department to look for opportunities to partner to help transition students to full time work. The uses allowed in the area will take this into consideration.
Ensure proper siting and ease of permitting for future schools.	In the 2008 Concept Plan process, the Oregon City School District determined that they did not need additional land within the concept plan boundaries. They do have a parcel of land located just south of the concept plan boundary, near Old Acres Road but is not being considered for construction in the short term. Development in the concept plan area will provide an opportunity for future connections with the school property.
Miscellaneous	
Be clear about what is meant by "conceptual" in terms of roadways and district boundaries. Consider changing it from a "plan" to a "guide".	Final roadway design will be addressed at the development application stage and will need to be consistent with the concept plan maps or provide an alternate design that meets or exceeds the intent of the adopted street map. The design team will make an effort to set the correct expectations.
The plan should include a mix of uses and amenities - they would be helpful to reduce traffic and in case of disaster.	We have heard a need for a mix of commercial uses. Some of these goals can be achieved by the zoning code. Others, are more aligned with economic development goals and programs that City Commission may employ to work collaboratively with property owners to achieve this mix.
Like Lake Oswego development.	We assume that this comment translates to "make it look nice". Zoning code and design standards can provide a template for how a private development could look. However, too detailed of standards can stifle creativity and sensitivity to a specific private parcel's market needs. The project team is trying to create a balance of not under or over-regulating the urban layout of the concept plan areas. We are identifying the major design goals of the Concept Plan and are trying to create code that requires these elements. As the draft code is released this spring and through the public hearing process, please let us know if this balance was achieved, or if you think there should be a different balance.
How to limit connections to a private street to the south.	Old Acres Road, located at the southern boundary of the Concept Plan, is a private road and new development in the Concept Plan area will not be able to utilize this connection unless previously allowed by the private property owners.
Manage density.	The density outlined in the Concept Plan is regulated by Title 11 which governs the Urban Growth Boundary process. This code ensures cities efficiently use land brought into the Urban Growth Boundary, which reduces the need to expand the growth boundary earlier than predicted. The density of dwelling units in the approved Beavercreek Road Concept Plan has been set to fall between 1,000 and 1,600 dwelling units. A dwelling unit is defined as one single-family house, a townhouse unit, or an apartment unit in a multi-family building. It does not differentiate between the number of bedrooms. Development of these units will be completed over time through the subdivision (single-family or townhomes) or Site Plan and Design Review process (multi-family) based on the market and property owner direction. The goal of the code amendment process is to adopt zoning codes that can ensure that the area develops dwelling units over time that fall within the adopted 1,200-1,600 threshold. <u>The placement of the densities and design will help create a community people like while minimizing</u>
Include art.	Public art is not a goal or requirement of the concept plan, and therefore does to align with the aims of this zoning amendments project (provide zoning code amendments to allow private development to build within the Concept Plan boundary). However, as development moves forward, there may be opportunities to partner with local art organizations such as the Clackamas County Art Alliance https://clackamasartsalliance.org/ for public art in city open spaces or in private development.

2019 Planning Commission Agenda Items

- January 14th
 - Vote for Planning Commission Chair and Vice Chair
 - Prioritize Planning Commission Requests to the City Commission for the 2019-2021 Biennium
 - Legal Training with Carrie Richter, Assistant City Attorney
 - Public Comments
 - Communications
- January 28th
 - Electronic Messaging Policy Explanation
 - Master Plan, Subdivision, Geologic Hazards, Floodplain, and Natural Resources Overlay District for the Cove Phase 2
 - Public Comments
 - Communications
- February 11th
 - Cancelled
- February 25th
 - Joint Work Session between the Planning Commission and Natural Resources Committee
 - How the Public May Learn About and Stay Involved with Land Use Decisions
 - 2018 Statistics
 - Public Comments
 - Communications
- March 11th
 - Cancelled
- March 25th
 - Cancelled
- April 8th
 - Work Session on the Stormwater Master Plan Update
 - Site Plan and Design Review, Parking Adjustment, and Minor Partition on Molalla Avenue
 - Public Comments
 - Communications
- April 22nd
 - Subdivision, Natural Resource Overlay District, and Variance on Hiram Avenue
 - Certain Code Amendments
 - Minutes
 - Public Comments
 - Communications
- May 13th
 - Presentation: Beaver Creek Road Concept Plan Project- Zoning and Code Amendments
 - Transportation and Growth Management Program Grant Briefing for Updates to the Transportation and Land Use Components of the Comprehensive Plan

- Public Comments
 - Communications
- May 27th
 - Cancelled
- June 10th
 - Site Plan and Design Review and Variance on Fir Street
 - Code Amendments
 - Public Comments
 - Communications
- June 24th
 - Site Plan and Design Review, Code Interpretation, Conditional Use, and Variances for the Public Safety Building on Linn Avenue
 - Historic Review Board Policy Changes
 - Public Comments
 - Communications
- July 3rd Joint Work Session with the City Commission
 - Height Limits within the Mixed Use Downtown District
- July 8th
 - Cancelled
- July 22nd
 - Variance for retaining wall height on Warner Milne Road
 - Chapter 17.40 Code Amendment for HRB Policies Procedures
 - Public Comments
 - Communications
- August 12th
 - Beaver Creek Road Concept Plan: Code and Zoning Amendments
 - Public Comments
 - Communications
- August 26th
 - Site Plan and Design Review, Parking Adjustment, and Variance for Parking Lot on Molalla Avenue
 - Beaver Creek Road Concept Plan: Code and Zoning Amendments
 - Public Comments
 - Communications
- September 9th
 - Beaver Creek Road Concept Plan: Code and Zoning Amendments
 - Code Amendments: Amendments to the Recently Adopted Code for Clarifications, Corrections of Errors, or Improvements
 - Heritage Tree Code Amendments OCMC 12.32
 - Public Comments
 - Communications
- September 23rd
 - Code Amendments: Amendments to the Recently Adopted Code for Clarifications, Corrections of Errors, or Improvements

- Beavercreek Road Concept Plan: Geologic Hazards, Upland Habitat, Master Planning
 - Annexation, Zone Change, and Subdivision on Maplelane Road
 - Public Comments
 - Communications
- October 14th
 - Request for Continuance: Site Plan and Design Review and Parking Adjustment on Molalla Avenue
 - Updates to the Oregon City Stormwater and Grading Design Standards and Stormwater Master Plan
 - Beavercreek Road Concept Plan: Parks, Enhanced Home Occupation/Cottage Industry, Concept Plan Renaming
 - Code Amendments Including Equitable Housing: General Amendments for Clarification, Correction of Errors, or Improvements
 - Minutes
 - Public Comments
 - Communications
- October 28th
 - Interviews
 - Request for Continuance: Request for Continuance: Site Plan and Design Review and Parking Adjustment on Molalla Avenue
 - Annexation, Zone Change, Subdivision, and Variance on S. Maplelane Road
 - Buildable Land Inventory and Preliminary Housing Needs Analysis Presentation
 - Public Comments
 - Communications
- November 11th
 - Cancelled
- November 18th (Tentative Agenda)
 - Code Interpretation
 - Site Plan and Design Review and Parking Adjustment on Molalla Avenue
 - Beavercreek Road Concept Plan: Parks, Home Occupations, and Renaming
 - Public Comments
 - Communications
- Tentative Agenda Items within the Remainder of the Year
 - Beavercreek Road Concept Plan: Transportation
 - Beavercreek Road Concept Plan: Overall Recommendation
 - Legislative Review of Water CIP List
 - Gardiner Middle School