Meeting Agenda

Boundary and Growth Scenarios Technical Advisory Committee – Meeting 12
Thursday, October 22, 2015 9:00 AM – 12:30 PM
Barnes/Sawyer Room – Deschutes Services Building
1300 NW Wall Street
PLEASE NOTE THE 9 AM START TIME AND THE LOCATION

Meeting Purpose, What is Needed from the TAC, and Next Steps

The purpose of this meeting is to discuss and reach a recommendation regarding a draft Urban Growth Boundary (UGB) expansion scenario. The goal is to conclude the meeting with a preferred UGB expansion scenario and suggested refinements. In this meeting, the and Growth Scenarios Technical Advisory Committee (Boundary TAC) will:

- Hear a presentation by the project team on the key advantages and disadvantages of specific subareas and properties within subareas
- Hear and see depictions of discussion drafts of a preferred UGB scenario
- Discuss the draft preferred UGB scenario and offer suggestions for additional refinements
- Make a recommendation to the UGB Steering Committee (USC) regarding a draft preferred UGB scenario

Following this meeting and the USC's check-in, the draft preferred UGB scenario will be taken through a second round of evaluation and refinements. That work will be brought back to the Boundary TAC at the December meeting. In December and January, the Boundary TAC will finalize a UGB recommendation, along with supporting reports, policies, and the basis for adoption findings. The USC's discussion and action on this package is scheduled for February.

1. Welcome and Introductory Items — 9:00 AM

a.	Convene and welcome	Co-chairs
b.	Approval of minutes (Meeting 11)	
c.	Where we are in the process – a brief look back and look forward	Joe Dills, Brian Rankin

For additional project information, visit the project website at http://bend.or.us or contact Brian Rankin, City of Bend, at brankin@bendoregon.gov or 541-388-5584

Accessible Meeting/Alternate Format Notification
This meeting/event location is accessible. Sign and other language interpreter service, assistive listening devices, materials in alternate format such as Braille, large print, electronic formats, language translations or any other accommodations are available upon advance request at no cost. Please contact the City Recorder no later than 24 hours in advance of the meeting at rchristie@ci.bend.or.us, or fax 385-6676. Providing at least 2 days notice prior to the event will help ensure availability.

2. Public Comment — 9:15 AM

Persons wishing to testify should fill out a comment card, located at the welcome table. Testimony will be limited to 2 minutes per person, depending on the number of people wishing to speak

Co-chairs

3. Evaluation and Subarea Highlights — 9:45 AM

Presentation, TAC Discussion

a. Brief recap of the rationale for selecting Scenario 2.1 as the starting point for the preferred UGB scenario — Becky Hewitt, APG

b. Highlights of key advantages and disadvantages of each subarea and specific properties within each

c. Introduction and discussion of Scenarios 2.2 and 2.3 — Andrew Parish, Becky Hewitt

d. TAC questions and discussion.

Break — 10:45 AM

4. Draft UGB Scenario — 10:55 AM

TAC Discussion and Action

a. TAC comments and direction on preferred UGB scenario

b. TAC comments and direction on refinements to preferred UGB scenario

c. Summary of recommendations – TAC action

5. Project Information, Next Steps — 12:25 PM

a. Project information — Brian Rankin, Joe Dills

b. Next meeting – December 15, 2015

6. Adjourn — 12:30 PM

City of Bend
Boundary & Growth Scenarios Technical Advisory Committee
Meeting Notes
Date: October 8, 2015

The Boundary & Growth Scenarios TAC held its regular meeting at 9:00 am on Thursday, October 8, 2015 in the Municipal Court Hearing room of the Bend Police Station (555 NE 15th Street). The meeting was called to order at 9:00 by Mike Riley.

Roll Call

☐ Susan Brody	☐ Tom Kemper	☐ Sharon Smith
☐ Jim Bryant	☐ Nick Lelack	☐ Gary Timm
☐ Paul Dewey	☐ Brian Meece	☐ Rod Tomcho
☐ John Dotson	☐ Charlie Miller	☐ Dale Van Valkenburg
☐ Scott Edelman	☐ Mike Riley	☐ Robin Vora
☐ Ellen Grover	☐ John Russell	☐ Ruth Williamson
☐ Steve Hultberg	☐ Ron Ross	

Discussion

1. Welcome and Introductory Items

Mike called the meeting to order at 9:00 am. He then asked Joe to take over facilitation.

Joe welcomed the Boundary TAC. He began with some housing keeping items, including identifying time on the meeting agenda for accepting public comment. He indicated he would check to see how many people signed up to testify.

Joe then turned the TAC's attention to the meeting minutes of their June 24, 2015 meeting. He asked for a motion to approve the minutes as submitted. Dale moved approval of this motion with Steve providing a second to the motion. All but six TAC members voted in favor of the motion, no TAC members voted in opposition, and six TAC member abstained because they did not attend the June 24, 2015 meeting.

Joe then provided a brief report of where the TAC was in June and how we got from there to here (See Agenda 1c – Where are we in process – a brief look back and look forward). The focus of today's meeting is on learning; on understanding the materials included in the TAC meeting packet for today's meeting. He asked the TAC members to not focus on leaning – e.g. leaning toward a UGB scenario – but on learning. In June of this year, the Boundary TAC made recommendations to the UGB Steering Committee (USC) on three (3) UGB expansion scenarios and a pool of land in a supplemental analysis area. Joe referred to a map in power point slide that identified approximately 3,000 acres in the three scenarios (areas identified in red) and another 2,600 acres in the supplemental analysis areas (areas identified in blue). The team has evaluated the three (3) scenarios approved by the TAC and the USC, and created another three (3) supplemental analysis area maps (SAAMs) based on two premises. First, to ensure an apples to apples comparison of the scenarios and the SAAMs, based on the same set of evaluation criteria. Second, to ensure the evaluation and

modeling for sewer and transportation could occur based on "budgeted" land uses and also ensure an apples to apples comparison for sewer and transportation modeling.

2. Evaluation Briefings and Discussion

a. Overview of evaluation and approach to building the hybrid.

Joe then referred the TAC to the criteria used to evaluate the six (6) maps. These criteria included the Goal 14 Factors (of Statewide Planning Goal 14, Urbanization), the Community Outcomes, and the roughly 46 performance measures approved by the Boundary TAC. For context, he referred to the Goal 14 factors as the "High level" criteria; the Community Outcomes as the "middle," and the Performance Measures as "getting into the weeds."

Joe then turned the TAC's attention to a presentation slide that summarized the goals of the evaluation. These goals included: 1. which alternative best meets the criteria, and; 2. How might we refine that scenario to make it even better. The evaluation process involved balancing tradeoffs as part of a structured decision process. The desired outcome is to identify through this evaluation which scenario or choice for subareas is the best choice. The goal for the meeting today is to continue learning, start to review and think about the ranking, and then begin to understand the subarea options.

b. Topical Presentations and TAC discussion. From the agenda "*Each presenter will focus on key findings, difference makers, and preliminary conclusions about the best and worst performing parts of the scenarios*."

The following notes are based on presentations of the project team using slides now available online through this link: http://bendoregon.gov/index.aspx?page=52&parent=24529. [1]

- Factor 1 – Efficient Accommodation of Identified Land Needs
    - Complete Communities and Great Neighborhoods – Alex Joyce gave a presentation on the results of the evaluation against five (5) performance measures. The TAC questions and comments on this outcome included access to existing schools and master planned communities with new schools and amenities.
    - Efficient, Timely Growth – Alex also gave this presentation on how the scenarios and SAAMs performed against five performance measures. All the scenarios performed well; SAAM -1 had more poor or very poor ratings. The TAC questions and comments on this measure included questions on the housing mix.
- Factor 2 – Orderly and Economic Provisions of Public Facilities and Services
    - Balanced Transportation System – Chris Maciejewski of DKS and Associates gave the presentation on this set of performance measures. For a Balanced Transportation

[1] The presentation slides can be accessed through the link identified as "Boundary TAC Meeting #11 – October 8 2015 Presentation Slides."

System, the team evaluated the scenarios and the SAAMs against 11 different performance measures. Chris also went into more detail about the results of the evaluations of average trip length and vehicle miles traveled (VMT) and congestion. With respect to congestion, SAAM-1 performed the best and Scenario 3.1 performed the worst of the scenarios.

- Cost Effective Infrastructure – Chris of DKS and Associates and Dave Stangel of MSA and Associates gave the presentation of how the scenarios performed against 11 different performance measures on cost-effective infrastructure. With respect to the cost of transportation improvements, SAAM-3 was the cheapest or least expensive; Scenario 2.1 was the most expensive when considering total scenario transportation costs. The TAC questions and comments on this topic included whether OSU Cascades was included in the analysis, whether the Empire Avenue extension was considered, density increases contemplated in the Central Area, and whether highway improvement costs were included in the cost estimates. Dave Stangel gave a presentation that focused on those performance measures aimed at the sewer collection system. He presented three (3) immediate projects that will address existing issues in the current collection system: the Colorado Lift Station; the North Area Improvements, and; Phase 1 of the Southeast Interceptor. He highlighted what sewer improvements would be needed to serve the scenarios and those needed to serve the SAAMs. Dave also address water system improvements, and how providing water service to any of the scenarios or SAAMs through the city's water system will not be an issue; this performance measure was not a difference maker. With respect to the four performance measures focused on sewer and water, Scenario 1.2 performed the best and SAAM-3 performed the worst. The TAC comments on questions here included the City's coordination with Avion Water Company and their input on costs of providing service to the scenarios and the SAAMs.

- Factor 3 – Comparative Environmental, Social, Economic, and Energy Consequences

  - Quality Natural Environment (Environmental and Energy Consequences) – Karen Swirsky of the Growth Management Department gave the first presentation on this topic, focusing on wildlife and wildfire. The team considered six performance measures, of which two addressed wildfire and wildlife. For wildlife, the analysis considered the location of scenarios and subareas in deer and elk winter range that has been mapped and potential deer and elk winter range. Of the scenarios and SAAMs, SAAM-2 performed best and avoided the potential winter range areas. Regarding wildfire hazard, the team considered risk and hazard to evaluate the scenarios and the SAAMs. She referred to a map that identified different classifications of fire hazard: Extreme, Mosaic High, Managed High, Managed and Well-Managed High, and Well-Managed High. The TAC questions and comments on this topic included to what extent climate change has been incorporated in the analysis, whether the record shows a property by property analysis, the results reflecting additional work performed in the field, and fire history in the short term and the long term. With respect to this last topic, Craig Letz of the consultant team clarified that some mapped data in the record provided an incomplete look at wildfire

history due to the focus on large (100 acre or more) wildfires. He clarified that team needs to also consider fires of less than 100 acres that represent a threat to life and property.

- Housing Options and Affordability (Social Consequences) – Andrew Parrish of APG made the presentation on this topic. The team used two performance measures to evaluate the scenarios and SAAMs on housing options and affordability. One was the relative costs of new single family homes; the second was the estimated mix of new housing. With respect to the costs of new single family homes, Scenarios 1.2 and 2.1 performed the best; Scenario 3.1 and SAAM-3 performed the worst. The TAC's questions and comments on this topic included why housing was more expensive on the west side, the consideration of historic sales data, the effect of land values on prices, and how the design of housing on the west side compared to the east side of Bend affected prices.

- Strong Diverse Economy (Economic Consequences) – Andrew also gave the presentation on this topic. The team used three performance measures to evaluate the scenarios and the SAAMs. All the scenarios were rated as "Good" across the three measures. Scenarios with commercial areas in the West and Shevlin subareas rated slightly lower due to less pass-by visibility. The TAC's questions and comments on this topic included the UGB Steering Committee's (USC) decision on a large lot industrial site, and why average daily trips (ADT) as opposed to vehicle miles traveled (VMT) were considered.

- Factor 4 – Compatibility of Proposed Urban Uses with nearby Agricultural and Forest Activities occurring on farm and forest land outside the UGB.

  - Compatibility with Farms and Forests – Wendy Robinson and Damian Syrnyk of the city's Growth Management Department gave the presentations on this topic. The team used three performance measures to evaluate the scenarios and the SAAMs. With respect to the two addressing farm uses, Wendy reported that SAAM-3 performed best, with Scenario 3.1 and SAAM-2 receiving a "Poor" rating. These measures did not reveal that compatibility with farm uses was a difference maker among the measures. Damian reported on the results of the analysis of proximity to forest lands. SAAM-2 performed best on this measure and Scenario 3.1 performed the worst. Like the farm related measures, the evaluation of the scenarios and SAAMs against the proximity to forest uses did not show this measure was a difference maker. The TAC's questions and comments on these topics included the consideration of distance in the performance measures, and the potential forest practices that are allowed on forest lands.

c. Roll-up: summary of working recommendations

Before proceeding to the team recommendations, Andrew Parrish gave a short report on the results of the online Metroquest Survey as of October 5, 2015. The results of that date showed support

strongest for Scenarios 1.2 and 2.1. Natural Environment was a topic priority of the respondents and cost-effective infrastructure was a priority chosen most often by the respondents.

Becky Hewitt of APG then summarized the team recommendations. Of the six scenarios and SAAMs, Scenario 2.1 performed the best and was in the top tier on several criteria. She summarized the key weaknesses of the other alternatives with each of the other scenarios and SAAMs having at least one key weakness. She also summarized the team recommendations for potential refinements to the subareas in Scenario 2.1.

4. Public Comment.

After a short break, the TAC reconvened to accept public comments.

1. Lori Murphy – an attorney with Miller Nash, representing Sage Wind Farms; Rick Lane submitted materials. She directed the TAC to written testimony submitted to them regarding a tract of multiple properties identified as "Butler Market Village." The tract is 240 acres in size and referred to in the letter as the Perfect Rectangle. All property included in the tract is zoned MUA10 or UAR10 – all exception lands.

2. Myles Conway – an attorney representing property owner Rio Lobo. This property was not included in Scenario 2.1; some in Scenario 3.1. The property surrounded by UGB. The property scored very well on infrastructure analysis and is well managed for wildfire risk. There is a benefit to include to manage for wildfire. Skyline Ranch Road extension. All concerns in Scenario 3.1 don't have anything to do with this property. – Take an independent look at this property. It should be included.

3. Ed Elkins – owner of 412 acres in Gopher Gulch Ranch. Haven't irrigated for about 15 years. DSL – secondary level of exception lands. Gopher Gulch is first priority land. Development costs will be lower. A master plan from 2005 – sewer costs taken into account. Fire issues – none; asphalt, parks. Planned for different types of housing. Swalley water not an issue.

4. Tia Lewis – attorney representing Coats' property in Shevlin Area. Maps – 1. Conceptual master plan of 443 acres. Most important west side property. Surrounded on three sides by residential development. Served by six urban residential streets. Significant parks and trail connections. Should be managed by city and part of the park district. Have their own Goal 14 findings with evidence to support. Look at this separately from subarea – scores highly; sewer modeling by Awbrey and existing services with gravity. Important for transportation connections. Does not require all traffic to feed into west side and downtown. Wildfire – two water courses and surface mine abuts property.

5. Don Horton – representing Bend Metro Parks and Rec District. Thank you to all the volunteers. Arduous task. One, amount of effort and time – only a small amount land coming in. Encourage you to bring in more than what you're bringing in. Find properties that make the most sense – livable, walkable communities. Get as much land as you can.

6. Greg Blackmore – representing Brownrigg Family – 61 acre property – highlight items in your packet. Letter dated October 1 and conceptual master plan. This property is a gateway property. Northwest quadrant – north of Cooley, between OB Riley and Highway 20. Don't designate as large lot industrial; include mix of commercial and residential uses.

7. Tim Elliott – attorney representing Anderson Ranch holding company – Scenario 1.2 – top of the giraffes' neck. 27 acres. Not all of this property is included in Scenario 1.2. Sewer infrastructure – this area scored well. Owners have paid for sewer capacity. Schools are close. In Westside subarea. Will provide connectivity.

8. Matt Harrell – here on behalf of Gopher Gulch Ranch. Property offers opportunity for complete community. Settling on less acreage a disservice to the community.

5. TAC Roundtable

Following public comments, Joe asked started a roundtable discussion, asking each TAC member for their initial thoughts and observations. See flip chart notes attached to the end of this meeting summary.

1. Charley Miller – Subarea opportunities – to evaluate; 2.1 – with proposed modifications- what does 2.1 look like.

2. Dale Van Valkenburg – 2.1 is heavy in the southeast – wants to talk about difference makers

3. Tom Kemper – similar thoughts on 2.1 – process for evaluating and tweaking 2.1

4. Gary Timm – what is the refined scenario 2.1 look like? Northeast east area could stand some more complete communities

5. John Russell – pass

6. Steve Hultberg – difficult to differentiate one property from another in subareas; how would properties in one scenario do in another scenario. Need to understand how this works. Not just in west side. Need to address how a property passes/fails with other properties in a group.

7. Paul Dewey – alternatives – do you revisit Central Area Plan – increase number of units that could be built there? Would this affect cost of expansion? Miller Nash proposal – larger block of 240 acres in the northeast

8. Robin Vora – summary of things that are cost prohibitive; unrealistic by 2028. Still trouble supporting west side development – Goal 14 factors. Other tracts on east side that seem to have fewer conflicts. Wants to see 200 acres that have fewer Goal 14 conflicts that are not included in scenario 2.1.

9. Ellen Grover – small expansion; limited by remand and state requirements; look at opportunities for next phase of UGB expansion.

10. Susan Brody – think about next phase – interested in difference between 1.2 and 2.1 on the west side; how the analysis differs if you shift residential from 1.2 to 2.1. Intrigued with Miller Nash proposal. Is this a potential substitute? 2.1 – as we know it and 1.2 rely on us doing complete communities?

11. Brian Meece – SAAM 1; west side dragging down the northeast; just look at northeast and sewer looks good. Still believes that we have problem with SR2.5 south of Juniper Ridge – go back and remove some land from east side of JR and reallocate or figure out support northeast area; need housing to support JR. Aspirational issues – SR2.5 – bring in to support JR. Irrigation acreages on exception lands. Ways to mitigate water rights on exception lands.

12. John Dotson – supporting complete communities; unclear about – half way through planning period; 2014-2028 – what's the form of our recommendation to city council? Detail and refinements

13. Nick Lelack – continue to be clear in what we're evaluating – housing; wildfire (existing conditions), land uses (potential impacts for planned developments) – what we're evaluating. Affordable housing first – commercial and industrial (site suitability characteristics)

14. Scott Edelman – agency is increasingly impressed. Scenarios consider properties through Goal 14 analysis. More about balancing locally what's important.

15. Ruth Williamson – lens of Bend 2030 and a livable Bend. Pleased on where we're headed. Mostly in favor of moving process to conclusion and delivering supportable remand to the state. Affordable housing in and on periphery of UGB. Mirror Pond conversation – can't shelf this conversation.

16. Jim Bryant – bit concerned about impact of expansion lands on congested areas in North 97. Lack of infrastructure costs to accommodate growth in that area. Congestion and impacts of expansion lands to North 97 area. Mitigate, decrease land amount in this area, reduce impacts to North 97.

17. Sharon Smith – very limited expansion; we're constrained by the state. There will be a lot of properties that won't be included. Reality is not everyone that should will come in. Do a good job bringing in complete communities. Need a whole block of land. Bring in enough little properties to get land on line sooner. Think about spreading around more land; more on west and less on east. Transportation on North end.

18. Mike Riley – generally likes 2.1; complete communities and affordability. Wants to see map of revisions to 2.1 – what's it look like? Concerned about amount of development in the southeast. Doesn't' quite get how DSL rates high on transportation perspective.

19. Rod Tomcho – Thanked staff; concern over 2.1; southeast focus in 2.1; pretty heavy down in the southeast.

After Rod's comments Brian Rankin added a summary and some of his reflections. He asked the TAC to consider the potential refinements to Scenario 2.1. The TAC has one more meeting on October 22 where the team will seek a direction from the TAC. He asked the TAC to think about how the team frames the recommendations to the USC. He acknowledged that several TAC members raised the issue of Scenario 2.1 including a significant amount of land in the southeast, and that we consider how we position the City for the next UGB expansion. He concluded by asking the TAC to consider the difference makers, and why some measures were and others were not difference makers. Becky Hewitt of APG added some final comments and referred the TAC to the Evaluation Report on the advantages and the disadvantage of the subareas.

6. Project Information

After the TAC roundtable, Joe facilitated a discussion about the next TAC meeting on October 22, 2015. He asked the TAC for confirmation on whether the team had the right approach for the next meeting; bring back a map with suggested changes to Scenario 2.1 and some additional changes suggested by the TAC. He asked whether the team should also look at advantages and disadvantages. Susan asked for clarification for the outcome of the October 22 meeting – will the TAC make a formal recommendation to the Steering Committee? Brian responded the UGB Steering Committee will be meeting the same day (10/22/2015) and shortly after the Boundary TAC's meeting. He confirmed the TAC will be making a recommendation to a set of policy makers.

Joe followed up by stating the October to November phase of the UGB project will involve re-evaluating, re-analyzing the data and then meeting in December and January to get to the finish line. Brian confirmed that the team and staff are still working with the Residential and Employment TACs on a number of topics. The next meeting of the Boundary TAC after 10/22 is tentatively scheduled for December 15, with a final meeting also tentatively scheduled for January 21, 2016. The TAC's final meeting will be the January meeting, at which they will be asked for a final recommendation to the USC.

Brian Meece added one final comment regarding the northeast area; this area will need the northeast sewer interceptor, and has traffic problems at the north end. Sewer and transportation costs need to be looked at and quantified.

With no final comments or question, Sharon adjourned the meeting at 12:25 pm.

Transcribed Flip Chart Notes

Flip Chart Notes pg. 1	Flip Chart Notes pg. 2
<u>Top 1-2 Remaining Questions or Comments</u> • Subarea opportunities, how pieces come together • What does 2.1 look like with changes? • West side may not stay more expensive • Quantify proposed changes to 2.1 • 2.1 too heavy in SE – spread more • What's going on with weighting? • Process to evaluate and tweak • More complete communities in east area (NE)	• How to distinguish at a property level • How would changes inside UGB affect cost analyses? • Haven't had a chance to look at transportation • Intrigued with Butler Market Village • What's unrealistic for costs by 2028 • Concerns with including west over other land on east side with fewer Goal 14 conflicts • Lots of time and effort into a small expansion – look ahead to future phase with infrastructure investments • Look at next phase for context • 2.1 vs. 1.2 on west side • Intrigued with Butler Market Village • 2.1 relies on complete communities – need measures to quickly master plan
Flip Chart Notes pg. 3	**Flip Chart Notes pg. 4**
• SAAM-1 – combining creates inequities • Problem with SR2.5 near Juniper Ridge – need housing to support J.R. – bring in so J.R. less isolated • Efficient development mitigates impacts to water rights • Support concept of complete communities • What form will recommendations take – details, zoning • Be clear in what we're evaluating – based on past trends, current conditions, or future • Site suitability for affordable housing (e.g. topography) • Focus on balancing on local priorities – doing well on Goal 14 analysis • Pleased with where headed, keep moving ahead • Affordable housing outside and inside UGB • Measured approach to growing • Move on to community conversations	• Concerned about impact on North 97 already congested, lack of mitigation • Many suitable properties, not all will get to come in • Confirm top priorities, difference makers • Like complete communities, but also need some smaller properties – may need to spread around, more on west • Concerned about whether transportation costs will be affordable • High school in Thumb if just employment? • Map of recommended revisions • Lots happening in SE – can area handle that? Move to more to NE? • Why does DSL rank high on transportation? • Get down to detail of revisions to 2.1 • Less in SE

Memorandum

October 20, 2015

To: Boundary and Growth Scenarios Technical Advisory Committee

From: Angelo Planning Group Team

Re: Scenario Refinements for Consideration

OVERVIEW

The purpose of this memorandum is to describe the revised Urban Growth Boundary (UGB) scenarios that will discussed on October 22nd by the Boundary and Growth Scenarios Technical Advisory Committee (Boundary TAC). These options are offered in order to support a discussion by the Boundary TAC, and recommendation to the UGB Steering Committee (USC), regarding a draft preferred UGB scenario.

Following the October 22nd Boundary TAC meeting and USC check-in, the draft preferred UGB scenario will be taken through a second round of evaluation and refinements. That work will be brought back to the Boundary TAC at the December meeting. In December and January, the Boundary TAC will finalize a UGB recommendation, along with supporting reports, policies, and the basis for adoption findings. The USC's discussion and action on this package is scheduled for February.

SCENARIO REFINEMENTS FOR CONSIDERATION

The Evaluation Report reviewed by the Boundary TAC on October 8th included 3 scenarios, 3 supplemental analysis area maps, and working recommendations for how those alternatives could be narrowed. The report concluded that Scenario 2.1 is the best performing scenario based on the full set of performance measures evaluated, and that it can be improved by incorporating refinements in many of the subareas. The Boundary TAC heard additional public testimony, and then held a roundtable discussion to identify "top comments and questions" that the members had. Please see the meeting minutes and October 8th packet materials for background.

Building on the Boundary TAC discussion on October 8th, the project team has compiled and prepared the following scenarios for this memorandum:

- Scenario 2.1 - previously evaluated and included in the October 8th packet
- Scenario 2.2 – a refinement to Scenario 2.1 based on the team recommendations that were included in the October 8th packet.

- Scenario 2.3 – a refinement to Scenario 2.1 that reflects some of the project team's earlier recommendations in Scenario 2.2, and incorporates Boundary TAC comments at the October 8th meeting and continued evaluation of sub-area refinements.

The three scenarios essentially represent an evolution of ideas and refinement from the base of Scenario 2.1 to the current Scenario 2.3. The team believes that the narrowing and refinement process has now reached the point where a preferred scenario can emerge from Boundary TAC and USC direction regarding which elements to keep or modify - after review of the various pros, cons and trade-offs. As noted above, analysis will be performed on the preferred refined scenario to inform an eventual decision on the UGB expansion.

Two other updates have occurred in the short time since October 8th:

1. The current set of maps for discussion show conceptual, generalized land use designations within each expansion area as well as for the area inside the existing UGB. This is intended to support a more explicit discussion of land uses and complete communities in each subarea, including the concept of completing adjacent areas inside the UGB. (Note: the land uses shown are generalized versions of city General Plan designations and the detailed "development types" that are used in the Envision Tomorrow model.)

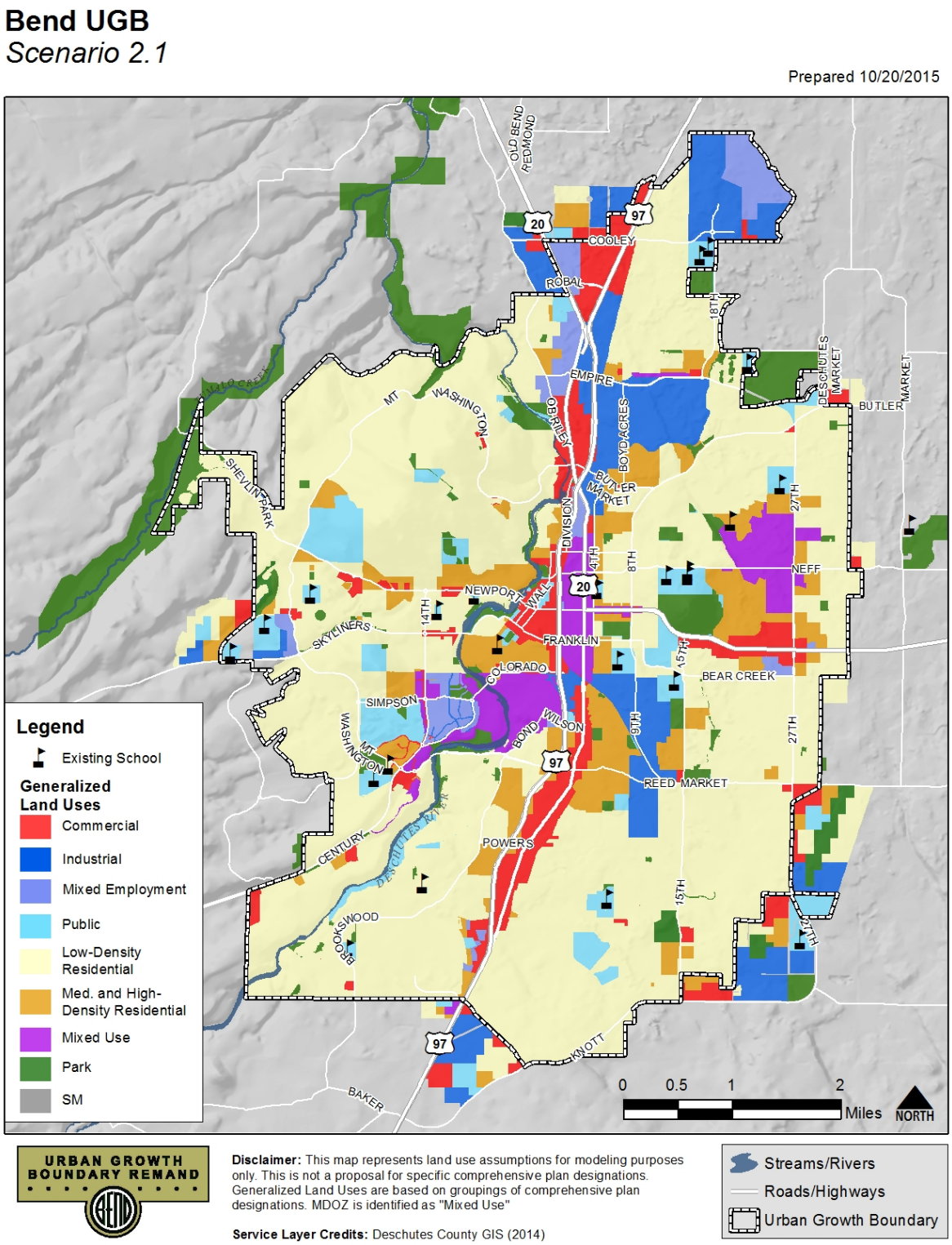
2. Updates to several land uses and assumptions have been made within the current UGB to better reflect: direction on land use efficiency measures from the Residential and Employment TACs; land needs for right of way, based on city standards; updates based on the latest recommendations from the Central Westside Plan; and other refinements (see footnote 2 on page 12 for more details). The impact of these refinements has a negligible impact on total land need outside the current UGB but does affect the number and mix of housing units and jobs needed outside the current UGB (see Table 1 on page 12 for more details).

Additional coordination between the project team and the Bend Parks and Recreation District and Bend La Pine school District may lead to additional refinements. Additional refinements may also be driven by further discussions and analysis performed by the Residential and Employment TACs related to Efficiency Measures.

RATIONALE FOR SCENARIO 2.1 AS THE STARTING POINT

Scenario 2.1, as evaluated, focuses on creating new complete communities with a broad mix of uses in all quadrants of the City. Nearly all expansion areas include housing, employment areas, shopping/services, and schools and parks. This scenario fully develops "The Elbow" and the DSL site as complete communities. It incorporates housing along with employment in the North "Triangle" and "The Thumb", and some industrial/professional office in the West Area along with residential. The OB Riley area is employment-focused, with a potential large lot industrial site.

Figure 1: Scenario 2.1 Generalized Land Use Map



Based on the body of work captured in the evaluation report, and considering and balancing the four Goal 14 Factors, Scenario 2.1 performed the best of the alternatives overall, regardless of whether and to what degree weighting is applied to distinguish between the more and less important performance measures. Scenario 2.1 was in the top tier relative to other alternatives on nearly all community outcomes, including:

- Complete Communities and Great Neighborhoods (because it was created with the intention of providing for complete communities in all quadrants of the city);
- Efficient, Timely Growth (because of its efficient use of residential land and reliance on large, vacant parcels);
- Balanced Transportation System (because of the above advantages plus enhanced connectivity due to the extension of Murphy Road to 27th / Knott and keeping growth in the northeast focused to nodes along major east-west corridors);
- Cost-Effective Infrastructure (because of relatively low cost for both connectivity- and capacity-related transportation improvements and reasonable costs for sewer improvements);
- Quality Natural Environment (because it avoids riparian areas, limits expansion in wildlife areas, does not have any features that prevent mitigation of wildfire risk in any expansion areas, and has fairly low energy and water consumption and greenhouse gas emissions); and
- Housing Options and Affordability (because it has good housing mix in nearly all subareas and good housing affordability with significant housing growth in the southeast[1]).

The two Community Outcomes where Scenario 2.1 was not in the Top Tier were Strong Diverse Economy (because it places employment and commercial uses in some areas, such as the West Area, where they are somewhat less well suited) and Compatibility with Farms and Forests (because it has relatively more impact to Arnold Irrigation District from inclusion of full Elbow area and development adjacent to several commercial farms, including the greatest amount of development next to a feed lot south of Knott Road).

No other alternative had as strong performance on as many community outcomes, and each of the other alternatives has at least one important weakness identified through the evaluation:

- Scenario 1.2 performs poorly on cost-effective infrastructure, because heavy development in the Thumb triggers the need to widen Knott Road to three lanes.
- Scenario 3.1 performs poorly on cost-effective infrastructure, due to high transportation costs to connect growth areas and the need to widen US 20 from Robal Rd to 3rd Street. It also performs poorly on compatibility with farms and forests due to heavy impacts to Swalley Irrigation District in OB Riley / Gopher Gulch and forest proximity in the Shevlin Area and on Housing Options and Affordability because much of the residential

[1] Housing costs for new construction were found to be roughly 30% lower in neighborhoods on the outer east side of the city relative to neighborhoods on the outer west side of the city. Housing in expansion areas is assumed to follow this trend.

development is focused on the west side of the city where land costs and housing prices are higher. It performs relatively poorly on Quality Natural Environment because including the Shevlin Area impacts wildlife areas, puts development in proximity to Tumalo Creek on the western edge, and has topography that makes wildfire hazard difficult to mitigate on the western edge.

- SAAM-1 performs poorly on multiple Community Outcomes. It performs poorly on Quality Natural Environment because including the full Shevlin Area impacts wildlife areas, puts development in proximity to Tumalo Creek, and has topography that makes wildfire hazard more difficult to mitigate. It performs poorly on Cost-Effective Infrastructure because development of the full Shevlin Area requires a costly new regional pump station for sanitary sewer, and it also has fairly high cost for new roads connecting growth areas and high costs for intersection improvements. SAAM-1 also rated relatively poorly on Complete Communities and Great Neighborhoods and Efficient, Timely Growth because the outer extents of the Shevlin Area and Northeast Edge are not well-suited to higher-density housing and have less proximity to commercial services, schools, and/or parks.
- SAAM-2 performs poorly on Balanced Transportation System, due to the lack of connectivity to the existing UGB from the Gopher Gulch area and the distance to reach key destinations inside the current UGB. It also performs relatively poorly on Compatibility with Farms and Forests due to heavy impacts to Swalley Irrigation District and proximity to the greatest number of working farms.
- SAAM-3 performs relatively poorly on Housing Options and Affordability because all of the residential development is focused in the West Area, which is more expensive (as noted above), and on Cost-Effective Infrastructure because including the full West Area (particularly the northwest portion) requires a costly new regional pump station.

WHAT WE HEARD FROM THE BOUNDARY TAC

The Boundary TAC expressed a number of ideas regarding possible modifications to Scenario 2.1 and areas of concern with Scenario 2.1 as drawn. These include, in brief:

- Concern about the amount of new development in the southeast (from multiple members)
- Interest in the Miller Nash / Butler Market Village proposal for greater development northeast of Butler Market Road in the northeast (from multiple members)
- Desire for more complete communities in the northeast
- Spread development around to more land – more on the west and less in the southeast
- Concern about including growth on the west side
- Desire to bring in subdivisions south of Juniper Ridge to better connect and support the Juniper Ridge employment area
- Concern about amount of growth in the north and impacts on infrastructure and state highways

Many of these comments are reflected in Scenario 2.3, as described further on page 8. It is also important to note that the concept of creating complete communities has been one of the most widely supported over-arching ideas throughout the development and refinement of scenarios, including at the meeting on October 8th.

Several members of the Boundary TAC also requested further information about how specific properties perform within a given subarea or additional information about a specific evaluation. The project team will endeavor to provide the additional information requested during the October 22nd meeting, as needed to support the discussion and development of recommendations.

DESCRIPTION OF SCENARIO 2.2

Scenario 2.2 reflects the team's recommended modifications to Scenario 2.1 from the Evaluation Report, focusing growth to the areas that performed the best on the evaluation while shifting growth away from areas that performed relatively poorly. It yields an expansion scenario with complete communities in most subareas, but an employment focus in the north. The recommendation in each subarea and a brief recap of the rationale for this recommendation, along with notes about implementation considerations and concepts for the area, are summarized below.

North

- **North Triangle**: employment-focused, due to concerns about compatibility and desirability of residential surrounded by commercial and employment uses. Needs to provide for a transition to existing rural residential development to the north through techniques such as buffers, setbacks, landscaping, limitations on allowed land uses, and/or special development standards.
- **OB Riley / Gopher Gulch**: a relatively modest, employment-focused expansion between US 20 and OB Riley Road. Commercial uses are best focused adjacent to Cooley Road, which provides the greatest access to state highways. The large lot industrial site is not located in this area.

Northeast

- **Northeast Edge**: complete neighborhoods focused on nodes around Butler Market Road and Neff Road where sewer is cost-effective, transportation connectivity is good, and VMT is relatively low (excludes the roughly 40-acre Bear Creek Road area due to high sewer and transportation costs). Site design for the commercial nodes should provide multi-modal access for both existing and new adjacent neighborhoods.

Southeast and South

- **DSL Property**: fully utilizes the exception land portion of the site for a broad mix of uses, including a possible large lot industrial site at the southern end, due to relatively strong performance of this area and its suitability for a mix of uses. Employment and

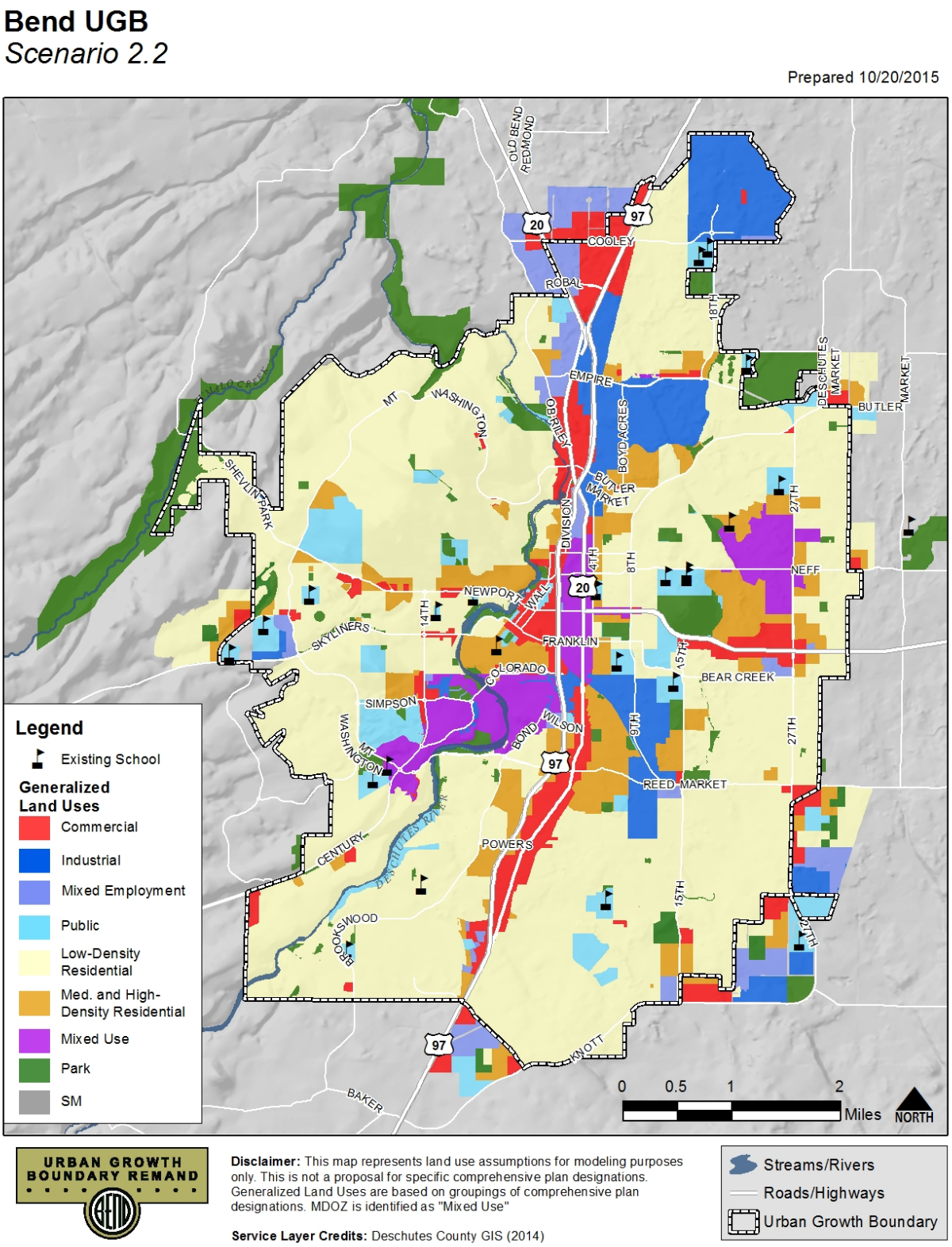
commercial uses are focused along major roads with more industrial uses in the southern portion of the site, closer to the county landfill property, although the specific location of various land uses will be subject to a master planning process. The location of the caves needs to be better identified and reflected in the land use assumptions.

- **The Elbow**: fully utilizes this subarea, because doing so spreads the cost of needed sewer facilities (an interim pump station) and allows for the extension of the Murphy Road corridor to meet Knott Road / 27th. Employment uses near the southeastern corner of the subarea need to be compatible with the adjacent feed lot on the south side of Knott Road.
- **The Thumb**: includes roughly half of this subarea, with a mix of uses including a high school and a community park along with medium density residential, commercial nodes, and an employment area. While the specific location of various land uses will be subject to a master planning process, uses abutting Knott Road and China Hat Road should be designed to be compatible with existing adjacent rural and suburban housing.

West

- **West Area**: a primarily residential expansion with a mix of housing types is focused around a commercial node. While the specific location of various land uses will be subject to a master planning process, the siting of medium- and high-density housing should support the commercial area and provide maximum walkability to the commercial node and adjacent schools inside the current UGB.
- **Shevlin**: this area is excluded, due to the various concerns identified through the evaluation, including habitat impacts, wildfire and riparian impact concerns on the northwestern edge, and long trip lengths.

Figure 2: Scenario 2.2 Generalized Land Use Map



DESCRIPTION OF SCENARIO 2.3

Scenario 2.3 reflects some of the project team's earlier recommendations in Scenario 2.2 (see above), and incorporates Boundary TAC comments at the October 8th meeting and continued evaluation of sub-area refinements.

The recommendation in each subarea and a brief summary of the rationale for this recommendation are summarized below. Where Scenario 2.3 mirrors Scenario 2.2, the descriptions are not repeated; this includes the notes about implementation considerations and concepts for each area.

North

- **North Triangle**: largely identical to Scenario 2.2 (see page 6)
- **OB Riley / Gopher Gulch**: incorporates residential in the southern portion of the OB Riley area, in order to provide for a more complete community in the north, and to capture some of the transportation advantages of including residential in that area that were identified through the evaluation. Also extends further north in order to accommodate needed employment shifted out of other areas and displaced by residential uses to the south.

Northeast

- **Northeast Edge**: Inclusion of the full Butler Market Village area (a.k.a. "the Miller Nash proposal" and "the perfect rectangle") except for developed church properties at the southeastern corner (similar to Scenario 2.1 but more extensive).

Southeast and South

- **DSL Property**: Slightly reduced expansion in this area to reflect Boundary TAC concerns with over-emphasis in southeast, while retaining significant growth in order to retain the advantages identified in the evaluation of Scenario 2.1.
- **The Elbow**: reduced emphasis on growth in this area to reflect Boundary TAC concerns with over-emphasis in southeast, with less residential development in particular. Retains employment areas along Knott Road to help meet employment need and allow for the extension of the Murphy Road corridor to meet Knott Road / 27th.
- **The Thumb**: includes a little over half of this subarea, providing for a larger housing component while keeping the total acreage in that area somewhat less than in Scenario 2.1. Providing a greater residential emphasis and less employment is intended to provide for better compatibility with adjacent residential uses.

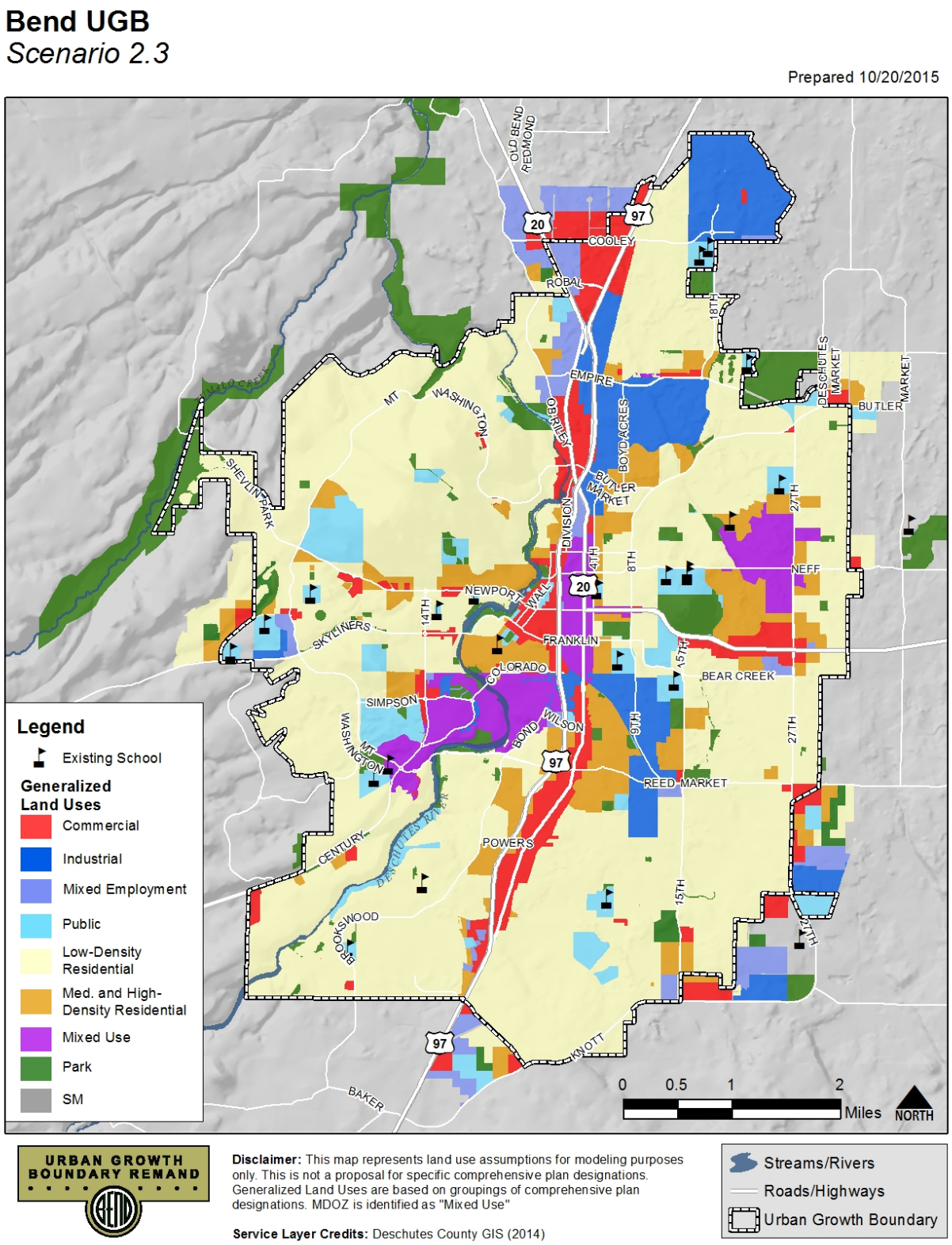
West

- **West Area**: includes an additional swath of the West Area abutting the current UGB along the planned extension of Skyline Ranch Road, in order to facilitate the extension of that roadway, with somewhat less expansion to the southwest on the Miller property.

- **Shevlin**: still excluded, although including more growth in the northern portion of the West Area may make the school site in the Shevlin area more likely to be needed, especially if it could be sited in the southeastern portion of the Shevlin area where wildfire, wildlife and riparian concerns are less pronounced.

The result of these refinements is an expansion scenario with a mix of land uses in the expansion areas in all sections of the city, and with a relatively balanced distribution of growth among the expansion areas in all sections of the city. The Northeast Edge and West Area extend and complete existing neighborhoods with a mix of housing types, supported by commercial nodes at major intersections. The DSL Property and The Thumb provide for major new master planned areas with employment centers as well as a mix of housing types to better complete the existing largely single family neighborhoods in the southeastern part of the city. The Elbow and OB Riley areas provide employment areas along major arterial roads with modest amounts of residential development adjacent to existing housing inside the city. The North Triangle provides an extension of the existing, successful commercial and employment areas inside the city between US 20 and US 97.

Figure 3: Scenario 2.3 Generalized Land Use Map



KEY METRICS

The table below summarizes key metrics including acres by broad land use category, housing units by type, and jobs by general category for each subarea for Scenario 2.1, 2.2 and 2.3. (Note that total acres, units and jobs have changed from 2.1 to 2.2 and 2.3 due to updates made to assumptions inside the UGB.[2])

Table 1: Key Metrics for Scenarios 2.1, 2.2 and 2.3

Metric	Scenario 2.1	Scenario 2.2	Scenario 2.3
Total Acres of Expansion	1,815	1,855	1,806
Residential Acres	706	694	705
Employment Acres	840	951	906
Civic Acres	269	211	202
Total Housing Units (outside UGB)	4,109	4,413	4,332
Single Family Detached Units	1,644	2,002	2,026
Single Family Attached Units	575	546	516
Multifamily Units	1,890	1,865	1,791
Total Jobs (outside UGB)	8,222	8,119	8,107
Retail & Hospitality Jobs	1,828	3,323	3,328
Office Jobs	2,874	2,373	2,329
Industrial Jobs	3,515	2,421	2,447
Public Jobs	5	2	2

CONCLUSION AND RECOMMENDATION

The project team requests that the Boundary TAC consider the options and provide a recommendation on a preferred scenario, along with any further refinements, to the USC. The recommendation will allow further analysis and refinement.

[2] Updates to assumptions inside the UGB include: modifications to capture direction on land use efficiency measures from the Residential and Employment TACs, including reducing the minimum density requirement assumed for master-planned neighborhoods; updates to right of way set-asides to better reflect city standards and previous city analysis; updates in the Central Westside Plan area to better reflect the latest recommendations from the Central Westside Plan; updates to the Ward property opportunity site on 15th Street to slightly increase the amount of medium- and high-density housing assumed in that area; an update to the assumptions for Juniper Ridge, assuming industrial plan designations rather than Mixed Employment; updates to the COID opportunity site to better reflect constrained and available acreages on that property; and updates to the assumed housing products in several residential development types to better reflect current city standards.

Memorandum

October 20, 2015

To: Boundary and Growth Scenarios Technical Advisory Committee

Cc: Urban Growth Boundary Steering Committee

From: Andrew Parish AICP, Angelo Planning Group

Re: MetroQuest Phase 2 Summary

INTRODUCTION AND HIGHLIGHTS

This memorandum is intended to provide an executive-level overview of the input received from the Phase 2 MetroQuest online public survey, which was open between September 22 and October 15, 2015. Detailed results will be made available in a full report at a later date.

The key takeaways of the MetroQuest online public survey are listed below.

- Roughly **1,700 people** participated in the survey. Of these, roughly 82% of respondents said they live within the City of Bend, and 72% work in Bend.
- **"Quality Natural Environment"** was the top priority of survey respondents, followed by **"Strong Diverse Economy"**.
- **Scenario 2.1** scored the highest of the scenarios/SAAMs included.
- Respondents provided **over 1,200 comments** representing a wide range of viewpoints about the future character and design of the City of Bend.

SURVEY ORGANIZATION

The survey consisted of four "Screens" which gathered user input on the following topics:

- **Screen 1: Introductory screen.** This screen briefly described the background and purpose of the survey. No user input was gathered on this screen.
- **Screen 2: Priority Ranking.** Users chose their top five priorities from a list of eight possible "Community Outcomes". There was space available to suggest an additional outcome and to provide comments about those listed.
- **Screen 3: Scenario/Supplemental Analysis Area Map (SAAM) Ranking**. Users received information about the three scenarios and three SAAMs that were evaluated, and then rated each scenario/SAAM on a 1-5 scale.
- **Screen 4: Growth Strategies.** This screen asked users to provide input on growth strategies to increase land use efficiency in a variety of areas, including: the Central

Area, transit corridors, existing neighborhoods, new neighborhoods, and employment areas. Users checked boxes to indicate support for a strategy.

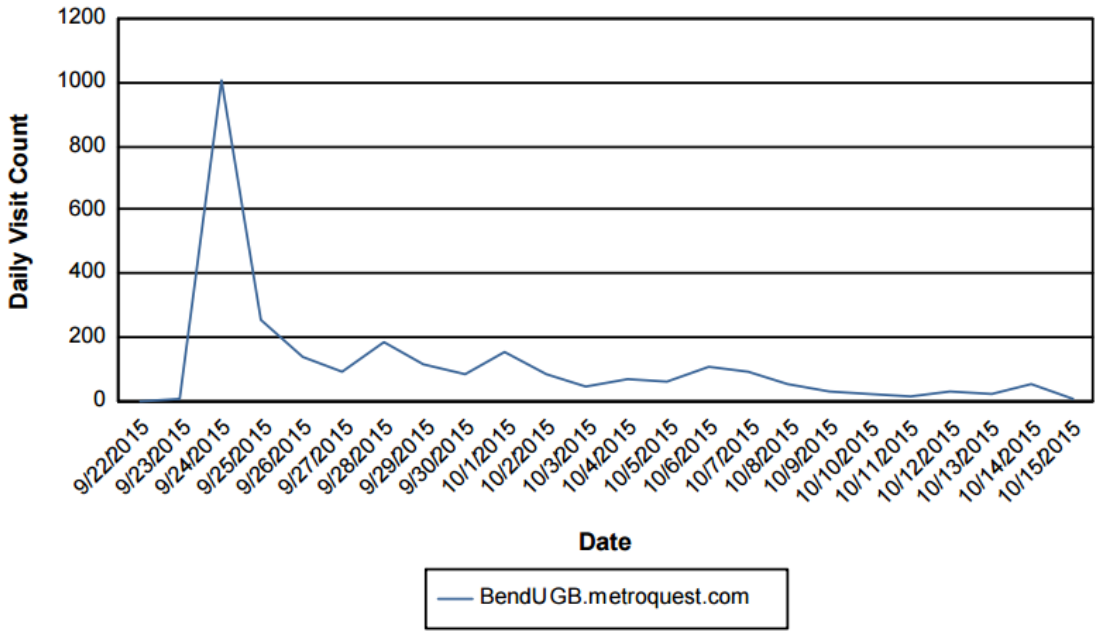
- **Screen 5: Demographic Information.** Users provided optional demographic information about gender, age, what neighborhood they live in, and whether they work in Bend.

Overall Data

Key data about the degree of participation in the survey are summarized below. Figure 1 shows the daily visit count, with a clear spike in activity around September 24th due to a successful media outreach campaign.

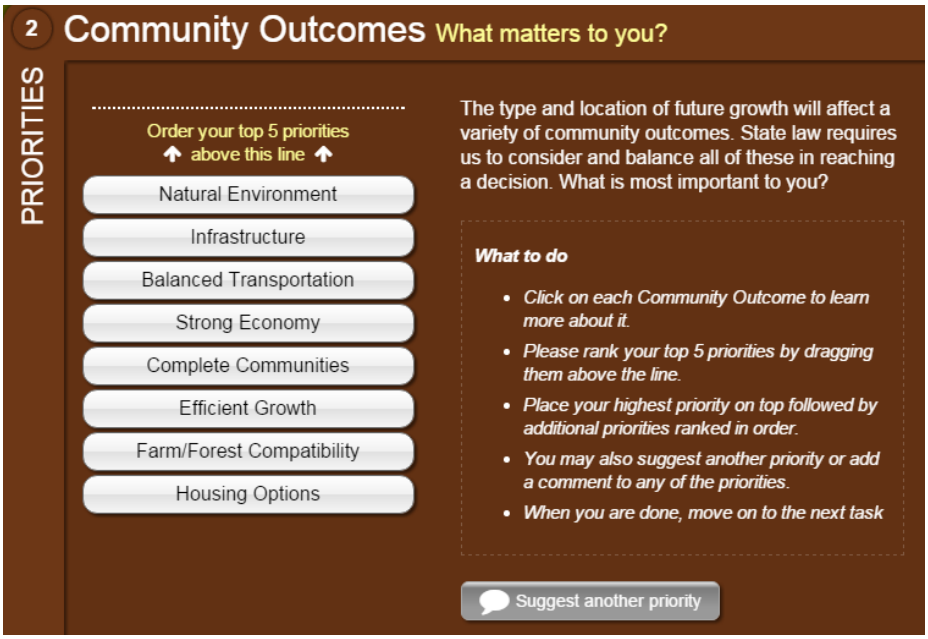
- **Total Visits:** 2,736
- **Total Visits with information entered:** 1,700 (62%)
- **Total Comments**: 1,236

Figure 1. Daily Visit Count



SCREEN 2: PRIORITY RANKING

Users were asked to rank their top 5 out of 8 “Community Outcomes” by dragging goals above a line (see image below). Key points are summarized below, and all priority rankings are shown in Table 1 and Figure 2. A lower numerical score indicates a better ranking on this screen.



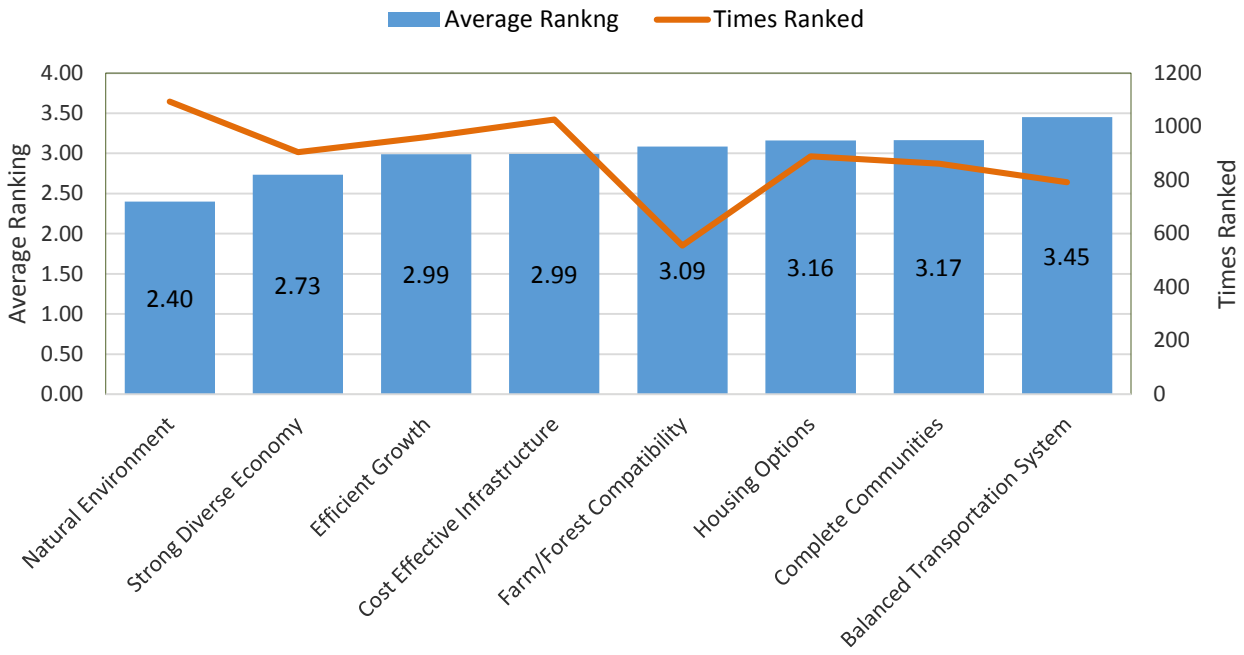
- **"A quality natural environment"** was ranked highest by a wide margin.
- **"Cost-effective infrastructure"** was ranked nearly as many times, though not as highly.
- **"Balanced transportation system"** received the lowest ranking.
- **"Farm and Forest Compatibility"** was ranked fifth overall, but was ranked the fewest number of times. This means that those who did rank this priority at all tended to rank it very highly.

Table 1. Screen 2 Priority Ranking

Overall Rank	Average Position	Times Ranked	Goal
1	2.40	1094	Quality Natural Environment
2	2.73	905	Strong Diverse Economy
3	2.99	961	Efficient Growth
4	2.99	1027	Cost-Effective Infrastructure
5	3.09	555	Farm and Forest Compatibility
6	3.16	889	Housing Options and Affordability
7	3.17	862	Complete Communities
8	3.45	792	Balanced Transportation System

Figure 2. Priority Ranking

(Lower numerical score is a better ranking)



Screen 2 Comments

A selection of common themes for Screen 2 comments is provided on the following pages. Additional detail about survey comments will be provided in a full report at a later date. As can be seen from the comments, many represent conflicting points of view or priorities.

Suggestions for New Priorities:

- Comments in support of “Complete Communities” generally
- Comments in support of “Strong Natural Environment” generally
- Affordable housing
- Less Growth / No Growth
- Compatibility of neighboring uses (specifically industrial adjacent to residential)
- Balance of amenities/quality of life between East and West Bend
- Flexibility for property owners
- Future citizens
- Education and quality of schools
- Water use / drought tolerance
- Wildfire
- Reduction in traffic

Comments about Complete Communities:

- Walkability/bikeability
- Living close to work
- East side / northeast neighborhoods need to be completed ("We can't all live on the West side")
- Density is needed for complete communities.

Comments about Efficient, Timely Growth:

- Affordable housing is an important part of this outcome.
- Small-lot homes are undesirable.
- Taller buildings do not mean loss of small-town feel. They preserve walkability and neighborliness.
- Past uses shouldn't completely dictate new uses.
- Industrial growth should not be adjacent to residential areas.
- Infill first, “grow up not out.”
- Need flexibility in zoning, for ADUs and multifamily housing in single family zones
- More multifamily zoning overall
- Mixed use, mixed density, and mixed cost housing throughout Bend.

Comments about Balanced Transportation System:

- Transit needs improvement.
- Need convenient and safe bicycle system to major destinations. Especially East-West corridors.
- Separated bicycle paths needed.
- Bicycle transportation is overrated - can't bike year round in Bend.
- There is too much traffic already - more growth will only increase that.
- Density will cause too much traffic.
- Keep existing system in good condition before building new roads.

Comments about Cost-Effective Infrastructure:

- Bend should never outgrow capacity to manage its infrastructure.
- Density = more cost-effective infrastructure.

Comments about Strong Diverse Economy:

- Need non-tourism jobs.
- More flexible zoning needed.
- Encourage small/local businesses
- Need affordable housing near employment centers.

Comments about Natural Environment:

- More natural parks, less water parks
- Bend Parks and Recreation is City's greatest asset
- People come to Bend because they cherish the natural environment - let's protect it.
- Some people love the nice parks but they are an expensive luxury.
- Wildfires are natural and should be expected.

Comments about Housing Options and Affordability

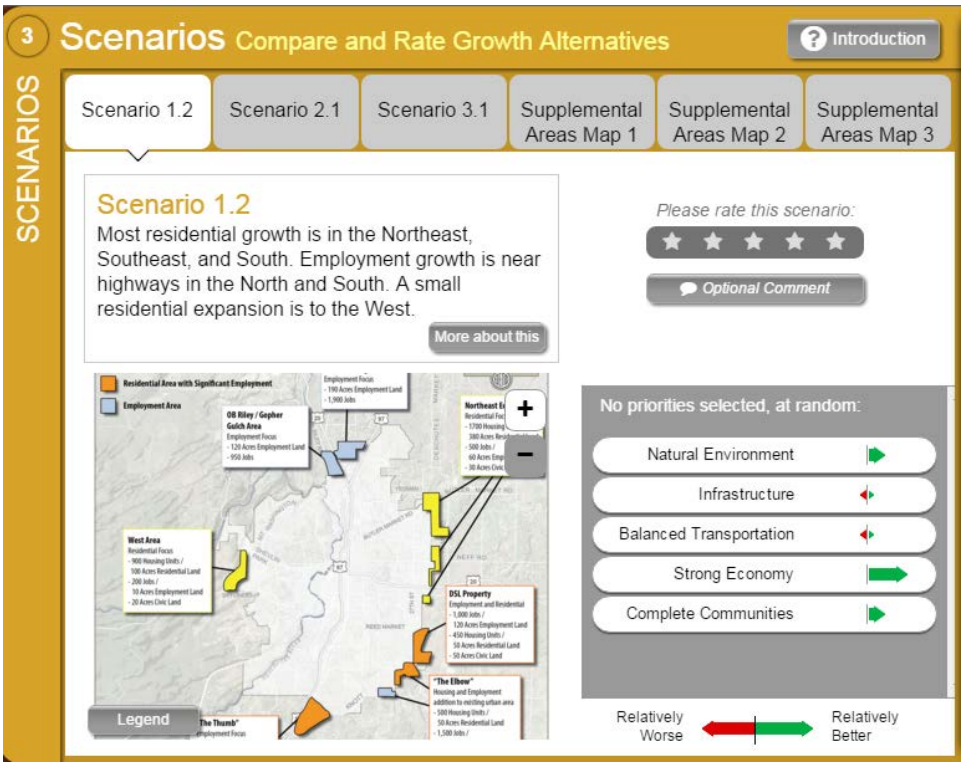
- A range of lot sizes is needed.
- Bend lacks affordable housing options.
- Bend does not have housing options for mid-range incomes.
- Bend needs flexibility in permitted types of housing.
- ADUs are key to affordability.
- The rental market is very tight right now.
- Housing options do not include homes on large lots within the city. Available lots on one acre or more are rare. Plenty of smaller lots are available

Comments about Farm and Forest Compatibility

- Bend should not grow into irrigated lands. These are rare in central Oregon.
- This is not a concern in Bend. We are surrounded by thousands of acres of BLM land and forest service land. It is not a precious resource.
- We need to be very careful about extending into the urban/wildlife interface.

SCREEN 3: SCENARIO/SAAM RATING

Users were asked to rate their level of support for each of the scenarios/SAAMs that were evaluated. Users were given maps and information about each scenario/SAAM based on the five top priorities chosen in Screen 2. Key points from Screen 3 are summarized below. Table 2 and Figure 3 show the ratings from this screen.



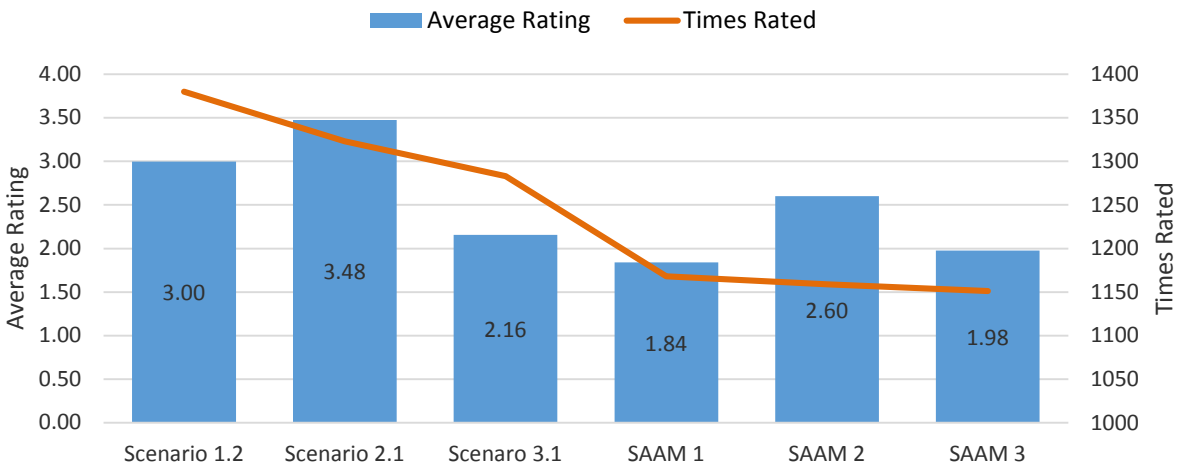
- **Scenario 2.1** had the highest average rating.
- **SAAM 1** had the lowest average rating.
- Number of times rated tended to decrease as users progressed through the screen – fewer people rated the later scenarios/SAAMs than the earlier ones.

Table 2. Screen 3 Scenario/SAAM Rating

Scenario/SAAM	Average Rating	Times Rated
Scenario 1.2	3.00	1380
Scenario 2.1	3.48	1323
Scenario 3.1	2.16	1283
SAAM 1	1.84	1168
SAAM 2	2.60	1159
SAAM 3	1.98	1151

Figure 3. Scenario/SAAM Rating

(Higher numerical score is a better rating)



Screen 3 Comments

A selection of common themes for Screen 3 is provided on the following pages. Additional detail about survey comments will be provided in a full report at a later date.

Scenario 1.2 Comments

- Too much West side growth. (wildfire risk, wildlife habitat, affordable housing concerns)
- Do not expand West.
- Balanced option - includes West and NE. Could use more housing in North. Growth should be spread around all areas of Bend.
- Streets in West are already overburdened. COCC and OSU
- Not as good as 2.1
- Buildout should be North and Northeast.
- Gopher Gulch/North Triangle should have residential component.
- Congestion is a huge concern in North area.
- Industrial areas should not be adjacent to existing residential.
- Large tracts provide opportunities for complete communities, so these parcels should have highest priority.
- Less growth in SE as there is fire danger there as well.
- No expansion is best.
- Development to the East destroys established residential neighborhoods near Hamby.
- Traffic already overloaded on Neff to downtown.
- Limited commercial on highway frontage (not Knott)
- Thumb should be residential.
- Too much density focused on the urban fringe.

Scenario 2.1

- No housing by the dump. "I think you might be underestimating the impact of a landfill next to a subdivision" "Does complete community include a dump?"
- Too much West side development.
- Expand residential area on Butler Market Road to Hamby Road
- Bend needs more "hubs" of complete communities.
- No employment land south of China Hat.

- Large Lot in OB Riley area is a bad idea.
- No residential in the Thumb. No one wants to buy a home by the freeway. Commercial area preferred.
- Good distribution and balance of land uses around the boundary.
- Traffic a concern in SE. Current roads are subpar.
- Reducing area of the Thumb limits ability to create a complete community.
- Elbow needs residential not employment.
- More mixed use is needed inside existing UGB.
- More housing and commercial in NW.
- Overburdens Newport and Galveston.
- This option takes advantage of existing infrastructure the best.
- North residential neighborhood will have trouble connecting to the city with walkable/bikeable paths.
- Like mixed residential/commercial idea for Thumb.
- More commercial needed in NE.

Scenario 3.1

- Opposed to West side / Shevlin development.
- Best option for the Thumb.
- Lack of transportation on West side.
- Housing nearby the new college will be helpful.
- Need more housing on West side.
- Housing too expensive on West side.
- This scenario grows in areas that are not already too crowded.
- Industrial development should not be adjacent to residential areas.
- Thumb should not be employment only - it has amenities suitable for residential.
- Shevlin area had utilities that abut the property making it easy to serve.
- More density in the West will make bend unattractive.

SAAM 1

- Too much on West side, no to development of Shevlin area.
- Best option for affordability - easy new housing with proximity to utilities and airport.
- Not enough mixing of uses.
- Residential focus in Thumb
- Like NE, don't like Shevlin area.

SAAM 2

- Like lots of room to make a nice community.
- Transit problems.
- Elbow as employment is a bad idea.
- No to development in Gopher Gulch.
- Efficient to invest in infrastructure mostly in one place, rather than everywhere around the city.
- Complete community needed in Thumb.
- Not balanced approach.

SAAM 3

- Too much emphasis on lands of a few landowners
- Already congested on West side
- Residential growth is far from job centers
- Large forest impact. Large nature/habitat impact.
- High wildfire risk.
- Not a balanced approach.
- Not enough affordable housing.

SCREEN 4: LONG-TERM STRATEGIES

Users were asked to weigh in on a variety of general strategies that affect urban form in different areas throughout the City of Bend. Users checked boxes relating to strategies they supported in a particular area. The following figures show the number of times specific strategies were checked.

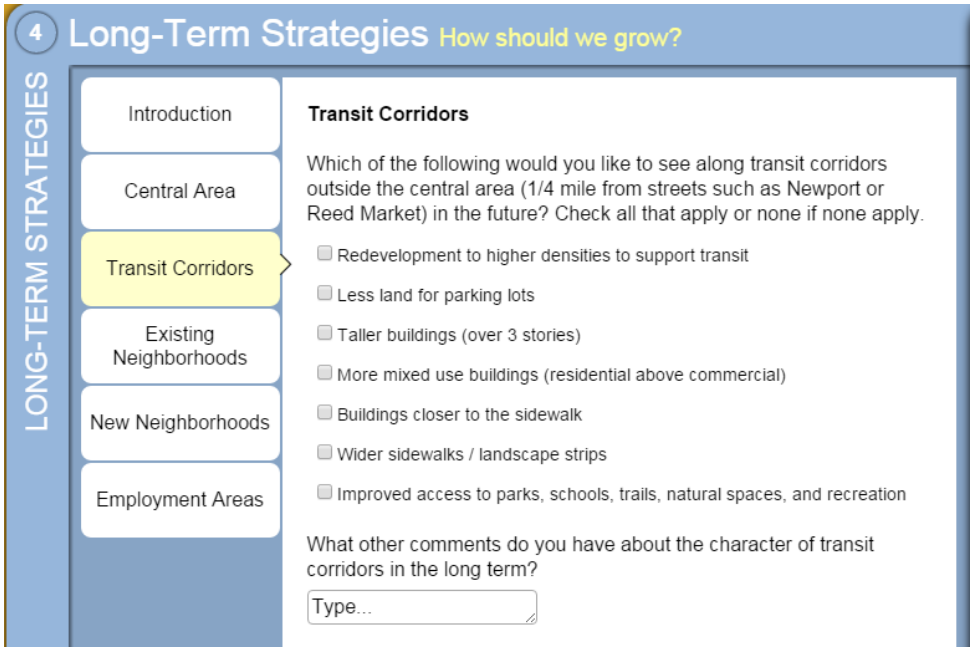


Figure 4. Support for Land Use Strategies – Central Area

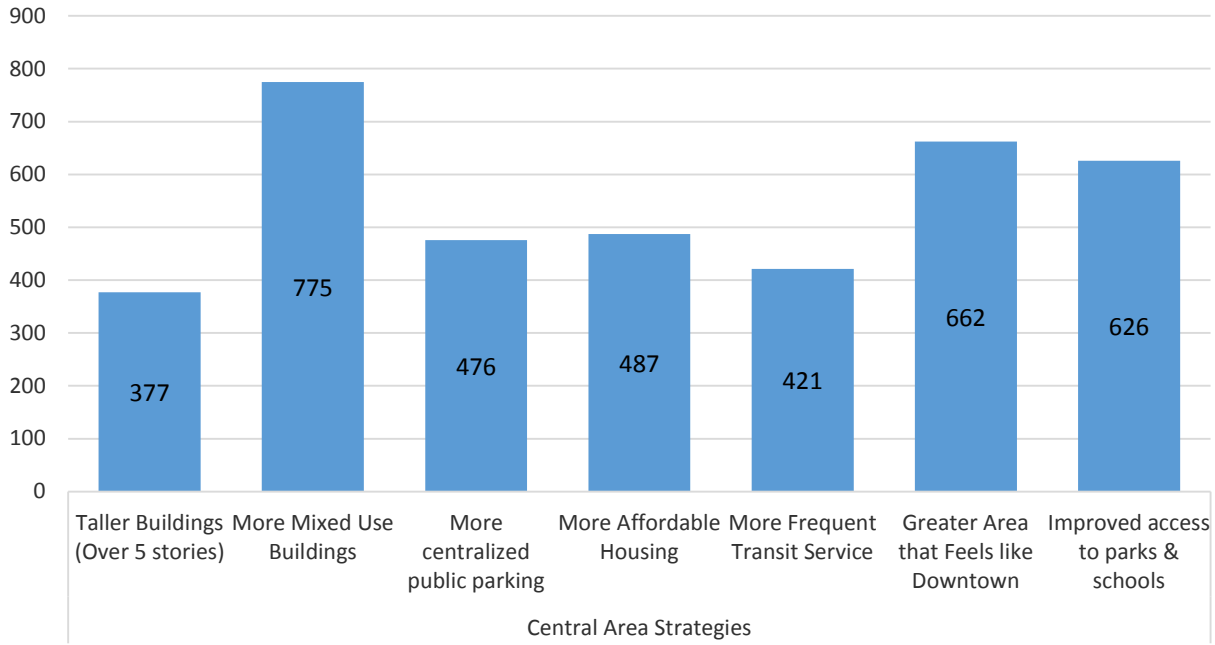


Figure 5. Support for Land Use Strategies – Transit Corridors

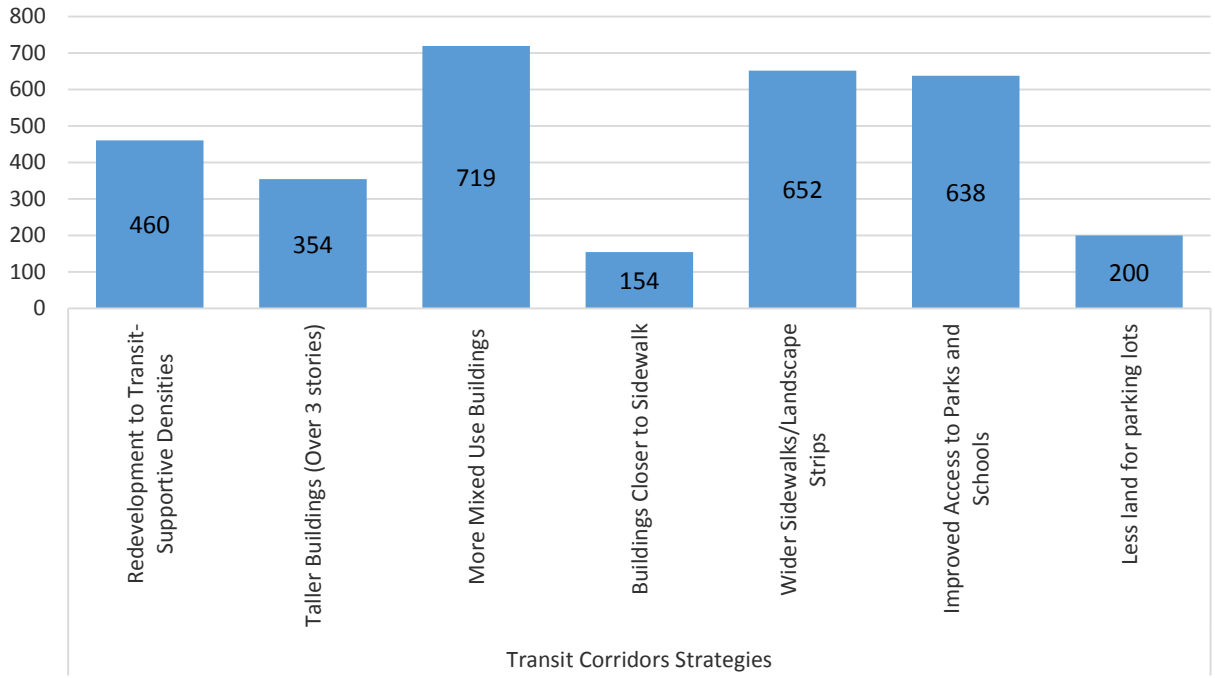


Figure 6. Support for Land Use Strategies – Existing Neighborhoods

Figure 7. Support for Land Use Strategies – New Neighborhoods

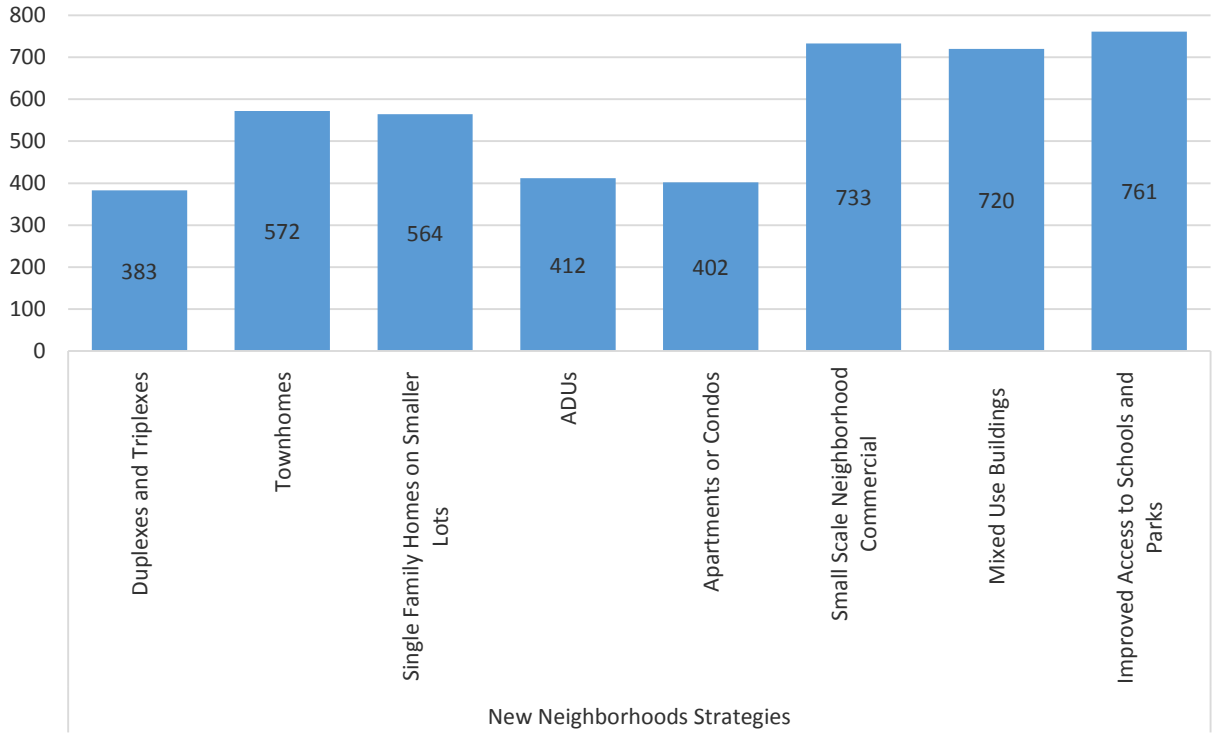
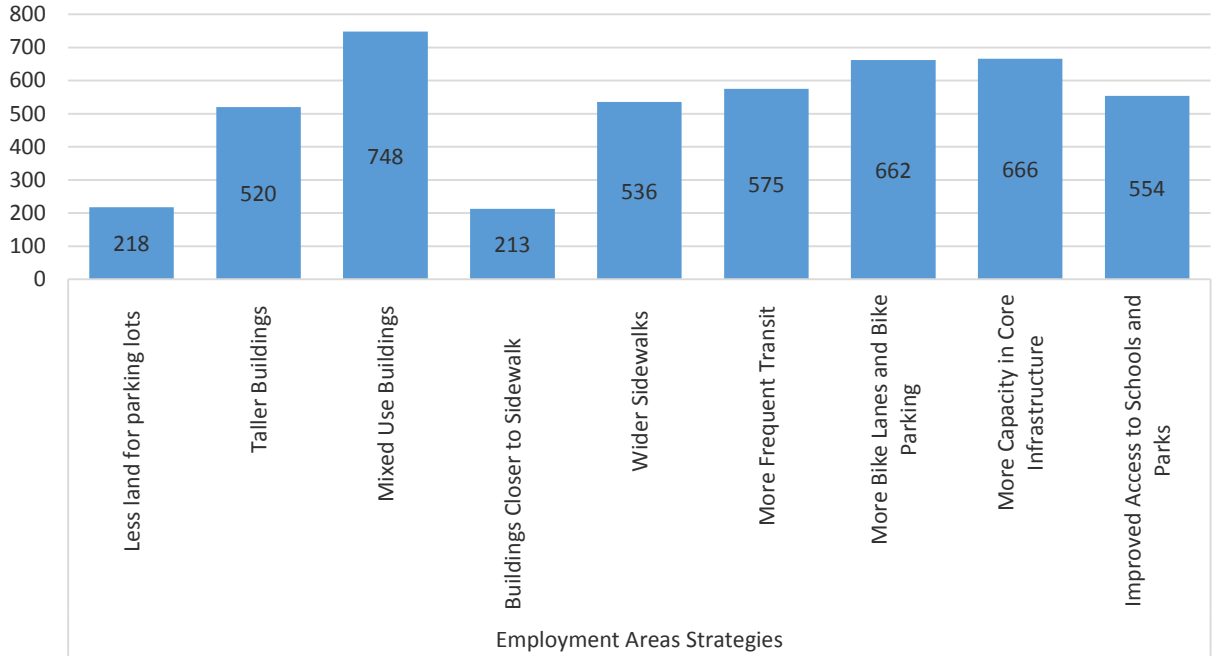


Figure 8. Support for Land Use Strategies – Employment Areas



Screen 4 Comments:

A selection of common themes for Screen 4 comments is provided on the following pages. Additional detail about survey comments will be provided in a full report at a later date.

Central Area

- Buildings over 5 stories are okay if designed well.
- Absolutely no taller buildings. No more than 2 stories high.
- Better bike infrastructure needed.
- Expand downtown feel to the East, to 3rd street.
- Do not restrict traffic flow on 3rd street.
- Remove trucks from 3rd street.
- Do not change downtown at all. Keep quaint.
- Would rather see density downtown than sprawl in outer areas.
- Pedestrian safety is important. Make bike/ped bridges into downtown.
- Need more parking.
- Need less cars and more natural spaces.
- “Stop them at the border”/ no more growth.
- The central area is currently less dense than expansion areas being considered.
- Central area has great potential.
- Preserve historical buildings

Transit corridors

- All major corridors should be two lanes each way with turn lanes.
- Need better bike/ped facilities.
- Need much better public transportation service.
- Crosswalks on 14th.
- Don't under-park these areas.
- Focus on walkability
- Higher commercial densities
- Zone for zero lot line homes.
- No need for this. “I didn't move from So Cal to end up back in it.”
- Allow small-scale commercial

Existing Neighborhoods

- Bend needs more NW Crossing type developments.
- Bigger lots - 1/2 acre minimum.
- Smaller homes as infill, more residential above commercial.
- More walkable communities, more local commercial.
- No change to existing neighborhoods.
- Maintain parks and natural spaces accessible from neighborhoods.
- More sidewalks
- Integrate affordable housing throughout existing neighborhoods.
- No heavy industry near existing neighborhoods.

New Neighborhoods

- Full range of housing types
- Self-contained communities.
- Large lots with smaller homes - 1/2 acre
- Alternatives to single family homes
- No apartments.
- Affordable housing.
- Mixed use communities.
- Need apartments on the West side.
- New neighborhoods are an opportunity for great bike infrastructure.
- More access to transit needed.
- Need more upscale communities on East side.

Employment Areas

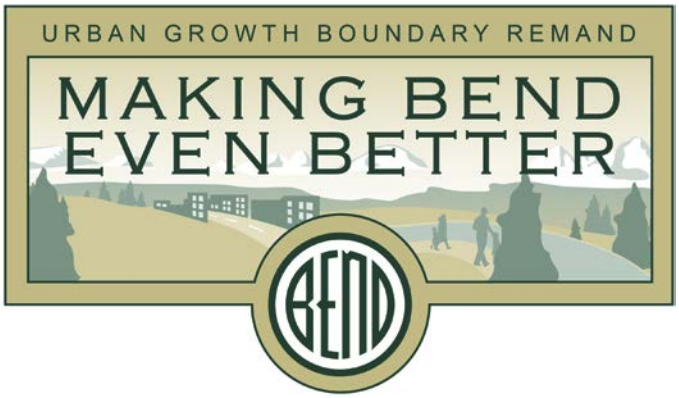
- Bicycle and pedestrian access to employment centers
- More auto parking.
- Way less land for parking lots.
- Build tall.
- No tall buildings.
- Old zoning may not be applicable to current employment needs.
- Opportunities needed for living near work.
- Provide alternatives to driving and charge for parking.
- Existing employment areas should be enlarged, rather than putting it in new areas.

SCREEN 5: COMMUNITY DEMOGRAPHICS

Roughly 1,150 respondents provided at least some demographic information, shown in Table 3. “Other” was chosen for neighborhood affiliation more times than any other neighborhood and accounted for almost 20% of respondents. Looking at the average scores for Screen 2 priority ranking and Screen 3 scenario/SAAM rating, users who chose “Other” did not have preferences that were dissimilar from the overall average score. A more detailed breakdown of scores by demographic segments will be provided in a full report at a later date.

Table 3. Demographic Information

Group	Number	Percent
Age		
18 and under	6	1%
19-35	127	20%
26-50	232	37%
51-65	178	28%
65+	89	14%
Gender		
Female	554	48%
Male	592	52%
Neighborhood		
Awbrey Butte	86	8%
Boyd Acres	69	6%
Century West	46	4%
Larkspur	36	3%
Mountain View	105	9%
Old Bend	51	4%
Old Farm District	76	7%
Orchard District	55	5%
River West	99	9%
Southeast Bend	111	10%
Southern Crossing	22	2%
Southwest Bend	91	8%
Summit West	91	8%
Other	206	18%
Work		
Work In Bend	831	72%
Don’t Work In Bend	326	28%

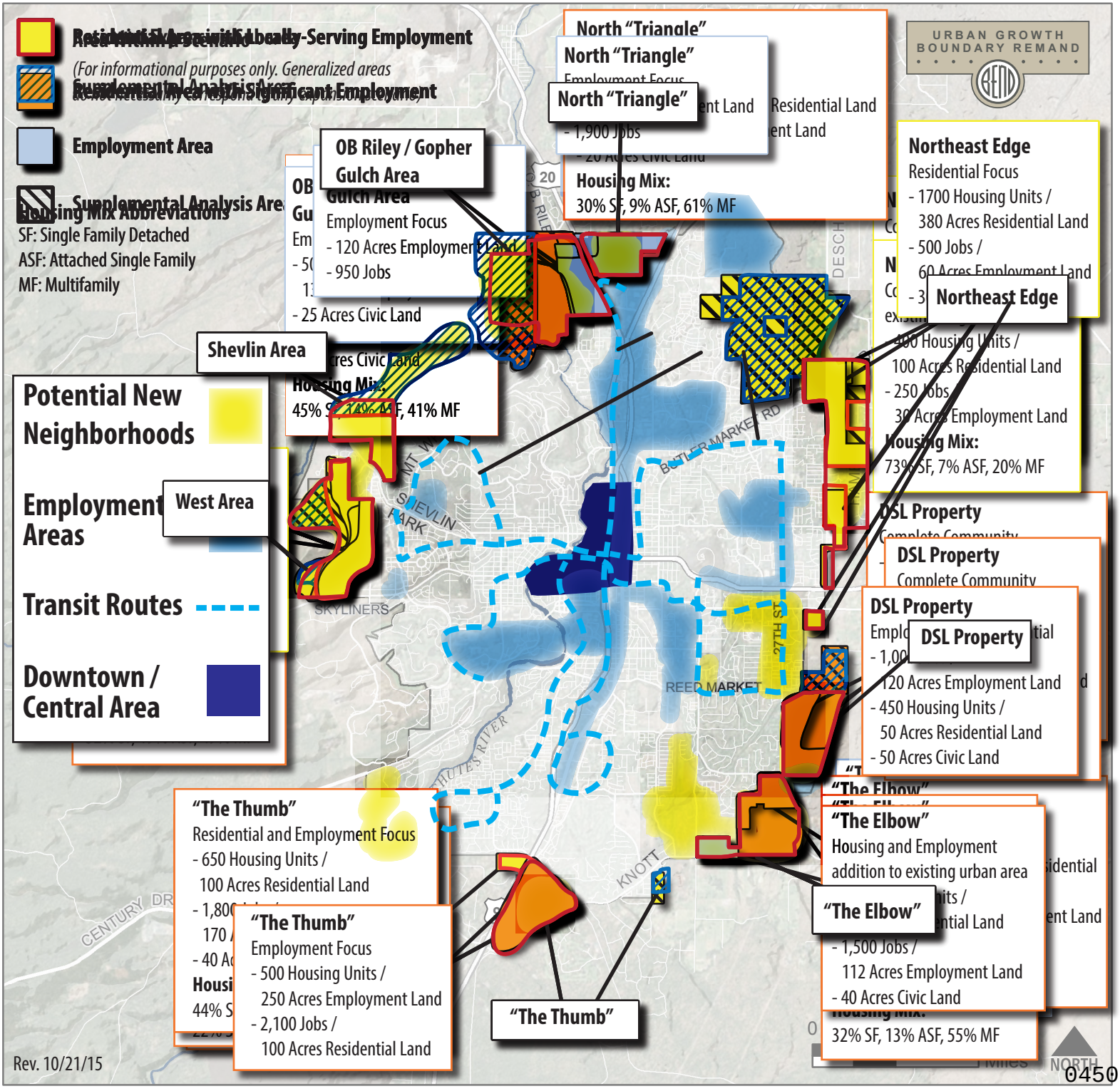


BOUNDARY TAC MEETING 12 (10/22/15): PACKET PART 2

Posting date: 10/21/15

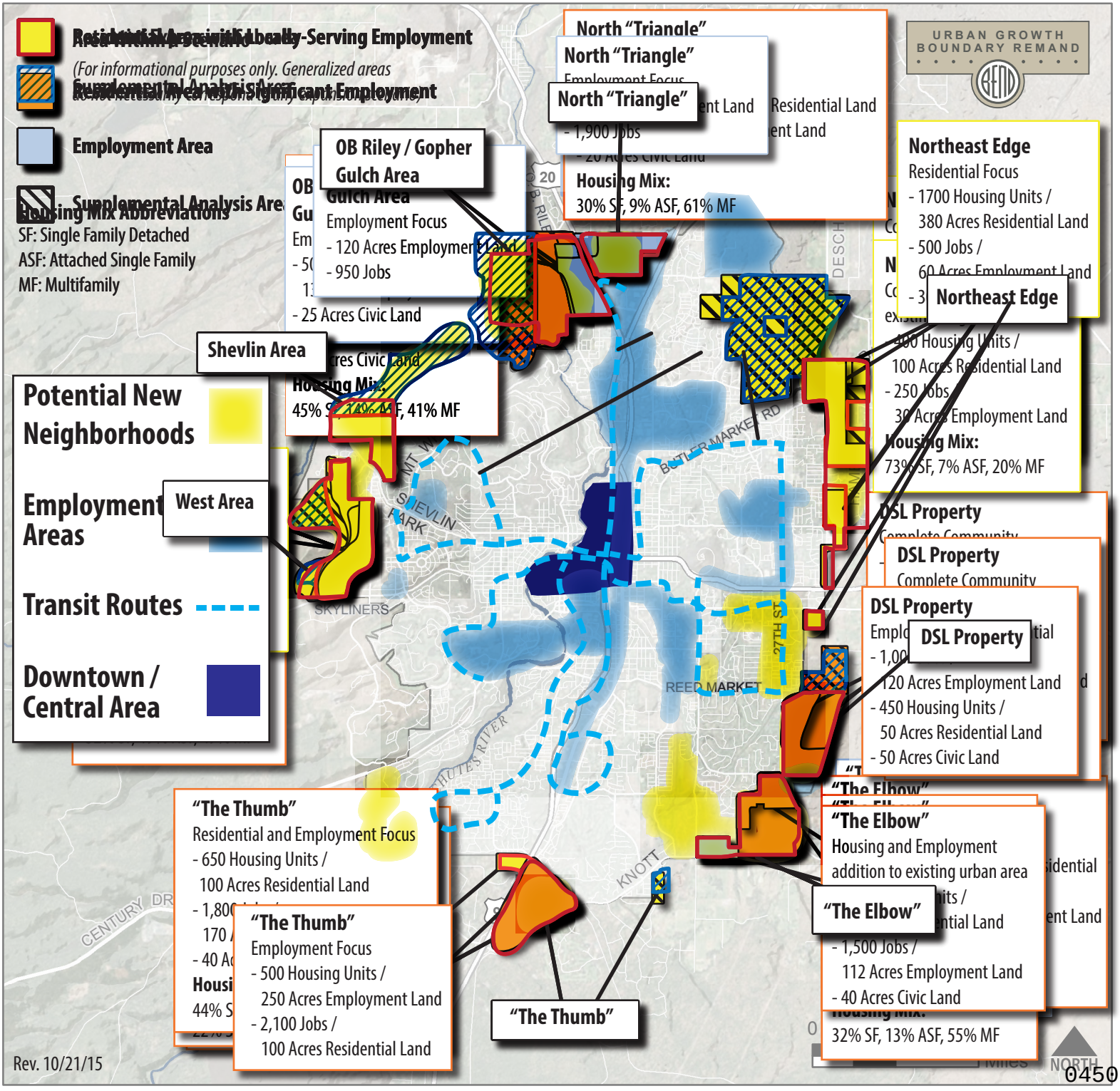
Contents: Overview maps (with housing mix information) for Scenarios 2.1, 2.2 and 2.3.

Supplemental Analysis Areas Map 3

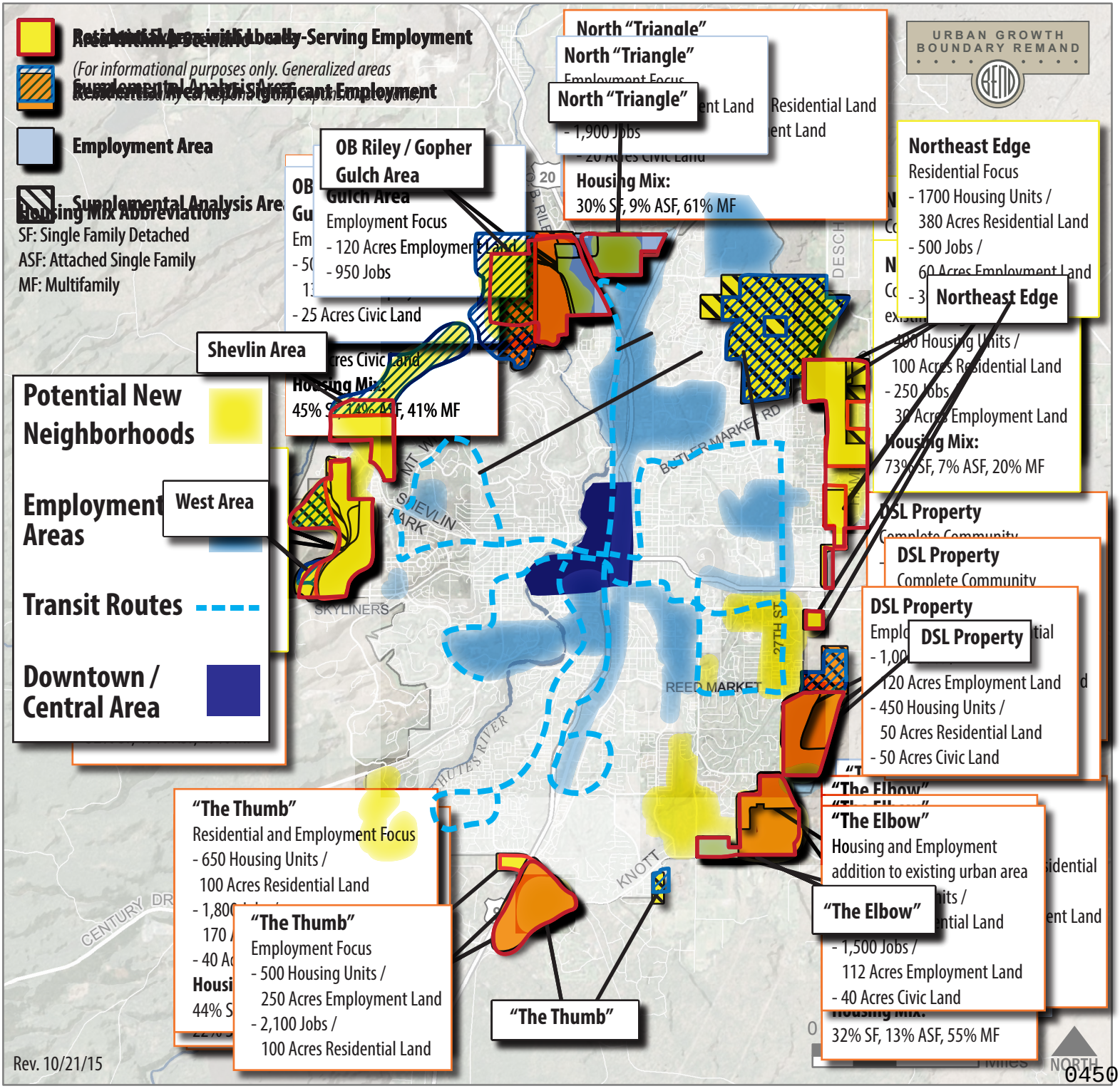


Rev. 10/21/15

Supplemental Analysis Areas Map 3



Supplemental Analysis Areas Map 3



Meeting Agenda

Urban Growth Boundary Steering Committee
Thursday, October 22, 2015 2:30-5:00 PM
City Council Chambers
Bend City Hall – 710 NW Wall Street, Bend

Purpose of Meeting and Next Steps

The purpose of this meeting is to provide a check-in and directional opportunity for the Urban Growth Boundary Steering Committee (USC). Working recommendations from the Boundary and Growth Scenarios Technical Advisory Committee (Boundary TAC) regarding a draft preferred UGB scenario will be discussed. The draft preferred UGB scenario is a working direction for the UGB, representing the narrowing of the alternatives that were evaluated by the Boundary TAC.

Following this meeting, the draft preferred UGB scenario will be taken through a second round of evaluation and refinements. That work will be brought back to the Boundary TAC at their December meeting. In December and January, the Boundary TAC will finalize a UGB recommendation, along with supporting reports, policies, and the basis for adoption findings. The USC's discussion and action on this package is scheduled for February.

1. Welcome — 2:30 PM

a. Welcome by Victor Chudowsky
b. Agenda overview (Joe Dills) and Opening Remarks (Brian Rankin)
c. Approval of June 25, 2015 Minutes

2. Scenario Evaluation and TAC Recommendations — 2:40 PM

a. Staff briefing: highlights of scenario evaluation and MetroQuest results and summary of Boundary TAC recommendations — Project Team
b. USC discussion

For additional project information, visit the project website at http://bend.or.us or contact Brian Rankin, City of Bend, at brankin@bendoregon.gov or 541-388-5584

Accessible Meeting/Alternate Format Notification
This meeting/event location is accessible. Sign and other language interpreter service, assistive listening devices, materials in alternate format such as Braille, large print, electronic formats, language translations or any other accommodations are available upon advance request at no cost. Please contact the City Recorder no later than 24 hours in advance of the meeting at rchristie@ci.bend.or.us, or fax 385-6676. Providing at least 2 days notice prior to the event will help ensure availability.

3. Public Comment — 3:20 PM

Persons wishing to testify should fill out a comment card, located at the welcome table. Testimony will be limited to 2 minutes per person, depending on the number of people wishing to speak.

Public comment will managed by the Chair.

4. Draft Preferred UGB Scenario — 3:50 PM

a. USC discussion – review elements of the draft preferred UGB scenario

b. USC action

Angelo Planning Group

Action requested: Consider TAC recommendations and vote upon a preferred UGB scenario as a basis for further analysis and refinement; provide direction as necessary regarding refinements and further analysis if needed.

5. Adjourn — 5:00 PM

City of Bend
Urban Growth Boundary Steering Committee
Meeting Minutes
Date: June 25, 2015

The Urban Growth Boundary Steering Committee (USC) held its June 2015 meeting at 2:00 pm on Thursday, June 25, 2015 in the Barnes/Sawyer Room of the Deschutes Services Building (1300 NW Wall Street).

Members present: Jim Clinton, Victory Chudowsky, Doug Knight, Sally Russell, Casey Roats, Barb Campbell, Bill Wagner, Rex Wolf, and Tony DeBone.

1. Welcome

Chair Victor Chudowsky called the meeting to order at 2:02 pm. He then asked Joe for an overview of the meeting's agenda.

Joe Dills of the Angelo Planning Group (APG) gave an overview of the agenda. One of the goals of today's meeting is for the USC to decide on a slate scenarios to forward for infrastructure modeling. The second goal is to approve the Boundary TAC recommendations for assessing wildfire in the UGB process. After reviewing the agenda, he noted that the time slot of 2:45 pm to 3:00 pm on the agenda has been reserved for taking public comments.

Brian Rankin of the City's Growth Management Department then made a few remarks on the progress of the UGB Remand Project. He noted that we've been at this for about a year now and have made tremendous progress. The UGB Steering Committee (USC) approved TAC materials, we've had an extensive public process that includes 60 community members on the TACs. We've made some important decisions on land need. In addition, the USC approved a two mile study area around the UGB and we have formed scenarios based on the work done over the last year. More analysis will be coming their way later this fall. During the summer of this year, the Residential and Employment TACs will be reviewing core planning documents that include the housing needs analysis, economic opportunities analysis, comprehensive plan, and plan policies.

Minutes. Joe then asked the USC for a motion to approve the minutes from the March 19, 2015 meeting. Doug moved approval of the minutes; Bill provided a second to the motion. No changes were proposed. The motion passed unanimously.

2. Refinement of Potential Expansion Areas and Proposed UGB Expansion Scenarios

Mary Dorman of APG started the presentation of this topic with a power point presentation. She started by identifying those lands identified as exception lands – there are 18,000 acres of exception lands or Priority 2 lands within the two mile study area for Bend. Proceeding to Step 2 in the "McMinnville decision" analysis, the team screened out 1,800 acres due to wildlife habitat overlay zone and a development application for the Miller Tree Farm. She then proceeded to describe the next screening process – identified as Step 3 of the McMinnville decision – which identified remaining exception lands after removing annotations from the April 30 workshop map. These areas represented areas that were isolated and separated from those exception lands abutting the UGB by

intervening resource lands. These annotations also included areas such as Deschutes River Woods to the south that would not help the city meet land needs and provide capacity for development. This step removed 8,300 acres from consideration, leaving 9,700 acres.

Mary then described the most recent narrowing and reducing of the amount of acres for consideration, based on the June 24, 2015 presentation to the Boundary TAC. This work also fell within Step 3 of the McMinnville decision and identified the property within the study by quartile. This step narrowed the amount of land by 12,600 acres, leaving 5,400 acres remaining. Mary reminded the USC that the total land need for the UGB expansion is about 2,000 acres.

At this point several members of the USC had questions for Mary and the team. Doug asked what Mary referred to as the "McMinnville decision." Mary replied that this was a decision of the Oregon Court of Appeals involving a UGB amendment for the City of McMinnville. The court decided that in a UGB expansion process the screening out of exception lands needed to take place before balancing areas according to Goal 14. The City can screen on Factor 3 and/or on Factor 4 only at the beginning. Barb clarified that exception lands is any lands that are not resource lands.

Becky Hewitt of Angelo Planning Group then presented the proposed approach to flexibility with scenarios analysis. Becky referred to a slide in the power point presentation that identified 3,000 acres that were included in scenarios (blue), 12,600 acres that were screened out (gray), and 2,400 acres that were highest quartile exception lands that were not included in a scenario (purple). The 3,000 acres in scenarios represent those lands included in one of the subareas in each scenario. The 2,400 acres represent those lands adjacent to lands in one or more scenarios which the team recommended including in a supplemental analysis area. There are a total of eight subareas, some or all of which are included in one or more of the three scenarios.

Bill asked if the Boundary TAC was tasked with shrinking the supplemental areas. Joe clarified that the TAC looked at the blue areas yesterday but provided no direction on reducing or shrinking this area. Sally asked where in the information is the specific number of acres for specific uses. This information would be handy for future reference. She then asked if there are areas or directions where we expect the boundary to not be further moved. Brian responded by pointing out that there are some "hard" edges around the city, such as the Forest Service lands to the west, publicly owned Bureau of Land Management (BLM) land to the south and east. State law directs the city to look at exception lands first for urbanization.

Victor questioned about the analysis that will be conducted in the next steps. Becky responded that all four (4) Goal 14 factors will be used next. Resource lands (Factor 4) are considered particularly where the city may expand towards high value farmland or forest lands. Victor then asked about the northeast parcels in blue on the supplemental map. With respect to the transportation analysis of Scenario 1, will the analysis include some of the blue areas shown on the supplemental map? Brian responded that sub consultants will do this work. The Boundary TAC wanted to analyze supplemental lands. We need to equalize the analysis between areas; impacts are cumulative and proximity matters. Victor followed up by asking what if the supplemental land looks really good after the analysis. Is the available pool of land much larger? If so, how will we choose from this extra amount of land? Joe responded by stating the starting point for the analysis is the expansion areas. The team will look at supplemental areas only as far as they need to. Any addition of supplemental areas to the expansion areas would be very limited at that point, and only those that show best compliance with the Goal 14 factors.

Brian added that the team will look for natural break points in the infrastructure – including water, sewer, and transportation. The team will look at whether infrastructure system breaks down within a certain area or scenario. Joe added that the process will benefit from a clear expression of the USC's priorities, including looking across the four factors of Goal 14, and picking the best balance.

The USC members then asked more questions on the proposed approach. Bill asked about the use of the supplemental areas, and pointed to "the Thumb" as an example. Would a mix of land uses in this area necessitate moving other lands uses, such as industrial, to another location? Joe responded by indicating the team would look for other areas that would be suitable for the use that was moving from one area to another. He referred the USC to Appendix C in the June 25, 2015 meeting packet, which includes a memorandum dated June 22, 2015 from the APG Team to the USC – "Suitability Advantages, and Disadvantages of Lands Advanced for Further Analysis." Each scenario represents a different spatial arrangement of land uses. The team can look at whether a mix of uses affects a certain area.

Barb then asked about the red areas on the map (those included within one of the three scenarios) to clarify that these areas would be subjected to a higher level of analysis and that the blue areas (supplemental analysis areas) would be considered just in case. Mary Dorman responded that the workshop on April 30, 2015 included work to balance the Goal 14 factors. The balancing took place first, then the first cut of scenarios was completed to get manageable data for modeling. The land need may change based on efficiency of land outside the UGB, school location, application of need on green fields versus areas already developed (e.g. those highly parcelized). The scenarios would all use the same control totals and the actual acreages in each scenario will depend on location of UGB expansion.

Doug asked about whether this work would increase the timeline and budget. Brian responded by noting the Boundary TAC has asked for more meetings to consider the results of the modeling analysis. This modeling would cost between $80,000 and $100,000. Beyond that and multiple rounds of refinement, about a meeting a month, and depending on the capacity of the Boundary TAC. Doug clarified that the Boundary TAC is asked for this additional time and what the $100,000 was buying? Sharon Smith of the Boundary TAC was present and answered this question. She said the Boundary TAC is doing important work, and needs good ideas, and needs time to absorb the results to make a recommendation. The additional TAC meeting is needed to process the information; the TAC will need another meeting to make a recommendation. Her hope is that the Boundary TAC would need two meetings; the TAC could have two meetings in one month with one meeting to review the information and a second meeting to make a recommendation. This schedule will also be affected by the time the team needs to do this work. One potential option is to have the team do their best work and take that directly to the USC for approval.

The discussion then turned to the time implications of the additional work for modeling and for conducting an extra meeting of the Boundary TAC. Victor suggested looking at those things in the supplemental analysis that matter to the rate payers. Doug mentioned Goal 14 requiring the city balance all factors. Victor asked for clarification on using the Goal 14 factors; is this balancing intended to weed out lands in the supplemental areas? What level of analysis are we doing? Brian responded that the analysis will consider what's important and provide that direction to the team, all consistent with Goal 14. Victor asked if transportation costs was a good example.

Jim asked whether this analysis was the crux of the entire program, the balancing of factors. He inquired whether presumably, this means we have a quantitative assessment of each factor. Brian responded that some communities do this with questions and factors. Jim questioned whether there were no numbers associated with these processes, and indicated he wanted numbers considered. We need to know what roads and sewers cost in the scenarios. Joe responded that we will have costs and numbers within individual factors. For example, with Factor 1, these numbers include which scenario has the least amount of parcelization, how many children can walk to a park or school, and public facility costs – organized by high, middle, and low. With respect to the edge of the UGB, proximity to farm and forest land can be quantified. He referred the USC to the data in the meeting packet that will be used for the analysis. The analysis itself is not an algorithm, but part of a structured assessment.

Becky reminded the USC that those areas in dark green on the maps performed best among the exception lands. Jim expressed a concern about pre-weighting the data. Barb asked a process question regarding the three scenarios. She inquired if the team was analyzing every piece that appears in all three scenarios (3,000 acres) and our need being 2,000 acres. Victor provided a suggestion to the Boundary TAC that the analysis would be more thorough if it included the lands in the supplemental maps.

After the USC's initial discussion, Andrew Parrish of the APG team gave a power point presentation that went into more detail on each scenario. The presentation relied upon the same maps included in the meeting packet at pages 27 through 35.

- Scenario 1.1 locates more employment uses closer to the highways. This scenario includes all of the Thumb, North Triangle. More residential included in the Northeast Edge.

- Scenario 2.1 mixes residential and employment in subareas around the boundary.

- Scenario 3.1 moves more development into the west and the northwest. This is the only scenario that includes the Shevlin subarea, and includes different levels of development in the Thumb and the Elbow.

Andrew then went on to describe the refinements that came out of the June 24, 2015 Boundary TAC meeting.

- Scenario 1.1 – the large lot industrial site (LLI) was moved from Section 11 and into Juniper Ridge. Employment land displaced by this move will be relocated to Section 11. One hundred (100) acres of residential land from the Northeast Edge will be relocated to the Thumb. Employment land displaced by this move will be relocated to the Northeast and to the North Triangle/OR Riley acres (50 acres a piece).

- Scenario 2.1 – the LLI moved to Juniper Ridge. Employment lands displaced by this move will be relocated to OR Riley Road area.

- Scenario 3.1 – the LLI will be moved from the North Triangle to Juniper Ridge. The displaced employment lands will be moved to the North Triangle.

Andrew noted that the large lot industrial (LLI) site was moved to Juniper Ridge due to its public ownership.

c. Public Comments

After Andrew's presentation, Chair Chudowsky asked for public comments.

1. Tia Lewis, attorney representing the Coats Family who own Shevlin Sand and Gravel. She handed out two maps describing her client's property. There are a total of 700 acres of UAR land adjacent to the existing UGB. The family has been holding for urbanization for many years. Map 3 includes only a small part of the property. Her client is asking for 416 acres to be included in a scenario, and have it studied under the Goal 14 factors. Any decision to exclude from the boundary needs to be clear as to why it was excluded. The rest of it is shown on the supplemental map. She testified that the property meets all Goal 14 factors. The property has eight urban roads stubbed to it and it can help relieve transportation congestion. Sewer service can be provided through the Awbrey Glen pump station. The Riley Ranch nature preserve is close by and the Park district testified in favor of this property.

2. Brian Meece, member of the Boundary TAC. He supports the Supplemental Map and supplemental study. He supported the supplemental map in case one area does not perform well in the evaluation and the City needs to have alternatives. He argued that it's critical to look at the 5,400 acres in the supplemental area and that the 2,000 acre land need is not enough. The City has an affordable housing crisis and an affordable industrial land crisis, and this amount of land is inadequate to deal with this in a timely matter. Annexation and zone changes will take time. City will force land owners to annex. Efficiency measures will not work as well as projected. The current rate of development is burning up land at 100 houses a month. Regarding Juniper Ridge, the city needs to either make a commitment to Juniper Ridge or reallocate land. It's an island in the northeast. Create mass around it or back it out.

3. Joe Emerson – He strongly urged preserving wildlife, wildlife corridors, minimize wildfire risk, and preserve view shed of Shevlin Park when weighing factors. He asked the USC to think about Forest Park in Portland. Shevlin could be cannibalized or expanded. He testified in favor of preserving and expanding Shevlin Park. He asked whether we are planning for Bend to be a real city. He testified that we can be Tucson or livable downtown and a city we're proud of.

4. Jodie Ward and Dean Wise of JL Ward Company – they also handed out a letter to the USC. The process has been wonderful to date. The Ward Company is a residential community developer. The Workshop was really effective and interesting. They saw a theme of complete neighborhoods and complete communities. As a result they have prepared two conceptual master plans for the Ward properties. They shared the same conceptual plan shared with Boundary TAC on 6/24/2015. The color yellow on the plan shows a high school site. They also showed the USC a conceptual master plan for their land on 15th. They own 40 acres just outside UGB and asked that all 40 acres be brought in.

5. Moey Newbold – Central Oregon Landwatch. She thanked staff, the TACs, and the USC for all the hard work going into the process. She repeated the goals of the project – quality natural environment…strong diverse economy…cost effective infrastructure. The process includes in-depth analysis of wildfire risk. She testified that the city limit suburban sprawl and outlined the benefits of

non-sprawl. She commented that we value the outdoor heritage. She also presented a display of a tree on which each leaf represents someone who values natural resources.

6. Derek Hopp, attorney representing Pacwest. His client owns 40 acres outside of the UGB which is not being considered in any scenarios. The property abuts the current UGB, and is close to sewer and water connections in Livingston Dr. and 27th Street. Avion Water is available in 27th Street. He asked to have it included in Scenario 1.1 as supplemental analysis land and in Scenario 4 proposed by Boundary TAC.

7. Myles Conway, attorney representing Rio Lobo investments. He submitted a letter, parcel map, and forestry fire report. His client's property does not appear in two scenarios and testified that this is contrary to Division 24 rules. He supported the supplemental analysis map and recommended that no specific scenarios be identified until infrastructure modeling is done.

8. Robin Vora – member of the Boundary TAC. He submitted an email and a large wildfire map. He argued for an alternative Scenario 4 that included the following components; from Scenario 2.1 take what's proposed on the Westside from this alternative and move it to the eastside; put it into the supplemental parcels. Mr. Hopp suggested Pacwest parcel – he testified that this could be included. We don't have a much better range of alternatives. Any differences are masked due to unweighted factors. He testified that the supplemental maps are arbitrary; with differential level of analysis and unequal treatment. He also recommended that the UGB Include Deschutes River Woods.

9. Dan Pena – identified himself as a contractor with a banking background. He commented on what he described as the divide in Bend of east-west affordability, earnings by certain professions, and where you build based on the price of land. He testified on a lot of demand with dwindling supply and in particular pointed out the Raintree parcel owned by the Schumacher Family. This parcel is the perfect spot for residential. He recommended taking light industrial out of "the Elbow." The property on Raintree Drive is 59 acres in size.

10. Sid Snyder – member of the Boundary TAC now speaking as a private citizen. First, he mentioned he really likes the process; the team has done a yeoman's job. Second, he commented that he found it disturbing that "performance" was measured with the dollars as the units. He asked that the USC not exclude other community values. He testified that we don't exclude small property owners and don't leave them out of the process. There are more values included that aren't just dollars. Third and final point regarding the analysis of supplemental lands; doggedly holding on to schedule is penny wise and pound foolish.

11. Anne Brayfield – she testified on wildfire and what she was hearing at the meeting. She also mentioned reaching out on this question; how much analysis is possible given the acreage involved.

d. USC discussion and action

After the conclusion of Public Comments, Joe directed the USC to page 19 of the meeting packet. Joe referred the TAC to three recommendations in the meeting packet.

1. Packet page 19 of 92 – first of recommendations, reproduced below.

> **Recommendation**
> The project team recommends that the Boundary TAC approve, and forward to the USC, the lands to be screened from further consideration as described beginning on page 5 and shown on Figure 2: Phase 2 Narrowing of Exception Lands.

This first recommendation involves narrowing the amount of exception land and approving how the team reduced the amount of land now under consideration from 18,000 acres to 5,400 acres. Joe asked if there was any discussion or motion. Tony moved approval of the recommendation from the team, with Casey providing a second to the motion. The motion passed unanimously.

2. Page 24 of 92 – second recommendation. Joe then directed the USC to the recommendation on page 24 of the meeting packet, which is reproduced below:

> **Recommendation**
> The project team recommends forwarding the approach described under Recommended Approach: Overview and Rationale" starting on page 8 and the set of lands for scenarios and supplemental analysis on Figure 3 (page 10) to the USC for approval.

Joe described this recommendation as one for maintaining flexibility. Doug moved approval of the recommendation on page 24, with Sally providing a second to the motion. The motion passed with all voting for the motion except Jim, who cast the only "no" vote.

3. The final recommendation, as summarized on 35 of 92, was to approve a slate of scenarios for the team's modeling and evaluation. Joe directed the USC through a review of the maps once more before proceeding to the discussion. The Boundary TAC recommends slate of three scenarios as revised. Joe reviewed the refinements on the scenario maps for each scenario.

Following Joe's introduction, the USC began their deliberations. Doug asked if we are displacing employment land in each scenario. Mary Winters responded by providing some background on Juniper Ridge. The overlay zone for Juniper Ridge includes 500 acres of land in UGB. Of that, 306 acres are zoned for employment and light industrial. The Juniper Ridge Management Board (JRMB) made several recommendations to the City Council on Juniper Ridge and its land uses and design. These included an emphasis on light industrial uses, with more offices, reserved for remainder of property. The eastern side was reserved for potential private educational institution and a town center.

Jim commented on moving the large lot industrial site (LLI) from other sites to Juniper Ridge, and whether the city would be putting all eggs into one basket. The LLI site is sensitive to land development costs.Too much in site preparation. Loading up JR with all the LLI is a bad idea. Not consistent with what the market might require. He concluded by stating he did not support these changes.

Doug also stated he was not in favor of these amendments. Barb asked if Juniper Ridge is in the current UGB. She asked do we not study any further if we move the LLI to land in the UGB in Juniper Ridge. Mary Winters responded that only about 200 acres of Juniper Ridge are unplanned in the UGB. Brian summarized results of the workshop on Juniper Ridge. All tables agreed that we put one

50-acre LLI in Juniper Ridge and one 50 acre LLI site somewhere else. We need this information for modeling and site suitability.

Sally commented that transportation issues are still coming and that lots of this size are preferred on public property due to long holding time. She asked how large are the lots at the Bend airport? Brian responded that there is a need for large lots identified through discussions with stakeholders, and responding to the need for a large lot use. This is an aspirational land use under Goal 9. This need is additive to our employment forecast. With respect to public versus private – who's an ideal land owner? Not just public; there are carrying costs for private entities. Public can hold longer and withstand market pressures.

Doug commented that if we're falling short in LLI effort, is it rational to meet need at airport. Victor commented that he agrees with Doug and Jim. With respect to possible market choice, two lots in Juniper Ridge may not be attractive. He is against #1 in this refinement. Barb stated she agrees.

Motion: For Scenario 1.1 - First amendment – Vote; Sally moved removal of Amendment #1 from Scenario 1.1; Doug provided a second for this motion. Brian recommend for reference packet pages 27, 30, and 33 that shows the maps of the Original scenarios. Discussion – Barb recommended the USC keep an open mind on any suitable locations and to keep original locations in Scenarios 1.1, 2.1, and 3.1. She then provided a friendly amendment to the motion that was seconded by Doug. Victor asked a procedural question on whether the USC was doing one vote on all three maps.

Barb made a new **motion** – she moved that the USC accept Scenarios 1.1, 2.1, and 3.1 without the recommended changes regarding moving the 50-acre large lot industrial site into Juniper Ridge. Doug provided a second to this motion. This motion passed with a unanimous vote.

Motion: Bill then moved approval that the USC inform Boundary TAC that we would entertain other locations for large lot industrial sites in supplemental areas. Doug provided a second for this motion. This motion passed unanimously.

Victor then asked if a 50-acre LLI site could be found in the supplemental areas. Brian responded that one possible site is Gopher Gulch. That's a possible option, but it wouldn't meet siting requirements. The focus of this work right now is on future modeling. We can discuss with the Employment TAC. Won't have big implications on time or money. Jim added that proximity to the highway is important, and the DSL property is on 27th street.

Motion: Second amendment to Scenario 1.1 – from 100 acres from the Edge to the Thumb. Joe asked if there was a motion to accept this second amendment to Scenario 1.1. Sally moved approval of accepting this amendment to Scenario 1.1, with Bill providing a second. This motion passed unanimously.

Second amendment to Scenario 2.1 – from eastern edge of elbow moved to the Thumb. Becky summarized the team's original analysis and TAC's reasoning for change. **Motion** – Barb moved approval of a motion to accept Scenario 2.1 as proposed. Sally provided a second to the motion. This motion passed unanimously.

After this vote, Barb asked why a Scenario 4 was not pursued. Brian responded that the team did complete a scenario that's more east side focused; not one that has no east side focus. The majority

of the Boundary TAC supported Scenario 1.1 – more east side focused, but does include some west side expansion. Majority of the committee did not support the idea of no east side in the scenario.

Mary added a comment that with respect to land on the east side, such as EFU land, the city can't legally include this land due to the amount of Priority 2 land. We (city) can't include scenarios with Priority 4 land (EFU) because we have 18,000 acres of exception land. Barb followed up with a question about the map on page 17 of 92 of the meeting packet, in particular the lands in light green. Brian responded that those lands were exception lands and that the city had plenty of good exception land to go around to not justify going onto resource lands. Jim asked if there was enough land on the east side to do the job, for the 2,000 acres we need. Mary added that we need to come up with some kind balancing in this process.

Motion: Casey commented that he was opposed to an east side only UGB expansion approach. He followed by making a motion that the USC not consider an east-side only approach in the here and the now. Victor provided a second to this motion. The motion passed unanimously.

In the TAC's final discussion under this agenda item, Sally added that the USC still needs to work through wildfire. Barb expressed a concern that fire has not been heavily weighted yet. These costs could easily rival sewer and transportation. When you look at Scenario 1.1, a pretty quick and dirty examination to add a Scenario 4.1 that would not have West Area and OB Riley could be developed. Victor asked that we test area under Scenario 1.1 and see what happens; don't make any blanket restrictions that eliminate the west side entirely. Doug agreed with a more holistic approach and commented that the Skeleton fire exceeded the Awbrey Hall fire in size.

3. Wildfire Assessment Methods

Victor then turned to the Wildfire Topic on the agenda, with Joe directing the USC's attention to page 84 of the packet. This topic includes three recommendations approved by the Boundary TAC.

Brian introduced topic and referred the USC to the recommendations from the Boundary TAC. The recommendations address mitigation strategies; use of buffers, and construction techniques. The package of recommendations from the Boundary TAC includes: 1. Use the Community Wildfire Protection Plan (CWPP) and onsite assessments; 2. Site assessment approach – use the SB360 risk assessment, and; 3. Evaluate mitigation strategies with a group. Each of these recommendations is reproduced from the 6/25 meeting packet below:

1. Recommendation to USC: *Use the CWPP, as illustrated by the Fire Risk Index Map and the Fire History map, in conjunction with onsite assessments. Proceed to onsite assessments as described below.*

2. Recommendation to USC: *Assess wildfire risk on land within the UGB Scenarios using the SB360 Risk Assessment. Utilize willing members of the Focus Group or trained staff for the site assessments. Assess adjacent land within a quarter mile. Use the results of the on-site risk assessments for (1) determining suitability for inclusion in the UGB under Goal 14 Factor 3, (2) determining appropriate mitigation for lands that are selected to be included in the UGB, and (3) qualitative mitigation recommendations and cost analysis.*

3. ***Recommendation to USC:*** *Form a Task Force to review Firewise recommendations as outlined in NFPA Standards 1141 and 1144, as well as programs adopted in other communities, and make recommendations to the City regarding mitigation measures appropriate for adoption as policy and codification.*

Tony commented that fire is a natural occurrence. With respect to fuel hazards we need to educate new residents. We should not be scared of it; we need to live with it and manage. Casey added that fire risk is all around city and there is fire risk in the watershed – those who raised it were tarred and feathered. He addressed the opponents of the City's water project - let's get it straight, opponents argued that there was not a significant fire risk in the watershed.

Sally asked a question on the fire risk map – clarifying that green is low and red is high. Doug added a comment that with more daily trips on corridors there is an increased risk with a cigarette being thrown out of a car and starting a fire. Barb concurred that we need a fire risk map.

Motion – First Recommendation. Victor then asked the TAC for votes on the recommendations from the Boundary TAC. Doug moved approval of the first recommendation, that we use the CWPP. Sally provided a second to this motion. This motion passed with six (6) votes in Favor and three (3) votes Opposed.

Motion - Second Recommendation. Tony provided some background on SB 360 and what the county already does with respect to wildfire. After his comment, Bill moved to accept the recommendation from the Boundary TAC with Victor providing a second. This motion passed unanimously.

Motion – Third Recommendation. Bill asked if this recommendation was relevant to the UGB, or a policy question for the City Council. Jim commented that we should have done this already, and has nothing to do with what lands are suitable for the UGB. Brian added there is a spatial element to this work if a buffer is included with managed fuels. Tony commented that Project Wildfire could serve as the group for act on this recommendation. Jim commented that this is not good for determining which land is suitable for urbanization. Joe added that this helps in determining the where and the how we implement spatial decisions with respect to wildfire. Rex moved approved of the Third Recommendation with Doug providing a second to the motion. The motion passed with six (6) votes in Favor and three (3) votes Opposed.

4. Adjourn

With no further business, Chair Chudowsky adjourned the meeting at 4:59 pm.

Memorandum

October 20, 2015

To: Urban Growth Boundary Steering Committee

From: Angelo Planning Group Team

Re: Scenario Refinements for Consideration

OVERVIEW

The purpose of this memorandum is to describe the proposed starting point for identifying a preferred Urban Growth Boundary (UGB) expansion scenario. The draft preferred UGB scenario will discussed on October 22nd by the Boundary and Growth Scenarios Technical Advisory Committee (Boundary TAC), which will make a recommendation to the UGB Steering Committee (USC) . The draft preferred UGB scenario is a working direction for the UGB, representing the narrowing of the alternatives that were evaluated by the Boundary TAC. The USC will vote to approve a preferred UGB scenario for a second round of evaluation and refinements following the October 22nd meetings. In December and January, the Boundary TAC will finalize a UGB recommendation, along with supporting reports, policies, and the basis for adoption findings. The USC's discussion and action on this package is scheduled for February.

SUMMARY OF RECENT WORK

The USC took the following actions at the June 25, 2015 meeting:

- Approved narrowing the amount of exception areas being considered for UGB expansion within the 2-mile study area from about 18,000 acres to about 5,400 acres.
- Approved the set of lands being considered for scenarios and supplemental analysis areas to maintain flexibility for the UGB evaluation and technical modeling for transportation and sewer.[1] The three scenarios encompassed a total of about 3,000 acres that ranked in the top quartile in the initial mapping and GIS analysis based on Goal 14 factors. The supplemental analysis areas encompassed about 2,600 additional acres that also ranked in the top quartile in the initial mapping and GIS analysis.
- Provided guidance to the team on maintaining options for the large lot industrial site.
- Approved the wildfire assessment methods recommended by the Boundary TAC.

The project team and the Residential, Employment and Boundary Technical Advisory Committees (TACs) have completed a substantial amount of work since USC meeting on June 25th.

[1] Scenarios identified as 1.1, 2.1 and 3.1 at the June 25, 2015 USC meeting.

Over the summer months, the project team completed the technical analysis and evaluation of the UGB Expansion Scenarios and Supplemental Analysis Areas, including initial observations about which scenario and subareas appear to offer the greatest advantages relative to the performance measures analysis. The analysis tested different choices about where to accommodate future housing and employment growth outside the current UGB.

The evaluation included transportation analysis, water and sewer system optimization, and a variety of land use, economic, social, and environmental evaluations. The evaluations were structured to provide information about how the UGB Expansion Scenarios and Supplemental Analysis Areas performed relative to the factors required by the state, but also relative to the Project Goals, which capture local priorities.

The Evaluation Report[2] reviewed by the Boundary TAC on October 8th included 3 scenarios, 3 supplemental analysis area maps, and working recommendations for how those alternatives could be narrowed. The Boundary TAC heard additional public testimony, and then held a roundtable discussion to identify "top comments and questions" that the members had. A summary of the Boundary TAC's direction from that meeting is provided on page 7.

In addition, the Residential and Employment TACs each met in July and August to discuss and prioritize the efficiency measures that are the most important to achieve the efficient use of residential and employment land inside the current UGB, as well as reviewing and providing input on proposed amendments to policies in the Housing and Employment Chapters of the General Plan and working drafts of the technical documents that support the UGB Project, including the Buildable Lands Inventory, the Housing Needs Analysis, and the Economic Opportunities Analysis. The Residential and Employment TACs also held a joint meeting in October to discuss potential long-term changes to land use and transportation inside the current UGB that would help the city grow in a less auto-dependent manner over the long term. This meeting relates to the TACs' work on efficiency measures and opportunity areas, and brings in a new perspective relating to Goal 12 (Transportation) and strategies to reduce vehicle miles traveled (VMT). The direction from the Residential and Employment TACs regarding efficiency measures informed an update to assumptions about growth inside the UGB that is reflected in the latest work.

SCENARIO REFINEMENTS FOR CONSIDERATION

The Evaluation Report concluded that Scenario 2.1 is the best performing scenario based on the full set of performance measures evaluated, and that it can be improved by incorporating refinements in many of the subareas (a summary of the rationale for this is included in this memorandum). Building on the Boundary TAC discussion on October 8th, the project team has compiled and prepared the following scenarios for this memorandum:

- Scenario 2.1 - previously evaluated and included in the October 8th packet

[2] The full Evaluation Report with all appendices has been provided to the USC as Part 2 of the packet materials for the October 22nd meeting.

- Scenario 2.2 – a refinement to Scenario 2.1 based on the team recommendations that were included in the October 8th packet.

- Scenario 2.3 – a refinement to Scenario 2.1 that reflects some of the project team's earlier recommendations in Scenario 2.2, and incorporates Boundary TAC comments at the October 8th meeting and continued evaluation of sub-area refinements.

The three scenarios essentially represent an evolution of ideas and refinement from the base of Scenario 2.1 to the current Scenario 2.3. The team believes that the narrowing and refinement process has now reached the point where a preferred scenario can emerge from Boundary TAC and USC direction regarding which elements to keep or modify - after review of the various pros, cons and trade-offs. As noted above, analysis will be performed on the preferred refined scenario to inform an eventual decision on the UGB expansion.

Two other updates have occurred in the short time since October 8th:

1. The current set of maps for discussion show conceptual, generalized land use designations within each expansion area as well as for the area inside the existing UGB. This is intended to support a more explicit discussion of land uses and complete communities in each subarea, including the concept of completing adjacent areas inside the UGB. (Note: the land uses shown are generalized versions of city General Plan designations and the detailed "development types" that are used in the Envision Tomorrow model.)

2. Updates to several land uses and assumptions have been made within the current UGB to better reflect: direction on land use efficiency measures from the Residential and Employment TACs; land needs for right of way, based on city standards; updates based on the latest recommendations from the Central Westside Plan; and other refinements (see footnote 4 on page **Error! Bookmark not defined.** for more details). The impact of these refinements has a negligible impact on total land need outside the current UGB but does affect the number and mix of housing units and jobs needed outside the current UGB (see Table 1 on page 13 for more details).

Additional coordination between the project team and the Bend Parks and Recreation District and Bend La Pine school District may lead to additional refinements. Additional refinements may also be driven by further discussions and analysis performed by the Residential and Employment TACs related to Efficiency Measures.

RATIONALE FOR SCENARIO 2.1 AS THE STARTING POINT

Scenario 2.1, as evaluated, focuses on creating new complete communities with a broad mix of uses in all quadrants of the City. Nearly all expansion areas include housing, employment areas, shopping/services, and schools and parks. This scenario fully develops "The Elbow" and the DSL site as complete communities. It incorporates housing along with employment in the

North “Triangle" and “The Thumb”, and some industrial/professional office in the West Area along with residential. The OB Riley area is employment-focused, with a potential large lot industrial site. (See Figure 1 on page 6.)

Based on the body of work captured in the evaluation report, and considering and balancing the four Goal 14 Factors, Scenario 2.1 performed the best of the alternatives overall, regardless of whether and to what degree weighting is applied to distinguish between the more and less important performance measures. Scenario 2.1 was in the top tier relative to other alternatives on nearly all community outcomes, including:

- Complete Communities and Great Neighborhoods (because it was created with the intention of providing for complete communities in all quadrants of the city);
- Efficient, Timely Growth (because of its efficient use of residential land and reliance on large, vacant parcels);
- Balanced Transportation System (because of the above advantages plus enhanced connectivity due to the extension of Murphy Road to 27th / Knott and keeping growth in the northeast focused to nodes along major east-west corridors);
- Cost-Effective Infrastructure (because of relatively low cost for both connectivity- and capacity-related transportation improvements and reasonable costs for sewer improvements);
- Quality Natural Environment (because it avoids riparian areas, limits expansion in wildlife areas, does not have any features that prevent mitigation of wildfire risk in any expansion areas, and has fairly low energy and water consumption and greenhouse gas emissions); and
- Housing Options and Affordability (because it has good housing mix in nearly all subareas and good housing affordability with significant housing growth in the southeast[3]).

The two Community Outcomes where Scenario 2.1 was not in the Top Tier were Strong Diverse Economy (because it places employment and commercial uses in some areas, such as the West Area, where they are somewhat less well suited) and Compatibility with Farms and Forests (because it has relatively more impact to Arnold Irrigation District from inclusion of full Elbow area and development adjacent to several commercial farms, including the greatest amount of development next to a feed lot south of Knott Road).

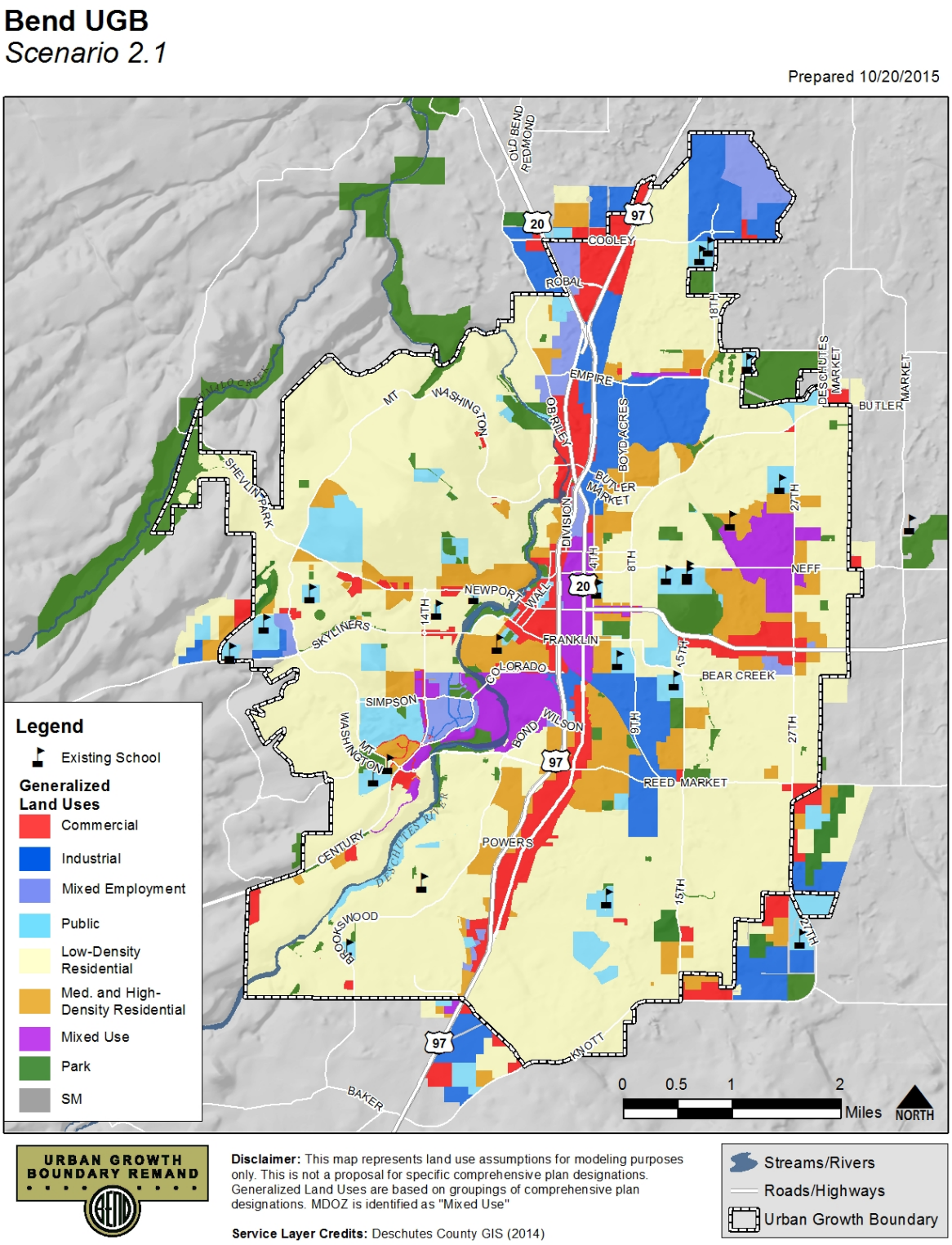
No other alternative had as strong performance on as many community outcomes, and each of the other alternatives has at least one important weakness identified through the evaluation:

- Scenario 1.2 performs poorly on cost-effective infrastructure, because heavy development in the Thumb triggers the need to widen Knott Road to three lanes.

[3] Housing costs for new construction were found to be roughly 30% lower in neighborhoods on the outer east side of the city relative to neighborhoods on the outer west side of the city. Housing in expansion areas is assumed to follow this trend.

- Scenario 3.1 performs poorly on cost-effective infrastructure, due to high transportation costs to connect growth areas and the need to widen US 20 from Robal Rd to 3rd Street. It also performs poorly on compatibility with farms and forests due to heavy impacts to Swalley Irrigation District in OB Riley / Gopher Gulch and forest proximity in the Shevlin Area and on Housing Options and Affordability because much of the residential development is focused on the west side of the city where land costs and housing prices are higher. It performs relatively poorly on Quality Natural Environment because including the Shevlin Area impacts wildlife areas, puts development in proximity to Tumalo Creek on the western edge, and has topography that makes wildfire hazard difficult to mitigate on the western edge.
- SAAM-1 performs poorly on multiple Community Outcomes. It performs poorly on Quality Natural Environment because including the full Shevlin Area impacts wildlife areas, puts development in proximity to Tumalo Creek, and has topography that makes wildfire hazard more difficult to mitigate. It performs poorly on Cost-Effective Infrastructure because development of the full Shevlin Area requires a costly new regional pump station for sanitary sewer, and it also has fairly high cost for new roads connecting growth areas and high costs for intersection improvements. SAAM-1 also rated relatively poorly on Complete Communities and Great Neighborhoods and Efficient, Timely Growth because the outer extents of the Shevlin Area and Northeast Edge are not well-suited to higher-density housing and have less proximity to commercial services, schools, and/or parks.
- SAAM-2 performs poorly on Balanced Transportation System, due to the lack of connectivity to the existing UGB from the Gopher Gulch area and the distance to reach key destinations inside the current UGB. It also performs relatively poorly on Compatibility with Farms and Forests due to heavy impacts to Swalley Irrigation District and proximity to the greatest number of working farms.
- SAAM-3 performs relatively poorly on Housing Options and Affordability because all of the residential development is focused in the West Area, which is more expensive (as noted above), and on Cost-Effective Infrastructure because including the full West Area (particularly the northwest portion) requires a costly new regional pump station.

Figure 1: Scenario 2.1 Generalized Land Use Map



WHAT WE HEARD FROM THE BOUNDARY TAC

The Boundary TAC expressed a number of ideas regarding possible modifications to Scenario 2.1 and areas of concern with Scenario 2.1 as drawn. These include, in brief:

- Concern about the amount of new development in the southeast (from multiple members)
- Interest in the Miller Nash / Butler Market Village proposal for greater development northeast of Butler Market Road in the northeast (from multiple members)
- Desire for more complete communities in the northeast
- Spread development around to more land – more on the west and less in the southeast
- Concern about including growth on the west side
- Desire to bring in subdivisions south of Juniper Ridge to better connect and support the Juniper Ridge employment area
- Concern about amount of growth in the north and impacts on infrastructure and state highways

Many of these comments are reflected in Scenario 2.3, as described further on page 9. It is also important to note that the concept of creating complete communities has been one of the most widely supported over-arching ideas throughout the development and refinement of scenarios, including at the meeting on October 8th.

Several members of the Boundary TAC also requested further information about how specific properties perform within a given subarea or additional information about a specific evaluation. The project team will endeavor to provide the additional information requested during the October 22nd meeting, as needed to support the discussion and development of recommendations.

DESCRIPTION OF SCENARIO 2.2

Scenario 2.2 reflects the team's recommended modifications to Scenario 2.1 from the Evaluation Report, focusing growth to the areas that performed the best on the evaluation while shifting growth away from areas that performed relatively poorly. It yields an expansion scenario with complete communities in most subareas, but an employment focus in the north. The recommendation in each subarea and a brief recap of the rationale for this recommendation, along with notes about implementation considerations and concepts for the area, are summarized below.

North

- **North Triangle**: employment-focused, due to concerns about compatibility and desirability of residential surrounded by commercial and employment uses. Needs to provide for a transition to existing rural residential development to the north through techniques such as buffers, setbacks, landscaping, limitations on allowed land uses, and/or special development standards.

- **OB Riley / Gopher Gulch**: a relatively modest, employment-focused expansion between US 20 and OB Riley Road. Commercial uses are best focused adjacent to Cooley Road, which provides the greatest access to state highways. The large lot industrial site is not located in this area.

Northeast

- **Northeast Edge**: complete neighborhoods focused on nodes around Butler Market Road and Neff Road where sewer is cost-effective, transportation connectivity is good, and VMT is relatively low (excludes the roughly 40-acre Bear Creek Road area due to high sewer and transportation costs). Site design for the commercial nodes should provide multi-modal access for both existing and new adjacent neighborhoods.

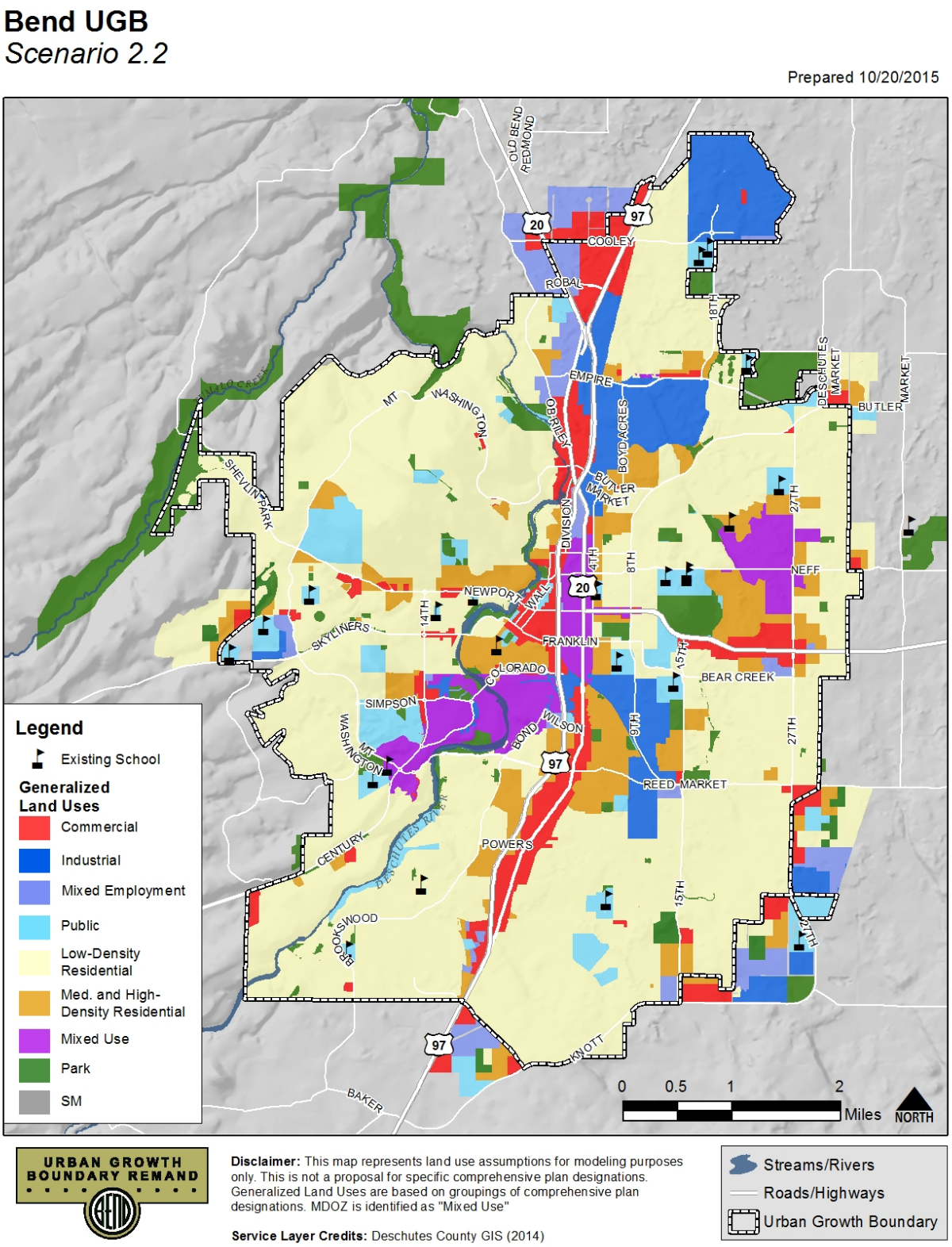
Southeast and South

- **DSL Property**: fully utilizes the exception land portion of the site for a broad mix of uses, including a possible large lot industrial site at the southern end, due to relatively strong performance of this area and its suitability for a mix of uses. Employment and commercial uses are focused along major roads with more industrial uses in the southern portion of the site, closer to the county landfill property, although the specific location of various land uses will be subject to a master planning process. The location of the caves needs to be better identified and reflected in the land use assumptions.
- **The Elbow**: fully utilizes this subarea, because doing so spreads the cost of needed sewer facilities (an interim pump station) and allows for the extension of the Murphy Road corridor to meet Knott Road / 27th. Employment uses near the southeastern corner of the subarea need to be compatible with the adjacent feed lot on the south side of Knott Road.
- **The Thumb**: includes roughly half of this subarea, with a mix of uses including a high school and a community park along with medium density residential, commercial nodes, and an employment area. While the specific location of various land uses will be subject to a master planning process, uses abutting Knott Road and China Hat Road should be designed to be compatible with existing adjacent rural and suburban housing.

West

- **West Area**: a primarily residential expansion with a mix of housing types is focused around a commercial node. While the specific location of various land uses will be subject to a master planning process, the siting of medium- and high-density housing should support the commercial area and provide maximum walkability to the commercial node and adjacent schools inside the current UGB.
- **Shevlin**: this area is excluded, due to the various concerns identified through the evaluation, including habitat impacts, wildfire and riparian impact concerns on the northwestern edge, and long trip lengths.

Figure 2: Scenario 2.2 Generalized Land Use Map



DESCRIPTION OF SCENARIO 2.3

Scenario 2.3 reflects some of the project team's earlier recommendations in Scenario 2.2 (see above), and incorporates Boundary TAC comments at the October 8th meeting and continued evaluation of sub-area refinements.

The recommendation in each subarea and a brief summary of the rationale for this recommendation are summarized below. Where Scenario 2.3 mirrors Scenario 2.2, the descriptions are not repeated; this includes the notes about implementation considerations and concepts for each area.

North

- **North Triangle**: largely identical to Scenario 2.2 (see page 7)
- **OB Riley / Gopher Gulch**: incorporates residential in the southern portion of the OB Riley area, in order to provide for a more complete community in the north, and to capture some of the transportation advantages of including residential in that area that were identified through the evaluation. Also extends further north in order to accommodate needed employment shifted out of other areas and displaced by residential uses to the south.

Northeast

- **Northeast Edge**: Inclusion of the full Butler Market Village area (a.k.a. "the Miller Nash proposal" and "the perfect rectangle") except for developed church properties at the southeastern corner (similar to Scenario 2.1 but more extensive).

Southeast and South

- **DSL Property**: Slightly reduced expansion in this area to reflect Boundary TAC concerns with over-emphasis in southeast, while retaining significant growth in order to retain the advantages identified in the evaluation of Scenario 2.1.
- **The Elbow**: reduced emphasis on growth in this area to reflect Boundary TAC concerns with over-emphasis in southeast, with less residential development in particular. Retains employment areas along Knott Road to help meet employment need and allow for the extension of the Murphy Road corridor to meet Knott Road / 27th.
- **The Thumb**: includes a little over half of this subarea, providing for a larger housing component while keeping the total acreage in that area somewhat less than in Scenario 2.1. Providing a greater residential emphasis and less employment is intended to provide for better compatibility with adjacent residential uses.

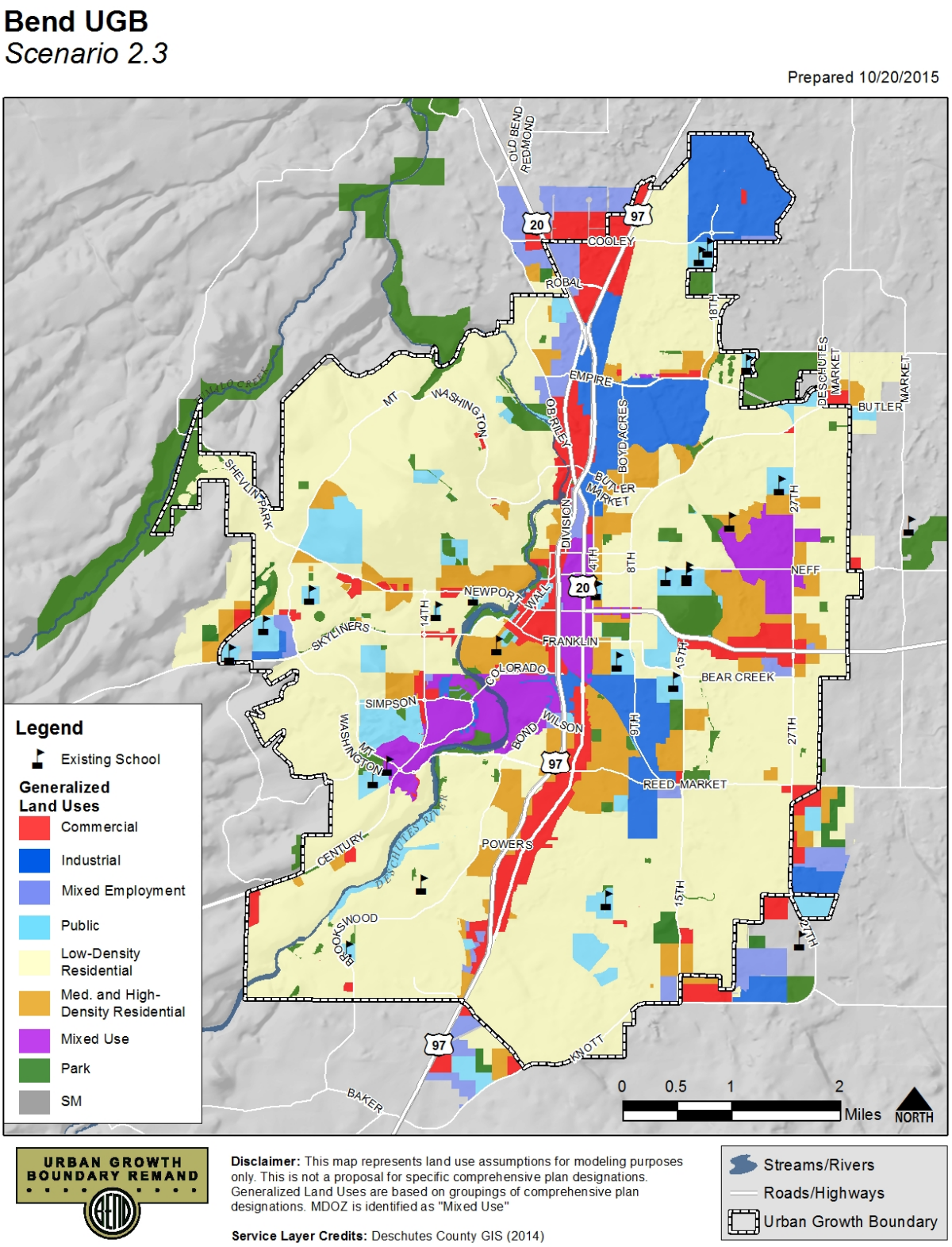
West

- **West Area**: includes an additional swath of the West Area abutting the current UGB along the planned extension of Skyline Ranch Road, in order to facilitate the extension of that roadway, with somewhat less expansion to the southwest on the Miller property.

- **Shevlin**: still excluded, although including more growth in the northern portion of the West Area may make the school site in the Shevlin area more likely to be needed, especially if it could be sited in the southeastern portion of the Shevlin area where wildfire, wildlife and riparian concerns are less pronounced.

The result of these refinements is an expansion scenario with a mix of land uses in the expansion areas in all sections of the city, and with a relatively balanced distribution of growth among the expansion areas in all sections of the city. The Northeast Edge and West Area extend and complete existing neighborhoods with a mix of housing types, supported by commercial nodes at major intersections. The DSL Property and The Thumb provide for major new master planned areas with employment centers as well as a mix of housing types to better complete the existing largely single family neighborhoods in the southeastern part of the city. The Elbow and OB Riley areas provide employment areas along major arterial roads with modest amounts of residential development adjacent to existing housing inside the city. The North Triangle provides an extension of the existing, successful commercial and employment areas inside the city between US 20 and US 97.

Figure 3: Scenario 2.3 Generalized Land Use Map



KEY METRICS

The table below summarizes key metrics including acres by broad land use category, housing units by type, and jobs by general category for each subarea for Scenario 2.1, 2.2 and 2.3. (Note that total acres, units and jobs have changed from 2.1 to 2.2 and 2.3 due to updates made to assumptions inside the UGB.[4])

Table 1: Key Metrics for Scenarios 2.1, 2.2 and 2.3

Metric	Scenario 2.1	Scenario 2.2	Scenario 2.3
Total Acres of Expansion	1,815	1,855	1,806
Residential Acres	706	694	705
Employment Acres	840	951	906
Civic Acres	269	211	202
Total Housing Units (outside UGB)	4,109	4,413	4,332
Single Family Detached Units	1,644	2,002	2,026
Single Family Attached Units	575	546	516
Multifamily Units	1,890	1,865	1,791
Total Jobs (outside UGB)	8,222	8,119	8,107
Retail & Hospitality Jobs	1,828	3,323	3,328
Office Jobs	2,874	2,373	2,329
Industrial Jobs	3,515	2,421	2,447
Public Jobs	5	2	2

CONCLUSION AND RECOMMENDATION

The project team requests that the USC consider TAC recommendations and vote upon a preferred UGB scenario as a basis for further analysis and refinement and provide direction as necessary regarding refinements and further analysis if needed.

