City of WILSONVILLE in OREGON
Planning Division
29799 SW Town Center Lp. E
Wilsonville, OR 97070
503-682-4960

PLANNING COMMISSION
WEDNESDAY, APRIL 9, 2014
6:00 PM

AGENDA

I. 6:00 PM CALL TO ORDER - ROLL CALL

Ben Altman, Chair
Marta McGuire, Vice Chair
Jerry Greenfield
Peter Hurley
Al Levit
Phyllis Millan
Eric Postma
City Council Liaison Susie Stevens

II. 6:05 PM PLEDGE OF ALLEGIANCE

III. 6:10 PM CITIZEN'S INPUT

This is the time that citizens have the opportunity to address the Planning Commission regarding any item that is not already scheduled for a formal Public Hearing tonight. Therefore, if any member of the audience would like to speak about any Work Session item or any other matter of concern, please raise your hand so that we may hear from you now.

IV. 6:15 PM CITY COUNCIL LIAISON REPORT

V. 6:20 PM CONSIDERATION OF THE MINUTES

A. Consideration Of The August 13, 2014 Planning Commission Minutes

Documents: 8.13.14 PC Minutes.pdf

VI. 6:25 PM WORK SESSIONS

A. Sanitary Sewer Collection System Master Plan (Kraushaar/Ward)

Documents: Oct 8 2014 Sanitary Sewer Master Plan PC Staff Report.pdf

B. Frog Pond Area Plan (Neamtzu)

Documents: 1. Frog Pond PC Staff Rpt 10 08 14.Pdf, 2. Evaluation Summary Final Sept 24 2014 With Exhibits.pdf, 3. Evaluation Summary Appendices Sept 24 2014.Pdf

VII. 8:25 PM OTHER BUSINESS

A. 2014 Planning Commission Work Program

Documents: 2014 PC Work Program Oct.pdf

VIII. 8:30 PM INFORMATIONAL ITEMS

VIII. 8:30 PM INFORMATIONAL ITEMS

A. Climate Smart Communities

Documents: Oct 8 2014 PC Climate Smart Comm.pdf

IX. 8:40 PM ADJOURNMENT

Time frames for agenda items are not time certain.

Public Testimony

The Commission places great value on testimony from the public. People who want to testify are encouraged to:

- *Provide written summaries of their testimony*
- *Recognize that substance, not length, determines the value of testimony*
- *Endorse rather than repeat testimony of others*

Thank you for taking the time to present your views.

For further information on Agenda items, call Linda Straessle, Planning Administrative Assistant, at (503) 570-1571 or e-mail her at straessle@ci.wilsonville.or.us.

Assistive Listening Devices (ALD) are available for persons with impaired hearing and can be scheduled for this meeting.

The City will also endeavor to provide the following services, without cost, if requested at least 48 hours prior to the meeting:

*Qualified sign language interpreters for persons with speech or hearing impairments
*Qualified bilingual interpreters.

To obtain services, please call the Planning Administrative Assistant at (503) 682-4960

City of Wilsonville

PLANNING COMMISSION
WEDNESDAY, OCTOBER 8, 2014
6:00 PM

V. CONSIDERATION OF THE MINUTES

A. Consideration of the August 13, 2014 Planning Commission minutes

PLANNING COMMISSION
WEDNESDAY, AUGUST 13, 2014
6:00 P.M.

DRAFT

Wilsonville City Hall
29799 SW Town Center Loop East
Wilsonville, Oregon

Minutes

I. CALL TO ORDER - ROLL CALL
Vice Chair McGuire called the meeting to order at 6:02 p.m. Those present:

Planning Commission: Marta McGuire, Eric Postma, Al Levit, Peter Hurley, Phyllis Millan, Jerry Greenfield, and City Councilor Susie Stevens. Ben Altman was absent.

City Staff: Chris Neamtzu, Barbara Jacobson, Nancy Kraushaar, Katie Mangle, and Mike Ward

II. PLEDGE OF ALLEGIANCE
The Pledge of Allegiance was recited.

III. CITIZEN'S INPUT - This is an opportunity for visitors to address the Planning Commission on items not on the agenda. There was none.

IV. CITY COUNCIL LIAISON REPORT
Councilor Stevens noted only one City Council meeting would be held in August, and reported on the August 4, 2014 Council meeting as follows:

- I-5 traffic has been an issue and topic of discussion during several work sessions. Staff would talk with the proper authorities about possibly timing the lights better and law enforcement was citing drivers blocking intersections that prevent cross traffic from getting through.
  - Council was also discussing an Old Town "escape", or alternative route, other than Boones Ferry Rd to get out of Old Town.
- Council also heard from the Willamette River Water Coalition about plans to enable Hillsboro to get water from Willamette River, which would require a new water plant to be built in Wilsonville as well as pipelines traveling through several jurisdictions, including Wilsonville. Updates from involved discussions about the locations of the pipelines and any fees the City could charge for the use of the right-of-way.
- The Stormwater Utility Fee update would begin in September to analyze the rates and see if increases might be necessary to maintain the City's existing infrastructure.
- The Urban Renewal Strategic Plan, which involved the Old Town "escape", was discussed including when the two existing urban renewal plans would be closed.
- Council also discussed the Charbonneau Consolidated Improvement Plan, the large project planned to replace City stormwater, sanitary sewer and water lines in Charbonneau over the next couple decades.
- She noted that Council voted unanimously on all the actions taken at the August 4th meeting; Council was working well together and was being well informed about the various options available by Staff, which made making good decisions easier.

Commissioner Levit asked what amount the City was currently spending on infrastructure improvements or maintenance, in general, in the Capital Improvement Plan (CIP). Such information would help put the plans for Charbonneau in perspective.

Chris Neamtzu, Planning Director, said he would provide the budget numbers to the Commission.

V. CONSIDERATION OF THE MINUTES

A. Consideration of the July 9, 2014 Planning Commission minutes

The July 9, 2014 Planning Commission minutes were approved 5 to 0 to 1 as presented with Vice Chair McGuire abstaining.

VI. WORK SESSIONS

A. Basalt Creek Concept Plan (Mangle)

Katie Mangle, Long Range Planning Manager, presented via PowerPoint a synopsis of the Basalt Creek Concept Plan presented at the Joint Wilsonville and Tualatin City Council meeting in July. Copies of that full presentation were also distributed to the Commission for reference. More specific details about the work being done and the input received were included in the Commission's meeting packet. Her key additional comments and responses to questions from the Commission were as follows:

- No one anticipated having quarries or similar heavy industry in the industrial areas of Basalt Creek. Wilsonville has a long history of clean industrial, flex spaces and industrial mixing with offices use. As the project begins developing alternatives, articulating the types of industrial uses allowed and especially, any potential impacts resulting from different types of industrial would be important.
- Those participating in the mapping exercise made very astute observations about the relationships between different land uses and what constituted a buffer. Everyone understood the importance of determining the type of use that would be assigned to the lands near the residential areas to the north and that it was a sensitive edge. The benefits of having a good industrial neighbor were also recognized; for example, the industrial area across Canyon Creek Road from the residential area where Xerox was maintaining the large green space.
- Both City Councils were working very well together, and it was clear each was committed to a collaborative process.
- In light of the material presented, Staff sought input from the Commission about the characteristics the project team should consider when developing land use scenarios, which would begin after the Joint City Council meeting in September.

Discussion and feedback from the Planning Commission was as follows with responses by Staff to Commissioner questions as noted:

- Was a more practical analysis expected from developers and businesses? The maps show constrained areas but some land areas, while not technically constrained, were practically constrained.
  - For example, the area near Grahams Ferry and the railroad tracks were continually being shown as potential commercial or industrial development, but the awkward railroad crossing with the low overpass prevented large trucks from crossing the railroad. This could be a practical constraint as far as what could be done in that area, which could decrease marketability.
  - Another area involved the hill in the middle of the area, which was shown as developable, but due to the cost of building infrastructure up the steep hill, building there might be impractical.
- Ms. Mangle explained that the consultant team was hired to develop digital scenarios and the Constraints Map removed any land with 25 percent slope and above. The graphically-illustrated scenarios presented to the community would show no development would occur in those areas, but that some development would be assumed on areas with a 10 percent slope. The consultants' digital scenarios would also be created from databases that were tied into development, such as return on investment, and market- based assumptions set by the market study and discussions with developers. These digital scenarios would result in an intelligent map however, the modeling and illustrating had not occurred yet.
  - She confirmed further analysis was yet to come. Fortunately, the digital plans would be easier to modify and refine as such information was included to get to a higher level of detail. The existing maps and information presented was laying the groundwork for future efforts.

- Issues had been discussed previously about potential conflicts with the Tonquin Trail going through the industrial land of the Basalt Creek area. The Tonquin Trail alignment was shown as a purple dotted line on the Transportation Refinement Plan (Page 11, paper copy of Joint Council PowerPoint). Except for one small section, the majority of the Tonquin Trail would fall outside the concept area; however decisions were yet to be made about the northern trail sections going into Tualatin. Tualatin was still working on the trail's alignment to the Southwest Tualatin Concept Planning Area. Wilsonville had firm alignments of the trail's placement in the south portion of Basalt Creek running through the west railroad area, crossing the Coffee Creek Causeway and going up to Sherwood.
- No state mandated restrictions were involved with the Coffee Creek Correctional Facility, which participated in one of the focus groups and had no concerns about development. Representatives of the facility talked more about their needs as a major employer in the area, such as needing transit service for their employees. The correctional facility was fairly up to capacity, but did not see any need to expand its need for land for development.
- The development emphasis in Basalt Creek has been jobs and industrial development, so the amount of residential (shown as yellow chips on Workshop Maps in the PowerPoint) designated by some workshop participants during the map exercise was surprising. Were target percentages set for the amount of residential and industrial use in Basalt Creek, or was that being left open for the development of the scenarios?
    - No target percentages have been set, but assumptions have been used, especially with regard to what the Cities have asked Metro to assume for the regional traffic modeling and growth projections. These assumptions were used by both City Staffs based on guidance from the respective Councils.
        - Wilsonville's Staff reviewed several City policies, including the Economic Opportunity Analysis, Comprehensive Plan and different agreements with Tualatin and Washington County. Wilsonville's assumption had always been that Basalt Creek would be a job center for Wilsonville; there has been no history of discussion about having residential in Wilsonville's portion.
        - When the area was brought into the urban growth boundary (UGB), the presumption, though not a requirement, was that the dividing line would be near the East-West (E-W) Connector; however the E-W Connector was a bit farther south than originally presumed ten years ago.
    - The dialogue about the balance between residential and jobs would be important for the Tualatin community to discuss as the Tualatin City Council had discussed interest in both at different times.
    - Seeing yellow chips south of the connector might make sense depending on whether the Basalt Creek Area was developed in isolation or as an extension of the community.
        - Given Wilsonville's centric perspective and Comprehensive Plan, having an isolated Wilsonville neighborhood north of the industrial areas would be a big departure from the Wilsonville vision and would require an important discussion with the community.
        - Many people at the workshop were thinking about Basalt Creek being a complete community, so seeing the amount of residential yellow chips made sense; however, it was important input into the process, not alternatives to be voted upon.
    - Mr. Neamtzu added that in retrospect, one weakness of the public workshop was that sideboards were not added to the map exercise to better shape that outcome. At the last joint work session of both City Councils, Metro provided a history lesson about the 2004 ordinance and the assumptions that lead to the decision regarding residential and industrial uses in Basalt Creek. Reestablishing that groundwork was helpful but map exercise participants would not have that knowledge going in and he wished that history would have been introduced.
- Guiding Principle 4 sounded as if a small, complete community would be created, but as the project was framed for the Commission, the focus was to create an industrial hub that would generate jobs. Having the same area also support a quality neighborhood could be challenging given the infrastructure that would be required to support that industrial base. Everyone involved needed to be continually reminded of that framing in order to continue on the same path.
- The Guiding Principles were developed by Staff based on discussion at the first Joint City Council meeting in October 2013 and presented to the Joint Council in July. No concrete feedback or editing was directed to Staff but some comments were that there were too many principles, some principles seemed obvious, and

perhaps the principles should focus on the Joint Council's attitude about five or so key important questions, so it was a work in progress.
- The concept of a complete community did not need to be in either jurisdiction entirely.
- The workshop provided the team and both communities with very helpful information that interest and some need exists to have a retail center that serves the existing neighborhoods, new neighborhoods, and the employees of the industrial neighborhoods in Basalt Creek, which was important to hear. Attendees lived in the area and in the southern part of Tualatin and had extraordinary creativity and interest in seeing a variety of uses in the area, including mixed use and retail.

B. Sanitary Sewer Master Plan (Kraushaar)

Nancy Kraushaar, Community Development Director, stated Staff has been working on an update to the Sanitary Sewer Master Plan for more than a year which included preliminary study work to better understand the different components of the system before doing the modeling and other steps needed to do the Master Plan update. The Master Plan had not been updated since 2001, and was especially needed given the proposed future growth in Frog Pond and potentially, the Advance Road and Basalt Creek areas.
- The recently upgraded and improved Wastewater Treatment Plan was not part of the update, only the unseen pipes, as well as the pump stations throughout the community required to pump sewage where gravity pull is unavailable. The existing conditions and capacity were reviewed to look for existing deficiencies and potential improvements. The project team also looked to see how well the current system and pump stations were operating, and then looked at future conditions to understand the future demands on the sanitary sewer collection system.
- Future considerations included the City's uncompleted concept plans, as well as some urban reserves outside the existing UGB that are upstream from the existing pipe system. Determining the impact those areas would have on the system in the future was important when making improvements to the system now so that pipes and facilities were sized correctly to accommodate future growth and prevent doing interim improvement projects that would need redone later.
- She introduced the consultant team, noting that because preparations were beginning for the final draft plan, Staff wanted to present the material for the Commission's comment and feedback.

Chad Roundy, Murray, Smith & Associates, Inc. presented the Sanitary Sewer Master Plan via PowerPoint and responded with Staff to clarifying questions from the Commission.
- It was noted that the City's stormwater and sanitary sewer systems are separated. While Wilsonville has a higher water table than some places, the City's system was influenced less by wet weather and was in good condition compared to some adjacent utilities. The existing system had almost no existing capacity constraints, though certain condition issues do exist that would be highlighted at future meetings.

Comments and discussion regarding the Sanitary Sewer Master Plan were as follows:
- Wilsonville was fortunate that most of the proposed sanitary sewer improvements needed for expansion tied in with improvements existing roads that would have to be improved anyway as the concept areas expanded.
  - One good example was section of Parkway Ave that would be in need of repair by the time the area north of Elligsen came into the city/UGB, likely requiring the pipe to be upsized. In addition, as development occurs on vacant properties in the area, the City would have the future planning knowledge to make necessary half-street or sewer line improvements, for example.
- One sewer line improvement near Kinsman Rd was located where no road existed yet. Construction of the next section of Kinsman Rd was planned for 2017, and would include upsizing the pipe when the road work was done.
- A small, 4-inch sewer line ran south of Charbonneau and east side of the highway that was forced gravity most of the way and then fed into the pump station at Charbonneau.
- The City would not consider the areas of Basalt Creek that are part of Tualatin. Horizon Christian School was in the City of Tualatin but the area between Horizon Christian School and the freeway was not.

- Staff was cautiously looking at areas in Basalt Creek because no public discussions have occurred regarding how the infrastructure needs in the area would be served. Sanitary sewer decisions would be based on the system being gravity fed, which might make sense for Wilsonville to do, but the decision could be to use pump stations.
    - Having the information about densities in Basalt Creek would back up how the area might impact the City's sewer system improvements. As information becomes available, the background for the Master Plan could be referenced to help make decisions in the future.

Ms. Kraushaar reviewed next steps, noting the project team planned to return to the Planning Commission in October to present a more comprehensive view of the Master Plan. The Committee for Citizen Involvement would be asked to hold a public meeting in November so the City could ensure public involvement, and then the public hearing would hopefully be held in December.

A. OTHER BUSINESS

A. 2014 Planning Commission Work Program

Mr. Neamtzu noted the evolving items on the Work Program, pointing out the numerous projects the Commission was working on, including the Form-Based Code, Sanitary Sewer Master Plan, Basalt Creek Concept Plan and Frog Pond Area Plan.

The Commissioner briefly discussed how many CCI meetings were required each year. Mr. Neamtzu agreed to check the Comprehensive Plan language to see if a certain number of meetings were required or suggested each year.

VIII. INFORMATIONAL ITEMS

A. Draft of Metro's Urban Growth Report (UGR)

Mr. Neamtzu briefly summarized the UGR used to assess the capacity of the regional UGB to accommodate jobs and housing. He believed this UGR was written better and was easier for the layperson to understand. Getting more appropriate authorities and disciplines engaged in the process could be problematic for the City with regard to the Advance Road area, because unless adjustments were made to the draft UGR, the Metro Council could easily determine that adequate land was available with no need for expanding the UGB in the Wilsonville area. He noted the following items for the Commission's consideration:

- Members of Staff met with Martha Bennett, Metro's Chief Operating Officer, and gave her a tour of the community, including Advance Road, Frog Pond, Villebois, various businesses, etc. It was a good meeting resulting in good ideas. Her parting comment was that Wilsonville is performing.
- Assumptions made about Damascus in the UGR remained in question, which Commissioner Hurley had alluded to months ago. Damascus showed no growth for the first 10 years, but did the second 10 years of the 20-year horizon. Policies about whether growth in Damascus was appropriately measured could be probed to make arguments in Wilsonville's favor. Showing a willingness to do more planning in Town Center and including that on the Work Program could be beneficial as well.
    - Misassumptions about Damascus could result in a potential shortage of single-family housing, which was what Wilsonville was trying to plan for, and would meet an important regional need. Given the rapid growth Wilsonville had seen, the City could tell a story about seeing the market and delivering the housing as well as the activity and investment in Wilsonville, which might play well for the city.
- Only Sherwood and Wilsonville showed an interest in expansion; however the UGR pointed out that both cities were given land in 2002 and had not done anything with it.
- The UGR celebrated Villebois as a major success story.
- He invited the Commission's input about strategies for the City to use to make a case for expanding the UGB.

Commissioner Hurley commented that it would be interesting to see whether some acreage was removed from Damascus and adding in smaller areas like Advance Road. The UGR also noted that Sherwood had voted down the expansion and Wilsonville had not.

- With regard to the concept of workforce housing, Metro has finally acknowledged after 25 years that people do not live near their work place. Washington County was the study area, and one third of Washington County residents live and work in the County; one third leave the County for work, and another third of the jobs come from those living outside Washington County. The concept of needing more workforce housing did not pan out now, according to the numbers.
- Another interesting finding regarded the type of housing millennials would want once they stop living at home. It was difficult to determine whether they would want to live in a single-family house or multifamily housing geared toward families. This was a discussion item for Frog Pond, which could place Wilsonville ahead of the game by offering single-family housing because none was available.
- It was impressive to see Metro tweaking the numbers rather than beating a drum that was not true.

Commissioner Levit noted that the infrastructure costs to develop Damascus would cost a fortune. Even with the current population, traffic was terrible coming from Damascus to Highway 224. A potential benefit for Frog Pond was that less infrastructure would be required.

- He referenced *The Spokesman* article on the Wilsonville Road/I-5 Interchange, noting that given how the material was presented, he questioned if they knew what the numbers meant.

IX. ADJOURNMENT

Vice Chair McGuire adjourned the regular meeting of the Wilsonville Planning Commission at 7:38 p.m.

Respectfully submitted,

By Paula Pinyerd of ABC Transcription Services, Inc. for
Linda Straessle, Planning Administrative Assistant

City of Wilsonville

PLANNING COMMISSION
WEDNESDAY, OCTOBER 8, 2014
6:00 PM

VI. WORK SESSIONS

A. Sanitary Sewer Collection System Master Plan (Kraushaar/Ward)

City of WILSONVILLE in OREGON

PLANNING COMMISSION MEETING
STAFF REPORT

Meeting Date: October 8, 2014	**Subject:** Wastewater Master Plan **Staff Member:** Mike Ward, P.E., Civil Engineer **Department:** Community Development
Action Required	**Advisory Board/Commission Recommendation**
☐ Motion ☐ Public Hearing Date: ☐ Ordinance 1st Reading Date: ☐ Ordinance 2nd Reading Date: ☐ Resolution ☒ Information or Direction ☐ Information Only ☐ Council Direction ☐ Consent Agenda	☐ Approval ☐ Denial ☐ None Forwarded ☒ Not Applicable **Comments:**

Staff Recommendation: N/A
Recommended Language for Motion: N/A

PROJECT / ISSUE RELATES TO: *[Identify which goal(s), master plans(s) issue relates to.]*		
☒Council Goals/Priorities #6 – Well Maintained Infrastructure	☒Wastewater Master Plan	☐Not Applicable

ISSUE BEFORE COMMISSION:
Staff has been working on an update to the Wastewater Master Plan with the assistance of Murray Smith & Associates (MSA). Staff desires to engage the Planning Commission to review the results received to date and to provide feedback.

EXECUTIVE SUMMARY:
MSA has modeled wet weather flows throughout the city based on the storm that occurred in January of 2012 and the data associated to impacts on the City's sewer system as read by flow meters. They have compared this information to the flows experienced in dry weather to

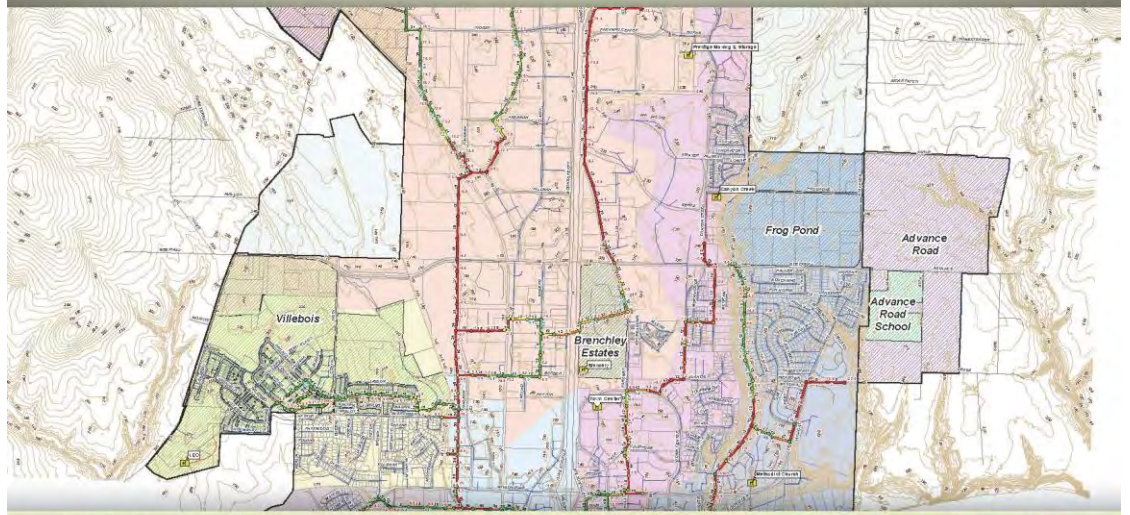
determine the amount of infiltration that is experienced by the City. Using this model the capacity of the wastewater collection pipe system was modeled in future growth conditions to determine deficiencies. Staff and consultants will review this process in greater detail, along with the results, in the attached slides.

EXPECTED RESULTS:
The Master Plan will establish priority of work to the sanitary system, both with new construction, increases to existing capacity and repair of existing pipe. It will also help us estimate the financial impact to the City.

TIMELINE:
Staff anticipates returning to the Planning Commission for their November 12th meeting, to present the report in a Public Hearing.

POTENTIAL IMPACTS or BENEFIT TO THE COMMUNITY (businesses, neighborhoods, protected and other groups):
The Master Plan will help the City to perform work to prepare areas for development as well as continue to provide safe and reliable sanitary sewer service to the community.

MSA MURRAY, SMITH & ASSOCIATES, INC.
ENGINEERS | PLANNERS



CITY OF WILSONVILLE

WASTEWATER COLLECTION SYSTEM MASTER PLAN

October 2014

City of WILSONVILLE In OREGON

Presentation Outline

PREVIOUS

- System Loading
- Design Criteria
- Existing System Capacity
- Improvement Analysis

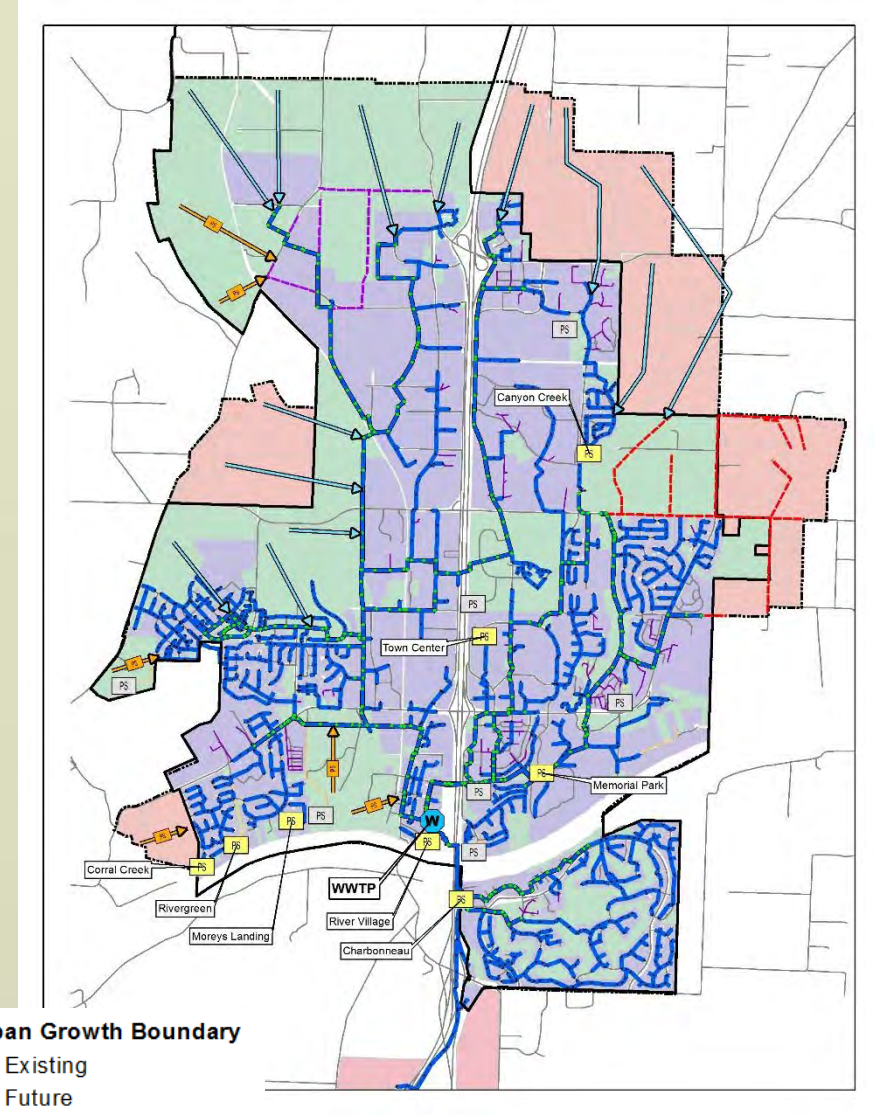
CURRENT

- Improvement Selection
- Costs
- Prioritization

System Loading

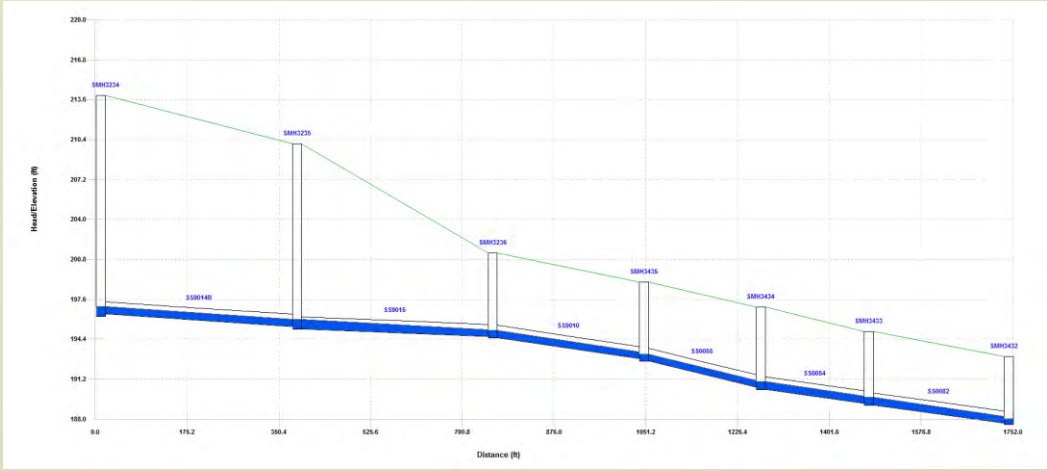
Land Use	Land Use Description	High Density		Medium Density		Low Density	
		Equivalent Dwelling Units per Acre	Unit Load (gpad)	Equivalent Dwelling Units per Acre	Unit Load (gpad)	Equivalent Dwelling Units per Acre	Unit Load (gpad)
Commercial							
CN	Neighborhood Commercial		1,000		750		500
PF	Public Facilities		1,000		750		500
Industrial							
IC	Campus/Industrial/Business Park		1,000		500		350
IH	Heavy Industrial		1,000		500		350
IL	Light Industrial		1,000		500		350
RI	Rural Industrial		1,000		500		350
Residential and Mixed-Use							
SFR1	Single Family 1 acre lot	1	166	1	166	1	166
SFR3	Single Family 10,000 sqft lot	3	498	3	498	3	498
SFR5	Single Family 7,000 sqft lot	5	831	5	831	5	831
SFR7	Single Family 5,000 sqft lot	7	1,163	7	1,163	7	1,163
SFR10	Single Family 3,500 sqft lot	10	1,662	10	1,662	10	1,662
MFR1	Multi-family Very Low Density	12.3	2,044	12.3	2,044	12.3	2,044
MFR2	Multi-family Low Density	17.8	2,958	17.8	2,958	17.8	2,958
MUR1	Mixed Use	11.2	1,861	11.2	1,861	11.2	1,861
Variable Density (Re-Zoning)							
EFU	Exclusive Farm or Forest Use	15	2,492	10	1,662	6	997
FUD	Future Urban Development	15	2,492	10	1,662	6	997
RRFU	Rural Residential	15	2,492	10	1,662	6	997

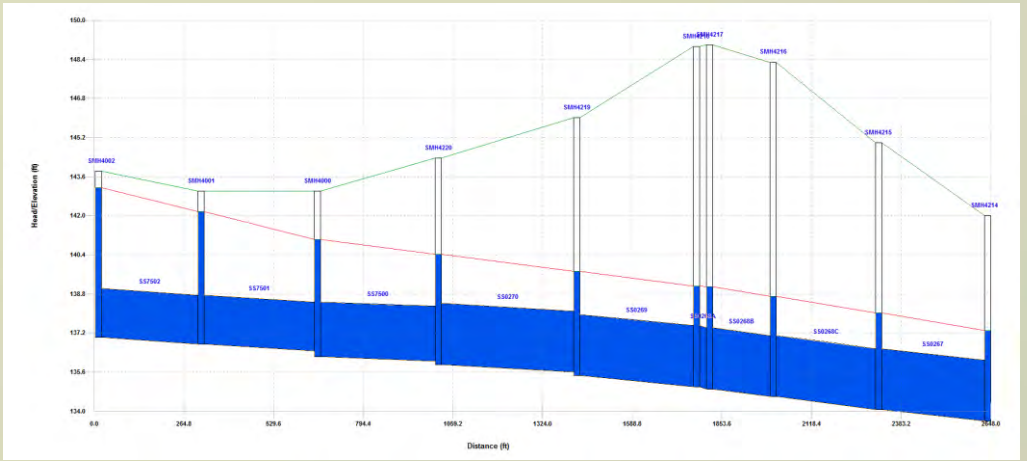
Note: Unit loads for land use classifications with equivalent dwellings units are calculated assuming 67 gpcd and 2.48 people per unit.



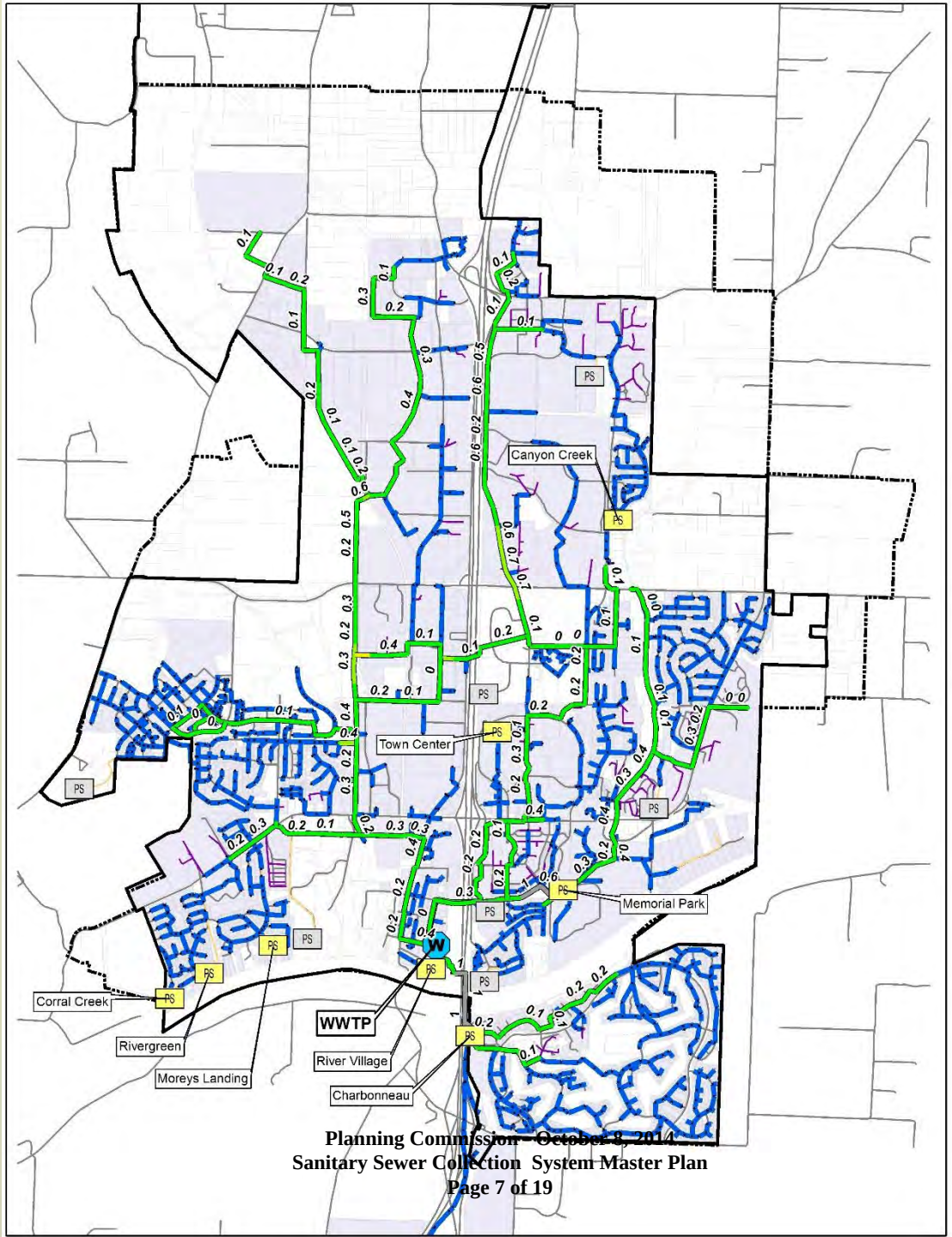
Design Criteria

Standard	Category	Criteria	Explanation
Primary	Maximum water depth to diameter ratio during dry weather conditions	0.8	When the depth to diameter ratio exceeds 0.9, the pipe begins to lose gravity capacity due to greater frictional loss associated with a larger wetted pipe perimeter.
	Minimum freeboard during design storm, (clearance from water surface to manhole rim)	Maximum water depth does not exceed crown of pipe	The City standard is conservative in that it does not allow surcharging during the design storm event.
	Pump Station firm capacity	Lift stations have capacity to pump at flows greater than or equal to peak hour flows with largest pump out of service	The firm capacity criteria protects against loss of service during equipment failure and allows for pump cycling for longer equipment life.
	Maximum force main velocity	8 ft/sec	The velocity criteria protects against excessive head loss and allows pumps to operate efficiently.
Secondary	Maximum gravity pipeline velocity	< 15 ft/sec or anchored appropriately for extreme slopes	The maximum velocity criteria protects pipelines from turbulent flow conditions and excessive air entrainment.
	Minimum cleansing/scouring velocity, gravity pipeline	2 ft/sec	Pipe diameters and minimum slopes should be selected to prevent solids deposition.
	Minimum cleansing/scouring velocity of force mains	3.5 ft/sec	Pipe diameters should be selected to prevent solids deposition.





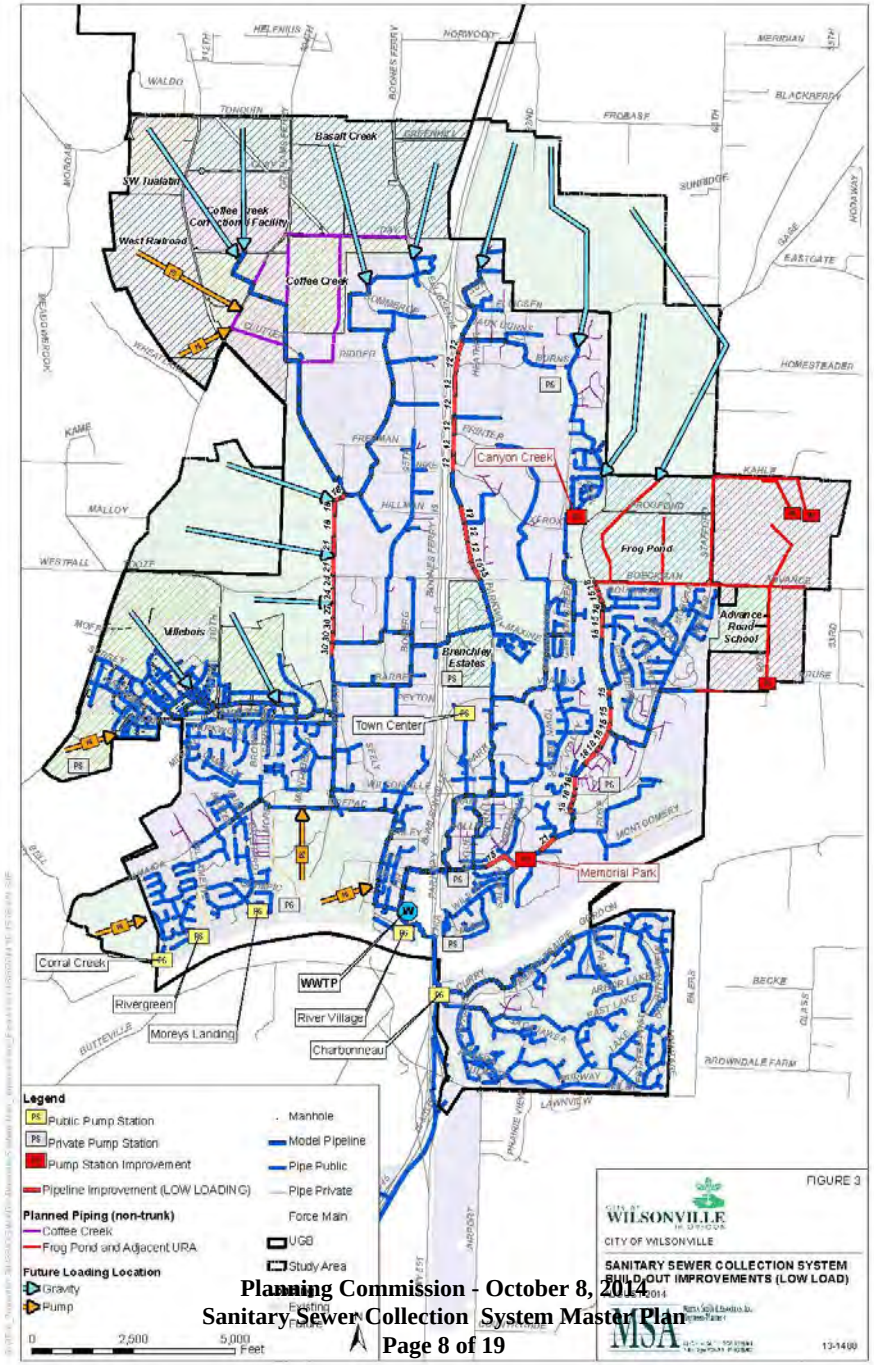
Existing System Capacity



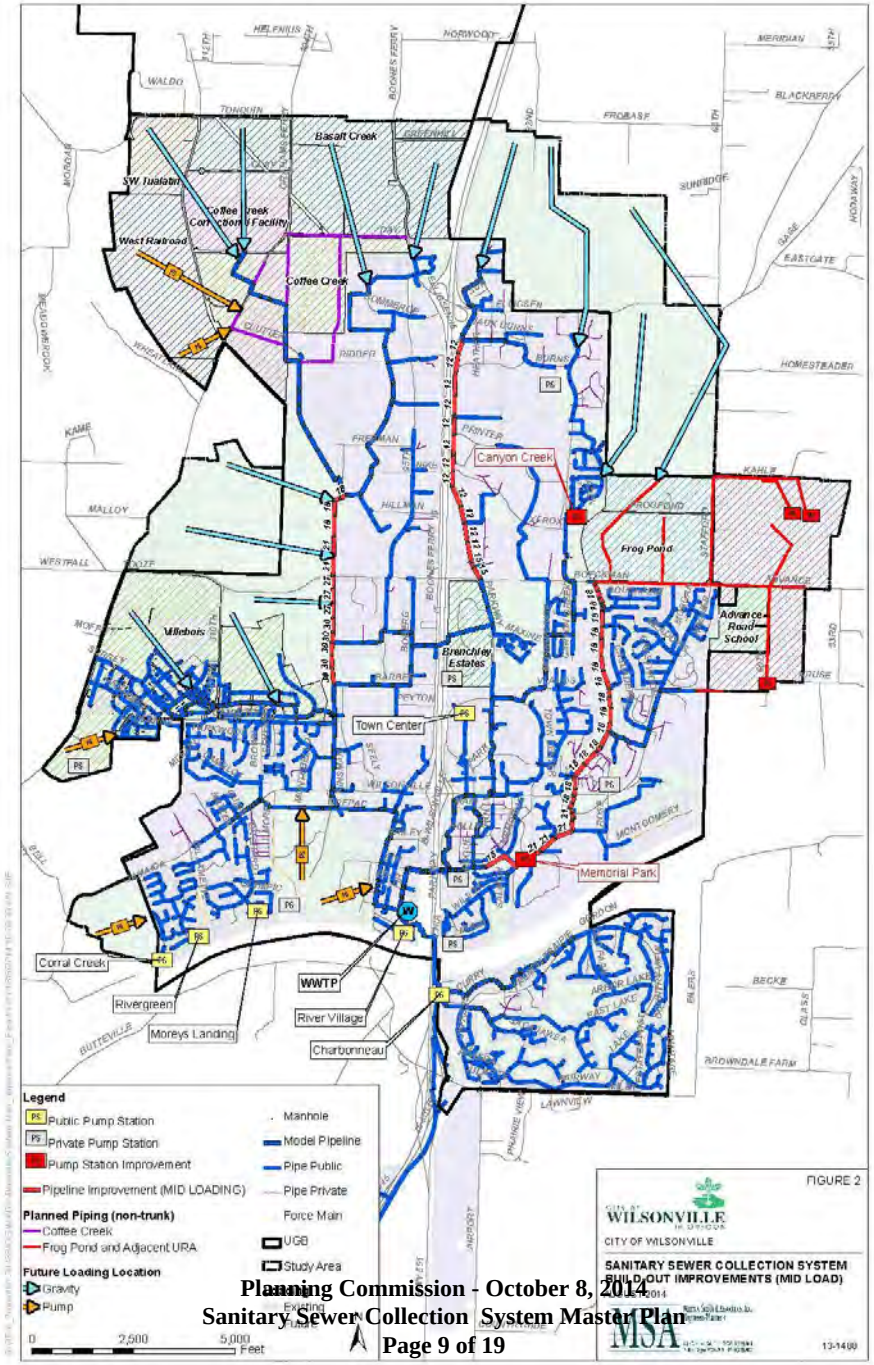
MSA

City of Wilsonville in Oregon

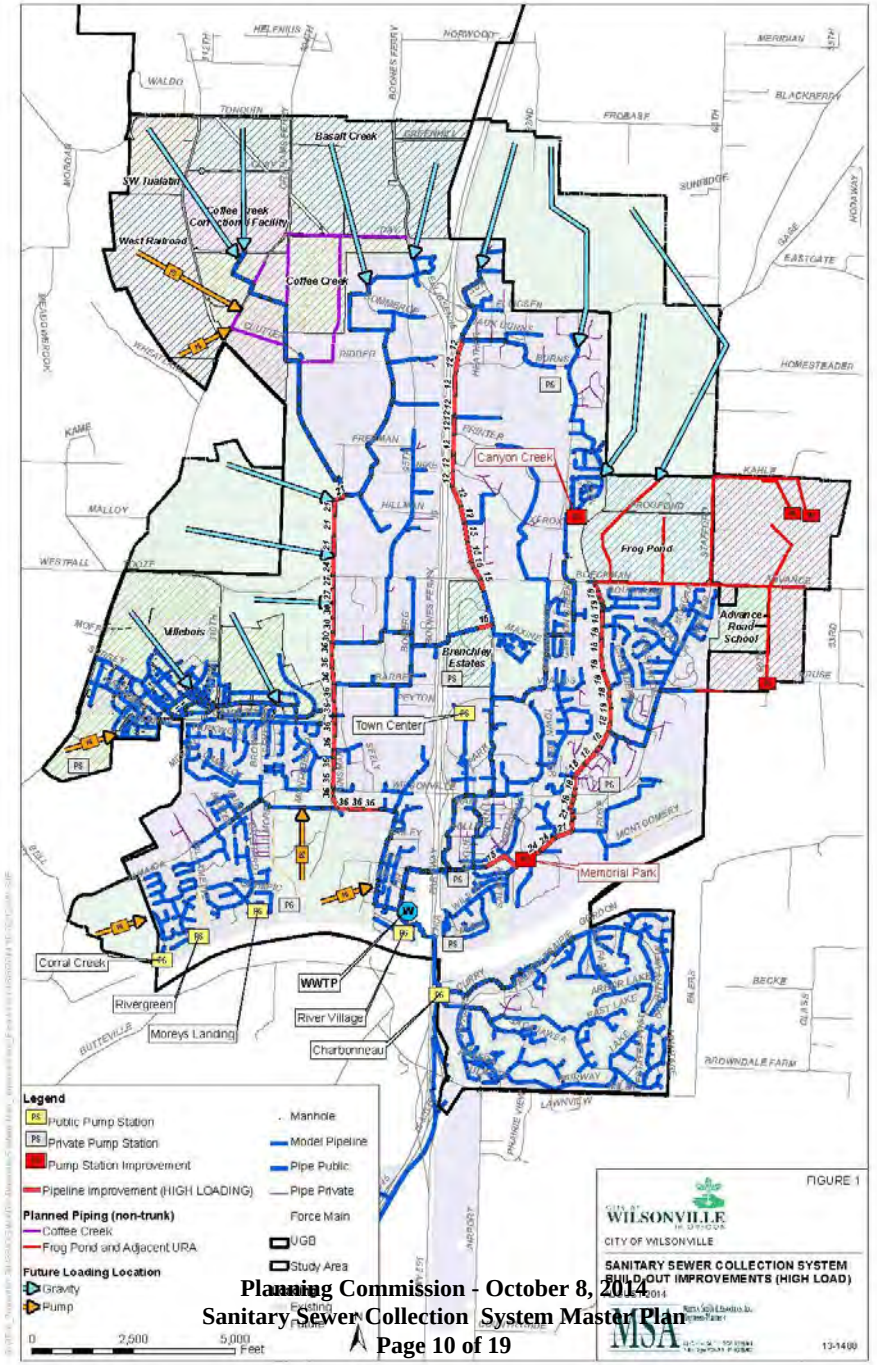
Low Load Scenario



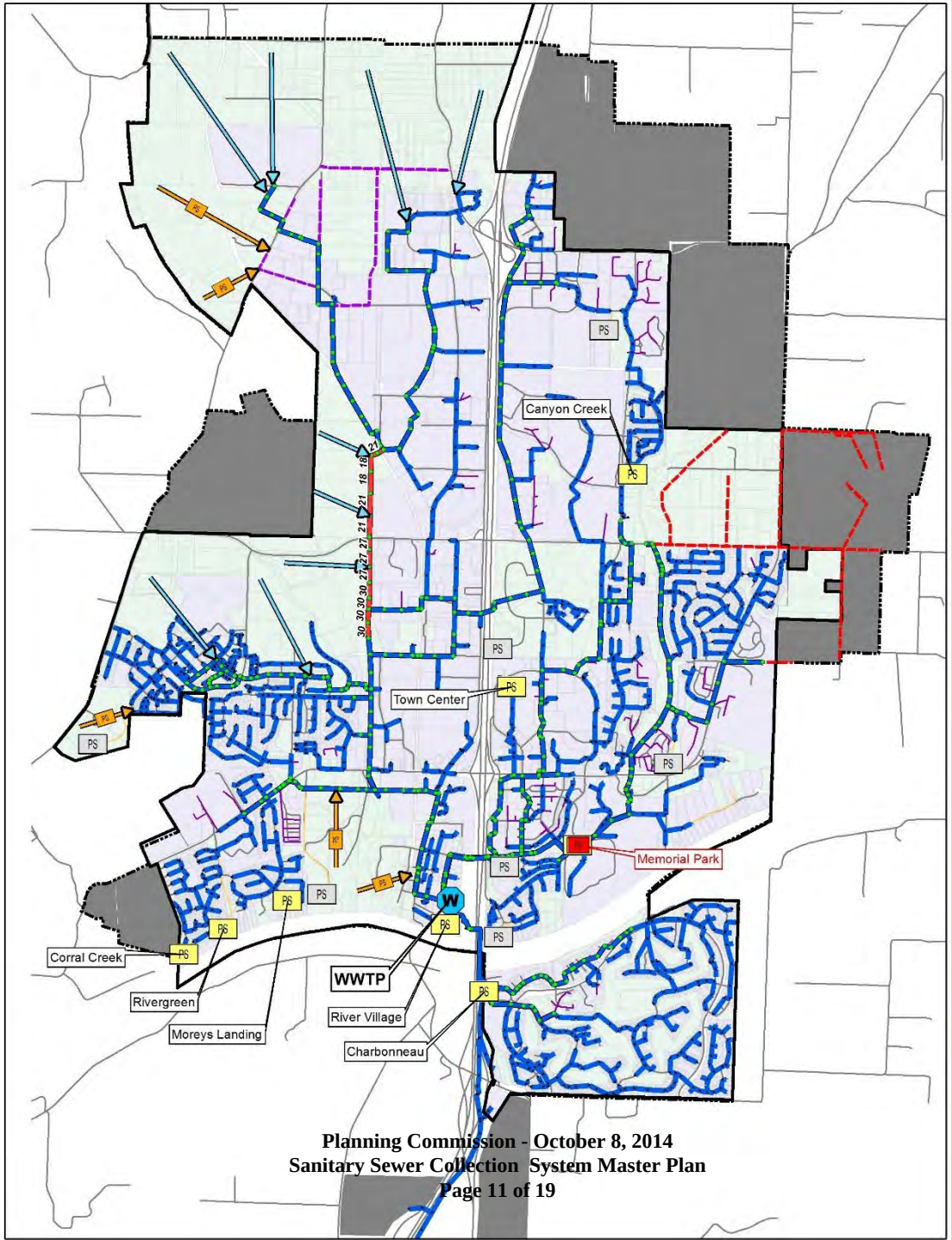
Medium Load Scenario



High Load Scenario



UGB & Planned Improvements (Build-out)



Project Type

- Existing System Capacity Upgrades
- Condition Based
- New Infrastructure for Future Development

Prioritization Category

DEVELOPMENT BASED

- UGB
- Advanced Road URA
- URA

CONDITION BASED

- 0-5 Years
- 5-10 Years
- 10-20 Years

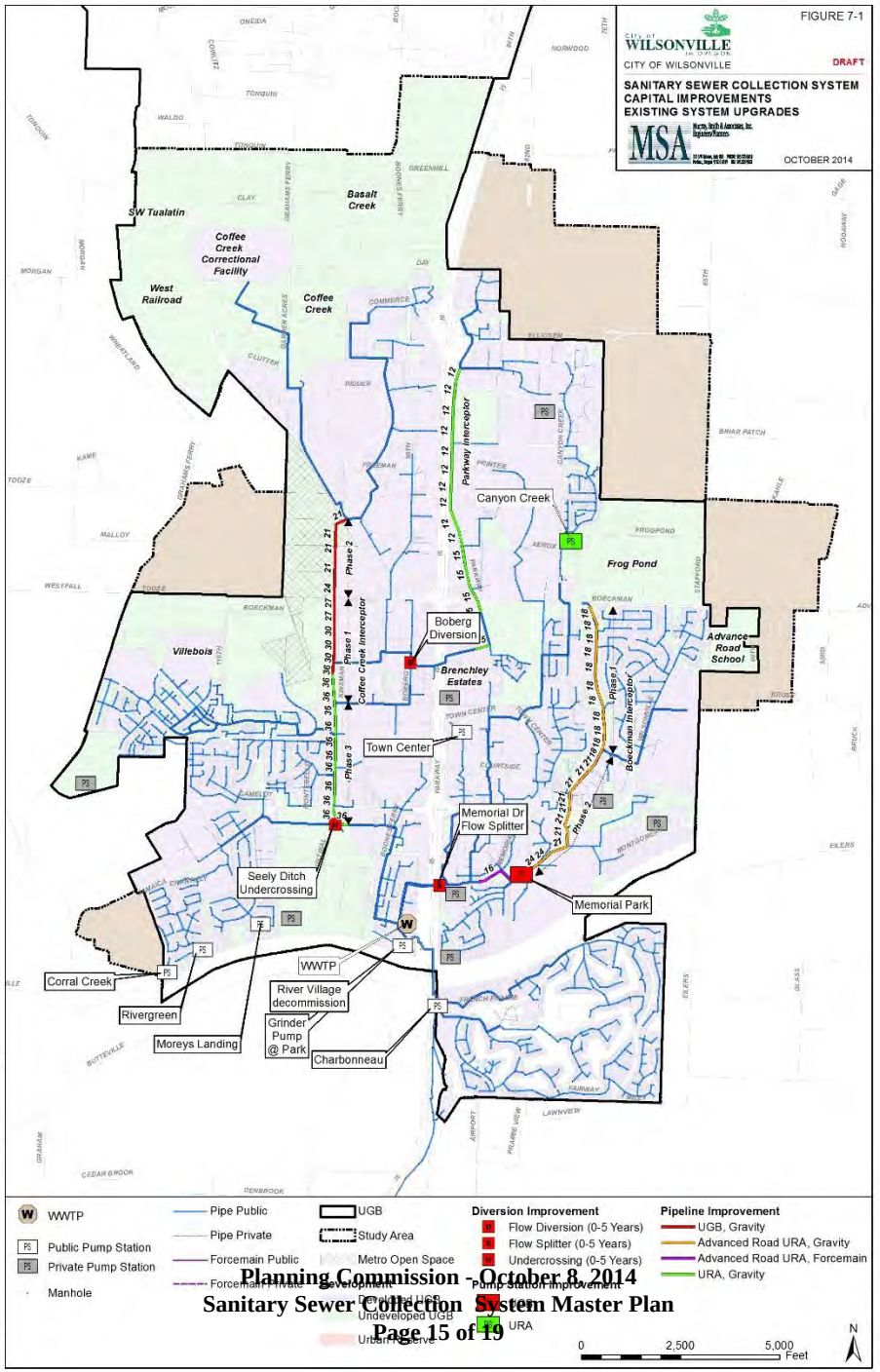
OTHER INFORMATION

- Project Drivers
- Growth Percentage

Existing System Capacity Upgrades

- Coffee Creek Interceptor Phases 1, 2, & 3
- Parkway Interceptor
- Boeckman Interceptor Phases 1 & 2
- Memorial Park Pump Station and Force Main
- Canyon Creek Pump Station
- Boberg Diversion Structure
- Memorial Drive Flow Splitter Structure

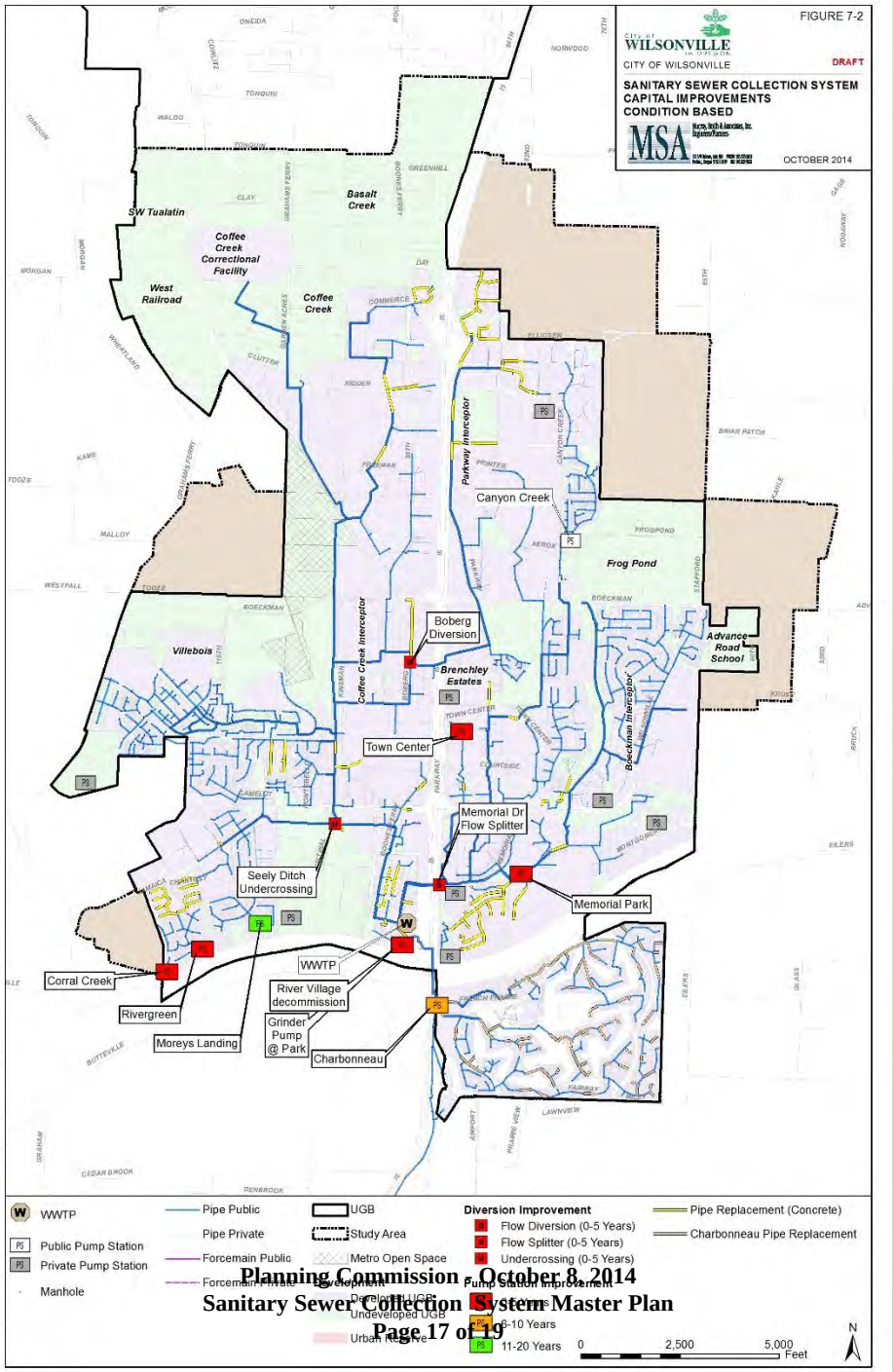
CIP – Existing Upsizing for Future Development



Condition Based Improvements

- Annual pipeline replacement program (concrete piping)
- Charbonneau District pipeline program
- Boberg Diversion structure
- Memorial Drive Flow Splitter structure
- Seely Ditch Undercrossing
- Memorial Park Pump Station
- Town Center Loop Pump Station
- River Village Pump Station - Decommission
- Corral Creek Pump Station
- River Green Pump Station
- Charbonneau Pump Station
- Morey's Landing Pump Station

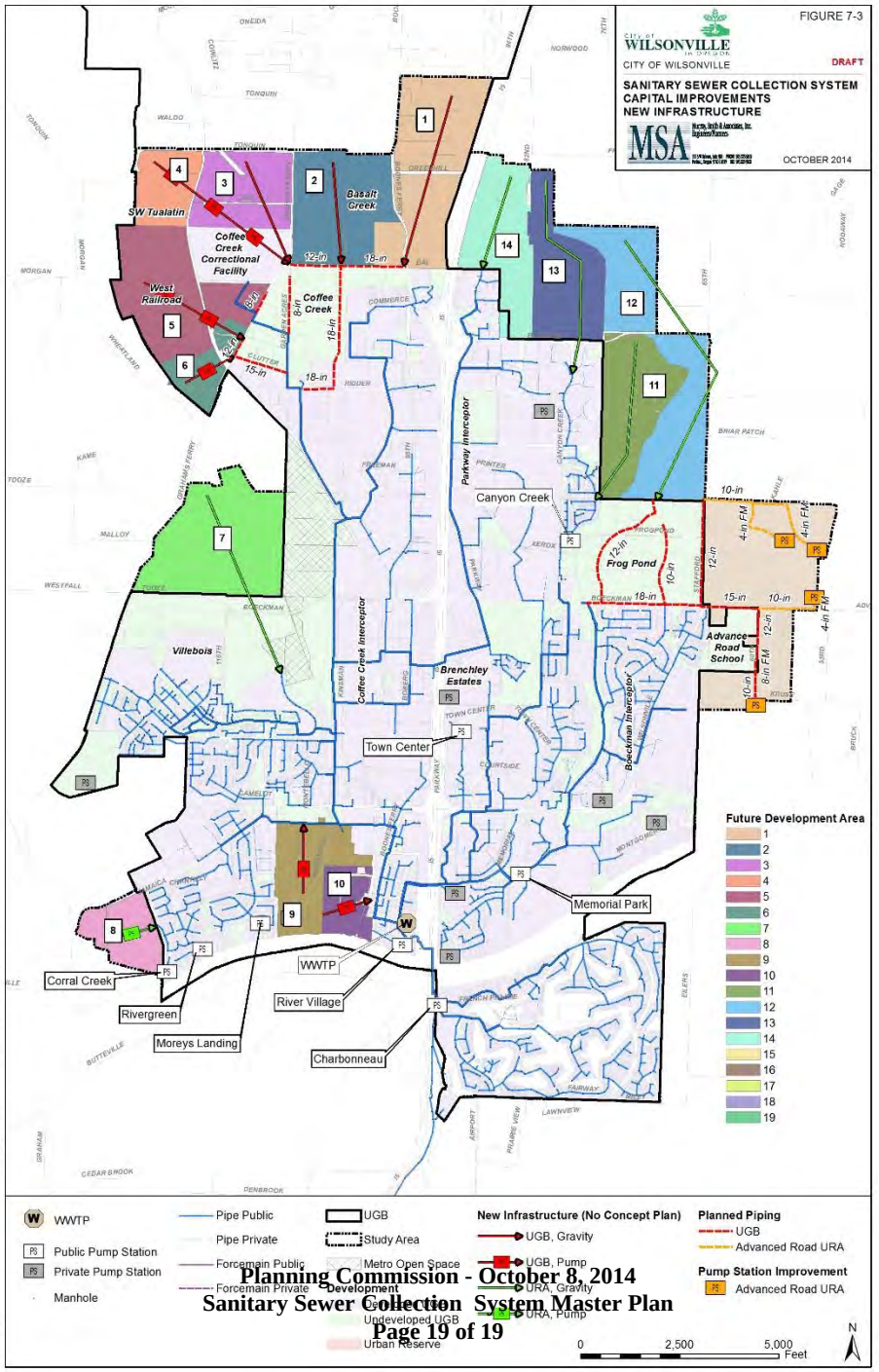
CIP – Condition Based



New Infrastructure for Future Development

- Infrastructure identified in concept plans for Frog Pond, Advance Road School, and Coffee Creek within the existing UGB.
- Future development areas that do not currently have concept plans within the UGB.
- Infrastructure identified in concept plans for Advanced Road URA.
- Future development areas that do not currently have concept plans within the URA.

CIP – New Infrastructure for Future Development



City of Wilsonville

PLANNING COMMISSION
WEDNESDAY, OCTOBER 8, 2014
6:00 PM

VI. WORK SESSIONS

B. Frog Pond Area Plan (Neamtzu)

City of WILSONVILLE in OREGON

PLANNING COMMISSION
WORKSESSION
STAFF REPORT

Meeting Date: October 8, 2014	**Subject:** Frog Pond Area Plan Alternatives Evaluation **Staff Member:** Chris Neamtzu, Planning Director **Department:** Community Development
Action Required	**Advisory Board/Commission Recommendation**
☐ Motion ☐ Public Hearing Date: ☐ Ordinance 1st Reading Date: ☐ Ordinance 2nd Reading Date: ☐ Resolution ☒ Information or Direction ☐ Information Only ☐ Council Direction ☐ Consent Agenda	☐ Approval ☐ Denial ☐ None Forwarded ☒ Not Applicable **Comments:** NA

Staff Recommendation: Staff recommends that the Commission provide specific input and direction on the land use and transportation alternatives evaluation as well as any other specific comments on the packet materials.
Recommended Language for Motion: NA

PROJECT / ISSUE RELATES TO:		
☒Council Goals/Priorities Thoughtful land use	☐Adopted Master Plan(s)	☐Not Applicable

ISSUE BEFORE COUNCIL: This worksession is to present progress on the Frog Pond Area Plan and receive feedback from the Commission on the work completed to date.

EXECUTIVE SUMMARY: With support of a Metro grant, the Frog Pond Area Plan was formally initiated in March 2014. Since that time, the project has completed four major tasks of the work plan including:

- Project set up
- Context and site analysis
- Vision, objectives and evaluation criteria
- Major infrastructure evaluation

The Frog Pond Task Force has met three times and the Technical Advisory Committee (TAC) has met twice to provide guidance during these first four tasks. The project to this point has also included ongoing distribution of public information and outreach.

The project's current work focuses on creating alternatives for preliminary concept plans, infrastructure analyses and a draft funding plan. Three alternative land use plans have been created most noticeably differentiated by residential density and street network. The attached alternatives evaluation memorandum and supporting information aim to inform the Commission of the working ideas and provide an opportunity to discuss the ideas prior to a community open house scheduled for October 16, 2014.

Supporting information includes:

- Draft transportation and trail plans
- Street design concepts
- Site studies for a potential neighborhood commercial center
- Neighborhood character images
- Estimates of housing capacity and density

In addition, technical memoranda have been prepared to evaluate transportation, water, sanitary sewer, and storm water infrastructure. An evaluation matrix, based on the project's Guiding Principles, is provided as a tool to evaluate the alternatives and identify the best elements to include in a draft concept plan. One piece of information not yet ready for review is the Infrastructure Funding Plan. This technical memorandum will be finalized over the next several weeks.

EXPECTED RESULTS: Staff desires to receive direction from the Commission on the draft materials contained in the packet. The Commission could focus much of its discussion on providing feedback on the best elements of the three alternatives, providing input into refinements of the alternatives and the sets of conclusions to frame key issues.

TIMELINE: Next steps include:

- Task Force and TAC review of alternatives evaluation summary – October 2
- City Council briefing – October 6
- Community Open House – October 16
- On-line Open House – October 10 - 21: www.ci.wilsonville.or.us/frogpond.
- Task Force and TAC review of draft concept plan – December 2014
- Joint Planning Commission – City Council work session – January 2015
- Completion of Phase 1 of the project by spring 2015

CURRENT YEAR BUDGET IMPACTS: This is a Metro grant funded project. Significant amounts of staff time are required to manage and advance the project. These costs were included in the adopted City of Wilsonville 2014-15 Budget.

COMMUNITY INVOLVEMENT PROCESS: Successful concept planning is a citizen driven process. The first community wide open house on the project is scheduled for October 16th. An on-line open house will run following the brick and mortar open house which is designed to gather input from a broader cross section of interested persons. A Task Force and Technical Advisory Committee have been established to guide the project and the Planning Commission will conduct work sessions and public hearings in preparation for recommendations to the City Council.

POTENTIAL IMPACTS or BENEFIT TO THE COMMUNITY (businesses, neighborhoods, protected and other groups): Completing a concept plan for the Frog Pond area is a City Council goal. Conducting a thorough and thoughtful planning process will identify and resolve potential impacts to the community. The benefits to the community include the potential for well-planned new neighborhoods that are well-connected to existing neighborhoods and that include diverse housing types, quality trails, parks and retail services to serve new and existing residents.

ALTERNATIVES: The consultant team has developed three land use alternatives and two transportation alternatives. There are pros and cons to all of the alternatives, and the preferred alternative will in all likelihood combine elements of each. It is important for the Commission to clearly articulate their preference for specific elements of the alternatives so that the project team can begin to move toward preparation of preferred alternatives and a draft concept plan.

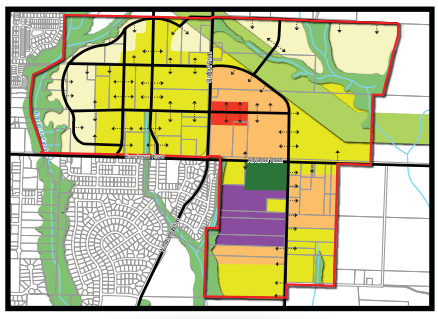
ATTACHMENTS

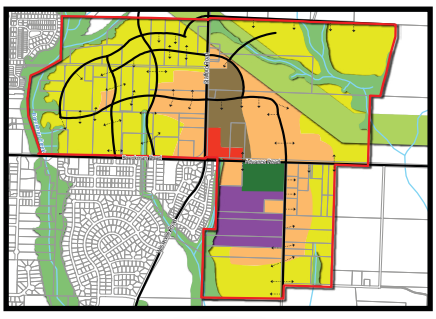
A. Alternatives evaluation summary and exhibits

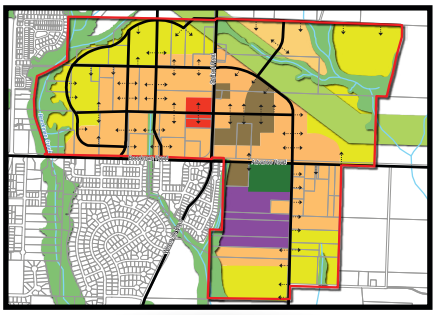
FROG POND AREA PLAN

Creating a great community

Land Use and Transportation Alternatives Summary and Evaluation







City of Wilsonville

Prepared by Angelo Planning Group, DKS Associates, Leland Consulting Group, Murray, Smith & Associates, Pacific Habitat Services, and Walker Macy.

Table of Contents

Executive Summary

Introduction

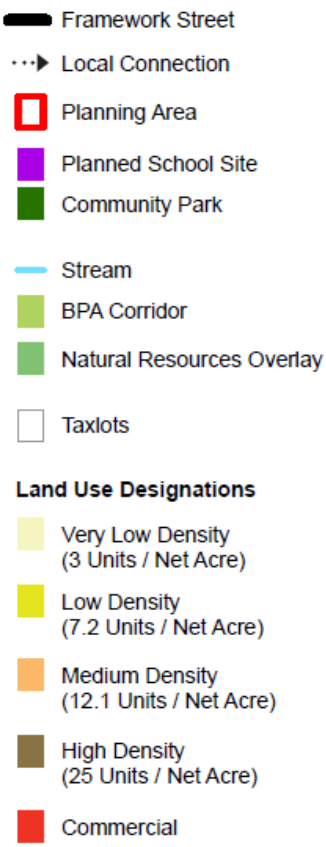
The Frog Pond Area Plan, led by the City of Wilsonville, will establish a vision for the 500-acre Frog Pond area, define expectations for the type of community it will be in the future, and recommend implementation steps. The project team has developed a set of three land use and transportation alternatives for consideration by the Frog Pond Planning Task Force, the public, stakeholders, and city policy-makers. All three of the alternatives are intended to implement the Frog Plan Area Plan's vision and guiding principles. The variations between the alternatives illustrate how there are different ways to achieve the vision. Based on this evaluation and the community dialogue that will occur, a "preferred" concept plan will be prepared. It is likely that a hybrid plan will be created that will combine the best elements of each of the alternatives.

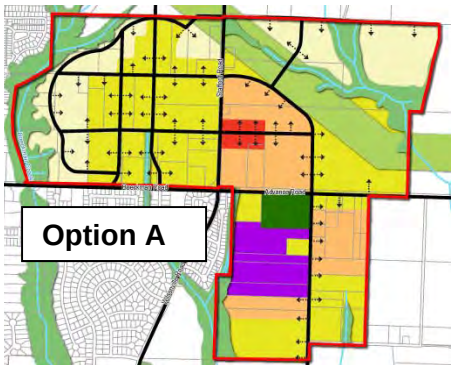
Alternatives Overview & Land Use

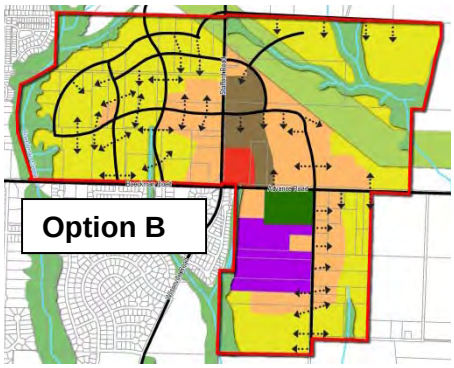
Land use in all three alternatives is predominately residential, with a neighborhood-scale retail area to serve new and existing residents.

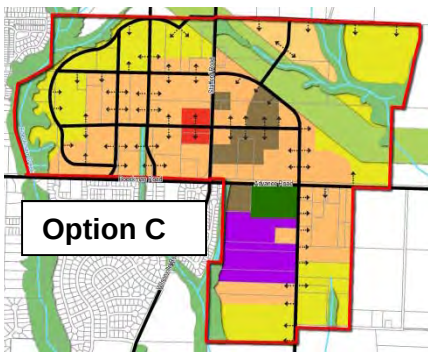
Option A has a "grid" street network and the lowest overall residential capacity of the three alternatives; the retail area is located at the east side of the intersection of Stafford Road and a new local street south of Frog Pond Lane. This option prioritizes single family detached housing in the early years of development, located in the neighborhood west of Stafford Road. Medium density is included in the Urban Reserve, to achieve a mix of housing types, consistent with the guiding principles and market analysis recommendations.

Option B is laid out around a more curvilinear or "organic" street network. In Option B, the variety of housing ranges increases, resulting in a greater mix









than Option A and an overall residential capacity and density that falls in between the other alternatives. The retail area is located adjacent to the intersection of Stafford Road and Advance Road. The housing program in this option is in the middle of the range recommended in the market analysis, providing the full range of housing from detached single family to cottages to townhomes to apartments.

Option C organizes residential uses around the "grid" street layout and provides more medium density housing (cottages and townhomes) than Option B, resulting in the highest total number of residential units of the three alternatives. It represents the high end of the housing programs recommended in the market analysis. The retail area is located on the west side of the intersection of Stafford Road and a new local street south of Frog Pond Lane.

The estimated total residential capacity of the Frog Pond area for each land use alternative is summarized in the table below.

Land Use Alternative	Total Housing Capacity (Units)	Average Net Density (Units / Net Acre)
Option A - Grid Low	1,759	7.2
Option B - Organic Medium	2,343	9.6
Option C - Grid High	2,653	11.0

Roads & Trails

Existing roads in the Frog Pond area will be upgraded to the City of Wilsonville's standards, including sidewalks and bike lanes. Stafford Road will have adequate capacity at three lanes (one travel lane each direction and a center turn lane as needed) to accommodate the build-out of the Frog Pond area, but will likely need to be widened to five lanes due to growth of background traffic and the future development of the Elligsen Urban Reserve (4G). Boeckman Road will have adequate capacity with three lanes. Advance Road can likely remain a collector road, providing access and on-street parking to serve adjacent land uses.

New collector roads are planned to run through the Frog Pond Area providing connections within the neighborhoods to the perimeter streets – from Boeckman Road at Willow Creek Drive to the northern edge of the Frog Pond Area, with potential for extension into the Elligsen Urban Reserve; along or adjacent to Frog Pond Lane to Stafford Road and continuing east to the BPA power lines; and from 60th Avenue north to the BPA power lines. These new collector roads will have sidewalks and bike lanes. In addition, a network of local roads will provide connectivity within the neighborhoods. All new local roads will include sidewalks.

The planned Boeckman Creek Regional Trail is shown extending north of Boeckman Road along the top of the bank of Boeckman Creek. Another trail is proposed within the BPA easement east of Stafford Road. Additional trails are proposed to provide links to the future school sites south of Advance Road. All trails are planned to connect across the major streets at local street intersections.

Safe and convenient bicycle and pedestrian crossings of the major roads are an essential part of making the Frog Pond area a great neighborhood. In particular, Stafford Road at Kahle Road will become a new entrance to the city. This location marks the transition "from country to city" and also ties into the history of the Grange. This area merits a "gateway" treatment.

Natural Resources, Open Space, and Parks

Several stream corridors and one wetland within the planning area have been identified as likely meeting locally significant resource criteria. These will be subject to Significant Resource Overlay Zone (SROZ) protections upon annexation to the City of Wilsonville. Other wetlands that were identified as part of the inventory for the Frog Pond Area that do not meet the criteria for local significance are assumed to be addressed by property owners / developers in accordance with state and federal regulations, which allow impacts subject to mitigation requirements when the property owner can show that the proposed project has the least impact to wetlands or waterways of all practicable alternatives that meet the project purpose and need. Further coordination with the Department of State Lands is needed to refine implementation strategies.

One of the project's Guiding Principles is to provide access to nature. One of the ways this can be implemented is through visual and physical access to protected resource areas, such as with parks or streets located adjacent to the edge of the protected area. The "framework" streets have been located to support visual and physical access to Boeckman Creek and the BPA Power line easements. All three alternatives provide for these areas to be amenities enjoyed by the neighborhoods, and not resources that are "walled off" by development.

The City's planned 10-acre community park is planned south of Advance Road as a key focal point. Two neighborhood parks will be needed in the neighborhood west of Stafford Road, and one in the neighborhood east of Stafford Road and north of Advance Road. Neighborhood parks are generally designed to be about 2.5 acres in size. Locations for future neighborhood parks are not identified specifically; they will be worked out either through development review or through land acquisition by the City of Wilsonville.

Sustainable stormwater management is another key component of the Frog Pond plan. The stormwater management approaches are anticipated to consist largely of roadside bioswales, with green street features wherever possible, and detention basins to manage drainage originating from development.

Key Questions and Considerations

The following summarizes key questions and considerations to be discussed by project participants during the evaluation of the alternatives and creation of the preferred alternative.

What is the appropriate mix and location of housing to achieve the vision and ensure feasible implementation? The alternatives explore a key "creative tension" for the plan: the more an alternative provides a mix of housing types as recommended in the market study - i.e. including attached single family and multi-family - the less that alternative provides single family detached housing. Option B is the closest to providing a middle ground of housing mix that generally matches market demand while also emphasizing single family homes. Option B provides 50%

Low Density Residential, 36% Medium Density Residential (which includes small-lot single family), and 14% High Density Residential. Based on the market study, roughly half of the Medium Density Residential shown on the plan options would be comprised of small-lot single family detached homes. Variations in housing mix and density between the three options have little impact on transportation or utility infrastructure improvement needs or costs; however, more housing generates more System Development Charge revenue to pay for off-site improvements.

Is a wider range of housing types needed in the West Neighborhood? Potential refinements could include providing a limited amount of Very Low Density Residential and/or a small amount of High Density Residential along with a mix of Low and Medium Density in the West Neighborhood in order to increase diversity of housing options.

Can Medium Density Residential be designed to provide a sensitive and compatible edge to adjacent Rural Reserve, or should urban-rural edges be developed only with Low or Very Low Density Residential? There may be little difference in impacts between having townhomes and small-lot single family versus standard lot single family adjacent to the rural edge, but more density increases the number of households in close proximity to working farmland, and means that tools like setbacks and landscaping would need to be provided through common open space or a trail corridor. Where possible, each plan option provides a "transect" from higher to lower densities, including lower density adjacent to rural lands.

Should housing transition down adjacent to Boeckman Creek or should the natural area be treated as an amenity for higher density housing? With clustered development, site planning can provide visual and physical access to a greater degree than would be possible with single family homes. The southern area along Boeckman Creek also has good access to employment areas to the east and the Town Center to the south, though it has less proximity to any of the retail sites within the Frog Pond Area.

Which retail location is most desirable? The locations identified in Options A and C would not have access from an intersection with a signal, which is a significant drawback. Since retail generally follows "rooftops" rather than preceding them, this is an advantage to a location in the East neighborhood, as in Options A and B. The location identified in Option B provides the greatest visibility for pass-by traffic and could have a synergistic relationship with the city's future community park, located just across Advance Road. A fourth potential retail site adjacent to the Grange has several advantages, including highlighting the historic Grange building as a community focal point, and the potential to site some parking and stormwater management for the development in the BPA easement.

Which street network is preferable? The grid network in Options A and C offers advantages including providing internal connections that support circulation and access, a local street network that is easy to understand and navigate, a better location for a future traffic signal that improves traffic flow, better potential for future transit coverage, better alignment with property lines, and better flexibility for incremental implementation without a master developer. The

"organic" street network is somewhat more responsive to topography and as a result requires fewer utility easements.

Issues for Further Study

Several implementation considerations for the Frog Pond Area Plan have begun to emerge from the evaluation of alternatives. As the concept plan and implementation strategies are prepared, the plan should address:

- Site design techniques for the Frog Pond retail area to ensure it is compatible with adjacent neighborhoods, easily accessible by all modes, and supports a high-quality pedestrian environment on adjacent streets;
- Where and to what degree to allow or encourage the use of alleys for residential development;
- Mechanisms to ensure provision of neighborhood parks if the Frog Pond Area is developed incrementally;
- Stormwater management strategies – on-site treatment and detention versus consolidated facilities serving multiple developments;
- Appropriate levels of protection for existing mature trees and tree groves;
- Wetland mitigation strategies;
- Appropriate bicycle and pedestrian crossing treatments for major road intersections to ensure safe routes to school and easy connections within the Frog Pond Area; and
- How certain road and utility infrastructure improvements will be built and paid for, such as urban upgrades to Stafford Road.

These issues will be explored further throughout the course of the project.

Introduction

The Frog Pond Area Plan, led by the City of Wilsonville, will establish a vision for the 500-acre Frog Pond area, and define expectations for the type of community it will be in the future. The project team has developed a set of three land use and transportation alternatives for consideration by the Frog Pond Planning Task Force, the public, stakeholders, and city policy-makers. This report describes the three alternatives currently under consideration as well as certain design concepts that are equally relevant for all alternatives. This report also summarizes information detailed in separate technical memoranda on the performance of the three alternatives to enable the Task Force, public, and policy-makers to make informed recommendations and decisions about a preferred alternative.

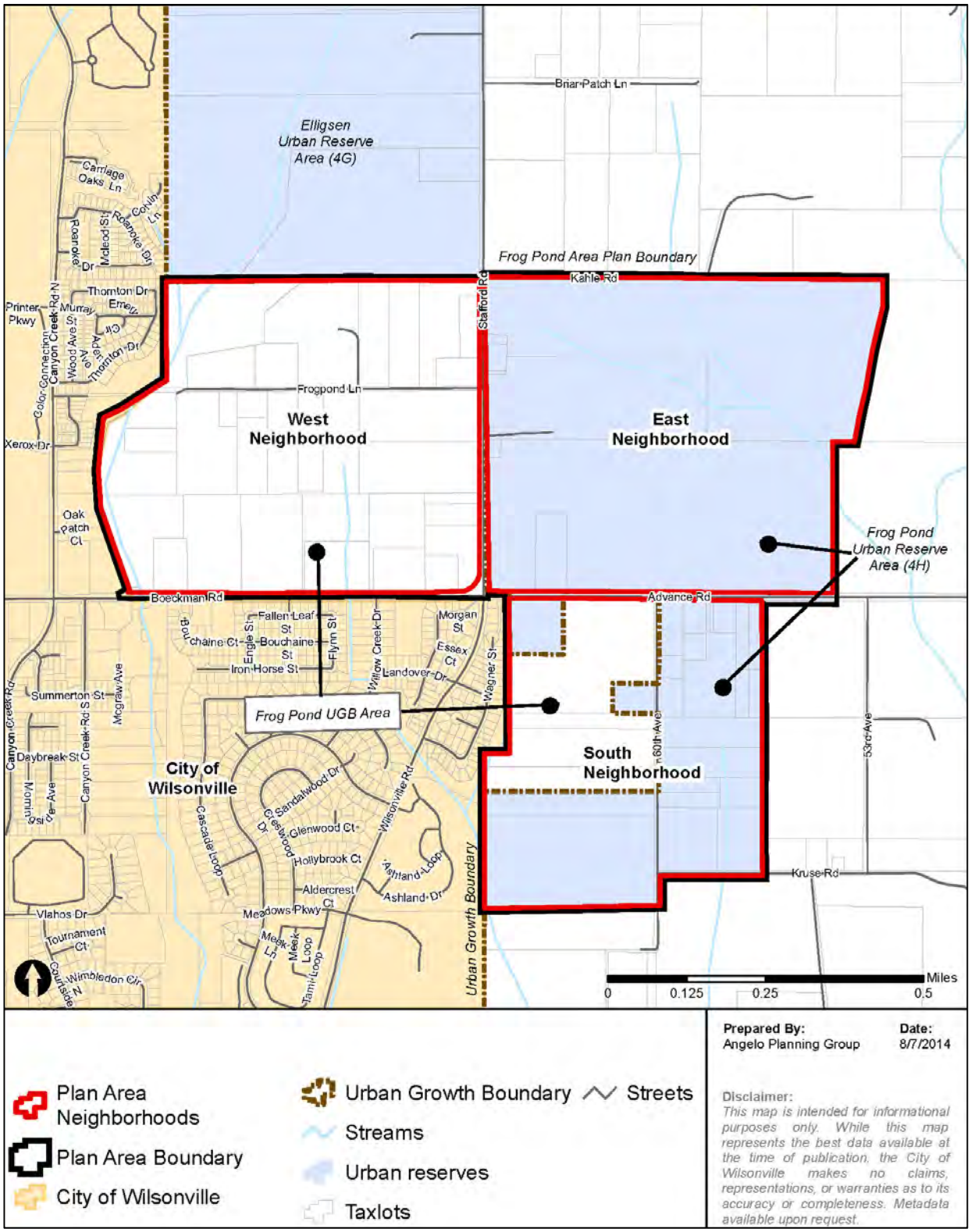
Description of Land Use and Transportation Alternatives

Overview

All three of the alternatives are intended to implement the Frog Plan Area Plan's vision and guiding principles. The alternatives, while different, share certain common elements in the area of land uses, schools and institutions, and street network. The variations between the alternatives illustrate how different ways exist to achieve the vision. Based on the alternatives evaluation presented in this summary and the community dialogue that will occur, a "preferred" concept plan will be prepared. Likely the evaluation and dialogue will create a hybrid plan combining the best elements of each of the alternatives together with the common elements.

The descriptions of the three alternatives make reference to three neighborhoods within the Frog Pond Area, identified on Figure 1. Exhibits 1A, 1B, and 1C show the land use and street frameworks for each of the three alternatives.

Figure 1: Frog Pond Neighborhoods



Land Uses

Land use in all three alternatives is predominately residential, with a retail area to serve new and existing residents.

The land use choices were shaped by the Frog Pond Area Plan Market Analysis prepared by Leland Consulting Group (included as Appendix A to this report); local policy direction about desired housing mix and balance of attached versus detached housing; requirements to provide land for needed housing; the urban design principle of "transects" that arrange land uses based on intensity, transitioning from the highest intensity to the lowest intensity; and focusing density near amenities such as retail areas, parks, and transit.

The retail area is approximately the same size in each alternative – approximately 5.3 acres, which would accommodate approximately 69,000 square feet of space in multiple buildings. The size is based on the Market Analysis done previously in the project based on projected demand from new residential growth, pass by traffic, and existing homes in the area. The Market Analysis also examined the locations of existing retail and services

The East and South neighborhoods have generally higher densities than the West neighborhood, because the residential areas are outside the Urban Growth Boundary (UGB), are designated Urban Reserve, and are more likely to be brought into the UGB by Metro if they demonstrate efficient accommodation of needed housing. Residential densities in each alternative are generally highest adjacent to the location identified for the retail area and adjacent to existing and potential transit service. The intention of this combination of land use is to support a walkable retail center with excellent transportation facilities.

Residential densities are described as "Very Low", "Low", "Medium", and "High" on the alternatives. Example images of these categories are provided in Exhibit 2. They are described in general terms below.

- **Very Low Density Residential** is assumed to be all single-family detached housing on relatively large lots, averaging roughly three housing units per net acre[1] of land.
- **Low Density Residential** is assumed to be nearly all single-family detached housing on standard-sized lots (e.g. 5,000 to 8,000 square feet), averaging 7.2 housing units per net acre of land.
- **Medium Density Residential** is assumed to include small-lot single-family homes as well as townhomes, cottage homes, and similar housing types, averaging 12.1 units per net acre of land. In the market study, approximately half of the medium density residential homes are small-lot single family.
- **High Density Residential** is assumed to include multi-family housing, such as two- to three-story apartments and similar housing types, averaging 25 units per net acre of land.

Table 1 presents the key elements of the three alternatives.

1 A net acre is the buildable land remaining after environmental and other constraints, street right-of-way, and stormwater management areas are accounted for and deducted.

Table 1: Land Use Alternatives

Alternative & Summary	Land Use by Neighborhood		
	West Neighborhood	**East Neighborhood**	**South Neighborhood**
Option A: "Grid" street network with lowest residential density	Exclusively Low and Very Low Density Residential use. The lowest densities are located closer to Boeckman Creek and the BPA power lines.	The retail area is located at the east side of the intersection of Stafford Road and the southern framework street. Medium density residential surrounds and supports the retail area, which are a key ingredients necessary for successful retail, enclosed by a framework street. Areas further east and north transition to Low Density Residential, with Very Low Density Residential in the "lobes" of buildable land between the creeks south of Kahle Road.	Two blocks of Medium Density Residential are shown: one east of 60th Avenue and one just south of the school property. The remainder is shown as Low Density Residential.
Option B: Curvilinear or "organic" street network with a residential density that falls between the other alternatives	Includes a mix of Low and Medium Density Residential use. The Medium Density is generally focused closer to Stafford Road and along the southern east-west framework street, although one block of Medium Density is shown further west, in a location central to the neighborhood. This arrangement is intended to focus medium density near the neighborhood center, and also provide low density residential along the north side of Boeckman Road across from similar single family homes.	The retail area is located adjacent to the intersection of Stafford Road and Advance Road. It is surrounded and supported by High Density Residential use, which then transitions to Medium Density Residential. The farthest east and north portions of this neighborhood are planned for Low Density Residential, including the areas south of Kahle Road.	Medium Density Residential is focused close to the school and park site, with Low Density residential along the east and south edges.
Option C: "Grid" street network with highest residential density	Includes the neighborhood retail area, located on the west side of the intersection of the southern framework street. Much of the neighborhood is planned for Medium Density Residential, with a transition to Low Density Residential at the northern and eastern edges.	Includes a mix of residential densities, with High Density Residential generally close to the southern framework street for ease of access to the retail area to the west. It is broken into one area that spans the southern framework street, reaching diagonally from Stafford Road to the BPA easement, and one smaller area adjacent to Stafford Road a little further north. The eastern portion of this neighborhood is planned for Low Density Residential, providing a transition to rural areas to the east. Of the two "lobes" south of Kahle Road, one is planned for Medium Density Residential, while the other (further east) is planned for Low Density residential.	There is a block of High Density Residential located between the school/park property and Advance Road, buffered from the existing neighborhoods to the west by Meridian Creek. The southern portion of this neighborhood is planned for Low Density Residential, while the remainder is planned for Medium Density Residential.

Institutions and Schools

All three alternatives identify the future school and community park site in the South neighborhood as a fixed location. The land is already owned by the School District, which, pending the outcome of a November bond measure, could initiate land use actions to begin development of a middle school on the site.

Because the future plans of existing institutions, such as the Grange and the Community of Hope church, are not known at this time, and because the school district has indicated that the land it holds in the West Neighborhood may not ultimately be used for a future school, land use designations have been identified for all land within the Frog Pond Area, including these institutions, except for the future school and park site in the South neighborhood.

Parks

A future 10-acre city owned community park is planned south of Advance Road. The land is currently part of the school district's 40-acre property. This park will serve the Frog Pond Area as well as existing neighborhoods. Its primary recreational focus will be to provide athletic fields to meet the growing needs of the community. Facilities are expected to include multi-use play fields and appropriate parking, a playground, restroom building, concession area, and picnic shelter.

Neighborhood parks will be needed in the West and East neighborhoods: two in the West neighborhood and one in the East neighborhood. The two neighborhood parks in the West Neighborhood implement the parks adopted in the Wilsonville Parks and Recreation Master Plan (2007). Locations for future neighborhood parks are not identified specifically; rather, a parks framework diagram is included in Exhibit 3 that illustrates general areas within which a future neighborhood park should be located. Neighborhood parks are typically designed to be about 2.5 acres in size and include a wide range of features balancing passive and active recreation. Exhibit 4 includes examples of different styles of neighborhood-scale parks. One option is to provide a linear neighborhood park along a portion of the Boeckman Creek Corridor that would include a proposed trail alignment (discussed on page 13).

Street Network

The alternatives all envision a connected local street network, framed around identified "Framework Streets", connecting to the existing major roadways. While there are three land use alternatives, there are only two street frameworks: the "grid" option or the curvilinear "organic" option.

All alternatives include two connections to Boeckman Road at existing local street intersections and three connections to Stafford Road north of Boeckman Road. The number of connections to Advance Road is expected to be roughly the same in all alternatives, with the existing connection to 60th Avenue and two or more additional local street connections. Access points to existing streets are driven by minimum street spacing and intersection alignment requirements. A future

north-south roadway through the West Neighborhood is envisioned to ultimately extend into the Elligsen Urban Reserve (4G).

All alternatives provide the option for alleys in some or all blocks. Alleys may be especially appropriate for development adjacent to major roads where direct vehicle access to the property is restricted by access spacing standards, but are simply one option for consideration at this stage of the project.

The grid street network responds to existing property lines and right-of-way, and provides a regular, largely rectilinear local street pattern, while acknowledging natural areas and constraints. The organic street network assumes one or a few master developers within each neighborhood, allowing for street alignments that do not follow property lines, but take their inspiration from the area's topography and natural resources. Additional local streets are assumed to provide a connected set of blocks. However, these blocks are not necessarily regularly shaped, and do not always intersect at right angles. Few of the streets follow property lines.

Street Classification

Exhibits 5A and 5B show the proposed street functional classifications for each street framework. A detailed explanation of these classifications and the associated standards and designs is included in the Future Transportation Analysis memorandum by DKS Associates, which is included as Appendix B to this report. Generally speaking, arterial roads, especially major arterials (such as Stafford Road), are intended to prioritize flow of traffic through an area over access to individual developments or homes within an area. Collector roads are intended to provide access into neighborhoods or commercial/industrial areas and connections to arterial roads and key destinations. Local roads are intended to provide primarily access to individual properties, with little through-traffic. In the Frog Pond Area, pedestrian safety and comfort is a priority along all streets, regardless of classification and functional role for vehicles.

Street Design Concepts and Crossings

Exhibits 6A and 6B, respectively, show design concepts for Stafford Road, and the north-south collector in the West Neighborhood, at key intersections. These illustrations are intended to highlight the importance of pedestrian and bicycle treatments and crossings, and the character of the roadways, consistent with their functional classification and the street cross-sections identified in the Transportation System Plan (TSP). Exhibit 7 includes examples of intersection crossing treatments. In addition, roundabouts may be considered at key intersections within the neighborhoods to facilitate traffic movement and moderate vehicle speeds in the neighborhood.

In addition, Exhibit 8 shows a Stafford Road gateway concept. Development in the West Neighborhood, and eventually in the East Neighborhood as well, will establish a new entrance to the city. Placement of the gateway is at the intersection of Kahle Road and Stafford Road and will extend south toward Frog Pond Lane. This location marks the transition “from country to city” calming traffic and also ties into the history of the Grange. A high level concept is shown, along with a selection of design elements to consider for the gateway.

Bicycle and Pedestrian Frameworks

The overall intent and organization of the bicycle and pedestrian frameworks is similar for both the grid and organic street frameworks, shown in Exhibits 9A and 9B. Exhibit 10 shows an additional diagram illustrating the relationship between the Frog Pond Area trails and other bicycle and pedestrian routes and destinations within and adjacent to the City of Wilsonville.

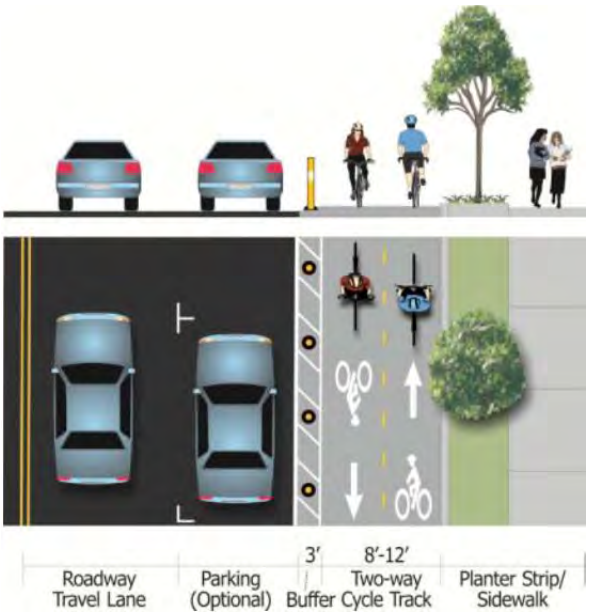
Providing safe routes to existing and planned schools is a key goal of the bicycle and pedestrian frameworks. Grade-separated bicycle and pedestrian crossings may be appropriate for key intersections on the major roadways in order to provide safe routes to school and better linkages between the neighborhoods.

On-Street Facilities

Collector and Arterial streets are planned for future bike lanes where they do not currently exist, either through urban upgrades or through construction of new roadways within the neighborhoods. All new local roads will include sidewalks.

A cycle track treatment that places bikes going both directions on the same side of the street, with a buffer or barrier to provide protection from vehicle traffic, as shown in Figure 2, may be appropriate on 60th Ave from Advance Road to the southern edge of the planning area on west side, adjacent to the school.

Figure 2: Two-Way Cycle Track



West Neighborhood: Boeckman Creek Trail

Plans show the planned Boeckman Creek Regional Trail extending north of Boeckman Road into the West neighborhood. South of Boeckman Road, the Wilsonville TSP shows the trail running within the creek canyon along the sewer line easement. After passing under the Boeckman Road bridge, the trail would likely climb to the top of bank along an existing access/maintenance road and run roughly along the edge of the vegetated corridor / Significant Resource Overlay Zone through the West neighborhood. Where outside the SROZ The trail alignment provides the opportunity for a linear park along the natural feature that could have nodes of activity framed by the forest edge. The location of this trail as a visible and accessible part of the neighborhood's west side is an intended outcome. This location will ensure the trail is a neighborhood amenity, and increase its use and safety. This trail would leave Boeckman Creek and traverse the northern edge of the West neighborhood to link to the BPA corridor, intersecting Stafford Road at Kahle Road. As a regional trail, this should be paved, but stormwater runoff from the trail will need to be managed so as not to impact Boeckman Creek.

Connections to the trail from the adjacent streets and in the form of accessways between homes in residential developments should be provided as frequently as is practical in order to maximize bicycle and pedestrian connectivity and convenience.

East Neighborhood: BPA Easement Trail

In the East neighborhood, where the BPA easement cuts through on a diagonal, plans propose a trail to run from Kahle Road to roughly the point where the easement turns to run east, at which point the trail would leave the easement, turning south to intersect with Advance Road at a local street intersection. Connections from the adjacent streets should be provided as frequently as is practical in order to maximize bicycle and pedestrian connectivity and convenience. Trails in all three neighborhoods will provide important Safe Routes to Schools opportunities.

South Neighborhood: School Connection Trails

The trail from the BPA easement would link to a proposed trail along the eastern edge of the South Neighborhood that would provide an edge to the future urban area, and, through landscaping and appropriate fencing, help buffer and protect the farmland in the adjacent rural reserve area. The trail would connect to the southern edge of the school property, providing as direct a route to the planned location of the school buildings as possible.

An additional trail would link from the existing Wilsonville High School and Boeckman Creek Elementary School across Meridian Creek to the future school sites, co-located with infrastructure easements and associated creek crossings. The two trails should meet along the southern edge of the school property in order to provide through-access for the public as well as access for students and school employees.

60th Avenue Trail

The possibility of using the existing unimproved 60th Avenue right-of-way as a trail south of the Frog Pond Area, connecting to the Willamette River at Oregon State Parks Willamette Meridian Landing, is identified for further exploration. Such a connection could provide a highly desirable link to the river and the open space and recreational opportunities at Willamette Meridian Landing.

Natural Resources

Significant Resources

Exhibit 11 shows stream corridors and wetlands identified as likely meeting locally significant resource criteria. These will be subject to Significant Resource Overlay Zone (SROZ) protections upon annexation to the City of Wilsonville.

Other wetlands identified as part of the inventory for the Frog Pond Area that do not meet the criteria for local significance are assumed to be addressed by property owners / developers in accordance with state and federal regulations, which allow impacts subject to mitigation requirements when the property owner can show that the proposed project has the least impact to wetlands or waterways of all practicable alternatives that meet the project purpose and need. For the purposes of calculating capacities, it was assumed that 80% of the non-significant

wetlands would be developed and mitigated off-site. This is a significant implementation issue that will need further definition.

Tree Groves

Existing tree groves were also inventoried as part of the planning work for this project. Identified groves are shown on Exhibit 11. The tree groves within the planning area provide a key visual asset, and are a link to the historic character of the area. To the extent that existing, mature trees can be retained and protected as annexation and development occurs, it will contribute to the character and desirability of new neighborhoods, as shown in several of the example images in Exhibits 2, 4, and 12. The city has existing annexation policies that incentivize (but do not mandate) tree retention.

Open Space Edges

One of the project's Guiding Principles is to provide access to nature. One of the ways this can be implemented is through visual and physical access to protected resource areas. Exhibit 12 provides example images of relationships between open spaces and the adjacent land use that provide for visual and physical access. Trails and park improvements are generally assumed to be located outside the SROZ boundary, with the possible exception of creative play, natural trails and crossing points.

Stormwater Management

Sustainable stormwater management is another key component of the Frog Pond Plan. The stormwater management approaches are anticipated to consist largely of a toolbox of approaches to treat, detain, and infiltrate runoff on-site. The City expects drainage originating from private development required to be managed by the private developer in accordance with the City's Public Works Standards and Oregon Drainage Law. The plans also assume new streets and on-site development will include low impact development (LID) techniques to the extent possible. The city's Stormwater Master Plan and Public Works Standards include a variety of LID options for stormwater management. Examples of low impact development as well as other types of green infrastructure are shown on Exhibit 13.

Alternatives Evaluation

Overview

The transportation impacts and infrastructure needs associated with the three alternatives have been evaluated in technical memoranda produced by DKS Associates and Murray Smith Associates, respectively. These technical memoranda are included as appendices to this report, and a brief summary of key findings from each evaluation are presented in this section. In addition, Leland Consulting Group is preparing an infrastructure Funding Analysis that evaluates infrastructure costs and expected city revenues from System Development Charges (SDCs). While this analysis is not yet complete, a few of the key early findings are summarized in this section.

This section also includes an evaluation of the land use considerations of each alternative. Finally, a matrix is provided on page 20 that summarizes the project team's evaluation of the three alternatives relative to the project's Guiding Principles.

Land Use Considerations

Capacity and Density

The total residential capacity of the Frog Pond Area is estimated to range from roughly 1,760 units in Option A to roughly 2,650 units in Option C, as shown in Table 2. The overall net residential density for the full Frog Pond Area ranges from 7.2 units per net acre in Option A to 11 units per net acre in Option C. A more detailed table showing net acres, percent of total units, and an estimate of the percent detached housing by neighborhood and for total for the planning area is included in Exhibit 14.

Table 2: Residential Capacity and Density Estimate Summary

	West Neighborhood		East Neighborhood		South Neighborhood		Frog Pond Area (Totals)	
Land Use	**Units**	**Net Density**	**Units**	**Net Density**	**Units**	**Net Density**	**Units**	**Net Density**
Option A - Grid Low								
Very Low Density	99	3	104	3	-	3	203	3
Low Density	492	7.2	169	7.2	219	7.2	880	7.2
Medium Density	-	12.1	384	12.1	292	12.1	677	12.1
High Density	-	25	-	25	-	25	-	25
Total	**591**	**5.8**	**657**	**7.3**	**511**	**9.4**	**1,759**	**7.2**
Option B - Organic Medium								
Very Low Density	-	3	-	3	-	3	-	3
Low Density	609	7.2	320	7.2	230	7.2	1,159	7.2
Medium Density	201	12.1	381	12.1	274	12.1	856	12.1
High Density	-	25.0	328	25.0	-	25	328	25
Total	**810**	**8.0**	**1,029**	**11.6**	**504**	**9.2**	**2,343**	**9.6**
Option C - Grid High								
Very Low Density	-	3	-	3	-	3	-	3
Low Density	276	7.2	229	7.2	174	7.2	680	7.2
Medium Density	706	12.1	574	12.1	330	12.1	1,610	12.1
High Density	-	25.0	363	25.0	-	25	363	25
Total	**982**	**10.2**	**1,166**	**12.4**	**505**	**9.8**	**2,653**	**11.0**

Housing Mix and Variety

Each of the three land use alternatives provides at least two different housing designations within each neighborhood. The East neighborhood has three density designations in each of the

alternatives. In addition, each residential designation is intended to capture a range of lot sizes and, in some cases, housing types, as described on page 9 and illustrated in Exhibit 2. To ensure that any one neighborhood does not become too dominated by a single housing type or style, policies and regulations could be developed that would allow, encourage, or even require development of a variety of housing styles and types within each development or each neighborhood.

The mix of single family detached homes relative to attached and multi-family housing is not entirely fixed by the land use alternatives, because some of the residential density categories, especially the Medium Density Residential designation, may include both detached homes and attached or multi-family housing. However, for the purposes of estimating the share of attached and detached housing, we assume that the Very Low Density is entirely single family detached homes, the Low Density residential is 95% detached, the Medium Density Residential is roughly half detached housing and half attached housing, and the High Density Residential is entirely attached housing. Given those assumptions, Option A provides the highest percentage of detached housing in the West Neighborhood (96%) and overall (78%), while Option C provides the lowest percentage with 63% in the West Neighborhood and 55% overall (see details in Exhibit 14).

There is a trade-off for each of the alternatives in that the better the alternative is aligned with the housing program recommended in the market study, the less well it meets the city's goals of reaching a balance between attached and detached housing (although they all have the potential to move the city closer to that balance, if the mix matches that assumed above). Option B may be the closest to providing a middle ground of density that generally matches market demand while also emphasizing single family homes.

Potential refinements as a preferred land use alternative is developed could include providing a broader range of densities in the West Neighborhood, such as a limited amount of Very Low Density Residential and/or a small amount of High Density Residential along with a mix of Low and Medium Density in order to increase diversity of housing options in this neighborhood.

Residential Land Use Patterns

Each of the land use alternatives has its own strengths and weaknesses. In addition to decisions about the overall level of residential density and housing mix discussed above, some of key distinctions and decision points related to the arrangement of different residential densities include:

- ***What housing type is appropriate in the Kahle Road area?*** Lower density may provide a more compatible transition to adjacent rural uses, but because both "lobes" require their own small sewer pump stations, the development costs may necessitate more units to spread the costs across.
- ***What housing type is appropriate for the parcel bounded by the future school and park site, Advance Road, and Meridian Creek?*** This location has excellent amenities, including proximity to the community park and school and the Meridian Creek natural area. If the retail is located at the location shown in Option B, this area would also have

excellent proximity to the retail area. It is also buffered from existing single family neighborhoods by the creek. This is an important and fairly visible location, so design will be important, regardless of housing type.

- ***Can Medium Density Residential be designed to provide a sensitive and compatible edge to adjacent Rural Reserve, or should urban-rural edges be developed only with Low or Very Low Density Residential?*** There may be little difference in impacts between having townhomes and small-lot single family versus standard lot single family adjacent to the rural edge, but it does increase the number of households in close proximity to working farmland. Setbacks and landscaping could be important site design tools regardless of density, but the smaller the lots, the less room there is for such features, unless they are provided through common open space or a trail corridor.
- ***Should density transition down adjacent to Boeckman Creek (as shown in Options A and C) or should the natural area be treated as an amenity for higher density housing?*** With clustered development, site planning can provide visual and physical access to a greater degree than would be possible with single family homes. The southern area along Boeckman Creek also has good access to employment areas to the east and the Town Center to the south, though it has less proximity to any of the retail sites within the Frog Pond Area.

Retail Location and Character

The three land use alternatives identity three different retail locations. Exhibits 15A, 15B, and 15C are site studies of how each of these locations could work – locations of buildings, parking, access points, etc. In addition, Exhibit 15D is a site study for a fourth location adjacent to and including the Grange; this site is not shown on any of the three land use alternatives.

The retail areas in Options A and C are envisioned as a two-sided "Main Street" environment, with excellent accessibility by all modes and pedestrian-friendly, street-oriented storefronts. Wilsonville has experience with trying to create walkable storefronts but a number of marketplace realities have made this outcome difficult to achieve in practice. While on-street parking would be available on the local streets, parking areas would face residential development on the back sides of the blocks. Developers and retailers generally only want one entrance, and generally prefer it to be oriented towards the bulk of the parking, making it difficult to get operational front doors to the sidewalk with parking behind.

The locations identified in Options A and C share another challenge: for transportation reasons (as discussed on subsequent pages), a traffic signal is more appropriate at the second new intersection north of Boeckman Road along Stafford Road, but this means the retail area would not have a signal at its access point. The success of the retail area will depend on ease of access for Frog Pond Area residents as well as residents of existing neighborhoods and those passing by. Access from an intersection with a traffic signal is much preferred for the retail area.

The retail locations in Options A and B, being in the East neighborhood, allow more time for residential development to be built in the West neighborhood before the retail could be built. Since retail generally follows "rooftops" rather than preceding them, this is an advantage to a location in the East neighborhood.

The location identified in Option B provides the greatest visibility for pass-by traffic and could have a synergistic relationship with the city's future community park, located just across Advance Road. Those visiting the park for athletic events and activities as well as for general recreation would have easy walking access to shops and services. However, this location also has a number of drawbacks. Little or no access would be provided from Stafford Road due to access spacing standards; however, access would be available from Advance Road. This access location would require nearly all those driving to the retail area to pass through the Wilsonville / Boeckman / Stafford / Advance Road intersection – one of the busiest in the area – and then make a left turn into the retail area. The issue of wanting stores to provide a pedestrian-oriented face to the street while the parking is located to the back is a challenge for the location in Option B, as it is in Options A and C. In Option B, with on-street parking not expected on Stafford Road, it is even less likely that stores would want to provide entrances facing that street.

The fourth potential retail site (called Option D), shown in Exhibit 15D but not in any of the land use options, has several advantages, including highlighting the historic Grange building as a community focal point, the potential to site some parking and stormwater management for the development in the BPA easement, and a location in the East neighborhood. Other than Kahle Road, the property next to the Grange may be one of the last areas to develop – a favorable consideration for small scale commercial.

Of these choices, the most promising seem to be Option B and Option D, though both need additional refinement and evaluation for access and site design considerations.

Key Transportation Findings

The evaluation of the future transportation system based on the land use and transportation alternatives presented in this report found the following:

- The variation in residential land uses (location and amount) between the three alternatives makes little difference in traffic and intersection delays; the additional transportation projects needed to support growth in Frog Pond are essentially the same for all alternatives.
- The location of a new traffic signal on Stafford Road makes more difference in delays – the location further north in Options A and C provides better traffic flow.
- Having the new east-west collector road through the East and West Neighborhoods and the associated traffic signal located further north in Options A and C also provides better future transit coverage in the northern part of the Frog Pond Area if a bus can be routed along the collector in the future.
- Stafford Road can function acceptably with three lanes (two travel lanes and a center turn lane) through the 20-year planning horizon for this project, but will likely need to be expanded to five lanes shortly thereafter.
- Advance Road is currently designated as a Collector. Retaining this designation (rather than reclassifying it as a Minor Arterial) when the East and South Neighborhoods urbanize offers benefits including allowing more frequent street and driveway access points and opportunities for on-street parking. More access points and connections

could facilitate multi-modal connections to the community park and schools in the South neighborhood, as well as providing greater opportunities for access to a retail or multi-family development at the northeast corner of Stafford and Advance Road. On-street parking could support both the community park and retail or higher intensity land uses near that corner.

- Urban upgrades (including adding sidewalks, bike lanes, center turn lanes) are needed for Boeckman Road, Stafford Road, and Advance Road in conjunction with development to fill in the pedestrian and bicycle network and connect to adjacent parts of Wilsonville.
- The layout of the grid network does a particularly good job of providing internal connections that support circulation and access.

Key Utility Infrastructure Findings

The evaluation of the water, sanitary sewer, and stormwater systems needed to serve growth in the Frog Pond Area found the following:

- The overall costs for providing utility infrastructure are similar for the three alternatives. Although the demands for each utility service varied between alternatives, the minimum requirements for infrastructure sizing typically governed their design. These minimum requirements often generate utilities with capacities that exceed their service demands.
- Water and sewer lines can generally be aligned with the framework streets; however, some easements will be necessary. The street layout of Option B requires slightly less use of easements.
- A number of the "framework" water and sewer lines that will serve Frog Pond will need to be "oversized" relative to minimum standards in order to serve growth in other parts of the Frog Pond Area or to provide capacity for future growth in the Elligsen Urban Reserve. Where on-site infrastructure must be over-sized to serve development beyond the abutting property, developers are anticipated to install these improvements at time of development; however, they are given System Development Charge (SDC) credits for the incremental cost increase due to oversizing.
- Both the water and sewer systems have major off-site improvements needed that are partially related to growth in Frog Pond, but are also needed to serve other parts of the city or to correct existing issues.
- Several parts of the East Neighborhood require pump stations for sanitary sewer, including both "lobes" off Kahle Road and the far southeastern corner of the East Neighborhood. An additional pump station is needed to serve the southern end of the South Neighborhood. The cost of these pump stations is assumed to be borne by the developer.
- The higher development density in Option C will have more impervious areas than in the other alternatives. These larger impervious areas will generate the need for larger stormwater management facilities, increasing stormwater management costs above the other alternatives.

Key Infrastructure Funding Findings

The preliminary work on the Frog Pond Funding Analysis has identified the following key findings:

- The amount of net SDC revenue generated by development in Frog Pond varies based on the amount of residential development: Option A generates the least SDC revenue for the city, while Option C generates the most. The difference in total SDC revenues (across all SDCs) between Option A and Option C is close to $20 million.
- The infrastructure costs estimated for building out Frog Pond are very consistent across the three alternatives, as noted above.
- While the City is expected to pay for and build a number of key pieces of infrastructure, Frog Pond developers are expected to pay for the majority (about three-quarters) of infrastructure costs. Clackamas County, Metro, and the West Linn Wilsonville School District are also expected to pay for some improvements.
- For all three alternatives, there is sufficient SDC revenue to exceed the amount of expected SDC credits and pay for some or all of the other city-funded projects that are related to growth in Frog Pond.

Guiding Principles Evaluation Summary

The following matrix summarizes the evaluation of the three land use and transportation alternatives against the project's Guiding Principles and other relevant evaluation measures. This is a relative comparison – "good", "better", and "best" notations refer to good, better, or best fulfillment of the stated Guiding Principle. Ties are possible.

Table 3: Evaluation Summary Matrix

Guiding Principle	Evaluation Measures	Option A Rating	Option B Rating	Option C Rating	Rationale
Create great neighborhoods *Frog Pond's homes, streets, open spaces, neighborhood-scale retail, and other uses fit together into walkable, cohesive, and connected neighborhoods. Frog Pond is a fun place to live.*	% of housing units within ¼ mile of neighborhood-scale retail	Good (45%)	Good (45%)	Better (50%)	Research shows that people are more likely to walk to service if they are located within about a quarter mile, or about a five-minute walk. Option C clusters more of the housing adjacent to the neighborhood retail area relative to the other two alternatives.
	"Legibility" & distinctiveness of neighborhoods – sense of place	Better	Good	Better	Grid streets make way-finding easy and are also somewhat distinctive since they are not common in Wilsonville today. The grid scheme also follows some of the original parcel and settlement patterns, providing a tie to the history of the area. The organic street network creates a distinctive feel to the neighborhood but may make way-finding more difficult.
Create a complete streets and trails network	Compliance with 300' spacing guideline identified in TSP	Good	Good	Good	While only a few local streets have been identified, both street frameworks lend themselves to 300' blocks.

Guiding Principle	Evaluation Measures	Option A Rating	Option B Rating	Option C Rating	Rationale
Streets are designed for safe and enjoyable travel by bike, on foot, or by car. A great network of trails is provided. Safe crossings and connections are provided throughout the street and trail network.	Provision for safe routes to planned schools	Good	Good	Good	All three alternatives have nearly identical off-street trails that provide connections to the future school site, and all provide nearly identical connections to the existing elementary and high school located to the south on Wilsonville Road (via either Wilsonville Road or local streets). Depending on how local streets are actually connected, the grid pattern has slightly more potential for shorter, more direct, and more convenient routes to and from the schools. The main distinction between the alternatives is the location of the presumed traffic signal. The more northerly location in Options A and C will provide a convenient bicycle and pedestrian crossing point only for those coming from the northern portion of the West Neighborhood; those starting further south will likely use the Boeckman Road crossing instead, which is a busier intersection. The more southerly location in Option B will provide a more convenient crossing point for cyclists and pedestrians crossing Stafford Road to reach the future school site. However, with the retail located at the first intersection north of Boeckman Road in both Options A and C, the location of the signal may need to be reconsidered for these alternatives.
	Alignment of trails & primary bicycle/pedestrian routes with safe & easy crossing locations	Good	Good	Good	All three alternatives align proposed trail crossings of major roads with proposed local street intersections; however, all of the proposed crossing points are at what are presumed to be stop-controlled, rather than signalized, intersections.
	Miles of trails proposed	Good	Good	Good	All three alternatives have essentially the same trail network proposed.

Guiding Principle	Evaluation Measures	Option A Rating	Option B Rating	Option C Rating	Rationale
	Streets and trail network provide connections to allow for a variety of route options	Good	Good	Good	All three alternatives provide nearly identical trail networks with similar opportunities to connect to the street network. The grid network framework street alignment near Boeckman Creek could mean that the trail parallels that street for a portion of its length at the north. In either case, stubbed streets or bicycle & pedestrian accessways can be provided that link to the trail network from all adjacent streets.
Provide access to nature *The creeks and natural areas provide opportunities to see and interact with nature close to home.*	Length of street frontage abutting to natural areas	Better	Good	Better	The grid network framework street alignment along the north end of Boeckman Creek provides more opportunity for a street adjacent to the open space without development in between. The organic street framework could easily be adjusted to do the same.
	Street layout integration with natural resource areas	Good	Better	Good	Both street frameworks respond to the natural resource areas on site. Neither includes framework streets that cross a natural resource area except to provide a connection to the development in the northeast corner of the East neighborhood across the BPA easement and the drainage/wetland area that runs through it. The crossing location identified in the organic street network (Option B) may have slightly less impact on the resource area due to its location further upstream, but more detailed study is needed to determine this with any certainty.
	Length of trails adjacent to or within natural areas	Good	Good	Good	The three alternatives provide essentially identical trail networks, all of which are focused along the edge of Boeckman Creek and within the BPA easement.
Create community gathering spaces *Beautiful parks, quality schools, and*	Retail node centrally located as focal point for Frog Pond neighborhoods	Good	Good	Good	All three retail locations are fairly centrally located within the Frog Pond area and all provide good focal points for adjacent development.

Guiding Principle	Evaluation Measures	Option A Rating	Option B Rating	Option C Rating	Rationale
other public spaces serve as community centers and gathering places. The land uses, transportation, and open space around the Advance Road school and park sites support a compatible neighborhood plan in that area. The Frog Pond Grange, and adjacent uses, fit together as a focal point of the community.	Compatibility of land uses in South neighborhood with future park and schools	Good	Good	Better	Option C includes high density residential in the corner between Advance Road and the park / school site. This location provides the higher density development with excellent access to the future community park and schools while also buffering it from nearby lower density housing. The medium density housing surrounding much of the park and school site in all three alternatives provides many households in housing types that may be more family-oriented with excellent proximity to the future park and schools.
Provide for Wilsonville's housing needs *A variety of attractive homes are provided to fulfill the City's housing needs and align with the market. Single-family homes are an important part of the mix, and*	Degree of match between housing mix and recommended mix from market analysis	Good	Better	Best	The market analysis included two housing mix options. The higher density mix included in the market analysis, which best reflected market trends, is most similar to Option C. The lower density mix from the market analysis, which is similar to Option B, was noted as offering limited diversity in the product mix, with less small lot single family homes and multifamily housing than demographic trends would suggest demand for. Option A provides a substantially different mix of housing products than recommended in the market study, with a greater emphasis on larger lot single-family homes and less attached housing types.

Guiding Principle	Evaluation Measures	Option A Rating	Option B Rating	Option C Rating	Rationale
neighborhoods are designed to be multi-generational and offer a diversity of attractive housing options at a variety of prices.	Degree of match between housing mix and Wilsonville's housing policy objectives	Best	Better	Good	Wilsonville has expressed a policy objective of moving towards an overall balance between single family detached housing and attached housing that is closer to a 50/50 split. Some policy-makers have also expressed a desire for more large-lot single-family housing. Option A best meets those policy objectives, with an overall 62% to 38% split for the whole Frog Pond area between the residential categories that are all or nearly all single family detached homes, and those that are more likely to be attached products (Medium Density, as noted previously, may include a mix of attached townhomes and detached small-lot homes). Option C has just 26% of the housing for the Frog Pond area overall in the density ranges that are expected to be detached homes, and 74% in Medium and High Density, which are more likely to be attached housing products.
	Each neighborhood provides for a variety of housing options	Good	Good	Better	While the range of densities provided in each neighborhood varies somewhat between the alternatives, all three provide for two densities of housing in the West neighborhood and three densities of housing in the East neighborhood. Option C provides three densities of housing in the South neighborhood, while the other alternatives provide two.
Create a feasible implementation strategy *A realistic funding plan for infrastructure, smart and flexible*	Cost and ease of available mechanisms to fund transportation system improvements	Good	Better	Best	The difference in transportation costs between the three options is negligible; however the greater levels of residential development in Option C and, to a lesser extent, Option B generate more SDC revenue to pay for transportation improvements.

Guiding Principle	Evaluation Measures	Option A Rating	Option B Rating	Option C Rating	Rationale
regulations, and other strategies promote successful implementation of the plan.	Cost and ease of available mechanisms to fund water system improvements	Good	Better	Best	Water system improvements for Option B are slightly less costly - about 4% ($1 million) less than Options A and C overall due to differences in the layouts. There is a greater difference in SDC revenue generated by each alternative, with Option C and, to a lesser extent, Option B generating more SDC revenue to pay for off-site water system improvements.
	Cost and ease of available mechanisms to fund sanitary sewer system improvements	Good	Better	Best	Sewer system improvements for Options A and C are slightly less costly – about 2% ($0.8 million) less than Option B due to differences in the layouts. There is a greater difference in SDC revenue generated by each alternative, with Option C and, to a lesser extent, Option B generating more SDC revenue to pay for off-site sewer system improvements.
	Compatibility of water, sewer and stormwater alignments with road layout	Good	Better	Good	Option B requires slightly less easements for water and sewer lines than Options A and C due to differences in the street networks.
	Operations & maintenance considerations, including accessibility of lines, for water, sewer and stormwater	Good	Good	Good	No significant operations and maintenance concerns have been identified for any of the alternatives.
	Reliance on gravity sewer vs. pumping	Good	Good	Good	All three alternatives require three small pump stations in the East neighborhood and one in the South neighborhood, but can otherwise be served by gravity sewer.

Guiding Principle	Evaluation Measures	Option A Rating	Option B Rating	Option C Rating	Rationale
	Ability of plan to develop over time with multiple developers	Best	Low	Better	The grid street network in Options A and C is more feasible to build incrementally without a master developer. The organic street network in Option B would be difficult to build without significant lot consolidation in the West Neighborhood. In Options A and B, the retail is nearly all located on a single parcel, which would make it easier to implement than in Option C, in which it is split across multiple properties that are not in common ownership. In Option B, the shaping of the residential land uses does not respond to property lines, and as a result is more dependent on a master developer for implementation. In Option C, the shaping of residential land uses in the West neighborhood largely works with the property lines, but the locations identified for High Density Residential are fragmented across properties that are not in common ownership. In Option A, the shaping of residential land uses works well with the property lines.
Frog Pond is an extension of Wilsonville *Frog Pond is truly connected – it is an easy and safe walk, bike trip, or bus ride to other parts of Wilsonville, and Frog Pond feels like a well-planned extension of the city.*	Alignment of main access points and internal circulation roads (i.e. Neighborhood Collector streets) with adjacent neighborhood connections	Good	Good	Good	All three alternatives align the connection points to Boeckman Road with the existing local street intersections that connect to neighborhoods to the south.
	% of residents/jobs within 1/4 mile of existing transit routes	Good (36%)	Better (38%)	Best (40%)	Over a third of housing units would be located within a quarter mile of existing transit routes in all three alternatives. Option C focuses the greatest percentage of new housing adjacent to existing transit routes. (Percentages are shown at left.)