[4] Updates to assumptions inside the UGB include: modifications to capture direction on land use efficiency measures from the Residential and Employment TACs, including reducing the minimum density requirement assumed for master-planned neighborhoods; updates to right of way set-asides to better reflect city standards and previous city analysis; updates in the Central Westside Plan area to better reflect the latest recommendations from the Central Westside Plan; updates to the Ward property opportunity site on 15th Street to slightly increase the amount of medium- and high-density housing assumed in that area; an update to the assumptions for Juniper Ridge, assuming industrial plan designations rather than Mixed Employment; updates to the COID opportunity site to better reflect constrained and available acreages on that property; and updates to the assumed housing products in several residential development types to better reflect current city standards.

Memorandum

October 20, 2015

To: Boundary and Growth Scenarios Technical Advisory Committee

Cc: Urban Growth Boundary Steering Committee

From: Andrew Parish AICP, Angelo Planning Group

Re: MetroQuest Phase 2 Summary

INTRODUCTION AND HIGHLIGHTS

This memorandum is intended to provide an executive-level overview of the input received from the Phase 2 MetroQuest online public survey, which was open between September 22 and October 15, 2015. Detailed results will be made available in a full report at a later date.

The key takeaways of the MetroQuest online public survey are listed below.

- Roughly **1,700 people** participated in the survey. Of these, roughly 82% of respondents said they live within the City of Bend, and 72% work in Bend.
- **"Quality Natural Environment"** was the top priority of survey respondents, followed by **"Strong Diverse Economy"**.
- **Scenario 2.1** scored the highest of the scenarios/SAAMs included.
- Respondents provided **over 1,200 comments** representing a wide range of viewpoints about the future character and design of the City of Bend.

SURVEY ORGANIZATION

The survey consisted of four "Screens" which gathered user input on the following topics:

- **Screen 1: Introductory screen.** This screen briefly described the background and purpose of the survey. No user input was gathered on this screen.
- **Screen 2: Priority Ranking.** Users chose their top five priorities from a list of eight possible "Community Outcomes". There was space available to suggest an additional outcome and to provide comments about those listed.
- **Screen 3: Scenario/Supplemental Analysis Area Map (SAAM) Ranking**. Users received information about the three scenarios and three SAAMs that were evaluated, and then rated each scenario/SAAM on a 1-5 scale.
- **Screen 4: Growth Strategies.** This screen asked users to provide input on growth strategies to increase land use efficiency in a variety of areas, including: the Central

Area, transit corridors, existing neighborhoods, new neighborhoods, and employment areas. Users checked boxes to indicate support for a strategy.

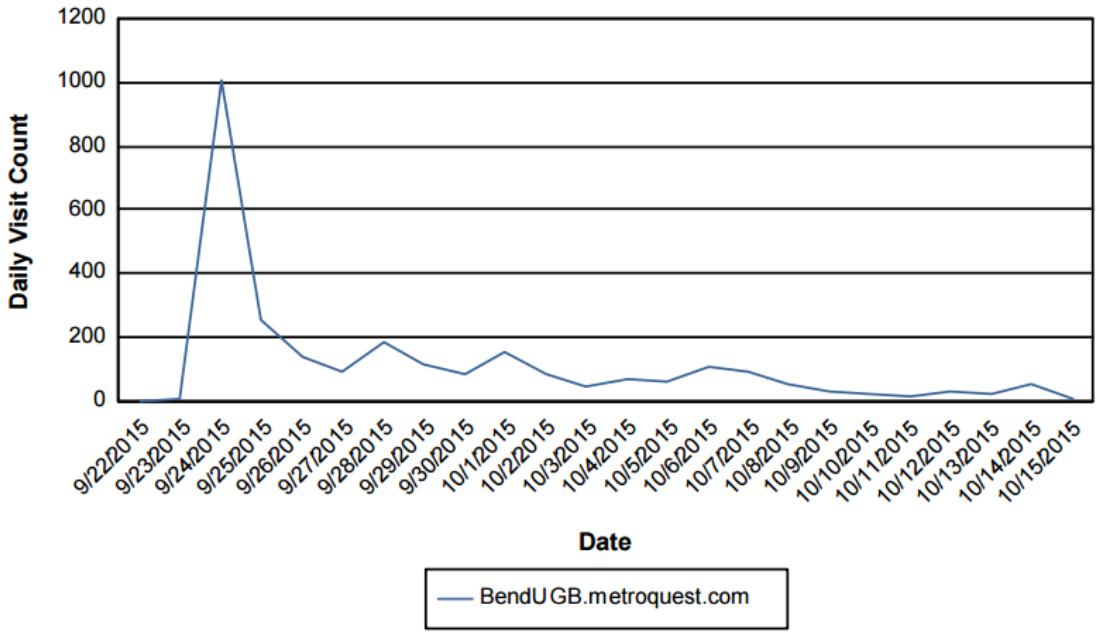
- **Screen 5: Demographic Information.** Users provided optional demographic information about gender, age, what neighborhood they live in, and whether they work in Bend.

Overall Data

Key data about the degree of participation in the survey are summarized below. Figure 1 shows the daily visit count, with a clear spike in activity around September 24th due to a successful media outreach campaign.

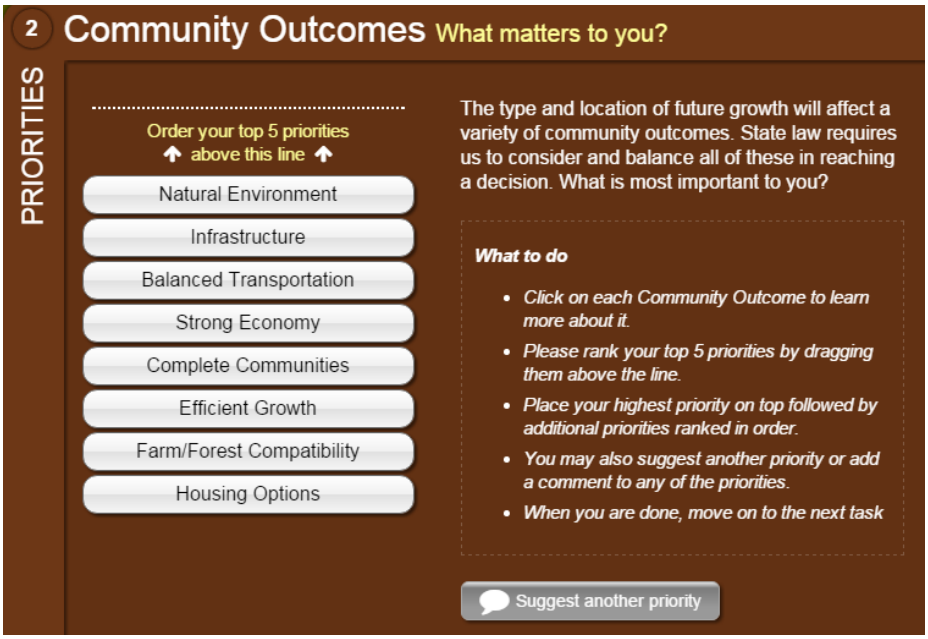
- **Total Visits:** 2,736
- **Total Visits with information entered:** 1,700 (62%)
- **Total Comments**: 1,236

Figure 1. Daily Visit Count



SCREEN 2: PRIORITY RANKING

Users were asked to rank their top 5 out of 8 “Community Outcomes” by dragging goals above a line (see image below). Key points are summarized below, and all priority rankings are shown in Table 1 and Figure 2. A lower numerical score indicates a better ranking on this screen.



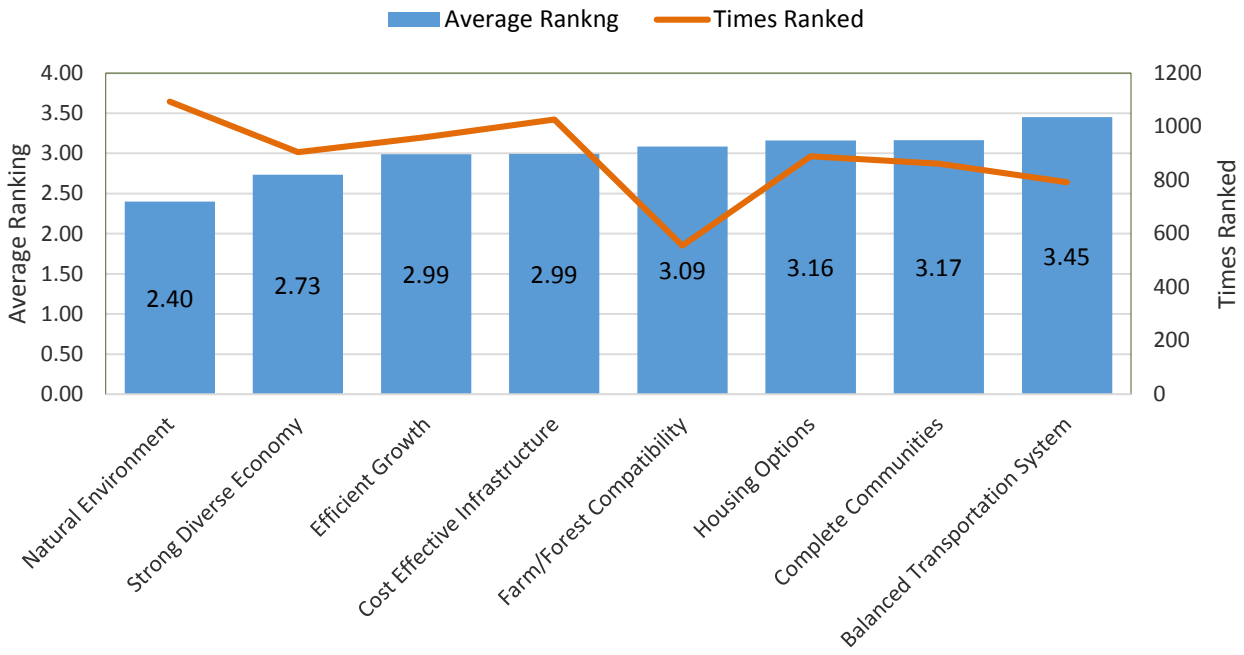
- **"A quality natural environment"** was ranked highest by a wide margin.
- **"Cost-effective infrastructure"** was ranked nearly as many times, though not as highly.
- **"Balanced transportation system"** received the lowest ranking.
- **"Farm and Forest Compatibility"** was ranked fifth overall, but was ranked the fewest number of times. This means that those who did rank this priority at all tended to rank it very highly.

Table 1. Screen 2 Priority Ranking

Overall Rank	Average Position	Times Ranked	Goal
1	2.40	1094	Quality Natural Environment
2	2.73	905	Strong Diverse Economy
3	2.99	961	Efficient Growth
4	2.99	1027	Cost-Effective Infrastructure
5	3.09	555	Farm and Forest Compatibility
6	3.16	889	Housing Options and Affordability
7	3.17	862	Complete Communities
8	3.45	792	Balanced Transportation System

Figure 2. Priority Ranking

(Lower numerical score is a better ranking)



Screen 2 Comments

A selection of common themes for Screen 2 comments is provided on the following pages. Additional detail about survey comments will be provided in a full report at a later date. As can be seen from the comments, many represent conflicting points of view or priorities.

Suggestions for New Priorities:

- Comments in support of “Complete Communities” generally
- Comments in support of “Strong Natural Environment” generally
- Affordable housing
- Less Growth / No Growth
- Compatibility of neighboring uses (specifically industrial adjacent to residential)
- Balance of amenities/quality of life between East and West Bend
- Flexibility for property owners
- Future citizens
- Education and quality of schools
- Water use / drought tolerance
- Wildfire
- Reduction in traffic

Comments about Complete Communities:

- Walkability/bikeability
- Living close to work
- East side / northeast neighborhoods need to be completed ("We can't all live on the West side")
- Density is needed for complete communities.

Comments about Efficient, Timely Growth:

- Affordable housing is an important part of this outcome.
- Small-lot homes are undesirable.
- Taller buildings do not mean loss of small-town feel. They preserve walkability and neighborliness.
- Past uses shouldn't completely dictate new uses.
- Industrial growth should not be adjacent to residential areas.
- Infill first, “grow up not out.”
- Need flexibility in zoning, for ADUs and multifamily housing in single family zones
- More multifamily zoning overall
- Mixed use, mixed density, and mixed cost housing throughout Bend.

Comments about Balanced Transportation System:

- Transit needs improvement.
- Need convenient and safe bicycle system to major destinations. Especially East-West corridors.
- Separated bicycle paths needed.
- Bicycle transportation is overrated - can't bike year round in Bend.
- There is too much traffic already - more growth will only increase that.
- Density will cause too much traffic.
- Keep existing system in good condition before building new roads.

Comments about Cost-Effective Infrastructure:

- Bend should never outgrow capacity to manage its infrastructure.
- Density = more cost-effective infrastructure.

Comments about Strong Diverse Economy:

- Need non-tourism jobs.
- More flexible zoning needed.
- Encourage small/local businesses
- Need affordable housing near employment centers.

Comments about Natural Environment:

- More natural parks, less water parks
- Bend Parks and Recreation is City's greatest asset
- People come to Bend because they cherish the natural environment - let's protect it.
- Some people love the nice parks but they are an expensive luxury.
- Wildfires are natural and should be expected.

Comments about Housing Options and Affordability

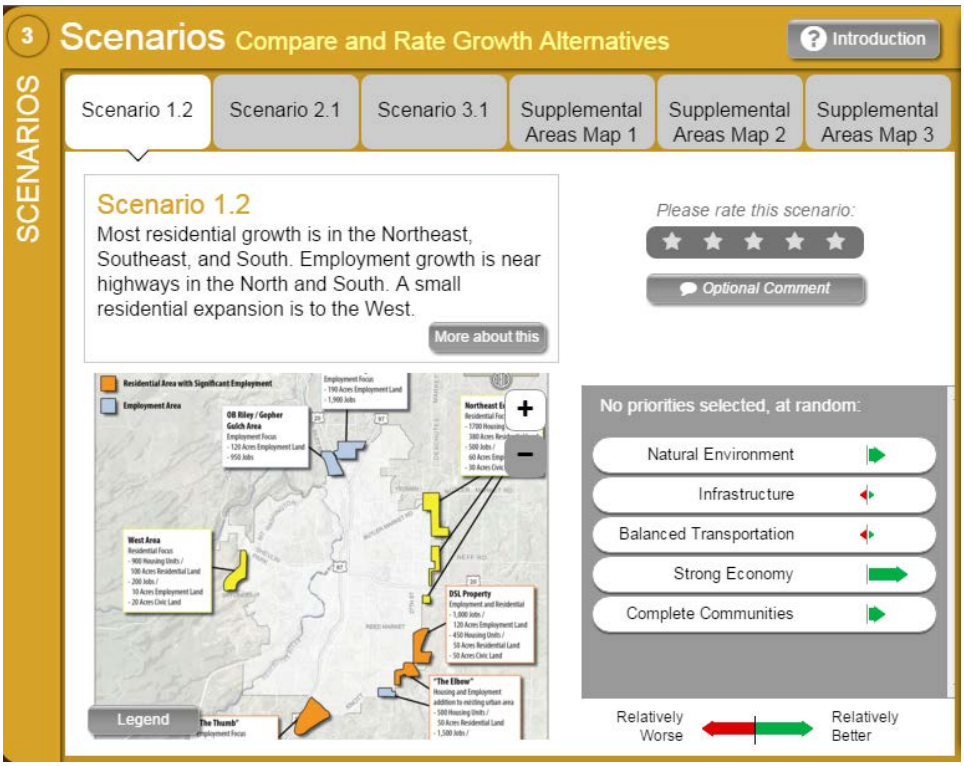
- A range of lot sizes is needed.
- Bend lacks affordable housing options.
- Bend does not have housing options for mid-range incomes.
- Bend needs flexibility in permitted types of housing.
- ADUs are key to affordability.
- The rental market is very tight right now.
- Housing options do not include homes on large lots within the city. Available lots on one acre or more are rare. Plenty of smaller lots are available

Comments about Farm and Forest Compatibility

- Bend should not grow into irrigated lands. These are rare in central Oregon.
- This is not a concern in Bend. We are surrounded by thousands of acres of BLM land and forest service land. It is not a precious resource.
- We need to be very careful about extending into the urban/wildlife interface.

SCREEN 3: SCENARIO/SAAM RATING

Users were asked to rate their level of support for each of the scenarios/SAAMs that were evaluated. Users were given maps and information about each scenario/SAAM based on the five top priorities chosen in Screen 2. Key points from Screen 3 are summarized below. Table 2 and Figure 3 show the ratings from this screen.



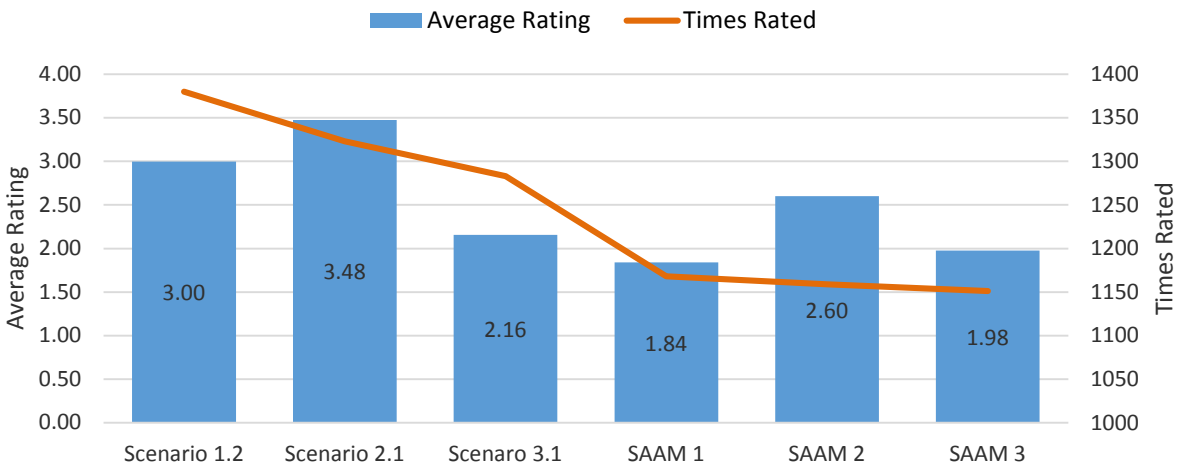
- **Scenario 2.1** had the highest average rating.
- **SAAM 1** had the lowest average rating.
- Number of times rated tended to decrease as users progressed through the screen – fewer people rated the later scenarios/SAAMs than the earlier ones.

Table 2. Screen 3 Scenario/SAAM Rating

Scenario/SAAM	Average Rating	Times Rated
Scenario 1.2	3.00	1380
Scenario 2.1	3.48	1323
Scenario 3.1	2.16	1283
SAAM 1	1.84	1168
SAAM 2	2.60	1159
SAAM 3	1.98	1151

Figure 3. Scenario/SAAM Rating

(Higher numerical score is a better rating)



Screen 3 Comments

A selection of common themes for Screen 3 is provided on the following pages. Additional detail about survey comments will be provided in a full report at a later date.

Scenario 1.2 Comments

- Too much West side growth. (wildfire risk, wildlife habitat, affordable housing concerns)
- Do not expand West.
- Balanced option - includes West and NE. Could use more housing in North. Growth should be spread around all areas of Bend.
- Streets in West are already overburdened. COCC and OSU
- Not as good as 2.1
- Buildout should be North and Northeast.
- Gopher Gulch/North Triangle should have residential component.
- Congestion is a huge concern in North area.
- Industrial areas should not be adjacent to existing residential.
- Large tracts provide opportunities for complete communities, so these parcels should have highest priority.
- Less growth in SE as there is fire danger there as well.
- No expansion is best.
- Development to the East destroys established residential neighborhoods near Hamby.
- Traffic already overloaded on Neff to downtown.
- Limited commercial on highway frontage (not Knott)
- Thumb should be residential.
- Too much density focused on the urban fringe.

Scenario 2.1

- No housing by the dump. "I think you might be underestimating the impact of a landfill next to a subdivision" "Does complete community include a dump?"
- Too much West side development.
- Expand residential area on Butler Market Road to Hamby Road
- Bend needs more "hubs" of complete communities.
- No employment land south of China Hat.

- Large Lot in OB Riley area is a bad idea.
- No residential in the Thumb. No one wants to buy a home by the freeway. Commercial area preferred.
- Good distribution and balance of land uses around the boundary.
- Traffic a concern in SE. Current roads are subpar.
- Reducing area of the Thumb limits ability to create a complete community.
- Elbow needs residential not employment.
- More mixed use is needed inside existing UGB.
- More housing and commercial in NW.
- Overburdens Newport and Galveston.
- This option takes advantage of existing infrastructure the best.
- North residential neighborhood will have trouble connecting to the city with walkable/bikeable paths.
- Like mixed residential/commercial idea for Thumb.
- More commercial needed in NE.

Scenario 3.1

- Opposed to West side / Shevlin development.
- Best option for the Thumb.
- Lack of transportation on West side.
- Housing nearby the new college will be helpful.
- Need more housing on West side.
- Housing too expensive on West side.
- This scenario grows in areas that are not already too crowded.
- Industrial development should not be adjacent to residential areas.
- Thumb should not be employment only - it has amenities suitable for residential.
- Shevlin area had utilities that abut the property making it easy to serve.
- More density in the West will make bend unattractive.

SAAM 1

- Too much on West side, no to development of Shevlin area.
- Best option for affordability - easy new housing with proximity to utilities and airport.
- Not enough mixing of uses.
- Residential focus in Thumb
- Like NE, don't like Shevlin area.

SAAM 2

- Like lots of room to make a nice community.
- Transit problems.
- Elbow as employment is a bad idea.
- No to development in Gopher Gulch.
- Efficient to invest in infrastructure mostly in one place, rather than everywhere around the city.
- Complete community needed in Thumb.
- Not balanced approach.

SAAM 3

- Too much emphasis on lands of a few landowners
- Already congested on West side
- Residential growth is far from job centers
- Large forest impact. Large nature/habitat impact.
- High wildfire risk.
- Not a balanced approach.
- Not enough affordable housing.

SCREEN 4: LONG-TERM STRATEGIES

Users were asked to weigh in on a variety of general strategies that affect urban form in different areas throughout the City of Bend. Users checked boxes relating to strategies they supported in a particular area. The following figures show the number of times specific strategies were checked.

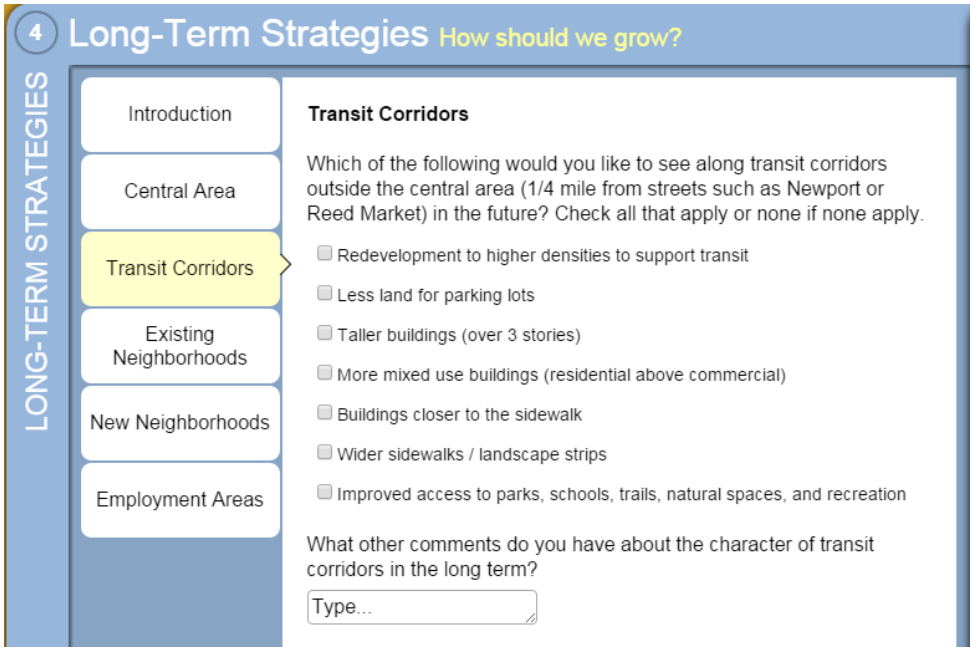


Figure 4. Support for Land Use Strategies – Central Area

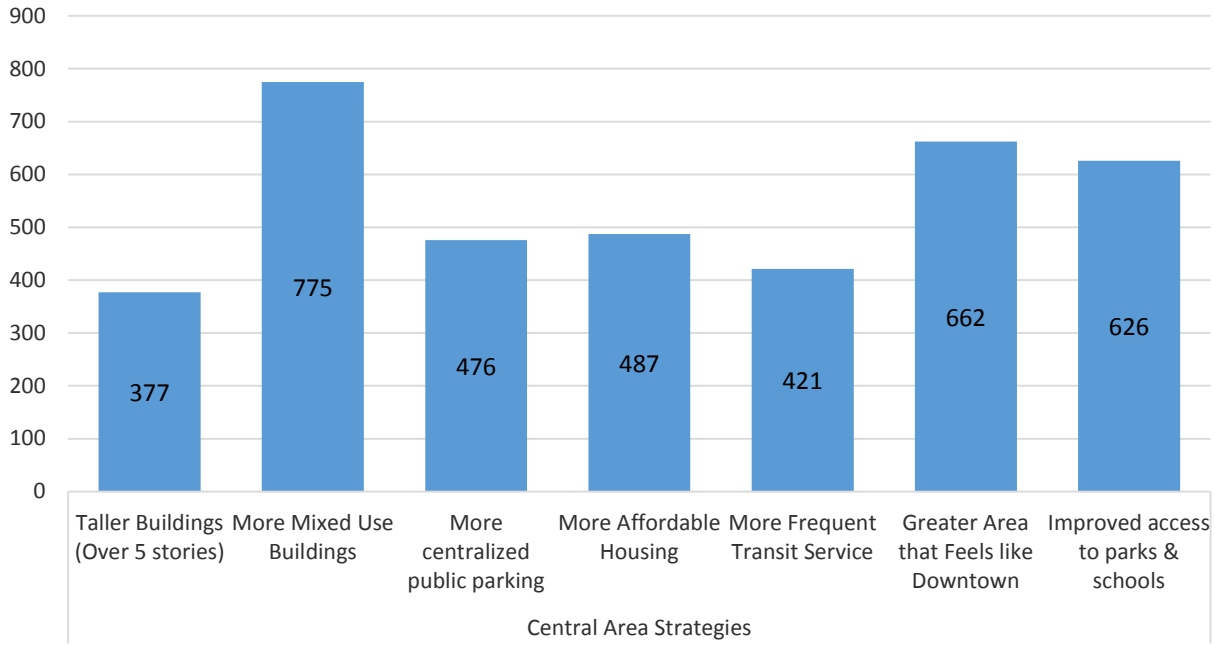


Figure 5. Support for Land Use Strategies – Transit Corridors

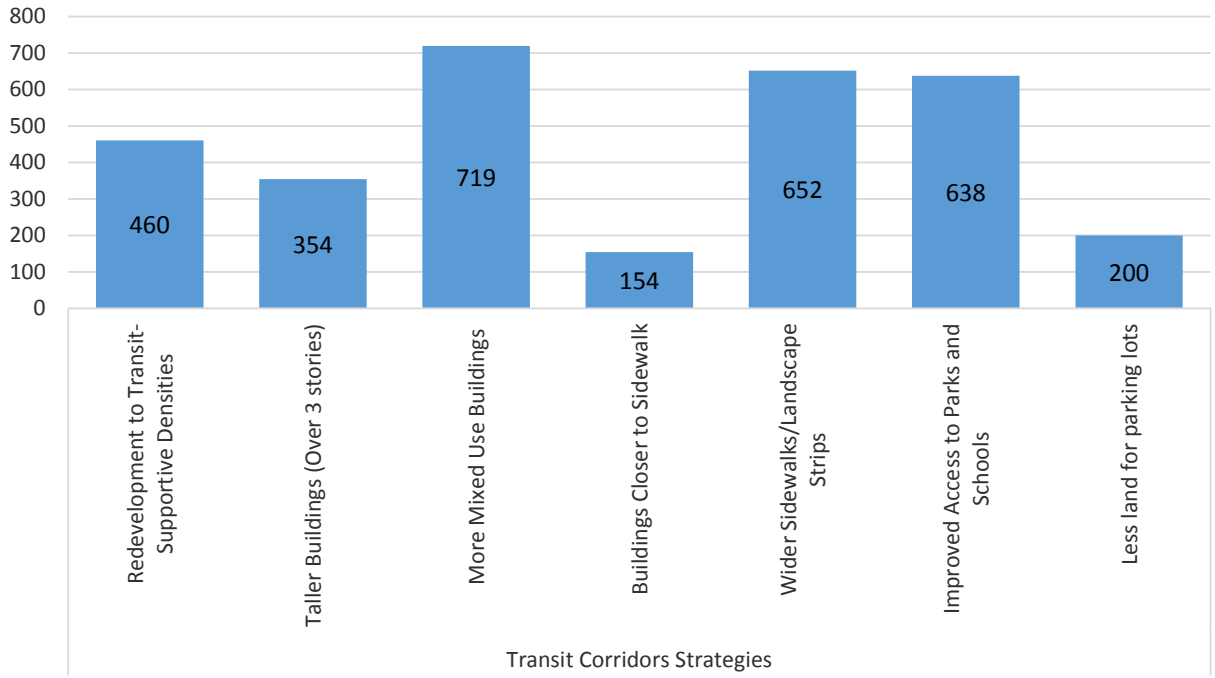


Figure 6. Support for Land Use Strategies – Existing Neighborhoods

Figure 7. Support for Land Use Strategies – New Neighborhoods

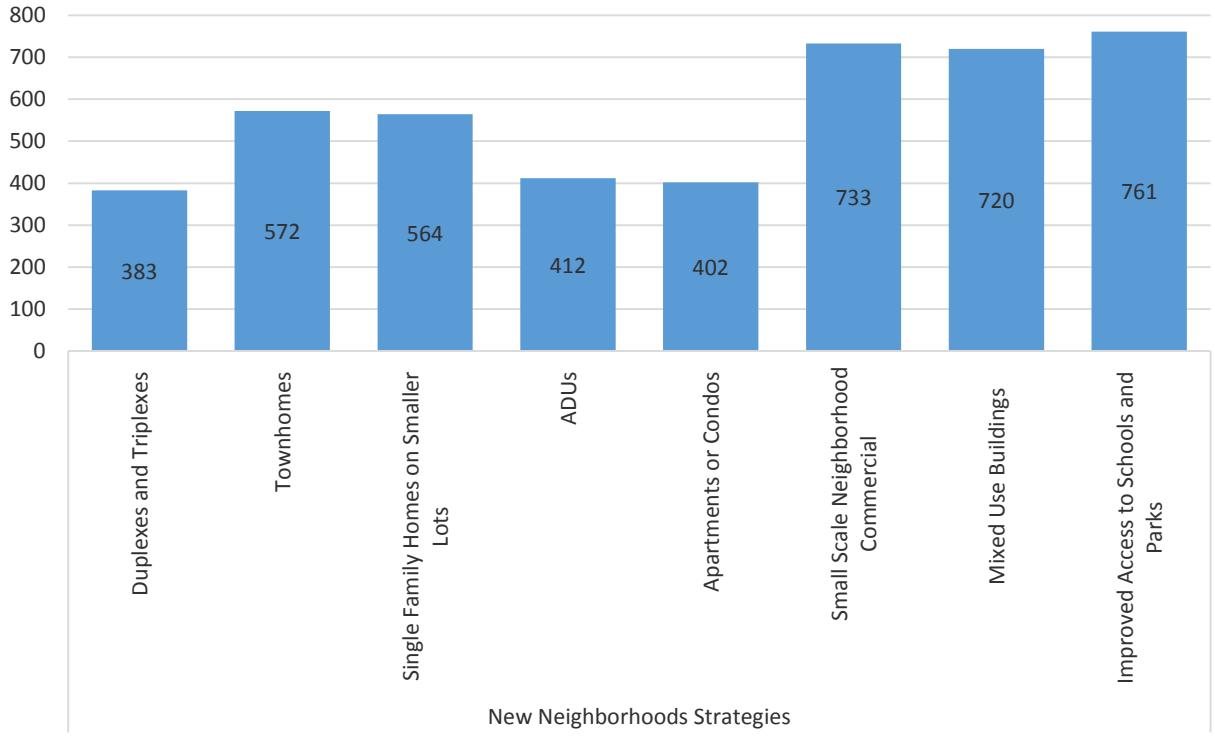
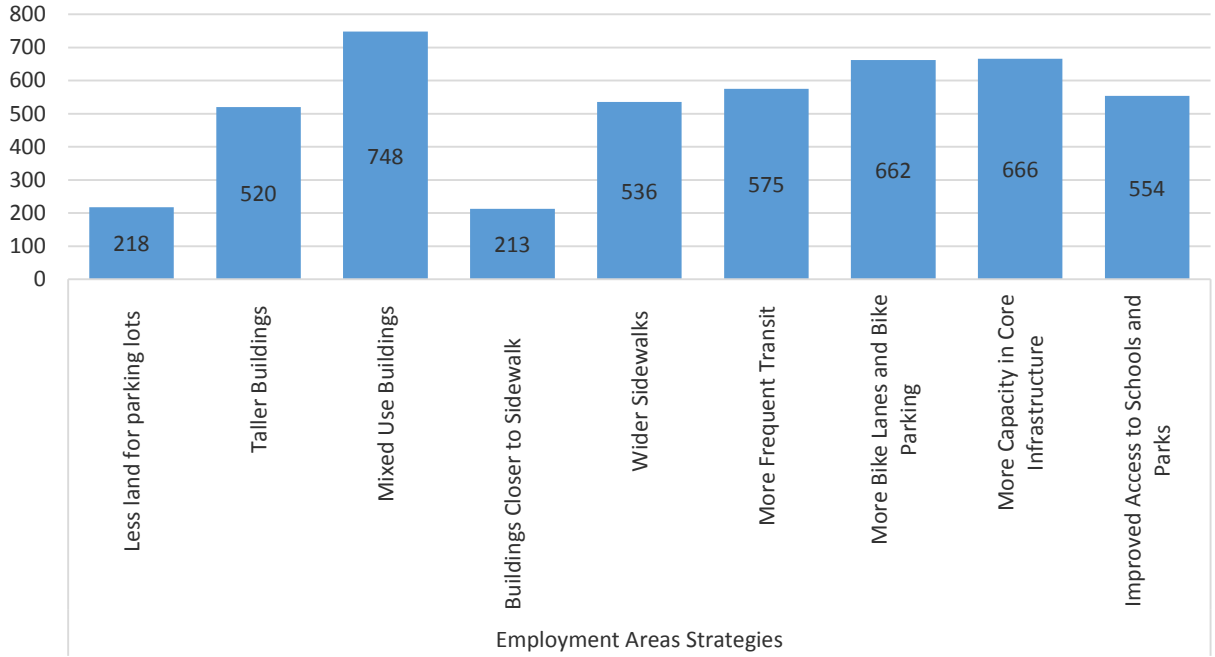


Figure 8. Support for Land Use Strategies – Employment Areas



Screen 4 Comments:

A selection of common themes for Screen 4 comments is provided on the following pages. Additional detail about survey comments will be provided in a full report at a later date.

Central Area

- Buildings over 5 stories are okay if designed well.
- Absolutely no taller buildings. No more than 2 stories high.
- Better bike infrastructure needed.
- Expand downtown feel to the East, to 3rd street.
- Do not restrict traffic flow on 3rd street.
- Remove trucks from 3rd street.
- Do not change downtown at all. Keep quaint.
- Would rather see density downtown than sprawl in outer areas.
- Pedestrian safety is important. Make bike/ped bridges into downtown.
- Need more parking.
- Need less cars and more natural spaces.
- “Stop them at the border”/ no more growth.
- The central area is currently less dense than expansion areas being considered.
- Central area has great potential.
- Preserve historical buildings

Transit corridors

- All major corridors should be two lanes each way with turn lanes.
- Need better bike/ped facilities.
- Need much better public transportation service.
- Crosswalks on 14th.
- Don't under-park these areas.
- Focus on walkability
- Higher commercial densities
- Zone for zero lot line homes.
- No need for this. “I didn't move from So Cal to end up back in it.”
- Allow small-scale commercial

Existing Neighborhoods

- Bend needs more NW Crossing type developments.
- Bigger lots - 1/2 acre minimum.
- Smaller homes as infill, more residential above commercial.
- More walkable communities, more local commercial.
- No change to existing neighborhoods.
- Maintain parks and natural spaces accessible from neighborhoods.
- More sidewalks
- Integrate affordable housing throughout existing neighborhoods.
- No heavy industry near existing neighborhoods.

New Neighborhoods

- Full range of housing types
- Self-contained communities.
- Large lots with smaller homes - 1/2 acre
- Alternatives to single family homes
- No apartments.
- Affordable housing.
- Mixed use communities.
- Need apartments on the West side.
- New neighborhoods are an opportunity for great bike infrastructure.
- More access to transit needed.
- Need more upscale communities on East side.

Employment Areas

- Bicycle and pedestrian access to employment centers
- More auto parking.
- Way less land for parking lots.
- Build tall.
- No tall buildings.
- Old zoning may not be applicable to current employment needs.
- Opportunities needed for living near work.
- Provide alternatives to driving and charge for parking.
- Existing employment areas should be enlarged, rather than putting it in new areas.

SCREEN 5: COMMUNITY DEMOGRAPHICS

Roughly 1,150 respondents provided at least some demographic information, shown in Table 3. “Other” was chosen for neighborhood affiliation more times than any other neighborhood and accounted for almost 20% of respondents. Looking at the average scores for Screen 2 priority ranking and Screen 3 scenario/SAAM rating, users who chose “Other” did not have preferences that were dissimilar from the overall average score. A more detailed breakdown of scores by demographic segments will be provided in a full report at a later date.

Table 3. Demographic Information

Group	Number	Percent
Age		
18 and under	6	1%
19-35	127	20%
26-50	232	37%
51-65	178	28%
65+	89	14%
Gender		
Female	554	48%
Male	592	52%
Neighborhood		
Awbrey Butte	86	8%
Boyd Acres	69	6%
Century West	46	4%
Larkspur	36	3%
Mountain View	105	9%
Old Bend	51	4%
Old Farm District	76	7%
Orchard District	55	5%
River West	99	9%
Southeast Bend	111	10%
Southern Crossing	22	2%
Southwest Bend	91	8%
Summit West	91	8%
Other	206	18%
Work		
Work In Bend	831	72%
Don’t Work In Bend	326	28%

URBAN GROWTH BOUNDARY REMAND

MAKING BEND EVEN BETTER

Bend Urban Growth Boundary Expansion Scenarios Evaluation Report

October 1, 2015
(Reissued October 20, 2015)

TABLE OF CONTENTS

Executive Summary **1**
Introduction **7**
Purpose and Background 7
About the Scenarios & Supplemental Analysis Areas 8
Overview 8
UGB Expansion Scenarios 10
Supplemental Analysis Maps 13
Legal Foundation and Criteria for Creating the Preferred Scenario **16**
State Statutes and Administrative Rules 16
Remand Considerations 17
Overview of Evaluation **17**
Linking the Evaluation to Criteria for Creating the Preferred Scenario 17
Performance Measures 18
Community Outcomes 18
Combining Performance Measures 20
Scenario Evaluation Summary **29**
To Weight, or not to Weight? 29
Factor 1: Efficient accommodation of identified land needs 29
Complete Communities and Great Neighborhoods 29
Efficient, Timely Growth 30
Factor 2: Orderly and economic provision of public facilities and services 31
Balanced Transportation System 31
Cost-Effective Infrastructure 31
Factor 3: Comparative environmental, social, economic and energy consequences (ESEE) 32
Quality Natural Environment (Environmental and Energy Consequences) 32
Housing Options and Affordability (Social Consequences) 33
Strong Diverse Economy (Economic Consequences) 33
Factor 4: Compatibility of proposed urban uses with nearby agricultural and forest activities occurring on farm and forest land outside the UGB 33
Compatibility with Farms and Forests 33
Conclusions and Recommendation 34
Subarea Advantages, Disadvantages and Trade-offs **35**

North Triangle....35
Northeast Edge....36
DSL Property & Darnell Estates....38
“The Elbow”....40
“The Thumb”....41
West Area....43
Shevlin Area....45
OB Riley / Gopher Gulch Area....46
Synthesis & Recommendations....48
List of Appendices....49

EXECUTIVE SUMMARY

The purposes of the Urban Growth Boundary (UGB) Expansion Scenarios Evaluation Report are to:

1. Summarize the results of the project team's evaluation of the UGB Expansion Scenarios and Supplemental Analysis Areas, including initial observations about which scenario and subareas appear to offer the greatest advantages relative to the performance measures analyzed;
2. Provide a factual and interpretive basis for the Boundary and Growth Scenarios Technical Advisory Committee (Boundary TAC) to use in directing the creation of a preferred scenario (which may be a hybrid of the best performing elements of several scenarios); and
3. Provide initial observations and draft recommendations about which scenario appears to offer the greatest advantages relative to the performance measures analyzed; and to suggest potential modifications that could improve its performance.

In June 2015, the Boundary TAC and the UGB Steering Committee (USC) approved three alternative UGB Expansion Scenarios for further evaluation, and directed the project team to evaluate additional land in "Supplemental Analysis Areas" in order to provide some flexibility when the proposed UGB is crafted. The UGB Expansion Scenarios and Supplemental Analysis Areas test different choices about where to accommodate future housing and employment growth outside the current UGB as a way to understand the trade-offs through the evaluation.

The Boundary TAC and USC, as well as the city's Legal Department, emphasized the importance of giving the Supplemental Analysis Areas a comparable level of analysis to the land included in UGB Expansion Scenarios. To achieve this, the team created three Supplemental Analysis Area Maps ("SAAMs") that collectively incorporate all the land in the Supplemental Analysis Areas in packages with roughly the same total levels of employment and residential growth and the same assumptions about development inside the UGB as the Expansion Scenarios. The areas tested by each of the SAAMs are listed in brief below; descriptions and maps of both the Scenarios and SAAMs are provided in the main report (the scenarios have not changed since their approval by the USC in June).

- SAAM-1: Full Shevlin Area and full Northeast Edge
- SAAM-2: Full OB Riley and Gopher Gulch Area
- SAAM-3: Full West Area

State statute and administrative rules govern how cities must evaluate potential UGB expansions. Local governments must consider and balance four factors listed in Statewide Planning Goal 14:

1. Efficient accommodation of identified land needs;
2. Orderly and economic provision of public facilities and services;
3. Comparative environmental, energy, economic and social consequences; and

4. Compatibility of the proposed urban uses with nearby agricultural and forest activities occurring on farm and forest land outside the UGB.[1]

A local government must show that all the factors were considered and balanced, but state law and rules do not prescribe how or whether to weight specific factors or what should be included in the consideration of each factor. The city has an opportunity to consider and balance the factors based on community goals and priorities. The city is also obligated to base its UGB decision on substantial evidence and findings that are well documented, and to be clear about the facts, reasoning and balancing used for the decision.

About the Evaluation

This evaluation report uses the following terms and hierarchy of considerations in the comparison, evaluation and balancing of Bend's UGB expansion alternatives.

- **Performance Measures** – Detailed measures for each Goal 14 factor: the factual base for the evaluation. Some performance measures are quantitative and others are qualitative.
- **Community Outcomes** – Eight intended outcomes that provide a way to "roll up" performance measures, "see the forest for the trees", and state what Bend is trying to achieve with this UGB update. They mirror the applicable Project Goals that were approved by the USC in September, 2014.
- **Goal 14 Factors** – Oregon's requirements for what must be considered and balanced (see above).

The Community Outcomes **(bold type)** and a summary of the performance measures under each Goal 14 Factor are listed below.

Factor 1: Efficient accommodation of identified land needs

- **Complete Communities and Great Neighborhoods**: walkability to schools, parks, and businesses; jobs/housing balance, and opportunities for master planning
- **Efficient, Timely Growth:** total expansion, density, land contiguous to existing UGB, and vacant vs. developed land included

Factor 2: Orderly and economic provision of public facilities and services

- **Balanced Transportation System**: reliance on the automobile (vehicle miles traveled per capita or VMT, trip length, mode split, walk trips), congestion, safety and connectivity, proximity to transit, and intersection density
- **Cost Effective Infrastructure**: total cost and cost per acre of transportation and sewer improvements, new miles of local roads, water system improvements in city water service area, impervious surface area, and development in welded tuff geology and Drinking Water Protection Areas

[1] ORS 197.298, effective 1999; and OAR 660-024-0060, effective April 16, 2009.

Factor 3: Comparative environmental, social, economic and energy consequences (ESEE)

- **Quality Natural Environment** (Environmental and Energy Consequences): development in wildlife areas, development adjacent to riparian areas, wildfire hazard, greenhouse gas emissions, energy use, and water consumption
- **Housing Options and Affordability** (Social Consequences): cost and mix of new housing
- **Strong Diverse Economy** (Economic Consequences): site suitability for commercial and industrial uses and for the large lot special site need

Factor 4: Compatibility of proposed urban uses with nearby agricultural and forest activities occurring on farm and forest land outside the UGB

(1) **Compatibility with Farms and Forests**: farm practices on high value farm land adjacent to expansion areas, impact to irrigation districts, and proximity to forest land

In Phase 1, the Boundary TAC and USC directed the team to use an "unweighted" (or, more precisely, an equally-weighted) approach to combining results from different indicators used to identify overall suitability of different areas to be considered for inclusion in potential expansion areas. For the scenario evaluation, neither the Boundary TAC nor the USC provided specific guidance on how the performance measures should be weighed and balanced against one another. To help test the sensitivity of individual performance measures on the ranking of the scenarios, the project team has analyzed the performance measures and has evaluated overall results using *both* an equally-weighted and an unequally-weighted approach, including several variations of weighting. Because some of the performance measures showed little variation among the scenarios, others capture advantages or disadvantages that are easily modified through implementation (e.g. location of a park or school), and others showed relatively significant and meaningful differences between the scenarios, the project team recommends that the "difference makers" be given greater consideration in reaching a decision on the preferred UGB. These "difference makers" include total cost of transportation and sewer improvements, residential land efficiency, affordability, and VMT. Additional performance measures that are especially important at the subarea level include development in wildlife areas and adjacent to riparian areas, wildfire hazard, proximity to farms and forests, irrigation district impacts, and suitability for commercial and industrial uses. It is important to note that the update of Bend's UGB is not intended to be a numerical exercise and points-based decision. Rather, it is intended to be a determination of which choices, on balance, best meet the Goal 14 factors and Project Goals (as expressed in the Community Outcomes).

Summary of Results

Based on the body of work captured in this evaluation report, in considering and balancing the four Goal 14 Factors, Scenario 2.1 performed the best of the alternatives overall, regardless of whether and to what degree weighting is applied to distinguish between the more and less important performance measures. Scenario 2.1 was in the "top tier" relative to other alternatives on nearly all community outcomes, including:

(1) Complete Communities and Great Neighborhoods (because it was created with the intention of providing for complete communities in all quadrants of the city);

(2) Efficient, Timely Growth (because of its efficient use of residential land and reliance on large, vacant parcels);
(3) Balanced Transportation System (because of the above advantages plus enhanced connectivity due to the extension of Murphy Road to 27th / Knott and keeping growth in the northeast focused to nodes along major east-west corridors);
(4) Cost-Effective Infrastructure (because of relatively low cost for both connectivity- and capacity-related transportation improvements and reasonable costs for sewer improvements);
(5) Quality Natural Environment (because it avoids riparian areas, limits expansion in wildlife areas, does not have any features that prevent mitigation of wildfire risk in any expansion areas, and has fairly low energy and water consumption and greenhouse gas emissions); and
(6) Housing Options and Affordability (because it has good housing mix in nearly all subareas and good housing affordability with significant housing growth in the southeast[2]).

The two Community Outcomes where Scenario 2.1 was not in the Top Tier were Strong Diverse Economy (because it places employment and commercial uses in some areas, such as the West Area, where they are somewhat less well suited) and Compatibility with Farms and Forests (because it has relatively more impact to Arnold Irrigation District from inclusion of full Elbow area and development adjacent to several commercial farms, including the greatest amount of development next to a feed lot south of Knott Road).

No other alternative had as strong performance on as many community outcomes, and each of the other alternatives has at least one important weakness identified through the evaluation:

- Scenario 1.2 performs poorly on cost-effective infrastructure, because heavy development in the Thumb triggers the need to widen Knott Road to three lanes.
- Scenario 3.1 performs poorly on cost-effective infrastructure, due to high transportation costs to connect growth areas and the need to widen US 20 from Robal Rd to 3rd Street. It also performs poorly on compatibility with farms and forests due to heavy impacts to Swalley Irrigation District in OB Riley / Gopher Gulch and forest proximity in the Shevlin Area and on Housing Options and Affordability because much of the residential development is focused on the west side of the city where land costs and housing prices are higher. It performs relatively poorly on Quality Natural Environment because including the Shevlin Area impacts wildlife areas, puts development in proximity to Tumalo Creek, and has topography that makes wildfire hazard difficult to mitigate.
- SAAM-1 performs poorly on multiple Community Outcomes. It performs poorly on Quality Natural Environment because including the full Shevlin Area impacts wildlife areas, puts development in proximity to Tumalo Creek has topography that makes wildfire hazard difficult to mitigate. It performs poorly on Cost-Effective Infrastructure

[2] Housing costs for new construction were found to be roughly 30% lower in neighborhoods on the outer east side of the city relative to neighborhoods on the outer west side of the city. Housing in expansion areas is assumed to follow this trend.

because development of the full Shevlin Area requires a costly new regional pump station for sanitary sewer, and it also has fairly high cost for new roads connecting growth areas and high costs for intersection improvements. SAAM-1 also rated relatively poorly on Complete Communities and Great Neighborhoods and Efficient, Timely Growth because the outer extents of the Shevlin Area and Northeast Edge are not well-suited to higher-density housing and have less proximity to commercial services, schools, and/or parks.

- SAAM-2 performs poorly on Balanced Transportation System, due to the lack of connectivity to the existing UGB from the Gopher Gulch area and the distance to reach key destinations inside the current UGB. It also performs relatively poorly on Compatibility with Farms and Forests due to heavy impacts to Swalley Irrigation District and proximity to the greatest number of working farms.
- SAAM-3 performs relatively poorly on Housing Options and Affordability because all of the residential development is focused in the West Area, which is more expensive (as noted above), and on Cost-Effective Infrastructure because including the full West Area (particularly the northwest portion) requires a costly new regional pump station.

The conclusion that Scenario 2.1 performed the best is only a starting point for crafting the proposed UGB update. The subarea evaluation provides a finer grain of analysis and insights into how to balance the Goal 14 factors and achieve the Community Outcomes. Additional evaluation at the subarea level shows that there is room for improvement of Scenario 2.1 through modifications to some of the subareas, as summarized in brief below.

- North Triangle: employment-focused rather than including residential
- Northeast Edge: drop the roughly 40-acre Bear Creek Road area, shifting that growth to create more complete neighborhoods around Butler Market Village and/or Neff Road, while retaining the focus on nodes along existing arterial corridors connecting to the city center
- DSL Property: include large lot industrial site at the southern end and refine land use assumptions
- The Elbow: refine arrangement of land uses along Knott Road to minimize impacts to the adjacent farms and feed lot operations
- The Thumb: refine land use assumptions and include a high school and a community park but reduce total expansion area somewhat
- West Area: reduce the amount of commercial and industrial use in this subarea
- Shevlin: none, follow Scenario 2.1 (area excluded)
- OB Riley / Gopher Gulch: remove large lot industrial use from this area (replace with other employment uses)

Next Steps

At the Boundary TAC meeting on October 8th, the project team will present a summary of this evaluation report and the Boundary TAC will have the opportunity to discuss and understand the body of work and the project team's preliminary recommendations. On October 22nd, the Boundary TAC will reconvene to discuss the creation of a preferred scenario and provide

direction for the preferred/hybrid scenario. The project team recommends that the Boundary TAC begin the process of creating the preferred scenario by agreeing on one of the alternatives evaluated as a starting point, and then identifying and agreeing on a list of refinements and improvements.

INTRODUCTION

Purpose and Background

The purposes of the Urban Growth Boundary (UGB) Expansion Scenarios Evaluation Report are to:

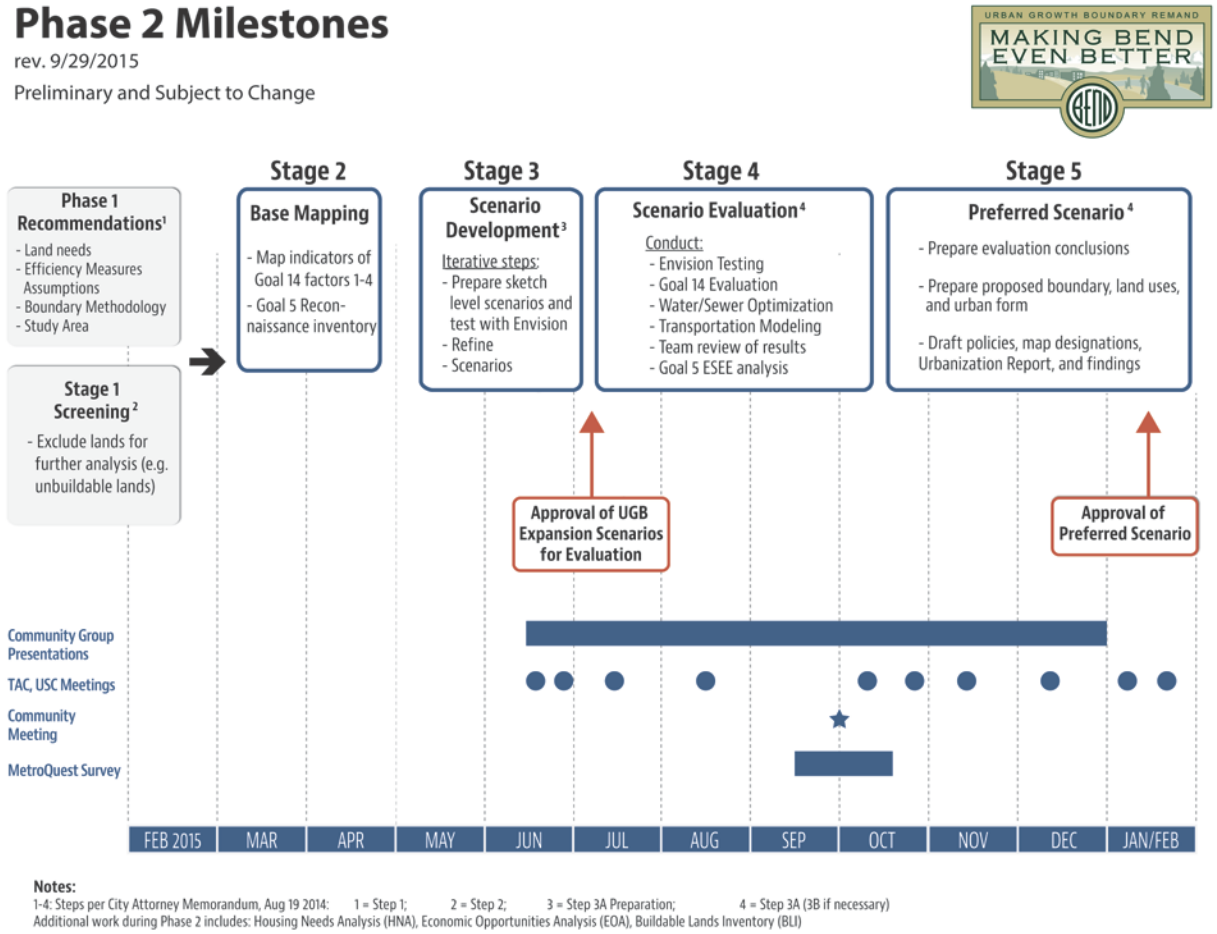
1. Summarize the results of the project team's evaluation of the UGB Expansion Scenarios and Supplemental Analysis Areas, including initial observations about which scenario and subareas appears to offer the greatest advantages relative to the performance measures analyzed;
2. Provide a factual and interpretive basis for the Boundary and Growth Scenarios Technical Advisory Committee (Boundary TAC) to use in directing the creation of a preferred scenario (which may be a hybrid of the best performing elements of several scenarios); and
3. Provide initial observations and draft recommendations about which scenario appears to offer the greatest advantages relative to the performance measures analyzed, and, potential modifications that could improve its performance.

In June 2015, the UGB Steering Committee (USC) for the Bend UGB Remand project approved three alternative UGB Expansion Scenarios for further evaluation, as recommended by Boundary TAC. The USC directed the project team to evaluate additional land in "Supplemental Analysis Areas" in order to provide some flexibility in crafting the final UGB . The UGB Expansion Scenarios and Supplemental Analysis Areas test different choices about where to accommodate future housing and employment growth outside the current UGB.

The evaluation included transportation analysis, water and sewer system optimization, and a variety of land use, economic, social, and environmental evaluations, described further on page 17. The evaluations have been structured to provide information about how the UGB Expansion Scenarios and Supplemental Analysis Areas perform relative to the factors required for consideration by the state, but also relative to the Project Goals, which capture local priorities. This is described further on page 17.

As a reminder, the scenario evaluation is "Stage 4" in the process of identifying the preferred UGB expansion, as shown on Figure 1.

Figure 1: Phase 2 Milestones Chart



About the Scenarios & Supplemental Analysis Areas

Overview

As noted above, the Boundary TAC recommended and USC approved three specific UGB Expansion Scenarios for evaluation, but also asked the project team to evaluate all land that had been given the top rating (i.e. scored in the top quartile when all indicators were combined) during the "Stage 2" evaluation of exception land within the two-mile study area and had not been excluded by subsequent refinements and narrowing.[3] The areas that met those tests and were not included in one of the three UGB Expansion Scenarios were identified as "Supplemental Analysis Areas" by the project team in the June 2015 meetings. The Boundary TAC and USC, as well as the city's Legal Department, emphasized the importance of giving the Supplemental Analysis Areas a comparable level of analysis to the land included in UGB Expansion Scenarios.

[3] "Stage 2" evaluation considered key indicators of the four factors of Goal 14 that could be assessed based on the land itself, without specific assumptions about the arrangement of land uses.

Some of the models used for scenario evaluation (such as the transportation model) require "budgeted" land use assumptions in order to do a full evaluation and an "apples to apples" comparison against land included in the three UGB Expansion Scenarios. In order to respond to the direction for equal evaluation, the team created three Supplemental Analysis Area Maps ("SAAMs") that collectively incorporate all the land in the Supplemental Analysis Areas in packages with roughly the same total levels of employment and residential growth and the same assumptions about the amount and type of development that can be accommodated inside the UGB as the UGB Expansion Scenarios.

The SAAMs are intended to test full utilization of certain geographic areas rather than distributed growth across a variety of potential expansion areas. The arrangement of land uses in the SAAMs is more conceptual than in the UGB Expansion Scenarios. The land use assumptions for each SAAM are based on workshop input where possible, property owner conceptual plans if available, and general land suitability characteristics (i.e. whether the area is suitable for commercial, industrial or residential use based on transportation access, visibility, topography, adjacent land uses, etc.). These assumptions are summarized in brief on page 10; the descriptions of the UGB Expansion Scenarios are also provided on page 10 for ease of reference; these scenarios have not changed since their approval by the USC in June.

The UGB Expansion Scenarios and SAAMs are described and illustrated below. The categories shown on the generalized scenario maps are as follows:

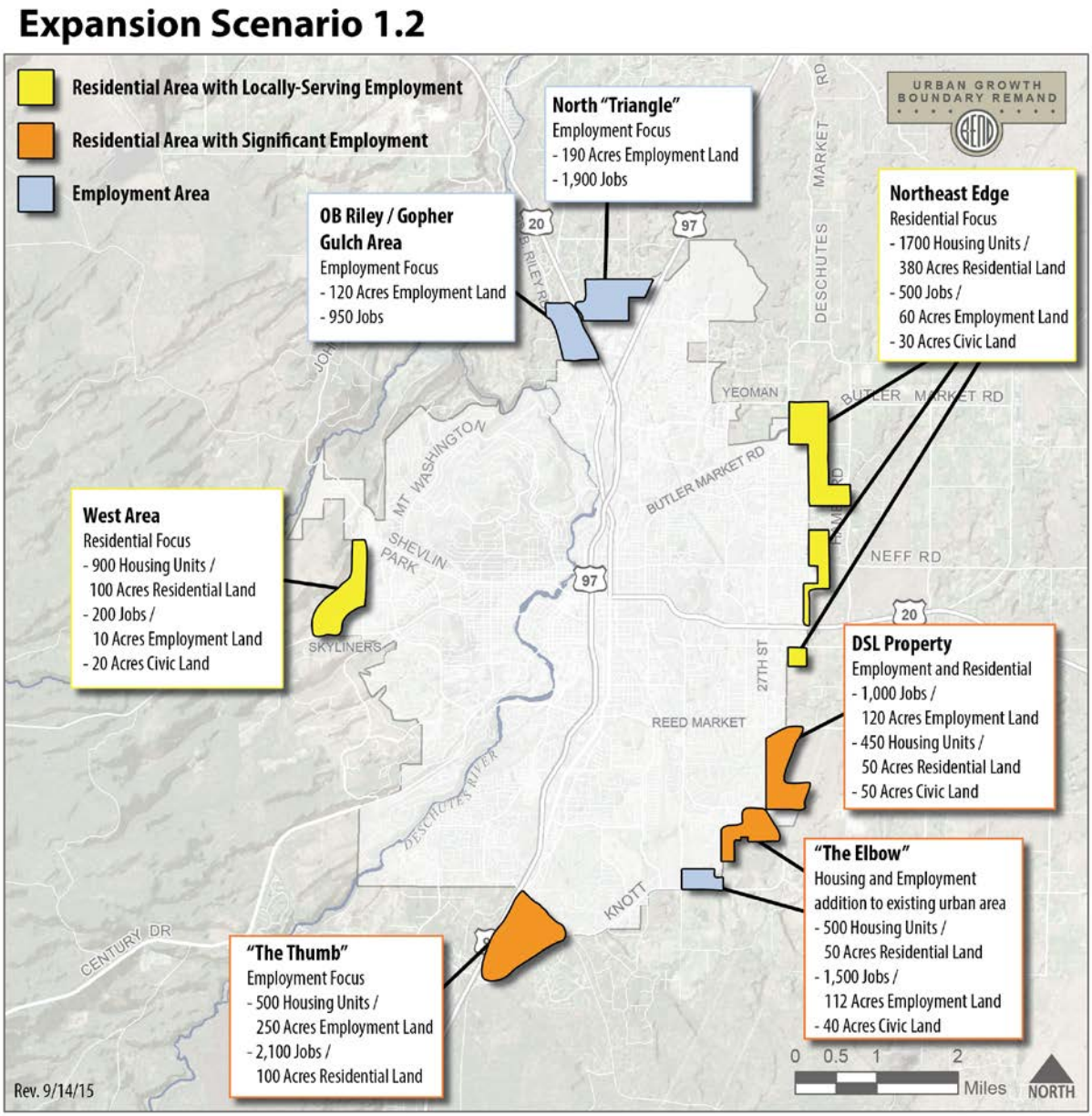
- *Residential area with locally-serving employment*: Predominately residential uses, with supportive uses such as parks, schools, and local commercial centers.
- *Residential area with significant employment*: A full mix with residential uses, parks and/or schools, and commercial and employment areas.
- *Employment area*: Employment-focused area providing for a mix of jobs (retail, office, and/or industrial) with little or no residential use.

Note that these categories are used for communication purposes only, and do not necessarily reflect official land use plan designations that would be applied to expansion areas.

UGB Expansion Scenarios

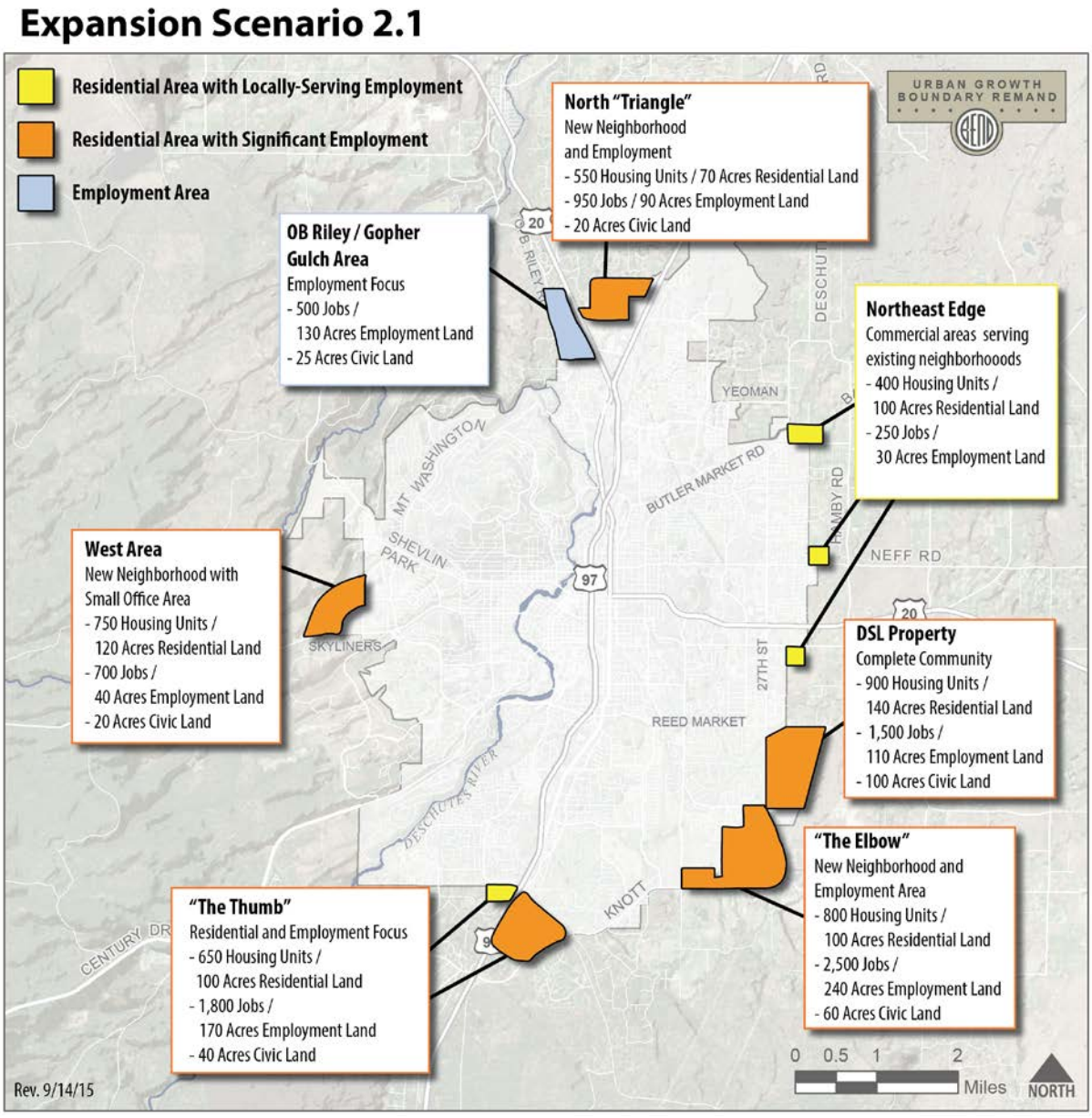
Scenario 1.2

Scenario 1.2 focuses large new employment districts in the “North Triangle” and “The Thumb” along Highway 97. “The Thumb” also includes housing development, while the “North Triangle” is employment-focused. A relatively small expansion in the West Area provides a mix of housing around a small commercial core. The DSL property offers a mix of housing and employment, including potential for a large-lot industrial user. A relatively large expansion on the Northeast Edge includes housing as well as commercial uses.



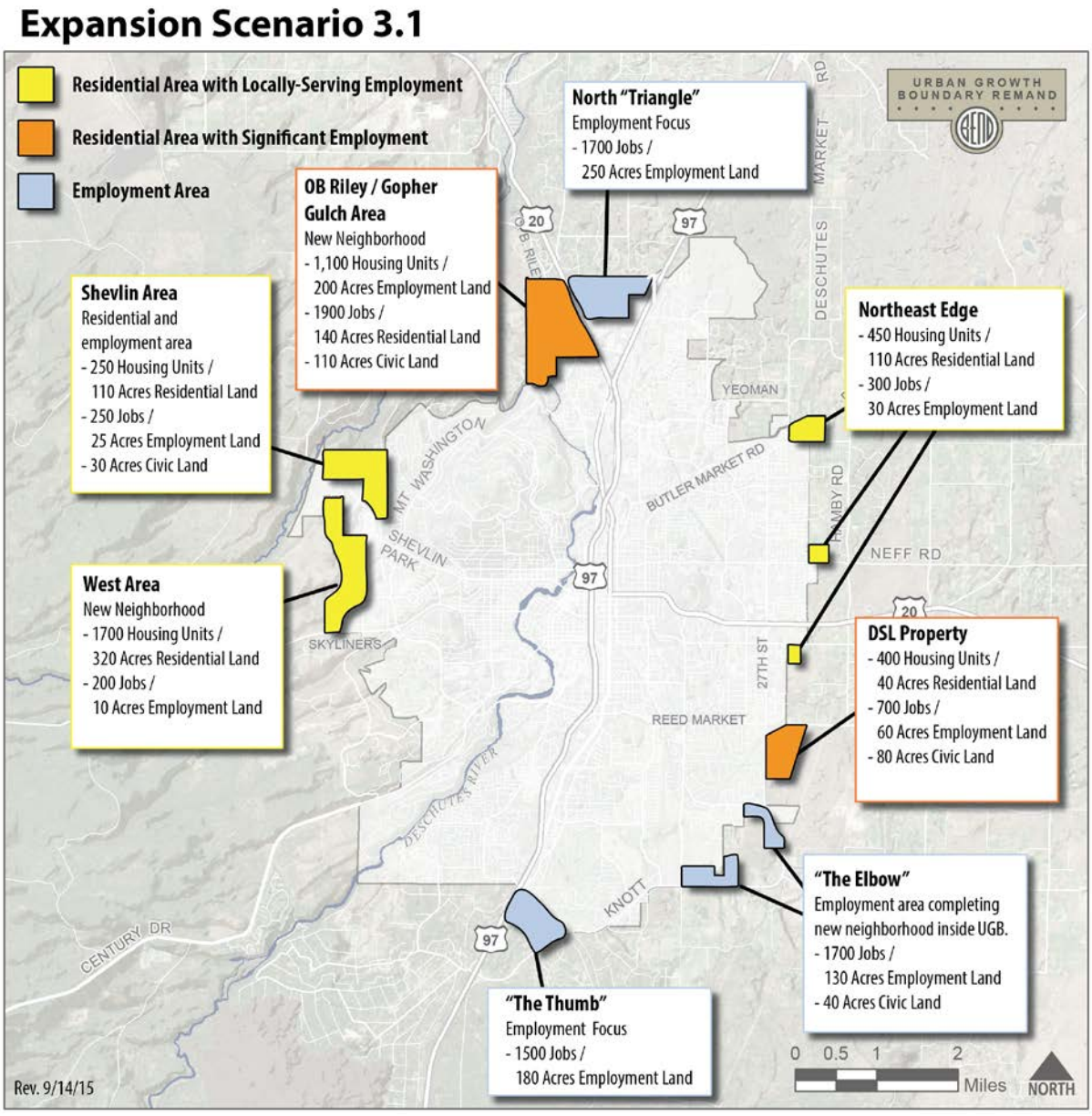
Scenario 2.1

Scenario 2.1 focuses on creating new "complete communities" with a broad mix of uses in all quadrants of the City. Nearly all expansion areas include housing, employment areas, shopping/services, and schools and parks. This scenario fully develops “The Elbow” and the DSL site as complete communities. It incorporates housing along with employment in the North “Triangle" and “The Thumb”, and some industrial/professional office in the West Area along with residential. The OB Riley area is employment-focused, with a potential large lot industrial site.



Scenario 3.1

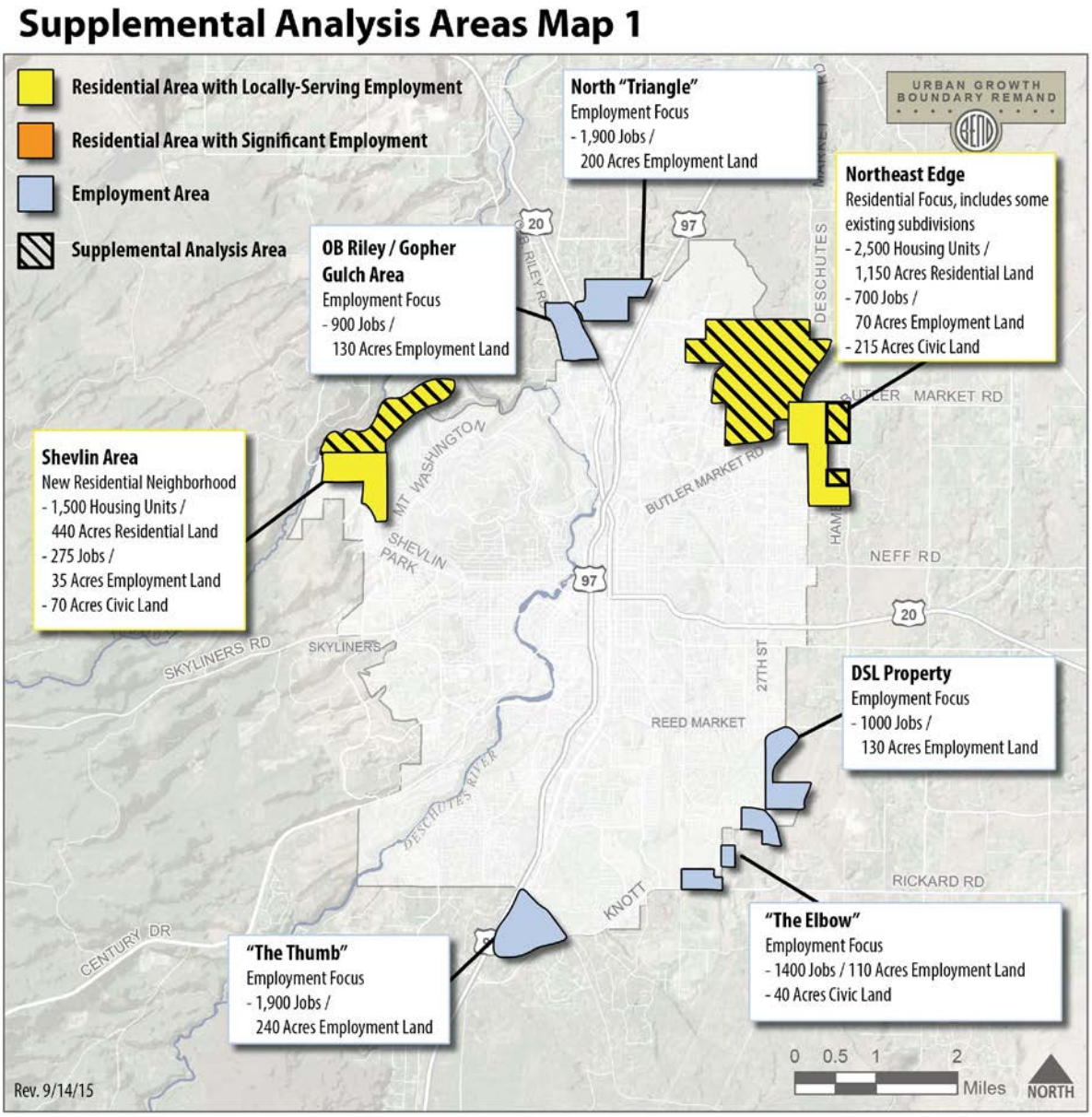
Scenario 3.1 focuses a larger amount of expansion to the north and west of the city. It includes a relatively large area along OB Riley adjacent to Gopher Gulch with a mix of employment and residential uses and a relatively large, mostly residential expansion in the West Area and the southern part of the Shevlin area. Only portions of the DSL Property, “The Elbow” and “The Thumb” are included. The “North Triangle” is employment focused, including a potential large lot industrial site.



Supplemental Analysis Maps

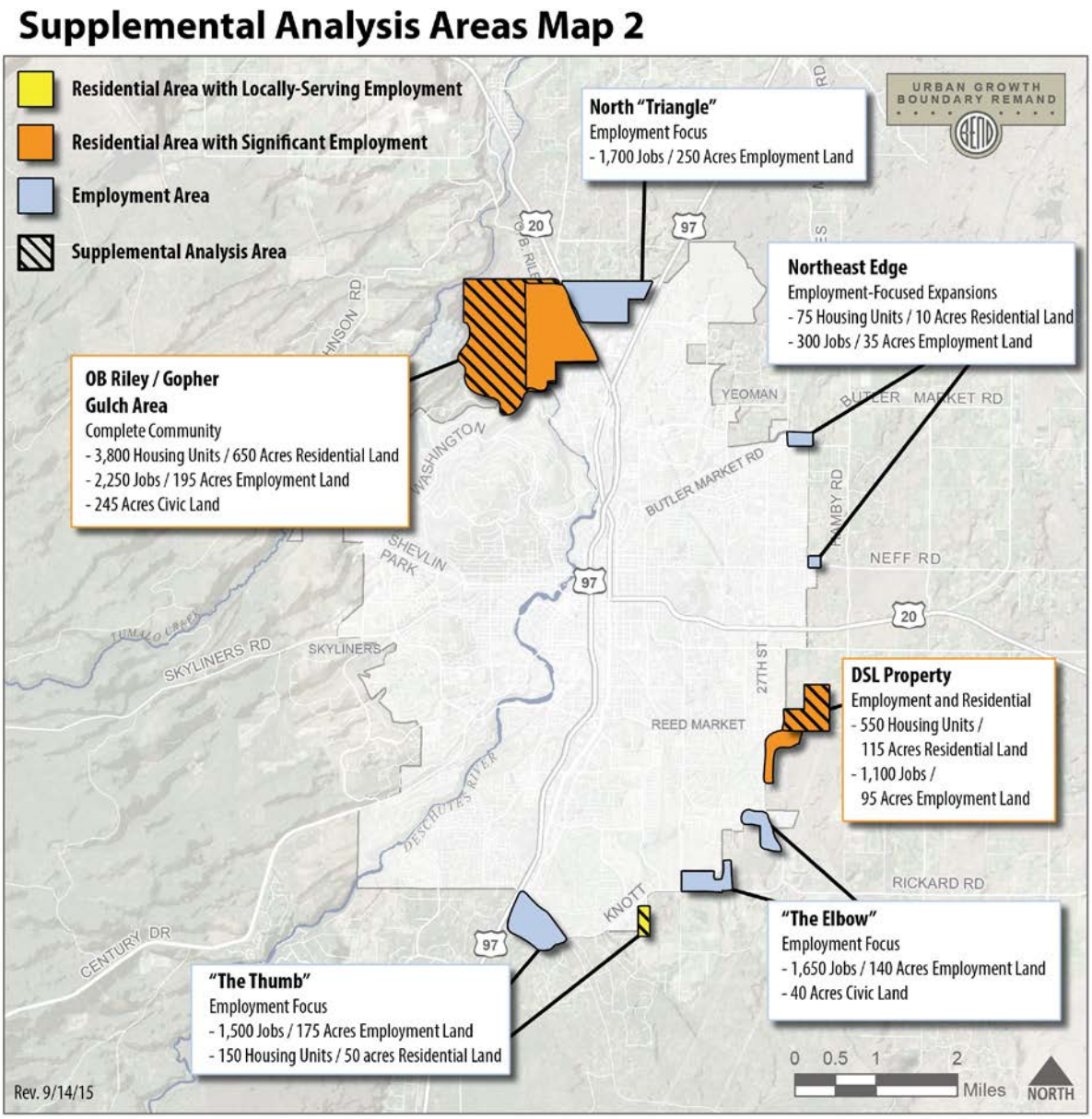
Supplemental Analysis Area Map 1

SAAM-1 is designed to test the greatest residential growth in the Shevlin Area and in the Northeast Edge. Existing subdivisions in the Northeast Edge are included; these are expected to experience only a modest amount of infill after annexation. To meet the remaining growth needs, SAAM-1 retains employment growth in the north, south, and southeast.



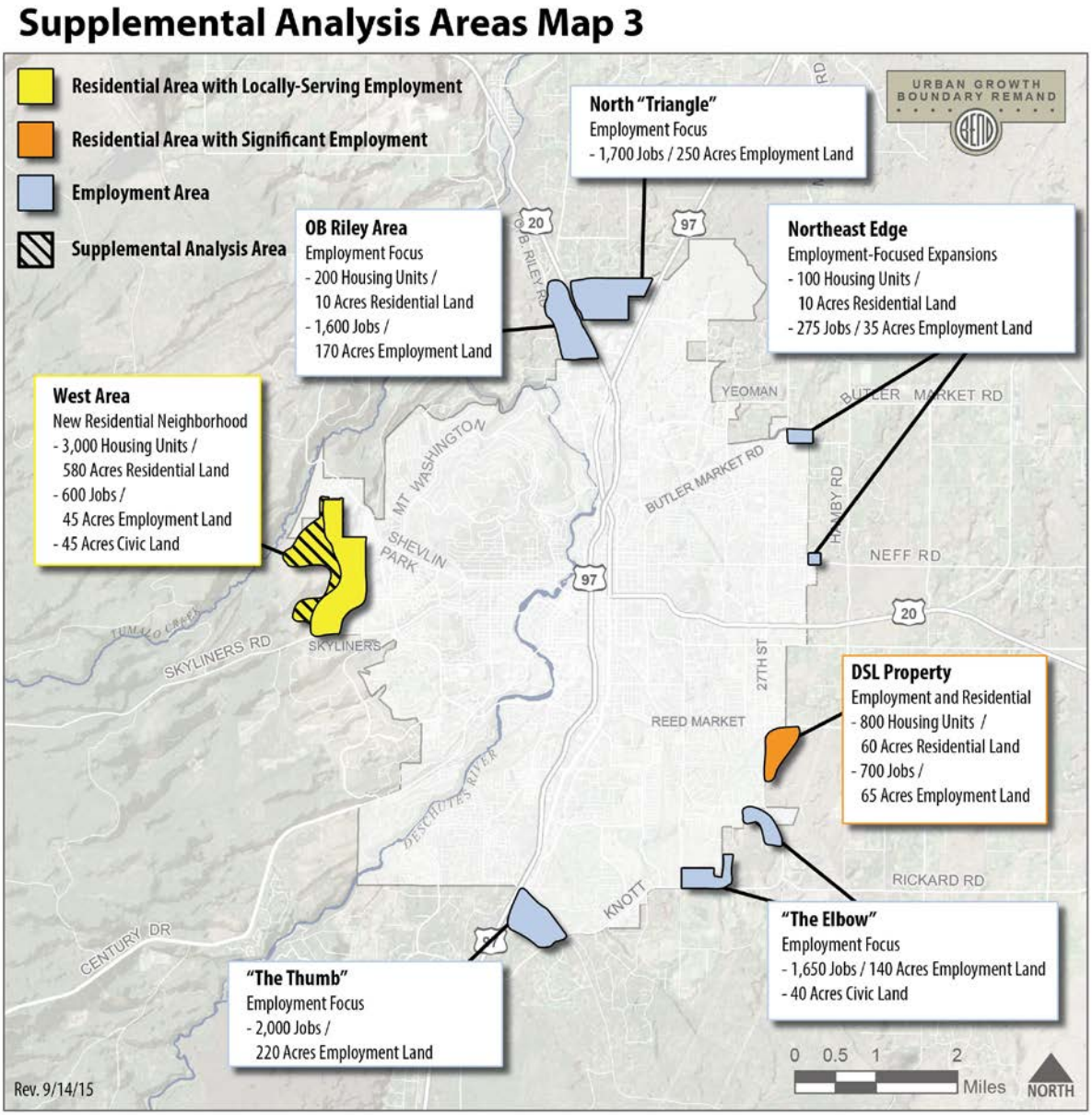
Supplemental Analysis Area Map 2

SAAM-2 is designed to test a large new residential neighborhood in the Gopher Gulch area, which accommodates nearly all of Bend's housing growth through the planning horizon. Remaining housing growth is accommodated in pockets of land along Stevens Rd. in the Southeast and Woodside Rd. in the South. Employment growth is located along the highways and in the Southeast.



Supplemental Analysis Area Map 3

SAAM-3 is designed to test full buildout of the West Area, which accommodates most of Bend's housing growth through the planning horizon. (Some additional residential growth is located in the DSL property to meet the remaining growth projections.) Employment growth occurs in the north, south, and southeast.



LEGAL FOUNDATION AND CRITERIA FOR CREATING THE PREFERRED SCENARIO

State Statutes and Administrative Rules

The UGB is a key component of Oregon's land use planning program. Guidance and rules related to management of a UGB are provided in Statewide Planning Goal 14; Oregon Administrative Rule 660, Division 24; and in Oregon Revised Statutes (ORS) 197.298. The requirements that are most relevant to the task of evaluating UGB expansion alternatives are summarized in brief below.[4]

In considering locations for UGB expansions, local governments must determine which land to add by evaluating alternative boundary locations based on four priority categories of rural land (land outside UGBs) identified in ORS 197.298.[5] The Bend UGB alternatives analysis is only considering land in the same priority category (exception lands)[6]. To choose among lands in the same priority category, local governments must consider and balance four factors listed in Goal 14:

1. Efficient accommodation of identified land needs;
2. Orderly and economic provision of public facilities and services;
3. Comparative environmental, energy, economic and social consequences; and
4. Compatibility of the proposed urban uses with nearby agricultural and forest activities occurring on farm and forest land outside the UGB.[7]

The Goal 14 administrative rule clearly directs how the four factors should be applied: "The boundary location factors of Goal 14 are not independent criteria. When the factors are applied to compare alternative boundary locations and to determine the UGB location, a local government must show that all the factors were considered and balanced."[8] The "relative costs, advantages and disadvantages of alternative UGB expansion areas with respect to the provision of public facilities and services" must also be evaluated and compared.[9]

---

[4] It is worth noting that the state requires local governments to demonstrate need and that needs cannot reasonably be accommodated on land already inside the urban growth boundary prior to expanding the UGB; complying with these requirements sets the amount and type of growth that the city must accommodate outside the UGB.

[5] Goal 14: OAR 660-015-0000(14), effective April 28, 2006; and OAR 660-024-0060(1), effective April 16, 2009.

[6] In Bend's situation, all urban area reserve lands on the Bend Area General Plan, and rural residential exception lands on the Deschutes County Comprehensive Plan, are Priority 2 lands under ORS 197.298.

[7] ORS 197.298, effective 1999; and OAR 660-024-0060, effective April 16, 2009.

[8] OAR 660-024-0060(3), effective April 16, 2009.

[9] OAR 660-024-0060(8), effective April 16, 2009.

In general, the city has a great deal of flexibility in deciding *how* to consider and balance the location factors of Goal 14 in the evaluation of UGB alternatives within a given priority category. In other words, state law and the rules do not prescribe how and whether to weight specific factors (such as orderly and economic provision of public facilities and services); or what should be included in the consideration of comparative environmental, energy, economic and social consequences. The city has an opportunity to consider and balance the factors based on community goals and priorities. This analysis links the Project Goals to the Goal 14 Factors, as discussed under "Overview of Evaluation" on page 17.

Remand Considerations

The Remand[10] includes numerous issues and directives relating to the methodology for identifying a proposed UGB expansion. In brief, the Remand requires the city to:

- analyze the relative costs of lands in the same priority category, rather than aggregating its analysis into subareas without regard to the priorities;
- evaluate the expansion area where Goal 5 resources are identified and evaluate them for significance and possible protection; the city may use the county's Goal 5 inventory as a starting point, but it must also evaluate other information and make its own determination of significance;
- analyze the costs of providing transportation facilities to serve individual areas, including any extraordinary costs related to overcoming topographic barriers or rights of way; and
- comply with state rules on reducing reliance on the automobile and vehicle miles traveled (VMT).

The UGB Expansion Scenarios evaluated in this report are about one-quarter the size of the 8,462-acre expansion proposed in 2009. Unlike the 2009 proposal, only priority exception lands are being considered. Remand issues will be addressed in the findings, but the guidance in OAR 660-024-0060 (Boundary Location Alternatives Analysis) provides the more important legal foundation for the evaluation.

OVERVIEW OF EVALUATION

Linking the Evaluation to Criteria for Creating the Preferred Scenario

This evaluation report uses the following terms and hierarchy of considerations in the comparison, evaluation and balancing of Bend's UGB expansion alternatives.

- **Performance Measures** – Detailed measures for each Goal 14 factor: the factual base for the evaluation. Some performance measures are quantitative and others are qualitative.
- **Community Outcomes** – Eight intended outcomes that provide a way to "roll up" performance measures and state what Bend is trying to achieve with this UGB update.

[10] The November 2, 2010 order from the Land Conservation and Development Commission (LCDC) that partially acknowledged and partially remanded Bend's 2008 proposed UGB expansion is referred to as "the Remand".

They mirror the applicable Project Goals that were approved by the USC in September, 2014.

- **Goal 14 Factors** – Oregon's requirements for what must be considered and balanced (see above description).

The performance measures and community outcomes are described in more detail below, along with their relationship to the Goal 14 Factors.

Performance Measures

In Phase 1 of the project, the Boundary TAC defined an approach to evaluate lands surrounding Bend for their relative strengths and weaknesses according to State laws pertaining to UGB expansions. A set of "performance measures" was identified for each of the Goal 14 factors for the "Stage 4" evaluation of UGB Expansion Scenarios by the Boundary TAC, and approved by the USC. The project team has operationalized these, incorporated thinking relative to SAAMs, and made refinements to enhance and efficiently conduct the evaluation. Changes to the list of performance measures include:

- Elimination of measures that do not vary among the scenarios and also do not provide useful information at a subarea level (e.g. amount of development inside vs. outside the UGB);
- Refinements to better reflect what the evaluation tools reveal; and
- New measures to reflect new ideas and interests from the TAC, USC, and public (e.g. site suitability of areas identified for commercial uses).

The full list of performance measures that have been analyzed is on page 21.

Community Outcomes

In organizing the evaluation of the UGB Expansion Scenarios and SAAMs, the project team sought a way to link the evaluation to the Project Goals and to capture why certain performance measures are important to the community. To this end, the project team has identified "community outcomes" that group related performance measures under a given Goal 14 Factor and that connect to the Project Goals. For example, one of the Project Goals is a Balanced Transportation System. There are a number of performance measures (e.g. VMT, walk trips, and congestion) that provide information to help evaluate whether that goal is being met. The goal of a Balanced Transportation System is one consideration under Goal 14 Factor 2: orderly and economic provision of public facilities and services. The community outcomes are described below. The performance measures used to evaluate each Community Outcome and Goal 14 Factor are listed in Table 1.

Factor 1: Efficient accommodation of identified land needs

Complete Communities and Great Neighborhoods

The city's goal is that Bend has a variety of great neighborhoods that promote a sense of community and are well-designed, safe, walkable, and include local schools and parks, and that small neighborhood centers provide local shops, a mix of housing types, and community

gathering places. The UGB expansion areas have the potential to both offer new complete neighborhoods outside the existing UGB and to help complete existing communities inside the existing UGB by providing needed amenities, employment opportunities and access to goods and services adjacent to existing neighborhoods.

Efficient, Timely Growth

Compact development helps to limit sprawl and reduce the amount of land needed to accommodate the same amount of housing and employment growth. Timely growth refers to development "readiness," i.e. the likelihood of development in the near term, and the degree of certainty that development will be feasible within the 2028 planning horizon. This has emerged as a frequent consideration in TAC discussions, especially because a portion of the 20-year planning horizon has already passed.

Factor 2: Orderly and economic provision of public facilities and services

Balanced Transportation System

The city's goal is that Bend's balanced transportation system incorporates an improved, well-connected system of facilities for walking, bicycling, and public transit, while also providing a reliable system for drivers, and that the transportation system emphasizes safety and convenience for users of all types and ages.

Cost-Effective Infrastructure

The city's goal is to plan and build water, wastewater, storm water, transportation, and green infrastructure in a cost-effective way that supports other project goals. Efficient use of existing and planned infrastructure is a top priority.

Factor 3: Comparative environmental, social, economic and energy consequences (ESEE)

Quality Natural Environment (Environmental and Energy Consequences)

The city's goal is that, as Bend grows, it preserves and enhances natural areas and wildlife habitat and also provides access to nature by enhancing its network of parks, trails, greenbelts, recreational facilities, and scenic views inside and outside the city. Wildfire risk management is also a key consideration. The city will take a balanced approach to environmental protection and building a great city. Growth choices can also affect resource consumption (e.g. energy and water) and greenhouse gas emissions, all of which are local as well as global issues.

Housing Options and Affordability (Social Consequences)

The city's goal is that Bend residents have access to a variety of high quality housing options, including housing affordable to people with a range of incomes and housing suitable to seniors, families, people with special needs, and others. Housing affordability has emerged as a key concern of the Residential TAC and one of the important reasons behind the need for additional housing and the need to shift the housing mix to provide more affordable options that better match the income profile of existing residents and the projected demographic trends affecting the local housing market.

Strong Diverse Economy (Economic Consequences)

Bend needs a good supply of serviced land planned for employment growth to support the City's economic development goals, provide a range of diverse jobs and industries, and support innovation. Employment areas, large and small, should have excellent transportation access. Areas identified for commercial and industrial development must be suitable for those uses and attractive to the types of businesses anticipated to locate there. In addition, areas for employment growth will need adequate infrastructure to support their development.

Factor 4: Compatibility of proposed urban uses with nearby agricultural and forest activities occurring on farm and forest land outside the UGB

Compatibility with Farms and Forests

Protection of farms and forests from impacts of development is a key tenet of the Oregon land use system. As Bend expands, it is important to ensure that development in expansion areas will be compatible with nearby farm and forest practices so that those uses remain viable.

Combining Performance Measures

As would be expected, the evaluation results indicate different types of outcomes for the performance measures. Some of the performance measures showed little variation among the scenarios. Others capture advantages or disadvantages that are easily modified through implementation (e.g. location of a park or school). Others showed relatively wide differences between the scenarios. Table 1 identifies which performance measures the project team has identified as most and least important (relative to others within the same Community Outcome) and a rationale for why the team recommends they be given greater consideration in reaching a decision on the preferred UGB. The broad categories of reasons to give one performance measure more consideration than another include: (1) the significance of the differences among alternatives, (2) the magnitude of the advantage or disadvantage identified by the performance measure, and (3) how easily it could be improved through refinements to the arrangement of land uses within one or more expansion areas.

The Difference-Makers

Stepping back from the roll-up to the Community Outcome level, there are a handful of performance measures that identify truly significant differences between the alternatives – differences that will meaningfully affect the community in 2028 and/or that are critical to meeting the legal requirements for this UGB expansion. These "difference makers" include total cost of transportation improvements, efficiency of additional sanitary sewer improvements required, residential land efficiency, affordability, and VMT. They are identified as "Very High" relative importance in Table 1, indicating their importance beyond a single community outcome. Additional performance measures that are especially important at the subarea level include development in wildlife areas and adjacent to riparian areas, wildfire hazard, proximity to farms and forests, irrigation district impacts, suitability for commercial and industrial uses, and per acre costs for needed infrastructure extensions (framework roads and sewer lines).

Table 1: Goal 14 Factors, Community Outcomes, and Performance Measures

Goal 14 Factor	Community Outcome	Performance Measures	Relative Importance[11]	Rationale
Factor 1: Efficient accommodation of identified land needs	Complete Communities and Great Neighborhoods	Housing units within walking distance of schools	Moderate	Some differentiation among scenarios, but relatively easy to refine potential future school locations to improve walk access to schools (and also better match the School District's input on where they hope to provide future schools).
		Housing units within walking distance of parks and trails	Low	Little differentiation among the alternatives. Most of the existing city and most of the expansion areas have excellent access to parks; there are few residential or mixed use areas that do not have at least one park or trail within walking distance.
		Housing units within walking distance of commercial services	High	The hardest performance measure of this group to improve through refinement of land uses. This measure showed meaningful variations among the scenarios.
		Jobs/housing balance (by subarea)	Moderate	No meaningful variation at the scenario / SAAM level because all alternatives have roughly the same total housing and jobs. When evaluated by subarea, a greater degree of jobs/housing balance may make it possible for people to live and work in the same neighborhood, potentially reducing VMT.
		Opportunities for master planning	Moderate	Large properties that will be required to undergo master planning offer the potential for greater input from the city in the ultimate design of the new development; however, the master planning process does add time and expense to development.

[11] Relative importance is relative to other performance measures within a given Community Outcome. Weighting of Community Outcomes against one another may be assigned at a later time based on community, TAC and/or USC input, but has not been applied at this time. However, performance measures identified as "Very High" importance are considered "difference makers" with importance beyond a single community outcome.

Goal 14 Factor	Community Outcome	Performance Measures	Relative Importance[11]	Rationale
	Efficient, Timely Growth	Total acres of expansion	Low	Some of the variation among alternatives is attributable to the efficiency of the land included (based on topography and existing development patterns) and is not easy to change for a given area, but some of the variability is a function of the number of schools or parks included or the need to include an entire area for testing and are not indicative of efficiency of the land.
		Gross density for new housing	Very High	Gross residential densities vary among the alternatives, and factor in land with existing development that is assumed not to redevelop, making this measure a good indicator of residential efficiency, a key issue for compliance with state law and a key indicator of Bend's degree of sprawl.
		Net density for new jobs	Low	Little to no variation among the alternatives. More a function of nuances in the type of employment uses assumed than the efficiency of the land itself.
		Parcels under 20 acres and contiguous to the existing UGB	Moderate	Some variation among alternatives. Not a perfect measure of development readiness, but the best available measure of this.
		Vacant vs. developed land included	Low	Development on vacant land may be more likely to occur in a shorter amount of time because there are no existing land uses generating income or providing value for the property owner, but this is not always the case.
Factor 2: Orderly and economic provision of	Balanced Transportation	Total VMT per capita	Very High	Used for determining compliance with a key provision of the Transportation Planning Rule (TPR).[12] Shows meaningful variation among the alternatives.

[12] Oregon Administrative Rule 660, Division 12, Section 0065.

Goal 14 Factor	Community Outcome	Performance Measures	Relative Importance[11]	Rationale
public facilities and services	System	Average trip length	Moderate	Shows meaningful variation among the alternatives; highly correlated with VMT, but informative at the subarea level.
		Household VMT per capita	Moderate	Highly correlated with Total VMT per capita; captures only travel to and from home.
		Congestion	High	Some areas rely heavily on congested corridors where increases in capacity either costly or are difficult or inappropriate. Increasing congestion on state highways is a primary issue both because of the impacts it can cause those who rely on the highways and because of regulations that require mitigation (which may be expensive, unlikely to be funded, and/or complex) if a change in land use will worsen congestion on a road that already does not meet standards.
		Walk/bike safety and connectivity	Moderate	Certain subareas have connectivity issues for integrating with the surrounding system that are difficult to overcome.
		System connectivity & progression of system hierarchy	Moderate	Certain subareas have connectivity and/or access issues that are difficult to overcome.
		Mode split	Moderate	Little variation at the full Scenario / SAAM level, though small differences in percentages can have a relatively large impact on the transportation system. Also informative at the subarea level.
		Average weekly walk trips per capita	Low	Correlated with mode split. Little variation at the Scenario / SAAM level. More informative at a subarea level.
		Proximity to transit corridors	Low	Minimal variation at the Scenario / SAAM level; more informative at the subarea level.

Goal 14 Factor	Community Outcome	Performance Measures	Relative Importance[11]	Rationale
		Housing & jobs within ¼ mile of transit corridors	Low	Minimal variation at the Scenario / SAAM level, and since transit routing can and should be modified to respond to the final proposed UGB expansion, there is some ability to improve transit access for alternatives that scored lower.
		Intersection density	Moderate	Intersection density is an influential predictor of walking, and impacts VMT and bicycling as well. This performance measure is based on both existing intersection density and projected future intersection density (based on assumptions built into the development types), which makes it more hypothetical and somewhat less robust in the expansion areas.
	Cost-Effective Infrastructure	Total cost of transportation improvements required	Very High	Transportation costs are generally the single biggest expense associated with new development. Funding sources to cover anything not eligible for System Development Charges (SDCs) are limited and uncertain unless born directly by developers.
		Cost per acre of transportation improvements	Moderate	Rewards larger, less efficient expansions at the full scenario / SAAM level; more useful at the subarea level.
		New linear miles of local streets	Low	Based on assumptions built into the development types; city regulations and topography will influence what is ultimately built beyond what is captured in the development type assumptions.
		Efficiency of additional sewer system improvements required	Very High	Captures how well each alternative makes use of infrastructure that will be needed to serve growth inside the UGB and/or that can serve multiple expansion areas and how many improvements are needed that are not aligned with the preferred long-range system identified through optimization.

Goal 14 Factor	Community Outcome	Performance Measures	Relative Importance[11]	Rationale
		Initial capital cost of sewer system improvements required	Moderate	A financing strategy for sewer has not be established yet; however, some or all of the capital costs identified may affect rate-payers. The city has recently increased rates to pay for upgrades needed to serve the existing UGB, so rate-payers will be sensitive to additional increases in rates, which makes keeping costs low important. Long-term improvement strategies typically are the most cost-effective, but this measure does not include life-cycle or operations and maintenance costs.
		Initial capital cost of sewer system improvements per acre of development	Moderate	Primarily relevant at the subarea level. Certain sub-areas have fixed costs to extend service, so when smaller areas are identified for development, the costs can become disproportionate to the area served.
		Water system improvements required in city water service area	Low	This measure addresses only areas within the city's water service area. Some areas are more challenging to upgrade capacity than others, but differences are fairly minor and no major issues were discovered.
		Capacity of Avion Water system	N/A	Comments have been sought but have not yet been received.
		Total impervious area for new development	Low	Little meaningful variation at the full Scenario / SAAM level. Stormwater costs are not significant relative to other types of infrastructure.
		Acres of new development within Drinking Water Protection Areas (DWPA)	Low	DWPA can be protected through regulations; the primary concern is industrial uses.

Goal 14 Factor	Community Outcome	Performance Measures	Relative Importance[11]	Rationale
		Acres of new development with welded tuff geology	Low	While geology is an important factor in the cost of building new infrastructure, the available spatial data is not at a detailed enough resolution to allow for accurate prediction of where excavation costs will be affected.
Factor 3: Comparative environmental, social, economic and energy consequences (ESEE)	Quality Natural Environment (Environmental and Energy Consequences)	Development in wildlife areas	Moderate	The ODFW mapped wildlife winter range is broad and includes the existing city. The areas where ODFW indicated that elk and deer are more likely to congregate are, by their nature, imprecise; however, they are important to consider.
		Linear distance of riparian areas adjacent to development	Moderate	Riparian areas will be protected with buffers / setbacks and other regulations (such as Waterway Overlay Zone) that will limit impacts from adjacent development.
		Wildfire hazard	High	Wildfire risk is an important issue for the Bend area. Vegetation management can reduce wildfire hazard, and construction mitigation measures are possible in most areas. However, there are limited areas where steep slopes make certain types of mitigation infeasible.
		Greenhouse gas emissions	Low	Highly correlated with VMT and housing mix. The majority of variation among scenarios / SAAMs is due to transportation emissions.
		Energy Use	Low	Little variation among Scenarios / SAAMs; highly correlated with housing mix and patterns match closely with greenhouse gas emissions. Some variation at the Scenario / SAAM level may be due to nuances in the type of land uses assumed rather than the characteristics of the area itself.

Goal 14 Factor	Community Outcome	Performance Measures	Relative Importance[11]	Rationale
		Average Water Consumption per Household	Low	Little variation among Scenarios / SAAMs; highly correlated with housing mix. Some variation at the Scenario / SAAM level may be due to nuances in the type of land uses assumed rather than the characteristics of the area itself.
	Housing Options and Affordability (Social Consequences)	Average cost of new single family housing	Very High	Affordability is a key issue for Bend and for this UGB expansion. Enough variation at the scenario level for meaningful distinctions.
		Housing mix of new housing (subarea balance)	Low	Having a balanced mix of housing in most or all subareas helps prevent income segregation at the neighborhood level, but can fairly easily be adjusted through adjustments to land use assumptions.
	Strong Diverse Economy (Economic Consequences)	Site suitability for large lot industrial use	Low	Identifying an appropriate site for a large lot industrial use is important; however, the large lot site can fairly easily be incorporated into any of the scenarios, so it is not a differentiating measure.
		Site suitability for areas identified for industrial uses	High	This is important at a subarea level and for the creation of the preferred scenario.
		Site suitability for areas identified for commercial uses	High	This is important at a subarea level and for the creation of the preferred scenario.
Factor 4: Compatibility of proposed urban uses with nearby agricultural and	Compatibility with Farms and Forests	Farm practices & high value farm land adjacent to expansion areas	High	Protection of farms from impacts of development is a key tenet of the Oregon land use system, and greater distances betwee urbanizing areas and farms and forests reduces legal risk due to fewer or no compatibility issues. Some variation at the Scenario / SAAM level; more relevant at the subarea level.

Goal 14 Factor	Community Outcome	Performance Measures	Relative Importance[11]	Rationale
forest activities occurring on farm and forest land outside the UGB		Impact to irrigation districts	Moderate	Meaningful variation among alternatives, particularly at the subarea level. Irrigation districts are important to the agricultural economy of Central Oregon. Loss of water rights due to development will have a financial impact on the Irrigation Districts and possibly impact the delivery of water to agricultural operations that are not directly affected by the boundary expansion.
		Designated forest land adjacent to expansion areas	Moderate	Greater distances beween urbanizing landuses and forest operations helps reduce concerns about compatibility and associated legal rise. However, very little area is proximate to designated forest land (several subareas are located more than one mile from the closest forest lands). Adjacent forest land is generally managed for recreation rather than timber harvest, so there are fewer compatibility concerns with adjacent development.

SCENARIO EVALUATION SUMMARY

The following evaluation summary rolls up the results from each of the performance measures to conclusions at the community outcome level, answering the question: How well does this Scenario (or SAAM) achieve this Community Outcome? This section offers a summary and synthesis of the evaluation results; detailed data sheets are provided in Appendix B. A summary of the methodology and further description of the evaluation for each performance measure are provided in Appendix D.

To Weight, or not to Weight?

In Phase 1, the Boundary TAC and USC directed the team to use an "unweighted" (or, more precisely, an equally-weighted) approach to combining results from different indicators evaluated in Stage 2 to identify overall performance of different areas. For Stage 4 scenario evaluation, neither the Boundary TAC nor the USC provided specific guidance on how the performance measures should be weighed and balanced against one another.

To help test the sensitivity of individual performance measures on the ranking of the scenarios, the project team has analyzed the performance measures and has evaluated overall results using both an equally-weighted and an unequally-weighted approach, including several variations of weighting. These are shown in Appendix C. Using or not using weighting and the degree of weighting had minimal impact on the overall results. The top performing scenarios were found to rank in the same order regardless of whether and how the performance measures are weighted, given the degree of importance assigned to each (as captured in Table 1).

The discussion that follows takes a "blended" approach on weighting – where the use of weighting matters, that is noted in the discussion. The discussion was written after considering the results from both sides (both equally-weighted and unequally-weighted).

It is important to note that the update of Bend's UGB is not intended to be a numerical exercise and points-based decision. Rather, it is intended to be a determination of which choices, on balance, best meet the Goal 14 factors and Project Goals (as expressed in the Community Outcomes). This requires both a quantitative and a qualitative evaluation and set of decisions.

Factor 1: Efficient accommodation of identified land needs

Complete Communities and Great Neighborhoods

Top Tier

Scenario 2.1 performed the best overall on this Community Outcome, particularly on access to schools and commercial services, because it was created with the intention of providing for complete communities (neighborhoods with a mix of housing, jobs, commercial services, parks, and schools) in all quadrants of the city.

Middle Tier

Scenario 3.1 and, to a lesser extent, **Scenario 1.2** and **SAAM-2**, also performed well. These alternatives all have some subareas that are fairly complete, and others that are less so. Scenario 3.1 performed well on walk access to both schools and commercial; nearly all new

residential expansion areas in each include at least a small commercial center and many include a school. Scenario 3.1 did the best at increasing the walk access of housing inside the existing UGB to commercial services. This appears to be due to the placement of commercial areas in a few key locations. For example, within "The Thumb", placing commercial adjacent to China Hat Road provides walkable access to neighborhoods at the southern edge of the city that currently lack it. In the Shevlin Area, placing commercial along Shevlin Park Road provides walk access to portions of Awbrey Butte.

Bottom Tier

SAAM-1 and **SAAM-3** had mixed results on this Community Outcome, with performance below that of the other alternatives. In part, this is because they include one or two large, primarily residential expansion areas and fragmented employment areas elsewhere. SAAM-1 was the only alternative that did not perform well on park/trail access, because the northernmost extent of the Northeast Edge would not have walkable park/trail access. SAAM-3 performed poorly on school and commercial access, because of the large amount of new housing in the outer portion of the west area, away from existing and future commercial uses and schools. Because of the nature of the areas included in SAAM-1 and SAAM-3, it would be difficult to improve their performance on these measures – there are few or no suitable locations for additional schools, parks, or commercial areas in either one.

Efficient, Timely Growth

Top Tier

Scenario 1.2 performed the best overall on this Community Outcome, with high ratings across the board, because it provides a mix of large, vacant properties and smaller parcels contiguous to the existing UGB. **Scenarios 2.1** and **SAAM-3** also performed well on this Community Outcome. Both do well on measures of density and efficiency because of their reliance on larger, vacant parcels, but both have a lower percentage of land under 20 acres and contiguous to the existing UGB.

Middle Tier

SAAM-2 and **Scenario 3.1** performed moderately well, though not as well as the others mentioned above. This is in part because lower residential densities were assumed in parts of the West Area and the Shevlin Area due to topography and the possible need for cluster development in order to allow for natural resource/wildlife habitat protection. Both also include a number of developed parcels between OB Riley Road and Gopher Gulch, which are less efficient to develop than vacant parcels.

Bottom Tier

SAAM-1 performed the worst on this Community Outcome, because the outer Northeast Edge and the Shevlin area both had lower residential densities; the outer Northeast edge includes quite a few developed properties, particularly in the subdivisions south of Juniper Ridge; and, while the parcels are smaller in the Northeast Edge, the outer portion is not contiguous to the current UGB.

Factor 2: Orderly and economic provision of public facilities and services

Balanced Transportation System

Top Tier

Across the various performance measures included in this Community Outcome, **Scenario 2.1** performed the best overall, with the lowest VMT per capita, the best overall walk/bike safety and connectivity, and the best system connectivity and progression of system hierarchy.

Middle Tier

Scenario 1.2, **Scenario 3.1**, **SAAM-1** and **SAAM-3** all performed moderately well – the relative ranking among these depends on which measures are given most importance, although differences are subtle. Scenario 1.2, SAAM-1 and SAAM-3 do fairly well on congestion, with relatively low overall congestion; they also do fairly well on walk/bike safety and connectivity, with no major barriers identified. It is worth nothing that SAAM-1 does poorly on VMT, but well on congestion (because there is relatively little existing congestion near the Shevlin area) and walk/bike safety and connectivity (because including the full extent of the Shevlin area provides for better connections to the existing road and trail system).

Bottom Tier

SAAM-2 does the worst on this Community Outcome overall, with poor performance on VMT, mode split, average trip length, and a number of other factors. It also performs less well on walk/bike safety and connectivity because the river forms a barrier with connections to the west.

Cost-Effective Infrastructure

Top Tier

Scenario 2.1 performed the best overall on this Community Outcome, in particular because of the low cost of transportation improvements required (low cost for connecting growth areas and low cost for projects to increase capacity). It also performed fair to well on measures of sewer system cost-effectiveness as well as new linear miles of local streets, water system improvements within the Bend water service area, and total impervious area for new development. It had only one negative rating, on new development within a Drinking Water Protection Area, because of the amount of development in The Thumb.

Middle Tier

SAAM-2 performed somewhat poorly on sewer, though it was not the worst performer; it takes advantage of major trunk infrastructure to the north but the DSL property and The Elbow are not cost-effective due to small area included and fixed costs to serve those areas. It had moderate transportation costs, with low costs for connecting growth areas but high costs for required capacity improvements (including the need to widen US 20 from Robal Rd to 3rd Street). It's only other drawback is having a relatively high proportion of development in areas with potentially challenging geology (welded tuff).

Bottom Tier

Scenarios 1.2 and **3.1, SAAM-1** and **SAAM-3** all had at least one significant drawback on transportation and/or sewer infrastructure, though most had mixed results overall. **Scenario 3.1**

performed acceptably across most performance measures in this group, but performed poorly on transportation costs due to high cost for connecting growth areas and the need to widen US 20 from Robal Rd to 3rd Street. **Scenario 1.2** also performed poorly on transportation infrastructure, due to high cost for connecting expansion areas and high cost for capacity improvements, but performed the best on sewer infrastructure, because it focuses more growth on the Northeast edge, which is efficient for sewer service. **SAAM-3** had high costs for sewer improvements because of the need for a new regional pump station to serve the northwest portion of the West Area, but low costs for transportation improvements due to low cost for connecting growth areas and moderate cost for congestion mitigations (including the need to widen US 20 from Robal Rd to 3rd Street). SAAM-3 also has the greatest amount of development in areas with welded tuff geology, which can add to the cost of excavation. **SAAM-1** had high costs for sewer because of the need for a new regional pump station to serve the Shevlin Area (though it does take advantage of cost-effective sewer in the Northeast edge), and also had relatively high transportation costs due to high costs for connecting expansion areas as well as high costs for intersection improvements.

Factor 3: Comparative environmental, social, economic and energy consequences (ESEE)

Quality Natural Environment (Environmental and Energy Consequences)

Top Tier

Scenario 1.2 and **Scenario 2.1** are rated fair to very good across all performance measures under this Community Outcome. Neither has development adjacent to riparian areas, and both have limited total expansion in elk and deer range, with no expansion into ODFW areas of potential concern. Neither has features that prevent mitigation of wildfire hazard in any expansion areas. Both had reasonably good performance on energy consumption, greenhouse gas, and water consumption measures as well.

Middle Tier

Scenario 3.1, **SAAM-2** and **SAAM-3** had mixed results. SAAM-2 performed fair to well on all measures except greenhouse gas emissions and energy use. Scenario 3.1 rated poorly on development in wildlife areas and wildfire hazard due to the inclusion of the Shevlin area, which is both an ODFW area of potential concern and has topographic features that make it difficult to fully mitigate wildfire risk. SAAM-3 rated poorly on development in wildlife areas because so much growth was focused in the West area, but performed fairly or well on other performance measures.

Bottom Tier

SAAM-1 performed poorly on many of the performance measures, and did not perform well on any. It rated very low on development in wildlife areas and lower also on wildfire hazard because it includes the full Shevlin area (see reasons noted above). It also rated lower than other scenarios on development adjacent to riparian areas because of the inclusion of the upper portion of the Shevlin Area.

Housing Options and Affordability (Social Consequences)

Top Tier

Scenario 2.1 and **SAAM-1** performed the best on this Community Outcome, though there were only two performance measures. Scenario 2.1 had good housing mix in nearly all subareas and good housing affordability with significant housing growth in the southeast. SAAM-1 had good housing mix in both primary residential expansion areas and had moderately affordable housing due to the heavy expansion in the Northeast Edge.

Middle Tier

Scenario 1.2 performed well on affordability, but less well on housing mix, with most subareas somewhat imbalanced (too much single family or too little). **SAAM-2** performed well on housing mix, but less well on affordability, with growth focused on the northwestern side of the city.

Bottom Tier

Scenario 3.1 and **SAAM-3** performed poorly on affordability due to the heavy focus on the west side of the city. SAAM-3 also did not perform well on housing mix because there were small residual areas of almost exclusively multifamily housing.

Strong Diverse Economy (Economic Consequences)

Top Tier

Nearly all alternatives – **Scenario 1.2**, **Scenario 3.1**, **SAAM-1**, **SAAM-2**, and **SAAM-3** -- performed well or very well across all performance measures in this Community Outcome.

Middle Tier

Scenario 2.1 rated somewhat lower, because it places employment and commercial uses in more of the expansion areas (e.g. the West Area) where they are somewhat less well suited.

Factor 4: Compatibility of proposed urban uses with nearby agricultural and forest activities occurring on farm and forest land outside the UGB

Compatibility with Farms and Forests

Top Tier

Scenario 1.2 rated the highest on farm and forest compatibility because it affects the fewest irrigation district customers and has no forest land within a mile of any expansion area.

Middle Tier

Scenario 2.1, **SAAM-3**, and, to a lesser extent, **SAAM-1** also rated fair to good on this Community Outcome. SAAM-3 has less farm impacts but more forest adjacency than other alternatives. Scenario 2.1 and SAAM-1 both have moderate levels of farm impacts, moderate impacts to irrigation districts, and little to no forest land adjacency.

Bottom Tier

Scenario 3.1 and **SAAM-2** rated the lowest on farm and forest compatibility because they are proximate to the greatest number of working farms and also affect the greatest number of

irrigation district customers. Scenario 3.1 also has some forest land between a mile and a quarter-mile away from the expansion in the West Area.

Conclusions and Recommendation

Scenario 2.1 was in the "top tier" relative to other alternatives on nearly all community outcomes, and performs the best on balance of all the alternatives. Scenario 2.1 excels in Complete Communities and Great Neighborhoods and Housing Options and Affordability and does not have any significant weaknesses identified through the evaluation. Each of the other alternatives has at least one important weakness that was identified through the evaluation, as summarized in brief below.

- Scenario 1.2 performs poorly on cost-effective infrastructure, because heavy development in the Thumb triggers the need to widen Knott Road to three lanes.
- Scenario 3.1 performs poorly on cost-effective infrastructure, due to high transportation costs to connect growth areas and the need to widen US 20 from Robal Rd to 3rd Street. It also performs poorly on compatibility with farms and forests due to heavy impacts to Swalley Irrigation District in OB Riley / Gopher Gulch and forest proximity in the Shevlin Area and on Housing Options and Affordability because much of the residential development is focused on the west side of the city where land costs and housing prices are higher. It performs relatively poorly on Quality Natural Environment because including the Shevlin Area impacts wildlife areas, puts development in proximity to Tumalo Creek, and has topography that makes wildfire hazard difficult to mitigate.
- SAAM-1 performs poorly on multiple Community Outcomes. It performs poorly on Quality Natural Environment because including the full Shevlin Area impacts wildlife areas, puts development in proximity to Tumalo Creek has topography that makes wildfire hazard difficult to mitigate. It performs poorly on Cost-Effective Infrastructure because development of the full Shevlin Area requires a costly new regional pump station for sanitary sewer, and it also has fairly high cost for new roads connecting growth areas and high costs for intersection improvements. SAAM-1 also rated relatively poorly on Complete Communities and Great Neighborhoods and Efficient, Timely Growth because the outer extents of the Shevlin Area and Northeast Edge are not well-suited to higher-density housing and have less proximity to commercial services, schools, and/or parks.
- SAAM-2 performs poorly on Balanced Transportation System, due to the lack of connectivity to the existing UGB from the Gopher Gulch area and the distance to reach key destinations inside the current UGB. It also performs relatively poorly on Compatibility with Farms and Forests due to heavy impacts to Swalley Irrigation District and proximity to the greatest number of working farms.
- SAAM-3 performs relatively poorly on Housing Options and Affordability because all of the residential development is focused in the West Area, which is more expensive (as noted above), and on Cost-Effective Infrastructure because including the full West Area (particularly the northwest portion) requires a costly new regional pump station.

The project team recommends that the Boundary TAC consider Scenario 2.1 as the starting point for crafting the preferred UGB Expansion Scenario. As described in the next section, the subarea evaluation provides insights into potential modifications of Scenario 2.1 that will improve it and are recommended for inclusion in the hybrid.

SUBAREA ADVANTAGES, DISADVANTAGES AND TRADE-OFFS

This section provides a summary of findings from the evaluation on the advantages and disadvantages of each subarea (those that are either inherent to the geography or that do not vary appreciably between the alternatives) and the trade-offs associated with the various land use choices in each of the alternatives. Its purpose is to illuminate which options perform the best for each subarea in order to inform the creation of the hybrid and the refinement of the top-performing scenario.

North Triangle

General advantages and disadvantages

Advantages	Disadvantages
• cost-effective to serve with sewer because it requires only an incremental extension of the Northeast Interceptor, which is also required to serve the OB Riley / Gopher Gulch area • Relatively close to existing transit lines at the southern edge (but over a quarter mile) • no issues for water service • generally well-suited to commercial uses • not in Welded Tuff geologic area; • minimal overlap with Drinking Water Protection Areas (DWPAs) • not in Elk/Deer Range or Oregon Department of Fish and Wildlife (ODFW) Areas of Potential Concern • Wildfire hazard is somewhat lower than other potential expansion areas • no commercial farms nearby; no forest land within 1 mile	• more growth in this area contributes to congestion on US 97 and US 20 • High cost per acre for transportation connectivity improvements • some compatibility concerns for industrial uses with rural residential area to the north • potential for significant impacts to Swalley Irrigation District • large format retail south of Cooley road reduces attractiveness for residential use

Trade-offs of land use options

Three main choices were tested for this area:

1. Scenario 1.2 and SAAM-1: an all-employment expansion excluding the smaller parcels on the western edge
2. Scenario 2.1: a mixed-use expansion excluding the smaller parcels on the western edge
3. Scenario 3.1, SAAM-2, and SAAM-3: an all-employment expansion including the smaller parcels on the western edge, with a large-lot industrial site designation on the eastern side

The trade-offs associated with these choices are summarized below.

- Including the sliver on the west side (as in Scenario 3.1, SAAM 2 and SAAM 3) so that the future UGB reaches Old Bend-Redmond Highway allows for completing the collector framework, but brings in smaller, developed rural residential parcels that are less suitable for commercial and industrial uses. This choice also increases the impact on Swalley Irrigation District.
- Including residential development in this area (as in Scenario 2.1) improves access to commercial services, but creates a potential compatibility concern for the abutting industrial uses. Including residential also slightly reduces average trip lengths, but only slightly, and not as much as including more substantial residential in the OB Riley / Gopher Gulch area.
- The area has some strengths as a large lot industrial site, but also has potential compatibility issues and not ideal lot configuration.

Draft recommendations for the hybrid

- This area is important and suitable for employment uses; however, including residential and the sliver on the west side appear to have more disadvantages than advantages. Therefore, an employment-focused expansion that excludes the sliver on the west, like Scenario 1.2 and SAAM-1, would be a good starting point for this area.
- Refine the arrangement of land uses to minimize compatibility issues with residential areas to the north and west (e.g. Light Industrial or Industrial Park as a transition).
- Explore the possibility of extending the collector to connect to US-20 across the smaller parcels on the western edge if they are not brought into the UGB.

Northeast Edge

General advantages and disadvantages

Advantages	Disadvantages
• Mid-size (4- to 10-acre) parcels contiguous to the UGB offer potential for near-term development • Portions of the area have good proximity to existing/planned parks & trails • Majority of the area is cost-effective to serve with sewer because it relies on the Hamby alignment and eastern	• Connectivity to existing UGB limited except for major roads • Over a half mile from existing and planned transit • small parcel size and adjacent residential uses limit suitability for larger/heavier industrial uses • small parcel sizes limit opportunities for master planning

Advantages	Disadvantages
portion of the Northeast Interceptor, which are needed regardless of expansion scenario choice • locations adjacent to major roads are generally well-suited to commercial uses • locations adjacent to major roads are moderately suitable for small industrial uses • not in Welded Tuff geologic area; • minimal overlap with DWPAs • not in Elk/Deer Range or ODFW Areas of Potential Concern • Wildfire hazard is somewhat lower than most potential expansion areas • housing likely to be more affordable in this part of the city • no forest land within 1 mile	• Some proximity to commercial farms • South of Butler Market Road, the land use pattern precludes a continuous north-south street that would parallel Hamby Road

Trade-offs of land use options

The scenarios and SAAMs encompass four discrete land use choices for the Northeast Edge:

1. Scenario 1.2: Fairly large, mostly residential expansion including most of the exception land between Yeoman Road and Bear Creek Road with commercial nodes at major roads
2. Scenarios 2.1 and 3.1: Limited expansion in three locations near major roads, with commercial nodes and adjacent residential
3. SAAM-1: Very large, mostly residential expansion including most of the exception land between Juniper Ridge and Neff Road with commercial nodes at major roads
4. SAAM-2 and SAAM-3: Very limited expansion – just commercial nodes at major roads with a small multifamily component.

The trade-offs associated with these choices are summarized below.

- Including the large rural subdivision south of Juniper Ridge (as in SAAM-1) significantly increases the acreage required to accommodate the housing need, since there is limited capacity for growth in that area.
- Including the area north of Yeoman Road (the northeastern-most part of the subarea, as in SAAM-1) makes more use of the proposed Hamby interceptor, but adds housing in a location that does not have good access to schools, parks, trails, or commercial services; increases congestion on nearby arterial corridors; and impacts Swalley Irrigation District.

- Including more of the land between Butler Market Road and Neff Road (as in Scenario 1.2 and SAAM-1) makes more use of the proposed Hamby interceptor, but increases trip lengths and VMT because people must travel further to reach a main road and their destinations, and local connectivity is not conducive to direct and convenient routes for local trips.
- Including the land near Bear Creek road (as in all but SAAM-2 and SAAM-3) increases sewer costs because that area would require an interim lift station, and also includes a small area of the 500' buffer for Drinking Water Protection Areas.

Draft recommendations for the hybrid

- Amount of expansion that falls in between Scenarios 2.1 / 3.1 and Scenario 1.2, because most of this area is highly efficient for sewer, and performs well for transportation if largely focused where connectivity is good and around the major roads connecting towards the center of Bend (e.g., Butler Market Road). .Include somewhat more of the area near Butler Market Road and/or Neff Road than in Scenarios 2.1 and 3.1, but less than in Scenario 1.2 to try to balance these trade-offs.
- Exclude the Bear Creek Road area, because it is not cost-effective for sewer, reallocating that housing to the Butler Market Village area or the area north of Neff Road.

DSL Property & Darnell Estates

General advantages and disadvantages

Advantages	Disadvantages
• Large, single ownership offers opportunities for master planning on DSL Property (not Darnell Estates) • Good grid & trail connections on DSL Property (not Darnell Estates) • Relatively close to existing transit lines at the northeastern corner (but over a quarter mile) • DSL property relies on Hamby sewer alignment & Northeast Interceptor (NEI) • not in Welded Tuff geologic area; • minimal overlap with DWPAs • not in Elk/Deer Range or ODFW Areas of Potential Concern • housing likely to be more affordable in this part of the city • Portions of DSL property adjacent to major roads are generally relatively well-suited to commercial and industrial uses (not Darnell Estates)	• Localized pipeline required to connect DSL Property to Southeast Interceptor (SEI) • Darnell Estates requires additional extension of Hamby sewer alignment • Extreme fire hazard; hazard could be reduced to high with proper vegetation management • Low impact commercial farm(s) within ¼ mile of northeastern edge • Potential impacts to bat caves from adjacent urbanization

Advantages	Disadvantages
• no forest land within 1 mile • no irrigation district impacts • good potential for local routes that parallel 27th the entire length of the property	

Trade-offs of land use options

The scenarios and SAAMs encompass five different land use options for this area:

1. Scenario 1.2: roughly half the exception land on the DSL property included with a mix of uses; Darnell Estates excluded.
2. Scenario 2.1: all exception land on the DSL property included with a mix of uses; Darnell Estates excluded.
3. Scenario 3.1 and SAAM-3: roughly a third of the exception land on the DSL property included with residential and commercial uses; Darnell Estates excluded.
4. SAAM-1: small portions of the DSL property along the roads included for commercial and industrial uses; Darnell Estates excluded.
5. SAAM-2: small portions of the DSL property along the roads included for commercial uses and multifamily; Darnell Estates included for housing and a small amount of employment.

The trade-offs associated with these choices are summarized below.

- Including the full exception area on the DSL property (as in Scenario 2.1) allows for construction of a collector road running north/south, which improves connectivity.
- Including Darnell Estates (as in SAAM-2) is not cost-effective for sewer service and increases trip lengths, and offers few advantages.
- A larger residential expansion (as in Scenario 2.1 and Scenario 1.2) provides the opportunity to include a school, which helps make the area more walkable.
- Emphasizing multifamily housing (as in Scenario 3.1 and SAAM-3) reduces VMT/capita.

Draft recommendations for the hybrid

- The hybrid should be most similar to Scenario 2.1, because this area offers advantages across a range of performance measures, and because inclusion of the full exception area offers additional advantages and relatively few disadvantages.
- Include large lot industrial site at the southern end (as in Scenario 1.2) – the location preferred by the Employment TAC.
- Refine land uses to address bat cave locations (may reduce the amount of park land), and consider whether park land may be able to be managed to provide a fire buffer on the eastern edge rather than internal to the developed area.

"The Elbow"

General advantages and disadvantages

Advantages	Disadvantages
• Includes possible future park site and existing school • not in Welded Tuff geologic area; • no overlap with DWPAs • does not overlap with ODFW Areas of Potential Concern • housing likely to be more affordable in this part of the city • Portions adjacent to 27th / Knott are generally fairly well-suited to commercial and industrial uses • no forest land within 1 mile	• Bike/ped and vehicle connectivity are both limited unless a connection can be built between Rickard and 15th (e.g. a new extension of Murphy south and east from 15th to a point where it would connect with Rickard). • Over a half mile from existing and planned transit • Requires interim pump station that does not contribute to long-term solution and sewer infrastructure is unique to Elbow area • partially in Elk/Deer Range • Extreme wildfire hazard west of 27th/north of Knott Road; hazard could be reduced with proper management of vegetation. (Remainder of area is lower wildfire hazard.) • 2 commercial farms within 1/4 mile, one which is an active operation that includes a feed lot for beef along Knott Rd. • Some impacts to Arnold Irrigation District deliveries

Trade-offs of land use options

The scenarios and SAAMs encompass three distinct land use options for this area:

1. Scenario 1.2: limited mixed use expansion along edge of existing UGB
2. Scenario 2.1: large mixed use expansion encompassing the full subarea (out to 27th / Knott)
3. Scenario 3.1 / SAAM-1 / SAAM-2 / SAAM-3: limited commercial / industrial expansion along the edge of the existing UGB (note that there are subtle variations among the alternatives in this group, but they are minor)

The trade-offs associated with these choices are summarized below.

- The large mixed use expansion in Scenario 2.1 provides the lowest average trip length for the area, in large part because it creates the potential for the extension of a collector road from 15th Street to 27th Street near Rickard Road (i.e., an extension of the Murphy

Road corridor), which improves connectivity in the area, but also puts more land use adjacent to the commercial farm to the south, across Knott Road and increases impacts on the Arnold Irrigation District.

- A small expansion in this area (as in all alternatives except Scenario 2.1) makes the needed sewer improvements not cost-effective on a per acre basis.

Draft recommendations for the hybrid

- Because this area is relatively well-suited for employment uses and there is so much adjacent single family housing inside the existing UGB to the west, it makes sense to bring this in primarily as an employment area with either a small, mixed housing component or no residential component. It completes the southeast area by providing employment uses, and does not necessarily need to provide a full mix of uses internal to the subarea. Transportation access is good for employment uses via Knott Road and 27th Street..
- Full or nearly full use of this area (as in Scenario 2.1), in order to spread the cost of the needed pump station across more acres.
- Refine arrangement of land uses to provide a transition between employment and existing lower density residential and to minimize commercial and residential uses along Knott Road to reduce impacts to the feed lot south of Knott.

"The Thumb"

General advantages and disadvantages

Advantages	Disadvantages
• The Ward and Baney properties are both over 20 acres and provide opportunities for master planning. • One of the Woodside Road properties is under 20 acres and contiguous to the existing UGB. • South end of US 97 is relatively uncongested. • Possible community connector bus stop on west side of US 97 could provide limited transit access to the southern end of this area in the long term. • not in Welded Tuff geologic area; • no overlap with DWPAs • does not overlap with ODFW Areas of Potential Concern • Wildfire hazard has been reduced due to good vegetation management • housing likely to be more affordable in	• Bike/ped and vehicle connectivity are both limited unless a full collector system can be built from China Hat to Knott (due to highway and railroad barriers). • Heavily reliant on US 97 for connections to the rest of the city • Average trip lengths are long from this area (highest of all subareas) • Baney property has limited access to US 97, making it less suitable for commercial and employment uses • Some sewer capacity upsizing required from current design of the Southeast Interceptor • Baney property requires its own gravity sewer line extension • almost entirely within DWPAs, where certain industrial and commercial uses may be a concern

Advantages	Disadvantages
this part of the city • Ward property is generally well-suited to a wide range of uses: residential, commercial and industrial uses (Baney or Woodside Road properties not well suited to commercial or industrial)	• entirely within in Elk/Deer Range • 2 commercial farms within 1/4 mile of Woodside Road properties • Arnold Irrigation District water serves Ward property (but would likely continue to serve the golf course) • Southern extent of Ward property and Woodside Road properties are under a mile from designated forest land

Trade-offs of land use options

The scenarios and SAAMs provide five different land use options for this area:

1. Scenario 1.2: Full use of the Ward property with a mix of housing and employment
2. Scenario 2.1: Use of roughly 2/3rds of the Ward property plus the Bany property for a mix of housing and employment
3. Scenario 3.1 and SAAM-3: Use of roughly 1/3rd of the Ward property for commercial and industrial uses
4. SAAM-1: Use of roughly 2/3rds of the Ward property for commercial and industrial uses
5. SAAM-2: Use of roughly 1/3rd of the Ward property for commercial and industrial uses plus Woodside Road properties for housing

The trade-offs associated with these choices are summarized below.

- Bringing in the full extent of the Ward property (as in Scenario 1.2) provides the opportunity for a complete collector network on that property that improves bicycle, pedestrian, and vehicular connectivity but generates enough traffic volume that it requires expanding Knott Road to three lanes (at significant expense). It also means more growth in the DWPA and in the Elk/Deer Range.
- Including the Baney property (as in Scenario 2.1) requires an additional gravity sewer main and does not appear to provide substantial benefits in other performance measures.
- Incorporating residential on the Ward property (as in Scenarios 1.2 and 2.1) may create potential for compatibility issues between industrial and residential uses and appears to have only modest benefits for the transportation system.
- More growth in this area (as in Scenarios 1.2 and 2.1 and SAAM-1) hurts overall performance on VMT because of the long average trip lengths from this area.
- A relatively large expansion that extends from US 97 to Knott Road (as in Scenarios 1.2 and 2.1) provides more opportunity for internal site collector roads, even if they don't extend all the way through the property, and spreads cost of sewer improvements over more acres.

- Siting commercial uses adjacent to China Hat Road (as in Scenario 3.1, SAAM-1, SAAM-2 and SAAM-3) provides better access for existing neighborhoods to the north, though these are low density and may not provide much support for such commercial.

Draft recommendations for the hybrid

- Because this area is relatively well-suited for employment uses and there is so much adjacent single family housing inside the existing UGB to the north, and because growth in this area tends to increase VMT, it makes sense to bring this in primarily as an employment area with either a small housing component or no residential component.
- An amount of expansion between Scenario 2.1 (without the Baney property) and Scenario 3.1 / SAAM-1 may best balance the trade-offs for this property, especially if there remains enough area to provide a collector connection from China Hat to Knott.
- Refine arrangement of land uses to best utilize each area of the Ward property.
- Include a high school as identified by the School District and a community park.

West Area

General advantages and disadvantages

Advantages	Disadvantages
• Nearly all properties in the area are well over 20 acres and provide opportunities for master planning on a large scale • Some connections to existing/planned parks & trails • Relatively close to existing transit lines on the eastern edge (but over a quarter mile) • No issues identified for serving with City of Bend water • No overlap with ODFW Areas of Potential Concern • Reduced wildfire hazard due to good vegetation management; • No commercial farms within a quarter mile • No irrigation district water	• Few to no parcels under 20 acres and contiguous to the current UGB • Limited capacity in Awbrey Glen pump station and force main, which would serve the northwestern portion of this subarea • Limited trail system • Difficult to build connected local streets • Largely welded tuff geology • Entirely within Deer & Elk Winter Range • Housing is likely to be more expensive in this area • Topography, transportation access and residential proximity limit suitability for industrial uses • Relatively low visibility limits suitability for commercial uses • Under a mile from forest land • Some area adjacent to the current UGB is within a DWPA

Trade-offs of land use options

The scenarios and SAAMs provide four different land use options for this area:

1. Scenario 1.2: Modest, primarily residential expansion that extends along the eastern edge of the subarea
2. Scenario 2.1: Modest mixed use expansion focused in the southern portion of the subarea
3. Scenario 3.1: Relatively large, primarily residential expansion that runs along the eastern side of the subarea
4. SAAM-3: Full use of the subarea for a primarily residential expansion

(Note that SAAM-1 and SAAM-2 exclude the West Area altogether.) The trade-offs associated with these choices are summarized below.

- Scenario 3.1 requires an additional sewer extension to connect to the Awbrey Glen pump station and upsizing of the pumps to serve the northern portion of the Day property (as well as the Shevlin area), which increases costs (though the cost per acre is similar to Scenarios 1.2 and 2.1).
- The full use of the sub-area (as in SAAM-3) exceeds the capacity of the Awbrey Glen pump station and force main and requires a new regional pump station and force main to serve the northwestern portion of the Day property. The same area (the northwestern portion of the Day property) would also bring in housing that is not within walking distance of commercial and that is within a quarter mile of designated forest land.
- Bringing in a larger area (as in Scenario 3.1 and SAAM-3) increases average trip length somewhat and also slightly increases reliance on congested corridors, but spreads the cost of connectivity improvements over a larger area, reducing the cost per acre.
- The southern portion of the West Area has good proximity to existing schools; extending further north (as in Scenario 1.2, Scenario 3.1 and SAAM-3 to varying degrees) puts more housing out of walking distance of schools.
- Incorporating employment uses (as in Scenario 2.1) puts those uses in a location that has some suitability concerns.
- A greater residential expansion (as in Scenario 3.1 and SAAM-3) may make the commercial component shared by all alternatives more viable.

Draft recommendations for the hybrid

- Expand primarily in the southern portion (Miller property), as in Scenario 2.1, where connectivity is good, transit and trails are closer, and sewer infrastructure is cost-effective to provide.
- Because this area has limited suitability for commercial and industrial uses, it makes sense to focus on residential uses, though retaining a small commercial area is appropriate and a very small amount of light industrial use may be appropriate.

Shevlin Area

General advantages and disadvantages

Advantages	Disadvantages
• Includes planned school site (currently in School District ownership) • Good proximity to existing/planned parks & trails • Large block of land in common ownership creates potential for master planning • Minimal congestion on roads in and serving this area • Relatively close to existing transit lines at the southeastern corner (but over a quarter mile) • No commercial farms within a quarter mile • No irrigation district water	• Few or no parcels under 20 acres and contiguous to the existing UGB • Average trip lengths are long from this area relative to other areas • Difficult to build connected local streets in much of this area • Limited capacity in Awbrey Glen pump station and force main, which would serve this subarea • Drinking water supply is through smaller infrastructure, which is more problematic to expand • Partially in welded tuff geology • Includes small areas of 500' buffer for Drinking Water Protection Areas • Entirely within Deer & Elk Winter Range • Largely within ODFW Areas of Potential Concern • Northwestern edge is adjacent to Tumalo Creek (but the Bend Metropolitan Parks & Recreation District has ownership of the property within roughly 500ft of the river) • Mix of High and Extreme fire hazard; outer portions of the subarea have topography and unmanaged adjacent lands that could make it difficult to reduce fire hazard • Housing is likely to be more expensive in this area • Topography, transportation access and residential proximity limit suitability for industrial uses • Low visibility limits suitability for commercial uses • Western corner within a quarter mile of forest land

Trade-offs of land use options

There are two development options tested in the Scenarios and SAAMS:

1. Scenario 3.1: Development of the southern half of the subarea with primarily residential uses and some commercial
2. SAAM-1: Development of the full subarea with primarily residential and some commercial

(Note that Scenario 1.2, Scenario 2.1, SAAM-2 and SAAM-3 exclude the Shevlin Area altogether.) The trade-offs associated with these choices are summarized below.

- Bringing in the full area creates better connections to the existing city for bicycles and pedestrians and spreads the cost of transportation improvements over more acres, reducing the cost per acre (though not the total cost).
- However, the full build option exceeds capacity at the Awbrey Glen pump station and force main, requiring a new regional pump station (at significant expense).[13] It also adds housing that is over a half-mile from the school and the commercial area in the southern part of this subarea; increases average trip length and per capita household VMT; puts development adjacent to Tumalo Creek; increases housing in an area where fire hazard may be difficult to mitigate; increases impacts on wildlife habitat areas; and puts more development within a quarter mile of designated forest land.

Draft recommendation for the hybrid

- Exclude this subarea, as in Scenarios 2.1 and 1.2, because of its relatively poor transportation performance, its impacts on wildlife habitat, its relatively higher fire hazard that may be difficult to mitigate, and lack of advantages over other subareas suitable for residential uses.

OB Riley / Gopher Gulch Area

General advantages and disadvantages

Advantages	Disadvantages
• Good proximity to planned parks on the west side of the subarea • Western portion (Gopher Gulch) provides large single ownership with potential for master planning on a large scale; one other large ownership east of OB Riley	• Eastern and southern edges include many parcels under 20 acres and contiguous to the existing UGB, though many have development on them. • Western portion does not have connectivity to surrounding networks for bikes, pedestrians, or vehicles.

[13] The peak flow excess capacity of the Awbrey Glen pumps and downstream force main for UGB expansion are approximately 60 gpm (15 gpm average flow) and 300 gpm (75 gpm average flow) respectively. This equates to approximately 120 additional equivalent dwelling units (EDUs) for the pumps and 580 additional EDUs for the force main. Peak and average flow estimates at the Awbrey Glen pump station should be confirmed with flow metering and pump testing prior to serving future UGB customers.

Advantages	Disadvantages
• Local grid opportunity with OB Riley as a spine roadway for the area. • No issues identified for serving with City of Bend water • Not in welded tuff geology • not in Elk/Deer Range or ODFW Areas of Potential Concern • Eastern portion is generally well-suited to industrial and commercial uses • Most of the area is not near commercial farms (but 2 commercial farms within 1/4 mile across canyon from the western edge) • Over a mile from designated forest lands • Southeastern corner is within a quarter mile of existing transit (a primary transit corridor)	• Requires extension of Northeast Interceptor west of US 20, which doesn't benefit any other areas unless a regional pump station is built to serve the West Area and/or Shevlin Area • Includes small areas of 500' buffer for Drinking Water Protection Areas • Western edge of Gopher Gulch property abuts the Deschutes River – some is public ownership, some is private ownership • High and extreme wildfire hazard, which could be reduced with proper management of vegetation except along steep slopes adjacent to river • Housing may be more expensive in this area (particularly western portions) • Impacts Swalley Irrigation District deliveries

Trade-offs of land use options

There are four different development options tested in the Scenarios and SAAMs:

1. Scenario 1.2, Scenario 2.1 and SAAM-1: Modest expansion east of OB Riley for employment uses only (note that Scenario 2.1 includes the large lot industrial site in this area, and has a slightly different arrangement of land uses)
2. Scenario 3.1: Development both east and west of OB Riley (but not into the Gopher Gulch area to the west) with a mix of housing and employment
3. SAAM-2: Inclusion of the full subarea with a very large residential expansion in the Gopher Gulch area and a mix of housing and employment (like Scenario 3.1) around OB Riley Road
4. SAAM-3: Inclusion of the full length of the subarea between US 20 and OB Riley for primarily employment uses, with a small amount of multifamily housing.

The trade-offs associated with these choices are summarized below.

- Including the rural residential areas in the southern part of the subarea (as in Scenario 3.1 and SAAM-2) provides more parcels under 20 acres and contiguous to the UGB, but many of these are developed and may be less efficient to accommodate future growth.
- Larger expansions with more commercial and residential (as opposed to industrial) development (as in Scenario 3.1, SAAM-2, and, to a lesser extent, SAAM-3) increase congestion and reliance on congested corridors. Larger expansions also increase impacts on Swalley Irrigation District.

- Including the full Gopher Gulch property (as in SAAM-2) brings development adjacent to the Deschutes River and the steep slopes where fire hazard may be difficult to mitigate, puts development within a quarter mile of two commercial farms (though they are separated by the river) and significantly increases impacts on Swalley Irrigation District.
- Including the large lot industrial site in this subarea (as in Scenario 2.1) puts it on a difficult site that is oddly shaped and may not work for many users.

Draft recommendations for the hybrid

- An employment-focused expansion that is primarily or entirely east of OB Riley Road, like those shown in Scenarios 1.2 and 2.1 and SAAM-1, is concluded to be a good starting point for this area, because: (a) the eastern portion of this area is important and suitable for employment uses; (b) including the portion west of OB Riley appears to have more disadvantages than advantages (particularly congestion, impacts to Swalley Irrigation District, and expansion onto developed rural residential land); and (c) the Gopher Gulch area does not offer enough advantages relative to other potential residential expansion areas to focus all residential growth there.
- Because of the weaknesses of the potential site identified for large lot industrial use, that use should not be included in this subarea, consistent with the Employment TAC recommendation.

SYNTHESIS & RECOMMENDATIONS

Based on the body of work captured in this evaluation report, in considering and in balancing the four Goal 14 Factors, Scenario 2.1 performed the best of the alternatives overall, regardless of whether and to what degree weighting is applied to distinguish between the more and less important performance measures. However, the subarea analysis shows that there may be room for improvement through modifications to some of the subareas, as summarized in brief below.

- North Triangle: employment-focused rather than including residential
- Northeast Edge: drop the roughly 40-acre Bear Creek Road area, shifting that growth to create more complete neighborhoods around Butler Market Village and/or Neff Road, while retaining the focus on nodes along existing arterial corridors connecting to the city center
- DSL Property: include large lot industrial site at the southern end and refine land use assumptions
- The Elbow: refine arrangement of land uses along Knott Road to minimize impacts to feed lot
- The Thumb: refine land use assumptions and include a high school and a community park but reduce total expansion area somewhat
- West Area: reduce the amount of commercial and industrial use in this subarea
- Shevlin: none, follow Scenario 2.1 (area excluded)
- OB Riley / Gopher Gulch: remove large lot industrial use from this area (replace with other employment uses)

LIST OF APPENDICES

Appendix A Goal 14 administrative rule (660-024-0060)

Appendix B Scenario Evaluation Data Sheets

Appendix C Performance Measure Weighting Examples and Results

Appendix D Technical Documentation *(provided under separate cover)*

APPENDIX A: GOAL 14 ADMINISTRATIVE RULE (660-024-0060)

Boundary Location Alternatives Analysis

(1) When considering a UGB amendment, a local government must determine which land to add by evaluating alternative boundary locations. This determination must be consistent with the priority of land specified in ORS 197.298 and the boundary location factors of Goal 14, as follows:

(a) Beginning with the highest priority of land available, a local government must determine which land in that priority is suitable to accommodate the need deficiency determined under OAR 660-024-0050.

(b) If the amount of suitable land in the first priority category exceeds the amount necessary to satisfy the need deficiency, a local government must apply the location factors of Goal 14 to choose which land in that priority to include in the UGB.

(c) If the amount of suitable land in the first priority category is not adequate to satisfy the identified need deficiency, a local government must determine which land in the next priority is suitable to accommodate the remaining need, and proceed using the same method specified in subsections (a) and (b) of this section until the land need is accommodated.

(d) Notwithstanding subsection (a) to (c) of this section, a local government may consider land of lower priority as specified in ORS 197.298(3).

(e) For purposes of this rule, the determination of suitable land to accommodate land needs must include consideration of any suitability characteristics specified under section (5) of this rule, as well as other provisions of law applicable in determining whether land is buildable or suitable.

(2) Notwithstanding OAR 660-024-0050(4) and subsection (1)(c) of this rule, except during periodic review or other legislative review of the UGB, a local government may approve an application under ORS 197.610 to 197.625 for a UGB amendment proposing to add an amount of land less than necessary to satisfy the land need deficiency determined under OAR 660-024-0050(4), provided the amendment complies with all other applicable requirements.

(3) The boundary location factors of Goal 14 are not independent criteria. When the factors are applied to compare alternative boundary locations and to determine the UGB location, a local government must show that all the factors were considered and balanced.

(4) In determining alternative land for evaluation under ORS 197.298, "land adjacent to the UGB" is not limited to those lots or parcels that abut the UGB, but also includes land in the vicinity of the UGB that has a reasonable potential to satisfy the identified need deficiency.

(5) If a local government has specified characteristics such as parcel size, topography, or proximity that are necessary for land to be suitable for an identified need, the local government may limit its consideration to land that has the specified characteristics when it conducts the boundary location alternatives analysis and applies ORS 197.298.

(6) The adopted findings for UGB adoption or amendment must describe or map all of the alternative areas evaluated in the boundary location alternatives analysis. If the analysis involves more than one parcel or area within a particular priority category in ORS 197.298 for which circumstances are the same, these parcels or areas may be considered and evaluated as a single group.

(7) For purposes of Goal 14 Boundary Location Factor 2, "public facilities and services" means water, sanitary sewer, storm water management, and transportation facilities.

(8) The Goal 14 boundary location determination requires evaluation and comparison of the relative costs, advantages and disadvantages of alternative UGB expansion areas with respect to the provision of public facilities and services needed to urbanize alternative boundary locations. This evaluation and comparison must be conducted in coordination with service providers, including the Oregon Department of Transportation with regard to impacts on the state transportation system. "Coordination" includes timely notice to service providers and the consideration of evaluation methodologies recommended by service providers. The evaluation and comparison must include:

(a) The impacts to existing water, sanitary sewer, storm water and transportation facilities that serve nearby areas already inside the UGB;

(b) The capacity of existing public facilities and services to serve areas already inside the UGB as well as areas proposed for addition to the UGB; and

(c) The need for new transportation facilities, such as highways and other roadways, interchanges, arterials and collectors, additional travel lanes, other major improvements on existing roadways and, for urban areas of 25,000 or more, the provision of public transit service.

Stat. Auth.: ORS 197.040, Statewide Planning Goal 14
Stats. Implemented: ORS 195.036, 197.015, 197.295 - 197.314, 197.610 - 197.650, 197.764
Hist.: LCDD 8-2006, f. 10-19-06, cert. ef. 4-5-07; LCDD 2-2009, f. 4-8-09, cert. ef. 4-16-09

APPENDIX B: SCENARIO EVALUATION DATA SHEETS

Index

Factor 1: Efficient accommodation of identified land needs

A. Complete Communities and Great Neighborhoods

(1) Housing units within walking distance of existing & planned schools in 2028
(2) Housing units within walking distance of existing & planned parks and trails in 2028
(3) Housing units within walking distance of commercial services in 2028
(4) Jobs/housing balance (subarea balance)
(5) Potential for master planning

B. Efficient, Timely Growth

(1) Total acres of expansion
(2) Gross density for new housing in 2028
(3) Net density for new jobs in 2028
(4) Percent of urbanized acres on parcels under 20 acres and contiguous to the existing UGB
(5) Vacant vs. developed land included

Factor 2: Orderly and economic provision of public facilities and services

A. Balanced Transportation System

(1) Total VMT per capita
(2) Average trip length
(3) Household VMT per capita
(4) Congestion
(5) Walk/bike safety and connectivity
(6) System connectivity & progression of system hierarchy
(7) Mode split
(8) Average Daily walk trips
(9) Proximity to transit corridors
(10) Housing & jobs within ¼ mile of transit corridors
(11) Intersection density

B. Cost Effective Infrastructure

Transportation Infrastructure

(1) Total cost of transportation improvements required
(2) Cost per acre of transportation improvements
(3) New linear miles of roadway

Sanitary Sewer Infrastructure

(4) Efficiency of additional sewer system improvements required
(5) Initial capital cost of sewer system improvements required

(6) Initial capital cost of sewer system improvements per acre of development

Drinking Water Infrastructure

(7) Water system improvements required in city water district
(8) Capacity of Avion Water system

Storm Water Infrastructure

(9) Total impervious area for new development
(10) Acres of new development within Drinking Water Protection Areas (DWPA)
(11) Acres of new development with welded tuff geology

Factor 3: Comparative environmental, social, economic and energy consequences (ESEE)

A. Quality Natural Environment (Environmental and Energy Consequences)

(1) Development in wildlife areas
(2) Linear distance of riparian areas adjacent to development
(3) Wildfire hazard
(4) Greenhouse gas emissions
(5) Energy Use
(6) Average Water Consumption per Household

B. Housing Options and Affordability (Social Consequences)

(1) Average cost of new single family housing
(2) Housing mix of new housing (subarea balance)

C. Strong Diverse Economy (Economic Consequences)

(1) Site suitability for large lot industrial use
(2) Site suitability for areas identified for industrial uses
(3) Site suitability for areas identified for commercial uses

Factor 4: Compatibility of proposed urban uses with nearby agricultural and forest activities occurring on farm and forest land outside the UGB

A. Compatibility with Farms and Forests

(7) Farm practices & high value farm land adjacent to expansion areas
(8) Impact to irrigation districts
(9) Designated forest land adjacent to expansion areas

Factor 1: Efficient Accommodation of Identified Land Needs

Author: Andrew Parish **APG**

Community Outcome A Complete Communities and Great Neighborhoods **Date:** 8/28/2015

Performance Measure 1 Housing Units within Walking Distance of Schools

Brief Description of Evaluation: This is an update to performance measure 1.A.1 using feedback from the Bend-La Pine School District about placement of schools within the scenario and SAAMs.

Data Sources Existing school locations from City of Bend, Deschutes County. Additional information provided at School District meeting, August 2015

Interpretation and Key Grey are areas that have no significant housing (minor amounts are projected even though employment designations are used, based on existing development in employment designations). Red areas have significant housing but few homes within walking distance of schools. Yellow areas have between 70 and 80% of housing units within walking distance of a school. Green areas have greater than 80% of their housing units within walking distance of a school.

"Good"	"Fair"	"Poor"	No Data	Not appropriate to rank

Evaluation Geography	Scenario 1.2		Scenario 2.1		Scenario 3.1		SAAM-1		SAAM-2		SAAM-3	
	Value	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*
Total Future UGB (Including Current UGB)	60%	Housing Units	62%	Housing Units	61%	Housing Units	60%	Housing Units	59%	Housing Units	58%	Housing Units
Total Expansion Area (excluding current UGB)	69%	Housing Units	82%	Housing Units	75%	Housing Units	82%	Housing Units	75%	Housing Units	66%	Housing Units
Subareas												
North Triangle	0%	Housing Units	100%	Housing Units	18%	Housing Units	0%	Housing Units	18%	Housing Units	0%	Housing Units
NE Edge	68%	Housing Units	19%	Housing Units	15%	Housing Units	**87%**	Housing Units	0%	Housing Units	0%	Housing Units
DSL Property	0%	Housing Units	100%	Housing Units	100%	Housing Units	27%	Housing Units	**0%**	Housing Units	0%	Housing Units
The "Elbow"	93%	Housing Units	71%	Housing Units	46%	Housing Units	33%	Housing Units	46%	Housing Units	46%	Housing Units
The "Thumb"	100%	Housing Units	100%	Housing Units	100%	Housing Units	100%	Housing Units	**24%**	Housing Units	100%	Housing Units
West Area	84%	Housing Units	85%	Housing Units	73%	Housing Units	0%	Housing Units	0%	Housing Units	**94%**	Housing Units
Shevlin Area	0%	Housing Units	0%	Housing Units	92%	Housing Units	**84%**	Housing Units	0%	Housing Units	0%	Housing Units
OB Riley / Gopher Gulch Area	0%	Housing Units	46%	Housing Units	98%	Housing Units	0%	Housing Units	**90%**	Housing Units	0%	Housing Units
Existing UGB (if applicable)	59%	Housing Units	60%	Housing Units	60%	Housing Units	58%	Housing Units	58%	Housing Units	57%	Housing Units
Overall Score	2		5		3		5		4		2	
	School district recommended a school in the Thumb area, increasing its score over the original scenario. The school in the DSL property was removed in this scenario, contributing to its low score.		This scenario performs very well due to the mixed and "complete neighborhood" character of expansion areas. The NE edge is the only residential expansion without a new school.		This scenario includes some expansion to the West that does not include a school. The District also removed a school from the NE Edge, compared to the original scenario.		This scenario performs very well due to the concentrated residential expansions around a planned school in the Shevlin Area and the addition of two schools in the Northeast Edge.		School district recommended an additional two elementary schools in the Gopher Gulch area, increasing its score over the original scenario.		This scenario includes modest residential expansion in the DSL property, which does not include a school. The West Area is adjacent to existing schools and one proposed school.	

For more information about this performance measure, see accompanying technical memorandum from Angelo Planning Group

Factor 1: Efficient Accommodation of Identified Land Needs

Author: Analysis by Fregonese Associates; interpretation by Angelo Planning Group

Community Outcome A Complete Communities and Great Neighborhoods

Date: 9/10/2015

Performance Measure 2 Housing Units within Walking Distance of Parks & Trails

Brief Description of Evaluation: The share of the total (existing and future) housing units within one half mile of existing and proposed parks and existing trails.

Data Sources Existing parks, open space and trails locations from Deschutes County, City of Bend and US Forest Service. City Officials were consulted about the location of new parks.

Interpretation and Key Over 95% of housing units within walking distance of a park or trail was rated as "Good", 75-95% of housing units within walking distance of a park or trail was rated "Fair"; less than 75% was rated "Poor". Grey cells with N/A indicate subareas that are not included in the alternative; grey cells with values are indicate subareas with trivial amounts of housing assumed in commercial areas.

"Good"	"Fair"	"Poor"	No Data	Not appropriate to rank

Evaluation Geography	Scenario 1.2		Scenario 2.1		Scenario 3.1		SAAM-1		SAAM-2		SAAM-3	
	Value	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*
Total Future UGB (Including Current UGB)	100%	Housing Units	100%	Housing Units	100%	Housing Units	99%	Housing Units	100%	Housing Units	100%	Housing Units
Total Expansion Area (excluding current UGB)	97%	Housing Units	98%	Housing Units	100%	Housing Units	91%	Housing Units	99%	Housing Units	99%	Housing Units
Subareas												
North Triangle	39%	Housing Units	95%	Housing Units	76%	Housing Units	39%	Housing Units	76%	Housing Units	76%	Housing Units
NE Edge	98%	Housing Units	99%	Housing Units	100%	Housing Units	88%	Housing Units	98%	Housing Units	98%	Housing Units
DSL Property	100%	Housing Units	100%	Housing Units	100%	Housing Units	100%	Housing Units	100%	Housing Units	100%	Housing Units
The "Elbow"	100%	Housing Units	100%	Housing Units	100%	Housing Units	100%	Housing Units	100%	Housing Units	100%	Housing Units
The "Thumb"	89%	Housing Units	89%	Housing Units	99%	Housing Units	63%	Housing Units	90%	Housing Units	78%	Housing Units
West Area	100%	Housing Units	100%	Housing Units	100%	Housing Units	N/A	Housing Units	N/A	Housing Units	100%	Housing Units
Shevlin Area	N/A	Housing Units	N/A	Housing Units	100%	Housing Units	100%	Housing Units	N/A	Housing Units	N/A	Housing Units
OB Riley / Gopher Gulch Area	62%	Housing Units	98%	Housing Units	100%	Housing Units	67%	Housing Units	100%	Housing Units	100%	Housing Units
Existing UGB (if applicable)	100%	Housing Units	100%	Housing Units	100%	Housing Units	100%	Housing Units	100%	Housing Units	100%	Housing Units
Overall Score	5		5		5		4		5		5	
	The only subarea with a residential component that doesn't have nearly 100% of housing units within walking distance of a park or trail is The Thumb, where it would be easy to plan a future park.		The only subarea with a residential component that doesn't have nearly 100% of housing units within walking distance of a park or trail is The Thumb, where it would be easy to plan a future park.		All subareas with residential neighborhoods planned have nearly 100% of housing units within walking distance of a park or trail.		The Northeast edge includes some areas that are not within walking distance of a park or trail; it would not be easy to provide a park to serve those areas.		The only subarea with a residential component that doesn't have nearly 100% of housing units within walking distance of a park or trail is The Thumb, where it would be easy to plan a future park.		All subareas with residential neighborhoods planned have nearly 100% of housing units within walking distance of a park or trail.	

For more information about this performance measure, see accompanying technical memorandum from Fregonese Associates.

Factor 1: Efficient Accommodation of Identified Land Needs

Author: Analysis by Fregonese Associates; interpretation by Angelo Planning Group

Community Outcome A Complete Communities and Great Neighborhoods

Date: 9/10/2015

Performance Measure 3 Housing Units within Walking Distance of Commercial Services

Brief Description of Evaluation: The share of the total housing units within one half mile of existing and commercial areas.

Data Sources Existing commercial area was based existing on parcel (Field GENPLAN) data from the Deschutes County Assessor's office, via the City of Bend. Future commercial areas were determined as development types that contained commercial services.

Interpretation and Key Over 90% of housing units within walking distance of commercial was rated as "Good", 70-90% of housing units within walking distance of commercial was rated "Fair"; less than 70% was rated "Poor". Grey cells with N/A indicate subareas that are not included in the alternative; grey cells with values are indicate subareas with trivial amounts of housing assumed in commercial areas.

"Good"	"Fair"	"Poor"	No Data	Not appropriate to rank

Evaluation Geography	Scenario 1.2		Scenario 2.1		Scenario 3.1		SAAM-1		SAAM-2		SAAM-3	
	Value	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*
Total Future UGB (Including Current UGB)	82%	Housing Units	84%	Housing Units	87%	Housing Units	83%	Housing Units	84%	Housing Units	82%	Housing Units
Total Expansion Area (excluding current UGB)	92%	Housing Units	99%	Housing Units	96%	Housing Units	57%	Housing Units	90%	Housing Units	71%	Housing Units
Subareas												
North Triangle	100%	Housing Units	100%	Housing Units	100%	Housing Units	100%	Housing Units	100%	Housing Units	100%	Housing Units
NE Edge	83%	Housing Units	96%	Housing Units	97%	Housing Units	**65%**	Housing Units	64%	Housing Units	64%	Housing Units
DSL Property	100%	Housing Units	100%	Housing Units	100%	Housing Units	89%	Housing Units	**100%**	Housing Units	99%	Housing Units
The "Elbow"	100%	Housing Units	100%	Housing Units	100%	Housing Units	100%	Housing Units	100%	Housing Units	100%	Housing Units
The "Thumb"	100%	Housing Units	100%	Housing Units	100%	Housing Units	95%	Housing Units	**16%**	Housing Units	65%	Housing Units
West Area	97%	Housing Units	97%	Housing Units	93%	Housing Units	N/A	Housing Units	N/A	Housing Units	**62%**	Housing Units
Shevlin Area	N/A	Housing Units	N/A	Housing Units	99%	Housing Units	**37%**	Housing Units	N/A	Housing Units	N/A	Housing Units
OB Riley / Gopher Gulch Area	70%	Housing Units	64%	Housing Units	96%	Housing Units	60%	Housing Units	**95%**	Housing Units	93%	Housing Units
Existing UGB (if applicable)	81%	Housing Units	83%	Housing Units	86%	Housing Units	85%	Housing Units	83%	Housing Units	83%	Housing Units
Overall Score	4		5		5		1		3		2	
	All expansion areas except for the Northeast Edge have over 90% of housing units within walking distance of commercial. The areas of the Northeast edge that are not proximate to commercial cannot easily be provided with walkable commercial services.		All expansion areas have over 90% of housing units within walking distance of commercial		All expansion areas have over 90% of housing units within walking distance of commercial		Neither of the two SAAs tested in SAAM 1 provide good access to commercial for many housing units.		The OB Riley / Gopher Gulch Area and the Darnell Estates / DSL area both score well; but the small SAA near The Thumb does not perform well in this analysis.		The West Area, which is the focus of this SAAM, does not score well in this analysis. There are not other locations for commercial that would be appropriate within that area, so it would be hard to improve its score.	

For more information about this performance measure, see accompanying technical memorandum from Fregonese Associates.

Factor 1: Efficient Accommodation of Identified Land Needs

Author: Analysis by Fregonese Associates; interpretation by Angelo Planning Group

Community Outcome A Complete Communities and Great Neighborhoods

Date: 9/10/2015

Performance Measure 4 Job-Housing Balance

Brief Description of Evaluation: The ratio of total jobs to total housing units.

Data Sources Envision Tomorrow Scenario Builder output.

Interpretation and Key Jobs/housing balance is fairly constant at the Scenario / SAAM level and variations are not meaningful at that level. Interpretation and rating is at the subarea level. Subareas are considered "balanced" if their ratio of jobs to housing units is between 1:6 and 6:1 (0.17 to 6). Subareas are considered moderately balanced if their ratio of jobs to housing units is between 1:12 and 12:1 (0.08 to 12). Subareas are considered imbalanced if their ratio of jobs to housing units is less than 1:12 or more than 12:1. Overall scores are based on how many of the subareas are balanced, moderately balanced, and imbalanced.

"Good"	"Fair"	"Poor"	No Data	Not appropriate to rank

Evaluation Geography	Scenario 1.2		Scenario 2.1		Scenario 3.1		SAAM-1		SAAM-2		SAAM-3	
	Value	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*
Total Future UGB (Including Current UGB)	1.10	Jobs:HU	1.10	Jobs:HU	1.10	Jobs:HU	1.10	Jobs:HU	1.09	Jobs:HU	1.10	Jobs:HU
Total Expansion Area (excluding current UGB)	1.96	Jobs:HU	1.94	Jobs:HU	1.97	Jobs:HU	1.79	Jobs:HU	1.69	Jobs:HU	1.89	Jobs:HU
Subareas												
North Triangle	37.08	Jobs:HU	1.64	Jobs:HU	32.63	Jobs:HU	37.08	Jobs:HU	32.63	Jobs:HU	32.63	Jobs:HU
NE Edge	0.31	Jobs:HU	0.62	Jobs:HU	0.55	Jobs:HU	0.27	Jobs:HU	0.90	Jobs:HU	0.90	Jobs:HU
DSL Property	2.28	Jobs:HU	1.63	Jobs:HU	1.68	Jobs:HU	17.87	Jobs:HU	2.09	Jobs:HU	0.89	Jobs:HU
The "Elbow"	2.89	Jobs:HU	3.04	Jobs:HU	32.11	Jobs:HU	24.22	Jobs:HU	32.11	Jobs:HU	32.11	Jobs:HU
The "Thumb"	4.33	Jobs:HU	2.76	Jobs:HU	52.20	Jobs:HU	25.08	Jobs:HU	8.54	Jobs:HU	45.85	Jobs:HU
West Area	0.24	Jobs:HU	0.90	Jobs:HU	0.13	Jobs:HU	N/A	Jobs:HU	N/A	Jobs:HU	0.20	Jobs:HU
Shevlin Area	N/A	Jobs:HU	N/A	Jobs:HU	0.94	Jobs:HU	0.19	Jobs:HU	N/A	Jobs:HU	N/A	Jobs:HU
OB Riley / Gopher Gulch Area	15.16	Jobs:HU	7.94	Jobs:HU	1.64	Jobs:HU	13.03	Jobs:HU	0.58	Jobs:HU	6.20	Jobs:HU
Existing UGB (if applicable)	1.12	Jobs:HU	1.12	Jobs:HU	1.12	Jobs:HU	1.12	Jobs:HU	1.12	Jobs:HU	1.12	Jobs:HU
Overall Score	3		5		4		1		4		2	
	Just under half of subareas are well-balanced; two are imbalanced.		Most areas are well balanced or moderately well balanced, with the exception of the employment-only expansion in OB Riley		Half of subareas are well-balanced; three are imbalanced.		Most areas are imbalanced, with only two moderately well-balanced and none well-balanced.		Half of subareas are well-balanced; two are imbalanced.		Few areas are well-balanced; three are imbalanced.	

For more information about this performance measure, see accompanying technical memorandum from Fregonese Associates.

Factor 1: Efficient Accommodation of Identified Land Needs

Author: CJ Doxsee, Andrew Parish — **APG**

Date: 10/1/2015

Community Outcome A — Complete Communities and Great Neighborhoods

Performance Measure 5 — Opportunity for master planning

Brief Description of Evaluation: Percent of developed area (excluding Schools) on land that is greater than 20 acres in common ownership.

Data Sources Deschutes County assessors data.

Interpretation and Key

This measure looks at how much of the expansion area will be subject to master planning requirements. Large properties that will be required to undergo master planning offer the potential for greater input from the city in the ultimate design of the new development (however, the master planning process does add time and expense to development). Subareas and Scenarios / SAAMs that have more than 70% of the developed area on sites over 20 acres in common ownership are rated "Good"; 50-70% is rated "Fair"; under 50% is rated "Poor".

"Good"	"Fair"	"Poor"	No Data	Not appropriate to rank

Evaluation Geography	Scenario 1.2 Value	Scenario 1.2 Units	Scenario 2.1 Value	Scenario 2.1 Units	Scenario 3.1 Value	Scenario 3.1 Units	SAAM-1 Value	SAAM-1 Units	SAAM-2 Value	SAAM-2 Units	SAAM-3 Value	SAAM-3 Units
Total Future UGB (Including Current UGB)		> 20 acres		> 20 acres		> 20 acres		> 20 acres		> 20 acres		> 20 acres
		< 20 acres		< 20 acres		< 20 acres		< 20 acres		< 20 acres		< 20 acres
Total Expansion Area (excluding current UGB)	61%	> 20 acres	76%	> 20 acres	66%	> 20 acres	38%	> 20 acres	59%	> 20 acres	79%	> 20 acres
	39%	< 20 acres	24%	< 20 acres	34%	< 20 acres	62%	< 20 acres	41%	< 20 acres	21%	< 20 acres
Subareas												
North Triangle	74%	> 20 acres	76%	> 20 acres	61%	> 20 acres	74%	> 20 acres	61%	> 20 acres	61%	> 20 acres
	26%	< 20 acres	24%	< 20 acres	39%	< 20 acres	26%	< 20 acres	39%	< 20 acres	39%	< 20 acres
NE Edge	12%	> 20 acres	0%	> 20 acres	0%	> 20 acres	**4%**	> 20 acres	0%	> 20 acres	0%	> 20 acres
	88%	< 20 acres	100%	< 20 acres	100%	< 20 acres	**96%**	< 20 acres	100%	< 20 acres	100%	< 20 acres
DSL Property	100%	> 20 acres	100%	> 20 acres	100%	> 20 acres	100%	> 20 acres	**37%**	> 20 acres	100%	> 20 acres
	0%	< 20 acres	0%	< 20 acres	0%	< 20 acres	0%	< 20 acres	**63%**	< 20 acres	0%	< 20 acres
The "Elbow"	67%	> 20 acres	69%	> 20 acres	68%	> 20 acres	69%	> 20 acres	69%	> 20 acres	76%	> 20 acres
	33%	< 20 acres	31%	< 20 acres	32%	< 20 acres	31%	< 20 acres	31%	< 20 acres	24%	< 20 acres
The "Thumb"	100%	> 20 acres	100%	> 20 acres	100%	> 20 acres	100%	> 20 acres	99%	> 20 acres	100%	> 20 acres
	0%	< 20 acres	0%	< 20 acres	0%	< 20 acres	0%	< 20 acres	1%	< 20 acres	0%	< 20 acres
West Area	97%	> 20 acres	100%	> 20 acres	95%	> 20 acres	-	> 20 acres	-	> 20 acres	**92%**	> 20 acres
	3%	< 20 acres	0%	< 20 acres	5%	< 20 acres	-	< 20 acres	-	< 20 acres	**8%**	< 20 acres
Shevlin Area	-	> 20 acres	-	> 20 acres	100%	> 20 acres	**63%**	> 20 acres	-	> 20 acres	-	> 20 acres
	-	< 20 acres	-	< 20 acres	0%	< 20 acres	**37%**	< 20 acres	-	< 20 acres	-	< 20 acres
OB Riley / Gopher Gulch Area	40%	> 20 acres	37%	> 20 acres	24%	> 20 acres	40%	> 20 acres	**57%**	> 20 acres	30%	> 20 acres
	60%	< 20 acres	63%	< 20 acres	76%	< 20 acres	60%	< 20 acres	**43%**	< 20 acres	70%	< 20 acres
Existing UGB (if applicable)												
Overall Score	3 ○		5 ◉		3 ○		1 ●		3 ○		5 ◉	
	Am emphasis on growth in the Northeast Edge, which has smaller parcels, results less of the expansion that would be subject to master planning than most other alternatives.		Relatively large developments in DSL, West area, and The Thumb make this scenario mostly (over 75%) large property owners.		The inclusion of the area between OB Riley Road and Gopher Gulch reduces the percent of expansion that would be subject to master planning relative to some other alternatives.		A significant expansion in the Northeast Edge, which has smaller parcels, makes this the lowest amount of expansion that would be subject to master planning.		The inclusion of Darnell Estates with the DSL Property and the inclusion of the area between OB Riley Road and Gopher Gulch reduce the percent of expansion that would be subject to master planning, despite the inclusion of the large ownership in Gopher Gulch.		A significant expansion in the West area and smaller expansions on other large sites make this scenario mostly (over 75%) large property owners.	

For more information about this performance measure, see accompanying technical memorandum from Angelo Planning Group

Factor 1: Efficient Accommodation of Identified Land Needs

Author: Andrew Parish **APG**

Community Outcome B **Efficient, Timely Growth**

Date: 10/1/2015

Performance Measure 1 **Urbanized Acres**

Brief Description of Evaluation: Current urbanized land was based on plan designations inside the existing UGB (all of the existing UGB is considered "urbanized" for the purposes of this performance measure). Future urbanized land is the total acres of expansion, categorized based on the development type.

Data Sources Envision Tomorrow Scenario Builder GIS inputs.

Interpretation and Key The amount of land for civic uses (parks & schools) in each alternative is preliminary - further refinement of school land needs has already occurred with the school district and park land needs may also be refined further. This is provided for information, but does not contribute to the scoring. Minor variations in the amount of employment land are also not especially meaningful, and do not contribute to the scoring. The primary differentiation among the alternatives is the amount of residential land, which varies based on where it is accommodated. The total residential acres for the scenario is the measure that drives the overall score. Alternatives with under 700 acres of residential expansion are rated "good", those with 700-900 acres are rated "fair", and those with over 900 acres are rated "poor".

"Good"	"Fair"	"Poor"	No Data	Not appropriate to rank

Evaluation Geography	Scenario 1.2		Scenario 2.1		Scenario 3.1		SAAM-1		SAAM-2		SAAM-3	
	Value	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*
Total Future UGB (Including Current UGB)	31615	Total acres	31749	Total acres	31828	Total acres	32764	Total acres	31938	Total acres	31608	Total acres
	8773	Res Acres	8803	Res Acres	8835	Res Acres	9687	Res Acres	8926	Res Acres	8761	Res Acres
	16837	Emp Acres	16799	Emp Acres	16834	Emp Acres	16874	Emp Acres	16849	Emp Acres	16884	Emp Acres
	6005	Civic Acres	6147	Civic Acres	6159	Civic Acres	6203	Civic Acres	6163	Civic Acres	5963	Civic Acres
Total Expansion Area (excluding current UGB)	1681	Total acres	1815	Total acres	1894	Total acres	2830	Total acres	2004	Total acres	1674	Total acres
	676	Res Acres	706	Res Acres	738	Res Acres	1590	Res Acres	829	Res Acres	664	Res Acres
	878	Emp Acres	840	Emp Acres	875	Emp Acres	915	Emp Acres	890	Emp Acres	925	Emp Acres
	127	Civic Acres	269	Civic Acres	281	Civic Acres	325	Civic Acres	285	Civic Acres	85	Civic Acres
Subareas												
North Triangle	193	Total acres	187	Total acres	231	Total acres	200	Total acres	250	Total acres	250	Total acres
	0	Res Acres	78	Res Acres	0	Res Acres	0	Res Acres	0	Res Acres	0	Res Acres
	193	Emp Acres	92	Emp Acres	231	Emp Acres	200	Emp Acres	250	Emp Acres	250	Emp Acres
	0	Civic Acres	17	Civic Acres	0	Civic Acres	0	Civic Acres	0	Civic Acres	0	Civic Acres
NE Edge	455	Total acres	131	Total acres	161	Total acres	1435	Total acres	45	Total acres	45	Total acres
	383	Res Acres	102	Res Acres	117	Res Acres	1150	Res Acres	10	Res Acres	10	Res Acres
	58	Emp Acres	29	Emp Acres	30	Emp Acres	70	Emp Acres	35	Emp Acres	35	Emp Acres
	14	Civic Acres	0	Civic Acres	14	Civic Acres	215	Civic Acres	0	Civic Acres	0	Civic Acres
DSL Property	222	Total acres	363	Total acres	192	Total acres	130	Total acres	210	Total acres	125	Total acres
	39	Res Acres	142	Res Acres	39	Res Acres	0	Res Acres	115	Res Acres	60	Res Acres
	128	Emp Acres	115	Emp Acres	65	Emp Acres	130	Emp Acres	95	Emp Acres	65	Emp Acres
	55	Civic Acres	106	Civic Acres	88	Civic Acres	0	Civic Acres	0	Civic Acres	0	Civic Acres
The "Elbow"	202	Total acres	431	Total acres	178	Total acres	150	Total acres	184	Total acres	184	Total acres
	48	Res Acres	89	Res Acres	3	Res Acres	0	Res Acres	4	Res Acres	4	Res Acres
	114	Emp Acres	278	Emp Acres	135	Emp Acres	110	Emp Acres	140	Emp Acres	140	Emp Acres
	40	Civic Acres	64	Civic Acres	40	Civic Acres	40	Civic Acres	40	Civic Acres	40	Civic Acres
The "Thumb"	350	Total acres	395	Total acres	176	Total acres	240	Total acres	225	Total acres	220	Total acres
	106	Res Acres	180	Res Acres	0	Res Acres	0	Res Acres	50	Res Acres	0	Res Acres
	244	Emp Acres	172	Emp Acres	176	Emp Acres	240	Emp Acres	175	Emp Acres	220	Emp Acres
	0	Civic Acres	43	Civic Acres	0	Civic Acres	0	Civic Acres	0	Civic Acres	0	Civic Acres
West Area	132	Total acres	173	Total acres	329	Total acres	0	Total acres	0	Total acres	670	Total acres
	100	Res Acres	115	Res Acres	313	Res Acres	0	Res Acres	0	Res Acres	580	Res Acres
	14	Emp Acres	41	Emp Acres	14	Emp Acres	0	Emp Acres	0	Emp Acres	45	Emp Acres
	18	Civic Acres	17	Civic Acres	2	Civic Acres	0	Civic Acres	0	Civic Acres	45	Civic Acres
Shevlin Area	0	Total acres	0	Total acres	176	Total acres	545	Total acres	0	Total acres	0	Total acres
	0	Res Acres	0	Res Acres	119	Res Acres	440	Res Acres	0	Res Acres	0	Res Acres
	0	Emp Acres	0	Emp Acres	28	Emp Acres	35	Emp Acres	0	Emp Acres	0	Emp Acres
	0	Civic Acres	0	Civic Acres	29	Civic Acres	70	Civic Acres	0	Civic Acres	0	Civic Acres
OB Riley / Gopher Gulch Area	127	Total acres	135	Total acres	451	Total acres	130	Total acres	1090	Total acres	180	Total acres
	0	Res Acres	0	Res Acres	147	Res Acres	0	Res Acres	650	Res Acres	10	Res Acres
	127	Emp Acres	113	Emp Acres	196	Emp Acres	130	Emp Acres	195	Emp Acres	170	Emp Acres
	0	Civic Acres	22	Civic Acres	108	Civic Acres	0	Civic Acres	245	Civic Acres	0	Civic Acres
Existing UGB (if applicable)	29934	Total acres	29934	Total acres	29934	Total acres	29934	Total acres	29934	Total acres	29934	Total acres
	8097	Res Acres	8097	Res Acres	8097	Res Acres	8097	Res Acres	8097	Res Acres	8097	Res Acres
	15959	Emp Acres	15959	Emp Acres	15959	Emp Acres	15959	Emp Acres	15959	Emp Acres	15959	Emp Acres
	5878	Civic Acres	5878	Civic Acres	5878	Civic Acres	5878	Civic Acres	5878	Civic Acres	5878	Civic Acres
Overall Score	5		4		4		3		4		5	
	Despite including some developed portions of the Northeast edge, the inclusion of multifamily housing in parts of that subarea means that this scenario still performs quite well overall.		A focus on large, vacant parcels keeps this scenario fairly efficient.		Less efficient development in the northeast edge and Shevlin area increase the total residential expansion.		Inclusion of the large existing rural subdivision south of Juniper Ridge significantly increases the total residential acres.		This scenario fills up the OB Riley / Gopher Gulch Area, which pushes the acreage (and total housing units) up beyond what's truly needed; it is not penalized for that.		Focusing residential development in the West Area allows for efficient residential development.	

For more information about this performance measure, see accompanying technical memorandum from Angelo Planning Group.

Factor 1: Efficient Accommodation of Identified Land Needs

Author: Andrew Parish **APG**

Community Outcome B **Efficient, Timely Growth** **Date:** 9/9/2015

Performance Measure 2 **Gross Residential Density**

Brief Description of Evaluation: The gross density (inclusive of roads, or other land reductions) of housing units on residential land only.

Data Sources Envision Tomorrow Scenario Builder output. Based on building type, and unit size.

Interpretation and Key Gross housing density is the number of residential units divided by the residential acreage for each evaluation geography. This does not include residential units in commercial areas (e.g. an apartment above a storefront). Gross densities equal to or greater than the overall gross density of new housing inside the UGB were rated "good"; densities below 3.0 units per gross acre were rated "Poor".

"Good"	"Fair"	"Poor"	No Data	Not appropriate to rank

Evaluation Geography	Scenario 1.2		Scenario 2.1		Scenario 3.1		SAAM-1		SAAM-2		SAAM-3	
	Value	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*
Total Future UGB (Including Current UGB)	4.7	HU / Gross Residential Acre	4.7	HU / Gross Residential Acre	4.7	HU / Gross Residential Acre	3.8	HU / Gross Residential Acre	4.7	HU / Gross Residential Acre	4.8	HU / Gross Residential Acre
Total Expansion Area (excluding current UGB)	6.0	HU / Gross Residential Acre	5.8	HU / Gross Residential Acre	5.5	HU / Gross Residential Acre	2.6	HU / Gross Residential Acre	5.7	HU / Gross Residential Acre	6.2	HU / Gross Residential Acre
Subareas												
North Triangle	N/A	HU / Gross Residenti	7.3	HU / Gross Residential Acre	N/A	HU / Gross Residenti	N/A	HU / Gross Residenti	N/A	HU / Gross Residenti	N/A	HU / Gross Residenti
NE Edge	4.4	HU / Gross Residential Acre	3.7	HU / Gross Residential Acre	3.9	HU / Gross Residential Acre	**2.2**	HU / Gross Residential Acre	8.3	HU / Gross Residential Acre	8.3	HU / Gross Residential Acre
DSL Property	11.7	HU / Gross Residential Acre	6.4	HU / Gross Residential Acre	10.9	HU / Gross Residential Acre	N/A	HU / Gross Residential Acre	4.8	HU / Gross Residential Acre	13.3	HU / Gross Residential Acre
The "Elbow"	10.6	HU / Gross Residential Acre	9.2	HU / Gross Residential Acre	9.7	HU / Gross Residenti	N/A	HU / Gross Residenti	7.3	HU / Gross Residenti	7.3	HU / Gross Residential Acre
The "Thumb"	4.6	HU / Gross Residential Acre	3.6	HU / Gross Residential Acre	N/A	HU / Gross Residenti	N/A	HU / Gross Residenti	3.2	HU / Gross Residential Acre	N/A	HU / Gross Residential Acre
West Area	8.9	HU / Gross Residential Acre	6.7	HU / Gross Residential Acre	5.4	HU / Gross Residential Acre	N/A	HU / Gross Residenti	N/A	HU / Gross Residenti	5.1	HU / Gross Residential Acre
Shevlin Area	N/A	HU / Gross Residential Acre	N/A	HU / Gross Residential Acre	2.3	HU / Gross Residential Acre	**3.4**	HU / Gross Residential Acre	N/A	HU / Gross Residential Acre	N/A	HU / Gross Residential Acre
OB Riley / Gopher Gulch Area	N/A	HU / Gross Residenti	N/A	HU / Gross Residenti	7.6	HU / Gross Residential Acre	N/A	HU / Gross Residenti	5.9	HU / Gross Residential Acre	19.0	HU / Gross Residential Acre
Existing UGB (if applicable)	4.5	HU / Gross Residenti	4.5	HU / Gross Residenti	4.5	HU / Gross Residential Acre	4.5	HU / Gross Residential Acre	4.5	HU / Gross Residenti	4.5	HU / Gross Residenti
Overall Score	5 ◉		5 ◉		3 ○		1 ●		4 ◔		5 ◉	
	All expansion areas have high residential density, and the overall average density is among the highest.		While the northeast edge is somewhat less efficient than other areas, overall this alternative has the highest net residential density for expansion areas.		The Shevlin Area is somewhat less efficient than other areas in this scenario, but overall net residential density for expansion areas is still good.		Due to the inclusion of the large residential subdivision south of Juniper Ridge, which has limited redevelopment capacity, the gross residential density of this SAAM is low.		The OB Riley/Gopher Gulch area scores well in this SAAM, and the overall net housing density is good. The small piece near the Thumb property is a low density, but its size is small.		The West Area scores fairly well in this SAAM, and the overall net housing density is good. There is a small piece of exclusively multifamily designation in the OB Riley Area, which is the cause if its high density.	

For more information about this performance measure, see accompanying technical memorandum from Angelo Planning Group.

Factor 1: Efficient Accommodation of Identified Land Needs

Author: Analysis by Fregonese Associates; interpretation by Angelo Planning Group

Community Outcome B: Efficient, Timely Growth

Date: 9/10/2015

Performance Measure 3	Net Density for New Jobs in 2028
Brief Description of Evaluation:	The net density (not inclusive of roads, or other land reductions) of new jobs on employment land only.
Data Sources	Envision Tomorrow Scenario Builder output. Based on building type, and employees per sqft.
Interpretation and Key	Net density for new employment areas is higher for all new employment areas than for existing employment areas in Bend, indicating that all alternatives have significantly improved employment land use efficiency. Net employment densities rate as "Good" in all subareas and for all scenarios.

"Good"	"Fair"	"Poor"	No Data	Not appropriate to rank

Evaluation Geography	Scenario 1.2		Scenario 2.1		Scenario 3.1		SAAM-1		SAAM-2		SAAM-3	
	Value	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*
Total Future UGB (Including Current UGB)	22	Jobs per Net Employment Acre	22	Jobs per Net Employment Acre	22	Jobs per Net Employment Acre	22	Jobs per Net Employment Acre	22	Jobs per Net Employment Acre	22	Jobs per Net Employment Acre
Total Expansion Area (excluding current UGB)	19	Jobs per Net Employment Acre	20	Jobs per Net Employment Acre	19	Jobs per Net Employment Acre	19	Jobs per Net Employment Acre	19	Jobs per Net Employment Acre	20	Jobs per Net Employment Acre
Subareas												
North Triangle	18	Jobs per Net Employment Acre	20	Jobs per Net Employment Acre	18	Jobs per Net Employment Acre	18	Jobs per Net Employment Acre	18	Jobs per Net Employment Acre	18	Jobs per Net Employment Acre
NE Edge	20	Jobs per Net Employment Acre	18	Jobs per Net Employment Acre	18	Jobs per Net Employment Acre	21	Jobs per Net Employment Acre	18	Jobs per Net Employment Acre	18	Jobs per Net Employment Acre
DSL Property	21	Jobs per Net Employment Acre	21	Jobs per Net Employment Acre	19	Jobs per Net Employment Acre	21	Jobs per Net Employment Acre	20	Jobs per Net Employment Acre	19	Jobs per Net Employment Acre
The "Elbow"	22	Jobs per Net Employment Acre	20	Jobs per Net Employment Acre	21	Jobs per Net Employment Acre	22	Jobs per Net Employment Acre	21	Jobs per Net Employment Acre	21	Jobs per Net Employment Acre
The "Thumb"	18	Jobs per Net Employment Acre	21	Jobs per Net Employment Acre	18	Jobs per Net Employment Acre	17	Jobs per Net Employment Acre	18	Jobs per Net Employment Acre	19	Jobs per Net Employment Acre
West Area	25	Jobs per Net Employment Acre	26	Jobs per Net Employment Acre	25	Jobs per Net Employment Acre	N/A	Jobs per Net Employment Acre	N/A	Jobs per Net Employment Acre	23	Jobs per Net Employment Acre
Shevlin Area	N/A	Jobs per Net Employment Acre	N/A	Jobs per Net Employment Acre	25	Jobs per Net Employment Acre	25	Jobs per Net Employment Acre	N/A	Jobs per Net Employment Acre	N/A	Jobs per Net Employment Acre
OB Riley / Gopher Gulch Area	18	Jobs per Net Employment Acre	18	Jobs per Net Employment Acre	20	Jobs per Net Employment Acre	18	Jobs per Net Employment Acre	21	Jobs per Net Employment Acre	20	Jobs per Net Employment Acre
Existing UGB (if applicable)	23	Jobs per Net Employment Acre	23	Jobs per Net Employment Acre	23	Jobs per Net Employment Acre	23	Jobs per Net Employment Acre	23	Jobs per Net Employment Acre	23	Jobs per Net Employment Acre
Overall Score	5		5		5		5		5		5	
	Net employment densities rate as "Good" in all subareas and for all scenarios.		Net employment densities rate as "Good" in all subareas and for all scenarios.		Net employment densities rate as "Good" in all subareas and for all scenarios.		Net employment densities rate as "Good" in all subareas and for all scenarios.		Net employment densities rate as "Good" in all subareas and for all scenarios.		Net employment densities rate as "Good" in all subareas and for all scenarios.	

For more information about this performance measure, see accompanying technical memorandum from Fregonese Associates.

Factor 1: Efficient Accommodation of Identified Land Needs

Author: CJ Doxsee **APG**

Date: 8/20/2015

Community Outcome B Efficient, Timely Growth

Performance Measure 4 Percent of urbanized acres on parcels under 20 acres and contiguous to the existing UGB

Brief Description of Evaluation: Percent of acres in each geography that have a lot size under 20 acres and are contiguous to the existing UGB. Note: Sewer capacity is an issue in all areas. 50' buffer was used for adjacency to UGB.

Data Sources Deschutes County Assessor's Data, City of Bend data.

Interpretation and Key Smaller parcels that are adjacent to the UGB may face fewer barriers to development within the first few years after the UGB expansion is adopted. For this performance measure, more land that is on parcels under 20 acres and adjacent to the UGB is considered better. (Note: this performance measure captures roughly the inverse of measure 1.A.5 - potential for master planning. Master planning provides opportunities for complete, well-designed communities but also takes more time for planning and permitting.) At a subarea level, subareas with less than 25% of acreage in this category rated as "Poor"; those with 25-50% rated as "Fair", and those with more than 50% rated as "Good". Overall ratings are relative to the other alternatives.

"Good"	"Fair"	"Poor"	No Data	Not appropriate to rank

Evaluation Geography	Scenario 1.2 Value	Scenario 1.2 Units	Scenario 2.1 Value	Scenario 2.1 Units	Scenario 3.1 Value	Scenario 3.1 Units	SAAM-1 Value	SAAM-1 Units	SAAM-2 Value	SAAM-2 Units	SAAM-3 Value	SAAM-3 Units
Total Future UGB (Including Current UGB)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total Expansion Area (excluding current UGB)	18.9%	Acres/Total Scenario Acres	14.2%	Acres/Total Scenario Acres	13.4%	Acres/Total Scenario Acres	11.3%	Acres/Total Scenario Acres	10.4%	Acres/Total Scenario Acres	9.5%	Acres/Total Scenario Acres
Subareas												
North Triangle	14%	Acres/Total Subarea Acres Included in UGB	14%	Acres/Total Subarea Acres Included in UGB	14%	Acres/Total Subarea Acres Included in UGB	11%	Acres/Total Subarea Acres Included in UGB	13%	Acres/Total Subarea Acres Included in UGB	10%	Acres/Total Subarea Acres Included in UGB
NE Edge	42%	Acres/Total Subarea Acres Included in UGB	63%	Acres/Total Subarea Acres Included in UGB	57%	Acres/Total Subarea Acres Included in UGB	93%	Acres/Total Subarea Acres Included in UGB	2%	Acres/Total Subarea Acres Included in UGB	76%	Acres/Total Subarea Acres Included in UGB
DSL Property	0%	Acres/Total Subarea Acres Included in UGB	0%	Acres/Total Subarea Acres Included in UGB	0%	Acres/Total Subarea Acres Included in UGB	0%	Acres/Total Subarea Acres Included in UGB	7%	Acres/Total Subarea Acres Included in UGB	0%	Acres/Total Subarea Acres Included in UGB
The "Elbow"	31%	Acres/Total Subarea Acres Included in UGB	19%	Acres/Total Subarea Acres Included in UGB	11%	Acres/Total Subarea Acres Included in UGB	25%	Acres/Total Subarea Acres Included in UGB	32%	Acres/Total Subarea Acres Included in UGB	26%	Acres/Total Subarea Acres Included in UGB
The "Thumb"	0%	Acres/Total Subarea Acres Included in UGB	0%	Acres/Total Subarea Acres Included in UGB	0%	Acres/Total Subarea Acres Included in UGB	0%	Acres/Total Subarea Acres Included in UGB	1%	Acres/Total Subarea Acres Included in UGB	0%	Acres/Total Subarea Acres Included in UGB
West Area	2%	Acres/Total Subarea Acres Included in UGB	0%	Acres/Total Subarea Acres Included in UGB	5%	Acres/Total Subarea Acres Included in UGB	N/A	Acres/Total Subarea Acres Included in UGB	N/A	Acres/Total Subarea Acres Included in UGB	0%	Acres/Total Subarea Acres Included in UGB
Shevlin Area	N/A	Acres/Total Subarea Acres Included in UGB	N/A	Acres/Total Subarea Acres Included in UGB	0%	Acres/Total Subarea Acres Included in UGB	21%	Acres/Total Subarea Acres Included in UGB	N/A	Acres/Total Subarea Acres Included in UGB	N/A	Acres/Total Subarea Acres Included in UGB
OB Riley / Gopher Gulch Area	27%	Acres/Total Subarea Acres Included in UGB	26%	Acres/Total Subarea Acres Included in UGB	53%	Acres/Total Subarea Acres Included in UGB	8%	Acres/Total Subarea Acres Included in UGB	56%	Acres/Total Subarea Acres Included in UGB	3%	Acres/Total Subarea Acres Included in UGB
Existing UGB (if applicable)	N/A		N/A		N/A		N/A		N/A		N/A	
Overall Score	5		3		3		2		2		1	
	Scenario 1.2 includes several parcels in the NE, North, OB Riley, and Elbow areas that are adjacent to the UGB and under 20 acres. Scenario 1.2 has the highest percentage of acreage that falls into this category, due to the inclusion of the highly parcelized NE Edge area.		Scenario 2.1 performs slightly worse than Scenario 1.2 due to inclusion of significant acreage on large parcels in DSL, Elbow, and Thumb, and West.		Scenario 3.1 performs roughly the same as scenario 2.1, as it includes large parcels in the West, Shevlin area, and areas of OB Riley / Gopher Gulch that are nonadjacent to the UGB		SAAMs generally perform worse than the first three scenarios due to inclusion of large parcels and large expansions away from the UGB		SAAMs generally perform worse than the first three scenarios due to inclusion of large parcels and large expansions away from the UGB		SAAMs generally perform worse than the first three scenarios due to inclusion of large parcels and large expansions away from the UGB	

For more information about this performance measure, see accompanying technical memorandum from APG

Factor 1: Efficient Accommodation of Identified Land Needs

Author: Analysis by Fregonese Associates; interpretation by Angelo Planning Group

Community Outcome B Efficient, Timely Growth

Date: 10/1/2015

Performance Measure 5 Growth on vacant versus developed land

Brief Description of Evaluation: Percent of urbanized acres on land that is vacant versus areas that are already developed

Data Sources Envision Tomorrow Scenario builder output; Buildable Lands Inventory and developed area outside the UGB by Fregonese Associates

Interpretation and Key Development on vacant land may be more likely to occur in a shorter amount of time because there are no existing land uses generating income or providing value for the property owner. For the purposes of this performance measure, more of the expansion on vacant land rather than developed land is considered positive. (Note that data is not available at the subarea level at this time.)

"Good"	"Fair"	"Poor"	No Data	Not appropriate to rank

Evaluation Geography	Scenario 1.2		Scenario 2.1		Scenario 3.1		SAAM-1		SAAM-2		SAAM-3	
	Value	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*
Total Future UGB (Including Current UGB)												
Total Expansion Area (excluding current UGB)	95%	Vacant	92%	Vacant	93%	Vacant	81%	Vacant	88%	Vacant	96%	Vacant
	5%	Developed	8%	Developed	7%	Developed	19%	Developed	12%	Developed	4%	Developed
Subareas												
North Traingle												
NE Edge												
DSL Property												
The "Elbow"												
The "Thumb"												
West Area												
Shevlin Area												
OB Riley / Gopher Gulch Area												
Existing UGB (if applicable)												
Overall Score	5		4		4		2		3		5	
	Includes some existing development in the Northeast Edge, but mostly large vacant parcels.		Includes some existing development in The Elbow and some in the Northeast Edge, but mostly large, vacant parcels.		Includes some existing development west of OB Riley Road and some in the Northeast Edge, but mostly large, vacant parcels.		Includes much existing development in the northern portion of the Northeast Edge.		Includes some existing development west of OB Riley Road and some north of DSL Property, but mostly large, vacant parcels.		Includes very little existing development in the Northeast Edge and the Elbow; mostly large, vacant parcels.	

For more information about this performance measure, see accompanying technical memorandum from Fregonese Associates.

Factor 2: Orderly and Economic Provision of Public Facilities and Services

Author: CSM **DKS Associates**

Date: 9/9/2015

Community Outcome A — Balanced Transportation System

Performance Measure 1: Vehicle Miles Traveled per Capita

Brief Description of Evaluation: Calculated from output from the travel demand model run by TPAU for trips internal to the City (both ends of the trip are within the proposed UGB boundary).

Data Sources: ODOT/MPO 2028 Regional Travel Demand Model, Daily Trips

Interpretation and Key: VMT results are relative to a base year target for VMT/Capita reduction (e.g., less than 9.64 VMT/Capita from the 2010 year model).* Good would be a reduction in VMT/Capita. Fair is an increase of less than 4%. Poor is an increase of more than 4%.

"Good"	"Fair"	"Poor"	No Data	Not appropriate to rank

Evaluation Geography	Scenario 1.2 Value	Scenario 1.2 Units	Scenario 2.1 Value	Scenario 2.1 Units	Scenario 3.1 Value	Scenario 3.1 Units	SAAM-1 Value	SAAM-1 Units	SAAM-2 Value	SAAM-2 Units	SAAM-3 Value	SAAM-3 Units
Total Future UGB (Including Current UGB)	10.11	Daily Vehicle Miles Traveled per capita	9.92	Daily Vehicle Miles Traveled per capita	9.99	Daily Vehicle Miles Traveled per capita	10.13	Daily Vehicle Miles Traveled per capita	10.11	Daily Vehicle Miles Traveled per capita	10.09	Daily Vehicle Miles Traveled per capita
	4.9%	Percent Increase relative to 2010	2.9%	Percent Increase relative to 2010	3.6%	Percent Increase relative to 2010	5.1%	Percent Increase relative to 2010	4.9%	Percent Increase relative to 2010	4.7%	Percent Increase relative to 2010
	10.1%	Percent increase relative to 2003	8.1%	Percent increase relative to 2003	8.8%	Percent increase relative to 2003	10.3%	Percent increase relative to 2003	10.1%	Percent increase relative to 2003	9.9%	Percent increase relative to 2003
Total Expansion Area (excluding current UGB)												
Subareas												
North Triangle												
NE Edge												
DSL Property												
The "Elbow"												
The "Thumb"												
West Area												
Shevlin Area												
OB Riley / Gopher Gulch Area												
Existing UGB (if applicable)												
Overall Score	2	See Measure 2.A.2 for more detailed findings.	3	See Measure 2.A.2 for more detailed findings.	3	See Measure 2.A.2 for more detailed findings.	2	See Measure 2.A.2 for more detailed findings.	2	See Measure 2.A.2 for more detailed findings.	2	See Measure 2.A.2 for more detailed findings.

For more information about this performance measure, see accompanying technical memorandum from DKS Associates.

* The project team is working with DLCD to determine whether Bend may use the base 2010 model for the VMT analysis, given that the Remand specifies 2003 as the baseline year, but the 2010 model is a better reflection of 2008 and includes other important updates and improvements. The distinction is important because VMT increased by nearly 5% between 2003 and 2010 (VMT per capita in 2003 was estimated at 9.18, versus 9.64 in 2010). For purposes of analysis, the project team is evaluating both 2003 and 2010 as baseline years.

Factor 2: Orderly and Economic Provision of Public Facilities and Services

Author: CSM **DKS Associates**

Community Outcome A **Balanced Transportation System**

Date: 9/9/2015

Performance Measure 2	**Average Trip Length**
Brief Description of Evaluation:	Calculated from output from the travel demand model run by TPAU for trips internal to the City (both ends of the trip are within the proposed UGB boundary, calculated per round-trip).
Data Sources	ODOT/MPO 2028 Regional Travel Demand Model, Daily Trips
Interpretation and Key	Average trip length results (a proxy for VMT/Capita for subareas) are expected to be higher in fringe growth areas of the City. Areas performing more closely to the existing UGB (i.e., average trip length below 9.0 miles), are colored as good.

"Good"	"Fair"	"Poor"	No Data	Not appropriate to rank

Evaluation Geography	Scenario 1.2 Value	Scenario 1.2 Units	Scenario 2.1 Value	Scenario 2.1 Units	Scenario 3.1 Value	Scenario 3.1 Units	SAAM-1 Value	SAAM-1 Units	SAAM-2 Value	SAAM-2 Units	SAAM-3 Value	SAAM-3 Units
Total Future UGB (Including Current UGB)	7.64	Average Daily Round-Trip Length	7.51	Average Daily Round-Trip Length	7.57	Average Daily Round-Trip Length	7.68	Average Daily Round-Trip Length	7.66	Average Daily Round-Trip Length	7.62	Average Daily Round-Trip Length
Total Expansion Area (excluding current UGB)	9.79	Average Daily Round-Trip Length	9.47	Average Daily Round-Trip Length	9.32	Average Daily Round-Trip Length	9.89	Average Daily Round-Trip Length	9.61	Average Daily Round-Trip Length	9.47	Average Daily Round-Trip Length
Subareas												
North Triangle	9.83	Average Daily Round-Trip Length	9.64	Average Daily Round-Trip Length	9.59	Average Daily Round-Trip Length	9.77	Average Daily Round-Trip Length	9.29	Average Daily Round-Trip Length	9.81	Average Daily Round-Trip Length
NE Edge	9.17	Average Daily Round-Trip Length	8.93	Average Daily Round-Trip Length	8.95	Average Daily Round-Trip Length	9.21	Average Daily Round-Trip Length	9.05	Average Daily Round-Trip Length	9.15	Average Daily Round-Trip Length
DSL Property	8.41	Average Daily Round-Trip Length	8.53	Average Daily Round-Trip Length	8.65	Average Daily Round-Trip Length	8.77	Average Daily Round-Trip Length	9.02	Average Daily Round-Trip Length	8.77	Average Daily Round-Trip Length
The "Elbow"	9.16	Average Daily Round-Trip Length	8.82	Average Daily Round-Trip Length	9.10	Average Daily Round-Trip Length	9.11	Average Daily Round-Trip Length	9.47	Average Daily Round-Trip Length	9.12	Average Daily Round-Trip Length
The "Thumb"	11.97	Average Daily Round-Trip Length	11.34	Average Daily Round-Trip Length	10.94	Average Daily Round-Trip Length	11.46	Average Daily Round-Trip Length	12.15	Average Daily Round-Trip Length	11.54	Average Daily Round-Trip Length
West Area	9.27	Average Daily Round-Trip Length	9.31	Average Daily Round-Trip Length	9.41	Average Daily Round-Trip Length	N/A	Average Daily Round-Trip Length	N/A	Average Daily Round-Trip Length	9.44	Average Daily Round-Trip Length
Shevlin Area	N/A	Average Daily Round-Trip Length	N/A	Average Daily Round-Trip Length	10.23	Average Daily Round-Trip Length	11.47	Average Daily Round-Trip Length	N/A	Average Daily Round-Trip Length	N/A	Average Daily Round-Trip Length
OB Riley / Gopher Gulch Area	9.24	Average Daily Round-Trip Length	9.67	Average Daily Round-Trip Length	9.27	Average Daily Round-Trip Length	9.16	Average Daily Round-Trip Length	9.51	Average Daily Round-Trip Length	9.05	Average Daily Round-Trip Length
Existing UGB (if applicable)	7.08	Average Daily Round-Trip Length	7.09	Average Daily Round-Trip Length	7.08	Average Daily Round-Trip Length	7.08	Average Daily Round-Trip Length	7.08	Average Daily Round-Trip Length	7.07	Average Daily Round-Trip Length
Overall Score	2		5		4		2		2		3	
	Significant magnitude of growth in the "Thumb" area, the worst performing sub-area, increased overall average scenario trip length.		Less growth in the "Thumb" and more in the better performing areas on the east-side improve overall average scenario trip-length. Bringing in the entire "Elbow" area to allow a connection from 15th/Murphy area to Rickard Rd. significantly improved the scenario.		Increased growth in the "Shevlin" area increased overall average scenario trip-length. More mixed-use development in OB Riley/Gopher Gulch helps this scenario.		Increased growth in the "Shevlin" area increased overall average scenario trip-length.		Less growth in the eastside, combined with the lack of connection from Rickard to 15th, increases the overall average scenario trip length.		More employment focus in the "North Triangle", the lack of connection from Rickard to 15th, and more growth in the West Area increases the overall average scenario trip length.	

For more information about this performance measure, see accompanying technical memorandum from DKS Associates.

Factor 2: Orderly and Economic Growth

Author: Fregonese Associates

Community Outcome A Balanced Transportation System

Date: 10/1/2015

Performance Measure 3 Household Vehicle Miles Traveled per Capita (7D Model)

Brief Description of Evaluation: The average number of vehicle miles travel (VMT) per person, per day. Output from 7D transportation model within Envision Tomorrow.

Data Sources

Interpretation and Key

The color coding was applied in two ways. At the Total Future UGB and the Expansion Area level, the colors are applied only across the same geography and help distinguish differences between scenarios at the same geography. The color coding does not compare the Total Future UGB against the Expansion Area, the value of the indicator itself does provide some insights into those differences, however. The subarea outputs, on the other hand, were coded relative to all subareas in all scenarios to highlight differences across subareas within one scenario but also across scenarios. In this way, we can identify which the best and worst performing subareas across all scenarios. Where the subarea cells are greyed out, the amount of housing within that subarea is not significant (less than 100 new units) and thus the result is not significant.

"Good"	"Fair"	"Poor"	No Data	Not appropriate to rank

Evaluation Geography	Scenario 1.2		Scenario 2.1		Scenario 3.1		SAAM-1		SAAM-2		SAAM-3	
	Value	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*
Total Future UGB (Including Current UGB)	9.40	VMT/capita	9.32	VMT/capita	9.42	VMT/capita	9.62	VMT/capita	9.62	VMT/capita	9.57	VMT/capita
Total Expansion Area (excluding current UGB)	12.66	VMT/capita	12.56	VMT/capita	14.24	VMT/capita	14.57	VMT/capita	13.82	VMT/capita	13.79	VMT/capita
Subareas												
North Triangle	12.09	VMT/capita	12.25	VMT/capita	11.74	VMT/capita	12.11	VMT/capita	11.96	VMT/capita	12.03	VMT/capita
NE Edge	12.43	VMT/capita	10.88	VMT/capita	10.97	VMT/capita	13.51	VMT/capita	11.48	VMT/capita	11.04	VMT/capita
DSL Property	9.17	VMT/capita	10.76	VMT/capita	12.98	VMT/capita	12.59	VMT/capita	9.52	VMT/capita	9.63	VMT/capita
The "Elbow"	13.53	VMT/capita	13.67	VMT/capita	13.61	VMT/capita	13.21	VMT/capita	13.60	VMT/capita	13.60	VMT/capita
The "Thumb"	11.16	VMT/capita	12.34	VMT/capita	12.37	VMT/capita	16.53	VMT/capita	16.44	VMT/capita	16.48	VMT/capita
West Area	15.26	VMT/capita	14.93	VMT/capita	16.13	VMT/capita	11.98	VMT/capita	11.93	VMT/capita	15.22	VMT/capita
Shevlin Area	15.46	VMT/capita	14.07	VMT/capita	14.97	VMT/capita	17.37	VMT/capita	18.75	VMT/capita	19.11	VMT/capita
OB Riley / Gopher Gulch Area	11.83	VMT/capita	11.83	VMT/capita	14.08	VMT/capita	11.84	VMT/capita	14.37	VMT/capita	12.91	VMT/capita
Existing UGB (if applicable)	8.13	VMT/capita	8.11	VMT/capita	8.12	VMT/capita	8.16	VMT/capita	8.20	VMT/capita	8.20	VMT/capita
Overall Score	4		5		3		1		2		2	

For more information about this performance measure, see accompanying technical memorandum from Fregonese Associates.

Factor 2: Orderly and Economic Provision of Public Facilities and Services

Author: CSM **DKS Associates**

Date: 9/9/2015

Community Outcome A: Balanced Transportation System

Performance Measure 4: Congestion: Miles of roadway that exceed mobility standards & relative contribution to congested roadways

Brief Description of Evaluation: The global measure indicates the overall congestion impact of each scenario. The subarea measures indicate the percentage of travel generated by each subarea (in VMT) contributes to congestion on over-capacity facilities

Data Sources: ODOT/MPO 2028 Regional Travel Demand Model, Weekday Peak Hour Trip Assignments

Interpretation and Key: Good scores represent less impact on congested roadway areas. Impact to highway corridors (US 97 or US 20) that do not have planned improvements are more significant than congested City corridors that can be mitigated if needed. For the overall proposed UGB Boundary, the values are not VMT and just total miles of congested roadways.

"Good"	"Fair"	"Poor"	No Data	Not appropriate to rank

Evaluation Geography	Scenario 1.2 Value	Scenario 1.2 Units	Scenario 2.1 Value	Scenario 2.1 Units	Scenario 3.1 Value	Scenario 3.1 Units	SAAM-1 Value	SAAM-1 Units	SAAM-2 Value	SAAM-2 Units	SAAM-3 Value	SAAM-3 Units
Total Future UGB (Including Current UGB)	14.12	Peak Hour miles of roadway with volume > capacity	14.30	Peak Hour miles of roadway with volume > capacity	14.66	Peak Hour miles of roadway with volume > capacity	13.43	Peak Hour miles of roadway with volume > capacity	14.24	Peak Hour miles of roadway with volume > capacity	14.12	Peak Hour miles of roadway with volume > capacity
Total Expansion Area (excluding current UGB)	11.5%	% of Total Peak Hour VMT on roadway with volume>capacity	11.4%	% of Total Peak Hour VMT on roadway with volume>capacity	18.3%	% of Total Peak Hour VMT on roadway with volume>capacity	11.3%	% of Total Peak Hour VMT on roadway with volume>capacity	14.8%	% of Total Peak Hour VMT on roadway with volume>capacity	13.2%	% of Total Peak Hour VMT on roadway with volume>capacity
Subareas												
North Triangle	13.2%	% of Total Peak Hour VMT on roadway with volume>capacity	12.7%	% of Total Peak Hour VMT on roadway with volume>capacity	17.1%	% of Total Peak Hour VMT on roadway with volume>capacity	12.1%	% of Total Peak Hour VMT on roadway with volume>capacity	17.0%	% of Total Peak Hour VMT on roadway with volume>capacity	15.1%	% of Total Peak Hour VMT on roadway with volume>capacity
NE Edge	10.2%	% of Total Peak Hour VMT on roadway with volume>capacity	9.8%	% of Total Peak Hour VMT on roadway with volume>capacity	10.5%	% of Total Peak Hour VMT on roadway with volume>capacity	11.2%	% of Total Peak Hour VMT on roadway with volume>capacity	9.0%	% of Total Peak Hour VMT on roadway with volume>capacity	9.1%	% of Total Peak Hour VMT on roadway with volume>capacity
DSL Property	14.9%	% of Total Peak Hour VMT on roadway with volume>capacity	14.9%	% of Total Peak Hour VMT on roadway with volume>capacity	18.3%	% of Total Peak Hour VMT on roadway with volume>capacity	17.5%	% of Total Peak Hour VMT on roadway with volume>capacity	16.4%	% of Total Peak Hour VMT on roadway with volume>capacity	18.4%	% of Total Peak Hour VMT on roadway with volume>capacity
The "Elbow"	13.7%	% of Total Peak Hour VMT on roadway with volume>capacity	15.6%	% of Total Peak Hour VMT on roadway with volume>capacity	15.5%	% of Total Peak Hour VMT on roadway with volume>capacity	14.8%	% of Total Peak Hour VMT on roadway with volume>capacity	16.6%	% of Total Peak Hour VMT on roadway with volume>capacity	15.0%	% of Total Peak Hour VMT on roadway with volume>capacity
The "Thumb"	11.0%	% of Total Peak Hour VMT on roadway with volume>capacity	8.7%	% of Total Peak Hour VMT on roadway with volume>capacity	9.1%	% of Total Peak Hour VMT on roadway with volume>capacity	12.0%	% of Total Peak Hour VMT on roadway with volume>capacity	8.0%	% of Total Peak Hour VMT on roadway with volume>capacity	8.7%	% of Total Peak Hour VMT on roadway with volume>capacity
West Area	4.8%	% of Total Peak Hour VMT on roadway with volume>capacity	4.7%	% of Total Peak Hour VMT on roadway with volume>capacity	7.6%	% of Total Peak Hour VMT on roadway with volume>capacity	N/A	% of Total Peak Hour VMT on roadway with volume>capacity	N/A	% of Total Peak Hour VMT on roadway with volume>capacity	9.8%	% of Total Peak Hour VMT on roadway with volume>capacity
Shevlin Area	N/A	% of Total Peak Hour VMT on roadway with volume>capacity	N/A	% of Total Peak Hour VMT on roadway with volume>capacity	4.6%	% of Total Peak Hour VMT on roadway with volume>capacity	2.6%	% of Total Peak Hour VMT on roadway with volume>capacity	N/A	% of Total Peak Hour VMT on roadway with volume>capacity	N/A	% of Total Peak Hour VMT on roadway with volume>capacity
OB Riley / Gopher Gulch Area	12.6%	% of Total Peak Hour VMT on roadway with volume>capacity	11.6%	% of Total Peak Hour VMT on roadway with volume>capacity	15.3%	% of Total Peak Hour VMT on roadway with volume>capacity	11.2%	% of Total Peak Hour VMT on roadway with volume>capacity	16.1%	% of Total Peak Hour VMT on roadway with volume>capacity	16.9%	% of Total Peak Hour VMT on roadway with volume>capacity
Existing UGB (if applicable)	12.7%	% of Total Peak Hour VMT on roadway with volume>capacity	13.2%	% of Total Peak Hour VMT on roadway with volume>capacity	12.6%	% of Total Peak Hour VMT on roadway with volume>capacity	12.3%	% of Total Peak Hour VMT on roadway with volume>capacity	11.7%	% of Total Peak Hour VMT on roadway with volume>capacity	12.2%	% of Total Peak Hour VMT on roadway with volume>capacity
Overall Score	4		3		2		5		3		4	
					This scenario has the most growth in the North Triangle and OB Riley/Gopher Gulch, causing significant impact on state highways.		Less growth in the North Triangle and OB Riley Area, combined with more growth in the Shevlin Area, reduces overall corridor congestion.					

For more information about this performance measure, see accompanying technical memorandum from DKS Associates.

Factor 2: Orderly and Economic Provision of Public Facilities and Services

Author: CSM **DKS Associates**

Community Outcome A **Balanced Transportation System**

Date: 9/9/2015

Performance Measure 5	**Walk/Bike Safety and Connectivity**
Brief Description of Evaluation:	Qualitative evaluation of pedestrian/bicycle that included: connectivity to adjacent areas, connectivity within the subarea, and safety barriers within the subarea.
Data Sources	Existing and planned multimodal roadway network and trail network based on the Bend MPO MTP Update compared to GoogleEarth imagery and City facility plans.
Interpretation and Key	Good areas are locations with good connectivity to the adjacent transportation infrastructure and few barriers within the site. Fair areas have either worse connectivity or some site barriers. No internal roadways are planned to be larger than 3-lanes, so significant safety barriers within the sites were not a key differentiator.

"Good"	"Fair"	"Poor"	No Data	Not appropriate to rank

Evaluation Geography	Scenario 1.2 *Qualitative Evaluation*	Scenario 2.1 *Qualitative Evaluation*	Scenario 3.1 *Qualitative Evaluation*	SAAM-1 *Qualitative Evaluation*	SAAM-2 *Qualitative Evaluation*	SAAM-3 *Qualitative Evaluation*
Total Future UGB (Including Current UGB)						
Total Expansion Area (excluding current UGB)						
Subareas						
North Triangle	No trails connecting to the area, but decent grid system for roadways.	No trails connecting to the area, but decent grid system for roadways.	No trails connecting to the area, but decent grid system for roadways.	No trails connecting to the area, but decent grid system for roadways.	No trails connecting to the area, but decent grid system for roadways.	No trails connecting to the area, but decent grid system for roadways.
NE Edge	Trail connections to a portion of the area.	Trail connections to the area.	Trail connections to the area.	Trail connections to a portion of the area.	Trail connections to the area.	Trail connections to the area.
DSL Property	Good grid and trail connections.	Good grid and trail connections.	Good grid and trail connections.	Good grid and trail connections.	Good grid and trail connections.	Good grid and trail connections.
The "Elbow"	Partial collector grid	Full collector grid in the subarea with extension of Murphy Road.	Partial collector grid	Partial collector grid	Partial collector grid	Partial collector grid
The "Thumb"	Full build allows connection south to Knott	Partial collector grid	Partial collector grid	Partial collector grid	Partial collector grid	Partial collector grid
West Area	Good collector grid, limited trail system.	Good collector grid, limited trail system.	Good collector grid, limited trail system.	N/A	N/A	Good collector grid, limited trail system.
Shevlin Area	N/A	N/A	Limited connections	Larger growth area creates better connections	N/A	N/A
OB Riley / Gopher Gulch Area	Connections via OB Riley	Connections via OB Riley	Growth further west does not have connectivity to surrounding networks	Connections via OB Riley	Growth further west does not have connectivity to surrounding networks	Connections via OB Riley
Existing UGB (if applicable)	N/A					
Overall Score	4	5	3	4	3	4

For more information about this performance measure, see accompanying technical memorandum from DKS Associates.

Factor 2: Orderly and Economic Provision of Public Facilities and Services

Author: CSM **DKS Associates**

Community Outcome A **Balanced Transportation System**

Date: 9/9/2015

Performance Measure 6 **System connectivity & progression of system hierarchy**

Brief Description of Evaluation: Ability to provide a well-spaced base roadway network of arterials and collectors

Data Sources Base roadway network for subareas

Interpretation and Key Good areas have the ability to provide access to development areas via a hierarchy of local, collector, and arterial roadways. Poor areas would likely provide access directly to higher class roadways. Overall results are for variations of sub-areas, not combined scenario results.

"Good"	"Fair"	"Poor"	No Data	Not appropriate to rank

Evaluation Geography	Scenario 1.2 *Qualitative Evaluation*	Scenario 2.1 *Qualitative Evaluation*	Scenario 3.1 *Qualitative Evaluation*	SAAM-1 *Qualitative Evaluation*	SAAM-2 *Qualitative Evaluation*	SAAM-3 *Qualitative Evaluation*
Total Future UGB (Including Current UGB)						
Total Expansion Area (excluding current UGB)						
Subareas						
North Traingle	Area on west remaining outside UGB creates challenges for connectivity	Area on west remaining outside UGB creates challenges for connectivity	West side reaches to Old Bend-Redmond Highway to complete the collector framework	Area on west remaining outside UGB creates challenges for connectivity	West side reaches to Old Bend-Redmond Highway to complete the collector framework	West side reaches to Old Bend-Redmond Highway to complete the collector framework
NE Edge	Direct access onto major roadways.	Direct access onto major roadways.	Direct access onto major roadways.	Direct access onto major roadways.	Direct access onto major roadways.	Direct access onto major roadways.
DSL Property	Inclusion of only a portion of the property does not allow for a complete N/S collector connection	Complete N/S collector to Stevens Rd.	Inclusion of only a portion of the property does not allow for a complete N/S collector connection	Inclusion of only a portion of the property does not allow for a complete N/S collector connection	Inclusion of only a portion of the property does not allow for a complete N/S collector connection	Inclusion of only a portion of the property does not allow for a complete N/S collector connection
The "Elbow"	Inclusion of only a portion of the subarea does not allow for a complete E/W collector connection	Inclusion of full subarea makes connection rom Rickard over to 15th near Murphy possible	Inclusion of only a portion of the subarea does not allow for a complete E/W collector connection	Inclusion of only a portion of the subarea does not allow for a complete E/W collector connection	Inclusion of only a portion of the subarea does not allow for a complete E/W collector connection	Inclusion of only a portion of the subarea does not allow for a complete E/W collector connection
The "Thumb"	Inclusion of full property allows full collector system from China Hat to Knott	Inclusion of only a portion of the property does not allow for a complete collector system from China Hat to Knott	Inclusion of only a portion of the property does not allow for a complete collector system from China Hat to Knott	Inclusion of only a portion of the property does not allow for a complete collector system from China Hat to Knott	Inclusion of only a portion of the property does not allow for a complete collector system from China Hat to Knott	Inclusion of only a portion of the property does not allow for a complete collector system from China Hat to Knott
West Area	Some ability to provide local collectors, difficult to build connected local streets.	Some ability to provide local collectors, difficult to build connected local streets.	Some ability to provide local collectors, difficult to build connected local streets.	N/A	N/A	Some ability to provide local collectors, difficult to built connected local streets.
Shevlin Area	N/A	N/A	Some ability to provide local collectors, difficult to build connected local streets.	Some ability to provide local collectors, difficult to build connected local streets.	N/A	N/A
OB Riley / Gopher Gulch Area	Local grid opportunity with OB Riley as a spine roadway for the area.	Local grid opportunity with OB Riley as a spine roadway for the area.	Local grid opportunity with OB Riley as a spine roadway for the area.	Local grid opportunity with OB Riley as a spine roadway for the area.	Local grid opportunity with OB Riley as a spine roadway for the area.	Local grid opportunity with OB Riley as a spine roadway for the area.
Existing UGB (if applicable)	N/A	N/A	N/A	N/A	N/A	N/A
Overall Score	3 ○	4 ◔	3 ○	3 ○	3 ○	4 ◔

For more information about this performance measure, see accompanying technical memorandum from DKS Associates.

Factor 2: Orderly and Economic Growth

Author: Analysis by Fregonese Associates; interpretation by Angelo Planning Group

Community Outcome A — **Balanced Transportation System**

Date: 9/10/2015

Performance Measure 7 — **Mode Split (% by Mode)**

Brief Description of Evaluation: The % of household based daily external trips by mode.

Data Sources: Output from 7D transportation model.

Interpretation and Key: Under 90% auto (the approximate mode split for the current UGB) = Good; 90% to 95% auto = Fair; over 95% auto = Poor

"Good"	"Fair"	"Poor"	No Data	Not appropriate to rank

Evaluation Geography	Scenario 1.2		Scenario 2.1		Scenario 3.1		SAAM-1		SAAM-2		SAAM-3	
	Value	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*
Total Future UGB (Including Current UGB)	90.9%	% Auto	90.9%	% Auto	90.9%	% Auto	90.9%	% Auto	91.0%	% Auto	90.9%	% Auto
	6.9%	% Walk	6.9%	% Walk	6.9%	% Walk	6.8%	% Walk	6.7%	% Walk	6.9%	% Walk
	0.7%	% Bike	0.7%	% Bike	0.7%	% Bike	0.7%	% Bike	0.7%	% Bike	0.7%	% Bike
	1.6%	% Transit	1.6%	% Transit	1.6%	% Transit	1.6%	% Transit	1.6%	% Transit	1.6%	% Transit
Total Expansion Area (excluding current UGB)	95.1%	% Auto	95.3%	% Auto	95.3%	% Auto	95.9%	% Auto	96.4%	% Auto	95.0%	% Auto
	3.5%	% Walk	3.4%	% Walk	3.4%	% Walk	2.9%	% Walk	2.5%	% Walk	3.5%	% Walk
	0.5%	% Bike	0.5%	% Bike	0.5%	% Bike	0.5%	% Bike	0.4%	% Bike	0.6%	% Bike
	0.9%	% Transit	0.9%	% Transit	0.8%	% Transit	0.7%	% Transit	0.7%	% Transit	0.9%	% Transit
Subareas												
North Traingle	96.4%	% Auto	96.4%	% Auto	96.9%	% Auto	96.3%	% Auto	96.2%	% Auto	96.2%	% Auto
	2.5%	% Walk	2.6%	% Walk	2.2%	% Walk	2.6%	% Walk	2.6%	% Walk	2.6%	% Walk
	0.3%	% Bike	0.4%	% Bike	0.3%	% Bike	0.3%	% Bike	0.3%	% Bike	0.4%	% Bike
	0.8%	% Transit	0.7%	% Transit	0.6%	% Transit	0.8%	% Transit	0.8%	% Transit	0.8%	% Transit
NE Edge	95.2%	% Auto	95.2%	% Auto	94.7%	% Auto	95.4%	% Auto	95.7%	% Auto	95.4%	% Auto
	3.5%	% Walk	3.5%	% Walk	3.9%	% Walk	3.3%	% Walk	3.0%	% Walk	3.3%	% Walk
	0.6%	% Bike	0.6%	% Bike	0.6%	% Bike	0.6%	% Bike	0.6%	% Bike	0.6%	% Bike
	0.7%	% Transit	0.7%	% Transit	0.8%	% Transit	0.7%	% Transit	0.7%	% Transit	0.7%	% Transit
DSL Property	93.5%	% Auto	95.0%	% Auto	93.9%	% Auto	94.4%	% Auto	92.9%	% Auto	93.3%	% Auto
	4.4%	% Walk	3.5%	% Walk	4.1%	% Walk	3.7%	% Walk	4.6%	% Walk	4.5%	% Walk
	0.4%	% Bike	0.4%	% Bike	0.4%	% Bike	0.4%	% Bike	0.4%	% Bike	0.4%	% Bike
	1.7%	% Transit	1.2%	% Transit	1.6%	% Transit	1.6%	% Transit	2.1%	% Transit	1.7%	% Transit
The "Elbow"	95.9%	% Auto	95.6%	% Auto	95.7%	% Auto	96.3%	% Auto	96.2%	% Auto	96.2%	% Auto
	2.8%	% Walk	3.1%	% Walk	3.0%	% Walk	2.5%	% Walk	2.6%	% Walk	2.6%	% Walk
	0.4%	% Bike	0.4%	% Bike	0.4%	% Bike	0.4%	% Bike	0.4%	% Bike	0.4%	% Bike
	0.9%	% Transit	0.9%	% Transit	0.8%	% Transit	0.7%	% Transit	0.7%	% Transit	0.7%	% Transit
The "Thumb"	95.4%	% Auto	95.1%	% Auto	95.4%	% Auto	95.9%	% Auto	96.2%	% Auto	96.0%	% Auto
	3.2%	% Walk	3.4%	% Walk	3.2%	% Walk	2.8%	% Walk	2.6%	% Walk	2.7%	% Walk
	0.5%	% Bike	0.5%	% Bike	0.5%	% Bike	0.5%	% Bike	0.5%	% Bike	0.5%	% Bike
	0.9%	% Transit	0.9%	% Transit	0.9%	% Transit	0.8%	% Transit	0.7%	% Transit	0.7%	% Transit
West Area	94.1%	% Auto	94.1%	% Auto	94.8%	% Auto	93.7%	% Auto	94.0%	% Auto	94.8%	% Auto
	4.1%	% Walk	4.3%	% Walk	3.7%	% Walk	4.7%	% Walk	4.4%	% Walk	3.7%	% Walk
	0.6%	% Bike	0.6%	% Bike	0.6%	% Bike	0.6%	% Bike	0.6%	% Bike	0.6%	% Bike
	1.1%	% Transit	1.1%	% Transit	0.8%	% Transit	1.0%	% Transit	0.9%	% Transit	0.8%	% Transit
Shevlin Area	97.6%	% Auto	97.7%	% Auto	96.7%	% Auto	96.6%	% Auto	97.6%	% Auto	97.6%	% Auto
	1.6%	% Walk	1.6%	% Walk	2.3%	% Walk	2.3%	% Walk	1.7%	% Walk	1.6%	% Walk
	0.3%	% Bike	0.3%	% Bike	0.5%	% Bike	0.5%	% Bike	0.3%	% Bike	0.3%	% Bike
	0.4%	% Transit	0.4%	% Transit	0.6%	% Transit	0.6%	% Transit	0.4%	% Transit	0.4%	% Transit
OB Riley / Gopher Gulch Area	96.3%	% Auto	96.0%	% Auto	96.2%	% Auto	96.2%	% Auto	96.7%	% Auto	96.3%	% Auto
	2.8%	% Walk	2.9%	% Walk	2.8%	% Walk	2.8%	% Walk	2.3%	% Walk	2.7%	% Walk
	0.3%	% Bike	0.3%	% Bike	0.3%	% Bike	0.3%	% Bike	0.4%	% Bike	0.3%	% Bike
	0.7%	% Transit	0.8%	% Transit	0.7%	% Transit	0.7%	% Transit	0.6%	% Transit	0.8%	% Transit
Existing UGB (if applicable)	89.9%	% Auto	89.9%	% Auto	89.8%	% Auto	89.7%	% Auto	89.8%	% Auto	89.8%	% Auto
	7.7%	% Walk	7.7%	% Walk	7.7%	% Walk	7.7%	% Walk	7.7%	% Walk	7.7%	% Walk
	0.7%	% Bike	0.7%	% Bike	0.7%	% Bike	0.7%	% Bike	0.7%	% Bike	0.7%	% Bike
	1.8%	% Transit	1.8%	% Transit	1.8%	% Transit	1.8%	% Transit	1.8%	% Transit	1.8%	% Transit
Overall Score	3 ○		3 ○		3 ○		2 ◡		2 ◡		3 ○	
	Most expansion areas have typical suburban transportation behaviours, with a higher proportion vehicle trips, relative to the existing city.		Most expansion areas have typical suburban transportation behaviours, with a higher proportion vehicle trips, relative to the existing city.		Most expansion areas have typical suburban transportation behaviours, with a higher proportion vehicle trips, relative to the existing city.		Most expansion areas have typical suburban transportation behaviours, with a higher proportion vehicle trips, relative to the existing city.		Most expansion areas have typical suburban transportation behaviours, with a higher proportion vehicle trips, relative to the existing city.		Most expansion areas have typical suburban transportation behaviours, with a higher proportion vehicle trips, relative to the existing city.	

For more information about this performance measure, see accompanying technical memorandum from Fregonese Associates.

Factor 2: Orderly and Economic Growth

Author: Analysis by Fregonese Associates; interpretation by Angelo Planning Group

Community Outcome A — **Balanced Transportation System**

Date: 9/10/2015

Performance Measure 8 — **Average Weekly Walk Trips**

Brief Description of Evaluation: The total number of household based walk trips per week.

Data Sources: Output from 7D transportation model.

Interpretation and Key: Over 2 = Good (more similar to existing UGB); 1-2 = Fair; under 1 = Poor. (Subareas with trivial amounts of housing generated by commercial areas are shown in grey.) Overall distinctions are subtle; however, there are meaningful differences at a subarea level.

"Good"	"Fair"	"Poor"	No Data / Minimal housing	Not appropriate to rank

Evaluation Geography	Scenario 1.2		Scenario 2.1		Scenario 3.1		SAAM-1		SAAM-2		SAAM-3	
	Value	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*
Total Future UGB (Including Current UGB)	1.98	Average weekly walk trips per capita	1.99	Average weekly walk trips per capita	2.00	Average weekly walk trips per capita	1.98	Average weekly walk trips per capita	1.96	Average weekly walk trips per capita	2.00	Average weekly walk trips per capita
Total Expansion Area (excluding current UGB)	0.48	Average weekly walk trips per capita	0.47	Average weekly walk trips per capita	0.51	Average weekly walk trips per capita	0.44	Average weekly walk trips per capita	0.39	Average weekly walk trips per capita	0.52	Average weekly walk trips per capita
Subareas												
North Traingle	0.70	Average weekly walk trips per capita	0.75	Average weekly walk trips per capita	0.60	Average weekly walk trips per capita	0.72	Average weekly walk trips per capita	0.73	Average weekly walk trips per capita	0.72	Average weekly walk trips per capita
NE Edge	1.27	Average weekly walk trips per capita	1.85	Average weekly walk trips per capita	1.89	Average weekly walk trips per capita	**0.97**	Average weekly walk trips per capita	0.83	Average weekly walk trips per capita	0.91	Average weekly walk trips per capita
DSL Property	1.24	Average weekly walk trips per capita	0.97	Average weekly walk trips per capita	1.47	Average weekly walk trips per capita	1.20	Average weekly walk trips per capita	1.37	Average weekly walk trips per capita	**1.37**	Average weekly walk trips per capita
The "Elbow"	0.76	Average weekly walk trips per capita	0.89	Average weekly walk trips per capita	0.85	Average weekly walk trips per capita	0.68	Average weekly walk trips per capita	0.73	Average weekly walk trips per capita	0.73	Average weekly walk trips per capita
The "Thumb"	1.06	Average weekly walk trips per capita	1.22	Average weekly walk trips per capita	2.81	Average weekly walk trips per capita	0.81	Average weekly walk trips per capita	0.75	Average weekly walk trips per capita	0.78	Average weekly walk trips per capita
West Area	1.29	Average weekly walk trips per capita	1.31	Average weekly walk trips per capita	1.23	Average weekly walk trips per capita	1.29	Average weekly walk trips per capita	1.22	Average weekly walk trips per capita	**1.12**	Average weekly walk trips per capita
Shevlin Area	5.98	Average weekly walk trips per capita	7.61	Average weekly walk trips per capita	0.82	Average weekly walk trips per capita	**0.73**	Average weekly walk trips per capita	1.40	Average weekly walk trips per capita	1.37	Average weekly walk trips per capita
OB Riley / Gopher Gulch Area	0.75	Average weekly walk trips per capita	0.80	Average weekly walk trips per capita	0.89	Average weekly walk trips per capita	0.74	Average weekly walk trips per capita	**0.68**	Average weekly walk trips per capita	0.72	Average weekly walk trips per capita
Existing UGB (if applicable)	2.23	Average weekly walk trips per capita	2.24	Average weekly walk trips per capita	2.24	Average weekly walk trips per capita	2.26	Average weekly walk trips per capita	2.25	Average weekly walk trips per capita	2.25	Average weekly walk trips per capita
Overall Score	3 ○		3 ○		3 ○		3 ○		2 ◡		3 ○	
	Adding more housing in the NE Edge that is not immediately adjacent to commercial appears to degrade that area's walk trip rates somewhat.		Filling the exception land portion of the DSL property appears to degrade its walk trip rates, presumably because it puts housing further from services. Other subareas perform better than under most other alternatives.		The NE Edge, DSL, Shevlin, and OB Riley / Gopher Gulch all perform somewhat better than under other alternatives.		Focusing growth in the outer portions of the NE Edge and Shevlin area, neither of which has very good walk trip rates, makes SAAM-1 somewhat worse than most of the others.		The Gopher Gulch area did not fair well by this performance measure. Focusing growth there makes SAAM-2 have somewhat worse performance than others.		Focusing growth in the West Area & DSL, both of which have somewhat better walk trip rates, makes SAAM-3 slightly better than the others	

For more information about this performance measure, see accompanying technical memorandum from Fregonese Associates.

Factor 2: Orderly and Economic Growth

Author: Becky Hewitt **APG**

Community Outcome A **Balanced Transportation System**

Date: 9/18/2015

Performance Measure 9 **Proximity to Transit**

Brief Description of Evaluation: Approximate distance to future transit corridors.

Data Sources Bend MPO Public Transit Plan, March 2013; 2015 proposed system map.

Interpretation and Key Subareas that include some development within a quarter mile of an existing or planned transit corridor = "Good" because people are likely to walk up to about a quarter mile to access transit; those including some development over 1/4 mile but under 1/2 mile from an existing or planned transit corridor = "Fair" because some people will walk up to a half mile to access transit; all development over 1/2 mile from an existing or planned transit corridor = "Poor" because few people will walk over a half mile to access transit.

"Good"	"Fair"	"Poor"	No Data / Minimal housing or jobs	Not appropriate to rank

Evaluation Geography	Scenario 1.2 Value	Scenario 1.2 Units	Scenario 2.1 Value	Scenario 2.1 Units	Scenario 3.1 Value	Scenario 3.1 Units	SAAM-1 Value	SAAM-1 Units	SAAM-2 Value	SAAM-2 Units	SAAM-3 Value	SAAM-3 Units
Total Future UGB (Including Current UGB)												
Total Expansion Area (excluding current												
Subareas												
North Triangle	>1/4 mile to >1/2 mile from primary transit corridor (mostly over 1/2 mile)		>1/4 mile to >1/2 mile from primary transit corridor (mostly over 1/2 mile)		>1/4 mile to >1/2 mile from primary transit corridor (mostly over 1/2 mile)		>1/4 mile to >1/2 mile from primary transit corridor (mostly over 1/2 mile)		>1/4 mile to >1/2 mile from primary transit corridor (mostly over 1/2 mile)		>1/4 mile to >1/2 mile from primary transit corridor (mostly over 1/2 mile)	
NE Edge	>1/2 mile from primary transit corridor		>1/2 mile from primary transit corridor		>1/2 mile from primary transit corridor		>1/2 mile from primary transit corridor; possible future extension could serve western edge of subdivision south of Juniper Ridge		>1/2 mile from primary transit corridor		>1/2 mile from primary transit corridor	
DSL Property	1/4-mile to over 1/2 mile from primary transit corridor (roughly half of development within 1/2 mile)		1/4-mile to over 1/2 mile from primary transit corridor (mostly over 1/2 mile)		1/4-mile to >1/2 mile from primary transit corridor (mostly within 1/2 mile)		1/4-mile to over 1/2 mile from primary transit corridor (roughly half of development within 1/2 mile)		1/4-mile to >1/2 mile from primary transit corridor (mostly within 1/2 mile)		1/4-mile to >1/2 mile from primary transit corridor (mostly within 1/2 mile)	
The "Elbow"	>1/2 mile from primary transit corridor		>1/2 mile from primary transit corridor		>1/2 mile from primary transit corridor		>1/2 mile from primary transit corridor		>1/2 mile from primary transit corridor		>1/2 mile from primary transit corridor	
The "Thumb"	>1/2 mile from primary transit corridor; possible community connector stop on west side of US 97 could provide limited transit access to the southern end of this area in the long-term		>1/2 mile from primary transit corridor		>1/2 mile from primary transit corridor		>1/2 mile from primary transit corridor		>1/2 mile from primary transit corridor		>1/2 mile from primary transit corridor	
West Area	1/4-mile to over 1/2 mile from existing transit corridor (mostly within 1/2 mile)		1/4-mile to >1/2 mile from existing transit corridor (roughly a third of development within 1/2 mile)		1/4-mile to >1/2 mile from existing transit corridor (roughly a third of development within 1/2 mile)		N/A		N/A		1/4-mile to over 1/2 mile from existing transit corridor (mostly over 1/2 mile)	
Shevlin Area	N/A		N/A		1/4-mile to >1/2 mile from existing transit corridor (roughly a third of development within 1/2 mile)		1/4-mile to over 1/2 mile from existing transit corridor (mostly over 1/2 mile)		N/A		N/A	
OB Riley / Gopher Gulch Area	<1/4-mile to >1/2 mile from primary transit corridor (roughly half within 1/4 mile; mostly within 1/2 mile)		<1/4-mile to >1/2 mile from primary transit corridor (roughly half within 1/4 mile; mostly within 1/2 mile)		<1/4-mile to >1/2 mile from primary transit corridor (small percentage within 1/4 mile; roughly a third of development within 1/2 mile)		<1/4-mile to >1/2 mile from primary transit corridor (roughly half within 1/4 mile; mostly within 1/2 mile)		<1/4-mile to >1/2 mile from primary transit corridor (small percentage within 1/4 mile; mostly over 1/2 mile)		<1/4-mile to >1/2 mile from primary transit corridor (about a quarter of development within 1/4 mile; roughly half of development within 1/2 mile)	
Existing UGB (if applicable)	N/A		N/A		N/A		N/A		N/A		N/A	
Overall Score	3 ○ Includes 1 subarea with good transit adjacency and 3 with fair transit adjacency; remainder with poor transit adjacency.		3 ○ Includes 1 subarea with good transit adjacency and 3 with fair transit adjacency; remainder with poor transit adjacency.		3 ○ Includes 1 subarea with good transit adjacency and 4 with fair transit adjacency; remainder with poor transit adjacency.		3 ○ Includes 1 subarea with good transit adjacency and 3 with fair transit adjacency; remainder with poor transit adjacency.		3 ○ Includes 1 subarea with good transit adjacency in a portion of the subarea, but extending out to Gopher Gulch puts most of the development over a 1/2 mile from transit		3 ○ Includes 1 subarea with good transit adjacency and 3 with fair transit adjacency; remainder with poor transit adjacency.	

For more information about this performance measure, see accompanying technical memorandum from Angelo Planning Group.

Factor 2: Orderly and Economic Growth

Author: Analysis by Fregonese Associates; interpretation by Angelo Planning Group

Community Outcome A — **Balanced Transportation System**

Date: 9/10/2015

Performance Measure 10 — **Housing & Jobs within 1/4 Mile of Future Transit Corridors**

Brief Description of Evaluation: The share of the total housing units, and total jobs within one quarter mile of future transit corridors.

Data Sources Current transit lines, and future planned transit lines from Cascade East Transit.

Interpretation and Key Over 20% of housing or jobs adjacent to transit was rated "Good"; 1-20% was rated "Fair", and 0% was rated "Poor". Subareas with trivial amounts of housing or jobs are shown in grey. Note that transit access could be improved through routing adjustments for all scenarios and SAAMs.

"Good"	"Fair"	"Poor"	No Data / Minimal housing or jobs	Not appropriate to rank

Evaluation Geography	Scenario 1.2		Scenario 2.1		Scenario 3.1		SAAM-1		SAAM-2		SAAM-3	
	Value	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*
Total Future UGB (Including Current UGB)	38%	Housing Units	38%	Housing Units	38%	Housing Units	38%	Housing Units	37%	Housing Units	38%	Housing Units
	55%	Jobs	54%	Jobs	55%	Jobs	55%	Jobs	55%	Jobs	55%	Jobs
Total Expansion Area (excluding current UGB)	0%	Housing Units	0%	Housing Units	0%	Housing Units	0%	Housing Units	0%	Housing Units	0%	Housing Units
	5%	Jobs	0%	Jobs	6%	Jobs	5%	Jobs	6%	Jobs	6%	Jobs
Subareas												
North Traingle	0%	Housing Units	0%	Housing Units	0%	Housing Units	0%	Housing Units	0%	Housing Units	0%	Housing Units
	0%	Jobs	0%	Jobs	0%	Jobs	0%	Jobs	0%	Jobs	0%	Jobs
NE Edge	0%	Housing Units	0%	Housing Units	0%	Housing Units	0%	Housing Units	0%	Housing Units	0%	Housing Units
	0%	Jobs	0%	Jobs	0%	Jobs	0%	Jobs	0%	Jobs	0%	Jobs
DSL Property	0%	Housing Units	0%	Housing Units	0%	Housing Units	0%	Housing Units	0%	Housing Units	0%	Housing Units
	0%	Jobs	0%	Jobs	0%	Jobs	0%	Jobs	0%	Jobs	0%	Jobs
The "Elbow"	0%	Housing Units	0%	Housing Units	0%	Housing Units	0%	Housing Units	0%	Housing Units	0%	Housing Units
	0%	Jobs	0%	Jobs	0%	Jobs	0%	Jobs	0%	Jobs	0%	Jobs
The "Thumb"	0%	Housing Units	0%	Housing Units	0%	Housing Units	0%	Housing Units	0%	Housing Units	0%	Housing Units
	0%	Jobs	0%	Jobs	0%	Jobs	0%	Jobs	0%	Jobs	0%	Jobs
West Area	0%	Housing Units	0%	Housing Units	0%	Housing Units	N/A	Housing Units	N/A	Housing Units	0%	Housing Units
	0%	Jobs	0%	Jobs	0%	Jobs	N/A	Jobs	N/A	Jobs	0%	Jobs
Shevlin Area	N/A	Housing Units	N/A	Housing Units	0%	Housing Units	0%	Housing Units	N/A	Housing Units	N/A	Housing Units
	N/A	Jobs	N/A	Jobs	0%	Jobs	0%	Jobs	N/A	Jobs	N/A	Jobs
OB Riley / Gopher Gulch Area	3%	Housing Units	3%	Housing Units	0%	Housing Units	3%	Housing Units	0%	Housing Units	1%	Housing Units
	40%	Jobs	0%	Jobs	28%	Jobs	39%	Jobs	24%	Jobs	33%	Jobs
Existing UGB (if applicable)	41%	Housing Units	41%	Housing Units	41%	Housing Units	41%	Housing Units	41%	Housing Units	41%	Housing Units
	62%	Jobs	62%	Jobs	62%	Jobs	62%	Jobs	62%	Jobs	62%	Jobs
Overall Score	3 ○		3 ○		3 ○		3 ○		3 ○		3 ○	
Notes about Overall Score			The differnece here is that the OB Riley / Gopher Gulch area includes the "Large lot Industrial" designation, which does not have a certain number of jobs associated with it, but still makes sense to be included for these purposes.									

For more information about this performance measure, see accompanying technical memorandum from Fregonese Associates.

Factor 2: Orderly and Economic Growth

Author: Analysis by Fregonese Associates; interpretation by Angelo Planning Group

Community Outcome A Balanced Transportation System

Date: 9/18/2015

Performance Measure 11	**Total Intersection Density per Sq Mi**
Brief Description of Evaluation:	The density (intersections per square mile) of intersections.
Data Sources	Current intersections were dervied from centerline files from Deschutes County. New intersections are an output of Envision Tomorrow, based off of road network assumptions for each development type. Generally, higher density residential and more urban commercial types have higher intersection densities, while lower density residential and industrial types have lower intersection densities.
Interpretation and Key	A higher intersection density makes an area more walkable and reduces out of direction travel. Ratings are relative to the existing UGB: similar to the existing UGB (within 5 intersections / sq mi) = Fair; better/higher than the existing UGB (by more than 5 intersections / sq mi) = Good; worse/lower than the existing UGB (by more than 5 intersections / sq mi) = Poor.

"Good"	"Fair"	"Poor"	No Data	Not appropriate to rank

Evaluation Geography	Scenario 1.2		Scenario 2.1		Scenario 3.1		SAAM-1		SAAM-2		SAAM-3	
	Value	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*
Total Future UGB (Including Current UGB)		Intersections/SqMI		Intersections/SqMI		Intersections/SqMI		Intersections/SqMI		Intersections/SqMI		Intersections/SqMI
Total Expansion Area (excluding current UGB)	77	Intersections/SqMI	69	Intersections/SqMI	73	Intersections/SqMI	83	Intersections/SqMI	76	Intersections/SqMI	78	Intersections/SqMI
Subareas												
North Traingle	77	Intersections/SqMI	79	Intersections/SqMI	62	Intersections/SqMI	77	Intersections/SqMI	62	Intersections/SqMI	62	Intersections/SqMI
NE Edge	80	Intersections/SqMI	85	Intersections/SqMI	84	Intersections/SqMI	86	Intersections/SqMI	107	Intersections/SqMI	107	Intersections/SqMI
DSL Property	61	Intersections/SqMI	62	Intersections/SqMI	60	Intersections/SqMI	70	Intersections/SqMI	93	Intersections/SqMI	105	Intersections/SqMI
The "Elbow"	90	Intersections/SqMI	68	Intersections/SqMI	78	Intersections/SqMI	91	Intersections/SqMI	78	Intersections/SqMI	78	Intersections/SqMI
The "Thumb"	81	Intersections/SqMI	77	Intersections/SqMI	78	Intersections/SqMI	92	Intersections/SqMI	77	Intersections/SqMI	74	Intersections/SqMI
West Area	88	Intersections/SqMI	82	Intersections/SqMI	79	Intersections/SqMI	-	Intersections/SqMI	-	Intersections/SqMI	76	Intersections/SqMI
Shevlin Area	-	Intersections/SqMI	-	Intersections/SqMI	79	Intersections/SqMI	79	Intersections/SqMI	-	Intersections/SqMI	-	Intersections/SqMI
OB Riley / Gopher Gulch Area	63	Intersections/SqMI	33	Intersections/SqMI	27	Intersections/SqMI	63	Intersections/SqMI	75	Intersections/SqMI	85	Intersections/SqMI
Existing UGB (if applicable)	80	Intersections/SqMI	80	Intersections/SqMI	80	Intersections/SqMI	80	Intersections/SqMI	80	Intersections/SqMI	80	Intersections/SqMI
Overall Score	3 ○		2 ◒		2 ◒		3 ○		3 ○		3 ○	

For more information about this performance measure, see accompanying technical memorandum from Fregonese Associates.

Factor 2: Orderly and Economic Provision of Public Facilities and Services

Author: CSM **DKS Associates**

Date: 10/7/2015

Community Outcome B. Cost Effective Infrastructure

Performance Measure 1 — Total Cost of Transportation Infrastructure Improvements

Brief Description of Evaluation: Cost of Transportation Improvements for serving the expansion area and mitigating impacts in the City system. Cost for expansion areas include new roadway network only (not congestion mitigation)

Data Sources Bend SDC Unit Costs, Travel Demand Model link congestion plots

Interpretation and Key Lower overall costs perform better. The overall scenario cost includes new arterials and collectors to serve expansion areas and capacity improvements in the system to mitigate congestion impacts. The Expansion area total excludes improvements identified as needed to serve growth inside the existing UGB. Costs at the subarea level (excluding the existing UGB) include the new arterial and collector grid system only. At the subarea level, costs under $15 million are rated "Good"; $15-35 million are rated "Fair"; over $35 million are rated "Poor". Ratings at the scenario/SAAM level are relative to one another.

"Good"	"Fair"	"Poor"	No Data	Not appropriate to rank

Evaluation Geography	Scenario 1.2 Value	Scenario 1.2 Units	Scenario 2.1 Value	Scenario 2.1 Units	Scenario 3.1 Value	Scenario 3.1 Units	SAAM-1 Value	SAAM-1 Units	SAAM-2 Value	SAAM-2 Units	SAAM-3 Value	SAAM-3 Units
Total Future UGB (Including Current UGB)	$204.5	Million	$157.8	Million	$173.9	Million	$164.8	Million	$154.6	Million	$146.8	Million
Total Expansion Area (excluding current UGB)	$200.5	Million	$153.8	Million	$169.9	Million	$160.8	Million	$150.6	Million	$142.8	Million
Subareas												
North Triangle	27.8	Millions $	27.8	Millions $	27.8	Millions $	27.8	Millions $	27.8	Millions $	27.8	Millions $
NE Edge	42.2	Millions $	8.4	Millions $	8.4	Millions $	46.8	Millions $	0.0	Millions $	0.0	Millions $
DSL Property	20.6	Millions $	21.6	Millions $	16.5	Millions $	12.1	Millions $	9.1	Millions $	16.5	Millions $
The "Elbow"	56.3	Millions $	66.3	Millions $	34.3	Millions $	34.3	Millions $	34.3	Millions $	34.3	Millions $
The "Thumb"	19.7	Millions $	10.5	Millions $	10.5	Millions $	4.3	Millions $	10.5	Millions $	10.5	Millions $
West Area	5.8	Millions $	9.7	Millions $	24.9	Millions $	0	Millions $	0	Millions $	39.1	Millions $
Shevlin Area	0	Millions $	0	Millions $	16.3	Millions $	20.9	Millions $	0	Millions $	0	Millions $
OB Riley / Gopher Gulch Area	2.7	Millions $	2.7	Millions $	21.7	Millions $	2.7	Millions $	52.4	Millions $	2.7	Millions $
Existing UGB (if applicable)	$4.0	Millions $	$4.0	Millions $	$4.0	Millions $	$4.0	Millions $	$4.0	Millions $	$4.0	Millions $
Overall Score	1		4		3		3		4		5	
	Highest cost for connecting growth areas and highest cost for capacity improvements (intersections and widening Knott Road corridor).		Low to moderate cost for connecting growth areas and lowest cost for capacity improvements.		High cost for connecting growth areas and moderate cost for capacity improvements (requires widening of US 20 from Robal Rd to 3rd Street but low intersection improvement costs).		Moderate cost for connecting growth areas, moderate costs for capacity improvements (low cost for roadway widening, high cost for intersection improvements).		Low cost for connecting growth areas, moderate to high costs for capacity improvements (highest cost for required intersection capacity improvements, and requires widening of US 20 from Robal Rd to 3rd Street).		Lowest cost for connecting growth areas, low to moderate costs for capacity improvements (requires widening of US 20 from Robal Rd to 3rd Street).	

For more information about this performance measure, see accompanying technical memorandum from DKS Associates.

Factor 2: Orderly and Economic Provision of Public Facilities and Services

Author: CSM **DKS Associates**

Community Outcome B. Cost Effective Infrastructure **Date:** 10/7/2015

Performance Measure 2	**Cost of Transportation Infrastructure Improvements per Acre**
Brief Description of Evaluation:	Cost of Transportation Improvements for serving the expansion area (collector and arterial grid) per acre developed
Data Sources	Bend SDC Unit Costs, Travel Demand Model link congestion plots
Interpretation and Key	Growth areas and scenarios that have the lowest cost/acre rank the best, with "good" rating for growth areas given where costs are $50K/acre or less, "fair" for $50-$100K/acre, and "poor" for >$100K/acre. For overall scenarios, "good" rating given where costs are $60K/acre or less, "fair" for $60-$90K/acre, and "poor" for >$90K/acre.

"Good"	"Fair"	"Poor"	No Data	Not appropriate to rank

Evaluation Geography	Scenario 1.2 Value	Scenario 1.2 Units	Scenario 2.1 Value	Scenario 2.1 Units	Scenario 3.1 Value	Scenario 3.1 Units	SAAM-1 Value	SAAM-1 Units	SAAM-2 Value	SAAM-2 Units	SAAM-3 Value	SAAM-3 Units
Total Future UGB (Including Current UGB)												
Total Expansion Area (excluding current UGB)	104	$1,000/Acre	81	$1,000/Acre	85	$1,000/Acre	53	$1,000/Acre	67	$1,000/Acre	78	$1,000/Acre
Subareas												
North Triangle	143.8	$1,000/Acre	148.5	$1,000/Acre	120.2	$1,000/Acre	138.8	$1,000/Acre	111.1	$1,000/Acre	111.1	$1,000/Acre
NE Edge	92.7	$1,000/Acre	63.9	$1,000/Acre	52.0	$1,000/Acre	32.6	$1,000/Acre	0.0	$1,000/Acre	0.0	$1,000/Acre
DSL Property	92.9	$1,000/Acre	59.4	$1,000/Acre	86.2	$1,000/Acre	93.0	$1,000/Acre	43.1	$1,000/Acre	132.4	$1,000/Acre
The "Elbow"	278.7	$1,000/Acre	153.7	$1,000/Acre	192.8	$1,000/Acre	228.7	$1,000/Acre	186.5	$1,000/Acre	186.5	$1,000/Acre
The "Thumb"	56.2	$1,000/Acre	26.5	$1,000/Acre	59.4	$1,000/Acre	17.8	$1,000/Acre	46.5	$1,000/Acre	47.5	$1,000/Acre
West Area	43.8	$1,000/Acre	55.9	$1,000/Acre	75.8	$1,000/Acre		$1,000/Acre		$1,000/Acre	58.4	$1,000/Acre
Shevlin Area		$1,000/Acre		$1,000/Acre	92.6	$1,000/Acre	38.3	$1,000/Acre		$1,000/Acre		$1,000/Acre
OB Riley / Gopher Gulch Area	20.9	$1,000/Acre	19.7	$1,000/Acre	48.1	$1,000/Acre	20.4	$1,000/Acre	48.1	$1,000/Acre	14.7	$1,000/Acre
Existing UGB (if applicable)		$1,000/Acre		$1,000/Acre		$1,000/Acre		$1,000/Acre		$1,000/Acre		$1,000/Acre
Overall Score	2		3		3		4		3		3	
	High overall cost per acre due to a moderate total cost and low acreage relative to the other alternatives. This scenario includes the highest or nearly the highest cost/acre reported for some individual growth aras.		Moderate cost/acre due to mix of subarea performance. Elbow includes additional development to decrease cost per acre relative to other scenarios.		Moderate cost/acre due to mix of subarea performance. Lower cost/acre in Triangle due to higher land use.		Lowest overall cost due to having lowest subarea costs in most growht areas except North Triangle (moderate costs and low dev), DSL (low costs and low dev) and The Elbow (moderate costs with low dev)		Moderate cost/acre due to mix of subarea performance. Lower cost/acre in Triangle due to higher land use. NE Edge uses existing network and Thumb network is minimized.		Moderate cost/acre due to mix of subarea performance. Lower cost/acre in Triangle due to higher land use. NE Edge uses existing network and Thumb network is minimized. DSL includes additional network with moderate growth.	

For more information about this performance measure, see accompanying technical memorandum from DKS Associates.

Factor 2: Orderly and Economic Provision of Public Facilities and Services

Author: Fregonese Associates

Community Outcome B. Cost Effective Infrastructure

Date: 9/10/2015

Performance Measure 3	**New Linear Miles of Local Roadway**
Brief Description of Evaluation:	The number of new road miles required to service the expansion areas. This is internal roadways only, not roadways aridly in the TPR.
Data Sources	New lineal roadways miles are an output of Envision Tomorrow, based on road network assumptions for each development type.

Interpretation and Key

"Good"	"Fair"	"Poor"	No Data	Not appropriate to rank

Evaluation Geography	Scenario 1.2		Scenario 2.1		Scenario 3.1		SAAM-1		SAAM-2		SAAM-3	
	Value	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*
Total Future UGB (Including Current UGB)	266	Road Lane Miles	260	Road Lane Miles	270	Road Lane Miles	301	Road Lane Miles	274	Road Lane Miles	269	Road Lane Miles
Total Expansion Area (excluding current UGB)	83	Road Lane Miles	76	Road Lane Miles	86	Road Lane Miles	117	Road Lane Miles	90	Road Lane Miles	85	Road Lane Miles
Subareas												
North Triangle	13	Road Lane Mil	10	Road Lane Miles	12	Road Lane Mil	13	Road Lane Mil	12	Road Lane Mil	12	Road Lane Miles
NE Edge	18	Road Lane Miles	6	Road Lane Miles	7	Road Lane Miles	48	Road Lane Miles	3	Road Lane Miles	3	Road Lane Miles
DSL Property	8	Road Lane Miles	15	Road Lane Miles	7	Road Lane Miles	6	Road Lane Miles	11	Road Lane Miles	8	Road Lane Miles
The "Elbow"	10	Road Lane Miles	18	Road Lane Miles	9	Road Lane Mil	7	Road Lane Mil	9	Road Lane Mil	9	Road Lane Miles
The "Thumb"	20	Road Lane Miles	16	Road Lane Miles	11	Road Lane Mil	17	Road Lane Mil	13	Road Lane Miles	13	Road Lane Miles
West Area	6	Road Lane Miles	8	Road Lane Miles	16	Road Lane Miles	N/A	Road Lane Mil	N/A	Road Lane Mil	30	Road Lane Miles
Shevlin Area	N/A	Road Lane Miles	N/A	Road Lane Miles	7	Road Lane Miles	19	Road Lane Miles	N/A	Road Lane Miles	N/A	Road Lane Miles
OB Riley / Gopher Gulch Area	7	Road Lane Mil	3	Road Lane Mil	18	Road Lane Miles	7	Road Lane Mil	42	Road Lane Miles	10	Road Lane Miles
Existing UGB (if applicable)	183	Road Lane Mil	183	Road Lane Mil	183	Road Lane Miles	183	Road Lane Miles	183	Road Lane Mil	183	Road Lane Miles
Overall Score	3		4		3		2		3		3	
							Model overestimates new road needed in NE Edge					

For more information about this performance measure, see accompanying technical memorandum from Fregonese Associates.

Factor 2: Orderly and Economic Provision of Public Facilities and Services

Author: Murray Smith Associates

Community Outcome B. Cost Effective Infrastructure

Date: 10/1/2015

Performance Measure 4 Efficiency of Additional Sanitary Sewer Infrastructure Improvements

Brief Description of Evaluation: Efficiency of sanitary sewer infrastructure improvements required to serve new growth, beyond what is included in the existing CSMP.

Data Sources

Interpretation and Key

Ratings for subareas are assigned based on the following considerations: "Good" means the subarea takes advantage of improvements needed to serve the existing UGB (e.g. Northeast Interceptor and Hamby alignment); "Fair" means there is somewhat costly localized infrastructure needed and/or that the amount of growth in the subarea doesn't take advantage of the improvements needed to serve the existing UGB; "Poor" means that costly new regional infrastructure (not a gravity system) is required that would not otherwise be needed.

"Good"	"Fair"	"Poor"	No Data	Not appropriate to rank

Evaluation Geography	Scenario 1.2 *Qualitative Evaluation*	Scenario 2.1 *Qualitative Evaluation*	Scenario 3.1 *Qualitative Evaluation*	SAAM-1 *Qualitative Evaluation*	SAAM-2 *Qualitative Evaluation*	SAAM-3 *Qualitative Evaluation*
Total Future UGB (Including Current UGB)						
Total Expansion Area (excluding current UGB)						
Subareas						
North Triangle	Incremental extension of NEI west of US 97; needed to serve OB Riley / Gopher Gulch Area as well	Incremental extension of NEI west of US 97; needed to serve OB Riley / Gopher Gulch Area as well	Incremental extension of NEI west of US 97; needed to serve OB Riley / Gopher Gulch Area as well	Incremental extension of NEI west of US 97; needed to serve OB Riley / Gopher Gulch Area as well	Incremental extension of NEI west of US 97; needed to serve OB Riley / Gopher Gulch Area as well	Incremental extension of NEI west of US 97; needed to serve OB Riley / Gopher Gulch Area as well
NE Edge	Relies primarily on Hamby alignment & NEI (very efficient), but Bear Creek area requires interim lift station	Relies primarily on Hamby alignment & NEI (very efficient), but Bear Creek area requires interim lift station; limited development does not take full advantage of Hamby and NEI	Relies primarily on Hamby alignment & NEI (very efficient), but Bear Creek area requires interim lift station; limited development does not take full advantage of Hamby and NEI	Relies entirely on Hamby alignment & NEI	Relies primarily on Hamby alignment & NEI (very efficient); limited development does not take full advantage of Hamby and NEI	Relies primarily on Hamby alignment & NEI (very efficient); limited development does not take full advantage of Hamby and NEI
DSL Property	Relies entirely on Hamby alignment & NEI, localized pipeline required to connect to SEI	Relies entirely on Hamby alignment & NEI, localized pipeline required to connect to SEI	Relies entirely on Hamby alignment & NEI, localized pipeline required to connect to SEI	Relies entirely on Hamby alignment & NEI, localized pipeline required to connect to SEI	Requires additional extension of Hamby alignment to serve Darnell Estates area	Relies entirely on Hamby alignment & NEI, localized pipeline required to connect to SEI
The "Elbow"	Requires interim pump station that does not contribute to long-term solution and infrastructure is unique to Elbow area	Requires interim pump station that does not contribute to long-term solution and infrastructure is unique to Elbow area	Requires interim pump station that does not contribute to long-term solution and infrastructure is unique to Elbow area	Requires interim pump station that does not contribute to long-term solution and infrastructure is unique to Elbow area	Requires interim pump station that does not contribute to long-term solution and infrastructure is unique to Elbow area	Requires interim pump station that does not contribute to long-term solution and infrastructure is unique to Elbow area
The "Thumb"	Requires pipe improvement on Parrell Road adjacent to SEI, then uses SEI / Hamby alignment & NEI	Pipe improvement on Parrell Road adjacent to SEI, Additional gravity main required to serve Baney property	Requires pipe improvement on Parrell Road adjacent to SEI, then uses SEI / Hamby alignment & NEI	Requires pipe improvement on Parrell Road adjacent to SEI, then uses SEI / Hamby alignment & NEI	Requires pipe improvement on Parrell Road adjacent to SEI, then uses SEI / Hamby alignment & NEI	Requires pipe improvement on Parrell Road adjacent to SEI, then uses SEI / Hamby alignment & NEI
West Area	Requires only incremental expansion & extension of existing lines	Requires only incremental expansion & extension of existing lines	requires expansion & extension of existing lines & connection to existing pump station	N/A	N/A	Exceeds capacity at Awbrey Glen & requires new regional pump station
Shevlin Area	N/A	N/A	Requires only extension of existing lines	Exceeds capacity at Awbrey Glen & requires new regional pump station	N/A	N/A
OB Riley / Gopher Gulch Area	Requires extension of NEI west of US 20	Requires extension of NEI west of US 20	Requires extension of NEI west of US 20 plus pipe extension to south	Requires extension of NEI west of US 20; shares infrastructure with new regional pump station triggered by Shevlin Area	Requires extension of NEI west of US 20 plus pipe extension to south	Requires extension of NEI west of US 20; shares infrastructure with new regional pump station triggered by West Area
Existing UGB (if applicable)	N/A	N/A	N/A	N/A	N/A	N/A
Overall Score	4	3	3	2	2	1
	Scenario takes advantage of Hamby and NEI	Scenario takes advantage of NEI, but does not take full advantage of Hamby by developing NE Edge	Scenario takes advantage of NEI, but does not take full advantage of Hamby by developing NE Edge	Scenario takes advantage of Hamby and NEI; however requires regional pump station for Shevlin	Scenario takes advantage of NEI, but does not take full advantage of Hamby by developing NE Edge	Scenario takes advantage of NEI; does not take full advantage of Hamby developing NE Edge; requires regional pump station for West

For more information about this performance measure, see accompanying technical memorandum from Murray Smith Associates.

Factor 2: Orderly and Economic Provision of Public Facilities and Services

Author: Murray Smith Associates

Community Outcome B. Cost Effective Infrastructure

Date: 10/1/2015

Performance Measure 5 Initial Capital Cost of Sanitary Sewer Infrastructure Improvements

Brief Description of Evaluation: Initial capital cost (millions of dollars) of sanitary sewer infrastructure improvements required to serve new growth, beyond what is included in the existing CSMP. Note that operational and maintenance costs and lifecycle costs for pump stations are not included.

Data Sources

Interpretation and Key

Better ranking fields have lower total cost of improvements needed. At the subarea level, costs under $6 million are rated "Good", $6-12 million is "Fair", over $12 million is "Poor". For Scenario / SAAM totals, under $46 million is rated "Good", $46-52 million is rated "Fair" and over $52 million is rated "Poor".

"Good"	"Fair"	"Poor"	No Data	Not appropriate to rank

Evaluation Geography	Scenario 1.2 Value	Scenario 1.2 Units	Scenario 2.1 Value	Scenario 2.1 Units	Scenario 3.1 Value	Scenario 3.1 Units	SAAM-1 Value	SAAM-1 Units	SAAM-2 Value	SAAM-2 Units	SAAM-3 Value	SAAM-3 Units
Total Future UGB (Including Current UGB)												
Total Expansion Area (excluding current UGB)	38.0	$M	39.5	$M	45.4	$M	54.3	$M	41.0	$M	54.3	$M
Subareas												
North Triangle	2.6	$M	2.5	$M	1.9	$M	0.8	$M	1.4	$M	1.8	$M
NE Edge	5.2	$M	2.6	$M	3.5	$M	8.2	$M	0.5	$M	0.6	$M
DSL Property	6.4	$M	7.8	$M	6.5	$M	5.5	$M	11.7	$M	5.5	$M
The "Elbow"	7.7	$M	10.0	$M	8.6	$M	7.9	$M	9.4	$M	9.5	$M
The "Thumb"	6.8	$M	7.1	$M	5.4	$M	6.1	$M	7.4	$M	6.9	$M
West Area	2.8	$M	2.8	$M	7.0	$M	N/A		N/A		27.2	$M
Shevlin Area	N/A		N/A		4.0	$M	24.1	$M	N/A		N/A	
OB Riley / Gopher Gulch Area	6.5	$M	6.6	$M	8.5	$M	1.6	$M	10.5	$M	2.7	$M
Existing UGB (if applicable)	N/A		N/A		N/A		N/A		N/A		N/A	
Overall Score	4		3		3		1		3		1	
	Initial capital costs are low to moderate in all subareas, and the lowest overall.		Initial capital costs are low to moderate in all subareas, and relatively low overall.		Initial capital costs are low to moderate in all subareas, and relatively low overall.		Need for new regional pump station significantly increases costs for the Shevlin Area and overall.		Initial capital costs are low to moderate in all subareas, and relatively low overall.		Need for new regional pump station significantly increases costs for the West Area and overall.	

For more information about this performance measure, see accompanying technical memorandum from Murray Smith Associates.

Factor 2: Orderly and Economic Provision of Public Facilities and Services

Author: Murray Smith Associates

Community Outcome B. Cost Effective Infrastructure

Date: 10/1/2015

Performance Measure 6	Initial capital cost of Sanitary Sewer Infrastructure Improvements per developed acre
Brief Description of Evaluation:	Cost of infrastructure improvements required to serve new growth, beyond what is included in the existing CSMP, divided by the urbanized acres
Data Sources	
Interpretation and Key	Ratings are assigned based primarily on the performance of the subareas and less on the overall average cost per acre at the Scenario / SAAM level; under $25,000 per acre is rated as "Good", $25,000-40,000 is rated as Fair; over $40,000 is rated as "Poor"

"Good"	"Fair"	"Poor"	No Data	Not appropriate to rank

Evaluation Geography	Scenario 1.2 Value	Scenario 1.2 Units	Scenario 2.1 Value	Scenario 2.1 Units	Scenario 3.1 Value	Scenario 3.1 Units	SAAM-1 Value	SAAM-1 Units	SAAM-2 Value	SAAM-2 Units	SAAM-3 Value	SAAM-3 Units
Total Future UGB (Including Current UGB)												
Total Expansion Area (excluding current UGB)	22,646	$/Acre	23,253	$/Acre	22,593	$/Acre	22,864	$/Acre	24,731	$/Acre	33,520	$/Acre
Subareas												
North Triangle	13,473	$/Acre	13,258	$/Acre	8,116	$/Acre	4,268	$/Acre	5,853	$/Acre	7,742	$/Acre
NE Edge	11,534	$/Acre	20,000	$/Acre	22,062	$/Acre	7,338	$/Acre	12,944	$/Acre	14,831	$/Acre
DSL Property	29,140	$/Acre	21,846	$/Acre	33,816	$/Acre	44,343	$/Acre	61,882	$/Acre	43,233	$/Acre
The "Elbow"	37,671	$/Acre	24,779	$/Acre	48,338	$/Acre	52,029	$/Acre	53,094	$/Acre	53,692	$/Acre
The "Thumb"	19,432	$/Acre	22,834	$/Acre	30,655	$/Acre	26,217	$/Acre	34,714	$/Acre	32,918	$/Acre
West Area	21,361	$/Acre	16,422	$/Acre	18,812	$/Acre	N/A		N/A		41,327	$/Acre
Shevlin Area	N/A		N/A		12,556	$/Acre	56,235	$/Acre	N/A		N/A	
OB Riley / Gopher Gulch Area	51,293	$/Acre	49,176	$/Acre	18,840	$/Acre	12,501	$/Acre	13,102	$/Acre	15,448	$/Acre
Existing UGB (if applicable)	N/A		N/A		N/A		N/A		N/A		N/A	
Overall Score	3 ○		4 ◔		3 ○		2 ◒		2 ◒		1 ●	
	DSL property and The Elbow are moderately cost-effective due to moderate area included and fixed costs to serve the area; OB Riley has cost per acre, but needed infrastructure to serve that area may in the very long term serve additional growth		Most subareas are cost-effective to serve; OB Riley has cost per acre, but needed infrastructure to serve that area may in the very long term serve additional growth		The Elbow is not cost-effective due to small area included and fixed costs to serve the area, DSL property and The Thumb are moderately cost-effective due to moderate area included and fixed costs to serve the area		DSL property and The Elbow are not cost-effective due to small area included and fixed costs to serve the area; also requires regional pump station for Shevlin which increases cost in that area significantly		DSL property and The Elbow are not cost-effective due to small area included and fixed costs to serve the area		DSL property and The Elbow are not cost-effective due to small area included and fixed costs to serve the area; also requires regional pump station for West, which increases cost in that area significantly; also has high overall cost per acre	

For more information about this performance measure, see accompanying technical memorandum from Murray Smith Associates.

Factor 2: Orderly and Economic Provision of Public Facilities and Services

Author: Murray Smith Associates

Community Outcome B. Cost Effective Infrastructure

Date: 9/8/2015

Performance Measure 7	**Drinking Water Infrastructure Improvements**
Brief Description of Evaluation:	Drinking water infrastructure improvements within city water service area required to serve new growth, beyond what is already planned
Data Sources	
Interpretation and Key	Better ranking fields are easier to expand / upgrade infrastructure.

"Good"	"Fair"	"Poor"	No Data	Not appropriate to rank

Evaluation Geography	Scenario 1.2 *Qualitative Evaluation*	Scenario 2.1 *Qualitative Evaluation*	Scenario 3.1 *Qualitative Evaluation*	SAAM-1 *Qualitative Evaluation*	SAAM-2 *Qualitative Evaluation*	SAAM-3 *Qualitative Evaluation*
Total Future UGB (Including Current UGB)						
Total Expansion Area (excluding current UGB)						
Subareas						
North Triangle	Zone 6 expansion	Zone 6 expansion	Zone 6 expansion	Zone 6 expansion	Zone 6 expansion	Zone 6 expansion
NE Edge						
DSL Property						
The "Elbow"						
The "Thumb"						
West Area	Zone 3 expansion	Zone 3 expansion	Zone 3 expansion	N/A	N/A	Zone 3 expansion
Shevlin Area	N/A	N/A	Zone 4E, 5B, 6B expansion: supply through smaller zones and PRVs	Zone 4E, 5B, 6B expansion: supply through smaller zones and PRVs	N/A	N/A
OB Riley / Gopher Gulch Area	Zone 6 expansion	Zone 6 expansion	Zone 6 expansion	Zone 6 expansion	Zone 6 expansion	Zone 6 expansion
Existing UGB (if applicable)	N/A	N/A	N/A	N/A	N/A	N/A
Overall Score	5	5	4	4	5	5
	Favors expansion in Zones 3 and 6	Favors expansion in Zones 3 and 6	More problematic to expand into Zones 4E, 5B, 6B	More problematic to expand into Zones 4E, 5B, 6B	Favors expansion in Zones 3 and 6	Favors expansion in Zones 3 and 6

For more information about this performance measure, see accompanying technical memorandum from Murray Smith Associates.

Factor 2: Orderly and Economic Growth

Author: Name **Fregonese Associates**

Community Outcome B **Cost Effective Infrastructure** **Date:** 9/10/2015

Performance Measure 9 **Total Impervious Area from New Development**

Brief Description of Evaluation: The amount of impervious area for each scenario. Includes impervious amounts of buildings, surface parking lots, and roadways.

Data Sources Impervious area is an Envision Tomorrow output, based off building/prototype assumptions. Note that certain land uses, including the large lot industrial site and schools, do not have specific impervious surface assumptions built in, and do not contribute to the totals.

Interpretation and Key Variations are subtle at the full scenario level and for the expansion areas total.

"Good"	"Fair"	"Poor"	No Data	Not appropriate to rank

Evaluation Geography	Scenario 1.2		Scenario 2.1		Scenario 3.1		SAAM-1		SAAM-2		SAAM-3	
	Value	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*
Total Future UGB (Including Current UGB)	3,315	Acres	3,291	Acres	3,393	Acres	3,526	Acres	3,405	Acres	3,311	Acres
Total Expansion Area (excluding current UGB)	1,047	Acres	1,022	Acres	1,122	Acres	1,251	Acres	1,130	Acres	1,043	Acres
Subareas												
North Triangle	153	Acres	130	Acres	138	Acres	153	Acres	138	Acres	138	Acres
NE Edge	237	Acres	72	Acres	91	Acres	452	Acres	29	Acres	29	Acres
DSL Property	115	Acres	210	Acres	93	Acres	72	Acres	127	Acres	102	Acres
The "Elbow"	126	Acres	233	Acres	113	Acres	92	Acres	113	Acres	113	Acres
The "Thumb"	239	Acres	219	Acres	130	Acres	180	Acres	151	Acres	158	Acres
West Area	92	Acres	118	Acres	181	Acres	N/A	Acres	N/A	Acres	377	Acres
Shevlin Area	N/A	Acres	N/A	Acres	98	Acres	216	Acres	N/A	Acres	N/A	Acres
OB Riley / Gopher Gulch Area	85	Acres	41	Acres	279	Acres	85	Acres	573	Acres	126	Acres
Existing UGB (if applicable)	2,268	Acres	2,268	Acres	2,268	Acres	2,268	Acres	2,268	Acres	2,268	Acres
Overall Score	4		4		3		3		3		4	
							Model overestimates impervious surface area for NE Edge					

For more information about this performance measure, see accompanying technical memorandum from Fregonese Associates.

Factor 2: Orderly and Economic Provision of Public Facilities and Services

Author: Laura Krull, Andrew Parish **APG**

Community Outcome B Cost Effective Infrastructure **Date:** 8/25/2015

Performance Measure 10	**Acres of new development with welded tuff geology**
Brief Description of Evaluation:	Acres of new development in areas with geology of "Welded Tuff", which is more difficult to build stormwater infrastructure upon.
Data Sources	Welded Tuff Geology, United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Soil Service Geographic (SSURGO) data set
Interpretation and Key	Areas with < 100 acres of development in welded tuff ranked green, areas with 100 - 200 acres ranked yellow, areas with > 200 acres ranked red.

"Good"	"Fair"	"Poor"	No Data	Not appropriate to rank

Evaluation Geography	Scenario 1.2 Value	Scenario 1.2 Units	Scenario 2.1 Value	Scenario 2.1 Units	Scenario 3.1 Value	Scenario 3.1 Units	SAAM-1 Value	SAAM-1 Units	SAAM-2 Value	SAAM-2 Units	SAAM-3 Value	SAAM-3 Units
Total Future UGB (Including Current UGB)	1269	acres	1310	acres	1478	acres	1409	acres	1143	acres	1666	acres
Total Expansion Area (excluding current UGB)	133	acres	173	acres	341	acres	272	acres	6	acres	529	acres
Subareas												
North Triangle	0	acres	0	acres	0	acres	0	acres	0	acres	0	acres
NE Edge	0	acres	0	acres	0	acres	0	acres	0	acres	0	acres
DSL Property	0	acres	0	acres	0	acres	0	acres	0	acres	0	acres
The "Elbow"	0	acres	0	acres	0	acres	0	acres	0	acres	0	acres
The "Thumb"	0	acres	0	acres	0	acres	0	acres	0	acres	0	acres
West Area	132	acres	171	acres	309	acres	0	acres	0	acres	529	acres
Shevlin Area	0	acres	0	acres	26	acres	272	acres	0	acres	0	acres
OB Riley / Gopher Gulch Area	0	acres	0	acres	0	acres	0	acres	6	acres	0	acres
Existing UGB (if applicable)	1137	acres	1137	acres	1137	acres	1137	acres	1137	acres	1137	acres
Overall Score	3		3		2		2		5		1	
	Moderate development in West area, which has Welded Tuff geology		Moderate development in West area, which has Welded Tuff geology		Significant development in West and Shevlin areas, which have Welded Tuff geology		Significant development in West and Shevlin areas, which have Welded Tuff geology		Little to no development in areas with Welded Tuff geology		Significant development in West area, which has Welded Tuff geology	

For more information about this performance measure, see accompanying technical memorandum from APG

Factor 2: Orderly and Economic Provision of Public Facilities and Services

Author: Laura Krull, Andrew Parish **APG**

Community Outcome B Cost Effective Infrastructure

Date: 8/25/2015

Performance Measure 6	**Acres of new development within DWPA**
Brief Description of Evaluation:	Acres of development within identified Drinking Water Protection Areas
Data Sources	Scenario and SAAM GIS layers, Bend UGB Remand Project; Drinking Water Protection Areas, City of Bend.
Interpretation and Key	All scenarios develop on land within DWPA. Most drinking water protection areas are in the South of the city. Scenarios with greater than 300 acres ranked "Poor" and scenarios with less than 300 ranked "Fair".

"Good"	"Fair"	"Poor"	No Data	Not appropriate to rank

Evaluation Geography	Scenario 1.2 Value	Scenario 1.2 Units	Scenario 2.1 Value	Scenario 2.1 Units	Scenario 3.1 Value	Scenario 3.1 Units	SAAM-1 Value	SAAM-1 Units	SAAM-2 Value	SAAM-2 Units	SAAM-3 Value	SAAM-3 Units
Total Future UGB (Including Current UGB)	1273	acres	1222	acres	1121	acres	1121	acres	1064	acres	1135	acres
Total Expansion Area (excluding current UGB)	403	acres	352	acres	250	acres	250	acres	193	acres	265	acres
Subareas												
North Triangle	2	acres	2	acres	2	acres	2	acres	2	acres	2	acres
NE Edge	6	acres	6	acres	6	acres	0	acres	0	acres	0	acres
DSL Property	3	acres	3	acres	3	acres	2	acres	2	acres	3	acres
The "Elbow"	0	acres	0	acres	0	acres	0	acres	0	acres	0	acres
The "Thumb"	335	acres	296	acres	161	acres	231	acres	182	acres	196	acres
West Area	56	acres	44	acres	64	acres	0	acres	0	acres	65	acres
Shevlin Area	0	acres	0	acres	6	acres	16	acres	0	acres	0	acres
OB Riley / Gopher Gulch Area	0	acres	0	acres	8	acres	0	acres	8	acres	0	acres
Existing UGB (if applicable)	871	acres	871	acres	871	acres	871	acres	871	acres	871	acres
Overall Score	1		2		3		3		5		3	
	Significant development in the Thumb drive this ranking.		Significant development in the Thumb drive this ranking.		Less development in The Thumb drives this ranking.		Less development in the Thumb and West areas drive this ranking.		Less development in the Thumb and West areas drive this ranking.		Less development in The Thumb drives this ranking.	

For more information about this performance measure, see accompanying technical memorandum from APG

Factor 3: ESEE

Author: CJ Doxsee **APG**

Community Outcome A Quality Natural Environment

Date: 8/20/2015

Performance Measure 1 Development near Goal 5 Resources

Brief Description of Evaluation: Acres of development outside the UGB within identified elk/deer winter range and acres of development within "ODFW Areas of Potential Concern".

Data Sources ODFW Winter Range GIS, Scenario and SAAM GIS

Interpretation and Key Areas with no development in wildlife corridor or "ODFW areas of potential concern" are identified in green. Subareas that are partially included in these categories are identified in yellow, and subareas that are wholly encompassed by winter range/"ODFW areas of potential concern" are red. At the whole-UGB roll-up, Scenarios/SAAMs with 300-500 acres in these Goal 5 areas are marked yellow, Scenarios/SAAMs with > 500 acres are marked red.

Good	Fair	Poor	No Data

Evaluation Geography	Scenario 1.2 Value	Scenario 1.2 Units	Scenario 2.1 Value	Scenario 2.1 Units	Scenario 3.1 Value	Scenario 3.1 Units	SAAM-1 Value	SAAM-1 Units	SAAM-2 Value	SAAM-2 Units	SAAM-3 Value	SAAM-3 Units
Total Future UGB (Including Current UGB)												
Total Expansion Area (excluding current UGB)	546	Acres in Elk/Deer Range	679	Acres in Elk/Deer Range	778	Acres in Elk/Deer Range	855	Acres in Elk/Deer Range	325	Acres in Elk/Deer Range	990	Acres in Elk/Deer Range
	0	Acres in "Potential Elk/Deer Range"	0	Acres in "Potential Elk/Deer Range"	176	Acres in "Potential Elk/Deer Range"	545	Acres in "Potential Elk/Deer Range"	0	Acres in "Potential Elk/Deer Range"	0	Acres in "Potential Elk/Deer Range"
Subareas												
North Triangle	0	Acres in Elk/Deer Range	0	Acres in Elk/Deer Range	0	Acres in Elk/Deer Range	0	Acres in Elk/Deer Range	0	Acres in Elk/Deer Range	0	Acres in Elk/Deer Range
	0	Acres in "ODFW Areas of Potential Concern"	0	Acres in "ODFW Areas of Potential Concern"	0	Acres in "ODFW Areas of Potential Concern"	0	Acres in "ODFW Areas of Potential Concern"	0	Acres in "ODFW Areas of Potential Concern"	0	Acres in "ODFW Areas of Potential Concern"
NE Edge	0	Acres in Elk/Deer Range	0	Acres in Elk/Deer Range	0	Acres in Elk/Deer Range	0	Acres in Elk/Deer Range	0	Acres in Elk/Deer Range	0	Acres in Elk/Deer Range
	0	Acres in "ODFW Areas of Potential Concern"	0	Acres in "ODFW Areas of Potential Concern"	0	Acres in "ODFW Areas of Potential Concern"	0	Acres in "ODFW Areas of Potential Concern"	0	Acres in "ODFW Areas of Potential Concern"	0	Acres in "ODFW Areas of Potential Concern"
DSL Property	0	Acres in Elk/Deer Range	0	Acres in Elk/Deer Range	0	Acres in Elk/Deer Range	0	Acres in Elk/Deer Range	0	Acres in Elk/Deer Range	0	Acres in Elk/Deer Range
	0	Acres in "ODFW Areas of Potential Concern"	0	Acres in "ODFW Areas of Potential Concern"	0	Acres in "ODFW Areas of Potential Concern"	0	Acres in "ODFW Areas of Potential Concern"	0	Acres in "ODFW Areas of Potential Concern"	0	Acres in "ODFW Areas of Potential Concern"
The "Elbow"	64	Acres in Elk/Deer Range	111	Acres in Elk/Deer Range	97	Acres in Elk/Deer Range	70	Acres in Elk/Deer Range	100	Acres in Elk/Deer Range	100	Acres in Elk/Deer Range
	0	Acres in "ODFW Areas of Potential Concern"	0	Acres in "ODFW Areas of Potential Concern"	0	Acres in "ODFW Areas of Potential Concern"	0	Acres in "ODFW Areas of Potential Concern"	0	Acres in "ODFW Areas of Potential Concern"	0	Acres in "ODFW Areas of Potential Concern"
The "Thumb"	350	Acres in Elk/Deer Range	395	Acres in Elk/Deer Range	176	Acres in Elk/Deer Range	240	Acres in Elk/Deer Range	225	Acres in Elk/Deer Range	220	Acres in Elk/Deer Range
	0	Acres in "ODFW Areas of Potential Concern"	0	Acres in "ODFW Areas of Potential Concern"	0	Acres in "ODFW Areas of Potential Concern"	0	Acres in "ODFW Areas of Potential Concern"	0	Acres in "ODFW Areas of Potential Concern"	0	Acres in "ODFW Areas of Potential Concern"
West Area	132	Acres in Elk/Deer Range	173	Acres in Elk/Deer Range	329	Acres in Elk/Deer Range	0	Acres in Elk/Deer Range	0	Acres in Elk/Deer Range	670	Acres in Elk/Deer Range
	0	Acres in "ODFW Areas of Potential Concern"	0	Acres in "ODFW Areas of Potential Concern"	0	Acres in "ODFW Areas of Potential Concern"	0	Acres in "ODFW Areas of Potential Concern"	0	Acres in "ODFW Areas of Potential Concern"	0	Acres in "ODFW Areas of Potential Concern"
Shevlin Area	0	Acres in Elk/Deer Range	0	Acres in Elk/Deer Range	176	Acres in Elk/Deer Range	545	Acres in Elk/Deer Range	0	Acres in Elk/Deer Range	0	Acres in Elk/Deer Range
	0	Acres in "ODFW Areas of Potential Concern"	0	Acres in "ODFW Areas of Potential Concern"	176	Acres in "ODFW Areas of Potential Concern"	545	Acres in "ODFW Areas of Potential Concern"	0	Acres in "ODFW Areas of Potential Concern"	0	Acres in "ODFW Areas of Potential Concern"
OB Riley / Gopher Gulch Area	0	Acres in Elk/Deer Range	0	Acres in Elk/Deer Range	0	Acres in Elk/Deer Range	0	Acres in Elk/Deer Range	0	Acres in Elk/Deer Range	0	Acres in Elk/Deer Range
	0	Acres in "ODFW Areas of Potential Concern"	0	Acres in "ODFW Areas of Potential Concern"	0	Acres in "ODFW Areas of Potential Concern"	0	Acres in "ODFW Areas of Potential Concern"	0	Acres in "ODFW Areas of Potential Concern"	0	Acres in "ODFW Areas of Potential Concern"
Existing UGB (if applicable)												
Overall Score	4		3		2		1		5		2	
	Significant expansion in elk/deer range (Thumb and West areas)		Significant expansion in elk/deer range (Thumb and West areas)		Scenario has significant development in both habitat corridor and "ODFW Areas of Potential Concern."		Scenario has significant development in both habitat corridor and "ODFW Areas of Potential Concern."		Only modest development in elk/deer range (Thumb and portion of Elbow).		Large amount of expansion in elk/deer range (Thumb and West areas)	

For more information about this performance measure, see accompanying technical memorandum from APG

Factor 3: ESEE

Author: Andrew Parish **APG**

Community Outcome A Quality Natural Environment **Date:** 9/2/2015

Performance Measure 2	**Linear feet of property along Deschutes River and Tumalo Creek**
Brief Description of Evaluation:	Linear feet (not in parks ownership) along identified Goal 5 areas of the Deschutes River and Tumalo Creek, in the Shevlin Area and the Gopher Gulch Area.
Data Sources	Deschutes County Assessor's Data, City of Bend data.

Interpretation and Key

"Good"	"Fair"	"Poor"	No Data	Not appropriate to rank

Evaluation Geography	Scenario 1.2		Scenario 2.1		Scenario 3.1		SAAM-1		SAAM-2		SAAM-3	
	Value	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*
Total Future UGB (Including Current UGB)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total Expansion Area (excluding current UGB)	-	Feet	-	Feet	1,100	Feet	6,000	Feet	8,100	Feet	-	Feet
Subareas												
North Triangle	-	Feet	-	Feet	-	Feet	-	Feet	-	Feet	-	Feet
NE Edge	-	Feet	-	Feet	-	Feet	-	Feet	-	Feet	-	Feet
DSL Property	-	Feet	-	Feet	-	Feet	-	Feet	-	Feet	-	Feet
The "Elbow"	-	Feet	-	Feet	-	Feet	-	Feet	-	Feet	-	Feet
The "Thumb"	-	Feet	-	Feet	-	Feet	-	Feet	-	Feet	-	Feet
West Area	-	Feet	-	Feet	0	Feet	0	Feet	-	Feet	-	Feet
Shevlin Area	0	Feet	0	Feet	-	Feet	6,000	Feet	0	Feet	0	Feet
OB Riley / Gopher Gulch Area	-	Feet	-	Feet	1,100	Feet	-	Feet	8,100	Feet	-	Feet
Existing UGB (if applicable)	-	Feet	-	Feet	-	Feet	-	Feet	-	Feet	-	Feet
Overall Score	5		5		4		3		3		5	
	No expansion areas abut Tumalo Creek or the Deschutes River.		No expansion areas abut Tumalo Creek or the Deschutes River.		The southern portion of the OB Riley / Gopher Gulch area abuts the Deschutes River for roughly 1100 feet.		Shevlin Area abuts Tumalo Creek, but the Bend Metropolitan Parks & Recreation District has ownership of the property within roughly 500ft of the river.		Gopher Gulch property abuts the Deschutes River - though State of Oregon Parks and Recreation owns much of the riverfront from about 50ft to 200ft from the river and roughly 7,000 feet of riverfront is owned by the Bend Parks & Recreation District. Open space buffers will likely be required in a few areas that are privately owned and within 100' of the river. Roughly 1300 feet of property is in private ownership and abuts the river.		West area does not abut Tumalo Creek.	

Factor 3: ESEE

Author: Karen Swirsky & Craig Letz — **City of Bend & Letz Consulting**

Community Outcome A: Quality Natural Environment — **Date:** 9/3/2015

Performance Measure 3: Wildfire Hazard

Brief Description of Evaluation: Based on wildfire hazard as determined by vegetation, slope, and levels of existing management.

Data Sources: Greater Bend Community Wildfire Protection Plan, Deschutes Co Fire Risk Index Map, Fire Risk Assessment for Bend UGB, Fire Behavior Analysis for Bend UGB Investigation (draft).

Interpretation and Key: By sub-area, "Good" means that fire hazard was determined to be low (1). "Fair" means that the fire hazard was determined to be "High (2)." "Poor" means that the fire hazard was determined to be "Extreme (3)." Areas with a mix of "High" and "Extreme" hazard were classified as "Poor." NOTE: These rankings are based on the hazard evaluation only. Employment land is protected by existing building code. Mitigation measures are being developed which will reduce hazard to residential areas if adopted into code.

"Good"	"Fair"	"Poor"	No Data	Not appropriate to rank

Evaluation Geography	Scenario 1.2	Scenario 2.1	Scenario 3.1	SAAM-1	SAAM-2	SAAM-3
Total Future UGB (Including Current UGB)						
Total Expansion Area (excluding current UGB)						
Subareas						
	Mosaic high fire hazard: there is hazard of fire due to vegetation type, but it would be relatively easy to control because of the patchy nature of the High fire hazard areas					
North Triangle	No residential development. Current building codes require fire protection for commercial buildings	Residential development in high fire hazard area. New regulations / mitigation strategies needed for residential areas	No residential development. Current building codes require fire protection for commercial buildings	No residential development. Current building codes require fire protection for commercial buildings	No residential development. Current building codes require fire protection for commercial buildings	No residential development. Current building codes require fire protection for commercial buildings
	Mosaic high fire hazard: there is hazard of fire due to vegetation type, but it would be relatively easy to control because of the patchy nature of the High fire hazard areas					
NE Edge	Residential development in high fire hazard area. New regulations / mitigation strategies needed for residential areas	Residential development in high fire hazard area. New regulations / mitigation strategies needed for residential areas	Residential development in high fire hazard area. New regulations / mitigation strategies needed for residential areas	Residential development in high fire hazard area. New regulations / mitigation strategies needed for residential areas	No residential development. Current building codes require fire protection for commercial buildings	No residential development. Current building codes require fire protection for commercial buildings
	Extreme fire hazard: unmanaged and unirrigated. Hazard could be reduced to high with proper management of vegetation.					
DSL Property	Residential development in extreme fire hazard area. New regulations / mitigation strategies needed for residential areas	Residential development in extreme fire hazard area. New regulations / mitigation strategies needed for residential areas	Residential development in extreme fire hazard area. New regulations / mitigation strategies needed for residential areas	No residential development. Current building codes require fire protection for commercial buildings	Residential development in high fire hazard area. New regulations / mitigation strategies needed for residential areas	Residential development in extreme fire hazard area. New regulations / mitigation strategies needed for residential areas
	Extreme fire hazard west of 27th/north of Knott Road; hazard could be reduced to high with proper management of vegetation. Remainder of area is mosaic High fire hazard					
The "Elbow"	Residential development in extreme fire hazard area. New regulations / mitigation strategies needed for residential areas	Residential development in extreme fire hazard area. New regulations / mitigation strategies needed for residential areas	No residential development. Current building codes require fire protection for commercial buildings	No residential development. Current building codes require fire protection for commercial buildings	No residential development. Current building codes require fire protection for commercial buildings	No residential development. Current building codes require fire protection for commercial buildings
	well-managed High fire hazard					
The "Thumb"	Residential development in high fire hazard area. New regulations / mitigation strategies needed for residential areas	Residential development in high fire hazard area. New regulations / mitigation strategies needed for residential areas	No residential development. Current building codes require fire protection for commercial buildings	No residential development. Current building codes require fire protection for commercial buildings	No residential development. Current building codes require fire protection for commercial buildings	No residential development. Current building codes require fire protection for commercial buildings
	Miller property : well-managed High hazard; Day property: managed High hazard					
West Area	Residential development in high fire hazard area. New regulations / mitigation strategies needed for residential areas	Residential development in high fire hazard area. New regulations / mitigation strategies needed for residential areas	Residential development in high fire hazard area. New regulations / mitigation strategies needed for residential areas	N/A	N/A	Residential development in high fire hazard area. New regulations / mitigation strategies needed for residential areas
	mosaic of managed High and Extreme fire hazard; portions of the subarea have topography and unmanaged adjacent lands that could make it difficult to reduce fire hazard					
Shevlin Area	N/A	N/A	Residential development in extreme fire hazard area. New regulations / mitigation strategies needed for residential areas	Residential development in extreme fire hazard area. New regulations / mitigation strategies needed for residential areas	N/A	N/A
	managed High fire hazard, with pockets of Extreme (hazard could be reduced to high with proper management of vegetation except along steep slopes adjacent to river)					
OB Riley / Gopher Gulch Area	No residential development. Current building codes require fire protection for commercial buildings	No residential development. Current building codes require fire protection for commercial buildings	Residential development in high fire hazard area. New regulations / mitigation strategies needed for residential areas	No residential development. Current building codes require fire protection for commercial buildings	Residential development in extreme fire hazard area. New regulations / mitigation strategies needed for residential areas	No residential development. Current building codes require fire protection for commercial buildings
Existing UGB (if applicable)	N/A	N/A	N/A	N/A	N/A	N/A
Overall Score	3 ○ Includes four subareas with a High hazard rating and three with an Extreme hazard rating. The three subareas rated Extreme in this scenario could be reduced to High with proper management of vegetation.	3 ○ Includes four subareas with a High hazard rating and three with an Extreme hazard rating. The three subareas rated Extreme in this scenario could be reduced to High with proper management of vegetation.	2 ◒ includes four subareas with a High hazard rating and four with an Extreme hazard rating. Most of the subareas rated Extreme in this scenario would likely to be reduced to High with proper management of vegetation; however, portions of the Shevlin subarea have topography and unmanaged adjacent lands that could make it more difficult to reduce fire hazard.	2 ◒ includes three subareas with a High hazard rating and four with an Extreme hazard rating. Most of the subareas rated Extreme in this scenario would likely to be reduced to High with proper management of vegetation; however, portions of the Shevlin subarea have topography and unmanaged adjacent lands that could make it more difficult to reduce fire hazard.	3 ○ includes three subareas with a High hazard rating and three with an Extreme hazard rating. Most of the subareas rated Extreme in this scenario would likely to be reduced to High with proper management of vegetation (area adjacent to river with steep slopes would make it harder to reduce fire hazard on the western edge, but this is largely park land).	3 ○ includes four subareas with a High hazard rating and three with an Extreme hazard rating. Most of the subareas rated Extreme in this scenario would likely to be reduced to High with proper management of vegetation

For more information about this performance measure, see accompanying technical memorandum from City of Bend.

Footnotes:

(1) No areas were determined to be low hazard in the onsite assessment. Areas are shown as low hazard because existing building codes require fire protection measures (i.e. materials and
(2) High hazard means that there is brush, healthy conifers, and open sage and juniper on terrain of less than 25% slope. Variability in the Bend area was addressed by modifying "high" as
(3) Extreme hazard means that the areas have grasses, heavy brush, and mature timber with slash. With proper management, all Extreme areas can be modified to High.

Factor 3: ESEE

Author: Analysis by Fregonese Associates; interpretation by Angelo Planning Group

Community Outcome A Quality Natural Environment

Date: 9/10/2015

Performance Measure 4 — Carbon Dioxide Emissions

Brief Description of Evaluation: The average number of tons of CO2 emitted per household, per year, for household based, and transportation based emissions.

Data Sources Household CO2 is an output of the Envision Tomorrow Scenario Builder, based on regional averages for different housing types, and seasonality. Transportation CO2 is the output from 7D transportation model, based on national averages for vehicle emissions.

Interpretation and Key Smaller, and more compact homes are more energy efficient, and have lower emissions. Larger homes emit more carbon than smaller units, and contain additional people, both of which result in increased emissions per household. As a result, this performance measure is highly correlated with housing mix. This also means that distinctions at the total expansion area and total future UGB level are very subtle, and that there is more variability at the subarea level, depending on the type of housing assumed in each. Transportation emissions reflect the amount and distance of auto trips (see 2.A.1). Color coding relative to average for existing UGB: better than existing UGB (by more than 0.2 tons/yr)= "Good"; within 0.2 tons/yr of existing UGB = "Fair"; worse than existing UGB (by more than 0.2 tons/yr) = "Poor". Subareas with trivial amounts of housing shown in grey since emissions are normalized per household. Overall ratings are based more on the transportation carbon emissions, because these have more meaningful variations at the scenario level, though they are highly correlated with VMT.

"Good"	"Fair"	"Poor"	No Data	Not appropriate to rank

Evaluation Geography	Scenario 1.2 Value	Scenario 1.2 Units	Scenario 2.1 Value	Scenario 2.1 Units	Scenario 3.1 Value	Scenario 3.1 Units	SAAM-1 Value	SAAM-1 Units	SAAM-2 Value	SAAM-2 Units	SAAM-3 Value	SAAM-3 Units
Total Future UGB (Including Current UGB)	4.4	Housing Carbon Emissions Per HH (Ton/Yr)	4.3	Housing Carbon Emissions Per HH (Ton/Yr)	4.3	Housing Carbon Emissions Per HH (Ton/Yr)	4.4	Housing Carbon Emissions Per HH (Ton/Yr)	4.4	Housing Carbon Emissions Per HH (Ton/Yr)	3.5	Housing Carbon Emissions Per HH (Ton/Yr)
	3.7	Trasnportation Carbon Emissions Per HH (Ton/Yr)	3.7	Trasnportation Carbon Emissions Per HH (Ton/Yr)	3.7	Trasnportation Carbon Emissions Per HH (Ton/Yr)	3.8	Trasnportation Carbon Emissions Per HH (Ton/Yr)	3.8	Trasnportation Carbon Emissions Per HH (Ton/Yr)	3.7	Trasnportation Carbon Emissions Per HH (Ton/Yr)
Total Expansion Area (excluding current UGB)	4.7	Housing Carbon Emissions Per HH (Ton/Yr)	4.6	Housing Carbon Emissions Per HH (Ton/Yr)	4.7	Housing Carbon Emissions Per HH (Ton/Yr)	4.9	Housing Carbon Emissions Per HH (Ton/Yr)	4.9	Housing Carbon Emissions Per HH (Ton/Yr)	3.9	Housing Carbon Emissions Per HH (Ton/Yr)
	6.6	Trasnportation Carbon Emissions Per HH (Ton/Yr)	6.4	Trasnportation Carbon Emissions Per HH (Ton/Yr)	7.4	Trasnportation Carbon Emissions Per HH (Ton/Yr)	7.9	Trasnportation Carbon Emissions Per HH (Ton/Yr)	8.1	Trasnportation Carbon Emissions Per HH (Ton/Yr)	7.5	Trasnportation Carbon Emissions Per HH (Ton/Yr)
Subareas											3.7	
North Traingle	3.5	Housing Carbon Emissions Per HH (Ton/Yr)	3.9	Housing Carbon Emissions Per HH (Ton/Yr)	3.5	Housing Carbon Emissions Per HH (Ton/Yr)	3.5	Housing Carbon Emissions Per HH (Ton/Yr)	3.5	Housing Carbon Emissions Per HH (Ton/Yr)	3.1	Housing Carbon Emissions Per HH (Ton/Yr)
	7.8	Trasnportation Carbon Emissions Per HH (Ton/Yr)	4.6	Trasnportation Carbon Emissions Per HH (Ton/Yr)	7.7	Trasnportation Carbon Emissions Per HH (Ton/Yr)	7.8	Trasnportation Carbon Emissions Per HH (Ton/Yr)	7.8	Trasnportation Carbon Emissions Per HH (Ton/Yr)	3.6	Trasnportation Carbon Emissions Per HH (Ton/Yr)
NE Edge	5.4	Housing Carbon Emissions Per HH (Ton/Yr)	6.0	Housing Carbon Emissions Per HH (Ton/Yr)	5.7	Housing Carbon Emissions Per HH (Ton/Yr)	5.1	Housing Carbon Emissions Per HH (Ton/Yr)	3.9	Housing Carbon Emissions Per HH (Ton/Yr)	54.6	Housing Carbon Emissions Per HH (Ton/Yr)
	6.2	Trasnportation Carbon Emissions Per HH (Ton/Yr)	9.1	Trasnportation Carbon Emissions Per HH (Ton/Yr)	8.5	Trasnportation Carbon Emissions Per HH (Ton/Yr)	5.9	Trasnportation Carbon Emissions Per HH (Ton/Yr)	12.1	Trasnportation Carbon Emissions Per HH (Ton/Yr)	3.4	Trasnportation Carbon Emissions Per HH (Ton/Yr)
DSL Property	3.5	Housing Carbon Emissions Per HH (Ton/Yr)	4.9	Housing Carbon Emissions Per HH (Ton/Yr)	3.8	Housing Carbon Emissions Per HH (Ton/Yr)	3.4	Housing Carbon Emissions Per HH (Ton/Yr)	5.1	Housing Carbon Emissions Per HH (Ton/Yr)	45.3	Housing Carbon Emissions Per HH (Ton/Yr)
	3.1	Trasnportation Carbon Emissions Per HH (Ton/Yr)	4.2	Trasnportation Carbon Emissions Per HH (Ton/Yr)	4.4	Trasnportation Carbon Emissions Per HH (Ton/Yr)	2.0	Trasnportation Carbon Emissions Per HH (Ton/Yr)	1.1	Trasnportation Carbon Emissions Per HH (Ton/Yr)	5.3	Trasnportation Carbon Emissions Per HH (Ton/Yr)
The "Elbow"	3.9	Housing Carbon Emissions Per HH (Ton/Yr)	3.9	Housing Carbon Emissions Per HH (Ton/Yr)	3.6	Housing Carbon Emissions Per HH (Ton/Yr)	3.4	Housing Carbon Emissions Per HH (Ton/Yr)	3.6	Housing Carbon Emissions Per HH (Ton/Yr)	6.0	Housing Carbon Emissions Per HH (Ton/Yr)
	9.0	Trasnportation Carbon Emissions Per HH (Ton/Yr)	7.2	Trasnportation Carbon Emissions Per HH (Ton/Yr)	55.9	Trasnportation Carbon Emissions Per HH (Ton/Yr)	47.8	Trasnportation Carbon Emissions Per HH (Ton/Yr)	54.6	Trasnportation Carbon Emissions Per HH (Ton/Yr)	4.0	Trasnportation Carbon Emissions Per HH (Ton/Yr)
The "Thumb"	6.5	Housing Carbon Emissions Per HH (Ton/Yr)	4.9	Housing Carbon Emissions Per HH (Ton/Yr)	3.0	Housing Carbon Emissions Per HH (Ton/Yr)	3.2	Housing Carbon Emissions Per HH (Ton/Yr)	6.0	Housing Carbon Emissions Per HH (Ton/Yr)	249.8	Housing Carbon Emissions Per HH (Ton/Yr)
	8.6	Trasnportation Carbon Emissions Per HH (Ton/Yr)	7.6	Trasnportation Carbon Emissions Per HH (Ton/Yr)	66.9	Trasnportation Carbon Emissions Per HH (Ton/Yr)	27.0	Trasnportation Carbon Emissions Per HH (Ton/Yr)	16.6	Trasnportation Carbon Emissions Per HH (Ton/Yr)	3.3	Trasnportation Carbon Emissions Per HH (Ton/Yr)
West Area	3.8	Housing Carbon Emissions Per HH (Ton/Yr)	4.2	Housing Carbon Emissions Per HH (Ton/Yr)	4.9	Housing Carbon Emissions Per HH (Ton/Yr)	N/A	Housing Carbon Emissions Per HH (Ton/Yr)	N/A	Housing Carbon Emissions Per HH (Ton/Yr)	5.6	Housing Carbon Emissions Per HH (Ton/Yr)
	5.3	Trasnportation Carbon Emissions Per HH (Ton/Yr)	5.5	Trasnportation Carbon Emissions Per HH (Ton/Yr)	6.2	Trasnportation Carbon Emissions Per HH (Ton/Yr)	N/A	Trasnportation Carbon Emissions Per HH (Ton/Yr)	N/A	Trasnportation Carbon Emissions Per HH (Ton/Yr)	4.4	Trasnportation Carbon Emissions Per HH (Ton/Yr)
Shevlin Area	N/A	Housing Carbon Emissions Per HH (Ton/Yr)	N/A	Housing Carbon Emissions Per HH (Ton/Yr)	6.8	Housing Carbon Emissions Per HH (Ton/Yr)	4.8	Housing Carbon Emissions Per HH (Ton/Yr)	N/A	Housing Carbon Emissions Per HH (Ton/Yr)	N/A	Housing Carbon Emissions Per HH (Ton/Yr)
	N/A	Trasnportation Carbon Emissions Per HH (Ton/Yr)	N/A	Trasnportation Carbon Emissions Per HH (Ton/Yr)	9.6	Trasnportation Carbon Emissions Per HH (Ton/Yr)	7.2	Trasnportation Carbon Emissions Per HH (Ton/Yr)	N/A	Trasnportation Carbon Emissions Per HH (Ton/Yr)	N/A	Trasnportation Carbon Emissions Per HH (Ton/Yr)
OB Riley / Gopher Gulch Area	3.9	Housing Carbon Emissions Per HH (Ton/Yr)	3.9	Housing Carbon Emissions Per HH (Ton/Yr)	3.9	Housing Carbon Emissions Per HH (Ton/Yr)	3.9	Housing Carbon Emissions Per HH (Ton/Yr)	4.9	Housing Carbon Emissions Per HH (Ton/Yr)	3.3	Housing Carbon Emissions Per HH (Ton/Yr)
	10.6	Trasnportation Carbon Emissions Per HH (Ton/Yr)	10.5	Trasnportation Carbon Emissions Per HH (Ton/Yr)	5.3	Trasnportation Carbon Emissions Per HH (Ton/Yr)	9.0	Trasnportation Carbon Emissions Per HH (Ton/Yr)	5.7	Trasnportation Carbon Emissions Per HH (Ton/Yr)		Trasnportation Carbon Emissions Per HH (Ton/Yr)
Existing UGB (if applicable)	4.4	Housing Carbon Emissions Per HH (Ton/Yr)	4.4	Housing Carbon Emissions Per HH (Ton/Yr)	4.4	Housing Carbon Emissions Per HH (Ton/Yr)	4.4	Housing Carbon Emissions Per HH (Ton/Yr)	4.4	Housing Carbon Emissions Per HH (Ton/Yr)	4.4	Housing Carbon Emissions Per HH (Ton/Yr)
	3.2	Trasnportation Carbon Emissions Per HH (Ton/Yr)	3.2	Trasnportation Carbon Emissions Per HH (Ton/Yr)	3.2	Trasnportation Carbon Emissions Per HH (Ton/Yr)	3.2	Trasnportation Carbon Emissions Per HH (Ton/Yr)	3.2	Trasnportation Carbon Emissions Per HH (Ton/Yr)	3.2	Trasnportation Carbon Emissions Per HH (Ton/Yr)
Overall Score	3 ○		4 ◔		3 ○		2 ◒		2 ◒		3 ○	

For more information about this performance measure, see accompanying technical memorandum from Fregonese Associates.

Factor 3: ESEE

Author: Analysis by Fregonese Associates; interpretation by Angelo Planning Group

Community Outcome A Quality Natural Environment

Date: 9/10/2015

Performance Measure 5 Energy Use

Brief Description of Evaluation: The average number of BTUs used per household, per year.

Data Sources Household energy usage is an output of the Envision Tomorrow Scenario Builder, based on regional averages for energy efficiency of different housing types.

Interpretation and Key Smaller, and more compact homes are more efficient, and require less energy. Larger homes simply occupy more area, and require more energy to operate. As a result, this performance measure is highly correlated with housing mix. This also means that distinctions at the total expansion area and total future UGB level are very subtle, and that there is more variability at the subarea level, depending on the type of housing assumed in each. Color coding is assigned relative to the performance of growth in the existing UGB. "Good" means does better than the existing UGB by 0.5 Million BTU/yr. "Poor" means does worse than the existing UGB by more than 0.5 Million BTU/yr; Fair is within 0.5 Million BTU/yr of the existing UGB.

"Good"	"Fair"	"Poor"	No Data	Not appropriate to rank

Evaluation Geography	Scenario 1.2		Scenario 2.1		Scenario 3.1		SAAM-1		SAAM-2		SAAM-3	
	Value	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*
Total Future UGB (Including Current UGB)	68.1	Energy Use per HH (Million BTU/yr)	67.9	Energy Use per HH (Million BTU/yr)	68.0	Energy Use per HH (Million BTU/yr)	68.3	Energy Use per HH (Million BTU/yr)	68.4	Energy Use per HH (Million BTU/yr)	68.1	Energy Use per HH (Million BTU/yr)
	21.2	Energy Use per Employee (Million BTU/yr)	21.0	Energy Use per Employee (Million BTU/yr)	21.3	Energy Use per Employee (Million BTU/yr)	20.9	Energy Use per Employee (Million BTU/yr)	20.9	Energy Use per Employee (Million BTU/yr)	21.0	Energy Use per Employee (Million BTU/yr)
Total Expansion Area (excluding current UGB)	74.2	Energy Use per HH (Million BTU/yr)	71.2	Energy Use per HH (Million BTU/yr)	73.0	Energy Use per HH (Million BTU/yr)	76.0	Energy Use per HH (Million BTU/yr)	76.2	Energy Use per HH (Million BTU/yr)	73.4	Energy Use per HH (Million BTU/yr)
	17.6	Energy Use per Employee (Million BTU/yr)	15.9	Energy Use per Employee (Million BTU/yr)	17.9	Energy Use per Employee (Million BTU/yr)	17.7	Energy Use per Employee (Million BTU/yr)	18.0	Energy Use per Employee (Million BTU/yr)	18.3	Energy Use per Employee (Million BTU/yr)
Subareas												
North Triangle	54.2	Energy Use per HH (Million BTU/yr)	60.7	Energy Use per HH (Million BTU/yr)	54.2	Energy Use per HH (Million BTU/yr)	54.2	Energy Use per HH (Million BTU/yr)	54.2	Energy Use per HH (Million BTU/yr)	54.2	Energy Use per HH (Million BTU/yr)
	14.2	Energy Use per Employee (Million BTU/yr)	14.1	Energy Use per Employee (Million BTU/yr)	14.8	Energy Use per Employee (Million BTU/yr)	14.2	Energy Use per Employee (Million BTU/yr)	14.8	Energy Use per Employee (Million BTU/yr)	14.8	Energy Use per Employee (Million BTU/yr)
NE Edge	84.4	Energy Use per HH (Million BTU/yr)	93.7	Energy Use per HH (Million BTU/yr)	89.3	Energy Use per HH (Million BTU/yr)	**79.0**	Energy Use per HH (Million BTU/yr)	60.9	Energy Use per HH (Million BTU/yr)	60.9	Energy Use per HH (Million BTU/yr)
	23.5	Energy Use per Employee (Million BTU/yr)	22.9	Energy Use per Employee (Million BTU/yr)	23.0	Energy Use per Employee (Million BTU/yr)	22.9	Energy Use per Employee (Million BTU/yr)	22.8	Energy Use per Employee (Million BTU/yr)	22.8	Energy Use per Employee (Million BTU/yr)
DSL Property	55.0	Energy Use per HH (Million BTU/yr)	77.1	Energy Use per HH (Million BTU/yr)	59.4	Energy Use per HH (Million BTU/yr)	52.4	Energy Use per HH (Million BTU/yr)	**79.4**	Energy Use per HH (Million BTU/yr)	57.7	Energy Use per HH (Million BTU/yr)
	18.5	Energy Use per Employee (Million BTU/yr)	14.9	Energy Use per Employee (Million BTU/yr)	25.0	Energy Use per Employee (Million BTU/yr)	18.4	Energy Use per Employee (Million BTU/yr)	22.3	Energy Use per Employee (Million BTU/yr)	25.0	Energy Use per Employee (Million BTU/yr)
The "Elbow"	60.8	Energy Use per HH (Million BTU/yr)	61.6	Energy Use per HH (Million BTU/yr)	57.0	Energy Use per HH (Million BTU/yr)	52.7	Energy Use per HH (Million BTU/yr)	57.0	Energy Use per HH (Million BTU/yr)	57.0	Energy Use per HH (Million BTU/yr)
	16.3	Energy Use per Employee (Million BTU/yr)	16.1	Energy Use per Employee (Million BTU/yr)	14.7	Energy Use per Employee (Million BTU/yr)	16.4	Energy Use per Employee (Million BTU/yr)	14.7	Energy Use per Employee (Million BTU/yr)	14.7	Energy Use per Employee (Million BTU/yr)
The "Thumb"	101.4	Energy Use per HH (Million BTU/yr)	76.0	Energy Use per HH (Million BTU/yr)	46.9	Energy Use per HH (Million BTU/yr)	49.3	Energy Use per HH (Million BTU/yr)	93.6	Energy Use per HH (Million BTU/yr)	52.5	Energy Use per HH (Million BTU/yr)
	19.6	Energy Use per Employee (Million BTU/yr)	16.5	Energy Use per Employee (Million BTU/yr)	17.6	Energy Use per Employee (Million BTU/yr)	19.6	Energy Use per Employee (Million BTU/yr)	17.6	Energy Use per Employee (Million BTU/yr)	19.0	Energy Use per Employee (Million BTU/yr)
West Area	59.0	Energy Use per HH (Million BTU/yr)	65.8	Energy Use per HH (Million BTU/yr)	75.9	Energy Use per HH (Million BTU/yr)	62.4	Energy Use per HH (Million BTU/yr)	62.6	Energy Use per HH (Million BTU/yr)	**82.4**	Energy Use per HH (Million BTU/yr)
	21.3	Energy Use per Employee (Million BTU/yr)	16.1	Energy Use per Employee (Million BTU/yr)	21.4	Energy Use per Employee (Million BTU/yr)	21.0	Energy Use per Employee (Million BTU/yr)	21.4	Energy Use per Employee (Million BTU/yr)	19.7	Energy Use per Employee (Million BTU/yr)
Shevlin Area		Energy Use per HH (Million BTU/yr)		Energy Use per HH (Million BTU/yr)	106.0	Energy Use per HH (Million BTU/yr)	**74.9**	Energy Use per HH (Million BTU/yr)	62.6	Energy Use per HH (Million BTU/yr)	62.6	Energy Use per HH (Million BTU/yr)
		Energy Use per Employee (Million BTU/yr)		Energy Use per Employee (Million BTU/yr)	20.8	Energy Use per Employee (Million BTU/yr)	21.4	Energy Use per Employee (Million BTU/yr)		Energy Use per Employee (Million BTU/yr)		Energy Use per Employee (Million BTU/yr)
OB Riley / Gopher Gulch Area	61.4	Energy Use per HH (Million BTU/yr)	61.0	Energy Use per HH (Million BTU/yr)	60.7	Energy Use per HH (Million BTU/yr)	61.6	Energy Use per HH (Million BTU/yr)	**77.2**	Energy Use per HH (Million BTU/yr)	51.8	Energy Use per HH (Million BTU/yr)
	15.3	Energy Use per Employee (Million BTU/yr)	14.6	Energy Use per Employee (Million BTU/yr)	18.7	Energy Use per Employee (Million BTU/yr)	15.3	Energy Use per Employee (Million BTU/yr)	19.6	Energy Use per Employee (Million BTU/yr)	19.6	Energy Use per Employee (Million BTU/yr)
Existing UGB (if applicable)	68.1	Energy Use per HH (Million BTU/yr)	68.1	Energy Use per HH (Million BTU/yr)	68.1	Energy Use per HH (Million BTU/yr)	68.1	Energy Use per HH (Million BTU/yr)	68.1	Energy Use per HH (Million BTU/yr)	68.1	Energy Use per HH (Million BTU/yr)
	21.5	Energy Use per Employee (Million BTU/yr)	21.5	Energy Use per Employee (Million BTU/yr)	21.5	Energy Use per Employee (Million BTU/yr)	21.5	Energy Use per Employee (Million BTU/yr)	21.5	Energy Use per Employee (Million BTU/yr)	21.5	Energy Use per Employee (Million BTU/yr)
Overall Score	3 ○		3 ○		3 ○		3 ○		3 ○		3 ○	
	Differences are not significant when comparing full expansion areas against one another.		Differences are not significant when comparing full expansion areas against one another.		Differences are not significant when comparing full expansion areas against one another.		Differences are not significant when comparing full expansion areas against one another.		Differences are not significant when comparing full expansion areas against one another.		Differences are not significant when comparing full expansion areas against one another.	