Guiding Principle	Evaluation Measures	Option A Rating	Option B Rating	Option C Rating	Rationale
	Accessibility of commercial area to existing neighborhoods	Good	Best	Better	All three alternatives provide access to the future retail area from existing Wilsonville neighborhoods via Wilsonville / Stafford Road. The retail location in Option B provides more direct access for existing neighborhoods to the south and west.
Retain trees *Mature native trees are integrated into the community to enhance the area's character and value.*	Alignment of roads to avoid stands of mature native trees	Good	Good	Good	The framework streets in all alternatives generally avoid existing tree groves.
	Potential impacts to tree groves from infrastructure alignments	Good	Good	Good	All three alternatives require a water line easement through a wooded area around Newland Creek in the East neighborhood. No other framework infrastructure alignments are anticipated to impact tree groves.
	Potential for parks to align with high-quality tree groves	Good	Good	Good	All alternatives have roughly the same potential for future parks to be aligned with high-quality tree groves. Future park locations will be determined through land acquisition efforts by the city, through subsequent concept plan refinements or the development review process.
Honor Frog Pond's history *A sense of history is retained, recognized, and celebrated.*	Prominence of Grange relative to street network and other land uses	Good	Best	Better	The northern framework street in Option B crosses closer to the Grange itself, providing an opportunity to create a plaza between the Grange and the street that would complement and highlight the Grange building. The location of the retail in the West neighborhood in Option C provides the possibility of a second, smaller node in the East neighborhood near the Grange.
	Retention of Frog Pond Lane	Better	Low	Better	The organic street framework in Option B assumes that Frog Pond Lane is abandoned. The grid street framework in Options A and C retains Frog Pond Lane as part of the future street network. Frog Pond Lane may have historic and sentimental value to those whose families have lived or owned property in the area for many decades.

Guiding Principle	Evaluation Measures	Option A Rating	Option B Rating	Option C Rating	Rationale
Provide compatible transitions to surrounding areas *New urban land uses are good neighbors to adjacent rural land uses, future developable areas, and existing neighborhoods. The plan provides for future growth of the City into adjacent urban reserves.*	Number of new homes within 1,000 feet of a Rural Reserve	Best (about 470)	Better (about 550)	Good (about 570)	Option A has the fewest new homes located within 1,000 feet of a Rural Reserve (numbers shown at left).
	Use of transects to transition density adjacent to rural edges	Better	Better	Good	Option A has very low density housing in the northeast corner of the East neighborhood where it abuts Rural Reserve and low density housing on the southern end of the South neighborhood where it abuts Rural Reserve, but some medium density housing on the east side of the South neighborhood. Option B locates low density housing along all of the outer edges of the Frog Pond plan area. Option C has medium density in part of the northeast corner of the East neighborhood and on part of the eastern edge of the South neighborhood.
	Use of open spaces or other features to provide buffers to adjacent rural areas	Good	Good	Good	All three alternatives show a potential future trail alignment down the eastern edge of the South neighborhood that could help provide an edge and a buffer to the adjacent Rural Reserve if appropriately designed and landscaped.
	Land use and transportation patterns can logically be extended into Elligsen Urban Reserve in the future	Good	Good	Good	All three alternatives plan for the eventual extension of the north-south neighborhood collector through the West neighborhood into the Elligsen Urban Reserve.

Guiding Principle	Evaluation Measures	Option A Rating	Option B Rating	Option C Rating	Rationale
Promote healthy, active lifestyles *Extensive walkways, community gardens, recreational facilities, and other elements support active and healthy lifestyles.*	Connectivity of trails to parks, schools, open spaces, and neighborhood-scale retail	Good	Good	Good	All three alternatives have essentially the same trail network, which connects well to the future schools and to the BPA powerline easement and the Boeckman Creek corridor, but does not connect directly to the retail area or the future community park.
Integrate sustainability *The plan integrates solutions which address economic, environmental and social needs. Frog Pond is a sustainable community over the long term.*	Environmental impacts to wetlands, tree groves and SROZ areas in the placement of transportation, water, sewer, and stormwater facilities	Good	Good	Good	Alignment of framework streets and infrastructure facilities (with the possible exception of local streets) generally avoid tree groves and significant natural resource areas. Wetland impacts from roads and infrastructure are about the same in all three alternatives.
	Total impervious area	Better	Better	Good	Option C has higher density residential development, which tends to have higher impervious surface coverage.
	Proximity of new infrastructure to seismic & landslide hazard areas, and steep slopes	Good	Better	Good	Alignment of West Neighborhood roadway for Concept 2 being offset from Boeckman Creek ravine reduces proximity of new infrastructure to the Boeckman Creek ravine, which has steep slopes.
	Compatibility of stormwater management facilities with existing topography	Good	Good	Good	All alternatives offer similar opportunities to design stormwater management facilities that are compatible with existing topography.

Guiding Principle	Evaluation Measures	Option A Rating	Option B Rating	Option C Rating	Rationale
Coordinate with Wilsonville's transportation network *The plan is consistent with the Wilsonville Transportation System Plan for all modes of travel: trails, bikeways, SMART, and vehicles. Traffic impacts are managed for key streets and intersections, including the I-5 interchanges.*	Level of Service (LOS) at Study Intersections	Best	Good	Better	Two study intersections would fail to meet LOS standards in Option B. Option A and C each have only one intersection that fails to meet standards, but one study intersection performs slightly better in Option A than Option C and delays are slightly shorter for Option A. This difference is primarily due to the difference in the signal location; the location further north in Options A and C performs better.
	Integration of the various travel modes (pedestrian, bicycle, transit, and motor vehicle) that facilitates transportation choices	Better	Good	Better	The layout of the grid network does a particularly good job of providing internal connections that support circulation and access. The collector street route being located further north also provides better transit coverage in the northern part of the planning area.
	Number and magnitude of deviations to projects and standards identified in TSP	Good	Good	Good	No major deviations from TSP standards are needed for any of the alternatives. The additional transportation projects needed to support growth in Frog Pond are essentially the same for all alternatives.

Issues for Further Study

Several implementation considerations for the Frog Pond Area Plan have begun to emerge from the evaluation of alternatives, including:

- Site design techniques for the Frog Pond retail area to ensure it is compatible with adjacent neighborhoods, easily accessible by all modes, and supports a high-quality pedestrian environment on adjacent streets;
- Where and to what degree to allow or encourage the use of alleys for residential development;
- Mechanisms to ensure provision of neighborhood parks if the Frog Pond Area is developed incrementally;
- Stormwater management strategies – on-site treatment and detention versus consolidated facilities serving multiple developments;
- Appropriate levels of protection for existing mature trees and tree groves;
- Wetland mitigation strategies;
- Appropriate bicycle and pedestrian crossing treatments for major road intersections to ensure safe routes to school and easy connections within the Frog Pond Area; and
- How certain road and utility infrastructure improvements will be built and paid for, such as urban upgrades to Stafford Road.

These issues will be explored further throughout the course of the project as it moves towards a final plan and set of implementation measures.

Exhibits & Appendices

List of Exhibits

Exhibit 1 A-C: Land Use Alternatives, Options A, B and C

Exhibit 2: Land Use and Housing Types Example Images

Exhibit 3: Parks Framework

Exhibit 4: Park Design Concepts

Exhibit 5 A-B: Proposed Street Functional Classifications

Exhibit 6 A-B: Stafford Road and New Neighborhood Collector Design Concepts

Exhibit 7: Intersection Crossing Treatment Example Images

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Exhibit 9 A-B: Bicycle and Pedestrian Frameworks

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Exhibit 13: Green Infrastructure Example Images

Exhibit 14: Capacity and Density Estimates Detailed Table

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Appendix A: Frog Pond Area Plan Market Analysis (Leland Consulting Group)

Appendix B: Future Transportation Analysis memorandum (DKS Associates)

Appendix C: Frog Pond Area Plan – Concept Plan Infrastructure Analysis memorandum (Murray Smith & Associates)

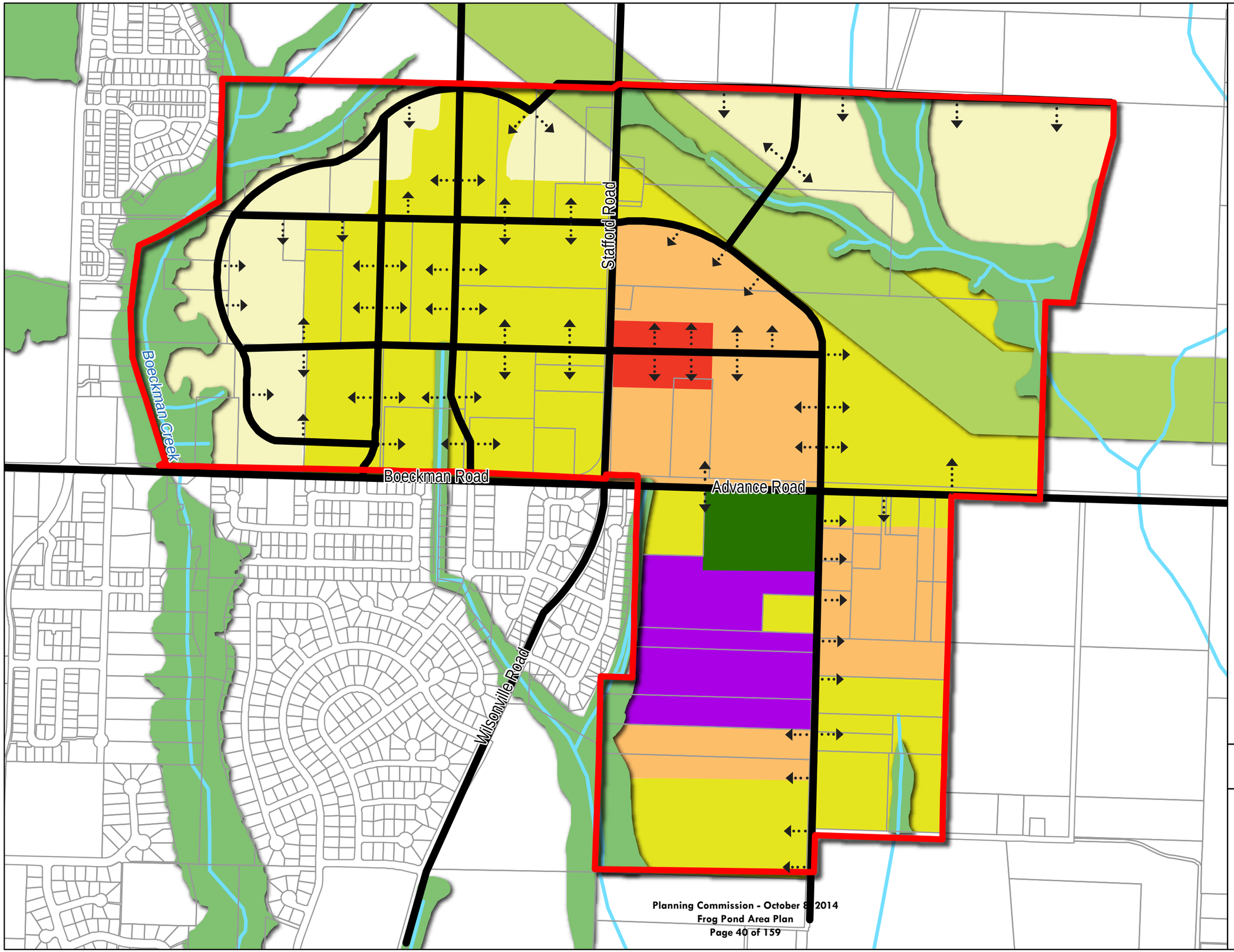

Exhibit 1A

FROG POND AREA PLAN
Creating a great community

Option A

- Framework Street
- Local Connection
- Planning Area
- Planned School Site
- Community Park
- Stream
- BPA Corridor
- Natural Resources Overlay
- Taxlots

Land Use Designations

- Very Low Density (3 Units / Net Acre)
- Low Density (7.2 Units / Net Acre)
- Medium Density (12.1 Units / Net Acre)
- High Density (25 Units / Net Acre)
- Commercial

0 250 500 1,000 Feet

Prepared By:
Angelo Planning Group

Date:
8/19/2014

Coordinate System:
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Exhibit 1B

FROG POND AREA PLAN

Creating a great community

Option B

- Framework Street
- Local Connection
- Planning Area
- Planned School Site
- Community Park
- Stream
- BPA Corridor
- Natural Resources Overlay
- Taxlots

Land Use Designations

- Very Low Density (3 Units / Net Acre)
- Low Density (7.2 Units / Net Acre)
- Medium Density (12.1 Units / Net Acre)
- High Density (25 Units / Net Acre)
- Commercial

0 250 500 1,000 Feet

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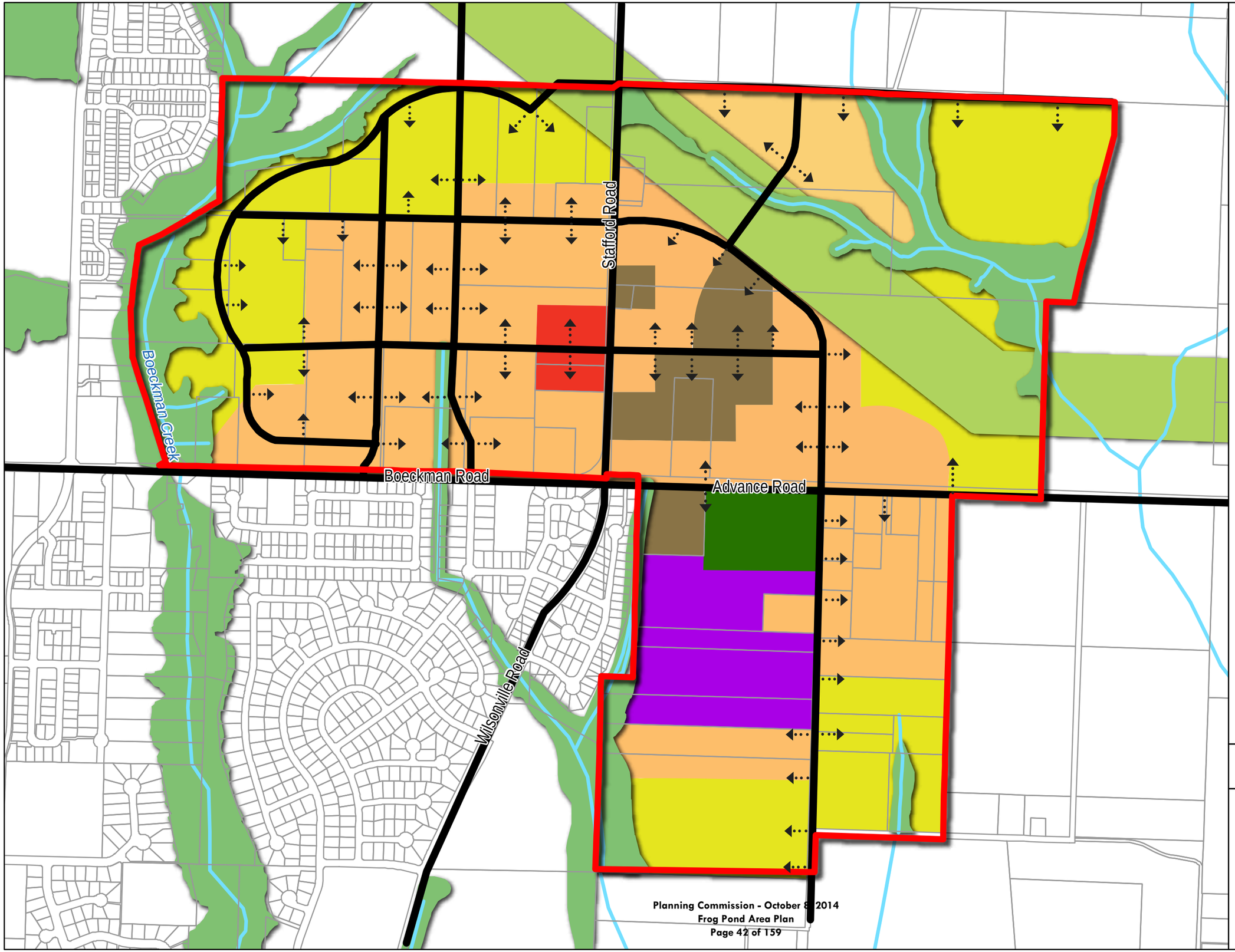

Exhibit 1C

FROG POND AREA PLAN
Creating a great community

Option C

- Framework Street
- Local Connection
- Planning Area
- Planned School Site
- Community Park
- Stream
- BPA Corridor
- Natural Resources Overlay
- Taxlots

Land Use Designations

- Very Low Density (3 Units / Net Acre)
- Low Density (7.2 Units / Net Acre)
- Medium Density (12.1 Units / Net Acre)
- High Density (25 Units / Net Acre)
- Commercial

0 250 500 1,000 Feet

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Very Low Density
(with Accessory Dwelling Unit over garage)

Very Low Density Residential

Very Low Density Residential

Low Density Residential

Low Density Residential

Low Density Residential

Low-Density Residential
(Duplex within single-family home neighborhood)

Low Density Residential
(With mature tree protected in front yard)

Creating a great community

Exhibit 2

Medium Density Residential
(Townhomes)

Medium Density Residential
(Townhomes)

Medium Density Residential
(Townhomes)

Medium Density Residential
(Cottages)

Medium Density Residential
(Cottages)

High-Density Residential
(Small Condominium)

High-Density Residential
(Garden Apartments)

High-Density Residential
(Garden Apartments)

Land Use & Housing Types

Neighborhood-scale commercial building

Corner left unbuilt to provide access into parking lot from Main Street

Stormwater treatment integrated into Main Street

Parking is located behind buildings and well-landscaped. On-street parking contributes to supply.

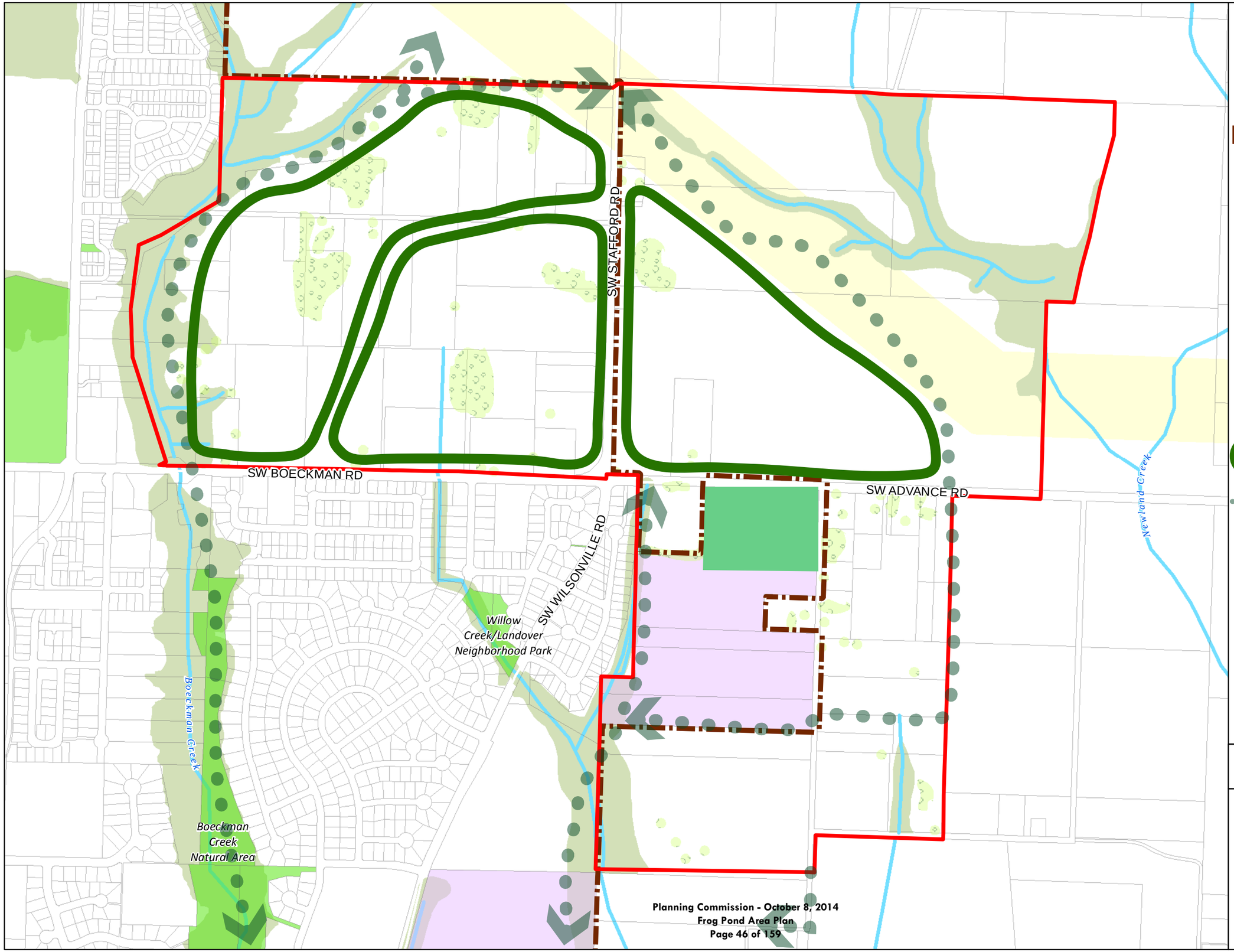
Mature trees protected within parking lot

Commercial
(Small-scale retail)

Commercial
(Mixed Use, 3 stories housing over 1 retail)

Commercial
(Mixed Use, 2 stories housing over 1 retail)

Neighborhood Commercial



FROG POND AREA PLAN
Creating a great community

Exhibit 3

Parks Framework

- Planning Area
- UGB
- Streams
- Tree Groves
- Taxlots
- Existing Parks and/or Natural Areas
- Existing & Future School Sites
- Significant Natural Resources
- BPA Easement
- Future Community Park
- Neighborhood Park Target Area
- Future Trail Connection

0 250 500 1,000 Feet

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Kids' fountain in park plaza

Neighborhood Center Plaza

Park events

Civic space and mature trees in neighborhood park

Neighborhood Park

Trails

Park integrated with powerline easement

Park Design Concepts

Exhibit 5A

FROG POND AREA PLAN
Creating a great community

Transportation Framework Options A and C

- Existing Major Arterial
- Existing Minor Arterial
- Existing Collector
- New Collector*
- New Local Framework Street
- New Local Connection
- Planning Area
- Planned School Site
- Community Park
- Stream
- BPA Corridor
- Natural Resources Overlay
- Taxlots

** Includes bike lanes and on-street parking where appropriate.*

0 250 500 1,000 Feet

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Exhibit 5B

FROG POND AREA PLAN
Creating a great community

Transportation Framework Option B

- Existing Major Arterial
- Existing Minor Arterial
- Existing Collector
- New Collector*
- New Local Framework Street
- New Local Connection
- Planning Area
- Planned School Site
- Community Park
- Stream
- BPA Corridor
- Natural Resources Overlay
- Taxlots

** Includes bike lanes and on-street parking where appropriate.*

0 250 500 1,000 Feet

Prepared By:
Angelo Planning Group

Date:
9/5/2014

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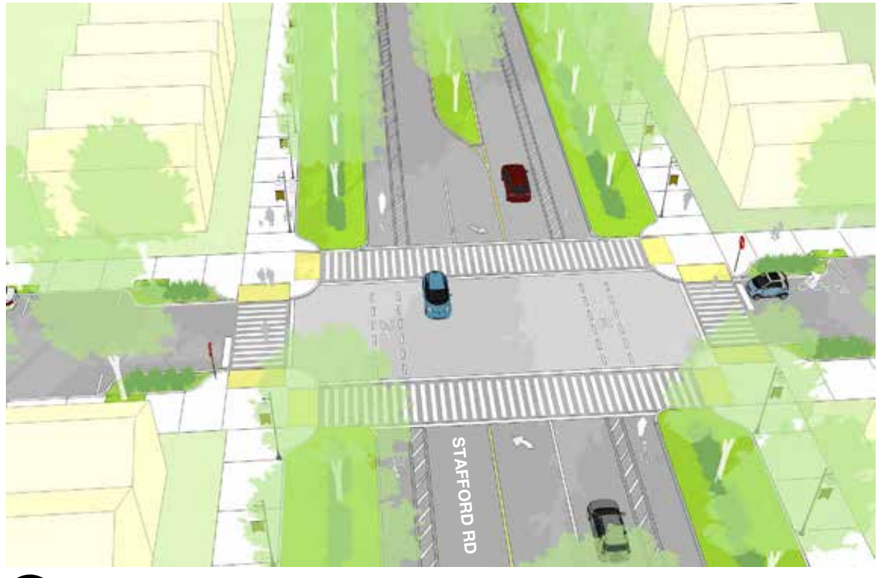
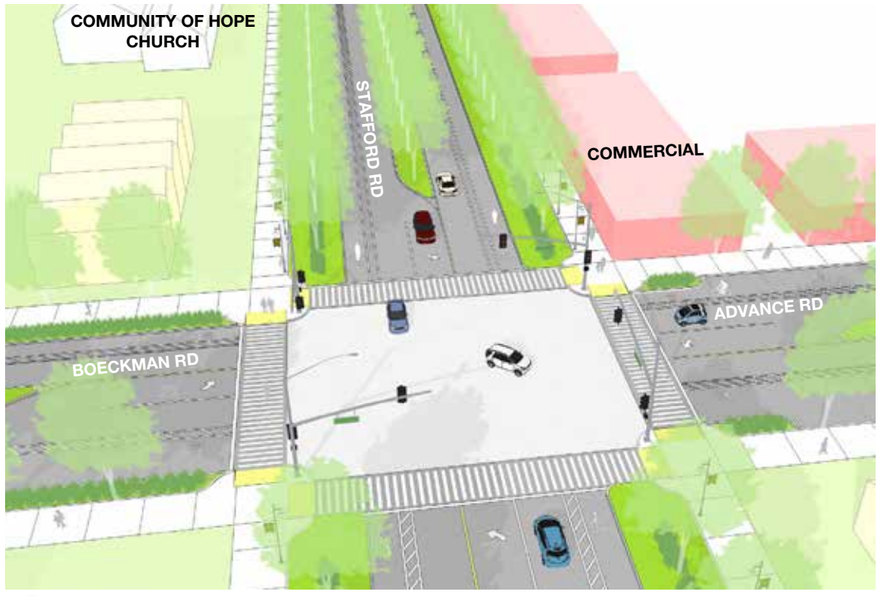
Creating a great community

Exhibit 6A

1 **New Neighborhood Collector Intersection**

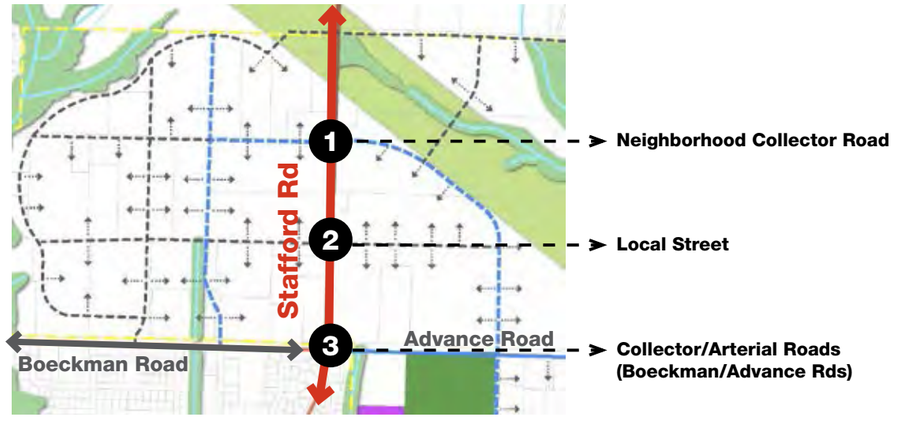


2 **New Local Street Intersection**



3 **Boeckman Road/Advance Road Intersection**

Sidewalk extents represent sufficient ROW for potential expansion of Stafford Rd. to 5 lanes



Key Map

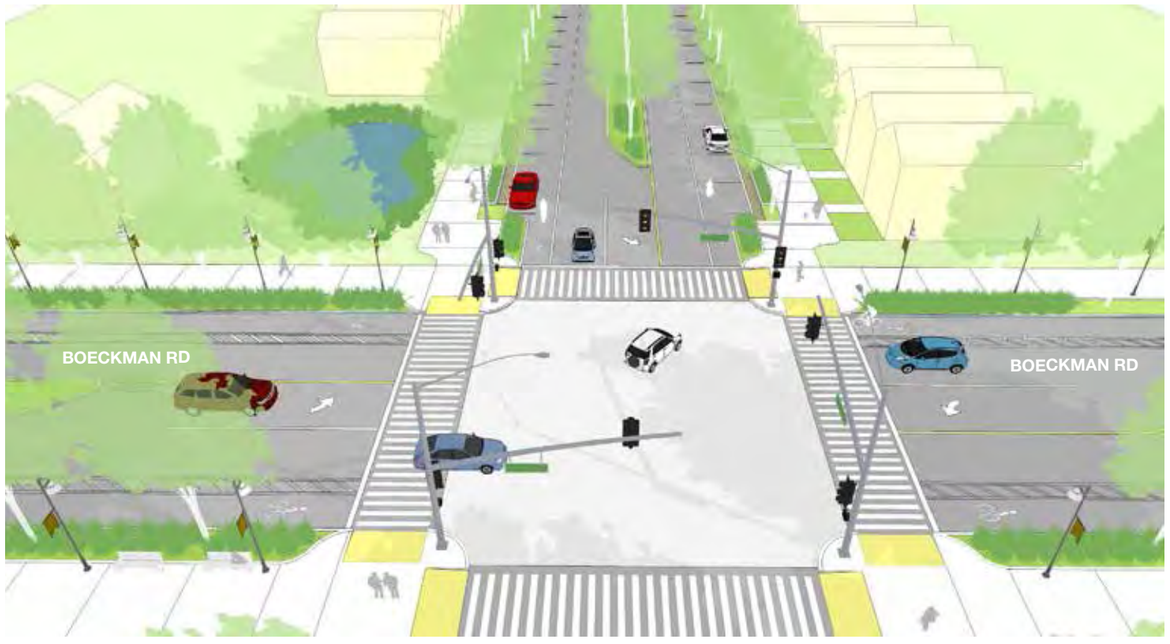
Stafford Road Intersection Types

Creating a great community

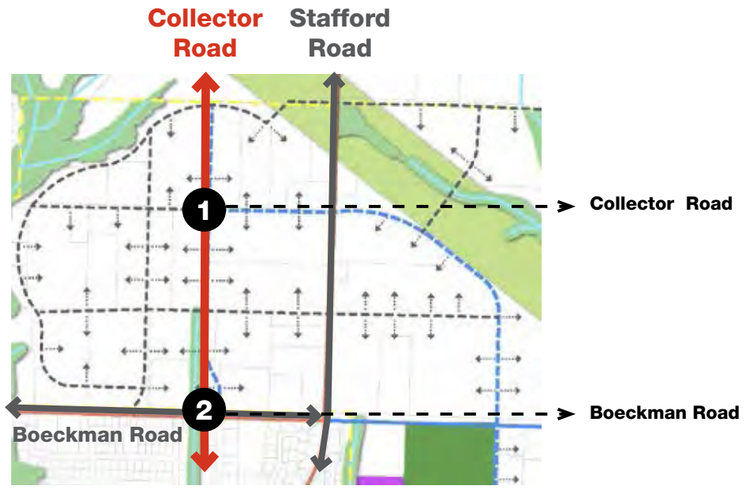
Exhibit 6B

1 Collector Road Roundabout

Wilsonville Roundabout Example



2 Boeckman Road Intersection



Key Map

Collector Road Characteristics

Creating a great community

Exhibit 7

Pedestrian Refuge at Roundabout

Bicycle Priority at Intersection

Curbless Street and Intersection

Pedestrian Undercrossings

Pedestrian Undercrossings

Zebra Crossing
(Provides wide, visible and safe crossing)

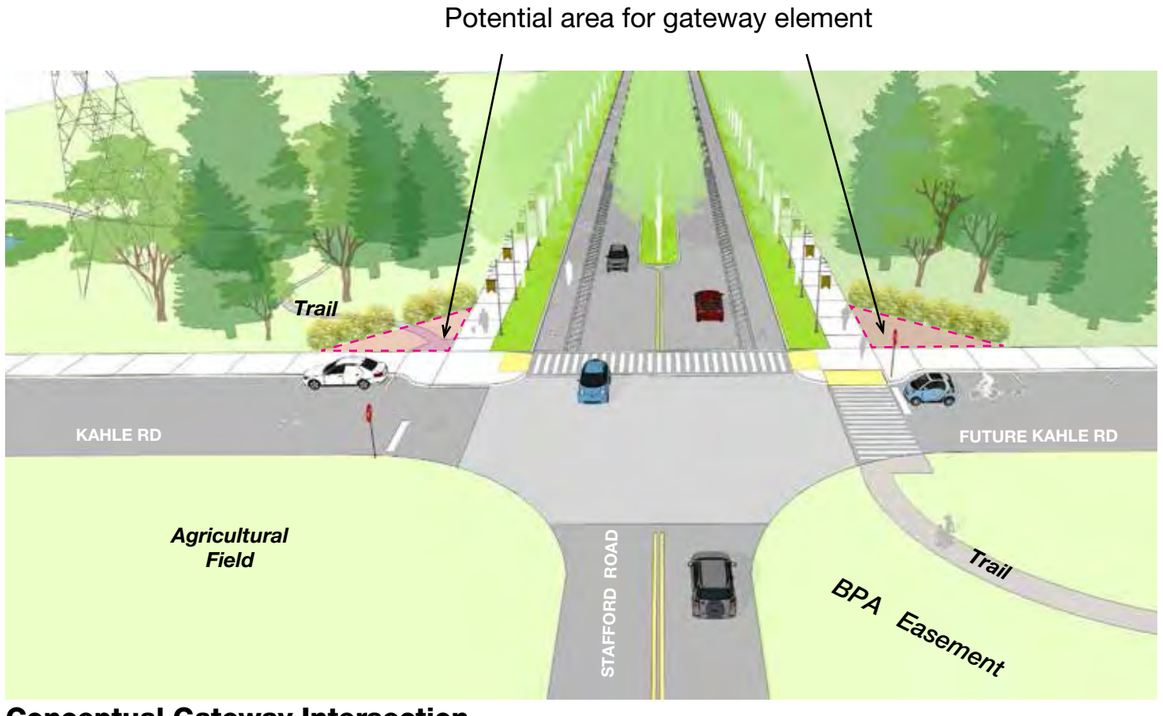
Concrete Crosswalk

Curb Bump-Out

Intersection Treatments

Seasonal color provides visual interest

Opportunity to highlight trail connection



Conceptual Gateway Intersection
SW Stafford & SW Kahle, looking south

- Facilitates transition from rural to urban setting
- Landscape and signage design should reflect the character of the planning area

Vertical elements, landscape and signage mark transitions and gateways

Stafford Road "Gateway" Intersection

Exhibit 9A

FROG POND AREA PLAN
Creating a great community

Bicycle / Pedestrian Circulation

Option A and C

- Framework Street
- Local Connection
- Planning Area
- Planned School Site
- Community Park
- Stream
- BPA Corridor
- Natural Resources Overlay
- Taxlots
- Existing Sidewalks
- Framework Street with Proposed Sidewalks (All local connections will have sidewalks)
- Existing Bicycle Lane and Sidewalks
- Proposed Bicycle Lane and Sidewalks
- Future Trail Connection
- Potential Grade-Separated Crossing

Boeckman Creek
Stafford Road
Boeckman Road
Advance Road
Wilsonville Road
New trail along BPA Corridor
Planned Regional Trail
Trail connecting Boeckman Creek Elementary School to planned school site
Potential use of unimproved 60th Ave ROW as trail

0 250 500 1,000 Feet

Prepared By:
Angelo Planning Group

Date:
9/3/2014

Coordinate System:
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Exhibit 9B

FROG POND AREA PLAN
Creating a great community

Bicycle / Pedestrian Circulation

Option B

- Framework Street
- Local Connection
- Planning Area
- Planned School Site
- Community Park
- Stream
- BPA Corridor
- Natural Resources Overlay
- Taxlots
- Existing Sidewalks
- Framework Street with Proposed Sidewalks
  (All local connections will have sidewalks)
- Existing Bicycle Lane and Sidewalks
- Proposed Bicycle Lane and Sidewalks
- Future Trail Connection
- Potential Grade-Separated Crossing

Feet
0 250 500 1,000

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9/3/2014

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Stafford Road
Boeckman Creek
Boeckman Road
Advance Road
Wilsonville Road
New trail along BPA Corridor
Planned Regional Trail
Trail connecting Boeckman Creek Elementary School to planned school site
Potential use of unimproved 60th Ave ROW as trail

FROG POND AREA PLAN
Creating a great community

Frog Pond Bicycle and Pedestrian Projects

1. Planned Boeckman Creek Regional Trail
2. Proposed BPA Corridor Trail
3. Connection to Wilsonville HS and Boeckman Elementary
4. Potential Connection to Wilamette River
5. Improved bicycle and pedestrian access through planning area

WASHINGTON CO
CLACKAMAS CO
SW DAY RD
SW BOONES FERRY RD
SW CLUTTER ST
SW RIDDER RD
SW ELLIGSEN RD
SW STAFFORD RD
SW HOMESTEADER RD
Argyle Square Retail Center
Canyon Creek Park
Xerox Company
Oregon Institute of Technology
Mentor Graphics
SW BOECKMAN RD
SW ADVANCE RD
School Site
Willow Creek Park
Landover Park
SW TOOZE RD
SW WESTFALL RD
SW GRAHAMS FERRY RD
SW 110TH AVE
SW CCSTA CIR
SW BARBER ST
Lowrie Primary
Sofia Park
Palermo Park
Town Center
Town Center Park
Boeckman Creek Crossing Trail
Courtside Park
Hathaway Park
Boeckman ES
Wilsonville High
SW BROWN RD
Tranquil Park
Engelman Park
Merryfield Park
Northwest Montessori School
SW WILSONVILLE RD
Oregon State Parks Willamette Meridian Landing
Inza R Wood Middle
Graham Oaks Nature Park
I5
Murase Plaza
Memorial Park
SW BELL RD
River Fox Park
Arrowhead Creek Park
Boones Ferry Park
Memorial to Boones Ferry Trail
Corral Creek Natural Area
NE BUTTEVILLE RD
Charbonneau Golf Course
NE PRAHL RD
SW MILEY RD
NE BOONES FERRY RD
NE GRAHAM RD
NE AIRPORT RD

Existing Bike Lane
Proposed Bikeway
Low-Moderate Traffic Through Street
Existing Trail
Proposed Regional Trail
Proposed Water Trail
Major Destination

Urban Growth Boundary
Park
School
Natural Area
City of Wilsonville
Frog Pond Planning Area

0 1,000 2,000 4,000 Feet

Coordinate System:
NAD 1983 HARN State Plane Oregon North FIPS 3601

Prepared By: Angelo Planning Group
Date: 9/10/2014

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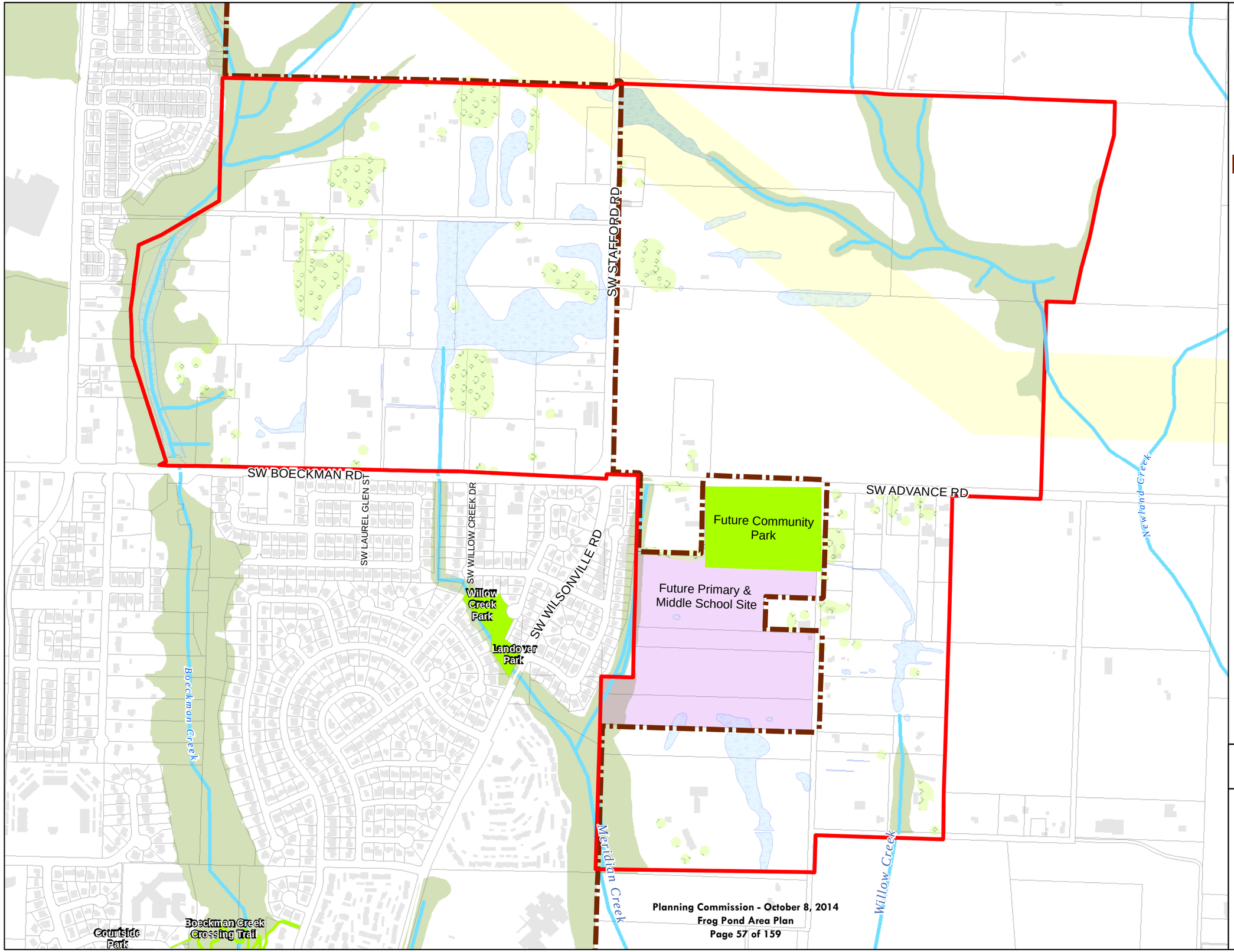
Frog Pond Area Plan

Natural Resources

Exhibit 11



- Building Footprints
- Planning Area
- UGB
- Parks
- Streams
- Tree Groves
- Wetlands*
- Taxlots
- Future Primary & Middle School Site
- Significant Natural Resources
- Locally Significant Wetland
- BPA Easement

*Jurisdictional, likely not locally significant

0 250 500 1,000 Feet

Prepared By: Angelo Planning Group

Date: 9/11/2014

Coordinate System:
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Creating a great community

Exhibit 12

Homes overlooking community garden

Homes facing pocket park

Low density home overlooking open space

Homes facing park and natural area

Homes overlooking nature park

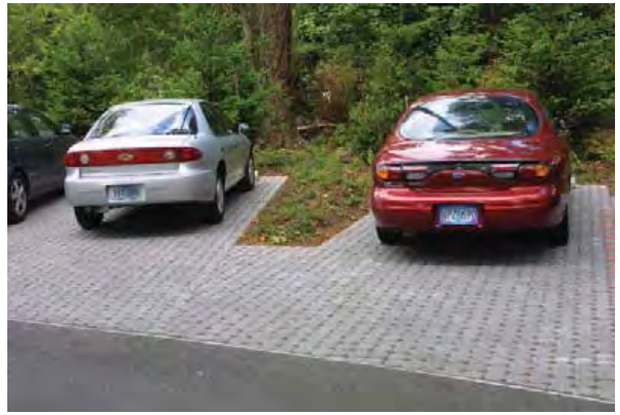
Homes facing Powerline easement

Open Space Edge Conditions

Creating a great community

Exhibit 13

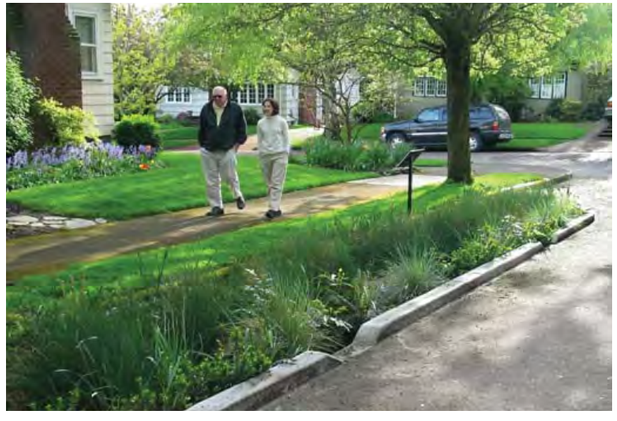
Green Roof
(Reduces roof runoff and improves building insulation)



Pervious Paving
(Allows rainwater to percolate into soil)

Parking Lot Rain Garden
(Natural detention and filtration of parking lot rainwater)

Retention Pond
(Holds rainwater in wetland environment)



Stormwater Bioswale
(Natural detention and filtration of on-street rainwater)

Street Trees
(Provide canopy over street for shade, pedestrian comfort, and rainwater absorption)

Green Infrastructure

Exhibit 14

Frog Pond Area Plan Land Use Options: Capacity and Density Estimates

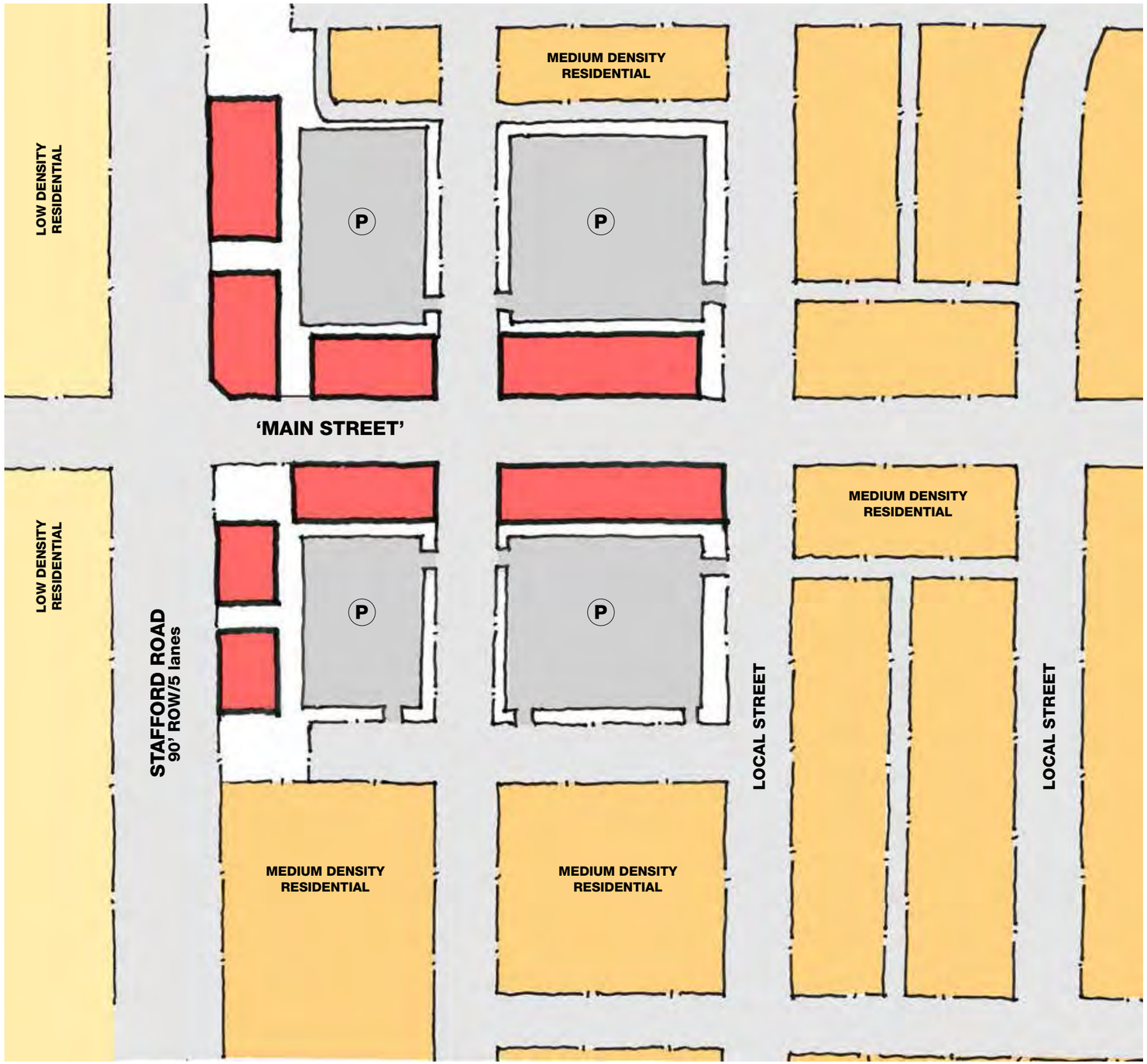
Option A - Grid Low		West Neighborhood					East Neighborhood					South Neighborhood					Frog Pond Area (Totals)				
Land Use	Map Key	Net Residential Acres	Units	% of units	% detached (est)	Net Density	Net Residential Acres	Units	% of units	% detached (est)	Net Density	Net Residential Acres	Units	% of units	% detached (est)	Net Density	Net Residential Acres	Units	% of units	% detached (est)	Net Density
Very Low Density		33.0	99	17%	17%	**3**	34.6	104	16%	16%	**3**	-	-	0%	0%	**3**	67.6	203	12%	12%	**3**
Low Density		68.3	492	83%	79%	**7.2**	23.5	169	26%	24%	**7.2**	30.4	219	43%	41%	**7.2**	122.2	880	50%	48%	**7.2**
Medium Density		-	-	0%	0%	**12.1**	31.7	384	58%	29%	**12.1**	24.2	292	57%	29%	**12.1**	55.9	677	38%	19%	**12.1**
High Density		-	-	0%	0%	**25**	-	-	0%	0%	**25**	-	-	0%	0%	**25**	-	-	0%	0%	**25**
Total		101.3	591		96%	5.8	89.8	657		69%	7.3	54.6	511		69%	9.4	245.7	1,759	100%	78%	7.2

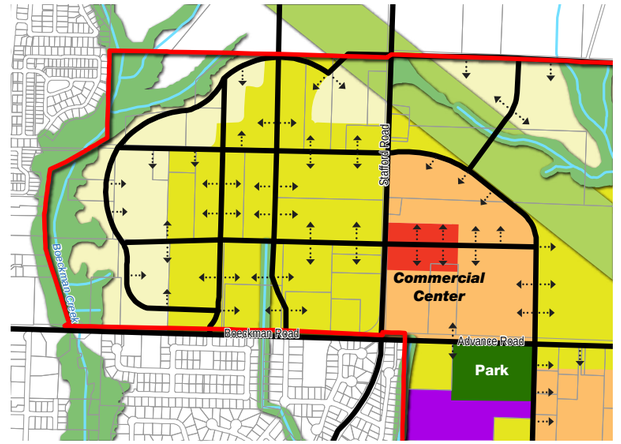
Option B - Organic Medium		West Neighborhood					East Neighborhood					South Neighborhood					Frog Pond Area (Totals)				
Land Use	Map Key	Net Residential Acres	Units	% of units	% detached (est)	Net Density	Net Residential Acres	Units	% of units	% detached (est)	Net Density	Net Residential Acres	Units	% of units	% detached (est)	Net Density	Net Residential Acres	Units	% of units	% detached (est)	Net Density
Very Low Density		-	-	0%	0%	**0**	-	-	0%	0%	**0**	-	-	0%	0%	**3**	-	-	0%	0%	**3**
Low Density		84.579612	609	75%	71%	7.2	44.4	320	31%	30%	7.2	31.9	230	46%	43%	**7.2**	160.9	1,159	49%	47%	**7.2**
Medium Density		16.6	201	25%	12%	12.1	31.5	381	37%	19%	12.1	22.7	274	54%	27%	**12.1**	70.7	856	37%	18%	**12.1**
High Density		-	-	0%	0%	25.0	13.1	328	32%	0%	25.0	-	-	0%	0%	**25**	13.1	328	14%	0%	**25**
Total		101.2	810		84%	8.0	89	1,029		48%	11.6	54.6	504		71%	9.2	244.8	2,343	100%	65%	9.6

Option C - Grid High		West Neighborhood					East Neighborhood					South Neighborhood					Frog Pond Area (Totals)				
Land Use	Map Key	Net Residential Acres	Units	% of units	% detached (est)	Net Density	Net Residential Acres	Units	% of units	% detached (est)	Net Density	Net Residential Acres	Units	% of units	% detached (est)	Net Density	Net Residential Acres	Units	% of units	% detached (est)	Net Density
Very Low Density		-	-	0%	0%	**0**	-	-	0%	0%	**0**	-	-	0%	0%	**3**	-	-	0%	0%	**3**
Low Density		38.4	276	28%	27%	7.2	31.9	229	20%	19%	7.2	24.2	174	35%	33%	**7.2**	94.5	680	26%	24%	**7.2**
Medium Density		58.3	706	72%	36%	12.1	47.4	574	49%	25%	12.1	27.3	330	65%	33%	**12.1**	133.0	1,610	61%	30%	**12.1**
High Density		-	-	0%	0%	25.0	14.5	363	31%	0%	25.0	-	-	0%	0%	**25**	14.5	363	14%	0%	**25**
Total		96.7	982		63%	10.2	93.8	1,166		43%	12.4	51.5	505		66%	9.8	242.0	2,653	100%	55%	11.0

Creating a great community

Exhibit 15A





Key Map

COMMERCIAL FOOTPRINTS

** Option shows 69,000sf of commercial space, with +/-240 surface parking spaces*

** See Neighborhood Commercial Images for more information*

N

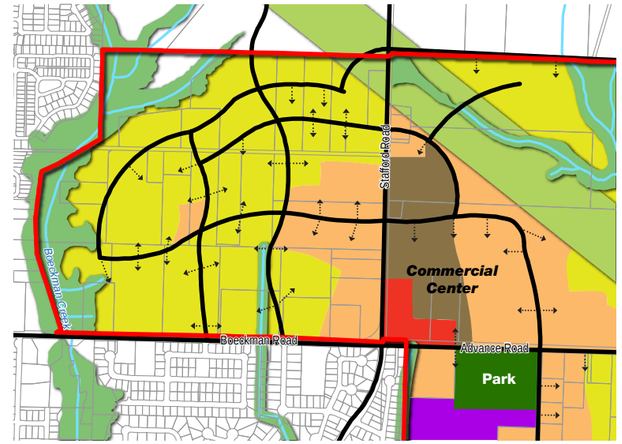
0 25 50 100 200

Neighborhood Commercial Center Program and Access Study

Option A

Creating a great community

Exhibit 15B



Key Map

COMMERCIAL FOOTPRINTS

** Option shows 69,000sf of commercial space, with +/-240 surface parking spaces*

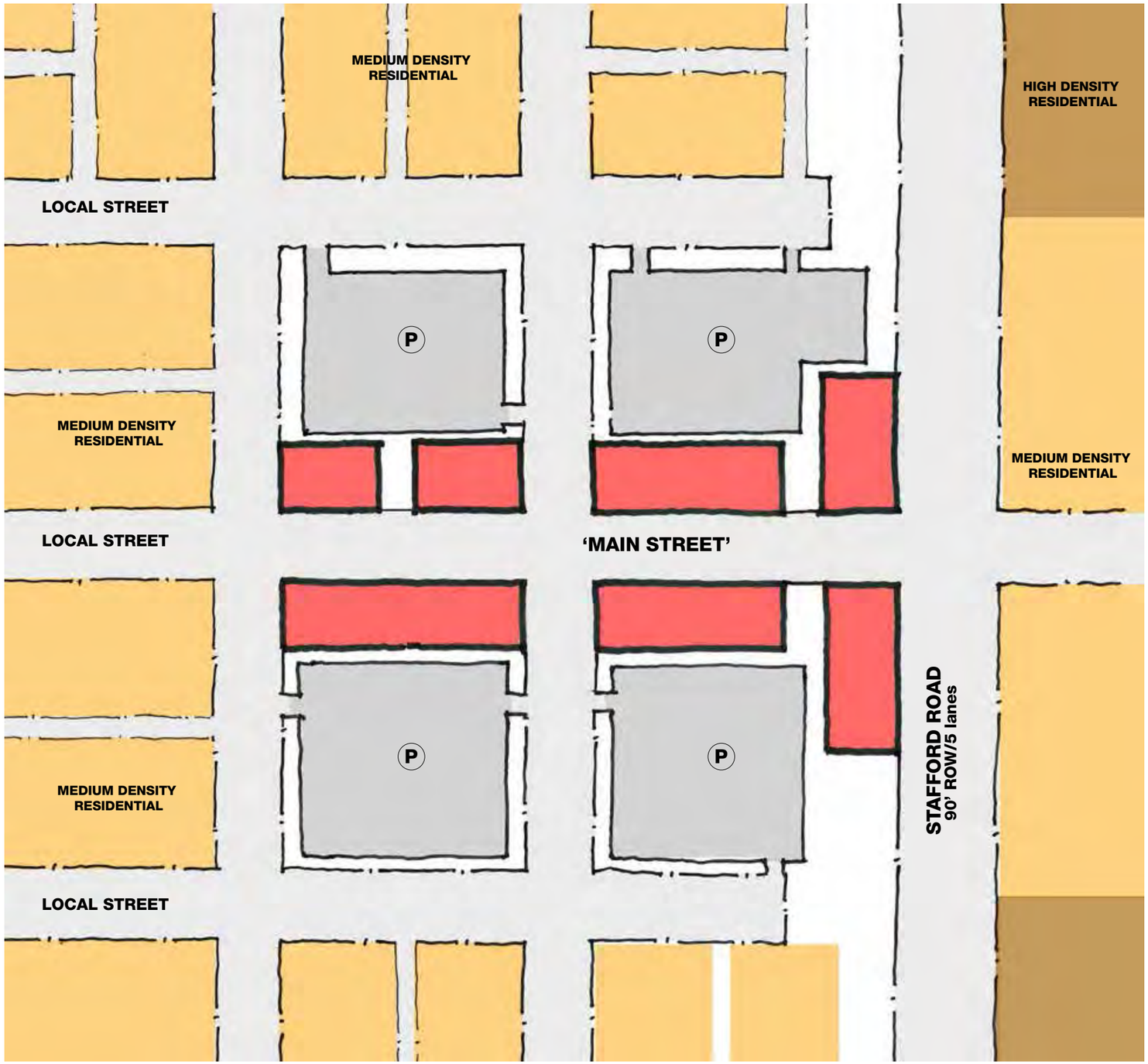
** See Neighborhood Commercial Images for more information*

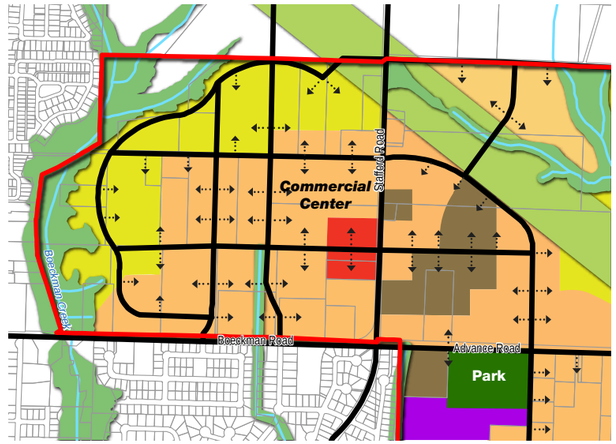
Neighborhood Commercial Center Program and Access Study

Option B

Creating a great community

Exhibit 15C





Key Map

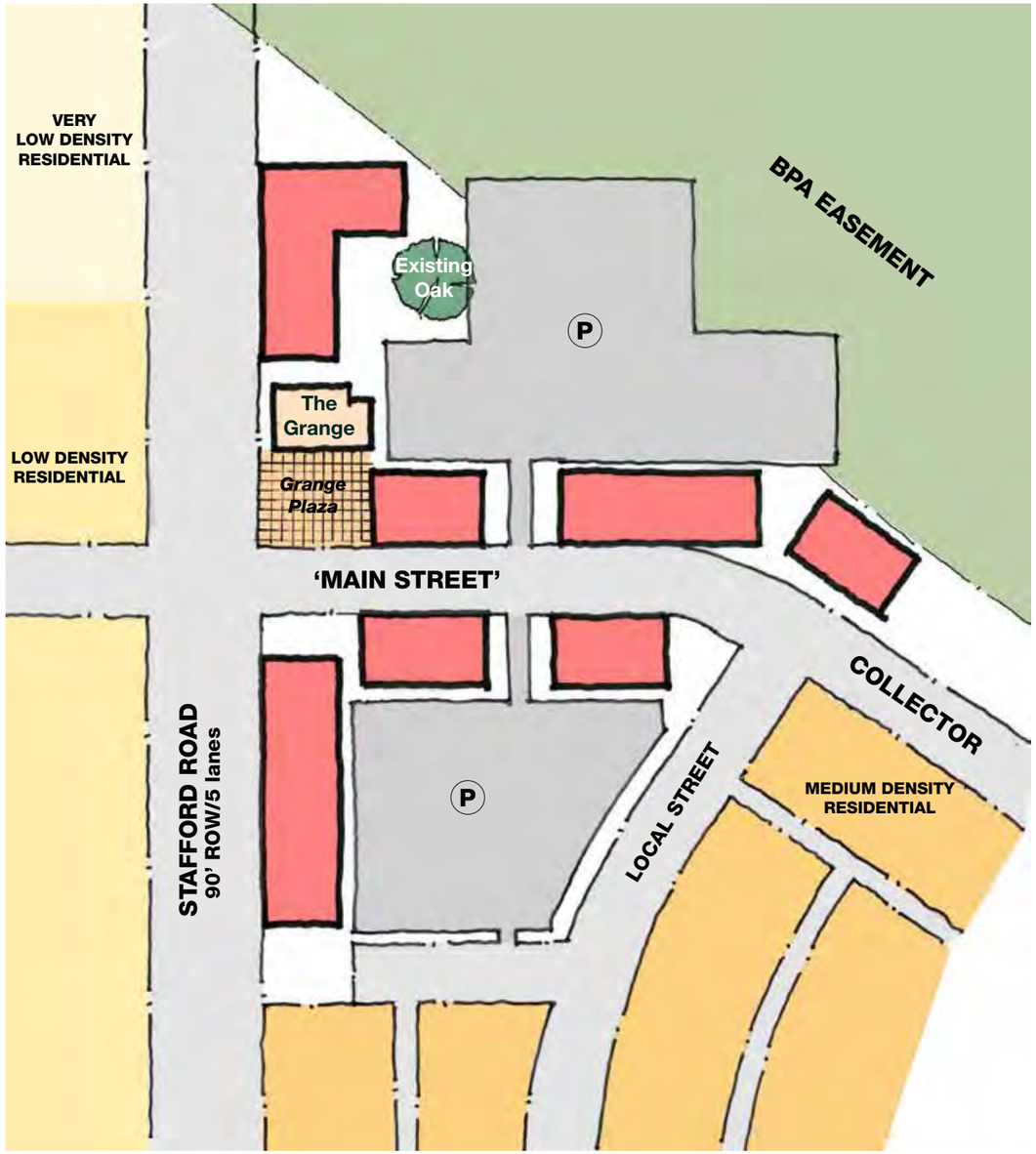
COMMERCIAL FOOTPRINTS

** Option shows 69,000sf of commercial space, with +/-240 surface parking spaces*

** See Neighborhood Commercial Images for more information*

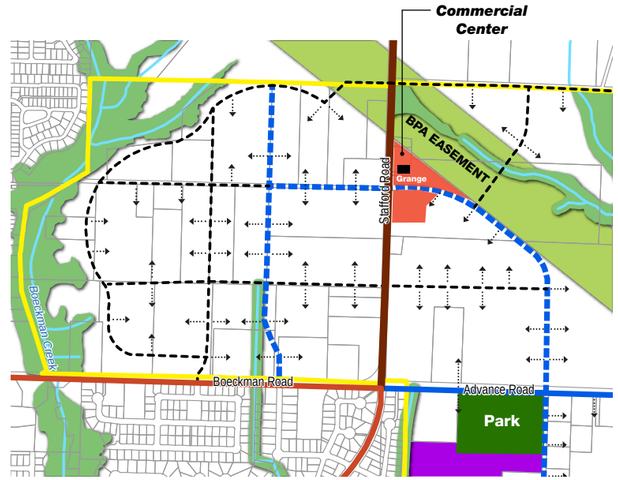
Neighborhood Commercial Center Program and Access Study

Option C



Creating a great community

Exhibit 15D



Key Map

COMMERCIAL FOOTPRINTS

** Option shows 69,000sf of commercial space, with +/-240 surface parking spaces*

** See Neighborhood Commercial Images for more information*

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Neighborhood Commercial Center Program and Access Study

Option D

FROG POND AREA PLAN
Creating a great community

Appendix A: Frog Pond Area Plan Market Analysis

City of Wilsonville

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FROG POND AREA PLAN

MARKET ANALYSIS

PREPARED FOR

City of
WILSONVILLE
OREGON

PREPARED BY

LELAND CONSULTING GROUP

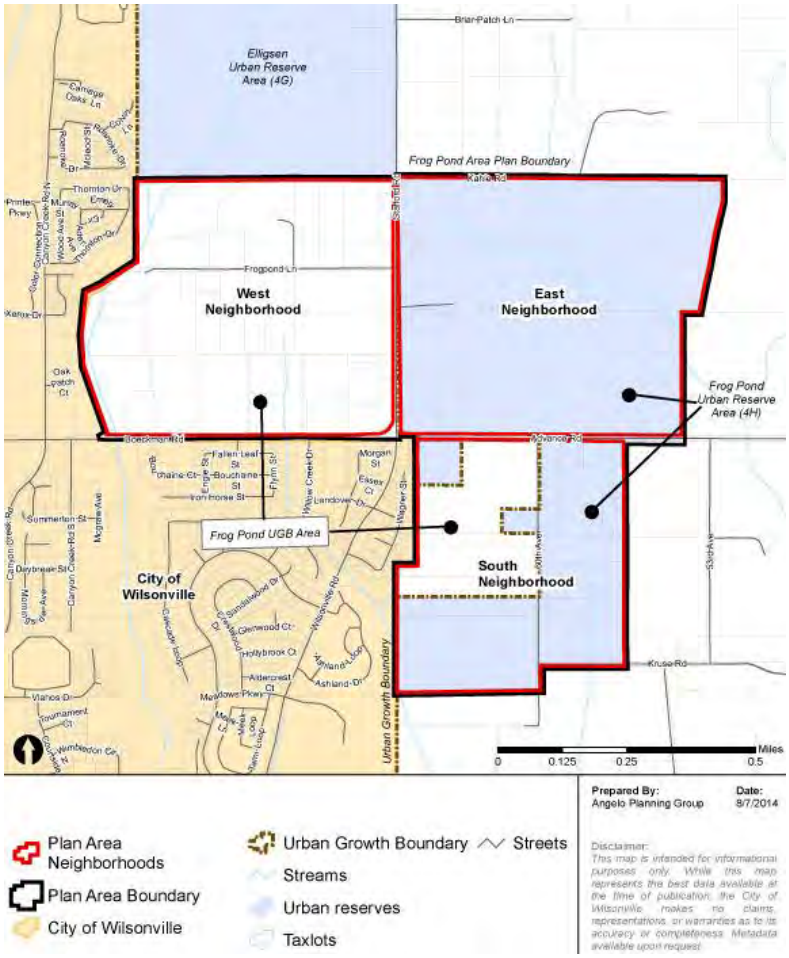
Contents

Introduction and Executive Summary

This market analysis is one component of the Frog Pond Area Plan, which the City of Wilsonville has initiated in order to establish a vision for the area, and to define expectations for the type of community that the 495-acre Frog Pond Area will become in the future. Leland Consulting Group (LCG), the authors of this report, is part of a consultant team led by Angelo Planning Group, which has been engaged by the City of Wilsonville to manage parts of the Frog Pond Area Plan. Through a process that will involve Wilsonville's citizens and elected officials, the Frog Pond Area Plan will ultimately identify the types of development (housing, neighborhood retail, parks, etc.), supporting infrastructure, regulatory framework, and a series of implementation steps needed to realize the plan. This executive summary provides key findings of the market analysis, while details are contained in the body of the report beginning on page 7.