For more information about this performance measure, see accompanying technical memorandum from Fregonese Associates.

Factor 3: ESEE — **Author:** Analysis by Fregonese Associates; interpretation by Angelo Planning Group

Community Outcome A Quality Natural Environment — **Date:** 9/10/2015

Performance Measure 6 Household Water Usage

Brief Description of Evaluation: The average number of gallons of water used per household, per day, for both internal consumption, and landscaping.

Data Sources Household water usage is an output of the Envision Tomorrow Scenario Builder, based off the number of people per household, and the amount of landscaped area per household, and regional averages for water consumption rates.

Interpretation and Key More compact homes have less users, and lower consumption rates. Smaller homes and apartment also have less external landscaped area, requiring less water. Large homes have more users, and higher consumption rates. Larger properties with larger yards also require additional water for lawn maintenance. Color coding relative to average for existing UGB: better than existing UGB (by more than 5 G/Day)= "Good"; within 5 G/Day of existing UGB = "Fair"; worse than existing UGB (by more than 5 G/Day) = "Poor". Subareas with trivial amounts of housing shown in grey since emissions are normalized per household.

"Good"	"Fair"	"Poor"	No Data	Not appropriate to rank

Evaluation Geography	Scenario 1.2		Scenario 2.1		Scenario 3.1		SAAM-1		SAAM-2		SAAM-3	
	Value	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*
Total Future UGB (Including Current UGB)	113	Landscaping Water Use (G/Day)	111	Landscaping Water Use (G/Day)	113	Landscaping Water Use (G/Day)	117	Landscaping Water Use (G/Day)	112	Landscaping Water Use (G/Day)	112	Landscaping Water Use (G/Day)
	144	Internal Water Consumption (G/Day)	143	Internal Water Consumption (G/Day)	143	Internal Water Consumption (G/Day)	145	Internal Water Consumption (G/Day)	145	Internal Water Consumption (G/Day)	143	Internal Water Consumption (G/Day)
Total Expansion Area (excluding current UGB)	83	Landscaping Water Use (G/Day)	74	Landscaping Water Use (G/Day)	84	Landscaping Water Use (G/Day)	101	Landscaping Water Use (G/Day)	83	Landscaping Water Use (G/Day)	79	Landscaping Water Use (G/Day)
	129	Internal Water Consumption (G/Day)	123	Internal Water Consumption (G/Day)	123	Internal Water Consumption (G/Day)	134	Internal Water Consumption (G/Day)	134	Internal Water Consumption (G/Day)	126	Internal Water Consumption (G/Day)
Subareas												
North Triangle	6	Landscaping Water Use (G/Day)	68	Landscaping Water Use (G/Day)	6	Landscaping Water Use (G/Day)	6	Landscaping Water Use (G/Day)	6	Landscaping Water Use (G/Day)	6	Landscaping Water Use (G/Day)
	53	Internal Water Consumption (G/Day)	102	Internal Water Consumption (G/Day)	53	Internal Water Consumption (G/Day)	53	Internal Water Consumption (G/Day)	53	Internal Water Consumption (G/Day)	53	Internal Water Consumption (G/Day)
NE Edge	115	Landscaping Water Use (G/Day)	139	Landscaping Water Use (G/Day)	128	Landscaping Water Use (G/Day)	118	Landscaping Water Use (G/Day)	56	Landscaping Water Use (G/Day)	56	Landscaping Water Use (G/Day)
	149	Internal Water Consumption (G/Day)	174	Internal Water Consumption (G/Day)	165	Internal Water Consumption (G/Day)	140	Internal Water Consumption (G/Day)	103	Internal Water Consumption (G/Day)	103	Internal Water Consumption (G/Day)
DSL Property	39	Landscaping Water Use (G/Day)	81	Landscaping Water Use (G/Day)	45	Landscaping Water Use (G/Day)	7	Landscaping Water Use (G/Day)	93	Landscaping Water Use (G/Day)	34	Landscaping Water Use (G/Day)
	93	Internal Water Consumption (G/Day)	132	Internal Water Consumption (G/Day)	97	Internal Water Consumption (G/Day)	55	Internal Water Consumption (G/Day)	130	Internal Water Consumption (G/Day)	86	Internal Water Consumption (G/Day)
The "Elbow"	47	Landscaping Water Use (G/Day)	56	Landscaping Water Use (G/Day)	45	Landscaping Water Use (G/Day)	8	Landscaping Water Use (G/Day)	45	Landscaping Water Use (G/Day)	45	Landscaping Water Use (G/Day)
	103	Internal Water Consumption (G/Day)	107	Internal Water Consumption (G/Day)	71	Internal Water Consumption (G/Day)	56	Internal Water Consumption (G/Day)	71	Internal Water Consumption (G/Day)	71	Internal Water Consumption (G/Day)
The "Thumb"	115	Landscaping Water Use (G/Day)	65	Landscaping Water Use (G/Day)	9	Landscaping Water Use (G/Day)	6	Landscaping Water Use (G/Day)	105	Landscaping Water Use (G/Day)	9	Landscaping Water Use (G/Day)
	174	Internal Water Consumption (G/Day)	130	Internal Water Consumption (G/Day)	57	Internal Water Consumption (G/Day)	54	Internal Water Consumption (G/Day)	164	Internal Water Consumption (G/Day)	57	Internal Water Consumption (G/Day)
West Area	49	Landscaping Water Use (G/Day)	64	Landscaping Water Use (G/Day)	87	Landscaping Water Use (G/Day)	36	Landscaping Water Use (G/Day)		Landscaping Water Use (G/Day)	97	Landscaping Water Use (G/Day)
	102	Internal Water Consumption (G/Day)	115	Internal Water Consumption (G/Day)	130	Internal Water Consumption (G/Day)	87	Internal Water Consumption (G/Day)		Internal Water Consumption (G/Day)	143	Internal Water Consumption (G/Day)
Shevlin Area		Landscaping Water Use (G/Day)		Landscaping Water Use (G/Day)	165	Landscaping Water Use (G/Day)	81	Landscaping Water Use (G/Day)		Landscaping Water Use (G/Day)		Landscaping Water Use (G/Day)
		Internal Water Consumption (G/Day)		Internal Water Consumption (G/Day)	171	Internal Water Consumption (G/Day)	132	Internal Water Consumption (G/Day)		Internal Water Consumption (G/Day)		Internal Water Consumption (G/Day)
OB Riley / Gopher Gulch Area	6	Landscaping Water Use (G/Day)	6	Landscaping Water Use (G/Day)	60	Landscaping Water Use (G/Day)	6	Landscaping Water Use (G/Day)	82	Landscaping Water Use (G/Day)	25	Landscaping Water Use (G/Day)
	53	Internal Water Consumption (G/Day)	53	Internal Water Consumption (G/Day)	100	Internal Water Consumption (G/Day)	53	Internal Water Consumption (G/Day)	135	Internal Water Consumption (G/Day)	65	Internal Water Consumption (G/Day)
Existing UGB (if applicable)	122	Landscaping Water Use (G/Day)	122	Landscaping Water Use (G/Day)	122	Landscaping Water Use (G/Day)	122	Landscaping Water Use (G/Day)	122	Landscaping Water Use (G/Day)	122	Landscaping Water Use (G/Day)
	149	Internal Water Consumption (G/Day)	149	Internal Water Consumption (G/Day)	149	Internal Water Consumption (G/Day)	149	Internal Water Consumption (G/Day)	149	Internal Water Consumption (G/Day)	149	Internal Water Consumption (G/Day)
Overall Score	3 ○		4 ◔ Better performance due to higher housing densities.		3 ○		2 ◔ Worse performance due to more low-density housing.		3 ○		3 ○	

For more information about this performance measure, see accompanying technical memorandum from Fregonese Associates.

Factor 3: ESEE

Author: Analysis by Fregonese Associates; interpretation by Angelo Planning Group

Community Outcome B Housing Options, Affordability, and Equity

Date: 9/10/2015

Performance Measure 1 Average Cost of New Single Family Housing

Brief Description of Evaluation: The average cost a new, single family detached house. Does not include townhomes, condominiums, or rental products.

Data Sources The base price is based on simple construction costs, determined by the size and quality of the house. Further price adjustments were made based off real estate trends identified using multiple listing service (MLS) data.

Interpretation and Key Color coding is relative to the existing UGB: similar to existing UGB average ($425-475k) = "Fair"; less than existing UGB average (<$425k) = "Good"; more than existing UGB average (>$475k) = "Poor"

"Good"	"Fair"	"Poor"	No Data	Not appropriate to rank

Evaluation Geography	Scenario 1.2 Value	Scenario 1.2 Units	Scenario 2.1 Value	Scenario 2.1 Units	Scenario 3.1 Value	Scenario 3.1 Units	SAAM-1 Value	SAAM-1 Units	SAAM-2 Value	SAAM-2 Units	SAAM-3 Value	SAAM-3 Units
Total Future UGB (Including Current UGB)	$ 436,000	Dollars	$ 435,000	Dollars	$ 461,000	Dollars	$ 449,000	Dollars	$ 459,000	Dollars	$ 461,000	Dollars
Total Expansion Area (excluding current UGB)	$ 398,000	Dollars	$ 394,000	Dollars	$ 503,000	Dollars	$ 454,000	Dollars	$ 491,000	Dollars	$ 500,000	Dollars
Subareas												
North Triangle	$ -	Dollars	$ 347,000	Dollars	$ -	Dollars	$ -	Dollars	$ -	Dollars	$ -	Dollars
NE Edge	$ 385,000	Dollars	$ 404,000	Dollars	$ 389,000	Dollars	$ 409,000	Dollars	$ 269,000	Dollars	$ 269,000	Dollars
DSL Property	$ 336,000	Dollars	$ 378,000	Dollars	$ 349,000	Dollars	$ 342,000	Dollars	$ 403,000	Dollars	$ 372,000	Dollars
The "Elbow"	$ 343,000	Dollars	$ 328,000	Dollars	$ 602,000	Dollars	$ 342,000	Dollars	$ 602,000	Dollars	$ 602,000	Dollars
The "Thumb"	$ 372,000	Dollars	$ 358,000	Dollars	$ 357,000	Dollars	$ 357,000	Dollars	$ 372,000	Dollars	$ 357,000	Dollars
West Area	$ 507,000	Dollars	$ 539,000	Dollars	$ 566,000	Dollars	$ 523,000	Dollars	$ -	Dollars	**$ 554,000**	Dollars
Shevlin Area	$ -	Dollars	$ -	Dollars	$ 694,000	Dollars	**$ 547,000**	Dollars	$ -	Dollars	$ -	Dollars
OB Riley / Gopher Gulch Area	$ 496,000	Dollars	$ 931,000	Dollars	$ 478,000	Dollars	$ 496,000	Dollars	**$ 515,000**	Dollars	$ 368,000	Dollars
Existing UGB (if applicable)	$ 448,000	Dollars	$ 448,000	Dollars	$ 448,000	Dollars	$ 448,000	Dollars	$ 448,000	Dollars	$ 448,000	Dollars
Overall Score	5		5		2		4		3		2	
	Significant housing growth in the northeast and south (where home prices are anticipated to be lower) drives lower overall costs.		Significant housing growth in the southeast (where home prices are anticipated to be lower) drives lower overall costs.		More development in the West Area and the Shevlin Area, where home prices are anticipated to be higher, drives the higher overall cost.		More development in the Shevlin Area (anticipated to have higher home prices) is balanced out somewhat by development in the Northeast Edge (anticipated to have somewhat lower home prices).		More development in Gopher Gulch, where home prices are anticipated to be somewhat higher, drives the overall cost up a bit relative to other alternatives.		More development in the West Area, where home prices are anticipated to be higher, drives the higher overall cost.	

For more information about this performance measure, see accompanying technical memorandum from Fregonese Associates.

Factor 3: ESEE — **Author:** Analysis by Fregonese Associates; interpretation by Angelo Planning Group

Community Outcome B — **Housing Options, Affordability, and Equity** — **Date:** 9/17/2015

Performance Measure 2 — **Housing Mix of New Housing**

Brief Description of Evaluation: The % of new housing, by type of house.

Data Sources Housing mix is an output of Envision Tomorrow, based on the types of buildings that go into each development type, and the amount of each development type applied.

Interpretation and Key If less than 30% of new housing is single family detached in a given subarea, or if single family attached and multifamily together represent less than 30% of the new housing in a subarea, this is considered a moderately unbalanced mix for that area; if those percentages are below 15%, that is considered a highly unbalanced mix. Ratings for the overall scenario are based on how many subareas are internally balanced, rather than on the overall housing mix, which is constant across scenarios. For SAAMs, more consideration was given to the mix in the SAAs that were being tested, with less consideration to the mix in the areas used to accommodate the residual growth.

"Good"	"Fair"	"Poor"	No Data	Not appropriate to rank

Evaluation Geography	Scenario 1.2		Scenario 2.1		Scenario 3.1		SAAM-1		SAAM-2		SAAM-3	
	Value	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*
Total Future UGB (Including Current UGB)	55%	Detached SF	54%	Detached SF	54%	Detached SF	55%	Detached SF	55%	Detached SF	54%	Detached SF
	9%	Attached SF	9%	Attached SF	9%	Attached SF	9%	Attached SF	9%	Attached SF	10%	Attached SF
	36%	Multifamily	37%	Multifamily	37%	Multifamily	36%	Multifamily	35%	Multifamily	36%	Multifamily
Total Expansion Area (excluding current UGB)	45%	Detached SF	40%	Detached SF	40%	Detached SF	46%	Detached SF	48%	Detached SF	40%	Detached SF
	12%	Attached SF	14%	Attached SF	13%	Attached SF	12%	Attached SF	13%	Attached SF	16%	Attached SF
	43%	Multifamily	46%	Multifamily	47%	Multifamily	42%	Multifamily	39%	Multifamily	45%	Multifamily
Subareas												
North Triangle		Detached SF	30%	Detached SF		Detached SF		Detached SF		Detached SF		Detached SF
		Attached SF	9%	Attached SF		Attached SF		Attached SF		Attached SF		Attached SF
	100%	Multifamily	61%	Multifamily	100%	Multifamily	100%	Multifamily	100%	Multifamily	100%	Multifamily
NE Edge	60%	Detached SF	74%	Detached SF	70%	Detached SF	**51%**	Detached SF	42%	Detached SF	42%	Detached SF
	8%	Attached SF	8%	Attached SF	8%	Attached SF	**8%**	Attached SF	6%	Attached SF	6%	Attached SF
	32%	Multifamily	19%	Multifamily	22%	Multifamily	**41%**	Multifamily	52%	Multifamily	52%	Multifamily
DSL Property	19%	Detached SF	45%	Detached SF	22%	Detached SF	2%	Detached SF	44%	Detached SF	12%	Detached SF
	16%	Attached SF	15%	Attached SF	14%	Attached SF		Attached SF	9%	Attached SF	20%	Attached SF
	64%	Multifamily	40%	Multifamily	65%	Multifamily	98%	Multifamily	47%	Multifamily	68%	Multifamily
The "Elbow"	27%	Detached SF	32%	Detached SF	9%	Detached SF	2%	Detached SF	9%	Detached SF	9%	Detached SF
	15%	Attached SF	13%	Attached SF		Attached SF		Attached SF		Attached SF		Attached SF
	58%	Multifamily	55%	Multifamily	91%	Multifamily	98%	Multifamily	91%	Multifamily	91%	Multifamily
The "Thumb"	75%	Detached SF	44%	Detached SF	3%	Detached SF	1%	Detached SF	69%	Detached SF	3%	Detached SF
	10%	Attached SF	13%	Attached SF	0%	Attached SF	0%	Attached SF	9%	Attached SF	0%	Attached SF
	15%	Multifamily	43%	Multifamily	97%	Multifamily	99%	Multifamily	22%	Multifamily	97%	Multifamily
West Area	24%	Detached SF	32%	Detached SF	41%	Detached SF	N/A	Detached SF	N/A	Detached SF	**50%**	Detached SF
	18%	Attached SF	19%	Attached SF	16%	Attached SF	N/A	Attached SF	N/A	Attached SF	**16%**	Attached SF
	58%	Multifamily	49%	Multifamily	42%	Multifamily	N/A	Multifamily	N/A	Multifamily	**34%**	Multifamily
Shevlin Area	N/A	Detached SF	N/A	Detached SF	60%	Detached SF	**43%**	Detached SF	N/A	Detached SF	N/A	Detached SF
	N/A	Attached SF	N/A	Attached SF	23%	Attached SF	**20%**	Attached SF	N/A	Attached SF	N/A	Attached SF
	N/A	Multifamily	N/A	Multifamily	17%	Multifamily	**37%**	Multifamily	N/A	Multifamily	N/A	Multifamily
OB Riley / Gopher Gulch Area	0%	Detached SF		Detached SF	28%	Detached SF	0%	Detached SF	**48%**	Detached SF	1%	Detached SF
		Attached SF		Attached SF	10%	Attached SF		Attached SF	**14%**	Attached SF	10%	Attached SF
	100%	Multifamily	100%	Multifamily	62%	Multifamily	100%	Multifamily	**38%**	Multifamily	89%	Multifamily
Existing UGB (if applicable)	58%	Detached SF	58%	Detached SF	58%	Detached SF	58%	Detached SF	58%	Detached SF	58%	Detached SF
	8%	Attached SF	8%	Attached SF	8%	Attached SF	8%	Attached SF	8%	Attached SF	8%	Attached SF
	34%	Multifamily	34%	Multifamily	34%	Multifamily	34%	Multifamily	34%	Multifamily	34%	Multifamily
Overall Score	3 ○		4 ◔		4 ◔		5 ◉		5 ◉		3 ○	
	Most subareas are rated fair, but not well-balanced.		Most subareas well-balanced, one rated fair.		Most subareas well-balanced, two rated fair.		Both SAAs well balanced.		All subareas and the main SAA well-balanced.		The main SAA is well-balanced, though the residual areas are not (which is less important).	

For more information about this performance measure, see accompanying technical memorandum from Fregonese Associates.

Factor 3: ESEE **Author:** Andrew Parish **APG**

Community Outcome C **Strong Diverse Economy** **Date:** 8/20/2015

Performance Measure 1 **Site suitability for large lot industrial use**

Brief Description of Evaluation: Qualitative evaluation of the Large Lot Industrial Site location proposed in each scenario/supplemental map.

Data Sources Deschutes County Tax lot Data, Rough slope data from Google Earth.

Interpretation and Key All sites have positive and negative attributes.

"Good"	"Fair"	"Poor"	No Data	Not appropriate to rank

Evaluation Geography	Scenario 1.2	Scenario 2.1	Scenario 3.1	SAAM-1	SAAM-2	SAAM-3
Subareas						
North Triangle			Roughly 60 acres under common ownership in the North Triangle, but site as drawn spans two ownerships. Preliminary analysis shows slopes >5% in this area. Area under common ownership divided by a public right-of-way. Site is adjacent to existing commercial/industrial uses and is within 200 feet of Highway 97, though primary access point would likely be from Cooley Road, 1/2 mile to the South, via Berg Lane. The site is accessible to Bend residents, and its location at the northernmost part of the city makes it more accessible to Redmond and other communities to the North.		Same as Scenario 3.1	Same as Scenario 3.1
NE Edge						
DSL Property	Site is over 300 acres and under State of Oregon ownership. It has minimal slopes (below 2%) and is large enough to provide flexibility in layout. Site is adjacent to Humane Society and Public Works area to the South and planned employment to the West in this scenario. Site is not adjacent to either Highway 97 or Highway 20, but it has relatively direct access to US 97 via 27th / Knott rd. Site is in the southeast corner of the City, arguably less accessible to neighboring communities than other alternatives. Deed restrictions on the sale of the DSL property may be a concern.			Same as Scenario 1.2		
The "Elbow"						
The "Thumb"						
West Area						
Shevlin Area						
OB Riley / Gopher Gulch Area		Site is roughly 60 acres under common ownership. Some slopes in the area, overall below 5% grade. Irregularly shaped - though there is roughly 30 acres that is rectangular. Area to the south is residential and area to the West (Separated by a collector road) is rural residential. Adjacent to Highway 20; current access onto OB Riley Road on the West and Cooley Road to the North, potential future access via an extension of Robal Road. The site is accessible to Bend residents, and its location at the northernmost part of the city makes it more accessible to Redmond and other communities to the North.				
Existing UGB (if applicable)	One large lot site assumed inside UGB at Juniper Ridge					
Overall Score	4	3	3	4	3	3
	Each location has its pros and cons, detailed in the accompanying memorandum. The Employment TAC selected the DSL property as its preferred location.	Each location has its pros and cons, detailed in the accompanying memorandum.	Each location has its pros and cons, detailed in the accompanying memorandum.	Each location has its pros and cons, detailed in the accompanying memorandum. The Employment TAC selected the DSL property as its preferred location.	Each location has its pros and cons, detailed in the accompanying memorandum.	Each location has its pros and cons, detailed in the accompanying memorandum.

For more information about this performance measure, see accompanying technical memorandum from APG.

Factor 3: ESEE

Author: Andrew Parish **APG**

Community Outcome C Strong Diverse Economy

Date: 8/25/2015

Performance Measure 2 Site suitability for other industrial and mixed employment

Brief Description of Evaluation: Comparison of site characteristics of the subarea with Table 15 and Table 16 in the Draft Economic Opportunity Analysis (EOA), which describe site characteristics needed by various industries.

Data Sources Deschutes County Assessor's Data, Draft EOA

Interpretation and Key Areas that meet the requirements of Tables 15 and 16 in the draft EOA are coded green. Areas that are somewhat outside of the recommendations of Tables 15 and 16 are coded yellow.

"Good"	"Fair"	"Poor"	No Data	Not appropriate to rank

Evaluation Geography	Scenario 1.2	Scenario 2.1	Scenario 3.1	SAAM-1	SAAM-2	SAAM-3
Subareas						
North Triangle	**Parcel Size**: 10 ac - 40 ac **Site Size**: 1 100 ac site, 1 35 ac site **Topography**: Slopes below 5% overall **Compatibility**: Rural residential uses to North, existing employment to South **Transportation Access**: Access to Cooley Rd to South, Highway 20 to West, Highway 97 to East	**Parcel Size**: 10 ac - 40 ac **Site Size**: 1 50 ac site, 1 25 ac site **Topography**: Slopes below 5% overall **Compatibility**: Residential within Expansion Area, rural residential uses to North, existing employment to South **Transportation Access**: Access to Cooley Rd to South, Highway 20 to West, Highway 97 to East	**Parcel Size**: Some 1 ac - 10 ac, and 10 ac 40 ac **Site Size**: 2 50 ac sites, 1 80 ac site **Topography**: Slopes below 5% overall **Compatibility**: Rural residential uses to North, existing employment to South **Transportation Access**: Access to Cooley Rd to South, Highway 20 to West, Highway 97 to East	**Parcel Size**: 10 ac - 40 ac **Site Size**: 1 100 ac site, 1 35 ac site **Topography**: Slopes below 5% overall **Compatibility**: Rural residential uses to North, existing employment to South **Transportation Access**: Access to Cooley Rd to South, Highway 20 to West, Highway 97 to East	**Parcel Size**: Some 1 ac - 10 ac, and 10 ac 40 ac **Site Size**: 2 50 ac sites, 1 80 ac site **Topography**: Slopes below 5% overall **Compatibility**: Rural residential uses to North, existing employment to South **Transportation Access**: Access to Cooley Rd to South, Highway 20 to West, Highway 97 to East	**Parcel Size**: Some 1 ac - 10 ac, and 10 ac 40 ac **Site Size**: 2 50 ac sites, 1 80 ac site **Topography**: Slopes below 5% overall **Compatibility**: Rural residential uses to North, existing employment to South **Transportation Access**: Access to Cooley Rd to South, Highway 20 to West, Highway 97 to East
NE Edge	**Parcel Size**: 7-12 ac **Site Size**: 1 10-ac site **Topography**: Low slopes **Compatibility**: Adjacent to planned residential areas **Transportation Access**: Cole Rd, near Butler Market Rd			**Parcel Size**: 7-12 ac **Site Size**: 1 10-ac site **Topography**: Low slopes **Compatibility**: Adjacent to planned residential areas **Transportation Access**: Cole Rd, near Butler Market Rd		
DSL Property	**Parcel Size**: One large parcel **Site Size**: 1 18 ac site, 1 7-ac site, 1 50-ac site **Topography**: Low slopes **Compatibility**: Adjacent to employment/open space/public uses. **Transportation Access**: Access to 27th / Knott	**Parcel Size**: One large parcel **Site Size**: 1 25-ac site, 1 50-ac site **Topography**: Low slopes **Compatibility**: Adjacent to employment/open space/public uses. Also adjacent to planned residential to North. **Transportation Access**: Access to 27th / Knott		**Parcel Size**: One large parcel **Site Size**: 1 18 ac site, 1 7-ac site, 1 50-ac site **Topography**: Low slopes **Compatibility**: Adjacent to employment/open space/public uses. **Transportation Access**: Access to 27th / Knott		
The "Elbow"	**Parcel Size**: 5-50 acre sites **Site Size**: 2 25-acre sites, I 8-ac site **Topography**: Low slopes **Compatibility**: Adjacent to existing and planned residential areas **Transportation Access**: Access to 27th / Knott	**Parcel Size**: 5-50 acre sites **Site Size**: 4 40-plus acre sites. **Topography**: Low slopes **Compatibility**: Adjacent to existing and planned residential areas **Transportation Access**: Access to 27th / Knott	**Parcel Size**: 5-50 acre sites **Site Size**: 2 25-acre sites, I 8-ac site **Topography**: Low slopes **Compatibility**: Adjacent to existing and planned residential areas **Transportation Access**: Access to 27th / Knott	**Parcel Size**: 5-50 acre sites **Site Size**: 2 25-acre sites, I 8-ac site **Topography**: Low slopes **Compatibility**: Adjacent to existing and planned residential areas **Transportation Access**: Access to 27th / Knott	**Parcel Size**: 5-50 acre sites **Site Size**: 2 25-acre sites, I 8-ac site **Topography**: Low slopes **Compatibility**: Adjacent to existing and planned residential areas **Transportation Access**: Access to 27th / Knott	**Parcel Size**: 5-50 acre sites **Site Size**: 2 25-acre sites, I 8-ac site **Topography**: Low slopes **Compatibility**: Adjacent to existing and planned residential areas **Transportation Access**: Access to 27th / Knott
The "Thumb"	**Parcel Size**: One large parcel **Site Size**: 1 25-acre site, 1 75-acre site **Topography**: Low slopes **Compatibility**: Adjacent to planned residential areas **Transportation Access**: Access to Knott and Highway 97	**Parcel Size**: One large parcel **Site Size**: 1 100-acre site and 1 20-acre site **Topography**: Low slopes **Compatibility**: Adjacent to planned residential **Transportation Access**: Access to Knott and Highway 97	**Parcel Size**: One large parcel **Site Size**: 1 100-acre site **Topography**: Low slopes **Compatibility**: Across China Hat Rd. from residential area **Transportation Access**: Access to Knott and Highway 97	**Parcel Size**: One large parcel **Site Size**: 1 25-acre site, 1 75-acre site **Topography**: Low slopes **Compatibility**: Across China Hat Rd. from residential area **Transportation Access**: Access to Knott and Highway 97	**Parcel Size**: One large parcel **Site Size**: 1 100-acre site **Topography**: Low slopes **Compatibility**: Across China Hat Rd. from residential area **Transportation Access**: Access to Knott and Highway 97	**Parcel Size**: One large parcel **Site Size**: 1 30-acre site and 1 90-acre site **Topography**: Low slopes **Compatibility**: Across China Hat Rd. from residential area **Transportation Access**: Access to Knott and Highway 97
West Area		**Parcel Size**: One large parcel **Site Size**: 20 acres **Topography**: Some topography **Compatibility**: Adjacent to planned residential and school **Transportation Access**: Limited access to major roads				**Parcel Size**: One large parcel **Site Size**: 20 acres **Topography**: Some topography **Compatibility**: Adjacent to planned residential and school **Transportation Access**: Limited access to major roads
Shevlin Area						
OB Riley / Gopher Gulch Area	**Parcel Size**: 5-35 ac parcels **Site Size**: 1 70-ac site, 1 40-ac site **Topography**: Some slopes **Compatibility**: Adjacent to employment uses, rural residential **Transportation Access**: Access to US 20	**Parcel Size**: 5-35 ac parcels **Site Size**: 1 50-ac site, 2 20-ac sites **Topography**: Some slopes **Compatibility**: Adjacent to employment uses, rural residential **Transportation Access**: Access to US 20	**Parcel Size**: 5-35 ac parcels **Site Size**: 2 40-ac sites, 1 30-ac site **Topography**: Some slopes **Compatibility**: Adjacent to some planned residential, rural residential **Transportation Access**: Access to US 20	**Parcel Size**: 5-35 ac parcels **Site Size**: 1 70-ac site, 1 40-ac site **Topography**: Some slopes **Compatibility**: Adjacent to employment uses, rural residential **Transportation Access**: Access to US 20	**Parcel Size**: 5-35 ac parcels **Site Size**: 2 40-ac sites, 1 30-ac site **Topography**: Some slopes **Compatibility**: Adjacent to some planned residential, rural residential **Transportation Access**: Access to US 20	**Parcel Size**: 5-35 ac parcels **Site Size**: 1 30-ac site and 1 45-ac site **Topography**: Some slopes **Compatibility**: Adjacent to some planned residential, rural residential **Transportation Access**: Access to US 20
Existing UGB (if applicable)						
Overall Score	4	3	5	5	5	4
	Scenario 1.2 locates industrial and mixed employment uses in the North Triangle, along OB Riley, on the DSL Property, in the Elbow, in the Thumb, and a small portion in the NE Edge. These are all fairly good areas for this use under these criteria - the main reason it didn't receive a score of green is adjacency to residential areas in the North and in the NE Edge	Scenario 2.1 locates industrial and mixed employment uses in the North Triangle, along OB Riley, on the DSL Property, in the Elbow, in the Thumb, and a small portion in the West Area These are all fairly good areas for this use under these criteria - the main reason it didn't receive a score of green is adjacency to residential areas in the North and in the West Area	Scenario 2.1 locates industrial and mixed employment uses in the North Triangle, along OB Riley, in the Elbow, and in the Thumb. These are all fairly good areas for this use under these criteria - the main reason this scenario received a green is that there are fewer areas of residential/industrial adjacency (and potential conflict)	SAAM 1 has a similar arrangement of industrial land to Scenario 1.2, with somewhat less adjacency to residential areas.	SAAM2 has similar arrangement of industrial land as Scenario 3.1, with similar amounts of residential adjacency.	SAAM3 has similar arrangement of industrial land as Scenario 3.1, with similar amounts of residential adjacency.

Factor 3: ESEE | **Author:** Andrew Parish | **APG**

Community Outcome C: Strong Diverse Economy | **Date:** 8/25/2015

Performance Measure 3: Site suitability of commercial uses

Brief Description of Evaluation: Comparison of site characteristics of the subarea with Table 15 and Table 16 in the Draft Economic Opportunity Analysis (EOA), which describe site characteristics needed by various industries.

Data Sources: Deschutes County Assessor's Data, Draft EOA

Interpretation and Key: Areas that meet the requirements of Tables 15 and 16 in the draft EOA are coded green. Areas that are somewhat outside of the recommendations of Tables 15 and 16 are coded yellow.

"Good" | "Fair" | "Poor" | No Data | Not appropriate to rank

Evaluation Geography	Scenario 1.2	Scenario 2.1	Scenario 3.1	SAAM-1	SAAM-2	SAAM-3
Subareas						
North Triangle	**Parcel Size:** 10 ac - 40 ac	**Parcel Size:** 10 ac - 40 ac	**Parcel Size:** Some 1 ac - 10 ac, and 10 ac - 40 ac	**Parcel Size:** 10 ac - 40 ac	**Parcel Size:** Some 1 ac - 10 ac, and 10 ac - 40 ac	**Parcel Size:** Some 1 ac - 10 ac, and 10 ac - 40 ac
	Site Size: 2 30-ac sites	**Site Size:** 2 10-ac sites	**Site Size:** 2 30-ac sites	**Site Size:** 2 30-ac sites	**Site Size:** 2 30-ac sites	**Site Size:** 2 30-ac sites
	Topography: Slopes below 5% overall	**Topography:** Slopes below 5% overall	**Topography:** Slopes below 5% overall	**Topography:** Slopes below 5% overall	**Topography:** Slopes below 5% overall	**Topography:** Slopes below 5% overall
	Compatibility: Rural residential uses to North, existing employment to South	**Compatibility:** Residential within Expansion Area, rural residential uses to North, existing employment to South	**Compatibility:** Rural residential uses to North, existing employment to South	**Compatibility:** Rural residential uses to North, existing employment to South	**Compatibility:** Rural residential uses to North, existing employment to South	**Compatibility:** Rural residential uses to North, existing employment to South
	Visibility: Yes, > 10k ADT on Hwy 97, 500-5k ADT on Cooley	**Visibility:** Yes, > 10k ADT on Hwy 97, >5k ADT on Cooley	**Visibility:** Yes, > 10k ADT on Hwy 97, 500-5k adt on Cooley	**Visibility:** Yes, > 10k ADT on Hwy 97, 500-5k ADT on Cooley	**Visibility:** Yes, > 10k ADT on Hwy 97, >5k ADT on Cooley	**Visibility:** Yes, > 10k ADT on Hwy 97, 500-5k ADT on Cooley
	Transportation Access: Access to Cooley Rd to South, Highway 20 to West, Highway 97 to East	**Transportation Access:** Access to Cooley Rd to South, Highway 20 to West, Highway 97 to East	**Transportation Access:** Access to Cooley Rd to South, Highway 20 to West, Highway 97 to East	**Transportation Access:** Access to Cooley Rd to South, Highway 20 to West, Highway 97 to East	**Transportation Access:** Access to Cooley Rd to South, Highway 20 to West, Highway 97 to East	**Transportation Access:** Access to Cooley Rd to South, Highway 20 to West, Highway 97 to East
NE Edge	**Parcel Size:** 7-12 ac	**Parcel Size:** 7-12 ac	**Parcel Size:** 7-12 ac	**Parcel Size:** 7-12 ac	**Parcel Size:** 7-12 ac	**Parcel Size:** 7-12 ac
	Site Size: 2 20-ac sites, 1 10-ac site	**Site Size:** 1 20-ac site, 1 10-ac site	**Site Size:** 1 20-ac site, 1 10-ac site	**Site Size:** 2 20-ac sites, 1 10-ac site	**Site Size:** 1 20-ac site, 1 10-ac site	**Site Size:** 1 20-ac site, 1 10-ac site
	Topography: Low slopes	**Topography:** Low slopes	**Topography:** Low slopes	**Topography:** Low slopes	**Topography:** Low slopes	**Topography:** Low slopes
	Compatibility: Adjacent to planned residential areas	**Compatibility:** Adjacent to planned residential areas	**Compatibility:** Adjacent to planned residential areas	**Compatibility:** Adjacent to planned residential areas	**Compatibility:** Adjacent to planned residential areas	**Compatibility:** Adjacent to planned residential areas
	Visibility: >5k ADT on Eagle, > 10 on Butler Market Road.	**Visibility:** >5k ADT on Eagle, > 10 on Butler Market Road.	**Visibility:** >5k ADT on Eagle, > 10 on Butler Market Road.	**Visibility:** >5k ADT on Eagle, > 10 on Butler Market Road.	**Visibility:** >5k ADT on Eagle, > 10 on Butler Market Road.	**Visibility:** 500-5000 ADT on Eagle, > 5000 on Butler Market
	Transportation Access: Cole Rd, near Butler Market Rd	**Transportation Access:** Cole Rd, near Butler Market Rd	**Transportation Access:** Cole Rd, near Butler Market Rd	**Transportation Access:** Cole Rd, near Butler Market Rd	**Transportation Access:** Cole Rd, near Butler Market Rd	**Transportation Access:** Cole Rd, near Butler Market Rd
DSL Property	**Parcel Size:** One large parcel	**Parcel Size:** One large parcel	**Parcel Size:** One large parcel	**Parcel Size:** One large parcel	**Parcel Size:** One large parcel	**Parcel Size:** One large parcel
	Site Size: 1 40-ac site, 1 20-ac site	**Site Size:** 1 40-ac site, 1 15-ac site	**Site Size:** 1 40-ac site, 1 25-ac site	**Site Size:** 1 18 ac site, 1 7-ac site, 1 50-ac site	**Site Size:** 1 40-ac site, 1 20-ac site	**Site Size:** 1 18 ac site, 1 7-ac site, 1 50-ac site
	Topography: Low slopes	**Topography:** Low slopes	**Topography:** Low slopes	**Topography:** Low slopes	**Topography:** Low slopes	**Topography:** Low slopes
	Compatibility: Adjacent to employment/open space/public uses.	**Compatibility:** Adjacent to employment/open space/public uses.	**Compatibility:** Adjacent to employment/open space/public uses.	**Compatibility:** Adjacent to employment/open space/public uses.	**Compatibility:** Adjacent to employment/open space/public uses.	**Compatibility:** Adjacent to employment/open space/public uses.
	Visibility: >10k ADT on both SE 27th and Reed Market at west of site.	**Visibility:** >10k ADT on both SE 27th and Reed Market at west of site. >5k ADT on Stevens Rd at North of site.	**Visibility:** >10k ADT on both SE 27th and Reed Market at west of site.	**Visibility:** >10k ADT on both SE 27th and Reed Market at west of site.	**Visibility:** >10k ADT on both SE 27th and Reed Market at west of site.	**Visibility:** >10k ADT on both SE 27th and Reed Market at west of site.
	Transportation Access: Access to 27th / Knott	**Transportation Access:** Access to 27th / Knott	**Transportation Access:** Access to 27th / Knott	**Transportation Access:** Access to 27th / Knott	**Transportation Access:** Access to 27th / Knott	**Transportation Access:** Access to 27th / Knott
The "Elbow"	**Parcel Size:** 5-50 acre sites	**Parcel Size:** 5-50 acre sites	**Parcel Size:** 5-50 acre sites	**Parcel Size:** 5-50 acre sites	**Parcel Size:** 5-50 acre sites	**Parcel Size:** 5-50 acre sites
	Site Size: 1 25-ac site, 1 30-ac site	**Site Size:** 1 15-ac site, 1 12-ac site, 1 25-ac site, 1 20-ac site	**Site Size:** 1 25-ac site, 1 30-ac site	**Site Size:** 2 25-acre sites, I 8-ac site	**Site Size:** 1 25-ac site, 1 20-ac site	**Site Size:** 1 25-ac site, 1 20-ac site
	Topography: Low slopes	**Topography:** Low slopes	**Topography:** Low slopes	**Topography:** Low slopes	**Topography:** Low slopes	**Topography:** Low slopes
	Compatibility: Adjacent to existing and planned residential areas	**Compatibility:** Adjacent to existing and planned residential areas	**Compatibility:** Adjacent to existing and planned residential areas	**Compatibility:** Adjacent to existing and planned residential areas	**Compatibility:** Adjacent to existing and planned residential areas	**Compatibility:** Adjacent to existing and planned residential areas
	Visibility: >10k ADT on Knott and 27th	Visibility: >10k ADT on Knott and 27th	Visibility: >10k ADT on 27th, >5k ADT on Knott	Visibility: >10k ADT on Knott and 27th	Visibility: >10k ADT on Knott and 27th	Visibility: >10k ADT on Knott and 27th
	Transportation Access: Access to 27th / Knott	**Transportation Access:** Access to 27th / Knott	**Transportation Access:** Access to 27th / Knott	**Transportation Access:** Access to 27th / Knott	**Transportation Access:** Access to 27th / Knott	**Transportation Access:** Access to 27th / Knott
The "Thumb"	**Parcel Size:** One large parcel	**Parcel Size:** One large parcel	**Parcel Size:** One large parcel	**Parcel Size:** One large parcel	**Parcel Size:** One large parcel	**Parcel Size:** One large parcel
	Site Size: 1 130-ac site, a 7-ac site	**Site Size:** 3 7-ac sites, 1 30-ac site	**Site Size:** 1 35-ac site, 1 30-ac site	**Site Size:** 1 7-ac site, 1 70-ac site, 1 55-ac site	**Site Size:** 2 30-ac sites	**Site Size:** 1 30-ac site, 1 65-ac site
	Topography: Low slopes	**Topography:** Low slopes	**Topography:** Low slopes	**Topography:** Low slopes	**Topography:** Low slopes	**Topography:** Low slopes
	Compatibility: Adjacent to planned residential areas	**Compatibility:** Adjacent to planned residential	**Compatibility:** Across China Hat Rd. from residential area	**Compatibility:** Across China Hat Rd. from residential area	**Compatibility:** Across China Hat Rd. from residential area	**Compatibility:** Across China Hat Rd. from residential area
	Visibility: >10k ADT on Hwy 97, China Hat, Knott, and new interior road,	**Visibility:** >10k ADT on Hwy 97, Knott. >5k ADT on China Hat and new interior road.	Visibility: >10k ADT on Hwy 97. >5k ADT on Knott, China Hat and new interior road.	Visibility: >10k ADT on Hwy 97 and China Hat. >5k on Knott.	Visibility: Yes>10k on Hwy 97. >5k on China Hat an Knott.	**Visibility:** >10k ADT on Hwy 97, China Hat, Knott, and new interior road,
	Transportation Access: Access to Knott and Highway 97	**Transportation Access:** Access to Knott and Highway 97	**Transportation Access:** Access to Knott and Highway 97	**Transportation Access:** Access to Knott and Highway 97	**Transportation Access:** Access to Knott and Highway 97	**Transportation Access:** Access to Knott and Highway 97
West Area	**Parcel Size:** One large parcel	**Parcel Size:** One large parcel	**Parcel Size:** One large parcel			**Parcel Size:** One large parcel
	Site Size: 1 15-ac site	**Site Size:** 1 20-ac site	**Site Size:** 1 15-ac site			**Site Size:** 1 30-ac site
	Topography: Some topography	**Topography:** Some topography	**Topography:** Some topography			**Topography:** Some topography
	Compatibility: Adjacent to planned residential and school	**Compatibility:** Adjacent to planned residential and school	**Compatibility:** Adjacent to planned residential and school			**Compatibility:** Adjacent to planned residential and school
	Visibility: <500 ADT on nearby roads	**Visibility:** >5k ADT on new connection, <500 adt on other roads	**Visibility:** 10k ADT on new connection, <500 ADT on other roads			**Visibility:** 10k ADT on new connection, <500 ADT on other roads
	Transportation Access: Limited access to major roads	**Transportation Access:** Limited access to major roads	**Transportation Access:** Limited access to major roads			**Transportation Access:** Limited access to major roads
Shevlin Area	**Parcel Size:**	**Parcel Size:**	**Parcel Size:** 28 ac	**Parcel Size:** 28 ac	**Parcel Size:**	**Parcel Size:**
	Site Size:	**Site Size:**	**Site Size:** 28 ac	**Site Size:** 28 ac	**Site Size:**	**Site Size:**
	Topography:	**Topography:**	**Topography:** Low slopes	**Topography:** Low slopes	**Topography:**	**Topography:**
	Compatibility:	**Compatibility:**	**Compatibility:** Adjacent to existing and planned residential	**Compatibility:** Adjacent to existing and planned residential	**Compatibility:**	**Compatibility:**
	Visibility:	**Visibility:**	**Visibility:** 500 - 5k ADT	**Visibility:** <500 ADT	**Visibility:**	**Visibility:**
	Transportation Access:	**Transportation Access:**	**Transportation Access:** Access on Shevlin Park Rd	**Transportation Access:** Access on Shevlin Park Rd	**Transportation Access:**	**Transportation Access:**
OB Riley / Gopher Gulch Area	**Parcel Size:** 5-35 ac parcels	**Parcel Size:** 5-35 ac parcels	**Parcel Size:** 5-35 ac parcels	**Parcel Size:** 5-35 ac parcels	**Parcel Size:** 5-35 ac parcels	**Parcel Size:** 5-35 ac parcels
	Site Size: 2 12-ac sites	**Site Size:** 1 5-ac site, 1 10-ac site	**Site Size:** 2 20-ac sites, 3 10-ac sites, 1 35-ac site	**Site Size:** 2 12-ac sites	**Site Size:** 2 20-ac sites, 1 10-ac site, 1 35-ac site	**Site Size:** 2 20-ac sites, 1 10-ac site, 1 35-ac site
	Topography: Some slopes	**Topography:** Some slopes	**Topography:** Some slopes	**Topography:** Some slopes	**Topography:** Some slopes	**Topography:** Some slopes
	Compatibility: Adjacent to employment uses, rural residential	**Compatibility:** Adjacent to employment uses, rural residential	**Compatibility:** Adjacent to some planned residential, rural residential	**Compatibility:** Adjacent to employment uses, rural residential	**Compatibility:** Adjacent to some planned residential, rural residential	**Compatibility:** Adjacent to some planned residential, rural residential
	Visibility: >10k ADT on Hwy 97	**Visibility:** >10k ADT on Hwy 97	**Visibility:** >10k ADT on Hwy 97 and southern portion of OB Riley	**Visibility:** >10k ADT on Hwy 97	**Visibility:** >10k ADT on Hwy 97 and southern portion of OB Riley, >5k ADT on other new interior roads	**Visibility:** >10k ADT on Hwy 97
	Transportation Access: Access to US 20	**Transportation Access:** Access to US 20	**Transportation Access:** Access to US 20	**Transportation Access:** Access to US 20	**Transportation Access:** Access to US 20	**Transportation Access:** Access to US 20
Existing UGB (if applicable)						
Overall Score	4	5	4	4	5	5
	Commercial uses in Scenario 1.2 are generally supported by the surrounding land uses and transportation network, with the possible exception of the commercial node in the West Area (which lacks pass-by traffic in that area)	Commercial uses in Scenario 2.1 are generally supported by the surrounding land uses and transportation network, with the possible exception of the commercial node in the West Area (which lacks pass-by traffic in that area, though it has a slightly greater amount than in Scenario 1.2)	Commercial uses in Scenario 3.1 are generally supported by the surrounding land uses and transportation network, with the possible exception of the commercial nodes in the West Area and Shevlin Area (which lack pass-by traffic in that area)	Commercial uses in SAAM 1 are generally supported by the surrounding land uses and transportation network, with the possible exception of the commercial node in the Shevlin Area (which lacks pass-by traffic in that area)	Commercial uses in SAAM 2 are generally supported by the surrounding land uses and transportation network.	Commercial uses in SAAM 3 are generally supported by the surrounding land uses and transportation network.

Factor 4: Farm and Forest Compatibility

Author: Wendy | **City of Bend**

Community Outcome A — **Farm and Forest Compatibility** | **Date:** 10/1/2015

Performance Measure 1 — **Farm uses adjacent to expansion areas**

Brief Description of Evaluation:	proximity to farm uses occurring on lands designated for farm (EFU) within 1/4 mile of lands under consideration for UGB expansion
Data Sources	Deschutes County GIS, scenarios approved by USC, field check, etc.
Interpretation and Key	*"Good"* - property is not within 1/4 mile of farm land; *Fair"* - within 1/4 mile of farm land with low impact (hay production less than 20 ac)farm uses; *"Poor"* - within 1/4 mile of farm land with active farm uses.

"Good" | "Fair" | "Poor" | No Data | Not appropriate to rank

Evaluation Geography	Scenario 1.2	Scenario 2.1	Scenario 3.1	SAAM-1	SAAM-2	SAAM-3
	Qualitative Evaluation	*Qualitative Evaluation*	*Qualitative Evaluation*	*Qualitative Evaluation*	*Qualitative Evaluation*	*Qualitative Evaluation*
Total Future UGB (Including Current UGB)						
Total Expansion Area (excluding current UGB)	3 commercial farms (one is a feed lot), several low impact hay fields	4 commercial farms (one is a feed lot)	5 commercial farms (one is a feed lot), several low impact hay fields	3 commercial farms (one is a feed lot), several low impact hay fields	7 commercial farms (one is a feed lot)	2 commercial farms (one is a feed lot)
Subareas						
North Triangle	Good	Good	Good	Good	Good	Good
NE Edge	1 commercial farm and several low impact hay fields within 1/4 mile	Good	1 commercial farm and several low impact hay fields within 1/4 mile	1 commercial farm and several low impact hay fields within 1/4 mile	Good	Good
DSL Property	Good	North area along Bear Creek is adjacent to 2 low impact commercial farms	North area along Bear Creek is adjacent to 2 low impact commercial farms	Good	1 low impact Commercial farm within 1/4 mile	Good
The "Elbow"	2 commercial farms within 1/4 mile, one which is an active operation that includes a feed lot for beef along Knott Rd.	2 commercial farms within 1/4 mile, one which is an active operation that includes a feed lot for beef along Knott Rd.	2 commercial farms within 1/4 mile, one which is an active operation that includes a feed lot for beef along Knott Rd.	2 commercial farms within 1/4 mile, one which is an active operation that includes a feed lot for beef along Knott Rd.	2 commercial farms within 1/4 mile, one which is an active operation that includes a feed lot for beef along Knott Rd.	2 commercial farms within 1/4 mile, one which is an active operation that includes a feed lot for beef along Knott Rd.
The "Thumb"	Good	Good	Good	Good	2 commercial farms within 1/4 mile of Woodside Road properties	Good
West Area	Good	Good	Good	Not in Scenario	Not in Scenario	Good
Shevlin Area	Not in Scenario	Not in Scenario	Good	Good	Not in Scenario	Not in Scenario
OB Riley / Gopher Gulch Area	Good	Good	Good	Good	2 Commercial farms within 1/4 mile across canyon	Good
Existing UGB (if applicable)	N/A	N/A	N/A	N/A	N/A	N/A
Overall Score	3 ○	3 ○	2 ◒	3 ○	2 ◒	4 ◓
	Good = 66% Fair = 17% Poor = 17%	Good = 66% Fair = 17% Poor = 17%	Good = 57% Fair = 29% Poor = 14%	Good = 71% Fair = 14.5% Poor = 14.5%	Good = 50% Fair = 33% Poor = 17%	Good = 83% Fair = 00% Poor = 17%

For more information about this performance measure, see accompanying technical memorandum from City of Bend

Factor 4: Farm and Forest Compatibility						Author:	Wendy	City of Bend		
Community Outcome A	Farm and Forest Compatibility					Date:	9/10/2015			
Performance Measure 2	Expansion onto land with Irrigation District deliveries									
Brief Description of Evaluation:	Number of parcels in each scenario that has an irrigation delivery by district and amount of water conveyed to those parcels									
Data Sources	Deschutes County GIS, scenarios approved by USC, field check, etc. Mapping provided by Andrew									
Interpretation and Key	The irrigation districts receive a fee for each delivery to cover O & M costs plus an assessment for the acre foot of water delivered. For small districts, a significant loss of deliveries due to UGB expansion can be detrimental to their operation and mean increased assessments for remaining water patrons. The fewer the deliveries and the lesser the amount of water conveyed per scenario per district, the better the ranking. Generally, impacts to over 20 ac ft of water were rated "Poor"; impacts to 1-20 ac ft of water were rated "Fair"; and areas with no irrigation district water were rated "Good". However, each district will experience a different degree of impact based on the amount of water conveyed and details of how that particular delivery affects other customers. Swalley irrigation uses a value of $500/acre of water + the delivery assessment of $560 per delivery. Each district's fees will vary based on a number of factors.									
	"Good"	"Fair"	"Poor"	No Data / Not Applicable	Not appropriate to rank					

Evaluation Geography	Scenario 1.2	Scenario 2.1	Scenario 3.1	SAAM-1	SAAM-2	SAAM-3
	Qualitative Evaluation	*Qualitative Evaluation*	*Qualitative Evaluation*	*Qualitative Evaluation*	*Qualitative Evaluation*	*Qualitative Evaluation*
Total Future UGB (Including Current UGB)						
Total Expansion Area (excluding current UGB)	Swalley Total Loss: 16 deliveries / 78.71 ac ft Arnold Total Loss: 7 deliveries / 19.25-168.98 ac ft COID: # & amount of deliveries unknown	Swalley Total Loss: 16 deliveries / 78.71 ac ft Arnold Total Loss: 10 deliveries / 38-150 ac ft COID: # & amount of deliveries unknown	Swalley Total Loss: 70 deliveries / 207.64 ac ft Arnold Total Loss: 6 deliveries / 13.3-88.3 ac ft COID: # & amount of deliveries unknown	Swalley Total Loss: 23 deliveries / 100.97 ac ft Arnold Total Loss: 6 deliveries / 13.3-88.3 ac ft COID: # & amount of deliveries unknown	Swalley Total Loss: 76 deliveries / 337.04 ac ft Arnold Total Loss: 8 deliveries / 17.3-69.45 ac ft COID: # & amount of deliveries unknown	Swalley Total Loss: 35 deliveries / 97.7 ac ft Arnold Total Loss: 6 deliveries / 17.3-72.3 ac ft COID: # & amount of deliveries unknown
Subareas						
North Triangle	Swalley - 16 / 78.71 ac ft*	Swalley -16/ 78.71*	Swalley - 35/ 97.71 ac ft*	Swalley - 16/ 78.71 ac ft*	Swalley - 35/ 97.71 ac ft*	Swalley - 35/ 97.71 ac ft*
NE Edge	COID - # & amount of deliveries unknown	COID - # & amount of deliveries unknown	COID - # & amount of deliveries unknown	Swalley - 8/ 99.67 ac ft (BMPRD water rights total 77.41 ac ft that would not be lost), COID - # & amount of deliveries unknown	COID - # & amount of deliveries unknown	COID - # & amount of deliveries unknown
DSL Property	No Irrigation Dist. Water	No Irrigation Dist water	No Irrigation Dist water	No Irrigation Dist water	No Irrigation Dist water	No Irrigation Dist water
The "Elbow"	Arnold - 7/ 19.25 ac ft	Arnold -10 / 38 ac ft	Arnold - 6 / 17.3 ac ft	Arnold 6 /13.3 ac ft	Arnold - 8 / 15.75 ac ft***	Arnold - 6 / 17.3 ac ft
The "Thumb"	Arnold -1/ 149.73 ac ft**	Arnold - 1/ 112 ac ft**	Arnold 1 / 52.15 ac ft**	Arnold 1/ 75 ac ft**	Arnold - 1 / 52.15 ac ft**	Arnold - 1 / 55 ac ft**
West Area	No Irrigation Dist. Water	No Irrigation Dist water	No Irrigation Dist water	No Irrigation Dist water	No Irrigation Dist water	No Irrigation Dist water
Shevlin Area	No Irrigation Dist. Water	No Irrigation Dist water	No Irrigation Dist water	No Irrigation Dist water	No Irrigation Dist water	No Irrigation Dist water
OB Riley / Gopher Gulch Area	Swalley *	Swalley *	Swalley - 35 / 109.93 ac ft*	Swalley *	Swalley - 42/ 295.63 ac ft* (BMPRD water rights total 56.3 ac ft that would not be lost)	Swalley *
Existing UGB (if applicable)	N/A	N/A	N/A	N/A	N/A	N/A
Overall Score	4	3 ○	2	3 ○	1 ●	3 ○
	Relatively limited northern expansion limits impacts to Swalley ID; uncertain impact to Arnold ID due to questions about future water rights on the Thumb	Relatively limited northern expansion limits impacts to Swalley ID; greater impact to Arnold ID from inclusion of full Elbow area	Greater north / northwest expansion increases impact to Swalley ID; limited south/southeast expansion reduces impact to Arnold ID	Expansion into outer NE Edge increases impact to Swalley ID; limited south/southeast expansion reduces impacts to Arnold ID	Focusing growth in north/northwest and extending into Gopher Gulch results in greatest impact to Swalley ID; inclusion of Woodside Road properties slightly increases impact to Arnold ID	Moderate amount of northern expansion causes moderate impacts to Swalley ID; limited south/southeast expansion reduces impact to Arnold ID

For more information about this performance measure, see accompanying technical memorandum from City of Bend

* A portion of the OB Riley / Gopher Gulch area (between US 20 and OB Riley) was counted with the North Triangle in this analysis. At least 5 tax lots west of US 20 are included in the North Triangle numbers.

** The Thumb has a total water right of 149.73 acre ft. The use of this water is for the Back Nine Golf Course. Even if the Thumb were to develop, some or all of the water rights would likely continue to serve the golf course.

*** Includes 2 deliveries in the Woodside Road area, which is counted with "The Thumb" for other performance measures.

Factor 4: Farm and Forest Compatibility

Author: Damian Syrnyk, AICP & Andrew Parish, AICP
City of Bend Growth Management
Angelo Planning Group

Community Outcome A — **Farm and Forest Compatibility**

Date: 9/9/2015

Performance Measure 3 — **Proximity of proposed UGB to designated forest lands**

Brief Description of Evaluation: Distance to designated forest lands and amount of land within 1/4 mile of designated forest land

Data Sources Deschutes County GIS, scenarios approved by USC

Interpretation and Key

Those areas rated as Green are greater than one (1) mile from designated Forest lands. These areas abut areas designated as rural residential exception lands on the Deschutes County Comprehensive Plan . Those areas rated as "Fair" are those that are within one (1) mile of Forest Lands. There may be intervening lands that are designated exception lands. Those areas rated as "Poor" abut or are within one-quarter (1/4) mile of lands designated as Forest lands on the Deschutes County Comprehensive Plan.

"Good"	"Fair"	"Poor"	No Data	Not appropriate to rank

Evaluation Geography	Scenario 1.2 *Qualitative Evaluation*	Scenario 2.1 *Qualitative Evaluation*	Scenario 3.1 *Qualitative Evaluation*	SAAM-1 *Qualitative Evaluation*	SAAM-2 *Qualitative Evaluation*	SAAM-3 *Qualitative Evaluation*
Total Future UGB (Including Current UGB)						
Total Expansion Area (excluding current UGB)	2 areas within a mile of forest land; no areas within 1/4 mile of forest land	2 areas within a mile of forest land; no areas within 1/4 mile of forest land	1 area within a mile of forest land; 1 area (1 acre) within 1/4 mile of forest land	1 area within a mile of forest land; 1 area (7 acres) within 1/4 mile of forest land	All subareas over 1 mile from forest land	1 area within a mile of forest land; 1 area (6 acres) within 1/4 mile of forest land
Subareas						
North Triangle	>1 mile from forest lands	>1 mile from forest lands	>1 mile from forest lands	>1 mile from forest lands	>1 mile from forest lands	>1 mile from forest lands
NE Edge	>1 mile from forest lands	>1 mile from forest lands	>1 mile from forest lands	>1 mile from forest lands	>1 mile from forest lands	>1 mile from forest lands
DSL Property	>1 mile from forest lands	>1 mile from forest lands	>1 mile from forest lands	>1 mile from forest lands	>1 mile from forest lands	>1 mile from forest lands
The "Elbow"	>1 mile from forest lands	>1 mile from forest lands	>1 mile from forest lands	>1 mile from forest lands	>1 mile from forest lands	>1 mile from forest lands
The "Thumb"	1/4 mile to 1 mile from forest lands	1/4 mile to 1 mile from forest lands	>1 mile from forest lands	1/4 mile to 1 mile from forest lands	>1 mile from forest lands	>1 mile from forest lands
West Area	1/4 mile to 1 mile from forest lands	1/4 mile to 1 mile from forest lands	1/4 mile to 1 mile from forest lands	Not included in this scenario	Not included in this scenario	6 acres within 1/4 mile of forest lands
Shevlin Area	Not included in this scenario	Not included in this scenario	1 acre within 1/4 mile of forest lands	7 acres within 1/4 mile of forest lands (separated by developed rural residential land)	Not included in this scenario	Not included in this scenario
OB Riley / Gopher Gulch Area	>1 mile from forest lands	>1 mile from forest lands	>1 mile from forest lands	>1 mile from forest lands	>1 mile from forest lands	>1 mile from forest lands
Existing UGB (if applicable)	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Overall Score	4	4	3	3	5	3
	All subareas over 1/4 mile from forest land; most over 1 mile	All subareas over 1/4 mile from forest land; most over 1 mile	This scenario has a small amount of expansion into areas within 1/4 mile of forest zones; most areas are over a mile from forest land	This scenario has a small amount of expansion into areas within 1/4 mile of forest zones; most areas are over a mile from forest land	All subareas over 1 mile from forest land	This scenario has a small amount of expansion into areas within 1/4 mile of forest zones; most areas are over a mile from forest land

For more information about this performance measure, see accompanying technical memoranda from City of Bend and Angelo Planning Group

APPENDIX C: PERFORMANCE MEASURE WEIGHTING EXAMPLES AND RESULTS

Updated October 7, 2015

Index:

- Equally Weighted
- Lightly Weighted
- Heavily Weighted
- Focus on Difference-Makers

Weighting: **Equally Weighted**

Updated: 10/7/2015

Factor	Community Outcome	Performance Measure	Weighting*		Scenario 1.2	Scenario 2.1	Scenario 3.1	SAAM-1	SAAM-2	SAAM-3
Factor 1: Efficient accommodation of identified land needs										
	A. Complete Communities and Great Neighborhoods		H	1	3.4	5.0	4.0	2.4	3.8	3.2
		(1) Housing units within walking distance of existing & planned schools in 2028	M	1	2	5	3	5	4	2
		(2) Housing units within walking distance of existing & planned parks and trails in 2028	L	1	5	5	5	4	5	5
		(3) Housing units within walking distance of commercial services in 2028	H	1	4	5	5	1	3	2
		(4) Jobs/housing balance (by subarea)	M	1	3	5	4	1	4	2
		(5) Opportunities for master planning	M	1	3	5	3	1	3	5
	B. Efficient, Timely Growth		H	1	5.0	4.2	3.8	2.6	3.6	4.2
		(1) Total urbanized acres	L	1	5	4	4	3	4	5
		(2) Gross density for new housing in 2028	VH	1	5	5	3	1	4	5
		(3) net density for new jobs in 2028	L	1	5	5	5	5	5	5
		(4) percent of urbanized acres on parcels under 20 acres and contiguous to existing UGB	M	1	5	3	3	2	2	1
		(5) vacant vs. developed land included	L	1	5	4	4	2	3	5
Factor 2: Orderly and economic provision of public facilities and services										
	A. Balanced Transportation System		H	1	3.1	3.7	3.0	2.9	2.5	3.1
		(1) Total VMT per capita	VH	1	2	3	3	2	2	2
		(2) Average trip length	M	1	2	5	4	2	2	3
		(3) Household VMT per capita	M	1	4	5	3	1	2	2
		(4) Congestion	H	1	4	3	2	5	3	4
		(5) walk/bike safety and connectivity	M	1	4	5	3	4	3	4
		(6) System connectivity & progression of system hierarchy	M	1	3	4	3	3	3	4
		(7) Mode split	M	1	3	3	3	3	2	3
		(8) Average weekly walk trips per capita	L	1	3	3	3	3	2	3
		(9) Proximity to transit corridors	M	1	3	3	3	3	3	3
		(10) Percent of housing and jobs within 1/4 mile of transit	L	1	3	3	3	3	3	3
		(11) Intersection density	M	1	3	2	2	3	3	3
	B. Cost Effective Infrastructure		H	1	3.0	3.5	3.0	2.7	3.4	2.7
		Transportation Infrastructure								
		(1) Total cost of transportation improvements required	VH	1	1	4	3	3	4	5
		(2) Cost per acre of transportation improvements	M	1	2	3	3	4	3	3
		(3) New linear miles of roadway	L	1	3	4	3	2	3	3
		Sanitary Sewer Infrastructure								
		(4) Efficiency of additional sewer system improvements required	VH	1	4	3	3	2	2	1
		(5) Initial capital cost of sewer system improvements required	M	1	4	3	3	1	3	1
		(6) Initial capital cost of sewer system improvements per acre of development	M	1	3	4	3	2	2	1
		Drinking Water Infrastructure								
		(7) Water system improvements required in city water district	L	1	5	5	4	5	4	5
		(8) Capacity of Avion Water system								
		Storm Water Infrastructure								
		(9) Total impervious area for new development	L	1	4	4	3	3	3	4
		(10) Acres of new development with welded tuff geology	L	1	3	3	2	2	5	1
		(11) Acres of new development within DWPA	L	1	1	2	3	3	5	3
Factor 3: Comparative environmental, social, economic and energy consequences (ESEE)										
	A. Quality Natural Environment (Environmental and Energy Consequences)		H	1	3.5	3.7	2.8	2.2	3.2	3.2
		(1) Development in wildlife areas	M	1	4	3	2	1	5	2
		(2) Linear distance of riparian areas adjacent to development	M	1	5	5	4	3	3	5
		(3) Wildfire hazard	H	1	3	3	2	2	3	3
		(4) Greenhouse gas emissions	L	1	3	4	3	2	2	3
		(5) Energy Use	L	1	3	3	3	3	3	3
		(6) Average Water Consumption per Household	L	1	3	4	3	2	3	3
	B. Housing Options and Affordability (Social Consequences)		H	1	4.0	4.5	3.0	4.5	4.0	2.5
		(1) Average cost of new single family housing	VH	1	5	5	2	4	3	2
		(2) Housing mix of new housing (subarea balance)	L	1	3	4	4	5	5	3
	C. Strong Diverse Economy (Economic Consequences)		H	1	4.0	3.7	4.0	4.3	4.3	4.0
		(1) site suitability for large lot industrial use	L	1	4	3	3	4	3	3
		(2) site suitability for areas identified for industrial uses	H	1	4	3	5	5	5	4
		(3) site suitability for areas identified for commercial uses	H	1	4	5	4	4	5	5
Factor 4: Compatibility of proposed urban uses with nearby agricultural and forest activities occu										
	A. Compatibility with Farms and Forests		H	1	3.7	3.3	2.3	3.0	2.7	3.3
		(1) Farm practices & high value farm land adjacent to expansion areas	H	1	3	3	2	3	2	4
		(2) impact to irrigation districts	M	1	4	3	2	3	1	3
		(3) Proximity of expansion areas to designated forest land	M	1	4	4	3	3	5	3
Overall					**3.7**	**3.9**	**3.2**	**3.1**	**3.4**	**3.3**

Key: H = High Importance; M = Moderate Importance; L = Low Importance; N = Excluded. Very Good; Good; Fair; Poor; Very Poor

* Weighting for performance measures is relative to others within a single community outcome. Weighting for community outcomes is against other community outcomes. Weighting is provided as an example only and is subject to further refinement.

Weighting: **Lightly Weighted**

Updated: 10/7/2015

Factor	Community Outcome	Performance Measure	Weighting*		Scenario 1.2	Scenario 2.1	Scenario 3.1	SAAM-1	SAAM-2	SAAM-3
Factor 1: Efficient accommodation of identified land needs										
	A. Complete Communities and Great Neighborhoods		H	1	3.3	5.0	4.0	2.1	3.6	2.9
		(1) Housing units within walking distance of existing & planned schools in 2028	M	0.6	2	5	3	5	4	2
		(2) Housing units within walking distance of existing & planned parks and trails in 2028	L	0.3	5	5	5	4	5	5
		(3) Housing units within walking distance of commercial services in 2028	H	1	4	5	5	1	3	2
		(4) Jobs/housing balance (by subarea)	M	0.6	3	5	4	1	4	2
		(5) Opportunities for master planning	M	0.6	3	5	3	1	3	5
	B. Efficient, Timely Growth		H	1	5.0	4.5	3.3	1.8	3.7	4.3
		(1) Total urbanized acres	L	0.3	5	4	4	3	4	5
		(2) Gross density for new housing in 2028	VH	2	5	5	3	1	4	5
		(3) net density for new jobs in 2028	L	0.3	5	5	5	5	5	5
		(4) percent of urbanized acres on parcels under 20 acres and contiguous to existing UGB	M	0.6	5	3	3	2	2	1
		(5) vacant vs. developed land included	L	0.3	5	4	4	2	3	5
Factor 2: Orderly and economic provision of public facilities and services										
	A. Balanced Transportation System		H	1	2.9	3.6	2.9	2.8	2.4	2.9
		(1) Total VMT per capita	VH	2	2	3	3	2	2	2
		(2) Average trip length	M	0.6	2	5	4	2	2	3
		(3) Household VMT per capita	M	0.6	4	5	3	1	2	2
		(4) Congestion	H	1	4	3	2	5	3	4
		(5) walk/bike safety and connectivity	M	0.6	4	5	3	4	3	4
		(6) System connectivity & progression of system hierarchy	M	0.6	3	4	3	3	3	4
		(7) Mode split	M	0.6	3	3	3	3	2	3
		(8) Average weekly walk trips per capita	L	0.3	3	3	3	3	2	3
		(9) Proximity to transit corridors	M	0.6	3	3	3	3	3	3
		(10) Percent of housing and jobs within 1/4 mile of transit	L	0.3	3	3	3	3	3	3
		(11) Intersection density	M	0.6	3	2	2	3	3	3
	B. Cost Effective Infrastructure		H	1	2.8	3.5	3.0	2.6	3.1	2.7
		Transportation Infrastructure								
		(1) Total cost of transportation improvements required	VH	2	1	4	3	3	4	5
		(2) Cost per acre of transportation improvements	M	0.6	2	3	3	4	3	3
		(3) New linear miles of roadway	L	0.3	3	4	3	2	3	3
		Sanitary Sewer Infrastructure								
		(4) Efficiency of additional sewer system improvements required	VH	2	4	3	3	2	2	1
		(5) Initial capital cost of sewer system improvements required	M	0.6	4	3	3	1	3	1
		(6) Initial capital cost of sewer system improvements per acre of development	M	0.6	3	4	3	2	2	1
		Drinking Water Infrastructure								
		(7) Water system improvements required in city water district	L	0.3	5	5	4	5	4	5
		(8) Capacity of Avion Water system								
		Storm Water Infrastructure								
		(9) Total impervious area for new development	L	0.3	4	4	3	3	3	4
		(10) Acres of new development with welded tuff geology	L	0.3	3	3	2	2	5	1
		(11) Acres of new development within DWPA	L	0.3	1	2	3	3	5	3
Factor 3: Comparative environmental, social, economic and energy consequences (ESEE)										
	A. Quality Natural Environment (Environmental and Energy Consequences)		H	1	3.6	3.6	2.7	2.1	3.3	3.2
		(1) Development in wildlife areas	M	0.6	4	3	2	1	5	2
		(2) Linear distance of riparian areas adjacent to development	M	0.6	5	5	4	3	3	5
		(3) Wildfire hazard	H	1	3	3	2	2	3	3
		(4) Greenhouse gas emissions	L	0.3	3	4	3	2	2	3
		(5) Energy Use	L	0.3	3	3	3	3	3	3
		(6) Average Water Consumption per Household	L	0.3	3	4	3	2	3	3
	B. Housing Options and Affordability (Social Consequences)		H	1	4.7	4.9	2.3	4.1	3.3	2.1
		(1) Average cost of new single family housing	VH	2	5	5	2	4	3	2
		(2) Housing mix of new housing (subarea balance)	L	0.3	3	4	4	5	5	3
	C. Strong Diverse Economy (Economic Consequences)		H	1	4.0	3.9	4.3	4.4	4.7	4.3
		(1) site suitability for large lot industrial use	L	0.3	4	3	3	4	3	3
		(2) site suitability for areas identified for industrial uses	H	1	4	3	5	5	5	4
		(3) site suitability for areas identified for commercial uses	H	1	4	5	4	4	5	5
Factor 4: Compatibility of proposed urban uses with nearby agricultural and forest activities occu										
	A. Compatibility with Farms and Forests		H	1	3.5	3.3	2.3	3.0	2.5	3.5
		(1) Farm practices & high value farm land adjacent to expansion areas	H	1	3	3	2	3	2	4
		(2) impact to irrigation districts	M	0.6	4	3	2	3	1	3
		(3) Proximity of expansion areas to designated forest land	M	0.6	4	4	3	3	5	3
Overall					**3.7**	**4.0**	**3.1**	**2.9**	**3.3**	**3.2**

Key: H = High Importance; M = Moderate Importance; L = Low Importance; N = Excluded. Very Good; Good; Fair; Poor; Very Poor

* Weighting for performance measures is relative to others within a single community outcome. Weighting for community outcomes is against other community outcomes. Weighting is provided as an example only and is subject to further refinement.

Weighting: **Heavily Weighted**

Updated: 10/7/2015

Factor	Community Outcome	Performance Measure	Weighting*		Scenario 1.2	Scenario 2.1	Scenario 3.1	SAAM-1	SAAM-2	SAAM-3
Factor 1: Efficient accommodation of identified land needs										
	A. Complete Communities and Great Neighborhoods		H	1	3.3	5.0	4.0	1.9	3.5	2.7
		(1) Housing units within walking distance of existing & planned schools in 2028	M	0.5	2	5	3	5	4	2
		(2) Housing units within walking distance of existing & planned parks and trails in 2028	L	0.1	5	5	5	4	5	5
		(3) Housing units within walking distance of commercial services in 2028	H	1	4	5	5	1	3	2
		(4) Jobs/housing balance (by subarea)	M	0.5	3	5	4	1	4	2
		(5) Opportunities for master planning	M	0.5	3	5	3	1	3	5
	B. Efficient, Timely Growth		H	1	5.0	4.7	3.1	1.3	3.7	4.5
		(1) Total urbanized acres	L	0.1	5	4	4	3	4	5
		(2) Gross density for new housing in 2028	VH	3	5	5	3	1	4	5
		(3) net density for new jobs in 2028	L	0.1	5	5	5	5	5	5
		(4) percent of urbanized acres on parcels under 20 acres and contiguous to existing UGB	M	0.5	5	3	3	2	2	1
		(5) vacant vs. developed land included	L	0.1	5	4	4	2	3	5
Factor 2: Orderly and economic provision of public facilities and services										
	A. Balanced Transportation System		H	1	2.8	3.5	2.9	2.7	2.4	2.8
		(1) Total VMT per capita	VH	3	2	3	3	2	2	2
		(2) Average trip length	M	0.5	2	5	4	2	2	3
		(3) Household VMT per capita	M	0.5	4	5	3	1	2	2
		(4) Congestion	H	1	4	3	2	5	3	4
		(5) walk/bike safety and connectivity	M	0.5	4	5	3	4	3	4
		(6) System connectivity & progression of system hierarchy	M	0.5	3	4	3	3	3	4
		(7) Mode split	M	0.5	3	3	3	3	2	3
		(8) Average weekly walk trips per capita	L	0.1	3	3	3	3	2	3
		(9) Proximity to transit corridors	M	0.5	3	3	3	3	3	3
		(10) Percent of housing and jobs within 1/4 mile of transit	L	0.1	3	3	3	3	3	3
		(11) Intersection density	M	0.5	3	2	2	3	3	3
	B. Cost Effective Infrastructure		H	1	2.6	3.5	3.0	2.5	3.0	2.8
		Transportation Infrastructure								
		(1) Total cost of transportation improvements required	VH	3	1	4	3	3	4	5
		(2) Cost per acre of transportation improvements	M	0.5	2	3	3	4	3	3
		(3) New linear miles of roadway	L	0.1	3	4	3	2	3	3
		Sanitary Sewer Infrastructure								
		(4) Efficiency of additional sewer system improvements required	VH	3	4	3	3	2	2	1
		(5) Initial capital cost of sewer system improvements required	M	0.5	4	3	3	1	3	1
		(6) Initial capital cost of sewer system improvements per acre of development	M	0.5	3	4	3	2	2	1
		Drinking Water Infrastructure								
		(7) Water system improvements required in city water district	L	0.1	5	5	4	5	4	5
		(8) Capacity of Avion Water system								
		Storm Water Infrastructure								
		(9) Total impervious area for new development	L	0.1	4	4	3	3	3	4
		(10) Acres of new development with welded tuff geology	L	0.1	3	3	2	2	5	1
		(11) Acres of new development within DWPA	L	0.1	1	2	3	3	5	3
Factor 3: Comparative environmental, social, economic and energy consequences (ESEE)										
	A. Quality Natural Environment (Environmental and Energy Consequences)		H	1	3.7	3.5	2.6	2.0	3.4	3.2
		(1) Development in wildlife areas	M	0.5	4	3	2	1	5	2
		(2) Linear distance of riparian areas adjacent to development	M	0.5	5	5	4	3	3	5
		(3) Wildfire hazard	H	1	3	3	2	2	3	3
		(4) Greenhouse gas emissions	L	0.1	3	4	3	2	2	3
		(5) Energy Use	L	0.1	3	3	3	3	3	3
		(6) Average Water Consumption per Household	L	0.1	3	4	3	2	3	3
	B. Housing Options and Affordability (Social Consequences)		H	1	4.9	5.0	2.1	4.0	3.1	2.0
		(1) Average cost of new single family housing	VH	3	5	5	2	4	3	2
		(2) Housing mix of new housing (subarea balance)	L	0.1	3	4	4	5	5	3
	C. Strong Diverse Economy (Economic Consequences)		H	1	4.0	4.0	4.4	4.5	4.9	4.4
		(1) site suitability for large lot industrial use	L	0.1	4	3	3	4	3	3
		(2) site suitability for areas identified for industrial uses	H	1	4	3	5	5	5	4
		(3) site suitability for areas identified for commercial uses	H	1	4	5	4	4	5	5
Factor 4: Compatibility of proposed urban uses with nearby agricultural and forest activities occu										
	A. Compatibility with Farms and Forests		H	1	3.5	3.3	2.3	3.0	2.5	3.5
		(1) Farm practices & high value farm land adjacent to expansion areas	H	1	3	3	2	3	2	4
		(2) impact to irrigation districts	M	0.5	4	3	2	3	1	3
		(3) Proximity of expansion areas to designated forest land	M	0.5	4	4	3	3	5	3
Overall					**3.7**	**4.0**	**3.0**	**2.7**	**3.3**	**3.2**

Key: H = High Importance; M = Moderate Importance; L = Low Importance; N = Excluded. Very Good; Good; Fair; Poor; Very Poor

* Weighting for performance measures is relative to others within a single community outcome. Weighting for community outcomes is against other community outcomes. Weighting is provided as an example only and is subject to further refinement.

Weighting: **Focus on Difference Makers**

Updated: 10/7/2015

Factor	Community Outcome	Performance Measure	Weighting*		Scenario 1.2	Scenario 2.1	Scenario 3.1	SAAM-1	SAAM-2	SAAM-3
Factor 1: Efficient accommodation of identified land needs										
	A. Complete Communities and Great Neighborhoods		H	1	3.7	5.0	4.6	1.3	3.2	2.2
		(1) Housing units within walking distance of existing & planned schools in 2028	M	0.1	2	5	3	5	4	2
		(2) Housing units within walking distance of existing & planned parks and trails in 2028	L	0	5	5	5	4	5	5
		(3) Housing units within walking distance of commercial services in 2028	H	1	4	5	5	1	3	2
		(4) Jobs/housing balance (by subarea)	M	0.1	3	5	4	1	4	2
		(5) Opportunities for master planning	M	0.1	3	5	3	1	3	5
	B. Efficient, Timely Growth		H	1	5.0	5.0	3.0	1.0	4.0	5.0
		(1) Total urbanized acres	L	0	5	4	4	3	4	5
		(2) Gross density for new housing in 2028	VH	10	5	5	3	1	4	5
		(3) net density for new jobs in 2028	L	0	5	5	5	5	5	5
		(4) percent of urbanized acres on parcels under 20 acres and contiguous to existing UGB	M	0.1	5	3	3	2	2	1
		(5) vacant vs. developed land included	L	0	5	4	4	2	3	5
Factor 2: Orderly and economic provision of public facilities and services										
	A. Balanced Transportation System		H	1	2.2	3.1	2.9	2.3	2.1	2.2
		(1) Total VMT per capita	VH	10	2	3	3	2	2	2
		(2) Average trip length	M	0.1	2	5	4	2	2	3
		(3) Household VMT per capita	M	0.1	4	5	3	1	2	2
		(4) Congestion	H	1	4	3	2	5	3	4
		(5) walk/bike safety and connectivity	M	0.1	4	5	3	4	3	4
		(6) System connectivity & progression of system hierarchy	M	0.1	3	4	3	3	3	4
		(7) Mode split	M	0.1	3	3	3	3	2	3
		(8) Average weekly walk trips per capita	L	0	3	3	3	3	2	3
		(9) Proximity to transit corridors	M	0.1	3	3	3	3	3	3
		(10) Percent of housing and jobs within 1/4 mile of transit	L	0	3	3	3	3	3	3
		(11) Intersection density	M	0.1	3	2	2	3	3	3
	B. Cost Effective Infrastructure		H	1	2.5	3.5	3.0	2.5	3.0	3.0
		Transportation Infrastructure								
		(1) Total cost of transportation improvements required	VH	10	1	4	3	3	4	5
		(2) Cost per acre of transportation improvements	M	0.1	2	3	3	4	3	3
		(3) New linear miles of roadway	L	0	3	4	3	2	3	3
		Sanitary Sewer Infrastructure								
		(4) Efficiency of additional sewer system improvements required	VH	10	4	3	3	2	2	1
		(5) Initial capital cost of sewer system improvements required	M	0.1	4	3	3	1	3	1
		(6) Initial capital cost of sewer system improvements per acre of development	M	0.1	3	4	3	2	2	1
		Drinking Water Infrastructure								
		(7) Water system improvements required in city water district	L	0	5	5	4	5	4	5
		(8) Capacity of Avion Water system								
		Storm Water Infrastructure								
		(9) Total impervious area for new development	L	0	4	4	3	3	3	4
		(10) Acres of new development with welded tuff geology	L	0	3	3	2	2	5	1
		(11) Acres of new development within DWPA	L	0	1	2	3	3	5	3
Factor 3: Comparative environmental, social, economic and energy consequences (ESEE)										
	A. Quality Natural Environment (Environmental and Energy Consequences)		H	1	3.3	3.2	2.2	2.0	3.2	3.1
		(1) Development in wildlife areas	M	0.1	4	3	2	1	5	2
		(2) Linear distance of riparian areas adjacent to development	M	0.1	5	5	4	3	3	5
		(3) Wildfire hazard	H	1	3	3	2	2	3	3
		(4) Greenhouse gas emissions	L	0	3	4	3	2	2	3
		(5) Energy Use	L	0	3	3	3	3	3	3
		(6) Average Water Consumption per Household	L	0	3	4	3	2	3	3
	B. Housing Options and Affordability (Social Consequences)		H	1	5.0	5.0	2.0	4.0	3.0	2.0
		(1) Average cost of new single family housing	VH	10	5	5	2	4	3	2
		(2) Housing mix of new housing (subarea balance)	L	0	3	4	4	5	5	3
	C. Strong Diverse Economy (Economic Consequences)		H	1	4.0	4.0	4.5	4.5	5.0	4.5
		(1) site suitability for large lot industrial use	L	0	4	3	3	4	3	3
		(2) site suitability for areas identified for industrial uses	H	1	4	3	5	5	5	4
		(3) site suitability for areas identified for commercial uses	H	1	4	5	4	4	5	5
Factor 4: Compatibility of proposed urban uses with nearby agricultural and forest activities occu										
	A. Compatibility with Farms and Forests		H	1	3.2	3.1	2.1	3.0	2.2	3.8
		(1) Farm practices & high value farm land adjacent to expansion areas	H	1	3	3	2	3	2	4
		(2) impact to irrigation districts	M	0.1	4	3	2	3	1	3
		(3) Proximity of expansion areas to designated forest land	M	0.1	4	4	3	3	5	3
Overall					**3.6**	**4.0**	**3.0**	**2.6**	**3.2**	**3.2**

Key: H = High Importance; M = Moderate Importance; L = Low Importance; N = Excluded. Very Good; Good; Fair; Poor; Very Poor

* Weighting for performance measures is relative to others within a single community outcome. Weighting for community outcomes is against other community outcomes. Weighting is provided as an example only and is subject to further refinement.

APPENDIX D: TECHNICAL DOCUMENTATION

Index to Reports and Performance Measures covered:

- **Angelo Planning Group**: Land Use Analysis Technical Memorandum *(packet pages 3-18)*
    - Performance Measure 1.A.1: Housing Units within Walking Distance of Schools (School District Update)
    - Performance Measure 1.A.5: Opportunities for Master Planning
    - Performance Measure 1.B.1: Urbanized Acres
    - Performance Measure 1.B.2: Gross Residential Density
    - Performance Measure 1.B.4: Percent of Urbanized Acres on Parcels under 20 acres and Contiguous to Existing UGB
    - Performance Measure 2.A.9: Proximity to Transit Corridors
    - Performance Measure 2.B.10: Acres of new development with welded tuff geology
    - Performance Measure 2.B.11: Acres of new development within Drinking Water Protection Areas (DWPA)
    - Performance Measure 3.A.1: Development in Wildlife Areas
    - Performance Measure 3.A.2: Linear distance of riparian areas adjacent to development
    - Performance Measure 3.C.1: Site suitability for large lot industrial use
    - Performance Measure 3.C.2: Site suitability for other industrial and mixed employment
    - Performance Measure 3.C.3: Site suitability for other Commercial Uses
    - Performance Measure 4.A.3: Forest land within 1/4 mile of expansion areas
- **Fregonese Associates**: Envision Tomorrow Technical Memorandum *(packet pages 19-46)*
    - Performance Measure 1.A.1: Housing Units within Walking Distance of Schools
    - Performance Measure 1.A.2: Housing Units within Walking Distance of Parks and Trails
    - Performance Measure 1.A.3: Housing Units within Walking Distance of Commercial Services
    - Performance Measure 1.B.3: Net Density for New Jobs
    - Performance Measure 1.B.5: Vacant and Developed Acres
    - Performance Measure 2.A.3: Household VMT/Capita
    - Performance Measure 2.A.7: Mode Split
    - Performance Measure 2.A.8: Average Weekly Walk Trips
    - Performance Measure 2.A.10: Housing and Jobs within Walking Distance to Future Transit Corridors
    - Performance Measure 2.B.3: New Linear Miles of Local Roadway
    - Performance Measure 2.B.9: Total Impervious Area of New Development
    - Performance Measure 3.A.4: Greenhouse Gas Emissions
    - Performance Measure 3.A.5: Household Energy Use

    - Performance Measure 3.A.6: Household Water Usage
    - Performance Measure 3.B.1: Average Cost of New Single Family Housing
    - Performance Measure 3.B.2: Housing Mix of New Housing
- **Murray Smith Associates**: Sanitary Sewer Analysis Technical Memorandum *(packet pages 47-87)*
    - Performance Measure 2.B.4: Efficiency of Additional Sanitary Sewer Infrastructure Improvements
    - Performance Measure 2.B.5: Initial Capital Cost of Sanitary Sewer Infrastructure Improvements
    - Performance Measure 2.B.6: Initial capital cost of Sanitary Sewer Infrastructure Improvements per developed acre
- **City of Bend Growth Management Department**: Wildfire Evaluation Technical Memorandum *(packet pages 88-105)*
    - Performance Measure 3.A.3: Wildfire Risk and Hazard
- **City of Bend Growth Management Department**: Factor 4 Evaluation Technical Memorandum *(packet pages 106-114)*
    - Performance Measure 4.A.1: Farm practices & high value farm land adjacent to expansion areas
    - Performance Measure 4.A.2: Impacts to Irrigation Districts
    - Performance Measure 4.A.3: UGB Expansion Subareas Proximity to Forest Lands
- **DKS Associates**: Transportation Evaluation Technical Memorandum
    - Performance Measure 2.A.1: Vehicle Miles Traveled per Capita
    - Performance Measure 2.A.2: Average Trip Length
    - Performance Measure 2.A.4: Miles of Roadway that Exceed Mobility Standards & Relative Contribution to Congested Roadways
    - Performance Measure 2.A.5: Walk/Bike Safety and Connectivity
    - Performance Measure 2.A.6: System Connectivity & Progression of System Hierarchy.
    - Performance Measure 2.B.1: Total Cost of Transportation Infrastructure Improvements
    - Performance Measure 2.B.2: Cost per Acre of Transportation Infrastructure Improvements

Memorandum

October 2, 2015

To: Urban Growth Boundary and Growth Scenarios Technical Advisory Committee

Cc: Project Team

From: Angelo Planning Group

Re: Scenario Evaluation: Land Use Analysis Technical Memorandum

Introduction

Purpose

The purpose of this memorandum is to describe the data sources and methodology of various performance measure evaluations conducted in "Stage 4" of the Bend Urban Growth Boundary (UGB) Remand project, the evaluation of alternative UGB expansion scenarios. This memorandum addresses the performance measures evaluated by Angelo Planning Group (see Table 1). Details of the results of the analysis and interpretation are provided in the Bend UGB Scenario Evaluation Report.

Table 1. Performance Measures in this Technical Memorandum

Performance Measure	Description
Community Outcome: Complete Communities and Great Neighborhood	
1.A.1	Housing Units within Walking Distance of Schools (Update)
1.A.5	Opportunities for Master Planning
Community Outcome: Efficient, Timely Growth	
1.B.1	Developed Acres
1.B.2	Gross Housing Density
1.B.4	Percent of urbanized acres on parcels under 20 acres and contiguous to the existing UGB
Community Outcome: Balanced Transportation System	
2.A.9	Proximity to Transit Corridors
Community Outcome: Cost Effective Infrastructure	
2.B.10	Acres of new development with welded tuff geology
2.B.11	Acres of new development within DWPA
Community Outcome: Quality Natural Environment	
3.A.1	Development near ODFW Habitat Ranges
3.A.2	Linear feet of property along Deschutes River and Tumalo Creek
Community Outcome: Strong Diverse Economy	
3.C.1	Site suitability for large lot industrial use

Performance Measure	Description
3.C.2	Site suitability for other industrial and mixed employment
3.C.3	Site suitability of commercial uses
Community Outcome: Farm and Forest Compatibility	
4.A.3	Forest land within 1/4 mile of expansion areas

Evaluation Tools

The evaluations described in this memorandum were completed using ArcGIS mapping software and the Envision Tomorrow Scenario Planning Tool. ArcGIS is a geographic information system (GIS) for working with maps and geographic information. This analysis was completed primarily using simple tools such as buffers, measurement, and area calculations. The Envision Tomorrow tool is described in detail in the Fregonese Associates technical memorandum.

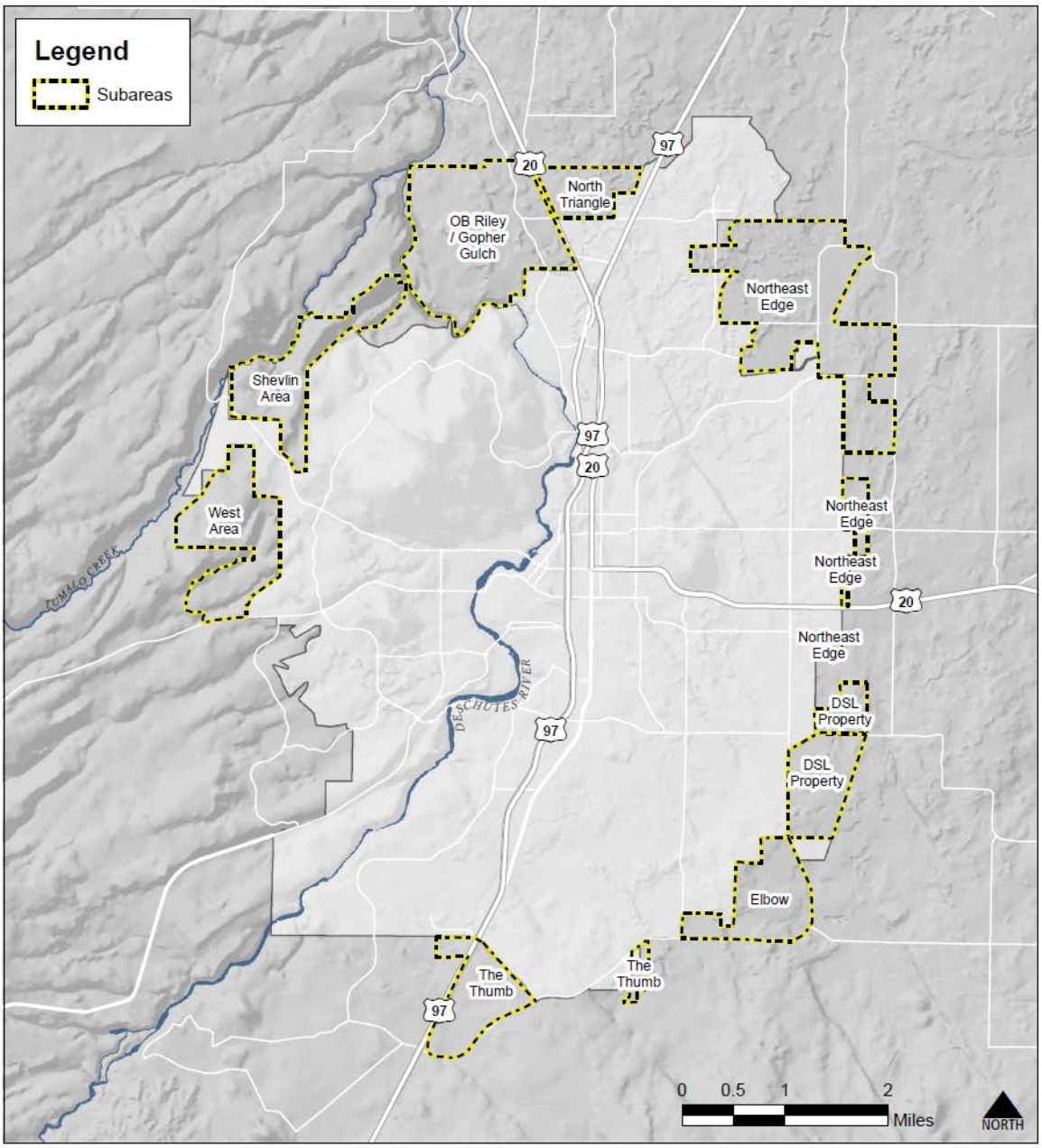
Scenarios Evaluated

A total of six sets of land use assumptions were evaluated (Scenario 1.2; Scenario 2.1; Scenario 3.1; Supplemental Analysis Area Map 1; Supplemental Analysis Area Map 2; Supplemental Analysis Area Map 3); their characteristics and rationale are described in detail in the evaluation report. Each UGB Expansion Scenario and Supplemental Analysis Area Map (SAAM) is comprised of a set of land use assumptions describing the type and amount of housing, employment, and other uses in polygons within the existing UGB and in various expansion subareas. They are all consistent with the City of Bend's overall housing and jobs need for the planning horizon, and use consistent assumptions for development on land inside the existing UGB.

Geographies

These performance measures were evaluated at the subarea level (see Figure 1), as well as for the entire expansion area (all areas that would be added to the UGB under a given scenario) and the City of Bend as a whole (the existing UGB plus the expansion area).

Figure 1. Subareas



Complete Communities and Great Neighborhoods

Performance Measure 1.A.1: Housing Units within Walking Distance of Schools (School District Update)

Purpose

Schools are an important ingredient of a complete community. Having schools within walking distance supports great neighborhoods because schools are an important destination for many households, and they often provide recreational amenities (e.g. playgrounds and ball fields) that

are accessible to the public during non-school hours. Ability to walk also decreases reliance on the automobile; however, this is captured by other performance measures.

Data Sources

GIS data for locations of existing schools provided by City of Bend and Deschutes County. Proposed school locations drafted in scenarios approved by the UGB Steering Committee (USC). Refined school locations based on input from Bend-La Pine School District received in August 2015.

Methodology

Data on existing housing units comes from parcel inventory data provided by the City of Bend, based on a combination of Deschutes County Assessor's Office data, City building permit data, aerial photography, and existing City parcel inventory data. Future housing units for land inside and outside UGB were derived for each scenario using Envision Tomorrow and assumptions about various types of development (development types). "Walking Distance" buffers of ½ mile (as the crow flies, not accounting for barriers such as highways) were applied to the outer edge of parcels or areas identified as existing and future school sites. Total housing units within polygons intersecting this buffer were reported for each subarea and for the City as a whole, and then divided by the total housing units within each geography. Subareas and scenarios with the highest percentage of housing units within walking distance of schools were given higher ratings.

An analysis of Envision outputs was performed by APG to evaluate how well scenario assumptions lined up with School District input. Adjustments made in the following cases:

- School district desired high school in "The Thumb" subarea in all scenarios. Nearly all households in this subarea would be within walking distance in this case – adjusted accordingly. (Scenario 2.1 needed no change)
- Two schools desired in NE edge in SAM-1. Nearly all new homes and many existing homes in this subarea would be within walking distance in this case – adjusted accordingly.
- No school desired in NE Edge in Scenario 3.1 – removed housing units from "walking distance" buffer.
- No school desired in DSL Property in Scenario 1.2 - removed housing units from "walking distance" buffer.
- No school desired in West Area in Scenario 1.2. Proposed school was within ½ mile of two existing schools, no change needed to household proximity numbers.
- 1 school desired in Shevlin Area in Scenario 1.2. Very little housing in this scenario within walking distance – no change needed to household proximity numbers.
- Change of school location in West Area in SAAM 3 – almost all housing units in this subarea now within walking distance of school; changed accordingly.

Performance Measure 1.A.5: Opportunities for Master Planning

Purpose

The purpose of this performance measure is to evaluate the balance of property ownership in each scenario/SAAM between large property holders (greater than 20 acres in common ownership) and small property holders (less than 20 acres in common ownership). There has been concern expressed by TAC members about having the benefits of urban expansion accrue to a relatively small number of property owners, and this performance measure aims to quantify that metric.

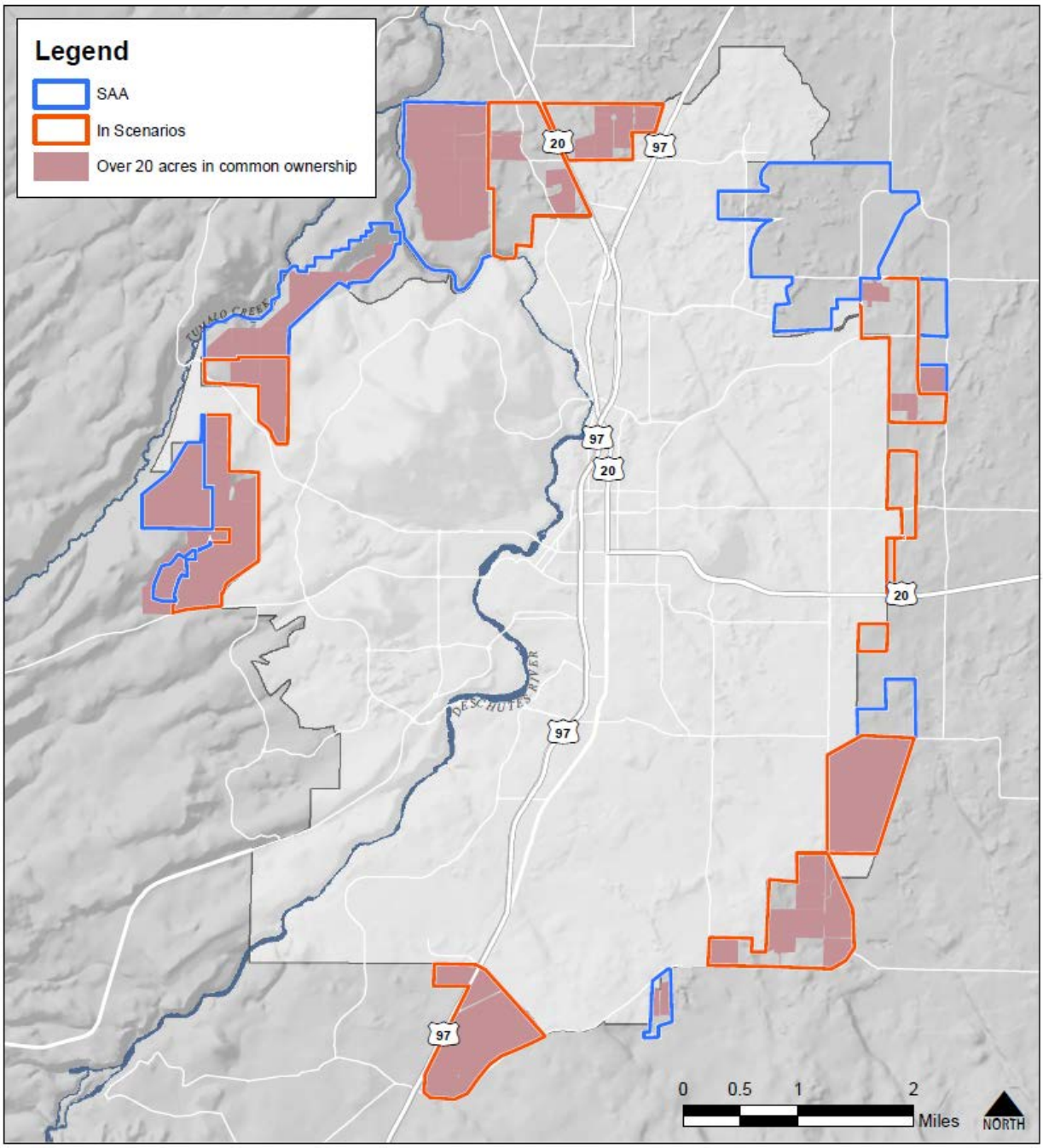
Data Sources

Deschutes county tax lot data.

Methodology

Land ownership was examined in each expansion subarea and groups of parcels totaling 20 acres or greater in common ownership was identified (See map). Areas in school ownership that are anticipated to be developed as schools are not included, as inclusion in an expansion would not change ownership of land. Acreage of development in each scenario inside and outside these parcels were compared. Performance measure is reported as the percentage of total expansion acres in ownerships >20 acres and <20 acres. Figure 4 shows areas in common ownership of greater than 20 acres.

Figure 4. Ownership over 20 acres



Efficient, Timely Growth

Performance Measure 1.B.1: Urbanized Acres

Purpose

The purpose of this performance measure is to provide basic information about the amount of development within each scenario / SAAM, broken down by subarea and by type of development.

Data Sources

Draft scenarios approved by the USC and SAAMs.

Methodology

Envision Tomorrow development types were grouped into three general categories – Residential Land, Employment Land, and Civic Land. Residential Land contains development types corresponding to residential plan designations (RL, RS, RS Masterplan, RS Hillside, RM, RM Masterplan, RH, and mixed use); Employment Land contains development types corresponding to employment plan designations (CC, CC2, CL, CG, IP, IL, IG, Large Lot Industrial), and Civic Land contains park and school land. These gross figures are the acres of designations placed in expansion subareas.

Performance Measure 1.B.2: Gross Residential Density

Purpose

The purpose of this performance measure is to provide basic information about the gross housing density of subareas and scenarios/SAAMs.

Data sources

Draft scenarios approved by the USC and SAAMs.

Methodology

Envision Tomorrow calculates residential units in new development. This measure of gross housing density is the number of residential units divided by the residential acreage for each evaluation geography. This does not include residential units in commercial areas (e.g. an apartment above a storefront), but those types of units make up a very small amount of residential development in scenario expansion areas.

Performance Measure 1.B.4: Percent of Urbanized Acres on Parcels under 20 acres and Contiguous to Existing UGB

Purpose

The purpose of this performance measure is to assess the “low hanging fruit” of smaller parcels (with no master-planning requirement that parcels > 20 acres have) that are adjacent to the UGB and presumed to be developable quickly. Originally this performance measure was intended to include only parcels where sewer capacity was not a large concern, but sewer analysis showed that sewer capacity requires significant improvements regardless of where the boundary expands.

Data Sources

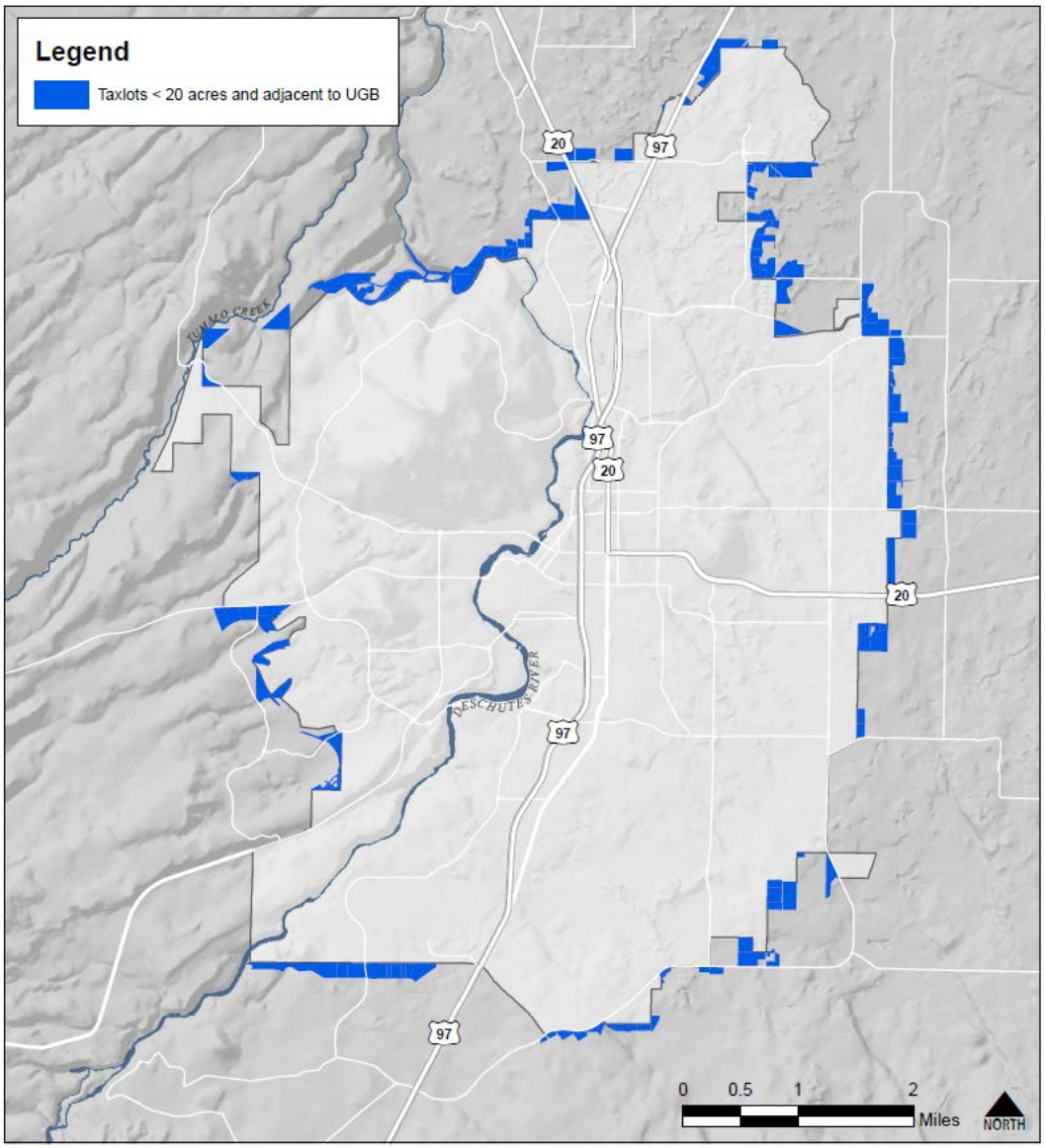
Deschutes County assessor’s data, City of Bend GIS data.

Methodology

GIS query was performed to select parcels less than 20 acres in size and that were adjacent to the existing Urban Growth Boundary. Performance measure was reported as the total acreage of these selected parcels as percent of total expansion acreage in each scenario/SAM. Figure 2

below shows the locations of these smaller tax lots (note: not all tax lots in Figure 2 are part of a Scenario/SAAM).

Figure 2. Taxlots under 20 acres and adjacent to existing UGB



Balanced Transportation System

Performance Measure 2.A.9: Proximity to Transit Corridors

Purpose

Performance Measure 2.A.10 (Housing and Jobs within Walking Distance to Future Transit Corridors), which is described in the Fregonese Associates Technical Memorandum, captures development immediately adjacent to transit. However, given how little area within the potential UGB expansion areas lies within a quarter mile of transit, this performance measure was developed to offer a more qualitative look at how close each area is to existing and planned

transit. This matters because some people will walk over a quarter mile to access transit, particularly if the transit offers a convenient connection to their destination, and because there is some potential to modify transit routing in the future to better serve future expansion areas. Areas that lie closer to existing and already-planned transit lines may be easier extend service to in the future.

Data Sources

Bend MPO Public Transit Plan, March 2013; 2015 proposed transit system map; GIS data for transit corridors provided by Bend Metropolitan Planning Organization (MPO), scenarios approved by the USC and SAAMs.

Methodology

A visual inspection of the proposed future transit system from the Bend MPO Public Transit Plan was used to identify additional proposed service not included in the available GIS data. Manual distance calculation with GIS software was used to estimate the distance from the subarea to the nearest existing or proposed transit line or stop.

Cost-Effective Infrastructure

Performance Measure 2.B.10: Acres of new development with welded tuff geology

Purpose

The purpose of this performance measure is to evaluate the amount of development occurring within areas with Welded Tuff (QTst) geology, which is less suitable for “low impact development” techniques such as stormwater infiltration ponds. Stormwater infrastructure is expected to be somewhat greater in areas with this geology than elsewhere.

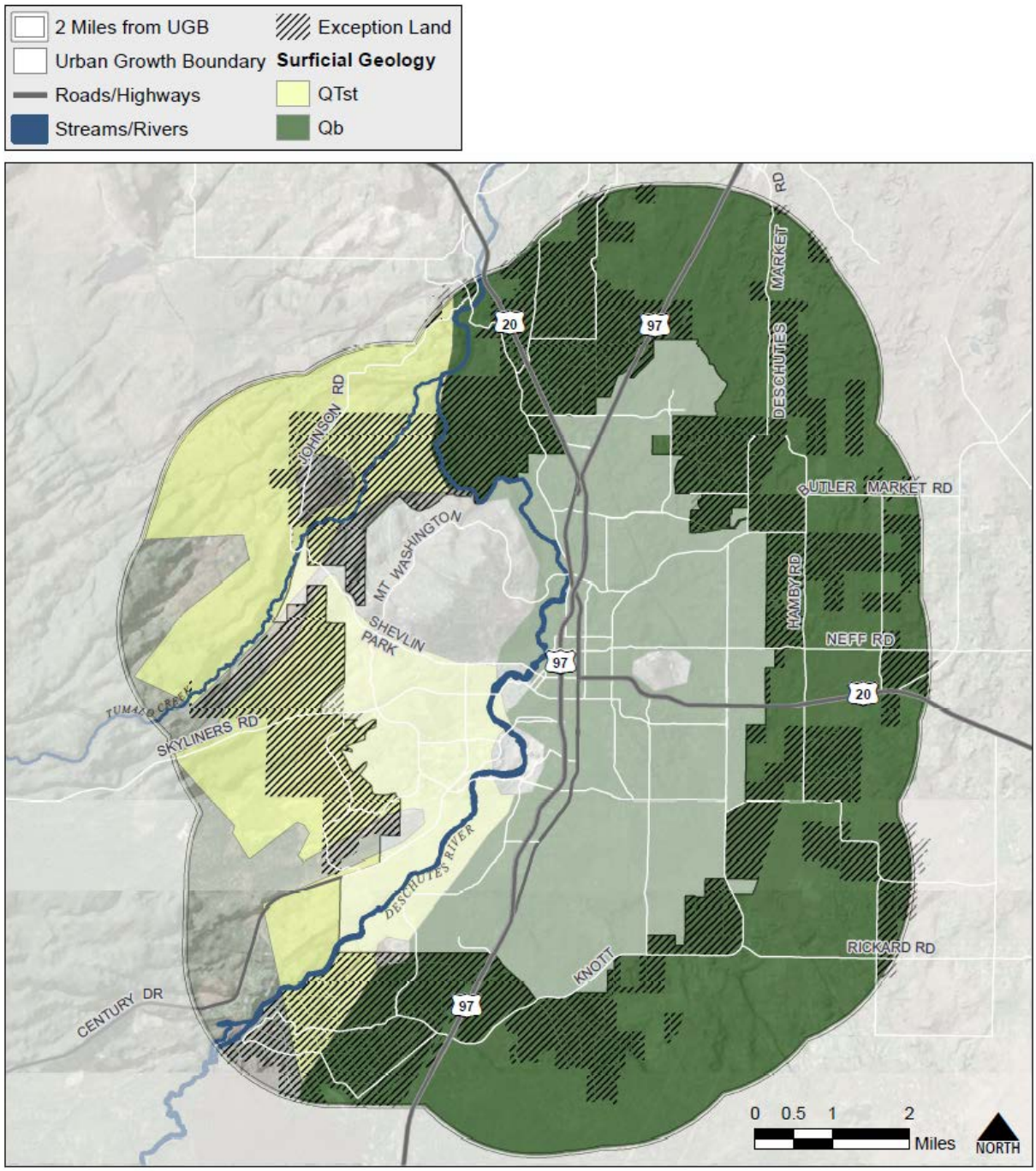
Data Sources

Deschutes County GIS, Surficial Geology data from City of Bend

Methodology

Welded Tuff surficial geology feature intersected with development in each scenario/SAAM. Total acreage reported by subarea. Figure 6 shows the surficial geology data – Welded Tuff designation is “QTst”

Figure 6. Surficial Geology



Performance Measure 2.B.11: Acres of new development within Drinking Water Protection Areas (DWPA)

Purpose

The purpose of this performance measure is to evaluate the amount of development occurring within identified Drinking Water Protection Areas (DWPA). Development in these areas has a greater risk of causing pollution and impacting drinking water for the City.

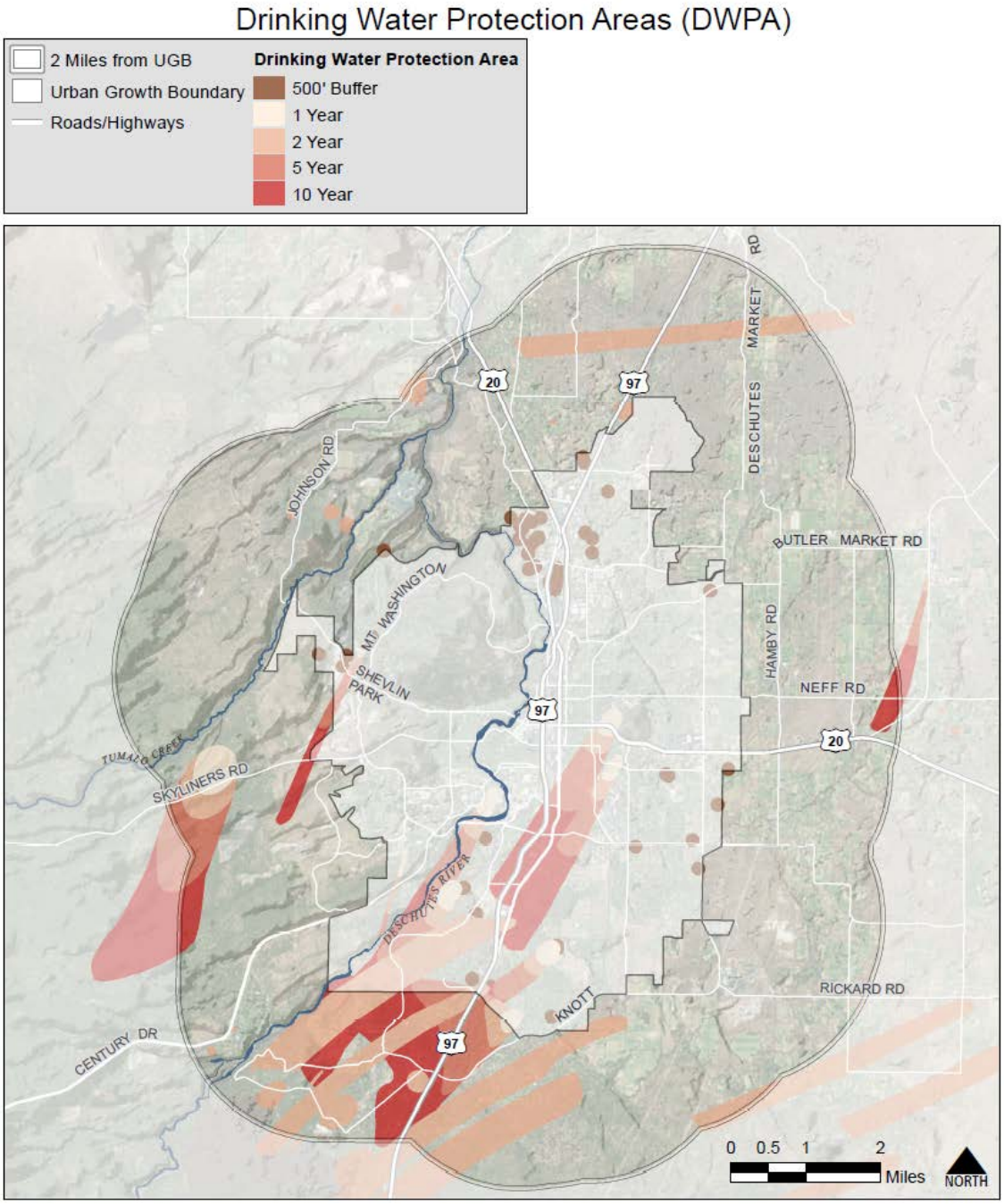
Data Sources

2013 Bend Groundwater Assessment Data

Methodology

Drinking Water Protection Area features were intersected with development in each scenario/SAAM. Total acreage reported by subarea. Figure 5 shows a map of the drinking water protection areas.

Figure 5. Drinking Water Protection Areas (DWPA)



Quality Natural Environment

Performance Measure 3.A.1: Development in Wildlife Areas

Purpose

The purpose of this performance measure is to evaluate the acres of development that may impact wildlife areas identified by the Oregon Department of Forest and Wildlife (ODFW). Development at urban densities that makes efficient use of land is considered incompatible with high-quality wildlife habitat.

Data Sources

Deschutes County GIS, ODFW elk/deer range and “Areas of Potential Concern” data used in UGB Stage 2 mapping.

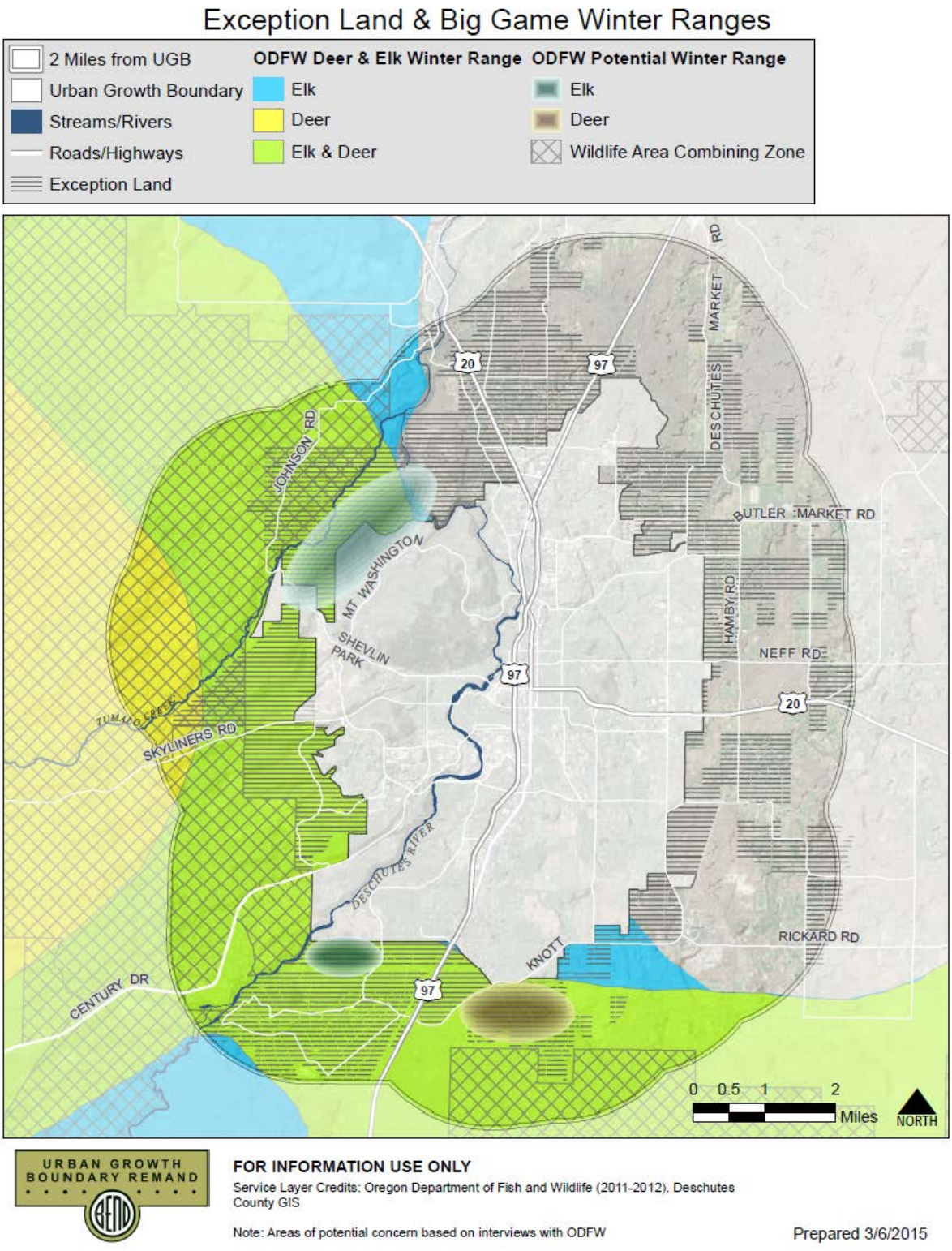
Methodology

ODFW “areas of potential concern” identified are loose ovals where elk/deer tend to rest. For the purposes of this evaluation they were not treated as geographically accurate features, but rather indicative of a general area within topographic boundaries. Where these areas overlap with an expansion subarea, they are assumed to encompass the entire subarea unless a topographic boundary is present.

Figure 3 depicts the ODFW data. Two calculations were performed for each subarea and each scenario/SAAM:

1. Calculated acres of development intersecting ODFW Elk/Deer ranges
2. Calculated acres of development within ODFW “Areas of Potential Concern.”

Figure 3. Exception Land and Big Game Winter Ranges



Performance Measure 3.A.2: Linear distance of riparian areas adjacent to development

Purpose

Discussions during early phases of the UGB project have identified that Goal 5 protection of the Deschutes River and Tumalo Creek areas will require a fine-grained and site-specific evaluation of appropriate buffer distances. For this evaluation, we examined the linear feet along the Deschutes River and Tumalo Creek in the Shevlin Area and the Gopher Gulch Area. Some of this land is in Bend Parks & Recreation ownership, and some assumes a "clustered" development time that includes open space buffers, but these do not guarantee Goal 5 resource protection and are still measured for this performance measure.

Data Sources

Deschutes County assessor's data, City of Bend GIS data.

Methodology

Manual distance calculation of linear feet along riverfront. Results should not be interpreted as accurate to less than 100'.

Strong, Diverse Economy

Performance Measure 3.C.1: Site suitability for large lot industrial use

Purpose

The purpose of this performance measure is to evaluate the locations of a Large Lot Industrial Site identified in the various scenarios/SAAMs. This evaluation is the subject of a separate memorandum, presented to the Employment TAC in July 2015.

Data Sources

Deschutes County GIS, rough topographic data from Google Earth, aerial imagery from ESRI, criteria from the 2015 Draft Bend Employment Opportunities Analysis and the Regional Large Lot Industrial Need Program[1].

Methodology

Qualitative evaluation of sites with regard to criteria. Details in separate memorandum.

Performance Measure 3.C.2: Site suitability for other industrial and mixed employment

Purpose

The purpose of this performance measure is to evaluate the locations of industrial and mixed employment land identified in the various scenarios/SAAMs.

[1] Available online at http://www.deschutes.org/sites/default/files/fileattachments/community_development/page/808/central_oregon_large_lot_industrial_land_need_analysis_2.4mb_pdf.pdf

Data Sources

Deschutes County GIS, rough topographic data from Google Earth, aerial imagery from ESRI, criteria from the 2015 Draft Bend Employment Opportunities Analysis.

Methodology

Qualitative evaluation of identified areas of industrial/mixed employment use against the criteria (Parcel size, site size, topography, compatibility with adjacent uses, and transportation access).

Performance Measure 3.C.3: Site suitability for other Commercial Uses

Purpose

The purpose of this performance measure is to evaluate the locations of commercial land identified in the various scenarios/SAAMs.

Data Sources

Deschutes County GIS, rough topographic data from Google Earth, aerial imagery from ESRI, criteria from the 2015 Draft Bend Employment Opportunities Analysis.

Methodology

Qualitative evaluation of identified areas of industrial/mixed employment use against the criteria (Parcel size, site size, topography, compatibility with adjacent uses, visibility, and transportation access). Visibility evaluated using maps of Average Daily Trips along the future network of each scenario provided by DKS Associates.

Farm and Forest Compatibility

Performance Measure 4.A.3: Forest land within 1/4 mile of expansion areas

Purpose

Acreage of forest land within a 1/4 mile buffer of expansion scenarios. For "Existing UGB" subarea - used existing UGB.

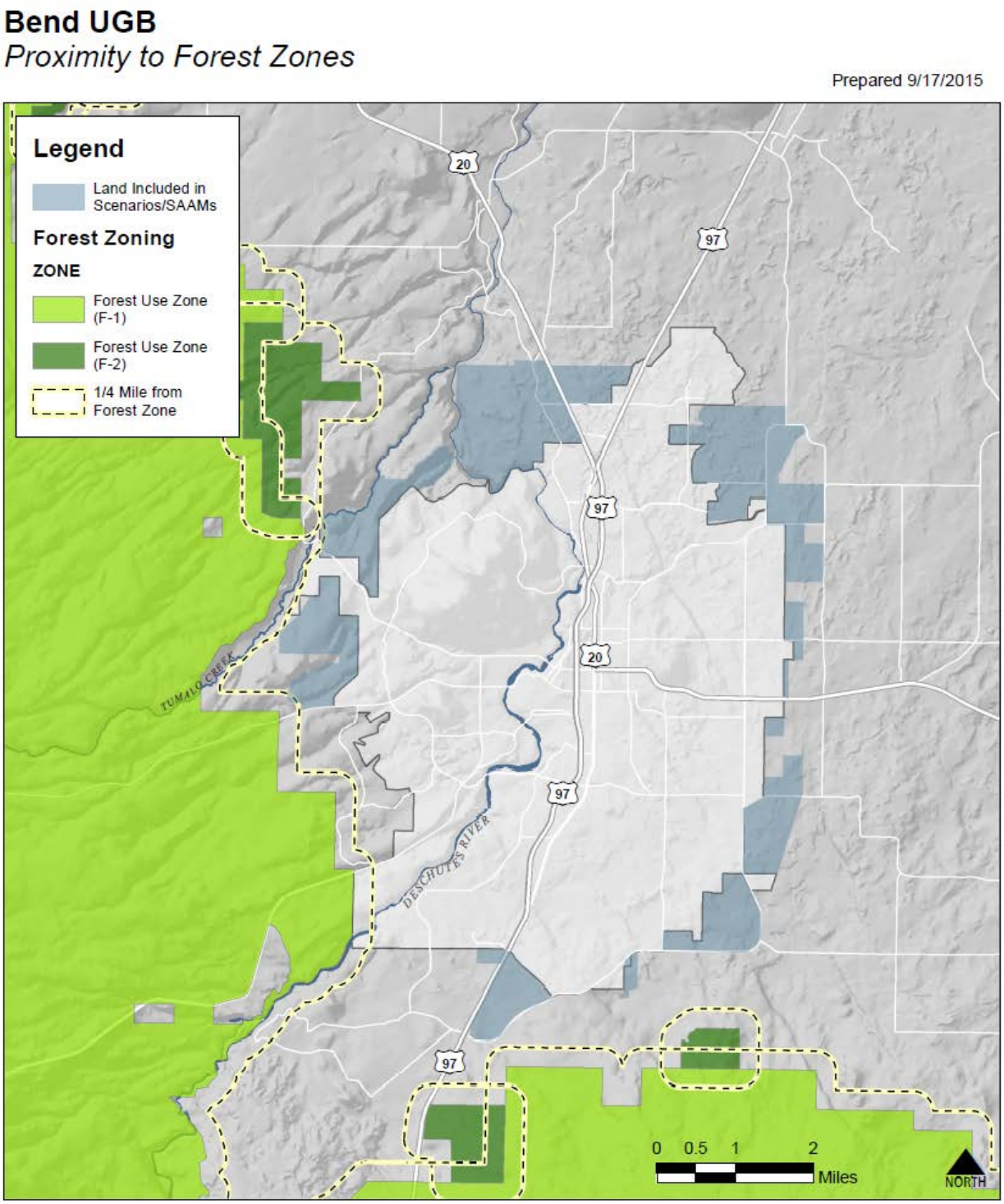
Data Sources

Deschutes County GIS (Zoning Data, F-1 and F-2 zones)

Methodology

Calculated ¼ mile buffer from F-1 and F-2 zones, intersect with expansion areas/existing UGB. Figure 7 shows forest zones in the proximity of Bend and ¼ mile buffer.

Figure 7. Proximity to Forest Zones



Memorandum

October 2, 2015

To: Urban Growth Boundary and Growth Scenarios Technical Advisory Committee
Cc: Project Team
From: Fregonese Associates, Inc.
Re: Scenario Evaluation: Envision Tomorrow Technical Memorandum

Introduction

Purpose

The purpose of this memorandum is to describe the data sources and methodology of various performance measure evaluations conducted in "Stage 4" of the Bend Urban Growth Boundary (UGB) Remand project, the evaluation of alternative UGB expansion scenarios. This memorandum addresses the performance measures evaluated by Fregonese Associates Inc. (see Table 1). Details of the analysis and interpretation are provided in the Bend UGB Scenario Evaluation Report.

Table 1. Performance Measures in this Technical Memorandum

Performance Measure	Description
Community Outcome: Complete Communities and Great Neighborhood	
1.A.1	Housing Units within Walking Distance of Schools
1.A.2	Housing Units within Walking Distance of Parks and Trails
1.A.3	Housing Units within Walking Distance of Commercial Services
Efficient, Timely Growth	
1.B.3	Net Density for New Jobs
1.B.5	Vacant/Developed Acres
Balanced Transportation System	
2.A.1	VMT/Capita
2.A.7	Mode Split
2.A.8	Average Weekly Walk Trips
2.A.10	Housing and Jobs within Walking Distance to Future Transit Corridors
Cost-Effective Infrastructure	
2.B.3	New Linear Miles of Local Roadway

Performance Measure	Description
2.B.9	Total Impervious Area of New Development
Quality Natural Environment	
3.A.4	Greenhouse Gas Emissions
3.A.5	Household Energy Use
3.A.6	Household Water Use
Housing Options, Affordability, and Equity	
3.B.1	Average Cost of New Housing
3.B.2	Housing Mix of New Housing

Evaluation Tools

The evaluations described in this memorandum were completed using ArcGIS mapping software and the Envision Tomorrow Scenario Planning Tool. Envision Tomorrow is an innovative set of urban and regional planning tools that can be used to model development feasibility on a site-by-site basis as well as create and evaluate multiple land use scenarios, test and refine transportation plans, produce small-area concept plans, and model complex regional issues. The software also provides a real-time evaluation of relevant indicators such as land use, energy consumption, and financial impacts that measure a scenario's performance. It can also provide baseline carbon emissions analysis of different land use patterns, enabling planners to model the relationship between greenhouse gas emissions and land use and transportation decisions.

Envision Tomorrow consists of two primary tools: the Prototype Builder, an ROI model spreadsheet tool, and the Scenario Builder, an ArcGIS add-on.

The ***Prototype Builder***, a return on investment (ROI) spreadsheet tool, can be used to model buildings and test the physical and financial feasibility of development. The tool allows the user to examine land use regulations in relation to the current development market and consider the impact of parking, height requirements, construction costs, rents and subsidies. Use this tool to see what is market feasible. Use it to see how preferred forms of development, such as mixed-use retail with housing above, might become more financially feasible within your existing code.

The ***Scenario Builder*** adds scenario-building functionality to ArcGIS. First, design a library of buildings in the Prototype Builder. Next, use the Scenario Builder to create development types and "paint the landscape" by allocating different development types across the study area to create unique land use scenarios. The tool then allows real-time evaluation of each scenario through a set of user-defined benchmarks or indicators. The indicators measure such things as the scenario's impact on land use, housing, sustainability, transportation, and economic conditions. It also allows communities and regions to monitor progress over the short-and long-terms.

Scenarios Evaluated

A total of six sets of land use assumptions were evaluated (Scenario 1.2; Scenario 2.1; Scenario 3.1; Supplemental Analysis Area Map 1; Supplemental Analysis Area Map 2; Supplemental Analysis Area Map 3); these are described in detail in the evaluation report. Each UGB Expansion Scenario and Supplemental Analysis Map (SAAM) is comprised of a set of land use assumptions describing the type and amount of housing, employment, and other uses in polygons within the existing UGB and in various expansion subareas. They are all consistent with the City of Bend's overall housing and jobs need for the planning horizon, and use consistent assumptions for development on land inside the UGB.

Geographies

These performance measures were evaluated at the subarea level, as well as for the entire expansion area (all areas that would be added to the UGB under a given scenario) and the City of Bend as a whole (the existing UGB plus the expansion area).

Complete Communities and Great Neighborhoods

Performance Measure 1.A.1: Housing Units within Walking Distance of Schools

Purpose

Schools are an important ingredient of a complete community. Having schools within walking distance supports great neighborhoods because schools are an important destination for many households, and they often provide recreational amenities (e.g. playgrounds and ball fields) that are accessible to the public during non-school hours. (Ability to walk also decreases reliance on the automobile; however, this is captured by other performance measures.)

Data Sources

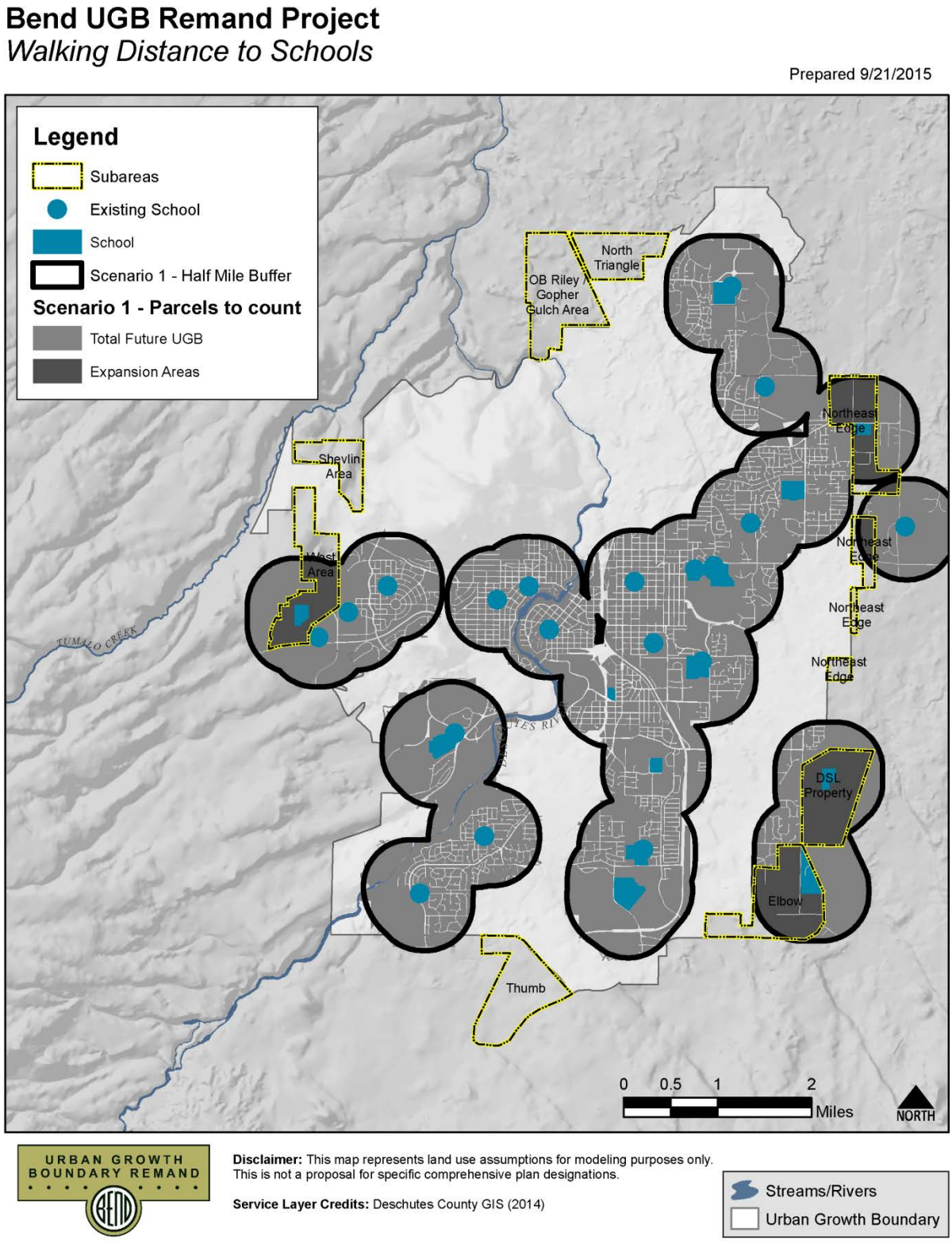
GIS data for locations of existing schools provided by City of Bend and Deschutes County. Proposed school locations drafted in scenarios approved by the UGB Steering Committee (USC). (Note: refined school locations based on input from Bend-La Pine School District received in August 2015. See APG technical memorandum for details.)

Methodology

Data on existing housing units comes from parcel inventory data provided by the City of Bend, based on a combination of Deschutes County Assessor's Office data, City building permit data, aerial photography, and existing City parcel inventory data. Future housing units for land inside and outside UGB were derived for each scenario using Envision Tomorrow and assumptions about various types of development (development types). "Walking Distance" buffers of ½ mile (as the crow flies, not accounting for barriers such as highways) were applied to the outer edge of parcels or areas identified as existing and future school sites. Total housing units within polygons intersecting this buffer were reported for each subarea and for the City as a whole, and then divided by the total housing units within each geography. Subareas and scenarios with the highest percentage of housing units within walking distance of schools were given higher ratings.

Updates to Envision outputs were performed by APG to evaluate how well scenario assumptions lined up with School District input. See APG technical memorandum for details.

Figure 1: Half-Mile Buffer from Schools (Scenario 1.2 example)



Performance Measure 1.A.2: Housing Units within Walking Distance of Parks and Trails

Purpose

Access to greenspace is an important aspect of a complete community. It allows residents to relax within nature, provides spaces to play and meet, and provides opportunities for exercise. Homes with greenspace within walking distance are more likely to have greater opportunity for transportation, which may reduce reliance on the automobile, and is inclusive of populations that do not drive.

Data Sources

GIS data for locations of existing trails and parks provided by City of Bend and Deschutes County. Proposed park locations drafted in scenarios approved by the USC, and SAAMs.

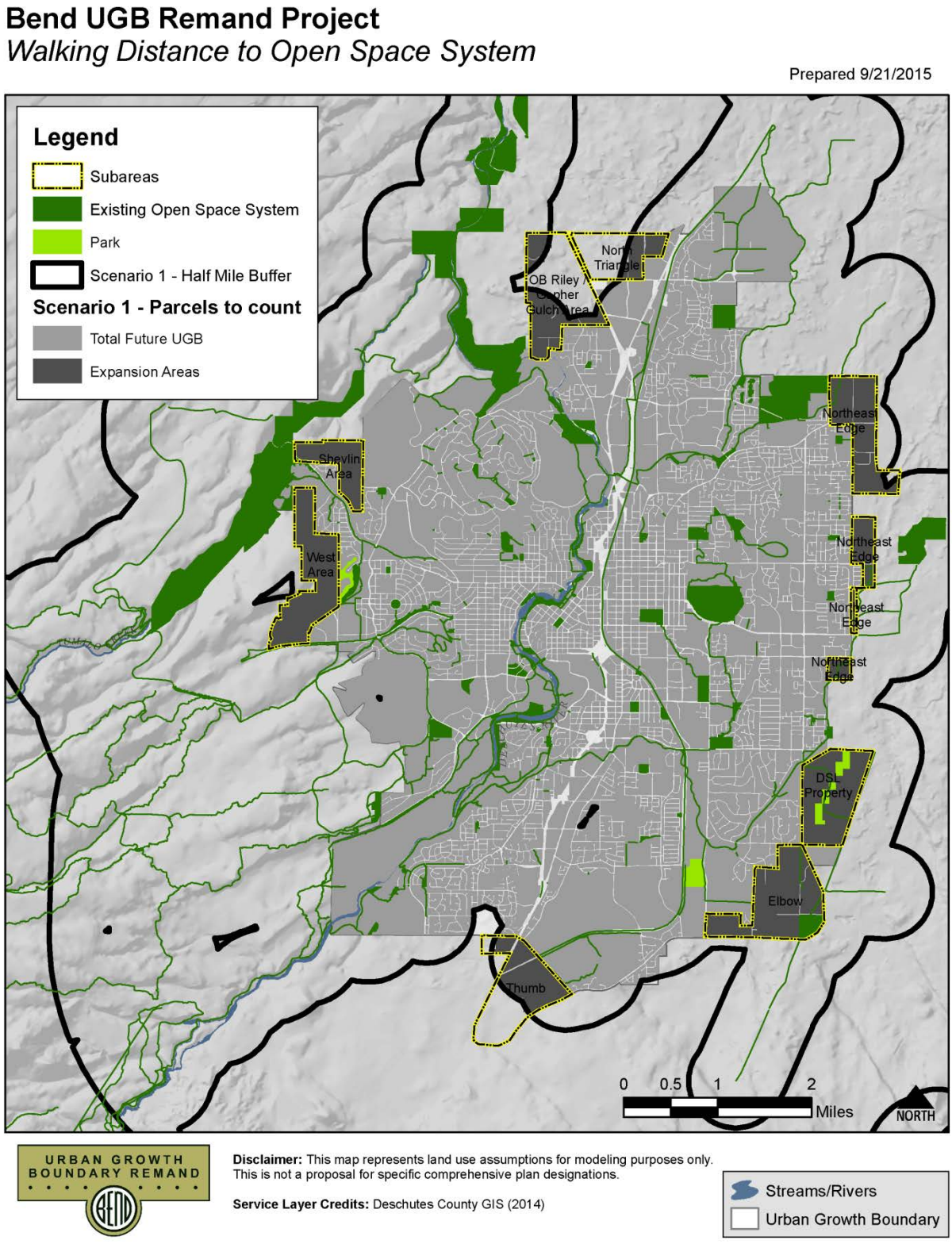
Methodology

The methodology for this indicator was to count the number of housing units within a 0.5 mile buffer from current and future parks and trails. The 0.5 mile buffer is consistent with the 0.5 mile buffer used for other proximity measures, as it is roughly equal to what most would consider a reasonable walk.

Existing parks and trails were buffered out by 0.5 mile from the edge of their boundary. That is to say, if a park encompassed a whole block, 0.5 miles were buffered out from each edge of the block, rather than a single point in the middle of the park. Future parks and trails were then buffered out by 0.5 miles, using the same technique. Future park locations varied across the different scenarios, based on the scenario layout and development types.

Finally, future total (existing plus new) housing units for each scenario were calculated within the buffer. A housing unit was considered within the buffer if the centroid of its parcel was within the buffer. This was done to eliminate small slivers of a parcels being included in the measure. The total number of housing units within the buffers were divided by the total number of housing units overall to find the percentage of units within walking distance to parks and trails.

Figure 2: Half-Mile Buffer from Parks and Trails (Scenario 1.2 example)



Performance Measure 1.A.3: Housing Units within Walking Distance of Commercial Services

Purpose

Close access to commercial services is an important aspect of a complete community. By having commercial services close by, residents can walk to reach them, which reduces automobile use, increase physical activity, and promotes more pedestrian activity and street life. Additionally, more dispersed community commercial locations can support smaller local businesses and offer additional third places for residents.

Data Sources

GIS data for locations of existing housing and zoning/general plan provided by City of Bend. Future housing and commercial locations drafted in scenarios approved by the USC and SAAMs.

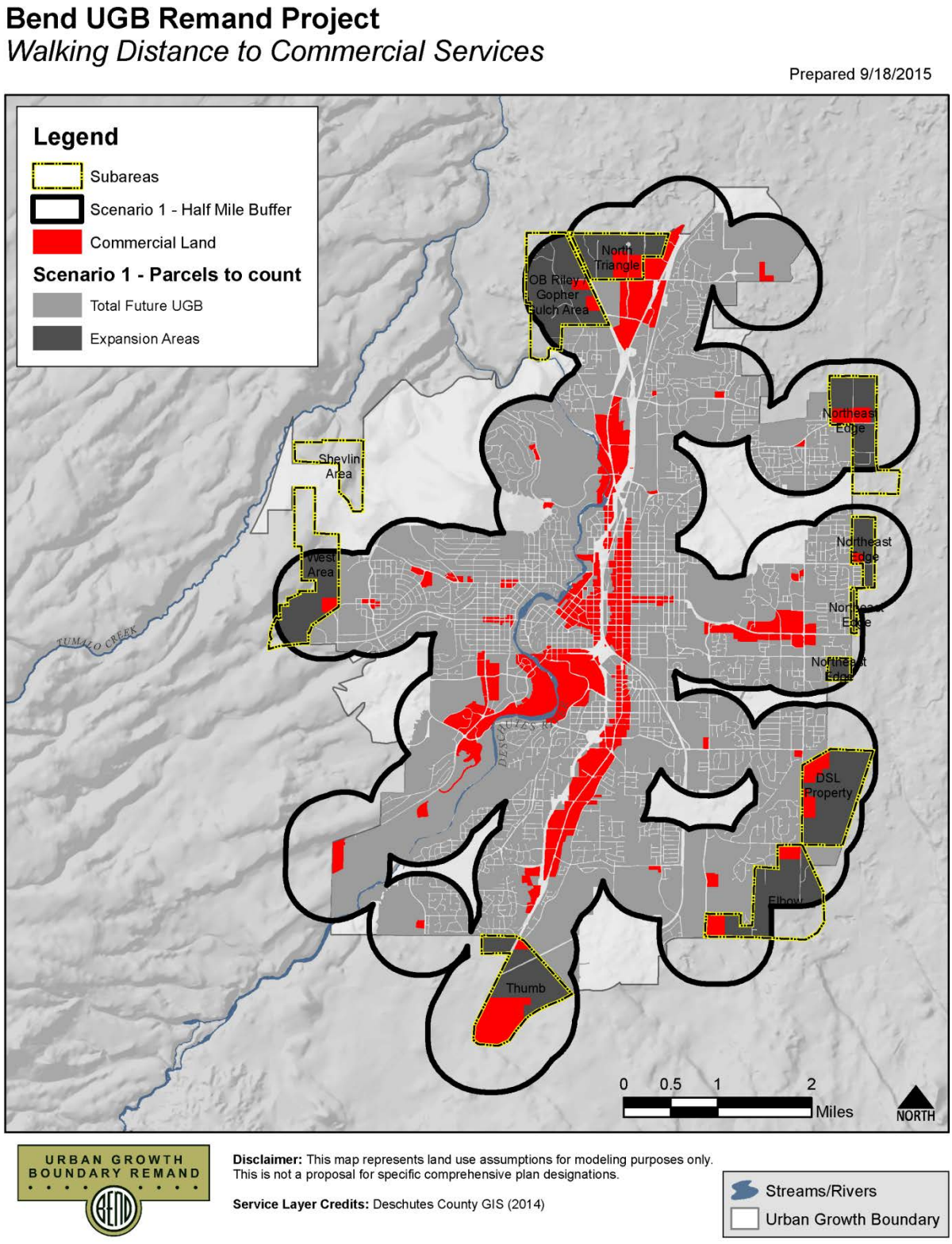
Methodology

The methodology for this indicator was to count the number of housing units within a half mile buffer from current and future commercial services. The half mile buffer is consistent with the half mile buffer used for other proximity measures, as it is roughly equal to what most would consider a reasonable walk.

Existing commercial areas were identified based on their general plan designation. The designations used were: CB, CC, CG, CL and MR. Future commercial areas were based on the development types painted, which were: CB, CC, CC2, CG, CL, ME, MR, MU 1, and MU-2a. Once parcels with these designations were selected, they were buffered out by 0.5 miles, based on the edge of their parcel boundaries.

Finally, future total (existing plus new) housing units for each scenario were calculated within the buffer. A housing unit was considered within the buffer if the centroid of its parcel was within the buffer. This was done to eliminate small slivers of a parcels being included in the measure. The total number of housing units within the buffers were divided by the total number of housing units overall to find the percentage of units within walking distance to commercial services.

Figure 3: Half-Mile Buffer from Commercial Areas (Scenario 1.2 example)



Efficient, Timely Growth

Performance Measure 1.B.3: Net Density for New Jobs

Purpose

Tracking the net density of new employment areas allows for the evaluation of different scenarios and employment policies. The type of business affects the density of jobs, as some business types have more employees in less area. Tracking the density allows for the comparison of how efficiently land is being consumed for employment.

Data Sources

Scenarios approved by USC and SAAMs.

Methodology

Envision Tomorrow tracks gross employment density as part of the scenario process. Different buildings with different business types were created, with both the building form, and the type of business affecting the density. Similar to housing, multi-story, more compact buildings create higher densities relative to single-story buildings. In order to determine the amount of jobs per business type, the average employees per square foot was determined based on business type and building size. These assumptions are part of the model's development types, which were used to create the scenarios and SAAMs.

Performance Measure 1.B.5: Vacant and Developed Acres

Purpose

Development on vacant land may be more likely to occur in a shorter amount of time because there are no existing land uses generating income or providing value for the property owner, though this is not always the case. In addition, owners of developed rural residential properties sometimes prefer a rural lifestyle and prefer not to be annexed and not to have infill in their neighborhood.

Data Sources

Existing developed area for land outside the existing UGB was identified based on parcel data provided by the City of Bend. Parcels with an existing housing unit (based on county assessor's data) were assumed to have a quarter acre developed. Other development was identified through aerial photography.

Methodology

The number of acres identified as having existing development that were assigned a development type was divided by the total urbanized acres for each Scenario and SAAM.

Balanced Transportation System

Performance Measure 2.A.1: Household VMT/Capita

Purpose

VMT (vehicle miles traveled) is a common indicator of mobility and measures the distances people need to travel to meet daily needs. By tracking the distance a given person drives each day, VMT per capita shows how different community designs and spatial arrangements affect

driving behavior. For example, denser, more mixed land uses and transit rich communities tend to have less VMT, because people can walk, cycle, or take transit. On the other hand, mono-land use communities often have a higher VMT per capita, as there is less accessibility within the community itself, forcing residents to drive elsewhere to have their needs met.

VMT is an important measure to track, as travel behavior has numerous economic, environmental, and social impacts. Increased driving means additional resources are required for new roads and road maintenance, and it can mean more congestion and lost productivity. Additional driving means additional carbon and other GHG emissions (see 3.A.3), which have a negative environmental impact. Finally, increased driving (and lack of other transportation options) can proportionally impact populations that cannot drive, such as the elderly, those with disabilities, or those who simply cannot afford a vehicle.

VMT can be reduced through integrated land use and transportation planning. Innovative policies and plans can be made to help minimize the increase of VMT at the edge, and reduce VMT growth within the rest of the City.

Data Sources

TAZs (traffic analysis zones) provided by Deschutes County. Future traffic behavior based on drafted scenarios approved by the USC and SAAMs.

Methodology

The VMT per capita value is an output of the 7D Regional Household Travel Model, an element of Envision Tomorrow. The 7D model is a complex, linear regression travel model, with numerous inputs and outputs. This methodology section will only outline the theoretical level of how the 7D model computes the VMT. For a more detailed description of the model process within Envision Tomorrow, please visit EnvisionTomorrow.org/CityRegional-Travel-Model. For a more complex description of the model, read Ewing, Tan, Goates, Zhang, Greenwald, Joyce, Kircher, and Greene (2014) Varying influences of the built environment on household travel in 15 diverse regions of the United States, *Urban Studies* 1-19.

Initially, one major difference between the VMT indicator (and the other 7D model indicators) and other Envision Tomorrow indicators is that they occur at a different geography. Whereas the rest of the Envision Tomorrow model is parcel based (meaning that it considers what happens on each parcel, such as a single house or business), the VMT indicator is TAZ based. TAZs vary in size; they are as small as several city blocks in downtown areas, a small residential neighborhood in more urban areas, and larger subdivision in more suburban areas. Typically TAZ boundaries follow census block geographies and major arterial roads to make aggregation and analysis easier. However, TAZ boundaries are obviously coarser than parcel boundaries and sub-area boundaries are not followed precisely. See [insert map number] below for a comparison.

Figure 4: Household VMT/Capita, Scenario 1.2

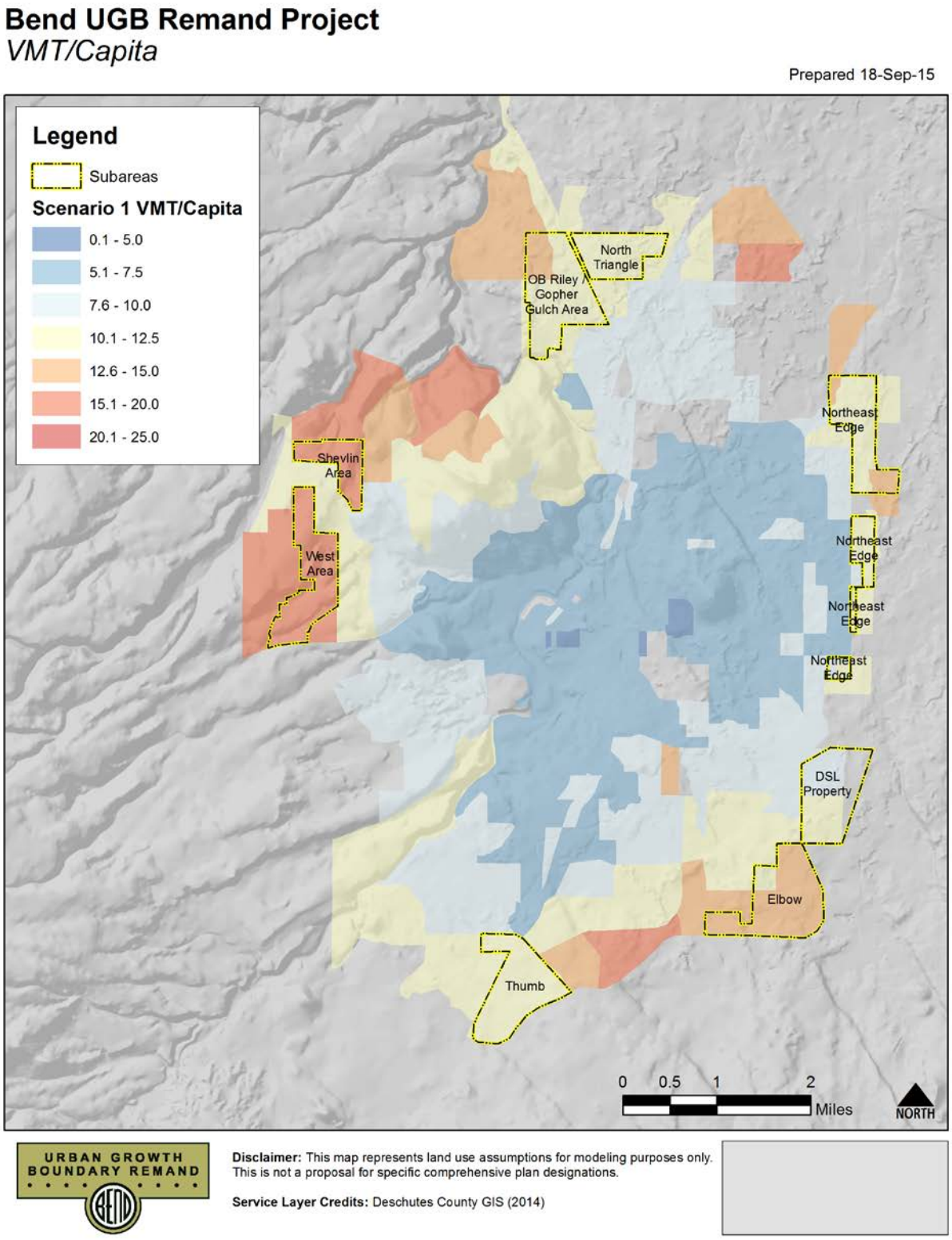


Figure 5: Household VMT/Capita, Scenario 2.1

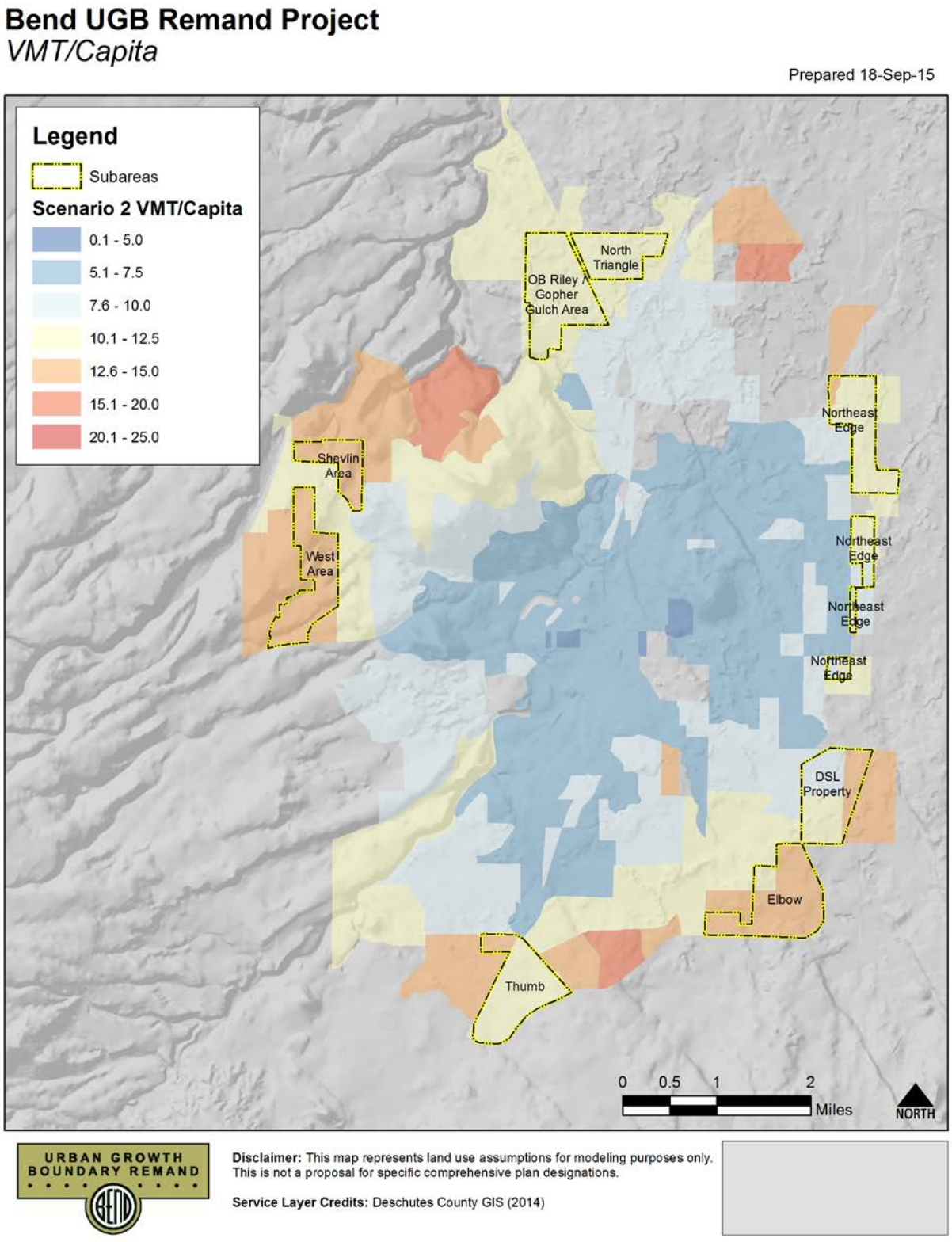


Figure 6: Household VMT/Capita, Scenario 3.1

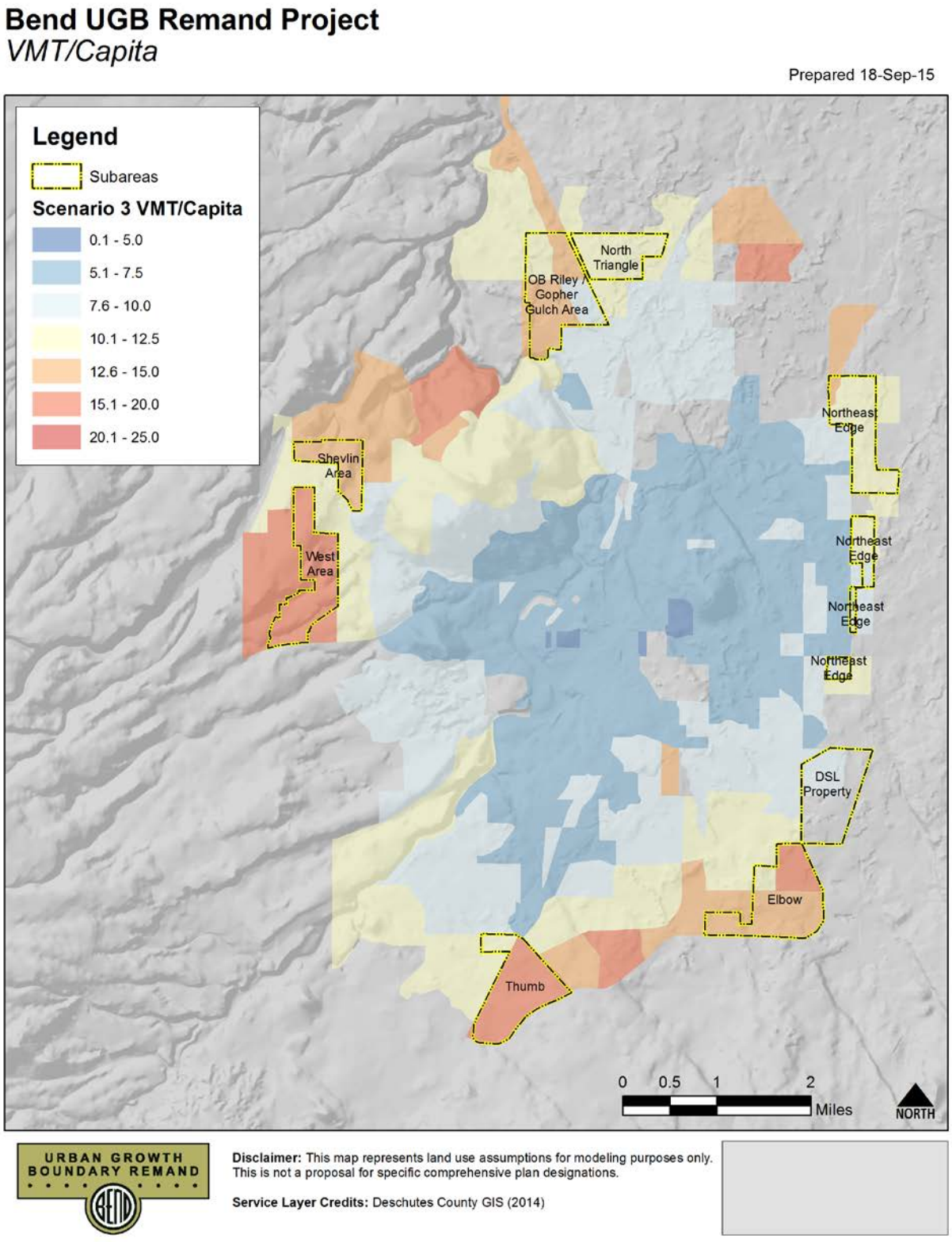


Figure 7: Household VMT/Capita, SAAM-1

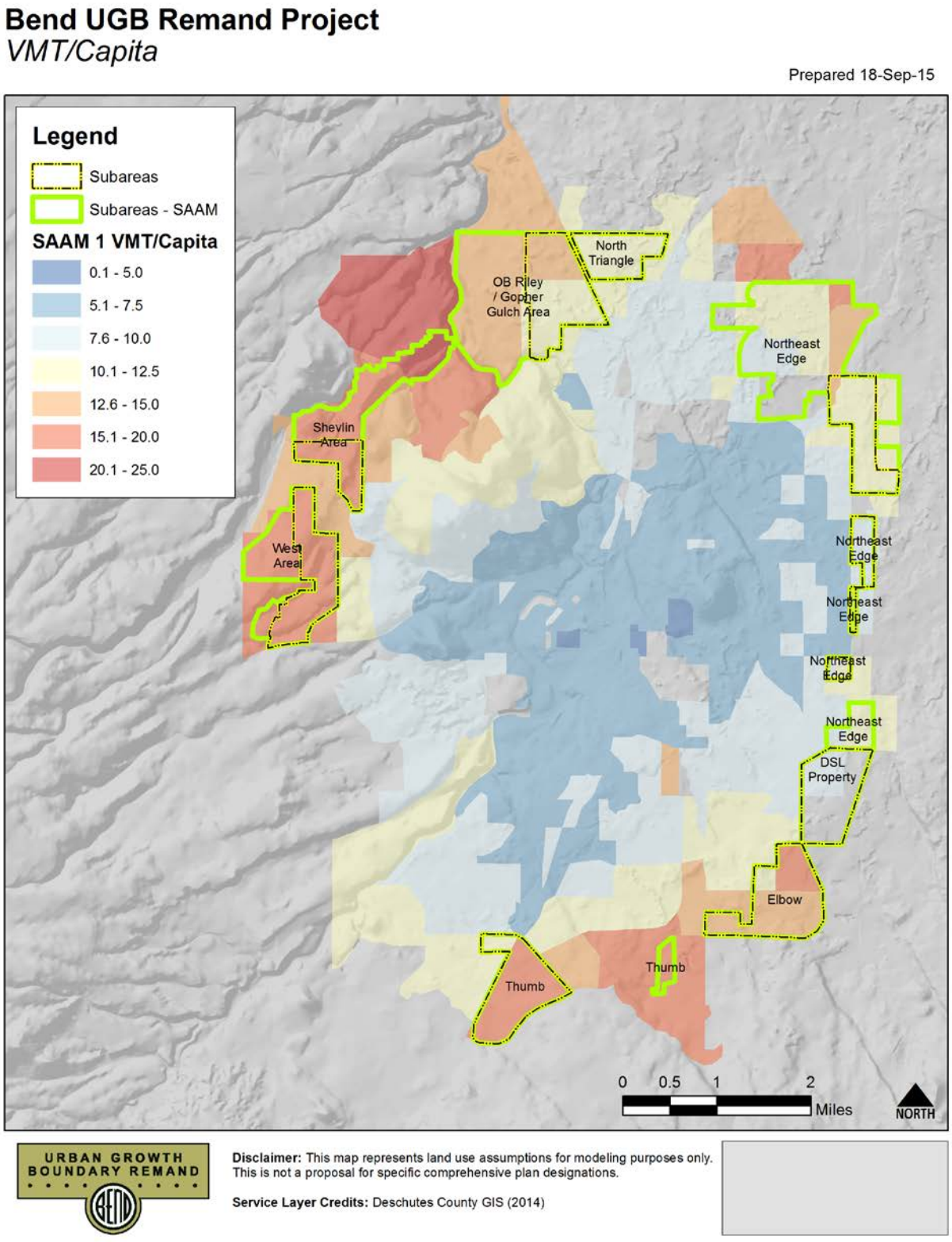


Figure 8: Household VMT/Capita, SAAM-2

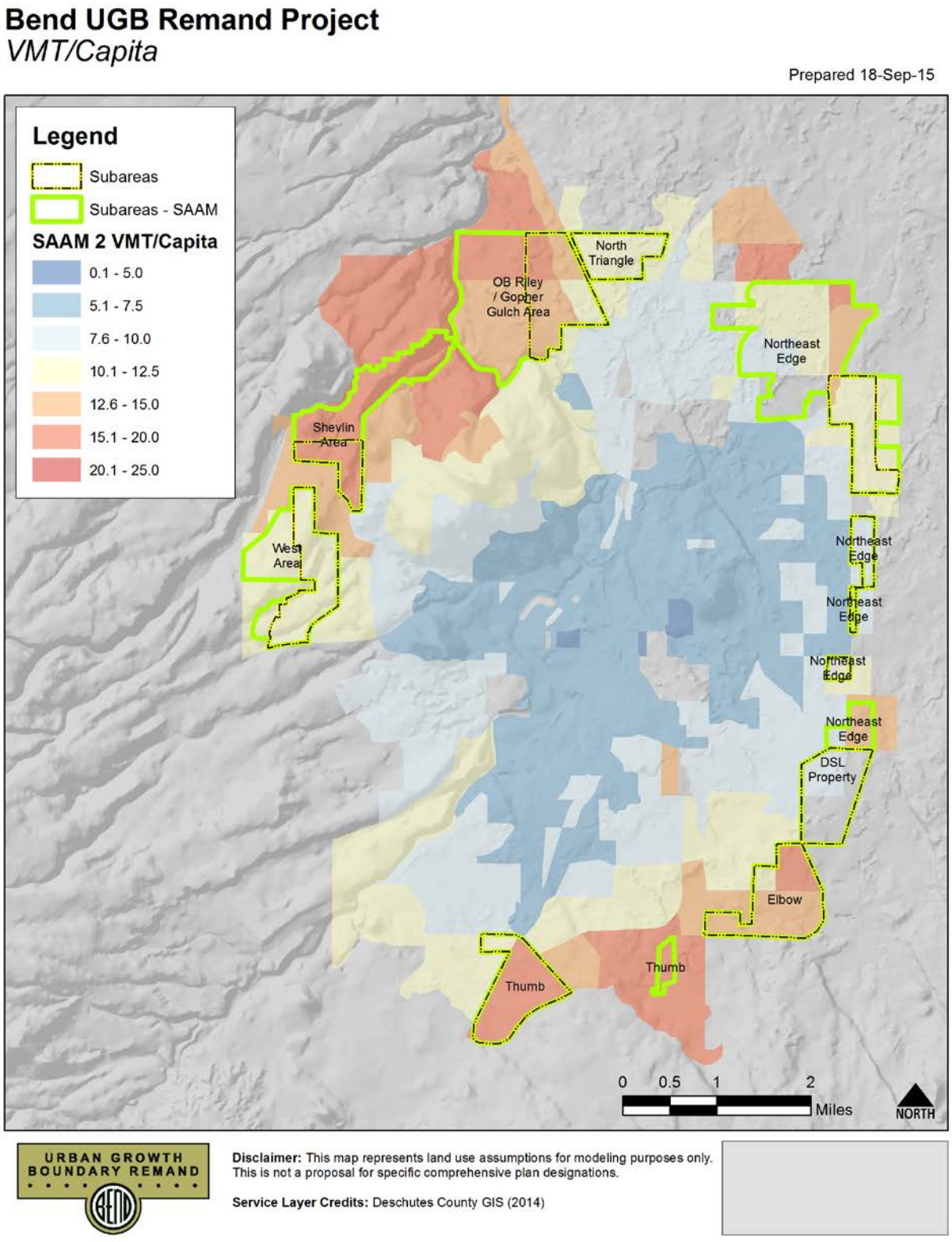


Figure 9: Household VMT/Capita, SAAM-3

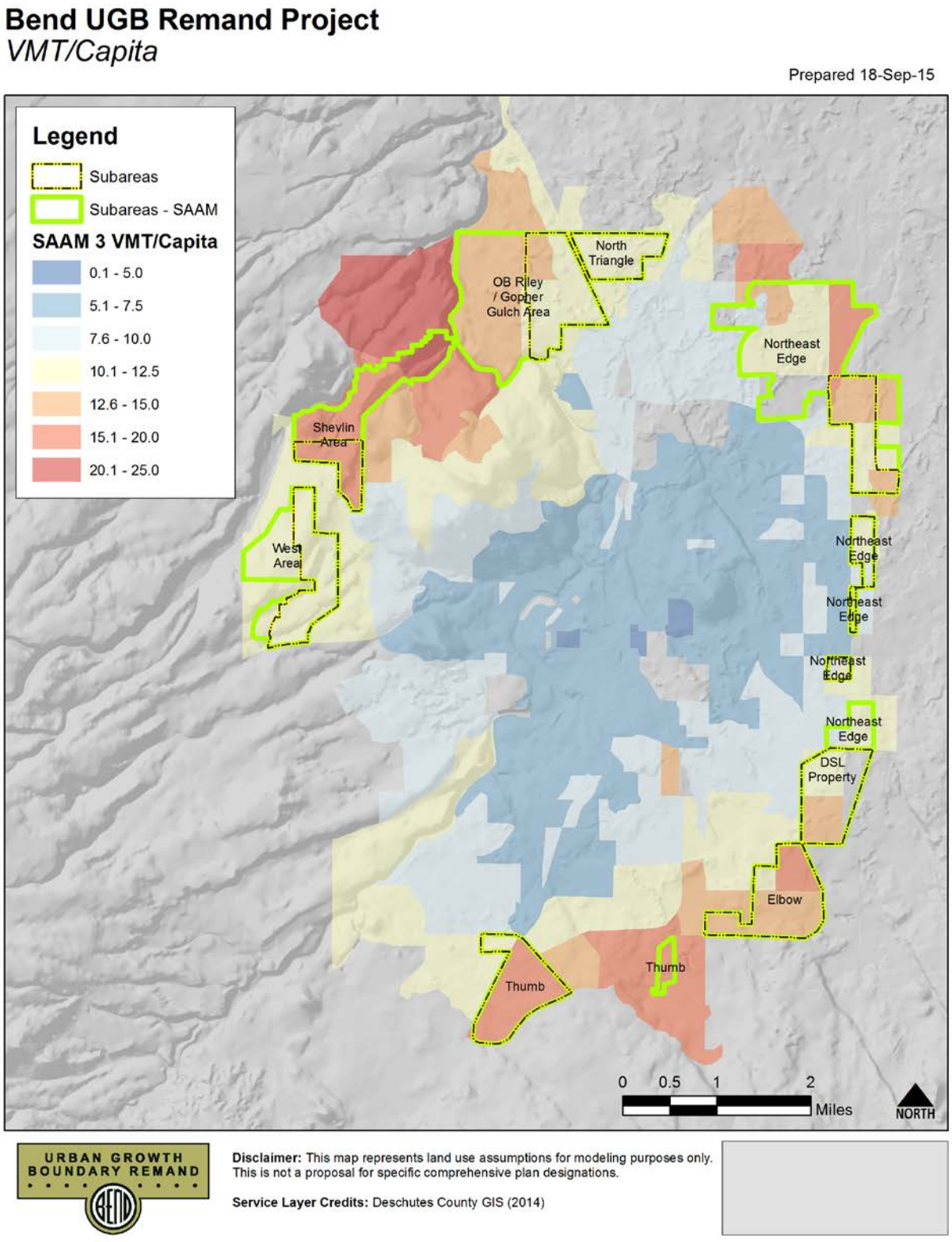
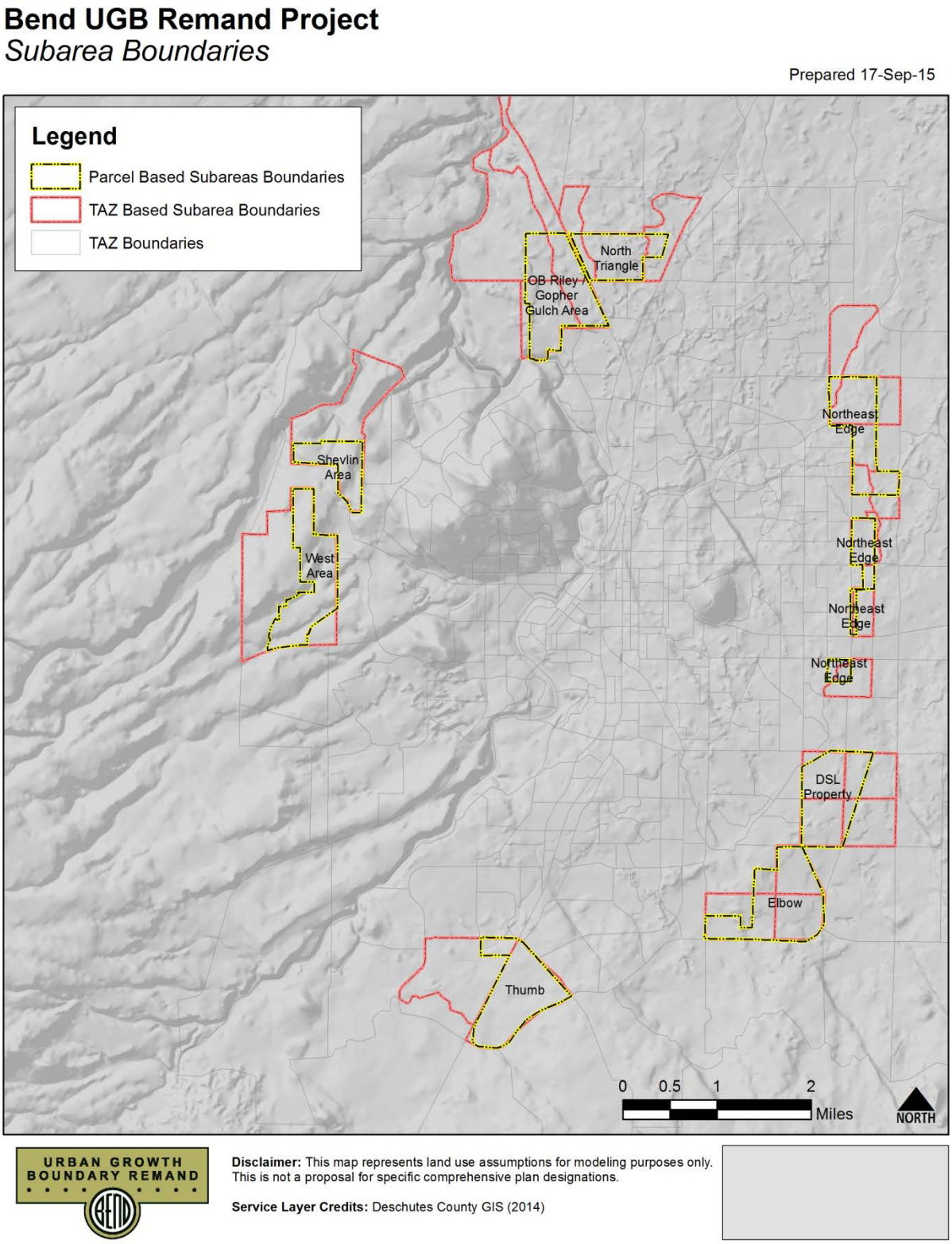


Figure 10: Subarea boundaries vs. TAZ boundaries



VMT is computed based on the following inputs. A "+" indicates that a higher value of this variable increases VMT, and a "-" indicates that a higher value of this variable decrease VMT.

- + average household size
- +average household workers
- + average household income
- - activity density within one mile
- - jobs and population within a quarter mile
- - land use mix within a quarter mile
- - percent of regional employment within a 10 minute drive
- - percent of regional employment within a 30 minute transit trip
- - intersection density within one mile
- - percent 4-way intersections within one mile
- - transit stop density within a quarter mile
- - regional population
- - compactness score

For a more detailed description of these variables, see the above paper by Ewing et al. (2014). All of the variables were computed for the base year and for the forecast year, with the exception of the compactness score.

The above variables computed two outputs: VMT probability and raw VMT. The VMT probability is the chance that a person will drive on a given day, and raw VMT is how many miles they drive in a day. Therefore to get total VMT, the raw VMT is multiplied by the VMT probability. Finally, this total VMT value for the entire TAZ is divided by the TAZ population in order to determine VMT per capita. Note that this is not a traditional four step travel model. A four step model requires many additional inputs, and differs in how it calculates how people choose to travel. However, the VMT results produced by the 7D Travel model were very similar to those produced by a traditional four step model (See evaluation memo by DKS).

Performance Measure 2.A.7: Mode Split

Purpose

Mode split refers to the breakdown of all household based trips by mode of transportation: automobile, walking, cycling, and transit. Household trips are all trips generated by a household, such as an adult driving to work, a child biking to school, or a family walking to the store. It is a way to measure how people choose to travel in their day-to-day habits, which is informed by various socio-economic and built environment characteristics. Often, the percentage of non-automobile trips are summed into one, leading to a mode split dichotomy of auto, and non-auto. Similar to VMT, denser mixed use communities tend to have higher percentages of non-automobile trips, while more suburban areas tend to have higher percentages of automobile trips.

Mode split is important to track, as it shows the breakdown of how people choose to move around their communities. Creating more complete communities can provide residents with destinations to walk and cycle to. Mixing jobs and housing can allow employees to take alternative modes to work. Expanding and enhancing transit service can increase transit mode share. All of these improvements could cut down on automobile mode share, which would have great environmental and social benefits.

Data Sources

TAZ (traffic analysis zone) provided by Deschutes County. Future traffic behavior based on Envision Tomorrow scenarios approved by the USC and SAAMs.

Methodology

Mode split is an output of the 7D Regional Travel Model, an element of Envision Tomorrow. The 7D model is a complex, linear regression travel model, with numerous inputs and outputs. For the purposes of this methodology section, it will only outline at a theoretical level how the 7D model computes mode split. For a more detailed description of the model process within Envision Tomorrow, please visit EnvisionTomorrow.org/CityRegional-Travel-Model. For a more complex description of the model, read Ewing, Tan, Goates, Zhang, Greenwald, Joyce, Kircher, and Greene (2014) Varying influences of the built environment on household travel in 15 diverse regions of the United States, *Urban Studies* 1-19.

Similar to VMT/capita, mode split is calculated at the TAZ level. See above for a description of this differentiation. A "+" indicates that a higher value of this variable increases individual mode share (more trips for the specific mode), and a "-" indicates that a higher value of this variable decrease mode share (less trips for the specific mode.)

Automobile trips:

- + average household size
- + average household workers
- + average household income
- - activity density within half a mile
- + jobs and population within one mile
- - land use mix within a quarter mile
- + percent of regional employment within a 20 minute drive
- + transit stop density within a half mile

Walking trips:

- + average household size
- - average household workers
- - average household income
- + activity density within a half mile
- + activity density within one mile
- + land use mix within a quarter mile
- + land use mix within half mile
- + percent of regional employment within a 30 minute transit trip
- + percent four way intersections within a quarter mile
- + percent four way intersections within one mile
- + transit stop density within a half mile
- + compactness score

Biking trips:

- + average household size
- + average household workers
- + jobs and population within a half mile
- + intersection density within one mile
- + percent four way intersections within one mile
- + transit stop density within one mile
- - regional population
- + compactness score

Transit trips:

- + average household size
- + average household workers
- - average household income
- + jobs and population within one mile
- + land use mix within a quarter mile
- + land use mix within a half mile
- + percent of regional employment within a 30 minute transit trip
- + percent four way intersections within one mile
- + transit stop density within a quarter mile
- + regional population
- + compactness score

For a more detailed description of these variables, see the above paper by Ewing et al. (2014). All of the variables were computed for the base year and for the forecast year, with the exception of the compactness score, for which the same value was used, as it was not possible to re-compute compactness with the available resources.

The above variables computed two outputs: trip probability and raw trip counts. The trip probability is how likely it is for a household to use that method of transportation in a given day, and the raw trip count is how many trips are made by that mode of transportation each day. Therefore to obtain total trip counts, the probability of each trip is multiplied by the raw counts. The only exception to this is auto trips. There is no probability function for auto trips, so the raw counts are the total counts. Finally, once the total counts for all modes are known, they are summed, and the total number of trips per type is expressed as a percentage of total trips.

Performance Measure 2.A.8: Average Weekly Walk Trips

Purpose

Walkable communities are an integral part of a balanced transportation system. By making planning and design designs that foster walkable neighborhoods, unnecessary driving trips to local destinations can be minimized. Tracking how many walk trips are generated a day is a good measure of this, as it tracks not only how people make major trips like getting to work, but also captures smaller trips, such as walking to a local store, or park.

Data Sources

TAZ (traffic analysis zone) provided by Deschutes County. Future traffic behavior based on Envision Tomorrow scenarios approved by the USC and SAAMs.

Methodology

Average Daily Walk trips is an output of the 7D Regional Travel Model, an element of Envision Tomorrow. The average number of walk trips is actually the same output as the walk trip mode share (2.A.3), simply expressed differently. Instead of expressing the number of walk trips as a percentage of all trips, it is simply expressed as a total number of trips. For a deeper description of how the number of walk trips is calculated, see Methodology for 2.A.3.Performance Measure 2.A.10: New Lineal Miles of Roadway

Performance Measure 2.A.10: Housing and Jobs within Walking Distance to Future Transit Corridors

Purpose

Measuring the amount of housing and employment within walking distance to transit corridors indicates the accessibility to transit. Having transit access within walking distance of homes allows residents to take transit to work or other destinations, while having transit access to employment areas allows employees to take transit to work.

Data Sources

GIS data for transit corridors provided by Bend Metropolitan Planning Organization (MPO), scenarios approved by the USC and SAAMs.

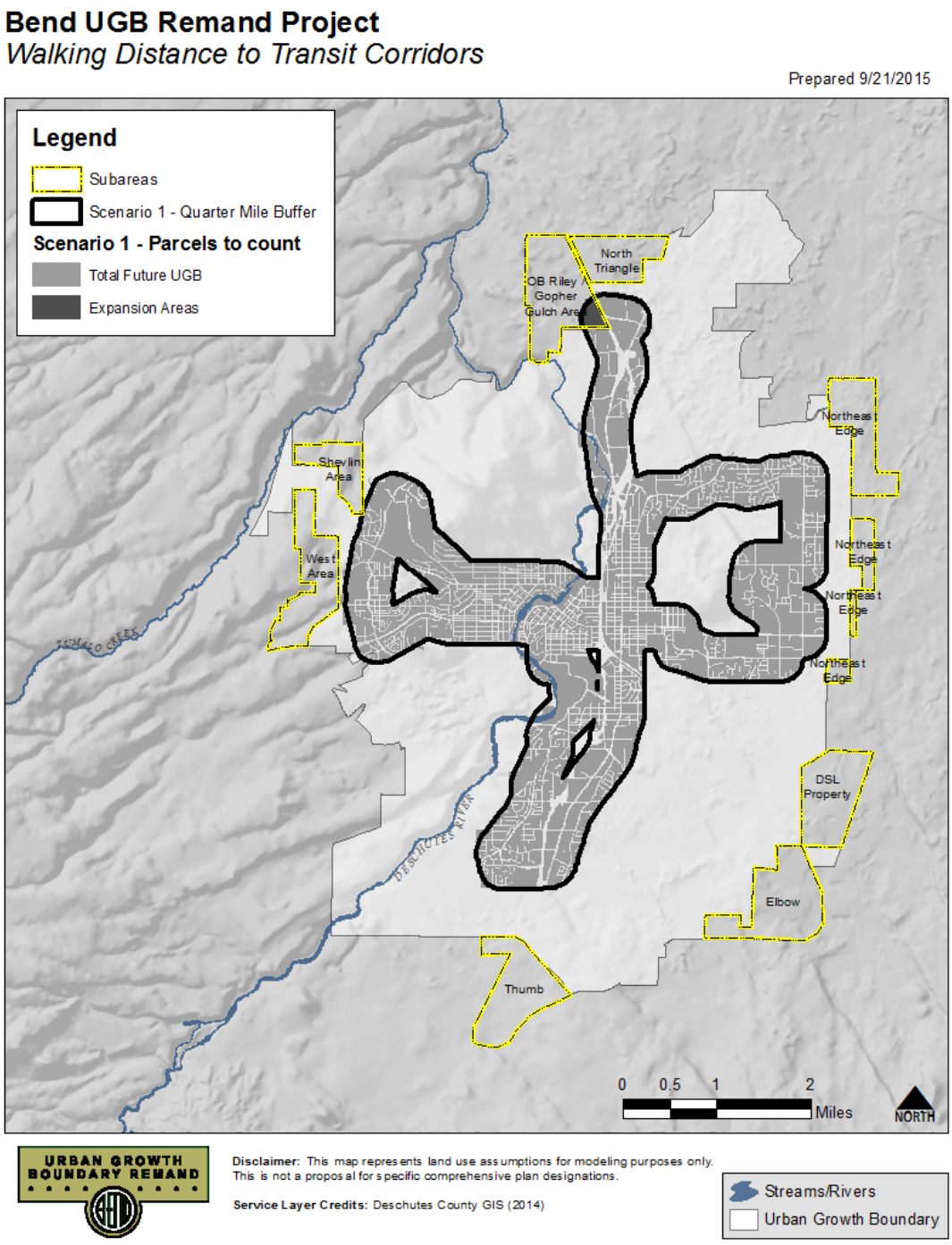
Methodology

The methodology for this indicator was to count the number of housing units and jobs within a 0.25 mile buffer from existing and future transit corridors. The quarter mile buffer is less than the half mile buffer used for other proximity measures, as the distance that most people would walk to a transit stop is less.

Since the transit corridor buffer was provided, there were no additional buffers created. Additionally, the future corridor buffer was consistent across all scenarios.

Future total (existing plus new) housing units and jobs for each scenario were calculated within the buffer. A housing unit or place of employment was considered within the buffer if the centroid of its parcel was within the buffer. This was done to eliminate small slivers of a parcels being included in the measure. The total number of housing units and jobs within the buffers were divided by the total numbers of each to find the percentage within walking distance to the transit corridors.

Figure 11: Quarter Mile Transit Buffer



Cost-Effective Infrastructure

Performance Measure 2.B.3: New Linear Miles of Local Roadway

Purpose

While local roads are generally built by the developer, they can represent a substantial cost. In addition, once they are built and dedicated to the city, the city is responsible for maintenance of

those roads. More miles of roadway generally translates into more maintenance costs over the long term for the city.

Data Sources

Scenarios approved by the USC and SAAMs.

Methodology

New lineal miles of roadway is an automated output of the Envision Tomorrow Planning software. Development types within Envision Tomorrow have road characteristics including block size, percent cul-du-sacs, and right of way widths. When these development types are applied to vacant land, Envision Tomorrow calculates the amount of new roadways that would be needed to service these areas.

Performance Measure 2.B.9: Total Impervious Area of New Development

Purpose

Impervious surface area (buildings, parking lots, streets, and other paved/hard surfaces) do not absorb water, instead forcing it to run-off into storm water systems. This can increase the pressure on existing storm water infrastructure. By decreasing the amount of impervious area in new development through green design, this can be mitigated, reducing the burden on existing infrastructure, and minimizing the level of new infrastructure that needs to be constructed.

Data Sources

Scenarios approved by the USC and SAAMs.

Methodology

Amount of impervious surface is an output of the Envision Tomorrow modeling software. It calculates impervious surface area in two parts; at the building level, and then at the street level. The values for these two are added together in order to get total impervious surface area.

At the building level, the amount of impervious area is determined by the building prototype used. These buildings have the percentage of imperious surface, as determined by the building's physical form. Parking lots, and the building footprint itself are considered impervious, although it is possible to alter this through green design. With these percentages known, it is possible to calculate the total amount of impervious area, given the area of the building (or mix of buildings) within the sub area.

At the street level, the amount of impervious area is determined by street design and block layout. More paved area, resulting from either wider streets or simply more streets, results in a greater amount of impervious surface. The amount of park space assigned at the street level can also affect the impervious surface. Note that the street level impervious surface only comes into account when building on vacant land, as it is assumed that redeveloping existing parcels will be served by the existing street system.

Quality Natural Environment

Performance Measure 3.A.4: Greenhouse Gas Emissions

Purpose

Monitoring greenhouse gas emissions allows for the tracking of new development and transportation behaviors' impact on the environment. Different housing types and household size generates differing amounts of GHG, with larger, detached housing emitting more than smaller, more compact housing. Similarly, more auto oriented communities (see 2.A.3), produce more vehicle activity (see 2.A.1), which again, results in more emissions. Increased GHG emissions contribute to anthropogenic climate change, which in turn has massive environmental, social, and physical impacts.

Data Sources

Scenarios approved by the USC and SAAMs, and average emissions rates from the US Energy Information Administration.

Methodology

There are two aspects to the combined household greenhouse gas emissions: household emissions and transportation emissions. Both are outputs of the Envision Tomorrow modeling software.

Household based emissions are based on the building and development types within Envision Tomorrow. Each residential building prototype has certain assumptions about its emission rates, which is based on the assumed number of occupants, its heating and cooling needs, power source, and other energy efficiencies. The amount of emissions for each area as a whole is a blend of the housing types painted within that development type. Note that this measure is only examining household based emissions, as there is a great deal of variability in employment building emissions due to a variety of building forms and energy demands.

Transportation based emissions are an output of the Travel Model, an element of Envision Tomorrow. The emissions value is based on both the amount of driving, and the characteristics of the vehicles and average driving behavior. The amount of driving (VMT) is determined based on a variety of socio-economic and built form characteristics (see 2.A.1). Vehicles characteristics (i.e. vehicle type, fuel efficiency, and fuel type) are based on national averages. Finally, driving behavior, such as average speed impacts total emission. Again, these values are based on national averages.

Performance Measure 3.A.5: Household Energy Use

Purpose

Monitoring household energy usage allows for different residential configurations to be compared in terms of energy efficiency and usage. Different housing types use more energy depending on size, structure type, and household size. Household energy use is important, as it has environmental implications.

Data Sources

Scenarios approved by the USC and SAAMs, US Energy Information Administration.

Methodology

Household energy use is an automated output of Envision Tomorrow. Energy use is based on the building prototypes, which contain information about building size, type, average number of uses, and also assumptions about energy needs based on the above characteristics. Development types are comprised of these prototypes, and the average household energy use for an area is determined by the blend of prototypes that comprise it.

Performance Measure 3.A.6: Household Water Usage

Purpose

Monitoring household energy usage allows for different residential configurations to be compared in terms of water efficiency and usage. Different housing types use more energy depending on size, structure type, household size, and amount of landscaped area. Household water use is important, as it has environmental implications, given the current state of drought, and future climate instability.

Data Sources

Scenarios approved by the USC and SAAMs, Vickers, Amy. Handbook of Water Use and Conservation. (2001).

Methodology

Household water usage is comprised of two elements: internal water use, and landscaping water use, both of which are automated outputs of Envision Tomorrow.

Internal water use is based on the building prototypes, which contain information about building size, type, average number of uses, and also assumptions about water needs, based on the above characteristics. Development types are comprised of these prototypes, and the average household energy use for an area is determined by the blend of prototypes that comprise it. Landscaping water use is simply based on the amount of landscaped area that is modelled for each prototype. Larger landscaped areas require more water in order to maintain.

Housing Options, Affordability, and Equity

Performance Measure 3.B.1: Average Cost of New Single Family Housing

Purpose

Assessing housing cost allows for the evaluation of new expansion areas for affordability and equity. The type and size of new housing units impacts their costs, and different location premiums within Bend affect sales prices. By tracking those together, it is possible to see what the anticipated new cost of housing in different expansion areas will be under different scenarios, which determines who can afford to live in these new areas.

Data Sources

Scenarios approved by the USC and SAAMs. Housing construction costs per square foot based on RSMeans, calibrated to local conditions from local developer interviews conducted by Leland

Consulting. Geographic variations in valuations of new, single family homes came from City of Bend building permit data.

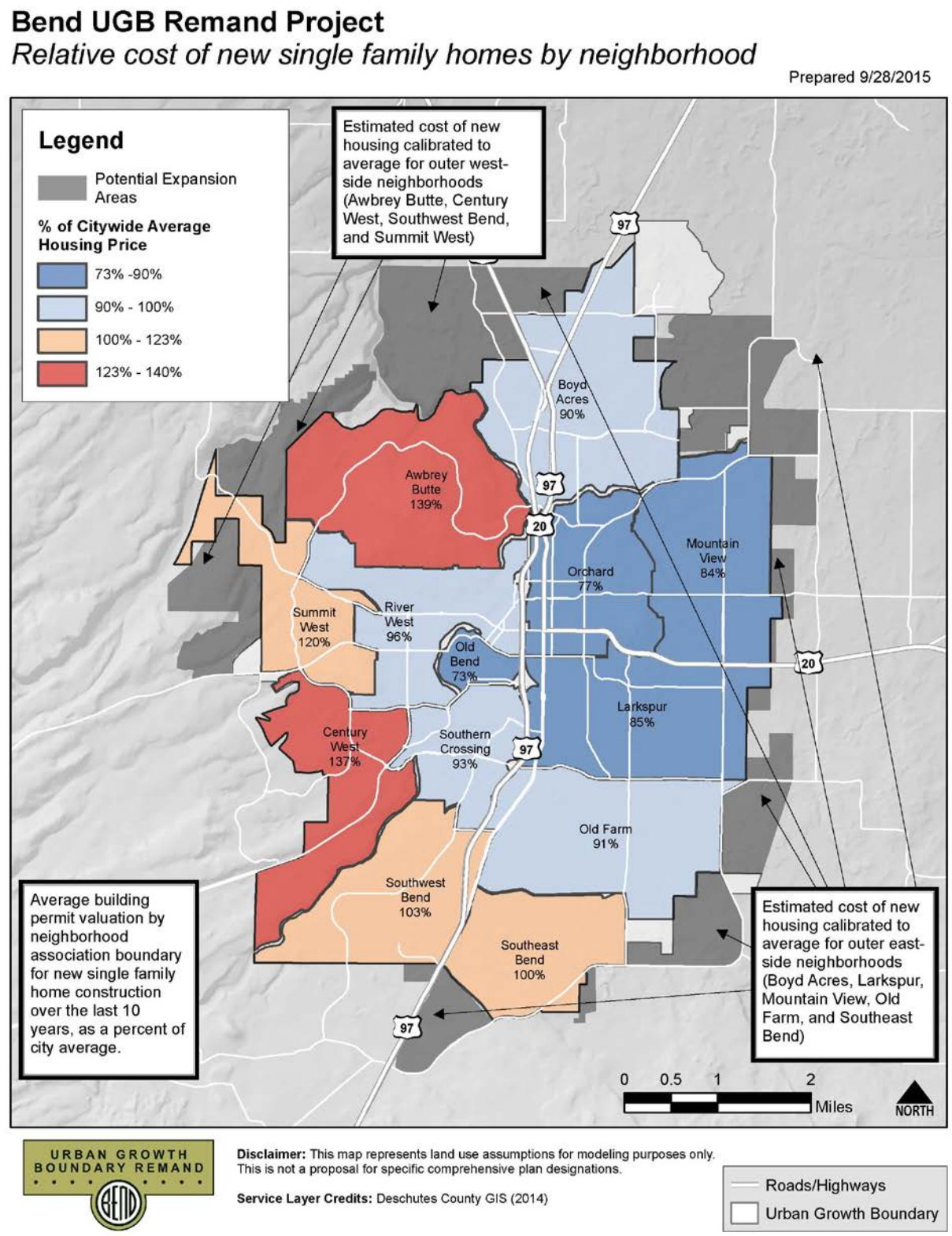
Methodology

New housing cost only considers the cost of detached, single family homes. In order to determine this value, the home cost was first identified based on construction and other development costs, which were then converted to sales prices. Next these values were adjusted based on geographically specific real estate trends within the existing City of Bend.

Modeled housing cost was based on the physical characteristics of the house. These characteristics were modelled within the Envision Tomorrow prototype builder. The main characteristics that affect housing cost are the construction rate, and the overall building size. Larger homes cost more to build, as there is simply more house to build. Also, the quality of the construction (i.e. the $/sqft of home built) affects the overall cost. Additional factors that affect overall cost are system development charges and other permit fees and taxes, and other development costs, as insurance, and holding fees. The raw cost of the house is translated into a sales price, based on a desired return rate.

The second step in determining housing cost was to adjust the raw model output cost based on geographic location within Bend. To do this, City building permit valuation data for new single family housing was summarized by neighborhood association boundary (See Figure 1). Based on the patterns observed in average valuation at the neighborhood level, weighted averages were calculated for broad sections of the city: outer east and outer west. (Note: the observed pattern of higher home values in the western portion of the city than in the eastern portion was also evident in mapping land value of residential property based on Deschutes County Assessor’s data and asking prices of recently-built homes for sale in online listings.)

Figure 12: Relative cost of new single family homes by neighborhood



Since the building permit valuations often do not reflect full market values, the average value was converted to a percentage of the overall city average valuation. Then, based on the location of the sub-area, the unadjusted housing cost was adjusted to match the location premium of different areas within the City. Adjustments were as follows:

Table 1: Single family home value adjustment factors by subarea

Subarea	Price adjustment factor, relative to max (Outer West)	Reference Neighborhoods*
North Triangle	71%	Outer East
NE Edge	71%	Outer East
DSL Property	71%	Outer East
The "Elbow"	71%	Outer East
The "Thumb"	71%	Outer East
West Area	100%	Outer West
Shevlin Area	100%	Outer West
OB Riley / Gopher Gulch Area	100%	Outer West
Existing UGB	79%	City average

* “Outer East” includes Boyd Acres, Larkspur, Mountain View, Old Farm, and Southeast Bend; “Outer West” includes Awbrey Butte, Century West, Southwest Bend, and Summit West.

Performance Measure 3.B.2: Housing Mix of New Housing

Purpose

Tracking housing mix allows for the evaluation of housing demand vs new housing supply. Different populations have preferences for different housing types based on lifestyle preferences, affordability considerations, and household size. By tracking the mix of new housing being built both in the expansion areas and the existing City, this mix can be compared to these preferences to see if the different scenarios meet expected demand. In addition, at the subarea level, housing mix can be evaluated to ensure that a range of housing options is available in all areas of the city and that housing types are not being excessively segregated from one another.

Data Sources

Scenarios approved by the USC and SAAMs.

Methodology

Housing mix is an output of the Envision Tomorrow modeling software. Each housing prototype is assigned as either a single family, townhome, or multifamily, and the development types then contain a mix of these housing prototypes. As a result, it is possible to know the number of housing units of each type painted in an area. In order to determine the mix of units as a percentage, the number of each unit type is divided by the total number of new units.

MSA
Murray, Smith & Associates, Inc.
Engineers/Planners
121 S.W. Salmon, Suite 900 ■ Portland, Oregon 97204-2919 ■ PHONE 503.225.9010 ■ FAX 503.225.9022

DRAFT TECHNICAL MEMORANDUM

DATE: October 1, 2015

PROJECT: Bend UGB Expansion

TO: City of Bend, Oregon

FROM: Murray, Smith & Associates, Inc.

RE: UGB Expansion – Sanitary Sewer Analysis

Background

The City of Bend (City) is studying the potential expansion of their existing Urban Growth Boundary (UGB) to facilitate future growth. As a follow on to collection system planning work that was completed in 2014, Murray, Smith & Associates, Inc. (MSA) was contracted to evaluate the potential sanitary sewer infrastructure impacts associated with long-term and incremental UGB expansion. In this UGB analysis, the initial analysis was performed to identify a long-term infrastructure plan within a two-mile buffer around the City's existing UGB. This allows the City to develop a much longer term view for infrastructure that has 100 year plus expected lifespan of modern pipe materials. This longer term view allows for better infrastructure planning to ensure that whatever is ultimately installed ends up being consistent with the long-term infrastructure needs and avoids the issues the City faces today of a sewer collection system that is piecemealed without a larger long-term vision. After understanding the infrastructure needs for the two mile buffer, the analysis then looked at the various incremental expansions that focused on solutions consistent with the longer term needs. Requirements were determined for two (2) generalized UGB expansion scenario packages. The generalized UGB expansion scenario packages were analyzed to select the least cost improvements consistent with the long-term infrastructure plan and a select set of short-term improvement alternatives. Finally, six (6) distinct UGB expansion scenarios were rated for relative cost that were consistent with the long-term infrastructure analysis. In most cases, portions of the long-term sewer infrastructure solutions were selected to serve the UGB expansion scenarios. This memorandum summarizes the results of the UGB expansion analysis for the sanitary sewer infrastructure.

DRAFT – WORK IN PROGRESS – SUBJECT TO CHANGE

Improvement Analysis

The primary objective of the improvement analysis is to determine the combination of system improvements that satisfy the specified hydraulic performance criteria while minimizing overall life-cycle costs for the potential UGB expansion scenarios. Optimization technology was used to identify the least cost improvement strategies. Additionally, the UGB expansion analysis builds on the optimization analysis performed for the City of Bend Collection System Master Plan (CSMP) completed in 2014.

To enable an exhaustive and objective evaluation of all feasible improvement alternatives, the optimization analysis was undertaken using Optimizer WCS™ and the EPASWMM 5 hydraulic engine. Optimizer WCS is a decision-support software program that integrates improvement alternatives, comprehensive life-cycle costs, design criteria and the calibrated hydraulic model of the collection system. In a single optimization analysis, the software evaluates over 100,000 possible solution configurations and assesses life-cycle cost and hydraulic performance simultaneously while sizing system improvements. EPASWMM 5 is an industry standard dynamic simulation software developed by the United States Environmental Protection Agency for evaluating sanitary and stormwater system capacity.

The UGB expansion analysis focuses on assessing additional improvement alternatives not considered in the CSMP that are required to serve growth outside of the existing UGB and re-evaluating alternatives that were considered in the CSMP that are likely to be affected by expanding the UGB. Many of the detailed alternatives considered in the CSMP were not re-evaluated in the UGB expansion analysis if the outcome of the analysis of those alternatives was considered to not be affected significantly by the UGB expansion. Furthermore, improvements selected in the CSMP optimization that are committed for near-term construction (North Area Improvements, Colorado Diversion and Southeast Interceptor Phase 1) were locked in as committed projects in the UGB expansion analysis.

The optimization analysis for the UGB Expansion was completed in two key stages:

1. Long-term Infrastructure Analysis (Task 3): Comprehensive evaluation of sewer service alternatives that encompasses an area out to a 2 mile buffer from the current UGB. This evaluation encompasses an area that is anticipated to be significantly larger than what will be included in the next UGB expansion. This evaluation allows the City to identify long term infrastructure solutions consistent with the goal of having all new infrastructure provide effective capacity and function for 75 to 100 years and not require upsizing or paralleling in the near term.

2. UGB Expansion Infrastructure Analysis (Task 4): Determine the cost-effective capital improvement strategy to service population growth through the 2028 planning horizon within the existing UGB and through expansion of the existing UGB. The analysis included improvement options from the long-term infrastructure analysis (Task 3) and from a subset of short-term improvement alternatives that were focused on service to the UGB expansion areas. Two generalized UGB expansion growth

DRAFT – WORK IN PROGRESS – SUBJECT TO CHANGE

scenario packages (referred to as Task 4a and Task 4b) were evaluated in the optimization analysis.

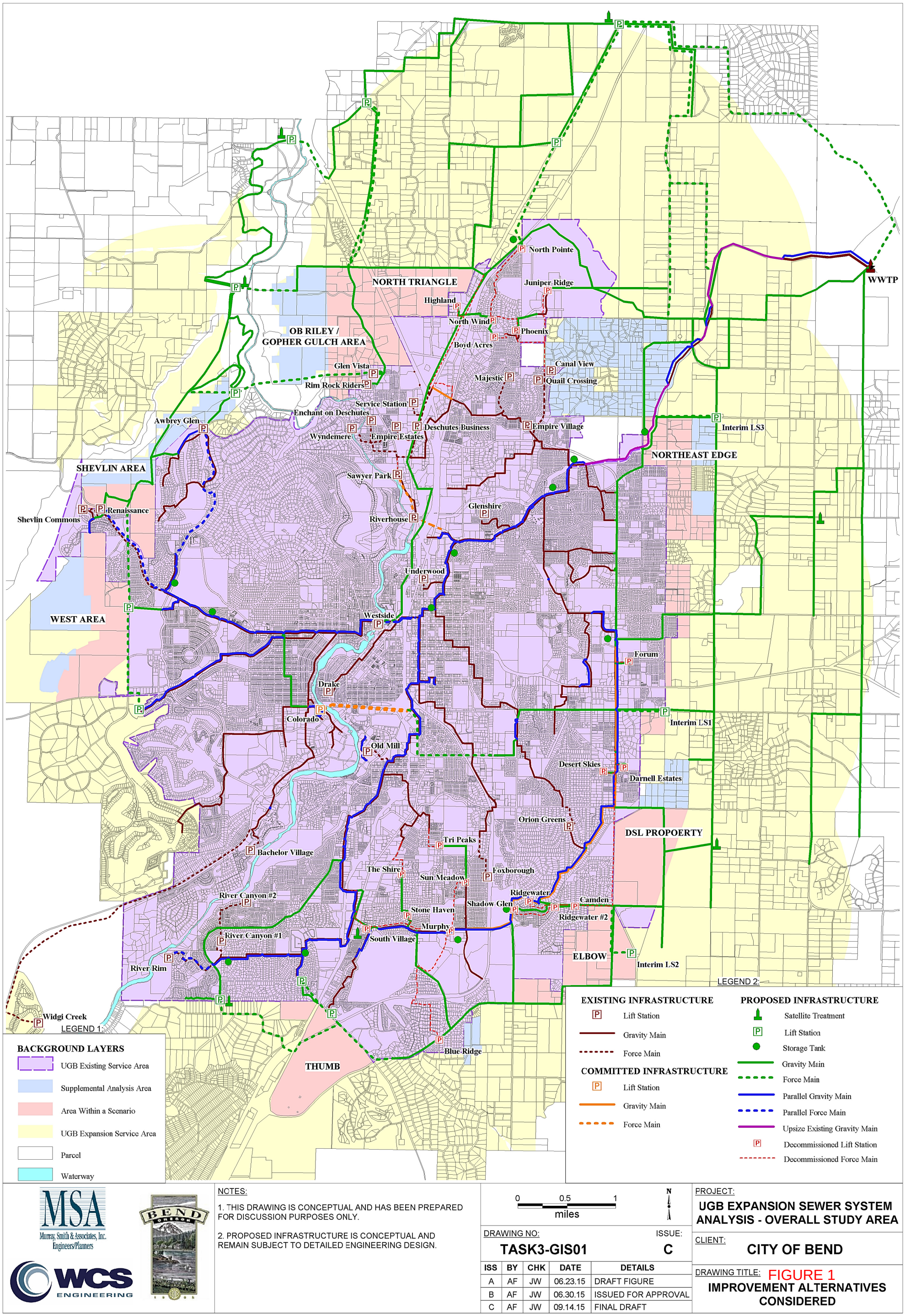
The Initial Capital Cost and Equivalent Uniform Annual Cost (EUAC) methods were used for comparing various alternatives in the optimization analysis. The Initial Capital Cost method estimates capital investment, but excludes operation and maintenance costs. The EUAC calculates the cost per year of constructing, operating and maintaining an asset over its entire lifespan. As noted previously the goal of the optimization is to minimize the overall life cycle costs while identifying a solution that meets the identified hydraulic criteria. The EUAC approach allows for the comparison of different types of assets (eg lift stations, gravity mains, satellite treatment, etc) with varying design lives on an equivalent yearly basis.

Collection System Improvement Alternatives

Improvement alternatives include new alternatives to serve UGB expansion, CSMP improvements, and CSMP alternatives that were not previously selected, but may be appropriate considering the potential expansion area. The full set of system improvement alternatives that were considered in the Long-term Infrastructure Analysis are presented in Figure 1 and include the following categories:

- Gravity and force main improvements along existing alignments
- New gravity and force main alignment alternatives
- New lift stations, existing lift station upgrades, and existing lift station decommissioning alternatives
- Storage tank alternatives (restricted to wet-weather operation)
- Linear transport/storage alternatives (restricted to wet-weather operation)
- Satellite treatment alternatives

Planning level pipeline profiles were developed for new gravity alternatives from available United States Geologic Survey (USGS) contours. The profile development included a high level evaluation of minimum pipe cover (3 feet), extent of service area boundary by gravity, minimum pipe slope, and average pipeline depth (10 to 15 feet). In some critical locations, the gravity pipeline depths exceeded 20 feet.



Murray, Smith & Associates, Inc. Engineers/Planners

WCS ENGINEERING

NOTES:

1. THIS DRAWING IS CONCEPTUAL AND HAS BEEN PREPARED FOR DISCUSSION PURPOSES ONLY.

2. PROPOSED INFRASTRUCTURE IS CONCEPTUAL AND REMAIN SUBJECT TO DETAILED ENGINEERING DESIGN.

0 0.5 1 miles

N

DRAWING NO: TASK3-GIS01

ISSUE: C

ISS	BY	CHK	DATE	DETAILS
A	AF	JW	06.23.15	DRAFT FIGURE
B	AF	JW	06.30.15	ISSUED FOR APPROVAL
C	AF	JW	09.14.15	FINAL DRAFT

PROJECT: UGB EXPANSION SEWER SYSTEM ANALYSIS - OVERALL STUDY AREA

CLIENT: CITY OF BEND

DRAWING TITLE: FIGURE 1 IMPROVEMENT ALTERNATIVES CONSIDERED

DRAFT – WORK IN PROGRESS – SUBJECT TO CHANGE

Design and Performance Criteria

The relevant design and performance criteria applied in the UGB expansion analysis are consistent with the criteria applied in the CSMP. These include; system surcharge, freeboard and overflow constraints, maximum and minimum velocity constraints, lift station firm capacity, and backup power. The criteria are summarized in Table 1 below and specific details are summarized in the CSMP Report Section 4 – "System Analysis."

Table 1| Summary of Design Criteria

Category	CSMP Standard
During peak dry weather flows, depth/Diameter (d/D)	≤ 0.8
During peak wet weather flows, d/D	Existing Pipe: Covered under freeboard requirements New Pipe: < 1.0
During peak wet weather flows, maximum surcharge (freeboard from water surface to manhole rim)	Existing Pipe: Minimum 2.0 feet of freeboard system wide for unsealed gravity pipes. Manholes with < 2.0 feet from crown to rim will be identified and evaluated individually as exceptions or required improvements. New Pipe: No manhole surcharging, piping will be sized to convey peak wet weather flows under full pipe conditions.
Shallow manhole (crown of pipe to rim < 2.5 ft), during peak wet weather flows, maximum surcharge (freeboard from water surface to manhole rim)	Existing Pipe: Covered under peak wet weather requirement New Pipe: No manhole surcharging, piping will be sized to convey peak wet weather flows under full pipe conditions.
Lift station firm capacity	Lift capacity to discharge the peak flow associated with the design wet weather event with largest unit out of service.
Maximum force main velocity	6 ft/s max under peak dry weather flows, 10 ft/s max under peak wet weather conditions with all pumps operating
Maximum gravity pipe velocity	10 ft/s to identify pipelines that may require anchoring and regular inspection
Minimum cleansing/scouring velocity, gravity pipe and force main	2 ft/s flow rate attained during peak dry weather flow to maintain cleansing or identify pipelines in need of flushing.
Minimum cleansing/scouring velocity, siphon	Existing: 3 ft/s (2 barrels required) New: No new siphons permitted

DRAFT – WORK IN PROGRESS – SUBJECT TO CHANGE

Category	CSMP Standard
Backup power (response time)	Onsite backup power or backup diesel pumps should be provided for any large or regional lift stations. On case-by-case basis, other lift stations (excluding private pumps) should comply with ODEQ guidelines for onsite storage, auxiliary power, etc. Standby power required for new lift stations or existing lift stations that go through a "material modification."

General note: ft/s = feet per second. ODEQ – Oregon Department of Environmental Quality.

Table 2 presents the design standards that were followed to determine slope of new pipelines. These criteria are based on:

- *City of Bend Standards and Specifications*, 2011 for pipes less than or equal to 24 inches in diameter.
- *Recommended Standards for Wastewater Facilities (10 States Standards, www.10statesstandards.com)*, 2004 edition, for pipes greater than 24 inches in diameter.

For pipe diameters greater than or equal to 48 inches, slopes should be designed to produce mean velocities, when flowing full, of not less than 3.0 feet per second (ft/s) based on Manning's formula using an "n" value of 0.013.

Table 2| Pipe Design Standards: Grade and Slope

Recommended Minimum Slopes							
Nominal Pipe Size (inch)	**8**[1]	**12**[1]	**18**[1]	**24**[1]	**30**[2]	**36**[2]	**42**[2]
Minimum Slope (ft per 100 ft)	**0.4**	**0.19**	**0.11**	**0.08**	**0.058**	**0.046**	**0.037**

[1] *Minimum Grade (City of Bend Standards and Specifications, 2011).*
[2] *Recommended minimum slopes (Recommended Standards for Wastewater Facilities [10 States Standards, 2004]).*

Unit Cost Rates

Unit cost rates used in the optimization analysis are planning-level estimates and are consistent with the approach used in the CSMP and have been updated to reflect 2015 conditions. The unit cost rates are summarized in the CSMP Report Section 5 – "Project Unit Costs and Cost Analysis" and Appendix 5A – "Supplemental Material for Unit Costs." The Engineering News Record Construction Cost Index (ENR CCI) basis is 9430 (Seattle, April 2013) for the CSMP and 10,386 (Seattle, February 2015) for the UGB expansion study. All CSMP unit costs were multiplied by a factor of 1.10138 for the UGB Expansion study based on the ENR CCI ratio (10,386/9430).

DRAFT – WORK IN PROGRESS – SUBJECT TO CHANGE

The EUAC approach utilized in the optimization includes capital costs, end-of-life replacement costs, applicable operations and maintenance costs, and electrical costs to evaluate improvement alternatives. Unit cost rates include markups for design and administration costs, mobilization, traffic control, erosion control, and contractor's overhead. Additionally, project costs include surface restoration for arterial, local, and dirt roadways; and trenchless or crossing construction costs associated with canal, railroad and highway crossings. Lower surface restoration costs were applied to those alignments outside of the current UGB due to their more rural nature and lack of curb and gutter or sidewalk.

Project unit cost estimates were prepared in accordance with the guidelines of American Association of Cost Engineers (AACE) International, the Association for the Advancement of Cost Engineering. (*AACE International Recommended Practice No. 56R-08 Cost Estimate Classification System - As Applied for the Building and General Construction Industries - TCM Framework: 7.3 - Cost Estimating and Budgeting Rev. December 31, 2011*). AACE International's description of a Class 5 Estimate is quoted as follows:

> *Typical accuracy ranges for Class 5 estimates are -20% to -30% on the low side, and +30% to +50% on the high side, depending on the construction complexity of the project, appropriate reference information and other risks (after inclusion of an appropriate contingency determination). Ranges could exceed those shown if there are unusual risks.*

The project cost estimates have been prepared for the purpose of evaluating project alternatives and budgeting for master plan implementation. Project cost estimates were prepared from information available at the time of the estimate, and are based on a low level of project definition. Project costs developed herein produce "rough cost estimates" consistent with the definition of Oregon Administrative Rules 660-011-0005(2) and 660-011-035. The true cost and resulting feasibility of a planned project will depend on the actual labor and material costs, competitive market conditions, site conditions, final project scope, implementation schedule, continuity of personnel, and other variable factors. Therefore, the actual project costs will vary from the estimates presented here. Because of these factors, project feasibility, benefit-to-cost ratios, risks and funding must be carefully reviewed prior to making specific financial decisions or establishing project-specific budgets.

UGB Expansion Scenarios

For all land use alternatives in the UGB expansion analysis, the existing UGB was assumed to be built-out based on model calibration and wastewater flow projections identified in the CSMP Report Section 3, "Wastewater Flow Projections" and Section 4, "System Analysis." The additional wastewater flow projections for the UGB expansion analysis applied specifically to potential UGB expansion areas and scenarios as outlined below and shown in Figure 2.

- Task 3 (Long-term Infrastructure Analysis) – Two-mile buffer around the existing UGB used to identify long-term improvement strategy. Includes all land within 2

DRAFT – WORK IN PROGRESS – SUBJECT TO CHANGE

miles of the existing UGB, excluding land identified as unbuildable.[1] Additionally, a net acreage factor of 79% was applied to the buildable lands to account for future right-of-way (ROW) requirements.[2]

- Task 4a (generalized UGB Expansion Scenarios) – Composite of UGB expansion scenarios approved by the UGB Steering Committee (USC), including all land included in scenarios. (Scenario Areas)

- Task 4b (generalized Supplemental Analysis Areas) – Composite of all supplemental analysis areas approved by the USC. (Supplemental Analysis Areas)

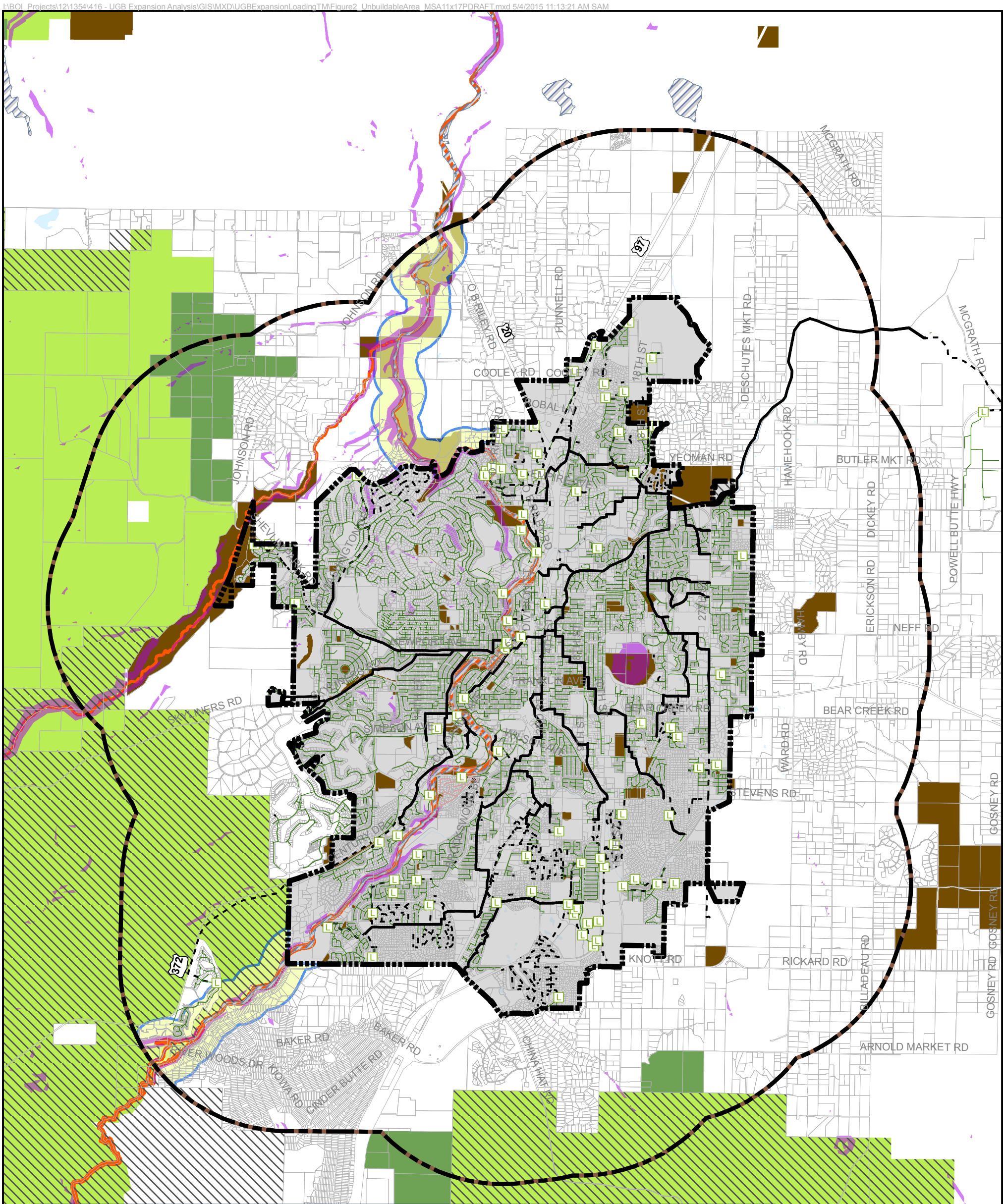
The scenario and supplemental expansion areas were grouped into eight (8) geographic sub-areas as shown in Figure 3. These areas became the basis for comparative ratings of potential expansion areas. A summary of area for the sanitary sewer study is provided in Table 3.

Table 3| UGB Expansion Study Area Buildable Acres

Category[1, 2]	Buildable Area (net acres)[1, 2, 3]
Existing UGB[4]	16,155
Tetherow and Widgi Creek[4]	860
UGB Expansion Scenario Areas	
DSL Property	285
Elbow	337
Thumb	316
West	314
Shevlin	143
OB Riley/Gopher Gulch	387
North Triangle	195
Northeast Edge	368
Supplemental Analysis Areas	
DSL Property	92
Elbow	0
Thumb	34
West	208
Shevlin	200
OB Riley/Gopher Gulch	283
North Triangle	0
Northeast Edge	665
2 Mile Buffer	14,193
Total	40,555

Note 1. Within the study area, the following list of unbuildable land was excluded from the sewer analysis: State and Federal lands; Bend Parks and Recreation District ownership; 100 year FEMA Floodplain; Steep Slopes (greater than 25%); Riparian Areas; Federal and Scenic Rivers; Oregon Scenic Waterways. Note 2. Net acres based on 21% future ROW consistent with City planning criteria. Note 3. Incremental values, except for total.
Note 4. Obtained from the CSMP Buildable Land Inventory database.

I:\BOI_Projects\12\1354\416 - UGB Expansion Analysis\GIS\MXD\UGBExpansionLoadingTM\Figure2_UnbuildableArea_MSA11x17PDRAFT.mxd 5/4/2015 11:13:21 AM SAM



Murray, Smith & Associates, Inc.

DRAFT

City of Bend
Expansion of UGB
Sewer System Analysis

WORK IN PROGRESS - SUBJECT TO CHANGE

Figure 2
Unbuildable Land

N
W
E
S

BEND OREGON

C:\Users\...\GIS\MXD\UMTOOL\UT_9_4_2015\Growth_Areas_Figure_3.mxd 9/23/2015 4:28:09 PM SAM

Legend

- Existing Lift Station
- Gravity Main - Existing Trunk
- Gravity Main - Existing
- Force Main - Existing
- Water
- Scenario Area
- Supplemental Area
- UGB - Existing
- UGB 2-Mile Buffer

OB Riley Gopher Gulch 3
North Triangle 1
North Triangle 2
OB Riley Gopher Gulch 4
OB Riley Gopher Gulch 1
OB Riley Gopher Gulch 2
MH-399
NE Edge 11
NE Edge 12
NE Edge 9
NE Edge 10
NE Edge 8
NE Edge 7
NE Edge 6
NE Edge 5
NE Edge 4
NE Edge 3
NE Edge 2
NE Edge 1
WWTP
Shevlin Area 6
Shevlin Area 5
Shevlin Area 4
Shevlin Area 3
Shevlin Area 2
Shevlin Area 1
UGB
West 2
West 1
DSL Property 1
DSL Property 2
DSL Property 3
Elbow 2
Elbow 1
Thumb 2
Thumb 3
Thumb 1

0 0.5 1 Mile

MSA Murray, Smith & Associates, Inc.

DRAFT
City of Bend
Expansion of UGB
Sewer System Analysis
WORK IN PROGRESS - SUBJECT TO CHANGE

Figure 3
Growth Areas

N W E S

BEND OREGON

DRAFT – WORK IN PROGRESS – SUBJECT TO CHANGE

Flow Development

The sanitary sewer system was analyzed for capacity based on peak dry weather and wet weather flow estimates as defined below:

- Peak dry weather flow: highest flow during dry weather conditions (sanitary flows), corresponding to the day of maximum sewer use (no rainfall is contributing).
- Peak wet weather flow: peak flow during wet weather conditions, corresponding to the rainfall contribution from the design storm (rainfall derived infiltration and inflow, RDII) and dry weather flow conditions of the day of maximum sewer use. Dry and wet flow peaks are aligned to ensure that the peak dry weather flow and the peak RDII contribution occur at the same time.

Dry Weather Loading

As part of the recently completed CSMP, land use and loading rates (average dry weather flow) were attributed to all tax lots within the existing UGB based on available flow monitoring. Future loading within the existing UGB was extrapolated based on unit flow factors as presented in Table 4.

Table 4| Unit Loading Rates for Dry Weather Flow

Land Use Category	Units per Acre	Loading (gpad)[1, 2]
Very Low Density Residential	2	370
Low Density Residential	4	740
Medium Density Residential	6	1,110
High Density Residential	10	1,850
Non-Residential	-	490
Schools	-	347

Note 1. Gallons-per-acre-per-day (gpad)
Note 2. Residential loading based on 185 gallons-per-unit-per-day x number of units.

Dry weather loading was developed for the potential UGB expansion areas using the unit loading rates from the CSMP and assumptions shown in Table 4. Numbers of estimated units were applied to Scenario Areas and Supplemental Analysis Areas where unit projections were available. Based on the statistical analysis and input from City staff, a density of 4 units per acre was applied where unit projections or other land use data was unavailable (i.e. in the remainder of the 2-mile buffer area, outside the Scenario Areas and Supplemental Analysis Areas). The justification for the 4 units per acre assumption is further documented in the technical memorandum entitled, "UGB Expansion – Sewer Loading Assumptions [July 2015]." The total and existing loading estimates are summarized in Table 5.

DRAFT – WORK IN PROGRESS – SUBJECT TO CHANGE

Table 5| Dry Weather Loading

Category	Loading (gpm)[1, 2]
Existing, Tetherow, Widgi Creek	4,430
Future Growth within Existing UGB	3,490
UGB Expansion Scenario Areas[3]	
DSL Property	154
Elbow	186
Thumb	142
West	242
Shevlin	70
OB Riley/Gopher Gulch	216
North Triangle	132
Northeast Edge	259
Supplemental Analysis Areas (minus scenario areas)[3]	
DSL Property	63
Elbow	0
Thumb	31
West	185
Shevlin	131
OB Riley/Gopher Gulch	244
North Triangle	0
Northeast Edge	253
2 Mile Buffer (minus scenario and supplemental analysis areas)[4]	7,294
Total	17,522

Note 1. Gallons-per-minute (gpm)
Note 2. Incremental values, except for total.
Note 3. Based on specific land use, loading factors, and projected units x 185 gallons-per-unit-per-day where projected unit data is available. Based on 4 units/acre x 185 gallons-per-unit-per-day where projected unit data is unavailable.
Note 4. Based on 4 units/acre x 185 gallons-per-unit-per-day.

The selected loading rates do not imply that all residential development outside the existing UGB will be 4 units per acre. The assumption of 4 units per acre was selected because it approximates urban development observed in the existing UGB, but also accounts for the fact that build-out of all exception lands in the study area is unlikely, even in the very long-term future. The selected loading rate attempts to balance observed urban densities with the large study area.

Loading was distributed to manholes within the hydraulic model based on USGS contours, sub-basin delineation and pipeline profile review. The loading location map is presented in Figure 4.

C:\Users\...\GIS\...\UMTOOL\IT_9_4_2015\Growth_Areas_Figure_4.mxd 9/23/2015 4:32:05 PM SAM

Legend

- Existing Lift Station
- Gravity Main - Existing Trunk
- Gravity Main - Existing
- Force Main - Existing
- Water
- Pipe Alternative
- 2 Mile Buffer Areas
- Scenario Area
- Supplemental Area
- Task 3 Loading
- Task 4a Loading (Scenario Area)
- Task 4b Loading (Supplemental Area)
- Alternative Loading
- UGB - Existing
- UGB 2-Mile Buffer

OB Riley Gopher Gulch 3
North Triangle 1
North Triangle 2
OB Riley Gopher Gulch 4
OB Riley Gopher Gulch 1
OB Riley Gopher Gulch 2
MH-399
Shevlin Area 6
Shevlin Area 5
Shevlin Area 4
Shevlin Area 2
Shevlin Area 3
Shevlin Area 1
UGB
West 2
West 1
Thumb 2
Thumb 1
Thumb 3
NE Edge 12
NE Edge 11
NE Edge 9
NE Edge 10
NE Edge 8
NE Edge 7
NE Edge 6
NE Edge 5
NE Edge 4
NE Edge 3
NE Edge 2
NE Edge 1
DSL Property 1
DSL Property 2
DSL Property 3
Elbow 2
Elbow 1
WWTP

0 0.5 1 Mile

MSA
Murray, Smith & Associates, Inc.

DRAFT
City of Bend
Expansion of UGB
Sewer System Analysis
WORK IN PROGRESS - SUBJECT TO CHANGE

Figure 4
Growth Areas
Full 2 Mile UGB Buffer Study Area

N W E S

BEND OREGON

DRAFT – WORK IN PROGRESS – SUBJECT TO CHANGE

Peak Flow Estimates

The flow values presented in Table 5 represent an average dry weather flow condition. Approximately 50 different diurnal patterns with peaking factors were developed for the existing collection system during the CSMP. These patterns are based on flow monitoring data and reflect the differences in development and land use within the UGB. In order to estimate a peak dry weather flow for the UGB expansion area, the 75th percentile peaking factor of 1.8 was applied to the average dry weather loading.

The design storm used to estimate existing peak wet weather flow within the collection system has a total rainfall volume of 1.3 inches and follows a National Resources Conservation Service (NRCS) Type II theoretical distribution (spring/summer thunderstorm). Based on the statistical analyses presented in the CSMP Report Appendix 4A-"Technical Memorandum - Design Storm Considerations for the City of Bend Sewer Collection System", the recommended annual storm depth and distribution historically has a 20% chance of occurring during the winter and a 10% chance of occurring during the summer. Peak wet weather flow estimates for future development potential inside and outside of the existing UGB were based on City development standards. These standards apply a dry average to peak wet peaking factor of three (3) to estimate peak wet weather flow during the design storm event.

Peak flow rate estimates for dry and wet weather conditions are presented in Table 6.

Table 6| Peak Flow Estimates

Category	Peak Dry Weather Flow (mgd)[1, 2, 3]	Peak Dry + Wet Weather Flow (mgd)[4]
Existing	11.5	19.1
Build-out Development, Existing UGB	9.0	15.1
Subtotal Existing UGB	20.5	34.2
UGB Expansion Scenario Areas	3.5	5.9
Supplemental Analysis Areas	2.4	4.1
Subtotal Existing UGB + Priority and Supplemental UGB Expansion	26.4	44.2
2 Mile Buffer	18.9	31.5
Total Existing UGB + Priority and Supplemental UGB Expansion + 2 Mile Buffer	45.3	75.7

Note 1. Incremental values, except for total.
Note 2. Million-gallons-per-day (mgd)
Note 3. Peak dry weather flow = average dry weather loading x peaking factor of 1.8.
Note 4. Peak dry + wet weather flow = average dry weather loading x peaking factor of 3.

DRAFT – WORK IN PROGRESS – SUBJECT TO CHANGE

Optimization Results

Optimization results showing the identified improvements are summarized in Figures 5 thru 8 and Tables 7 thru 8 for the CSMP (build-out of existing UGB), Task 3 (build-out of existing UGB + full 2 mile study area), Task 4a (build-out of existing UGB + Scenario Areas), and Task 4b (build-out of existing UGB + Scenario Areas + Supplemental Analysis Areas). The results are followed by a discussion of key improvement differences between tasks and more detailed review of the infrastructure associated with Tasks 4a and 4b for UGB expansion. Table 7 includes a summary of Initial Capital Costs and Table 8 includes a summary of EUAC.

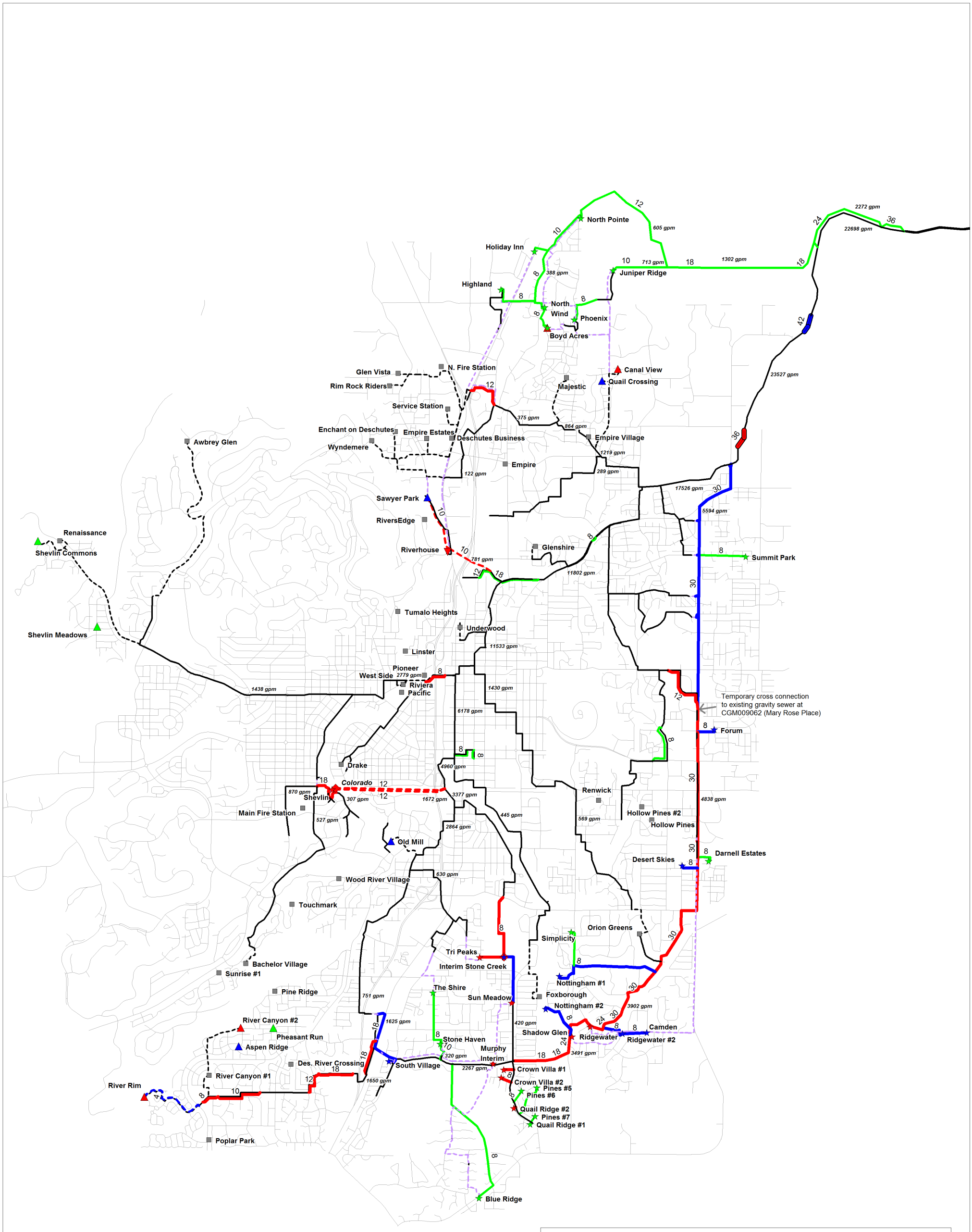
Table 7| Initial Capital Costs, Optimization Solution

Cost Item	Task[1]			
	CSMP	Task 3	Task 4a	Task 4b
Gravity Sewer	77.40	257.42	122.64	138.12
Force Main	7.10	31.81	6.33	12.04
Linear Storage	0.00	0.00	0.00	0.00
Storage Tank	0.00	1.10	0.00	0.00
Lift Station	4.48	41.96	6.68	9.73
Plant Interceptor Upsize	1.13	0.00	0.00	0.00
Exist Lift Station	7.58	8.25	10.85	8.25
TOTAL ($M)[2]	**97.70**	**340.55**	**146.49**	**168.15**

Table 8| EUAC, Optimization Solution

Cost Item	Task[1]			
	CSMP	Task 3	Task 4a	Task 4b
Gravity Sewer	2.11	8.11	3.85	4.31
Force Main	0.28	1.30	0.23	0.47
Linear Storage	0.00	0.00	0.00	0.00
Storage Tank	0.00	0.07	0.00	0.00
Lift Station	0.41	6.14	0.64	0.98
Plant Interceptor Upsize	0.05	0.00	0.00	0.00
Exist Lift Station	0.27	0.29	0.39	0.29
TOTAL ($M/year)[2]	**3.12**	**15.91**	**5.11**	**6.05**

Note 1. CSMP = build-out of existing UGB; Task 3 = build-out of existing UGB + full 2-mile study area; Task 4a = build-out of existing UGB + Scenario Areas; Task 4b = build-out of existing UGB + Scenario Areas + Supplemental Analysis Areas.
Note 2. Initial Capital Cost estimates in millions of dollars. EUAC estimates in millions of dollars per year. Cost estimates based on 2015, AACE Class 5 unit costs and exclude present value credits. Treatment plant costs excluded.



Legend

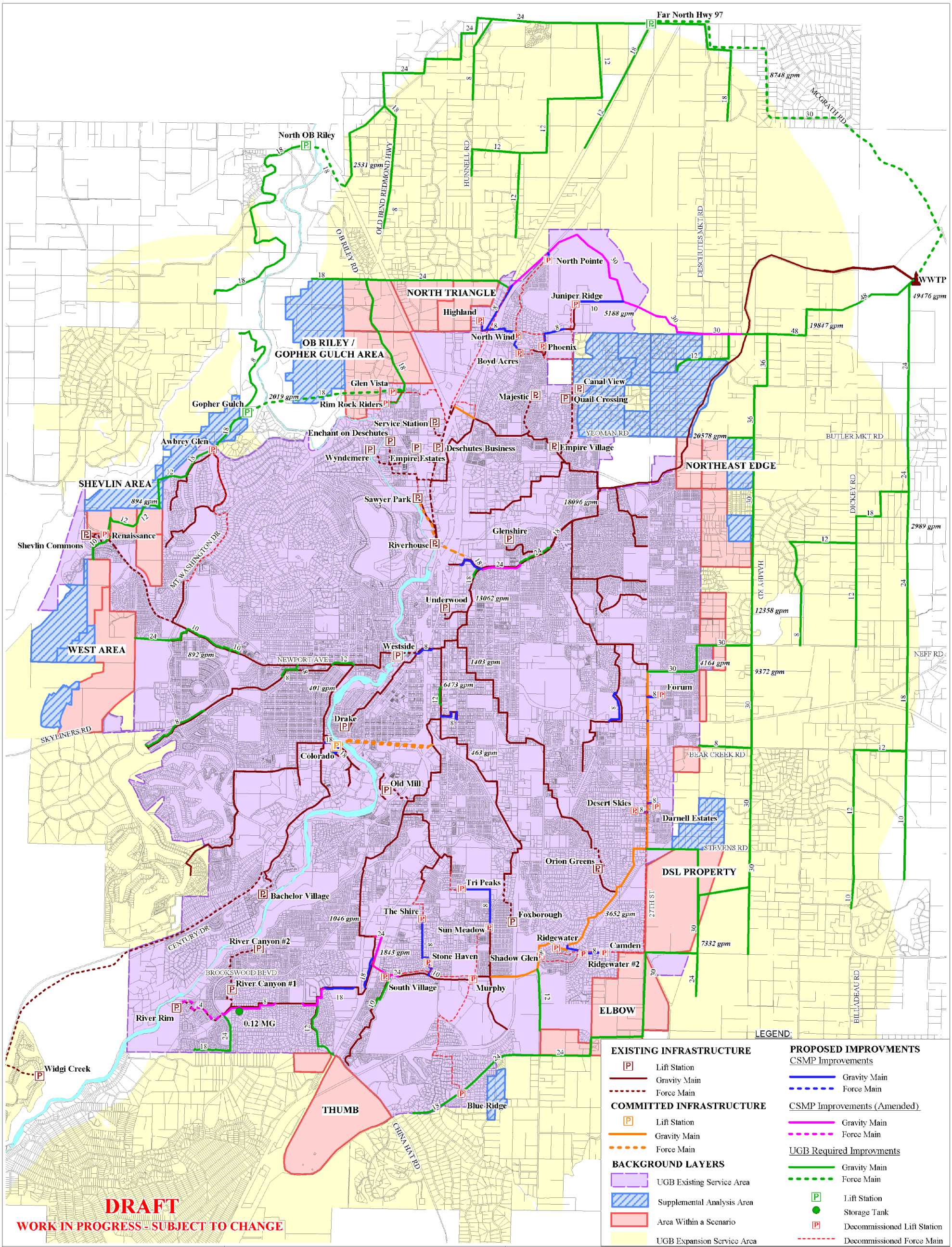
- New Force Main - 5 to 10 years
- New Force Main - 0 to 5 years
- Existing Force Main
- Decommissioned
- New Gravity Sewer - 10 to 20 years
- New Gravity Sewer - 5 to 10 years
- New Gravity Sewer - 0 to 5 years
- Existing Gravity Sewer
- GS Upsize - 0 to 5 years
- GS Upsize - 5 to 10 years
- Upgrade Lift Station - 10 to 20 years
- Upgrade Lift Station - 5 to 10 years
- Upgrade Lift Station - 0 to 5 years
- VSD or Downsize Lift Station - 0 to 5 years
- Decommission Lift Station - 10 to 20 years
- Decommission Lift Station - 5 to 10 years
- Decommission Lift Station - 0 to 5 years
- New Lift Station - 10 to 20 years
- New Lift Station - 5 to 10 years
- New Lift Station - 0 to 5 years

FIGURE 5

Bend CSMP Optimization - 20-Year Mid R Project Phasing

(Flow Rates Represent 20-Y Mid R Peak Wet Weather Flow)

July 30, 2014



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

WCS ENGINEERING

BEND OREGON

NOTES:

1. THIS DRAWING IS CONCEPTUAL AND HAS BEEN PREPARED FOR DISCUSSION PURPOSES ONLY.

2. PROPOSED INFRASTRUCTURE DIAMETERS AND ALIGNMENTS ARE CONCEPTUAL AND REMAIN SUBJECT TO DETAILED ENGINEERING DESIGN.

3. ALL FLOW RATES SHOWN ARE PEAK WET WEATHER FLOW.

0 0.5 1 miles

N

DRAWING NO: TASK3-GIS02B-A3

ISSUE: B

ISS	BY	CHK	DATE	DETAILS
A	AF	JW	08.24.15	DRAFT FIGURE
B	AF	JW	09.04.15	FINAL DRAFT

PROJECT:

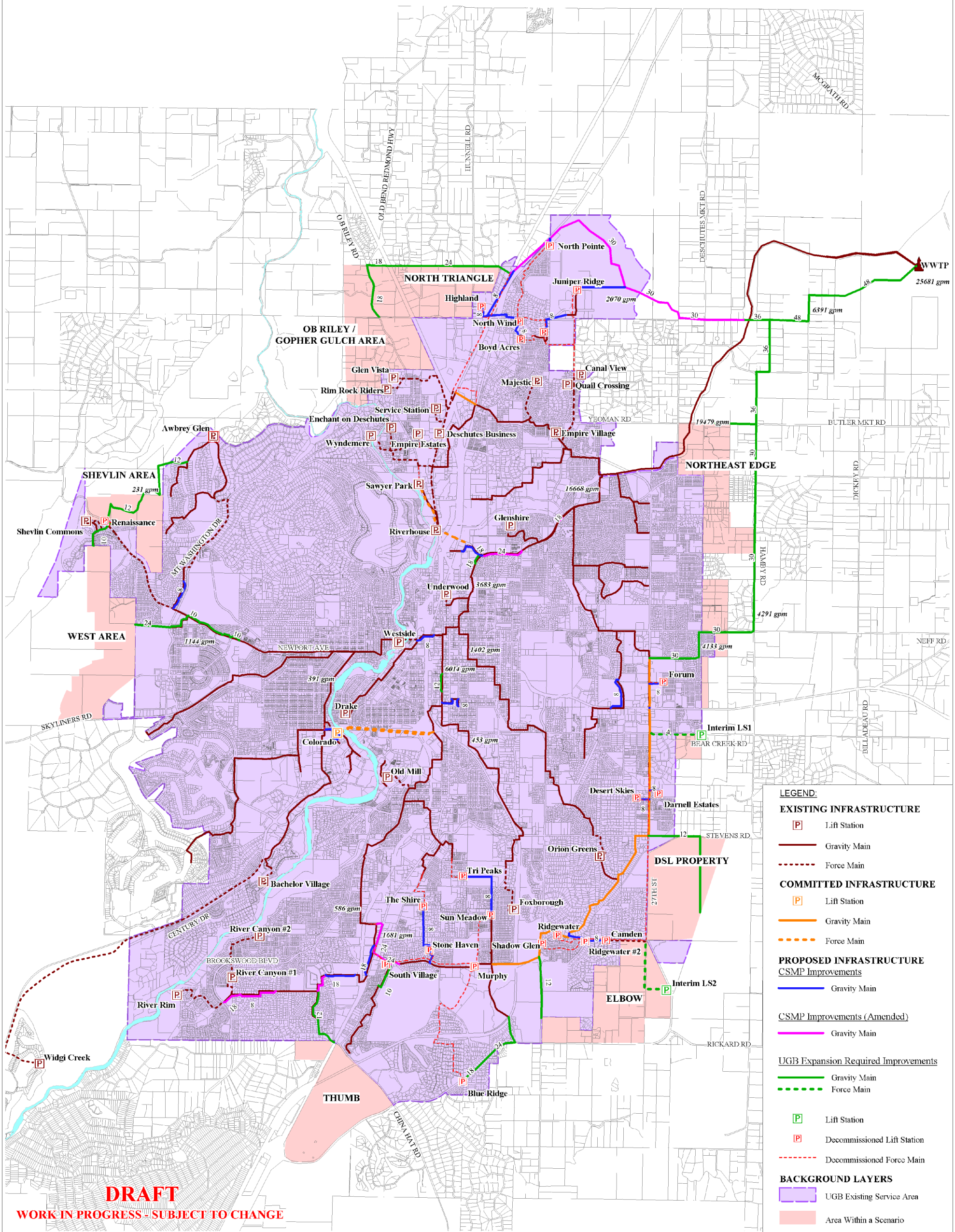
UGB EXPANSION SEWER SYSTEM ANALYSIS - OVERALL STUDY AREA

CLIENT:

CITY OF BEND

DRAWING TITLE: FIGURE 6

TASK 3 OPTIMIZED SOLUTION UGB OVERALL STUDY AREA ANALYSIS



Murray, Smith & Associates, Inc. Engineers/Planners

WCS ENGINEERING

NOTES:

1. THIS DRAWING IS CONCEPTUAL AND HAS BEEN PREPARED FOR DISCUSSION PURPOSES ONLY.
2. PROPOSED INFRASTRUCTURE DIAMETERS AND ALIGNMENTS ARE CONCEPTUAL AND REMAIN SUBJECT TO DETAILED ENGINEERING DESIGN.
3. ALL FLOW RATES SHOWN ARE PEAK WET WEATHER FLOW.

0 0.5 1 miles

N

DRAWING NO: TASK4A-GIS01B-A3 ISSUE: B

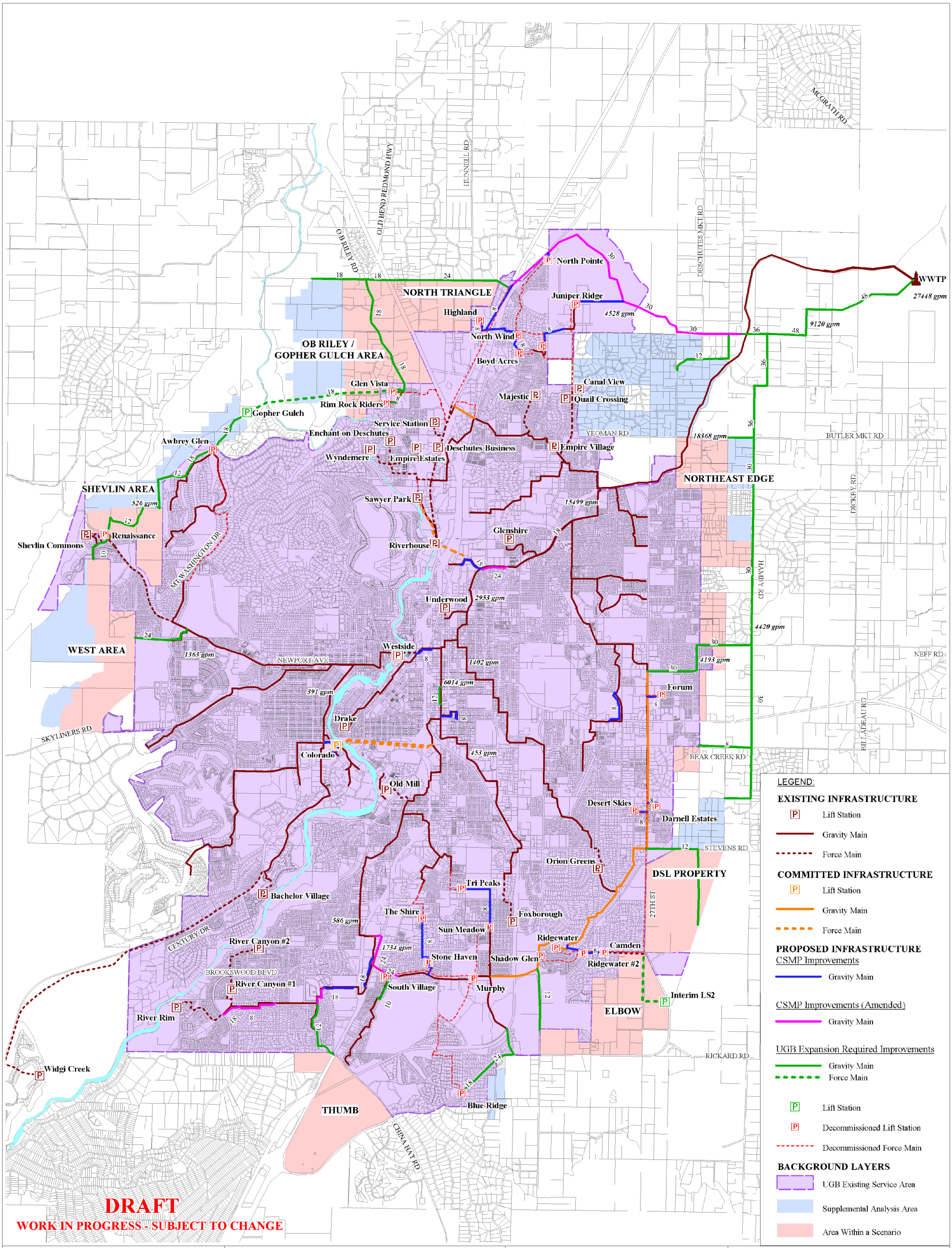
ISS	BY	CHK	DATE	DETAILS
A	AF	JW	08.25.15	DRAFT FIGURE
B	AF	JW	09.24.15	FINAL DRAFT

PROJECT: UGB EXPANSION SEWER SYSTEM ANALYSIS - OVERALL STUDY AREA

CLIENT: CITY OF BEND

DRAWING TITLE: FIGURE 7

TASK 4A OPTIMIZED SOLUTION
UGB COMBINED BASE SCENARIO ANALYSIS



LEGEND:

EXISTING INFRASTRUCTURE
- Lift Station
- Gravity Main
- Force Main

COMMITTED INFRASTRUCTURE
- Lift Station
- Gravity Main
- Force Main

PROPOSED INFRASTRUCTURE

CSMP Improvements
- Gravity Main

CSMP Improvements (Amended)
- Gravity Main

UGB Expansion Required Improvements
- Gravity Main
- Force Main
- Lift Station
- Decommissioned Lift Station
- Decommissioned Force Main

BACKGROUND LAYERS
- UGB Existing Service Area
- Supplemental Analysis Area
- Area Within a Scenario

DRAFT

WORK IN PROGRESS - SUBJECT TO CHANGE

Murray, Smith & Associates, Inc. Engineers/Planners

WCS ENGINEERING

NOTES:

1. THIS DRAWING IS CONCEPTUAL AND HAS BEEN PREPARED FOR DISCUSSION PURPOSES ONLY.
2. PROPOSED INFRASTRUCTURE DIAMETERS AND ALIGNMENTS ARE CONCEPTUAL AND REMAIN SUBJECT TO DETAILED ENGINEERING DESIGN.
3. ALL FLOW RATES SHOWN ARE PEAK WET WEATHER FLOW.

0 0.5 1 miles

N

DRAWING NO: TASK4B-GIS02B-A3

ISSUE: B

ISS	BY	CHK	DATE	DETAILS
A	AF	JW	08.25.15	DRAFT FIGURE
B	AF	JW	09.14.15	FINAL DRAFT

PROJECT: **UGB EXPANSION SEWER SYSTEM ANALYSIS - OVERALL STUDY AREA**

CLIENT: **CITY OF BEND**

DRAWING TITLE: FIGURE 8

TASK 4B OPTIMIZED SOLUTION
UGB SUPPLEMENTAL AREA ANALYSIS

DRAFT – WORK IN PROGRESS – SUBJECT TO CHANGE

Solution Discussion – CSMP Projects Affected by UGB Expansion

Major projects from the CSMP that are impacted by the UGB expansion include the Southeast Interceptor Phase 2 (north of Neff Road), the Northeast Interceptor, and the Plant Interceptor. The drivers for the changes to each of these projects are discussed below.

Southeast Interceptor

The optimal alignment of the Southeast Interceptor north of Neff Road changes from 27th Street in the CSMP to Hamby Road in the UGB expansion analysis. The primary drivers contributing to this change include the following.

1. The Hamby alignment allows for gravity service to be provided to properties east of 27th street. If the Southeast alignment was to be constructed along 27th Street, a second eastern gravity pipeline along an alignment such as Hamby would be required in the future. Alternately if the pipeline was constructed along 27th Street, lift stations would be required to serve any growth east of that alignment including the Northeast Edge.
2. The Hamby alignment parallels sections of the existing plant interceptor that would otherwise require significant capacity improvements to serve long-term growth.

West of South Village the proposed size of the Southeast Interceptor is amended to provide sufficient capacity for additional growth in the southern expansion area including a small portion of "The Thumb" (Bany property).

Northeast Interceptor and Plant Interceptor

The size of the Northeast Interceptor is amended to provide sufficient capacity for additional growth in the north and west expansion areas including the North Triangle, OB Riley/Gopher Gulch, Shevlin, and West areas.

The alignment of the Northeast Interceptor is also amended to connect directly to the Wastewater Treatment Facility (WWTF). The amended alignment bypasses the existing Plant Interceptor and connects with the Hamby alignment of the Southeast Interceptor. The proposed Northeast Interceptor extension eliminates the need for capacity improvements to the existing Plant Interceptor and siphon structure upstream of the WWTF that would otherwise be required to serve future growth. The Northeast Interceptor extension is also proposed to include a diversion structure where flows from the existing Plant Interceptor can be diverted and conveyed directly to the WWTF providing valuable redundancy for existing poor condition and near capacity interceptor piping.

DRAFT – WORK IN PROGRESS – SUBJECT TO CHANGE

Solution Discussion –Projects Affected by Phasing

The generalized UGB expansion scenarios selected the least cost improvements from the long-term infrastructure plan and a select set of short-term improvement alternatives. The short-term improvements that were selected and that are different from the long-term infrastructure plan are discussed below.

Regional Gopher Gulch Lift Station vs Existing Awbery Glen Lift Station

In Task 3 and Task 4b (Supplemental Areas), the full extents of the Shevlin area, the northern portion of the West area, and the Awbrey Glen lift station service area are pumped to the Northeast Interceptor through a new regional lift station and force main (Gopher Gulch lift station). These areas are identified in Figure 3 as West 2 and Shevlin 1 thru 6. The Gopher Gulch lift station is more cost effective than upsizing the Awbrey Glen lift station, associated force main, and downstream gravity trunk sewer. The Awbrey Glen force main is approximately 1.7 miles long and represents the most significant alternate cost.

In Task 4a (Scenario Areas), the more limited Shevlin area and the northern portion of the West area are served through the Awbrey Glen lift station.. The Awbrey Glen pumps require upsizing for limited UGB expansion; however, the existing force main upsizing is not required. Pumps are assumed to be replaced on a 20-year schedule to account for mechanical lifespan and therefore the cost of pump replacement and incremental upsizing is relatively cost effective. The peak flow excess capacity (beyond build-out of the existing UGB) of the Awbrey Glen pumps and the downstream force main for UGB expansion are approximately 60 gpm (15 gpm average flow) and 300 gpm (75 gpm average flow) respectively. This equates to approximately 120 additional equivalent dwelling units (EDUs) for the pumps and 580 additional EDUs for the force main. Peak and average flow estimates at the Awbrey Glen lift station should be confirmed with flow metering and pump testing prior to serving future UGB customers.

When compared to gravity trunk sewer solutions serving other expansion areas, both the Awbrey Glen and Gopher Gulch lift stations present greater operational complexity and costs for the City.

Interim Lift Stations

In Task 4a (Scenario Areas) and Task 4b (Supplemental Areas), an interim lift station was selected in the optimization to serve a major portion of "The Elbow." The interim lift station delays the extension of major trunk lines along Hamby Road to this area, which was the alternative selected to serve the large 2 mile buffer in Task 3.

In Task 4a, an interim lift station was selected to serve a small portion of the Northeast Edge adjacent to Bear Creek Road. In Task 4b, the Hamby alignment was extended south to serve this same parcel of land by gravity plus additional northern areas of the DSL Property sub-area (near Darnell Estates).

DRAFT – WORK IN PROGRESS – SUBJECT TO CHANGE

Relative Capital Cost Summary by Sub-Area

The relative sewer infrastructure costs for the eight (8) sub-areas were compared for Tasks 4a (Scenario Areas) and 4b (Supplemental Areas) to identify the most cost effective areas for UGB expansion. The comparative cost analysis assumes the following:

1. All sewer improvements associated with 4a and 4b UGB expansion are sized to serve the full 2-mile study area identified in Task 3 (long-term growth). Alternate Task 4 solutions were developed with improvements sized only for the short-term growth; however, in most cases the infrastructure size differential was minimal.

2. The costs associated with the CSMP improvements were assumed to be contributed by the current and future customers within the existing UGB. All other costs were assumed to be contributed by future development in UGB expansion areas. The incremental cost to upsize the Northeast Interceptor, for example, was assumed to be contributed by UGB expansion areas served by the Northeast Interceptor. Additionally, Hamby alignment costs from future development within the existing UGB was limited to the cost of the Southeast Interceptor Phase 2 (27^{th} Street alignment north of Neff Road). All other Hamby alignment costs were assumed to be contributed by UGB expansion areas within the Hamby alignment service area.

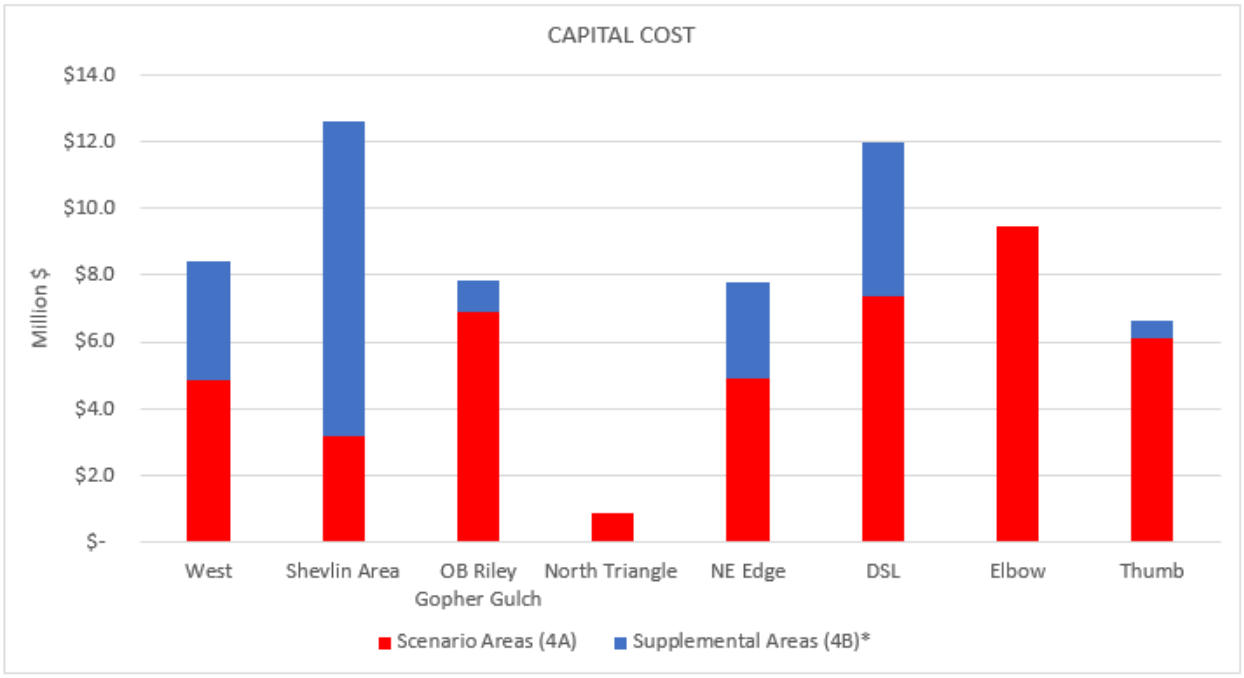
3. Improvements were implemented incrementally in UGB expansion areas, such that all costs associated with build-out size improvements to serve the Scenario areas in Task 4a were funded by Scenario areas associated with Task 4a. Incremental UGB expansion in Task 4b (Supplemental Areas) benefited from pre-existing infrastructure constructed in Task 4a. Likewise, supplemental area expansion in Task 4b funded additional pipeline extensions and lift stations as required to serve incremental UGB expansion areas associated with Task 4b. Areas served in the Task 3 UGB expansion benefited from pre-existing infrastructure from both Tasks 4a and Tasks 4b. UGB expansion for Tasks 4a and 4b was incremental in terms of area served, but both expansions were assumed to occur during the 2028 planning timeframe.

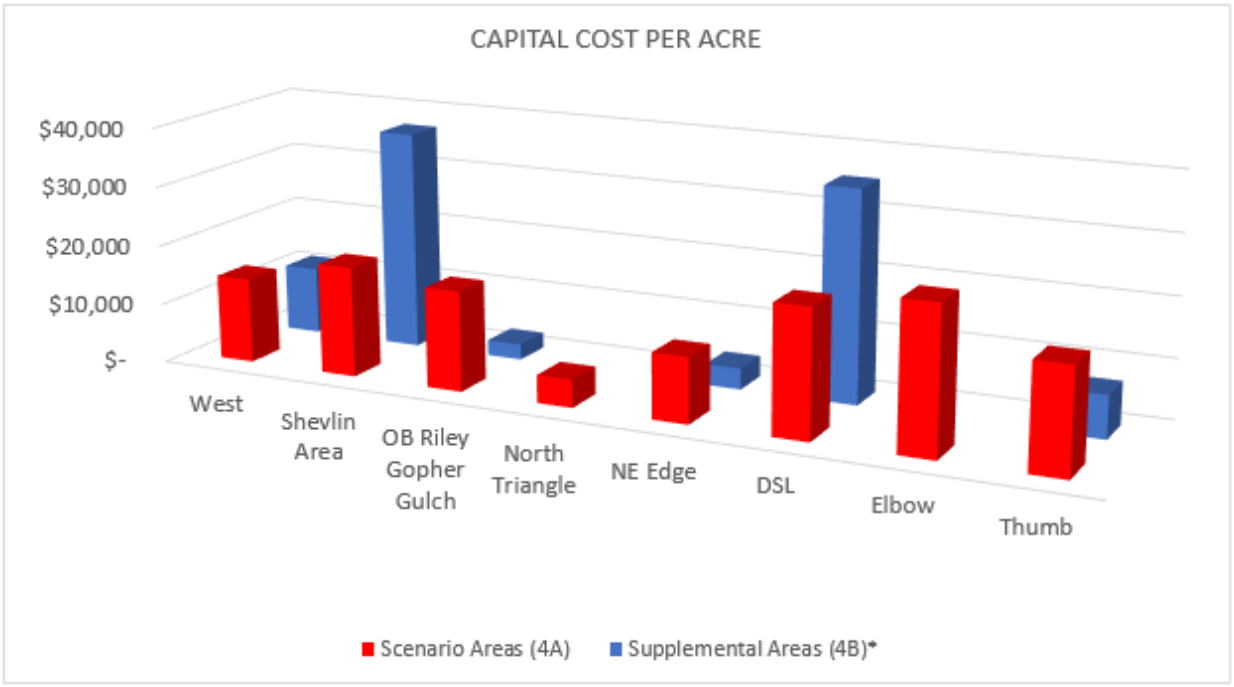
4. All UGB expansion areas associated with the same task were assumed to develop simultaneously such that all areas within the task contributing to an improvement received the same cost share on a per acre basis. For example, where two sub-areas such as North Triangle and OB Riley/Gopher Gulch are within the same task, the two areas are assumed to equally contribute to the Northeast Interceptor upsizing on a per acre basis.

The relative cost comparison for the eight (8) sub-areas is presented for Initial Capital and Initial Capital per acre in Figure 9 for Tasks 4a and 4b. EUAC and EUAC per acre costs establish similar trends.

DRAFT – WORK IN PROGRESS – SUBJECT TO CHANGE

Figure 9| Capital Cost and Capital Cost per Acre for Sub-areas





*Note. Incremental infrastructure cost to serve additional areas in Supplemental Area Analysis.

DRAFT – WORK IN PROGRESS – SUBJECT TO CHANGE

Key findings from the relative cost comparison include:

1. Service to the Shevlin area and the West area is relatively cost effective for Scenario areas associated with Task 4a. The conveyance elements associated with the priority areas are limited to new trunk gravity piping, existing pipeline upsizing, and Awbrey Glen lift station pump upsizing. The supplemental analysis areas associated with Task 4b are significantly less cost effective because of the regional Gopher Gulch lift station, force main, and additional contributions to the Northeast Interceptor.

2. Service to sub-areas adjacent to the Hamby Alignment and the Northeast Interceptor (Northeast Edge, North Triangle) are relatively cost effective for both Scenario Areas and Supplemental Analysis Areas because the proposed infrastructure is required to serve future development within the existing UGB. Sub-areas furthest from the new trunk mains become less cost-effective because of trunk main extensions and additional localized improvements to convey wastewater to the new trunk mains. Specific sub-area notes include:

    a. North Triangle – Highly cost effective because of proximity to the Northeast Interceptor. Benefits from assumed simultaneous development of OB Riley/Gopher Gulch.

    b. OB Riley/Gopher Gulch – Cost effectiveness limited in Task 4a by required extension of the Northeast Interceptor. Highly cost effective for supplemental expansion in Task 4b because of pre-existing infrastructure.

    c. Northeast Edge – Cost effectiveness limited by small localized interim lift station to serve area adjacent to Bear Creek Road for Task 4a. Cost effectiveness impacted by contribution to the Hamby alignment and Northeast Interceptor. Cost effectiveness increases when considering that the associated trunk mains are required independent of development in the Northeast Edge. Cost effectiveness also improves when maximum acreage is developed for Task 4b.

    d. DSL Property – Cost effectiveness limited in Task 4a by localized sewer mains required to connect to the Southeast Interceptor. Cost effectiveness limited in Task 4b by extension of the Hamby alignment to serve the northern portion of the sub-area.

    e. Elbow – Cost effectiveness limited by localized interim lift station and localized gravity piping to convey wastewater to the Southeast Interceptor for both Tasks 4a and 4b.

    f. Thumb – Cost effectiveness limited by contribution to Southeast Interceptor improvements west of Parrell Road and localized pipeline improvements along Parrell Road adjacent to the Southeast Interceptor.

DRAFT – WORK IN PROGRESS – SUBJECT TO CHANGE

Another method for summarizing the findings of the relative cost comparison is to identify the primary improvements serving each sub-area and listing the other areas that also share the applicable infrastructure as shown in Table 9. The table also includes a rating for cost effectiveness with the following guidelines.

- "Good" – Relatively low capital cost and capital cost per acre. Infrastructure contributes to long-term infrastructure required to serve areas within the existing UGB. Sub-area is immediately adjacent to an existing trunk main, Northeast Interceptor, Southeast Interceptor, or Hamby alignment.

- "Fair" – Relatively moderate capital cost and capital cost per acre. Sub-area may require localized infrastructure or interim lift station to convey wastewater to existing trunk main, Northeast Interceptor, Southeast Interceptor, or Hamby alignment.

- "Poor" – Relatively high capital cost and capital cost per acre. Sub-area may require localized infrastructure or interim lift station to convey wastewater to existing trunk main, Northeast Interceptor, Southeast Interceptor, or Hamby alignment. Sub-area also requires regional lift station to convey wastewater to an existing or future trunk main.

Table 9| Summary of Relative Cost Comparison

Sub-area	Task 4a (Scenario Areas)		Task 4b (Scenario + Supplemental Areas)		Other Critical Dependent Areas[1]
	Critical Infrastructure	Cost Effective-ness	Critical Infrastructure	Cost Effective-ness	
North Triangle	NEI, NEI extension to WWTF	Good	NEI, NEI extension to WWTF	Good	OB Riley/Gopher Gulch Area is also served by the NEI
NE Edge	Hamby, NEI extension to WWTF, Interim lift station	Good	Hamby, Hamby extension, NEI extension to WWTF	Good	DSL Property, The "Elbow", The "Thumb" are also served by Hamby
DSL Property	Local pipe extensions, Hamby, NEI extension to WWTF	Fair	Local pipe extensions, Hamby, Hamby extension, NEI extension to WWTF	Fair-Poor	NE Edge, The "Elbow", The "Thumb" are also served by Hamby
The "Elbow"	Interim lift station, local pipe extensions	Fair-Poor	Interim lift station, local pipe extensions	Fair-Poor	NE Edge, DSL Property, The "Thumb" are also served by Hamby
The "Thumb"	Local pipe extensions, Hamby, NEI extension to WWTF	Fair	Local pipe extensions, Hamby, NEI extension to WWTF	Fair	NE Edge, DSL Property, The "Elbow" are also served by Hamby

DRAFT – WORK IN PROGRESS – SUBJECT TO CHANGE

Sub-area	Task 4a (Scenario Areas)		Task 4b (Scenario + Supplemental Areas)		Other Critical Dependent Areas[1]
	Critical Infrastructure	Cost Effective-ness	Critical Infrastructure	Cost Effective-ness	
West Area	Local pipe extensions, incremental existing pipe upsizing or parallel piping	Good-Fair	Local pipe extensions, Gopher Gulch lift station, NEI, NEI extension to WWTF	Poor	Shevlin Area is also served by Gopher Gulch lift station and some common piping extensions
Shevlin Area	Local pipe extensions, incremental existing pipe upsizing or parallel piping	Good-Fair	Local pipe extensions, Gopher Gulch lift station, NEI, NEI extension to WWTF	Poor	West Area is also served by Gopher Gulch lift station and some common piping extensions
OB Riley / Gopher Gulch Area	NEI extension west and south, NEI, NEI extension to WWTF	Fair	NEI extension west and south, NEI, NEI extension to WWTF	Good	North Triangle is also served by the NEI

Note 1. All sub-areas are served by the Northeast Interceptor (NEI) extension to the WWTF for Task 4b. All areas except for the West and Shevlin areas are served by the NEI extension to the WWTF for Task 4a.

Unique Scenario Analysis

The City and TAC refined the scenario and supplemental analysis areas into six (6) distinct scenarios. The portion of the scenario evaluation process associated with analyzing individual scenarios was conducted on a compressed schedule. The time required to develop an infrastructure optimization analysis for each distinct scenario was not available within the project schedule. Additionally, the land use assumptions associated with the six (6) scenarios were in a state of flux during the critical time to complete the optimization analysis. Finally and most importantly, the approach to identify the optimum long term sewer solutions initially requires evaluating the entire potential future service area (Task 3) and then subsequently refining that solution to serve the individual expansion areas. As such, the City elected to move forward with the generalized analysis previously described for Tasks 4a and 4b.

Subsequent to the completion of the generalized analysis, the finalized six (6) scenarios were summarized by contributing area based on applicable infrastructure and costs identified in Tasks 4a and 4b. Three UGB Expansion scenarios (1.2, 2.1, and 3.1) were summarized based on the applicable infrastructure and costs identified in Task 4a; while three supplemental analysis area maps (SAAM-1, SAAM-2, and SAAM-3) were summarized based on the applicable infrastructure and costs identified in Task 4b.

Scenario Areas and Loading

Dry and wet weather flow generation for the individual scenarios followed the assumptions previously presented for Tasks 3, 4a, and 4b. Acreage and loading by sub-area are summarized in Table 10 for the six (6) scenarios.

DRAFT – WORK IN PROGRESS – SUBJECT TO CHANGE

Table 10| Scenario Area and Loading by Sub-area

Sub-area	Buildable Area (acre)[1]					
	Scenario 1.2	Scenario 2.1	Scenario 3.1	SAAM-1	SAAM-2	SAAM-3
DSL Property	173	284	151	99	149	101
Elbow	161	318	140	121	140	140
Thumb	277	246	139	184	170	166
West	105	137	260	0	0	521
Shevlin	0	0	139	338	0	0
OB Riley/Gopher Gulch	100	107	356	100	636	136
North Triangle	152	147	183	152	183	183
Northeast Edge	359	104	127	881	32	32
Total	1,327	1,343	1,495	1,874	1,309	1,279

Sub-area	Average Dry Weather Loading (gpm)[2]					
	Scenario 1.2	Scenario 2.1	Scenario 3.1	SAAM-1	SAAM-2	SAAM-3
DSL Property	93	154	73	34	83	118
Elbow	102	182	47	40	47	47
Thumb	124	139	47	82	63	57
West	126	119	242	0	0	427
Shevlin	0	0	63	163	0	0
OB Riley/Gopher Gulch	34	31	216	34	356	65
North Triangle	52	103	62	52	62	62
Northeast Edge	259	61	76	475	17	17
Total	789	790	825	879	628	792

Note 1. Excludes unbuildable lands and 21% of gross area for ROW.
Note 2. Gallons-per-minute (gpm)

Scenario Results

The specific lands served for each of the six (6) scenarios and the applicable collection system improvements associated with each scenario from Tasks 4a and 4b are presented in Figures 9 thru 14. The improvements are identified by categories associated with cost: CSMP (funded by development within the existing UGB), UGB expansion (funded by development outside of the existing UGB), or shared (partially funded by development inside and partially funded by development outside of the existing UGB). Relative cost summaries by sub-area and scenario are presented for Initial Capital and Initial Capital per acre in Figure 15.

Existing Infrastructure
- Gravity Main - Existing Trunk
- Gravity Main - Existing
- Vacuum Main - Existing
- Force Main - Existing
- Parcel
- UGB - Existing
- UGB - 2 Mile Buffer
- Expansion Area

Pipe Improvement Category
- CSMP
- Expansion
- Shared

Lift Station Improvement Category
- Expansion
- Decommission
- CSMP

North Triangle
OB Riley Gopher Gulch
Northeast Interceptor
WWTF
Hamby Alignment
Northeast Edge
West
Southeast Interceptor
Interim LS1
DSL Property
Interim LS2
Elbow
Thumb

0 0.5 1 Mile

DRAFT

Murray, Smith & Associates, Inc.

City of Bend
Dry Weather Flow System Capacity
Employment Analysis

WORK IN PROGRESS - SUBJECT TO CHANGE

Figure 9
Scenario 1.2

N W E S

Existing Infrastructure
- Gravity Main - Existing Trunk
- Gravity Main - Existing
- Vacuum Main - Existing
- Force Main - Existing
- Parcel
- UGB - Existing
- UGB - 2 Mile Buffer
- Expansion Area

Pipe Improvement Category
- CSMP
- Expansion
- Shared

Lift Station Improvement Category
- Expansion
- Decommission
- CSMP

North Triangle
OB Riley Gopher Gulch
Northeast Interceptor
WWTF
Hamby Alignment
Northeast Edge
West
Southeast Interceptor
Interim LS1
DSL Property
Interim LS2
Elbow
Thumb

0 0.5 1 Mile

MSA Murray, Smith & Associates, Inc.

DRAFT

City of Bend
Dry Weather Flow System Capacity
Employment Analysis

WORK IN PROGRESS - SUBJECT TO CHANGE

Figure 10
Scenario 2.1

N W E S

BEND OREGON

Existing Infrastructure
- Gravity Main - Existing Trunk
- Gravity Main - Existing
- Vacuum Main - Existing
- Force Main - Existing
- Parcel
- UGB - Existing
- UGB - 2 Mile Buffer
- Expansion Area

Pipe Improvement Category
- CSMP
- Expansion
- Shared

Lift Station Improvement Category
- Expansion
- Decommission
- CSMP

North Triangle
Northeast Interceptor
WWTF
OB Riley Gopher Gulch
Awbrey Glen LS
Northeast Edge
Hamby Alignment
Shevlin Area
West
Southeast Interceptor
Interim LS1
DSL Property
Interim LS2
Elbow
Thumb

0 0.5 1 Mile

MSA Murray, Smith & Associates, Inc.

DRAFT

City of Bend
Dry Weather Flow System Capacity
Employment Analysis

WORK IN PROGRESS - SUBJECT TO CHANGE

Figure 11
Scenario 3.1

N W E S

Existing Infrastructure
- Gravity Main - Existing Trunk
- Gravity Main - Existing
- Vacuum Main - Existing
- Force Main - Existing
- Parcel
- UGB - Existing
- UGB - 2 Mile Buffer
- Expansion Area

Pipe Improvement Category
- CSMP
- Expansion
- Shared

Lift Station Improvement Category
- Expansion
- Decommission
- CSMP

North Triangle
OB Riley Gopher Gulch
Gopher Gulch LS
Shevlin Area
Northeast Interceptor
WWTF
Northeast Edge
Hamby Alignment
Southeast Interceptor
DSL Property
Interim LS2
Elbow
Thumb

0 0.5 1 Mile

MSA Murray, Smith & Associates, Inc.

DRAFT

City of Bend
Dry Weather Flow System Capacity
Employment Analysis

WORK IN PROGRESS - SUBJECT TO CHANGE

Figure 12
Supplemental Scenario 1

N W E S

BEND OREGON

Existing Infrastructure
- Gravity Main - Existing Trunk
- Gravity Main - Existing
- Vacuum Main - Existing
- Force Main - Existing
- Parcel
- UGB - Existing
- UGB - 2 Mile Buffer
- Expansion Area

Pipe Improvement Category
- CSMP
- Expansion
- Shared

Lift Station Improvement Category
- Expansion
- Decommission
- CSMP

North Triangle
OB Riley Gopher Gulch
Northeast Interceptor
WWTF
Northeast Edge
Hamby Alignment
Southeast Interceptor
DSL Property
Interim LS2
Elbow
Thumb

0 0.5 1 Mile

DRAFT

City of Bend
Dry Weather Flow System Capacity
Employment Analysis

WORK IN PROGRESS - SUBJECT TO CHANGE

Figure 13
Supplemental Scenario 2

Murray, Smith & Associates, Inc.

Existing Infrastructure
- Gravity Main - Existing Trunk
- Gravity Main - Existing
- Vacuum Main - Existing
- Force Main - Existing
- Parcel
- UGB - Existing
- UGB - 2 Mile Buffer
- Expansion Area

Pipe Improvement Category
- CSMP
- Expansion
- Shared

Lift Station Improvement Category
- Expansion
- Decommission
- CSMP

North Triangle
OB Riley Gopher Gulch
Gopher Gulch LS
West
Northeast Interceptor
WWTF
Northeast Edge
Hamby Alignment
Southeast Interceptor
DSL Property
Interim LS2
Elbow
Thumb

0 0.5 1 Mile

DRAFT

City of Bend
Dry Weather Flow System Capacity
Employment Analysis

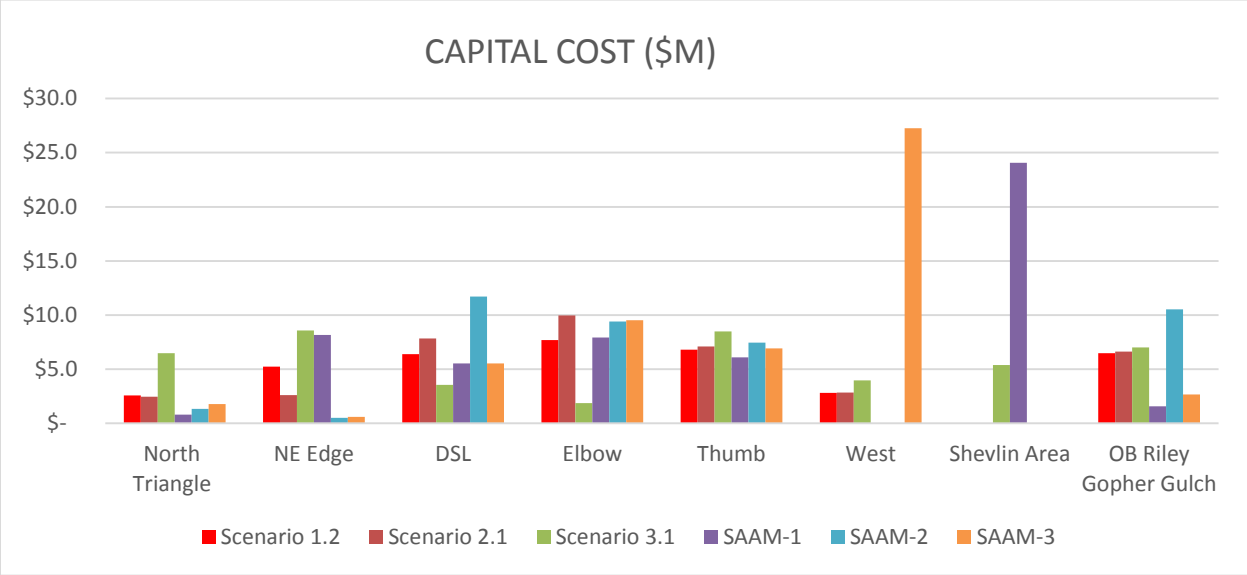
WORK IN PROGRESS - SUBJECT TO CHANGE

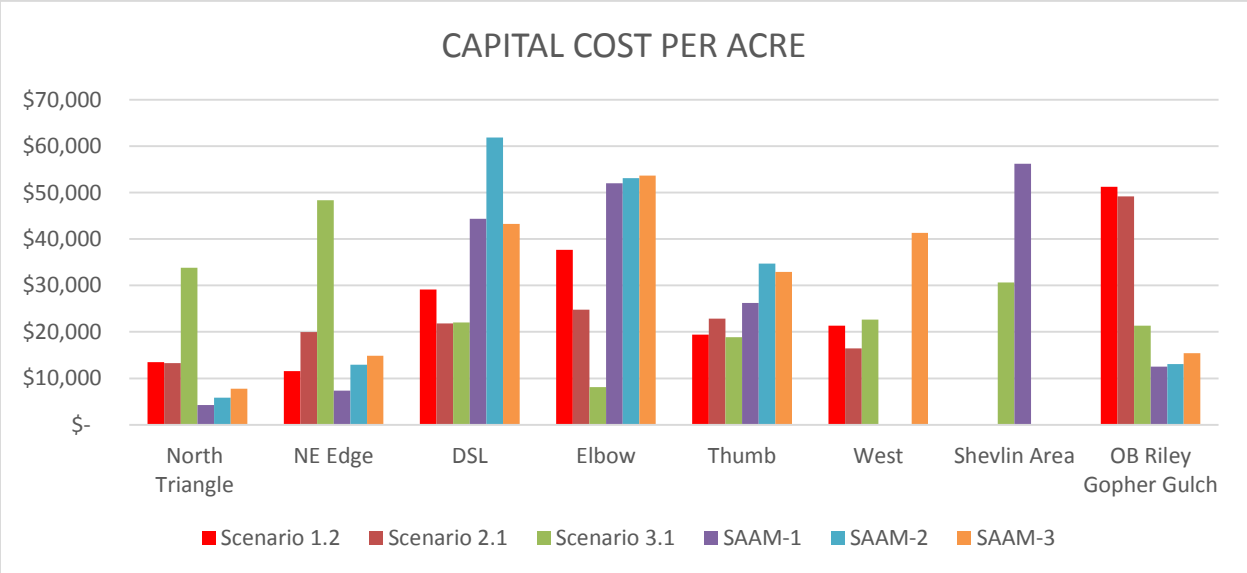
Figure 14
Supplemental Scenario 3

Murray, Smith & Associates, Inc.

DRAFT – WORK IN PROGRESS – SUBJECT TO CHANGE

Figure 15| Capital Cost and Capital Cost per Acre for Sub-areas





Key findings from the relative cost comparison by scenario are similar to the relative cost comparison for Tasks 4a and 4b with refinement for distinct areas of development within each sub-area. The key findings are summarized by sub-area below.

1. Shevlin Area – Most cost effective for scenario 3.1 where development is limited to the capacity of the existing Awbrey Glen force main and improvements are limited to

DRAFT – WORK IN PROGRESS – SUBJECT TO CHANGE

localized pipeline extensions to convey wastewater to the lift station and pump upsizing. Least cost effective for SAAM-1 where the additional development triggers high cost improvements including the regional Gopher Gulch lift station.

2. West Area – Most cost effective for scenarios 1.2 and 2.1 where development is limited to the southerly portion of the sub-area and improvements are limited to localized pipeline extensions to convey wastewater to the existing trunk main and upsizing of the existing trunk main. Scenario 3.1 is moderately cost effective; however, in addition to the localized pipeline extensions and existing trunk main upsizing, the northerly portion of the sub-area contributes to localized pipeline extensions to convey wastewater to the Awbery Glen lift station and pump upsizing. Least cost effective for SAAM-3 where the additional development triggers high cost improvements including the regional Gopher Gulch lift station.

3. North Triangle – Cost effective for all scenarios because of proximity to the Northeast Interceptor. Requires incremental extension of the interceptor west of US Highway 97.

4. OB Riley/Gopher Gulch - Moderately cost effective for all scenarios. Most cost effective on a per acre basis for scenarios where greater area is considered and contributing to infrastructure. All scenarios require incremental extension of the Northeast Interceptor west and south. SAAM-1 and SAAM-3 include shared infrastructure with the Shevlin or West areas to fund the Northeast Interceptor extension. Scenarios 3.1 and SAAM-2 most fully utilize the Northeast Interceptor extension by developing a larger portion of the sub-area without a reliance on the Shevlin and West areas and the regional Gopher Gulch lift station

5. Northeast Edge – Relatively cost effective for all scenarios because of proximity to the Hamby alignment and Northeast Interceptor extension to the WWTF. Scenario 1.2 and SAAM-1 include larger development of the sub-area and more fully take advantage of future trunk main infrastructure. Scenarios 1.2 and 2.1 are less cost effective than the other scenarios where development adjacent to Bear Creek Road requires and interim lift station to delay future extension of the Hamby alignment.

6. DSL Property - Moderately cost effective for all scenarios because of proximity to Southeast Interceptor and reliance on the Hamby alignment and Northeast Interceptor extension to the WWTF. All scenarios require existing pipeline upsizing to connect to the Southeast Interceptor. Additionally, SAAM-2 requires extension of the Hamby alignment to serve the northerly portion of the sub-area (near Darnell Estates). Scenarios 1.2 and 2.1 are most cost effective on a per acre basis because of development of a larger portion of the sub-area.

7. Elbow – Moderately cost effective for all scenarios because of proximity to Southeast Interceptor and reliance on the Hamby alignment and Northeast Interceptor extension to the WWTF. All scenarios require an interim lift station and localized pipeline

DRAFT – WORK IN PROGRESS – SUBJECT TO CHANGE

extensions to convey wastewater to the Southeast Interceptor delaying an extension of the Hamby trunk main. Scenario 2.1 is most cost effective on a per acre basis because of development of a larger portion of the sub-area.

8. Thumb - Moderately cost effective for all scenarios because of proximity to Southeast Interceptor and reliance on the Hamby alignment and Northeast Interceptor extension to the WWTF. All scenarios require existing pipeline upsizing on Parrell Road adjacent to the Southeast Interceptor and upsizing of the existing design, but unconstructed portion of the Southeast Interceptor immediately east of Parrell Road. Scenario 2.1 is less cost effective to serve as it requires contributions to additional upsizing of the Southeast Interceptor and other existing pipeline upsizing west of Parrell Road to serve the Bany property. Scenario 1.2 is most cost effective on a per acre basis because of development of a larger portion of the sub-area without development of the Bany property.

Scenario Ratings

Consistent with the approach for analyzing other infrastructure and land use data for the UGB Remand, the six (6) scenarios were rated as "Good", "Fair" or "Poor" by sub-area. These ratings were developed qualitatively for overall cost effectiveness based on Initial Capital Cost and Initial Capital Cost per acre. The qualitative ratings were combined with the key findings from the task and scenario summaries to provide an overall quantitative rating. Additionally, each scenario was given an overall rating on a scale of one (1) to five (5) to indicate overall cost effectiveness with five (5) being the most cost effective. The qualitative and quantitative ratings are shown in Tables 11 thru 13. For visual review a "Good," "Fair," and "Poor" rating are highlighted in green, yellow, and red respectively.

DRAFT – WORK IN PROGRESS – SUBJECT TO CHANGE

Factor 2: Orderly and Economic Provision of Public Facilities and Services

Community Outcome B.	Cost Effective Infrastructure	**Author:**	**Murray, Smith & Associates**
		Date:	10/01/2015

Performance Measure S2 — **Table 11. Initial Capital Cost of Sanitary Sewer Infrastructure Improvements**

Brief Description of Evaluation: Initial Capital Cost (millions of dollars) of sanitary sewer infrastructure improvements required to serve new growth, beyond what is included in the existing CSMP. Operation and maintenance costs are not included.

Interpretation and Key

"Good"	"Fair"	"Poor"	No Data	Not appropriate to rank

Better ranking fields have lower total cost of improvements needed. At the sub-area level, costs under $6 million are rated "Good", $6-12 million are rated "Fair", and over $12 million are rated "Poor". For Scenario / SAAM totals, under $46 million are rated "Good", $46-50 million are rated "Fair" and over $50 million are rated "Poor".

Evaluation Geography	Scenario 1.2		Scenario 2.1		Scenario 3.1		SAAM-1		SAAM-2		SAAM-3	
	Value	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*
Initial Capital Cost (excluding current UGB)	38.0	$M	39.5	$M	45.4	$M	54.3	$M	41.0	$M	54.3	$M
Subareas												
North Triangle	2.6	$M	2.5	$M	1.9	$M	0.8	$M	1.4	$M	1.8	$M
NE Edge	5.2	$M	2.6	$M	3.5	$M	8.2	$M	0.5	$M	0.6	$M
DSL Property	6.4	$M	7.8	$M	6.5	$M	5.5	$M	11.7	$M	5.5	$M
The "Elbow"	7.7	$M	10.0	$M	8.6	$M	7.9	$M	9.4	$M	9.5	$M
The "Thumb"	6.8	$M	7.1	$M	5.4	$M	6.1	$M	7.4	$M	6.9	$M
West Area	2.8	$M	2.8	$M	7.0	$M	N/A		N/A		27.2	$M
Shevlin Area	N/A		N/A		4.0	$M	24.1	$M	N/A		N/A	
OB Riley / Gopher Gulch Area	6.5	$M	6.6	$M	8.5	$M	1.6	$M	10.5	$M	2.7	$M
Overall Score	4		3		3		1		3		1	

DRAFT – WORK IN PROGRESS – SUBJECT TO CHANGE

Factor 2: Orderly and Economic Provision of Public Facilities and Services		Author:	Murray, Smith & Associates
Community Outcome B.	Cost Effective Infrastructure	Date:	10/01/2015

Performance Measure S3	**Table 12.** Initial Capital Cost of Sanitary Sewer Infrastructure Improvements per developed acre
Brief Description of Evaluation:	Initial Capital Cost of infrastructure improvements required to serve new growth, beyond what is included in the existing CSMP, divided by the developed acres.

Interpretation and Key	"Good"	"Fair"	"Poor"	No Data	Not appropriate to rank	Ratings are assigned based primarily on the performance of the sub-areas and less on the overall average cost per acre at the Scenario / SAAM level; under $25,000 per acre are rated as "Good", $25,000-40,000 are rated as Fair; over $40,000 are rated as "Poor."

Evaluation Geography	Scenario 1.2		Scenario 2.1		Scenario 3.1		SAAM-1		SAAM-2		SAAM-3	
	Value	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*	*Value*	*Units*
Initial Capital Cost per Acre (excluding current UGB)	22,646	$/Acre	23,253	$/Acre	23,966	$/Acre	22,864	$/Acre	24,731	$/Acre	33,520	$/Acre
Subareas												
North Triangle	13,473	$/Acre	13,258	$/Acre	8,116	$/Acre	4,268	$/Acre	5,853	$/Acre	7,742	$/Acre
NE Edge	11,534	$/Acre	20,000	$/Acre	22,062	$/Acre	7,338	$/Acre	12,944	$/Acre	14,831	$/Acre
DSL Property	29,140	$/Acre	21,846	$/Acre	33,816	$/Acre	44,343	$/Acre	61,882	$/Acre	43,233	$/Acre
The "Elbow"	37,671	$/Acre	24,779	$/Acre	48,338	$/Acre	52,029	$/Acre	53,094	$/Acre	53,692	$/Acre
The "Thumb"	19,432	$/Acre	22,834	$/Acre	30,655	$/Acre	26,217	$/Acre	34,714	$/Acre	32,918	$/Acre
West Area	21,361	$/Acre	16,422	$/Acre	21,332	$/Acre	N/A		N/A		41,327	$/Acre
Shevlin Area	N/A		N/A		22,636	$/Acre	56,235	$/Acre	N/A		N/A	
OB Riley / Gopher Gulch Area	51,293	$/Acre	49,176	$/Acre	18,840	$/Acre	12,501	$/Acre	13,102	$/Acre	15,448	$/Acre
Overall Score	3		4		3		2		2		1	

DRAFT – WORK IN PROGRESS – SUBJECT TO CHANGE

Factor 2: Orderly and Economic Provision of Public Facilities and Services		Author:	Murray, Smith & Associates
Community Outcome B.	Cost Effective Infrastructure	Date:	10/01/2015
Performance Measure S1	**Table 13.** Sanitary Sewer Infrastructure Improvements		
Brief Description	Efficiency of sanitary sewer infrastructure improvements required to serve new growth, beyond what is included in the existing CSMP		
Interpretation and Key	"Good" / "Fair" / "Poor" / No Data / Not appropriate to rank		Ratings for sub-areas are assigned based on the following considerations: "Good" means the sub-area takes advantage of improvements needed to serve the existing UGB (e.g. Northeast Interceptor and Hamby alignment); "Fair" means there is somewhat costly localized infrastructure needed and/or that the amount of growth in the sub-area does not take advantage of the improvements needed to serve the existing UGB; "Poor" means that costly new regional infrastructure (not a gravity system) is required.

Evaluation Geography	Scenario 1.2 *Qualitative Evaluation*	Scenario 2.1 *Qualitative Evaluation*	Scenario 3.1 *Qualitative Evaluation*	SAAM-1 *Qualitative Evaluation*	SAAM-2 *Qualitative Evaluation*	SAAM-3 *Qualitative Evaluation*
Subareas						
North Triangle	Incremental extension of NEI west of US 97	Incremental extension of NEI west of US 97	Incremental extension of NEI west of US 97	Incremental extension of NEI west of US 97	Incremental extension of NEI west of US 97	Incremental extension of NEI west of US 97
NE Edge	Relies primarily on Hamby alignment & NEI (very efficient), but Bear Creek Road area requires interim lift station	Relies primarily on Hamby alignment & NEI (very efficient), but Bear Creek Road area requires interim lift station; limited development does not take full advantage of Hamby alignment and NEI	Relies primarily on Hamby alignment & NEI (very efficient), but Bear Creek Road area requires interim lift station; limited development does not take full advantage of Hamby alignment and NEI	Relies entirely on Hamby alignment & NEI	Relies primarily on Hamby alignment & NEI (very efficient); limited development does not take full advantage of Hamby alignment and NEI	Relies primarily on Hamby alignment & NEI (very efficient); limited development does not take full advantage of Hamby alignment and NEI
DSL Property	Relies entirely on Hamby alignment & NEI, localized pipeline required to connect to SEI	Relies entirely on Hamby alignment & NEI, localized pipeline required to connect to SEI	Relies entirely on Hamby alignment & NEI, localized pipeline required to connect to SEI	Relies entirely on Hamby alignment & NEI, localized pipeline required to connect to SEI	Relies primarily on Hamby alignment & NEI, localized pipeline required to connect to SEI; also requires additional extension of Hamby alignment to serve Darnell Estates area	Relies entirely on Hamby alignment & NEI, localized pipeline required to connect to SEI
The "Elbow"	Relies on SEI, Hamby, and NEI. Requires interim lift station that does not contribute to long-term gravity improvements. Localized pipeline required to connect to SEI	Relies on SEI, Hamby, and NEI. Requires interim lift station that does not contribute to long-term gravity improvements. Localized pipeline required to connect to SEI	Relies on SEI, Hamby, and NEI. Requires interim lift station that does not contribute to long-term gravity improvements. Localized pipeline required to connect to SEI	Relies on SEI, Hamby, and NEI. Requires interim lift station that does not contribute to long-term gravity improvements. Localized pipeline required to connect to SEI	Relies on SEI, Hamby, and NEI. Requires interim lift station that does not contribute to long-term gravity improvements. Localized pipeline required to connect to SEI	Relies on SEI, Hamby, and NEI. Requires interim lift station that does not contribute to long-term gravity improvements. Localized pipeline required to connect to SEI
The "Thumb"	Relies on SEI, Hamby, and NEI. Pipe improvement on Parrell Road adjacent to SEI	Relies on SEI, Hamby, and NEI. Pipe improvement on Parrell Road adjacent to SEI, Additional gravity main required to serve Bany property	Relies on SEI, Hamby, and NEI. Pipe improvement on Parrell Road adjacent to SEI	Relies on SEI, Hamby, and NEI. Pipe improvement on Parrell Road adjacent to SEI	Relies on SEI, Hamby, and NEI. Pipe improvement on Parrell Road adjacent to SEI	Relies on SEI, Hamby, and NEI. Pipe improvement on Parrell Road adjacent to SEI
West Area	Requires incremental expansion & extension of existing pipelines	Requires incremental expansion & extension of existing pipelines	Requires expansion & extension of existing pipelines, connection to existing lift station, and pump upsizing at Awbrey Glen	N/A	N/A	Exceeds capacity at Awbrey Glen lift station/force main & requires new regional lift station
Shevlin Area	N/A	N/A	Requires expansion & extension of existing pipelines,connection to existing lift station, and pump upsizing at Awbrey Glen	Exceeds capacity at Awbrey Glen lift station/force main & requires new regional lift station	N/A	N/A
OB Riley / Gopher Gulch Area	Requires extension of NEI west of US 20	Requires extension of NEI west of US 20	Requires extension of NEI west of US 20 plus pipeline extension to south	Requires extension of NEI west of US 20; shares infrastructure with new regional lift station triggered by Shevlin Area	Requires extension of NEI west of US 20 plus pipeline extension to south	Requires extension of NEI west of US 20; shares infrastructure with new regional lift station triggered by West Area
Overall Score	4	3	3	2	2	1

Note 1. NEI = Northeast Interceptor, including extension to WWTF. SEI = Southeast Interceptor. Hamby = Hamby alignment of Southeast Interceptor.

DRAFT – WORK IN PROGRESS – SUBJECT TO CHANGE

Key rating considerations related to each scenario are described below. Positives (+) and negatives (-) are highlighted. Overall ratings are highest for scenarios that take advantage of gravity sewer improvements needed to serve the existing UGB (Northeast Interceptor and Hamby alignment).

1. Scenario 1.2 – Rated high (4) because the scenario takes advantage of the Hamby alignment and Northeast Interceptor by maximizing development in the Northeast Edge and North Triangle (+). The scenario minimizes development impacts in the West and avoids a regional lift station (+).

2. Scenario 2.1 – Rated medium (3) because the scenario takes advantage of the Northeast Interceptor by maximizing development in the North Triangle (+). The scenario does not take full advantage of the Hamby alignment by minimizing development in the Northeast Edge (-). The scenario minimizes development impacts in the West and avoids a regional lift station (+).

3. Scenario 3.1 – Rated medium (3) because the scenario takes advantage of the Northeast Interceptor by maximizing development in the North Triangle and OB Riley/Gopher Gulch (+). The scenario does not take full advantage of the Hamby alignment by minimizing development in the Northeast Edge (-). The scenario maximizes potential development in the West and Shevlin areas, while avoiding a new regional lift station (+).

4. SAAM-1 – Rated low (2) because the scenario requires a new regional lift station and force main to serve an expanded area of Shevlin (-). The scenario does takes advantage of the Hamby alignment and Northeast Interceptor by maximizing development in the Northeast Edge and North Triangle (+).

5. SAAM-2 – Rated low (2) because the scenario does not take full advantage of the Hamby alignment by minimizing development in the Northeast Edge (-). The scenario does take advantage of the Northeast Interceptor by maximizing development in the North Triangle and OB Riley/Gopher Gulch (+). The scenario requires a high cost extension of the Hamby alignment to serve the northern portion of the DSL Property (-).

6. SAAM-3 – Rated very low (1) because the scenario requires a new regional lift station and force main to serve an expanded area of the West (-). The scenario does take advantage of the Northeast Interceptor by maximizing development in the North Triangle (+). The scenario does not take full advantage of the Hamby alignment by minimizing development in the Northeast Edge (-).

From a sewer infrastructure planning perspective the City would prefer to leverage existing or planned infrastructure investments to their full potential where possible. The City is committed to constructing both the Northeast Interceptor and the Hamby alignment in the near future to serve customers within the existing UGB. These projects will require large

DRAFT – WORK IN PROGRESS – SUBJECT TO CHANGE

capital investments and should be leveraged where possible to serve areas outside the existing UGB as identified in this remand process. As noted above, Scenario 1.2 appears to be the best combination of areas relative to leveraging existing or planned infrastructure and minimizing new sewer investments. From a sewer infrastructure perspective a hybrid scenario would be recommended that prioritizes UGB expansion in the North Triangle and Northeast Edge.

Memorandum

October 1, 2015

To: Urban Growth Boundary and Growth Scenarios Technical Advisory Committee

Cc: Project Team

From: Karen Swirsky, City of Bend Growth Management

Re: Scenario Evaluation: Wildfire Hazard Technical Memorandum

Introduction

Purpose

The purpose of this memorandum is to describe the data sources and methodology of performance measure evaluations conducted in "Stage 4" of the Bend Urban Growth Boundary (UGB) Remand project, the evaluation of alternative UGB expansion scenarios

Table 1. Performance Measures in this Technical Memorandum

Performance Measure	Description
Community Outcome: Quality Natural Environment	
3.A.3	Wildfire Risk[1] and Hazard[2]

Evaluation Tools

The wildfire evaluation was conducted using published maps and an on-the ground survey of lands under consideration for inclusion into the UGB by a group of wildfire experts[3].

Scenarios Evaluated

A total of six sets of land use assumptions were evaluated (Scenario 1.2; Scenario 2.1; Scenario 3.1; Supplemental Analysis Map 1; Supplemental Analysis Map 2; Supplemental Analysis Map 3); these are described in detail in the evaluation report. Each UGB Expansion Scenario and Supplemental Analysis Area Map (SAAM) is comprised of a set of land use assumptions describing the type and amount of housing, employment, and other uses in polygons within the existing UGB and in various expansion subareas. They are all consistent with the City of Bend's overall housing and jobs need for the planning horizon, and use consistent assumptions for development on land inside the UGB.

[1] Risk" describes the likelihood of a fire occurring based on historical fire occurrence and ignition sources.

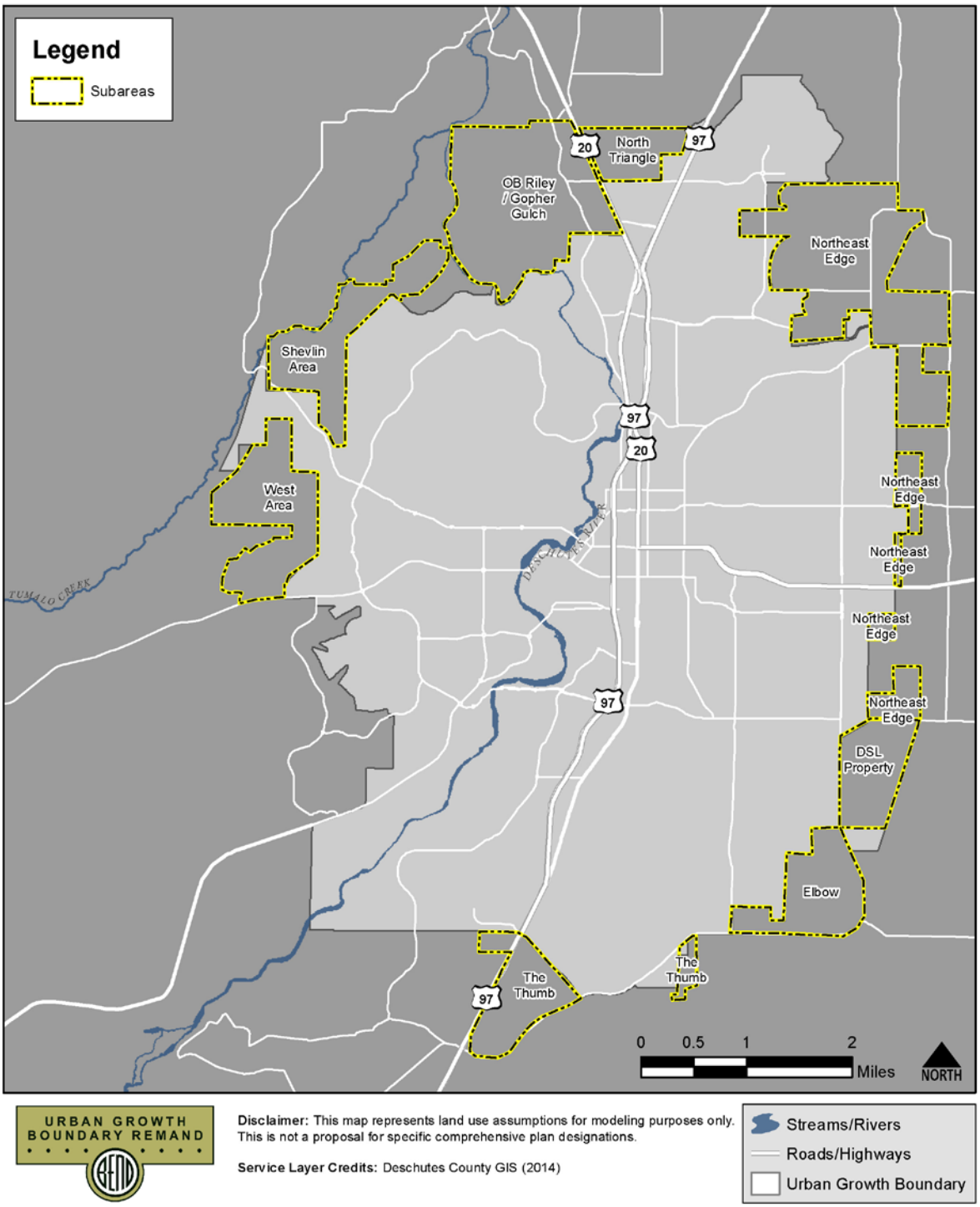
[2] "Hazard" describes resistance to control once a fire starts, based on weather, topography, and fuel (vegetation type). All areas in Central Oregon have the same climate rating; therefore, hazard was assessed by vegetation type and topography.

[3] Fire officials from the City of Bend, Deschutes County, Oregon Department of Forestry, and US Forest Service.

Geographies

Wildfire hazard was evaluated at the subarea level (see Figure 1).

Figure 1: Evaluation Subareas



Quality Natural Environment

Performance Measure 3.A.3: Wildfire Risk and Hazard

Purpose

Statewide Planning Goal 14 Factor 3 requires the City to compare environmental, energy, economic, and social consequences of alternative boundary locations. The City has identified the risks and hazards of wildfire in the Wildland/Urban Interface (WUI)[4] as a component of the environmental, energy, economic and social consequences of the alternatives.[5]

Data Sources

General wildfire risk was identified by referring to the findings of the 2011 Greater Bend Area Community Wildfire Protection Plan (CWPP) and the Deschutes County Fire Risk Index Map. The CWPP used the ODF Assessment of Risk Factors and the classification ratings of individual areas under the Oregon Forestland-Urban Interface Fire Protection Act of 1997 (aka Senate Bill 360). These documents identified the fire risk in all areas adjacent to the existing UGB as ranging from "high" to "extreme." The Deschutes County Fire Risk Index Map created a regional map of the fire risk. The UGB Steering Committee approved the use of these resource documents at their June 2015 meeting. The classification ratings from the Oregon Forestland-Urban Interface Fire Protection Act were the basis for the on-the-ground fire hazard field assessment methodology, which is described further below.

Methodology

In order to further understand the wildfire hazard associated with lands proposed for potential inclusion into the Urban Growth Boundary, a group of wildfire experts conducted an on-the-ground survey on June 19, 2015. The survey consisted of lands under consideration for inclusion into the UGB, as well as a 1/4 mile buffer area.

The team used the format shown in Table 2 for hazard assessment, based on the Oregon Forestland-Urban Interface Fire Protection Act guidelines, with modifications as described in the following text.

[4] Wildland-Urban Interface Area (WUI): That geographical area where structures and other human development meets or intermingles with wildland or vegetative fuels (International Wildland-Urban Interface Code, 2012).

[5] Note that the LCDC concluded in the Remand that while "neither Goals 2 nor 7 requires the City to address wildfire risk... [it] is entirely appropriate and permissible for the City to consider relative risk of wildfire in alternate UGB expansion candidate areas in considering the environmental, energy, economic and social consequences of the alternatives under locational factor 3 of Goal 14." (Remand, page 93)

Table 2: Classification of Hazard for Forestland-Urban Interface Lands

Natural Vegetative Fuel Hazard Factor Value	Fire Characteristics	Topographic Hazard Factor Value	
		1 (<25%)	2 (>25%)
1: Low brush & short needle timber litter	Typically produces a flame length of up to 5 ft, a wildfire which exhibits very little spotting, torching, or crowning, and which results in a burned area that can normally be entered within 15 minutes.	HIGH[6]	HIGH
2: Moderate brush, conifer reproduction, open sage & juniper	Typically produces a flame length of 5 to 8 ft, a wildfire which exhibits sporadic spotting, torching, or crowning, and which results in a burned area that can normally be entered within 1 hour.	HIGH	EXTREME
3: Grasses, heavy brush & mature timber with slash	Typically produces a flame length of over 8 ft, a wildfire that exhibits frequent spotting, torching, or crowning, and which results in a burned area that normally cannot be entered for over 1 hour.	EXTREME	EXTREME

This classification was interpreted and modified as follows for use in evaluating the potential UGB expansion areas:

- Well-managed High: Brush has been mowed within last 5 years, trees limbed up and thinned, junipers removed.
- Managed High: Close to well-managed but falling short of the complete package.
- Mosaic High: Pockets of High and Extreme but interspersed with irrigated or cleared land.
- Extreme: Unmanaged land with dense brush, unlimbed and/or unthinned trees.

The field data shown in Table 2 was used to evaluate the six scenarios. Subareas were evaluated as follows:

- “Good” means that fire hazard was determined to be low.
- “Fair” means that the fire hazard was determined to be “High”.
- “Poor” means that fire hazard was determined to be “Extreme”.
- Areas with a mix of “High” and “Extreme” hazard were classified as “Poor”.

Ratings at the Scenario/SAAM level were based on the presence of subareas where extreme fire hazard due to topography or conditions in the buffer area that could make it more difficult to reduce fire hazard. The land uses identified for each area were noted, because employment uses are protected by existing building code, while mitigation measures are being developed

[6] These classifications have been modified for the purposes of this assessment as described in the text and summarized at the end of this memorandum.

that will reduce risk to residential areas if adopted in to code[7]. However, it should be noted that the ratings were based on the hazard evaluation only and did not take into consideration the land uses identified in each area.

Results

Because of vegetation and climate, all areas surveyed were either High or Extreme fire hazard. Some areas have been subject to management processes (i.e., brush removal, removal of lower tree limbs, and stand thinning) which reduced of the hazard rating from Extreme to High. Similar management processes would reduce most areas identified as Extreme to High, with the exception of portions of the Shevlin area, which would remain extreme due to topography. Results of the field assessment are shown in Table 3 and on Figure 2.