The purpose of this market analysis is to provide the City and Frog Pond Area Plan participants with information about the types of residential and commercial real estate that are likely to be in demand and market feasible in the Frog Pond study area. The market analysis takes into account the project's goals to (1) create a concept plan for the entire 495-acre Frog Pond Area shown in Figure 1 below; and (2) create more specific master plan recommendations for the 179-acre "West Neighborhood" portion that is within the Urban Growth Boundary (UGB). Development within the West Neighborhood will occur first, and development within the East and South Neighborhoods will occur later if they are brought into the UGB by Metro. The real estate market is of critical importance to the future of the entire Frog Pond Area, since this new community will be shaped by both the private sector (e.g., land owners, developers, new residents, retail tenants) and the public sector (through planning, regulation, provision of infrastructure, annexation, and other actions).

Figure 1. The Frog Pond Area



Source: City of Wilsonville, Angelo Planning Group.

Demographic context. Wilsonville is one of the Portland region's fastest growing cities. Metro has projected that the city's households will grow at 1.8 percent annually through 2035, faster than the region and other nearby cities such as Tualatin and Sherwood. The city may also grow faster than this rate: between 2000 and 2012, Wilsonville's households grew at a rate of 2.8 percent per year, despite the recession. Therefore, there will almost certainly be demand for housing, and potentially commercial development, in Wilsonville and Frog Pond during the next two decades.

Wilsonville's residents are more likely to have a bachelor's or advanced degree than residents of the region, they earn slightly more than households regionwide, and they are more likely to work in white collar jobs. Wilsonville has large shares of both young adults and senior residents, while the city has a smaller share of households headed by middle-aged adults compared to the region.

Analysis by Metro, the State of Oregon, and the US Census Bureau indicate that America's demographics are changing, and growth in the Frog Pond market area is likely to include a wide variety of household types. The most dramatic growth will come in the 65+ senior population, whose numbers will increase by 93 percent between 2015 and 2035. By comparison, no other age group is expected to grow by more than 29 percent during that time period. In addition, "non-traditional" household types such as families with children, couples, single-parent households, and single-person households will be important components of growth and therefore will shape real estate demand in

Frog Pond. Sixty-eight percent of Wilsonville's current households are one or two people; such smaller households have been growing as a share of the country's population since the 1970s, a trend that is expected to continue. Wilsonville's recently adopted Residential Land Study (RLS) documents many of these projections and sets the stage for this market analysis.

The Frog Pond Area. Past policies adopted by the City of Wilsonville and Metro call for the Frog Pond Area to be developed primarily as a residential community, though ancillary commercial development may take place in Frog Pond. These policy decisions directly influence this market analysis. As shown in Figure 1, the Frog Pond Area contains two main sub-areas. The first is the West Neighborhood, which is located west of Stafford Road and is 179 gross acres in size. The second is the East and South Neighborhoods combined, located east of Stafford Road. With the exception of the planned school property, the East and South Neighborhoods are outside the UGB, will therefore develop later, and are 316 gross acres in size. Together the two areas comprise 495 gross acres.

Frog Pond has a number of positive features including easy access to natural areas, existing and planned schools and parks, jobs, retail services, and major transportation infrastructure. Developers interviewed as part of this study consistently view Wilsonville in general and Frog Pond in particular as a desirable location for future residential and commercial development, though they did not consistently point out any specific advantages that Frog Pond has compared to other Wilsonville locations.

Housing market analysis. Based on the RLS, demographic projections, past housing built in Wilsonville, and other factors, Leland Consulting Group recommends that Frog Pond be developed as a community that contains a relatively broad mix of housing types including a variety of detached single-family, attached single-family, and multifamily homes. In total, LCG projects that Frog Pond is likely to be built out with between 2,200 and 2,700 homes. This report proposes a series of housing development principles on page 23, followed by two housing development scenarios for the West Neighborhood, and two for the East and South Neighborhoods, in order to provide alternative development options. The primary housing type should be single-family detached homes within a variety of lot sizes, since such homes continue to be the choice of most American households. Because one and two-person households make up the majority of market area households, and because of the dramatic growth of the senior population, LCG recommends that the program contain a significant share of small lot single-family homes (lots between 2,500 and 4,000 square feet), as well as multifamily and attached housing. Developers generally support a diversity of housing within a large community such as Frog Pond, since such a broad mix of housing will accommodate a wider segment of the population, and therefore speed sales and absorption.

Recent surveys and research by the National Association of Realtors (NAR), Urban Land Institute (ULI), and others show that the amenities associated with complete and walkable neighborhoods are important in addition to the home itself. These popular amenities include shops within an easy walk, places to walk for exercise, public transportation, and sidewalks. Such features should be taken into account in the design of the community.

There is no single "correct" development program for the purposes of this study. Rather, the development scenarios described above provide a range of reasonable expectations. The actual housing program should be influenced by the community's goals and vision, public policy set by the City, and this Frog Pond Area Plan process. In addition to market considerations, development alternatives with more housing will generate more public revenues, particularly through systems

development charges, which fund community infrastructure such as roads, sewer, and water lines, and reduce the funding required from elsewhere in the city.

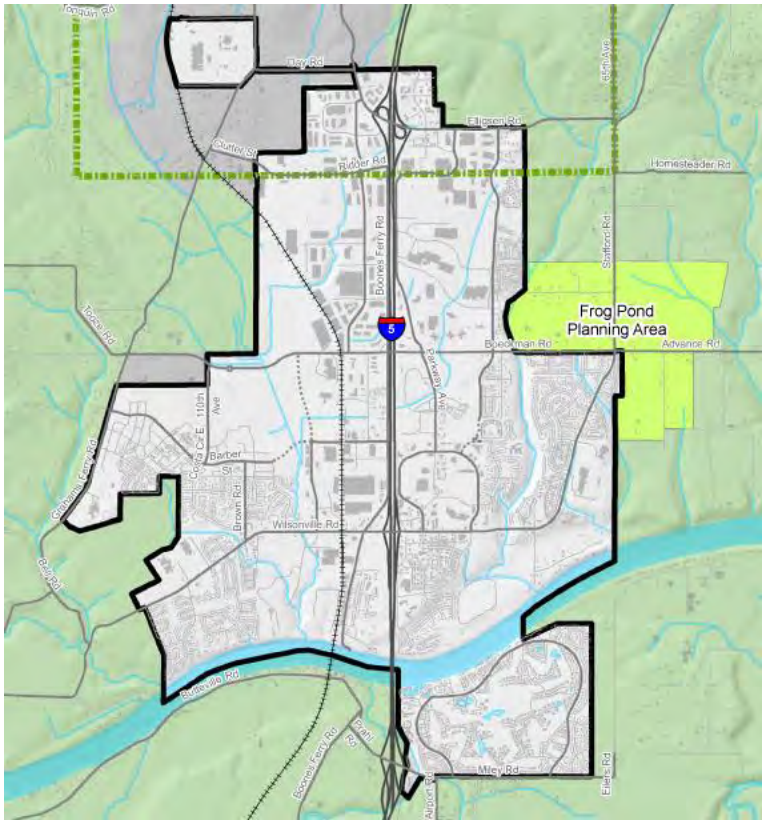
Retail market analysis. The Frog Pond Area community will build out along the edge of an existing urbanized city and region. As mentioned above, nearby goods and services are an amenity that residents will want; however, "retail follows rooftops"—in other words, significant retail development only takes place when there is a significant population of likely shoppers in the area. As a potential retail location, Frog Pond benefits from being situated along two arterial roads, Boeckman/Advance Roads and Stafford/Wilsonville Roads, which will provide some drive-by traffic. Retail in Frog Pond can also serve some adjacent existing communities to the west and southwest.

Based on an evaluation of current and projected future retail spending, LCG projects that Frog Pond could *potentially* support a small to medium-size grocery-anchored retail center (60,000 square feet or more) at full project build out in approximately 2035. If such a grocery-anchored center cannot be attracted, Frog Pond could support a smaller center of between 10,000 and 30,000 square feet. A variety of factors will affect retail feasibility, particularly whether or not other retail is built near Frog Pond during the next 20 years, the number of homes in the area, and retail development formats in the future. Regardless of the size and scale of retail, the focus should be on establishing a retail/commercial hub development that provides some goods and services for local residents, while also creating a gateway, center, sense of place, and social hub for the area.

Demographic Context

Figure 2 below shows the Frog Pond Planning Area and the City of Wilsonville. Frog Pond is well located: It is proximate to both urban amenities such as employment centers, retail areas, major transportation routes, and parks. It is also adjacent to attractive rural lands to the north, east, and south. The area's specific attributes including natural areas are evaluated in more detail on page 21.

Figure 2. City of Wilsonville and Frog Pond Area



Source: City of Wilsonville.

Information Sources

The population and demographic projections on the following pages make use of a number of information sources, including demographic forecasts prepared by Metro, Portland's regional government; ESRI Business Analyst, a private third-party data provider; the State of Oregon's Office of Economic Analysis, which produces the official long-term population forecasts for all of the State's counties; the US Census; and the City of Wilsonville Residential Lands Study (2014) and permitting database. In addition to these data sources, LCG consulted recent research on housing preferences completed by the National Association of Realtors, the Urban Land Institute (ULI), and others. The purpose of the Residential Land Study (RLS), completed in compliance with Statewide Planning Goal 10, is to inventory Wilsonville's existing residential land, project future demand for housing and residential land, and to help Wilsonville's decision makers develop policies to guide housing development in the city over the next 20 years, from 2014 to 2034. While the Residential Land Study's findings and recommendations apply citywide, it also contains some high level guidance specifically for the Frog Pond Area, which is referenced in this report.

Population and Household Forecast

Demographics are fundamental to estimating market demand for residential and commercial real estate. The types of housing and commercial goods forecasted to be in demand in the future in Wilsonville and Frog Pond will depend on the types of people and households who live there in the future.

Table 1 shows the household growth projected by Metro (the Portland regional government) for the 2010 to 2035 time period for the Cities of Wilsonville, Tualatin, and Sherwood, the "Frog Pond market area," and the three primary metro-area counties. The market area encompasses the three cities and the areas immediately around them. This area was defined based on interviews with developers, who stated that it is the area that future Frog Pond residents are most likely to be drawn from. A map of the market area is shown on the following page. Some key takeaways from this demographic projection are:

Wilsonville is projected to grow quickly. As shown in Table 1, Metro projects the number of households in Wilsonville to grow at a rate of 1.8 percent annually between 2010 and 2035. Metro projects Wilsonville will grow at faster rate than other nearby cities such as Tualatin, Sherwood, Tigard, West Linn, and Lake Oswego, and at a faster rate than the region as a whole. While Metro's projections show rapid growth for Wilsonville, they may actually underestimate the pace of growth: The Residential Land Study documents that Wilsonville's "average annual population growth between 1990 and 2012 was nearly 5% and 3.2% between 2000 and 2012."

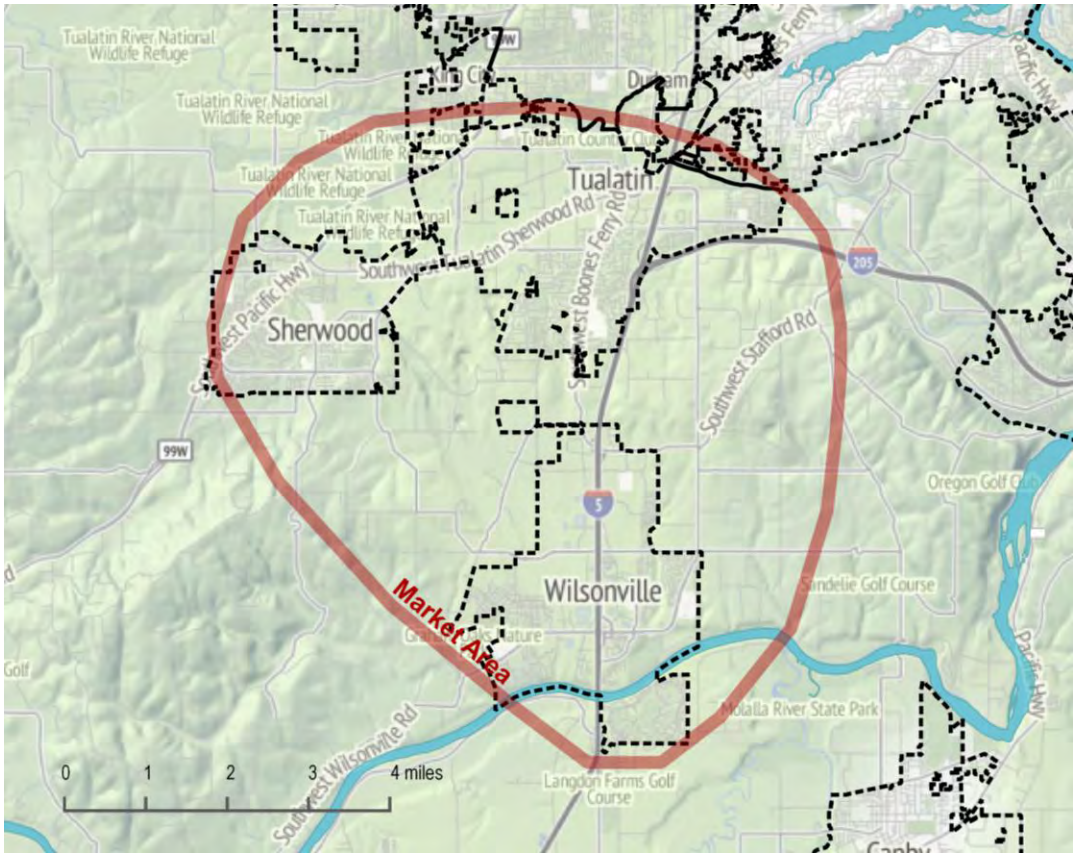
Regardless of the exact rate, household growth is the key driver of demand for new housing, as well as a key driver of commercial development. This means that there will be demand over the next 20 years for housing in the Frog Pond Area, and that it makes sense to conduct this Concept Plan process now in order to prepare for that demand.

Table 1. Demographic Forecasts for Wilsonville and the Metro Region

Jurisdiction	Households			
	2010	2035	Change	CAGR
City of Wilsonville	8,011	12,530	4,519	1.8%
City of Tualatin	10,000	11,170	1,170	0.4%
City of Sherwood	6,316	7,269	953	0.6%
Frog Pond Market Area	**27,825**	**38,704**	**10,879**	**1.3%**
Clackamas County	146,324	208,437	62,113	1.4%
Multnomah County	304,649	442,546	137,897	1.5%
Washington County	202,647	289,592	86,945	1.4%
Three County Total	**653,620**	**940,575**	**286,955**	**1.5%**

Source: Metroscope Gamma Forecasts, Published Feb 07, 2013, http://www.oregonmetro.gov/regional-2035-forecast-distribution. Note that Metro's projections shown in Table 1 include the Frog Pond West Neighborhood, but not Frog Pond East or South, since those neighborhoods are currently outside the UGB.

Figure 3. Frog Pond Primary Market Area



Source: Leland Consulting Group.

Wilsonville's Current Demographic Characteristics

Table 2 and Table 3 on the following page summarize key demographic attributes of Wilsonville, the Frog Pond market area, and the Portland region (Metropolitan Statistical Area or MSA). The data is for 2014 except where noted. Some key takeaways from this demographic analysis are:

- Wilsonville has a higher percentage of young adult residents (aged 24 to 34) and older residents (aged 65+) than the market area or region. Conversely, a slightly smaller percentage of Wilsonville's population is middle-aged (aged 35 to 64) than the market area or region.
- Fifty-nine percent of Wilsonville's households are "family households"—those with two or more related family members living together—compared with 68 and 64 percent in the market area and region, respectively.
- Wilsonville has a larger share (68 percent) of one and two-person households than the market area or region.

Table 2. Demographic Summary

Key: Lower Higher Compared to the other geographical areas shown below.

Demographic figures are for 2014 except where otherwise noted.

Demographic Attribute	City of Wilsonville	Frog Pond Market Area	Portland MSA
Comparison to Portland MSA:	More 25 - 34 and 65+ HHs Fewer family HHs Smaller HHs More 1 and 2 person HHs Slightly higher HH and Per Capita Incomes	More children, 35 - 54 HHs More family HHs Larger HHs More 1 and 2 person HHs Higher HH and Per Capita Incomes	NA
Population By Age			
0 to 24	31%	34%	32%
25 - 34	16%	13%	15%
35 - 44	14%	15%	14%
45 to 54	13%	14%	14%
55 to 64	11%	12%	13%
65 +	15%	11%	13%
Family Households (2010 Census)	59%	68%	64%
Median Age	37.0	36.6	37.5
Household Size (Average)	2.32	2.57	2.52
Household by Size (2010 Census)			
1 and 2 person households	68%	58%	61%
3 and 4 person households	25%	32%	29%
5 + person households	7%	10%	10%

Source: ESRI Business Analyst, Leland Consulting Group.

Table 3 shows that:

- Both Wilsonville and the market area have a high percentage of residents (70 and 69 percent respectively) that are employed in “white collar” jobs, compared with 63 percent regionwide. This reflects a high earning demographic of professional, technical, and management workers and bodes well for the city’s long-term economic health.
- Incomes—particularly household incomes—are very high in the market area. Wilsonville household incomes are lower than the market area but slightly higher than the region. The high incomes in the market area reflects the high number of professional, technical, and management employees who perform their work in the market area or commute to those jobs elsewhere.
- Educational attainment follows a similar pattern to incomes. Forty-one percent of residents of the market area have a bachelor’s degree or higher, which is slightly more than Wilsonville, and significantly more than the region.
- The median home value in Wilsonville is slightly higher than the market area, and significantly higher than the region.
- These demographic attributes, along with the long-term population growth forecast by Metro, also demonstrate that housing demand is likely to be strong in Frog Pond during the next two decades.

Table 3. Demographic Summary (Continued)

Demographic Attribute	City of Wilsonville	Frog Pond Market Area	Portland MSA
Occupation			
"White Collar"	70%	69%	63%
"Blue Collar"	14%	14%	20%
Median Household Income	$59,812	$70,256	$57,441
Per Capita Income	$31,995	$33,336	$30,135
Education and Employment			
Less than High School	8%	8%	9%
High School or Equivalent	20%	18%	22%
Associate's or Some College	32%	33%	34%
Bachelor's or Advanced Degree	39%	41%	34%
Median Home Value	$349,927	$337,289	$275,516
Housing Tenure			
Owner Occupied Housing Units	43%	55%	56%
Renter Occupied Housing Units	51%	40%	38%

Source: ESRI Business Analyst, Leland Consulting Group.

Tapestry Segments

"Tapestry segments" are a series of demographic categories developed by ESRI, a national third-party demographic information provider that describe groups of people based on their lifestyles, attitudes, purchasing patterns, and interests. The benefit of Tapestry segments is that they go beyond raw numbers and begin to describe groups of people in everyday language. Tapestry segments can also sometimes be overly simplistic, and because they are created at the national level, some aspects of different segments may not apply locally. ESRI uses information from the US Census, Bureau of Labor, and other private sector data sources to create Tapestry segments.

As shown in Table 4 below, the City of Wilsonville is dominated by three main Tapestry segments—Enterprising Professionals, Silver and Gold, and Up and Coming Families—which together comprise 95 percent of the city's total population. ESRI estimates that the Enterprising Professionals group alone accounts for 65 percent of the city's population, and is therefore 34 times more prevalent than in the nation at large. Attributes of the top three Tapestry segments are summarized below; additional information about them is included in the appendix.

Table 4. City of Wilsonville's Primary Tapestry Segments

Tapestry Segment	Percent of Households		
	City of Wilsonville	United States	Prevalence Compared to US
Enterprising Professionals	65%	2%	34
Silver and Gold	19%	1%	19
Up and Coming Families	12%	4%	3
Urban Chic	4%	1%	3
Exurbanites	1%	3%	0
All others	0%	89%	NA

Source: ESRI, Leland Consulting Group.

Enterprising Professionals (65%)

- Young, educated, single, married, working professionals, residents of Enterprising Professionals neighborhoods have a median age of 33.2 years.
- Forty-three percent of the households are singles who live alone or share housing with roommates, and 43 percent are married couple families.
- With an annual household growth of 1.95 percent per year since 2000, the households in this segment comprise approximately two percent of total U.S. households.
- Enterprising Professionals residents move frequently to find growth opportunities and better jobs, especially in cities such as Chicago, Atlanta, and Seattle.
- Forty-six percent of the households are located in the South, 29 percent are in the West, and 20 percent are in the Midwest.
- They prefer to own instead of rent in newer neighborhoods of townhouses or apartments. The median home value is $239,007.
- For those who rent, the average gross rent is 36 percent higher than the U.S. average.

Silver and Gold (19%)

- With a median age of 61.3 years, Silver and Gold residents are the second oldest of the Tapestry segments.
- More than 70 percent are aged 55 years or older.
- Most residents have retired from professional occupations. Half of the households are composed of married couples without children.
- Residents of these neighborhoods are not ethnically diverse; 93 percent of them are Caucasian.
- One-fourth of this Tapestry segment is located in the West, mainly in California and Arizona. Neighborhoods are exclusive with a home ownership rate of 81 percent.
- The median home value is $290,103. Silver and Gold ranks second of the Tapestry segments for the percentage of seasonal housing owners.
- Because these seniors have moved to newer single-family homes, they are not living in the homes where they raised their children.

Up and Coming Families (12%)

- With an annual household growth rate of 1.69 percent, Up and Coming Families represents Tapestry's second highest household growth market.
- A mix of Generation Xers and Baby Boomers with a median age of 32.8 years, this segment is the youngest of Tapestry's affluent family markets.
- Residents of these neighborhoods are young, affluent families with younger children.
- Eighty percent of the households are families. Most of the residents are Caucasian; however, diversity is increasing as the segment grows.
- Most residents live in new single-family housing in the suburban outskirts of midsized metropolitan areas with populations higher than 250,000, with a median home value of $193,161. More than half the housing units were built in the last 10 years.
- Homeownership is at 80 percent.

Long-Term Demographic Trends

Two long-term demographic trends that are expected to have a significant impact on real estate demand at Frog Pond are described below. These are the aging of the Baby Boom generation, and the trend towards household diversity and decreasing household size.

Many other demographic trends are also affecting our communities today. For example, one is "Generation Y"—young Americans now in their 20s and early 30s. This is a large generation and is a major driver of the recent apartment market boom. However, over the 20-plus year build out of Frog Pond, the two trends identified above are expected to have the most significant impact.

Aging Baby Boomers

The figures below show the demographic trend that is variously called the aging of the Baby Boomers or the "silver tsunami," which is expected to have a significant impact on housing demand. As Baby Boomers (those born between 1946 and 1964) retire and begin to consider selling their homes and relocating within or beyond the metropolitan region, they are expected to have a major impact on housing markets, as they always have had throughout their lifespan. Many will be selling medium and large-size single-family homes and looking for smaller homes with lower maintenance and upkeep, and the freedom to "lock and leave" home to visit family and friends, and vacation elsewhere.

Figure 4 highlights several points. The population of Washington and Clackamas Counties for all age categories is growing between 2015 and 2035—the period during which Frog Pond is expected to build out—creating demand for housing that meets the needs of all of these groups. The 65+ population will grow by the largest amount. The effect of this growth will be even more pronounced since these are relatively small households and thus more housing units are needed to serve the same population. The population of the 35 to 64 age category, and their children, under 19, will also grow significantly. This group is likely to re-occupy many of the single-family homes now in the market area, and new homes in Frog Pond. The size of the 20 to 34 age group is not expected to increase much. This is because Generation Y / Millennials, now in their 20s and early 30s, make up a large age cohort, and the cohort behind them is expected to be smaller.

Figure 4. Forecasted Net Population Change by Age Group, 2015 to 2035

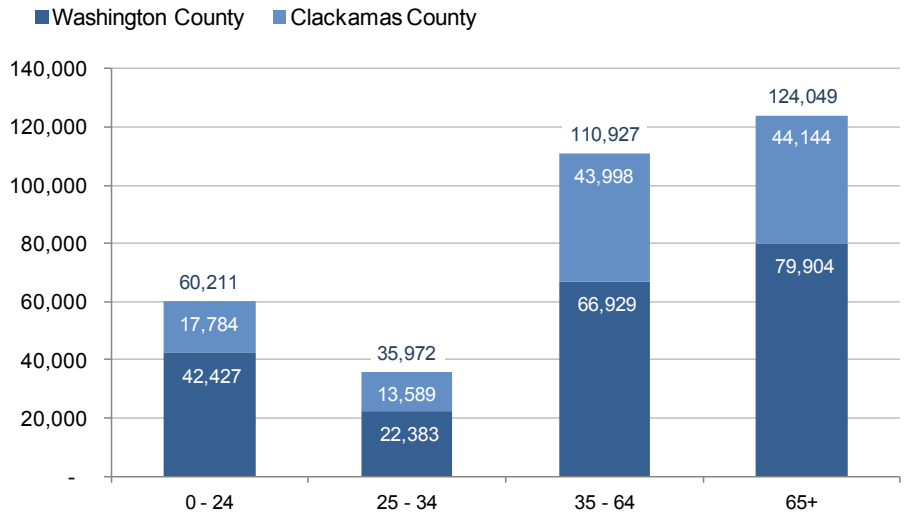
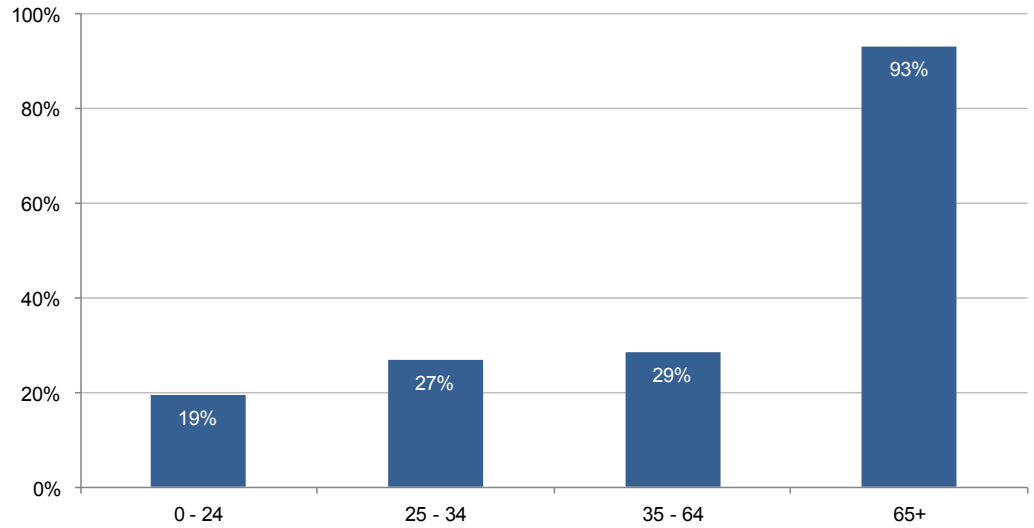


Figure 5 shows that, as a percentage of the current population, the growth in the 65+ age group will be far, far greater than growth in other age groups. While the numerical increase (shown in Figure 4) is only slightly greater than the increase in other population groups, the percent increase is far greater. Therefore, the impacts this age group will have on housing, healthcare, and other parts of society is likely to be greater. This local impact of the Baby Boom generation is consistent with the impact anticipated nationwide.

Figure 5. Forecasted Percent Population Increase by Age Group, 2015 to 2035

Washington and Clackamas Counties combined.



Source for both figures: Long-term Oregon State's County Population Forecast, 2010-2050, Office of Economic Analysis, State of Oregon, 2013; Leland Consulting Group.

Research on 65+ aged households tends to reach several broad conclusions. The following are some of the key findings from a Portland State University study on age-related housing demand shifts:[1]

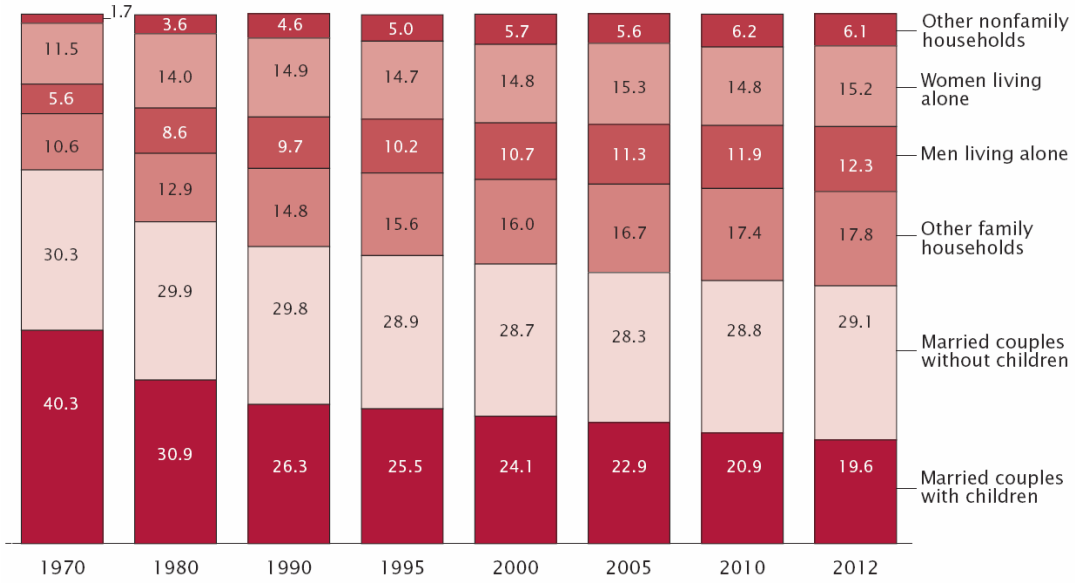
- "Middle-aged and older adults' clear preferences for suburban living must be acknowledged and plans developed to make suburban areas more pedestrian friendly and homes retrofitted or designed initially to better meet the needs of older adults."
- "With respect to features within the residence, there is a preference for a full bath and a bedroom on the main level as well as an entrance without steps."
- "When older householders do move, they are more likely to move into higher density housing than middle-age adults."
- "There are a number of indications… that baby boomers are more likely than younger adults to have a preference for more walkable locations, public transit, and higher density living."

[1] *Age-Related Shifts in Housing and Transportation Demand. A Multidisciplinary Study Conducted for Metro*, Portland State University, College of Urban and Public Affairs. 2006; excerpts from pages 1 and 44.

Increasing Household Diversity and Non-Traditional Households

When thinking about population growth, there can be a tendency to assume that this growth will be driven by "traditional" family households that consist of a married couple with children. However, as Figure 6 shows, this type of household has been becoming less prevalent over time, while most other "non-traditional" household types have increased as a share of the population over time. The other household types tend to be smaller than families with children, and tend to be open to a wider variety of housing types. One writer has identified four demographic "S groups" that have seen the highest rate of growth in recent decades and are expected to continue growing in the coming decades: seniors, singles, single-parent households, and starter households (e.g., the married couples without children shown below, and unmarried couples). This national trend is consistent with the Portland region: As shown in Table 2, the percentage of one-and two-person households is 68 percent in the City of Wilsonville, and 58 percent in the market area.

Figure 6. Households by Type as a Percent of All Households, United States, 1970 to 2012



Source: US Census Bureau.

Community Preferences

Real estate and home buying is all about "location, location, location"—in other words, the community, city, or neighborhood in which a given home is located. Since 2004, the National Association of Realtors (NAR) has conducted a nationwide poll to better understand what Americans are looking for in their future homes and communities. This is the most robust, widely-applicable survey instrument available to suggest how housing demand is evolving. One important focus of this poll is testing Americans' interest in the features of what are variously called "walkable communities," "complete communities," or "traditional neighborhood development." Such communities tend to be pedestrian friendly—parks, schools, shops and businesses are located within walking (and driving) distance of homes—and contain a range of different housing types where households of different ages and sizes can live—single-family homes, townhouses, and multifamily housing.

Figure 7 shows how people responded when asked, "Do you think there is too much, too little, or the right amount of each of the following in the area close to where you live?" Respondents most often felt that there are too few features such as safe routes for walking and biking, public transit, a diversity of housing, and shops and restaurants within an easy walk.

Figure 7. Which Neighborhood Amenities are in Demand?

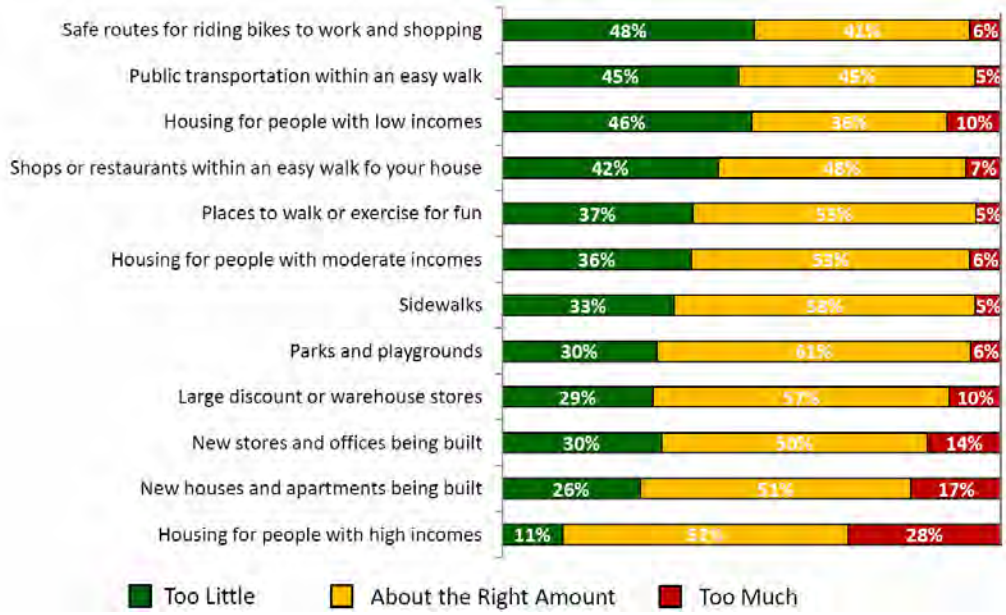
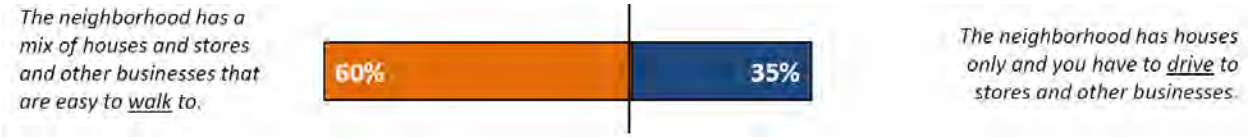


Figure 8 shows how people responded when asked to select the house where they would prefer to live when provided with two community options. By nearly a two-to-one margin, Americans prefer a neighborhood where they can walk to stores and businesses. The preference is significantly more pronounced among those who recently purchased a home or are currently in the market.

Figure 8. Community Preferences



Source, both figures: National Community Preference Survey, National Association of Realtors, October 2013.

The Urban Land Institute (ULI) is another organization that routinely evaluates home buyer and renter preferences. The ULI is a national professional association for developers, homebuilders, planners, and other land use professionals. Some key findings published by the ULI in the organization's *Residential Futures: Thought-Provoking Ideas on What's Next for Master-Planned Communities* (2012) are listed below. These are consistent with findings from Realtor's surveys and respond to the question, "What do buyers need in terms of housing and community?"

- Home buyers are, "looking for value (affordability), walkability, shopping, restaurants, services, good schools, and a sense of community."
- "Single-use zoning is out and mixed use is in, along with living close to services and jobs. The typical master planned community offering, including schools, parks, and pools, is still important, especially to first-time buyers. Couple that with a scarcity of resources, living near where you work and shop is in, long commutes are out."
- Home buyers "want safety, good schools, and proximity to employment, which usually entails less than a 30-minute commute. Financial security related to the home purchase means that the community is on stable ground and the builder is viable. Buyers want to feel that the housing value is permanent and appreciation is likely over time."

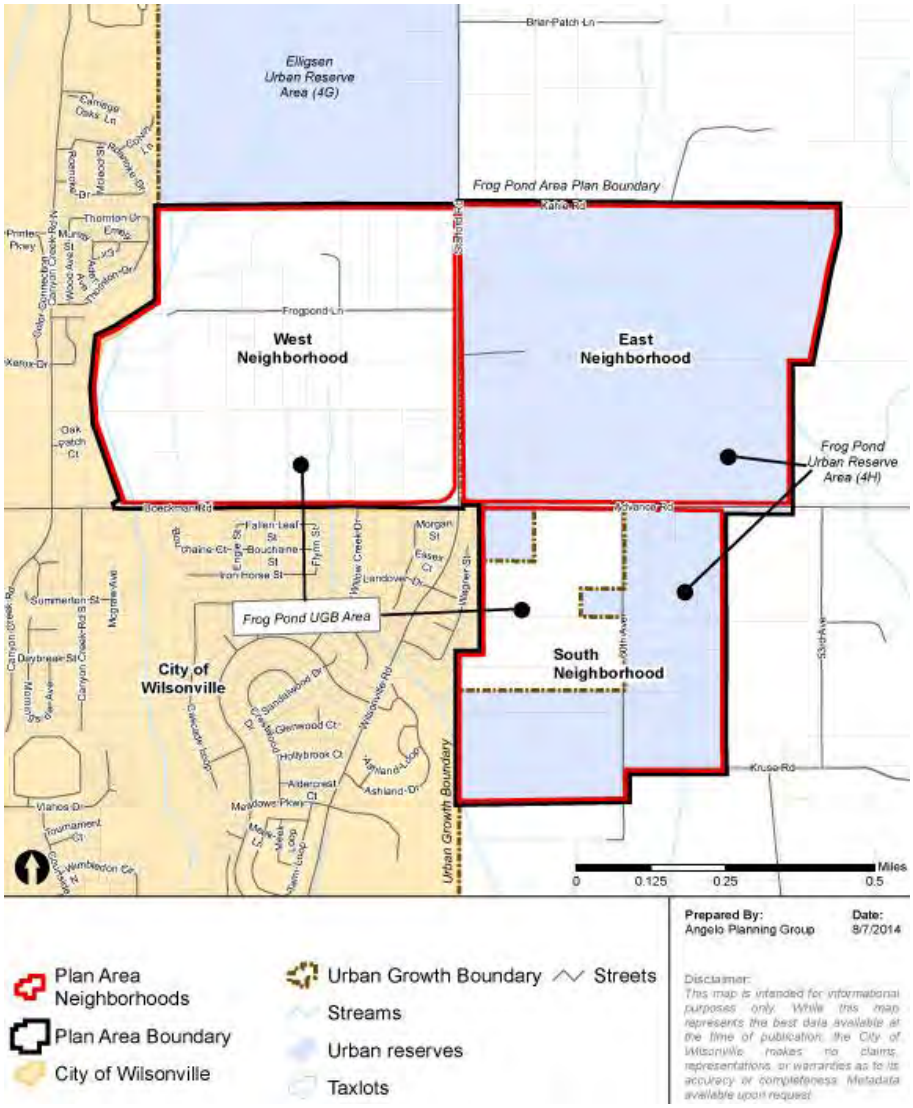
The Frog Pond Area

This market analysis addresses the Frog Pond Area (or "study area") as shown in Figure 9. In some sections of this report, the study area is divided into two parts: the West Neighborhood (or Frog Pond West), which is the land west of Stafford Road; and the East and South Neighborhoods, The entire Frog Pond Area is 495 gross acres. The City's 20-Year Look process has identified the entire Frog Pond Area as the top priority area for future residential development. Metro has supported this policy direction by designating the larger area as Urban Reserve 4H during its 2009 Urban Reserves designation process.

The West Neighborhood is 179.4 gross acres in size. It is currently located outside of the city's boundaries and inside the UGB. Because it is within the UGB, the West Neighborhood can be concept planned, annexed by the City, zoned, and then developed within the next few years. Developers and/or the City will also need to extend infrastructure to the area in advance of or concurrently with development. The intent of the City's current concept and master planning process is to set the stage for the near-term development of the West Neighborhood.

The Residential Land Study found that the development of the Frog Pond West Neighborhood is fundamental to the city's ability to accommodate future housing demand. In addition, based on discussions with Wilsonville's decision makers conducted during the Residential Land Study, and their desire to achieve a more balanced housing mix and the results of the housing needs analysis, the study recommends that Wilsonville plan for the Frog Pond West Neighborhood to be "developed predominantly with single-family detached housing." Specifically, the housing needs assessment modeling conducted for the Residential Land Study assumed that the housing would develop at densities between 5.0 and 8.5 dwelling units per gross acre in the West Neighborhood.

Figure 9. The Frog Pond Area



Source: City of Wilsonville, Angelo Planning Group.

The East and South Neighborhoods are larger—315.8 gross acres. With the exception of the future school property, both of these neighborhoods are currently outside both the city and UGB boundaries, but have been identified by the Metro regional government and the City as a residential Urban Reserve—an area that will be built out, primarily to accommodate housing growth, within the next 50 years. Because of the city's rapid and projected future population growth, Wilsonville may seek to bring the East and South Neighborhoods into the UGB sooner rather than later. For the purposes of this market analysis, LCG has assumed that development can begin in the East and South Neighborhoods in the year 2022; however, the actual date will depend on decisions made by the City of Wilsonville, Metro, and others.

The Residential Land Study concludes that Wilsonville may need residential land by 2032 or sooner, depending on the city's population growth rate in the coming decades. For this reason, the East and South Neighborhoods are being concept planned along with the West Neighborhood. Because of the Urban Reserve status, it is not a question of if the area will be built out with mainly housing, but when.

The Residential Land Study does not offer any specific density or land use recommendations for the East and South Neighborhoods.

Given the amount of time it takes to get a new area to be development-ready (i.e., brought into the UGB, planned, and services extended to the area), Wilsonville should begin discussions about bringing the East and South Neighborhoods into the UGB as part of the next cycle of UGB expansion discussions.

Key Features of the Frog Pond Area

The following are some of the key features of the study area that are most relevant to this market analysis and the future development of the area:

- **Natural areas,** including Boeckman Creek and various tree stands throughout. The area also benefits from views to ridgelines to the north and west. These natural features limit the amount of development that can take place, but can also be unique sources of identity, pride, and land value for the new community if they are properly integrated into the overall concept plan.

- **Schools.** The West Linn-Wilsonville School District currently owns properties in Frog Pond and is planning to build two schools there, a primary school and a middle school. The City will be building a 10-acre community park adjacent to these schools. These schools, along with the high quality of the School District, will increase the desirability of the future community, particularly for families. The concept plan should carefully consider how "safe routes to school" can be designed throughout the community. In addition to its South Neighborhood properties, the School District also owns several parcels in the West Neighborhood, but has not announced specific plans for these properties, which could be retained and developed by the School District, or sold.

- **The City of Wilsonville** has a good reputation in the marketplace for high-quality communities and development. Villebois' carefully integrated parks, homes, schools, and public realm distinguish it from almost all other suburban residential communities in the Portland region.

- **Proximity to jobs.** Wilsonville is known for the significant number of jobs within the city, as well as its accessibility to most Portland metro area employment centers and Salem. The planning area is also within a half-mile of the Mentor Graphics headquarters, Xerox, and other white collar offices, which will drive interest in Frog Pond.

- **Proximity to services and shopping.** The subject area is approximately two miles from the Wilsonville Town Center, and 2.5 miles from the Argyle Square regional shopping center at Elligsen Road. Both commercial centers offer a wide variety of goods and services.

- **Transportation access.** Advance Road/Boeckman Road bisects the area running east to west, and Stafford Road/Wilsonville Road bisects the area running north to south. Both roads currently carry about 5,000 cars per day and are significant transportation routes for travelers going to and from Wilsonville. Certain land uses, including retail, office/commercial, and apartments, benefit from higher exposure, and any such uses should be located near these main roads. The roads will carry more traffic in the future as development increases. SMART bus service connects the subject area to the Town Center and to the WES commuter train station.

- **Property ownership.** Assuming that one desired outcome of the concept plan is the establishment of a cohesive, integrated plan that knits the entire study area together and results in a whole greater than its parts, the fragmented property ownership is likely to present some challenges. Fragmented property ownership can prevent key gateway properties from being developed, empower hold-out owners to demand above-market land prices, and limit the potential for area-wide solutions to issues such as storm water management and transportation.

Buildable Land in the Frog Pond Area

The City of Wilsonville conducted a buildable lands inventory in order to better understand what parts of the study area are likely to remain in natural or undeveloped conditions, become infrastructure such as roads, or be buildable land where new residential and commercial development could take place. A summary of that inventory is shown in Table 5 below. The key figures used in this analysis are the gross buildable area (318 acres) and net buildable area (243 acres) shown at the bottom of the table. The new buildable area is the amount of land on which LCG expects that residential or commercial development can take place.

Table 5. Buildable Land Inventory

Land Category	Frog Pond Neighborhood (Acres)		
	West	East & South	Total
Total Area	**179**	**316**	**495**
Unbuildable			
Committed [a]	12	90	102
Unbuildable (stream corridor/ adjacent wetland / adjacent riparian buffer/ >25% slope)	24	37	61
Buildable but challenging			
Acreage of all non-significant wetlands	18	5	23
20% of the total acreage of non-significant wetlands [b]	4	1	5
Subtotal [c]	54	124	177
Gross Buildable (Total acreage less unbuildable)	**126**	**192**	**318**
Infrastructure and Amenities			
Internal Roads [d]	23	35	57
Stormwater Management	5	3	8
Parks [e]	5	5	10
Subtotal	33	42	75
Net Buildable			
Retail/Commercial	2	5	7
Residential	91	145	236
Net Buildable	**93**	**150**	**243**

Source: City of Wilsonville, Leland Consulting Group. Notes: a: Committed land includes the BPA easement, residential developments valued greater than $160,000, land held for planned schools and parks, the church property, and the Grange hall. b: This line lists the 20 percent of the land that is unbuildable due to constraints of wetland fill permitting. This is an assumption, to acknowledge the challenge of permitting and possible mitigation of potentially jurisdictional wetlands. c: Some areas of land are categorized in more than one "unbuildable" category. The Subtotal, therefore, is the amount of land classified as "unbuildable" for any reason. d: LCG estimate. e: Land that will be used for the Urban Growth Area community park is included in the "Committed" land above.

Housing Market Analysis

Residential Land Study Findings and Recommendations

Wilsonville's Residential Land Study was adopted in May 2014 and provides a framework for this market analysis, due to its extensive analysis of Wilsonville's household types, demographics, current and future housing, and other information. The Residential Land Study provides the following information that guides this market analysis:

- The types of housing that will be in demand, both citywide and in the study area; and
- Conceptual housing development targets that can be used as a starting point for planning in the study area.

Some of the Residential Land Study's key findings and recommendations that are relevant to the study area are summarized below.

Planning for balance. Wilsonville is planning for a complete, balanced community. The Wilsonville Comprehensive Plan includes a balanced portfolio of different housing types that are well-designed and will be developed across the community to serve different people at different points in their lives.

Future housing demand. The Residential Lands Study projects that the following housing will be needed in the Wilsonville planning area between 2014 and 2034 period. The projection is based on Metro's population growth forecasts as well as other assumptions. While the forecast for Wilsonville shows a need for all types of housing, the Study concludes that the supply of land available for multifamily development is sufficient. To balance the city's housing supply, the Study recommends planning for predominantly single-family housing in the Frog Pond Area.

Table 6. Forecast of Needed Housing Units by Mix and Density, Wilsonville, 2014 to 2034

Housing Type	Needed New Housing Units (2014 - 2034)	
	Number of new new dwellings	Percent of new dwellings
Single Family Detached	1,875	50%
Single Family Attached	375	10%
Multifamily	1,499	40%
Total	3,749	100%
Annual Average	187	

Source: Wilsonville Residential Lands Study, American Community Survey.

The complete Residential Land Study, background technical reports, and associated public records, can be found online at http://or-wilsonville.civicplus.com/335/2014-Residential-Land-Study.

Housing Types

In order to illustrate potential development scenarios within the Frog Pond Area, this market analysis uses five different housing types, as shown in Table 7 below. These are broad categories, and there can be significant variation in home design, layout, site size, and other factors within these types. These housing types are key parts of the "palette" with which stakeholders can paint the Frog Pond Area during later phases of the Concept Plan process. These housing types are based on housing recently built in Wilsonville, housing proposed for other comparable new development areas, and the definitions used in the Residential Land Study.

Table 7. Housing Types

Housing Type	Lot Size			Net
	Low	Average	High	Density
Large Lot Single Family	6,000	**7,500**	8,500	6.0
Medium Lot Single Family	4,000	**5,000**	6,000	7.5
Small Lot Single Family	2,500	**3,500**	4,000	11.0
Attached Single Family: Townhomes and Duplexes	1,000	**2,250**	2,500	16.0
Multifamily: Apts, Condos, and Senior Housing	NA	**NA**	NA	25.0

Large Lot Single-Family

Medium Lot Single-Family

Small Lot Single-Family

Single-Family Attached

Multifamily

The major change from the types defined by the Residential Land Study is that three different types of single-family detached housing are used here rather than one, in order to provide a more nuanced view of housing demand and on-the-ground development.

The housing densities shown in Table 7 and used elsewhere in this report are *net* densities: the number of units that are located on a given area of *net buildable land*. As shown in Table 5, net buildable land is the amount of land available after deductions have been made for natural areas, slopes, public and private roads, parks, and stormwater retention has been deducted from the *gross area*. Buildable land can also be defined as the parcel upon which residential dwellings are constructed, including any open space (e.g., yard) provided on that parcel. The definitions used here are consistent with the Oregon Administrative Rules and the Residential Land Study.

Residential Density in Wilsonville

Table 8 and Table 9 below show excerpts from the Residential Land Study that document the density of recent (2000 to 2012) residential development in Wilsonville. This analysis is useful because it provides Frog Pond Concept Plan stakeholders with a range of built examples of residential density that can be compared to the Frog Pond development scenarios presented later in this report. Table 8 shows the densities of different housing types, while Table 9 shows the densities within different plan (Comprehensive Plan and Zoning) designations.

The analysis shows a range of potential residential densities. Unsurprisingly, the lowest density housing type built in Wilsonville between 2000 and 2012 were single-family homes, with a density of 7.6 dwelling units per net acre; the net density of multifamily housing is 18.5. The weighted average (total) net density for these two housing types combined is 12.4. Table 9 shows that, across all housing types built within residential zones in the city between 2000 and 2012, the density is 10.8 dwelling units per net acre. In village-designated areas (Villebois), the density is 18.0 dwelling units per net acre.

Table 8. Residential Development Density by Housing Type, Wilsonville, 2000 to 2012

Housing Type	Net Density
Single Family	7.6
Multifamily	18.5
Total	12.4

Source: Wilsonville Residential Land Study, adapted from Table 3-5, May 2014.

Table 9. Residential Development Density by Plan Designation, Wilsonville, 2000 to 2012

Plan Designation	Net Density
Residential	10.8
Village (Villebois)	18.0

Source: Wilsonville Residential Land Study, adapted from Table 3-4, May 2014.

Recent Housing Permits in Wilsonville

In order to inform this market analysis and potential development programs for Frog Pond, LCG reviewed residential permits issued by the City of Wilsonville between 2000 and 2012, the same time period that was evaluated for the Residential Land Study. The summary results of this analysis are shown in the two tables below. Table 10 shows data for permits granted citywide between 2000 and 2012. Table 11 shows permits granted in Villebois during the same time period. Villebois is shown since it is a currently-developing "greenfield" community that is similar in size to Frog Pond, and therefore is likely to be comparable in some ways.

It is important to make several notes about this data in order to understand its applicability to Frog Pond. Past permitting may or may not be a good predictor of future housing demand. The data is likely to reflect some conditions that may or may not be in place at Frog Pond. For example, zoning and lot sizes citywide and in Villebois may or may not be similar to those imposed at Frog Pond. In addition, economic and demographic conditions such as the great recession and the rapid entry of Generation Y into the housing market may create distortions in this data which will not be replicated in the future. Nevertheless, this data can inform planning for Frog Pond.

Several trends emerge from this analysis. First, there have been more permits issued for multifamily housing than any of the other housing types; this is true both citywide and in Villebois. Second, a large share of permitting at Villebois has been within the small lot single-family housing type. This is likely due to a combination of factors, including market demand and the size of lots available to builders, defined by the Villebois Village Concept Plan and subsequent documents.

Table 10. City of Wilsonville Residential Permits, 2000 to 2012

Housing Type	Total Permits	
	Number	Percent
Large Lot Single Family	260	9%
Medium Lot Single Family	298	10%
Small Lot Single Family	356	12%
Attached Single Family	56	2%
Multifamily	1,892	66%
Total	**2,862**	**100%**

Source: City of Wilsonville permit database, Leland Consulting Group.

Table 11. Villebois Permits, 2000 to 2012

Housing Type	Total Permits	
	Number	Percent
Large Lot Single Family	74	8%
Medium Lot Single Family	75	8%
Small Lot Single Family	309	35%
Attached Single Family	56	6%
Multifamily	380	43%
Total	**894**	**100%**

Source: City of Wilsonville permit database, Leland Consulting Group.

Third, attached single-family homes made up a higher share of permitting in Villebois than the city as a whole. Finally, large and medium lot single-family housing both made up a similar and modest share of all permitting citywide and in Villebois.

Housing Demand Summary

Based on the review of local, regional, and national demographics trends, the Residential Land Study, emerging community preferences, and other factors, LCG has used the following principles in creating a series of development scenarios for Frog Pond:

- **General housing preferences.** Across all household types, there is a general preference for detached single-family homes and for walkable communities in which goods, services, amenities, and community meeting places are within easy walking, biking, or driving distance. People's ideal housing preferences are typically moderated by their home buying budget, location of work, school and relatives, and other factors.

- **Housing diversity.** Housing mix and diversity is important in a large area such as Frog Pond. LCG recommends that a range of housing types be included in the Frog Pond concept planning, since there is a correspondingly wide range of households—old and young, large and small. A large area should be appeal to a wide variety of households. This will speed sales and thus the financial viability of the area.

- **Flexibility.** Flexibility is important to developers. Future Comprehensive Plan and Zoning regulation should ideally allow flexibility in Frog Pond, since housing demand in 2035 is by nature difficult to predict, and developers will want some ability to adjust to changes in demand.

- **65+ households.** The greatest amount of household growth in Washington and Clackamas Counties, and other relevant geographical regions is expected to come from households aged 65 and older. This is a dramatic shift from past demographic patterns. Age 65 and older households who move will likely demand a mix of housing, but will tend towards homes that are lower maintenance, somewhat higher density, and have many amenities close by. Many in this age group will still desire detached single-family homes, though others will be interested in attached and multifamily housing.

- **Families with children.** There will also be significant household growth in the 35 to 65 age cohort. Within this broad cohort, married couples with children ("traditional households") are expected to tend to seek single-family detached housing, within a variety of lot sizes.

- **Non-traditional households**—including singles, single-parent, and married couple households without children—have grown consistently and dramatically since the 1970s and are expected to continue to grow. These tend to be one and two-person households, and LCG expects that they will exhibit a broad range of housing preferences, across detached and attached single-family and multifamily housing types. Because of their smaller size, they will tend to seek medium and smaller size homes.

- **Policy.** The Residential Land Study recommends that the Frog Pond West Neighborhood be "developed predominantly with single-family detached housing." However, it also recognizes that this Concept Plan process will ultimately determine the set of land uses at Frog Pond, and it does not set specific expectations for the East and South Neighborhoods.

- **Compatibility.** Housing in Frog Pond should be somewhat compatible with the densities and housing types that have been historically developed in Wilsonville's neighborhoods.

Based on these principles, Table 12 below summarizes LCG's high level forecast of likely housing demand in the Frog Pond Area during the next two decades.

The level of demand within each housing type is reflected by the length of the blue bars at right—the longer the bar, the greater the demand. This reflects a general, high level assessment of demand; the specific quantitative implications (i.e., the number of units likely to be built) are discussed in the following pages.

Table 12. Housing Demand Summary

Housing Type		Household Type			
	Lot Size Average	Boomers	Familes with Children	Couples, Single Parents, Non Family HHs	**Combined All Households**
Large Lot Single Family	7,500				
Medium Lot Single Family	5,000				
Small Lot Single Family	3,500				
Attached Single Family: Townhomes & Duplexes	2,250				
Multifamily: Apts, Condos, and Senior Housing	NA				

Source: Leland Consulting Group.

Housing Development Scenarios

Two housing development programs, or scenarios, for both the West Neighborhood, and the East and South Neighborhoods combined, are shown below, along with a brief summary of the rationale behind each. These housing scenarios will be used by the Frog Pond team—including the City, Angelo Planning Group, and the public—to inform Concept Plan (physical design) alternatives for the area. The scenarios may also be used to test the capacity of transportation, sewer, and water infrastructure, and for other elements of the Concept Plan process. LCG expects that they may be revised later in the planning process.

There is no single correct housing program for Frog Pond. Rather, there are multiple ways that housing at Frog Pond can meet the demand for housing that will be expressed by a variety of different household types that will consider moving to the area in the coming decades. Communities such as Villebois, Charbonneau, and Wilsonville's other neighborhoods each represent a somewhat different approach to appealing to potential residents.

West Neighborhood

The two tables below show Development Scenarios 1 and 2 for the Frog Pond West Neighborhood.

Scenario 1 is approximately the same density (7.7 dwelling units per net acre) as the average density of all single-family housing built in Wilsonville between 2000 and 2012 (see page 25). Ninety-four percent of the housing is single-family detached, which meets the Residential Land Study policy guidance. Nearly 60 percent of all housing is medium lot single-family, with lots between 4,000 and 6,000 square feet, which can be considered a "standard" residential lot. One drawback of this scenario is that the density may be too low to generate the revenues (through lot sales and systems development charges) necessary to build the highquality infrastructure expected in a complete, walkable community.

Scenario 2 has more housing diversity and is slightly denser. The overall density (10.6 dwelling units per net acre) is similar to all housing (including single and multifamily) built in residential-designated land in Wilsonville between 2000 and 2012 (see page 25). Sixty-nine percent of all housing is single-family detached, which should meet the intent of the Residential Land Study policy guidance. This scenario is more likely to achieve the principles of housing diversity and fostering a walkable community than Scenario 1. It is also more likely to meet the housing needs of 65+ and non-traditional households through the provision of more small lot single-family homes, as well as a greater share of attached and multifamily homes. This scenario would likely accommodate a single market rate or age-restricted multifamily project, which tend to start at about 150 units in size.