Table 3. Summary of Wildfire Hazard Field Assessment

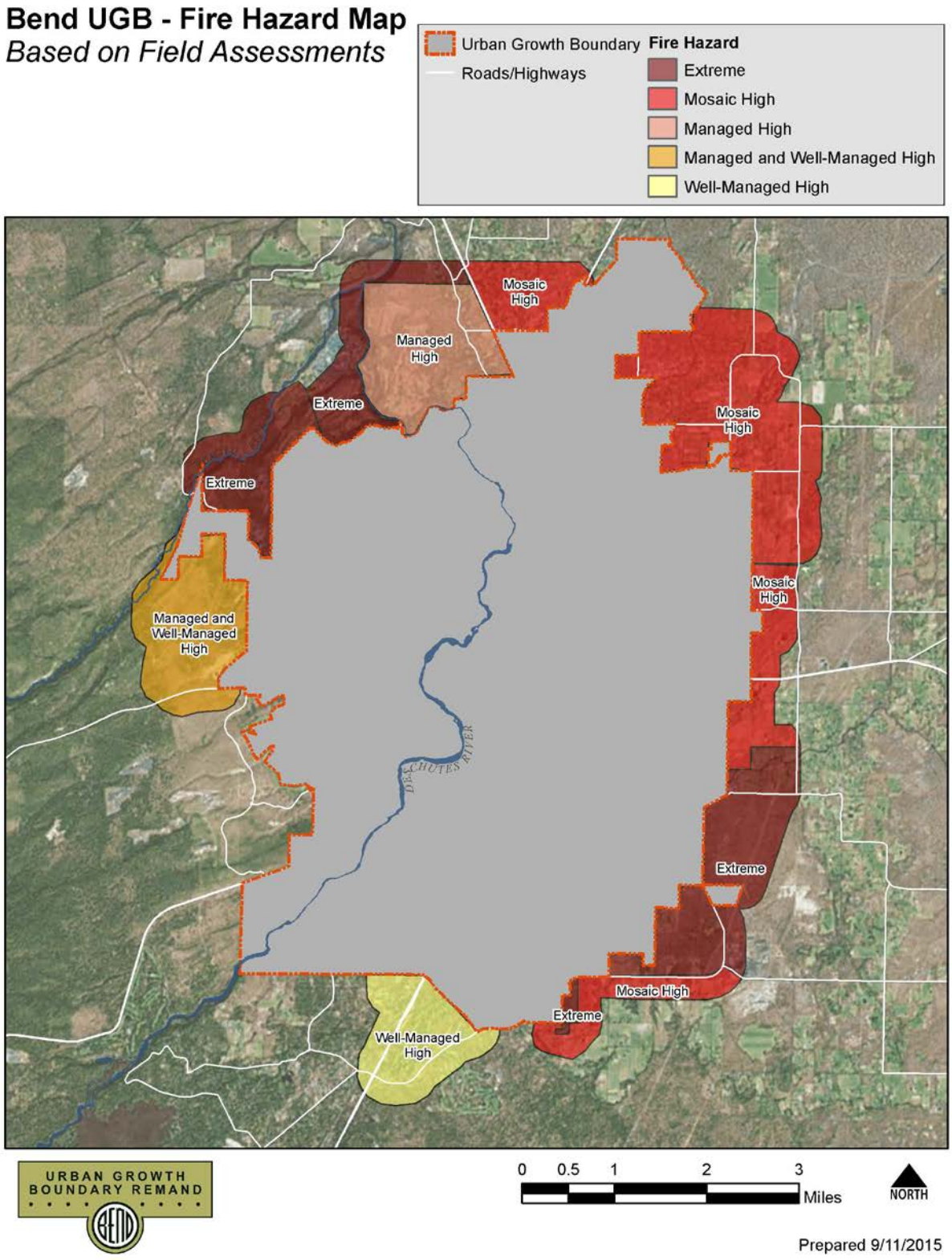
Geographic Area	Parcel Hazard	Buffer Hazard (1/4 mile)
West	well-managed & Managed High	well-managed & managed High
Shevlin	Extreme (topo & vegetation)	Extreme (topo & vegetation)
OB Riley/Gulpher Gulch	managed High	Extreme (topo & vegetation)
North Triangle	mosaic High	mosaic High
Northeast Edge	mosaic High	mosaic High
DSL	Extreme (vegetation)	Extreme (vegetation)
Elbow	Extreme (vegetation)	mosaic High
Thumb	well-managed High	well-managed High

Definitions:

- Well-managed High: Brush has been mowed within last 5 years, trees limbed up and thinned, junipers removed.
- Managed High: Close to well-managed but falling short of the complete package.
- Mosaic High: Pockets of High and Extreme but interspersed with irrigated or cleared land.
- Extreme: Unmanaged land with dense brush, unlimbed and/or unthinned trees.

[7] See attached memorandum*: Potential Wildfire Mitigation Approach.*

Figure 2: Wildfire Hazard by Subarea



Scenario 1.2: Scenario 1.2 includes four subareas with a High hazard rating and three with an Extreme hazard rating. The three subareas rated Extreme in this scenario could be reduced to High with proper management of vegetation. Scenario 1.2 proposes residential uses, which will require new mitigation measures to reduce fire hazard, in the Northeast Edge, DSL Property, The "Elbow", The "Thumb", and the West Area.

Scenario 2.1: Scenario 2.1 includes four subareas with a High hazard rating and three with an Extreme hazard rating. The three subareas rated Extreme in this scenario could be reduced to High with proper management of vegetation. Scenario 2.1 proposes residential uses, which will require new mitigation measures to reduce fire hazard, in the North Triangle, Northeast Edge, DSL Property, The "Elbow", The "Thumb", and the West Area.

Scenario 3.1: Scenario 3.1 includes four subareas with a High hazard rating and four with an Extreme hazard rating. Most of the subareas rated Extreme in this scenario would likely to be reduced to High with proper management of vegetation; however, portions of the Shevlin subarea have topography and unmanaged adjacent lands that could make it more difficult to reduce fire hazard. Scenario 3.1 proposes residential uses, which will require new mitigation measures to reduce fire hazard, in the Northeast Edge, DSL Property, the West Area, the Shevlin Area, and the OB Riley / Gopher Gulch area.

SAAM-1: SAAM-1 includes three subareas with a High hazard rating and four with an Extreme hazard rating. Most of the subareas rated Extreme in this scenario would likely to be reduced to High with proper management of vegetation; however, portions of the Shevlin subarea have topography and unmanaged adjacent lands that could make it more difficult to reduce fire hazard. SAAM-1 proposes residential uses, which will require new mitigation measures to reduce fire hazard, in the Northeast Edge and the Shevlin Area.

SAAM-2: SAAM-2 includes three subareas with a High hazard rating and three with an Extreme hazard rating. Most of the subareas rated Extreme in this scenario would likely to be reduced to High with proper management of vegetation. SAAM-2 proposes residential uses, which will require new mitigation measures to reduce fire hazard, in the DSL Property and the OB Riley / Gopher Gulch area.

SAAM-3: SAAM-3 includes four subareas with a High hazard rating and three with an Extreme hazard rating. Most of the subareas rated Extreme in this scenario would likely to be reduced to High with proper management of vegetation. SAAM-3 proposes residential uses, which will require new mitigation measures to reduce fire hazard, in the DSL Property and the West Area.

Conclusion: Based on the wildfire *risk* as determined by the CWPP, and *hazards* as evaluated in the field, there are only subtle differences between the six proposed Scenarios/SAAMs. There are no areas under consideration for inclusion into the UGB that have a low fire risk or hazard due the Central Oregon's climate and the prevalent vegetation types. All areas under consideration have a high or extreme fire risk and hazard.

With the exception of portions of the Shevlin subarea, proper vegetation management and imposition of mitigation measures, such as the fire protective building codes shown in the

attached memorandum*: Potential Wildfire Mitigation Approach,* could minimize risk in all areas under consideration. Shevlin is the exception due to the combination of topography and adjacent vegetation. However, fire hazard to development in that area could be minimized with aggressive management, careful land use planning, and implementation of fire protective measures.

Memorandum

September 29, 2015

To: UGB Boundary TAC
From: City of Bend Planning Staff and Craig Letz, Wildfire consultant
Re: Potential Wildfire Mitigation Approach

Wildfire risk[1], as identified by the Greater Bend Community Wildfire Protection Plan, is high to extreme in the Bend area. The Urban Growth Boundary (UGB) Technical Advisory Committee requested a more area-specific examination of wildfire hazard[2] associated with adding lands to the City's Urban Growth Boundary. In response, the City performed an on the ground assessment, documenting topography, vegetation and management history (see Scenario Evaluation: Wildfire Hazard Technical Memorandum) for the detailed results of this assessment. In summary, the assessment concluded that, due to the climate and vegetation type prevalent in the Bend area, essentially all the lands in the wildland-urban interface (WUI) pose a wildfire hazard ranging from high to extreme. Management, such as thinning and brush removal, may reduce the hazard in some areas from extreme to high, but further mitigation measures will be needed to protect new and existing development in the WUI.

At the request of City staff, a group of local fire officials[3] met several times over the summer as a mitigation working group to advise the City on the best approach to codifying wildfire protection. After review of several options, the group concluded that the best approach was found in the 2012 International Wildland-Urban Interface Code (IWUIC). This code is an extension of the International Fire Code presently used by the City of Bend, with special provisions for assessing the mitigation of fire in the WUI.

The IWUIC was the recommended approach because it builds upon the City's existing building code while not adding unnecessarily to the cost of construction. The group also felt that the IWUIC would allow flexibility in the use of new development concepts, materials, and technology.

The attached code language is adapted from the IWUIC to meet the needs of the UGB expansion. The main difference between the draft language provided here and the IWUIC is the provision of a buffer zone. The IWUIC addresses the need for "defensible space" by requiring space around individual structures. While effective, this can lead to a relatively low density development pattern. The working group realized that there was a need to provide flexibility in order for the City to meet its land need and to provide a range of options for developers. The recommendation was to allow a developer to propose either a defensible space around individual structures ***or*** to allow an alternative of aggregating the defensible space into a buffer area.

[1] Risk" describes the likelihood of a fire occurring based on historical fire occurrence and ignition sources.

[2] "Hazard" describes resistance to control once a fire starts, based on weather, topography, and fuel (vegetation type). All areas in Central Oregon have the same climate rating; therefore, hazard was assessed by vegetation type and topography.

[3] City of Bend, US Forest Service, Oregon Department of Forestry, Deschutes County, and the City's wildfire consultant

Additional work will be needed to fully formulate mitigation measures for the City. For example, the IWUIC assumes that a City has adopted a WUI map. For the purposes of the UGB discussion, it is assumed that all new lands brought into the UGB would be mapped as being within the WUI, but logically, there are other lands within the existing UGB that would potentially be mapped as WUI. That work is beyond the scope of the UGB expansion but is likely to be accomplished in the future.

The attached mitigation measures are provided in a matrix, followed by excerpted code language from the IWUIC so the TAC can see the types of approaches available. The matrix attached addresses three parameters:

1. Fire hazard severity
2. Water supply
3. Defensible space

Fire hazard severity is based on fuel (vegetation), weather (number of days during a year when fire weather is critical – a combination of low humidity and wind), and topography. For the Bend area, weather is the same in all parts of the area. Areas with steep slopes were eliminated during the consideration of lands to bring into the UGB. Therefore, fuel is the main consideration. In the on-site analysis, all areas were considered to be high or extreme because of the vegetation types. However, it is possible that some areas will be rated as moderate in the future, so this column was left in the table.

Water supply is defined in the IWUIC (Section 404, attached), but basically means that fire flows can be met.

Defensible space is an area, either natural or man-made, where material (vegetation and structures) capable of allowing a fire to spread unchecked has been treated, cleared, or modified to slow the rate and intensity of an advancing wildfire and to create an area for fire suppression operations to occur. Non-conforming means that the defensible space cannot be provided, and conforming means that it can be provided either by spacing of individual structures or with a buffer. If 1.5 times the required defensible space can be provided, less stringent building construction regulations can be applied.

The building construction regulations establish minimum standards for the location, design and construction of building and structures base on fire hazard severity. The construction provisions are intended to supplement the requirements of the International Building Code and address mitigation of the unique hazards posed to buildings by wildfire, and to reduce the hazards of building fires spreading to wildland fuels. This is accomplished by requiring ignition-resistant construction materials based on the hazard severity of the building site. Construction features regulated include underfloor areas, roof coverings, eaves and soffits, gutters and downspouts, exterior walls, doors and windows, ventilation openings, and accessory structures.

Construction regulations are divided into three categories of ignition resistance (IR):

- IR Class 1: A schedule of additional requirements for construction in WUI based on **extreme** fire hazard.
- IR Class 2: A schedule of additional requirements for construction in WUI based on **high** fire hazard.
- IR Class 3: A schedule of additional requirements for construction in WUI based on **moderate** fire hazard.

It should be noted, that where water supply and/or defensible space standards cannot be met, a higher construction regulation would be applied than the fire hazard would require if all requirement could be met. For example, an area of high fire hazard would require IR 2 construction if

the defensible space can be provided, but would jump to IR 1 if defensible space requirements could not be met. In some circumstances, a non-combustible exterior wall would be required. A worse case might be where the hazard is extreme and both water supply and defensible space requirements cannot be met, no construction would be allowed at all.

The following table and text are excerpted from the IWUIC.

IGNITION-RESISTANT CONSTRUCTION MATRIX

DEFENSIBLE SPACE[1]	FIRE HAZARD SEVERITY					
	Moderate hazard		High hazard		Extreme hazard	
	Water supply		Water supply		Water supply	
	Conforming[2]	Nonconforming[3]	Conforming[2]	Nonconforming[3]	Conforming[2]	Nonconforming[3]
Nonconforming	IR[4] 2	IR 1	IR 1	IR 1	IR 1 & N.C.[4]	Not Permitted
Conforming	IR 3	IR 2	IR 2	IR 1	IR 1	IR 1 & N.C.[5]
1.5 x Conforming	Not Required	IR 3	IR 3	IR 2	IR 2	IR 1

1. An area either natural or man-made, where material capable of allowing a fire to spread unchecked has been treated, cleared, or modified to slow the rate and intensity of an advancing wildfire and to create an area for fire suppression operation to occur. See Required Defensible Space, below.
2. Subdivisions shall have a conforming water supply. See IWUIC Section 404, attached, for the criteria for a conforming water supply.
3. A nonconforming water supply is any water system or source that does not comply with Section 404
4. I.R. means Ignition Resistant.
   IR 1, see IWUIC Section 504, attached.
   IR 2, see IWUIC Section 505, attached.
   IR 3, see IWUIC Section 506, attached.
5. N.C. means noncombustible, where exterior walls shall have a fire-resistance rating of not less than 1-hour, and the exterior surfaces of such walls shall be noncombustible.

REQUIRED DEFENSIBLE SPACE

Wildland-Urban Interface Area	Fuel Modification Distance
Moderate Hazard	30‘ between structures OR 100-foot buffer between structures and WUI
High Hazard	50’ between structures OR 200-foot buffer between structures and WUI
Extreme Hazard	100’ between structures OR300-foot buffer between structures and WUI

IWUIC SECTION 404
WATER SUPPLY

404.1 General. When provided in order to qualify as a conforming water supply for the purpose of Table 503.1 or as required for new subdivisions in accordance with Section 402.1.2[4], an *approved* water source shall have an adequate water supply for the use of the fire protection service to protect buildings and structures from exterior fire sources or to suppress structure fires within the *wildland-urban interface area* of the jurisdiction in accordance with this section.

> **Exception:** Buildings containing only private garages, carports, sheds and agricultural buildings with a floor area of not more than 600 square feet (56 m^2).

404.2 Water sources. The point at which a water source is available for use shall be located not more than 1,000 feet (305 m) from the building and be *approved* by the code official. The distance shall be measured along an unobstructed line of travel.

Water sources shall comply with the following:

1. Man-made water sources shall have a minimum usable water volume as determined by the adequate water supply needs in accordance with Section 404.5. This water source shall be equipped with an *approved* hydrant. The water level of the water source shall be maintained by rainfall, water pumped from a well, water hauled by a tanker or by seasonal high water of a stream or river. The design, construction, location, water level maintenance, access and access maintenance of man-made water sources shall be *approved* by the code official.
2. Natural water sources shall have a minimum annual water level or flow sufficient to meet the adequate water supply needs in accordance with Section 404.5. This water level or flow shall not be rendered unusable because of freezing. This water source shall have an *approved* draft site with an *approved* hydrant. Adequate water flow and rights for access to the water source shall be ensured in a form acceptable to the code official.

404.3 Draft sites. *Approved* draft sites shall be provided at all natural water sources intended for use as fire protection for compliance with this code. The design, construction, location, access and access maintenance of draft sites shall be *approved* by the code official.

> **404.3.1 Access.** The draft site shall have emergency vehicle access from an access road in accordance with Section 402.
>
> **404.3.2 Pumper access points.** The pumper access point shall be either an emergency vehicle access area alongside a conforming access road or an *approved* driveway no longer than 150 feet (45 720 mm). Pumper access points and access driveways shall be designed and constructed in accordance with all codes and ordinances enforced by this jurisdiction. Pumper access points shall not require the pumper apparatus to obstruct a road or driveway.

404.4 Hydrants. All hydrants shall be designed and constructed in accordance with nationally recognized standards. The location and access shall be *approved* by the code official.

---

[4] **402.1.2 Water supply.** New subdivisions as determined by this jurisdiction shall be provided with water supply in accordance with Section 404.

404.5 Adequate water supply. Adequate water supply shall be determined for purposes of initial attack and flame front control as follows:

1. One- and two-family dwellings. The required water supply for one- and two-family dwellings having a fire flow calculation area that does not exceed 3,600 square feet (334 m^2) shall be 1,000 gallons per minute (63.1 L/s) for a minimum duration of 30 minutes. The required water supply for one- and two-family dwellings having a fire flow calculation area in excess of 3,600 square feet (334 m^2) shall be 1,500 gallons per minute (95 L/s) for a minimum duration of 30 minutes.

   Exception: A reduction in required flow rate of 50 percent, as *approved* by the code official, is allowed when the building is provided with an *approved* automatic sprinkler system.

2. Buildings other than one- and two-family dwellings. The water supply required for buildings other than one- and two-family dwellings shall be as *approved* by the code official but shall not be less than 1,500 gallons per minute (95 L/s) for a duration of two hours.

   Exception: A reduction in required flow rate of up to 75 percent, as *approved* by the code official, is allowed when the building is provided with an *approved* automatic sprinkler system. The resulting water supply shall not be less than 1,500 gallons per minute (94.6 L/s).

404.6 Fire department. The water supply required by this code shall only be approved when a fire department rated Class 9 or better in accordance with ISO Commercial Rating Service, 1995, is available.

404.7 Obstructions. Access to all water sources required by this code shall be unobstructed at all times. The code official shall not be deterred or hindered from gaining immediate access to water source equipment, fire protection equipment or hydrants.

404.8 Identification. Water sources, draft sites, hydrants and fire protection equipment and hydrants shall be clearly identified in a manner *approved* by the code official to identify location and to prevent obstruction by parking and other obstructions.

404.9 Testing and maintenance. Water sources, draft sites, hydrants and other fire protection equipment required by this code shall be subject to periodic tests as required by the code official. All such equipment installed under the provisions of this code shall be maintained in an operative condition at all times and shall be repaired or replaced where defective. Additions, repairs, alterations and servicing of such fire protection equipment and resources shall be in accordance with *approved* standards.

404.10 Reliability. Water supply reliability shall comply with Sections 404.10.1 through 404.10.3.

404.10.1 Objective. The objective of this section is to increase the reliability of water supplies by reducing the exposure of vegetative fuels to electrically powered systems.

404.10.2 Clearance of fuel. *Defensible space* shall be provided around water tank structures, water supply pumps and pump houses.

404.10.3 Standby power. Stationary water supply facilities within the wildland-*urban interface area* dependent on electrical power to meet adequate water supply demands shall provide

standby power systems in accordance with Chapter 27 of the *International Building Code,* Section 604 of the *International Fire Code* and NFPA 70 to ensure that an uninterrupted water supply is maintained. The standby power source shall be capable of providing power for a minimum of two hours.

Exceptions:

1. When *approved* by the code official, a standby power supply is not required where the primary power service to the stationary water supply facility is underground.
2. A standby power supply is not required where the stationary water supply facility serves no more than one single-family dwelling.

IWUIC SECTION 504
CLASS 1 INGNITION-RESISTANT CONSTRUCTION

504.1 General. Class 1 ignition-resistant construction shall be in accordance with Sections 504.2 through 504.11.

504.2 Roof covering. Roofs shall have a Class A roof assembly. For roof coverings where the profile allows a space between the roof covering and roof decking, the space at the eave ends shall be firestopped to preclude entry of flames or embers, or have one layer of 72-pound (32.4 kg) mineral-surfaced, nonperforated cap sheet complying with ASTM D 3909 installed over the combustible decking.

504.2.1 Roof valleys. When provided, valley flashings shall be not less than 0.019 inch (0.48 mm) (No. 26 galvanized sheet gage) corrosion-resistant metal installed over a minimum 36-inch-wide (914 mm) underlayment consisting of one layer of 72-pound (32.4 kg) mineral-surfaced, nonperforated cap sheet complying with ASTM D 3909 running the full length of the valley.

504.3 Protection of eaves. Eaves and soffits shall be protected on the exposed underside by ignition-resistant materials or by materials *approved* for a minimum of 1-hour fire-resistance-rated construction, 2-inch (51 mm) nominal dimension lumber, or 1-inch (25.4 mm) nominal fire-retardant-treated lumber or $^{3}/_{4}$-inch (19 mm) nominal fire-retardant-treated plywood, identified for exterior use and meeting the requirements of Section 2303.2 of the *International Building Code.* Fascias are required and shall be protected on the backside by ignition-resistant materials or by materials *approved* for a minimum of 1-hour fire-resistance-rated construction or 2-inch (51 mm) nominal dimension lumber.

504.4 Gutters and downspouts. Gutters and downspouts shall be constructed of *noncombustible* material. Gutters shall be provided with an *approved* means to prevent the accumulation of leaves and debris in the gutter.

504.5 Exterior walls. Exterior walls of buildings or structures shall be constructed with one of the following methods:

1. Materials *approved* for a minimum of 1-hour fire-resistance-rated construction on the exterior side.
2. *Approved noncombustible* materials.
3. Heavy timber or log wall construction.
4. Fire-retardant-treated wood on the exterior side. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the *International Building Code.*
5. Ignition-resistant materials on the exterior side.

   Such material shall extend from the top of the foundation to the underside of the roof sheathing.

504.6 Unenclosed underfloor protection. Buildings or structures shall have all underfloor areas enclosed to the ground with exterior walls in accordance with Section 504.5.

> **Exception:** Complete enclosure may be omitted where the underside of all exposed floors and all exposed structural columns, beams and supporting walls are protected as required for exterior 1-hour fire-resistance-rated construction or heavy timber construction or fire-retardant-treated wood. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the *International Building Code.*

504.7 Appendages and projections. *Unenclosed accessory* structures attached to buildings with habitable spaces and projections, such as decks, shall be a minimum of 1-hour fire resistance-rated construction, heavy timber construction or constructed of one of the following:

1. *Approved noncombustible* materials;
2. Fire-retardant-treated wood identified for exterior use and meeting the requirements of Section 2303.2 of the *International Building Code;* or
3. Ignition-resistant building materials.

504.7.1 Underfloor areas. When the attached structure is located and constructed so that the structure or any portion thereof projects over a descending slope surface greater than 10 percent, the area below the structure shall have all underfloor areas enclosed to within 6 inches (152 mm) of the ground, with exterior wall construction in accordance with Section 504.5.

504.8 Exterior glazing. Exterior windows, window walls and glazed doors, windows within exterior doors, and skylights shall be tempered glass, multilayered glazed panels, glass block or have a fire protection rating of not less than 20 minutes.

504.9 Exterior doors. Exterior doors shall be *approved* noncombustible construction, solid core wood not less than $1^3/_4$ inches thick (45 mm), or have a fire protection rating of not less than 20 minutes. Windows within doors and glazed doors shall be in accordance with Section 504.8.

> **Exception:** Vehicle access doors.

504.10 Vents. Attic ventilation openings, foundation or underfloor vents, or other ventilation openings in vertical exterior walls and vents through roofs shall not exceed 144 square inches (0.0929 m^2) each. Such vents shall be covered with *noncombustible* corrosion-resistant mesh with openings not to exceed $^1/_4$ inch (6.4 mm), or shall be designed and *approved* to prevent flame or ember penetration into the structure.

504.10.1 Vent locations. Attic ventilation openings shall not be located in soffits, in eave overhangs, between rafters at eaves, or in other overhang areas. Gable end and dormer vents shall be located at least 10 feet (3048 mm) from lot lines. Underfloor ventilation openings shall be located as close to grade as practical.

504.11 Detached accessory structures. Detached accessory structures located less than 50 feet (15 240 mm) from a building containing habitable space shall have exterior walls constructed with materials *approved* for a minimum of 1-hour fire-resistance-rated construction, heavy timber, log wall construction, or constructed with *approved noncombustible* materials or fire-retardant-treated wood on the exterior side. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the *International Building Code.*

504.11.1 Underfloor areas. When the detached structure is located and constructed

so that the structure or any portion thereof projects over a descending slope surface greater than 10 percent, the area below the structure shall have all underfloor areas enclosed to within 6 inches (152 mm) of the ground, with exterior wall construction in accordance with Section 504.5 or underfloor protection in accordance with Section 504.6.

Exception: The enclosure shall not be required where the underside of all exposed floors and all exposed structural columns, beams and supporting walls are protected as required for exterior 1-hour fire-resistance-rated construction or heavy-timber construction or fire-retardant-treated wood on the exterior side. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the *International Building Code.*

IWUIC SECTION 505
CLASS 2 IGNITION-RESISTANT CONSTRUCTION

505.1 General. Class 2 ignition-resistant construction shall be in accordance with Sections 505.2 through 505.11.

505.2 Roof covering. Roofs shall have at least a Class B roof assembly or an *approved noncombustible* roof covering. For roof coverings where the profile allows a space between the roof covering and roof decking, the space at the eave ends shall be firestopped to preclude entry of flames or embers, or have one layer of 72-pound (32.4 kg) mineral-surfaced, nonperforated cap sheet complying with ASTM D 3909 installed over the combustible decking.

505.2.1 Roof valleys. When provided, valley flashings shall be not less than 0.019 inch (0.48 mm) (No. 26 galvanized sheet gage) corrosion-resistant metal installed over a minimum 36-inch-wide (914 mm) underlayment consisting of one layer of 72-pound (32.4 kg) mineral-surfaced, nonperforated cap sheet complying with ASTM D 3909 running the full length of the valley.

505.3 Protection of eaves. Combustible eaves, fascias and soffits shall be enclosed with solid materials with a minimum thickness of $^{3}/_{4}$ inch (19 mm). No exposed rafter tails shall be permitted unless constructed of heavy timber materials.

505.4 Gutters and downspouts. Gutters and downspouts shall be constructed of *noncombustible* material. Gutters shall be provided with an *approved* means to prevent the accumulation of leaves and debris in the gutter.

505.5 Exterior walls. Exterior walls of buildings or structures shall be constructed with one of the following methods:

1. Materials *approved* for a minimum of 1-hour fire-resistance-rated construction on the exterior side.
2. *Approved noncombustible* materials.
3. Heavy timber or log wall construction.
4. Fire-retardant-treated wood on the exterior side. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the *International Building Code.*
5. Ignition-resistant materials on the exterior side.

Such material shall extend from the top of the foundation to the underside of the roof sheathing.

505.6 Unenclosed underfloor protection. Buildings or structures shall have all underfloor areas enclosed to the ground, with exterior walls in accordance with Section 505.5.

Exception: Complete enclosure shall not be required where the underside of all exposed floors and all exposed structural

columns, beams and supporting walls are protected as required for exterior 1-hour fire-resistance-rated construction or heavy timber construction or fire-retardant-treated wood. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the *International Building Code.*

505.7 Appendages and projections. Unenclosed accessory structures attached to buildings with habitable spaces and projections, such as decks, shall be a minimum of 1-hour fire-resistance-rated construction, heavy timber construction or constructed of one of the following:

1. *Approved noncombustible* materials;
2. Fire-retardant-treated wood identified for exterior use and meeting the requirements of Section 2303.2 of the *International Building Code;* or
3. Ignition-resistant building materials.

505.7.1 Underfloor areas. When the attached structure is located and constructed so that the structure or any portion thereof projects over a descending slope surface greater than 10 percent, the area below the structure shall have all underfloor areas enclosed to within 6 inches (152 mm) of the ground, with exterior wall construction in accordance with Section 505.5.

505.8 Exterior glazing. Exterior windows, window walls and glazed doors, windows within exterior doors, and skylights shall be tempered glass, multilayered glazed panels, glass block or have a fire-protection rating of not less than 20 minutes.

505.9 Exterior doors. Exterior doors shall be *approved noncombustible* construction, solid core wood not less than $1^3/_4$-inches thick (45 mm), or have a fire protection rating of not less than 20 minutes. Windows within doors and glazed doors shall be in accordance with Section 505.8.

Exception: Vehicle access doors.

505.10 Vents. Attic ventilation openings, foundation or underfloor vents or other ventilation openings in vertical exterior walls and vents through roofs shall not exceed 144 square inches (0.0929 m^2) each. Such vents shall be covered with *noncombustible* corrosion-resistant mesh with openings not to exceed $^1/_4$ inch (6.4 mm) or shall be designed and *approved* to prevent flame or ember penetration into the structure.

505.10.1 Vent locations. Attic ventilation openings shall not be located in soffits, in eave overhangs, between rafters at eaves, or in other overhang areas. Gable end and dormer vents shall be located at least 10 feet (3048 mm) from lot lines. Underfloor ventilation openings shall be located as close to grade as practical.

505.11 Detached accessory structures. Detached accessory structures located less than 50 feet (15 240 mm) from a building containing habitable space shall have exterior walls constructed with materials *approved* for a minimum of 1-hour fire-resistance-rated construction, heavy timber, log wall construction, or constructed with *approved noncombustible* materials or fire-retardant-treated wood on the exterior side. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the *International Building Code.*

505.11.1 Underfloor areas. When the detached accessory structure is located and constructed so that the structure or any portion thereof projects over a descending slope surface greater than 10 percent, the area below the structure shall have all underfloor areas enclosed to within 6 inches (152 mm) of the ground, with exterior wall construction in accordance with Section 505.5 or un-

derfloor protection in accordance with Section 505.6.

Exception: The enclosure shall not be required where the underside of all exposed floors and all exposed structural columns, beams and supporting walls are protected as required for exterior 1-hour fire-resistance-rated construction or heavy-timber construction or fire-retardant-treated wood on the exterior side. The fire-retardant-treated wood shall be labeled for exterior use and meet the requirements of Section 2303.2 of the *International Building Code.*

IWUIC SECTION 506
CLASS 3 IGNITION-RESISTANT CONSTRUCTION

506.1 General. Class 3 ignition-resistant construction shall be in accordance with Sections 506.2 through 506.4.

506.2 Roof covering. Roofs shall have at least a Class C roof assembly or an *approved noncombustible* roof covering. For roof coverings where the profile allows a space between the roof covering and roof decking, the space at the eave ends shall be firestopped to preclude entry of flames or embers, or have one layer of 72-pound (32.4 kg) mineral-surfaced, nonperforated cap sheet complying with ASTM D 3909 installed over the combustible decking.

506.2.1 Roof valleys. Where provided, valley flashings shall be not less than 0.019-inch (0.44 mm) (No. 26 galvanized sheet gage) corrosion-resistant metal installed over a minimum 36-inch-wide (914 mm) underlayment consisting of one layer of 72-pound (32.4 kg) mineral-surfaced, nonperforated cap sheet complying with ASTM D 3909 running the full length of the valley.

506.3 Unenclosed underfloor protection. Buildings or structures shall have all underfloor areas enclosed to the ground with exterior walls.

Exception: Complete enclosure may be omitted where the underside of all exposed floors and all exposed structural columns, beams and supporting walls are protected as required for exterior 1-hour fire-resistance-rated construction or heavy timber construction.

506.4 Gutters and downspouts. Gutters and downspouts shall be constructed of *noncombustible* material. Gutters shall be provided with an *approved* means to prevent the accumulation of leaves and debris in the gutter.

Memorandum

October 2, 2015

To: Urban Growth Boundary and Growth Scenarios Technical Advisory Committee

Cc: Project Team

From: City of Bend Growth Management Staff

Re: Scenario Evaluation – Factor 4 Analysis Technical Memorandum

Introduction

Purpose

The purpose of this memorandum is to describe the data sources and methodology of various performance measure evaluations conducted in "Stage 4" of the Bend Urban Growth Boundary (UGB) Remand project, the evaluation of alternative UGB expansion scenarios. This memorandum addresses the performance measures evaluated by City of Bend staff related to Goal 14 Factor 4 – Farm and Forest Compatibility (see Table 1). Details of the analysis and interpretation are provided in the Bend UGB Scenario Evaluation Report.

Table 1. Performance Measures in this Technical Memorandum

Performance Measure	Description	Page #
Community Outcome: Compatibility with Farms and Forests		
4.A.1	Farm practices on high value farm land adjacent to expansion areas	3
4.A.2	Impacts to irrigation districts	5
4.A.3	Proximity of expansion areas to designated forest land	6

Evaluation Tools

The evaluations described in this memorandum were completed using ArcGIS mapping software, analysis of tabular data, and visual analysis of additional geographic information. Specific data sources are listed for each performance measure.

Scenarios Evaluated

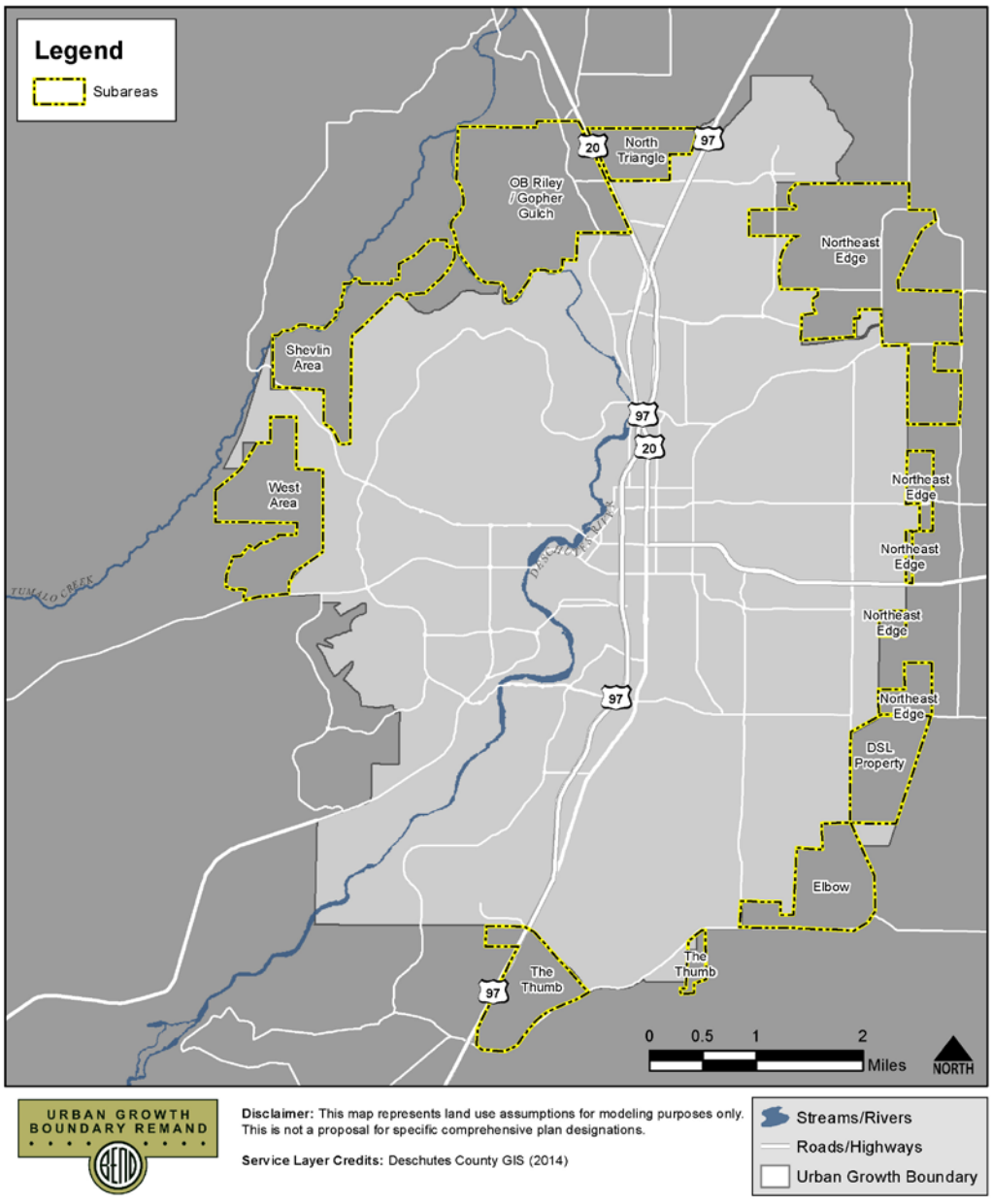
A total of six sets of land use assumptions were evaluated (Scenario 1.2; Scenario 2.1; Scenario 3.1; Supplemental Analysis Map 1; Supplemental Analysis Map 2; Supplemental Analysis Map 3); these are described in detail in the evaluation report. Each UGB Expansion Scenario and Supplemental Analysis Area Map (SAAM) is comprised of a set of land use assumptions describing the type and amount of housing, employment, and other uses in polygons within the existing UGB and in various expansion subareas. They are all consistent

with the City of Bend's overall housing and jobs need for the planning horizon, and use consistent assumptions for development on land inside the UGB.

Geographies

These performance measures were evaluated at the subarea level (see Figure 1), as well as for the entire expansion area (all areas that would be added to the UGB under a given scenario) and the City of Bend as a whole (the existing UGB plus the expansion area).

Figure 1. Subareas



Farm and Forest Compatibility

Performance Measure 4.A.1: Farm practices & high value farm land adjacent to expansion areas

Purpose

State law protects farm lands for lawful farming practices. Under state law, cities are required to consider the compatibility of proposed urban uses that may be located within a UGB to ensure such uses are compatible with adjacent farm practices occurring on nearby farm lands. The purpose of doing so is to ensure that urbanization does not:

(a) Force a significant change in accepted farm or forest practices on surrounding lands devoted to farm or forest use; or

(b) Significantly increase the cost of accepted farm or forest practices on surrounding lands devoted to farm or forest use.

Data Sources

- The Deschutes County Comprehensive plan map: Exclusive Farm Use (EFU) lands are those shown on the County Comprehensive Plan to comply with Statewide Planning Goal 3, Agricultural Land.
- Deschutes County inventory of Commercial Farms[1]
- Aerial photos.
- Irrigation District Boundary maps
- The UGB Scenarios and Supplemental Analysis Area Maps. Maps were prepared for each scenario and supplemental analysis area (SAAM) with a series of subarea maps to illustrate the location of EFU land within a ¼ mile buffer.

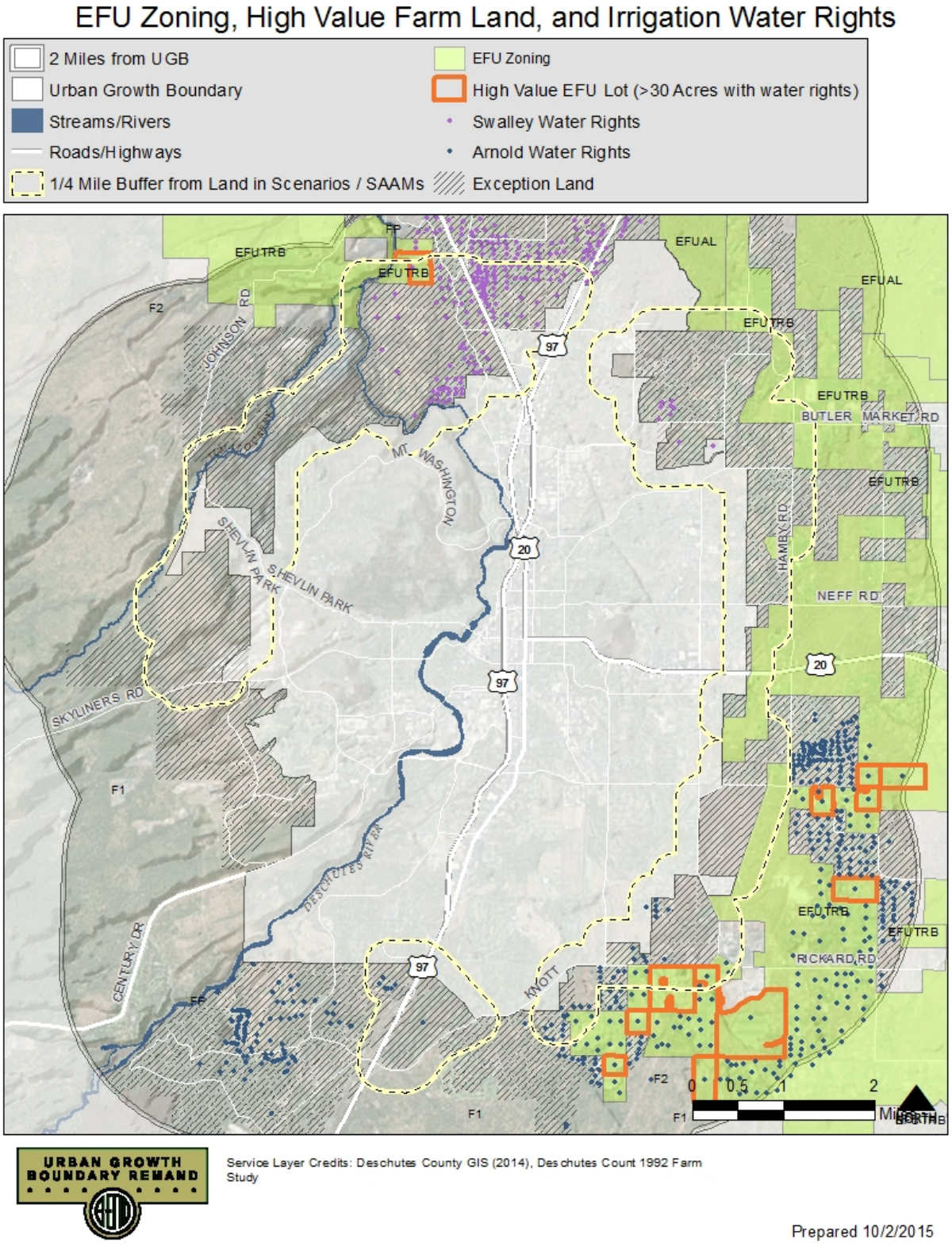
Methodology

A compilation of EFU lands from the Deschutes County Comprehensive Plan Map, the Arnold Irrigation District and Swalley Irrigation District, UGB Scenarios (3) maps, and SAAMs (3 maps) were used to identify properties within the different scenarios located within ¼ mile of farm lands. (Figure 1 identifies zoned EFU land and high value farm land adjacent to the potential UGB expansion areas that was further evaluated for this performance measure.) This is important because Factor 4 refers to farm uses and activities occurring on farm lands. This factor does not require the City to consider farm uses and activities occurring on exception lands.[2] Aerial photography was used to identify irrigated lands and potential active farm land. This was followed up with a windshield survey to verify actual use of farm land.

[1] In 1992, Oregon State University (OSU) Extension service conducted a farm study for Deschutes County; one product of this work was an inventory of commercial farm tax lots. This research examined a combination of data sources, including county assessor's data and field work (observation).

[2] Exception lands includes those lands for which Deschutes County has adopted an exception to Goals 3 (Agriculture) and 4 (Forest Lands). In Deschutes County, exception lands include, but are not limited to, lands designated for rural residential development on the County Comprehensive Plan Map.

Figure 1: Exclusive Farm Use zones, High Value Farm Land, and Irrigation Water Rights



Note that this evaluation did not consider the potential uses that might be adjacent to the active farm use. State law does not differentiate between adjacent proposed uses. However, where farm activity is adjacent to an employment use, particularly an industrial use, the compatibility concerns with an adjacent farm activity may be less. Residential use is typically more sensitive to certain farm practices such as machinery/ equipment operation, spraying, and farm odors.

Summary of Results

The following summarizes the results in the Data Sheet for this performance measure.

- The majority of the farm activity occurs along the east and southeast areas. All scenarios included subareas within ¼ mile proximity to an active commercial farm activity south of Knott Road.
- Three of the scenarios had at least two thirds of the subareas rated as Good (over a quarter-mile from the nearest commercial farm), including Scenario 2.1, SAAM-1 and SAAM-3.
- The other scenarios had one additional subarea within ¼ mile proximity of low impact farm activities, such as hay production.

Performance Measure 4.A.2: Impacts to Irrigation Districts

Purpose

As stated above, Factor 4 refers to farm uses and recognized farm activities on nearby farms, not exception lands. The irrigation impacts captured in this performance measure would assume the elimination of irrigation water deliveries and water rights from exception lands within the different expansion scenarios as these exception lands develop to urban standards with a few exceptions where the water rights serve park land and recreational uses. This could impact farm uses on designated farm land within the affected irrigation district if the district's financial viability is compromised or if assessments are increased for patrons that remain. There is also potential for impact to farm uses downstream of these intervening exception lands, though that has not been evaluated specifically.

Data Sources

- Irrigation District Boundary maps
- Delivery and acre foot assessment information for each subarea provided by Arnold Irrigation and Swalley Irrigation (Central Oregon Irrigation District did not provide any delivery location or water conveyance information)

Methodology

The City of Bend has 4 irrigation districts that have delivery operations within the current UGB and adjacent areas. These include:

- Arnold Irrigation, located primarily in the southwest and south east
- Central Oregon Irrigation District, located in the east and north east
- North Unit Irrigation District, does not deliver in Bend but instead delivers water from the Deschutes River north to Madras
- Swalley Irrigation District serves the north and northeast

The identification of properties served with irrigation water within the different scenarios was used to determine potential impacts to the Irrigation Districts. (Figure 1 identifies properties with Swalley and Arnold Irrigation water rights in and adjacent to the potential UGB expansion areas.) In determining impact to irrigation district operations and maintenance, it is not an either/or assessment. The number of deliveries has a financial impact, however the volume of water loss per deliver has both a financial and operational impact. If too many water rights are removed from a system the ability to deliver water to the end of the system is impaired.

The fewer the deliveries and the lesser the amount of water conveyed per scenario per district, the better the ranking, as summarized below.

Good	An expansion subarea has no water deliveries
Fair	An expansion subarea has fewer than 10 water deliveries and 20 total acre feet of irrigation water rights within any single irrigation district
Poor	An expansion subareas has more than 20 water deliveries and greater than 20 total acre feet of irrigation water rights within any single irrigation district

Summary of Results

Across all scenarios, the DSL Property, the West Area, and the Shevlin Area subareas are either not within an irrigation district or do not receive irrigation deliveries (thus receiving a "good" ranking). Swalley Irrigation serves many properties in the North Triangle, OB Riley / Gopher Gulch, and a few in the northern-most portion of the Northeast Edge (around Yeoman Road). Also across all scenarios where Swalley Irrigation has deliveries, the ranking was poor due to either the number of deliveries affected or the amount of water loss. Arnold Irrigation serves a number of properties in "The Elbow" as well as the "Thumb". Every scenario includes a portion of the "Thumb", which has a total of 149.73 acre feet of water delivered.[3] COID encompasses the rest of the Northeast Edge and the Darnell Estates area that has been included with the DSL Property subarea, though its deliveries are unknown at this time. The ranking of the subareas within the COID boundary was a "best guess". The assumption is that most properties within a subarea scenario that is within the COID boundary will receive irrigation water.

Performance Measure 4.A.3: UGB Expansion Subareas Proximity to Forest Lands

Purpose

State law protects forest lands for lawful forest practices, including forest operations, uses to conserve soil and wildlife habitat, and non-resource uses that may be compatible with forest operations. Under state law, cities are required to consider the compatibility of proposed urban uses that may be located within a UGB to ensure such uses are compatible with adjacent forest

[3] The Wards have a legal obligation to continue the operation of the Back Nine golf course, which would include irrigating the course. They could possibly use some of their water rights to irrigate common open space, new parks and school ball fields. However, the majority of the rights would be transferred elsewhere in the district or returned to the river which could impact Arnold irrigation operations significantly.

uses and practices occurring on nearby forest lands. The purpose of doing so is to ensure that urbanization does not interfere with or significantly increase the costs of conducting forest practices on designated forest lands. This serves the second purpose of not creating conditions in which a property owner subject to the Oregon Forest Practices Act needs to modify operations to satisfy the act due to increasing adjacent development[4].

Data Sources

The following data sources were used for conducting this analysis:

1. The Deschutes County Comprehensive Plan map; to identify those areas and parcels designated as Forest Lands under the Comprehensive Plan[5]
2. The March 2015 UGB Steering Committee packet; to identify how areas within the UGB study area were initially evaluated based on their distance from designated forest lands.
3. Deschutes County GIS data to measure the distance of a given parcel within a subarea from the closest designated Forest Lands.
4. The UGB Scenario and Supplemental Analysis Area Maps; to determine the distance of a given subarea from the closest designated Forest Lands.

Methodology

The County Comprehensive Plan Map, UGB Scenarios (3) maps, and SAAMs were used to measure the distance of land included in the scenarios and SAAMs from the closet designated Forest Lands. This is important because Factor 4 refers to forest uses and activities occurring on forest lands; it does not require the City to consider forest uses and activities occurring on exception lands. Ratings at the subarea level were assigned as follows:

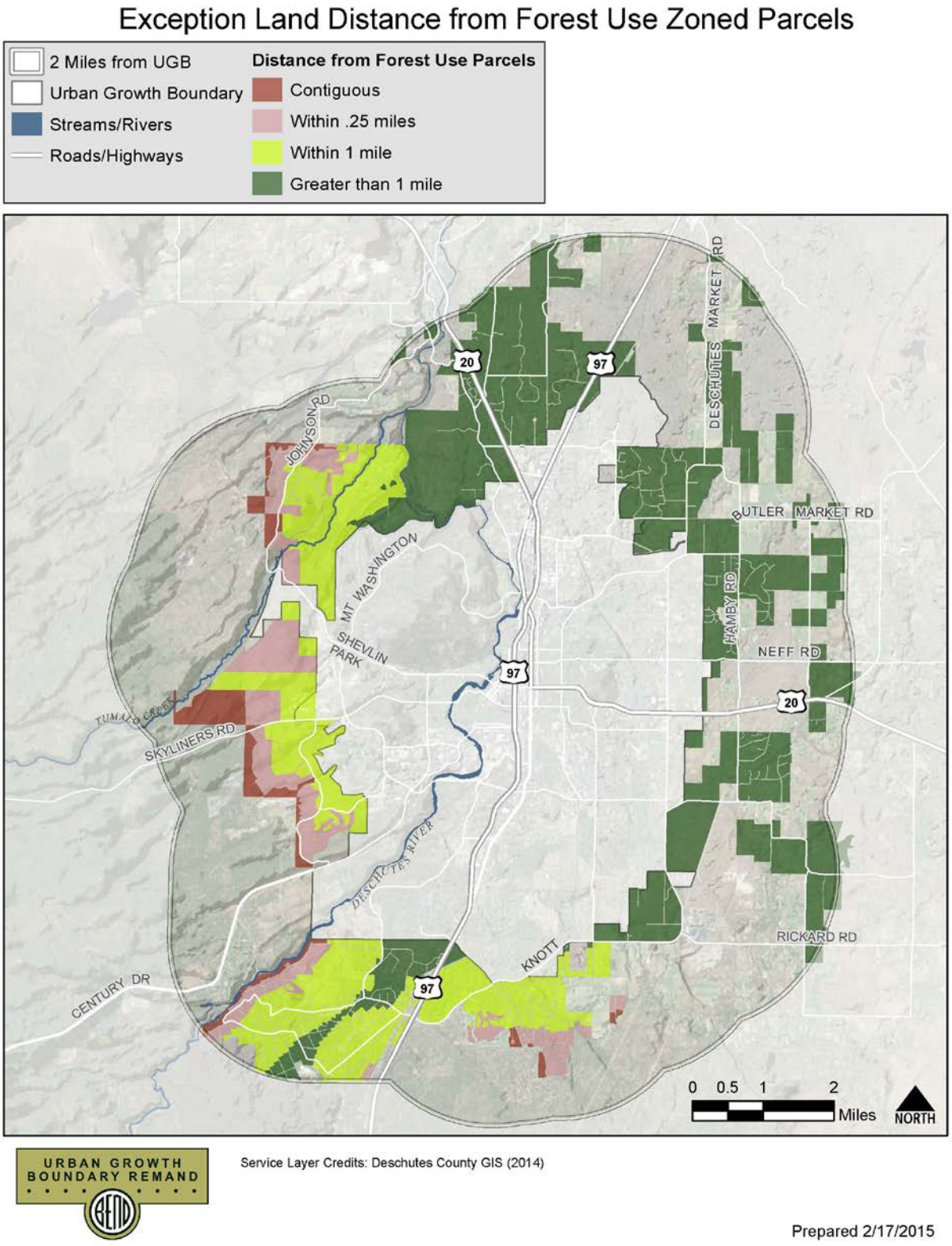
Good	An expansion subarea is located more than one mile from designated forest lands
Fair	An expansion subarea is located within one mile, but more than ¼ mile from designated forest lands
Poor	An expansion subarea is located within ¼ of designated forest lands

Scenarios received a rating of 1 (Poor) to 5 (Good) based on the number of subareas that were more than one mile from designated forest lands. Figure 2 shows the Stage 2 map of proximity to Forest land.

[4] For more information on the Oregon Forest Practices Act see http://www.oregon.gov/odf/privateforests/pages/fpakeys.aspx.

[5] The County complied with Goal 4 by inventorying and designating forest lands, and by creating and adopting policies in Section 2.3 of the County Comprehensive Plan. The County implements this designation of Forest Lands through the Forest Use 1 and 2 Zones under Chapters 18.36 and 18.40, respectively, of the Deschutes County Zoning Ordinance.

Figure 2: Distance to Designated Forest Land



Summary of Results

The following summarizes the results in the Data Sheet for this performance measure.

- One scenario, SAAM-2, received a score of 5. All of the subareas included in this scenario were more than one mile from designated forest lands.
- Two of the scenarios, Scenarios 1.2 and 2.1, received a score of 4. Five of the seven subareas included in in these scenarios were more than one mile from designated forest lands. Two of the seven subareas were within one mile, and more than one quarter (1/4) mile from designated forest lands.
- Three of the scenarios received a score of 3. These scenarios included Scenarios 3.1, SAAM-1, and SAAM-3. Two of these scenarios, Scenario 3.1 and SAAM01, each had one subarea that was within one mile of forest lands, and a second subarea that was within ¼ mile of forest lands. SAAM-3 received a score of 3 because one of the subareas included is within ¼ mile of designated forest lands.

Memorandum

October 7, 2015

To: Urban Growth Boundary and Growth Scenarios Technical Advisory Committee
Cc: Project Team
From: DKS Associates
Re: Scenario Evaluation: Transportation Analysis Technical Memorandum

Introduction

Purpose

The purpose of this memorandum is to describe the data sources and methodology of various performance measure evaluations conducted in "Stage 4" of the Bend Urban Growth Boundary (UGB) Remand project, the evaluation of alternative UGB expansion scenarios. The planning/legal context for this analysis is also described, along with summaries of key results for the performance measures. This memorandum addresses the performance measures evaluated by DKS Associates (see Table 1). Further details of the analysis and interpretation are provided in the Bend UGB Scenario Evaluation Report.

Table 1. Performance Measures in this Technical Memorandum

Performance Measure	Description	Page #
Community Outcome: Balanced Transportation System		
2.A.1	Vehicle Miles Traveled (VMT) per Capita	6
2.A.2	Average Trip Length	7
2.A.4	Congestion: Miles of Roadway that Exceed Mobility Standards and Relative Contribution to Congested Roadways	9
2.A.5	Walk/Bike Safety and Connectivity	11
2.A.6	System Connectivity & Progression of System Hierarchy	12
Community Outcome: Cost-Effective Infrastructure		
2.B.1	Total Cost of Transportation Infrastructure Improvements	14
2.B.2	Cost per Acre of Transportation Infrastructure Improvements	17

Evaluation Tools

The evaluations described in this memorandum were completed using the following tools:

- ArcGIS mapping software – This tool was used to provide mapping resources, including to lay out the conceptual street system, measure the approximate distances of for new

roadways, identify potential geographic properties (existing roads, rail, canals, etc.), and create map figures for presentation.

- Bend MPO Regional Travel Demand Model – This tool is the tool used to forecast future transportation growth and needs in Bend for the year 2028. The project team coordinated with Bend Metropolitan Planning Organization (MPO) staff and the Oregon Department of Transportation's (ODOT's) Transportation Planning Analysis Unit (TPAU), who manages the model, to prepare model scenarios that could be used to measure transportation system impacts for each growth configuration. A summary of key assumptions used in the transportation modeling is included on page 4.

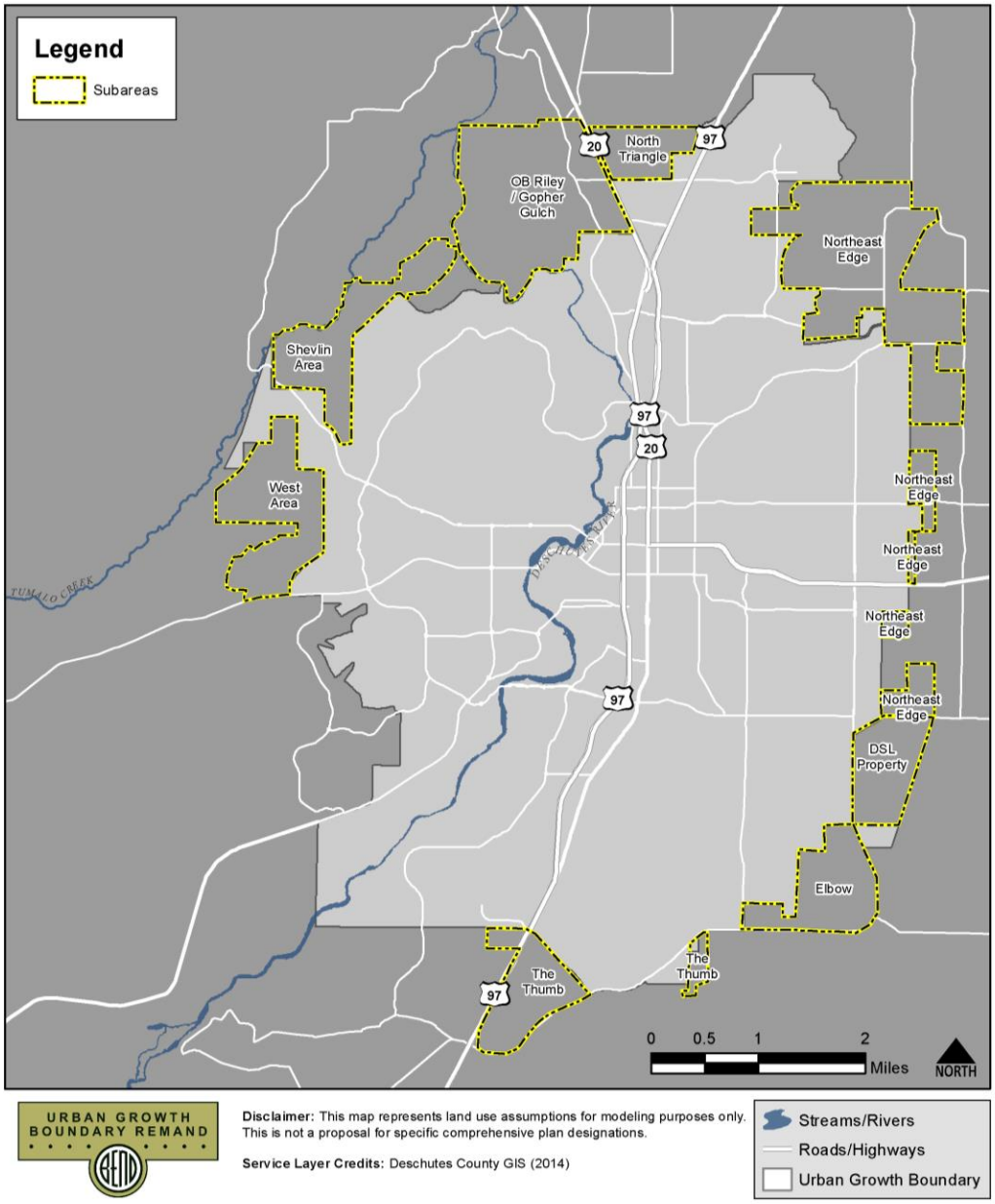
Scenarios Evaluated

A total of six alternatives were evaluated (Scenario 1.2; Scenario 2.1; Scenario 3.1; Supplemental Analysis Area Map 1; Supplemental Analysis Area Map 2; Supplemental Analysis Area Map 3); these are described in detail in the evaluation report. Each UGB Expansion Scenario and Supplemental Analysis Area Map (SAAM) is comprised of a set of land use assumptions describing the type and amount of housing, household demographics, employment, and other uses in polygons within the existing UGB and in various expansion subareas. They are all consistent with the City of Bend's overall housing and jobs need for the planning horizon, and use consistent assumptions for development on land inside the UGB.

Geographies

These performance measures were evaluated at the subarea level (see Figure 1), as well as for the entire expansion area (all areas that would be added to the UGB under a given scenario) and the City of Bend as a whole (the existing UGB plus the expansion area).

Figure 1. Subareas



Legal and Planning Context

The key regulatory drivers reside in Goals 12 (Transportation) and 14 (Urbanization), and their administrative rules, as well as the Remand Order. Division 24 implements Goal 14, and requires that the relative advantages and disadvantages and costs of alternative UGB expansion areas with respect to transportation be compared. This should be done through coordination with ODOT. The City and Bend MPO have been meeting regularly with ODOT to coordinate this modeling work. Impacts to existing facilities inside the current UGB, and proposed areas for addition, as well as the need for new transportation facilities such as highways and other roadways, interchanges, arterials and collectors, additional travel lands, and other major improvements on existing roadways, and public transit services be considered. The

rule requires a balancing of these impacts with other public infrastructure systems and other Goal 14 factors. Division 12 generally requires city TSPs to be coordinated and consistent with MPO regional plans. In the case of Bend, the MPO recently updated its Metropolitan Transportation Plan (MTP) to reflect needed improvements to major roadways (such as arterials, the highway, vs. local streets) for the time period between 2010 and 2040. This plan was approved by ODOT as well as the FHWA, and thus, establishes the major system improvements which are anticipated to be funded and built between 2010 and 2040. It is a financially constrained plan, which reflects anticipated funding streams leading to system improvements. The MTP also makes assumptions about Bend's major road network, which in this case is based upon recently approved (and Acknowledged by DLCD) finance plan residing in the Bend TSP. The modeling work reflected in this memorandum uses the MTP system improvements assumed by 2028 for consistency with the Division 12 requirements.

Key Travel Demand Model Assumptions

The Bend MPO Regional Travel Demand Model is a tool that utilizes an evaluation of supply (the transportation network) and demand (trip making generated from land use) to forecast the movement of people throughout the City. The model provides outputs that help assess network performance such as roadway volume and congestion at a regional scale, meaning that the network is limited primarily arterials and collectors (not local streets). Key inputs developed for the travel demand model evaluation, as described in the following sub-sections, include land use, transit service, regional growth, and transportation network.

Land Use

The land use inputs are aggregations of population and employment in transportation analysis zones for all areas in the Bend MPO boundary. Population (and corresponding demographic data) is represented by the number of households, the size of households, the income level of the households, and the average age of the head of household. Existing census data and outputs of the Envision Tomorrow development evaluation were used to update the population demographics.

The location and amount of land use by type was determined from updated buildable land inventories, economic opportunities analysis, and land use designations. For each of the six scenarios developed, the land use assigned to zones within the current UGB are the same, and also reflect the Opportunity Sites and efficiency measures underlying the UGB capacity and expansion analysis. Land use data for the proposed UGB expansion areas were developed based on the proposed development mixes. In all scenarios, the same population and employment totals for the City were maintained (approximately 122,000 people and 68,000 jobs).

Transit Service

The public transit system routes and frequency are an important factor for determining mode-split in the travel forecasts. For each of the six scenarios evaluated, the Bend MPO Metropolitan Transportation Plan (MTP) mid-term transit system improvements were incorporated. This system is very close to the recently funded transit system improvements that

are just beginning service. This assumption is consistent with the MPO RTP assumptions for transit service.

Regional Growth

The Bend MPO travel demand model includes roadways and traffic volumes that enter/exit the Bend urban area via major roadways such as US 97 and US 20. Traffic growth on these corridors takes into account regional growth (i.e., growth in surrounding cities or other parts of the state) that would travel to or through Bend. Previous versions of the Bend MPO travel demand model, such as the 2003 and 2030 scenarios utilized for the prior UGB study, utilized estimations from ODOT on these corridors that relied heavily upon historical growth trends. For the six scenarios evaluated for 2028, an updated estimate for growth on these corridors was utilized that is based on interpolating from the recent Bend MTP 2040 scenario. This is a key difference, as the Bend MTP 2040 scenario model was estimated by a newer technique that integrates with the statewide travel demand model to enhance predictions of growth on major regional corridors. The outcome of this revised approach is that the forecasted year 2028 traffic volumes on US 20 west of Cooley Road and US 97 south of Knott Road are significantly lower than prior year 2030 estimates, resulting in less congestion on the transportation network.

Transportation Network

The travel demand model transportation network for the six scenarios was based on the Bend MPO MTP financially constrained planned improvements, which is a subset of the City, County, and State planned improvements that was determined to be reasonably likely given anticipated funding sources. Key roadway capacity projects within the current UGB area from the MTP that are assumed in the 2028 future travel model networks include:

- State Highway System (implementation by 2028 from the overall 2040 project list[1])
  - US 97 / Murphy Road Interchange, including northbound on-ramps and southbound off-ramps
  - US 97 / Cooley Road grade-separation and control improvements (the “mid-term” improvements)
  - US 97 / Empire Avenue northbound off-ramp widening
  - US 20 / 4th Street traffic signal
- City Roadway System
  - Reed Market Road 3rd Street to 27th Street G.O. Bond improvements
  - Murphy Road Phase I, including the US 97 overcrossing and the 3rd Street roundabout
  - Empire Avenue widening from 3rd Street to US 97
  - Empire Avenue extension from Purcell Boulevard to 27th Street
  - Murphy Road extension from Brosterhous Road to 15th Street
  - Frontage roads near the US 97 / Murphy Road interchange

[1] Additional State Highway improvements are identified in the MTP for implementation beyond 2028 through 2040. This subset of projects identifies projects that are assumed to be reasonably implemented by 2028.

- Britta Street extensions from Robal Road to Empire Avenue and from Ellie Lane to Halfway Road
- Purcell Boulevard extension from Holiday Avenue (north) to Holiday Avenue (south)
- Mervin-Samples Road extension from 3rd Street to Empire Avenue
- O.B. Riley Road widening from Glen Vista Road to Archie Briggs Road
- 18th Street widening from Cooley Road to Empire Avenue
- 27th Street widening from Bear Creek Road to Ferguson Road

In addition to the roadway capacity projects included in model scenarios, each expansion scenario included unique roadway connections to provide access to proposed growth areas. Project tables and graphics showing these improvements are provided as an attachment (see Figures 62-73).

Balanced Transportation System

Performance Measure 2.A.1: Vehicle Miles Traveled per Capita

Purpose

The Remand requires an evaluation of vehicle miles traveled (VMT) per capita to determine if State Transportation Planning Rule requirements are met. In addition to this requirement, VMT per capita generally demonstrates the combined reliance on the automobile, proximity between land uses, and efficiency of the transportation system. Lower VMT can result from short auto trips and/or trips made by other modes such as walking, biking, or transit. Lower VMT values can indicate that the population has access to other travel modes and/or that the desired destinations (such as school, work, or shopping) are close to home or well connected. These causes for VMT reduction are generally seen as improvements to quality of life.

Data Sources

The regional travel demand model was used to measure VMT for each scenario. The travel demand model scenarios were based on land use quantities and demographics from the Envision Tomorrow tool and the Housing Needs Analysis. The base roadway network was based on assumptions from the Bend MPO's Metropolitan Transportation Plan and additional links developed by the project team to connect to the potential expansion areas.

Methodology

The methodology for measuring VMT was based on requirements in the Transportation Planning Rule and coordination with the Department of Land Conservation and Development (DLCD). The technical methodology details have been previously documented[2]. In general, the methodology seeks to estimate daily VMT for internal trips (beginning and ending in the Bend UGB) by analyzing the total daily trips over the transportation network. The rating for each

[2] Memorandum: Bend UGB Remand Phase 2 (Task 9.10.1-2 – Scenario Evaluation Methodology), prepared by DKS Associates, June 15, 2015.

scenario's results are relative to a base year target for VMT/Capita reduction (e.g., less than 9.64 VMT/Capita from the 2010 year model[3]). Good would be a reduction in VMT/Capita. Fair is an increase of less than 4%.

Summary of Results

The range of VMT results is from 9.92 (a 2.9% increase over 2010 and 8.1% increase over 2003) to 10.13 (a 5.1% increase over 2010 and 10.3% increase over 2003) daily VMT per capita, with Scenario 2.1 performing best and SAAM-1 performing worst. See Data Sheet for this Performance Measure for full results. In general, each scenario increased VMT relative to 2010 due to the amount of growth located outside the geographic center of the city, which is a primary draw for shopping, services, work, and other activities. Scenarios that focused expansion area growth along major corridors connecting to the center of the City (e.g., a node of growth along Butler Market Road) and have a mix of uses to create complete neighborhoods performed better. Details of trip-lengths for each subarea, provided in Measured 2.A.2, combined with the amount of growth assigned to each subarea also explains the differences between scenarios (i.e., more growth to assigned to areas with lower average trip-lengths improves overall VMT).

The following ranking was applied to the overall scenarios based on VMT per capita relative to year 2010:

- 5 (best) – VMT/capita reduction from 2010 (no scenarios)
- 4 – VMT/capita unchanged from 2010 (no scenarios)
- 3 – VMT/capita minor increase from 2010 (less than 4%)
  - Scenario 2.1 and Scenario 3.1
- 2 – VMT/capita moderate increase from 2010 (4% to 9%)
  - Scenario 1.2, SAAM-1, SAAM-2, SAAM-3
- 1 (worst) – VMT/capital major increase from 2010 (greater than 9%) – no scenarios

Performance Measure 2.A.2: Average Trip Length

Purpose

Average trip length serves the same general purpose of VMT per capita. However, this measure also provides additional detail relative to individual growth areas compared to each other (or other areas of the City). In essence, this measure, combined with the amount of growth in each subarea, informs how a particular area is contributing to the citywide VMT/capita.

[3] The project team is working with DLCD to determine whether Bend may use the base 2010 model for the VMT analysis, given that the Remand specifies 2003 as the baseline year, but the 2010 model is a better reflection of 2008 and includes other important updates and improvements. The distinction is important because VMT increased by nearly 5% between 2003 and 2010 (VMT per capita in 2003 was estimated at 9.18, versus 9.64 in 2010). For purposes of analysis, the project team is evaluating both 2003 and 2010 as baseline years.

Data Sources

The regional travel demand model was used to measure the average trip length for each scenario and growth area. The travel demand model scenarios were based on land use quantities and demographics from the Envision Tomorrow tool and the Housing Needs Analysis. The base roadway network was based on assumptions from Bend MPO's Metropolitan Transportation Plan.

Methodology

The methodology used to measure average trip length generally follows the methodology used for calculating VMT per capita, with the difference being that the total distance (or VMT) is reported relative to the number of trips in an analysis zone rather than the population. The per trip, not per capita, distance measure an important variation as it captures both employment and residential trip ends. This measure was obtained and reported for each of the four area types (individual growth areas, sum of growth areas, existing UGB, and overall future UGB).

Summary of Results

The average trip length by scenario for each Transportation Analysis Zone (TAZ), the geographic units used for transportation modeling, is shown in attached Figure 1 through Figure 6. In general, areas that are located more centrally to Bend's core, and those areas that have a balance of uses (within the subarea and/or adjacent subareas) will typically have shorter average trip lengths. Outer areas that do not have a well-balanced mix of uses (e.g., primarily residential or primarily employment) typically have longer average trip lengths due to the need for further travel to/from origins or destinations (e.g., outer residential use traveling to the central city core for retail needs).

Overall, the scenarios perform with a relatively similar ranking to the results of Measure 2.A.1.

- Scenario 2.1 (7.51 miles per trip - Score: 5) - Less growth in the "Thumb" and more in the better performing areas on the east-side improve overall average scenario trip-length. Bringing in the entire "Elbow" area to allow a connection from 15th/Murphy area to Rickard Rd. significantly improved the scenario.
- Scenario 3.1 (7.57 miles per trip – Score: 4) - Increased growth in the "Shevlin" area increased overall average scenario trip-length. More mixed-use development in OB Riley/Gopher Gulch helps this scenario.
- SAAM-3 (7.62 miles per trip – Score: 3) - More employment focus in the "North Triangle", the lack of connection from Rickard to 15th, and more growth in the West Area increases the overall average scenario trip length.
- Scenario 1.2 (7.64 miles per trip – Score: 2) - Significant magnitude of growth in the "Thumb" area, the worst performing sub-area, increased overall average scenario trip length.
- SAAM-2 (7.66 miles per trip – Score: 2) - Less growth in the eastside, combined with the lack of connection from Rickard to 15th, increases the overall average scenario trip length.
- SAAM-1 (7.68 miles per trip – Score: 2) - Increased growth in the "Shevlin" area increased overall average scenario trip-length.

General subarea observations include:

- The existing UGB has a lower average trip length than all growth areas due to proximity to existing uses inside the UGB.
- The central core of the City has trip lengths lower than the average for the existing UGB. Therefore, more growth in this area, relative to other areas of the City, would improve the system VMT.
- The eastern subareas typically perform better (lower average trip length) than others, including:
    - DSL Property generally has the lowest average trip length, ranging from 8.41 to 9.02 miles per trip.
    - NE Edge generally has the second lowest average trip length, ranging from 8.93 to 9.17 miles per trip.
    - The Elbow ranges from 8.82 to 9.47 miles per trip, with the lower trip lengths occurring when a complete grid is provided from 15th Street to 27th near Rickard Road.
- The Thumb and Shevlin area both typically have the highest average trip length, ranging from 10.23 to 12.15 miles per trip.
- Other northern and western subareas (North Triangle, West Area, OB Riley/Gopher Gulch) typically have intermediate average trip lengths that range from 9.05 to 9.83 miles per trip.

See Data Sheet for this Performance Measure for a roll-up of results by subarea and alternative.

Performance Measure 2.A.4: Miles of Roadway that Exceed Mobility Standards & Relative Contribution to Congested Roadways

Purpose

The level of congestion on the transportation system can indicate the quality of the system from a motor vehicle standpoint. Increasing levels of congestion may not only require more time spent in a vehicle, but may also affect the time of trips or, ultimately, reduce trips. These actions can reduce quality of life and may also lead to economic impacts due to delayed goods movement and/or reduced trips to local merchants.

Data Sources

The regional travel demand model was used to measure the travel network congestion for each scenario and relative contributions from each growth area. The travel demand model scenarios were based on land use quantities and demographics from the Envision Tomorrow tool and the Housing Needs Analysis. The base roadway network was based on assumptions from Bend MPO's Metropolitan Transportation Plan.

Methodology

The weekday p.m. peak hour travel demand model for each scenario was used to identify future congestion for the roadway network. Congested roadways were defined as any location with a demand to capacity (V/C) ratio above 1.0. These locations indicated roadway segments that the model identifies would be congested since there would be demand for more trips than can be

served. For each scenario, the total miles of roadway that have a V/C >1.0 were reported. For each growth area, the proportion of total trip distance (or VMT) using those congested corridors was reported.

Good scores represent less impact on congested roadway areas. Impact to highway corridors (US 97 or US 20) that do not have planned improvements are weighted more significant than congested City corridors. This is due to the link capacity in the model for City corridors generally not reflecting the additional through capacity on urban arterial 3-lane arterials that have center turn lanes, good access control, and high capacity intersections (e.g., roundabouts), which in most cases can serve the forecasted demand.

For the overall proposed UGB Boundary, the values are not VMT (just total miles of congested roadways) to provide a measure of the overall level of congestion in the system.

Summary of Results

Total congestion and volume for each scenario is shown in attached Figure 7 through Figure 12. Traffic contribution on congested links for each scenario and growth area is shown in attached Figure 13 through Figure 54. Figure 55 includes a table of congested model links for each scenario.

The following observations were made about the growth areas across the scenarios:

- The North Triangle and OB Riley/Gopher Gulch generally contribute to congested facilities on the north end of Bend and therefore typically have higher levels of congestion.
- The DSL Property and The Elbow both contribute to a congested segment of 27th Street and generally have higher levels of congestion contribution than other growth areas.
- The Shevlin area has the smallest contribution to congested corridors.
- The NE Edge, The Thumb, and West Area all have low/medium contribution to congested corridors.

The following observations were made at the scenario level:

- SAAM-1 performs the best overall with 13.43 peak hour miles of congested roadway. There is less growth in the North Triangle and OB Riley Area, which (across scenarios) typically contribute to congested roads. There is more growth in the Shevlin Area, which reduces the overall corridor congestion.
- Scenario 3.1 performs the worst overall with 14.66 peak hour miles of congested roadway. This scenario has the most growth in the North Triangle and OB Riley/Gopher Gulch, causing significant impact on state highways.
- Other remaining scenarios (Scenario 1.2, Scenario 2.1, SAAM-2, and SAAM-3) generally perform between the other two.

See Data Sheet for this Performance Measure for a roll-up of results by subarea and alternative.

Performance Measure 2.A.5: Walk/Bike Safety and Connectivity

Purpose

Providing transportation options for various modes of travel supports a balanced transportation system. Pedestrian and bicycle activity are encouraged by providing safe and well-connected networks. If potential pedestrian and bicycle users do not feel safe or do not have adequate facilities, they may be forced to rely on the automobile, leading to a less-balanced transportation system.

Data Sources

GIS data provided by City of Bend and Deschutes County and aerial photography was used to identify features that would present potential opportunities and constraints to pedestrians and bicycles. The travel demand model for each scenario was used to identify potential locations for future roadway widening that could result in a barrier for pedestrians and bicycles.

Methodology

The qualitative evaluation included three primary components that were considered for each growth area in each scenario:

- Connectivity to adjacent areas – This criterion considered the potential connectivity to the surrounding transportation system (via collectors and arterials[4]) adjacent to the growth area. Growth areas that were isolated would have poor connectivity, while those that bordered adjacent roadways would have some connectivity and those that were connected to roadways and trails would have the preferred level of connectivity to surrounding areas.
- Connectivity within the subarea – Each growth area was reviewed to determine how well pedestrian and bicycle connectivity could be provided on-site to promote movement within the areas. Areas with the ability to design a well-connected roadway grid would provide the best connectivity within the area, while the presence of constraints such as rail or canals would limit the connectivity potential for the area and would require longer trips for pedestrians and bicyclists.
- Safety barriers within the subarea – The presence of major roads within the growth areas provides mobility for motor vehicles, but it also reduces safety for pedestrians crossing these streets and/or bicyclists that travel on these roads. Each growth area was reviewed to determine if the collector and arterial grid would require roadways larger than a 3-lane section based on a review of the roadway capacity needs. The presence of these roadways would decrease the safety of pedestrians and bicycles.

[4] Collectors and arterials serve as the spine of the transportation system. Connections to these routes generally provide opportunities for connecting to other routes and local streets as well as potential for future transit connections (pending future service enhancements). Local streets adjacent to subareas can also be used for pedestrian and bicycle travel, however they may be indirect (depending on individual alignment and destination). Further, since the local street detail of growth areas has not been identified, it is unknown how well such streets would align with the adjacent areas and adjacent collectors/arterials may be needed for intermediate route connections.

Based on the opportunities and constraints identified in the qualitative assessment of the three combined factors noted above, each area was rated good, fair, or poor. In general, good areas are locations with good connectivity to the adjacent transportation infrastructure and few barriers within the site. Fair areas have either worse connectivity or some site barriers. No internal roadways are planned to be larger than 3-lanes for the potential growth areas, so significant safety barriers within the sites was not a key differentiator. Figure 56 through Figure 61 map the opportunities and constraints for each scenario and growth area.

Summary of Results

See Data Sheet for this Performance Measure for full results by growth area for each scenario. The following general observations were made about each growth area:

- Areas that generally perform well
  - DSL Property generally offers both a good grid within the area and adjacent trail connections to surrounding areas.
  - The NE Edge generally has good trail connections, with the exception of Scenario 1.2 and SAAM-1, where the dispersed development location would reduce the connectivity to trails.
- Areas that generally fare moderately
  - The Elbow would generally fare moderately due to the partial collector grid, except the additional buildout under Scenario 2.1 could allow the extension of Murphy Road, which would further enhance the connectivity in the area.
  - The Thumb would generally fare moderately due to the partial collector grid, except the additional buildout under Scenario 1.2 could allow the bisecting collector to be extended and improve connectivity.
  - The Shevlin area would have limited connections in Scenario 3.1 but the additional expansion in SAAM-1 would provide good connectivity.
  - North Triangle does not include trail connections, but does include a grid system for roadways.
  - The West area has a good collector grid and limited trail system.
  - The OB Riley/Gopher Gulch area includes connectivity via OB Riley. However, as the area expands further west (Scenario 3.1 and SAAM-2) growth areas become isolated and spread further from the connections to OB Riley.

Performance Measure 2.A.6: System Connectivity & Progression of System Hierarchy.

Purpose

Transportation systems are constructed by a hierarchy of streets using a functional classification system. All streets provide some balance of mobility (getting traffic through the “pipe”) and access (getting travelers to their desired building or destination). Arterial streets (a higher designation) typically provide high mobility and result in less access, while local streets (a lower designation) provide less through-traffic mobility but more direct access or driveways. Maintaining a well-spaced system of roadways is critical for ensuring that both access and mobility are achieved in the transportation system grid.

Data Sources

The functional class map from the City of Bend GIS data provided by City of Bend and Deschutes County, and aerial photography was used to identify existing roadway system and opportunities for future enhancements to the grid system.

Methodology

This qualitative measure was based on the ability of the growth area to support an ideal roadway grid spacing of one mile for arterials and one-half mile for collectors. The assumed potential for the new arterials and collectors within each growth area was based on the existing roadway grid system and other constraints (e.g., development, terrain, rail, etc.). The assumed roadway network by scenario for each growth area is shown in attached Figure 62 through Figure 67. Good areas have the ability to provide access to development areas via a hierarchy of local, collector, and arterial roadways. Poor areas would likely provide access directly to higher class roadways. Overall results are for variations of sub-areas, not combined scenario results.

Summary of Results

See Data Sheet for this Performance Measure for full results by growth area for each scenario. In general, partial expansion in areas would limit opportunities for connecting system roadways, while scenarios that include full development of a growth area would have a greater opportunity to enhance complete the system and improve connectivity in that area.

The following general observations were made about each growth area:

- Areas that generally perform well
    - OB Riley/Gopher Gulch includes a local grid opportunity with OB Riley as a spine roadway for the area. However, as the area expands further west (Scenario 3.1 and SAAM-2) growth areas become isolated and spread further from the connections to OB Riley.
- Areas that generally perform moderately
    - Shevlin and West Areas includes some ability to provide collectors, but difficult to connect local streets.
- Areas that generally perform moderately, but may be enhanced with broader development in the expansion area.
    - The Thumb allows some collector connection, but only with Scenario 1.2 does it allow a full extension from China Hat to Knott.
    - The DSL property would allow only a partial north/south collector under partial development, but would allow a complete north/south collector to Stevens Road under Scenario 2.1
    - North Triangle would have some connectivity, but it would not include a connection to the west under half of the scenarios (Scenario 1.2, Scenario 2.1, and SAAM-1), The other scenarios that expand to Old Bend-Redmond highway would enhance the connectivity in the subarea.
- Areas that generally perform poorly

- The NE Edge includes direct access onto major roadways and does not provide a hierarchy that feeds onto local roads that then distribute traffic to collectors.
- The Elbow does not allow for a complete east/west collector connection and has poor connectivity, except for Scenario 2.1 that extends Murphy Road from 15th to Rickard.

Cost-Effective Infrastructure

Performance Measure 2.B.1: Total Cost of Transportation Infrastructure Improvements

Purpose

Transportation improvements will be needed to provide access to new growth areas and to provide adequate capacity and multi-modal connectivity within the existing urban area to integrate and manage the growth. Funding required to address transportation improvements can be substantial (such as the $156M of roadway capacity improvements identified in the Bend MPO MTP) and may be an important factor for selecting a preferred boundary alternative.

Data Sources

The following data sources were used to develop the cost of transportation improvements for each cost component (described further in the following section):

- Base roadways – The total distance for new roadways was measured using GIS data for the framework of the collector and arterial grid sketched by the project team.
- Roadway capacity improvements – The travel demand model was used to identify locations where capacity improvements would be needed.
- Intersection capacity improvements – The travel demand model was used to estimate intersections that would exceed typical demand that would trigger a roundabout or traffic signal improvement. ODOT's preliminary signal warrants were also used to establish thresholds for potential intersection control improvements for all regional intersections (both local Bend system and State system).
- Roadway unit costs - The City of Bend provided unit costs for roadway improvements based on recent construction projects in Bend. Since these recent costs were for a subset of the overall project types, a cost-index factor[5] was determined to update the set of unit costs used in prior Bend SDC analysis. The following unit costs were used:
  - Intersection capacity – $2.37 million[6]
  - New 2 lane collector - $1,195 per foot

[5] Recent unit costs for Reed Market Road of $1,085 per foot were divided by the prior comparable SDC costs of $492 per foot, which resulted in an escalation factor of 2.21 from prior project costs. This factor was applied to the prior cost estimates for other roadway types to derive the unit costs listed for each item.

[6] Based on average roundabout cost at Empire/18th ($2.7 million), Simpson/Mt Washington ($2.2 million), and Powers/Brookswood ($2.2 million)

- New 2 lane arterial - $1,447 per foot
- Upgrade 2 to 3 lane arterial - $1,085 per foot
- Canal crossing - $3.7 million per location
- RR overpass - $14.2 million per location

Methodology

The following methodologies were applied to identify transportation costs related to each component:

- Base roadways – The locations for the base collector and arterial grid system were developed using an ideal spacing of one mile for arterials and one-half mile for collectors. The assumed locations for the new arterials and collectors within each growth area were based on the existing roadway grid system and other constraints (e.g. development, terrain, rail, etc.). The distances for new roads were measured using GIS. Costs for each road were estimated by applying an average roadway unit cost to the total roadway distance. Unit costs varied by type of roadway improvement (e.g., new two-lane collector, upgrade two-lane rural arterial, etc.). Right of way costs were also considered (assumed to be $10 per square foot).
- Roadway capacity improvements – The congested roadways from the travel demand model were reviewed to identify streets that would require capacity improvements beyond the improvement projects identified in the Bend MPO MTP and the City TSP reasonably funded projects. On the state highway system, if corridor demand was forecasted to exceed capacity, but the volumes were less than those in the Bend MPO MTP, additional mitigations were not recommended. On the City roadway system, the congested roadways were reviewed to determine if the demand exceeded capacity or would just be a congested condition, the latter not requiring widening mitigation. Like the base roadway costs, the unit costs for each capacity improvement were applied to the improvement length to derive the total cost.
- Intersection capacity improvements – The travel demand model was used to identify intersections that were forecasted to have traffic volumes that exceed levels that are typically served by stop-control. ODOT's preliminary signal warrants were used to set volume thresholds for major and minor street intersection approaches for roads in the regional travel demand model. Intersections that exceeded the threshold and are currently planned for stop-controlled were identified as candidates for intersection control improvements. The high level analysis did not identify control specifics related to traffic signals or roundabouts. Since roundabouts are preferred in Bend and typically have higher initial installation costs, average roundabout costs from City data were assumed for each identified intersection improvement location.

The costs for the three components were summed to provide an overall transportation cost for each scenario. These costs do not reflect currently planned transportation improvement programs such as the Bend MPO MTP and the City's SDC and CIP program. Therefore, the costs identified for each scenario are costs that are in addition previously planned (and reasonably funded) improvements. This high-level infrastructure analysis does not capture

additional urban upgrades that may be needed, such as frontage improvements that may be required by development along arterial, collector, or local roads.

Summary of Results

Table 2 summarizes the total Scenario cost for each cost component attributed to the UGB Expansion. Individual scenario project maps (Figure 62 through Figure 67) and tables (Figure 68 through Figure 73) are attached that summarize the project details and costs included in each component.

Table 2. Scenario Transportation Costs ($ Millions) Attributed to the UGB Expansion

Cost Element	Scenario 1.2	Scenario 2.1	Scenario 3.1	SAAM-1	SAAM-2	SAAM-3
Base Roadways	175.0	146.7	160.4	148.7	134.0	130.9
Roadway Capacity	16.0	0.0	4.8	2.5	4.8	4.8
Intersection Capacity	9.5	7.1	4.7	9.5	11.8	7.1
Total	200.5	153.8	169.9	160.8	150.6	142.8

In addition to the costs listed in Table 2, there are two improvement projects identified through the analysis that appear to be necessary with or without the proposed UGB expansion, which would be attributable to growth in the current UGB, but are not currently planned/funded:

- US 20 / Old Bend-Redmond Highway intersection improvements - $2.4M
- US 20 / Cooley Road intersection improvements - $1.6M

General observations about each scenario include:

- SAAM-3 has the lowest overall transportation cost, resulting from low costs in base roadways and low to moderate costs for capacity improvements. The West Area has the highest cost for this scenario due to the extent of development in that subarea.
- SAAM-2 has a low overall cost due to the low base roadway costs and moderate costs for capacity improvements. Base roadway and capacity costs would be slightly higher than SAAM-3, due to higher costs in OB Riley/Gopher Gulch, where most of the growth is focused (which offsets low cost in the West Area).
- Scenario 2.1 has low/moderate overall cost relative to the other scenarios, resulting from a moderate subarea connectivity cost and low mitigation cost. The Elbow would have high subarea costs due to the extent of development in that subarea.
- SAAM-1 has moderate overall cost, resulting from a moderate subarea cost and moderate mitigation cost.
- Scenario 3.1 has a moderate/high overall cost, resulting from the highest subarea cost and a moderate mitigation cost.
- Scenario 1.2 has the highest overall cost, resulting from the highest subarea cost and the highest mitigation cost. While NE Edge and The Elbow would have a high overall cost, the other subareas have low/moderate costs.

See Data Sheet for this Performance Measure for a roll-up of results by subarea and alternative.

Performance Measure 2.B.2: Cost per Acre of Transportation Infrastructure Improvements

Purpose

Transportation improvements will be needed to provide access to new growth areas and to provide adequate capacity and multi-modal connectivity within the growth areas to integrate and manage the growth. The purpose of this measure was to identify cost-effective subareas that consider the cost relative to the overall development potential.

Data Sources

The following data sources were used to develop the cost of transportation improvements for each cost component (described further in the following section):

- Base roadways – The total distance for new roadways was measured using GIS data for the framework of the collector and arterial grid sketched by the project team.
- Development area – The total acres of development for each subarea were summarized using GIS mapping tools and were provided by the project team for each scenario.

Methodology

The following methodologies were applied to identify cost-efficiency:

- Base roadways and cost – The location and cost of base roadways for each subarea were determined using the methodology described in Measure 2.B.1.
- Cost-efficiency – The total costs for each subarea were divided by the total developable acres to identify the cost/acre.

This measure focused on base roadway cost (new arterials and collectors); mitigation costs were not included at the subarea level.

Summary of Results

For each subarea in each alternative, transportation costs for the new roadway network ranged from $0/acre (in infill sites where the network already exists) to nearly $300/acre in some subareas. The general observations about the average cost for growth areas include:

- The Elbow has the highest average cost for each scenario, ranging from approximately $150K to $280K per acre for each scenario. These costs include the extension of east-west roads within the existing UGB (including Murphy Road east of 15th St) that would be needed to serve these areas.
- The North Triangle has a high average cost, ranging from approximately $110K to $150K per acre based on moderate/high connectivity costs and moderate acreage.
- The NE Edge is unique in that it has varies widely depending on scenario:
    - Scenarios that focus on in-fill (all SAAMs) make use of the existing system, do not spread enough to provide additional connectivity, and have a lower overall base network cost.

    - Scenarios that have a broader expansion (allowing more connectivity and base road construction), including Scenario 1.2, 2.1 and 3.1 all have high average costs.
- The DSL property has fairly moderate costs for most alternatives, including Scenario 2.1 which includes both higher overall growth and additional completion of the base transportation grid. The subarea has a higher average cost in SAAM-3 due to the moderate connectivity costs and lower total growth area.
- The West and Shevlin areas both have low to moderate costs, with increased average cost in Scenario 3.1 due to the West having additional roadway costs and Shevlin having less overall acreage in the alternative.
- The Thumb has low average costs when development is minimized, but average costs increase along with the opportunity to extend the collector system between China Hat and Knott (Scenario 1.2) and when the total acreage is reduced (Scenario 3.1).
- OB Riley/Gopher Gulch have low average costs due to the amount of developable acres included.

The following observations were made when aggregating all growth areas across individual scenarios:

- SAAM-1 has the lowest overall cost due to having the lowest subarea costs in most growth areas except North Triangle (moderate costs with low development), DSL (low costs with low development) and The Elbow (moderate costs with low development).
- Scenario 2.1, Scenario 3.1, SAAM-2, and SAAM-3 have moderate costs, when aggregated across the entire alternative, as they each include subareas with a mix of per-acre cost. These scenarios have high costs in the North Triangle and The Elbow and low costs/acre in OB Riley/Gopher Gulch, while other subareas vary by scenario as described above.
    - Scenario 2.1 has additional development in the Elbow that reduces the cost per acre relative to other scenarios.
    - Scenario 3.1 has lower cost per acre in the Triangle due to higher land uses and higher cost per acre in The Thumb due to less land uses and network connection to Knott Road.
    - SAAM-2 has decreased costs by using the existing network for NE Edge.
    - SAAM-3 has decreased costs by using the existing network for NE Edge. However, the DSL area includes additional network with moderate growth, providing a relatively higher cost per acre in that subarea.
- Scenario 1.2 has a high overall cost per acre due to a moderate total cost and low acreage relative to the other alternatives. This scenario includes the highest cost/acre reported for some individual growth areas (NE Edge, The Elbow) and has cost/acre that approach the highest for other areas (North Triangle, DSL property and The Thumb).

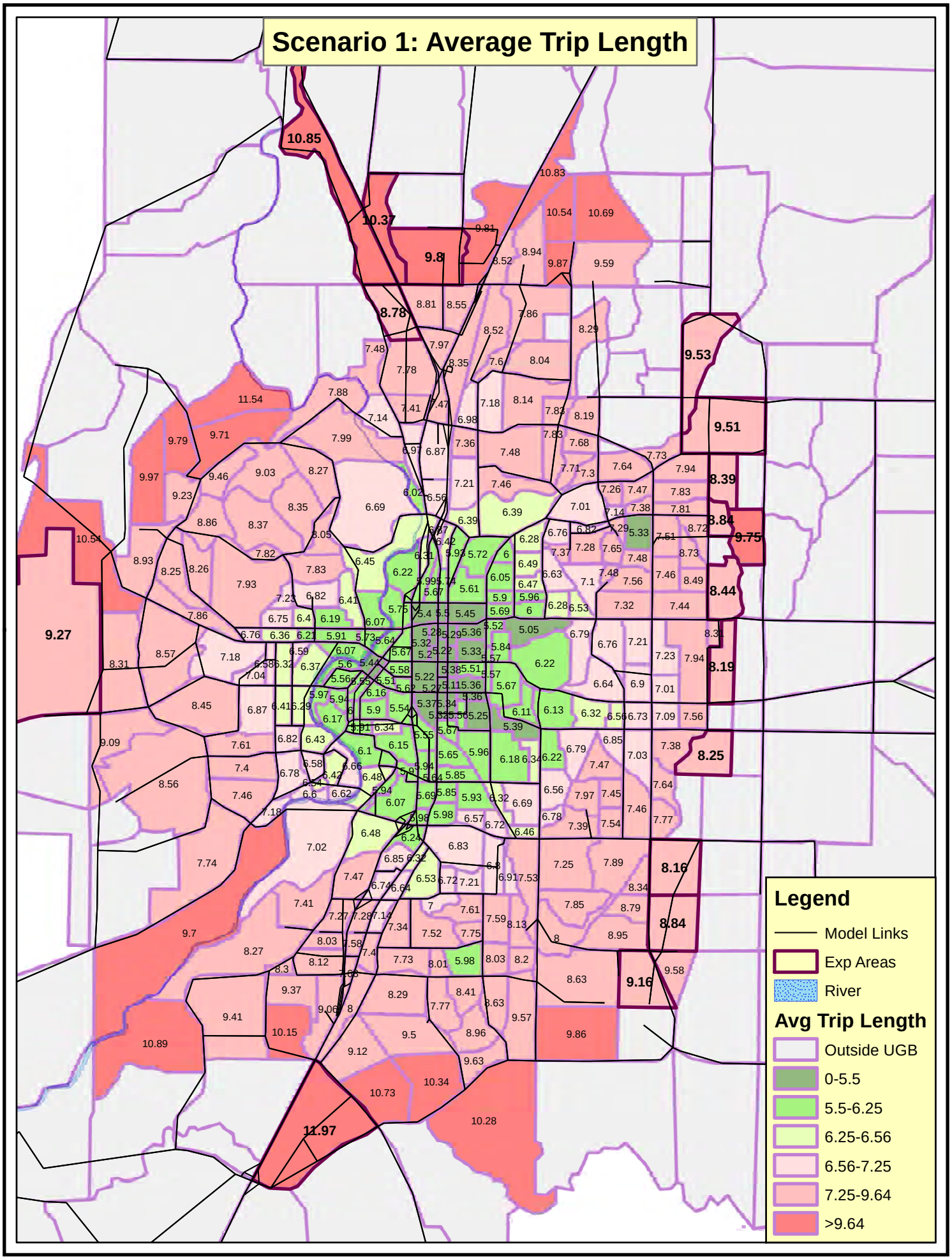

Scenario 1: Average Trip Length
Legend
Model Links
Exp Areas
River
Avg Trip Length
Outside UGB
0-5.5
5.5-6.25
6.25-6.56
6.56-7.25
7.25-9.64
>9.64

Figure 1

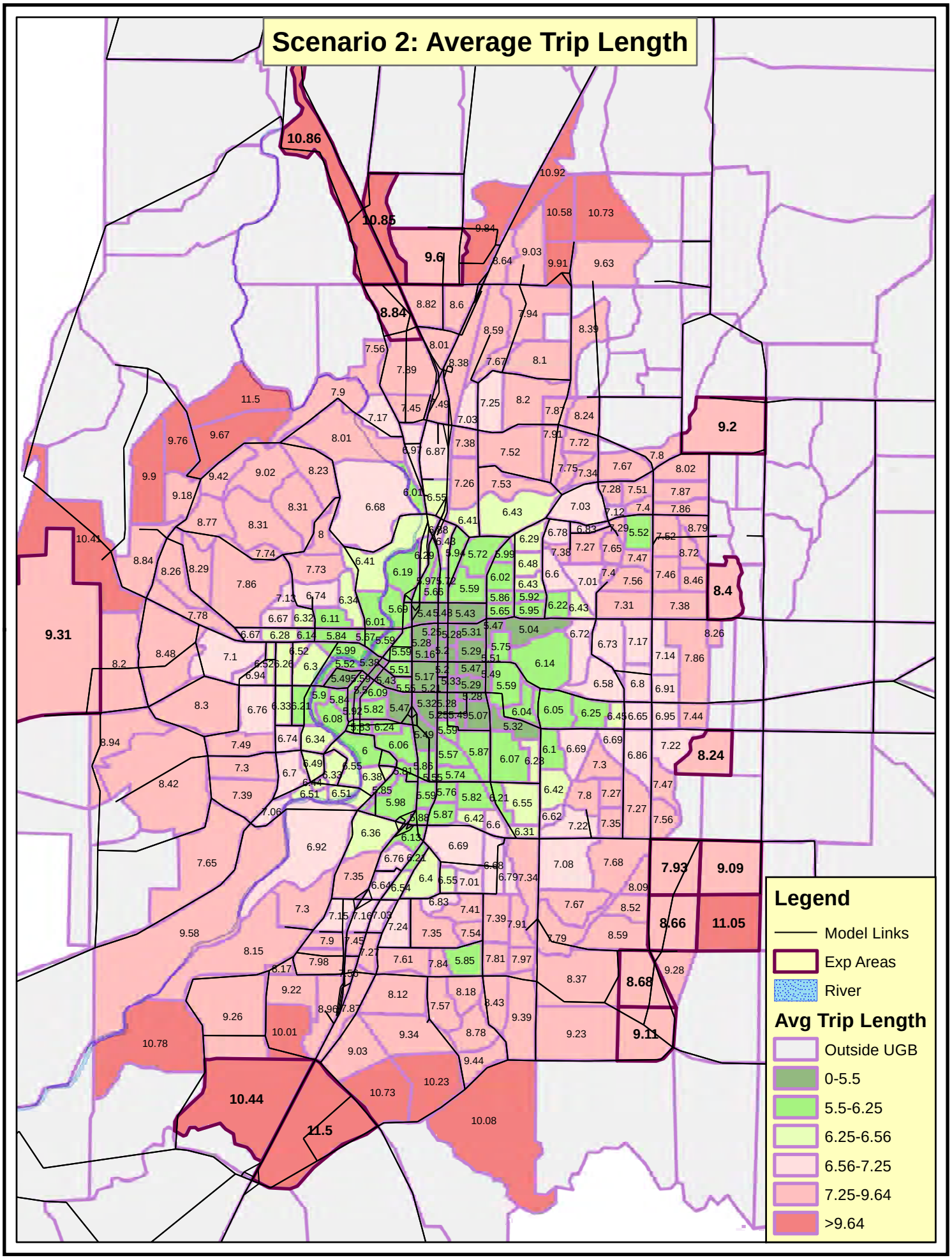

Scenario 2: Average Trip Length
Legend
Model Links
Exp Areas
River
Avg Trip Length
Outside UGB
0-5.5
5.5-6.25
6.25-6.56
6.56-7.25
7.25-9.64
>9.64

Figure 2

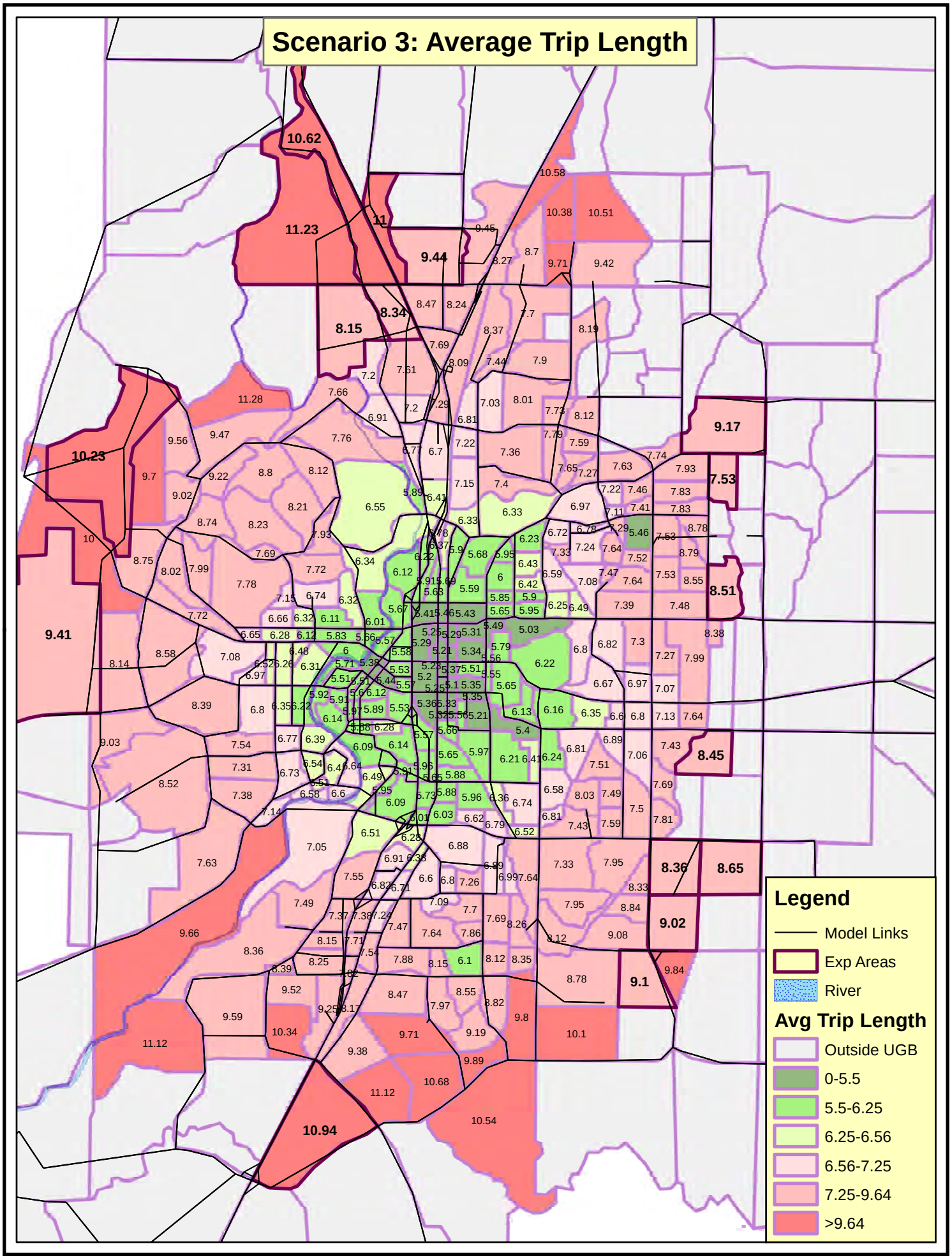

Scenario 3: Average Trip Length
Legend
Model Links
Exp Areas
River
Avg Trip Length
Outside UGB
0-5.5
5.5-6.25
6.25-6.56
6.56-7.25
7.25-9.64
>9.64

Figure 3

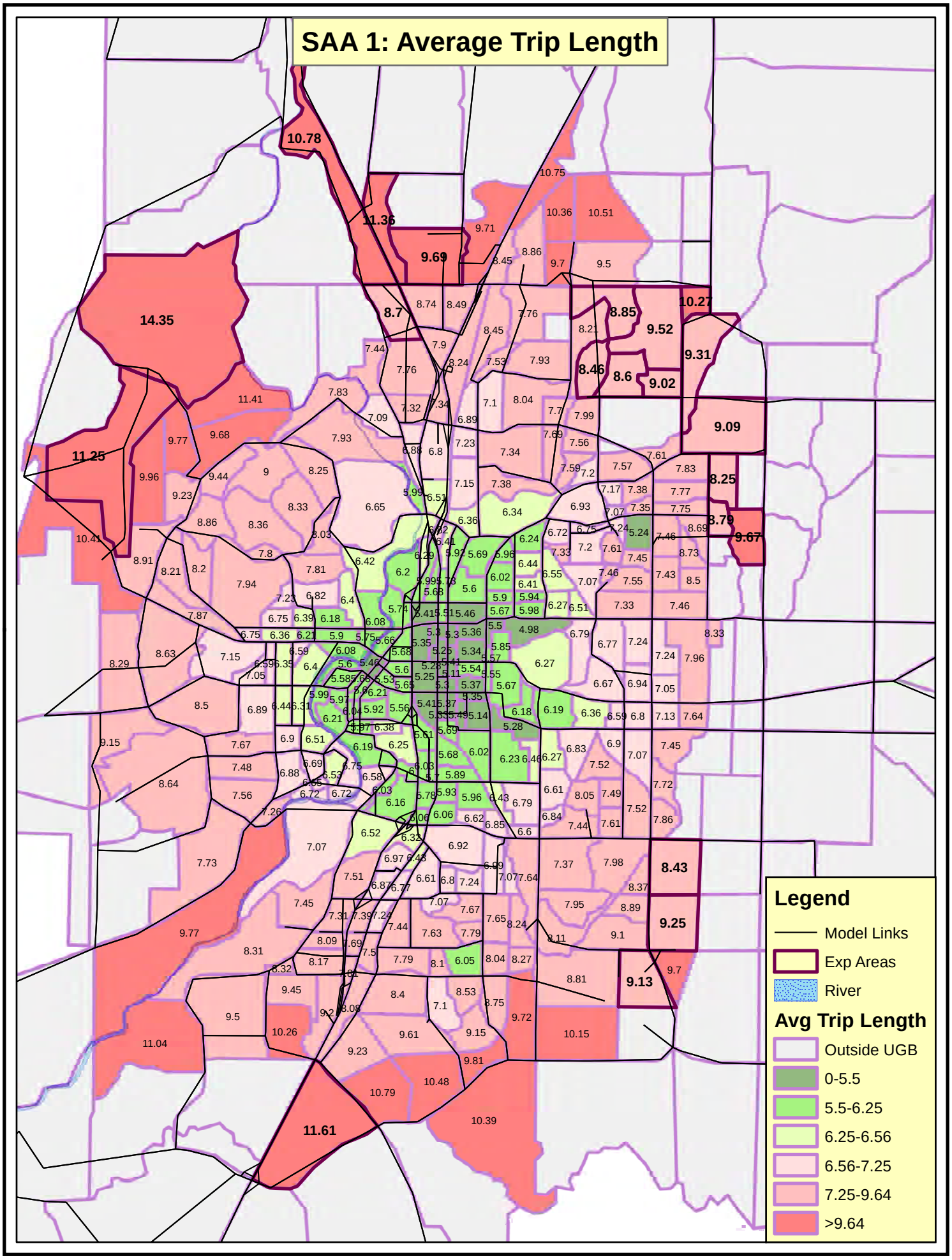

SAA 1: Average Trip Length
Legend
Model Links
Exp Areas
River
Avg Trip Length
Outside UGB
0-5.5
5.5-6.25
6.25-6.56
6.56-7.25
7.25-9.64
>9.64

Figure 4

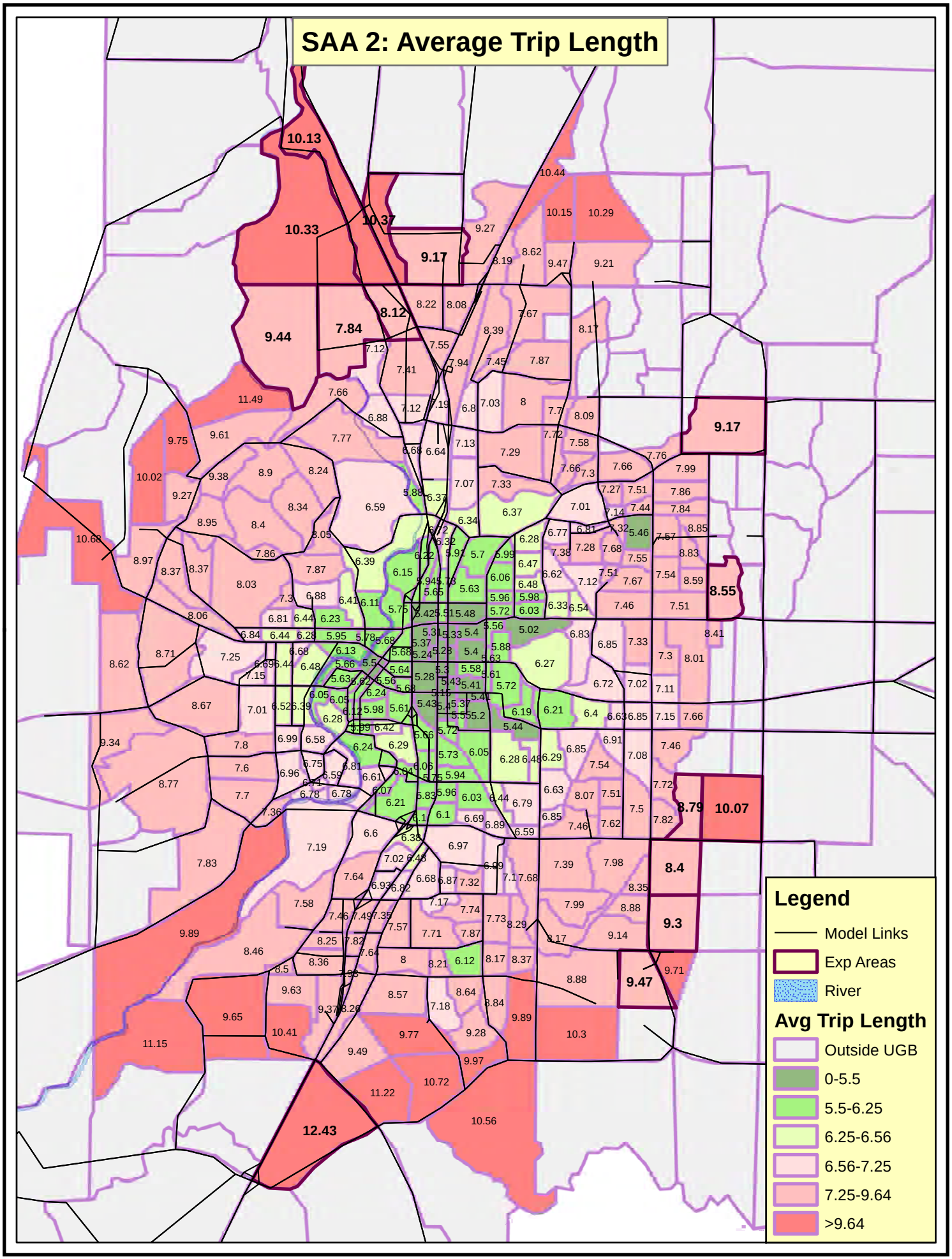

SAA 2: Average Trip Length
Legend
Model Links
Exp Areas
River
Avg Trip Length
Outside UGB
0-5.5
5.5-6.25
6.25-6.56
6.56-7.25
7.25-9.64
>9.64

Figure 5

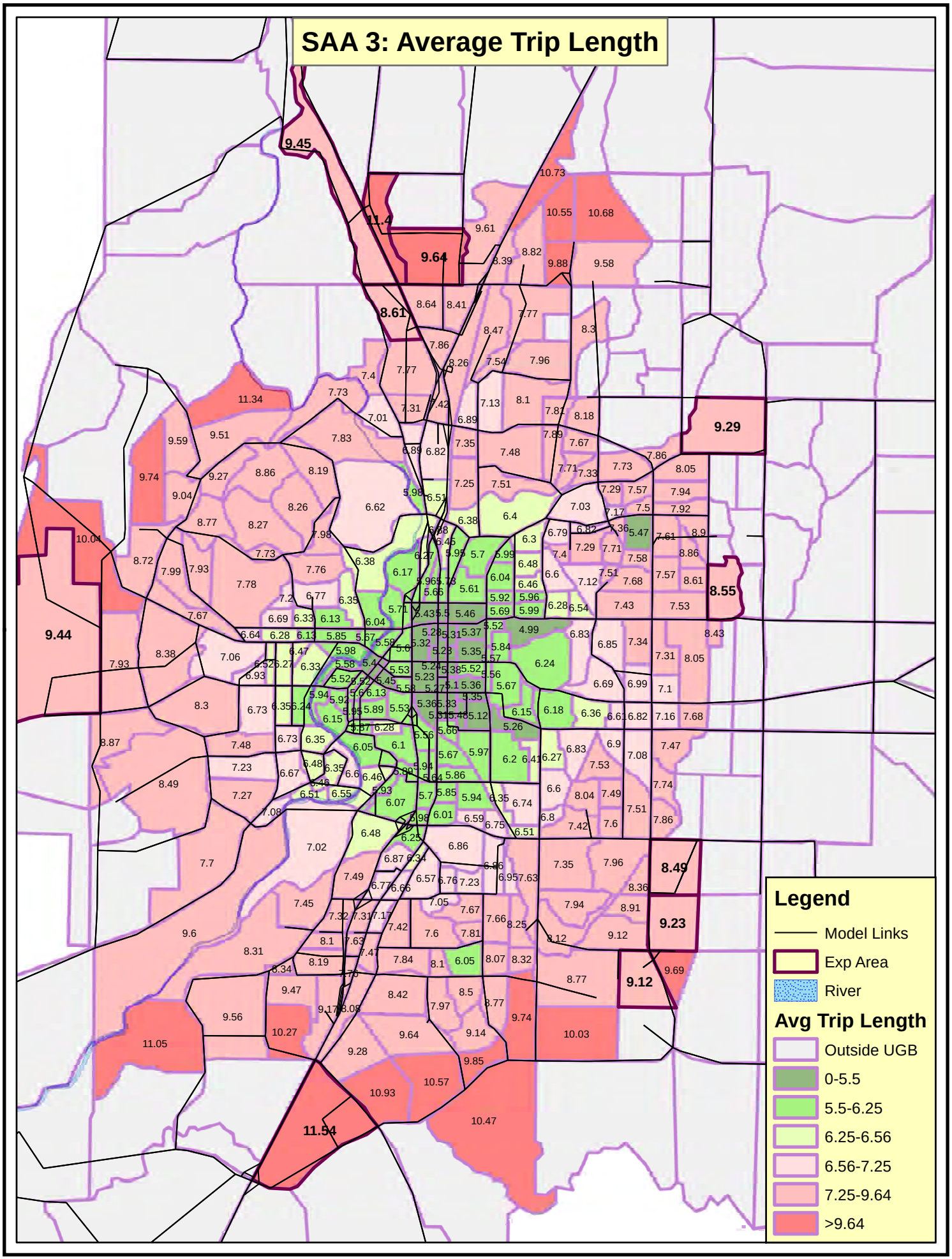

SAA 3: Average Trip Length
Legend
Model Links
Exp Area
River
Avg Trip Length
Outside UGB
0-5.5
5.5-6.25
6.25-6.56
6.56-7.25
7.25-9.64
>9.64

Figure 6

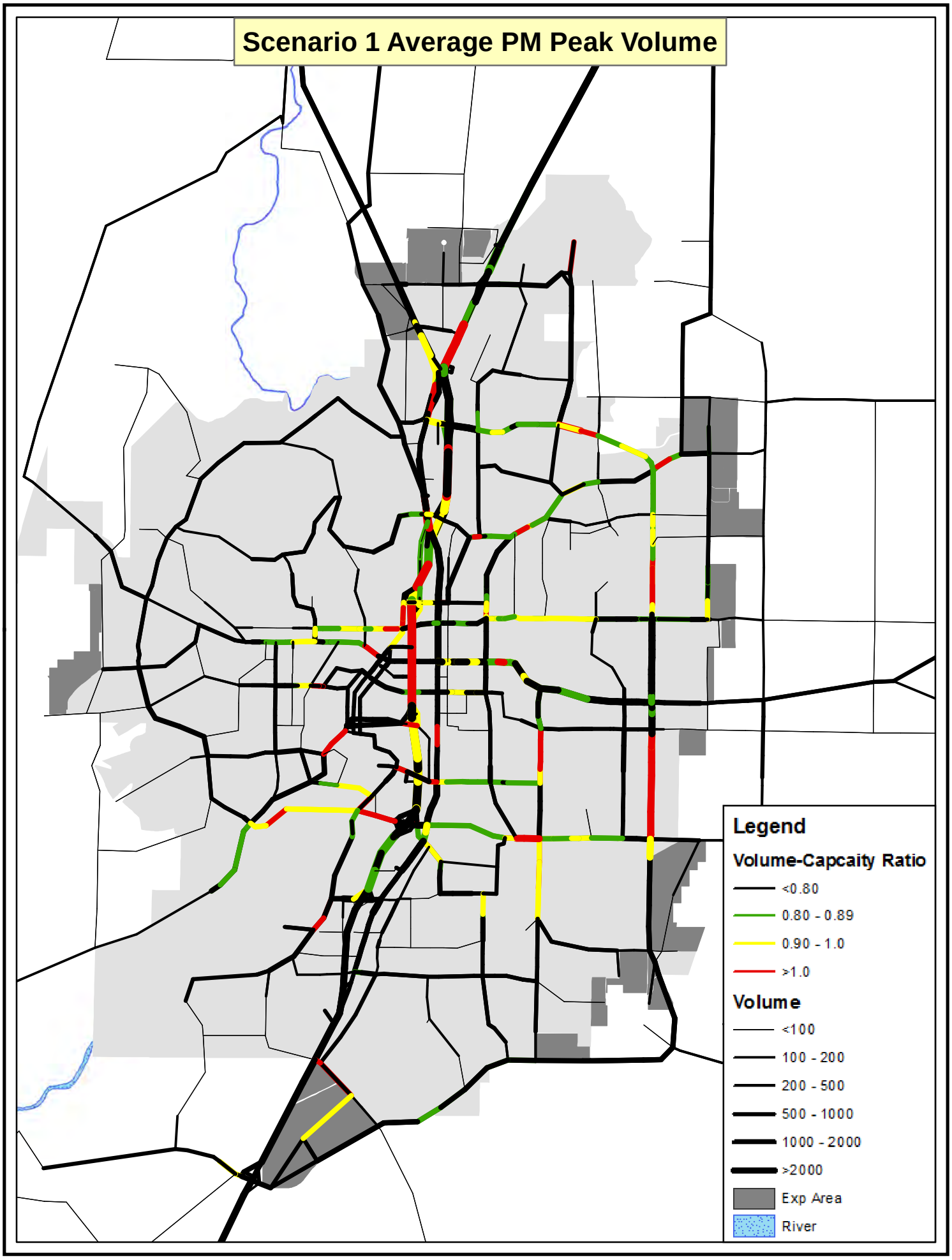

Scenario 1 Average PM Peak Volume
Legend
Volume-Capcaity Ratio
<0.80
0.80 - 0.89
0.90 - 1.0
>1.0
Volume
<100
100 - 200
200 - 500
500 - 1000
1000 - 2000
>2000
Exp Area
River

Figure 7

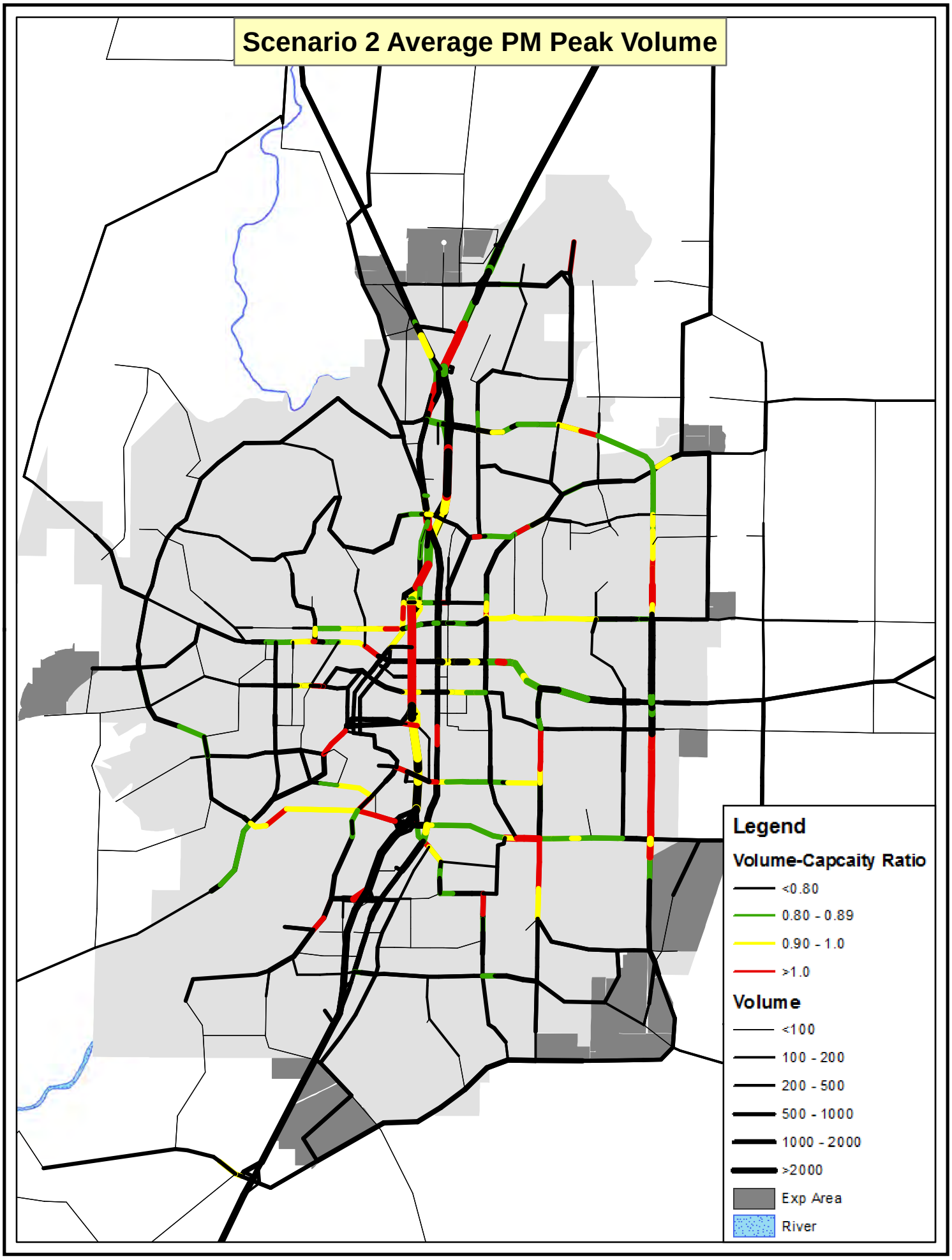

Scenario 2 Average PM Peak Volume
Legend
Volume-Capcaity Ratio
<0.80
0.80 - 0.89
0.90 - 1.0
>1.0
Volume
<100
100 - 200
200 - 500
500 - 1000
1000 - 2000
>2000
Exp Area
River

Figure 8

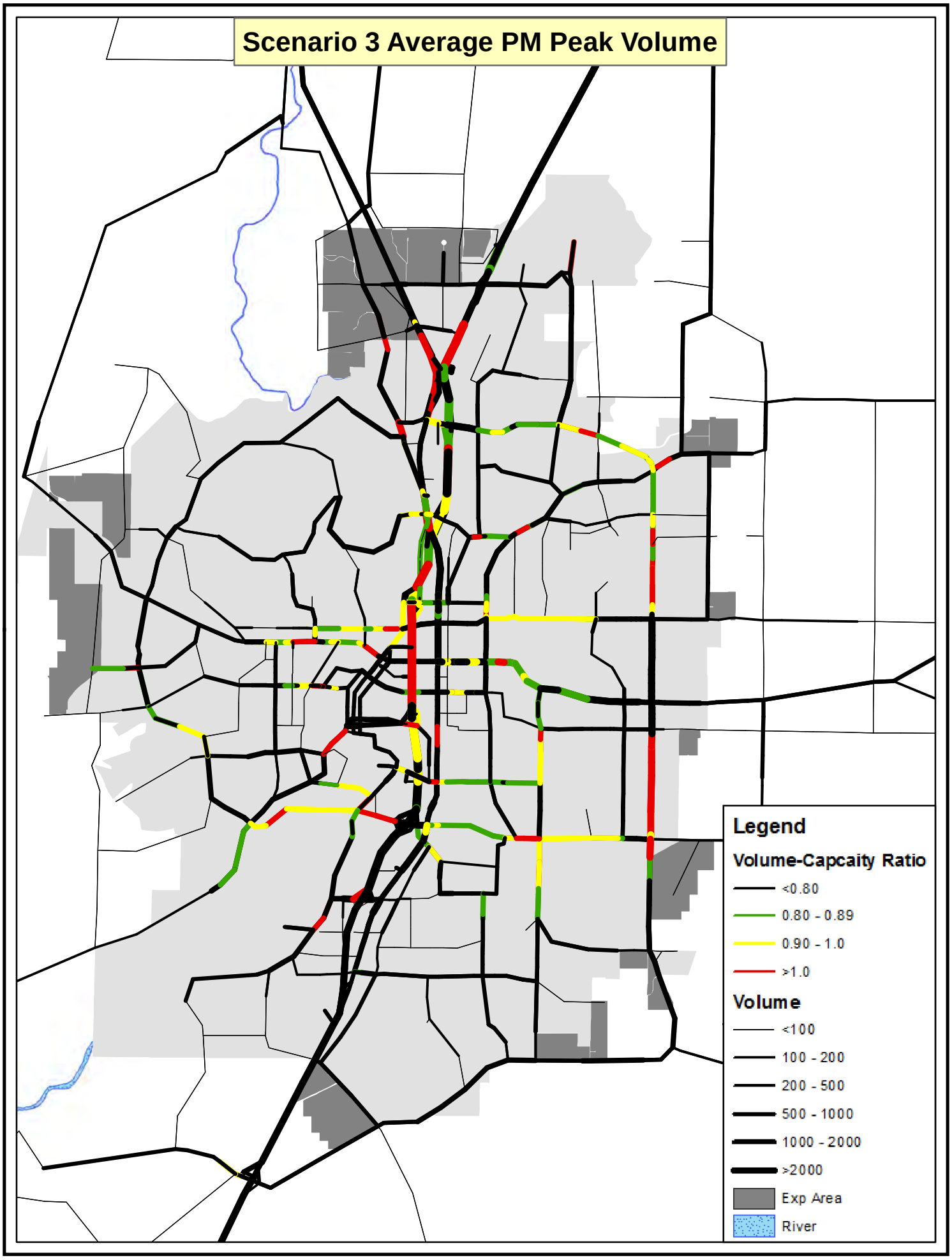

Scenario 3 Average PM Peak Volume
Legend
Volume-Capcaity Ratio
<0.80
0.80 - 0.89
0.90 - 1.0
>1.0
Volume
<100
100 - 200
200 - 500
500 - 1000
1000 - 2000
>2000
Exp Area
River

Figure 9

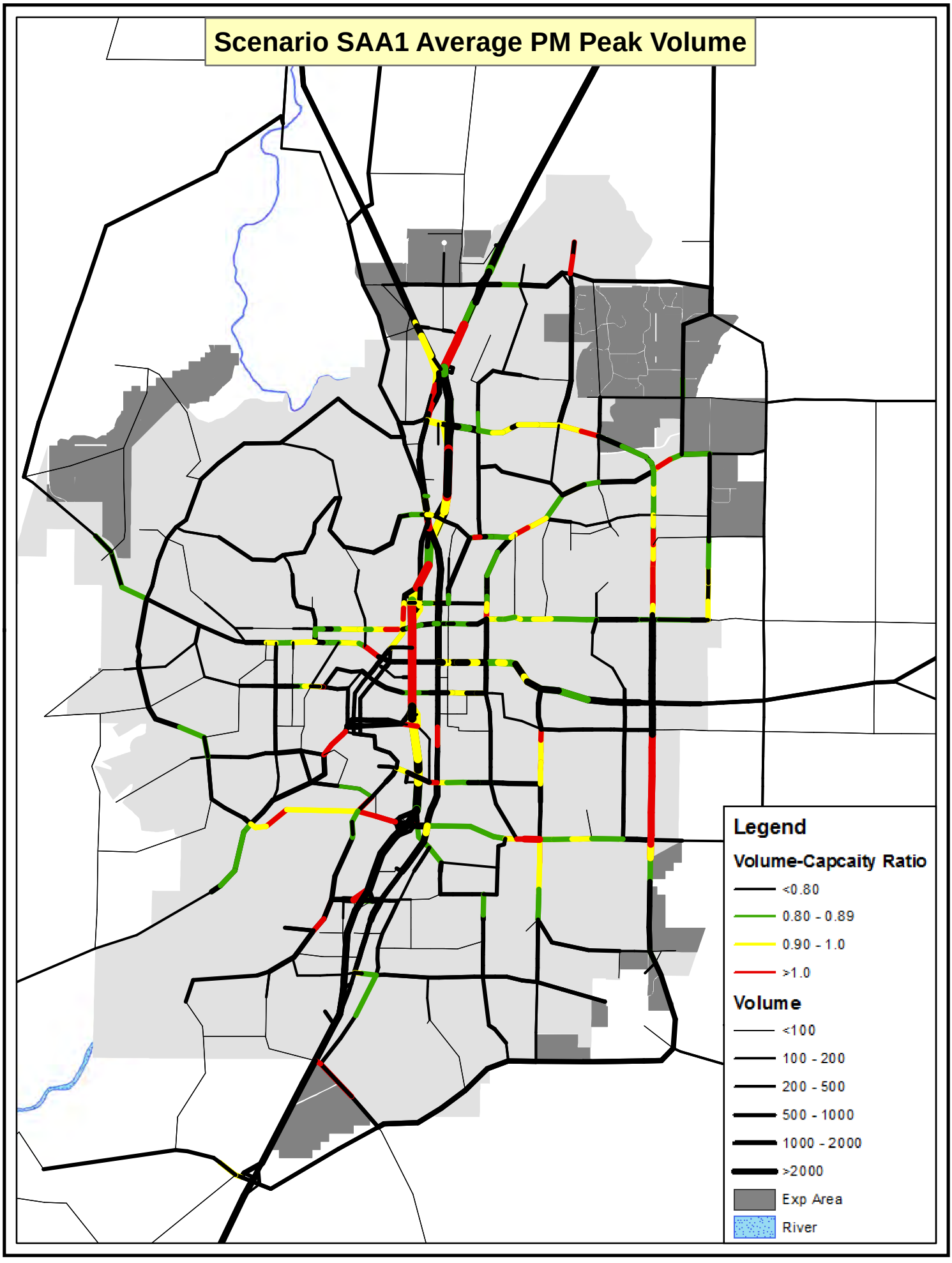

Scenario SAA1 Average PM Peak Volume
Legend
Volume-Capcaity Ratio
<0.80
0.80 - 0.89
0.90 - 1.0
>1.0
Volume
<100
100 - 200
200 - 500
500 - 1000
1000 - 2000
>2000
Exp Area
River

Figure 10

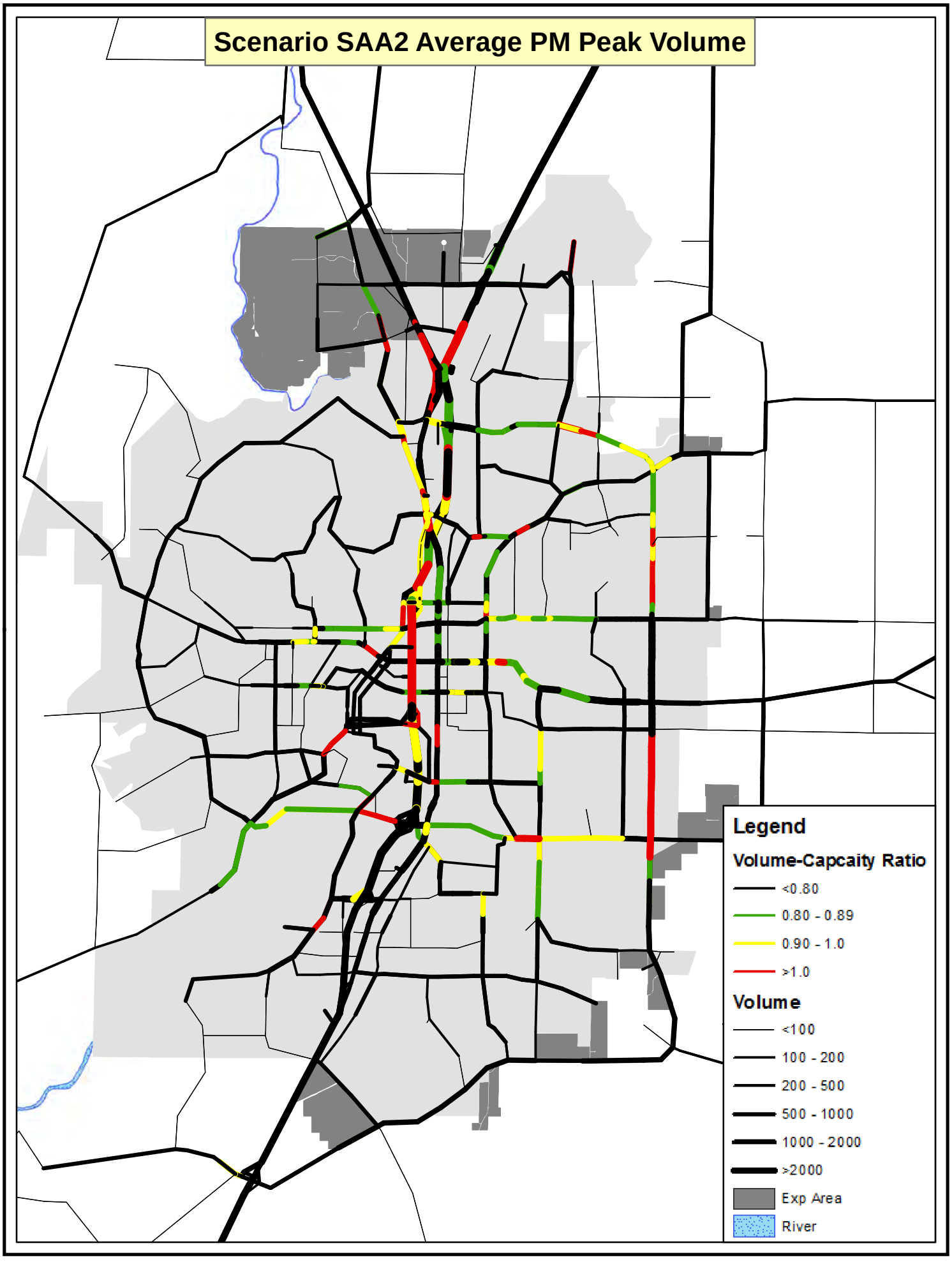

Scenario SAA2 Average PM Peak Volume
Legend
Volume-Capcaity Ratio
<0.80
0.80 - 0.89
0.90 - 1.0
>1.0
Volume
<100
100 - 200
200 - 500
500 - 1000
1000 - 2000
>2000
Exp Area
River

Figure 11

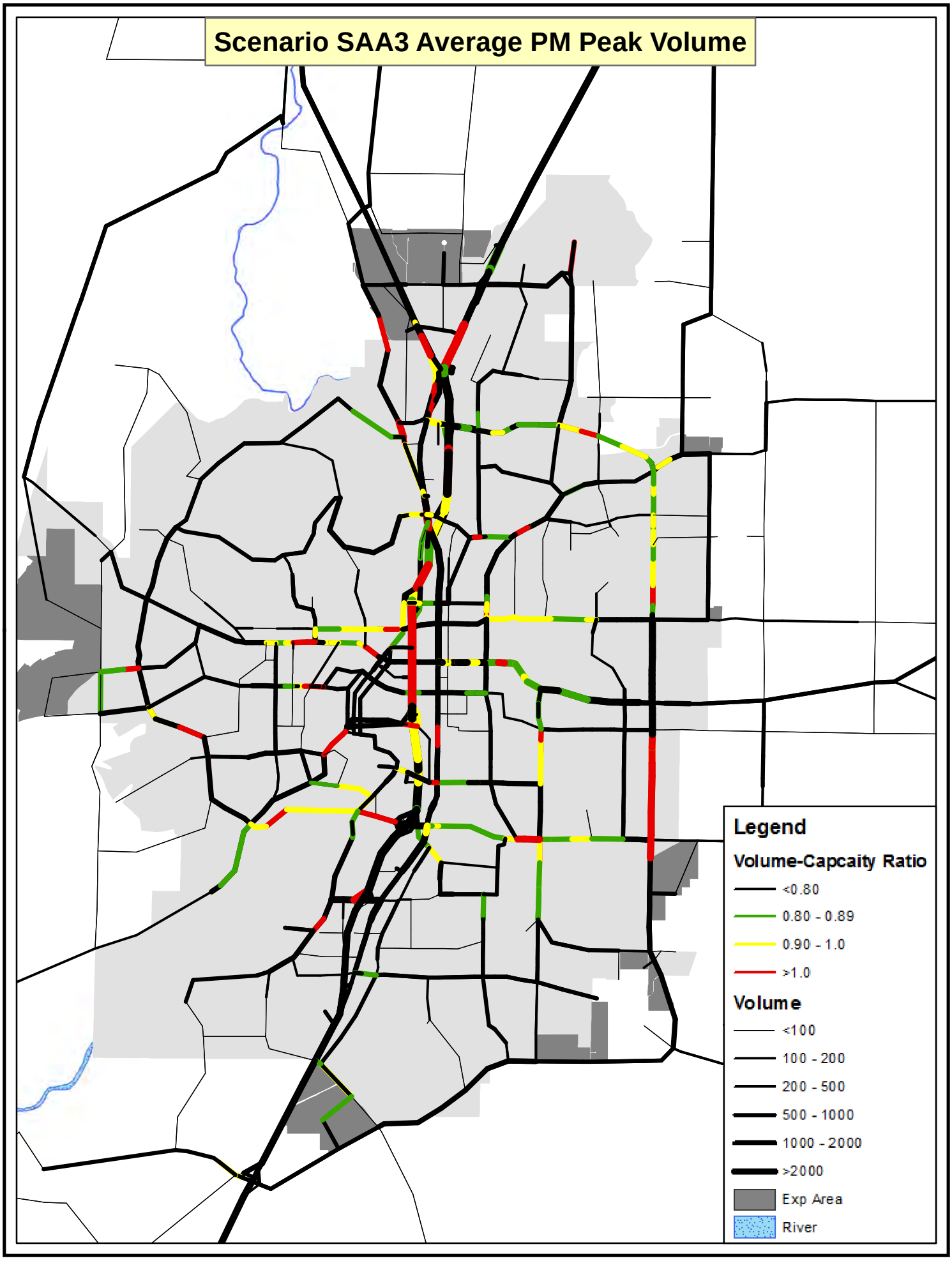

Scenario SAA3 Average PM Peak Volume
Legend
Volume-Capcaity Ratio
<0.80
0.80 - 0.89
0.90 - 1.0
>1.0
Volume
<100
100 - 200
200 - 500
500 - 1000
1000 - 2000
>2000
Exp Area
River

Figure 12

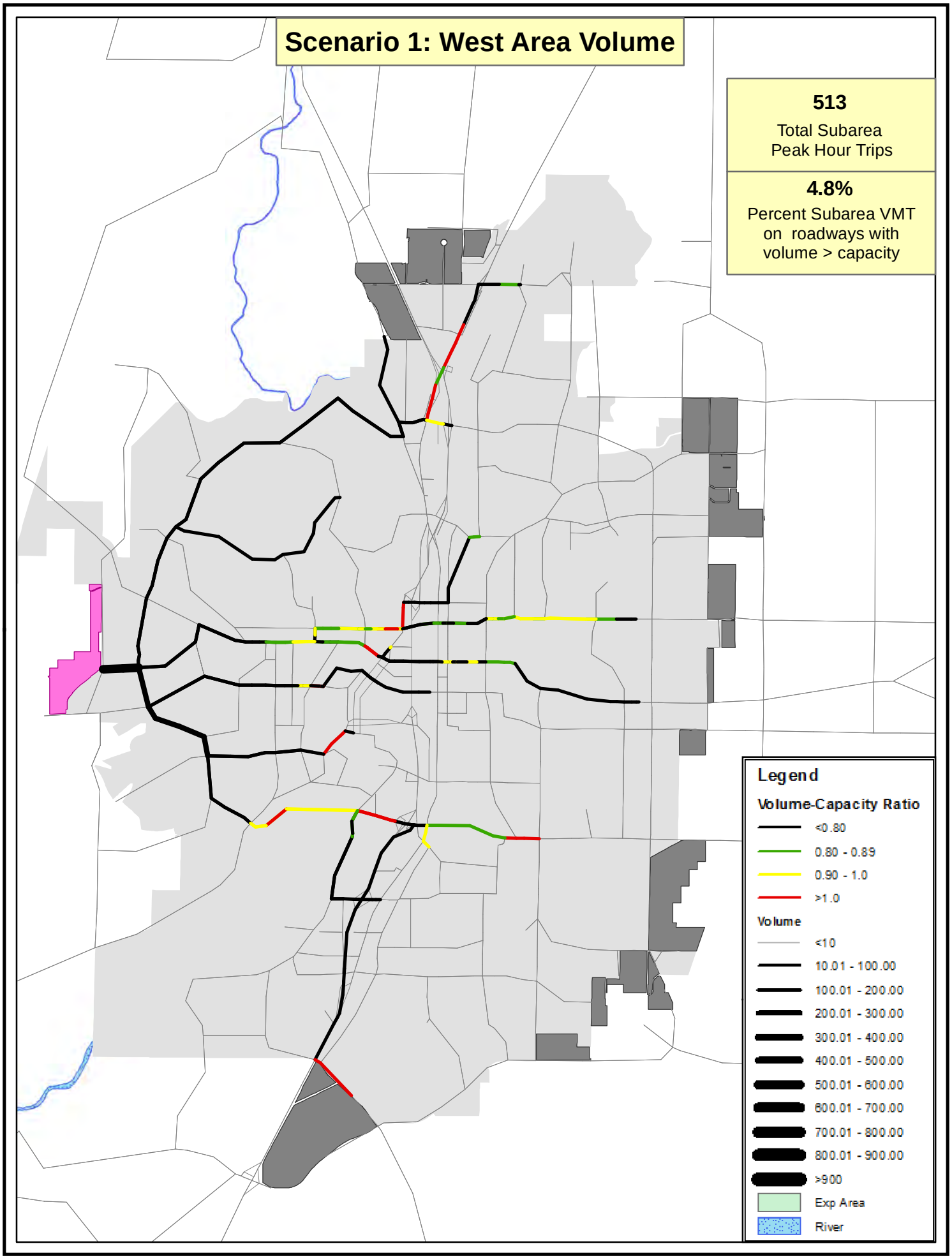

Scenario 1: West Area Volume
513
Total Subarea Peak Hour Trips
4.8%
Percent Subarea VMT on roadways with volume > capacity
Legend
Volume-Capacity Ratio
<0.80
0.80 - 0.89
0.90 - 1.0
>1.0
Volume
<10
10.01 - 100.00
100.01 - 200.00
200.01 - 300.00
300.01 - 400.00
400.01 - 500.00
500.01 - 600.00
600.01 - 700.00
700.01 - 800.00
800.01 - 900.00
>900
Exp Area
River

Figure 13

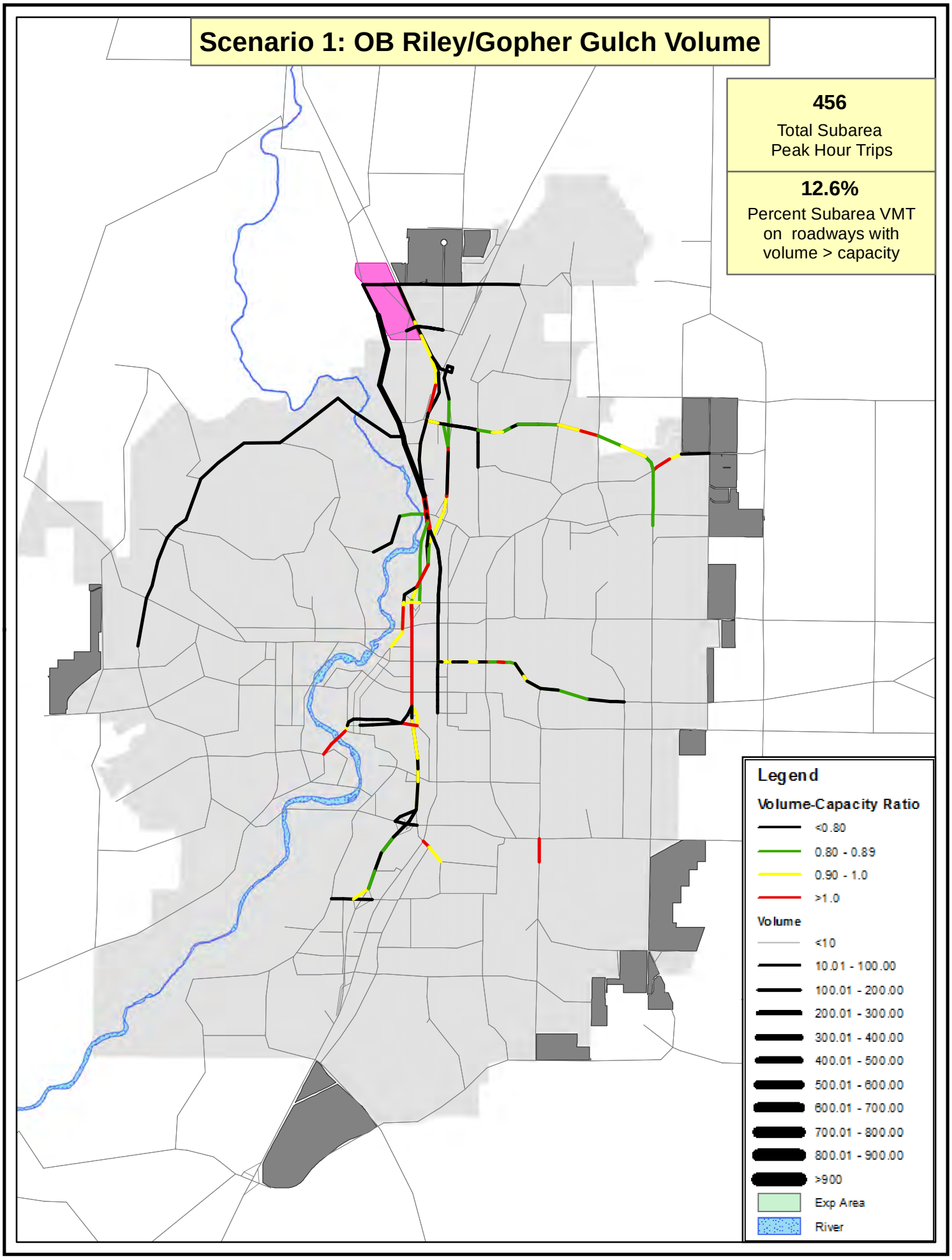

Scenario 1: OB Riley/Gopher Gulch Volume
456
Total Subarea
Peak Hour Trips
12.6%
Percent Subarea VMT
on roadways with
volume > capacity
Legend
Volume-Capacity Ratio
<0.80
0.80 - 0.89
0.90 - 1.0
>1.0
Volume
<10
10.01 - 100.00
100.01 - 200.00
200.01 - 300.00
300.01 - 400.00
400.01 - 500.00
500.01 - 600.00
600.01 - 700.00
700.01 - 800.00
800.01 - 900.00
>900
Exp Area
River

Figure 14

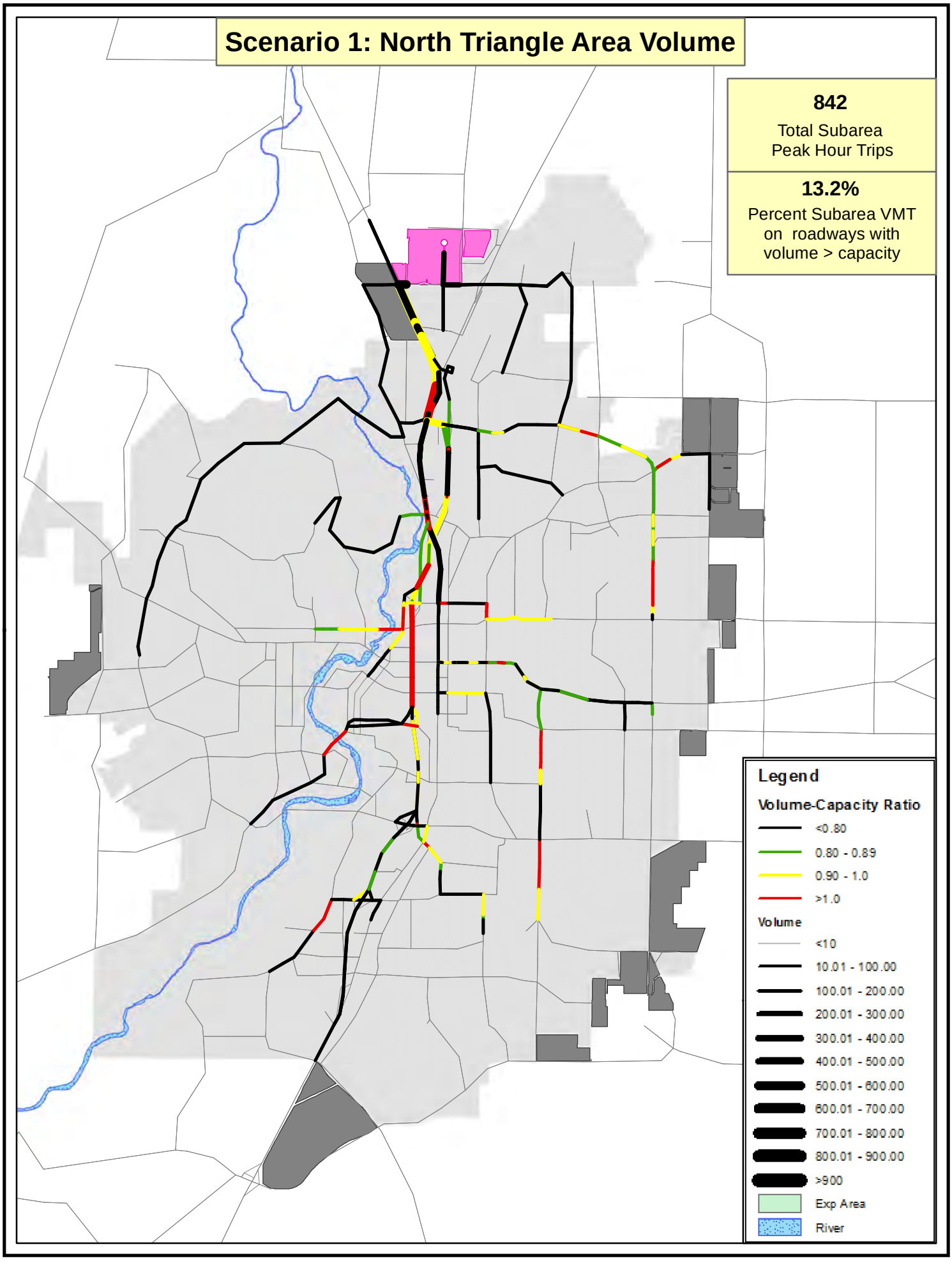

Scenario 1: North Triangle Area Volume
842
Total Subarea Peak Hour Trips
13.2%
Percent Subarea VMT on roadways with volume > capacity
Legend
Volume-Capacity Ratio
<0.80
0.80 - 0.89
0.90 - 1.0
>1.0
Volume
<10
10.01 - 100.00
100.01 - 200.00
200.01 - 300.00
300.01 - 400.00
400.01 - 500.00
500.01 - 600.00
600.01 - 700.00
700.01 - 800.00
800.01 - 900.00
>900
Exp Area
River

Figure 15

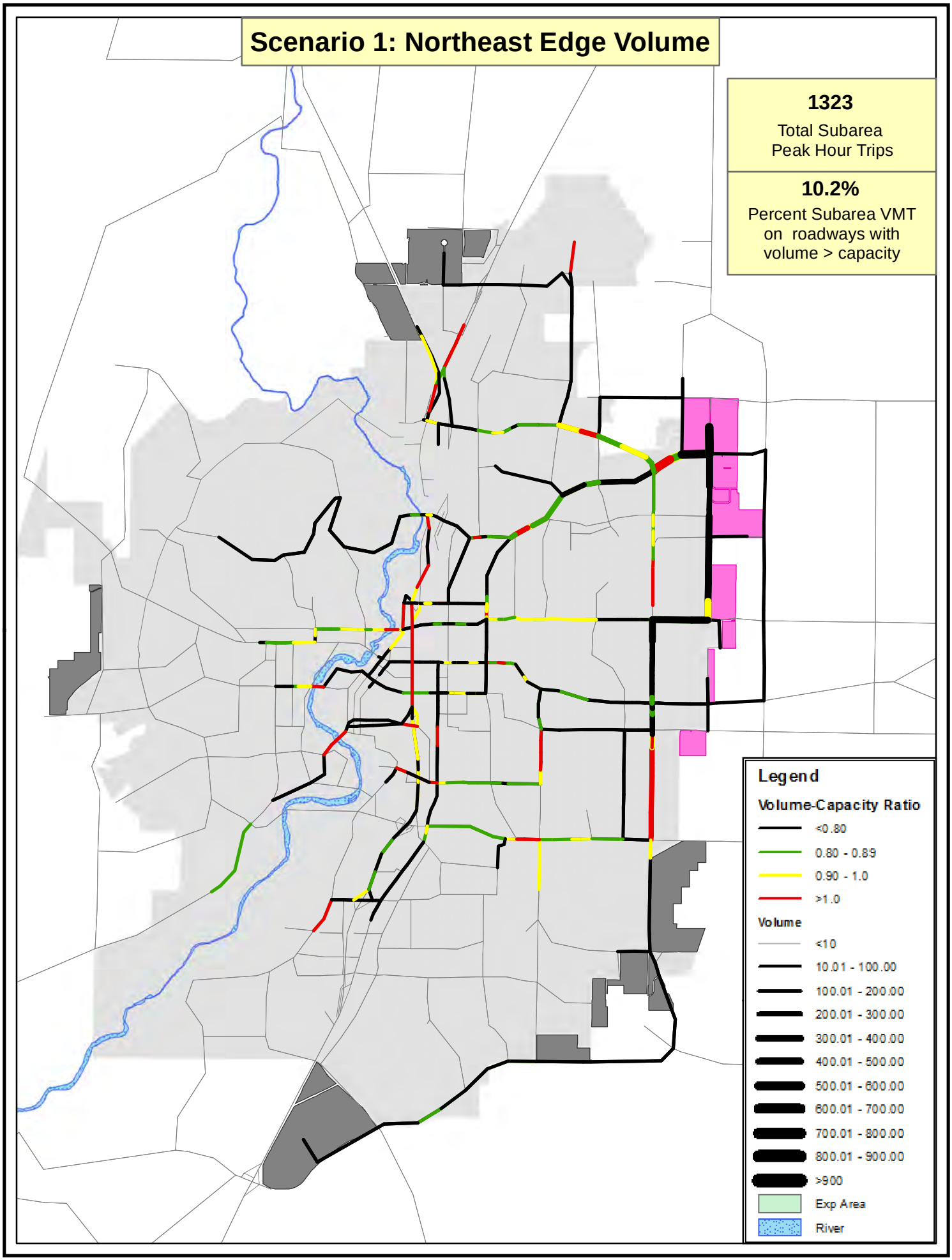

Scenario 1: Northeast Edge Volume
1323
Total Subarea
Peak Hour Trips
10.2%
Percent Subarea VMT
on roadways with
volume > capacity
Legend
Volume-Capacity Ratio
<0.80
0.80 - 0.89
0.90 - 1.0
>1.0
Volume
<10
10.01 - 100.00
100.01 - 200.00
200.01 - 300.00
300.01 - 400.00
400.01 - 500.00
500.01 - 600.00
600.01 - 700.00
700.01 - 800.00
800.01 - 900.00
>900
Exp Area
River