Table 13. West Neighborhood: Development Scenario 1

Housing Type	Lot Size	Net	Units		Net Acres	
	Average	Density	#	%	#	%
Large Lot Single Family	7,500	6.0	155	22%	25	28%
Medium Lot Single Family	5,000	7.5	410	59%	55	60%
Small Lot Single Family	3,500	11.0	90	13%	8	9%
Attached Single Family	2,250	16.0	45	6%	3	3%
Multifamily	NA	25.0	-	0%	-	0%
Total			700	100%	**91**	100%
Average		**7.7**				

Table 14. West Neighborhood: Development Scenario 2

Housing Type	Lot Size	Net	Units		Net Acres	
	Average	Density	#	%	#	%
Large Lot Single Family	7,500	6.0	65	7%	11	12%
Medium Lot Single Family	5,000	7.5	245	25%	33	36%
Small Lot Single Family	3,500	11.0	360	37%	33	36%
Attached Single Family	2,250	16.0	115	12%	7	8%
Multifamily	NA	25.0	180	19%	7	8%
Total			965	100%	**91**	100%
Average		**10.6**				

Source: Leland Consulting Group.

East and South Neighborhoods

The two tables below show Development Scenarios 1 and 2 for the Frog Pond East and South Neighborhoods.

Scenario 1 is approximately the same density (10.5 dwelling units per net acre) as all housing (including single and multifamily) built in residential-designated land in Wilsonville between 2000 and 2012 (see page 25). The majority (72 percent) of all housing is single-family detached, which is likely to be consistent and compatible with the Residential Land Study policy guidance for Frog Pond West. This scenario also provides some housing diversity and will meet the demands of some 65+ and non-traditional households through the provision of small lot single-family, single-family attached, and multifamily homes. By providing a significant share of these more compact housing types, this scenario should be able to foster a walkable community.

Scenario 2 is similar in terms of density (12.0 dwelling units per net acre) as all housing (including single and multifamily) built in Wilsonville between 2000 and 2012; this includes housing built in residential-designated land and in village-designated (Villebois) land. A majority (63 percent) of all housing is single-family detached, which is likely to be consistent and compatible with the Residential Land Study policy guidance for Frog Pond West. This scenario also provides more housing diversity than Scenario 1, which will meet the demands of some 65+ and non-traditional households through the provision of small lot single-family, single-family attached, and multifamily homes. This significant number of more compact housing types could be clustered in the center of the neighborhood around shops and open space in order to create a small retail and social hub for Frog Pond, putting more services within walking distance. This scenario would likely accommodate several market rate or age-restricted multifamily projects, which tend to start at about 150 units in size.

Table 15. East and South Neighborhoods: Development Scenario 1

Housing Type	Lot Size	Net	Units		Net Acres	
	Average	Density	#	%	#	%
Large Lot Single Family	7,500	6.0	45	3%	7	5%
Medium Lot Single Family	5,000	7.5	435	29%	58	40%
Small Lot Single Family	3,500	11.0	620	41%	57	39%
Attached Single Family	2,250	16.0	280	18%	17	12%
Multifamily	NA	25.0	145	10%	6	4%
Total			1,525	100%	**145**	100%
Average		**10.5**				

Table 16. East and South Neighborhoods: Development Scenario 2

Housing Type	Lot Size	Net	Units		Net Acres	
	Average	Density	#	%	#	%
Large Lot Single Family	7,500	6.0	35	2%	6	4%
Medium Lot Single Family	5,000	7.5	360	21%	48	33%
Small Lot Single Family	3,500	11.0	700	40%	64	44%
Attached Single Family	2,250	16.0	280	16%	17	12%
Multifamily	NA	25.0	365	21%	15	10%
Total			1,740	100%	**145**	103%
Average		**12.0**				

Source: Leland Consulting Group.

Frog Pond Area: All Neighborhoods Combined

Table 17 shows the results of combining the scenarios for both areas. The total number of housing units likely to be built in the area ranges from about 2,200 to 2,700.

Table 17. Development Scenarios for Entire Frog Pond Area

Housing Type	UGB Area		Urban Reserve		Entire Study Area	
	Low 1	High 2	Low 1	High 2	Low	High
Large Lot Single Family	155	65	45	35	200	100
Medium Lot Single Family	410	245	435	360	845	605
Small Lot Single Family	90	360	620	700	710	1,060
Attached Single Family	45	115	280	280	325	395
Multifamily	-	180	145	365	145	545
Total	**700**	**965**	**1,525**	**1,740**	**2,225**	**2,705**

Source: Leland Consulting Group.

A combination of these scenarios, or a variation on them, could be implemented. During this Concept Plan process, a preferred scenario should be selected based on this market analysis, the land planning process, input from the public and other stakeholders, transportation and infrastructure analysis, and other factors.

Absorption

Housing absorption—the rate of housing construction and sales—at Frog Pond will depend on a number of factors, including the actual rate of population and household growth in the metropolitan and market areas, economic conditions, when the areas are served with infrastructure and available for development, and the sales pace at Villebois, which will both complement and compete with Frog Pond.

Because of these variables, LCG created two different absorption forecasts, a “goal” or aggressive forecast, and a conservative forecast as shown in Table 18 below. The goal reflects developers’ and potentially the City’s desire for relatively quick absorption, and a build out of between nine and 13 years for the West Neighborhood, and 15 to 17 years for the East and South Neighborhoods. This goal forecast is only achievable if Wilsonville’s population and households continues to grow at the same pace as the city grew

during the 2000 to 2012 period (2.8 percent per year). If the city grows at the slower rate projected by Metro (1.8 percent per year), the conservative absorption rate is more likely.

Table 18. Frog Pond Absorption Forecasts

Neighborhood	Dwelling Units		Goal		Conservative	
	Scenario 1	Scenario 2	Absorption	Years to Buildout	Absorption	Years to Buildout
West	700	965	75	9 to 13	60	12 to 16
East and South	1,525	1,740	100	15 to 17	60	25 to 29
Total	**2,225**	**2,705**	**175**		**120**	

At peak development levels, when the West, East, and South Neighborhoods are developing and selling at the same time, LCG projects that annual absorption will be between 120 and 175 units per year. For purposes of comparison, about 125 homes were sold at Villebois in 2013, and there should be well over 200 sold at Villebois in 2014. However, the sales rate during the recession was much slower, generally between 40 and 80 units per year.

Assuming that the East and South Neighborhoods are available for development in 2022, the peak development and sales period for Frog Pond would take place between 2022 and 2032. Assuming that development begins in the West Neighborhood in 2017, it will be fully developed by about 2032.

Absorption is important for several reasons. A faster build out increases developers' return on investment, land values, and the systems development charges and other public revenues that help to fund infrastructure.

Retail Market Analysis

Figure 10 shows the Frog Pond Area and the key retail/commercial nodes that are located nearby. The commercial cluster to the north at the Elligsen Road interchange is anchored by Target and Costco; the cluster to the south includes retail centers on both sides of I-5 around Wilsonville Road, and includes anchor retailers such as Fred Meyer and Albertsons. One benefit that both of these clusters have over Frog Pond is the very high traffic, visibility, and access that comes with their location near I-5, and along major high volume arterial roads.

Figure 10. Frog Pond Retail Context

Source: Leland Consulting Group.

Retail at Frog Pond will need to consider these other retail centers, and establish an effective role and niche in order to compete effectively.

Frog Pond's location at the "crossroads" of Wilsonville/Stafford and Boeckman/Advance Roads is positive for potential retail, since retailers depend on visibility and accessibility to customers. "Interior" retail locations such as the retails centers at Villebois and Charbonneau can struggle due to lower levels of drive-by traffic, visibility, and access. Average daily traffic (ADT) levels of about 5,000 on the two arterials are shown on Figure 10. These are too low today to attract retail development, however, they will increase in the future as housing development takes place and the region grows and they reflect significant pass through traffic already. The City's Transportation System Plan forecasts that ADT on these two roads will approximately double in the next 20 years.

Figure 10 also shows the primary retail market area, within the dashed white line. This includes the Frog Pond study area, as well as some built out residential areas to the northwest, west, and southwest. There are currently about 1,150 households living in these existing neighborhoods, and these households are the most likely potential shoppers in addition to those living in Frog Pond proper.

Taking into account this existing stock of about 1,150 households and the approximately 2,500 new households likely to ultimately reside at Frog Pond, there will be about 3,650 households in the primary market area at full project build out in 2035. Retail spending from these households could be supplemented by drive-by shoppers, and by employees who work to the west. However, these secondary markets (drive-by and employees) are already well served by retail to the north and south, and close to those centers.

Types of Retail Centers

Retail is typically built in a series of standard formats, and while these vary somewhat, they maintain general consistency in terms of anchor tenants, size (square footage), trade area, and other features. Several types of retail centers are summarized below. A corner store, convenience center, or neighborhood center are the most appropriate types of retail for Frog Pond. The 3,650 households projected in the primary market area at Frog Pond suggests that a convenience center would likely be feasible, and a grocery-anchored neighborhood center would be a stretch. While neighborhood centers often have a two-mile trade area, such a large trade area is unlikely in this case given the competitive retailers nearby to the north and south.

Table 19. Types of Retail Centers

Retail Center Type	Gross Retail Area	Dwellings Necessary To Support	Average Trade Area	Anchor Tenants
Corner Store	1,500 - 3,000	1,000	Neighborhood	Corner store
Convenience Center	10,000 - 30,000	2,000	1 mile radius	Specialty food or pharmacy
Neighborhood Center	60,000 - 90,000	6 - 8,000	2 mile radius	Supermarket and pharmacy
Community Center	100,000 - 400,000	20,000+	5 mile radius	Junior department store

Sources: Urban Land Institute, Leland Consulting Group.

Corner stores and convenience centers may not be as desirable as a full neighborhood center. They often do not create the same sense of place or have the same quality of design as a neighborhood center, and they do not fulfill the full range of daily needs, particularly in terms of food.
Larger regional and lifestyle center information is not shown, since those center types already exist at large freeway interchanges to the north and south and require very high volume transportation infrastructure, and are therefore not appropriate for Frog Pond.

Retail Demand

Retail demand was evaluated for two different future years and is shown in the two tables below. Table 20 shows retail demand in 2025, when the Frog Pond Area will be about halfway to full build out. In 2025, a typical grocery-anchored neighborhood center could not be supported. A typical grocery store is between 40,000 and 60,000 square feet, and this model shows support for only 27,200 square feet. A grocery is the anchor tenant for neighborhood centers, and developers will not build the rest of the center if the anchor is not feasible.

Table 20. Retail Demand and Supportable Retail Area: 2025

Retail Type	Future Demand (Retail Potential) $ million	Current Supply (Retail Sales) $ million	Spending Gap $ million	Sales PSF	Capture Rate	Net New Demand Square feet
Furniture & Home Furnishings Stores	$1.6	$0.2	$1.4	$275	10%	500
Electronics & Appliance Stores	$2.1	$1.2	$0.9	$325	10%	300
Bldg Materials, Garden Equip. & Supply Stores	$2.2	-	$2.2	$325	10%	700
Grocery Stores / Food and Beverage	$13.7	-	$13.7	$400	80%	27,200
Health & Personal Care Stores	$3.9	-	$3.9	$350	15%	1,650
Gasoline Stations	$6.7	-	$6.7	$1,200	10%	600
Clothing & Clothing Accessories Stores	$4.4	$0.2	$4.2	$300	10%	1,400
Sporting Goods, Hobby, Book & Music Stores	$2.0	$0.1	$1.9	$275	10%	700
General Merchandise Stores	$13.5	-	$13.5	$275	10%	4,900
Miscellaneous Store Retailers	$2.5	0.53	$1.9	$225	20%	1,800
Food Services & Drinking Places	$8.2	$1.2	$7.0	$325	20%	4,400
Total						**44,150**

Sources: ESRI Business Analyst, Leland Consulting Group.

Table 21 shows retail demand in 2035, when the Frog Pond Area is expected to be near completion.

Table 21. Retail Demand and Supportable Retail Area: 2035

Retail Type	Future Demand (Retail Potential) $ million	Current Supply (Retail Sales) $ million	Spending Gap $ million	Sales PSF	Capture Rate	Net New Demand Square feet
Furniture & Home Furnishings Stores	$2.5	$0.2	$2.3	$275	10%	800
Electronics & Appliance Stores	$3.2	$1.2	$2.0	$325	10%	600
Bldg Materials, Garden Equip. & Supply Stores	$3.4	-	$3.4	$325	10%	1,000
Grocery Stores / Food and Beverage	$21.0	-	$21.0	$400	80%	42,400
Health & Personal Care Stores	$6.1	-	$6.1	$350	15%	2,550
Gasoline Stations	$10.4	-	$10.4	$1,200	10%	900
Clothing & Clothing Accessories Stores	$6.8	$0.2	$6.6	$300	10%	2,200
Sporting Goods, Hobby, Book & Music Stores	$3.1	$0.1	$3.0	$275	10%	1,100
General Merchandise Stores	$20.8	-	$20.8	$275	10%	7,600
Miscellaneous Store Retailers	$3.8	0.53	$3.3	$225	20%	3,000
Food Services & Drinking Places	$12.6	$1.2	$11.4	$325	20%	7,000
Total						**69,150**

Sources: ESRI Business Analyst, Leland Consulting Group.

In 2035, a typical grocery-anchored neighborhood center is *potentially* feasibly. The anchor grocery store is closer to feasibility, and the total square footage in demand is within the typical range of neighborhood centers shown in Table 19. This level of demand is close to the point at which retail developers, in many years, would likely conduct a closer and more detailed feasibility analysis that takes into account the strength of the competitive retail centers, household demographics, traffic patterns, potential tenants, and other factors at that time. Retail is a dynamic type of development, and formats can change significantly over a decade. For example, large stores selling videos, compact discs, and books were commonplace in neighborhood retail centers a decade ago; now they have all but disappeared; photo developers and travel agencies are also rare today.

Retail feasibility will depend on what if any retail is developed in other locations. For example, a new retail center located to the west of the Frog Pond Area on Boeckman Road would absorb demand from Frog Pond and potentially preclude new development in the study area. This analysis assumes that no new retail is built within a one-mile radius of the Boeckman and Wilsonville Road intersection.

Retailer developers may decide to wait until after 2035 to build significant retail, when additional Urban Reserve Areas such as the Elligsen Urban Reserve Area to the north may enter the UGB. Finally, buildable land will be necessary to accommodate new retail development.

Retail development in edge locations such as Frog Pond is challenging and requires the right mix of pass-by traffic and visibility, a dearth of strong competition in the primary market area, and adequate population. This also underscores the adage that “retail follows rooftops” and gets developed only when there is sufficient housing to support it.

Retail as Place Making

While it is often difficult to attract retail to new communities on the edge of metropolitan regions, retail often helps to achieve the goal of building a “complete community” where residents can easily meet their daily needs on foot or by car. Such local-serving retail also provides a social hub and

community-building function, and drives faster housing sales since this is seen as a top amenity by many prospective residents (see Community Preferences on page 17).

There are few good examples of successful, small-scale, local-serving retail in suburban locations. One example is at NorthWest Crossing, a master planned community on edge of the Bend metro area. Northwest Crossing contains about 35,000 square feet of retail, and though the space has for some periods had high vacancy rates, it provides a strong sense of place, and both a gateway and center for the community. The Northwest Crossing retail area is pictured below hosting a farmers market.

Appendices

Selected References

- *Age-Related Shifts in Housing and Transportation Demand. A Multidisciplinary Study Conducted for Metro,* Portland State University, College of Urban and Public Affairs. 2006; excerpts from pages 1 and 44.
- *America in 2013: A ULI Survey of Views on Housing, Transportation and Community*, Urban Land Institute, 2013.
- *America's Families and Living Arrangements: 2012 - Population Characteristics*, United States Census Bureau, August 2013, http://www.census.gov/prod/2013pubs/p20-570.pdf.
- *Changing American Households,* United States Census Bureau, November 2011.
- *Long-term Oregon State's County Population Forecast, 2010-2050,* and other documents and data, Office of Economic Analysis, State of Oregon, 2013, http://www.oregon.gov/DAS/OEA/Pages/index.aspx.
- Metroscope Gamma Forecasts, Metro regional government, published 7 February 2013, http://www.oregonmetro.gov/regional-2035-forecast-distribution.
- *National Community Preference Survey*, National Association of Realtors, October 2013.
- *Residential Futures: Thought-Provoking Ideas on What's Next for Master-Planned Communities*, Urban Land Institute, 2012, http://uli.org/wp-content/uploads/ULI-Documents/resident_futures_web_F.pdf.
- *Wilsonville Residential Land Study* and *Wilsonville Residential Land Study Technical Report,* City of Wilsonville and ECONorthwest, Adopted May 2014.
- *What Americans Really Want*, Arthur C. Nelson, Metropolitan Research Center, 2011.

Wilsonville Demographic Tapestry Segments

As shown in Table 22 below, the City of Wilsonville is dominated by three main tapestry segments—Enterprising Professionals, Silver and Gold, and Up and Coming Families—which together comprise 95 of the city's total population. ESRI estimates that the Enterprising Professionals group alone accounts for 65 percent of the city's population, and is therefore 34 times more prevalent than in the nation at large.

Table 22. City of Wilsonville's Primary Tapestry Segments

Tapestry Segment	Percent of Households		
	City of Wilsonville	United States	Prevalence Compared to US
Enterprising Professionals	65%	2%	34
Silver and Gold	19%	1%	19
Up and Coming Families	12%	4%	3
Urban Chic	4%	1%	3
Exurbanites	1%	3%	0
All others	0%	89%	NA

Source: ESRI, Leland Consulting Group.

Enterprising Professionals

65% of Wilsonville Population

Demographic

- Young, educated, single, married, working professionals, residents of Enterprising Professionals neighborhoods have a median age of 33.2 years.
- Forty-three percent of the households are singles who live alone or share housing with roommates, and 43 percent are married couple families.
- With an annual household growth of 1.95 percent per year since 2000, the households in this segment comprise approximately two percent of total U.S. households.
- The diversity of the population is similar to that of the U.S. Most of the residents are Caucasian; however, 12.4 percent are Asian.

Socioeconomic

- Median household income is $61,151.
- Ninety percent of the households earn income from wages and salaries; 39 percent receive income from investments.
- This is an educated group: approximately half of the population aged 25 years and older hold a bachelor's or graduate degree; more than three in four have attended college.
- These working professionals are employed in various jobs, especially in management, finance, computer, sales, and office/administrative support.

Residential

- Enterprising Professionals residents move frequently to find growth opportunities and better jobs, especially in cities such as Chicago, Atlanta, and Seattle.
- Forty-six percent of the households are located in the South, 29 percent are in the West, and 20 percent are in the Midwest.
- They prefer to own instead of rent in newer neighborhoods of townhouses or apartments. The median home value is $239,007.
- For those who rent, the average gross rent is 36 percent higher than the U.S. average.

Preferences

- They are young and mobile with growing consumer clout.
- Those who rent hold renter's insurance policies.
- They rely on cell phones and e-mail to stay in touch.
- They go online to download videos and music, track their investments, and shop for items, including personal computers and software.
- They own laptops, video game systems, and digital camcorders. They love to travel abroad and in the U.S. often.
- They play video games, visit theme parks, jog, and swim. They read computer, science, and technology magazines and listen to alternative, public-all-talk, and sports radio.
- They eat out at Cheesecake Factory and Chili's Grill and Bar. They shop for groceries at stores such as Publix and Albertson's.

Silver and Gold

19% of Wilsonville Population

Demographic

- With a median age of 61.3 years, Silver and Gold residents are the second oldest of the Tapestry segments.
- More than 70 percent are aged 55 years or older.
- Most residents have retired from professional occupations. Half of the households are composed of married couples without children.
- This segment is small, less than one percent of all U.S. households; however, annual household growth is 0.66 percent since 2000. Residents of these neighborhoods are not ethnically diverse; 93 percent of them are Caucasian.

Socioeconomic

- These are wealthy, educated seniors. Their median household income is $62,157.
- Fifty-six percent of the households still earn wages or salaries, half collect Social Security benefits, 63 percent receive investment income, and 35 percent collect retirement income.
- The percentage of those who work from home is higher than the U.S. worker percentage; nearly one-fourth of employed residents are self-employed, also higher than the U.S. level.

Residential

- Their affluence enables them to relocate to sunnier climates. More than 60 percent of these households are in the South, mainly in Florida.
- One-fourth of this Tapestry segment is located in the West, mainly in California and Arizona. Neighborhoods are exclusive with a home ownership rate of 81 percent.
- The median home value is $290,103. Silver and Gold ranks second of the Tapestry segments for the percentage of seasonal housing owners.
- Because these seniors have moved to newer single-family homes, they are not living in the homes where they raised their children.

Preferences

- Silver and Gold residents have the free time and resources to pursue their interests.
- They travel domestically and abroad including cruise vacations. They are also interested in home improvement and remodeling projects.
- Although they own the tools and are interested in home improvement and remodeling projects, they are more likely to contract for remodeling and housecleaning services.
- Active in their communities, they join civic clubs, participate in local civic issues, and write to newspaper or magazine editors. They prefer to shop by phone from catalogs such as L.L. Bean and Lands' End.
- Golf is more a way of life than just a leisure pursuit. They play golf, attend tournaments, and watch The Golf Channel. They also go to horse races, bird watching, saltwater fishing, and power boating. They eat out, attend classical music performances, and relax with a glass of wine.
- Favorite restaurants include Outback Steakhouse, Cracker Barrel, and Applebee's. Silver and Gold residents are avid readers of biography and mystery books and watch numerous news programs and news channels such as Fox News and CNN. Favorite non-news programs include detective dramas.

Up and Coming Families

12% of Wilsonville Population

Demographic

- With an annual household growth rate of 1.69 percent, Up and Coming Families represents Tapestry's second highest household growth market.
- A mix of Generation Xers and Baby Boomers with a median age of 32.8 years, this segment is the youngest of Tapestry's affluent family markets.
- Residents of these neighborhoods are young, affluent families with younger children.
- Eighty percent of the households are families. Most of the residents are white; however, diversity is increasing as the segment grows.

Socioeconomic

- Beginning their careers, residents of Up and Coming Families are earning above-average incomes. The median household income is $73,906, higher than the national median.
- Two-thirds of the residents aged 25 years and older have attended college; more than one in five holds a bachelor's degree.
- Ninety-one percent of households earn income from wages and salaries.
- Although half of the households have children, they also have working parents.

Residential

- In the suburban outskirts of midsized metropolitan areas with populations higher than 250,000, approximately half of Up and Coming Families neighborhoods are concentrated in the South, the other half in the West and Midwest.
- Most residents live in new single-family housing; with a median home value of $193,161. More than half the housing units were built in the last 10 years.
- Homeownership is at 80 percent.

Preferences

- Family and home dictate the products these residents buy.
- Many are beginning or expanding their families, so baby equipment, children's clothing, and toys are essential purchases.
- Because many are first-time homeowners, basic household furniture and lawn fertilizer, weed control, and insecticide products are important.
- Car loans and mortgage payments are major household budget items. They are most likely to own or lease an SUV or a minivan.
- They eat out at family restaurants, especially on the weekends, and buy fast food at the drive-through or for takeout.
- They play softball, take the kids to the zoo, and visit theme parks (generally Sea World or Disney World) where they make good use of their digital camera or camcorder.
- They rent comedy, family, and action/adventure DVDs. Cable station favorites include Country Music Channel, ESPN News, The Learning Channel, and the Disney Channel. They listen to country, soft rock, and contemporary hit radio.

FROG POND AREA PLAN
Creating a great community

Appendix B: Future Transportation Analysis memorandum

City of Wilsonville

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Transportation Costs Associated with Frog Pond Area Plan (Including Assumptions)

Project	Cost Estimate	Funding Source/Proportionate Share (FP = Frog Pond)							Comments/Assumptions
		City (CIP)	*West FP*	*East FP*	*Non-School in South FP*	*School in South FP*	*Clackamas County*	*Federal/ Region*	
UU-01 Boeckman Road Bridge Improvements (Option A)	$12,200,000	$3,700,000	-	-	-	-	-	$8,500,000	OBEC cost estimate prepared for City of Wilsonville (2014). Metro RTP includes $8,500,000 for project with 2018-24 funding timeframe.
UU-02 (Part 1) Boeckman Road Urban Upgrade	$1,600,000	$800,000	$800,000	-	-	-	-	-	Portion of project from TSP that only include Boeckman Road urban upgrade; north side is developer's responsibility and south side is City's
UU-02 (Part 2) Boeckman/ Stafford Traffic Signal	$500,000	-	$70,000	$180,000	$125,000	$125,000	-	-	Portion of project from TSP that includes signal at Boeckman/Advance/ Stafford/ Wilsonville Rd. Proportionate share methodology based on amount of p.m. peak hour traffic through intersection, which included most of South Neighborhood traffic (and half of South Neighborhood's share allotted to school site)
UU-06 Stafford Road Urban Upgrade (3 lane plus extra ROW)	$4,200,000	-	$2,100,000	$2,100,000	-	-	-	-	Assumes 3-lane cross-section and traffic signal at main project access covered by developer (half East Neighborhood and half West Neighborhood) and additional 24 feet of ROW (12 feet on each side) dedicated by the developer for future widening to 5-lane cross-section. It may also behoove the City to advance some funding from the 5-lane upgrade to add design features that would make for an easier transition to the 5-lane cross-section.
Future Stafford Road Upgrade to 5 Lanes	$6,825,000	$6,825,000	-	-	-	-	-	-	Widening to 5-lane cross-section (assumes 3-lane cross-section already built and ROW previously obtained)
Potential Single-Lane Roundabout on Stafford Road	$600,000	-	$300,000	$300,000	-	-	-	-	If desired, a single-lane roundabout could be installed at one of the access on Stafford Road (with the exception of where the traffic signal is needed) in conjunction with the 3-lane cross-section. The cost is assumed to be split evenly between the developers.
Widening Potential Roundabout to Dual Lanes with 5-Lane Upgrade	$400,000	-	$200,000	$200,000	-	-	-	-	If a roundabout is installed, then a dual-lane roundabout would be required when Stafford Road is widened to 5-Lane cross-section.
UU-P1 Advance Road Urban Upgrade (Extended to Full Site Frontage)	$4,350,000	$1,000,000	-	$1,175,000	$2,175,000	-	-	-	Based on upgrading the existing road to a 3-lane cross section with sidewalks and bike lanes, which would be similar for either a Collector or Minor Arterial. Breakdown assumes City covers south side of road adjacent to park as well as area outside Frog Pond Area
RT-01A Boeckman Creek Trail (West Neighborhood)	$850,000	$570,000	$280,000	-	-	-	-	-	Revised based on new alternative trail alignments. Bike and Ped plan estimate per mile used as base cost, adjusted by Seattle CCI, and then calculated by revised trail distance (north of Boeckman Road only)
BPA Easement Trail (East Neighborhood)	$670,000	$450,000	-	$220,000	-	-	-	-	Revised based on new alternative trail alignments and same approach as RT-01A
South Neighborhood Trail	$700,000	$460,000	-	-	$240,000	-	-	-	Revised based on new alternative trail alignments and same approach as RT-01A
LT-P5 New School Site Trail (South Neighborhood)	$700,000	$700,000	-	-	-	-	-	-	From TSP (Additional Planned Projects); does not include land cost
SI-03 Stafford Rd/65th Ave Intersection Improvements	$5,500,000	$1,000,000	-	-	-	-	$4,500,000	-	Clackamas County TSP includes a roundabout with a cost estimate of $5,500,000. It is a Tier 1 recommendation. Wilsonville TSP has cost estimate of $2,000,000, with a 1,000,000 City contribution.
West Neighborhood Collectors	$9,510,000	$1,585,000	$7,925,000	-	-	-	-	-	Assumes reuse of portion of Frog Pond Lane and cost of $1,500/ft to upgrade. $3,000/ft cost for new roadway
East Neighborhood Collectors	$8,160,000	$1,360,000	-	$6,800,000	-	-	-	-	Cost based on lineal foot estimate of $3,000/ft
South Neighborhood Collectors	$3,900,000	$450,000	-	-	$2,650,000	$800,000	-	-	Assumes reuse of 60th Avenue and cost of $1,500/ft to upgrade. A portion of this would be the School District's responsibility.
Total	**$60,665,000**	**$18,900,000**	**$11,675,000**	**$10,975,000**	**$5,190,000**	**$925,000**	**$4,500,000**	**$8,500,000**	

MEMORANDUM

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DATE: September 24, 2014

TO: Project Team

FROM: Scott Mansur, P.E., PTOE
Brad Coy, P.E.
Halston Tuss, E.I.T.

SUBJECT: **Frog Pond Area Plan – Future Transportation Analysis** P14033-000

The Frog Pond Area Plan, led by the City of Wilsonville, will establish a vision for the 500-acre Frog Pond area, and define expectations for the type of community it will be in the future. The project team has developed a set of three land use and transportation alternatives for consideration by the Frog Pond Planning Task Force, the public, stakeholders, and city policy-makers. This memorandum is one of several that are intended to provide information on the performance of the three alternatives to enable the Task Force, public, and policy-makers to make informed recommendations and decisions about a preferred alternative.

This memorandum provides information about the transportation performance and tradeoffs associated with the three land use and transportation alternatives currently being considered for the Frog Pond Area Plan. The purpose is to inform the development of a preferred alternative by local stakeholders and decision-makers. The preferred alternative is expected to take the best elements from each of the three alternatives now being studied and combine them to develop an area plan that will best implement the vision statement and guiding principles for the project.

The sections of this memorandum include the executive summary, descriptions of the land use and transportation alternatives, and a transportation evaluation and comparison of alternatives.

Executive Summary

There are three land use and transportation alternatives currently being evaluated for the Frog Pond Area Plan. The primary factor that differentiates these alternatives is the arrangement and density of residential land use (high, medium, low) and the location of a neighborhood commercial center. In addition, there are two street frameworks being considered (grid, organic). Additional details regarding these three alternatives are provided in the *Alternatives Evaluation Summary* memorandum associated with this project.[1]

To understand how the transportation system would be affected by the three alternatives, various aspects were considered and analyzed. These include traffic volumes and operations, functional classifications, street design, multimodal connectivity, transit routing and coverage area, and planning level cost estimates.

[1] Draft Alternatives Evaluation Summary, September 11, 2014 .

Traffic Volumes and Operations

Future traffic forecasts were performed for a 2035 horizon year based on Metro population and land use assumptions for the region, with the exception of the Frog Pond Area Plan, which was revised based on the proposed land uses. The majority of traffic growth between 2014 and 2035 is expected to occur to the north of Frog Pond because of additional growth in the area and the increasing importance of the Stafford Road connection to I-205.

Future intersection operations were analyzed for the site accesses and major intersections in the Frog Pond Area vicinity, and Stafford Road can perform adequately as a three-lane roadway; however, it will be approaching its capacity and the City should be prepared to widen it to 5 lanes in the future. To accommodate safe and efficient operations for traffic turning into and out of the East and West Neighborhoods, it is important to have a traffic signal at one of the Stafford Road accesses. Because of the high volumes to and from the north and desired traffic signal spacing, the preferred signal location is the middle access (rather than the south access). This middle access provides good connectivity to the heart of the East and West Neighborhoods and aligns with Collector streets as assumed in the Option A and C grid street framework. Even with the traffic signal, the unsignalized access north of the signal is expected to exceed the City of Wilsonville's level of service D performance standard due to increased delay. Therefore, drivers wanting to turn left onto Stafford Road are likely to reroute to the signalized access.

Intersection operations were also analyzed at key off-site study intersections, including both I-5 interchange areas, the Stafford Road/65th Avenue/Elligsen Road junction, and other key east side intersections. With the completion of all High Priority Projects identified in the Wilsonville TSP, these areas are expected to meet applicable mobility targets and operating standards through the year 2035 as required by the City of Wilsonville, Clackamas County, and the Oregon Department of Transportation (ODOT). This analysis assumes growth consistent with Metro forecasts, build out of the current Wilsonville urban growth boundary, and a Maximum Build Out scenario for the Frog Pond Area that exceeds the amount of growth identified in any of the three land use alternatives currently under consideration.

Functional Classifications and Street Design

As a Major Arterial, Stafford Road is envisioned to eventually become a five-lane roadway. While a three-lane roadway is expected to provide adequate capacity over the 20-year planning horizon, Stafford Road would be approaching its three-lane capacity limit. By acquiring adequate right-of-way for the future five-lane facility consistent with the Major Arterial classification and designing a three-lane roadway that can easily be widened, the City would ensure it can support future development in its northeast area and also can have improved access to the future growth areas.

Only a portion of Advance Road is currently in the City's urban growth boundary (UGB), and the Wilsonville TSP currently designates this section as a Collector street. As a Collector, Advance Road can accommodate a greater amount of access, which would be beneficial if a retail development was located at the corner of the Advance Road-Boeckman Road/SW Stafford Road-Wilsonville Road intersection, and also allows more points of connection to the future park and school site. As a Collector, the standard would also support on-street parking, which may be beneficial to the City adjacent to the proposed park and retail areas. The Collector classification

would include lower design speeds and a better pedestrian environment that will be beneficial to the high level of pedestrian activity that would be expected near the park and schools.

The major streets through the East, West, and South Neighborhoods are being proposed as Collectors, which would include bike facilities (dedicated bike lanes or shared lanes) and on-street parking.

Multimodal Connectivity

Both the grid and organic street frameworks have very similar transportation networks with basic features that support multimodal connectivity. A mix of streets, bicycle facilities, and trails connect to the various land uses within the Frog Pond area (including the school site south of Advance Road, which should have safe routes connecting to the adjacent neighborhoods) and take advantage of natural and man-made features (including regional trails along Boeckman Creek and the BPA corridor). In addition, urban upgrades (including adding sidewalks, bike lanes, center turn lanes) are needed for Boeckman Road, Stafford Road, and Advance Road in conjunction with the development to fill in the pedestrian and bicycle network and connect to adjacent parts of Wilsonville.

The street networks for all three options connect internally as well as to Boeckman Road, Stafford Road, and Advance Road at locations that will help distribute traffic while also providing convenient access to the signalized access on Stafford Road (particularly for those needing to make a left turn during peak congestion periods) and connections to the existing neighborhood to the south. The layout of the grid network does a particularly good job of providing internal connections that support circulation and access. Because the neighborhood Collector is located farther north in the grid network, it also provides better transit coverage on the north end of Frog Pond.

Planning Level Cost Estimates

Planning level cost estimates were prepared for the transportation improvements associated with the Frog Pond Area Plan. No substantial differences exist between the transportation network and improvement needs of the three alternatives; therefore, the same cost estimates are considered applicable. The pie chart in Figure 1 at right shows the estimated breakdown in costs between the various funding sources (FP = Frog Pond). Detailed project cost breakdowns are provided in Table 7 and in the appendix.

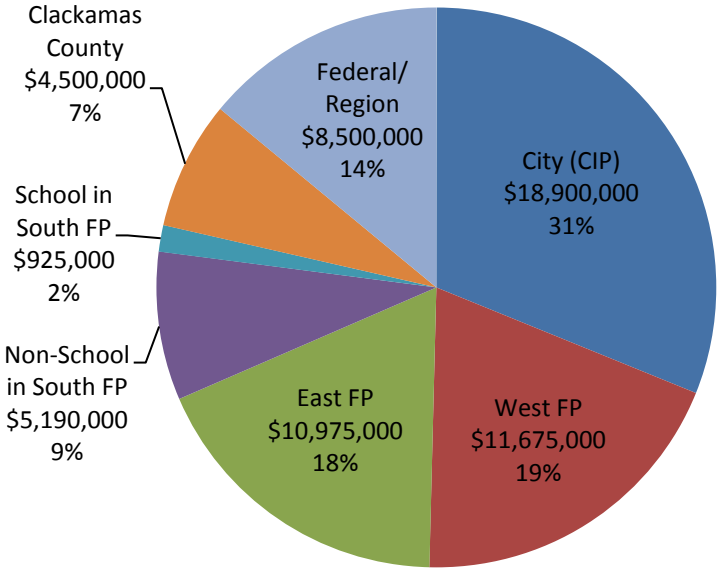


Figure 1: Cost Breakdown of Transportation Improvements by Funding Source or Proportionate Share of Frog Pond Neighborhood

Descriptions of Land Use and Transportation Alternatives

There are three land use and transportation alternatives currently being evaluated. The primary factor that differentiates these alternatives is the arrangement and density of residential land use (high, medium, low) and the location of a neighborhood commercial center. In addition, there are two street frameworks being considered (grid, organic). While the street framework is independent from the land uses, each alternative assumes one of the street frameworks to facilitate analysis. Table 1 lists the land use assumptions and street framework being analyzed for the three alternatives.

Table 1: Land Use and Transportation Alternatives Being Analyzed

Alternative	Residential Land Use	Households	Employees			Street Framework
			Retail	*Non-Retail*	*Total*	
Option A	Low	1,773	150	123	273	Grid
Option B	Medium	2,357	150	123	273	Organic
Option C	High	2,742	150	123	273	Grid

Additional details regarding these three alternatives are provided in the *Alternatives Evaluation Summary* memorandum associated with this project.[2] This memo also includes figures showing the three alternatives, along with their assumed land uses and street framework.

Transportation Evaluation and Comparison of Alternatives

The three land use and transportation alternatives were evaluated for multiple transportation-related considerations, including the following:

- Traffic volumes and operations (project vicinity)
- Traffic volumes and operations (off-site intersections and I-5 Interchange areas)
- Functional classifications
- Street design (Arterial and Collector roadways)
- Multimodal connectivity
- Transit routing and coverage area

Traffic Volumes and Operations (Project Vicinity)

Future traffic volumes and operations were evaluated for the three alternatives to determine how well the City's transportation system would support the long term build-out of the Frog Pond area and whether there would be different improvement needs depending on the area's land use densities and street framework. Based on the analysis provided in the existing and baseline transportation analysis memorandum,[3] it was determined that a traffic signal would be needed to accommodate safe and efficient operations at the primary Stafford Road access point into the East and West Frog Pond Neighborhoods, particularly to serve the left turning traffic into

[2] Draft Alternatives Evaluation Summary, September 11, 2014 .

[3] *Frog Pond Area Plan Existing and Baseline Transportation Analysis*, DKS Associates August 8, 2014.

and out of the site. Therefore, the analysis in this memorandum assumes a traffic signal but considers two different locations for its placement based on the street frameworks previously discussed.

For analysis purposes, the Frog Pond Area Plan is assumed to experience full build-out by the year 2035, which is the future horizon year for both the Metro Regional Transportation Plan (RTP)[4] and the Wilsonville Transportation System Plan (TSP).[5] The future 2035 traffic volumes were forecasted for the study area using a travel forecast model developed specifically for Wilsonville. The model applies trip generation and trip distribution data directly taken from the Metro Gamma regional travel demand forecast model, but adds additional detail to better represent local travel conditions and routing within Wilsonville. In particular, revisions were made to the model's land use assumptions for the transportation analysis zones (TAZs) that comprise the Frog Pond Area Plan to account for the three proposed land use alternatives. In addition, the neighborhood street network and location of the previously mentioned traffic signal on Stafford Road were accounted for in the trip routing estimates.

The p.m. peak hour traffic volumes, lane geometries, and intersection operating conditions are shown in the following figures:

- Figure 2 (Low with grid street network)
- Figure 3 (Medium with organic street network)
- Figure 4 (High with grid street network).

These figures also show the location of Collector roads with neighborhood characteristics (i.e. bike facilities and on-street parking) throughout the Frog Pond area to provide multimodal connectivity and serve as the backbone for traffic, bicycles and pedestrians entering and exiting each of the neighborhood areas.

Table 2 provides the intersection operating conditions in table format for each of the three alternatives. The installation of a traffic signal at the SW Advance Road-Boeckman Road/SW Stafford Road-Wilsonville Road intersection and the widening of Stafford Road to three lanes (a travel lane in each direction plus a center turn lane) are identified in the Wilsonville TSP as High Priority Projects and are also accounted for in the analysis.

As shown on the figures and in Table 2, the unsignalized accesses along Stafford Road (particularly north of the signalized access) are expected to exceed the City's level of service D performance standard. The primary reason is the high through volumes that contribute to the delay experienced by side street vehicles turning left. Providing left-turn lanes on the side street approaches would be one way to help reduce delays; however, it is not expected to be sufficient to achieve LOS D operations at all accesses during the p.m. peak hour.

Because one of the accesses along Stafford Road would be signalized, it is likely that many of the residents and drivers familiar with the area would choose to turn left at the traffic signal during the peak periods, particularly with Collector/Local Street connectivity that provides good access to the heart of the East and West Neighborhoods. Traffic routing to this signal was assumed in the analysis; however, even a few left-turning vehicles at some of the other accesses would trigger delays that exceed the City's standard. One potential

[4] *Regional Transportation Plan*, Adopted by Metro Council (Exhibit A to Ordinance No. 14-1340), July 17, 2014.
[5] *Wilsonville Transportation System Plan*, Adopted by Council (Ordinance 718), June 17, 2013.

option to eliminate failing left turns would be to force traffic to use the traffic signal by installing a median that only allows right-out movements. However, this limits connectivity for all modes of travel and may not be necessary as lower delays would be experienced during off-peak hours.

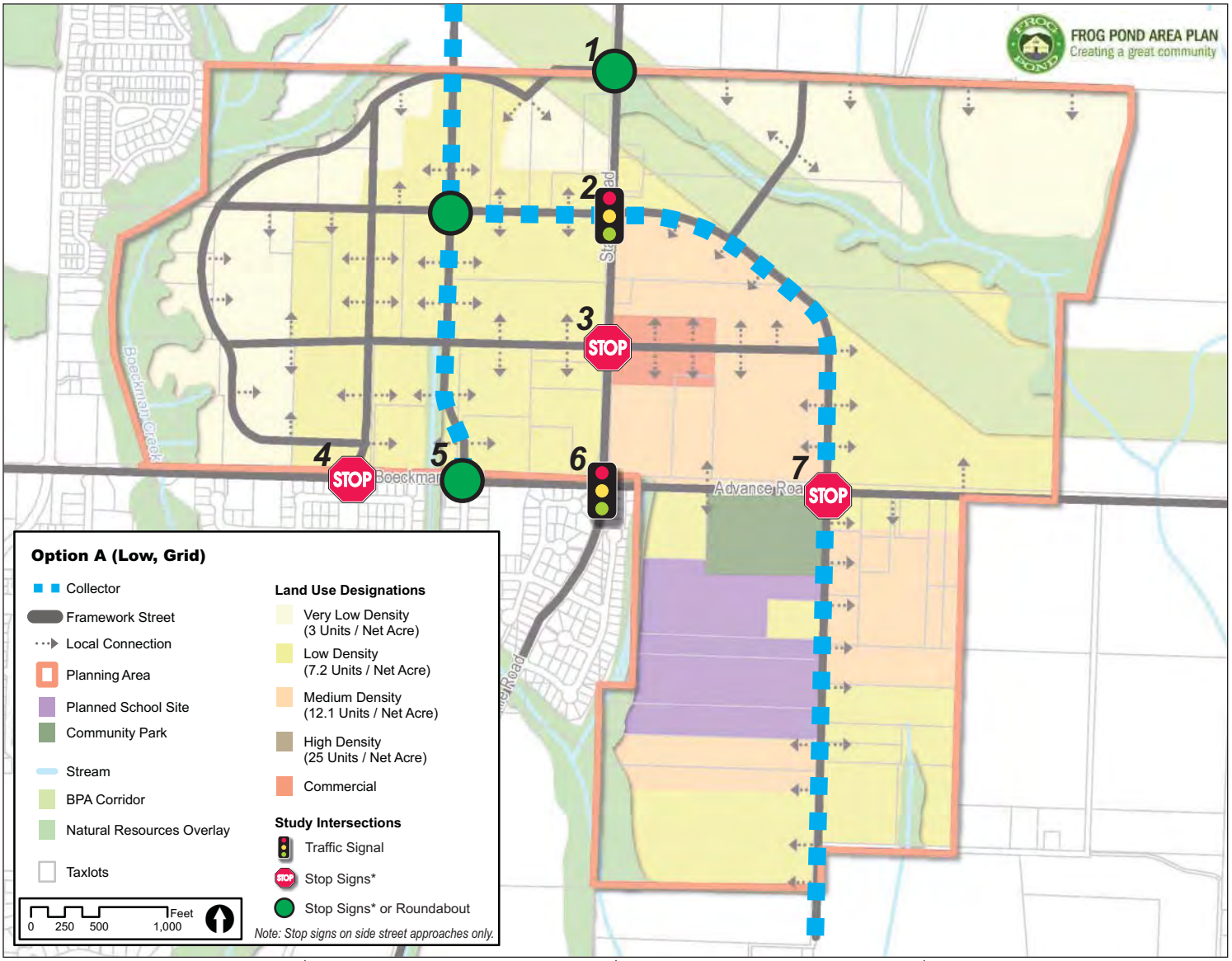
Another option that could be considered further to reduce delay to side street traffic would be to install roundabouts at key access points (except where the traffic signal is recommended) as well as at the intersection of two Collector streets in the West Neighborhood (see locations shown on Figure 2, Figure 3, and Figure 4). There are many tradeoffs associated with roundabouts that should be considered when determining whether to select them as the preferred traffic control at any of the potential locations. Some of the advantages and disadvantages are listed below:

Advantages of Installing a Roundabout

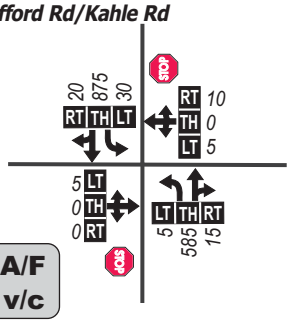
- Roundabouts can help reduce delay for side street traffic because no approach is given more priority than another. Therefore, it is likely that the northern access points onto Stafford Road would no longer be expected to operate at LOS F in the future scenarios.
- A roundabout at the northern access point on Stafford Road would provide a clear gateway between the rural and urban environment. This location is under the BPA power line easement and would have underutilized land available to accommodate the larger footprint that roundabouts require.
- Roundabouts can help to slow traffic speeds on the roadway. Typical circulating speeds for a roundabout are 25 miles per hour (mph), which would help to calm traffic in the vicinity of the new development area.

Disadvantages of Installing a Roundabout

- Because all approaches are treated the same and must yield to traffic within the roundabout, this would introduce delay for traffic on the major approach.
- Roundabouts are more difficult for large trucks to navigate and may result in complaints from the freight community and farmers.
- Roundabouts can be difficult for pedestrians and bicyclists to cross because there is no exclusive stop phase. The lack of straight paths and clear turns can also be difficult for the vision impaired.
- Roundabouts require a larger footprint, which would require additional right-of-way dedication from the developers.
- Roundabouts are significantly more expensive than the alternative being considered for these locations (i.e., unsignalized intersections that would only require the installation of a few stop signs).
- Using different traffic control on SW Stafford Road and Boeckman Road can create uncertainty and negatively affect user expectation, which affects safety. This disadvantage does not affect the potential location within the West Neighborhood.

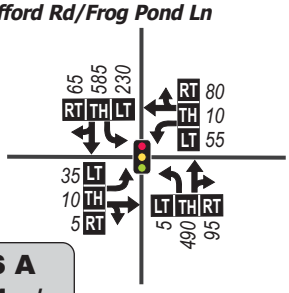


1. Stafford Rd/Kahle Rd



LOS A/F
0.37 v/c

2. Stafford Rd/Frog Pond Ln



LOS A
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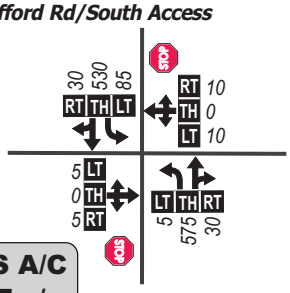
3. Stafford Rd/South Access



LOS A/C
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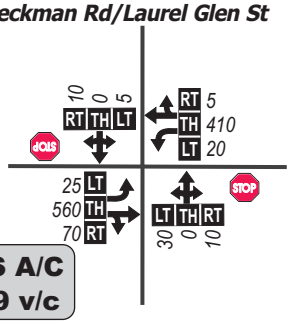
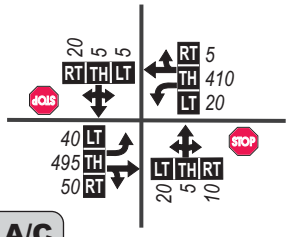
4. Boeckman Rd/Laurel Glen St



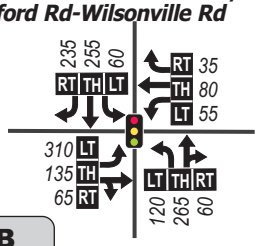
LOS A/C
0.39 v/c

5. Boeckman Rd/Willow Creek Dr



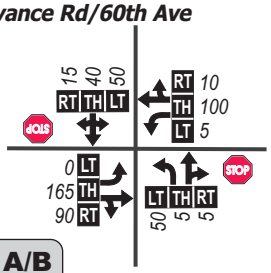
LOS A/C
0.34 v/c

6. Advance Rd-Boeckman Rd/ Stafford Rd-Wilsonville Rd



LOS B
0.53 v/c

7. Advance Rd/60th Ave



LOS A/B
0.18 v/c

LEGEND (Operations)

LOS A/A
0.00 v/c
- Level of Service
- Volume-to-Capacity

Signalized Intersections
- Level of Service of Intersection
- Volume-to-Capacity of Intersection

Stop Controlled Intersections
- Level of Service of Major/Minor Street
- Volume-to-Capacity of Worst Movement

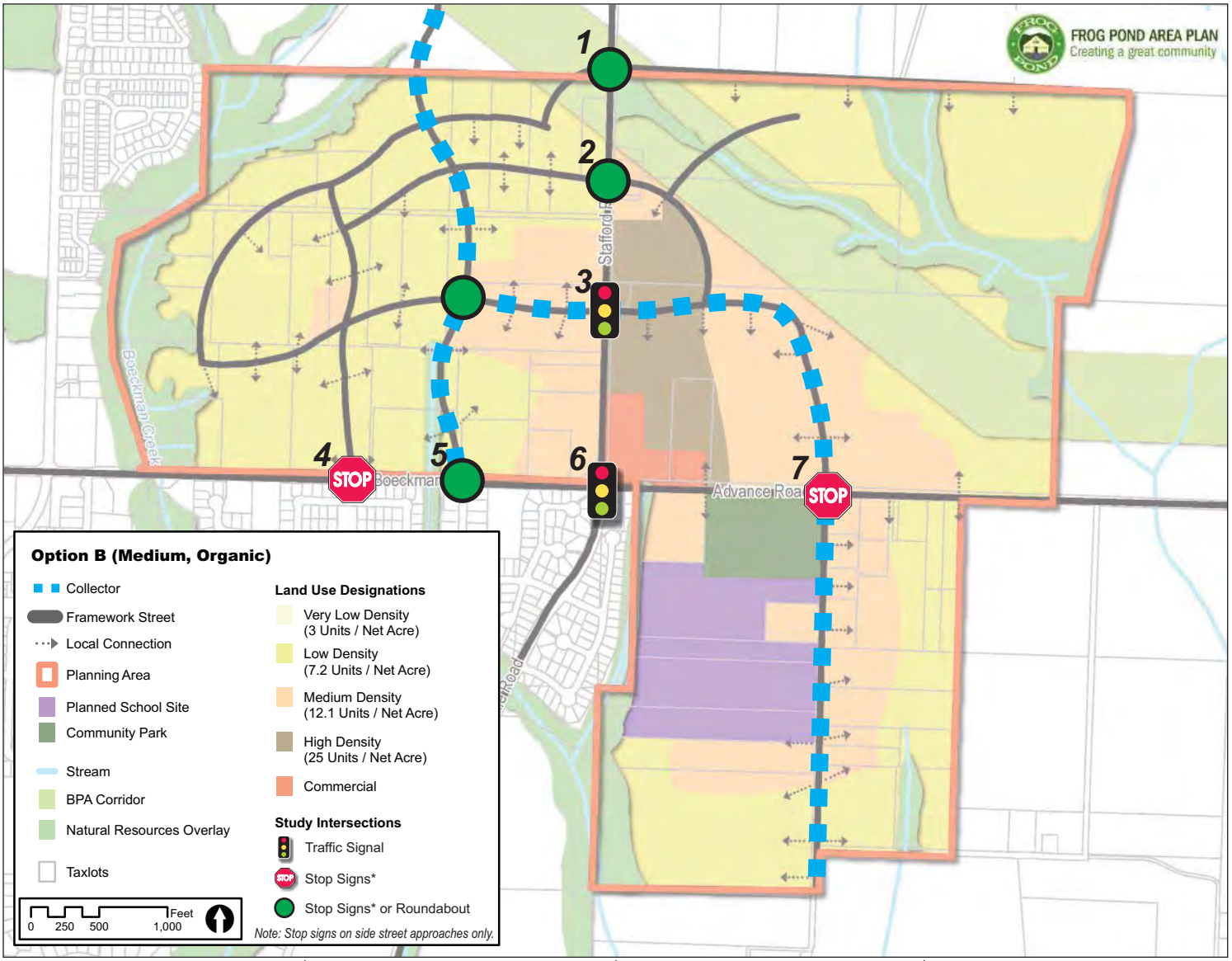
LEGEND (Traffic Control and Volumes)

- Traffic Signal
- Stop Sign
- Lane Configuration
- 000 - PM Peak Hour Traffic Volumes
- LT TH RT (Left•Thru•Right) - Volume Turn Movement

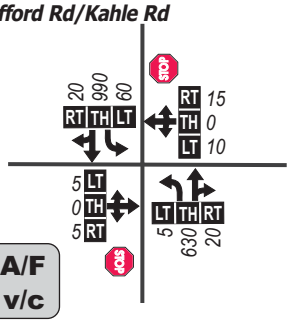
DKS

Figure 2

OPTION A (LOW, GRID)
2035 PM PEAK HOUR TRAFFIC VOLUMES AND OPERATIONS



1. Stafford Rd/Kahle Rd



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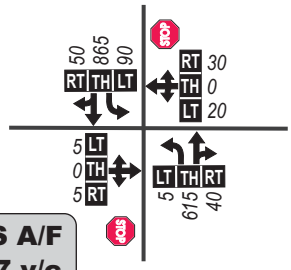
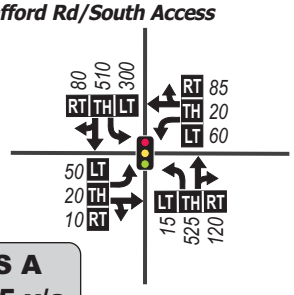
2. Stafford Rd/Frog Pond Ln



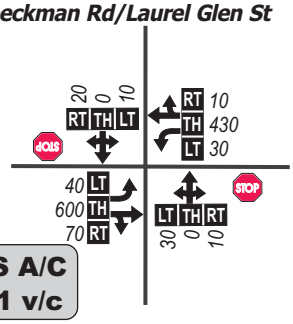
LOS A/F
0.57 v/c

3. Stafford Rd/South Access



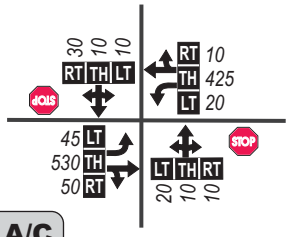
LOS A
0.65 v/c

4. Boeckman Rd/Laurel Glen St



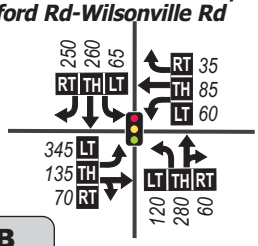
LOS A/C
0.41 v/c

5. Boeckman Rd/Willow Creek Dr



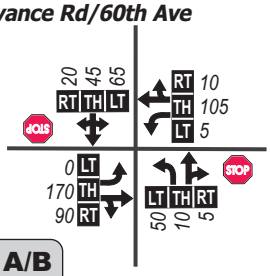
LOS A/C
0.36 v/c

6. Advance Rd-Boeckman Rd/ Stafford Rd-Wilsonville Rd



LOS B
0.53 v/c

7. Advance Rd/60th Ave



LOS A/B
0.22 v/c

LEGEND (Operations)

LOS A/A
0.00 v/c
- Level of Service
- Volume-to-Capacity

Signalized Intersections
- Level of Service of Intersection
- Volume-to-Capacity of Intersection

Stop Controlled Intersections
- Level of Service of Major/Minor Street
- Volume-to-Capacity of Worst Movement

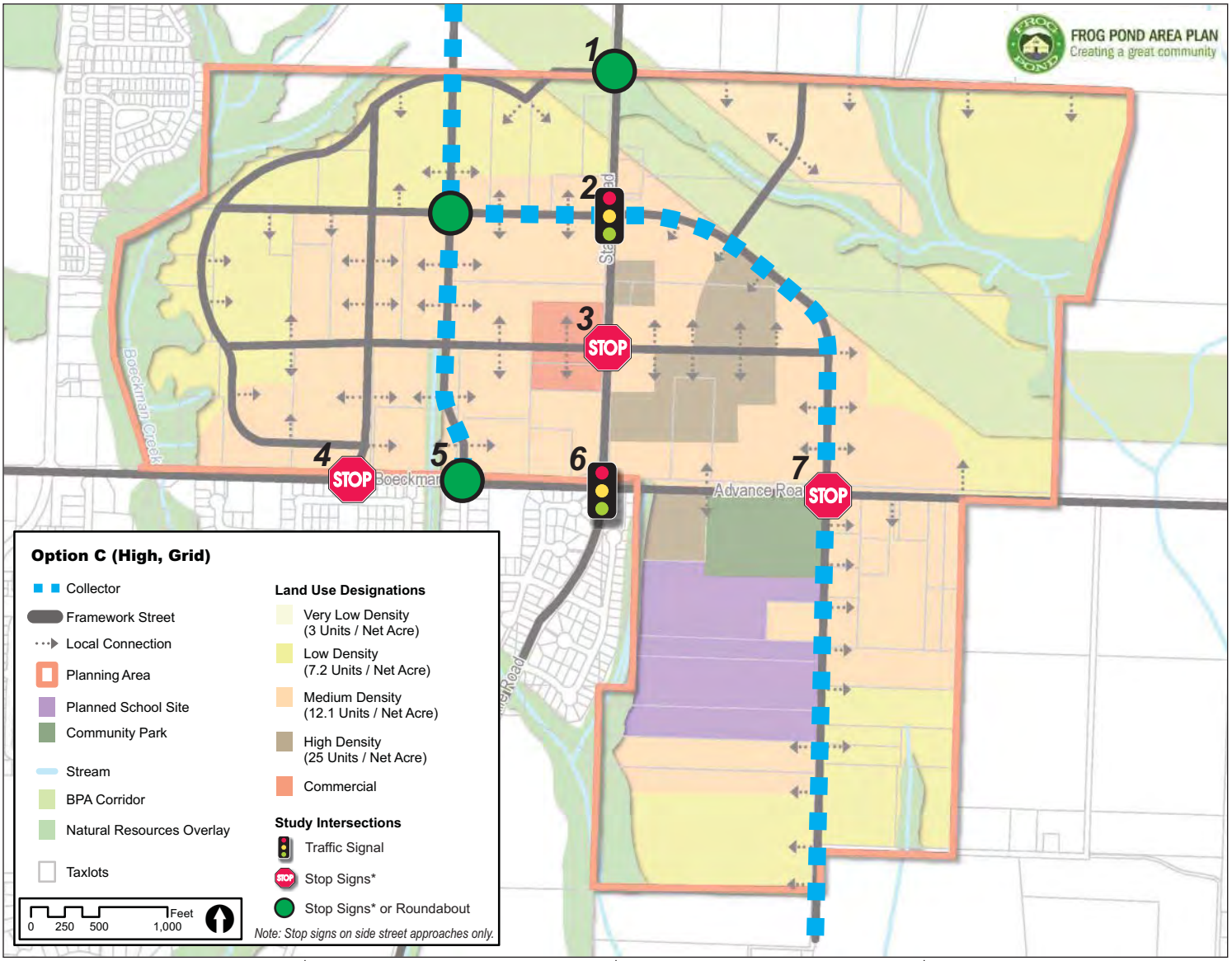
LEGEND (Traffic Control and Volumes)

- Traffic Signal
- Stop Sign
- Lane Configuration
- 000 - PM Peak Hour Traffic Volumes
- LT TH RT (Left•Thru•Right) - Volume Turn Movement

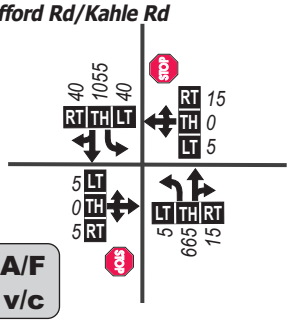
DKS

Figure 3

OPTION B (MEDIUM, ORGANIC)
2035 PM PEAK HOUR TRAFFIC VOLUMES AND OPERATIONS



1. Stafford Rd/Kahle Rd



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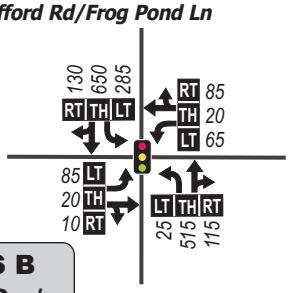
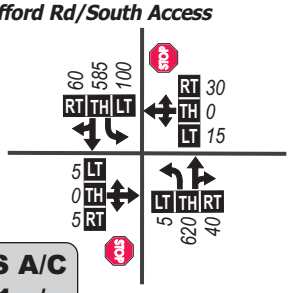
2. Stafford Rd/Frog Pond Ln



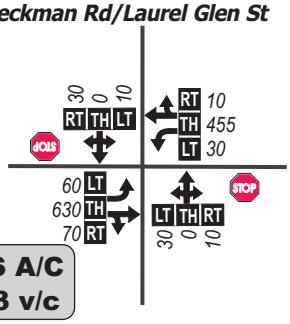
LOS B
0.69 v/c

3. Stafford Rd/South Access



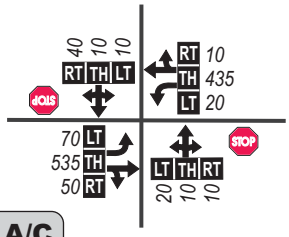
LOS A/C
0.41 v/c

4. Boeckman Rd/Laurel Glen St



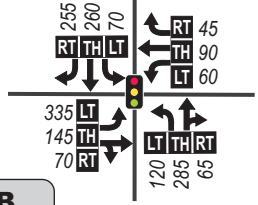
LOS A/C
0.43 v/c

5. Boeckman Rd/Willow Creek Dr



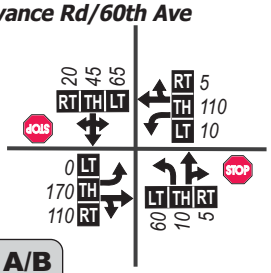
LOS A/C
0.36 v/c

6. Advance Rd-Boeckman Rd/ Stafford Rd-Wilsonville Rd



LOS B
0.56 v/c

7. Advance Rd/60th Ave



LOS A/B
0.23 v/c

LEGEND (Operations)

LOS A/A
0.00 v/c
- Level of Service
- Volume-to-Capacity

Signalized Intersections
- Level of Service of Intersection
- Volume-to-Capacity of Intersection

Stop Controlled Intersections
- Level of Service of Major/Minor Street
- Volume-to-Capacity of Worst Movement

LEGEND (Traffic Control and Volumes)

- Traffic Signal
- Stop Sign
- Lane Configuration
- 000 - PM Peak Hour Traffic Volumes
- LT TH RT (Left•Thru•Right) - Volume Turn Movement

DKS

Figure 4

OPTION C (HIGH, GRID)
2035 PM PEAK HOUR TRAFFIC VOLUMES AND OPERATIONS

Table 2: 2035 P.M. Peak Hour Intersection Operating Conditions (Low, Medium, High)

Intersection[a]	Traffic Control	Operating Standard	PM Peak Hour			Meets Standard?
			Delay	*LOS*	*V/C*	
Option A (Low, Grid)						
1) Stafford Rd/Kahle Rd (North)	Two-Way Stop	LOS D	**55.1**	**A/F**	**0.37**	**No**
2) Stafford Rd/Frog Pond Ln (Center)	Signalized	LOS D	9.3	A	0.51	Yes
3) Stafford Rd/South Access	Two-Way Stop	LOS D	23.0	A/C	0.37	Yes
4) Boeckman Rd/Laurel Glen St (West)	Two-Way Stop	LOS D	15.8	A/C	0.39	Yes
5) Boeckman Rd/Willow Creek Dr (East)	Two-Way Stop	LOS D	15.0	A/C	0.34	Yes
6) Advance Rd-Boeckman Rd/ Stafford Rd-Wilsonville Rd	Signalized	LOS D	18.2	B	0.53	Yes
7) Advance Rd/60th Ave	Two-Way Stop	LOS D	12.5	A/B	0.18	Yes
Option B (Medium, Organic)						
1) Stafford Rd/Kahle Rd (North)	Two-Way Stop	LOS D	**53.3**	**A/F**	**0.24**	**No**
2) Stafford Rd/Frog Pond Ln (Center)	Two-Way Stop	LOS D	**55.6**	**A/F**	**0.57**	**No**
3) Stafford Rd/South Access	Signalized	LOS D	6.9	A	0.65	Yes
4) Boeckman Rd/Laurel Glen St (West)	Two-Way Stop	LOS D	17.2	A/C	0.41	Yes
5) Boeckman Rd/Willow Creek Dr (East)	Two-Way Stop	LOS D	16.1	A/C	0.36	Yes
6) Advance Rd-Boeckman Rd/ Stafford Rd-Wilsonville Rd	Signalized	LOS D	19.6	B	0.53	Yes
7) Advance Rd/60th Ave	Two-Way Stop	LOS D	12.7	A/B	0.22	Yes
Option C (High, Grid)						
1) Stafford Rd/Kahle Rd (North)	Two-Way Stop	LOS D	**59.4**	**A/F**	**0.68**	**No**
2) Stafford Rd/Frog Pond Ln (Center)	Signalized	LOS D	14.7	B	0.69	Yes
3) Stafford Rd/South Access	Two-Way Stop	LOS D	23.5	A/C	0.41	Yes
4) Boeckman Rd/Laurel Glen St (West)	Two-Way Stop	LOS D	18.9	A/C	0.43	Yes
5) Boeckman Rd/Willow Creek Dr (East)	Two-Way Stop	LOS D	17.3	A/C	0.36	Yes
6) Advance Rd-Boeckman Rd/ Stafford Rd-Wilsonville Rd	Signalized	LOS D	19.8	B	0.56	Yes
7) Advance Rd/60th Ave	Two-Way Stop	LOS D	13.4	A/B	0.23	Yes

Signalized Intersections:
Delay = Average Stopped Delay per Vehicle (sec)
LOS = Level of Service of Intersection
V/C = Volume-to-Capacity Ratio of Intersection

Two-Way Stop Intersections:
Delay = Average Stopped Delay per Vehicle (sec) at Worst Movement (typically a minor movement)
LOS = Level of Service of Major Street/Minor Street
V/C = Volume-to-Capacity Ratio of Worst Movement

[a] Intersection numbers correspond with volume figures: Figure 2, Figure 3, and Figure 4.