Figure 16

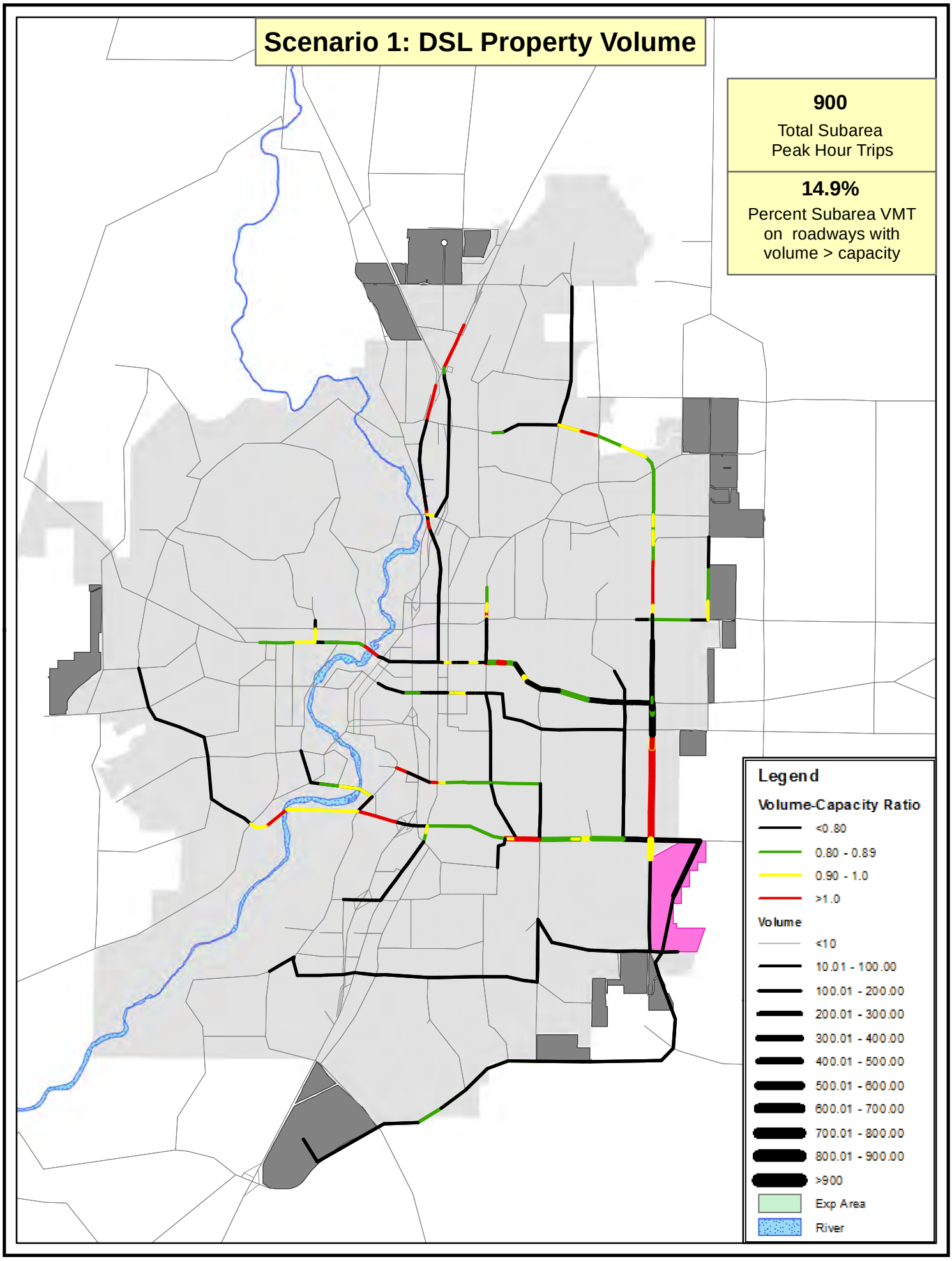

Scenario 1: DSL Property Volume
900
Total Subarea
Peak Hour Trips
14.9%
Percent Subarea VMT
on roadways with
volume > capacity
Legend
Volume-Capacity Ratio
<0.80
0.80 - 0.89
0.90 - 1.0
>1.0
Volume
<10
10.01 - 100.00
100.01 - 200.00
200.01 - 300.00
300.01 - 400.00
400.01 - 500.00
500.01 - 600.00
600.01 - 700.00
700.01 - 800.00
800.01 - 900.00
>900
Exp Area
River

Figure 17

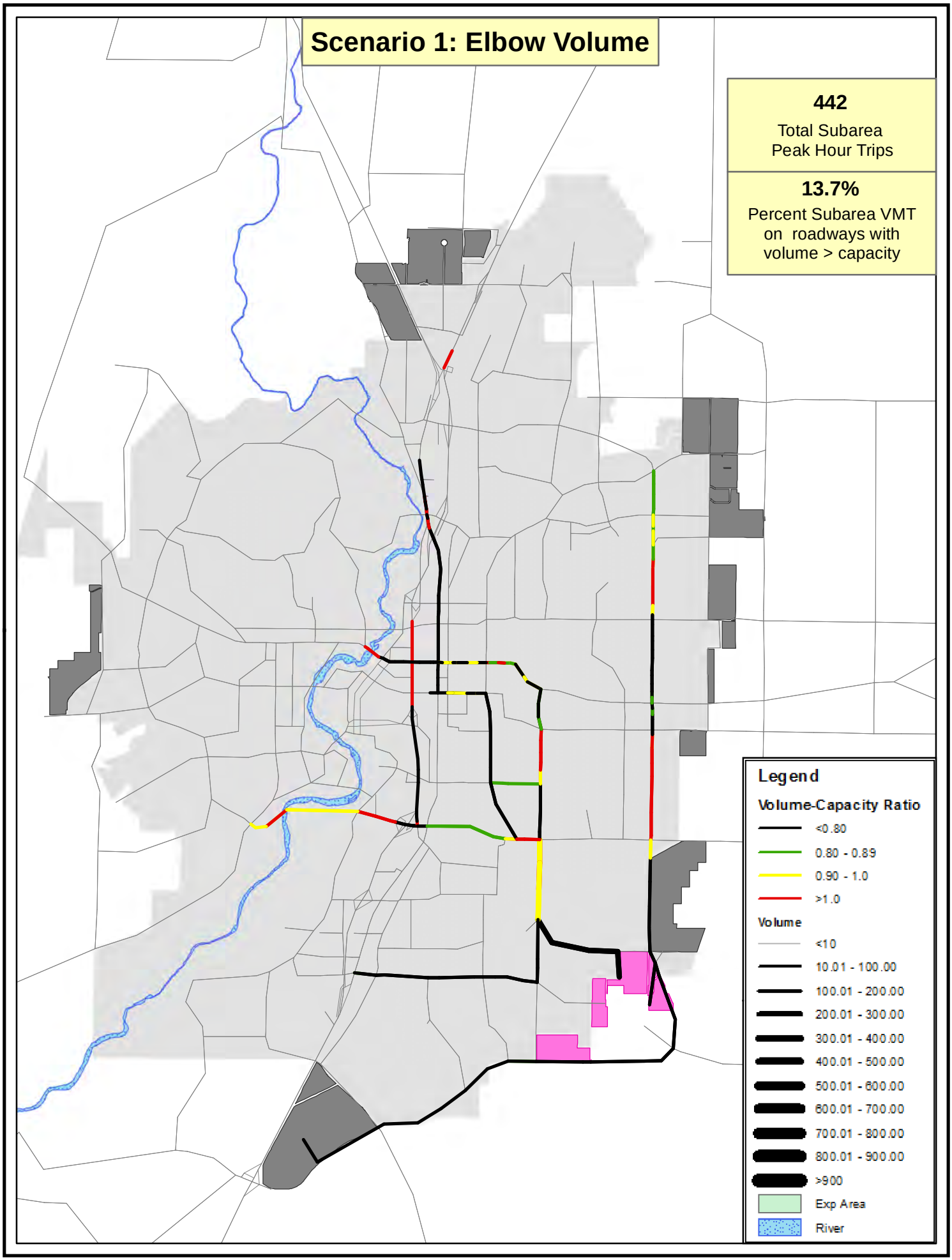

Scenario 1: Elbow Volume
442
Total Subarea Peak Hour Trips
13.7%
Percent Subarea VMT on roadways with volume > capacity
Legend
Volume-Capacity Ratio
<0.80
0.80 - 0.89
0.90 - 1.0
>1.0
Volume
<10
10.01 - 100.00
100.01 - 200.00
200.01 - 300.00
300.01 - 400.00
400.01 - 500.00
500.01 - 600.00
600.01 - 700.00
700.01 - 800.00
800.01 - 900.00
>900
Exp Area
River

Figure 18

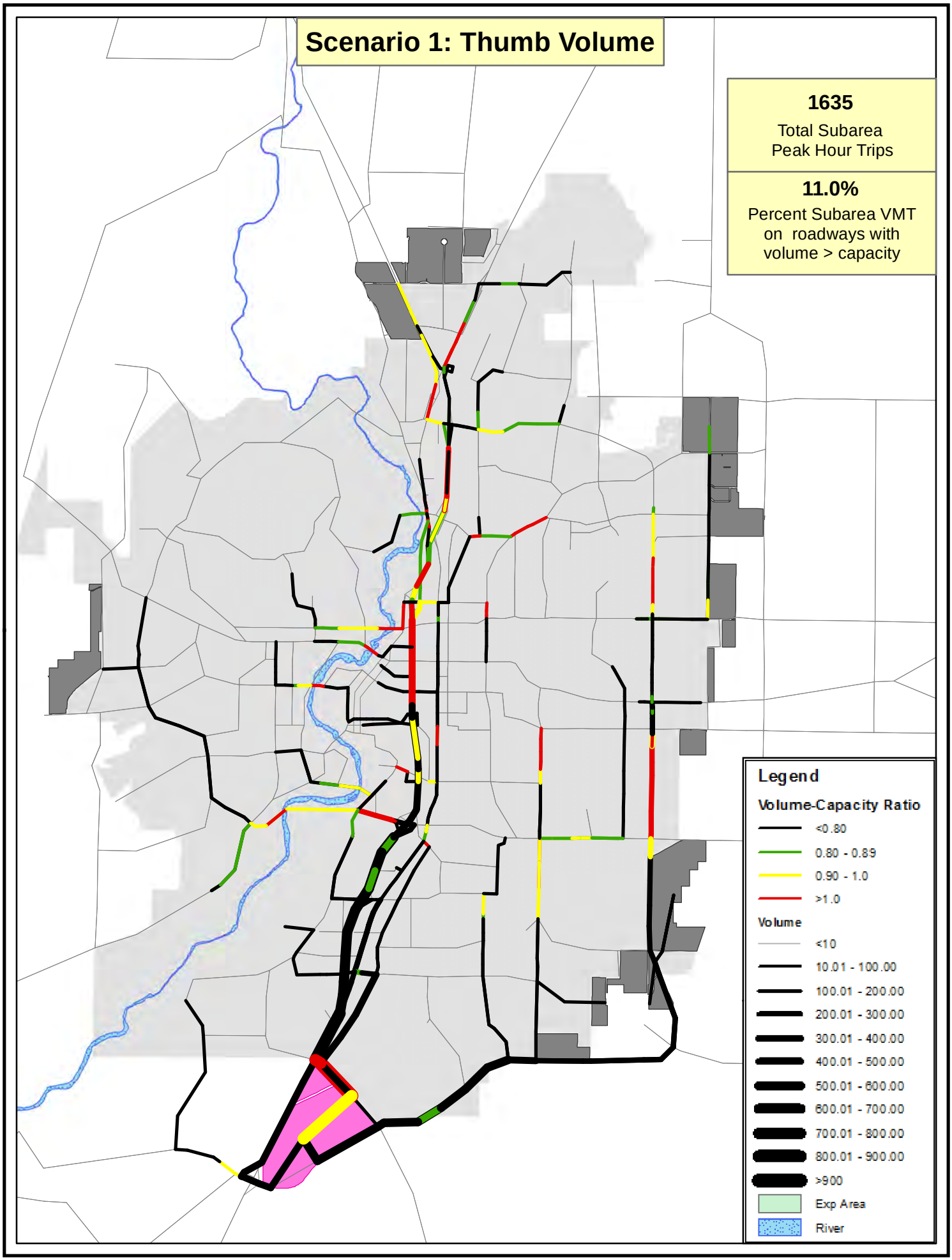

Scenario 1: Thumb Volume
1635
Total Subarea
Peak Hour Trips
11.0%
Percent Subarea VMT
on roadways with
volume > capacity
Legend
Volume-Capacity Ratio
<0.80
0.80 - 0.89
0.90 - 1.0
>1.0
Volume
<10
10.01 - 100.00
100.01 - 200.00
200.01 - 300.00
300.01 - 400.00
400.01 - 500.00
500.01 - 600.00
600.01 - 700.00
700.01 - 800.00
800.01 - 900.00
>900
Exp Area
River

Figure 19

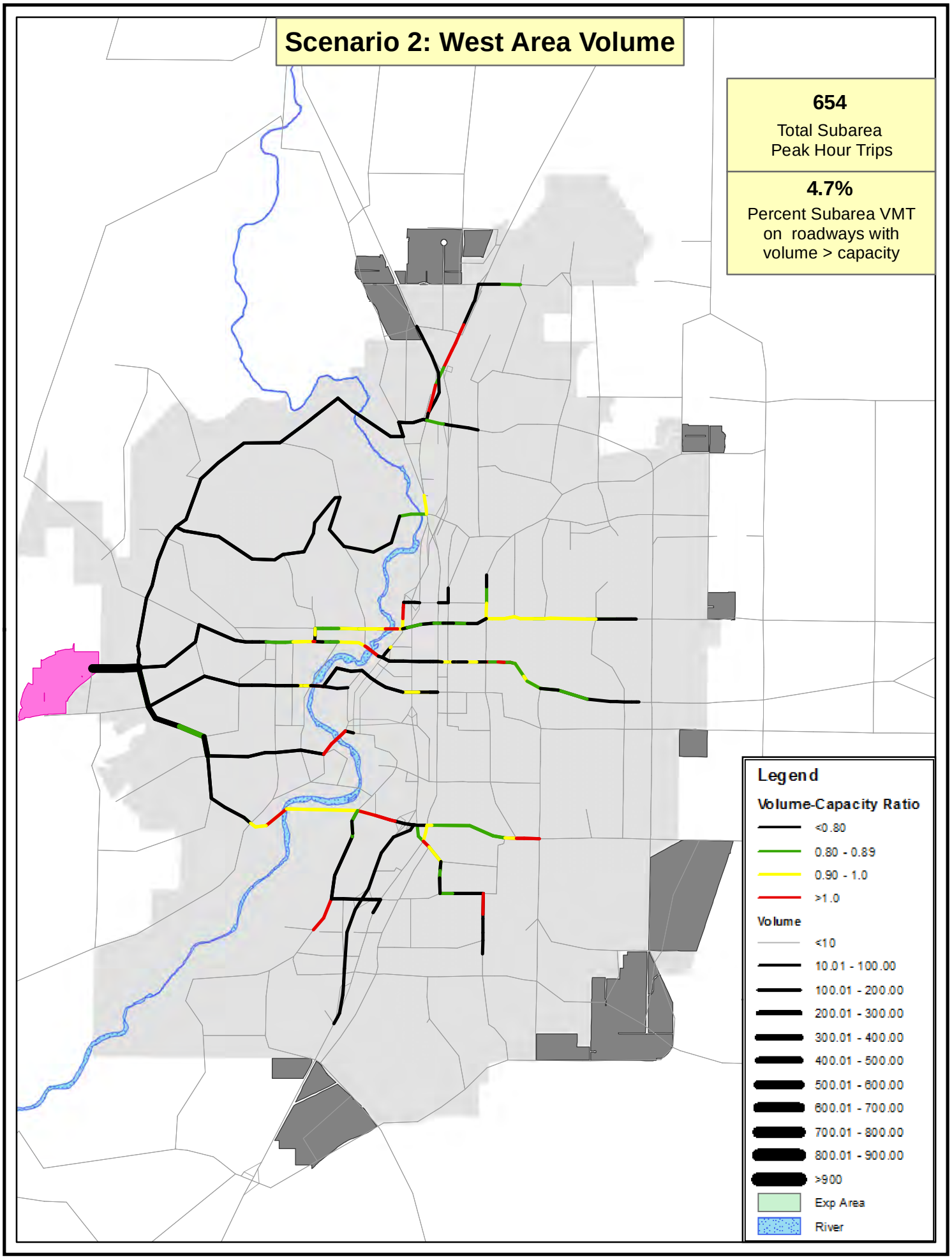

Scenario 2: West Area Volume
654
Total Subarea Peak Hour Trips
4.7%
Percent Subarea VMT on roadways with volume > capacity
Legend
Volume-Capacity Ratio
<0.80
0.80 - 0.89
0.90 - 1.0
>1.0
Volume
<10
10.01 - 100.00
100.01 - 200.00
200.01 - 300.00
300.01 - 400.00
400.01 - 500.00
500.01 - 600.00
600.01 - 700.00
700.01 - 800.00
800.01 - 900.00
>900
Exp Area
River

Figure 20

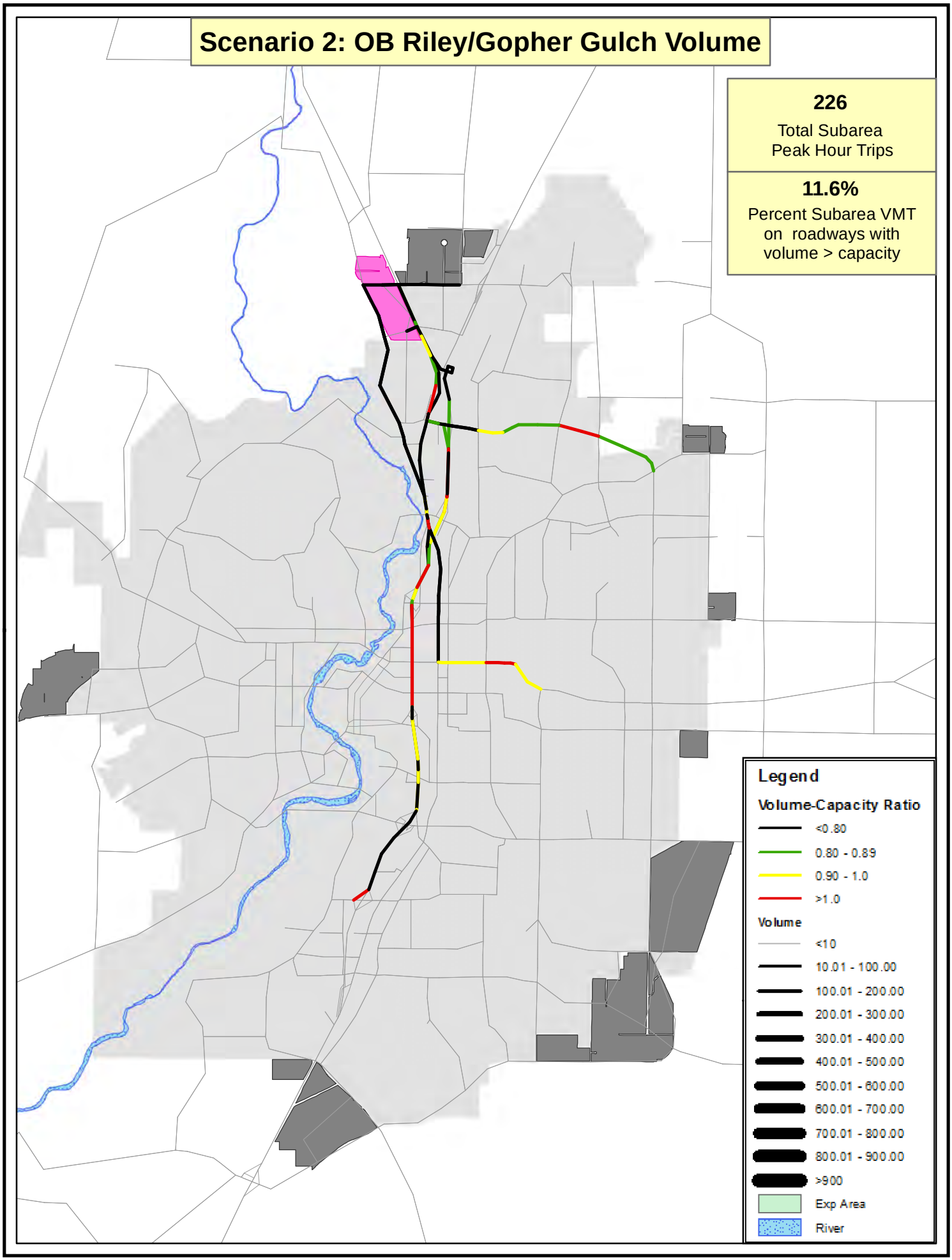

Scenario 2: OB Riley/Gopher Gulch Volume
226
Total Subarea Peak Hour Trips
11.6%
Percent Subarea VMT on roadways with volume > capacity
Legend
Volume-Capacity Ratio
<0.80
0.80 - 0.89
0.90 - 1.0
>1.0
Volume
<10
10.01 - 100.00
100.01 - 200.00
200.01 - 300.00
300.01 - 400.00
400.01 - 500.00
500.01 - 600.00
600.01 - 700.00
700.01 - 800.00
800.01 - 900.00
>900
Exp Area
River

Figure 21

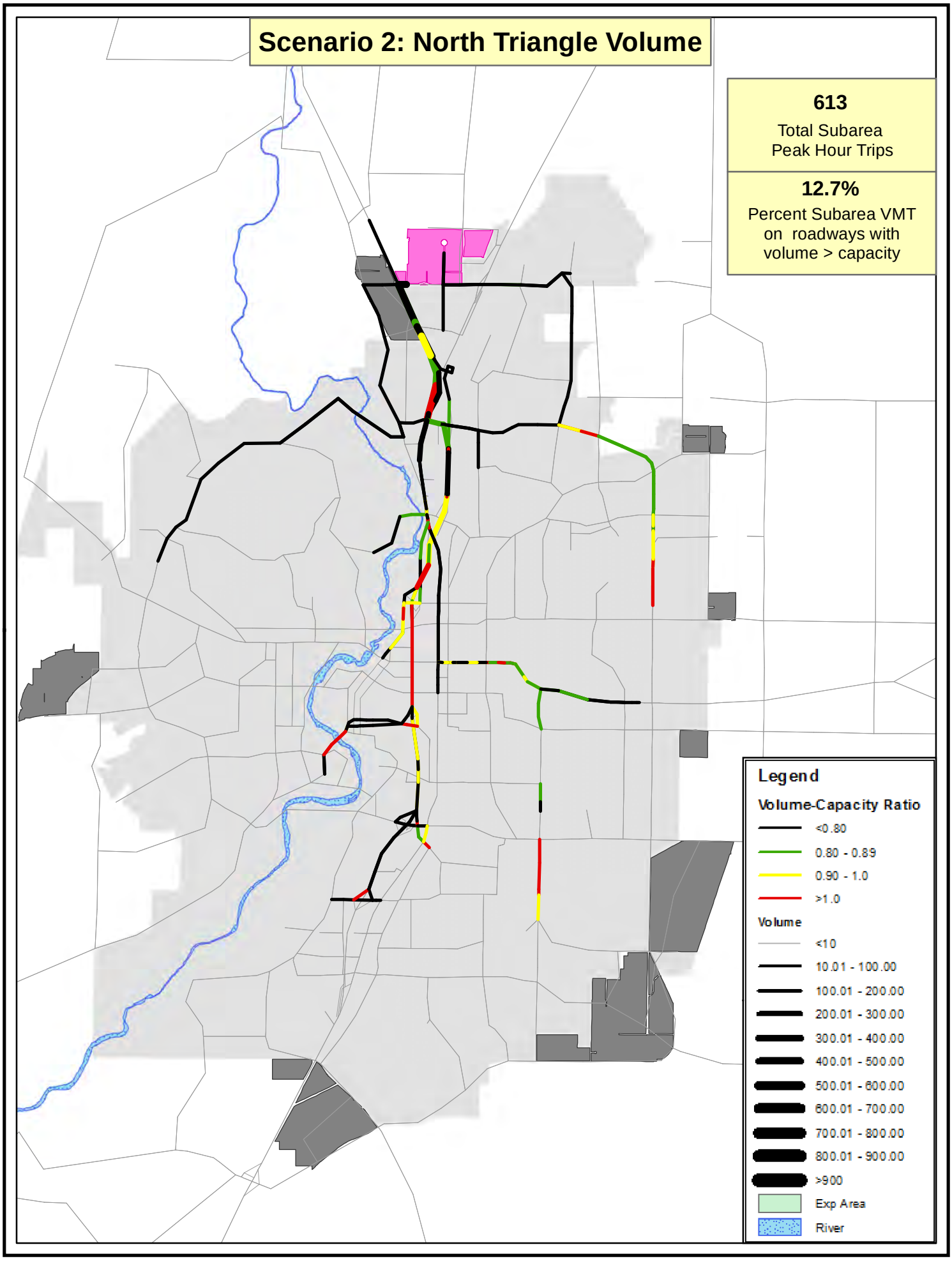

Scenario 2: North Triangle Volume
613
Total Subarea Peak Hour Trips
12.7%
Percent Subarea VMT on roadways with volume > capacity
Legend
Volume-Capacity Ratio
<0.80
0.80 - 0.89
0.90 - 1.0
>1.0
Volume
<10
10.01 - 100.00
100.01 - 200.00
200.01 - 300.00
300.01 - 400.00
400.01 - 500.00
500.01 - 600.00
600.01 - 700.00
700.01 - 800.00
800.01 - 900.00
>900
Exp Area
River

Figure 22

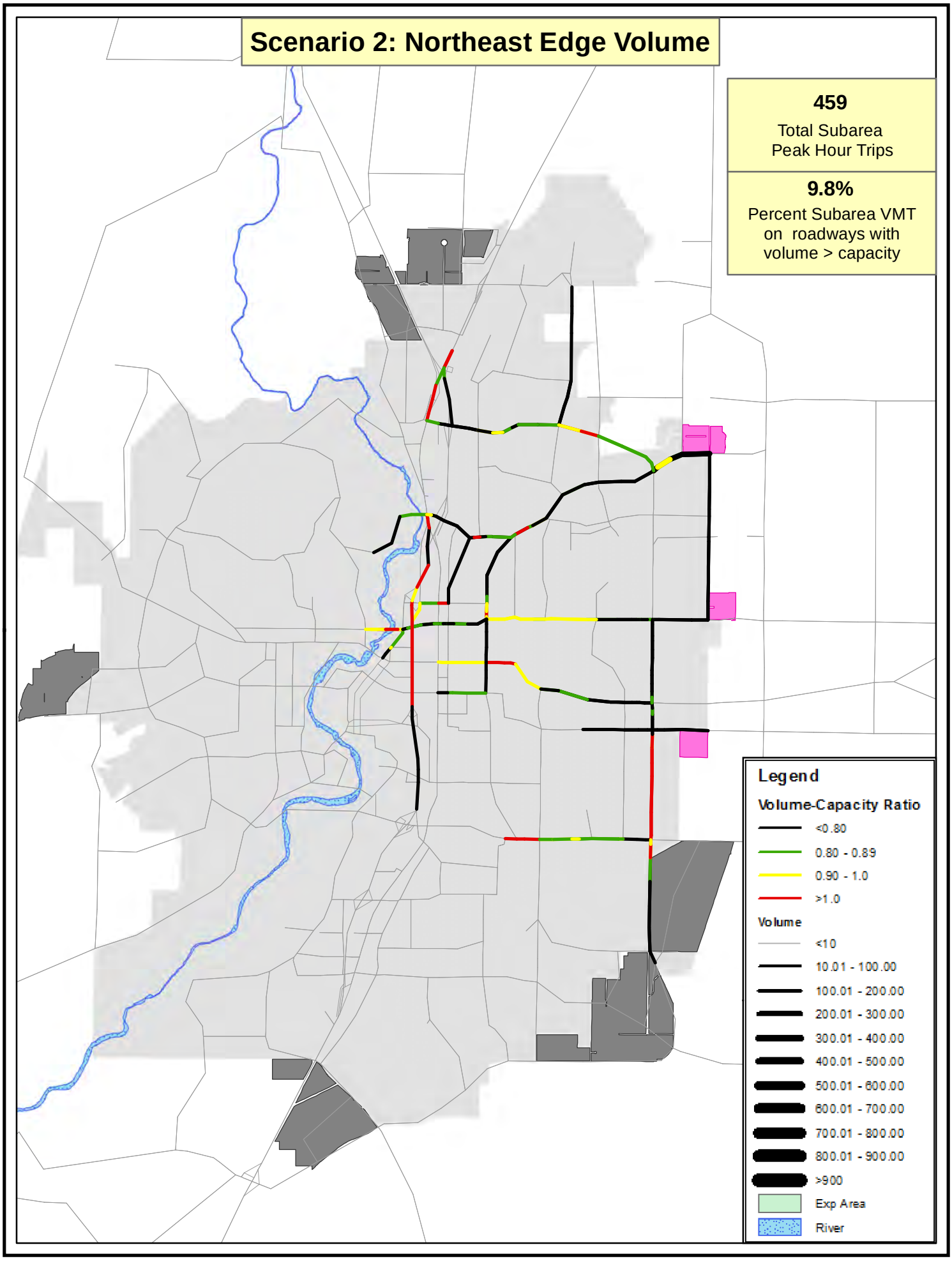

Scenario 2: Northeast Edge Volume
459
Total Subarea Peak Hour Trips
9.8%
Percent Subarea VMT on roadways with volume > capacity
Legend
Volume-Capacity Ratio
<0.80
0.80 - 0.89
0.90 - 1.0
>1.0
Volume
<10
10.01 - 100.00
100.01 - 200.00
200.01 - 300.00
300.01 - 400.00
400.01 - 500.00
500.01 - 600.00
600.01 - 700.00
700.01 - 800.00
800.01 - 900.00
>900
Exp Area
River

Figure 23

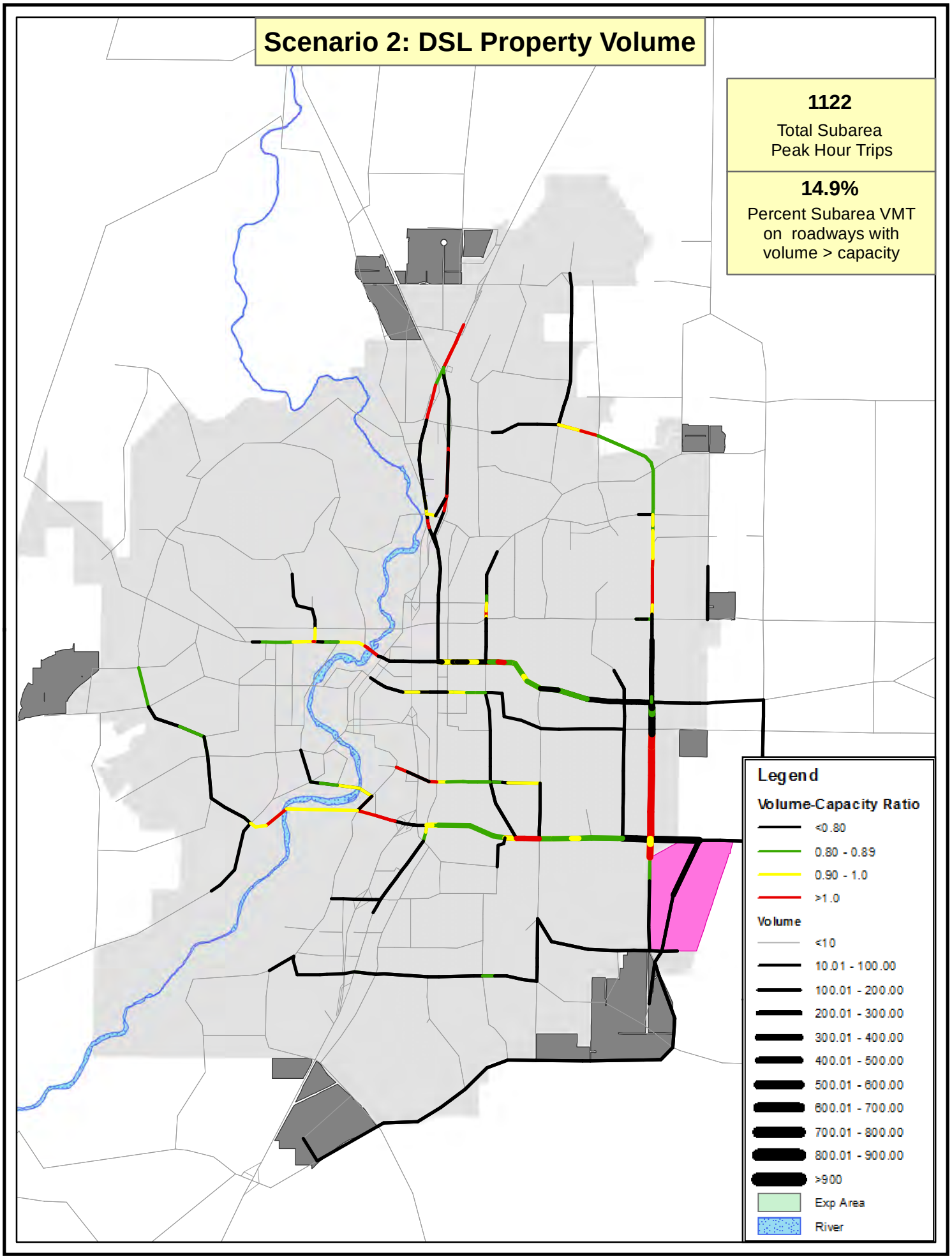

Scenario 2: DSL Property Volume
1122
Total Subarea Peak Hour Trips
14.9%
Percent Subarea VMT on roadways with volume > capacity
Legend
Volume-Capacity Ratio
<0.80
0.80 - 0.89
0.90 - 1.0
>1.0
Volume
<10
10.01 - 100.00
100.01 - 200.00
200.01 - 300.00
300.01 - 400.00
400.01 - 500.00
500.01 - 600.00
600.01 - 700.00
700.01 - 800.00
800.01 - 900.00
>900
Exp Area
River

Figure 24

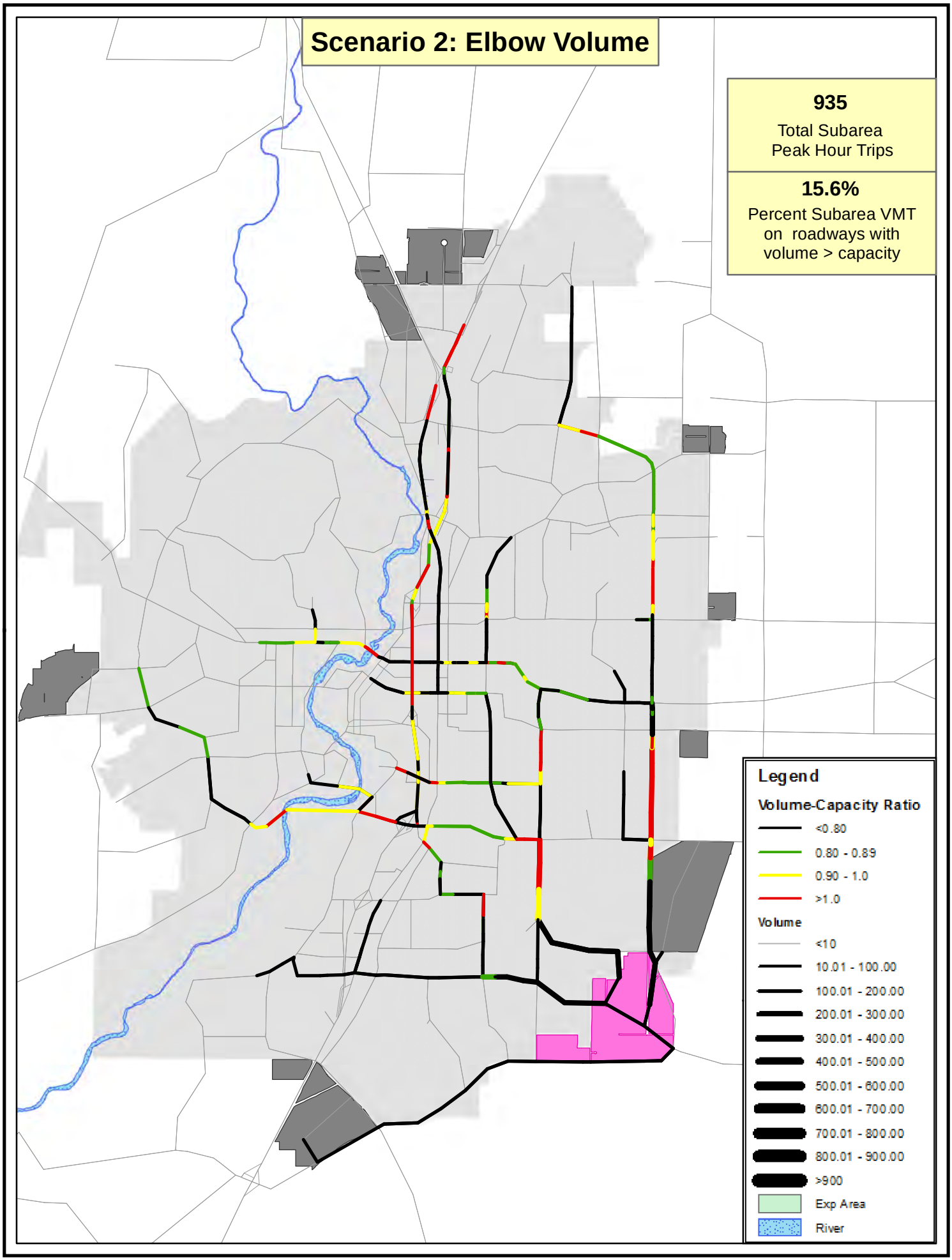

Scenario 2: Elbow Volume
935
Total Subarea
Peak Hour Trips
15.6%
Percent Subarea VMT
on roadways with
volume > capacity
Legend
Volume-Capacity Ratio
<0.80
0.80 - 0.89
0.90 - 1.0
>1.0
Volume
<10
10.01 - 100.00
100.01 - 200.00
200.01 - 300.00
300.01 - 400.00
400.01 - 500.00
500.01 - 600.00
600.01 - 700.00
700.01 - 800.00
800.01 - 900.00
>900
Exp Area
River

Figure 25

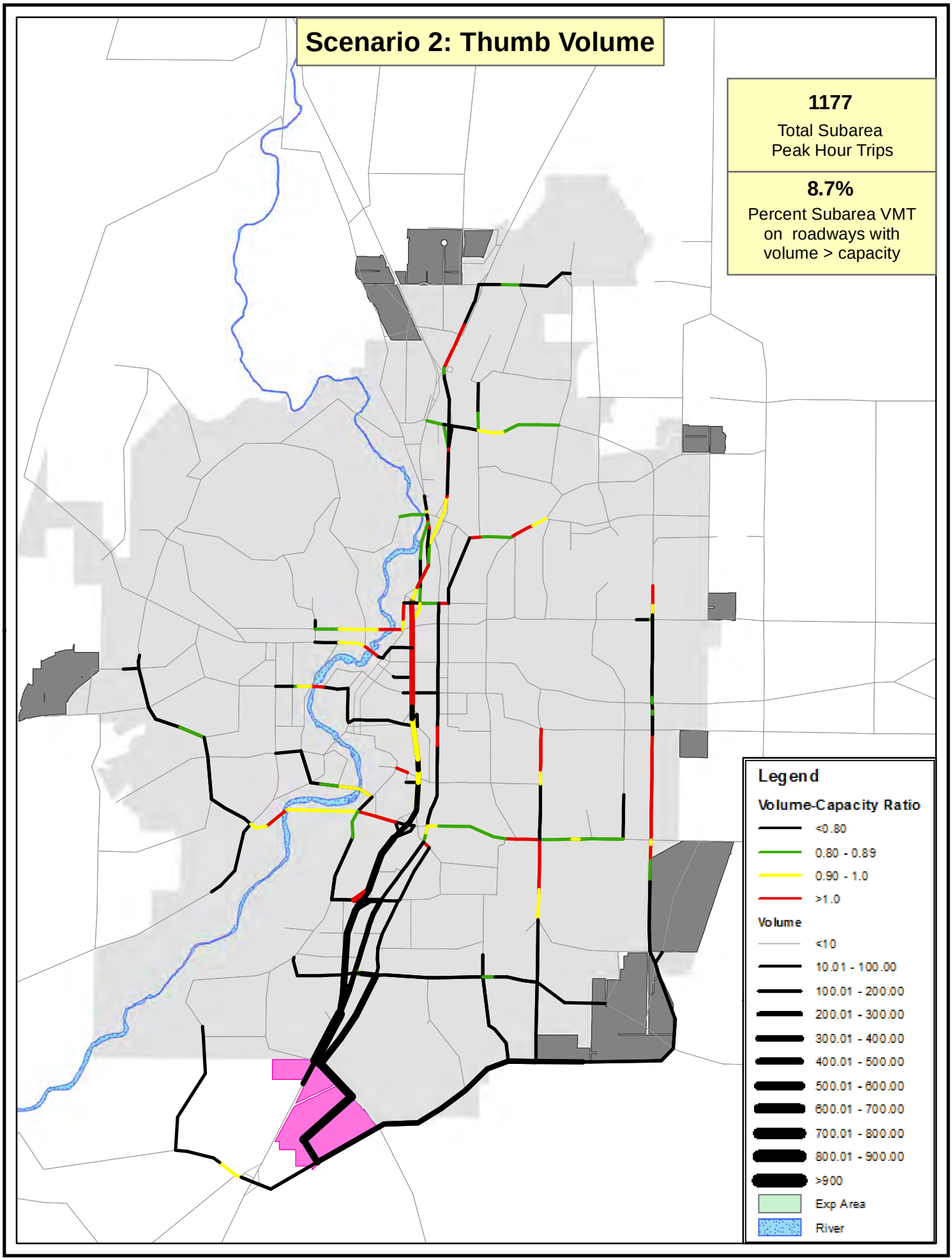

Scenario 2: Thumb Volume
1177
Total Subarea Peak Hour Trips
8.7%
Percent Subarea VMT on roadways with volume > capacity
Legend
Volume-Capacity Ratio
<0.80
0.80 - 0.89
0.90 - 1.0
>1.0
Volume
<10
10.01 - 100.00
100.01 - 200.00
200.01 - 300.00
300.01 - 400.00
400.01 - 500.00
500.01 - 600.00
600.01 - 700.00
700.01 - 800.00
800.01 - 900.00
>900
Exp Area
River

Figure 26

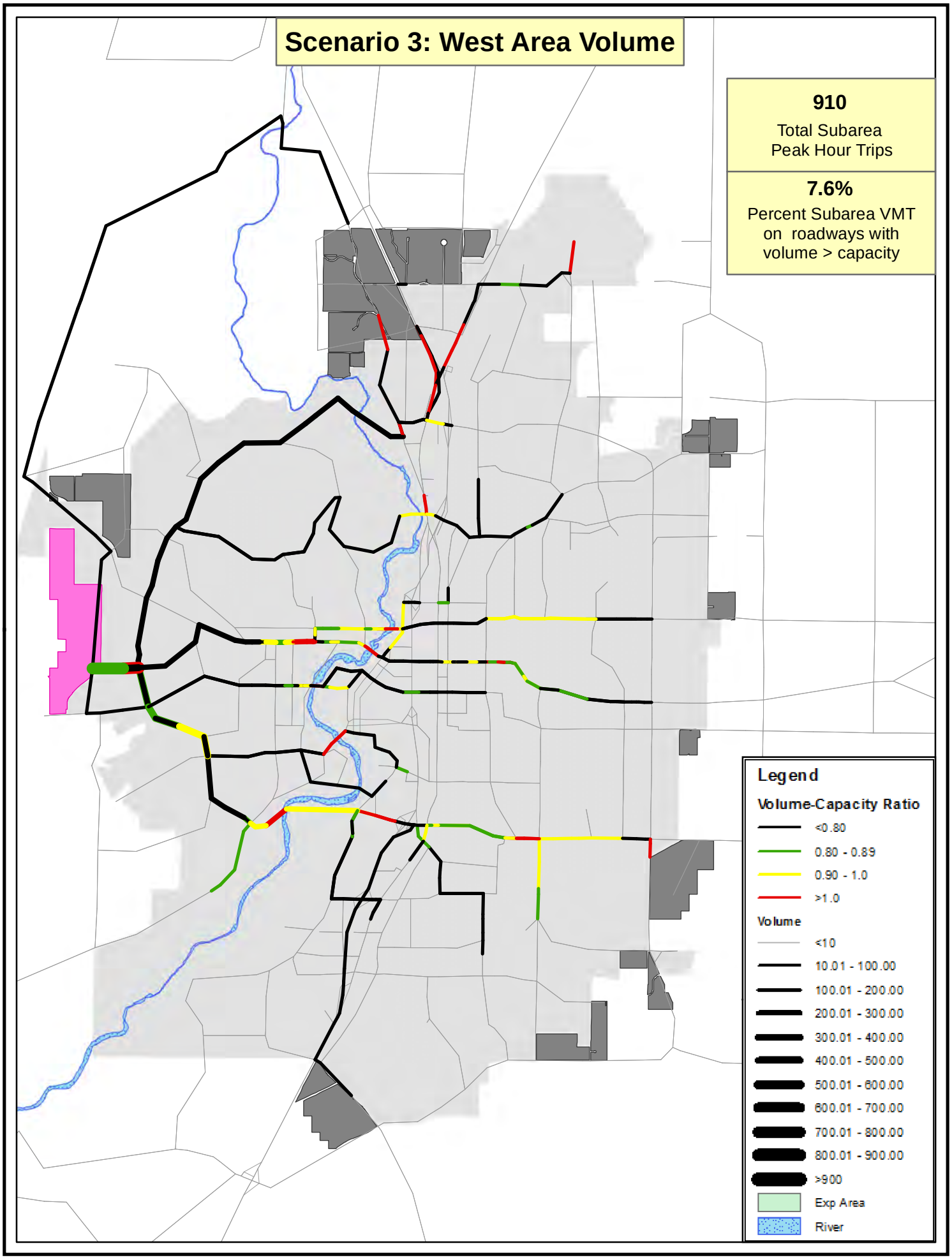

Scenario 3: West Area Volume
910
Total Subarea
Peak Hour Trips
7.6%
Percent Subarea VMT
on roadways with
volume > capacity
Legend
Volume-Capacity Ratio
<0.80
0.80 - 0.89
0.90 - 1.0
>1.0
Volume
<10
10.01 - 100.00
100.01 - 200.00
200.01 - 300.00
300.01 - 400.00
400.01 - 500.00
500.01 - 600.00
600.01 - 700.00
700.01 - 800.00
800.01 - 900.00
>900
Exp Area
River

Figure 27

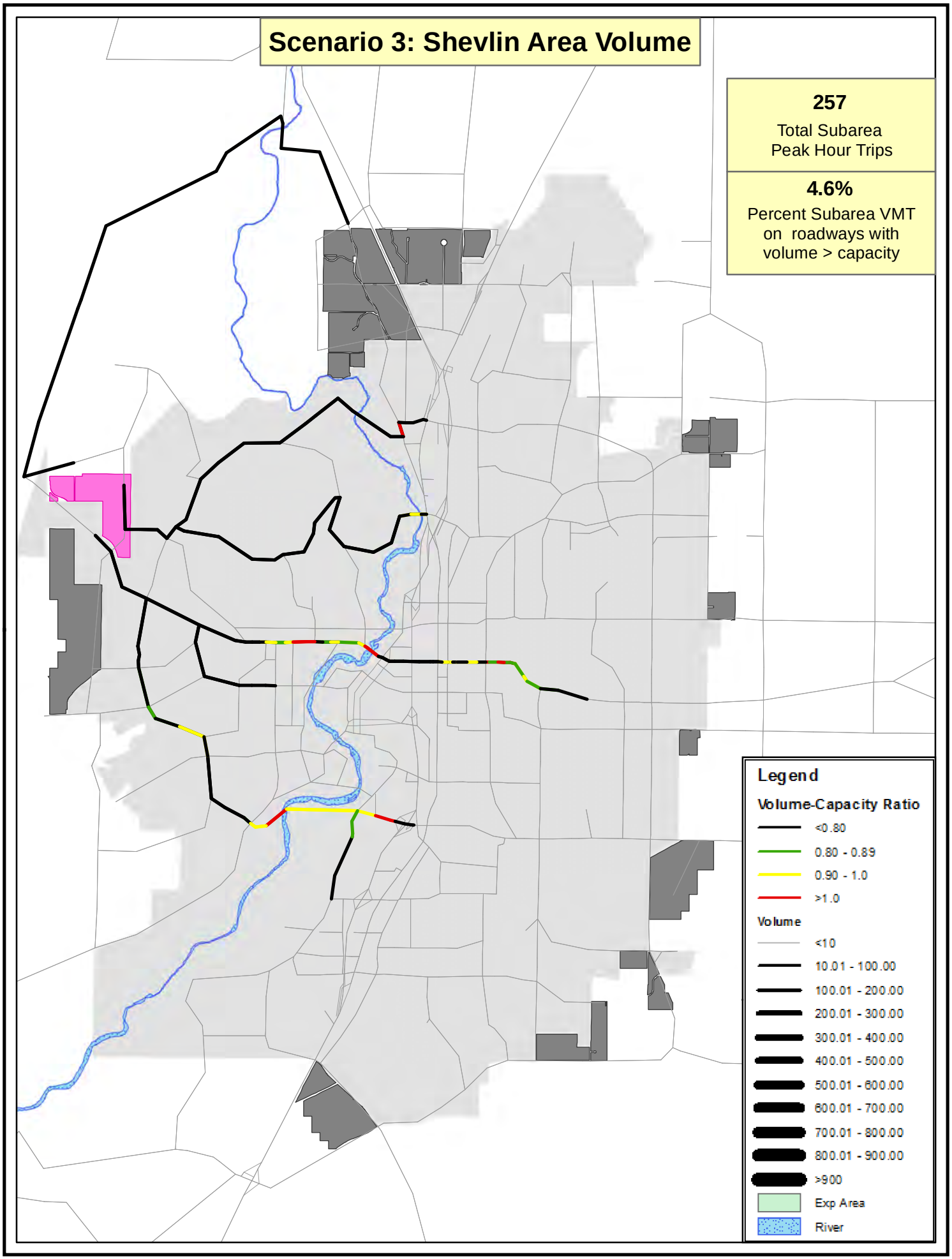

Scenario 3: Shevlin Area Volume
257
Total Subarea Peak Hour Trips
4.6%
Percent Subarea VMT on roadways with volume > capacity
Legend
Volume-Capacity Ratio
<0.80
0.80 - 0.89
0.90 - 1.0
>1.0
Volume
<10
10.01 - 100.00
100.01 - 200.00
200.01 - 300.00
300.01 - 400.00
400.01 - 500.00
500.01 - 600.00
600.01 - 700.00
700.01 - 800.00
800.01 - 900.00
>900
Exp Area
River

Figure 28

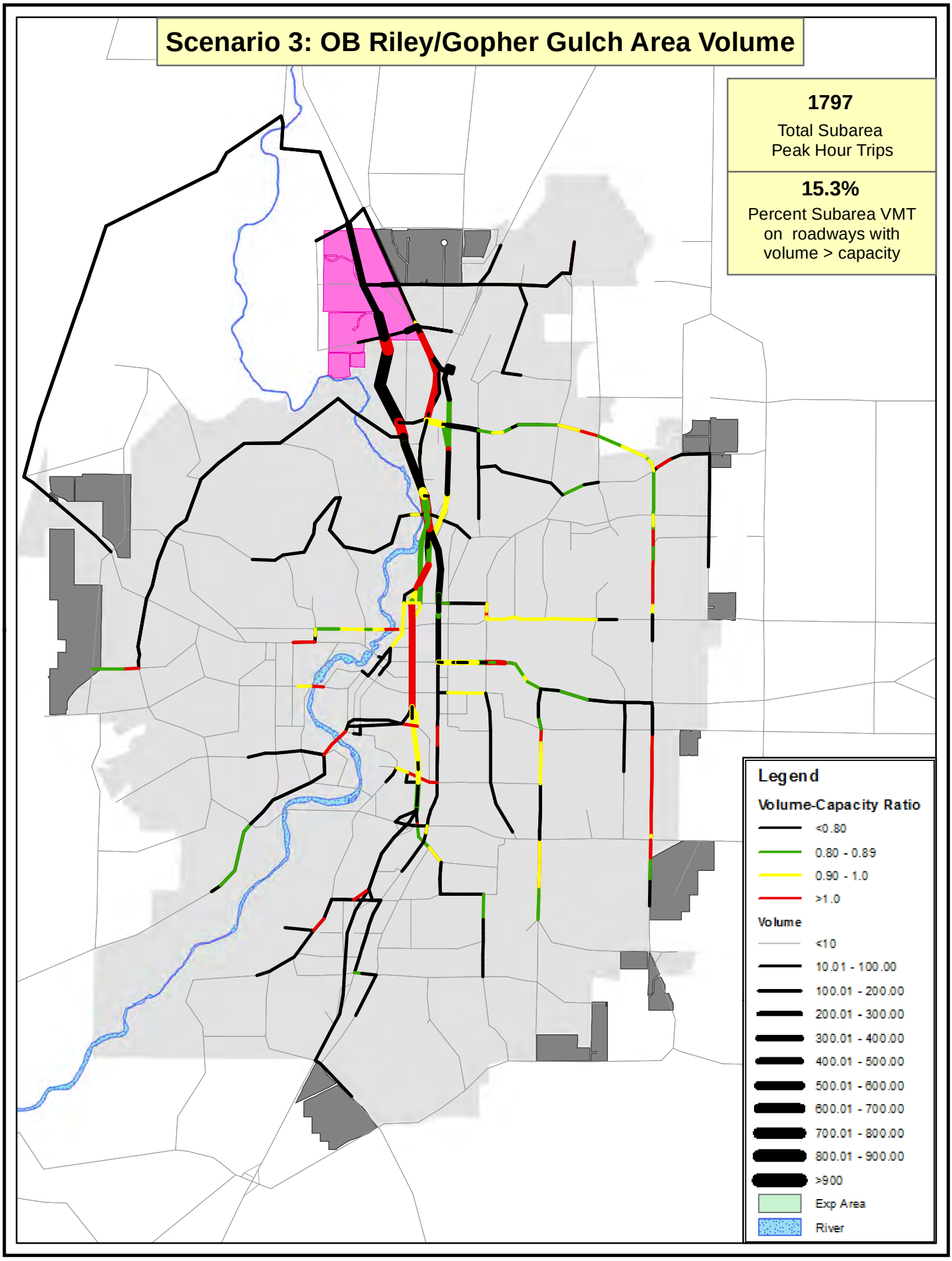

Scenario 3: OB Riley/Gopher Gulch Area Volume
1797
Total Subarea Peak Hour Trips
15.3%
Percent Subarea VMT on roadways with volume > capacity
Legend
Volume-Capacity Ratio
<0.80
0.80 - 0.89
0.90 - 1.0
>1.0
Volume
<10
10.01 - 100.00
100.01 - 200.00
200.01 - 300.00
300.01 - 400.00
400.01 - 500.00
500.01 - 600.00
600.01 - 700.00
700.01 - 800.00
800.01 - 900.00
>900
Exp Area
River

Figure 29

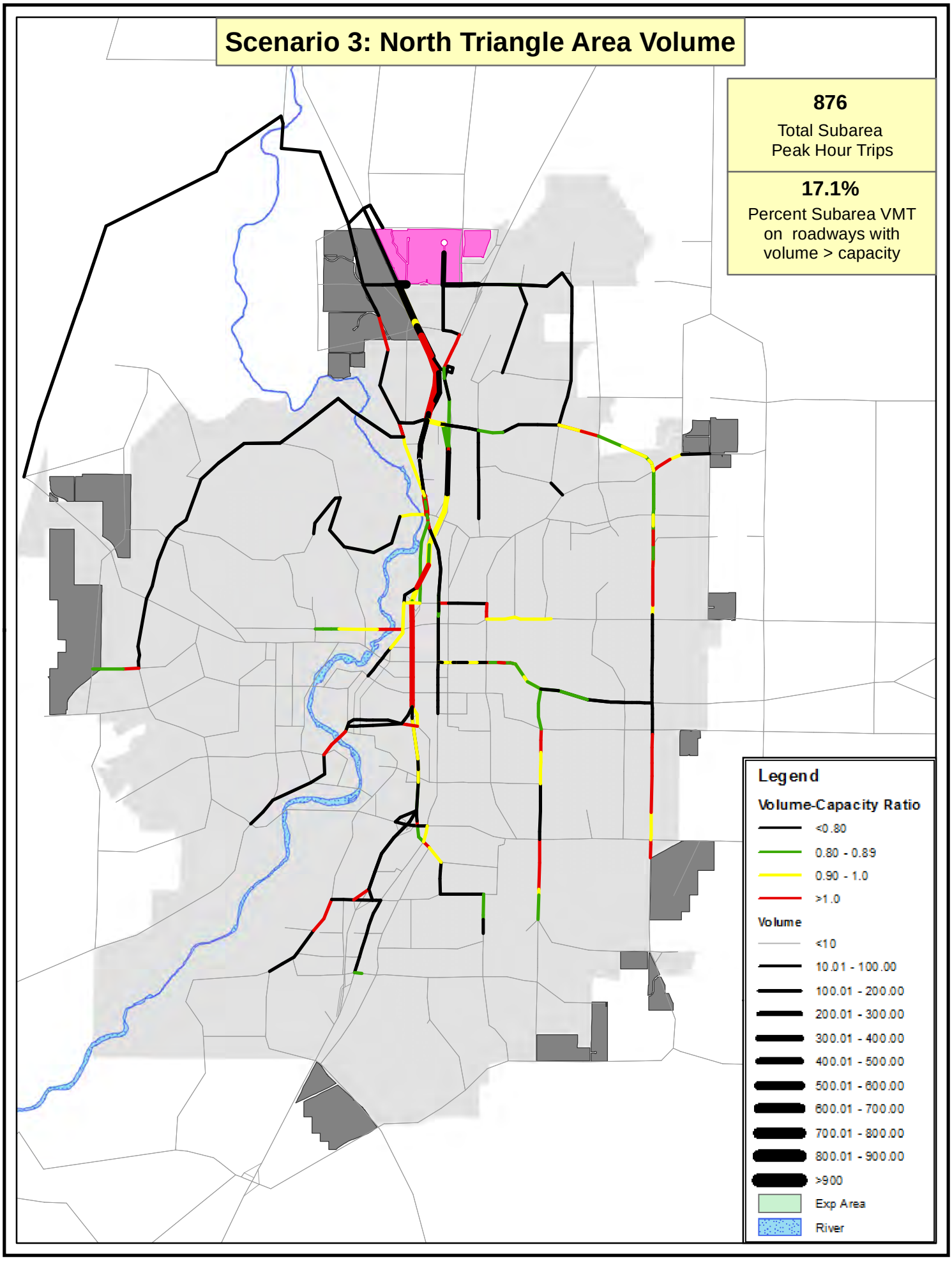

Scenario 3: North Triangle Area Volume
876
Total Subarea Peak Hour Trips
17.1%
Percent Subarea VMT on roadways with volume > capacity
Legend
Volume-Capacity Ratio
<0.80
0.80 - 0.89
0.90 - 1.0
>1.0
Volume
<10
10.01 - 100.00
100.01 - 200.00
200.01 - 300.00
300.01 - 400.00
400.01 - 500.00
500.01 - 600.00
600.01 - 700.00
700.01 - 800.00
800.01 - 900.00
>900
Exp Area
River

Figure 30

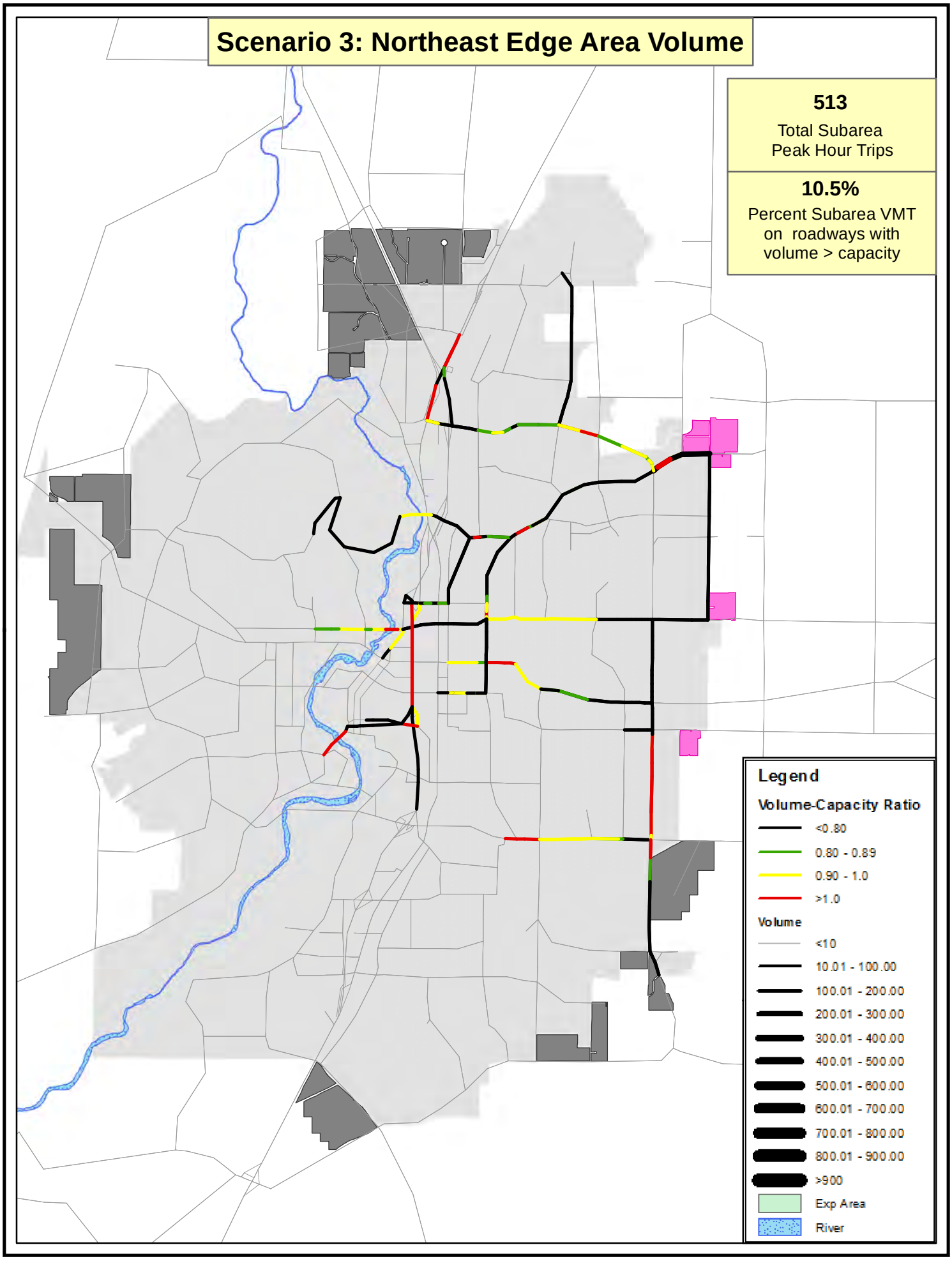

Scenario 3: Northeast Edge Area Volume
513
Total Subarea Peak Hour Trips
10.5%
Percent Subarea VMT on roadways with volume > capacity
Legend
Volume-Capacity Ratio
<0.80
0.80 - 0.89
0.90 - 1.0
>1.0
Volume
<10
10.01 - 100.00
100.01 - 200.00
200.01 - 300.00
300.01 - 400.00
400.01 - 500.00
500.01 - 600.00
600.01 - 700.00
700.01 - 800.00
800.01 - 900.00
>900
Exp Area
River

Figure 31

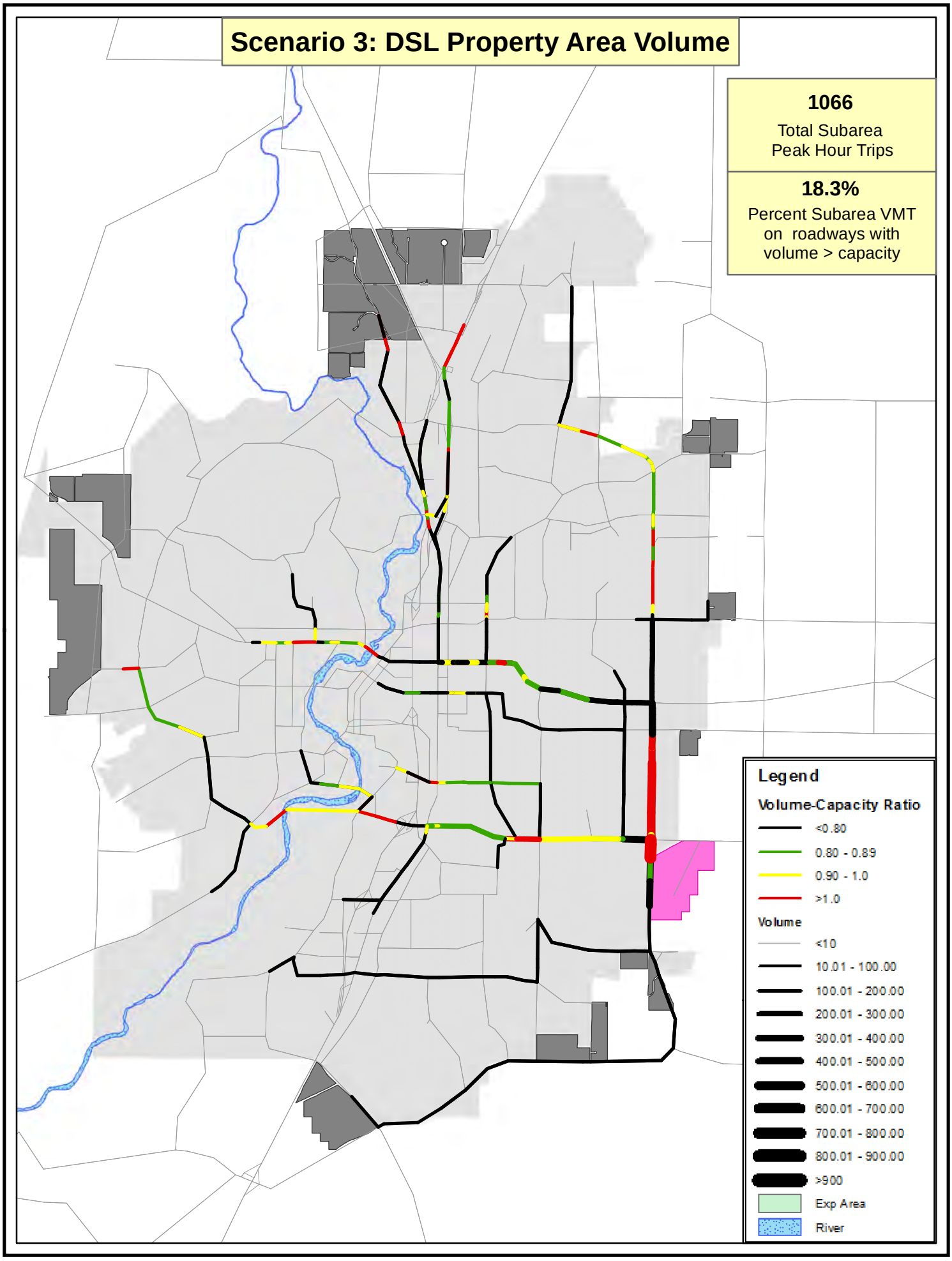

Scenario 3: DSL Property Area Volume
1066
Total Subarea
Peak Hour Trips
18.3%
Percent Subarea VMT
on roadways with
volume > capacity
Legend
Volume-Capacity Ratio
<0.80
0.80 - 0.89
0.90 - 1.0
>1.0
Volume
<10
10.01 - 100.00
100.01 - 200.00
200.01 - 300.00
300.01 - 400.00
400.01 - 500.00
500.01 - 600.00
600.01 - 700.00
700.01 - 800.00
800.01 - 900.00
>900
Exp Area
River

Figure 32

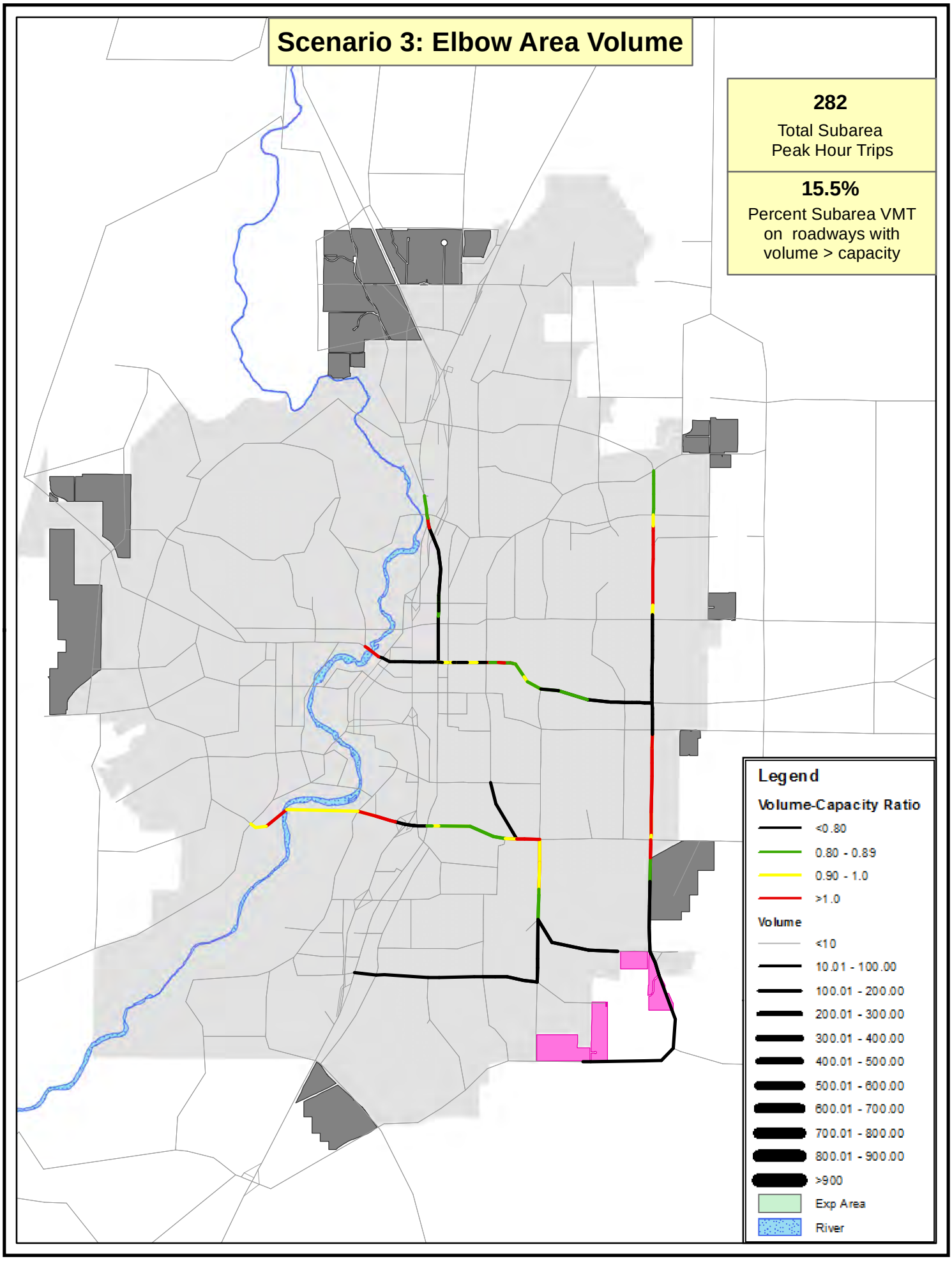

Scenario 3: Elbow Area Volume
282
Total Subarea Peak Hour Trips
15.5%
Percent Subarea VMT on roadways with volume > capacity
Legend
Volume-Capacity Ratio
<0.80
0.80 - 0.89
0.90 - 1.0
>1.0
Volume
<10
10.01 - 100.00
100.01 - 200.00
200.01 - 300.00
300.01 - 400.00
400.01 - 500.00
500.01 - 600.00
600.01 - 700.00
700.01 - 800.00
800.01 - 900.00
>900
Exp Area
River

Figure 33

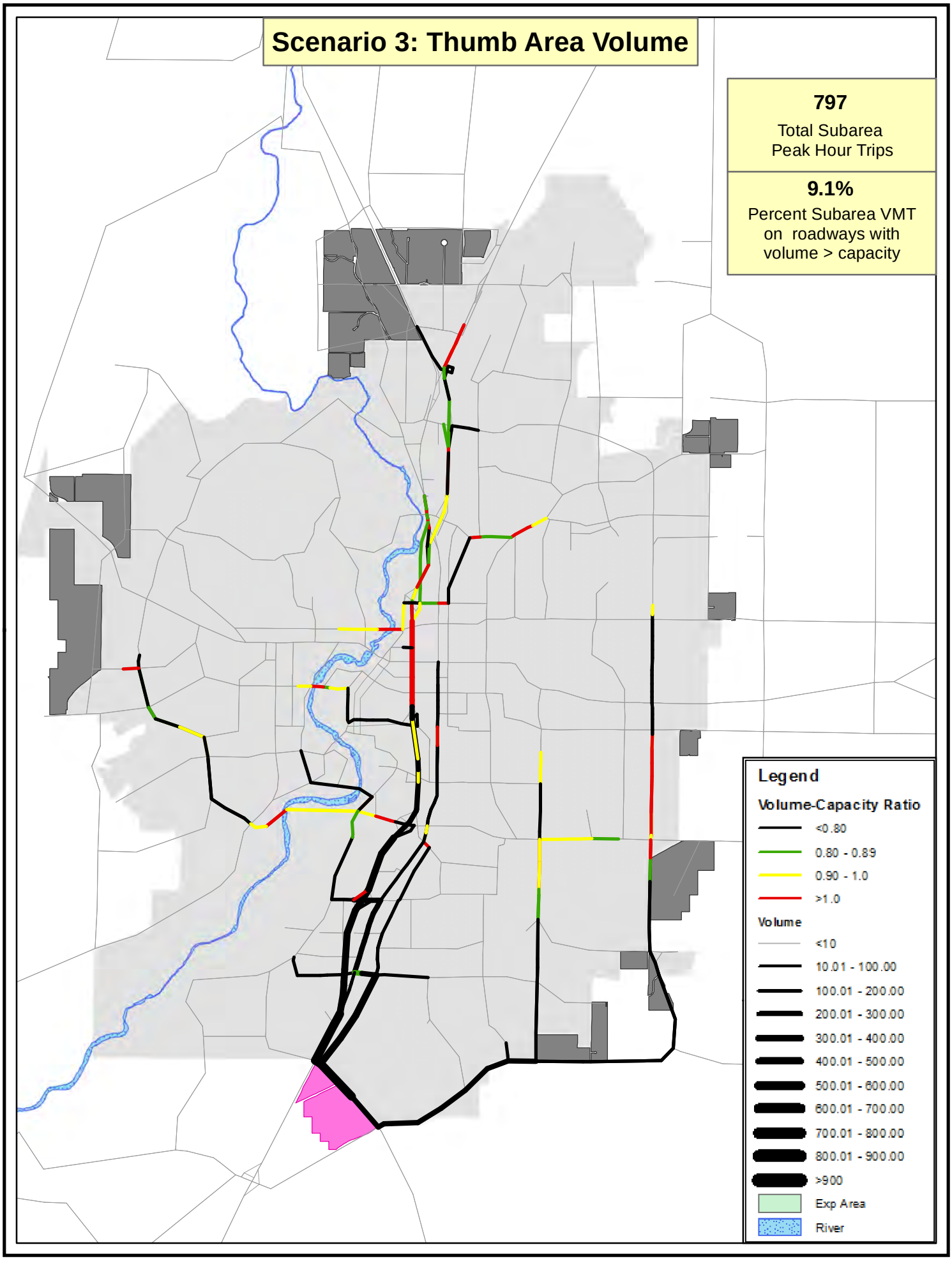

Scenario 3: Thumb Area Volume
797
Total Subarea Peak Hour Trips
9.1%
Percent Subarea VMT on roadways with volume > capacity
Legend
Volume-Capacity Ratio
<0.80
0.80 - 0.89
0.90 - 1.0
>1.0
Volume
<10
10.01 - 100.00
100.01 - 200.00
200.01 - 300.00
300.01 - 400.00
400.01 - 500.00
500.01 - 600.00
600.01 - 700.00
700.01 - 800.00
800.01 - 900.00
>900
Exp Area
River

Figure 34

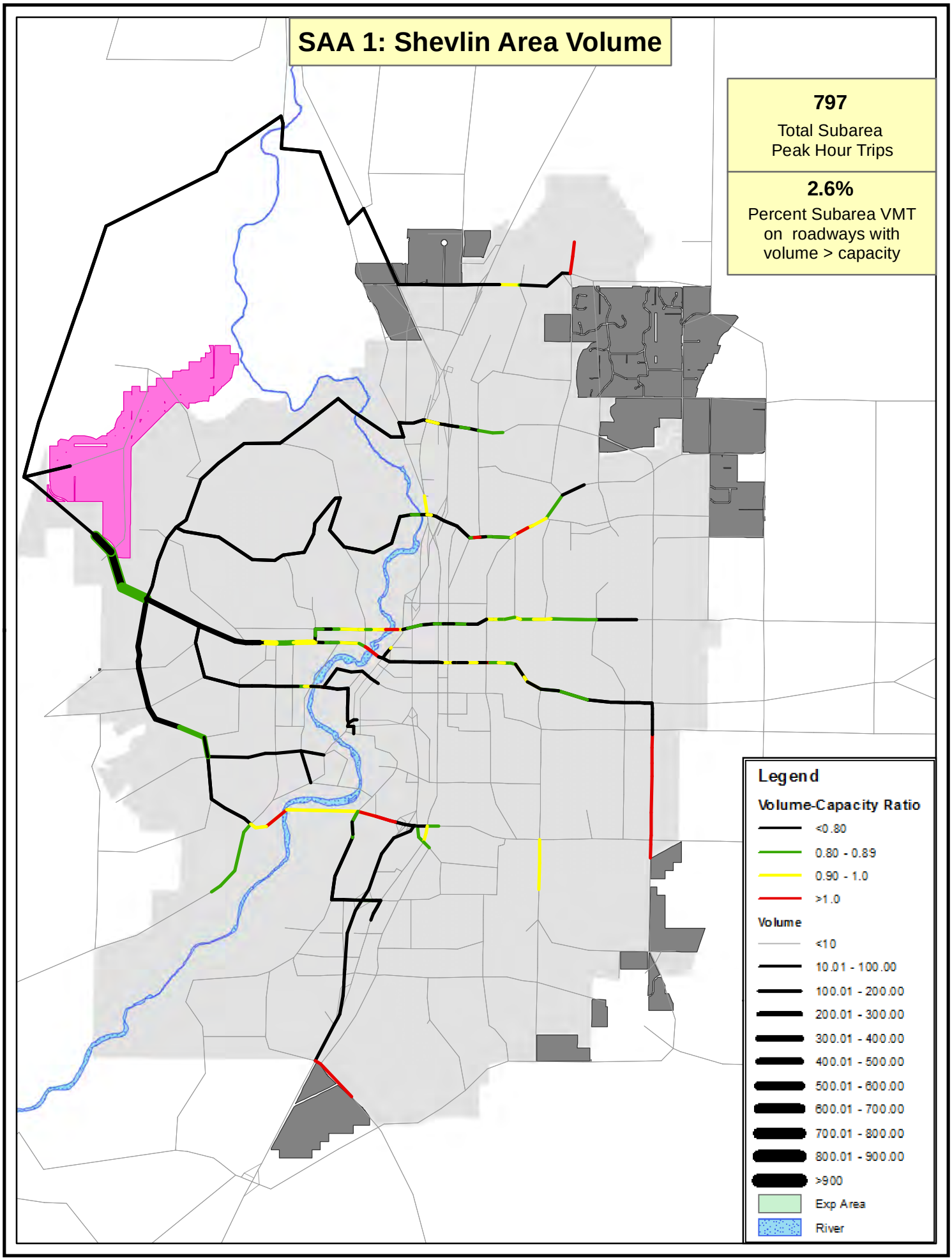

SAA 1: Shevlin Area Volume
797
Total Subarea Peak Hour Trips
2.6%
Percent Subarea VMT on roadways with volume > capacity
Legend
Volume-Capacity Ratio
<0.80
0.80 - 0.89
0.90 - 1.0
>1.0
Volume
<10
10.01 - 100.00
100.01 - 200.00
200.01 - 300.00
300.01 - 400.00
400.01 - 500.00
500.01 - 600.00
600.01 - 700.00
700.01 - 800.00
800.01 - 900.00
>900
Exp Area
River

Figure 35

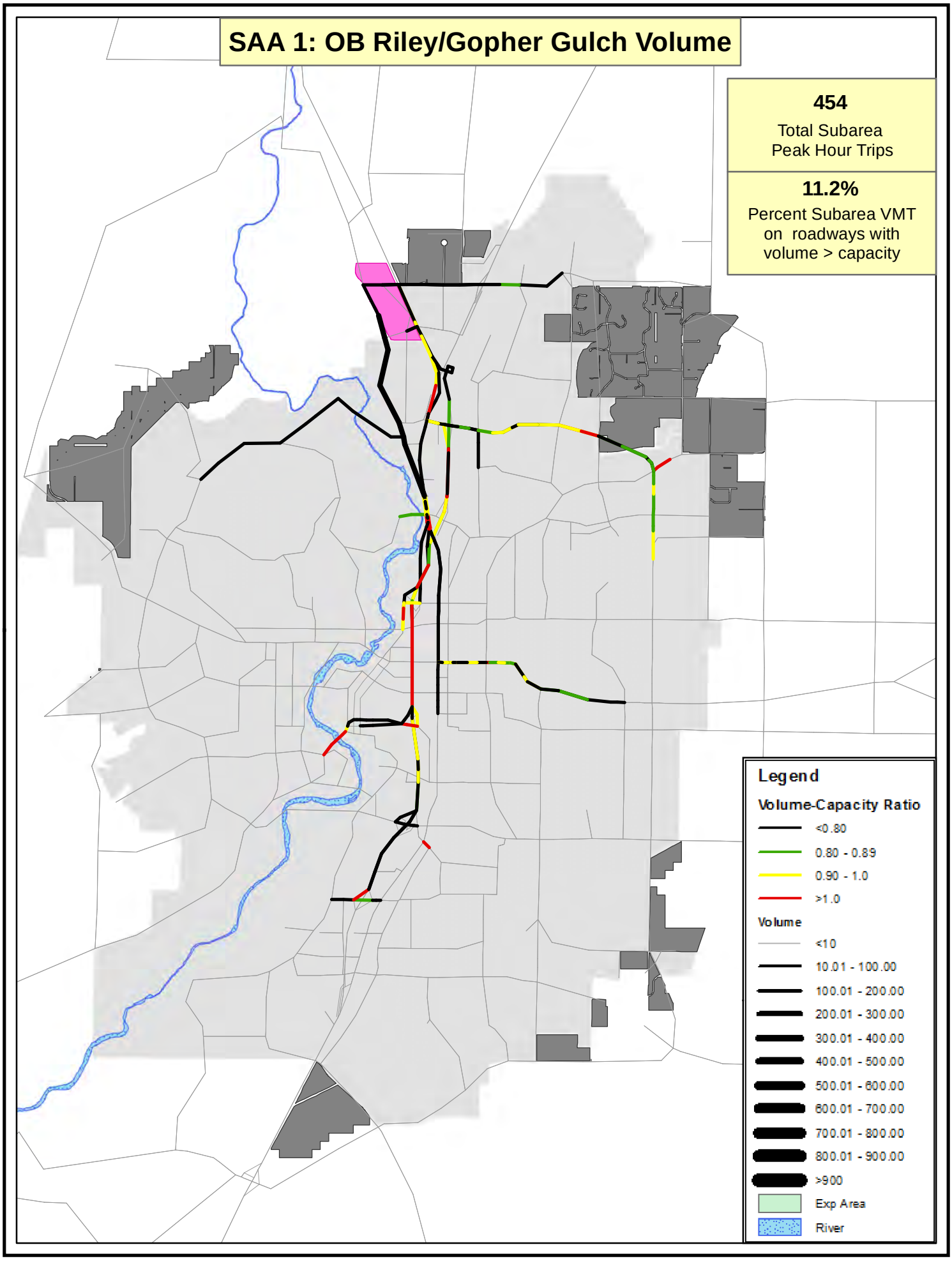

SAA 1: OB Riley/Gopher Gulch Volume
454
Total Subarea Peak Hour Trips
11.2%
Percent Subarea VMT on roadways with volume > capacity
Legend
Volume-Capacity Ratio
<0.80
0.80 - 0.89
0.90 - 1.0
>1.0
Volume
<10
10.01 - 100.00
100.01 - 200.00
200.01 - 300.00
300.01 - 400.00
400.01 - 500.00
500.01 - 600.00
600.01 - 700.00
700.01 - 800.00
800.01 - 900.00
>900
Exp Area
River

Figure 36

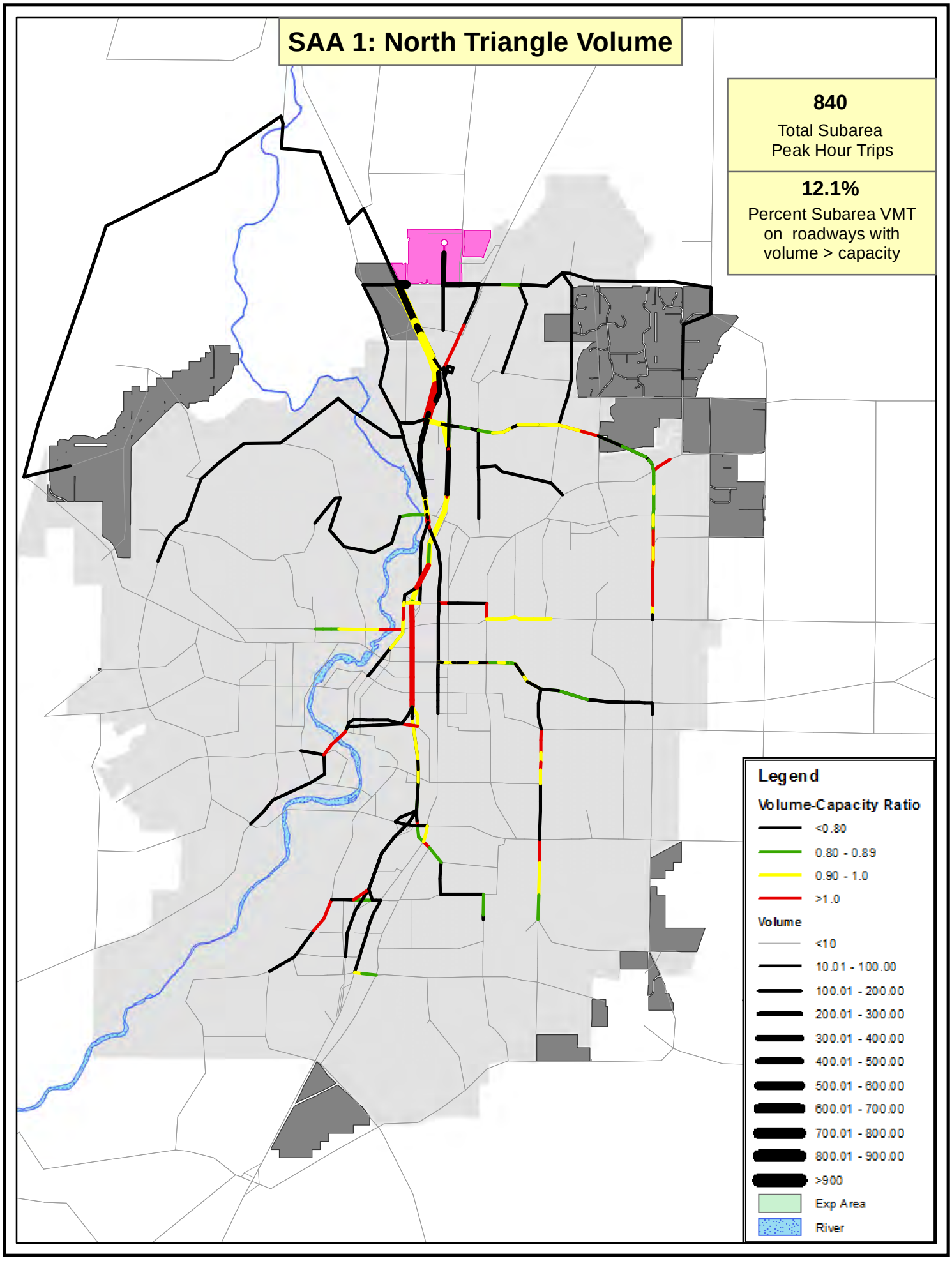

SAA 1: North Triangle Volume
840
Total Subarea Peak Hour Trips
12.1%
Percent Subarea VMT on roadways with volume > capacity
Legend
Volume-Capacity Ratio
<0.80
0.80 - 0.89
0.90 - 1.0
>1.0
Volume
<10
10.01 - 100.00
100.01 - 200.00
200.01 - 300.00
300.01 - 400.00
400.01 - 500.00
500.01 - 600.00
600.01 - 700.00
700.01 - 800.00
800.01 - 900.00
>900
Exp Area
River

Figure 37

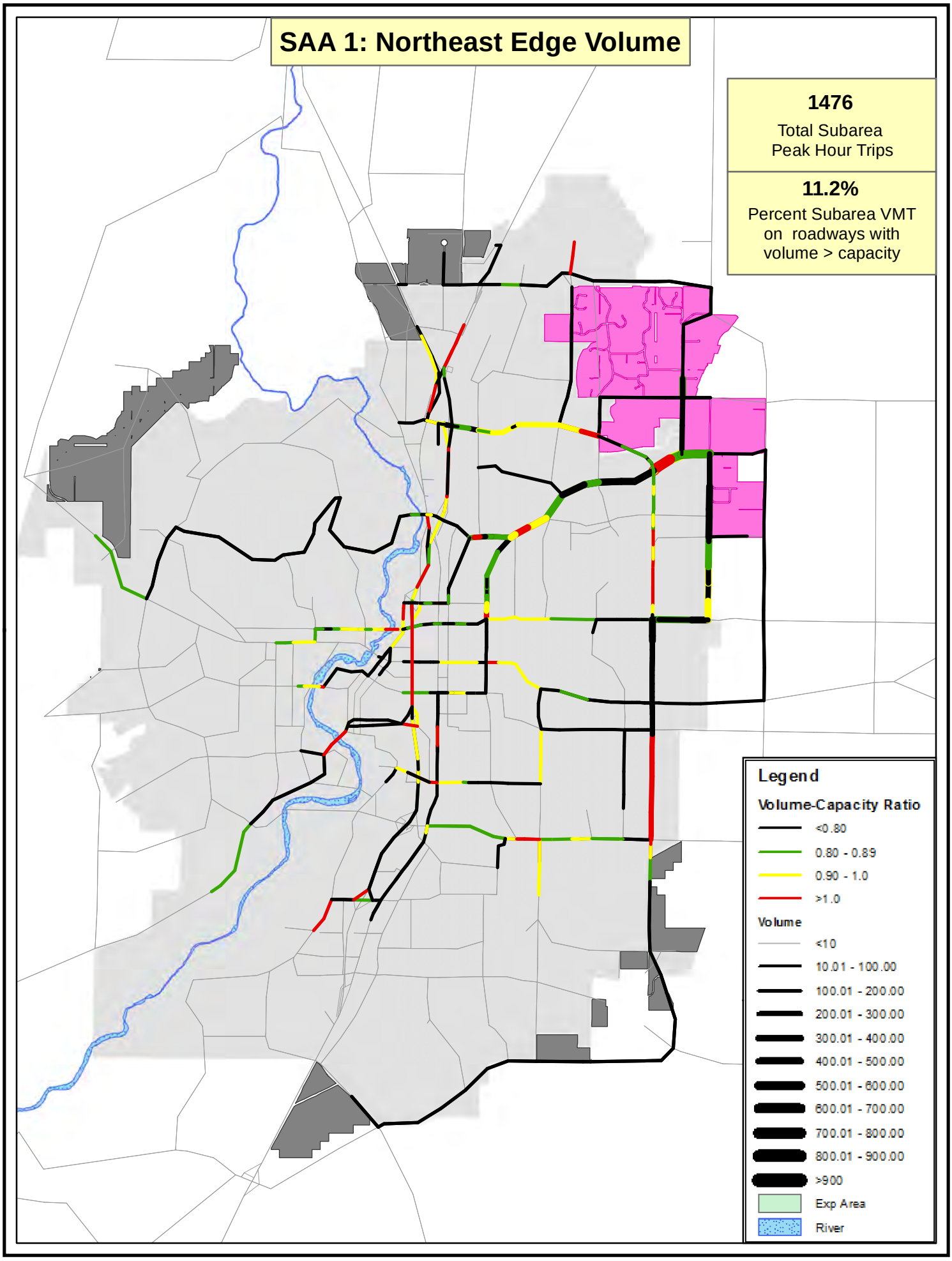

SAA 1: Northeast Edge Volume
1476
Total Subarea Peak Hour Trips
11.2%
Percent Subarea VMT on roadways with volume > capacity
Legend
Volume-Capacity Ratio
<0.80
0.80 - 0.89
0.90 - 1.0
>1.0
Volume
<10
10.01 - 100.00
100.01 - 200.00
200.01 - 300.00
300.01 - 400.00
400.01 - 500.00
500.01 - 600.00
600.01 - 700.00
700.01 - 800.00
800.01 - 900.00
>900
Exp Area
River

Figure 38

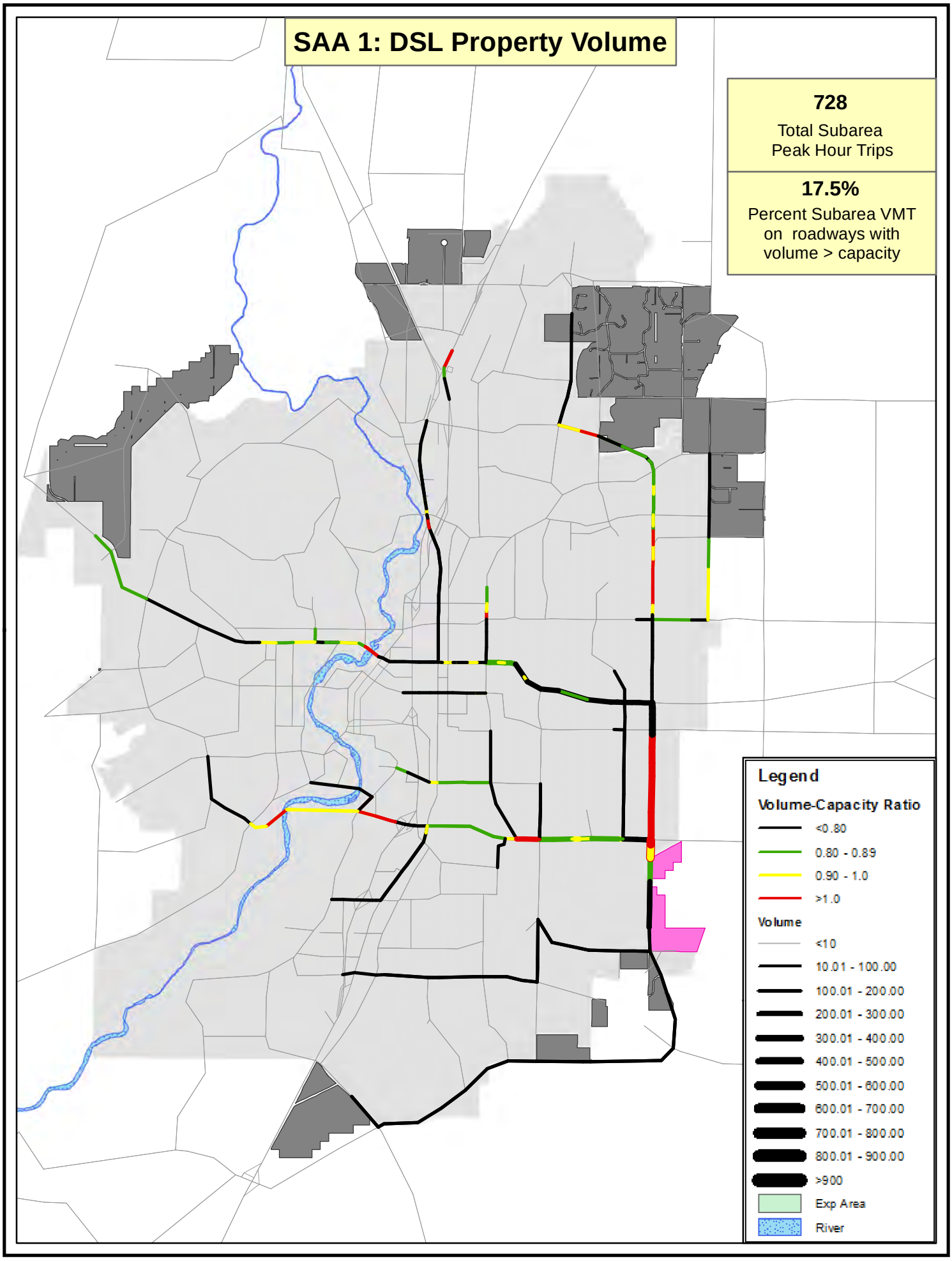

SAA 1: DSL Property Volume
728
Total Subarea Peak Hour Trips
17.5%
Percent Subarea VMT on roadways with volume > capacity
Legend
Volume-Capacity Ratio
<0.80
0.80 - 0.89
0.90 - 1.0
>1.0
Volume
<10
10.01 - 100.00
100.01 - 200.00
200.01 - 300.00
300.01 - 400.00
400.01 - 500.00
500.01 - 600.00
600.01 - 700.00
700.01 - 800.00
800.01 - 900.00
>900
Exp Area
River

Figure 39

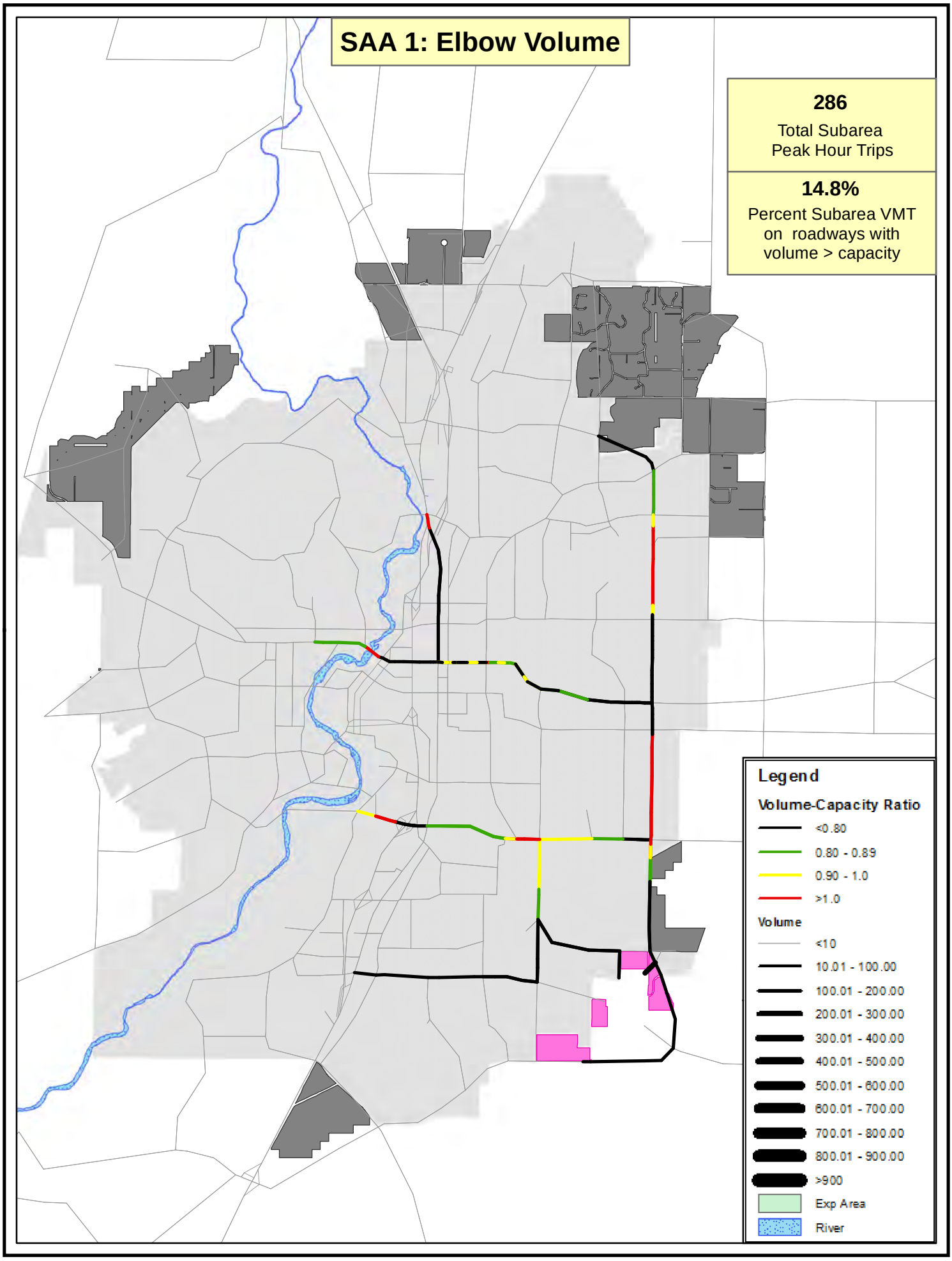

SAA 1: Elbow Volume
286
Total Subarea Peak Hour Trips
14.8%
Percent Subarea VMT on roadways with volume > capacity
Legend
Volume-Capacity Ratio
<0.80
0.80 - 0.89
0.90 - 1.0
>1.0
Volume
<10
10.01 - 100.00
100.01 - 200.00
200.01 - 300.00
300.01 - 400.00
400.01 - 500.00
500.01 - 600.00
600.01 - 700.00
700.01 - 800.00
800.01 - 900.00
>900
Exp Area
River

Figure 40

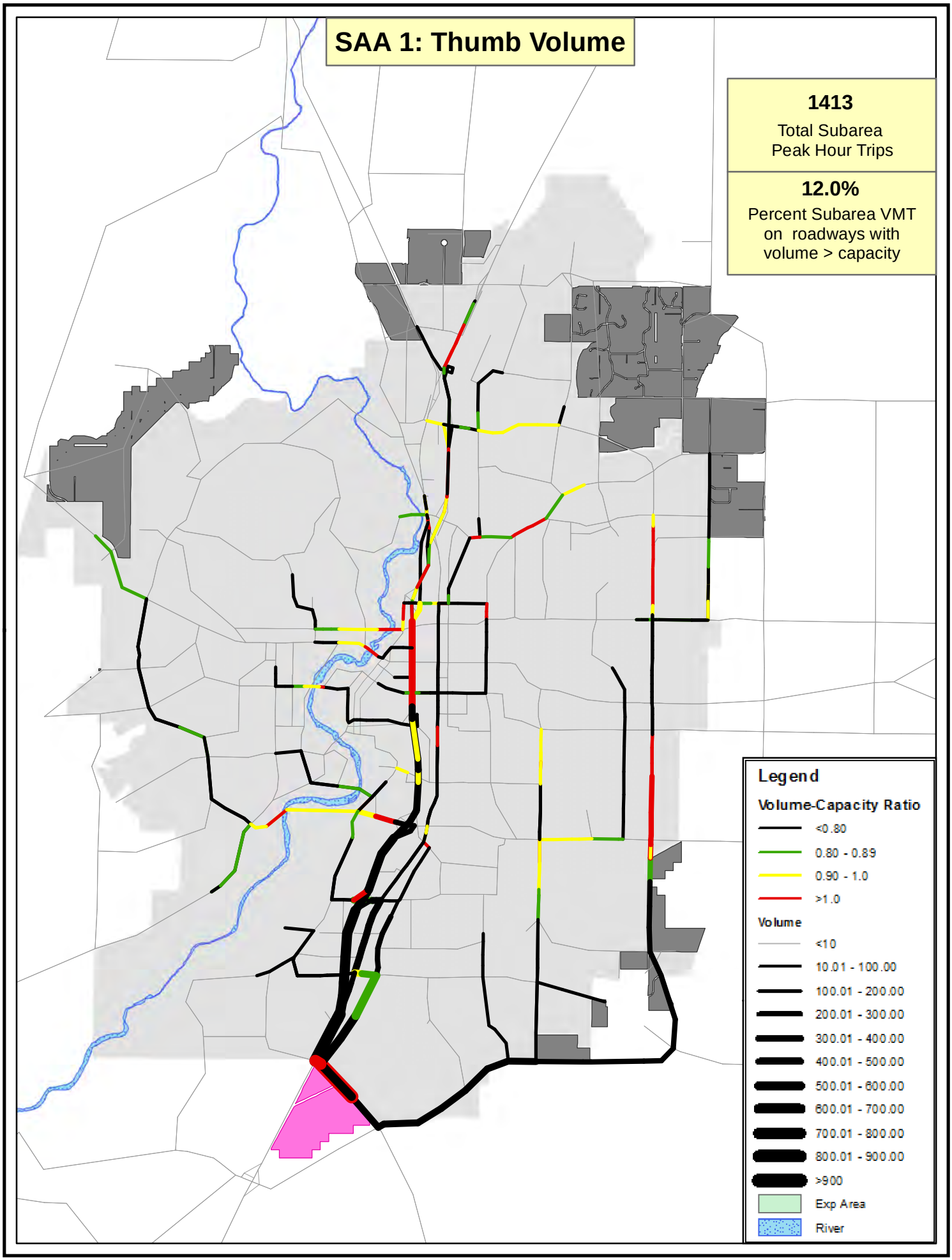

SAA 1: Thumb Volume
1413
Total Subarea
Peak Hour Trips
12.0%
Percent Subarea VMT
on roadways with
volume > capacity
Legend
Volume-Capacity Ratio
<0.80
0.80 - 0.89
0.90 - 1.0
>1.0
Volume
<10
10.01 - 100.00
100.01 - 200.00
200.01 - 300.00
300.01 - 400.00
400.01 - 500.00
500.01 - 600.00
600.01 - 700.00
700.01 - 800.00
800.01 - 900.00
>900
Exp Area
River

Figure 41

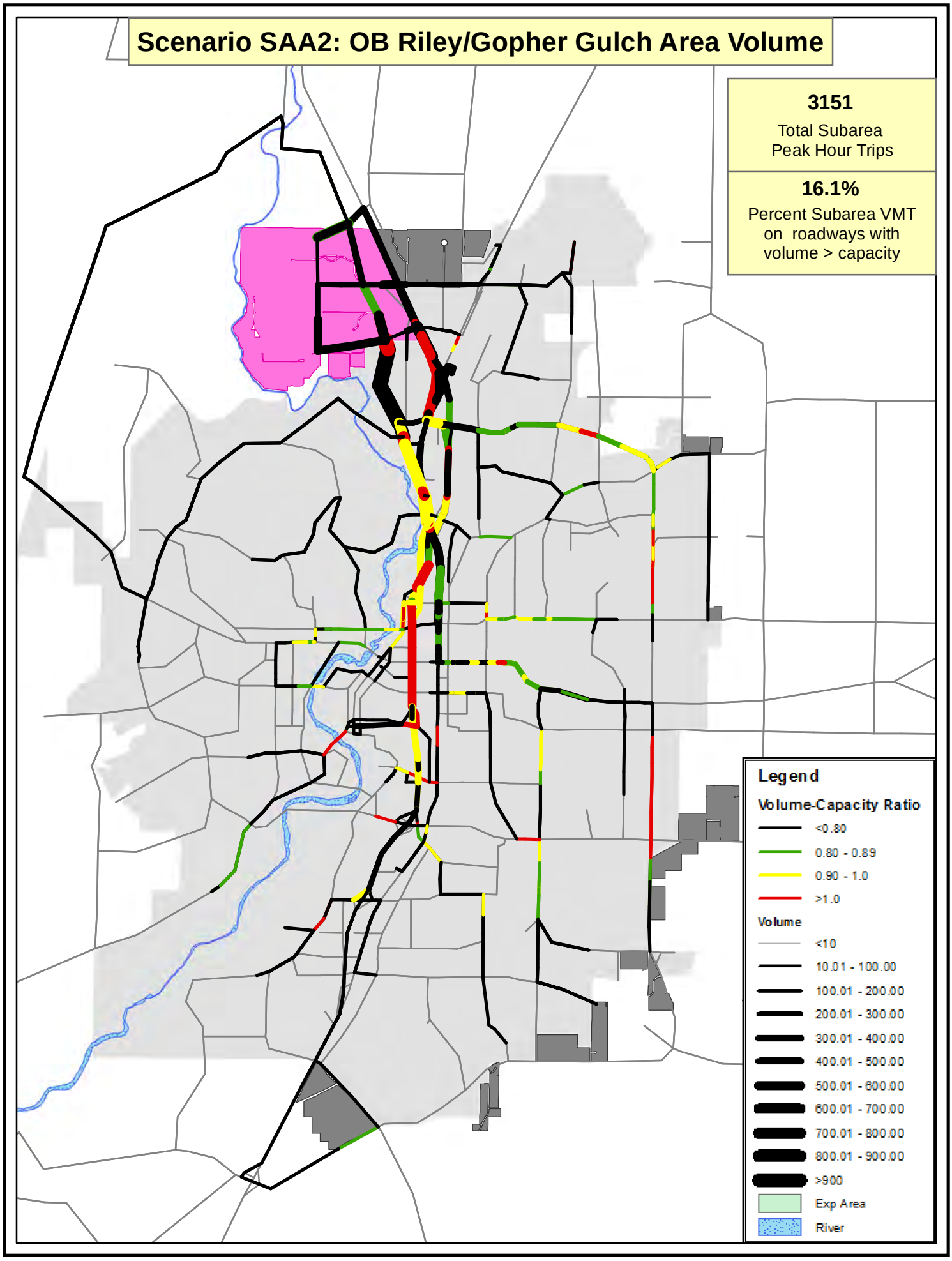

Scenario SAA2: OB Riley/Gopher Gulch Area Volume
3151
Total Subarea Peak Hour Trips
16.1%
Percent Subarea VMT on roadways with volume > capacity
Legend
Volume-Capacity Ratio
<0.80
0.80 - 0.89
0.90 - 1.0
>1.0
Volume
<10
10.01 - 100.00
100.01 - 200.00
200.01 - 300.00
300.01 - 400.00
400.01 - 500.00
500.01 - 600.00
600.01 - 700.00
700.01 - 800.00
800.01 - 900.00
>900
Exp Area
River

Figure 42

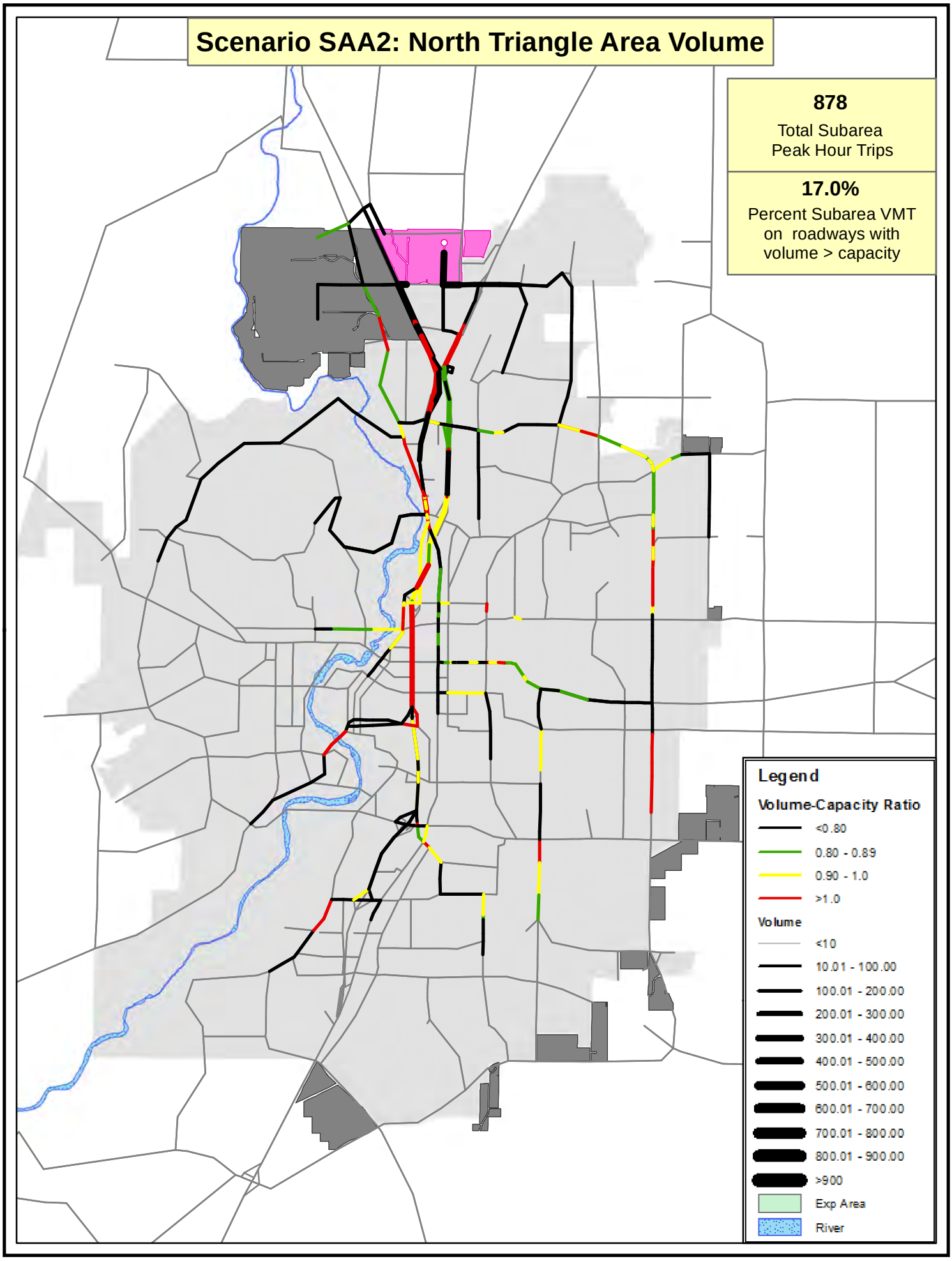

Scenario SAA2: North Triangle Area Volume
878
Total Subarea Peak Hour Trips
17.0%
Percent Subarea VMT on roadways with volume > capacity
Legend
Volume-Capacity Ratio
<0.80
0.80 - 0.89
0.90 - 1.0
>1.0
Volume
<10
10.01 - 100.00
100.01 - 200.00
200.01 - 300.00
300.01 - 400.00
400.01 - 500.00
500.01 - 600.00
600.01 - 700.00
700.01 - 800.00
800.01 - 900.00
>900
Exp Area
River

Figure 43

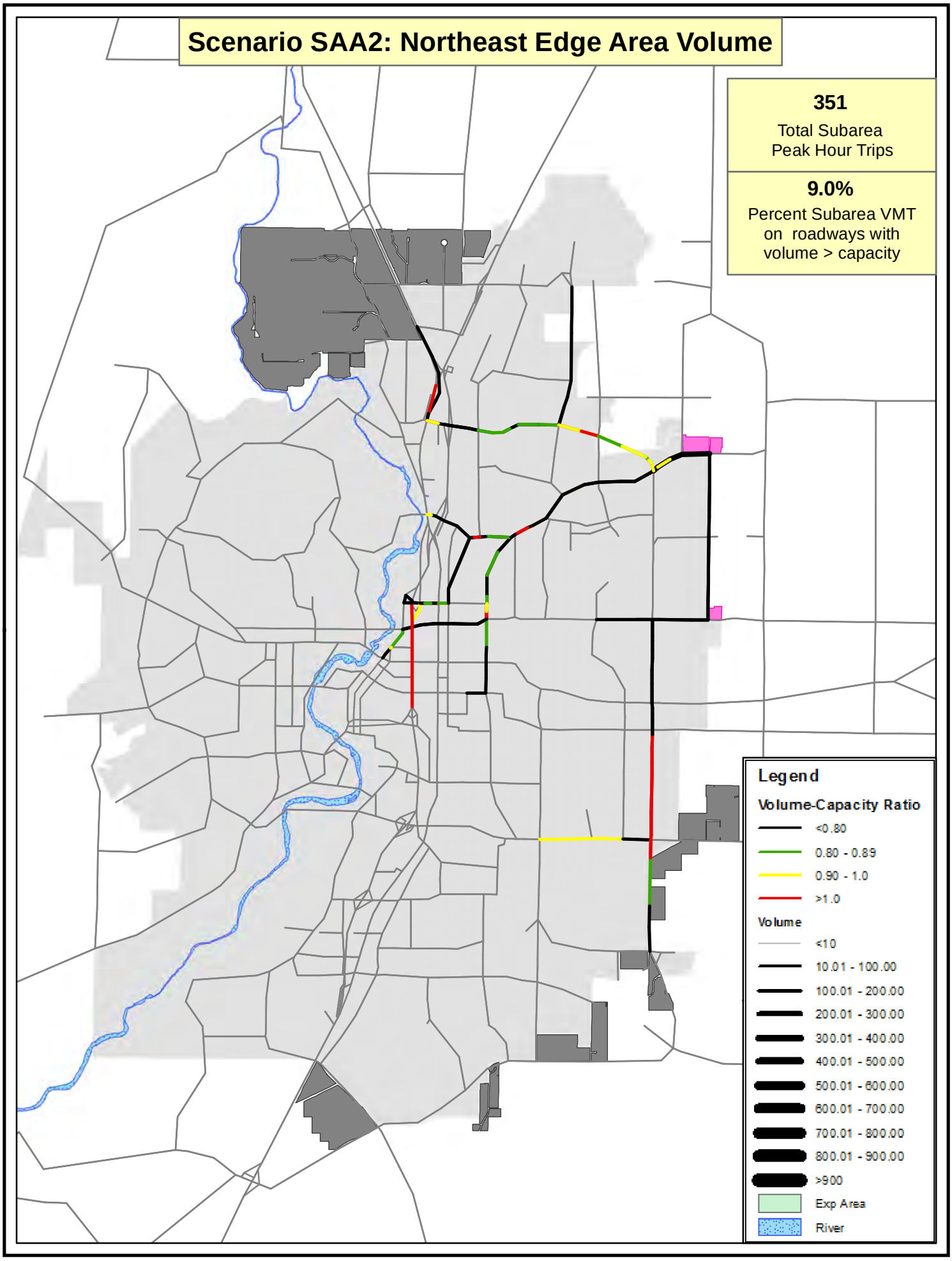

Scenario SAA2: Northeast Edge Area Volume
351
Total Subarea
Peak Hour Trips
9.0%
Percent Subarea VMT
on roadways with
volume > capacity
Legend
Volume-Capacity Ratio
<0.80
0.80 - 0.89
0.90 - 1.0
>1.0
Volume
<10
10.01 - 100.00
100.01 - 200.00
200.01 - 300.00
300.01 - 400.00
400.01 - 500.00
500.01 - 600.00
600.01 - 700.00
700.01 - 800.00
800.01 - 900.00
>900
Exp Area
River

Figure 44

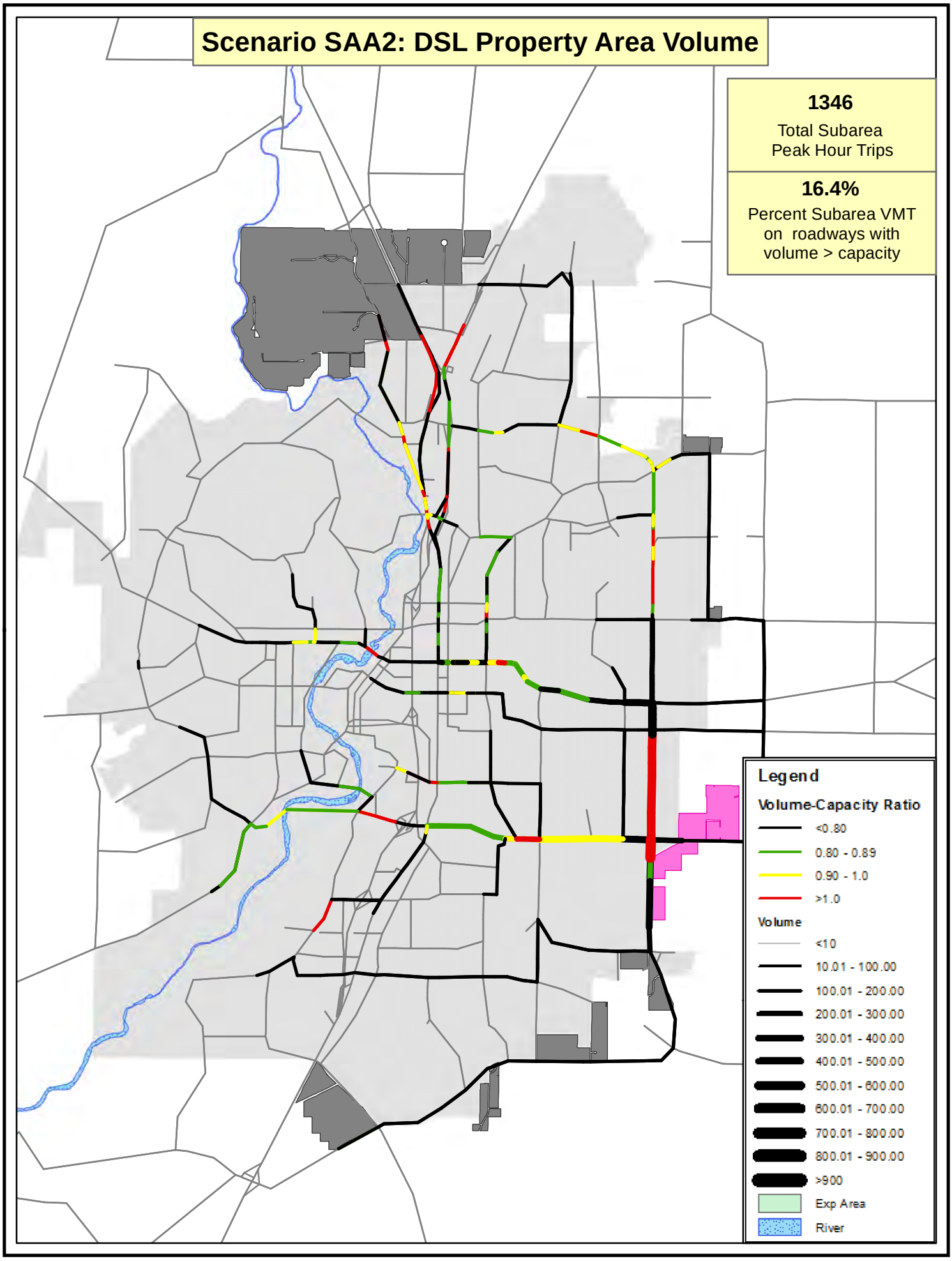

Scenario SAA2: DSL Property Area Volume
1346
Total Subarea
Peak Hour Trips
16.4%
Percent Subarea VMT
on roadways with
volume > capacity
Legend
Volume-Capacity Ratio
<0.80
0.80 - 0.89
0.90 - 1.0
>1.0
Volume
<10
10.01 - 100.00
100.01 - 200.00
200.01 - 300.00
300.01 - 400.00
400.01 - 500.00
500.01 - 600.00
600.01 - 700.00
700.01 - 800.00
800.01 - 900.00
>900
Exp Area
River

Figure 45

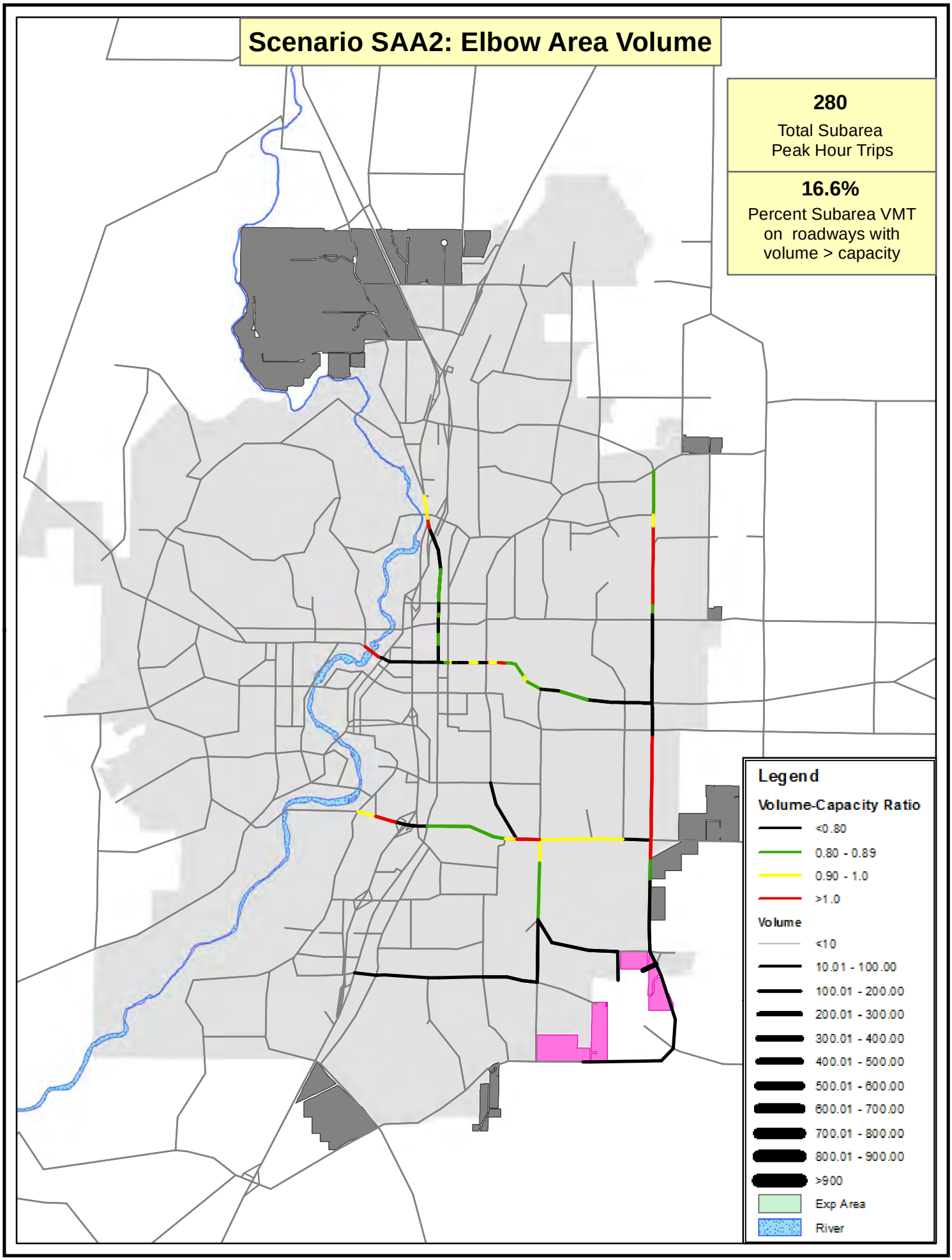

Scenario SAA2: Elbow Area Volume
280
Total Subarea Peak Hour Trips
16.6%
Percent Subarea VMT on roadways with volume > capacity
Legend
Volume-Capacity Ratio
<0.80
0.80 - 0.89
0.90 - 1.0
>1.0
Volume
<10
10.01 - 100.00
100.01 - 200.00
200.01 - 300.00
300.01 - 400.00
400.01 - 500.00
500.01 - 600.00
600.01 - 700.00
700.01 - 800.00
800.01 - 900.00
>900
Exp Area
River

Figure 46

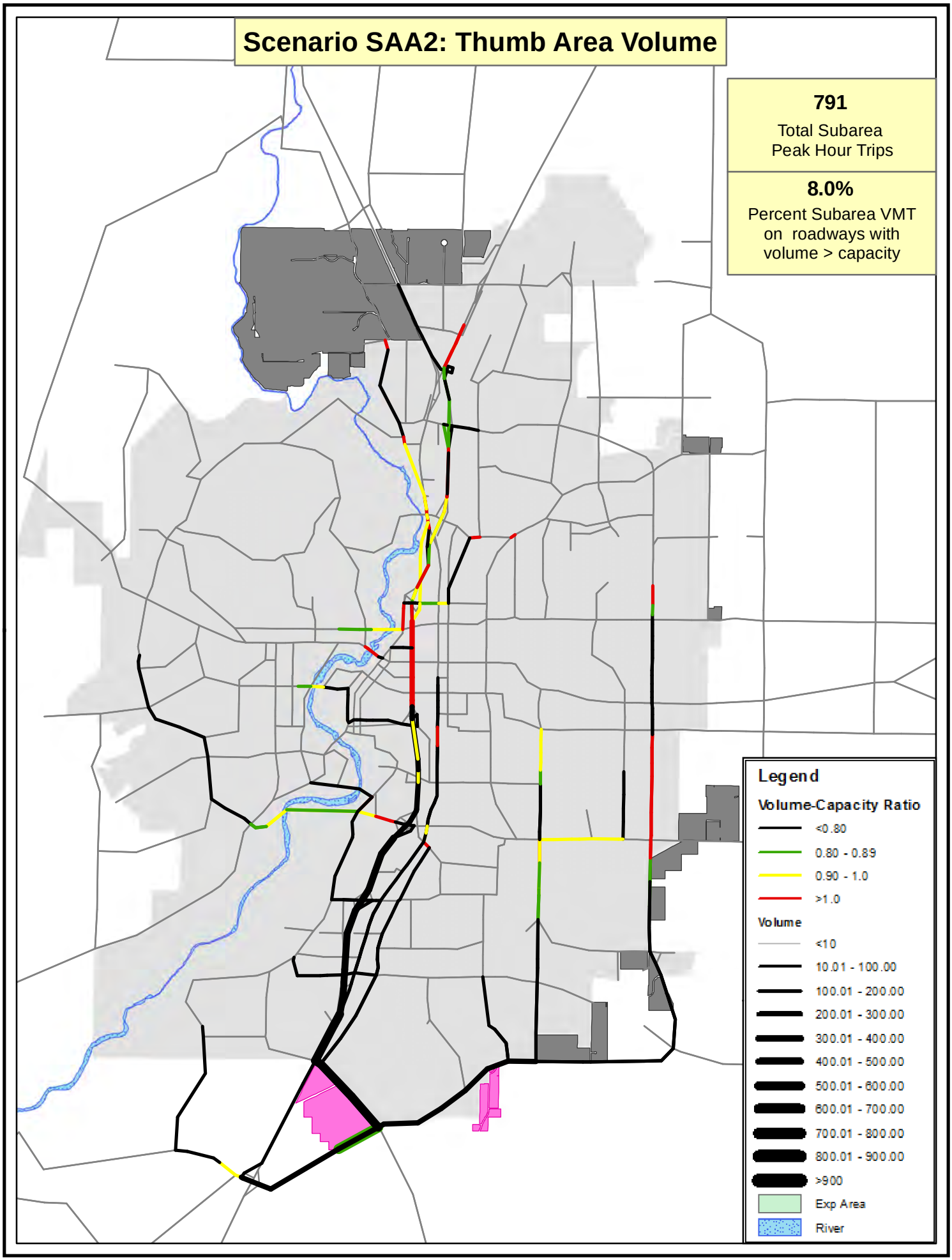

Scenario SAA2: Thumb Area Volume
791
Total Subarea Peak Hour Trips
8.0%
Percent Subarea VMT on roadways with volume > capacity
Legend
Volume-Capacity Ratio
<0.80
0.80 - 0.89
0.90 - 1.0
>1.0
Volume
<10
10.01 - 100.00
100.01 - 200.00
200.01 - 300.00
300.01 - 400.00
400.01 - 500.00
500.01 - 600.00
600.01 - 700.00
700.01 - 800.00
800.01 - 900.00
>900
Exp Area
River

Figure 47

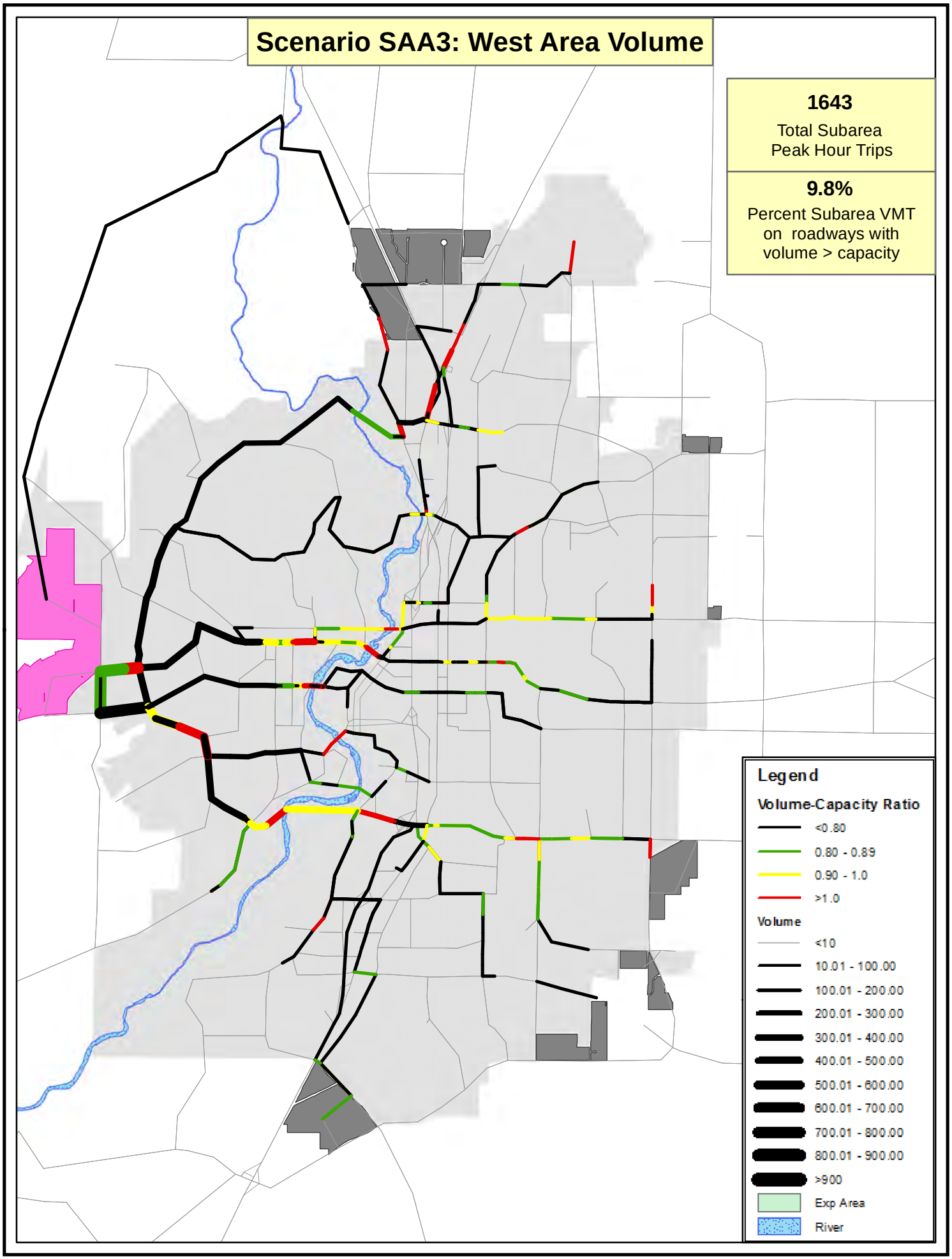

Scenario SAA3: West Area Volume
1643
Total Subarea Peak Hour Trips
9.8%
Percent Subarea VMT on roadways with volume > capacity
Legend
Volume-Capacity Ratio
<0.80
0.80 - 0.89
0.90 - 1.0
>1.0
Volume
<10
10.01 - 100.00
100.01 - 200.00
200.01 - 300.00
300.01 - 400.00
400.01 - 500.00
500.01 - 600.00
600.01 - 700.00
700.01 - 800.00
800.01 - 900.00
>900
Exp Area
River

Figure 48

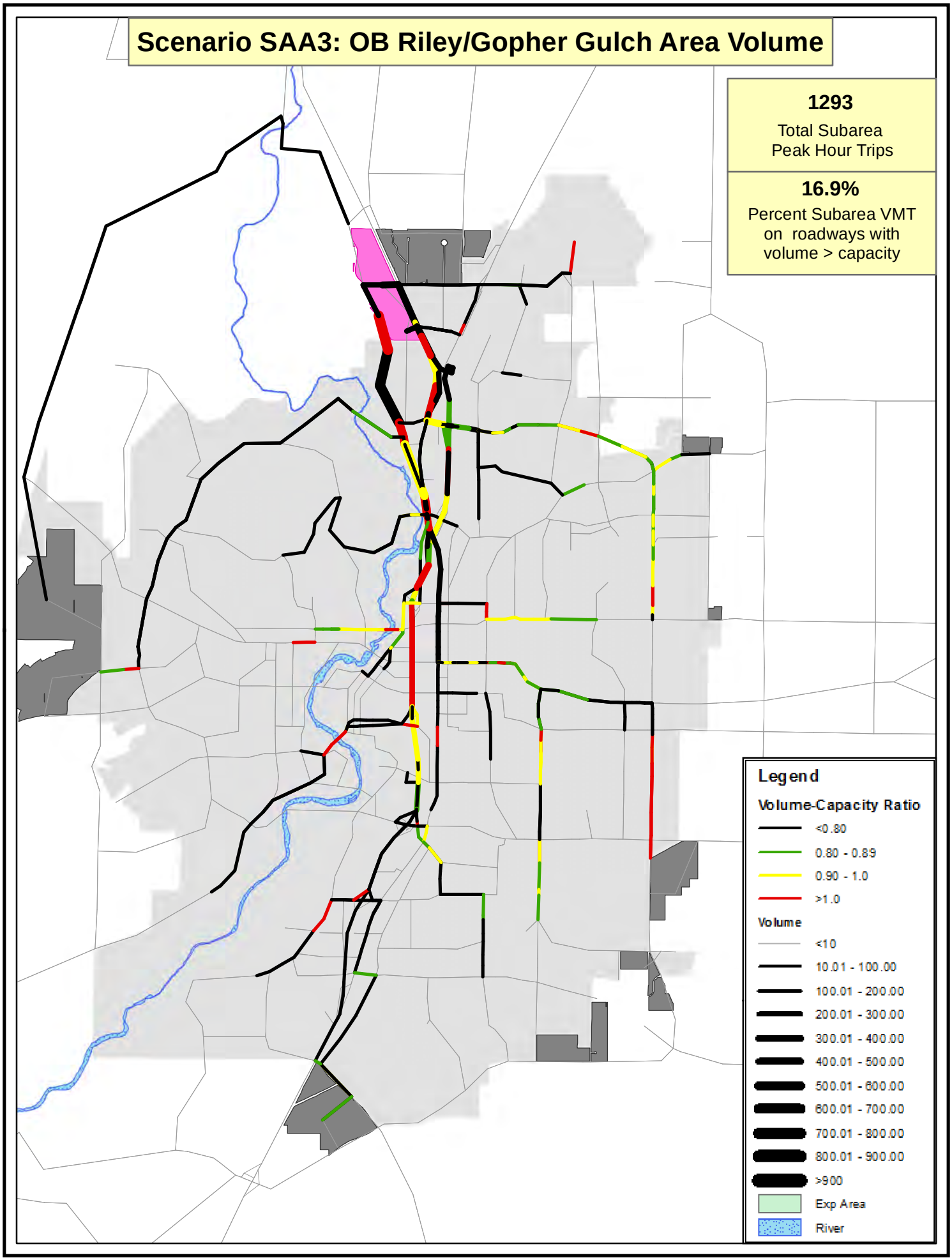

Scenario SAA3: OB Riley/Gopher Gulch Area Volume
1293
Total Subarea Peak Hour Trips
16.9%
Percent Subarea VMT on roadways with volume > capacity
Legend
Volume-Capacity Ratio
<0.80
0.80 - 0.89
0.90 - 1.0
>1.0
Volume
<10
10.01 - 100.00
100.01 - 200.00
200.01 - 300.00
300.01 - 400.00
400.01 - 500.00
500.01 - 600.00
600.01 - 700.00
700.01 - 800.00
800.01 - 900.00
>900
Exp Area
River

Figure 49

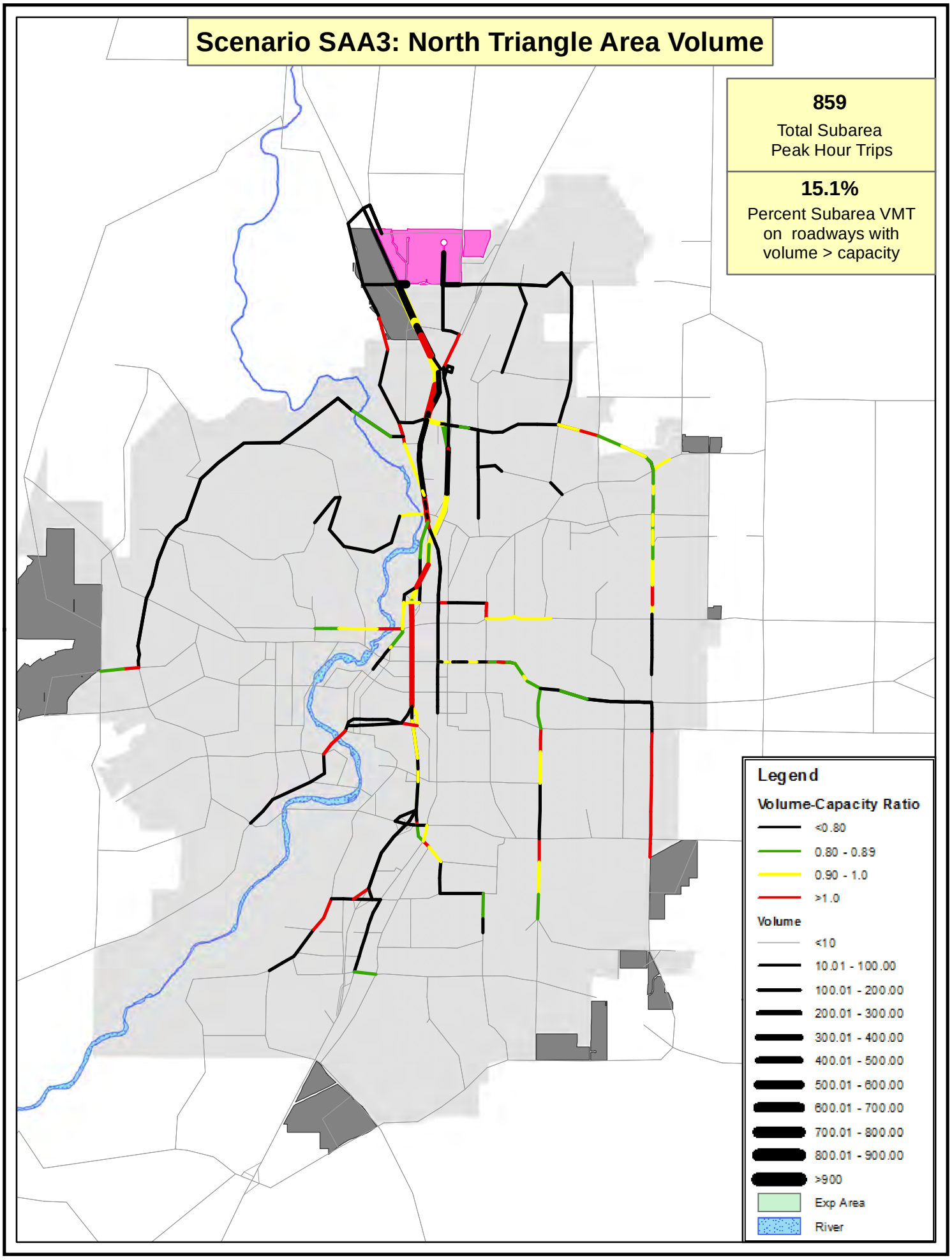

Scenario SAA3: North Triangle Area Volume
859
Total Subarea Peak Hour Trips
15.1%
Percent Subarea VMT on roadways with volume > capacity
Legend
Volume-Capacity Ratio
<0.80
0.80 - 0.89
0.90 - 1.0
>1.0
Volume
<10
10.01 - 100.00
100.01 - 200.00
200.01 - 300.00
300.01 - 400.00
400.01 - 500.00
500.01 - 600.00
600.01 - 700.00
700.01 - 800.00
800.01 - 900.00
>900
Exp Area
River

Figure 50

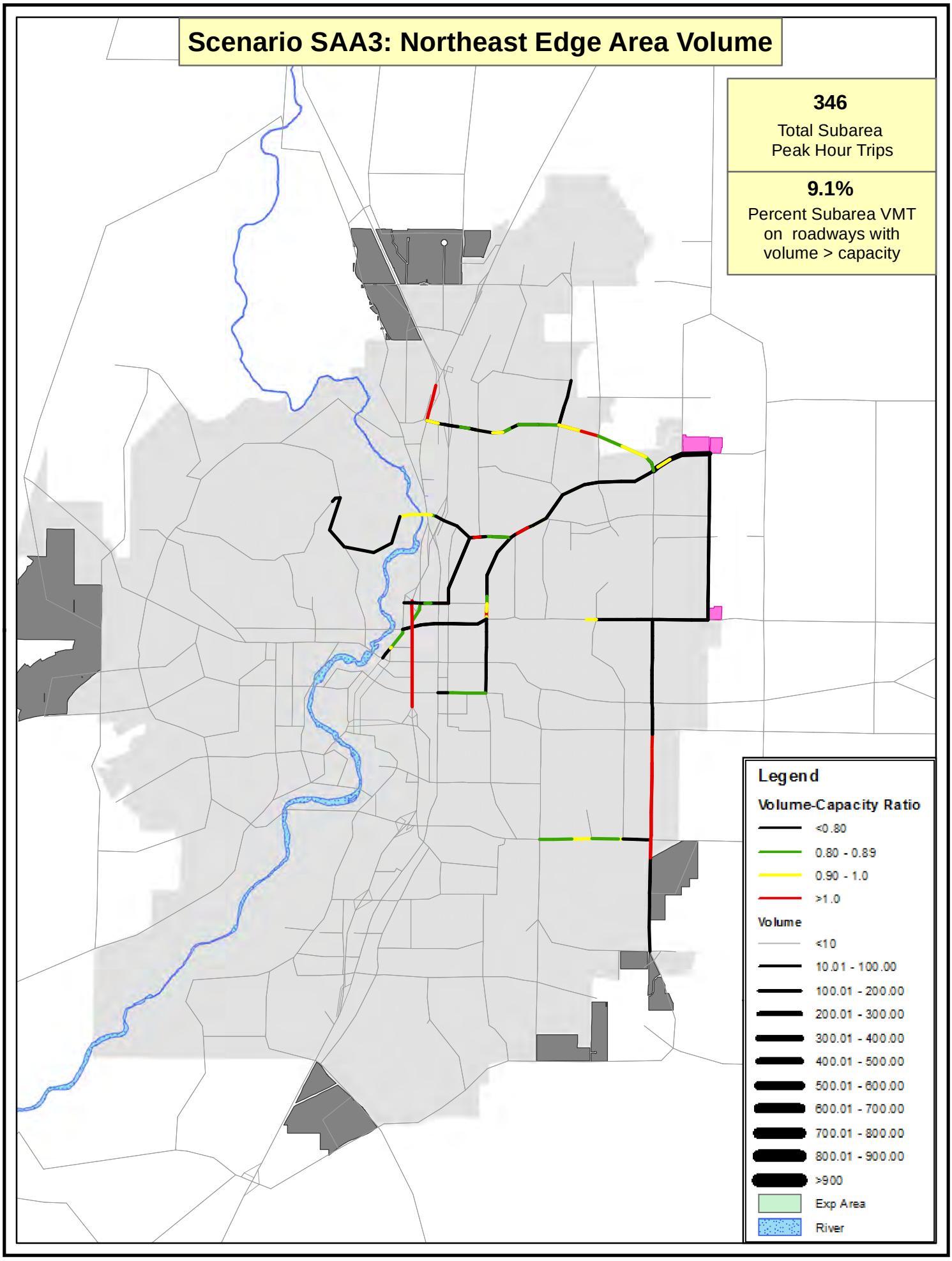

Scenario SAA3: Northeast Edge Area Volume
346
Total Subarea Peak Hour Trips
9.1%
Percent Subarea VMT on roadways with volume > capacity
Legend
Volume-Capacity Ratio
<0.80
0.80 - 0.89
0.90 - 1.0
>1.0
Volume
<10
10.01 - 100.00
100.01 - 200.00
200.01 - 300.00
300.01 - 400.00
400.01 - 500.00
500.01 - 600.00
600.01 - 700.00
700.01 - 800.00
800.01 - 900.00
>900
Exp Area
River

Figure 51

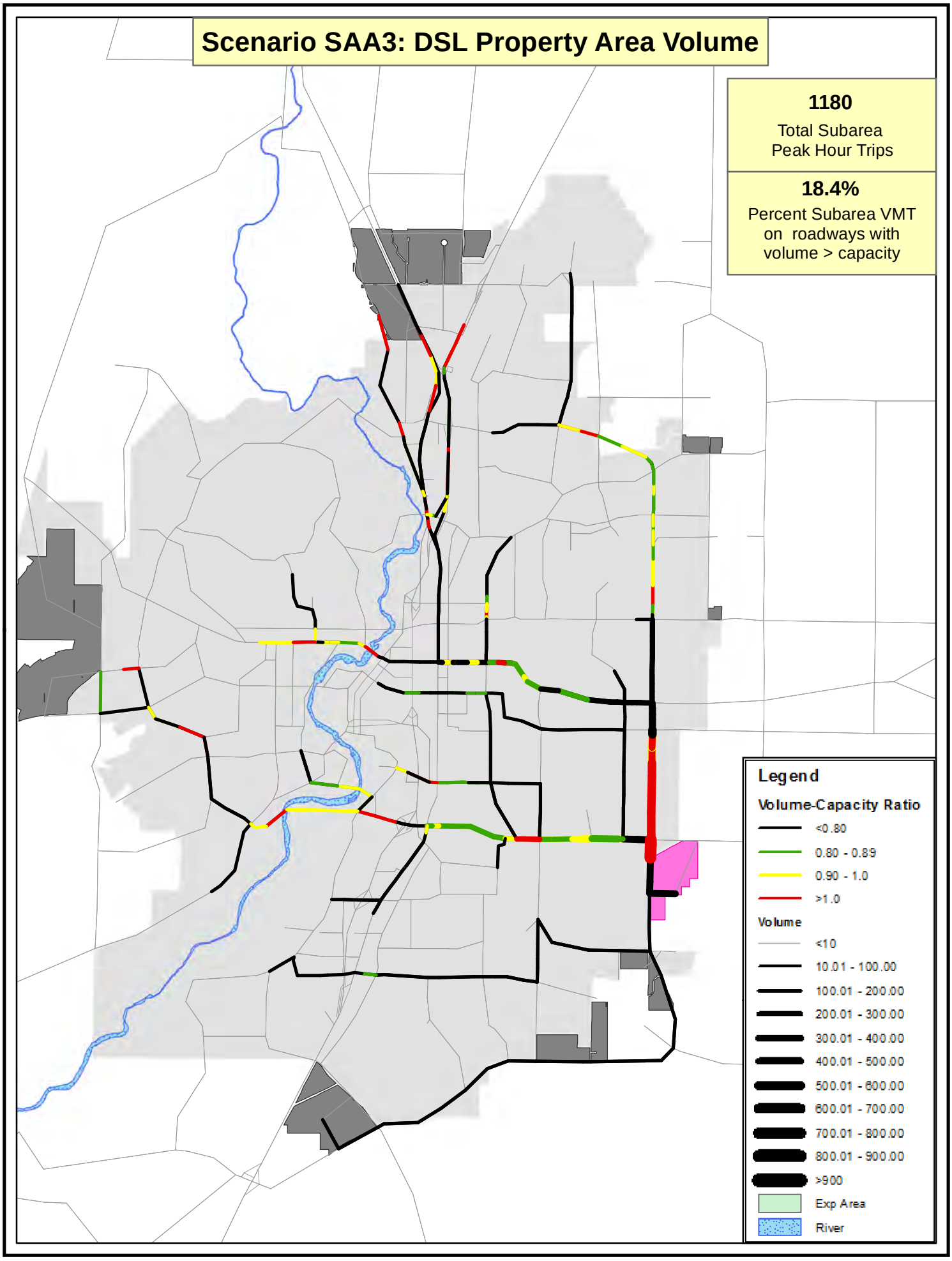

Scenario SAA3: DSL Property Area Volume
1180
Total Subarea
Peak Hour Trips
18.4%
Percent Subarea VMT
on roadways with
volume > capacity
Legend
Volume-Capacity Ratio
<0.80
0.80 - 0.89
0.90 - 1.0
>1.0
Volume
<10
10.01 - 100.00
100.01 - 200.00
200.01 - 300.00
300.01 - 400.00
400.01 - 500.00
500.01 - 600.00
600.01 - 700.00
700.01 - 800.00
800.01 - 900.00
>900
Exp Area
River

Figure 52

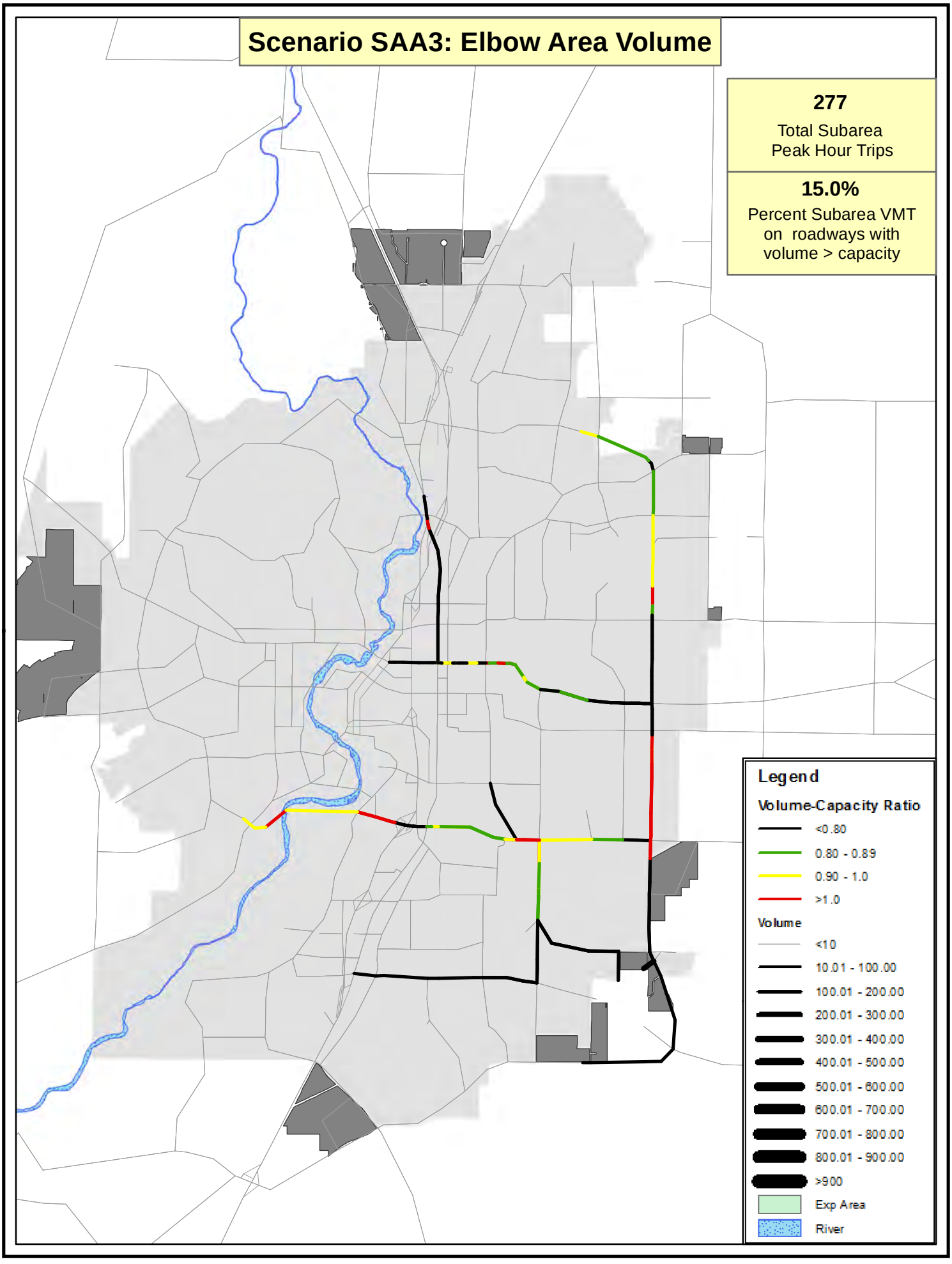

Scenario SAA3: Elbow Area Volume
277
Total Subarea Peak Hour Trips
15.0%
Percent Subarea VMT on roadways with volume > capacity
Legend
Volume-Capacity Ratio
<0.80
0.80 - 0.89
0.90 - 1.0
>1.0
Volume
<10
10.01 - 100.00
100.01 - 200.00
200.01 - 300.00
300.01 - 400.00
400.01 - 500.00
500.01 - 600.00
600.01 - 700.00
700.01 - 800.00
800.01 - 900.00
>900
Exp Area
River

Figure 53

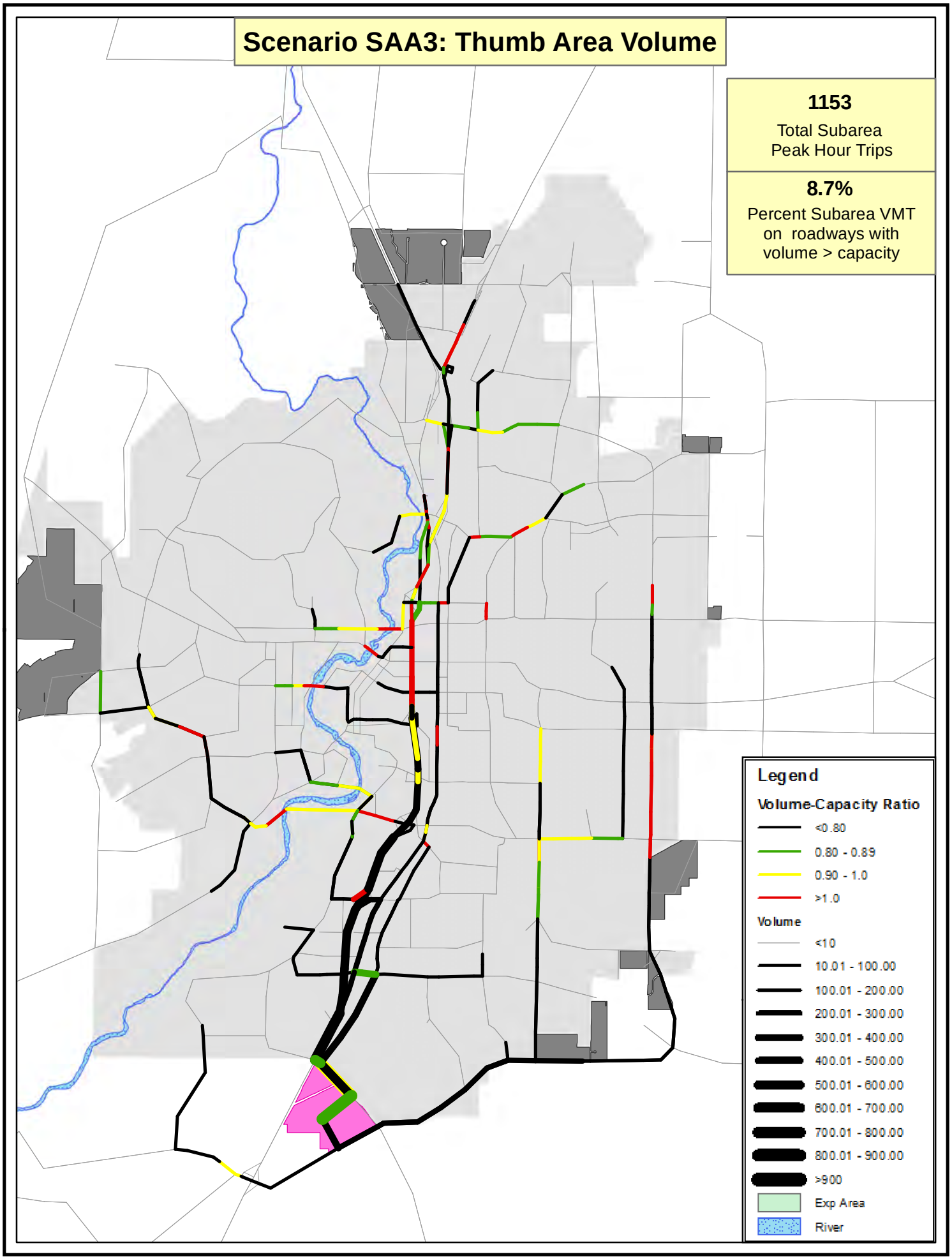

Scenario SAA3: Thumb Area Volume
1153
Total Subarea Peak Hour Trips
8.7%
Percent Subarea VMT on roadways with volume > capacity
Legend
Volume-Capacity Ratio
<0.80
0.80 - 0.89
0.90 - 1.0
>1.0
Volume
<10
10.01 - 100.00
100.01 - 200.00
200.01 - 300.00
300.01 - 400.00
400.01 - 500.00
500.01 - 600.00
600.01 - 700.00
700.01 - 800.00
800.01 - 900.00
>900
Exp Area
River