Traffic Volumes and Operations (Nearby Intersections and I-5 Interchange Areas)

Traffic volumes and operations were also analyzed for a few key nearby intersections as well as Wilsonville's two I-5 interchange areas. Analysis at the interchange ramps was performed previously as a sensitivity analysis in the existing and baseline transportation analysis memorandum[6] to determine the expected effects of the projected maximum reasonable build out of the Frog Pond study area. Table 3 shows the land use assumptions for the "Maximum Build Out" scenario, which was intentionally selected to be as high as the team believed could be feasible for the Frog Pond area in order to test "reasonable worst case" impacts. These land use assumptions are similar to—but slightly higher than—the land use assumptions in Option C (High); therefore, it is sufficiently conservative to apply the results to all three alternatives.

Table 3: Land Use Estimates for Future 2035 Scenarios

Future 2035 Scenario	Households	Employees		
		Retail	*Non-Retail*	*Total*
Maximum Build Out	2,812	188	183	371

Table 4 provides the operating conditions for the Maximum Build Out scenario at both the highway interchanges (as previously reported) and other key nearby intersections that were not evaluated in the previous sensitivity analysis. It lists the estimated average delay, level of service (LOS), and volume to capacity (v/c) ratio at each off-site study intersection based on the *2000 Highway Capacity Manual* methodology.[7] This analysis assumes improved intersection geometries associated with all High Priority Projects included in Wilsonville's TSP. Specific High Priority Projects include installation of signalized intersections at Boeckman Road/Canyon Creek Road and a traffic signal or roundabout combining the existing intersections of Stafford Road/65th Avenue and Elligsen Road/65th Avenue.

As shown in Table 4, all off-site study intersections are expected to meet applicable mobility targets and operating standards through the year 2035 as required by the City of Wilsonville, Clackamas County, and the Oregon Department of Transportation (ODOT). This analysis assumes completion of all High Priority Projects from the Wilsonville TSP, growth consistent with Metro forecasts, build out of the current Wilsonville urban growth boundary, and a Maximum Build Out scenario for the Frog Pond Area that exceeds the amount of growth identified in any of the three land use alternatives currently under consideration.

[6] *Frog Pond Area Plan Existing and Baseline Transportation Analysis*, DKS Associates August 8, 2014.

[7] *2000 Highway Capacity Manual*, Transportation Research Board, Washington DC, 2000.

Table 4: 2035 P.M. Peak Hour Intersection Operating Conditions (Maximum Build Out Scenario)

Intersection	Jurisdiction	Operating Standard or Target	PM Peak Hour			Meets Standard or Target?
			Delay	*LOS*	*V/C*	
Signalized						
Elligsen Rd/I-5 SB Ramp	ODOT	0.90 V/C[a]	24.5	C	0.90	Yes
Elligsen Rd/I-5 NB Ramp	ODOT	0.90 V/C[a]	12.8	B	0.66	Yes
Wilsonville Rd/I-5 SB Ramp	ODOT	0.85 V/C	29.6	C	0.83	Yes
Wilsonville Rd/I-5 NB Ramp	ODOT	0.85 V/C	22.5	C	0.58	Yes
Elligsen Rd/Parkway Ave	Wilsonville	LOS D	36.9	D	0.77	Yes
Elligsen Rd/Park Center Dr	Wilsonville	LOS D	34.8	C	0.88	Yes
Boeckman Rd/Canyon Creek Rd	Wilsonville	LOS D	11.6	B	0.68	Yes
Wilsonville Rd/Town Center Loop W	Wilsonville	LOS D	40.6	D	0.86	Yes
Stafford Rd/65th Ave/ Elligsen Rd (Two Traffic Control Options)						
Traffic Signal	Clackamas Co.	LOS D	49.5	D	0.91	Yes
Roundabout (2-Lane)	Clackamas Co.	LOS D	20.0	C	0.79	Yes

Signalized Intersections:
Delay = Average Stopped Delay per Vehicle (sec)
LOS = Level of Service of Intersection
V/C = Volume-to-Capacity Ratio of Intersection
Bold Underlined values do not meet standards.

Two-Way Stop Intersections:
Delay = Average Stopped Delay per Vehicle (sec) at Worst Movement (typically a minor movement)
LOS = Level of Service of Major Street/Minor Street
V/C = Volume-to-Capacity Ratio of Worst Movement
Bold Underlined values do not meet standards.

[a] The typical ODOT mobility target for interchange ramps is a 0.85 v/c ratio. However, when the interchange vicinity is fully developed and adequate storage is available on the interchange ramp to prevent queues from backing up on the mainline, then the target can be increased to a 0.90 v/c ratio. Queuing analysis was performed (see Table 5) to ensure this is the case at the Elligsen Road/I-5 interchange, and it is likely the case for the Wilsonville Road/I-5 interchange as well.

In addition, queuing analysis was performed for the p.m. peak hours under the 2035 full build scenario to determine the 95th percentile queues at the Elligsen Road/I-5 interchange ramps. The 95th percentile queue is the queue length for a given intersection movement that has only a 5% chance of being exceeded during the peak traffic hour. This analysis was performed to ensure that adequate storage is available on the interchange off-ramp to prevent queues from backing up on the I-5 mainline. This analysis is important because the applicable ODOT mobility target can be increased from 0.85 v/c to 0.90 v/c when this condition is met and the interchange area is fully developed. Table 5 provides the results of the queuing analysis, and shows that the 95th percentile queues can be accommodated by the existing ramp lengths.

Table 5: Future 2035 PM Peak Hour Queuing Estimates for Elligsen Road I-5 Off Ramps

Intersection Approach	Movements	Number of Lanes	Ramp Storage Length	95th Percentile Queue of Longest Movement
Elligsen Rd/I-5 SB Ramp	Left, Through-Left, Right	3	700 ft	525 ft
Elligsen Rd/I-5 NB Ramp	Left, Left, Right	3	575 ft	425 ft

Functional Classifications

The Wilsonville Transportation System Plan (TSP)[8] identifies the functional classifications of the major study area roadways, and Figure 5 shows the Frog Pond Area vicinity. Stafford Road is a Major Arterial, Boeckman Road is a Minor Arterial, and Advance Road is a Collector.

Now that this area is being master planned, some of these classifications may benefit from being changed depending on the desired cross sections (including number of travel lanes, presence of on-street parking, etc.) and access spacing standards. Because Boeckman Road has been developed along its entire south side and portions of the roadway have already been improved with sidewalks and bike lanes, it will be difficult to make changes to its cross section and access spacing; however, now is the ideal time to make any desired revisions to functional classification for Advance Road and Stafford Road. Additional discussion and analysis of cross sections and access will be provided later in this memorandum and should be used as the basis for any functional classification changes.

Figure 5: Wilsonville Functional Classifications in Frog Pond Area Vicinty (Image clipped from TSP)

Another importation functional classification consideration for the Frog Pond Area relates to internal roadways. Similar to how Meadows Loop is a designated Collector street that runs through the neighborhood south of the Frog Pond area, at least one Collector street is recommended through each of the Frog Pond neighborhoods. Figure 2, Figure 3, and Figure 4, which were discussed previously, show the recommended Collectors for each of the three alternatives. These Collectors would have neighborhood design characteristics that would include bike facilities (shared lanes or dedicated bike lanes) and on-street parking. They would also be alley loaded to limit the number of driveways accessing the Collector street.

The purpose of the Collectors is to provide convenient multimodal access into the heart of each neighborhood. These roadways will include bike facilities within and between neighborhoods. They should also be designed to support a transit route and bus stops so that South Metro Area Regional Transit (SMART) is able to provide high quality transit service to the residents and businesses. To best serve these purposes, the Collectors should be continuous streets that allow through movements to have priority.

[8] *Wilsonville Transportation System Plan*, Adopted by Council (Ordinance 718), June 17, 2013.

Street Design (Arterial and Collector Roadways)

One of the desired outcomes of developing the Frog Pond Area Plan is to determine what the preferred street design is for the arterial and collector roadways. These roadways include Boeckman Road, Stafford Road, Advance Road, and the Collector roadways that serve the Frog Pond Area Plan. Prior to an area developing, it is important for the City to acquire the necessary right-of-way to accommodate the full future cross-section. This will ensure that additional changes, such as widening, can occur as the future need arises. Depending on the preferred cross-section and access spacing, it may be beneficial to change some of the functional classifications for the roadways fronting the Frog Pong Area.

The Wilsonville TSP designates the functional classifications for all of its existing roadways and planned roadway extensions. Each functional classification has corresponding cross-section and access spacing standards. The functional classifications for each of these roadways are provided previously in this memorandum and listed again in Table 6. This table also lists the access spacing standards that correspond with each functional classification. These standards particularly limit the number of accesses that would be provided on major arterials, such as Stafford Road. By having limited access, Stafford Road can better serve the higher traffic volumes it is expected to experience. Boeckman Road, as a Minor Arterial, also benefits from a reduced number of accesses so it can serve vehicles traveling between the Frog Pond Area and land uses to the west.

Table 6: City of Wilsonville Access Spacing Standards (Wilsonville TSP)

Functional Classification	Applicable Study Area Roadways	Access Spacing Standards[a]		What Does This Mean for the Study Area?
		Desired[b]	*Minimum*	
Major Arterial	Stafford Road	1,320 ft	1,000 ft	2-3 access points spaced approximately 900 to 1,000 feet apart along site frontage, preferably at Collector streets and other higher use streets (variances may be granted but will likely include turn restrictions)
Minor Arterial	Boeckman Road	1,000 ft	600 ft	Up to 3 access points spaced 600 feet apart along site frontage, preferably at Collector streets and/or aligned with existing streets to the south (variances may be granted but will likely include turn restrictions)
Collector	Advance Road	300 ft	100 ft	Preferably no more than 7 access points spaced 300 feet apart along site frontage with driveway access more easily provided
	Primary roadways through Frog Pond Area Plan neighborhoods	300 ft	100 ft	Up to 2 access points per 300-foot block, preferably to shared alleyways, retail sites, and apartments rather than private driveways

[a] Spacing is measured from centerline to centerline on Major Arterials and Minor Arterials and between adjacent curb returns on Collectors and Local Streets

[b] Desired Access Spacing shall be adhered to unless otherwise approved by the City Engineer. Reasons for deviating from Desired Access Spacing include aligning with existing driveways, topography, property limitations, and other safety related issues as identified in a transportation study.

While a street's functional classification does not dictate which street elements to include, it does facilitate the selection of multimodal facilities and widths that will help ensure the roadway can meet its intended multimodal function both now and in the future. Figure 6, Figure 7, and Figure 8 show the standard corridor cross-sections for Major Arterials, Minor Arterials, and Collectors, respectively. In addition, Figure 9 shows the buffered bike lane and two-way cycle track bicycle facility options. Roadway cross-section design elements include travel lanes, curbs, planter strips, sidewalks on both sides of the road, and bicycle facilities consistent with designated bikeways, walkways, and shared-use trails. Low impact development (LID) standards may also be used throughout the City at the City's discretion.

As a Major Arterial, Stafford Road is envisioned to eventually become a five-lane roadway. The operations analysis presented previously in this memorandum shows that a three-lane roadway would still be expected to provide adequate capacity to serve Frog Pond Area Plan through the 2035 planning horizon. Therefore, a three-lane roadway is considered sufficient in the short-term; however, Stafford Road would be approaching its three-lane capacity limit in the long-term. By acquiring adequate right-of-way for the future five-lane facility and designing a three-lane roadway that can easily be widened to five lanes, the City would ensure it can support future development without impacting established development in its northeast area and also can have improved access to the future growth areas.

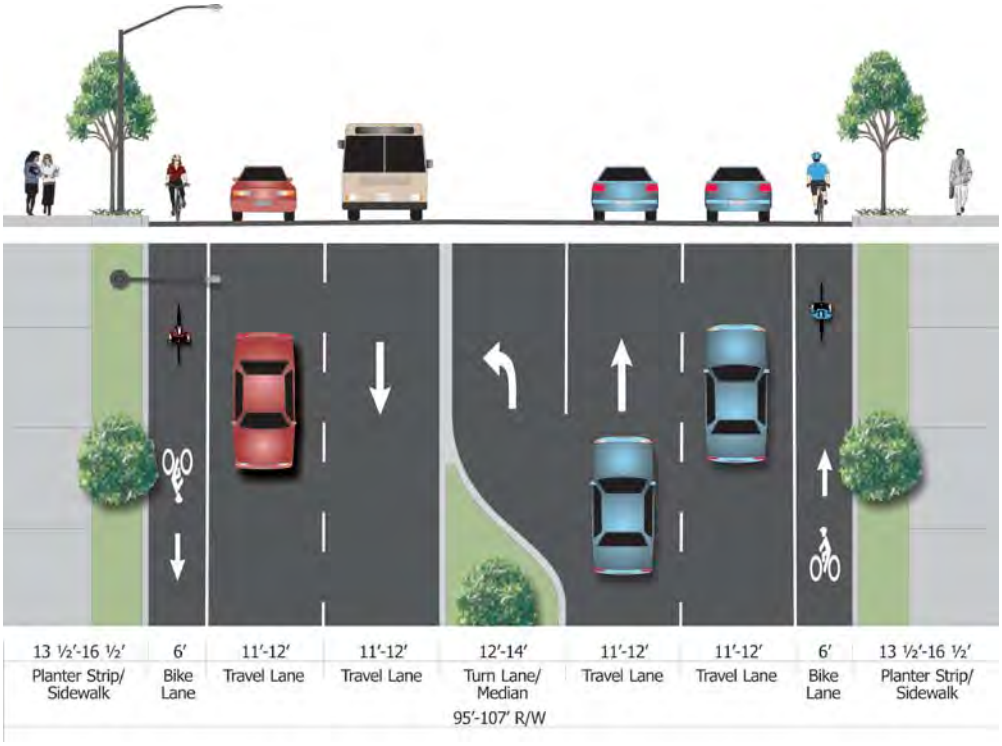


Figure 6: Major Arterial Cross-Section (Wilsonville TSP)

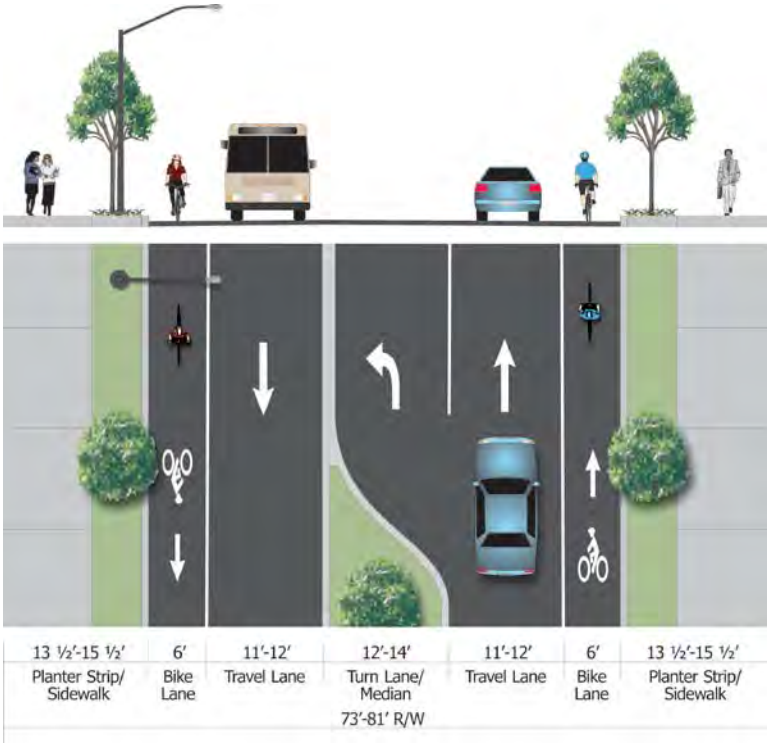


Figure 7: Minor Arterial Cross-Section (Wilsonville TSP)

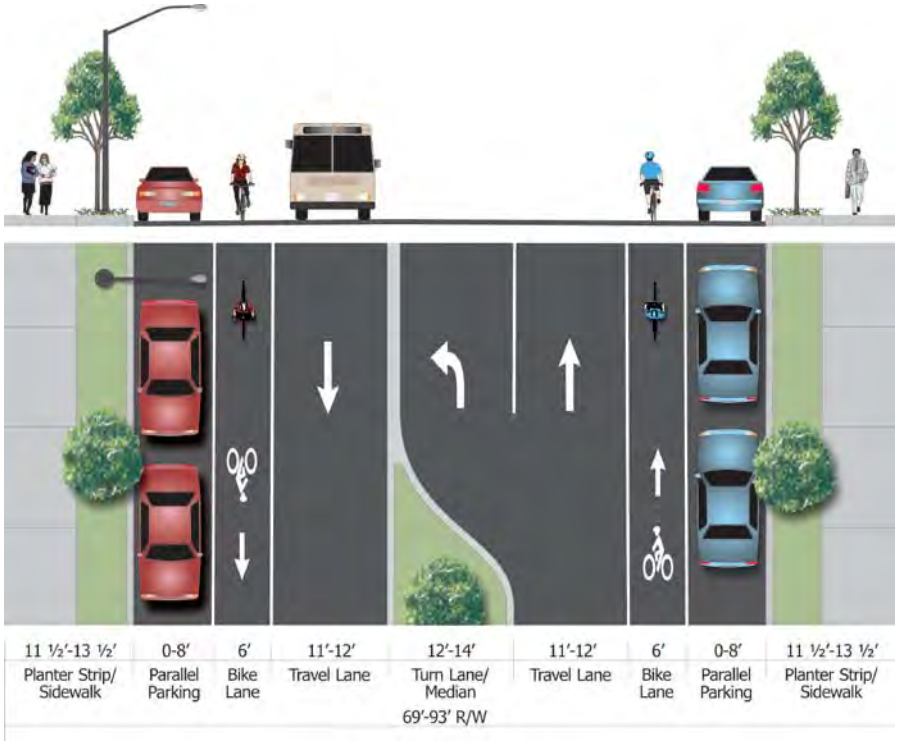


Figure 8: Collector Cross-Section (Wilsonville TSP)

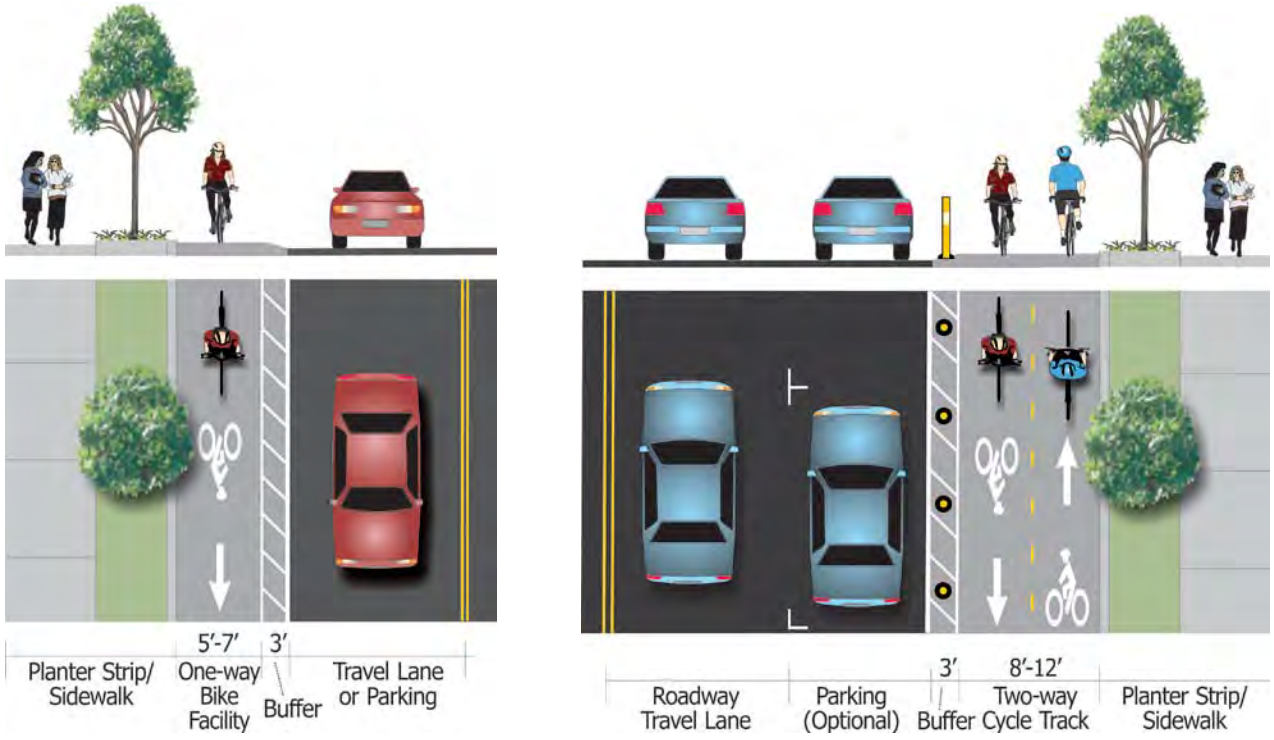


Figure 9: Buffered Bike Lane and Two-Way Cycle Track Bicycle Facility Options (Wilsonville TSP)

Only a portion of Advance Road is included in the City's urban growth boundary (UGB), and the Wilsonville TSP currently designates this section as a Collector street. If a substantial future development area was expected to be built east of the Frog Pond Area, then it may be beneficial to reclassify Advance Road as a Minor Arterial and provide additional capacity to serve greater traffic volumes. However, future urban growth to the east of the Frog Pond Area is highly unlikely during the planning horizon because much of the land to the east is designated Rural Reserve, which precludes its addition to the UGB for 50 years. As a Collector, Advance Road can accommodate a greater amount of access, which would be beneficial if a retail development was located at the corner of the Advance Road-Boeckman Road/SW Stafford Road-Wilsonville Road intersection, and also allows more points of connection to the future park and school site. As a Collector, the standard would also support on-street parking, which may be beneficial to the City adjacent to the proposed park. The Collector classification would include lower design speeds and a better pedestrian environment than an Arterial. These qualities will be beneficial to the high level of pedestrian activity near the park and schools.

The major streets through the East, West, and South Neighborhoods are being proposed as Collectors, which would include bike facilities (dedicated bike lanes or shared lanes) and on-street parking. It will be beneficial to have a consistent cross-section for all the Collector streets and to make the Collector a continuous through street where the side streets have stopped approaches. This would allow the streets to meet user expectation and to better collect traffic and utilize the capacity provided by the proposed traffic signal at the intersection of the Collector roadway and Stafford Road. One of the main challenges in the West Neighborhood is where there are east-west Collector roadway tees into the Collector roadway that runs north-south. As a four-legged intersection, this means the west leg would have a different cross-section from the east leg. Some options to

address this could be to have a roundabout, remove the west leg so it is just a three-legged intersection, or provide sharrows on the west leg so there is some parity with the east leg's bike lane.

Multimodal Connectivity

The City of Wilsonville highly values providing transportation system connectivity within and between its neighborhoods. Bicyclists, pedestrians, and transit riders benefit from closely spaced facilities because they are the most affected by distance. Good connectivity consists of the following:

- Direct connections between neighborhoods, schools, transit stops, retail centers, employment centers, and recreational areas that decrease out of direction travel
- Connected streets that help distribute traffic
- Walking and biking facilities
- Through streets that penetrate neighborhoods and accommodate transit routes

Figure 10 and Figure 11 show bicycle and pedestrian circulation diagrams for the grid and organic street frameworks, respectively. Both the grid and organic street frameworks have very similar transportation networks with basic features that support multimodal connectivity and are expected to facilitate travel choices between the various travel modes (i.e., walking, biking, taking transit, driving).

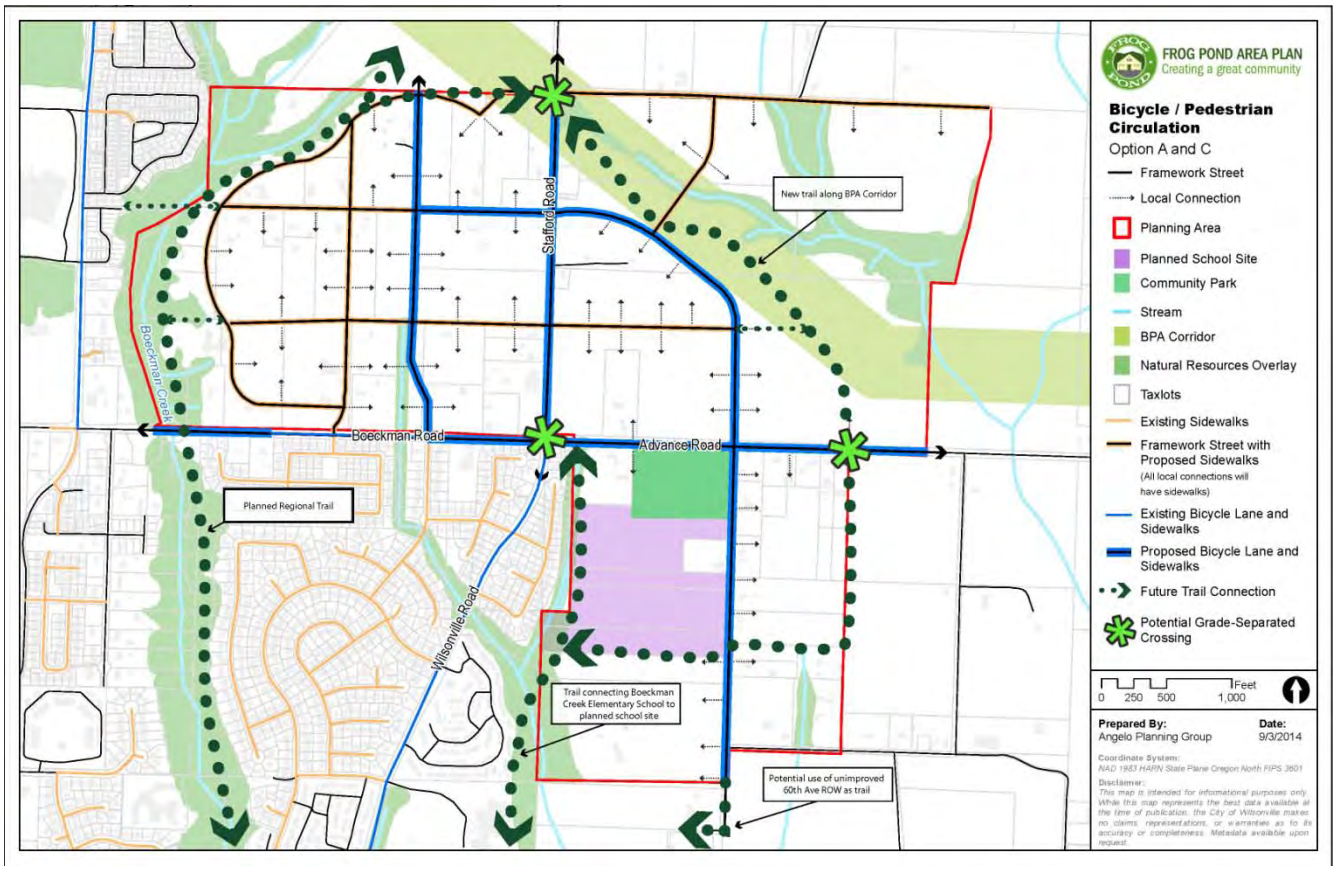


Figure 10: Bicycle and Pedestrian Circulation Diagram for Grid Network (Options A and C)

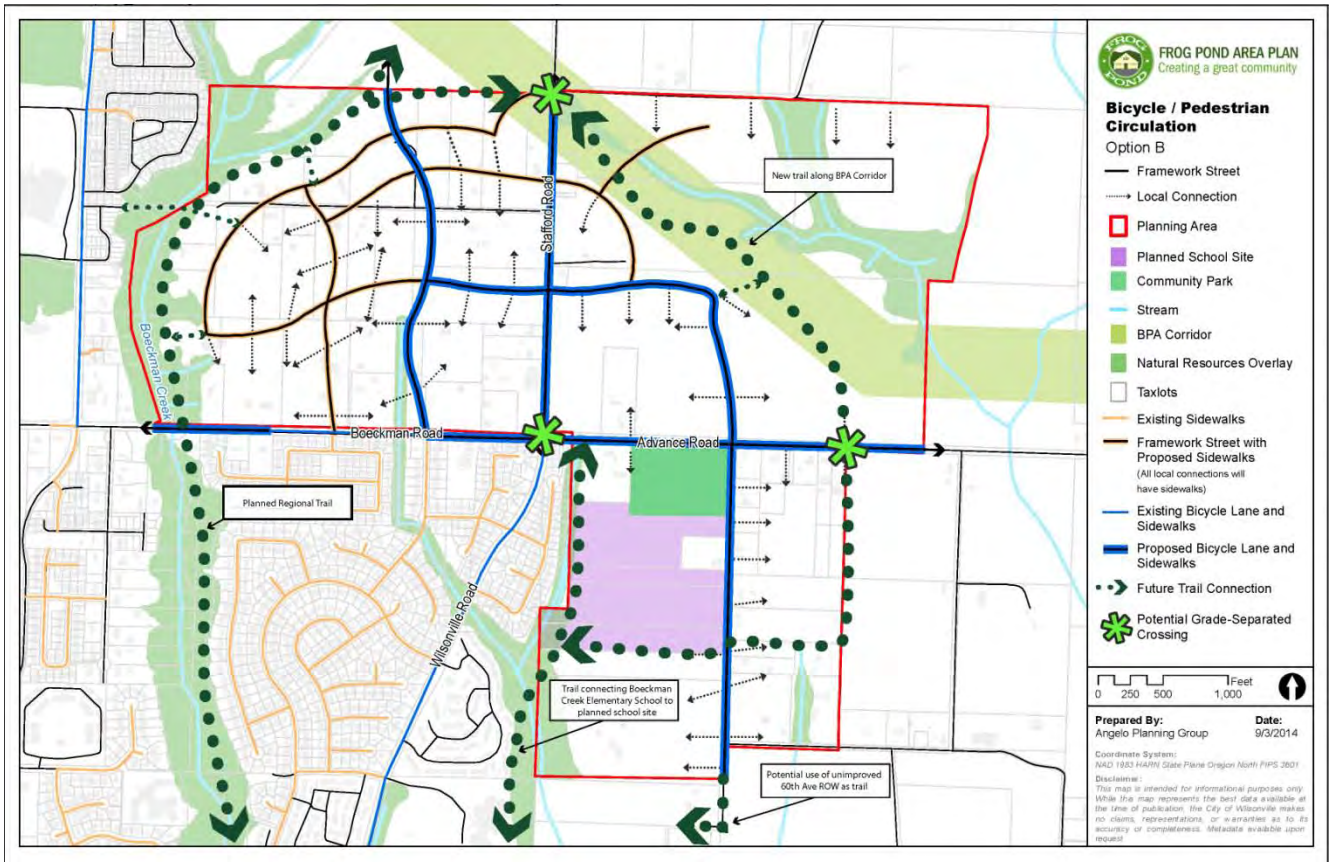


Figure 11: Bicycle and Pedestrian Circulation Diagram for Organic Network (Option B)

A mix of streets, bicycle facilities, and trails are shown on the figures that connect to the various land uses within the Frog Pond area (including the school site south of Advance Road, which should have safe routes connecting to the adjacent neighborhoods) and take advantage of natural and man-made features (including regional trails along Boeckman Creek and the BPA corridor). In addition, urban upgrades (including adding sidewalks, bike lanes, center turn lanes) are needed for Boeckman Road, Stafford Road, and Advance Road in conjunction with the development to fill in the pedestrian and bicycle network and connect to adjacent parts of Wilsonville. A new bridge on Boeckman Road over Boeckman Creek, where there is currently a geometric deficiency, would also improve connectivity between the Frog Pond Area and other neighborhoods to the west.

The street networks are also shown to connect internally as well as to Boeckman Road, Stafford Road, and Advance Road at locations that will help distribute traffic while also providing convenient access to the signalized access on Stafford Road (particularly for those needing to make a left turn during peak congestion periods) and connections to the existing neighborhood to the south. The figures also show arrows that represent potential local roadway connections. These connections occur approximately every 300 feet, which is important to meet City of Wilsonville standards for bicycle and pedestrian facility spacing guidelines.

The layout of the grid network does a particularly good job of providing internal connections that support circulation and access. The straight, regularly spaced roads provide clear expectations that can help reduce

uncertainty regarding the most direct route for walking or biking. However, the organic framework may contribute to a more pleasant walking and biking experience because the roadway curvature can help reduce motor vehicle speeds and add an aesthetic value for some pedestrians (others prefer a direct and convenient walking route). If the curvature of the organic network is desired, then one option may be to adapt the layout of the grid network but add curvature where appropriate.

Each of the different facilities serving the various travel modes should also be connected together at convenient locations in ways that support multimodal access and travel choices, especially to the planned school site, existing schools along Wilsonville Road, and the commercial area along Stafford Road. These trails are intended to accommodate both school and non-school users. The trails are also planned to connect to and cross the street system at either grade separated crossings or at intersections rather than midblock to avoid the need for special crossing treatments that stop traffic or create additional vehicle/pedestrian conflicts.

One important consideration is how to best accommodate pedestrians crossing Stafford Road, Boeckman Road, and Advance Road. The greatest amount of protection can be provided through grade separated crossings, which are recommended for each of the major trail crossings of these roadways. Providing grade separated crossings will improve both safety and the travel experience of trail users and drivers. In addition, pedestrian crossings will be accommodated at the proposed traffic signals at the Boeckman Road/Advance Road/Stafford Road/Wilsonville Road intersection and the signalized access point on Stafford Road. These signals should include clearly marked crosswalks, pedestrian countdown timers, and consideration for signal phasing to eliminate vehicle/pedestrian conflicts arising from vehicles turning left during a permitted phase. In addition, by locating the retail uses adjacent to the traffic signal on Stafford Road, access for both vehicles and pedestrians crossing the street can be best accommodated.

Transit Routing and Coverage Area

Transit routing and coverage are also important considerations for the Frog Pond Area Plan. Figure 12 and Figure 13 show the potential transit routing and coverage for the grid and organic street networks, respectively. The figures also show the existing transit route (Route 4) that uses Wilsonville Road and Boeckman Road. The potential transit routing assumptions through the Frog Pond Area are based on the potential use of Collector streets through the West and East Neighborhoods and the traffic signal on Stafford Road. It is important to ensure that these Collector streets and any required turn movements can accommodate transit vehicles. Coordination should also be performed with South Metro Area Regional Transit (SMART) and TriMet to identify any transit-related needs they have for the area. The study area west of Stafford Road (West Neighborhood) is currently in the SMART service district, while the areas east of Stafford Road and Wilsonville Road (East and South Neighborhoods) are in the TriMet service district. However, it is recommended that the area all be transferred to SMART, who will be better able to serve the development area.

The transit coverage areas are based on the assumption that pedestrians typically find it convenient to take transit when they are able to walk less than one-quarter mile to access a transit stop. A comparison of the grid and organic street networks shows that when the transit route is farther to the north and the signalized crossing is near Frog Pond Lane, the Frog Pond Area Plan experiences greater transit coverage on the north end. Otherwise, there are very few differences.

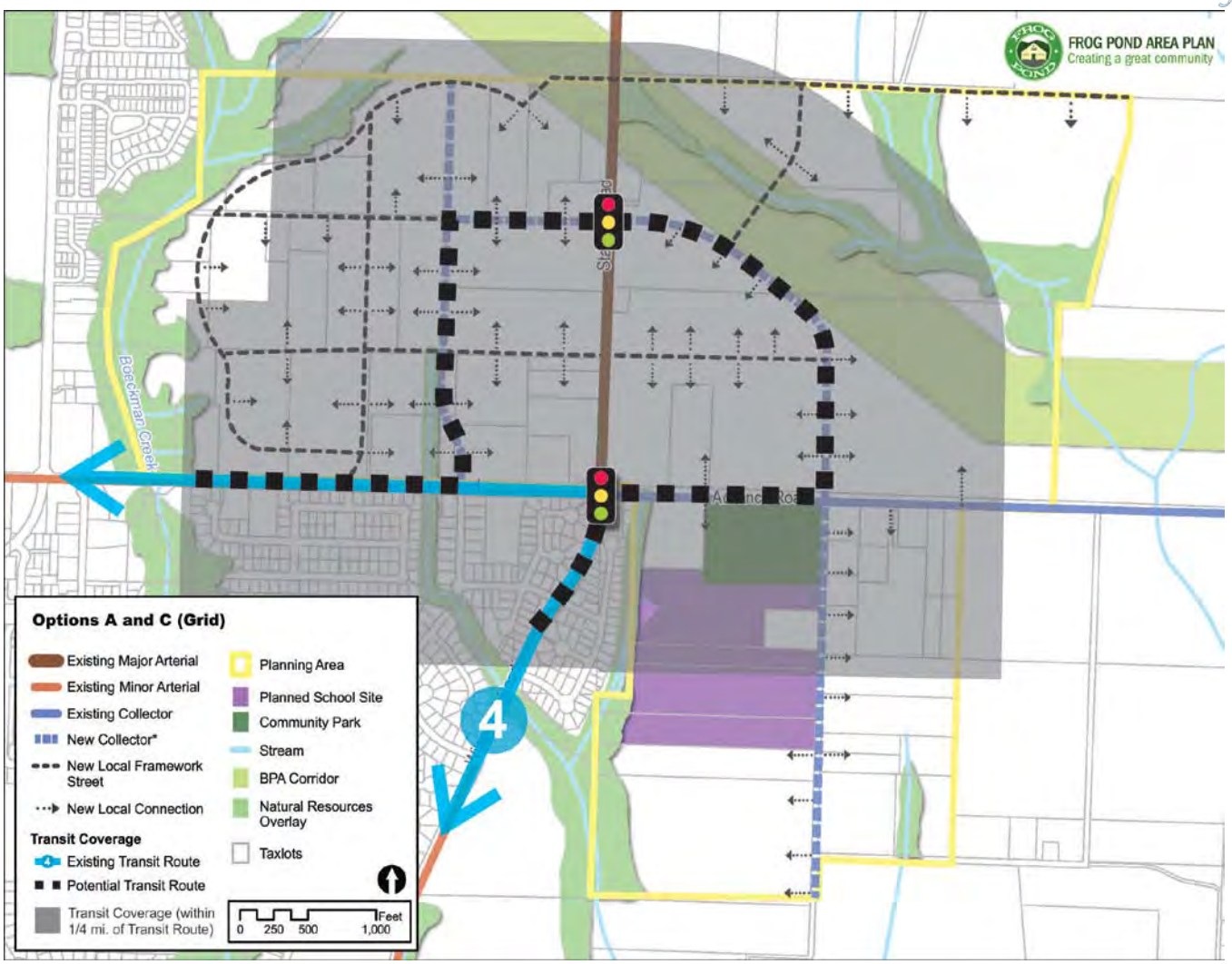


Figure 12: Potential Transit Routing and Coverage for Grid Network (Options A and C)

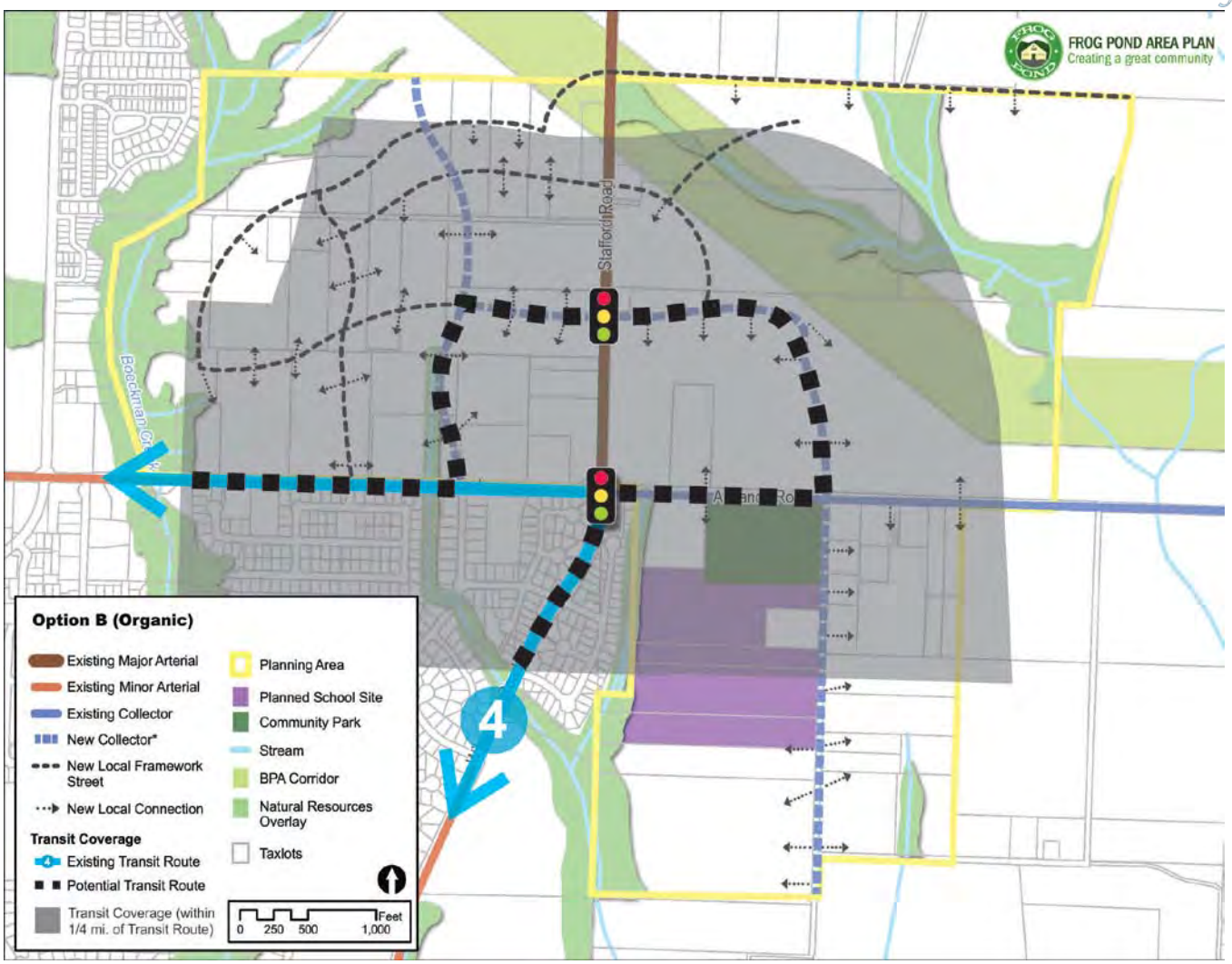


Figure 13: Potential Transit Routing and Coverage for Organic Network (Option B)

Transportation Costs

Planning level cost estimates have been prepared for the transportation improvements associated with the Frog Pond Area Plan. No substantial differences exist between the transportation network and improvement needs of the three alternatives; therefore, the same cost estimates are considered applicable. Table 7 lists the costs, which were primarily based on costs provided in the Wilsonville TSP. However, revisions were made to the funding source breakdown estimates as well as to the total cost of Project UU-01, which now includes a bridge, and Project UU-P1, which now extends a half-mile farther to the east to include the development area. The neighborhood Collector cost estimates were also newly prepared because they were not accounted for in the TSP. The City's portion of the neighborhood Collector cost is based on the assumption that the City would be responsible to pay for the cross-section overage associated with the inclusion of bike lanes on both sides of the road. Additional improvement project cost assumptions are provided in the appendix.

Table 7: Planning Level Transportation Costs Associated with Frog Pond Area Plan

Project	Planning Level Cost Estimate	Funding Source or Potential Proportionate Share Breakdown (FP = Frog Pond)						
		City (CIP)	*West FP*	*East FP*	*Non-School in South FP*	*School in South FP*	*Clackamas County*	*Federal/ Region*
UU-01 Boeckman Road Bridge Improvements (Option A)	$12,200,000	$3,700,000	-	-	-	-	-	$8,500,000
UU-02 (Part 1) Boeckman Road Urban Upgrade	$1,600,000	$800,000	$800,000	-	-	-	-	-
UU-02 (Part 2) Boeckman/ Stafford Traffic Signal	$500,000	-	$70,000	$180,000	$125,000	$125,000	-	-
UU-06 Stafford Road Urban Upgrade (3 lane plus extra ROW)	$4,200,000	-	$2,100,000	$2,100,000	-	-	-	-
Future Stafford Rd Upgrade to 5 lanes	$6,825,000	$6,825,000	-	-	-	-	-	-
Potential Single-Lane Roundabout on Stafford Road	$600,000	-	$300,000	$300,000	-	-	-	-
Widening Potential Roundabout to Dual Lanes with 5-Lane Upgrade	$400,000	-	$200,000	$200,000	-	-	-	-
UU-P1 Advance Road Urban Upgrade (Extended to Full Site Frontage)	$4,350,000	$1,000,000	-	$1,175,000	$2,175,000	-	-	-
RT-01A Boeckman Creek Trail (West Neighborhood)	$850,000	$570,000	$280,000	-	-	-	-	-
BPA Easement Trail (East Neighborhood)	$670,000	$450,000	-	$220,000	-	-	-	-
South Neighborhood Trail	$700,000	$460,000	-	-	$240,000	-	-	-
LT-P5 New School Site Trail (South Neighborhood)	$700,000	$700,000	-	-	-	-	-	-
SI-03 Stafford Rd/65th Ave Intersection Improvements	$5,500,000	$1,000,000	-	-	-	-	$4,500,000	-
West Neighborhood Collectors	$9,510,000	$1,585,000	$7,925,000	-	-	-	-	-
East Neighborhood Collectors	$8,160,000	$1,360,000	-	$6,800,000	-	-	-	-
South Neighborhood Collectors	$3,900,000	$450,000	-	-	$2,650,000	$800,000	-	-
Total	**$60,665,000**	**$18,900,000**	**$11,675,000**	**$10,975,000**	**$5,190,000**	**$925,000**	**$4,500,000**	**$8,500,000**

FROG POND AREA PLAN
Creating a great community

Appendix C: Frog Pond Area Plan Infrastructure Analysis memorandum

City of Wilsonville

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MSA
Murray, Smith & Associates, Inc.
Engineers/Planners
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TECHNICAL MEMORANDUM

DATE: September 24, 2014

PROJECT: 14-1553.600

TO: Joe Dills, Angelo Planning Group

FROM: Mathew L. Hickey, P.E.
Murray, Smith & Associates, Inc.

RE: Frog Pond Area Plan – Concept Plan Infrastructure Analysis

Introduction

The Frog Pond Area Plan, led by the City of Wilsonville, will establish a vision for the 500-acre Frog Pond area, and define expectations for the type of community it will be in the future. The project team has developed a set of three land use and transportation alternatives for consideration by the Frog Pond Planning Task Force, the public, stakeholders, and city policy-makers. This memorandum is one of several that are intended to provide information on the performance of the three alternatives to enable the Task Force, public, and policy-makers to make informed recommendations and decisions about a preferred alternative.

Executive Summary

The purpose of this memorandum is to evaluate three alternative "on-site" public utility infrastructure improvements and their associated costs relative to various development scenarios for the Frog Pond Area. The term "off-site" is also used throughout this document to refer to those utilities that support larger tracts of developable land. These off-site improvements are oversized in relation to providing services for individual properties that developers will construct, and are eligible for System Development Charge (SDC) credits to the developer under the current City funding policies.

The infrastructure improvements evaluated in this memorandum are limited to domestic water, sanitary sewer and storm drainage. The land use and transportation alternatives consist of the following[1]:

- Concept 1 – Grid, Low

  This alternative consists of a "grid" street layout with roadway alignments that generally run east to west, and north to south. Residential zoning within this scenario has the lowest average density of the three alternatives.

- Concept 2 – Organic, Medium

  This alternative consists of an "organic" street layout and medium average residential densities for the Frog Pond Area.

- Concept 3 – Grid, High

  This alternative consists of a "grid" street layout as described under Concept 1. Residential zoning within this scenario has the highest average density of the three alternatives.

The overall costs for providing on-site utility infrastructure are similar for the three alternatives, as summarized in Table 1, and illustrated in Figures 1 through 6[2]. These costs represent the infrastructure necessary to support a development's actual demands and the minimum required improvements defined under the City's Public Works Standards (PWS). For developments required to construct infrastructure exceeding their actual demands due to planning considerations for adjacent properties, the City compensates the developer using SDC credits. These costs are summarized in Table 2.

Each concept's demands for water and the peak flows for wastewater and storm drainage were estimated and evaluated. Although the demands for each utility service varied between scenarios, the minimum requirements for infrastructure sizing typically governed their design. These minimum requirements often generate utilities with capacities that exceed their service demands, which is explained in greater detail within each service summary.

[1] The three land use and transportation alternatives are described and illustrated in more detail in the Frog Pond Alternatives Summary Report prepared by Angelo Planning Group.
[2] Smaller residential streets are not shown for this analysis. The neighborhood collectors are shown due to a higher degree of confidence in their ultimate location, versus the uncertainty relative to the proposed location of smaller residential streets. The smaller residential streets are anticipated to be configured by property developers as more site specific plans are created.

Table 1 | Total On-Site Infrastructure Cost Summary

Neighborhood	Concept 1 Grid, Low	Concept 2 Organic, Medium	Concept 3 Grid, High
West	$29.6m	$35.8m	$30.0m
East	$26.9m	$25.6m	$27.1m
South	$24.3m	$19.1m	$24.4m
Totals	$80.8m	$80.5m	$81.5m

The previous planning analysis for "off-site" infrastructure improvements associated with the Frog Pond Area described improvements to infrastructure components located outside the Frog Pond Area needed to serve growth within Frog Pond. It also identified the "framework" components of on-site infrastructure to serve growth broadly within Frog Pond as well as future possible growth areas, such as the Elligsen Urban Reserve (4G)[3].

Where on-site infrastructure must be over-sized to serve development beyond the abutting property, developers are required by City standards to install these improvements at time of development; however they are given SDC credits for the incremental cost increase due to the required oversizing. Table 2 presents the estimated oversizing costs to be paid by the City thru a reimbursement district, or through SDC credits for installed infrastructure exceeding the City's minimum requirements.

Infrastructure development options were evaluated relative to a number of criteria including cost, environmental impact and compatibility with development needs. Where utilities deviated from a roadway alignment, an easement was assumed to be necessary through private property and was evaluated as an unfavorable aspect of the alternative. An evaluation matrix (see Table 10) provided later in this memorandum outlines the criteria and results of this analysis. Based on this evaluation it appears that Concept 2 offers the most favorable outcome relative to the utility infrastructure, primarily due to lower overall cost and the compatibility of water, sewer and stormwater alignments with road layout.

[3] *Frog Pond Area Plan Off-Site Infrastructure Analysis*, Murray, Smith & Associates, Inc., July 18, 2014.

Table 2 | Total Off-Site Infrastructure Cost Summary

Utility	Total Cost	Developer Cost	City (SDC) share	Remarks
Off-site water distribution within Frog Pond Area	$1.5m	$1.2m	$0.3m	Minimum standard: 8-inch diameter water main
Off-site water storage	$5.8m	SDCs[4]	$5.8m	25% of the total cost is attributable to the Frog Pond Area
Off-site sanitary sewer lines within Frog Pond Area	$13.7m	$10.0m	$3.7m	Minimum standard: 8-inch minimum diameter sewer main
Existing Off-site sanitary sewer piping upgrades	$8.0m	SDCs[4]	$8.0m	52% of total wastewater flow is attributable to the Frog Pond Area
Memorial Park Pump Station expansion	$5.2m	SDCs[4]	$5.2m	48% of total wastewater flow is attributable to the Frog Pond Area
Totals	$34.2m	$11.2m	$23.0m	

Conceptual Plan Infrastructure Analysis

Purpose

The purpose of this memorandum is to evaluate three alternative "on-site" public utility infrastructure improvements and their associated costs relative to various development scenarios for the Frog Pond Area. The term "off-site" is also used throughout this document to refer to those utilities that support larger tracts of developable land. These off-site improvements are oversized in relation to providing services for individual properties for which developers will construct, and may be eligible for SDC credits to the developer or subject to a reimbursement district under the current City funding policies.

Background

The analysis presented in this memorandum is based on information provided in the draft Land Use Alternatives Capacity Analysis provided by Angelo Planning Group, dated July 31, 2014. The infrastructure improvements evaluated in this memorandum are limited to

[4] The full cost of this improvement will be funded through SDC revenue by the city. The proportion of the demand (and cost) attributable to the Frog Pond Area is included for purposes of comparing SDC revenues and expenditures linked to growth in Frog Pond, as analyzed in the Funding Analysis memorandum prepared by Leland Consulting Group.

domestic water, sanitary sewer and storm drainage. The land use and transportation alternatives consist of the following[5]:

- Concept 1 – Grid, Low

  This alternative consists of a "grid" street layout with roadway alignments that generally run east to west, and north to south. Residential zoning within this scenario has the lowest average density of the three alternatives.

- Concept 2 – Organic, Medium

  This alternative consists of an "organic" street layout and medium average residential densities for the Frog Pond Area.

- Concept 3 – Grid, High

  This alternative consists of a "grid" street layout as described under Concept 1. Residential zoning within this scenario has the highest average density of the three alternatives.

Figures 1 through 6 presented at the end of this memorandum illustrate the utility infrastructure needs for these development options. Figures 1 through 3 show utility infrastructure needed to support the grid street layouts associated with Land Use Concept 1 or 3, while Figures 4 through 6 indicate the utility needs for the organic street layout associated with Land Use Concept 2[6]. Regarding Land Use Concepts 1 and 3, the utility sizes are essentially the same between the development scenarios; as such, a single utility map is provided that will serve them both equally.

Utility Infrastructure Improvement Concepts

The anticipated on-site utility infrastructure required to support the land use alternatives are presented below. These elements consist of stormwater, sanitary sewer, domestic water and fire flow supply improvements. With the exception of stormwater, the infrastructure needs for the Frog Pond Area are very similar for the grid and organic street layouts and the alternative land use scenarios. As such, alternatives relative to planning these neighborhoods will likely be evaluated based on other factors besides the required utility infrastructure.

[5] The three land use and transportation alternatives are described and illustrated in more detail in the Frog Pond Alternatives Summary Report prepared by Angelo Planning Group.
[6] Smaller residential streets are not shown for this analysis. The neighborhood collectors are shown due to a higher degree of confidence in their ultimate location, versus the uncertainty relative to the proposed location of smaller residential streets. The smaller residential streets are anticipated to be configured by property developers as more site specific plans are created.

An evaluation supporting this statement is provided under each of the following utility improvement summary sections below.

Stormwater Improvements

The planning for stormwater management facilities relies primarily upon their tributary impervious surface areas. These impervious areas can be estimated from the City of Wilsonville's Stormwater Master Plan, which provides percentages of impervious areas based on various land use types[7].

A set aside area for stormwater management facilities can then be obtained by applying an assumed ratio of 7.5 percent for commercial and residential areas, and 10 percent for streets relative to these impervious areas. This ratio represents a Low Impact Development (LID) approach to stormwater management, and the resulting set aside areas are summarized in Table 3. Streets were allocated the maximum allowable ratio by City's PWS of stormwater set aside due to their tributary area comprising essentially all impervious surfaces.

The approximate size and location of the stormwater management set aside areas are shown on Figures 1 through 6. The set aside areas have been placed at assumed locations based on general drainage routing resulting from various street configurations. These preliminary locations approximate the proportional set aside area necessary to manage stormwater originating from upstream impervious areas. They may be revised based on site-specific considerations at time of development.

Table 3 | Stormwater Set Aside Acreage for LID Facilities

				Residential Density				
	Neighborhood	**Commercial**	**Streets**	**Very Low**	**Low**	**Medium**	**High**	**Totals**
Concept 1 Grid, Low	West	0.0	2.8	0.8	2.4	0.0	0.0	6.0
	East	0.3	2.5	0.9	0.8	1.7	0.0	6.2
	South	0.0	1.5	0.0	1.1	1.3	0.0	3.9
	Totals	0.3	6.8	1.7	4.2	3.0	0.0	16.1
Concept 2 Organic	West	0.0	2.8	0.0	2.4	0.9	0.0	6.1
	East	0.3	2.5	0.0	0.8	1.7	1.1	6.4
	South	0.0	1.5	0.0	1.1	1.2	0.0	3.8
	Totals	0.3	6.8	0.0	4.2	3.8	1.1	16.3
Concept 3 Grid, High	West	0.3	2.7	0.0	2.4	3.2	0.0	8.5
	East	0.0	2.6	0.0	0.8	2.6	1.2	7.2
	South	0.0	1.5	0.0	1.1	1.5	0.3	4.3
	Totals	0.3	6.8	0.0	4.2	7.2	1.5	20.1

[7] Technical Memorandum, March 2012, City of Wilsonville Stormwater Master Plan Update Hydraulic and Hydrologic Modeling, URS Corporation.

The stormwater management approaches are anticipated to consist largely of roadside bioswales and detention basins to manage drainage originating from development. Drainage originating from private developments are expected to be managed by the private developer in accordance with the City's PWS and Oregon Drainage Law.

Since the total length of the neighborhood streets is nearly equivalent between the grid and organic schemes, the impervious areas associated with these facilities are also essentially equivalent. Therefore, the three alternatives are similar or equal in terms of needs and costs for stormwater infrastructure, which is reflected in the estimated costs for the improvements as summarized by Table 4.

Concept 3 will incur additional costs over the other options, since the higher development density is associated with greater impervious areas. These larger impervious areas would generate the need for larger stormwater management facilities, increasing their costs above the other alternatives.

Table 4 | On-Site Stormwater Infrastructure Cost Summary

Neighborhood	Concept 1 Grid, Low	Concept 2 Organic	Concept 3 Grid, High
West	$5.1m	$4.8m	$5.5m
East	$3.2m	$3.6m	$3.4m
South	$3.0m	$2.8m	$3.1m
Totals	$11.3m	$11.2m	$12.0m

Stormwater infrastructure must be constructed to convey drainage in accordance with the City's PWS and Oregon Drainage Law. Each successive conveyance within each basin will experience increased flows to account for the additional tributary areas upstream. As such, improvements are sized to convey the flows that are received, and are ineligible for reimbursement of system development charges.

Figures 1 through 6 anticipates that runoff for public roads will be comingled with private runoff, and conveyed to the downstream receiving conveyance by roadside bioswales and other strategically placed LID stormwater management facilities. The upsizing or additional improvements necessary to manage runoff from public roads is anticipated to be constructed by private developers as part of the overall development. The developers would be compensated for these improvements through a Stormwater Reimbursement District, while being responsible for the costs presented in Table 4.

Sanitary Sewer Improvements

The total length of the proposed streets within each of the grid and organic layout options are within approximately one percent. Since sanitary sewer collection piping is typically placed under the streets serving the adjacent developed areas, the total length of these utilities will

be approximately equal for either street layout selected. In locations where the pipe deviates from a roadway alignment, piping is the same for all options.

For the Frog Pond Area, the alternative land uses do not appreciably impact the sizing of supporting sanitary sewers, since their design is more heavily influenced by inflow and infiltration, the natural topography and PWS for minimum pipe slopes and pipe sizes. Similarly, the pump stations necessary to serve areas with relatively low lying elevations are the same for all options.

Table 5 below summarizes the peak wastewater flows that are estimated to result from the alternative land uses. The Average Peak Daily Flow (APDF) is used to size sewer pipes and is calculated by including Average Dry Weather Flows (ADWF) multiplied by a peaking factor of two, plus contributions from Rainfall Derived Inflow and Infiltration (RDII) at 1,800 gallons per acre per day. These two assumptions for APDF and ADWF are consistent with the values being utilized by the current Wastewater Collection System Master Plan under development with the City.

The sewer flow rates presented in Table 5 were used to size the sanitary sewer pipe diameters shown in Figures 1 through 6. A minimum pipe diameter of 8 inches was selected based on the City's PWS. Another key consideration in determining the pipe diameter was the need to achieve service to remote areas at relatively flat pipe slopes, while still maintaining the minimum flow velocities that typically prevent sediment deposition.

Table 5 | Sanitary Sewer Flow Summary

Neighborhood	Average Peak Daily Flow (APDF), GPM		
	Concept 1 Grid, Low	Concept 2 Organic	Concept 3 Grid, High
West	302	352	397
East	308	393	417
South	215	213	231
Totals	825	958	1,045

In order to provide service to all areas within the Frog Pond Area, sewers in certain locations are anticipated to include segments of deep burial depths at minimum allowable slopes to overcome topographical constraints. This design approach may result in larger diameter pipes at greater free board depths in certain locations, and accommodate facility capacity that exceeds the demands generated in the development footprint of the three alternatives. Therefore, the three alternatives are similar or equal in terms of considerations for sanitary sewer infrastructure, which is reflected in the estimated costs for the improvements as summarized by Table 6.

Table 6 | On-Site Sanitary Sewer Infrastructure Cost Summary[8]

Neighborhood	Concept 1 Grid, Low	Concept 2 Organic	Concept 3 Grid, High
West	$13.5m	$20.8m	$13.5m
East	$17.2m	$14.6m	$17.2m
South	$15.1m	$11.2m	$15.1m
Totals	$45.8m	$46.6m	$45.8m

The previous planning analysis for "off-site" infrastructure improvements associated with the Frog Pond Area included three pump stations and associated force main[9]. The pump stations were categorized as off-site improvements based on the assumption that the basins served would include multiple developments. Categorizing the pump stations as off-site improvements would place the construction, operation and maintenance of the pump stations under the purview of the City. The City has since indicated that these pump stations should be considered "on-site" improvements and the responsibility of the private developer for construction. As such, the "on-site" costs in Table 6 account for the private pump stations indicated on Figures 1 through 6. The construction costs from the previous planning analysis for "Proposed Off-site Piping Connections" would therefore be revised from $15.9m to $13.7m.

The City's minimum sanitary sewer is an 8 inches in diameter. Developers would be required to construct improvements meeting this minimum standard; however, the general development plan will require construction of interceptor sewers within major collector streets that will exceed this size based on anticipated loading from upstream properties. To account for this, these interceptors are considered off-site improvements and are presented in Table 7, along with the costs associated with meeting the City's minimum sewer sizing requirements (these segments are identified as "OFF-SITE" on Figures 1 through 6). The column indicated as "Developer Cost" represents the sewer cost constructed at an 8-inch minimum diameter.

[8] The costs for sanitary sewer infrastructure include an assumption all sewers are 15 feet deep and that manholes are provided on average every 400 feet and at all street intersections.
[9] *Frog Pond Area Plan Off-Site Infrastructure Analysis*, Murray, Smith & Associates, Inc., July 18, 2014.

Table 7 | Proposed Connections to Off-Site Sanitary Sewers

Sewer Line	From	To	Length (lineal feet)	Diameter (inches)	Total Cost (million)	Developer Cost[10] (million)
SW Boeckman Road	Boeckman Creek	SW Stafford Road	2,800	18	$2.6	$1.9
SW Advance Road	SW Stafford Road	East boundary of URA North	2,600	10 and 15	$1.9	$1.7
SW Stafford Road	SW Boeckman Road	SW Briar Patch Lane	2,700	12	$1.6	$0.5
SW Briar Patch Lane	SW Stafford Road	Newland Creek tributary	1,200	10	$1.4	$0.8
Boeckman Sewer Extension	Boeckman Road	North boundary of Frog Pond UGB	3,350	12	$2.6	$2.2
Frog Pond Lane	Boeckman Road	Frog Pond Lane	1,800	10	$1.1	$0.9
SW 60th Ave.	School District south boundary	SW Advance Road	1,250	12	$1.1	$0.8
SW 60th Ave.	BPA easement	SW Advance Road	1,850	10	$1.4	$1.2
				Total =	$13.7	$10.0

Domestic Water and Fire Service Improvements

In a similar manner to the sanitary sewer, the length of the proposed streets within each of the grid and organic layouts resulted in nearly equivalent lengths of water main piping. The net densities between alternative land use scenarios do not appreciably impact the sizing of supporting utilities, since their design is primarily influenced by the City's PWS requirements for fire flow and the difference in domestic demands relative to the various development scenarios is relatively small.

The City's PWS stipulate that minimum fire flow shall be 1,500 gallons per minute (gpm) with a residual pressure of 20 pounds per square inch (psi) for single family residential areas. All other areas shall be provided with fire flows of 3,000 gpm at 20 psi. These fire flow rates are significantly higher than the anticipated maximum daily domestic water demands for the area, as summarized in Table 8.

[10] The "Developer Cost" accounts for the expense necessary to construct infrastructure meeting the City's minimum standards. The difference between the total cost and the developer cost would be credited back to the developer through adjustments to system development charges or a reimbursement district.

Table 8 | Domestic Water Demand

Neighborhood	Average Day Demand (ADD), gpm			Maximum Day Demand (MDD), gpm[11]		
	Concept 1 Grid, Low	Concept 2 Organic	Concept 3 Grid, High	Concept 1 Grid, Low	Concept 2 Organic	Concept 3 Grid, High
West	100	137	176	246	287	252
East	121	178	190	196	279	263
South	93	91	103	150	151	152
Totals	314	407	469	591	718	667

Fire flow requirements are the main factor in the pipe sizing as shown in Figures 1 through 6. Additionally, analysis considered maintaining flow velocities below 10 feet per second during concurrent maximum day demand and fire demand. Although the peak water demands plus fire flows in certain portions of the Frog Pond Area could be served by piping less than 8-inch in diameter, the PWS requirement for an 8-inch minimum waterline size dictates their use. Figures 1 through 3 illustrate the infrastructure needs for either Concept 1 or Concept 3, which are variations of residential density on the same grid street layout.

Since the fire flow rates typically exceed the domestic demand by eight to ten times, water main diameters are minimally influenced by the street configurations or the alternative land uses. Therefore, the three land use alternates are similar or equal in terms of considerations for domestic water and fire service infrastructure, which is reflected in the estimated costs for the improvements as summarized by Table 9.

Table 9 | On-Site Domestic Water and Fire Infrastructure Cost Summary[12]

Neighborhood	Concept 1 Grid, Low	Concept 2 Organic	Concept 3 Grid, High
West	$11.0m	$10.2m	$11.0m
East	$6.5m	$7.4m	$6.5m
South	$6.2m	$5.1m	$6.2m
Totals	$23.7m	$22.7m	$23.7m

It is recommended that the City conduct hydraulic modeling to confirm the sizing for "on-site" and "off-site" piping systems. Modeling will determine if the pipe sizing of the looped system is adequate to serve future Urban Reserve Areas, such as the Elligsen Urban Reserve (4G) to the north of the Frog Pond Area's West Neighborhood.

[11] Maximum Day Demands are calculated using Table ES.1 – Water Demands by User Type, of the City of Wilsonville Water System Master Plan, September 12, 2012.
[12] The costs for domestic water and fire infrastructure include an assumption that fire hydrants are provided on average every 400 feet and at all street intersections.

The previous planning analysis for "off-site" infrastructure improvements associated with the Frog Pond Area included $1.5m for "framework" components of the water distribution piping and $4.2m for off-site storage[13]. The framework water distribution piping accounted for 12 inch diameter mains, which exceed the City's minimum standard of 8 inches. The cost for 8 inch diameter distribution piping would be $1.2m. This portion of the cost would be considered developer responsibility, and has been included in Table 2. The remaining $0.3m would be funded through SDC credits to developers for oversizing.

Additionally, the storage demand from the Frog Pond Area was indicated by the City to represent 25% of the overall storage demand identified for the West Side Tank and 24-inch Transmission Main Project (Capital Improvement Project ID#125). The costs from the previous planning analysis for "Storage" would therefore be revised from $4.2m to $1.5m[14]. As such, the overall cost for this capital improvement project applicable to the Frog Pond Area is provided in Table 2.

Cost Estimates for Infrastructure

These costs presented in this memorandum are considered a Feasibility Level or Class 4 estimate as defined by the American Association of Cost Engineering (AACE). These values are considered accurate to +50 percent to –30 percent and are inclusive of direct construction costs in addition to a construction contingency, engineering, legal and anticipated City administrative expenses. All costs assume new construction. As such, no costs for pavement surface restoration are included for "on-site" piping. Costs for sanitary sewer are consistent with those being generated for the collection system Wastewater Master Plan under development.

Figures 1 through 6 illustrate infrastructure placed within roadway alignments for neighborhood collector streets. Although the smaller residential streets are not shown on Figures 1 through 6, the cost summaries provided include pricing for utilities placed within them. These costs assume that the utilities are sized for the minimum PWS standards, and are located consistently with the "Local Connection" indications on the area plan maps prepared by Angelo Planning Group[15].

[13] *Frog Pond Area Plan Off-Site Infrastructure Analysis*, Murray, Smith & Associates, Inc., July 18, 2014.
[14] The full cost of this improvement will be funded through SDC revenue by the city. The proportion of the demand (and cost) attributable to the Frog Pond Area is included for purposes of comparing SDC revenues and expenditures linked to growth in Frog Pond, as analyzed in the Funding Analysis memorandum prepared by Leland Consulting Group.
[15] The three land use and transportation alternatives are described and illustrated in more detail in Frog Pond Alternatives Summary Report prepared by Angelo Planning Group.

Qualitative Evaluation of Development Alternatives

The Evaluation Matrix provided in Table 10 qualitatively evaluates the three land use alternatives relative to the guiding principles and other related evaluation criteria for the Frog Pond Area Plan. These guiding principles have been developed by the planning team to promote cohesive neighborhoods through a holistic approach to the planning process. This approach was developed to foster community connectivity, create neighborhood gathering places, meet the City's housing needs, integrate sustainability, and provide compatible transitions to surrounding areas.

The guiding principles within the matrix are evaluated qualitatively relative to each other within each category. The qualitative scoring is based on the following:

+	Denotes the alternative concept offers benefits relative to the others
-	Denotes the alternative concept exhibits additional issues relative to the others
=	Denotes the alternative concept is essentially equivalent to the others

Table 10 | Evaluation Matrix

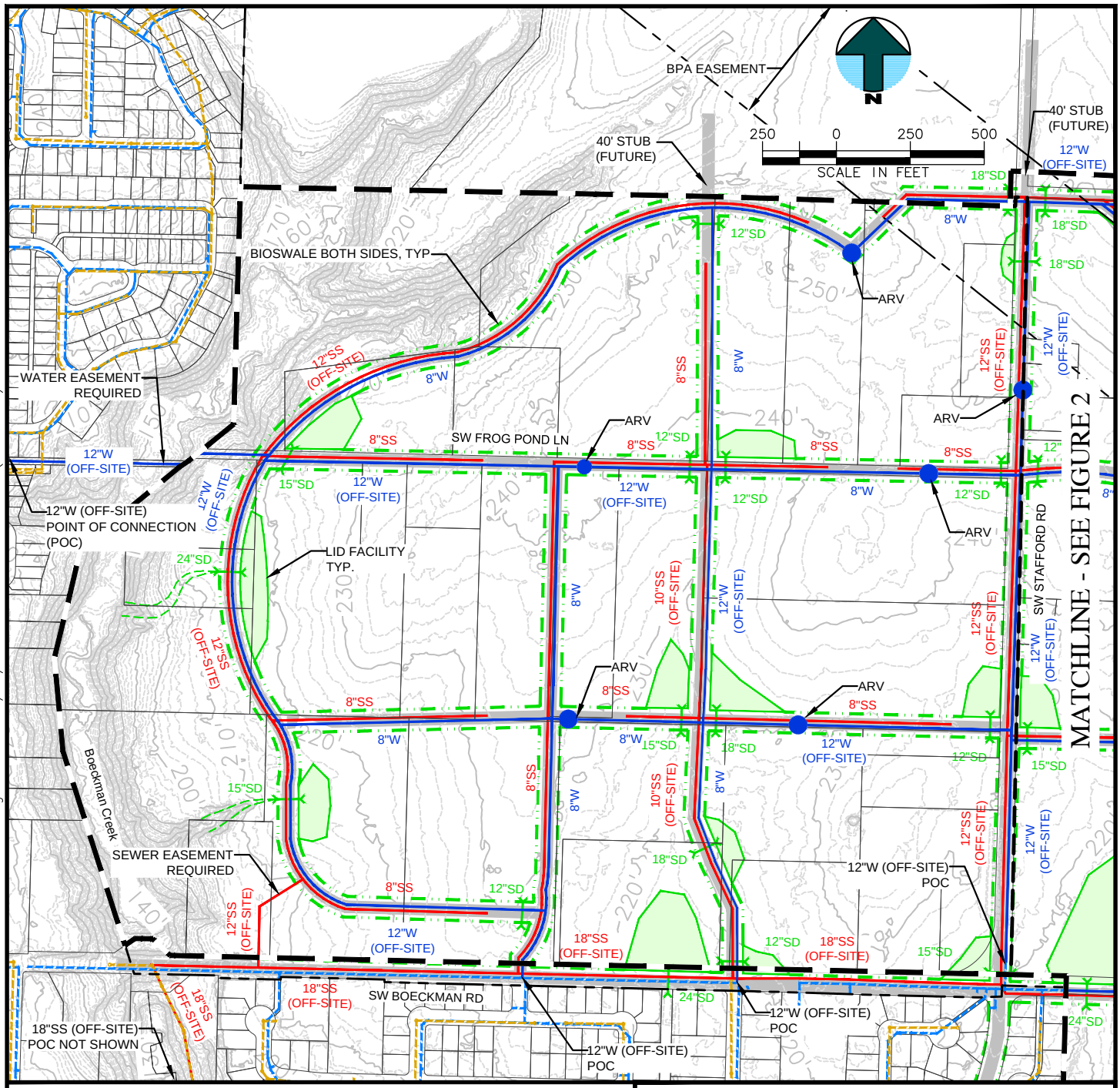
Guiding Principal	Evaluation Measures	Concept 1 Grid, Low	Concept 2 Organic, Med.	Concept 3 Grid, High	Remarks
Create a feasible implementation strategy - *A realistic funding plan for infrastructure, smart and flexible regulations, and other strategies promote successful implementation of the plan.*	Cost and ease of available mechanisms to fund water system improvements	=	+	=	Concept 2 is the least costly
	Cost and ease of available mechanisms to fund sanitary sewer system improvements	=	-	=	Concept 2 is the most costly
	Compatibility of water, sewer and stormwater alignments with road layout	=	+	=	Concept 2 requires minimum easements
	Operations & maintenance considerations, including accessibility to facilities, for water, sewer and stormwater	=	=	=	Alternatives are similar or equal
	Accommodating gravity sewer vs. relying on pumping	=	=	=	Alternatives are similar or equal
Retain trees - *Mature native trees are integrated into the community.*	Potential impacts to tree groves from infrastructure alignments	=	=	=	Alternatives are similar or equal
Integrate sustainability - *The plan integrates solutions which address economic, environmental and social needs. Frog Pond is a sustainable community over the long term.*	Environmental impacts to wetlands, tree groves and SROZ areas in the placement of transportation, water, sewer, and stormwater facilities	=	=	=	Alternatives are similar or equal
	Minimize total impervious area	=	=	-	Concept 3 realizes highest impervious areas
	Proximity of new infrastructure to seismic & potential landslide hazard areas, and steep slopes	=	+	=	West Neighborhood roadway for Concept 2 offset from Boeckman Creek ravine
	Compatibility of stormwater management facilities with existing topography	=	=	=	Alternatives are similar or equal

Summary

This memorandum evaluates the "on-site" utility infrastructure needs for the Frog Pond Area based on various development scenarios. The water demands and sewer and storm drainage design flows were estimated and the facilities sized based on the various development concepts. It was found that the infrastructure needs were very similar between the various street configuration and development densities and this was reflected in the facility sizing and estimated costs for each. The infrastructure needs were also quantitatively evaluated relative to the guiding principles and evaluation criteria developed by the planning team. It was found that utility infrastructure associated with the organic street layout of Concept 2 appeared to offer a slight advantage over the other alternatives relative to cost, compatibility with development configuration, and operations and maintenance considerations. This slight advantage was not of a magnitude to be considered critical in selecting the land use alternative.

MLH:njm

FIGURES



LEGEND

- FROG POND AREA BOUNDARY
- WASTEWATER PIPE - NEW
- WASTEWATER FORCE MAIN - NEW
- WASTEWATER PUMP STATION - NEW
- WASTEWATER PIPE - EXISTING
- STORM CULVERT - NEW
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- STORM PIPE - EXISTING
- STORM BIOSWALE - NEW
- WATER PIPE - NEW
- WATER AIR RELIEF VALVE (ARV) - NEW
- WATER PIPE - EXISTING
- CITY LIMITS
- URBAN GROWTH BOUNDARY (UGB)
- NEW STREET

FIGURE 1

City of WILSONVILLE In OREGON

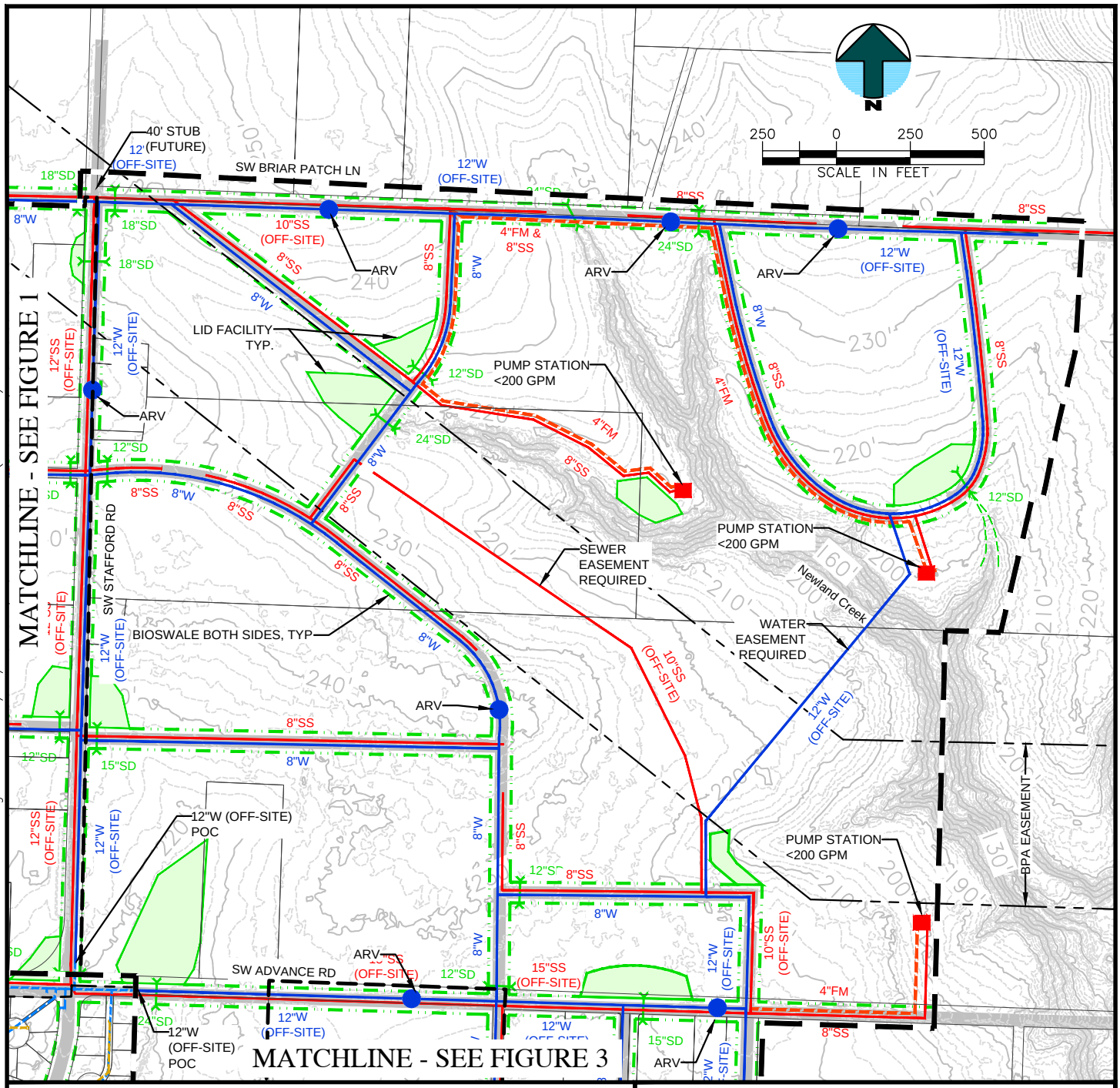
Frog Pond Area Plan
Composite Utility Plan

WEST NEIGHBORHOOD CONCEPTS 1 & 3 - GRID

MSA Murray, Smith & Associates, Inc. Engineers/Planners Portland, Oregon

August 2014
14-1553.500

G:\PDX_Projects\14\1553\CAD\Figures\14-1553-OR-NEIGHBORHOOD COMPOSITE UTILITY PLANS.dwg FIGURE 1 8/28/2014 8:43 AM NJM 19.1s (LMS Tech)



LEGEND

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FIGURE 2

City of WILSONVILLE In OREGON

Frog Pond Area Plan
Composite Utility Plan

EAST NEIGHBORHOOD CONCEPTS 1 & 3 - GRID

MSA Murray, Smith & Associates, Inc. Engineers/Planners Portland, Oregon

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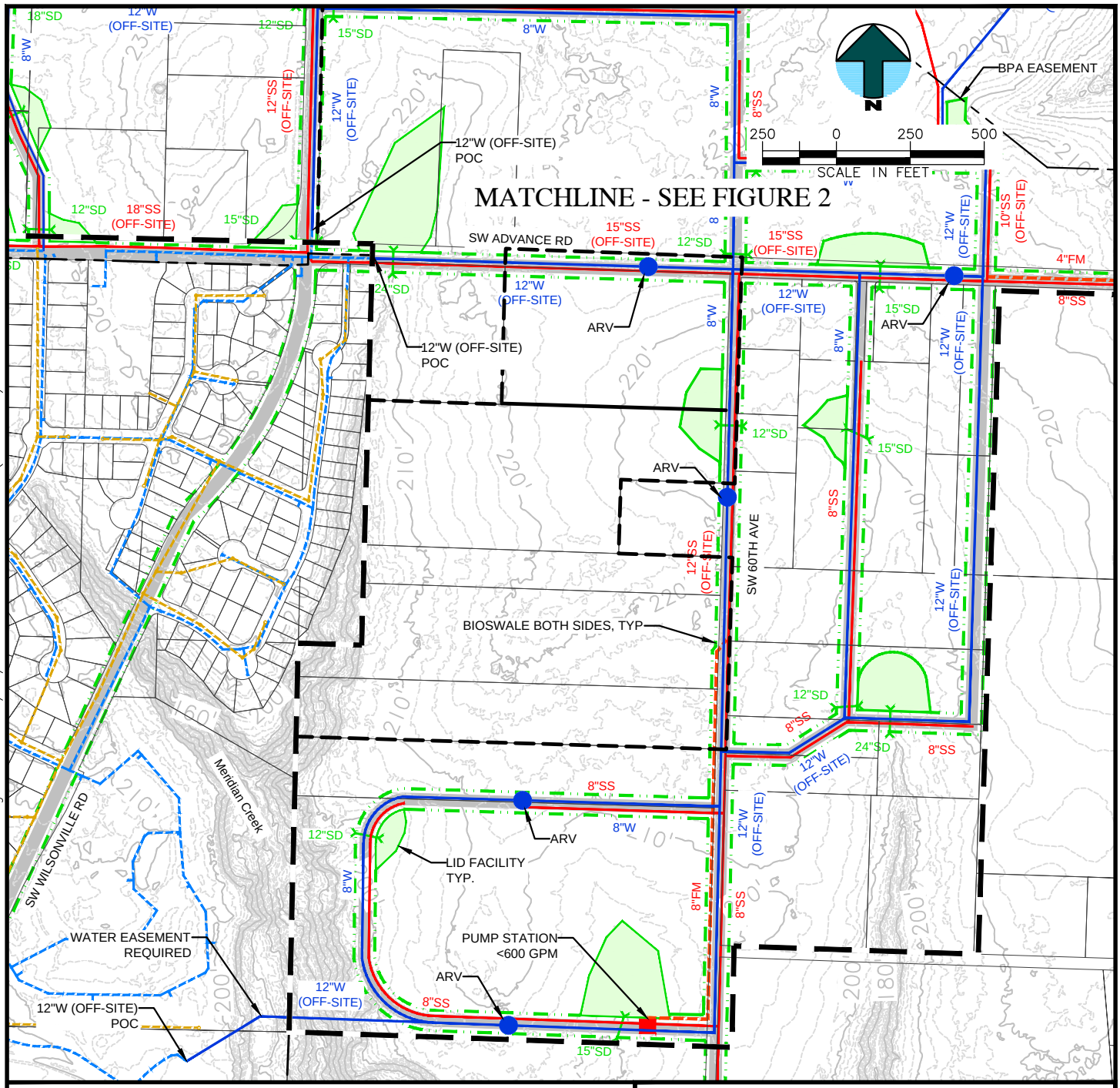

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- NEW STREET

FIGURE 3

City of WILSONVILLE In OREGON

Frog Pond Area Plan
Composite Utility Plan

SOUTH NEIGHBORHOOD CONCEPTS 1 & 3 - GRID

MSA
Murray, Smith & Associates, Inc.
Engineers/Planners
Portland, Oregon

August 2014
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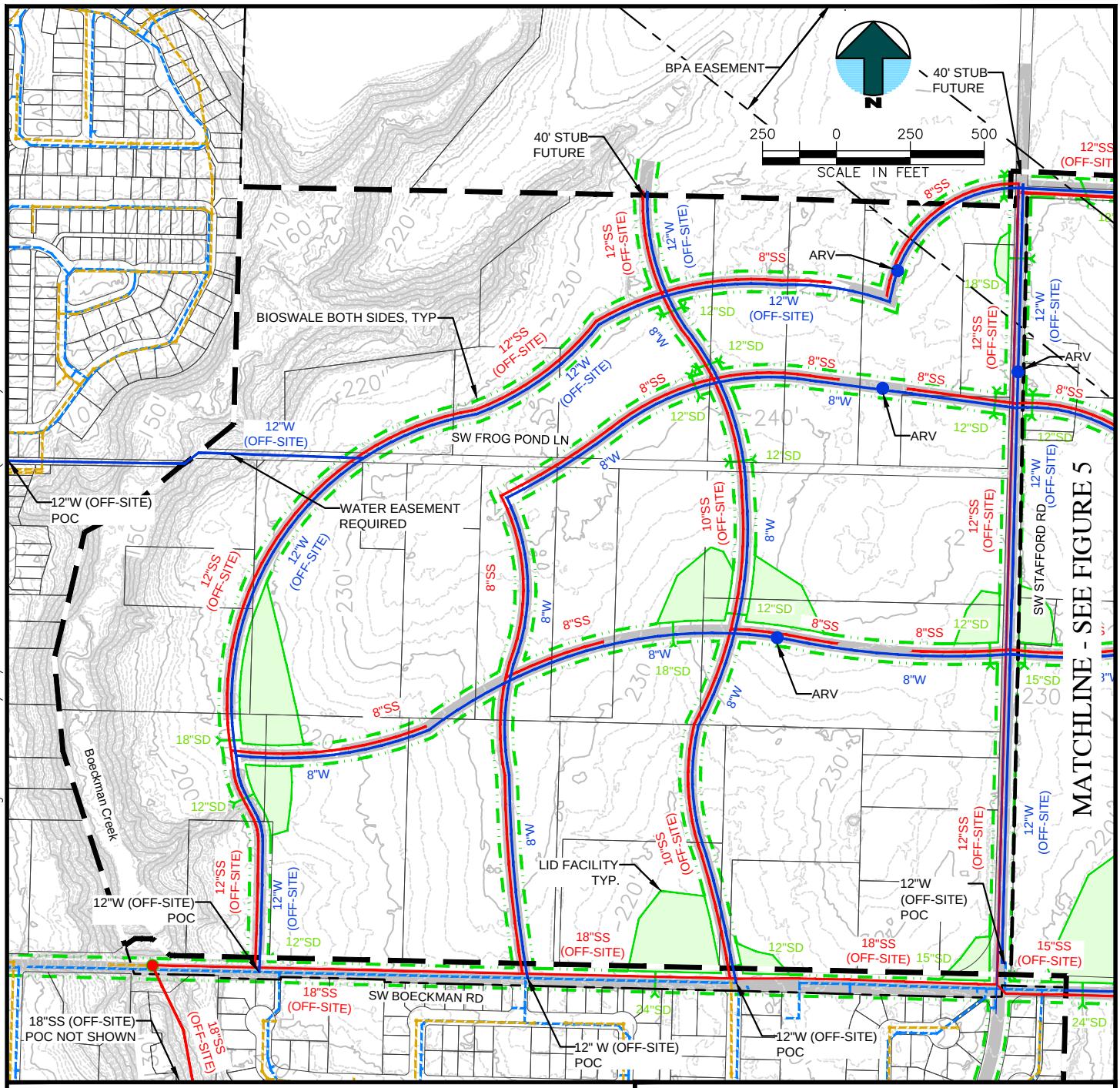

LEGEND

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- NEW STREET

FIGURE 4

City of WILSONVILLE In OREGON

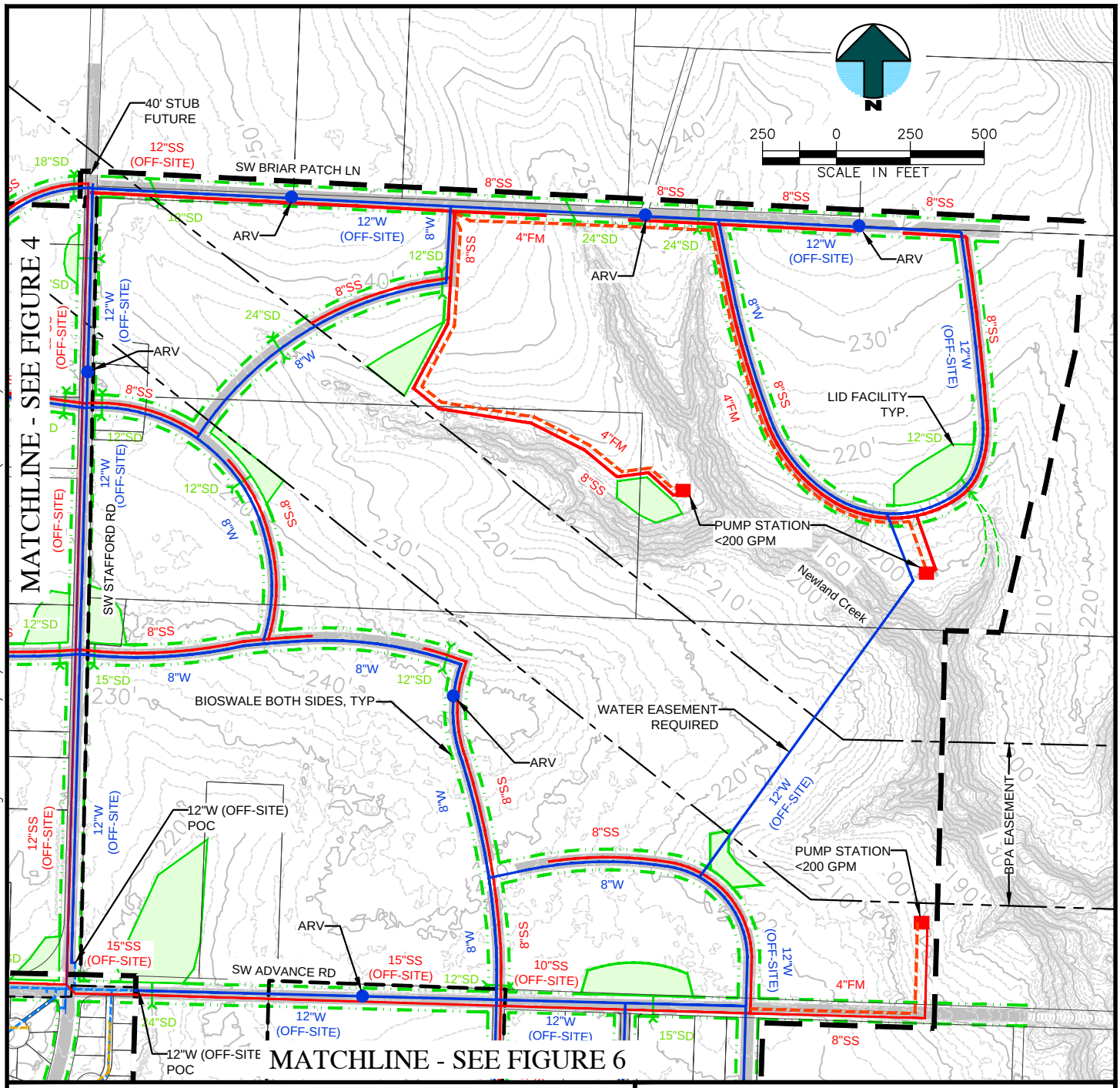
Frog Pond Area Plan
Composite Utility Plan

WEST NEIGHBORHOOD
CONCEPT 2 - ORGANIC

MSA
Murray, Smith & Associates, Inc.
Engineers/Planners
Portland, Oregon

August 2014
14-1553.500

G:\PDX_Projects\14\1553\CAD\Figures\14-1553-OR-NEIGHBORHOOD COMPOSITE UTILITY PLANS.dwg FIGURE 4 8/28/2014 8:43 AM NJM 19.1s (LMS Tech)



LEGEND

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- CITY LIMITS
- URBAN GROWTH BOUNDARY (UGB)
- NEW STREET

FIGURE 5

City of WILSONVILLE In OREGON

Frog Pond Area Plan
Composite Utility Plan

EAST NEIGHBORHOOD CONCEPT 2 - ORGANIC

MSA
Murray, Smith & Associates, Inc.
Engineers/Planners
Portland, Oregon

August 2014
14-1553.500

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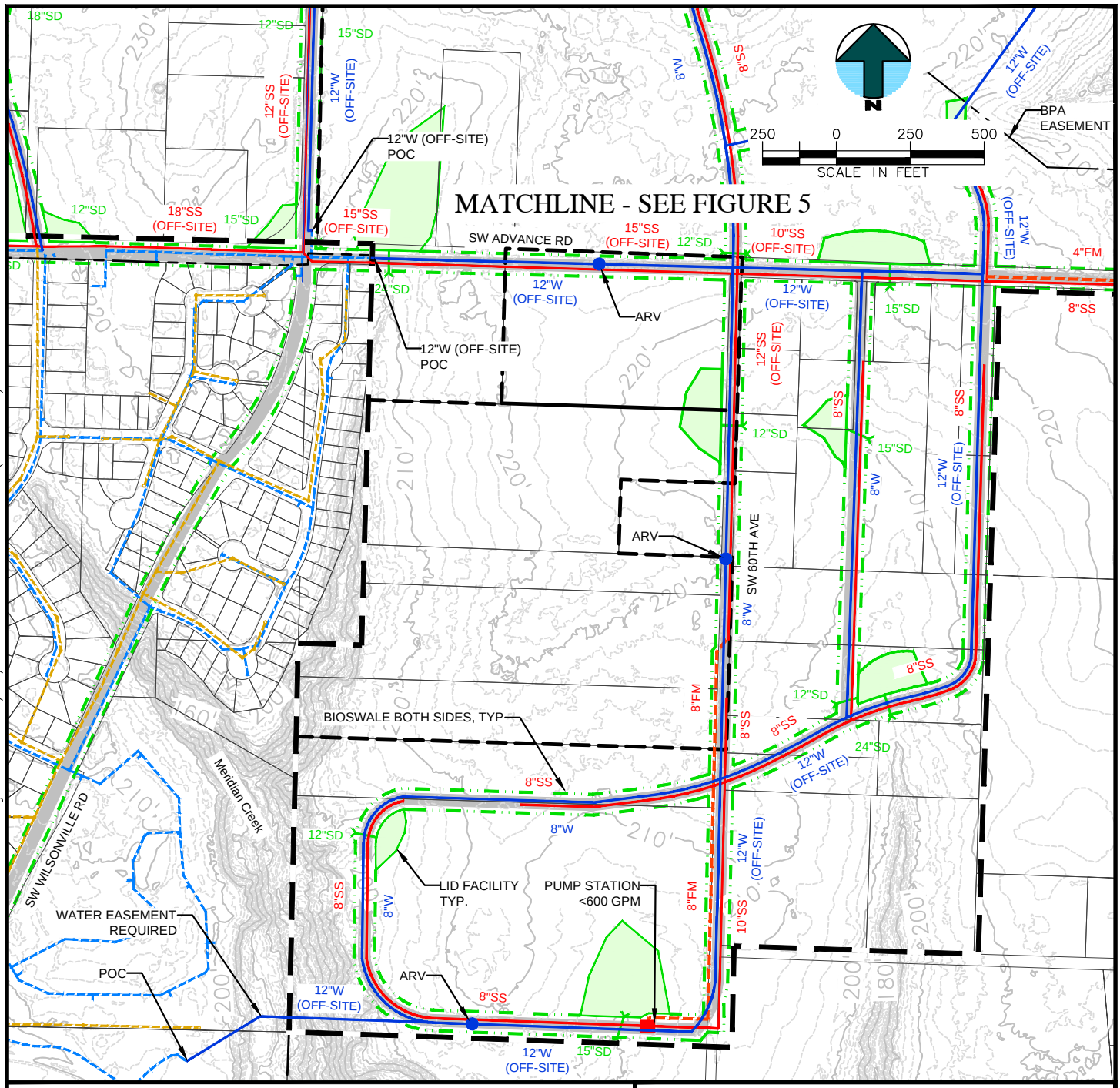

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- WATER PIPE - EXISTING
- CITY LIMITS
- URBAN GROWTH BOUNDARY (UGB)
- NEW STREET

FIGURE 6

City of WILSONVILLE In OREGON

Frog Pond Area Plan
Composite Utility Plan

SOUTH NEIGHBORHOOD CONCEPT 2 - ORGANIC

MSA
Murray, Smith & Associates, Inc.
Engineers/Planners
Portland, Oregon

August 2014
14-1553.500

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FROG POND AREA PLAN

Creating a great community

City of Wilsonville

City of Wilsonville

PLANNING COMMISSION
WEDNESDAY, OCTOBER 8, 2014
6:00 PM

VII. OTHER BUSINESS

A. 2014 Planning Commission Work Program

2014 Annual Planning Commission Work Program

DATE	AGENDA ITEMS		
	Informational	Work Sessions	Public Hearings
October 8	Climate Smart Communities	Sanitary Sewer Collection System Master Plan Frog Pond Area Plan	
October 16		**5:30: CCI Hosting** Frog Pond Open House	
November 12		**6:00: CCI Public Meeting:** Sanitary Sewer Collection System Master Plan	
December 10		Basalt Creek Concept Plan	Sanitary Sewer Collection System Master Plan
Jan. 14, 2015		Coffee Creek Industrial Area Form-Based Code	
January Day: TBD		**Joint City Council/ Planning Commission Work Session** Frog Pond Area Plan	

2014

1 5-year Infrastructure Plan
2 Asset Management Plan
3 **Basalt Creek Concept Planning**
4 Solid Waste and Recycling Code Amendments
5 Community Investment Initiative
6 **Climate Smart Communities (Metro)**
7 **Density Inconsistency Code Amendments**
8 Citywide signage and way finding program
9 **Industrial Form-Based Code**
10 **Frog Pond Area Plan**
11 **Goal 10 Housing Plan**
12 Old Town Code Amendments
13 Parks & Rec MP Update - Rec Center/Memorial Park Planning
14 **French Prairie Bike/Ped Bridge**

*Projects in bold are being actively worked on in preparation for future worksessions

City of Wilsonville

PLANNING COMMISSION
WEDNESDAY, OCTOBER 8, 2014
6:00 PM

VIII. INFORMATIONAL ITEMS

A. Climate Smart Communities

CLIMATE SMART COMMUNITIES SCENARIOS PROJECT

Metro

KEY RESULTS

The Climate Smart Communities Scenarios Project responds to a state mandate to reduce greenhouse gas emissions from cars and small trucks by 2035. Working together, community, business and elected leaders are shaping a strategy that meets the goal while creating healthy and equitable communities and a strong economy. On May 30, 2014, Metro's policy advisory committees unanimously recommended a draft approach for testing that relies on policies and investments that have already been identified as priorities in communities across the region. **The results are in and the news is good.**

WHAT DID WE LEARN?

We can meet the 2035 target if we make the investments needed to build the plans and visions that have already been adopted by communities and the region. However, we will fall short if we continue investing at current levels.

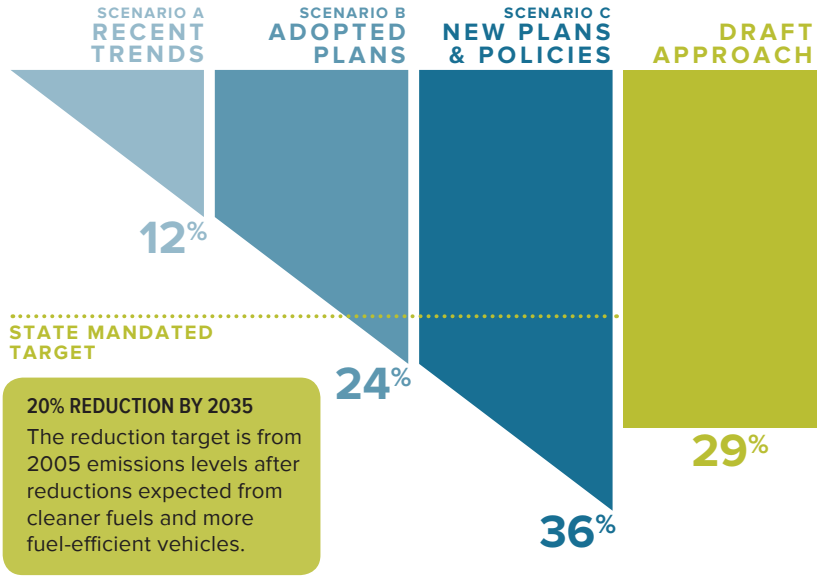
The region has identified a draft approach that does more than just meet the target. It supports many other local, regional and state goals, including clean air and water, transportation choices, healthy and equitable communities, and a strong regional economy.

WHAT KEY POLICIES ARE INCLUDED IN THE DRAFT APPROACH?

- Implement adopted plans
- Make transit convenient, frequent, accessible and affordable
- Make biking and walking safe and convenient
- Make streets and highways safe, reliable and connected
- Use technology to actively manage the transportation system
- Provide information and incentives to expand the use of travel options
- Manage parking to make efficient use of land and parking spaces

Reduced greenhouse gas emissions

PERCENT BELOW 2005 LEVELS



After a four-year collaborative process informed by research, analysis, community engagement and deliberation, the region has identified a draft approach that achieves a 29 percent reduction in per capita greenhouse gas emissions and supports the plans and visions that have already been adopted by communities and the region.

oregonmetro.gov/climatescenarios

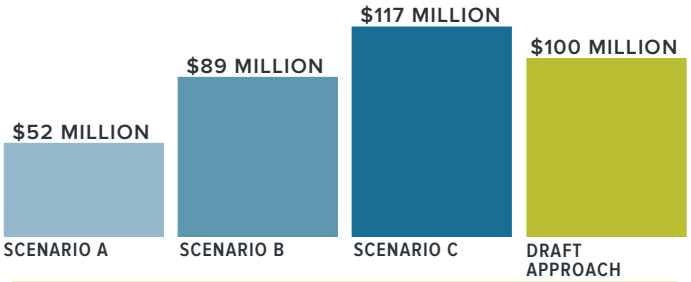
WHAT ARE THE PUBLIC HEALTH AND ECONOMIC BENEFITS?

By 2035, the draft approach can help people live healthier lives and save businesses and households money through benefits like:

- Reduced air pollution and increased physical activity can help **reduce illness and save lives**.
- Reducing the number of miles driven results in **fewer traffic fatalities and severe injuries**.
- Less air pollution and run-off of vehicle fluids means **fewer environmental costs**. This helps save money that can be spent on other priorities.
- Spending less time in traffic and reduced delay on the system **saves businesses money, supports job creation**, and promotes the efficient movement of goods and a strong regional economy.
- **Households save money** by driving more fuel-efficient vehicles fewer miles and walking, biking and using transit more.
- Reducing the share of household expenditures for vehicle travel **helps household budgets** and allows people to spend money on other priorities; this is particularly important for households of modest means.

Our economy benefits from improved public health

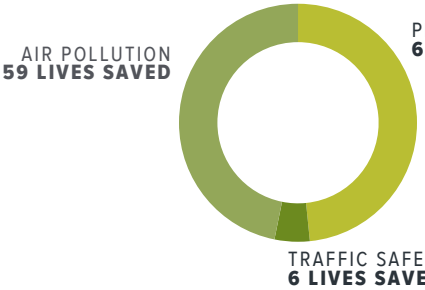
ANNUAL HEALTHCARE COST SAVINGS FROM REDUCED ILLNESS (MILLIONS, 2010$)



In 2010, our region spent $5-6 billion on healthcare costs related to illness alone. By 2035, the region can save $100 million per year from implementing the draft approach.

More physical activity and less air pollution provide most health benefits

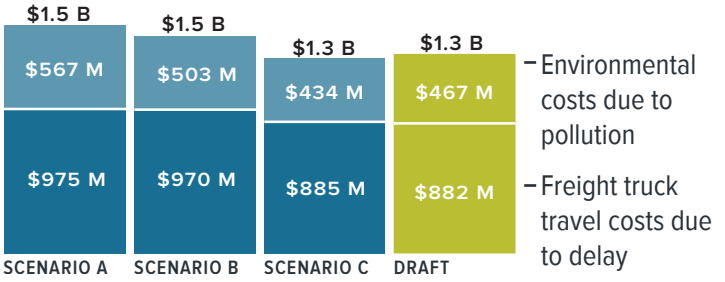
LIVES SAVED EACH YEAR BY 2035



By 2035, the region can save more than $1 billion per year from the lives saved each year by implementing the draft approach.

Our economy benefits from reduced emissions and delay

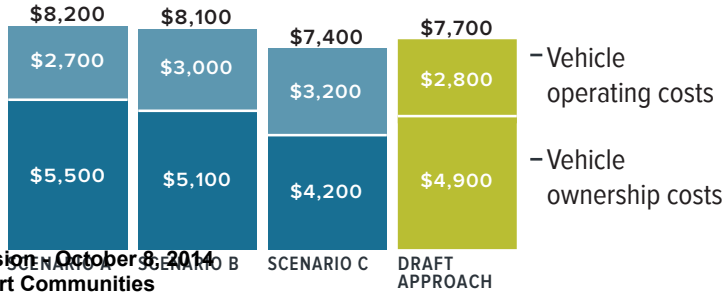
ANNUAL ENVIRONMENTAL AND FREIGHT TRUCK TRAVEL COSTS IN 2035 (MILLIONS, 2005$)



Cumulative savings calculated on an annual basis. The region can expect to save $2.5 billion by 2035, compared to A, by implementing the draft approach.

Overall vehicle-related travel costs decrease due to lower ownership costs

AVERAGE ANNUAL HOUSEHOLD VEHICLE OWNERSHIP & OPERATING COSTS IN 2005$



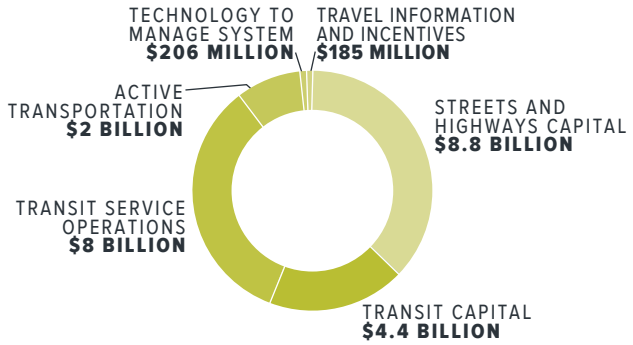
WHAT IS THE RETURN ON INVESTMENT?

Local and regional plans and visions are supported. The draft approach reflects local and regional investment priorities adopted in the 2014 Regional Transportation Plan (RTP) to address current and future transportation needs in the region. At $24 billion over 25 years, the overall cost of the draft approach is less than the full 2014 RTP ($29 billion), but about $5 billion more than the financially constrained 2014 RTP ($19 billion).*

More transportation options are available. As shown in the chart to the right, investment levels assumed in the draft approach are similar to those in the adopted financially constrained RTP, with the exception of increased investment in transit capital and operations region-wide. Analysis shows the high potential of these investments to reduce greenhouse gas emissions while improving access to jobs and services and supporting other community goals.

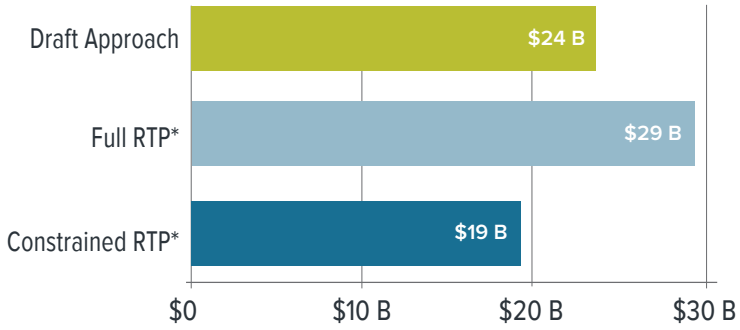
Households and businesses experience multiple benefits. The cost to implement the draft approach is estimated to be $945 million per year, plus an estimated $480 million per year needed to maintain and operate our road system. While this is about $630 million more than we currently spend as a region, analysis shows multiple benefits and a significant return on investment. In the long run, the draft approach can help people live healthier lives and save households and businesses money.

How much would we need to invest by 2035?

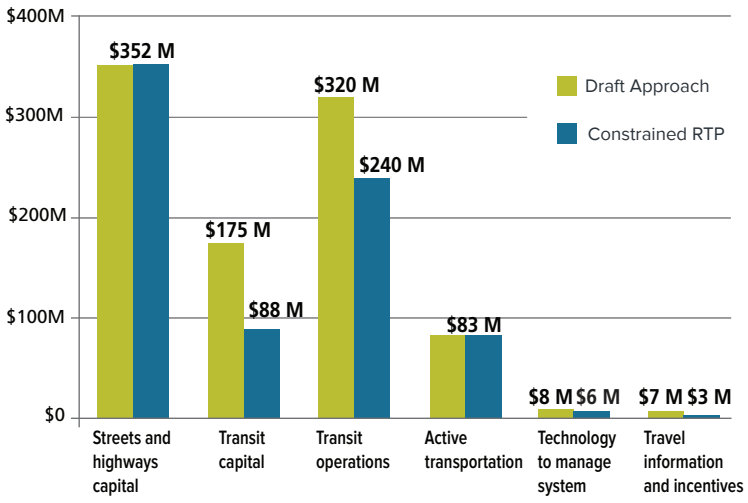


Investment costs are in 2014$. The total cost does not include road-related operations, maintenance and preservation (OMP) costs. Preliminary estimates for local and state road-related OMP needs are $12 billion through 2035.

Estimated costs of draft approach and 2014 RTP (billions, 2014$)



Annual cost of implementation through 2035 (millions, 2014$)



* The financially constrained 2014 RTP refers to the priority investments that can be funded with existing and anticipated new revenues identified by federal, state and local governments. The full 2014 RTP refers to all of the investments that have been identified to meet current and future regional transportation needs in the region. It assumes additional funding beyond currently anticipated revenues.

HOW DO WE MOVE FORWARD?

We're stronger together. Local, regional, state and federal partnerships and legislative support are needed to secure adequate funding for transportation investments and address other barriers to implementation.

Building on existing local, regional and statewide activities and priorities, the project partners have developed a draft toolbox of actions with meaningful steps that can be taken in the next five years. This is a menu of actions that can be locally tailored to best support local, regional and state plans and visions. Reaching the state target can best be achieved by engaging community and business leaders as part of ongoing local and regional planning and implementation efforts.

WHAT CAN LOCAL, REGIONAL AND STATE PARTNERS DO?

Everyone has a role. Local, regional and state partners are encouraged to review the draft toolbox to identify actions they have already taken and prioritize any new actions they are willing to consider or commit to as we move into 2015.

WHAT'S NEXT?

The Metro Policy Advisory Committee and the Joint Policy Advisory Committee on Transportation are working to finalize their recommendation to the Metro Council on the draft approach and draft implementation recommendations.

September 2014 Staff reports results of the analysis and draft implementation recommendations to the Metro Council and regional advisory committees

Sept. 15 to Oct. 30 Public comment period on draft approach and draft implementation recommendations

Nov. 7 MPAC and JPACT meet to discuss public comments and shape recommendation to the Metro Council

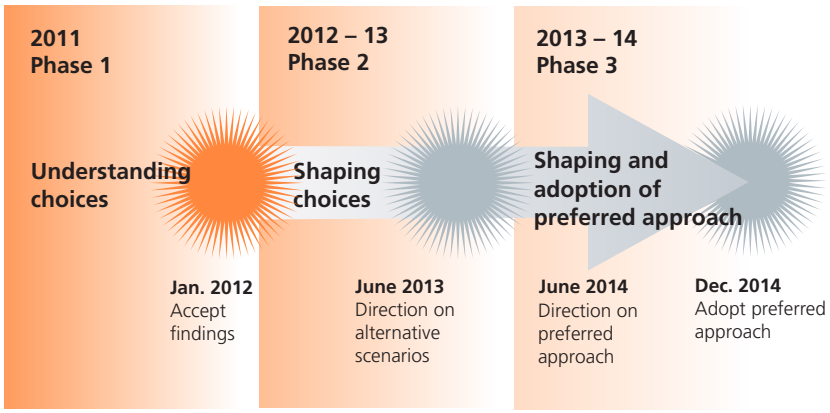
December 2014 MPAC and JPACT make recommendation to Metro Council

December 2014 Metro Council considers adoption of preferred approach

January 2015 Metro submits adopted approach to Land Conservation and Development Commission for approval

2015 and beyond Ongoing implementation and monitoring

Climate Smart Communities Scenarios Project timeline



WHERE CAN I FIND MORE INFORMATION?

The draft toolbox and other publications and reports can be found at **oregonmetro.gov/climatescenarios**.

For email updates, send a message to **climatescenarios@oregonmetro.gov.**

Metro

Sept. 12, 2014 | Printed on recycled-content paper. Job 14069

CLIMATE SMART COMMUNITIES SCENARIOS PROJECT

Draft Climate Smart Strategy

Public Review Draft

September 15, 2014

MAKING A GREAT PLACE

Metro

About Metro

Clean air and clean water do not stop at city limits or county lines. Neither does the need for jobs, a thriving economy, and sustainable transportation and living choices for people and businesses in the region. Voters have asked Metro to help with the challenges and opportunities that affect the 25 cities and three counties in the Portland metropolitan area.

A regional approach simply makes sense when it comes to providing services, operating venues and making decisions about how the region grows. Metro works with communities to support a resilient economy, keep nature close by and respond to a changing climate. Together we're making a great place, now and for generations to come.

Stay in touch with news, stories and things to do.

www.oregonmetro.gov/climatescenarios

DRAFT CLIMATE SMART STRATEGY

This is presented for public review and comment from Sept. 15 to Oct. 30, 2014.

This document provides background information and illustrative maps that highlight key elements of the draft approach identified by the region to meet adopted targets for reducing greenhouse gas emissions from light vehicle travel. Three additional documents have also been prepared that present draft implementation recommendations. The implementation recommendations will guide how the region moves forward to integrate reducing greenhouse gas emissions from cars and small trucks with ongoing local and regional efforts to create healthy and equitable communities and a strong economy.

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BACKGROUND

The Climate Smart Communities Scenarios Project responds to a 2009 mandate from the Oregon Legislature for our region to develop a strategy to reduce per capita greenhouse gas emissions from cars and small trucks by 2035. Metro is the regional government and federally-designated metropolitan planning organization for the Portland metropolitan area, serving a population of 1.5 million people. In that role, Metro has been working together with community, business and elected leaders across the region to shape a draft Climate Smart Strategy that meets the state mandate while supporting economic prosperity, community livability and protection of our environment.

After a four-year collaborative process informed by research, analysis, community engagement and deliberation, a draft Climate Smart Strategy that meets the state target is being presented for your review and comment. The draft strategy relies on policies and investments that have already been adopted as local priorities in communities across the region and in the region's long-range transportation plan.

HOW TO PROVIDE YOUR INPUT

- Take an on-line survey at www.makeagreatplace.org.
- Submit comments by mail to Metro Planning, 600 NE Grand Ave., Portland, OR 97232, by email to climatescenarios@oregonmetro.gov, or by phone at 503-797-1750 or TDD 503-797-1804 from Sept. 15 through Oct. 30, 2014.
- Testify at a Metro Council hearing on Oct. 30 at 600 NE Grand Ave., Portland, OR 97232 in the Council Chamber.

WHAT'S NEXT?

The Metro Policy Advisory Committee and the Joint Policy Advisory Committee on Transportation are working to finalize their recommendation to the Metro Council on the draft approach and draft implementation recommendations.

Sept. 15 to Oct. 30 Public comment period on draft approach and draft implementation recommendations

Nov. 7 MPAC and JPACT meet to discuss public comments and shape recommendation to the Metro Council

December 10 and 11 MPAC and JPACT make recommendation to Metro Council

December 18 Metro Council considers adoption of preferred approach

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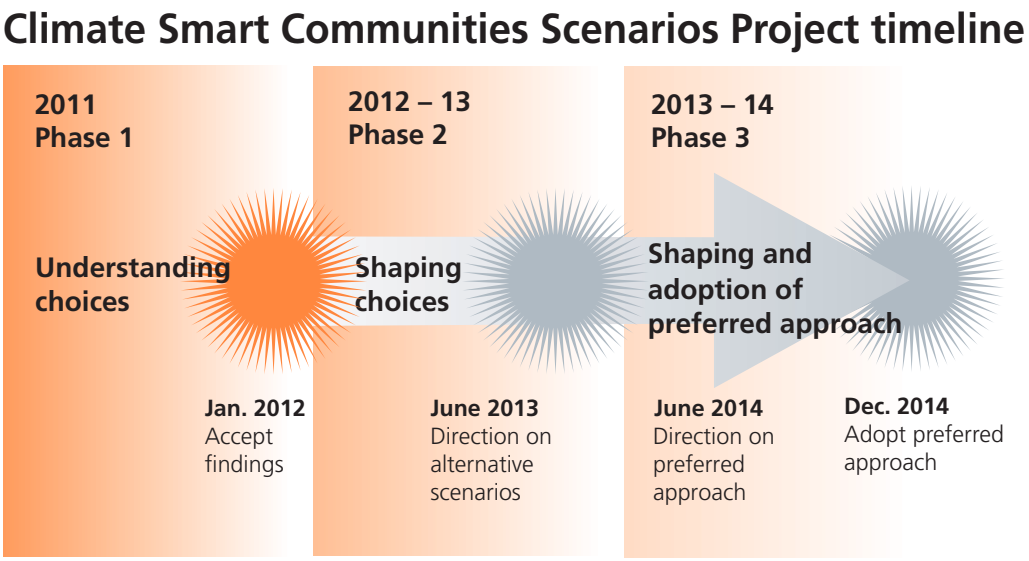
2015 and beyond Ongoing implementation and monitoring



WHERE CAN I FIND MORE INFORMATION?

Public review materials and other publications and reports can be found at **oregonmetro.gov/climatescenarios.** For email updates, send a message to **climatescenarios@oregonmetro.gov**.

CLIMATE SMART COMMUNITIES SCENARIOS PROJECT

Metro

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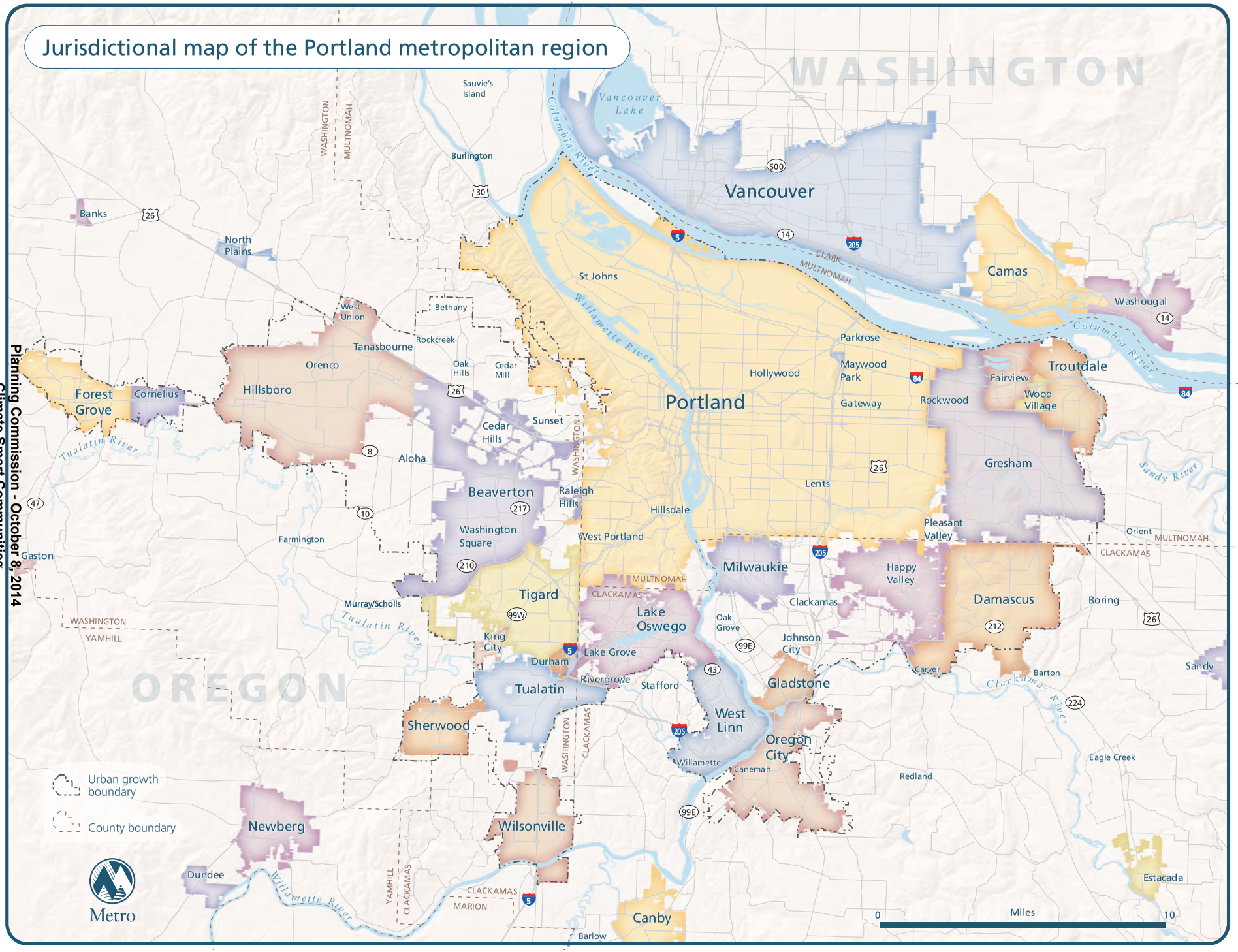
Jurisdictional map of the Portland metropolitan region



INTRODUCTION

The Climate Smart Communities Scenarios Project responds to a state mandate to reduce per capita greenhouse gas emissions from cars and small trucks by 2035.

The project has engaged community, business, public health and elected leaders to shape a draft approach that supports local plans for downtowns, main streets and employment areas; protects farms, forestland, and natural areas; creates healthy and equitable communities; increases travel options; and grows the economy while reducing greenhouse gas emissions.

The Metro Policy Advisory Committee (MPAC) and Joint Policy Advisory Committee on Transportation (JPACT) are working to finalize their recommendation to the Metro Council on the draft Climate Smart Strategy and implementation recommendations ((Regional Framework Plan amendments, toolbox of possible actions and performance monitoring approach) in December 2014.

But first, you are invited to provide feedback on the draft Climate Smart Strategy and implementation recommendations that will guide how the region moves forward.

ATTRIBUTES OF GREAT COMMUNITIES

The six desired outcomes for the region endorsed by the Metro Policy Advisory Committee and approved by the Metro Council in 2010.

The draft Climate Smart Strategy and implementation recommendations support all six of the region's desired outcomes.

Our analysis demonstrates significant benefits can be realized by implementing the draft approach. More information on the results, expected benefits and estimated costs is available at : **oregonmetro.gov/draftapproach**

ABOUT THE DRAFT APPROACH

The results are in and the news is good. After a four-year collaborative process informed by rsearch, analysis, community engagement and deliberation, the region has identified a draft approach that achieves a 29 percent reduction in per capita greenhouse gas emissions. The draft approach does more than just meet the target. Analyses shows it supports many other local, regional and state goals, including clean air and water, transportation choices, healthy and equitable communities, and a strong economy.

This overview is designed to help elected, business, and community leaders and residents better understand the draft approach. Metro Policy Advisory Committee (MPAC) and Joint Policy Advisory Committee on Transportation (JPACT) are working to finalize their recommendation to the Metro Council on the draft approach and implementation recommendations in December 2014.

The desired outcome for this overview is that together, cities, counties, regional partners and the public can weigh in on the draft approach and implementation recommendations (Regional Framework Plan amendments, Toolbox of possible action and performance monitoring approach). The se documents are presented for public review and comment.

After a four-year collaborative process informed by research, analysis, community engagement and deliberation, the region has identified a draft approach that achieves a 29 percent reduction in per capita greenhouse gas emissions and supports the plans and visions that have already been adopted by communities and the region.

WHAT IS THE DRAFT APPROACH?

The draft approach is a set of recommended policies and actions for how the region moves forward to integrate reducing greenhouse gas emissions with ongoing efforts to create the future we want for our region.

LEGISLATION The Metro Council will consider adoption of legislation signaling the region's commitment to the draft approach through the ongoing implementation of the 2040 Growth Concept. The legislation will include:

POLICIES Regional Framework Plan (RFP) amendments

- Changes to refine existing RFP policies and add new policies to achieve the draft approach.

TOOLBOX OF POSSIBLE ACTIONS Recommended actions

- Menu of investments and other tools needed to achieve the draft approach that can be tailored by each community to implement local visions.
- Near-term actions needed to implement and achieve the draft approach. This could include:
  - state and federal legislative agendas that request funding, policy changes or other tools needed to achieve draft approach
  - identification of potential/likely funding mechanisms for key actions
  - direction to the 2018 Regional Transportation Plan update
  - direction to future growth management decisions
  - direction to review regional functional plans that guide local implementation to determine if changes are needed.

PERFORMANCE MONITORING Recommended monitoring approach

- Monitoring and reporting system that builds on existing performance monitoring requirements per ORS 197.301 and updates to the Regional Transportation Plan and Urban Growth Report.

EXPECTED BENEFITS OF THE DRAFT APPROACH

By 2035, the draft approach can help people live healthier lives and save businesses and households money through benefits like:

- Reduced air pollution and increased physical activity can help reduce illness and save lives.

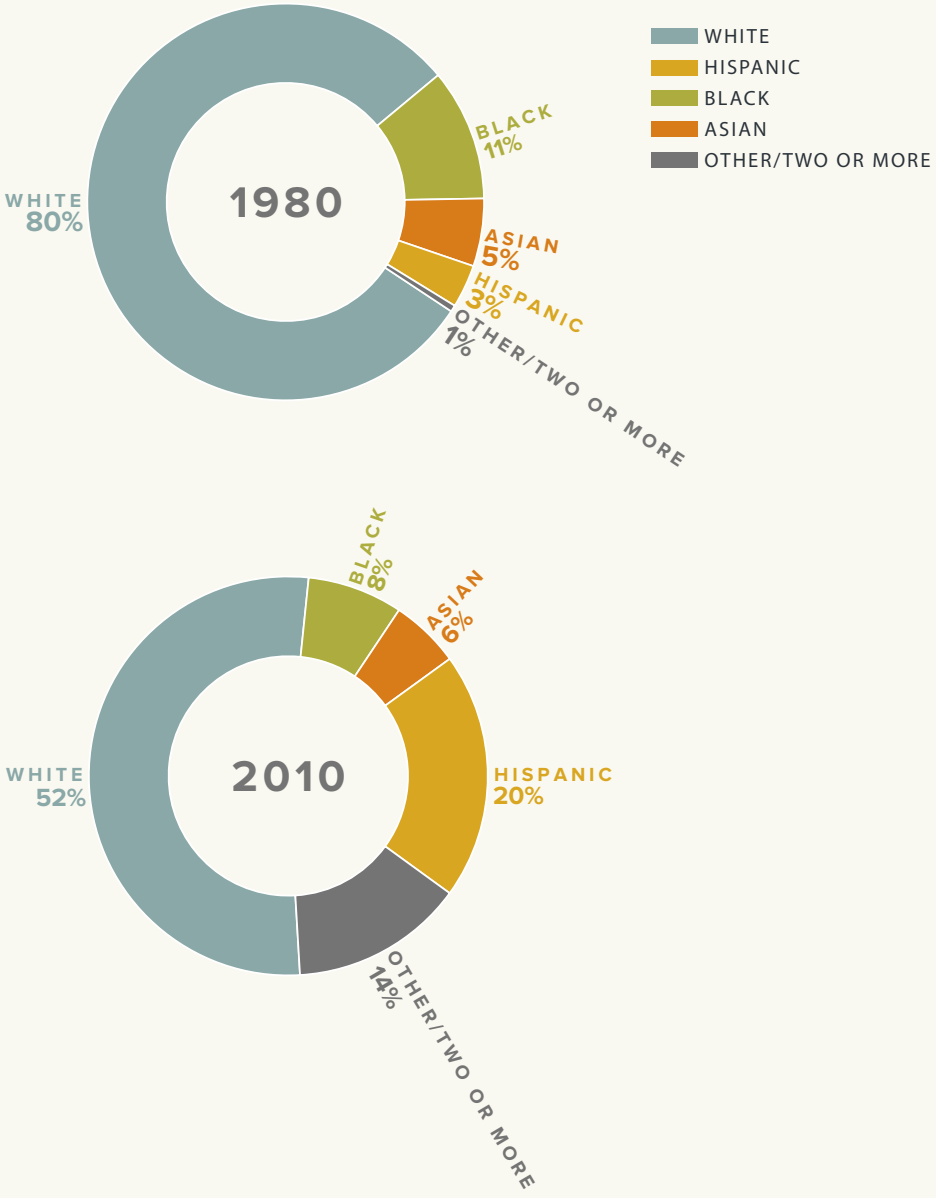
- Less air pollution also means fewer environmental costs. This helps save money that can be spent on other priorities.

- Spending less time in traffic and reduced delay on the system saves businesses money, supports job creation, and promotes the efficient movement of goods.

- Households save money by driving more fuel-efficient vehicles fewer miles and walking, biking and using transit more. This allows people to spend money on other priorities, of particular importance to households of modest means.

People of color are an increasingly significant percentage of the Portland metropolitan region's population. Areas with high poverty rates and people of color are located in all three of the region's counties – often in neighborhoods with limited transit access to family wage jobs and gaps in walking and bicycling networks.

RACE AND ETHNICITY IN THE PORTLAND METROPOLITAN REGION



REGIONAL CONTEXT

OUR REGION IS CHANGING

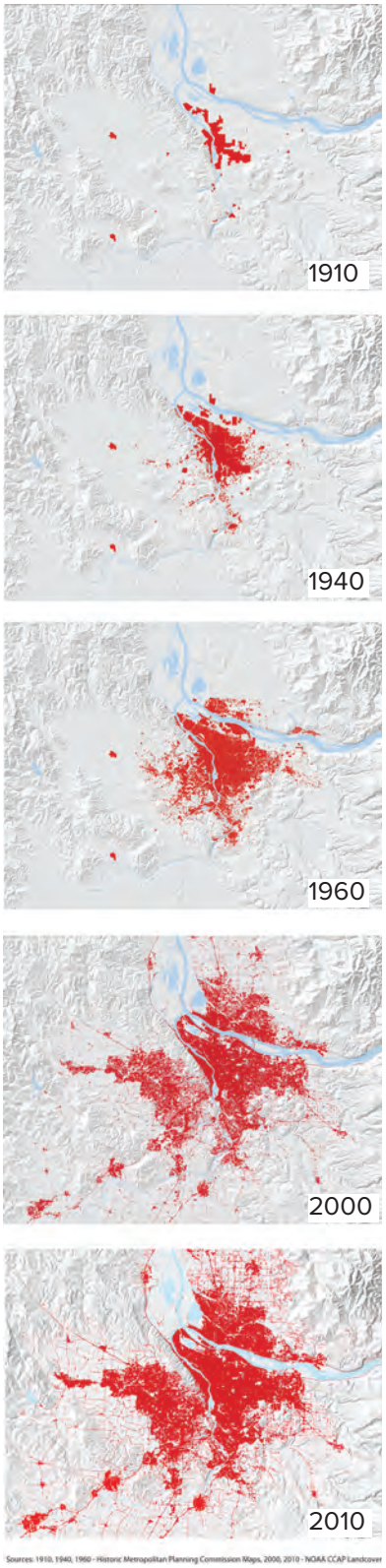
The Portland metropolitan region is an extraordinary place to call home. Our region has unique communities with inviting neighborhoods, a diverse economy and a world-class transit system. The region is surrounded by stunning natural landscapes and criss-crossed with a network of parks, trails and wild places within a walk, bike ride or transit stop from home. Over the years, the communities of the Portland metropolitan region have taken a collaborative approach to planning that has helped make our region one of the most livable in the country.

Because of our dedication to planning and working together to make local and regional plans a reality, we have set a wise course for managing growth – but times are challenging. With a growing and increasingly diverse population and an economy that is still in recovery, residents of the region along with the rest of the nation have reset expectations for financial and job security.

Aging infrastructure, rising energy costs, a changing climate, and global economic and political tensions demand new kinds of leadership, innovation and thoughtful deliberation and action to ensure our region remains a great place to live, work and play for everyone.

In collaboration with city, county, state, business and community leaders, Metro has researched how land use and transportation policies and investments can be leveraged to respond to these challenges and meet state targets for reducing greenhouse gas emissions from cars and small trucks.

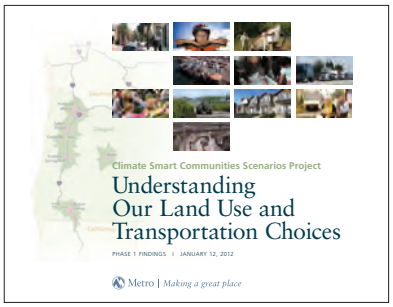
The region expects to welcome nearly 500,000 new residents and more than 365,000 new jobs within the urban growth boundary by 2035.



Sources: 1910, 1940, 1960 - Historic Metropolitan Planning Commission Maps, 2000, 2010 - NOAA CCAP Landcover

PROJECT BACKGROUND

The region's charge from the state is to identify and adopt a preferred approach for meeting the target by December 2014. The choices we make today about how we live, work and get around will shape the future of the region for generations to come. The project is being completed in three phases – and is in the third and final phase.



We found there are many ways to reduce emissions while creating healthy, equitable communities and a strong economy, but no single solution will enable the region to meet the state's target.

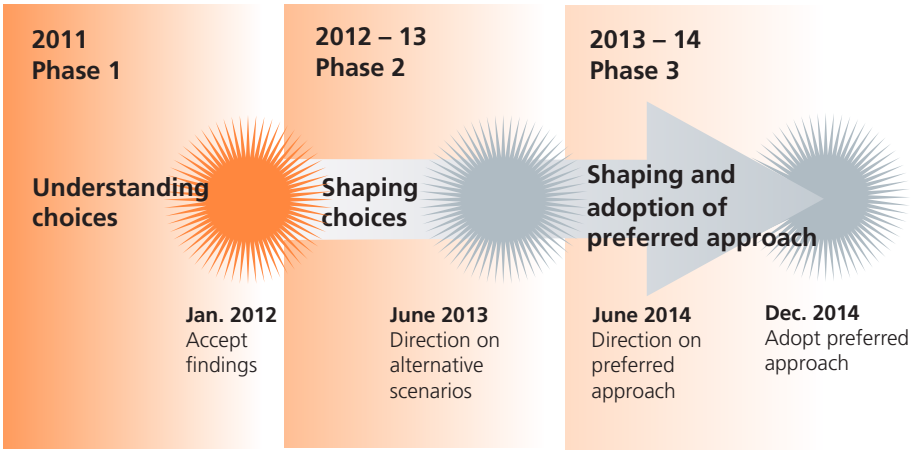
The first phase began in 2011 and concluded in early 2012. This phase consisted of testing strategies on a regional level to understand which strategies can most effectively help the region meet the state greenhouse gas emissions reduction mandate.

Most of the investments and actions under consideration are already being implemented to varying degrees across the region to realize community visions and other important economic, social and environmental goals.

As part of the first phase, Metro staff researched strategies used to reduce emissions in communities across the region, nation and around the world. This work resulted in a toolbox describing the range of potential strategies, their effectiveness at reducing emissions and other benefits they could bring to the region, if implemented.

We found there are many ways to reduce emissions while creating healthy, more equitable communities and a strong economy, but no single solution will enable the region to meet the state's target.

Climate Smart Communities Scenarios Project timeline



Investing in communities in ways that support local visions for the future will be key to reducing greenhouse gas emissions. Providing schools, services and shopping near where people live, improving bus and rail transit service, building new street connections, using technology to manage traffic flow, encouraging electric cars and providing safer routes for walking and biking all can help.

The second phase began in 2012 and concluded in October 2013. In this phase, Metro worked with community leaders to shape three approaches – or scenarios – and the criteria used to evaluate them. In 2013, Metro analyzed the three approaches to investing in locally adopted land use and transportation plans and policies.

The purpose of the analysis was to better understand the impact of those investments to inform the development of a preferred approach in 2014. Each scenario reflects choices about how and where the region invests to implement locally adopted plans and visions. They illustrate how different levels of leadership and investment could impact how the region grows over the next 25 years and how those investments might affect different aspects of livability for the region.

The results of the analysis were released in fall 2013, and summarized in a Discussion Guide For Policymakers.

The analysis showed that if we continue investing at our current levels we will fall short of what has been asked of our region, as well as other outcomes we are working to achieve – healthy and equitable communities, clean air and water, reliable travel options, and a strong economy.

Three approaches that we evaluated in 2013

SCENARIO A

Recent Trends

This scenario shows the results of implementing adopted land use and transportation plans to the extent possible with existing revenue.

SCENARIO B

Adopted Plans

This scenario shows the results of successfully implementing adopted plans and achieving the current Regional Transportation Plan which relies on increased revenue.

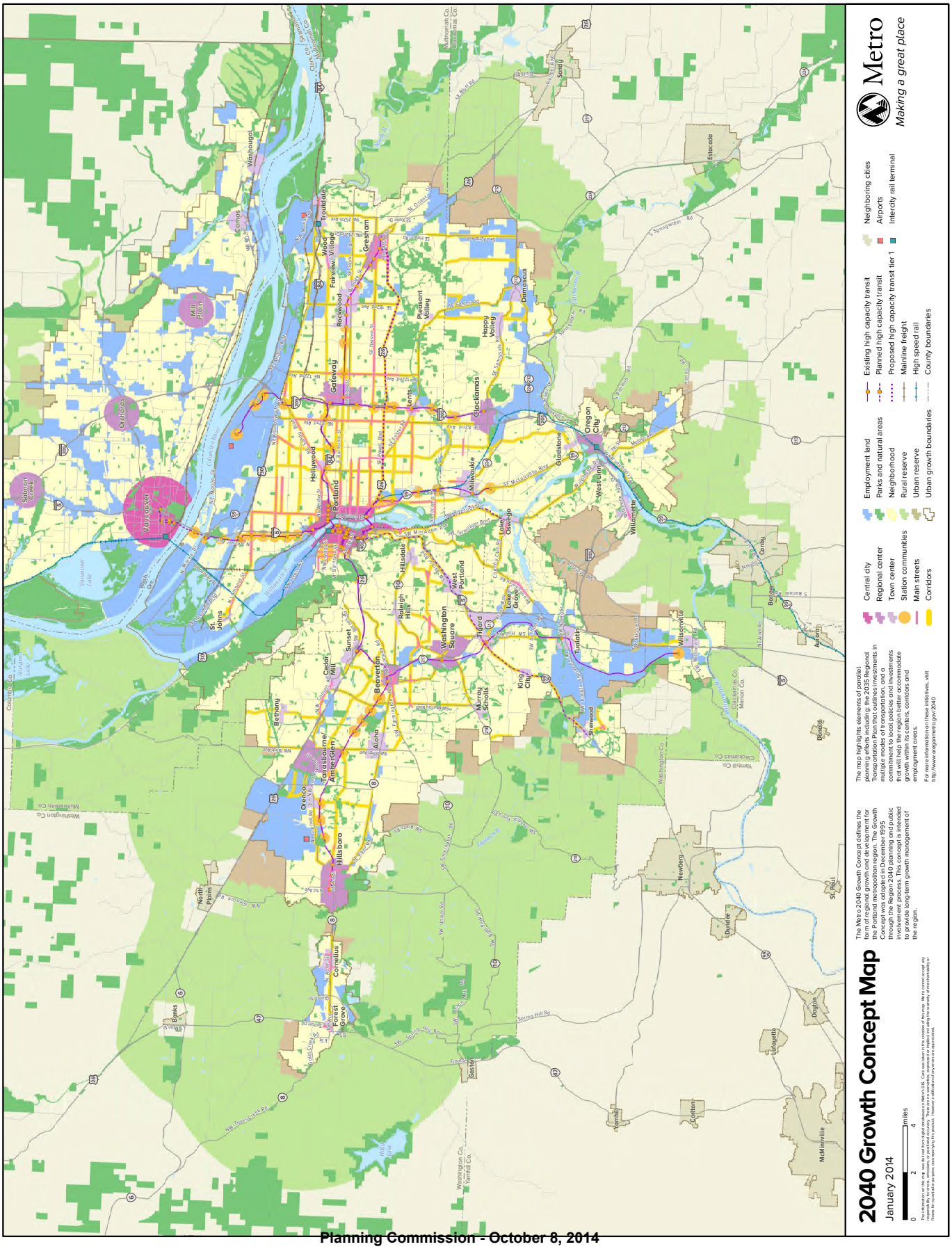
SCENARIO C

New Plans and Policies

This scenario shows the results of pursuing new policies, more investment and new revenue sources to more fully achieve adopted and emerging plans.

OUR SHARED VISION: THE 2040 GROWTH CONCEPT

An integrated land use and transportation vision for building healthy, equitable communities and a strong economy while reducing greenhouse gas emissions.



WHERE WE ARE TODAY

Building on the previous analyses and engagement, in February 2014, the Metro Policy Advisory Committee and Joint Policy Advisory Committee on Transportation approved a path for moving forward to shape and adopt a preferred approach in 2014.

As recommended by MPAC and JPACT, the draft approach started with the plans cities, counties and the region have already adopted – from local zoning, capital improvement, comprehensive, and transportation system plans to the 2040 Growth Concept and regional transportation plan – to create great communities and build a strong economy. This includes managing the urban growth boundary through regular growth management cycles (currently every six years).

In addition, MPAC and JPACT agreed to include assumptions for cleaner fuels and more fuel-efficient vehicles as defined by state agencies during the 2011 target-setting process. A third component they recommended be included in the draft approach is the Statewide Transportation Strategy assumption for pay-as-you-drive vehicle insurance.

From January to May 2014, the Metro Council engaged community and business leaders, local governments and the public on what mix of investments and actions best support their community's vision for healthy and equitable communities and a strong economy while reducing greenhouse gas emissions.

In May 2014, policymakers considered the results of prior engagement activities and analyses, and their February 2014 policy direction to recommend a draft approach for testing during summer 2014. Their recommendation was organized around six key policy areas.

The draft approach includes assumptions for cleaner fuels and more fuel-efficient vehicles as defined by state agencies during the 2011 target-setting process.

A one-size-fits-all approach won't meet the needs of our diverse communities. A combination of all of the investments and actions under consideration is needed to help us realize our shared vision for making this region a great place for generations to come.

OVERVIEW OF POLICY AREAS

This section provides an overview of the six key policy areas recommended in the draft approach:

- Make transit convenient, frequent, accessible and affordable
- Make biking and walking safe and convenient
- Make streets and highways safe, reliable and connected
- Use technology to actively manage the transportation system
- Provide information and incentives to expand the use of travel options
- Manage parking to make efficient use of parking resources

Each section includes a description of the policy, its potential climate benefit, cost, implementation benefits and challenges, and a summary of the how the policy is implemented in the draft approach.

EXPLANATION OF THE CLIMATE BENEFIT RATINGS

In Phase 1 of the project, staff conducted a sensitivity analysis to better understand the greenhouse gas emissions reduction potential of individual policies. The information derived from the sensitivity analysis was used to develop a five-star rating system for communicating the relative climate benefits of different policies. The ratings represent the potential effects of individual policy areas in isolation and do not capture variations that may occur from synergies between multiple policies.

Estimated reductions assumed in climate benefits ratings	
less than 1%	★
1 – 2%	★★
3 – 6%	★★★
7 – 15%	★★★★
16 – 20%	★★★★★

Source Memo to TPAC and interested parties on Climate Smart Communities: Phase 1 Metropolitan GreenSTEP scenarios sensitivity analysis (June 21, 2012)

RELATIVE CLIMATE BENEFIT

★★★★★

ESTIMATED COST TO IMPLEMENT BY 2035 (2014$)

Capital $4.4 billion

Operations $8 billion

Make transit convenient, frequent, accessible and affordable

There are four key ways to make transit service more convenient, frequent, accessible and affordable. The effectiveness of each will vary depending on the mix of nearby land uses, the number of people living and working in the area, and the extent to which travel information, marketing and technology are used.

Frequency Increasing the frequency of transit service in combination with transit signal priority and bus lanes makes transit faster and more convenient.

System expansion Providing new community and regional transit connections improves access to jobs and community services and makes it easier to complete some trips without multiple transfers.

Transit access Building safe and direct walking and biking routes and crossings that connect to stops makes transit more accessible and convenient.

Fares Providing reduced fares makes transit more affordable; effectiveness depends on the design of the fare system and the cost.

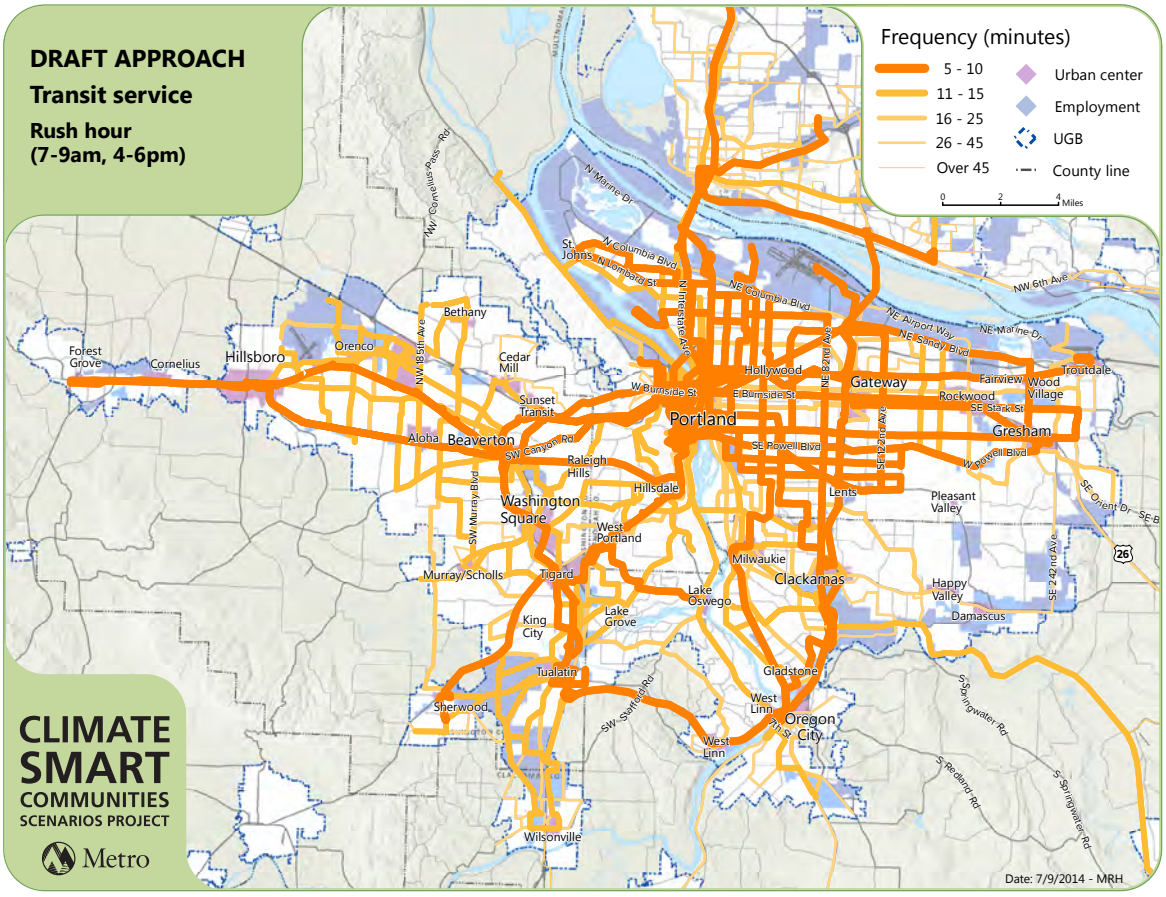
Transit is provided in the region by TriMet and South Metro Area Rapid Transit (SMART) in partnership with Metro, cities, counties, employers, business associations and non-profit organizations.

BENEFITS

- improves access to jobs, the workforce, and goods and services, boosting business revenues
- creates jobs and saves consumers and employers money
- stimulates development, generating local and state revenue
- provides drivers an alternative to congested roadways and supports freight movements by taking cars off the road
- increases physical activity
- reduces air pollution and air toxics
- reduces risk of traffic fatalities and injuries

CHALLENGES

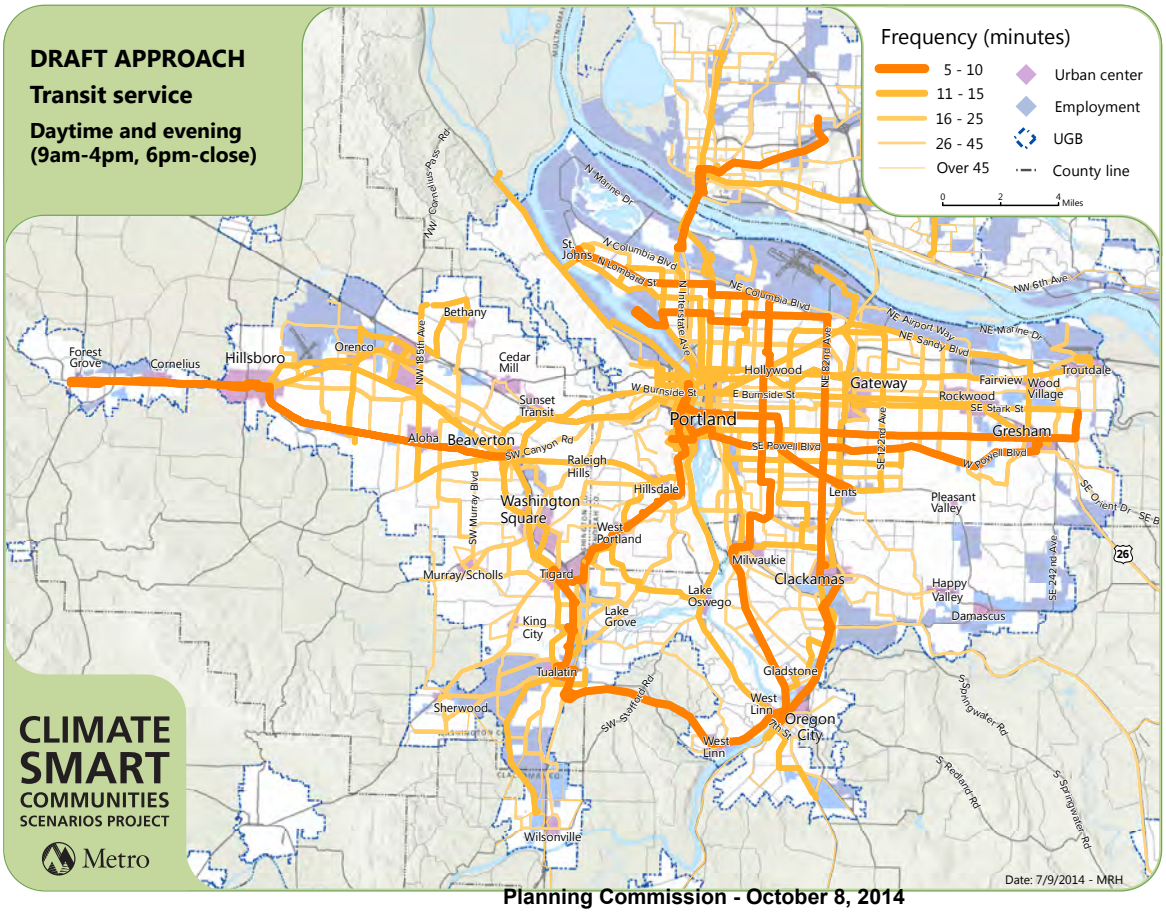
- transit demand outpacing funding
- enhancing existing service while expanding coverage and frequency to growing areas
- reduced revenue and federal funding, leading to increased fares and service cuts
- preserving affordable housing options near transit
- ensuring safe and comfortable access to transit for pedestrians, cyclists and drivers
- transit-dependent populations locating in parts of the region that are harder to serve with transit



DRAFT APPROACH

55% jobs
49% households
62% low-income households

Estimated jobs and households within ¼-mile of 15-minute or better service by 2035



52% jobs
37% households
49% low-income households

Estimated jobs and households within ¼-mile of 15-minute or better service by 2035

Note: The maps and cost estimates reflect the transit service operations and frequencies adopted in the full 2014 RTP and transit capital investments adopted in the constrained RTP plus additional capital to support operations level.

RELATIVE CLIMATE BENEFIT

★★★☆☆

ESTIMATED COST TO IMPLEMENT BY 2035 (2014$)

$2 billion

Make biking and walking safe and convenient

Active transportation is human-powered travel that engages people in healthy physical activity while they go from place to place. Examples include walking, biking, pushing strollers, using wheelchairs or other mobility devices, skateboarding, and rollerblading. Active transportation is an essential component of public transportation because most of these trips begin and end with walking or biking.

Today, about 50 percent of the regional active transportation network is complete. Nearly 18 percent of all trips in the region are made by walking and biking, a higher share than many other places. Approximately 45 percent of all trips made by car in the region are less than three miles and 15 percent are less than one mile. With a complete active transportation network supported by education and incentives, many of the short trips made by car could be replaced by walking and biking. (See separate summary on providing information and incentives to expand use of travel options.)

For active travel, transitioning between modes is easy when sidewalks and bicycle routes are connected and complete, wayfinding is coordinated, and transit stops are connected by sidewalks and have shelters and places to sit. Biking to work and other places is supported when bicycles are accommodated on transit vehicles, safe and secure bicycle parking is available at transit shelters and community destinations, and adequate room is provided for walkers and bicyclists on shared pathways. Regional trails and transit function better when they are integrated with on-street walking and biking routes.

BENEFITS

- increases access to jobs and services
- provides low-cost travel options
- supports economic development, local businesses and tourism
- increases physical activity and reduces health care costs
- reduces air pollution and air toxics
- reduces risk of traffic fatalities and injuries

CHALLENGES

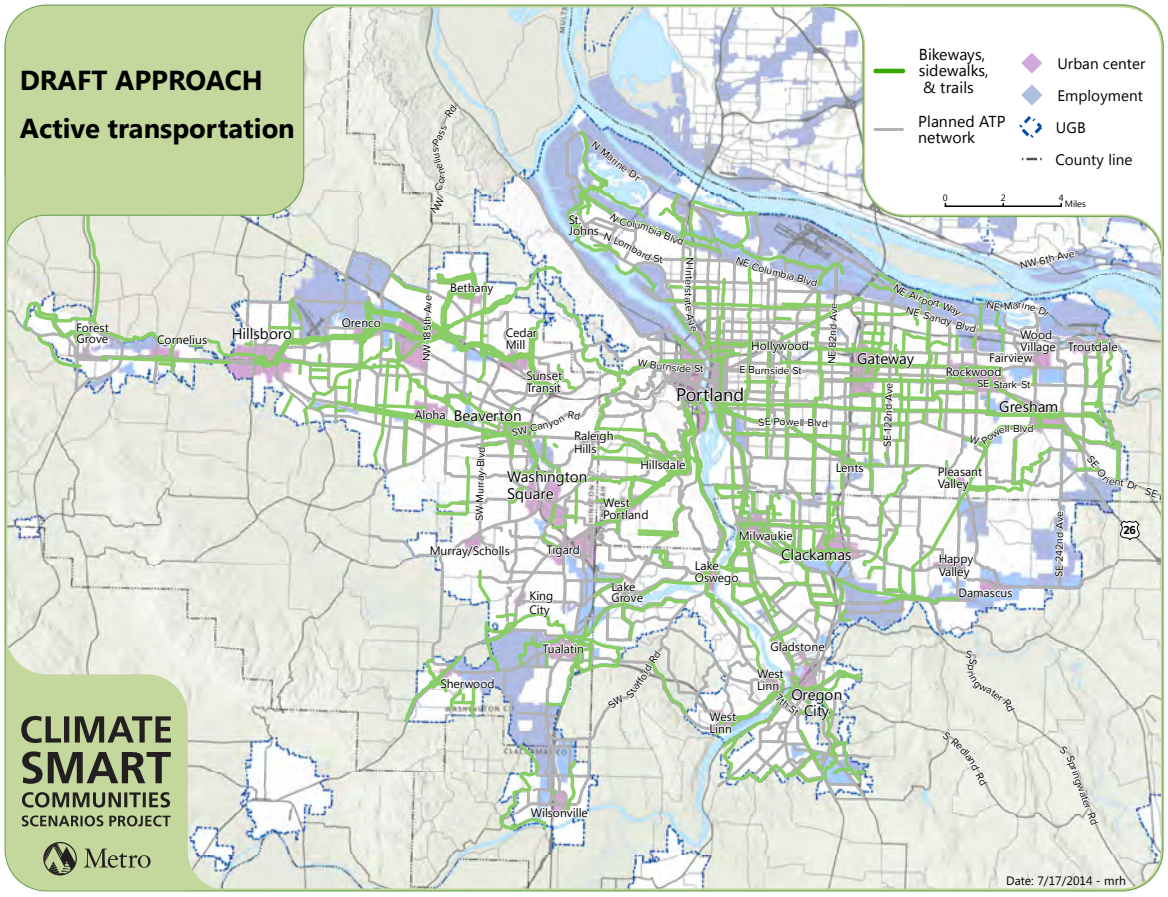
- major gaps exist in walking and biking routes across the region
- gaps in the active transportation network affect safety, convenience and access to transit
- many would like to walk or bike but feel unsafe
- many lack access to walking and biking routes
- limited dedicated funding is declining

DRAFT APPROACH

663
Miles of bikeways, sidewalks and trails added by 2035

61
Estimated lives saved annually from increased physical activity by 2035

$500 million
Estimated savings per year by 2035 from the lives saved each year



Note: The map and estimated cost reflect the active transportation investments adopted in the constrained 2014 Regional Transportation Plan.

RELATIVE CLIMATE BENEFIT

★ ★ ★ ★ ★

ESTIMATED COST TO IMPLEMENT BY 2035 (2014$)

Capital $8.8 billion

Operations, maintenance, and preservation (OMP) $12 billion

Make streets and highways safe, reliable and connected

Today, nearly 45 percent of all trips in the region made by car are less than three miles, and 15 percent are less than one mile. When road networks lack multiple routes serving the same destinations, short trips must use major travel corridors designed for freight and regional traffic, adding to congestion.

There are three key ways to make streets and highways more safe, reliable and connected to serve longer trips across the region on highways, shorter trips on arterial streets, and the shortest trips on local streets.

Maintenance and efficient operation of the existing road system Keeping the road system in good repair and using information and technology to manage travel demand and traffic flow help improve safety, and boost efficiency of the existing system. With limited funding, more effort is being made to maximize system operations prior to building new capacity in the region. (See separate summaries describing the use of technology and information.)

Street connectivity Building a well-connected network of complete streets including new local and major street connections shortens trips, improves access to community and regional destinations, and helps preserve the capacity and function of highways in the region for freight and longer trips. These connections include designs that support walking and biking, and, in some areas, provide critical freight access between industrial areas, intermodal facilities and the interstate highway system.

Network expansion Adding lane miles to relieve congestion is an expensive approach, and will not solve congestion on its own. Targeted widening of streets and highways along with other strategies helps connect goods to market and support travel across the region.

BENEFITS

- improves access to jobs, goods and services, boosting business revenue
- creates jobs and stimulates development, boosting the economy
- reduces delay, saving businesses time and money
- reduces risk of traffic fatalities and injuries
- reduces emergency response time

CHALLENGES

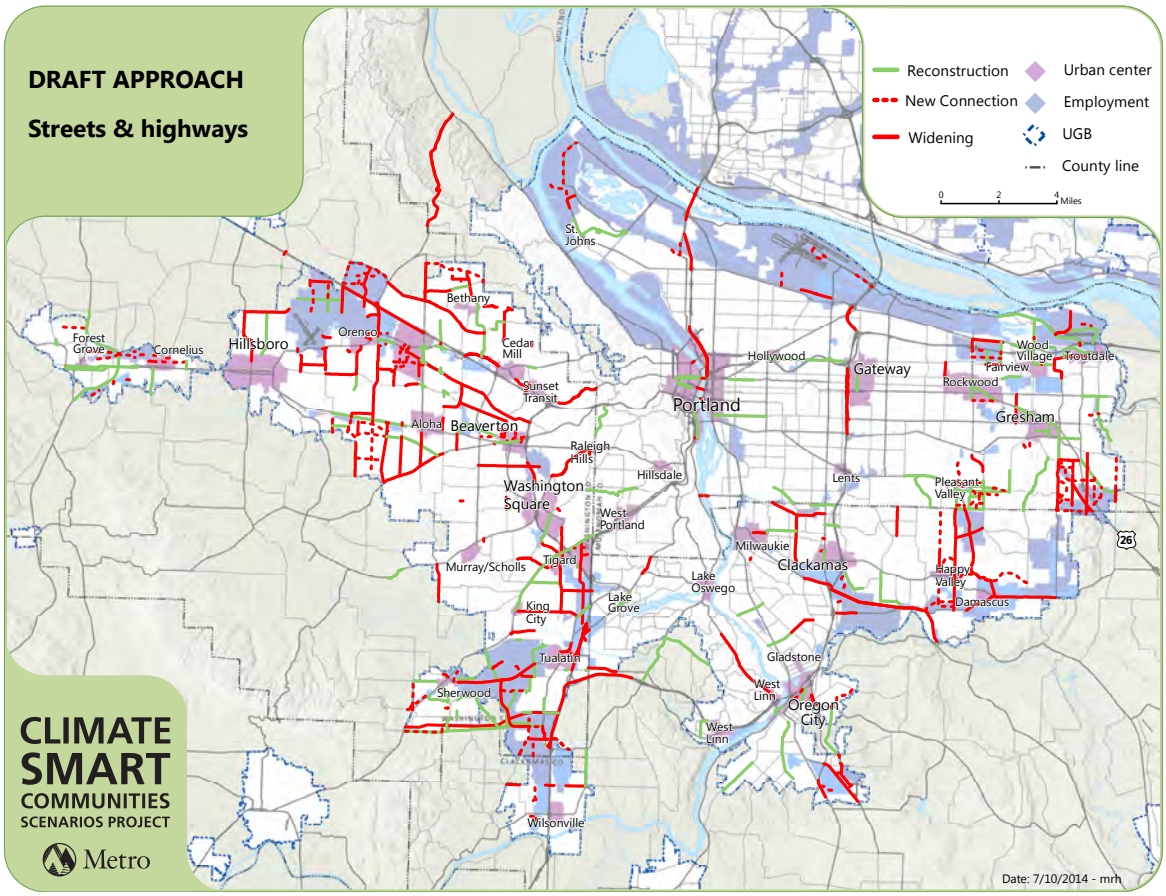
- declining purchasing power of existing funding sources, growing maintenance backlog, and rising construction costs
- may induce more traffic
- potential community impacts, such as displacement and noise
- concentration of air pollutants and air toxics in major travel corridors

52

Lane miles of freeways added by 2035 to support people and goods movement

386

Lane miles of arterials added by 2035, nearly two-thirds of which include bike and pedestrian improvements



Note: The map reflects capital investments adopted in the constrained 2014 Regional Transportation Plan for streets, highways and bridges in the region. The estimated costs includes capital costs adopted in the constrained 2014 RTP and preliminary estimates for local and state road-related operations, maintnance and preservation needs in the region.

RELATIVE CLIMATE BENEFIT

★★☆☆☆

ESTIMATED COST TO IMPLEMENT BY 2035 (2014$)

$206 million

Use technology to actively manage the transportation system

Using technology to actively manage the Portland metropolitan region's transportation system means using intelligent transportation systems (ITS) and services to reduce vehicle idling associated with delay, making walking and biking more safe and convenient, and helping improve the speed and reliability of transit. Nearly half of all congestion is caused by incidents and other factors that can be addressed using these strategies.

Local, regional and state agencies work together to implement transportation system technologies. Agreements between agencies guide sharing of data and technology, operating procedures for managing traffic, and the ongoing maintenance and enhancement of technology, data collection and monitoring systems.

Arterial corridor management includes advanced technology at each intersection to actively manage traffic flow. This may include coordinated or adaptive signal timing; advanced signal operations such as cameras, flashing yellow arrows, bike signals and pedestrian count down signs; and communication to a local traffic operations center and the centralized traffic signal system.

Freeway corridor management includes advanced technology to manage access to the freeways, detect traffic levels and weather conditions, provide information with variable message signs and variable speed limit signs, and deploying incident response patrols that quickly clear breakdowns, crashes and debris. These tools connect to a regional traffic operations center.

Traveler information includes using variable message and speed signs and 511 internet and phone services to provide travelers with up-to-date information regarding traffic and weather conditions, incidents, travel times, alternate routes, construction, or special events.

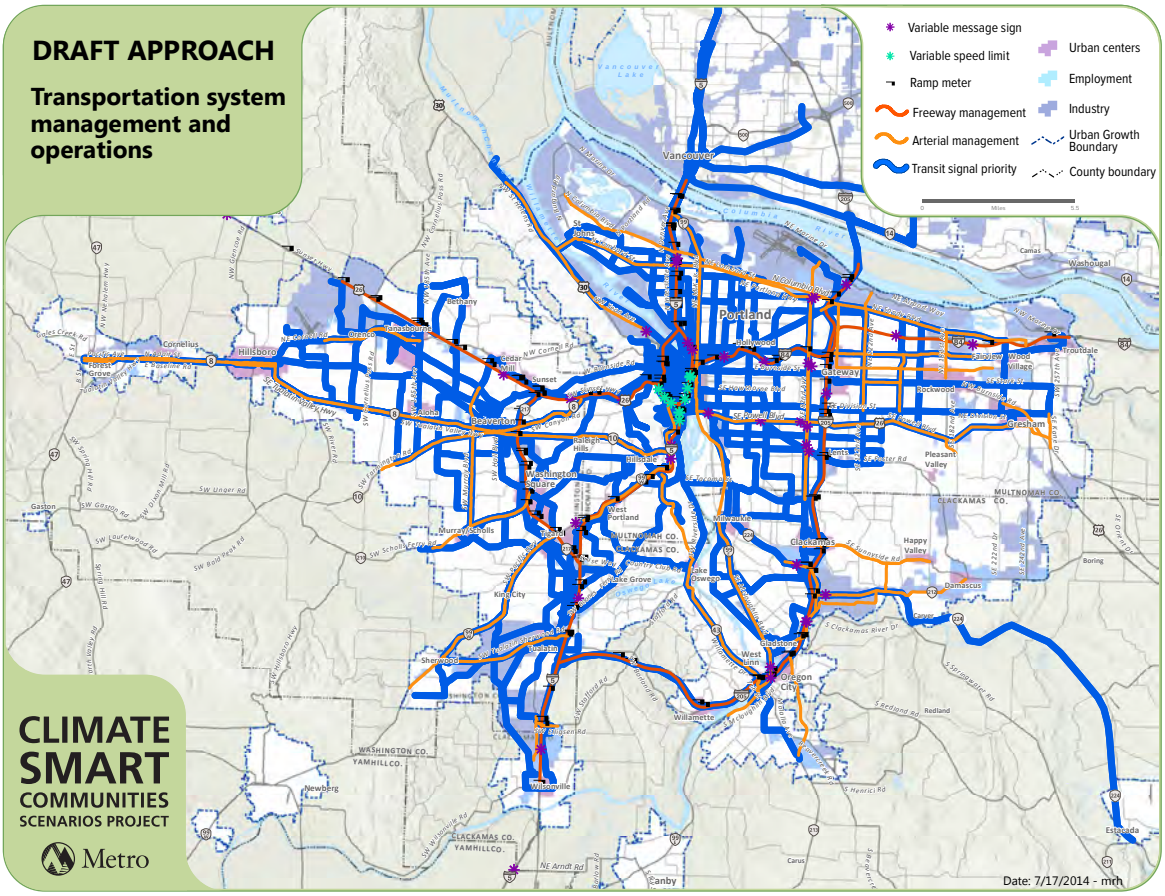
BENEFITS

- provides near-term benefits
- reduces congestion and delay
- makes traveler experience more reliable
- saves public agencies, consumers and businesses time and money
- reduces air pollution and air toxics
- reduces risk of traffic fatalities and injuries

CHALLENGES

- requires ongoing funding to maintain operations and monitoring systems
- requires significant cross-jurisdictional coordination
- workforce training gaps

.35% on arterials and freeways
Estimated delay reduction by 2035



Note: The map and estimated cost reflect the full 2014 Regional Transportation Plan transportation system management and operations investments plus additional investments to support expanding incident response and transit signal priority across the region.

RELATIVE CLIMATE BENEFIT

★★★☆☆

ESTIMATED COST TO IMPLEMENT BY 2035 (2014$)

$185 million

Provide information and incentives to expand the use of travel options

Public awareness, education and travel options support tools are cost-effective ways to improve the efficiency of the existing transportation system through increased use of travel options such as walking, biking, carsharing, carpooling and taking transit. Local, regional and state agencies work together with businesses and non-profit organizations to implement programs in coordination with other capital investments. Metro coordinates partners' efforts, sets strategic direction, evaluates outcomes, and manages grant funding.

Public awareness strategies include promoting information about travel choices and teaching the public about eco-driving: maintaining vehicles to operate more efficiently and practicing driving habits that can help save time and money while reducing greenhouse emissions.

Commuter programs are employer-based outreach efforts that include (1) financial incentives, such as transit pass programs and offering cash instead of parking subsidies; (2) facilities and services, such as carpooling programs, bicycle parking, emergency rides home, and work-place competitions; and (3) flexible scheduling such as working from home or compressed work weeks.

Individualized Marketing (IM) is an outreach method that encourages individuals, families or employees interested in making changes in their travel choices to participate in a program. A combination of information and incentives is tailored to each person's or family's specific travel needs. IM can be part of a comprehensive commuter program.

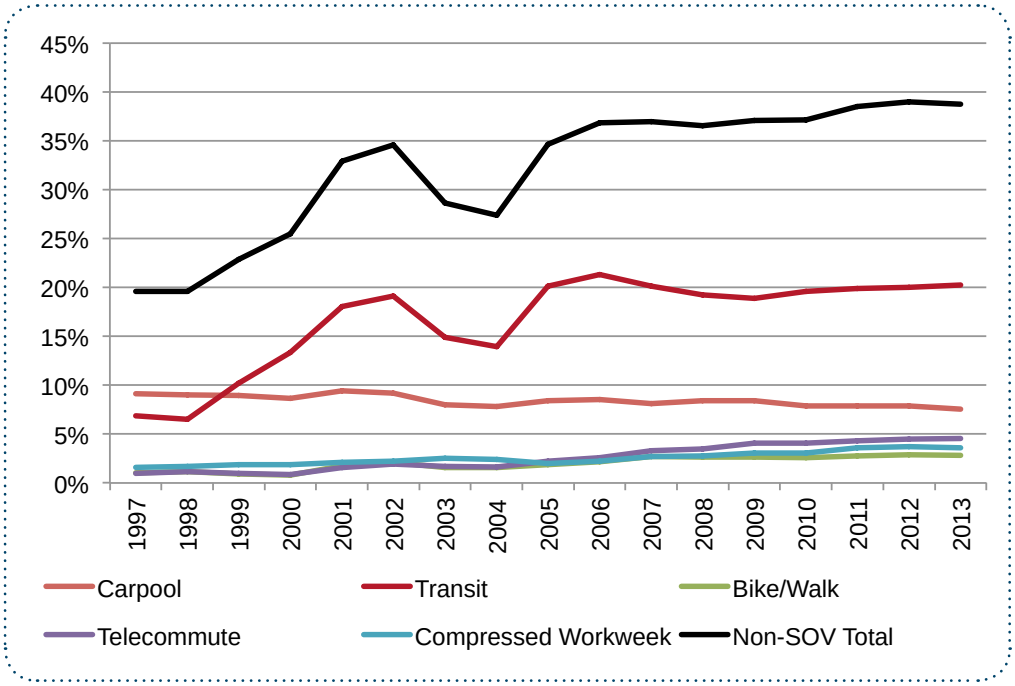
Travel options support tools reduce barriers to travel options and support continued use with tools such as the ***Drive Less. Connect.*** online carpool matching; trip planning tools; wayfinding signage; bike racks; and carsharing.

BENEFITS

- increases cost-effectiveness of capital investments in transportation
- saves public agencies, consumers and businesses time and money
- preserves road capacity
- reduces congestion and delay
- increases physical activity and reduces health care costs
- reduces air pollution and air toxics

CHALLENGES

- program partners need ongoing tools and resources to increase outcomes
- factors such as families with children, long transit times, night and weekend work shifts not served by transit
- major gaps exist in walking and biking routes across the region
- consistent data collection to support performance measurement



EFFECTIVENESS OF EMPLOYER COMMUTER PROGRAMS (1997 – 2013)

The TriMet, Wilsonville SMART and TMA employer outreach programs have made significant progress with reducing drive-alone trips. Since 1996, employee commute trips that used non-drive-alone modes (transit, bicycling, walking, carpooling/vanpooling and telecommuting) rose from 20% to over 39% among participating employers.

EFFECTIVENESS OF COMMUNITY AND NEIGHBORHOOD PROGRAMS

Community outreach programs such as Portland Sunday Parkways and Wilsonville Sunday Streets encourage residents to use travel options by exploring their neighborhoods on foot and bike without motorized traffic. Sunday Parkways events have attracted 400,000 attendees since 2008 and the Wilsonville Sunday Streets event attracted more than 5,000 participants in 2012.

Other examples of valuable community outreach and educational programs include the Community Cycling Center's program to reduce barriers to biking and Metro's Vámonos program, both of which provide communities across the region with the skills and resources to become more active by walking, biking, and using transit for their transportation needs.

In 2004, the City of Portland launched the Interstate TravelSmart individualized marketing project in conjunction with the opening of the MAX Yellow Line. Households that received individualized marketing made nearly twice as many transit trips compared to a similar group of households that did not participate in the marketing campaign. In addition, transit use increased nearly 15 percent during the SmartTrips project along the MAX Green Line in 2010. Follow-up surveys show that household travel behavior is sustained for at least two years after a project has been completed.



RELATIVE CLIMATE BENEFIT

★★★★½

ESTIMATED COST TO IMPLEMENT BY 2035 (2014$)

No cost estimated. This policy area is primarily implemented through local development codes.

Manage parking to make efficient use of land and parking spaces

Parking management refers to various policies and programs that result in more efficient use of parking resources. Parking management is implemented through city and county development codes. Managing parking works best when used in a complementary fashion with other strategies; it is less effective in areas where transit or bicycle and pedestrian infrastructure is lacking.

Planning approaches include conducting assessments of the parking supply to better understand needs. A typical urban parking space has an annualized cost of $600 to $1,200 to maintain, while structured parking construction costs averages $15,000 per space.

On-street parking approaches include spaces that are timed, metered, designated for certain uses or have no restriction. Examples of these different approaches include charging long-term or short-term fees, limiting the length of time a vehicle can park, and designating on-street spaces for preferential parking for electric vehicles, carshare vehicles, carpools, vanpools, bikes, public use (events or café "Street Seats") and freight truck loading/unloading areas.

Off-street parking approaches include providing spaces in designated areas, unbundling parking, preferential parking (for vehicles listed above), shared parking between land uses (for example, movie theater and business center), park-and-ride lots for transit and carpools/vanpools, and parking garages in downtowns and other mixed-use areas that allow surface lots to be developed for other uses.

BENEFITS

- allows more land to be available for development, generating local and state revenue
- reduces costs to governments, businesses, developers and consumers
- fosters public-private partnerships that can result in improved streetscape for retail and visitors
- generates revenues where parking is priced
- reduces air pollution and air toxics

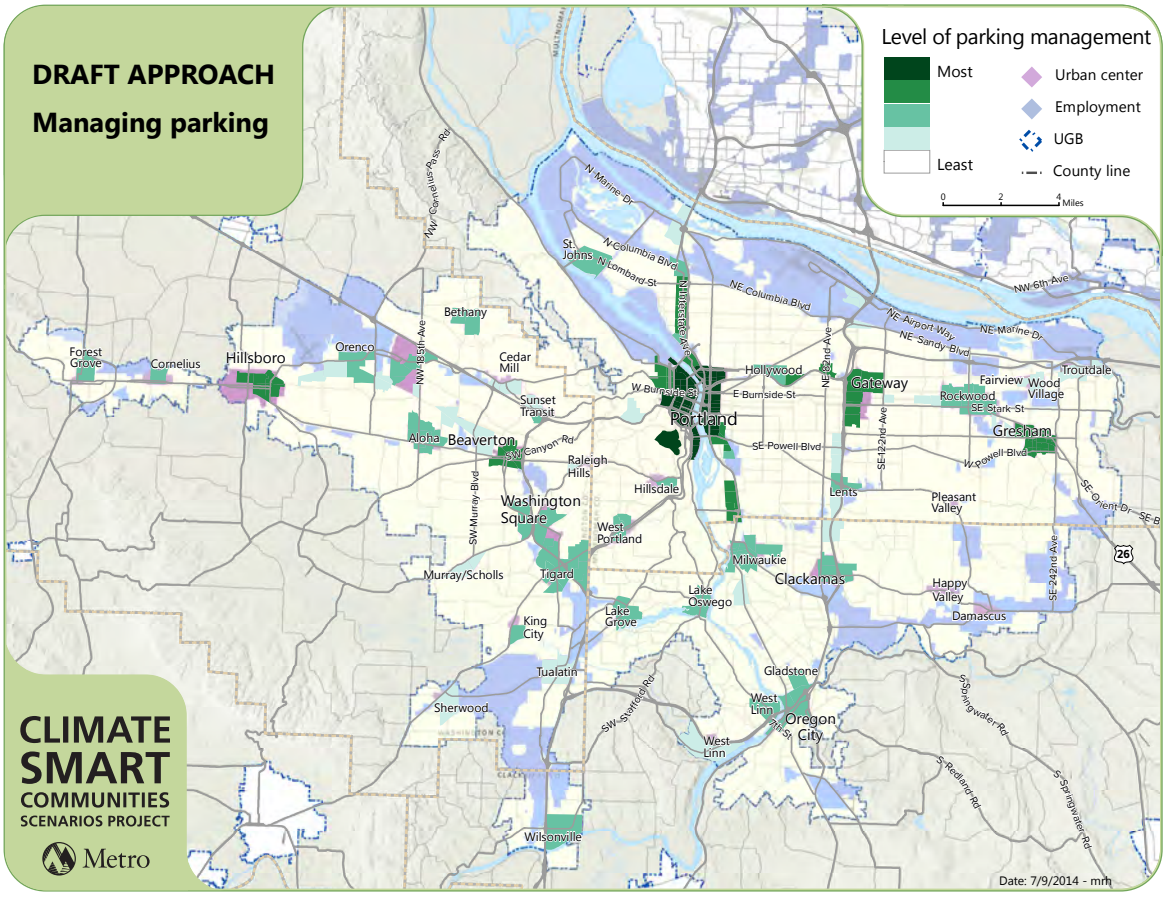
CHALLENGES

- inadequate information for motorists on parking and availability
- inefficient use of existing parking resources
- parking spaces that are inconvenient to nearby residents and businesses
- scarce freight loading and unloading areas
- low parking turnover rate
- lack of sufficient parking
- parking oversupply, ongoing costs and the need to free up parking for customers

DRAFT APPROACH

30% work trips
30% other trips
Estimated share of trips to areas with actively managed parking

Note: The map reflects the constrained 2014 Regional Transportation Plan parking assumptions



GLOSSARY

Carsharing A model similar to a car rental where a member user rents cars for short periods of time, often by the hour. Such programs are attractive to customers who make only occasional use of a vehicle, as well as others who would like occasional access to a vehicle of a different type than they use day-to-day. The organization renting the cars may be a commercial business or the users may be organized as a company, public agency, cooperative, or peer-to-peer. Zipcar and car2go are local examples.

Eco-driving A combination of public education, in-vehicle technology and driving practices that result in more efficient vehicle operation and reduced fuel consumption and emissions. Examples of eco-driving practices include avoiding rapid starts and stops, matching driving speeds to synchronized traffic signals, and avoiding idling. Program are targeted to those without travel options and traveling longer distances.

Employer-based commute programs Work-based travel demand management programs that can include transportation coordinators, employer-subsidized transit pass programs, ride-matching, carpool and vanpool programs, telecommuting, compressed or flexible work weeks and bicycle parking and showers for bicycle commuters.

Fleet mix The percentage of vehicles classified as automobiles compared to the percentage classified as light trucks (weighing less than 10,000 lbs.); light trucks make up 43 percent of the light-duty fleet today.

Fleet turnover The rate of vehicle replacement or the turnover of older vehicles to newer vehicles; the current turnover rate in Oregon is 10 years.

Greenhouse gas emissions According to the Environmental Protection Agency, gases that trap heat in the atmosphere are called greenhouse gases emissions. Greenhouse gases that are created and emitted through human activities include carbon dioxide (emitted through the burning of fossil fuels), methane, nitrous oxide and fluorinated gases. For more information see *www.epa.gov/climatechange.*

GreenSTEP GreenSTEP is a new model developed to estimate GHG emissions at the individual household level. It estimates greenhouse gas emissions associated with vehicle ownership, vehicle travel, and fuel consumption, and is designed to operate in a way that allows it to show the potential effects of different policies and other factors on vehicle travel and emissions. Metropolitan GreenSTEP travel behavior estimates are made irrespective of housing choice or supply; the model only considers the demand forecast components – household size, income and age – and the policy areas considered in this analysis.

House Bill 2001 (Oregon Jobs and Transportation Act) Passed by the Legislature in 2009, this legislation provided specific directions to the Portland metropolitan area to undertake scenario planning and develop two or more land use and transportation scenarios by 2012 that accommodate planned population and employment growth while achieving the GHG emissions reduction targets approved by LCDC in May 2011. Metro, after public review and consultation with local governments, is to adopt a preferred scenario. Following adoption of a preferred scenario, the local governments within the Metro jurisdiction are to amend their comprehensive plans and land use regulations as necessary to be consistent with the preferred scenario. For more information go to: *http://www.oregonlegislature.gov/bills_laws/lawsstatutes/2009orLaw0865.html*

Individualized marketing Travel demand management programs focused on individual households. IM programs involve individualized outreach to households that identify household travel needs and ways to meet those needs with less vehicle travel.

Light vehicles Vehicles weighing 10,000 pounds or less, and include cars, light trucks, sport utility vehicles, motorcycles and small delivery trucks.

Low Carbon Fuel Standard In 2009, the Oregon legislature authorized the Environmental Quality Commission to develop low carbon fuel standards (LCFS) for Oregon. Each type of transportation fuel (gasoline, diesel, natural gas, etc.) contains carbon in various amounts. When the fuel is burned, that carbon turns into carbon dioxide (CO_2), which is a greenhouse gas. The goal is to reduce the average carbon intensity of Oregon's transportation fuels by 10 percent below 2010 levels by 2022 and applies to the entire mix of fuel available in Oregon. Carbon intensity refers to the emissions per unit of fuel; it is not a cap on total emissions or a limit on the amount of fuel that can be burned. The lower the carbon content of a fuel, the fewer greenhouse gas emissions it produces.

Pay-as-you-drive insurance (PAYD) This pricing strategy converts a portion of liability and collision insurance from dollars-per-year to cents-per-mile to charge insurance premiums based on the total amount of miles driven per vehicle on an annual basis and other important rating factors, such as the driver's safety record. If a vehicle is driven more, the crash risk consequently increases. PAYD insurance charges policyholders according to their crash risk.

Oregon Sustainable Transportation Initiative (OSTI) An integrated statewide effort to reduce GHG emissions from the transportation sector by integrating land use and transportation. Guided by stakeholder input, the initiative has built collaborative partnerships among local governments and the state's six Metropolitan Planning Organizations to help meet Oregon's goals to reduce GHG emissions. The effort includes five main areas: Statewide Transportation Strategy development, GHG emission reduction targets for metropolitan areas, land use and transportation scenario planning guidelines, tools that support MPOs and local governments and public outreach. For more information, go to *www.oregon.gov/odot/td/osti*

Scenario A term used to describe a possible future, representing a hypothetical set of strategies or sequence of events.

Scenario planning A process that tests different actions and policies to see their affect on GHG emissions reduction and other quality of life indicators.

Statewide Transportation Strategy The strategy, as part of OSTI, will define a vision for Oregon to reduce its GHG emissions from transportation systems, vehicle and fuel technologies and urban form by 2050. Upon completion, the strategy will be adopted by the Oregon Transportation Commission. For more information go to: *http://www.oregon.gov/ODOT/TD/OSTI/STS.shtml.*

System efficiency Strategies that optimize the use of the existing transportation system, including traffic management, employer-based commute programs, individualized marketing and carsharing.

Traffic incident management A coordinated process to detect, respond to, and remove traffic incidents from the roadway as safely and quickly as possible, reducing non-recurring roadway congestion.

Traffic management Strategies that improve transportation system operations and efficiency, including ramp metering, active traffic management, traffic signal coordination and real-time traveler information regarding traffic conditions, incidents, delays, travel times, alternate routes, weather conditions, construction, or special events.