Figure 54

SUMMARY OF CONGESTED MODEL LINKS

Street Name	To	From	Scenario 1	Scenario 2	Scenario 3	SAA 1	SAA 2	SAA 3
15th Street	Desert Wood Drive	Reed Market Road	y	y	y	n	n	n
15th Street	Wilson Avenue	Bear Creek Road	y	y	n	y	n	n
27th Street	Reed Market Road	Bear Creek Road	y	y	y	y	y	y
27th Street	Stevens Road	Reed Market Road	n	y	y	y	y	y
27th Street	Neff Road	~ Yellow Ribbon Drive	y	y	n	y	n	n
27th Street	Neff Road	Conners Avenue	n	n	n	n	n	y
27th Street	Rainier Drive	Faith	n	y	n	n	n	n
3rd Street	Davis Avenue	~(south of) Burnside Avenue	y	y	y	y	y	y
8th Street	Olney Avenue	Revere Avenue	y	y	y	n	y	y
Bond Street	Reed Market Road	Columbia Street	y	y	y	y	y	n
Brookswood Boulevard	Porcupine Road	Powers Road	y	y	y	y	y	y
Brosterhous Road	3rd Street	Parrell Road	y	y	y	y	y	n
Brosterhous Road	Kalahani Drive	American Lane	n	y	n	n	n	n
Butler Market Road	Studio Road	Boyd Acres Road	y	y	y	y	y	y
Butler Market Road	8th Street	Wells Acres Road	y	n	n	y	n	n
Butler Market Road	8th Street	Pilot Butte Drive	n	y	y	n	y	y
Butler Market Road	27th Street	Sandalwood Drive	y	n	y	y	n	n
China Hat	US 97	New Road (Thumb)	y	n	n	y	n	n
Colorado Avenue	Simpson Avenue	Industrial Way	y	y	y	y	y	y
Division Street	3rd Street	Hayes Avenue	y	n	n	n	n	n
Division Street	Reed Market Road	US 97	n	y	y	y	y	n
Empire Avenue	18th Street	Purcell Boulevard	y	y	y	y	y	y
Newport Avenue	Awbrey Road	Wall Street	y	y	y	n	n	y
Newport Avenue	9th Street	11th Street	n	y	y	n	n	y
Newport Avenue	11th Street	14th Street	n	n	y	n	n	y
Portland Avenue	1st Street	Wall Street	y	y	y	y	y	y
Reed Market Road	American Lane	15th Street	y	y	y	y	y	y
Reed Market Road	Brookswood Boulevar	US 97	y	y	y	y	y	y
Reed Market Road	Bachelor Drive	West Roundabout near Farewell Bend Park	y	y	y	y	n	y
Revere Avenue	4th Street	US 20	y	y	y	y	n	y
Scott Street	US 97 NB Ramps	US 97 SB Ramps	y	y	y	y	y	y
Talus Place	Cooley Road	North Boundary	y	y	y	y	y	y
Tumalo Avenue	Columbia Street	Riverside Boulevard	y	y	n	n	n	y
US 20	Butler Market Road	Division Street Off Ramp	n	y	n	y	n	n
US 20	8th Street	11th Street	y	y	y	n	y	y
US 20	Division Street	OB Riley Road	y	n	y	n	y	y
US 20	Empire Boulevard Ran	US 97/US 20 Junction	y	y	y	y	y	y
US 20	US 97/US 20 Junction	Robal Road	n	n	y	y	y	y
US 97	~ Scott Street	Revere Avenue	y	n	y	y	y	y
US 97	Revere Avenue Ramps	~Lakeside Place	y	y	y	y	y	y
US 97	Revere Avenue Ramps	Empire Boulevard Ramps	y	y	n	n	n	n
US 97	US 97/US 20 Junction	Chavre Way	y	y	y	n	n	y
US 97	Butler Market Road	~Builders Court	n	y	y	y	y	y
US 97 NB on-ramp	Reed Market Road	US 97	y	n	n	n	n	n
US 97 SB Off-Ramp	US 97	Powers Road	n	y	y	y	n	y
Wall Street	Portland Avenue/Olne	Revere Avenue	y	y	n	y	y	n
Wilson Avenue	3rd Street	Bond Street	y	y	y	y	n	n
Wilson Avenue	3rd Street	Hill Street	n	n	n	n	n	y
15th Street	Virginia Road	Bear Creek Road	n	n	y	n	n	y
Crossing Drive	Clearwater Drive	Mount Washington Drive	n	n	y	n	n	y
15th Street	Neff Road	Wells Acres Road	n	n	y	n	n	n
OB Riley Road	Archie Briggs Road	Empire Avenue	n	n	y	n	y	y
OB Riley Road	Glen Vista Road/Hardy	Mathers Drive	n	n	y	n	y	y
15th Street	Twin Lakes Loop	Reed Market Road	n	n	n	n	y	y
US 97 NB on-ramp	Scott Street	US 97	n	n	n	n	n	n
27th Street	~Neff Road	~ Faith	n	n	n	n	y	n
US 97	US 97/US 20 Junction	Robal Road	n	n	n	n	y	n
Mount Washington Drive	Simpson Avenue	Flagliner Drive	n	n	n	n	n	y

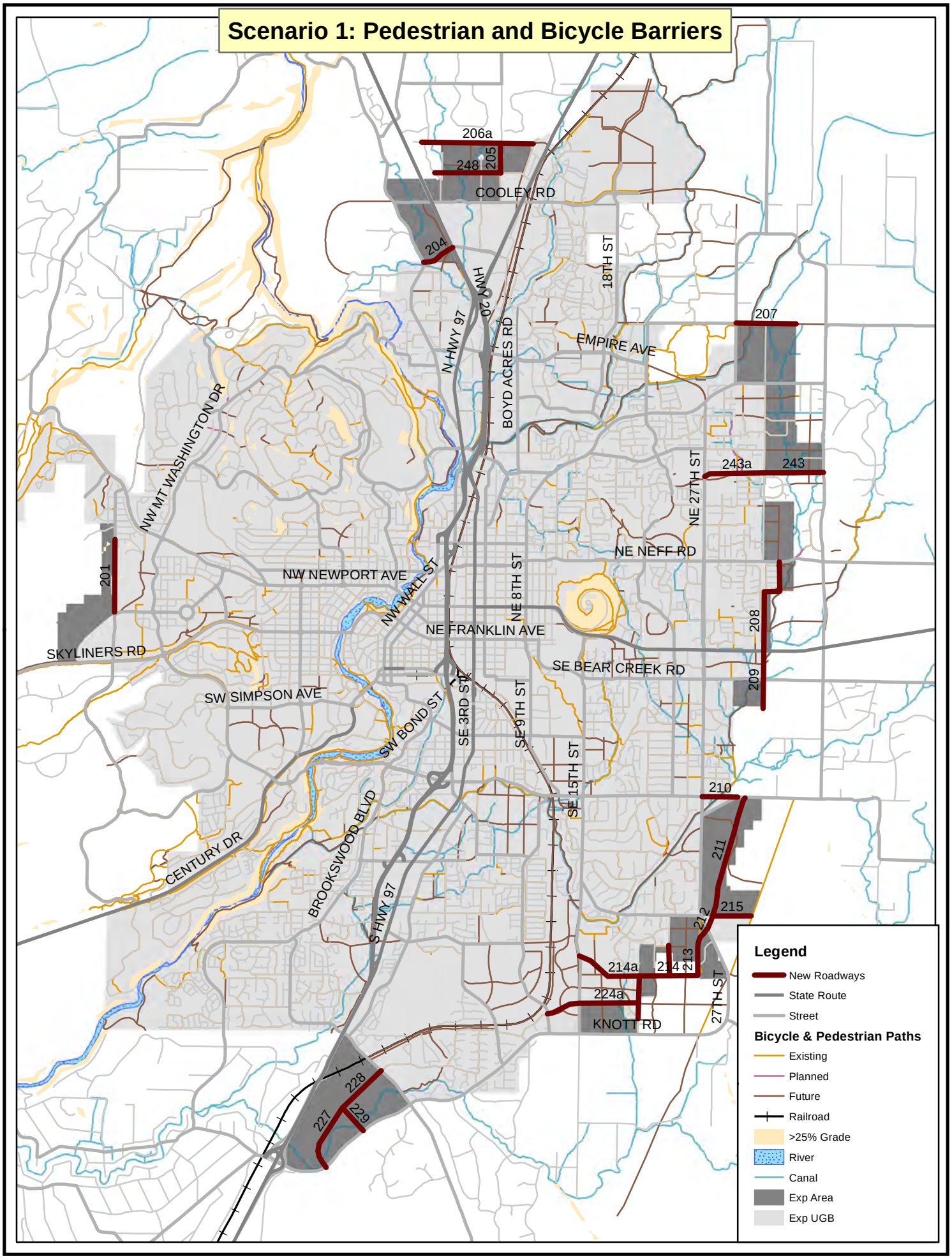

Scenario 1: Pedestrian and Bicycle Barriers
206a
248
205
COOLEY RD
204
HWY 20
N HWY 97
BOYD ACRES RD
18TH ST
EMPIRE AVE
207
NW MT WASHINGTON DR
243a
243
NE 27TH ST
NE NEFF RD
201
NW NEWPORT AVE
NW WALL ST
NE 8TH ST
208
NE FRANKLIN AVE
SKYLINERS RD
SE BEAR CREEK RD
209
SW SIMPSON AVE
SW BOND ST
SE 3RD ST
SE 9TH ST
SE 15TH ST
210
CENTURY DR
BROOKSWOOD BLVD
S HWY 97
211
215
212
213
214a
214
224a
KNOTT RD
27TH ST
228
227
229
Legend
New Roadways
State Route
Street
Bicycle & Pedestrian Paths
Existing
Planned
Future
Railroad
>25% Grade
River
Canal
Exp Area
Exp UGB

Figure 56

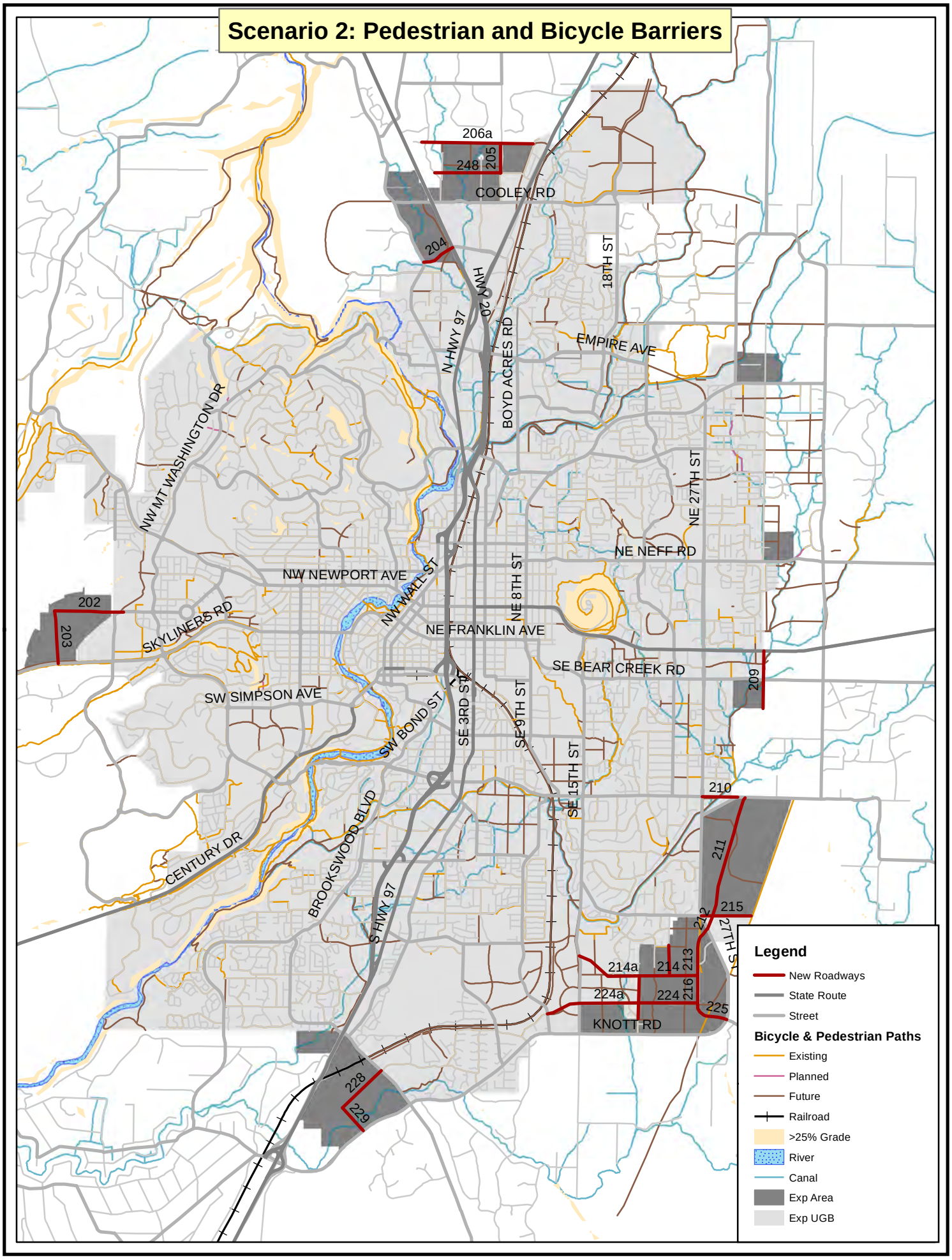

Scenario 2: Pedestrian and Bicycle Barriers
206a
248
205
COOLEY RD
204
HWY 20
N HWY 97
18TH ST
BOYD ACRES RD
EMPIRE AVE
NW MT WASHINGTON DR
NE 27TH ST
NE NEFF RD
NW NEWPORT AVE
NW WALL ST
NE 8TH ST
202
203
SKYLINERS RD
NE FRANKLIN AVE
SE BEAR CREEK RD
209
SW SIMPSON AVE
SW BOND ST
SE 3RD ST
SE 9TH ST
SE 15TH ST
210
CENTURY DR
BROOKSWOOD BLVD
S HWY 97
211
215
212
27TH ST
214a
214
213
216
224a
224
225
KNOTT RD
228
229
Legend
New Roadways
State Route
Street
Bicycle & Pedestrian Paths
Existing
Planned
Future
Railroad
>25% Grade
River
Canal
Exp Area
Exp UGB

Figure 57

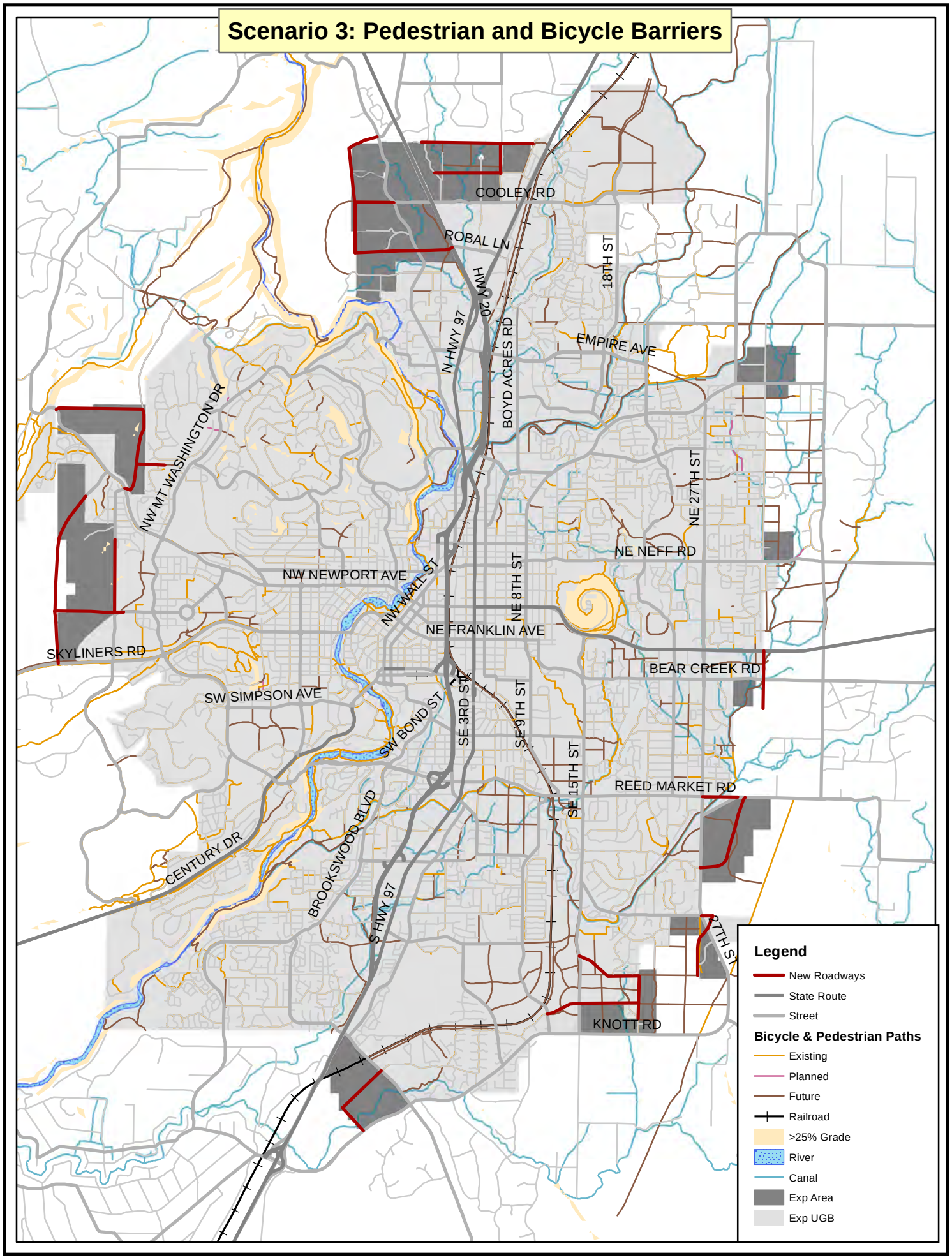

Scenario 3: Pedestrian and Bicycle Barriers
COOLEY RD
ROBAL LN
HWY 20
N HWY 97
18TH ST
EMPIRE AVE
BOYD ACRES RD
NW MT WASHINGTON DR
NE 27TH ST
NE NEFF RD
NW NEWPORT AVE
NW WALL ST
NE 8TH ST
NE FRANKLIN AVE
SKYLINERS RD
BEAR CREEK RD
SW SIMPSON AVE
SW BOND ST
SE 3RD ST
SE 9TH ST
SE 15TH ST
REED MARKET RD
CENTURY DR
BROOKSWOOD BLVD
S HWY 97
27TH ST
KNOTT RD
Legend
New Roadways
State Route
Street
Bicycle & Pedestrian Paths
Existing
Planned
Future
Railroad
>25% Grade
River
Canal
Exp Area
Exp UGB

Figure 58

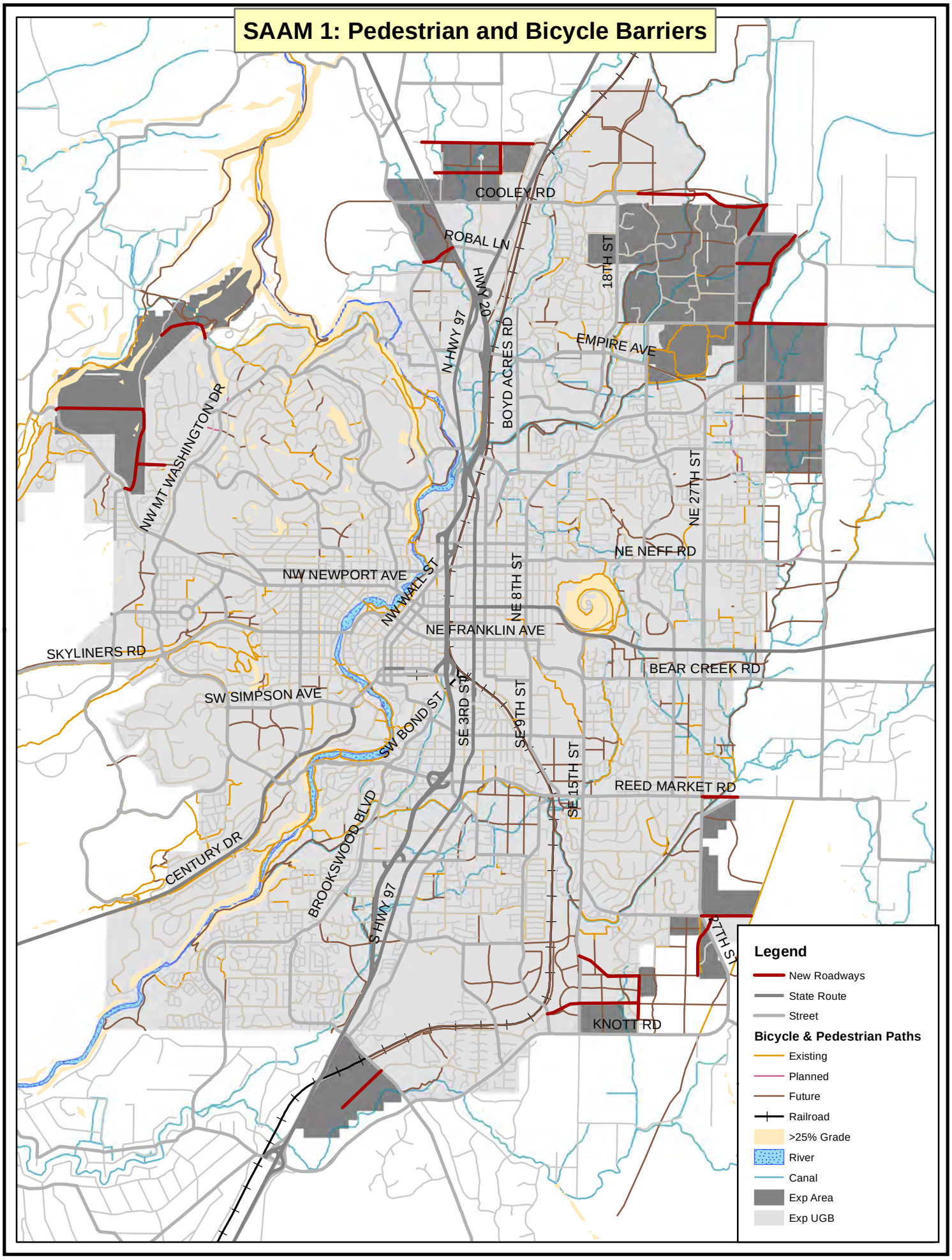
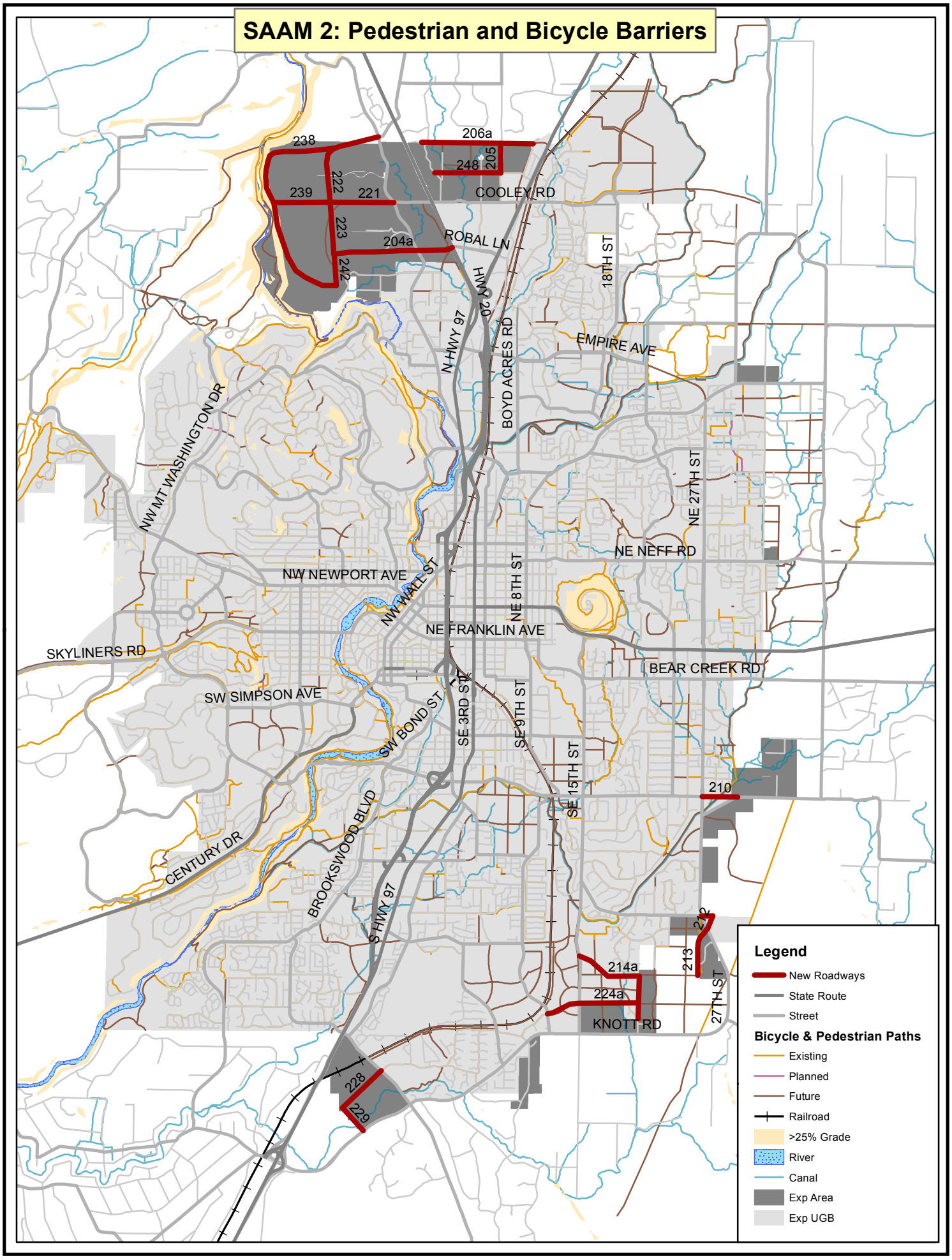
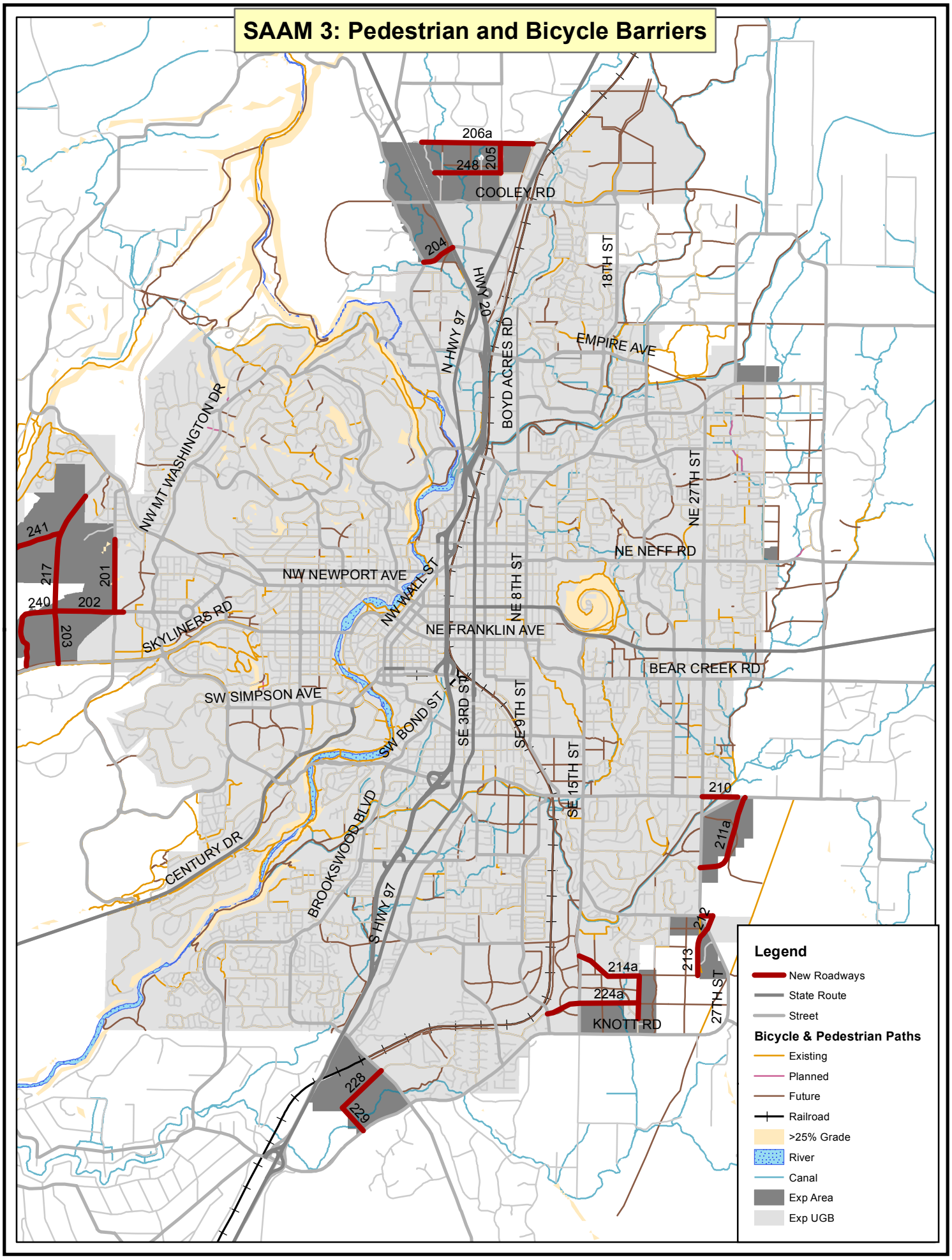

SAAM 1: Pedestrian and Bicycle Barriers
COOLEY RD
ROBAL LN
HWY 20
N HWY 97
BOYD ACRES RD
18TH ST
EMPIRE AVE
NW MT WASHINGTON DR
NE 27TH ST
NE NEFF RD
NW NEWPORT AVE
NW WALL ST
NE 8TH ST
NE FRANKLIN AVE
SKYLINERS RD
BEAR CREEK RD
SW SIMPSON AVE
SW BOND ST
SE 3RD ST
SE 9TH ST
SE 15TH ST
REED MARKET RD
CENTURY DR
BROOKSWOOD BLVD
S HWY 97
KNOTT RD
Legend
New Roadways
State Route
Street
Bicycle & Pedestrian Paths
Existing
Planned
Future
Railroad
>25% Grade
River
Canal
Exp Area
Exp UGB

Figure 59


SAAM 2: Pedestrian and Bicycle Barriers
238
239
222
221
223
242
206a
248
205
COOLEY RD
204a
ROBAL LN
HWY 20
N HWY 97
18TH ST
EMPIRE AVE
BOYD ACRES RD
NW MT WASHINGTON DR
NE 27TH ST
NE NEFF RD
NW NEWPORT AVE
NW WALL ST
NE 8TH ST
NE FRANKLIN AVE
SKYLINERS RD
BEAR CREEK RD
SW SIMPSON AVE
SW BOND ST
SE 3RD ST
SE 9TH ST
SE 15TH ST
210
CENTURY DR
BROOKSWOOD BLVD
S HWY 97
212
213
214a
224a
KNOTT RD
27TH ST
228
229
Legend
New Roadways
State Route
Street
Bicycle & Pedestrian Paths
Existing
Planned
Future
Railroad
>25% Grade
River
Canal
Exp Area
Exp UGB


SAAM 3: Pedestrian and Bicycle Barriers
206a
248
205
COOLEY RD
204
HWY 20
N HWY 97
18TH ST
EMPIRE AVE
BOYD ACRES RD
NW MT WASHINGTON DR
NE 27TH ST
NE NEFF RD
241
217
201
240
202
203
NW NEWPORT AVE
NW WALL ST
NE 8TH ST
SKYLINERS RD
NE FRANKLIN AVE
BEAR CREEK RD
SW SIMPSON AVE
SW BOND ST
SE 3RD ST
SE 9TH ST
SE 15TH ST
210
211a
CENTURY DR
BROOKSWOOD BLVD
S HWY 97
212
213
214a
224a
KNOTT RD
27TH ST
228
229
Legend
New Roadways
State Route
Street
Bicycle & Pedestrian Paths
Existing
Planned
Future
Railroad
>25% Grade
River
Canal
Exp Area
Exp UGB

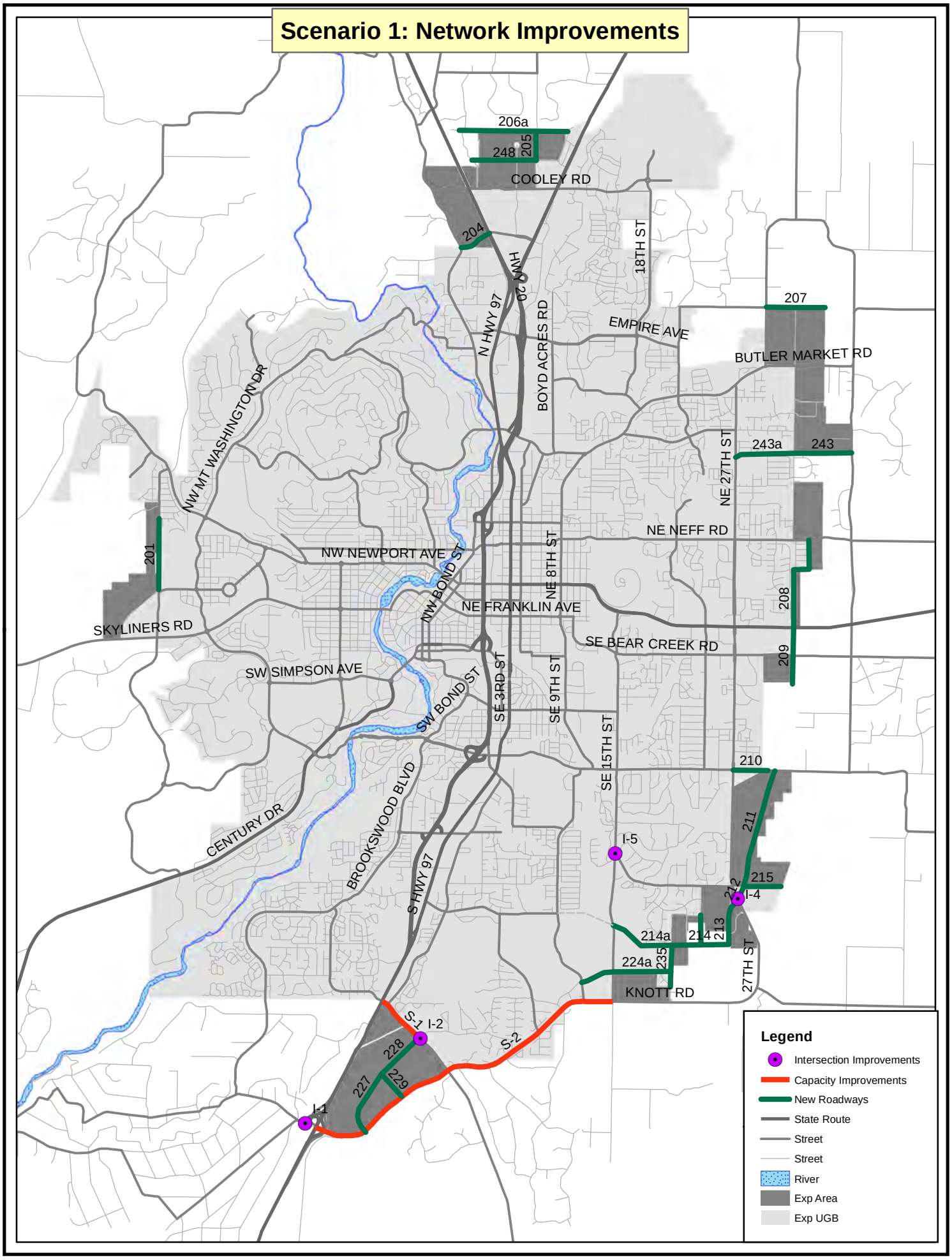

Scenario 1: Network Improvements
206a
248
205
COOLEY RD
204
HWY 20
N HWY 97
18TH ST
207
EMPIRE AVE
BUTLER MARKET RD
BOYD ACRES RD
NW MT WASHINGTON DR
243a
243
NE 27TH ST
NE NEFF RD
201
NW NEWPORT AVE
NW BOND ST
NE 8TH ST
208
NE FRANKLIN AVE
SKYLINERS RD
SE BEAR CREEK RD
209
SW SIMPSON AVE
SW BOND ST
SE 3RD ST
SE 9TH ST
SE 15TH ST
210
CENTURY DR
BROOKSWOOD BLVD
S HWY 97
I-5
211
215
I-4
212
213
214a
214
224a
235
27TH ST
KNOTT RD
S-1
I-2
228
227
229
S-2
I-1
Legend
Intersection Improvements
Capacity Improvements
New Roadways
State Route
Street
Street
River
Exp Area
Exp UGB

Figure 62

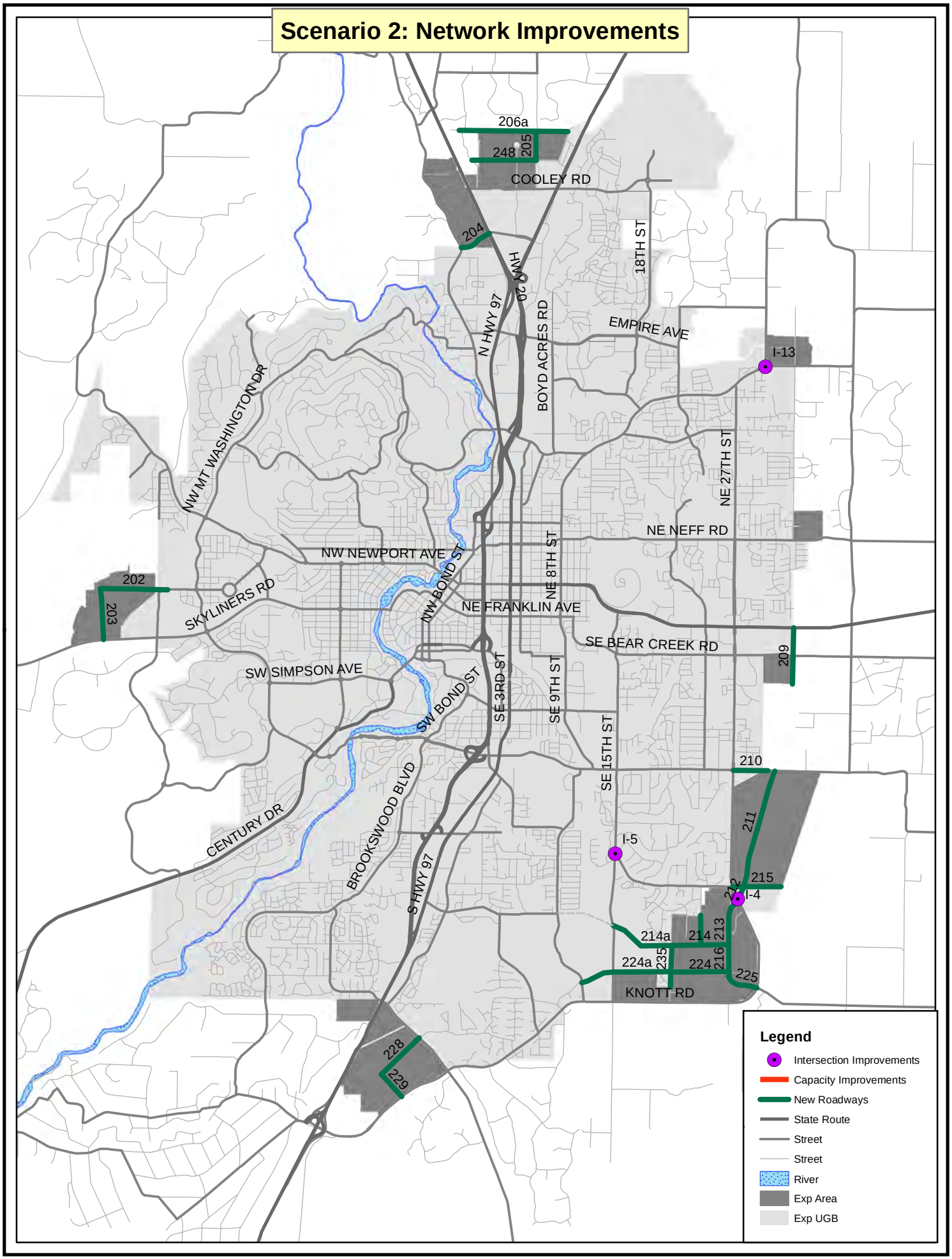

Scenario 2: Network Improvements
206a
248
205
COOLEY RD
204
HWY 20
N HWY 97
18TH ST
BOYD ACRES RD
EMPIRE AVE
I-13
NW MT WASHINGTON DR
NE 27TH ST
NE NEFF RD
NW NEWPORT AVE
NW BOND ST
NE 8TH ST
202
203
SKYLINERS RD
NE FRANKLIN AVE
SE BEAR CREEK RD
209
SW SIMPSON AVE
SW BOND ST
SE 3RD ST
SE 9TH ST
SE 15TH ST
210
CENTURY DR
BROOKSWOOD BLVD
S HWY 97
I-5
211
215
212
I-4
214a
214
213
224a
235
224
216
225
KNOTT RD
228
229
Legend
Intersection Improvements
Capacity Improvements
New Roadways
State Route
Street
Street
River
Exp Area
Exp UGB

Figure 63

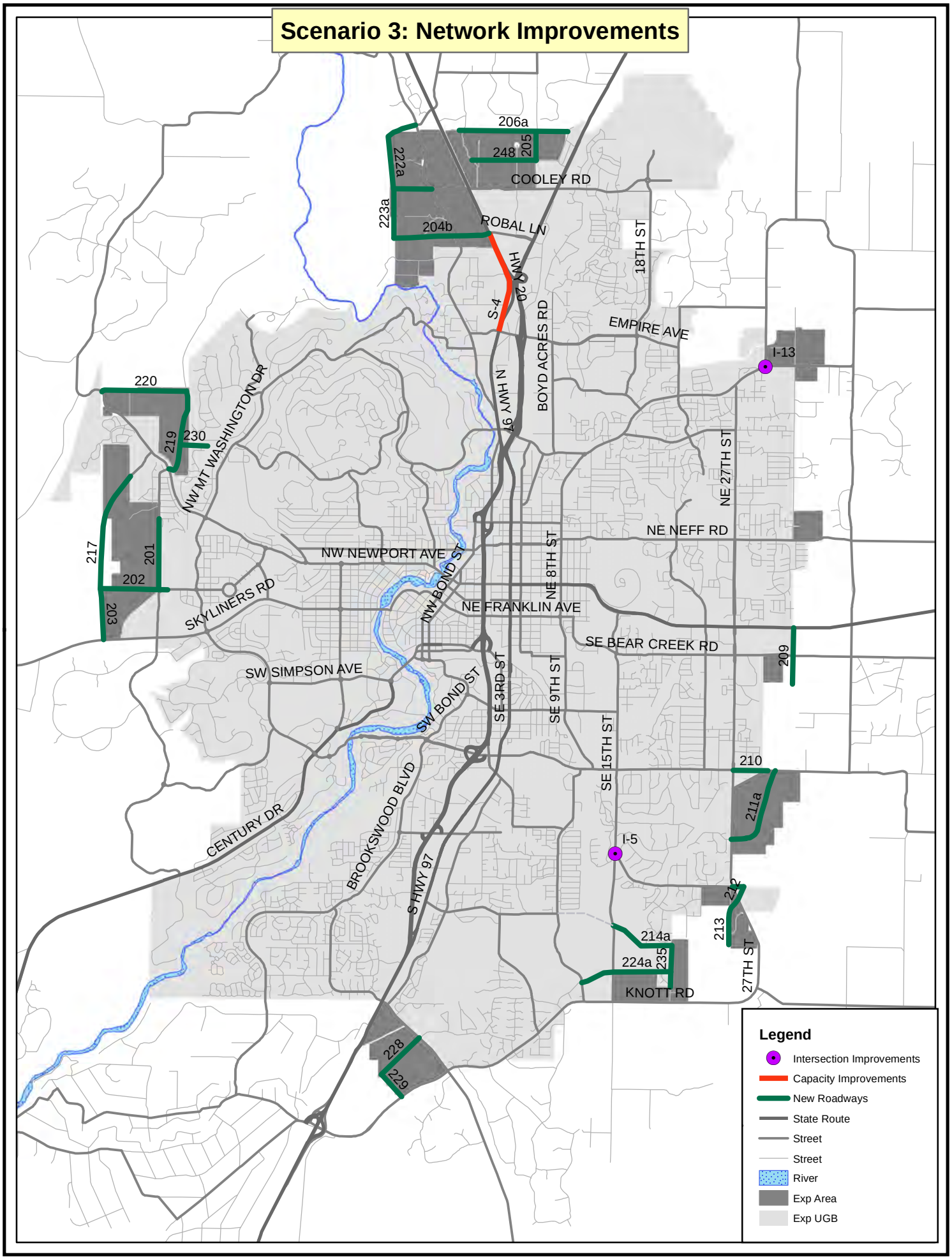

Scenario 3: Network Improvements
206a
248
205
222a
223a
204b
COOLEY RD
ROBAL LN
S-4
HWY 20
18TH ST
EMPIRE AVE
I-13
BOYD ACRES RD
N HWY 97
NE 27TH ST
220
219
230
NW MT WASHINGTON DR
NE NEFF RD
NW NEWPORT AVE
NW BOND ST
NE 8TH ST
217
201
202
203
SKYLINERS RD
NE FRANKLIN AVE
SE BEAR CREEK RD
209
SW SIMPSON AVE
SW BOND ST
SE 3RD ST
SE 9TH ST
SE 15TH ST
210
211a
CENTURY DR
BROOKSWOOD BLVD
S HWY 97
I-5
212
213
214a
224a
235
27TH ST
KNOTT RD
228
229
Legend
Intersection Improvements
Capacity Improvements
New Roadways
State Route
Street
Street
River
Exp Area
Exp UGB

Figure 64

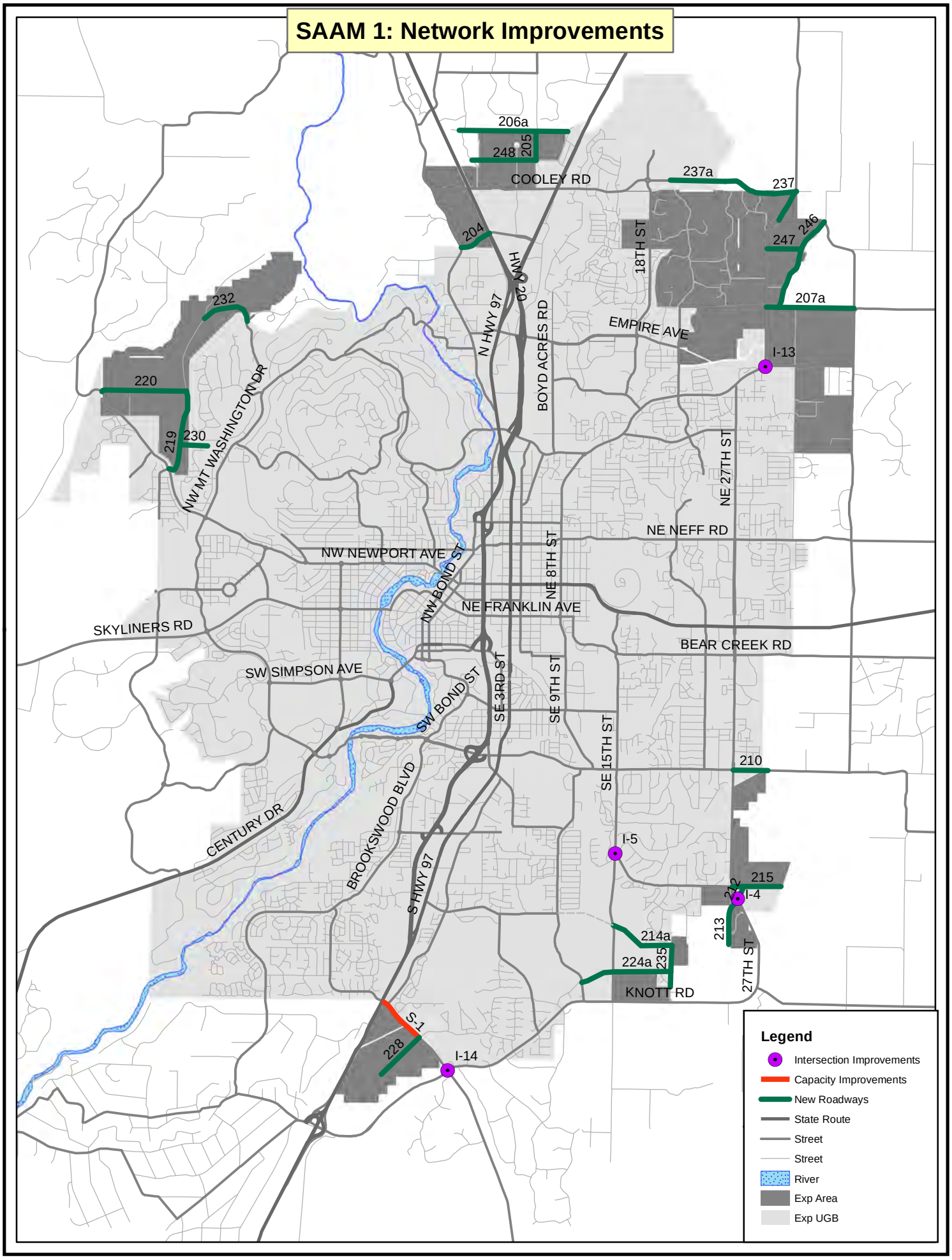
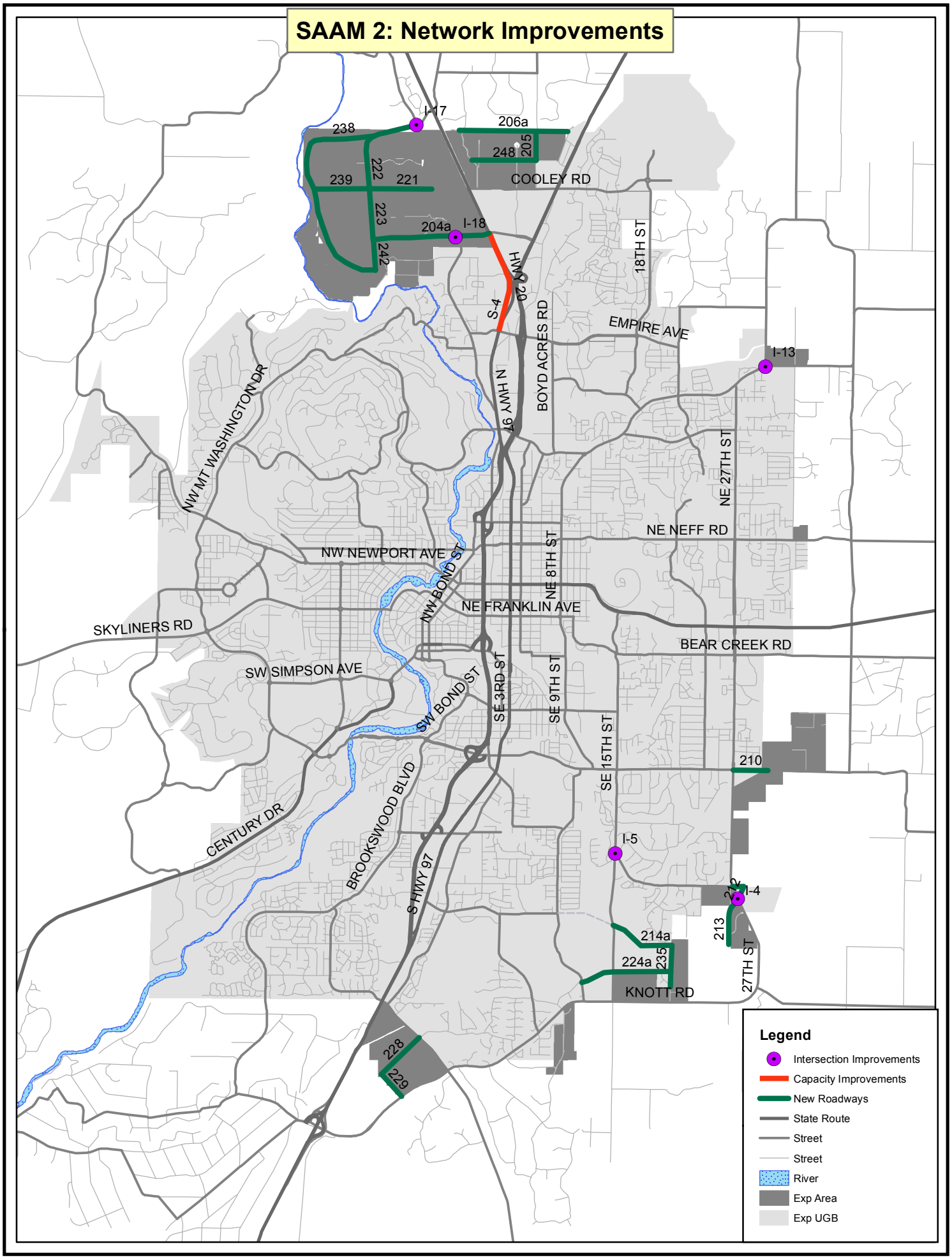
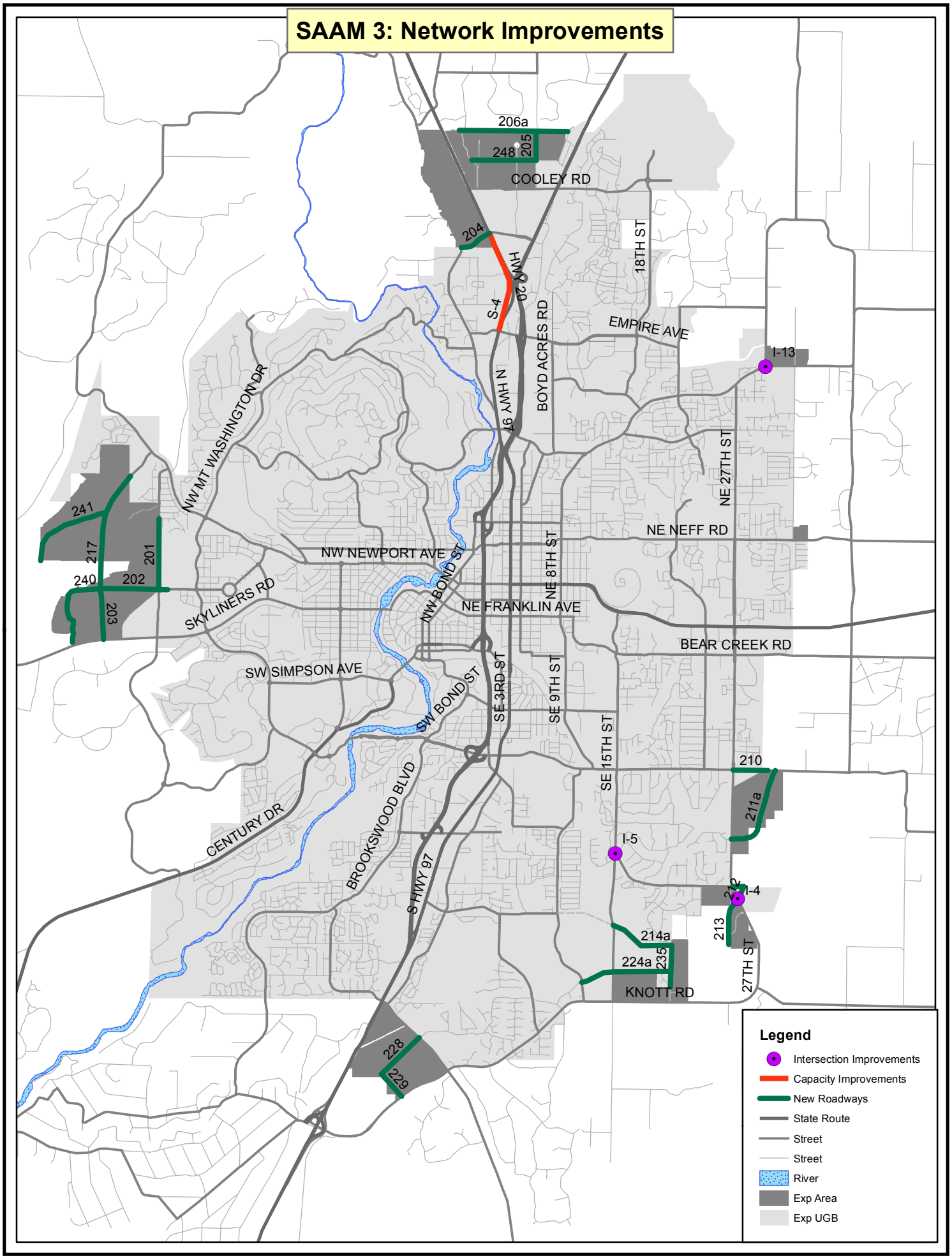

SAAM 1: Network Improvements
206a
248
205
COOLEY RD
237a
237
246
247
204
18TH ST
HWY 20
N HWY 97
BOYD ACRES RD
EMPIRE AVE
207a
I-13
232
220
219
230
NW MT WASHINGTON DR
NE 27TH ST
NE NEFF RD
NW NEWPORT AVE
NW BOND ST
NE 8TH ST
NE FRANKLIN AVE
SKYLINERS RD
BEAR CREEK RD
SW SIMPSON AVE
SW BOND ST
SE 3RD ST
SE 9TH ST
SE 15TH ST
210
CENTURY DR
BROOKSWOOD BLVD
S HWY 97
I-5
215
I-4
212
213
214a
224a
235
27TH ST
KNOTT RD
S-1
228
I-14
Legend
Intersection Improvements
Capacity Improvements
New Roadways
State Route
Street
Street
River
Exp Area
Exp UGB

Figure 65


SAAM 2: Network Improvements
I-17
238
206a
248
205
239
222
221
COOLEY RD
223
204a
I-18
242
HWY 20
S-4
18TH ST
EMPIRE AVE
BOYD ACRES RD
I-13
N HWY 97
NW MT WASHINGTON DR
NE 27TH ST
NE NEFF RD
NW NEWPORT AVE
NW BOND ST
NE 8TH ST
NE FRANKLIN AVE
SKYLINERS RD
BEAR CREEK RD
SW SIMPSON AVE
SW BOND ST
SE 3RD ST
SE 9TH ST
SE 15TH ST
210
CENTURY DR
BROOKSWOOD BLVD
S HWY 97
I-5
I-4
212
213
214a
224a
235
27TH ST
KNOTT RD
228
229
Legend
Intersection Improvements
Capacity Improvements
New Roadways
State Route
Street
Street
River
Exp Area
Exp UGB


SAAM 3: Network Improvements
206a
248
205
COOLEY RD
204
S-4
HWY 20
18TH ST
EMPIRE AVE
I-13
BOYD ACRES RD
N HWY 97
NW MT WASHINGTON DR
NE 27TH ST
241
217
201
240
202
203
NE NEFF RD
NW NEWPORT AVE
NW BOND ST
NE 8TH ST
SKYLINERS RD
NE FRANKLIN AVE
BEAR CREEK RD
SW SIMPSON AVE
SW BOND ST
SE 3RD ST
SE 9TH ST
SE 15TH ST
210
211a
CENTURY DR
BROOKSWOOD BLVD
S HWY 97
I-5
I-4
212
213
214a
224a
235
27TH ST
KNOTT RD
228
229
Legend
Intersection Improvements
Capacity Improvements
New Roadways
State Route
Street
Street
River
Exp Area
Exp UGB

Scenario 1.2

New Roadways Cost Summary

Road ID	Roadway Name	Subarea	Length (miles)	Number of Lanes	Functional Class	Railroad Crossing	Number of Bridges	Road String	Unit Cost	Base Cost	ROW Cost	Crossing Cost	Total Cost
201	Skyline Ranch Road Extension	West	0.61	2	Collector	no	0	2Collector	$1,195	$3,848,874	$1,932,480	$0	$5,782,549
204	New Road	OB Riley	0.28	2	Collector	no	0	2Collector	$1,195	$1,766,696	$887,040	$0	$2,654,931
205	Hunnell Road Extension	Triangle	0.25	2	Collector	no	0	2Collector	$1,195	$1,577,407	$792,000	$0	$2,370,602
206a	New Road	Triangle	0.94	2	Collector	no	1	2Collector	$1,195	$5,931,051	$2,977,920	$3,724,450	$12,634,617
207	Yeoman Road Extension	NE Edge	0.5	2	Collector	no	2	2Collector	$1,195	$3,154,815	$1,584,000	$7,448,900	$12,188,910
208	New Road	NE Edge	0.88	2	Collector	no	0	2Collector	$1,195	$5,552,474	$2,787,840	$0	$8,341,509
209	New Road	NE Edge	0.49	2	Collector	no	1	2Collector	$1,195	$3,091,718	$1,552,320	$3,724,450	$8,369,683
210	New Road to Stevens	DSL	0.3	2	Arterial	no	1	2Arterial	$1,447	$2,292,241	$950,400	$3,724,450	$6,968,538
211	New Road	DSL	1	2	Collector	no	0	2Collector	$1,195	$6,309,629	$3,168,000	$0	$9,478,824
212	New Road	DSL	0.12	2	Collector	no	0	2Collector	$1,195	$757,155	$380,160	$0	$1,138,510
213	New Road	Elbow	0.42	2	Collector	no	0	2Collector	$1,195	$2,650,044	$1,330,560	$0	$3,981,799
214	New Road	Elbow	0.5	2	Arterial	yes	1	2Arterial	$1,447	$3,820,401	$1,584,000	$14,212,303	$19,618,152
214a	New Road	UGB	0.56	2	Collector	yes	1	2Collector	$1,195	$3,533,392	$1,774,080	$14,212,303	$19,520,971
215	New Road	DSL	0.32	2	Collector	no	0	2Collector	$1,195	$2,019,081	$1,013,760	$0	$3,034,036
224a	New Road	UGB	0.78	2	Collector	no	0	2Collector	$1,195	$4,921,511	$2,471,040	$0	$7,393,746
226	New Road	Elbow	0.25	2	Collector	no	0	2Collector	$1,195	$1,577,407	$792,000	$0	$2,370,602
227	New Road	Thumb	0.58	2	Collector	no	1	2Collector	$1,195	$3,659,585	$1,837,440	$3,724,450	$9,222,670
228	New Road	Thumb	0.45	2	Collector	no	0	2Collector	$1,195	$2,839,333	$1,425,600	$0	$4,266,128
229	New Road	Thumb	0.26	2	Collector	no	1	2Collector	$1,195	$1,640,504	$823,680	$3,724,450	$6,189,829
234	Raintree Courth Extension	Elbow	0.13	2	Collector	no	0	2Collector	$1,195	$820,252	$411,840	$0	$1,233,287
235	Raintree Courth Extension north	Elbow	0.23	2	Collector	no	0	2Collector	$1,195	$1,451,215	$728,640	$0	$2,181,050
243	New Road	NE Edge	0.5	2	Collector	no	1	2Collector	$1,195	$3,154,815	$1,584,000	$3,724,450	$8,464,460
243a	New Road	NE Edge	0.51	2	Collector	no	0	2Collector	$1,195	$3,217,911	$1,615,680	$0	$4,834,786
248	Loco Road Extension	Triangle	0.56	2	Collector	no	2	2Collector	$1,195	$3,533,392	$1,774,080	$7,448,900	$12,757,568
											Total (New Roadways)		$174,997,755

Corridor Improvement Projects

P#	Corridor	Begin	End	Improvement	Distance	Unit Cost	Cost
S-1	China Hat Road	US 97 NB Ramps	New Road (thumb)	widen from 2 lane to 3 lane	2,350	$ 1,085	$ 2,549,750
S-2	Knott Road	US 97	15th Street	widen from 2 lane to 3 lane	15,600	$ 1,085	$ 13,447,902
					Total (Corridor)		$15,997,652

Intersection Improvement Projects

P#	Begin	End	Improvement	Cost
I-1	US 97 SB Ramps	Baker Road/Knott Road	roundabout or trafic signal	$2,366,666
I-2	China Hat Road	New Road	roundabout or trafic signal	$2,366,666
I-4	27th Street	New Road	roundabout or trafic signal	$2,366,666
I-5	15th Street	Sherwood Forest Drive/Ferguson Road	roundabout or trafic signal	$2,366,666
			Total (Intersection)	$9,466,664

Cost Summary

New Roadways	$174,997,755
Corridor Capacity	$15,997,652
Intersection Capacity	$9,466,664
TOTAL	**$200,462,071**

Scenario 2.1

New Roadways Cost Summary

Road ID	Roadway Name	Subarea	Length (miles)	Number of Lanes	Functional Class	Railroad Crossing	Number of Bridges	Road String	Unit Cost	Base Cost	ROW Cost	Crossing Cost	Total Cost
202	Crossing Drive Extension	West	0.58	2	Collector	no	0	2Collector	$1,195	$3,659,585	$1,837,440	$0	$5,498,220
203	McClain Drive Extension South	West	0.44	2	Collector	no	0	2Collector	$1,195	$2,776,237	$1,393,920	$0	$4,171,352
204	New Road	OB Riley	0.28	2	Collector	no	0	2Collector	$1,195	$1,766,696	$887,040	$0	$2,654,931
205	Hunnell Road Extension	Triangle	0.25	2	Collector	no	0	2Collector	$1,195	$1,577,407	$792,000	$0	$2,370,602
206a	New Road	Triangle	0.94	2	Collector	no	1	2Collector	$1,195	$5,931,051	$2,977,920	$3,724,450	$12,634,617
209	New Road	NE Edge	0.49	2	Collector	no	1	2Collector	$1,195	$3,091,718	$1,552,320	$3,724,450	$8,369,683
210	New Road to Stevens	DSL	0.3	2	Arterial	no	1	2Arterial	$1,447	$2,292,241	$950,400	$3,724,450	$6,968,538
211	New Road	DSL	1	2	Collector	no	0	2Collector	$1,195	$6,309,629	$3,168,000	$0	$9,478,824
212	New Road	DSL	0.12	2	Collector	no	0	2Collector	$1,195	$757,155	$380,160	$0	$1,138,510
213	New Road	Elbow	0.42	2	Collector	no	0	2Collector	$1,195	$2,650,044	$1,330,560	$0	$3,981,799
214	New Road	Elbow	0.5	2	Arterial	yes	1	2Arterial	$1,447	$3,820,401	$1,584,000	$14,212,303	$19,618,152
214a	New Road	UGB	0.56	2	Collector	yes	1	2Collector	$1,195	$3,533,392	$1,774,080	$14,212,303	$19,520,971
215	New Road	DSL	0.32	2	Collector	no	0	2Collector	$1,195	$2,019,081	$1,013,760	$0	$3,034,036
215a	New Road	DSL	0.1	2	Collector	no	0	2Collector	$1,195	$630,963	$316,800	$0	$948,958
216	New Road	Elbow	0.23	2	Collector	no	0	2Collector	$1,195	$1,451,215	$728,640	$0	$2,181,050
224	New Road	Elbow	0.5	2	Collector	no	0	2Collector	$1,195	$3,154,815	$1,584,000	$0	$4,740,010
224a	New Road	UGB	0.78	2	Collector	no	0	2Collector	$1,195	$4,921,511	$2,471,040	$0	$7,393,746
225	New Road	Elbow	0.32	2	Collector	no	0	2Collector	$1,195	$2,019,081	$1,013,760	$0	$3,034,036
226	New Road	Elbow	0.25	2	Collector	no	0	2Collector	$1,195	$1,577,407	$792,000	$0	$2,370,602
228	New Road	Thumb	0.45	2	Collector	no	0	2Collector	$1,195	$2,839,333	$1,425,600	$0	$4,266,128
229	New Road	Thumb	0.26	2	Collector	no	1	2Collector	$1,195	$1,640,504	$823,680	$3,724,450	$6,189,829
234	Raintree Courth Extension	Elbow	0.13	2	Collector	no	0	2Collector	$1,195	$820,252	$411,840	$0	$1,233,287
235	Raintree Courth Extension north	Elbow	0.23	2	Collector	no	0	2Collector	$1,195	$1,451,215	$728,640	$0	$2,181,050
248	Loco Road Extension	Triangle	0.56	2	Collector	no	2	2Collector	$1,195	$3,533,392	$1,774,080	$7,448,900	$12,757,568
												Total (New Roadways)	$146,736,498

Corridor Improvement Projects

P#	Corridor	Begin	End	Improvement	Distance	Unit Cost	Cost
						Total (Corridor)	$0

Intersection Improvement Projects

P#	Begin	End	Improvement	Cost
I-4	27th Street	New Road	roundabout or trafic signal	$2,366,666
I-5	15th Street	Sherwood Forest Drive/Ferguson Road	roundabout or trafic signal	$2,366,666
I-13	Dechutes Market Road	Butlet Market Road	roundabout or trafic signal	$2,366,666
			Total (Intersection)	$7,099,998

Cost Summary

New Roadways	$146,736,498
Corridor Capacity	$0
Intersection Capacity	$7,099,998
TOTAL	**$153,836,496**

Scenario 3.1

New Roadways Cost Summary

Road ID	Roadway Name	Subarea	Length (miles)	Number of Lanes	Functional Class	Railroad Crossing	Number of Bridges	Road String	Unit Cost	Base Cost	ROW Cost	Crossing Cost	Total Cost
201	Skyline Ranch Road Extension	West	0.61	2	Collector	no	0	2Collector	$1,195	$3,848,874	$1,932,480	$0	$5,782,549
202	Crossing Drive Extension	West	0.58	2	Collector	no	0	2Collector	$1,195	$3,659,585	$1,837,440	$0	$5,498,220
203	McClain Drive Extension South	West	0.44	2	Collector	no	0	2Collector	$1,195	$2,776,237	$1,393,920	$0	$4,171,352
204b	New Road	OB Riley	0.82	2	Collector	no	0	2Collector	$1,195	$5,173,896	$2,597,760	$0	$7,772,851
205	Hunnell Road Extension	Triangle	0.25	2	Collector	no	0	2Collector	$1,195	$1,577,407	$792,000	$0	$2,370,602
206a	New Road	Triangle	0.94	2	Collector	no	1	2Collector	$1,195	$5,931,051	$2,977,920	$3,724,450	$12,634,617
209	New Road	NE Edge	0.49	2	Collector	no	1	2Collector	$1,195	$3,091,718	$1,552,320	$3,724,450	$8,369,683
210	New Road to Stevens	DSL	0.3	2	Arterial	no	1	2Arterial	$1,447	$2,292,241	$950,400	$3,724,450	$6,968,538
211a	New Road	DSL	0.79	2	Collector	no	0	2Collector	$1,195	$4,984,607	$2,502,720	$0	$7,488,522
212	New Road	DSL	0.12	2	Collector	no	0	2Collector	$1,195	$757,155	$380,160	$0	$1,138,510
213	New Road	Elbow	0.42	2	Collector	no	0	2Collector	$1,195	$2,650,044	$1,330,560	$0	$3,981,799
214a	New Road	UGB	0.56	2	Collector	yes	1	2Collector	$1,195	$3,533,392	$1,774,080	$14,212,303	$19,520,971
215a	New Road	DSL	0.1	2	Collector	no	0	2Collector	$1,195	$630,963	$316,800	$0	$948,958
217	McClain Drive Extension North	West	1	2	Collector	no	0	2Collector	$1,195	$6,309,629	$3,168,000	$0	$9,478,824
219	Skyline Ranch Road	Shevlin	0.75	2	Collector	no	0	2Collector	$1,195	$4,732,222	$2,376,000	$0	$7,109,417
220	New Road	Shevlin	0.73	2	Collector	no	0	2Collector	$1,195	$4,606,029	$2,312,640	$0	$6,919,864
221a	New Road	OB Riley	0.33	2	Collector	no	0	2Collector	$1,195	$2,082,178	$1,045,440	$0	$3,128,813
222a	New Road	OB Riley	0.72	2	Collector	no	0	2Collector	$1,195	$4,542,933	$2,280,960	$0	$6,825,088
223a	New Road	OB Riley	0.42	2	Collector	no	0	2Collector	$1,195	$2,650,044	$1,330,560	$0	$3,981,799
224a	New Road	UGB	0.78	2	Collector	no	0	2Collector	$1,195	$4,921,511	$2,471,040	$0	$7,393,746
228	New Road	Thumb	0.45	2	Collector	no	0	2Collector	$1,195	$2,839,333	$1,425,600	$0	$4,266,128
229	New Road	Thumb	0.26	2	Collector	no	1	2Collector	$1,195	$1,640,504	$823,680	$3,724,450	$6,189,829
230	New Road	Shevlin	0.24	2	Collector	no	0	2Collector	$1,195	$1,514,311	$760,320	$0	$2,275,826
234	Raintree Courth Extension	Elbow	0.13	2	Collector	no	0	2Collector	$1,195	$820,252	$411,840	$0	$1,233,287
235	Raintree Courth Extension north	Elbow	0.23	2	Collector	no	0	2Collector	$1,195	$1,451,215	$728,640	$0	$2,181,050
248	Loco Road Extension	Triangle	0.56	2	Collector	no	2	2Collector	$1,195	$3,533,392	$1,774,080	$7,448,900	$12,757,568
												Total (New Roadways)	$160,388,409

Corridor Improvement Projects

P#	Corridor	Begin	End	Improvement	Distance	Unit Cost	Cost
S-4	US 20	Robal Road	(about) Empire Avenue	Add second SB lane			$ 4,800,000
						Total (Corridor)	$4,800,000

Intersection Improvement Projects

P#	Begin	End	Improvement	Cost
I-5	15th Street	Sherwood Forest Drive/Ferguson Road	roundabout or trafic signal	$2,366,666
I-13	Dechutes Market Road	Butlet Market Road	roundabout or trafic signal	$2,366,666
			Total (Intersection)	$4,733,332

Cost Summary

New Roadways	$160,388,409
Corridor Capacity	$4,800,000
Intersection Capacity	$4,733,332
TOTAL	$169,921,741

SAAM-1

New Roadways Cost Summary

Road ID	Roadway Name	Subarea	Length (miles)	Number of Lanes	Functional Class	Railroad Crossing	Number of Bridges	Road String	Unit Cost	Base Cost	ROW Cost	Crossing Cost	Total Cost
204	New Road	OB Riley	0.28	2	Collector	no	0	2Collector	$1,195	$1,766,696	$887,040	$0	$2,654,931
205	Hunnell Road Extension	Triangle	0.25	2	Collector	no	0	2Collector	$1,195	$1,577,407	$792,000	$0	$2,370,602
206a	New Road	Triangle	0.94	2	Collector	no	1	2Collector	$1,195	$5,931,051	$2,977,920	$3,724,450	$12,634,617
207a	Yeoman Road Extension	NE Edge	0.76	2	Collector	no	2	2Collector	$1,195	$4,795,318	$2,407,680	$7,448,900	$14,653,093
210	New Road to Stevens	DSL	0.3	2	Arterial	no	1	2Arterial	$1,447	$2,292,241	$950,400	$3,724,450	$6,968,538
212	New Road	DSL	0.12	2	Collector	no	0	2Collector	$1,195	$757,155	$380,160	$0	$1,138,510
213	New Road	Elbow	0.42	2	Collector	no	0	2Collector	$1,195	$2,650,044	$1,330,560	$0	$3,981,799
214a	New Road	UGB	0.56	2	Collector	yes	1	2Collector	$1,195	$3,533,392	$1,774,080	$14,212,303	$19,520,971
215	New Road	DSL	0.32	2	Collector	no	0	2Collector	$1,195	$2,019,081	$1,013,760	$0	$3,034,036
215a	New Road	DSL	0.1	2	Collector	no	0	2Collector	$1,195	$630,963	$316,800	$0	$948,958
219	Skyline Ranch Road	Shevlin	0.75	2	Collector	no	0	2Collector	$1,195	$4,732,222	$2,376,000	$0	$7,109,417
220	New Road	Shevlin	0.73	2	Collector	no	0	2Collector	$1,195	$4,606,029	$2,312,640	$0	$6,919,864
224a	New Road	UGB	0.78	2	Collector	no	0	2Collector	$1,195	$4,921,511	$2,471,040	$0	$7,393,746
228	New Road	Thumb	0.45	2	Collector	no	0	2Collector	$1,195	$2,839,333	$1,425,600	$0	$4,266,128
230	New Road	Shevlin	0.24	2	Collector	no	0	2Collector	$1,195	$1,514,311	$760,320	$0	$2,275,826
232	New Road	Shevlin	0.48	2	Collector	no	0	2Collector	$1,195	$3,028,622	$1,520,640	$0	$4,550,457
233	New Road	NE Edge	0.29	2	Collector	no	1	2Collector	$1,195	$1,829,792	$918,720	$3,724,450	$6,474,158
234	Raintree Courth Extension	Elbow	0.13	2	Collector	no	0	2Collector	$1,195	$820,252	$411,840	$0	$1,233,287
235	Raintree Courth Extension north	Elbow	0.23	2	Collector	no	0	2Collector	$1,195	$1,451,215	$728,640	$0	$2,181,050
237	237 - Cooley Road Extension	NE Edge	0.65	2	Collector	no	0	2Collector	$1,195	$4,101,259	$2,059,200	$0	$6,161,654
237a	237 - Cooley Road Extension	NE Edge	0.47	3	Collector	no	0	3Collector	$1,213	$3,010,226	$1,786,752	$0	$4,798,191
246	New Road	NE Edge	0.86	2	Collector	no	0	2Collector	$1,195	$5,426,281	$2,724,480	$0	$8,151,956
247	New Road	NE Edge	0.3	2	Collector	no	1	2Collector	$1,195	$1,892,889	$950,400	$3,724,450	$6,568,934
248	Loco Road Extension	Triangle	0.56	2	Collector	no	2	2Collector	$1,195	$3,533,392	$1,774,080	$7,448,900	$12,757,568
												Total (New Roadways)	$148,748,290

Corridor Improvement Projects

P#	Corridor	Begin	End	Improvement	Distance	Unit Cost	Cost
S-1	China Hat Road	US 97 NB Ramps	New Road (thumb)	widen from 2 lane to 3 lane	2,350	$ 1,085	$ 2,549,750
						Total (Corridor)	$2,549,750

Intersection Improvement Projects

P#	Begin	End	Improvement	Cost
I-4	27th Street	New Road	roundabout or trafic signal	$2,366,666
I-5	15th Street	Sherwood Forest Drive/Ferguson Road	roundabout or trafic signal	$2,366,666
I-13	Deschutes Markete Road	Butler Market Road	roundabout or trafic signal	$2,366,666
I-14	Knott Road	China Hat (Arnold ice Cave Road)	roundabout or trafic signal	$2,366,666
			Total (Intersection)	$9,466,664

Cost Summary

New Roadways	$148,748,290
Corridor Capacity	$2,549,750
Intersection Capacity	$9,466,664
TOTAL	$160,764,704

SAAM-2

New Roadways Cost Summary

Road ID	Roadway Name	Subarea	Length (miles)	Number of Lanes	Functional Class	Railroad Crossing	Number of Bridges	Road String	Unit Cost	Base Cost	ROW Cost	Crossing Cost	Total Cost
204a	New Road	OB Riley	1	2	Collector	no	0	2Collector	$1,195	$6,309,629	$3,168,000	$0	$9,478,824
205	Hunnell Road Extension	Triangle	0.25	2	Collector	no	0	2Collector	$1,195	$1,577,407	$792,000	$0	$2,370,602
206a	New Road	Triangle	0.94	2	Collector	no	1	2Collector	$1,195	$5,931,051	$2,977,920	$3,724,450	$12,634,617
210	New Road to Stevens	DSL	0.3	2	Arterial	no	1	2Arterial	$1,447	$2,292,241	$950,400	$3,724,450	$6,968,538
212	New Road	DSL	0.12	2	Collector	no	0	2Collector	$1,195	$757,155	$380,160	$0	$1,138,510
213	New Road	Elbow	0.42	2	Collector	no	0	2Collector	$1,195	$2,650,044	$1,330,560	$0	$3,981,799
214a	New Road	UGB	0.56	2	Collector	yes	1	2Collector	$1,195	$3,533,392	$1,774,080	$14,212,303	$19,520,971
215a	New Road	DSL	0.1	2	Collector	no	0	2Collector	$1,195	$630,963	$316,800	$0	$948,958
221	New Road	OB Riley	0.54	2	Collector	no	0	2Collector	$1,195	$3,407,200	$1,710,720	$0	$5,119,115
222	New Road	OB Riley	0.86	2	Collector	no	0	2Collector	$1,195	$5,426,281	$2,724,480	$0	$8,151,956
223	New Road	OB Riley	0.44	2	Collector	no	0	2Collector	$1,195	$2,776,237	$1,393,920	$0	$4,171,352
224a	New Road	UGB	0.78	2	Collector	no	0	2Collector	$1,195	$4,921,511	$2,471,040	$0	$7,393,746
228	New Road	Thumb	0.45	2	Collector	no	0	2Collector	$1,195	$2,839,333	$1,425,600	$0	$4,266,128
229	New Road	Thumb	0.26	2	Collector	no	1	2Collector	$1,195	$1,640,504	$823,680	$3,724,450	$6,189,829
234	Raintree Courth Extension	Elbow	0.13	2	Collector	no	0	2Collector	$1,195	$820,252	$411,840	$0	$1,233,287
235	Raintree Courth Extension north	Elbow	0.23	2	Collector	no	0	2Collector	$1,195	$1,451,215	$728,640	$0	$2,181,050
238	New Road	OB Riley	1.96	2	Collector	no	0	2Collector	$1,195	$12,366,873	$6,209,280	$0	$18,577,348
239	New Road	OB Riley	0.47	2	Collector	no	0	2Collector	$1,195	$2,965,526	$1,488,960	$0	$4,455,681
242	New Road	OB Riley	0.26	2	Collector	no	0	2Collector	$1,195	$1,640,504	$823,680	$0	$2,465,379
248	Loco Road Extension	Triangle	0.56	2	Collector	no	2	2Collector	$1,195	$3,533,392	$1,774,080	$7,448,900	$12,757,568
												Total (New Roadways)	**$134,005,256**

Corridor Improvement Projects

P#	Corridor	Begin	End	Improvement	Distance	Unit Cost	Cost
S-4	US 20	Robal Road	(about) Empire Avenue	Add second SB lane			$ 4,800,000
						Total (Corridor)	**$4,800,000**

Intersection Improvement Projects

P#	Begin	End	Improvement	Cost
I-4	27th Street	New Road	roundabout or trafic signal	$2,366,666
I-5	15th Street	Sherwood Forest Drive/Ferguson Road	roundabout or trafic signal	$2,366,666
I-13	Deschutes Markete Road	Butler Market Road	roundabout or trafic signal	$2,366,666
I-17	OB Riley Road	Old Bend Redmond Highway	roundabout or trafic signal	$2,366,666
I-18	OB Riley Road	New Road	roundabout or trafic signal	$2,366,666
			Total (Intersection)	**$11,833,330**

Cost Summary

New Roadways	$134,005,256
Corridor Capacity	$4,800,000
Intersection Capacity	$11,833,330
TOTAL	**$150,638,586**

SAAM-3

New Roadways Cost Summary

Road ID	Roadway Name	Subarea	Length (miles)	Number of Lanes	Functional Class	Railroad Crossing	Number of Bridges	Road String	Unit Cost	Base Cost	ROW Cost	Crossing Cost	Total Cost
201	Skyline Ranch Road Extension	West	0.61	2	Collector	no	0	2Collector	$1,195	$3,848,874	$1,932,480	$0	$5,782,549
202	Crossing Drive Extension	West	0.58	2	Collector	no	0	2Collector	$1,195	$3,659,585	$1,837,440	$0	$5,498,220
203	McClain Drive Extension South	West	0.44	2	Collector	no	0	2Collector	$1,195	$2,776,237	$1,393,920	$0	$4,171,352
204	New Road	OB Riley	0.28	2	Collector	no	0	2Collector	$1,195	$1,766,696	$887,040	$0	$2,654,931
205	Hunnell Road Extension	Triangle	0.25	2	Collector	no	0	2Collector	$1,195	$1,577,407	$792,000	$0	$2,370,602
206a	New Road	Triangle	0.94	2	Collector	no	1	2Collector	$1,195	$5,931,051	$2,977,920	$3,724,450	$12,634,617
210	New Road to Stevens	DSL	0.3	2	Arterial	no	1	2Arterial	$1,447	$2,292,241	$950,400	$3,724,450	$6,968,538
211a	New Road	DSL	0.79	2	Collector	no	0	2Collector	$1,195	$4,984,607	$2,502,720	$0	$7,488,522
212	New Road	DSL	0.12	2	Collector	no	0	2Collector	$1,195	$757,155	$380,160	$0	$1,138,510
213	New Road	Elbow	0.42	2	Collector	no	0	2Collector	$1,195	$2,650,044	$1,330,560	$0	$3,981,799
214a	New Road	UGB	0.56	2	Collector	yes	1	2Collector	$1,195	$3,533,392	$1,774,080	$14,212,303	$19,520,971
215a	New Road	DSL	0.1	2	Collector	no	0	2Collector	$1,195	$630,963	$316,800	$0	$948,958
217	McClain Drive Extension North	West	1	2	Collector	no	0	2Collector	$1,195	$6,309,629	$3,168,000	$0	$9,478,824
224a	New Road	UGB	0.78	2	Collector	no	0	2Collector	$1,195	$4,921,511	$2,471,040	$0	$7,393,746
228	New Road	Thumb	0.45	2	Collector	no	0	2Collector	$1,195	$2,839,333	$1,425,600	$0	$4,266,128
229	New Road	Thumb	0.26	2	Collector	no	1	2Collector	$1,195	$1,640,504	$823,680	$3,724,450	$6,189,829
234	Raintree Courth Extension	Elbow	0.13	2	Collector	no	0	2Collector	$1,195	$820,252	$411,840	$0	$1,233,287
235	Raintree Courth Extension north	Elbow	0.23	2	Collector	no	0	2Collector	$1,195	$1,451,215	$728,640	$0	$2,181,050
240	New Road	West	0.73	2	Collector	no	0	2Collector	$1,195	$4,606,029	$2,312,640	$0	$6,919,864
241	New Road	West	0.77	2	Collector	no	0	2Collector	$1,195	$4,858,414	$2,439,360	$0	$7,298,969
248	Loco Road Extension	Triangle	0.56	2	Collector	no	2	2Collector	$1,195	$3,533,392	$1,774,080	$7,448,900	$12,757,568
												Total (New Roadways)	$130,878,833

Corridor Improvement Projects

P#	Corridor	Begin	End	Improvement	Distance	Unit Cost	Cost
S-4	US 20	Robal Road	(about) Empire Avenue	Add second SB lane			$ 4,800,000
						Total (Corridor)	$4,800,000

Intersection Improvement Projects

P#	Begin	End	Improvement	Cost
I-4	27th Street	New Road	roundabout or trafic signal	$2,366,666
I-5	15th Street	Sherwood Forest Drive/Ferguson Road	roundabout or trafic signal	$2,366,666
I-13	Deschutes Markete Road	Butler Market Road	roundabout or trafic signal	$2,366,666
			Total (Intersection)	$7,099,998

Cost Summary

New Roadways	$130,878,833
Corridor Capacity	$4,800,000
Intersection Capacity	$7,099,998
TOTAL	$142,778,831

ERRATA SHEET

Corrections as of 10/20/15:

The following projects and costs should be removed/updated for the alternatives since they are currently included in Bend's TSP and indicated as having near/mid-term funding. These two minor modifications do not impact the overall evaluation/findings:

- China Hat Road - Remove $320K cost from Scenario 1 and SAAM1. This is not the total cost for capacity project S-1.
- Knott/China Hat Intersection - This intersection is listed in the near term and should be removed from SAAM1. This would reduce the cost by $2.4M.

Updating the overall scenario/SAAM costs to reflect the above does not impact the evaluation and scoring. SAAM1 still has on overall cost above $160M, so the score of 3 would not change.

Specific edits to reflect these changes are:

Appendix B (Data Sheets):

- For Performance Measure 2.B.1, Scenario 1.2 would have a total cost of $204.2M and expansion area cost of $200.2M. SAAM-1 would have a total cost of $162.1M and expansion area cost of $158.1M.

Appendix D, DKS transportation memo:

- Table 2 - Total costs would be updated for Scenario 1.2 and SAAM1 to reflect the expansion area totals noted above. Scenario 1.2 would have a roadway capacity cost of $15.7M. SAAM-1 would have a roadway capacity cost of $2.2M and an intersection capacity cost of $7.1M.
- Figure 65 - Remove project I-14 (Knott/China Hat)
- Figure 68 - Reduce cost of China Hat project from $2.5M to $2.2M. Update corridor cost and overall scenario cost.
- Figure 71 - Reduce cost of China Hat project from $2.5M to $2.2M. Update corridor cost and overall SAAM cost.
- Figure 71 - Remove project I-14 and Update total intersection cost and overall SAAM cost.

October 22, 2015 Boundary and Growth Scenarios TAC

October 22, 2015 UGB Steering Committee Meeting

Public Testimony – Received by **October 21,** 2015

1. Mark Smuland, October 16, 2015 letter
2. Myles Conway, October 21, 2015 letter
3. Charley Miller, October 21, 2015 letter and attached map
4. Brad Henry, Bend-LaPine Schools, October 20, 2015 letter
5. Gary Timm, October 21, 2015 email

October 16, 2015

Mr. Brian Rankin, Planning Manager, City of Bend
Submitted via Email: brankin@bendoregon.gov

Re: City of Bend, UGB Testimony for UGB Boundary TAC and UGB Steering Committee Meetings 10.22.15

Dear Brian:

I am a long-time Bend resident and have been following the UGB expansion since before the UGB remand began. I recently attended the Boundary TAC meeting on 10/8/15 where the group reviewed post-modeling data on expansion scenarios and the preferred UGB expansion scenario 2.1.

Like many others who reviewed the UGB data and recommendations, I feel that Scenario 2.1 focuses too much land in southeast Bend to the detriment of the City of Bend as a whole. While I agree that land on the eastern side of Bend is where the majority of the expansion should occur, I feel that the expansion should be more balanced between the north and south ends of Bend.

As articulated in the correspondence dated 10/7/15 by Miller Nash Graham & Dunn regarding the "Perfect Rectangle" land, inclusion of lands northeast of the current UGB boundary will better serve the City than concentrating the expansion in southeast Bend. The lands that they recommend for inclusion into the UGB will help to leverage recent parks built by the Bend Parks and Recreation District, provide residences easy access to a number of existing schools and will provide shorter trips to multiple shopping districts on the north side of Bend. New homes in this area will be closer to the City of Bend sewer treatment plant and will also provide more housing to service the city's investment in Juniper Ridge.

Placing so much of the City of Bend's expansion in a small number of land owners as would happen in the preferred expansion scenario 2.1 is a risky proposition from an infrastructure perspective. These large parcels of land that are being recommended for inclusion will face significant time delays due to the planning and cost of infrastructure that will be required to serve them. A more balanced approach that expands the UGB into more areas of town including smaller parcels that require less infrastructure improvements will allow new housing to be built in a timelier manner to help alleviate the City of Bend's current housing shortage and affordability crisis.

I urge you to carefully consider the benefits of a more balanced UGB expansion and to make modifications to expansion scenario 2.1 as it is currently proposed in order to provide a higher level of benefit to the City of Bend and its residents.

Best regards,

Mark Smuland
1532 Harmon Blvd. NW, Bend Oregon

MARTEN LAW

October 21, 2015

Via Email

UGB Steering Committee and Boundary and Growth Scenarios,
Technical Advisory Committee
c/o Brian Rankin City of Bend, Long Range Planning

Re: Urban Growth Boundary Remand

Members of the Boundary TAC and UGB Steering Committee:

Our office represents Rio Lobo Investments, LLC ("Rio Lobo"). Rio Lobo owns an approximately 376 acre property in the urban reserve located on the west side of Bend, south of Shevlin Park Road and north of Skyliners Road (a depiction of the property is attached hereto). There are two reasons for our submittal. First, we are writing to provide the committees with some specific details regarding the Rio Lobo Property and its particular suitability for inclusion within the Urban Growth Boundary. Second, we are compelled to register our concern with any decision by either the Boundary TAC or Steering Committee to proceed with the adoption of a preferred expansion scenario until a property specific Goal 14 analysis has been performed. As is explained in greater detail below, applicable state laws require the City to evaluate and compare the relative costs, advantages and disadvantages of alternative UGB expansion areas before proceeding to determine a specific boundary location. In this case, the City has performed its detailed Goal 14 analysis in the context of artificial property groupings (the proposed "Expansion Scenarios") that preclude a direct comparison of the advantages, disadvantages and relative infrastructure costs associated with specific properties. The methodology for this analysis is contrary to the requirements of OAR 660-024-0060(8).

The "Rio Lobo Property"

The entirety of the Rio Lobo Property is characterized as "Priority Exception Land" and identified as the "highest priority" for inclusion within the UGB. Large portions of the property are surrounded by the existing UGB on three sides, creating a peninsula of undeveloped property bordering directly on urban development. The eastern 40-acres of the Rio Lobo Property has been identified as the location of the future extension of the "Skyline Ranch" major collector roadway, which is identified in the Transportation System Plan ("TSP") and the Bend Urban Area Roadway System Plan as a facility necessary to accommodate planned growth on the west side of Bend. The construction of a collector roadway in this location will reduce "vehicle miles travelled" for the benefit of all west side properties. The TSP specifically provides that this planned critical roadway shall not be constructed to an urban standard until it is brought into the UGB. *See TSP at page 171.*

The recently completed Goal 14 infrastructure analysis identifies a number of advantages associated with the inclusion of the Rio Lobo Property within the UGB. The large size of

D - 541 . 408 . 9291 | E - mconway@martenlaw.com | 404 SW Columbia St, Suite 212, Bend, OR 97702

this vacant parcel will promote the efficient use of residential lands. The property provides unique opportunities for large scale master planning efforts, where the desired "Complete Communities" and "Great Neighborhoods" can be developed in the future. The property lies in close proximity to the public amenities of Shevlin Park and provides exceptional opportunities to develop green space corridors and trail links to Shevlin Park and the adjacent public lands.

The property scores very well in the City's analysis of potential infrastructure impacts. The property is located close to identified transit corridors and provides good opportunities to enhance City transit services. No issues have been identified for serving the property with City of Bend water service. The property also scores well for potential sewer impacts when evaluated individually and without aggregating other large west side properties in the analysis. The property can be served with multiple connections to the City road system and has been determined to have "good connectivity" and minimal reliance on "congested corridors" in the adopted "Factor 2 Maps." The property does not overlap with any ODFW "Areas of Potential Concern" related to deer and elk habitat. In addition, the recently completed "Wildfire Hazard Technical Memorandum, dated October 1, 2015" stated there is a reduced wildfire hazard on the property as the result of good vegetation management. As previously noted in the record, the majority of the property burned in the 1990 "Awbrey Hall" fire. As a result of the intensity and very high temperatures associated with this fire, Ponderosa Pine trees have not re-generated within the footprint of the fire scar. Low fertility soils, the loss of organic materials and the limited available moisture significantly constrain the ability to re-establish a pine forest on the parcel. Incorporation of the Rio Lobo property into the UGB will provide additional fire protection to urbanized areas within the current City limits. Developer funded roads, fire hydrants and access infrastructure can be utilized to mitigate against the fire risks that exist today on the west side of Bend. Rio Lobo has previously submitted a report that outlines how inclusion of this property in the UGB will provide a fire management benefit to the City of Bend.

In sum, the Rio Lobo Property is well suited for inclusion within the UGB and provides the best fit of any property located on the west side of Bend. Rio Lobo asks the Boundary TAC and Steering Committee to include the property in any future expansion scenario.

Artificially Created "Expansion Scenarios" Have Precluded a Comparative Goal 14 Analysis of Individual Properties

OAR 660-024-0060 "Boundary Location Analysis" requires a local government to determine which land to add to a UGB by evaluating alternative boundary locations. The Goal 14 boundary location determination requires evaluation and comparison of the "relative costs, advantages and disadvantages of alternative UGB expansion areas with respect to the provision of public facilities and services needed to urbanize alternative boundary locations." OAR 660-024-0060(8). The evaluation and comparison must include: (a) The impacts to existing water, sanitary sewer, storm water and transportation facilities that serve nearby areas already included in the UGB; (b) The capacity of existing public facilities and services to serve areas already inside the UGB as well as areas proposed for addition to the UGB; and (c) The need for new transportation facilities, such as highways and other roadways, interchanges arterials and collectors, additional travel lands, other major transportation improvements on existing roadways and, for urban areas of 25,000 or more, the provision for public services. OAR 660-024-0060(8).

In this case, the City has performed its detailed Goal 14 boundary location analysis in the context of designated property groupings or "expansion scenarios." Individual properties have only been studied and evaluated as part of an artificially created grouping or scenario. As a result, it is impossible for the City to fulfill its mandate to evaluate the relative costs, advantages and disadvantages of alternative UGB expansion areas as is required by OAR 660-024-0060(8). The detailed analysis contained in the "Expansion Scenarios Evaluation Report, dated October 1, 2015" (the "Expansion Report") illustrates how different groupings of properties perform relative to the other designated groupings/scenarios. The study does not, however, compare the relative costs, advantages and disadvantages of individual properties as is required by state law.

The fundamental problem with this approach is illustrated by looking at the various west side properties under consideration in this expansion. The Miller property has been studied as the single west side property included in what has become the preferred expansion Scenario 2.1. As a result, a study of this scenario demonstrates a lesser degree of impact on City infrastructure. Portions of the Rio Lobo Property, the Miller Property, the Swisher Property, the Shevlin Property and a significantly larger OB Riley/Gopher Gulch Area have all been aggregated together in Expansion Scenario 3.1. Scenario 3.1 represents a considerably larger west side boundary expansion with correspondingly greater infrastructure impacts than resulted from the limited west side expansion proposed in the preferred Scenario 2.1. As a consequence of this grouping, additional infrastructure impacts have been identified to the detriment of all properties in Scenario 3.1.

In the case of Rio Lobo, many of the justifications used to reject Scenario 3.1 cannot be attributed to the Rio Lobo Property. The higher impacts (costs) associated with sewer and transportation infrastructure are related, in large part, to the additional west side acreage included in this expansion scenario. The Expansion Report notes that Scenario 3.1 performed "poorly" on transportation costs due to the high cost for connecting growth areas and the need to widen US 20 from Robal Road to 3rd Street. *See Expansion Report, page 32*. These improvements are related to the OB Riley/Gopher Gulch area and the remand record contains no evidence that such improvements would be necessitated solely by the inclusion of the Rio Lobo Property (or portions thereof). In addition, Scenario 3.1 rated "poorly on development in wildlife areas and wildfire hazard due to the inclusion of the Shevlin area, which is both an ODFW area of potential concern and has topographic features that make it difficult to fully mitigate wildfire risk." *See UGB Expansion Scenarios Evaluation Report, page 32*. Scenario 3.1 also performed "poorly" on affordability "due to the heavy focus on the west side of the City." Finally, Scenario 3.1 rated the lowest on farm and forest compatibility, "because they are proximate to the greatest number of working farms and also affect the greatest number of irrigation district customers." *See Expansion Report, page 33-34*. The factors used in this reference have absolutely no application to the Rio Lobo property which is not adjacent to any agricultural areas and does not affect any irrigation districts. Moreover, there is absolutely no evidence contained in the remand record that development of the Rio Lobo Property would affect forestry operations conducted on properties across Shevlin Park to the west.

In sum, the factual basis utilized to reject Scenario 3.1 has little or no application to the Rio Lobo Property. The conduct of a Goal 14 analysis based on the developed scenario

analysis has precluded a full and independent look at specific properties as is required by state law.

Conclusion

The Rio Lobo Property (or portions thereof) are appropriate for inclusion within the UGB under the applicable Goal 14 factors. The property is surrounded by the existing UGB and has ranked favorably under all performance measures studied to date. A portion of the property is needed to extend a previously planned collector roadway (Skyline Ranch Road) for the benefit of all west side properties. Incorporation of the parcel into the UGB will also provide the City with an additional tool to address existing wildfire risks on the west side of Bend. The aggregation of west side properties into Scenario 3.1 has worked to the detriment of Rio Lobo and the City's Goal 14 analysis. The development and use of this scenario model precludes a meaningful evaluation and comparison of similarly situated properties and is contrary to applicable state law. We urge the Boundary TAC and Steering Committee to conduct a fair and meaningful comparison of individual properties as is required by Goal 14 and its implementing regulations. We are confident such an analysis will demonstrate the benefits of including portions of the Rio Lobo Property within the UGB. Thank you for your consideration of our concerns.

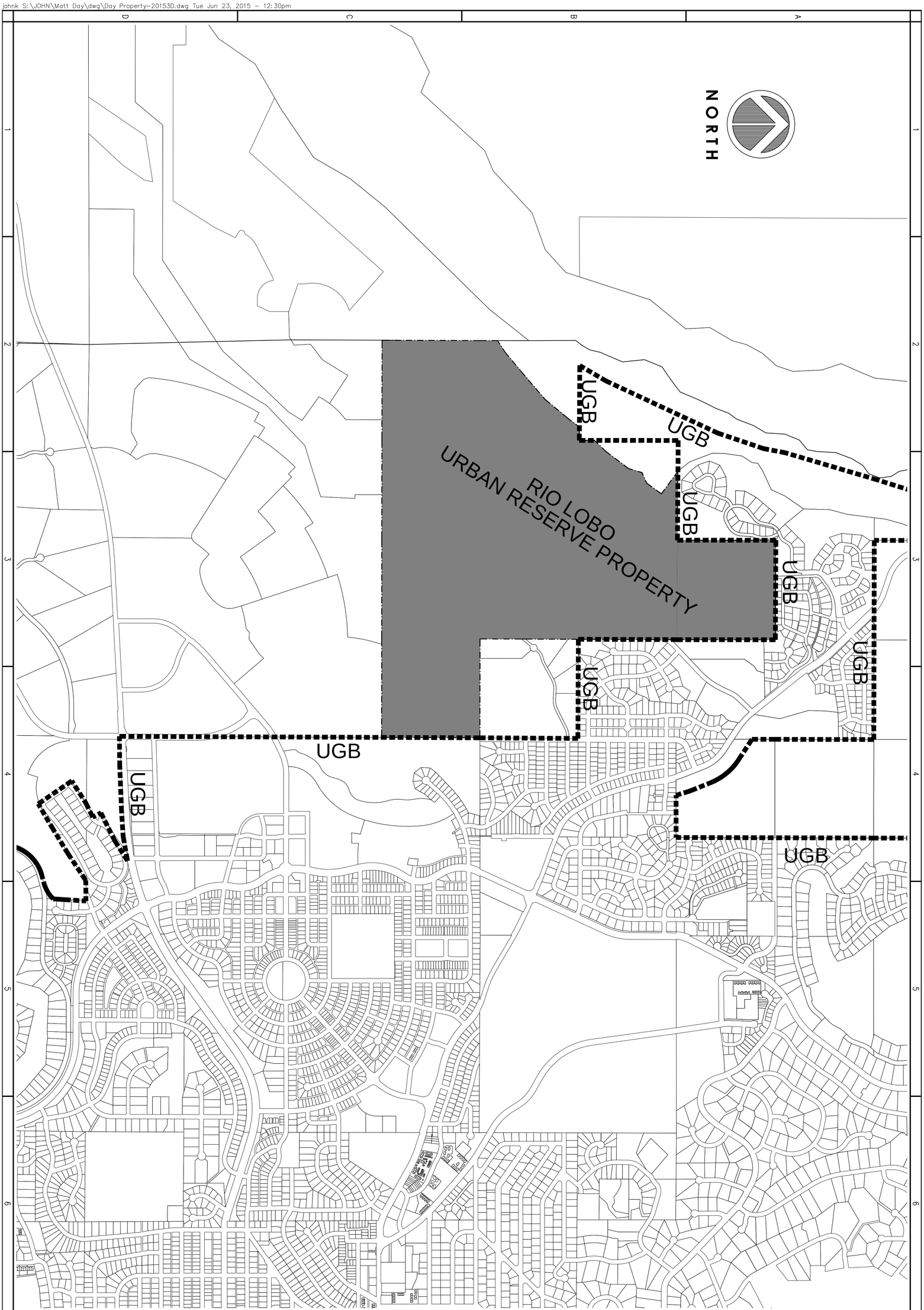
Sincerely,

Myles A. Conway

cc: Clients

Enclosures

johnk S:\JOHN\Matt Day\dwg\Day Property-20153D.dwg Tue Jun 23, 2015 - 12:30pm



HWA # NUMBER

SHEET 1/1

DATE 06/22/2015

FILE DAY PROPERTY.DWG

SCALE 1"=600'

CHECKED BY: JMK

DRAWN BY: JMK

DESIGNED BY: JMK

REVISIONS

1.
2.
3.
4.
5.
6.

HWA SURVEYORS, ENGINEERS & PLANNERS

HICKMAN, WILLIAMS & ASSOCIATES, INC

62930 O.B. RILEY ROAD, SUITE 100
BEND, OREGON 97701
PHONE: 541.389.9351 FAX: 541.388.5416
WWW.HWA-INC.ORG

RIO LOBO
URBAN RESERVE PROPERTY
URBAN GROWTH BOUNDARY

DESCHUTES COUNTY OREGON

COPYRIGHT 2010
HICKMAN, WILLIAMS & ASSOCIATES
Any reproduction of plans, in whole or in part, without the written consent of said firm is a violation of applicable laws.
ALL RIGHTS RESERVED

04865

MILLER TREE FARM, LLC
110 NE Greenwood Avenue
Bend, OR 97701

October 21, 2015

TO: Boundary Alternatives TAC

RE: Development plans for Miller property in UGB "West Area"

We would like to take this opportunity to comment on the new proposed UGB Boundary Alternatives published on 10/20/2015 as they relate to our plans and intent for the entire Miller property and infrastructure needs for the "West" subarea. While we like the new Scenario 2.2 for obvious reasons, we believe that Scenario 2.3 represents the best compromise of the many competing goals, needs, and interests. We also support the changes in uses recommended by the consultant team because the West subarea is not highly suitable for employment uses; therefore additional residential (and lower density residential) should be placed there instead. In addition, we have the following comments and recommendations on the alternative maps:

- Reduce employment lands in West subarea on Scenario 2 and relocate to the north "Triangle" as reflected in Scenario 2.2 and 2.3;
- Scenario 2.2 includes the entire 245-acre Miller property; this allows for a complete master plan, and also places more lower density single-family residential in this area to continue the "transect" of density transition between the rural Highlands and Tree Farm developments and the city;
- While we fully support the inclusion of our entire property as depicted in Scenario 2.2, we believe the inclusion of additional West subarea lands owned by Rio Lobo and Anderson Ranch as depicted Scenario 2.3 is critical in order to accommodate the completion of Skyline Ranch Road;
- Ideally, we would suggest a further hybridization of all lands included in Scenario 2.2 and 2.3 for the West subarea.

As noted above, Scenarios 2.1 and 2.2 exclude land owned by Rio Lobo and Anderson Ranch Holdings that should also be included in the UGB expansion in order to accommodate completion of the transportation network in the area. As currently depicted on the Bend Urban Area Transportation System Plan, this incomplete segment of Skyline Ranch Road follows the current UGB boundary, but due to significant topography is likely to be re-routed further to the west as highlighted on the attached map of the Miller property and surrounding lands. Once this last segment is complete, Skyline Ranch Road will form a connection between Century Drive and Shevlin Park Road that will alleviate pressure on Mt. Washington Drive and several other westside roads. The configuration of Scenario 2.3 includes the Rio Lobo and Anderson Ranch lands necessary to accommodate this preferred road alignment.

We have recently obtained land use approval from the Deschutes County Board of Commissioners for The Tree Farm development project, located on approximately 530 acres zoned both UAR and RR-10 just west of the West subarea. The Tree Farm is a cluster planned unit development at rural densities consisting of fifty 2-acre lots and over 420 acres of open space. The open space features a network of

public trails connecting to Shevlin Park. The project forms a logical soft edge to an expanded UGB in this area, providing a transition from urbanized areas to the east and public lands to the west. As discussed at length in our June submittal, wildland fire was a major consideration and component of our development plans as well as the County's approval, and the result will be a model fire-adapted community. The Tree Farm will create precisely the type of wildland fire buffer between forest lands and future urbanization recommended by the City's Wildland Fire Focus Group.

The attached map highlights the approved Tree Farm project and a conceptual urban area in the 245 acres situated between The Tree Farm and the UGB wrapping around Miller Elementary School and Pacific Crest Middle School. Our intent is that the entire 245-acre property would ultimately be brought into the UGB and urbanized. We are working with the development team behind the adjoining NorthWest Crossing master planned community to design a continuation of the mixed-use development pattern established to the east. Our preliminary design concepts include a mix of residential uses and a significant amount of open space on areas that were previously mined (roughly 40 acres) that will serve as an extension of Discovery Park, forming a continuous open space/trail corridor to the 420+ acre open space/trail network in The Tree Farm and on to Shevlin Park and U.S. Forest Service trail networks further west. This open space corridor will also contribute to the soft edge transect from urbanized areas to the undeveloped public lands to the west already established by The Tree Farm.

In summary, the advantages of the Miller property are:

- The property scores highly on the total Goal 14 metrics utilized by the consultant team and a significant portion of the property appears in all three Scenarios;
- The 245-acre property will be master planned to provide a complete community as an extension of NorthWest Crossing;
- Commercial uses and employment opportunities already exist in NorthWest Crossing directly to the east;
- The county-approved Tree Farm project will provide the wildfire fuel buffer recommended by Wildland Fire Focus Group.
- Parks have already been developed in the adjoining NorthWest Crossing and the master plan will provide a park/trail corridor connecting Discovery and Shevlin Parks;
- Schools – Miller Elementary, Pacific Crest Middle School, and Summit High School all adjoin the property.
- Infrastructure:
    - Sewer can be easily extended from the east and will be gravity served;
    - City water service is readily available from existing water lines on the property;
    - Transportation access is good and the network can be expanded with the completion of Skyline Ranch Road.

Thank you for your attention.

Sincerely,

Charley Miller
Co-Manager
Miller Tree Farm, LLC

To Shevlin Park Road

Anderson Ranch Holdings

Rio Lobo Investments

SHEVLIN PARK

The Tree Farm

Miller Property
245 Acres

DISCOVERY PARK

ALTERNATE SKYLINE RANCH ROAD

NW CROSSING DRIVE

Open Space

SUMMIT HIGH SCHOOL

NEW MIDDLE SCHOOL

West Park

LOLO DRIVE

WILLIAM E. MILLER ELEMENTARY

SKYLINERS ROAD

CITY OF BEND OUTBACK WATER TREATMENT FACILITY

PHIL'S TRAILHEAD
(0.5 mile)

SKYLINERS ROAD

SKYLINE RANCH ROAD

0 200' 400'

THE TREE FARM
BEND, OREGON

Preferred Alternative

Discovery Park/Miller Tree Farm

04868

Est. 1883
BEND LAPINE
Schools
EDUCATING THRIVING CITIZENS

OFFICE OF THE SUPERINTENDENT
Education Center
520 N.W. Wall Street
Bend, Oregon 97701-2699

October 20, 2015

Brian Rankin
City of Bend
710 NW Wall Street
Bend, OR 97701

Mr. Rankin,

Bend-La Pine Schools owns property adjacent to Shevlin Park road (tax map #1711230000600), in the area identified in the UGB Expansion Scenario 3.1 as "Shevlin Area." The property is planned for a school to meet growth projections in the northwest area of Bend. We are currently over capacity in some schools and anticipate that we will need another school in this area as the land in the west side continues to develop. We have been unable to locate an alternative suitable site that meets the location and size requirements for a school. Other sites, further south, would likely be too close to existing schools.

We request that the area identified in Scenario 3.1 as "Shevlin Area" be brought in to the UGB. Having the school district parcel and some additional residential land will complete the street grid system, provide buffers to existing development and enhance a walkable school neighborhood.

Thank you for your consideration.

Sincerely,

Brad Henry
Chief Operations and Financial Officer
Bend-La Pine Schools

Damian Syrnyk

From: Gary Timm <garytimm7@gmail.com>
Sent: Wednesday, October 21, 2015 4:55 PM
To: Brian Rankin; Damian Syrnyk
Subject: UGB TAC meeting

Hi Brian and Damian,

As you know I am traveling and will not be able to attend the TAC meeting this week. I have read the materials, however, and am providing some brief comments on the revised scenarios.

If I am reading the maps correctly it appears that scenarios 2.2 and 2.3 both expand west side residential development with more low density development. I believe that any west side development should be kept to a minimum and should be small-lot residential and clustered on the eastern edge of the existing UGB adjacent to the schools. Development should be compatible with that currently existing or being constructed in Northwest Crossing. I don't believe any new commercial or employment land is necessary in west side expansion. I think it is important to note that Northwest Crossing is still being developed with high density residential housing including apartments, townhouses, and clustered housing and that there are still several vacant commercial and employment lots to be developed.

The MetroQuest online survey results show that a quality natural environment received the highest priority among respondents and that scenario 2.1 received the highest rating. I agree on both but recommend some revisions that I believe would benefit the goal of a quality natural environment as well as providing more affordable housing. My suggestion is, as stated above, to minimize westside UGB expansion by clustering new residential on the eastern edge and relocating some proposed residential and new employment and commercial westside UGB expansion to the northeast and east side of the City. In my opinion revising scenario 2.1 in this manner would provide more protection for the forest lands and river habitat on the west side (a quality natural environment) and allow for the construction of more affordable housing for future residents of Bend.

I apologize for submitting my comments so late. Available time to review the materials and provide comments has been significantly limited by travel.

Gary Timm

Sent from my iPad

October 22, 2015 Boundary and Growth Scenarios TAC

Public Testimony – Received by October 20, 2015

1. Mike Larraneta, October 8, 2015 email
2. Ed Elkins, October 11, 2015 email.
3. Ed Elkins, October 13, 2015 email
4. John Russell, October 15, 2015 memo
5. Ed Elkins, October 16, 2015 email
6. Mike Larraneta, October 19, 2015 email
7. Wayne Purcell, October 19, 2015 letter
8. Jerry L. Curl, October 16, 2015 letter
9. Bill Galaway, October 19, 2015 letter
10. Mike Robinson, October 19, 2015 letter

Damian Syrnyk

From: Larraneta & Company <larranetaandco@gmail.com>
Sent: Thursday, October 08, 2015 11:18 PM
To: Damian Syrnyk; Brian Rankin
Subject: UGB Comments

Follow Up Flag: Follow Up
Due By: Friday, October 09, 2015 6:48 AM
Flag Status: Completed

Damian, Brian-

I have talked with you both about this and was hoping that you could get this into the record as a comment about the UGB. I tried to make comments on the survey but found it kind of cumbersome. If this could be added or forwarded to the committee, that would be great.

After going through the info and going to the meeting the other night I just had a few comments that stood out to me. I am a long time Bendite and am a builder/developer who lives on the NE side.

I don't quite understand how in all senario's the corner of Neff and Eagle gets included. There is only one viable property there of 9 acres undeveloped yet several small 2 acre parcels get thrown in. I recommend adding the entire length of Eagle Rd. on the east side up to the current UAR line. If you take out Bradetich Park and Keyte to Hyde Ln. that get's us a lot of usable growth land that has all infrastructure there and ready to go.

Even on Saam-1 there is a huge portion north of Yeoman that makes no sense also. That area is never going to be redeveloped just because of the complexity of getting services to all those small parcels. Areas like that should be removed from consideration so we don't inflate how much land we are asking for with land that can't be used efficiently.

I would also add the the NE side along Eagle is ready to go now. We need inventory of affordable lots which is what the NE side provides. The large parcels in the SE are great except for being by the landfill, but they are years and years from being ready to come online because of master plans and getting someone to commit to those large projects. That's not the case in the NE area. The NE Edge subarea is ready right now to be developed and help out with the affordable land situation while we are waiting for those larger, farther out areas that are years away from happening if at all.

Those are just a few of my opinions, I hope they are useful and insightful.

Thanks for the time.

Mike Larraneta

Damian Syrnyk

From: Edward Elkins <thumper2@centurylink.net>
Sent: Sunday, October 11, 2015 8:08 PM
To: Damian Syrnyk
Subject: UAR Lands

Follow Up Flag: Follow up
Flag Status: Flagged

Damian:

Please include this email in the UGB Remand Record

In reviewing the latest Scenario maps and SAAM maps it appears that some of the lands included in these maps may not be UAR zoned lands. If this is infact the case would you kindly send me revised map(s) that shows the non UAR lands and their acreages. It is all but impossible to generate this information based on the maps located on the City's web site. Your prompt attention to this request would be greatly appreciated as I am in the process of preparing written testimony for the October 22, 2015 BATC meeting.

Respectfully,

Edward J. Elkins
63613 O. B. Riley Road, Bend OR
541-647-7405
thumper2@centurylink.net

Damian Syrnyk

From: Ed Elkins <thumper2@centurylink.net>
Sent: Tuesday, October 13, 2015 3:12 PM
To: Damian Syrnyk
Subject: Re: UAR Lands

Follow Up Flag: Follow up
Flag Status: Flagged

Please include the following in the Record.

Damian:

I understand your position, however within in those exception lands there is a priority I.e.; UAR lands shall be considered first. There is no MUA priority mentioned. A real good review of Ordinance 80 -216 by the City's consultants is recommended. Also in the Remand Order LCDC acknowledged the UAR designations. In addition the DSL lands were not exception lands when the UGB expansion was submitted to LCDC.

Thanks for working with me on this issue.

Ed Elkins

Sent from Ed's IPad

> On Oct 13, 2015, at 10:33, Damian Syrnyk <dsyrnyk@bendoregon.gov> wrote:
>
> Thanks Ed, I'm following up with the consultant team on the answer to your question.
>
> Regarding the UAR lands, I wanted to clarify that the UAR lands are Priority 2 or "exception" lands just like the MUA and RR10-zoned lands. You're correct the issue was addressed in the Remand Order, and I have enclosed pages 132 and 133 for reference.
>
> Thanks, Damian
>
>
> Damian Syrnyk, AICP | Senior Planner
> O: 541-312-4919 |
>
>
>
>
> -----Original Message-----
> From: Ed Elkins [mailto:thumper2@centurylink.net]
> Sent: Tuesday, October 13, 2015 7:19 AM
> To: Damian Syrnyk <dsyrnyk@bendoregon.gov>
> Subject: Re: UAR Lands
>
> Thanks Damian for the reply. Will I have an answer and map(s) in time for the 10/22/2015 meeting. As you are aware UAR lands have priority over MUA and other zoned lands. This issue was addressed in the Remand Order.

>
> Please add this reply to the Record.
>
> Thanks
> Ed Elkins
>
> Sent from Ed's IPad
>
>> On Oct 12, 2015, at 09:29, Damian Syrnyk <dsyrnyk@bendoregon.gov> wrote:
>>
>> Hi Ed, I'm sending this message to confirm I received your email, will forward it on to the Boundary TAC, and will enter it into the record.
>>
>> Thanks, Damian
>>
>>
>> Damian Syrnyk, AICP | Senior Planner
>> O: 541-312-4919 |
>>
>>
>>
>>
>> -----Original Message-----
>> From: Edward Elkins [mailto:thumper2@centurylink.net]
>> Sent: Sunday, October 11, 2015 8:08 PM
>> To: Damian Syrnyk <dsyrnyk@bendoregon.gov>
>> Subject: UAR Lands
>>
>> Damian:
>>
>> Please include this email in the UGB Remand Record
>>
>> In reviewing the latest Scenario maps and SAAM maps it appears that some of the lands included in these maps may not be UAR zoned lands. If this is infact the case would you kindly send me revised map(s) that shows the non UAR lands and their acreages. It is all but impossible to generate this information based on the maps located on the City's web site. Your prompt attention to this request would be greatly appreciated as I am in the process of preparing written testimony for the October 22, 2015 BATC meeting.
>>
>> Respectfully,
>>
>> Edward J. Elkins
>> 63613 O. B. Riley Road, Bend OR
>> 541-647-7405
>> thumper2@centurylink.net
>> PUBLIC RECORDS LAW DISCLOSURE: Emails are generally public records and therefore subject to public disclosure unless exempt from disclosure under Oregon Public Records Law. Emails can be sent inadvertently to unintended recipients and contain confidential or privileged information. If you are not the intended recipient (or authorized to receive for the recipient), please advise by return email and delete immediately without reading or forwarding to others. Thank you.
> PUBLIC RECORDS LAW DISCLOSURE: Emails are generally public records and therefore subject to public disclosure unless exempt from disclosure under Oregon Public Records Law. Emails can be sent inadvertently to unintended recipients and contain confidential or privileged information. If you are not the intended recipient (or authorized to

receive for the recipient), please advise by return email and delete immediately without reading or forwarding to others. Thank you.
> <Bend UGB - 2010 Remand Order Sub 9.4.pdf>

TO: Boundary Scenarios Technical Advisory Committee

FROM: John Russell

SUBJECT: Comments for October 22 meeting

DATE: October 15, 2015

Unfortunately I will be unable to attend the meeting on October 22, due to a long-planned vacation. It was also indicated by city staff that calling in would not be feasible because the Municipal Court room did not work well for a speaker phone. Thus I submit the following comments in advance of the meeting and without having the option of reviewing the agenda packet.

1. Complete Communities. I am a strong believer in complete communities as the best future development scenario for Bend. Scenario 2.1, as addressed by the consulting team at the October 8 meeting, best meets the criteria of complete communities. One need only look as far as Northwest Crossing to see how a complete community can be successful in Bend. The modeling supported this scenario as the best performing almost all of the factors (and was competitive in others). As the representative of the DSL property, I recognize that this scenario brings in the largest DSL ownership of the three scenarios. The DSL property has been identified as a complete community since the State Land Board adopted the Stevens Road Conceptual Master Plan in 2007 (which is part of the record of this process). The analyses completed by the consulting team that verified higher performance from Scenario 2.1, confirms that the vision adopted by the Land Board is consistent with the best solution for Bend.
2. Juniper Ridge. I have indicated before that I believe the eastern portion of Juniper Ridge, consisting of about 200 acres, is highly unlikely to be utilized for development during the planning period (Brian Meece has noted this even more often than I have). The reasons for my belief are as follows:
    - The 300 or so acres on the westerly, currently zoned portion of Juniper Ridge, require about $50 million of public improvements to be fully developable. When one adds the time to market and sell the property *after it is developed,* it is simply unrealistic to believe that the easterly portion of the property will be utilized in the next 12 years (i.e. during the 2028 UGB planning period).
    - The 200 unplanned acres are on the far northeast corner of the city, and separated from major transportation facilities (e.g. Cooley, 18th) by a mile or so, and are essentially in a very large cul-de-sac (i.e. one point of access). Though the modeling only looked at potential properties for inclusion in the city, it would be very interesting to see how this area of Juniper Ridge would compare to those model results. I suspect that this area would not compare well with many other prospective areas that have been modeled. It would be nice to verify, or refute, my suspicions.
    - I believe Juniper Ridge holds tremendous long-term potential for the city as an employment center supported by a complete community. I strongly support this future use. However, at this point if it is not possible to bring that area to near-term

development, it is occupying 200 or so acres that will sit vacant for the duration of the planning term. If that land was removed from the current UGB, but kept in the city limits for the next UGB expansion, those 200 acres could be utilized elsewhere in a location that is much more likely to develop in the near-term. That would be the equivalent to about 10% more land in the expanded UGB. More importantly, it would be land that is developable, and not land that will sit idle.

- As noted above, I have suggested that this area be removed from the UGB but kept in the City. I asked the consulting team and staff about this possibility and was told it was not feasible to pursue. While I am not an expert on Goal 14 and the UGB expansion process, there are several members of the Boundary Scenarios TAC that have significant expertise. It would be a very interesting discussion to see if others agree with my opinions.

3. Modifications to Scenario 2.1. The team brought forth potential "tweaks" to this scenario. In general, I believe these tweaks can improve the scenario. Though I have expressed reluctance about the large lot industrial shift to the DSL property, in the current configuration of scenario 2.1 it can likely work. Under 2.1 the DSL property is all included and allows for a complete community, even with the large lot industrial designation. If the DSL property being incorporated into the UGB was significantly reduced, and also included the 50 acre site, there would be no potential for a complete community. This would be very unfortunate and counter to the community goals we have been trying to address as a TAC (and supported by the community), as well as the long term vision for the site addressed in the Conceptual Master Plan.

   One possible modification to the plan if the above discussion of Juniper Ridge is addressed and pursued, is that the 200 acres currently in Juniper Ridge could be added to the Ward property (i.e. the Thumb). The suggested tweak by the team identified a reduction in the Scenario 2.1 size of the Ward property, and placing more of an employment emphasis rather than a residential emphasis on that property, thus not requiring a widening of Knott Road. The Ward Property is well suited for employment land, as it is immediately adjacent to Highway 97 and the BNSF railroad. This would provide a valuable and highly visible expansion of employment land if the modeling of this concept were successful. There are also other likely places that could be considered for additional employment land interspersed in the UGB analysis area.

Thank you in advance for considering these comments. I did not talk at the end of meeting TAC roundtable last week because I felt my ideas were not well formulated. Hopefully they are understandable in this memorandum.

Please let me know if there is a potential for a telephone connection for the 10/22. If so I will make every attempt to call in from the Midwest.

John

Damian Syrnyk

From: Edward Elkins <thumper2@centurylink.net>
Sent: Friday, October 16, 2015 12:10 PM
To: Brian Rankin; Damian Syrnyk
Subject: Emailing: Order 001775
Attachments: Order 001775.PDF

Follow Up Flag: Follow Up
Due By: Friday, October 16, 2015 2:01 PM
Flag Status: Flagged

Brian, Damian:

Would you please submit the attached document into the current remand record. I understand Damian is out until the 19th, but feel it is important to have this avail to the BTAC before the Oct. 22, 2015 meeting.

Respectfully,

Edward J. Elkins
63613 o> B. Riley Rd.
Bend, Or 97703
thumper2@centurylink.net
541-647-7405

evaluate all of the parcels and/or areas of similar parcels in the next highest priority category in ORS 197.298(1). For Bend, the next highest priority of land for urbanization is resource land with low resource production capability in ORS 197.298(1) (d).

This evaluation *may* start with a suitability analysis based on: (1) one or more physical site need characteristics that were identified during the need analysis, if any, or (2) one or more of the exceptions to the priorities in ORS 197.298(3) if there are adequate data and findings to support one or more of the three exceptions, or (3) both. (See OAR 660-024-0060(1)(c) and (2).) The steps described for highest priority exception land above are applied to each available parcel of lower-capability farmland, providing a tentative list of suitable parcels in this priority to add to the UGB Note that the Goal 14 boundary location factors are *not* triggered and applied in this situation. The Goal 14 factors are applied only when there is an excess amount of suitable land in a priority category.

If, after the previous analyses, the city still does not have enough land to meet all of its 20-year identified need for the particular use, the city may consider lower priority lands (*i.e.*, the next set of higher capability farm and forest lands) under ORS 197.298(2), using the same analytical methodology used to select higher priority lands, and produce a tentative list of suitable parcels in this final priority to add to the UGB.

b. Summary of Local Actions

The analysis classified parcels designated UAR as exception lands. [R. at 162, 1177] In addition, the Bend Area General Plan (the city's comprehensive Plan) includes a statement that "Lands in this Urban Reserve area [land zoned UAR] are considered first for any expansion of the Urban Growth Boundary." Because of this plan provision, the amendment ranked UAR-zoned land higher than other exception land and included it in the UGB expansion before considering the other exception parcels zoned Suburban Residential 2.5-acre minimum, MUA 10-acre minimum, and Rural Residential 10-acre minimum. [R. at 175, 1190]

It is unclear from the record whether the city selected resource parcels in accordance with ORS 197.298(2), which includes mapping or describing the soil capability of all resource parcels in the study area, grouping them according to soil capability, considering low capability parcels before high capability parcels, and applying the Goal 14 boundary location factors if there is more resource land than needed.[77]

[77] The record is missing a map showing the soil capability of all resource parcels in the original or revised study area. The boundary location analysis map that shows resource lands does not show soil capability. [See R. at 165,1180, Figure V-4]

Consideration of resource parcels assumes that all of the 20-year needed cannot reasonably be accommodated on land within the existing UGB through efficiency measures, and on exception land outside the existing UGB. Whether the city can reasonably accommodate more or all of its 20-year land needs within the existing UGB or on exception land is addressed elsewhere in this report.

Damian Syrnyk

From: Larraneta and Co <larranetaandco@yahoo.com>
Sent: Monday, October 19, 2015 9:48 AM
To: Damian Syrnyk
Subject: Re: Website links for information on Bend UGB Remand Project

Damian,

Thanks for all of the info. I did make a comment on the scenarios website but wasn't exactly sure if that was going to get through so I am writing again. If you could just make sure this gets into the record for consideration I would appreciate it:

I have been discussing the scenarios with several people in the area and after spending way to much time looking at the maps and data I don't understand how the "northeast edge" subarea is not incorporated into every scenario. Specifically on Eagle Rd. the 40 +- acres just north and south of Bradetich Park and corner of Cole Rd. These areas have always been slated to come into the city sooner rather than later as evidenced by their UAR zoning. Also, the area has full services of water, sewer, roads and parks right now which makes it ideal for more affordable housing option right now, not 10-20 years down the road. People have said that they want single family, affordable, small lot housing in this area and that is what it is set up for. The key is that it is available now with all services and for affordable housing, that is what we need, now. I would argue that most of the larger parcels in SE are going to take years to get ready by the time you get master plans and services to these areas.
I would also add that in order eliminate an overinflated acreage coming into the UGB, you delete areas such as north of Yeoman Rd. which will most likely never be developed. These areas with small 1-2 acre parcels are to hard to develop and don't help with the problem of providing affordable land for near term development.

Thanks for the time and consideration,

Mike

On Tue, 9/29/15, Damian Syrnyk <dsyrnyk@bendoregon.gov> wrote:

Subject: Website links for information on Bend UGB Remand Project
To: "mike@larranetaandco.com" <mike@larranetaandco.com>
Date: Tuesday, September 29, 2015, 3:44 PM

To Mr. Brian Rankin, City Of Bend Planning Manager and UGB Committee
RE: City UGB Testimony

Dear Mr. Rankin and Committee Members,

I feel we are in danger of losing the opportunity for affordable housing in Bend if we do not put more land from the Northeast into the UGB. I have been a developer in Bend for over 25 years and the Northeast is one of the cheaper places to develop with great access to sewer and relatively flat land.

I recently reviewed the ranking scores for the various scenarios and see scenario 2.1 ranked higher mainly because of traffic. This was mainly due to the assumption large parcels will be mixed use and other areas will not be mixed use. There is no reason all areas of the city can't be multiple use. If residential areas are built, certain property owners will ask to be zoned commercial to meet those needs. You do not need to have a mixed use large parcel to have mixed use. A mixed use designation never even existed except for the last few years. All throughout the city you see mixed use. Look at the new development taking place around the hospital with restaurant and retail space, commercial retail around Boyd Acres and Butler Market as well as 27th and Butler Market. People will be there to fill the need for commercial when one exists. The city has specific zoning in its ordinance for this purpose such as Neighborhood Commercial Zone (CN) and Convenience Commercial Zone (CC). The Convenience Commercial Zone's purpose is listed below:

Section 14. Convenience Commercial Zone or CC Zone. (1) Purpose. This zone is intended to provide locations for a relatively wide range of small businesses and services which fit into the residential development pattern as a convenience to residents in that part of the City and to recognize existing uses of this type within the City. New centers of this type are intended to be limited in size to not more than four acres of contiguous land and to be located and developed in a manner consistent with the General Plan.

We are putting too much emphasis on large parcels. As a large property owner I can tell you large property owners will not develop land all at once. It is always done in phases over a period of years. Usually it is developed in six to ten acre tracks of land with about 25 to 40 lots at a time. All the large developments in town including ours, River's Edge, as well as others like Northwest Crossings have taken years to develop. Generally only one or two phases are done per year during busy times. No one wants to have too much inventory on hand should we get another down turn in building. Bend averaged over 82 single family detached home building permits per month from 7/1/14 – 2/4/15. There is no way large developments will keep up with the demand. I would also challenge you to check the cost of housing in these mixed use developments. They are not what you would consider lower cost.

Please do not put so many eggs in the large parcel basket. We need diversity of product. We need affordable housing near our current industrial area around the Boyd Acres and Empire area. We also need to have affordable housing for our future industrial area, Juniper Ridge. Northeast Bend has desirable infrastructure including a huge park complex at the old Pine Nursery, great sewer access and is located nearest to our sewer plant. It has easy to develop land that can create affordable lots which will translate into affordable housing.

Thank you for your time and consideration,

Wayne Purcell

Wayne Purcell

Jerry L. Curl, Trustee

703 NW Stonepine Dr.
Bend, OR 97703
Telephone: 541-389-6562
Facsimile: 541-383-2985
Email: debi@brickshiphouse.net

October 16, 2015

City of Bend Technical Advisory Committee ("TAC") for UGB Expansion
Bend, Oregon 97701

RE: UGB Expansion – Jean Curl Trust Properties and "Perfect Rectangle" Proposal

I am Trustee for the Jean Curl Trust. The Jean Curl Trust owns three tax lots in the far NW corner of the UGB Expansion Scenario 1.2 map area denoted as "Northeast Edge". On that map, the space is described as "Residential Area with Significant Employment. The three lots are also within the 240 acre block referred to as the "Perfect Rectangle", in the Miller Nash proposal submitted to the TAC on October 8, 2015.

On the UGB Expansion Scenario 2.1 map, the proposed UGB line is depicted as touching the south edge of part of the Jean Curl Trust property. It is roughly 250 feet south of other portions of the property. (*See attached Exhibit 3*)

My mother, Jean Curl, lived on the largest of the three aforementioned tax lots until her passing last August. (TL 700 - 16.88 a/c) The other two tax lots (TL 704 – 4.15 a/c & TL 707 – 8.30 a/c) are adjacent to the lot on which she lived. One lot is to the west, the other to the north, and neither have structures or improvements – other than a fence. Tax lot 707 has easterly access directly onto Deschutes Market Rd. It is located across the road from Pine Nursery Park.

Among other things, the combined 29.33 acres of relatively flat and cleared surfaces have long made this property attractive for UGB expansion. The extremely short distance to a sewer connection, nearby park availability, inclusion in the Bend Parks district, proximity and access to Deschutes and Butler Market Rd, full complement of nearby schools, short distance to the regional Redmond Airport and the Bend Airport, and proximity to improvable Yeoman and Cole roads are what earlier rightfully earned this acreage one of the most preferential and coveted designations – Urban Area Reserve. Thus, it has long been ripe for inclusion in the next UGB expansion. Previously, when evaluated in comparison to many other city boundary properties outside of the Perfect Rectangle, the location and superior ease-of-development criteria described herein is what caught the attention of planners and officials and resulted in zoning this property UAR.

A couple of weeks ago, after reading what was published in the paper on October 1st and after reviewing the city's updated website, I immediately made contact with Planning Staff questioning why our property had been left off the new "preferred" UGB expansion map. (Previously, on June 10th, the Bend Bulletin published a nearly full-page map, distinctly depicting the Jean Carl (sic) Trust property as being included in Scenario 1 for the UGB expansion). If I understood Staff correctly, our property was earlier deemed

acceptable for the configuration of Scenario 1, but the focus is now on Expansion Scenario 2.1 and that plunged our property, as well as others, into the unacceptable category of "poor" for this UGB update. That said, Staff has not been able to identify any criteria used nor locate any findings to support why there is this change in focus so I remain perplexed about what facilitated the change of outlook in the first place.

When assessing the different scenarios and their potential benefit to the long-range planning for the city, it appears **there may have been one critical connectivity component overlooked when the Scenario 1.2 map and the Jean Curl Trust and the Perfect Rectangle properties were analyzed for UGB expansion**. I realized this when communicating with Staff about Staff's preferred Scenario 2.1 map over the Scenario 1.2 map. If Staff was not aware, then it is reasonable to conclude the TAC may also not be aware of some important transportation connectivity information related to Cole and Yeoman roads. After recognizing this, at the October 8th session, I hand-delivered pertinent documents to Planner Karen Swirsky showing that there are, and have been, long-standing connectivity availability options along Cole and Yeoman roads.

Deschutes County possesses a right-of-way to extend Yeoman Rd from the west, across the canal to the east, all the way to Cole Rd. This right-of-way runs along the north boundary of a portion of the Jean Curl Trust properties. (*See Exhibit 2, excerpt from Deschutes County file: Cole Rd*) Although the county right-of-way ends at Cole Rd, **the County Road System Transportation System Plan Map shows Yeoman Rd extending east from that point, as a future collector, all the way to the intersection of Hamehook & Butler Market Rd**. (*See attached Exhibit 1- future collector)*. I verified with Peter Russell, Deschutes County Senior Transportation Planner, that the future collector between Yeoman Rd and Butler Mkt Rd is identifiable on the map.

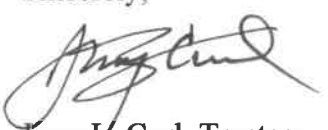
The Jean Curl Trust property has a long-standing history of being appropriately designated as UAR, yet on the new Staff preferred UGB map, the property is ignored and non-UAR areas such as the "Thumb" and the "DSL" properties – both of which will require a greater length of time and considerably more effort and cost to develop – are seemingly given priority. The new preferred map appears to place an unjust emphasis on the southeast area. With that area consuming so many of the resources needed for development that will take several years, it would behoove the city to consider phasing those areas and, for immediate expansion, include primacies for more shovel-ready areas such as the properties within the Perfect Rectangle.

Although it may be a low priority in 2015, it is entirely plausible that within the timeline of a 20-year plan, the county will necessarily extend Yeoman Rd from Cole Rd to the intersection of Hamehook and Butler Market Rd. This is yet another valuable element for the TAC to consider when analyzing the Jean Curl Trust properties and the Perfect Rectangle parcel. In the final analysis, additional west to east future plans for a collector, lying along the north boundary of these parcels, should exponentially increase the city's UGB desirability to annex the entire 240 UAR and MUA non-resource acres; over other areas without such plans or like designations.

I am in favor of the Perfect Rectangle proposal. Alternatively, because of the unique location and history of the three Jean Curl Trust tax lots (700, 704, 707), at the bare minimum, I urge the city to include *these* parcels in the next expansion of the UGB.

Please include me on any of the city's email lists regarding the UGB expansion discussion or decision. Should you have any questions, please feel free to contact me.

Sincerely,



Jerry L. Curl, Trustee – Jean Curl Trust

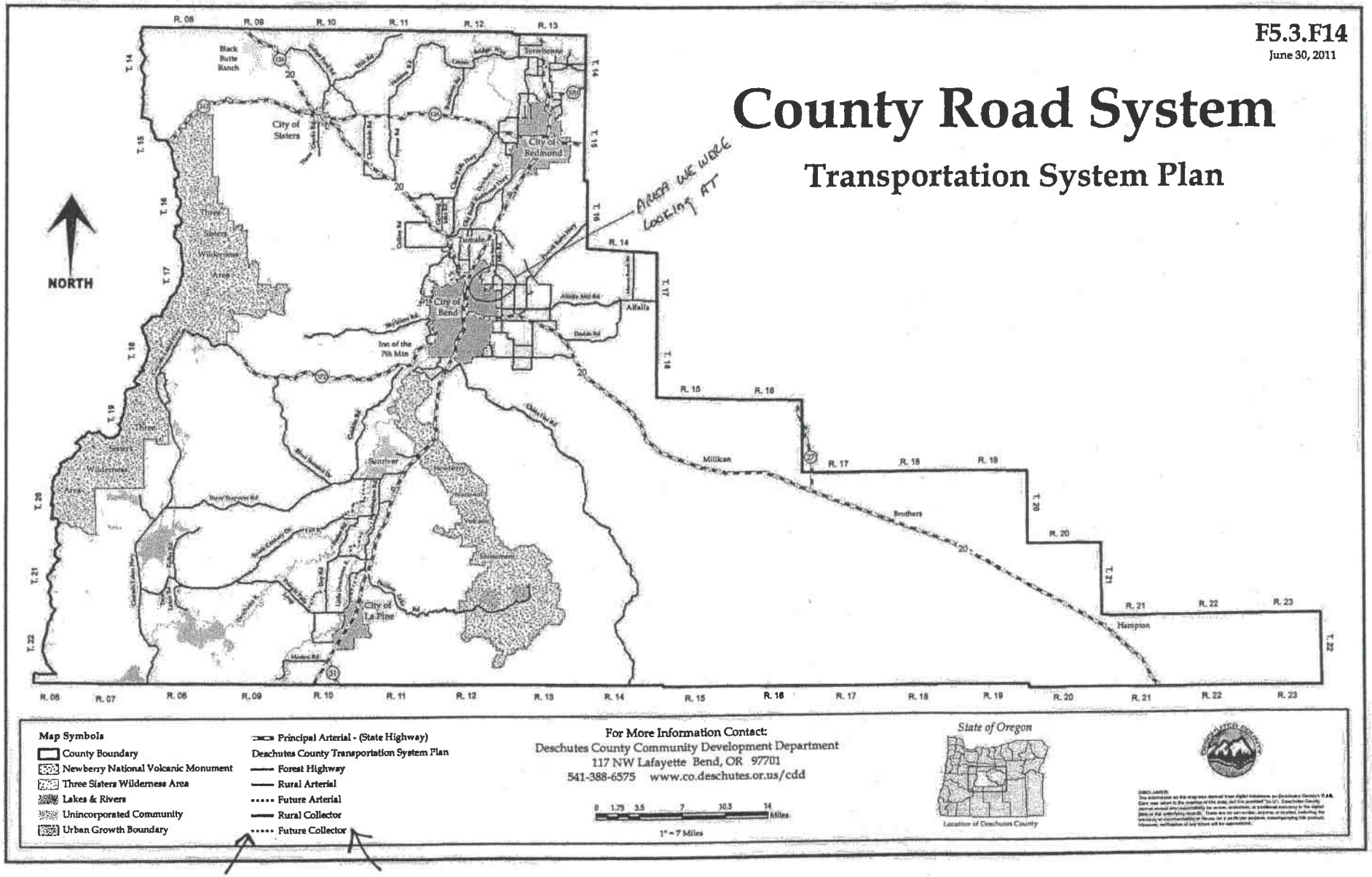
JEAN CURL TRUST EXHIBIT 1

F5.3.F14
June 30, 2011

County Road System

Transportation System Plan

AREA WE WERE LOOKING AT

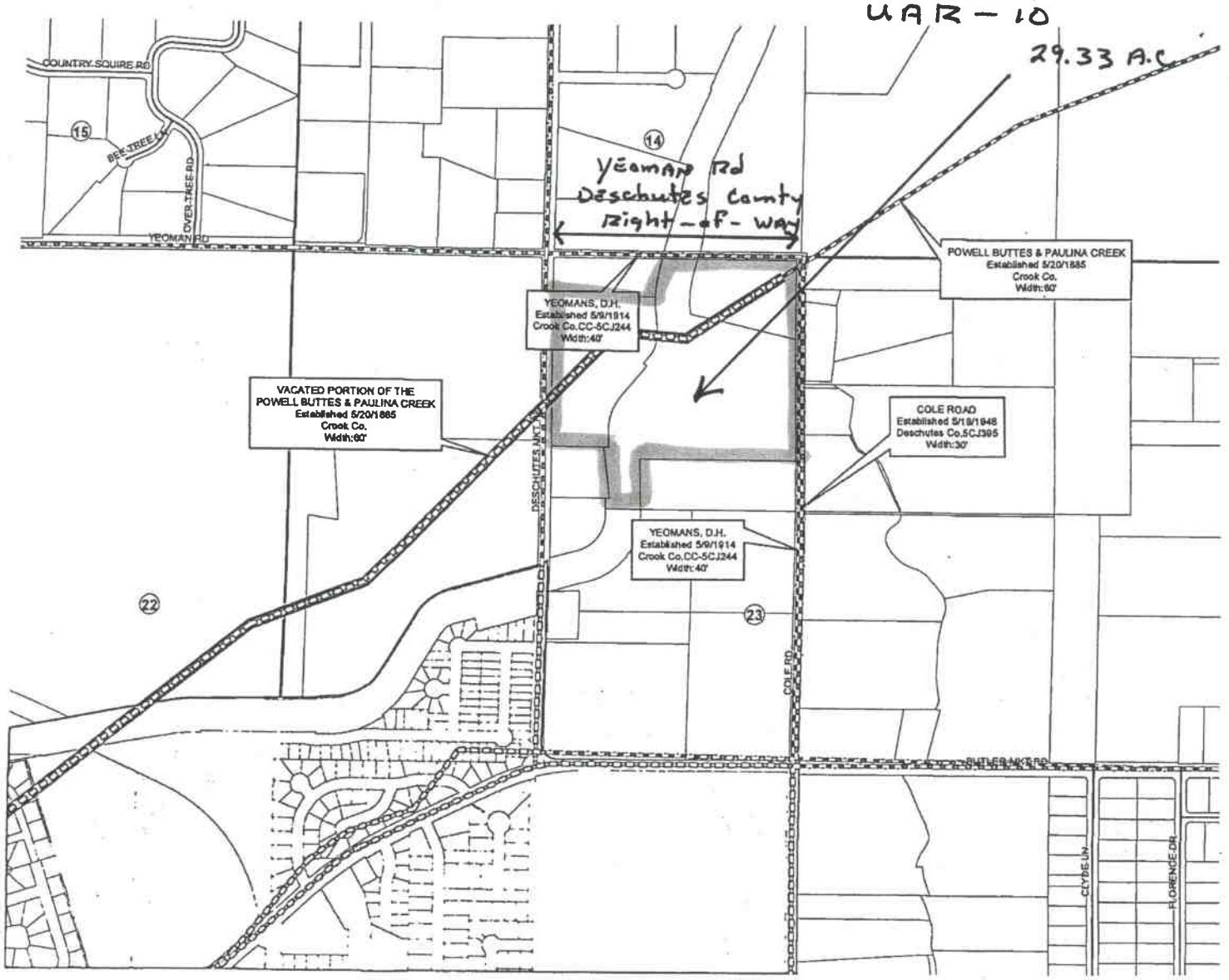


For More Information Contact:
Deschutes County Community Development Department
117 NW Lafayette Bend, OR 97701
541-388-6575 www.co.deschutes.or.us/cdd

DISCLAIMER:
The information on this map was derived from digital databases on Deschutes County's GIS. Care was taken in the creation of this map, but it is provided "as is". Deschutes County cannot accept any responsibility for errors, omissions, or positional inaccuracy in the digital data or the underlying records. There are no warranties, expressed or implied, including the warranty of merchantability or fitness for a particular purpose, accompanying this product. However, notification of any errors will be appreciated.

Jean Curl Trust
Total Acreage
UAR – 10

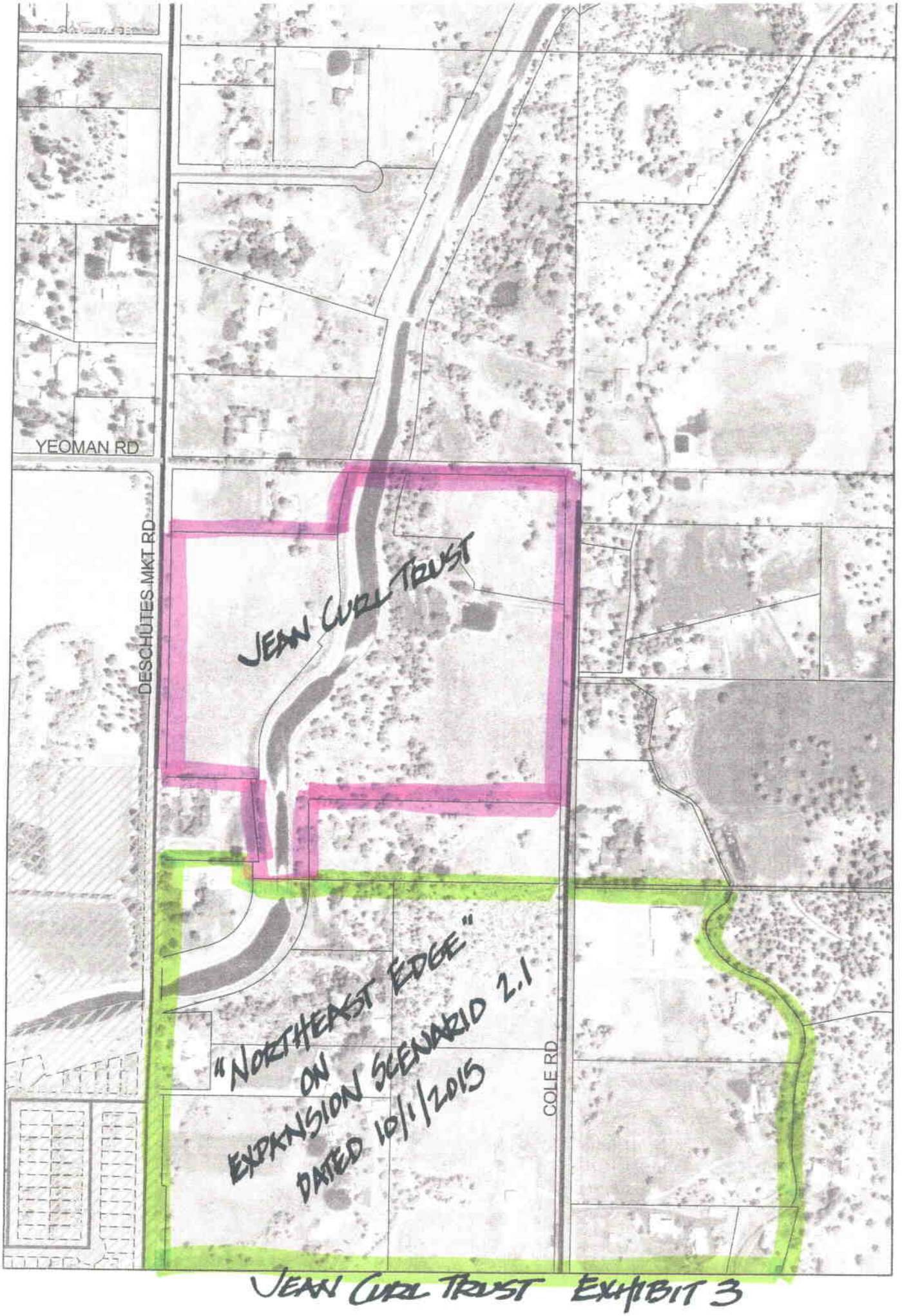
29.33 A.C



T.L. # 700 – 16.88 A.C.
T.L # 707 – 8.30 A.C
T.L # 704 – 4.15 A.C

29.33 A.C

JEAN CURL TRUST
EXHIBIT 2



JEAN CURL TRUST EXHIBIT 3

To: Brian Rankin, Principal Planner, City of Bend, Oregon

From: Bill Galaway, Member of the Stonegate Homeowners Association and Chairman of the Southeast Bend Neighborhood Association

Subject: Public Testimony Regarding the UGB / Proposals for the "Thumb"

Brian;

Thanks for the opportunity to provide input to the UGB Remand project. It is good to hear that public opinion is both encouraged and appreciated.

Many of us in the Southeast Bend Neighborhood Association attended the public meeting on October 1, and were glad to hear that Scenario 2.1 was becoming the best overall choice. However, we also heard that while the area known as the "Thumb" was noted as Residential and Employment focus in Scenario 2.1, the current thinking is to have the "Thumb" be predominately Employment focus, as noted in all of the Supplemental Analyses.

There are a number of neighborhoods that border the "Thumb" or are in close proximity to this area of land, including but not limited to: Mountain Pines, Stonegate, Mountain High, Woodside Ranch, and Sunset View Estates (on county property). One common trait that we all share is the need to drive to anything, be it a restaurant, a store, any shopping, parks, schools, etc. A common theme included in all of the mixed use development scenarios would be to have these types of businesses and/or properties co-located with housing, so that they would be close to where we live. Thus we were all looking forward to having the mixed use development within walking distances of our neighborhoods in the "Thumb".

The concept of predominant Employment focus has us very concerned. While we recognize that Employment focus does not leave out restaurants and shopping, it also includes truck stops, warehousing, and call centers. A Mixed Use development would have developers considering amenities for the homeowners that will move there, akin to what has transpired in the Northwest Crossing area. Without housing being included in the plan, this property could become the southern Juniper Ridge development, which none of us who live here want to see, nor would we like the impact to our property values.

The other concern with a predominant Employment focus is Transportation. This alternative shows up to 2,000 jobs being located in this area. The road system cannot support this. Traffic from the north would have to drive down Parrell or Knott to get there, or drive south on Highway 97 to Baker/Knott and double back. Knott is already a highway with the amount of traffic on it, having 2,000 jobs added to the area will make this worse. Parrell will never be able to support this added traffic.

If Mixed Use development were to be built in the “Thumb”, at least some of the workforce would live there, reducing the amount of traffic into the area. Plus it would also drive developers to consider employment development to support the homeowners, as noted above.

Regardless of the choice for the “Thumb”, the road network has to be looked at very closely. As noted, Knott is already being used as a highway for those wanting to move from south to east, and vice versa. Traffic is becoming very dangerous along Knott, especially with the amount of intersections with main roads (China Hat, Country Club Road, Brousterhous) with limited views and no turn lanes. The lack of an off ramp at China Hat and Highway 97 means that many drivers will use Parrell to get to their area of work in the “Thumb”, this road likely cannot be upgraded to support this amount of increased traffic, nor should it as it is too close to neighborhoods to be used as a conduit. There needs to be a full on/off ramp from Highway 97 into the “Thumb” built into the proposal.

Thanks again for the opportunity to provide input into the UGB Remand project. If I can provide help in any way I would appreciate the opportunity to do so.

I look forward to the TAC Committee’s response to this letter.

Regards,

Bill Galaway

PERKINSCOIE

1120 NW Couch Street
10th Floor
Portland, OR 97209-4128

+1.503.727.2000
+1.503.727.2222
PerkinsCoie.com

October 19, 2015

Michael C. Robinson
MRobinson@perkinscoie.com
D. +1.503.727.2264
F. +1.503.346.2264

VIA EMAIL

Victor Chudowski, Chair
City of Bend UGB Steering Committee
710 NW Wall Street
Bend, OR 97701

Re: City of Bend ("Bend") Urban Growth Boundary ("UGB") Expansion - Letter in Support of Including Two Properties

Dear Chair Chudowski and Members of the UGB Steering Committee:

This office represents the owners ("Owners") of two properties located in unincorporated Deschutes County that are under consideration for inclusion in the City's UGB expansion. The purpose of this letter is to request that the City's UGB Steering Committee ("Steering Committee") modify the preferred expansion scenario to include these two properties. A description of the properties and the justification for including them in the UGB at this time is set forth below.

1. The Steering Committee should recommend including Owners' property located on O.B. Riley Road ("Westside Property") in the UGB.

A. Description of Westside Property.

The Westside Property is approximately 140 acres in size and located at the northwest corner of O.B. Riley Road and Cooley Road in the "O.B. Riley/Gopher Gulch Area." It is an exception area and designated urban reserve. The Westside Property is currently vacant and zoned UAR-10. Surrounding properties are generally vacant, although the "Golden Triangle" commercial properties are located immediately east-southeast of the Westside Property. An aerial photo with the Westside Property outlined in black is set forth in Exhibit 1.

B. Reasons for Including the Westside Property in the UGB.

The Westside Property is an excellent candidate to be included in the UGB expansion for the following reasons:

- Located immediately west of land recommended for inclusion in UGB
- Designated urban reserve, so highest priority for inclusion in the UGB under ORS 197.298(1)
- Ranked by City staff in "highest quartile" for consistency with Goal 14 factors
- Few constraints on development
- Proximate to approximately one-third of regional employment destinations (including Juniper Ridge) and approximately one-quarter of regional retail destinations (including Golden Triangle), so development in this location will reduce vehicle miles traveled relative to other locations
- Further, it will allow those trips to occur in an east-to-west manner on the north side of the City, without further congesting downtown or other high-traffic locations
- Large enough to develop a "complete community" with multiple types of residential areas, local-serving retail, parks, and a school
- Large enough to leverage extension/expansion of utility facilities
- Large enough to be eligible for master-planning, giving the City greater regulatory control and assuring a comprehensive development plan
- Pedestrian-friendly access to/from downtown Bend could be accomplished via a multi-modal path (5-mile/25-minute bike/walk) either in O.B. Riley Road or the Bend Parks and Recreation Trail system along the Deschutes River (*see* Deschutes River Trail Projects map in Exhibit 2)
- No adverse impact to Swalley Irrigation District

- Serviceable by gravity from Bend water system
- North Interceptor for sanitary sewer, which would serve the site, is programmed
- Although westside housing has historically been more expensive than eastside housing, this is a function of supply and demand, and the City should not interfere in the marketplace on this issue
- Many general disadvantages identified for the O.B. Riley/Gopher Gulch Area properties (steep topography, poor serviceability for wastewater) are not applicable

For these reasons, the Steering Committee should recommend including the Westside Property in the UGB at this time.

2. The Steering Committee should recommend including Owners' property located on Eagle Road ("Eastside Property") in the UGB.

A. Description of Eastside Property.

The Eastside Property is approximately 29 acres in size and located on the east side of Eagle Road north of Neff Road in the "Northeast Edge Area." It is an exception area and designated urban reserve. The Eastside Property is zoned Urban Area Reserve (UAR-10). Urban residential uses in the City limits are located immediately west of the Eastside Property, while lower-density residential uses surround the Eastside Property in other directions. An aerial photo with the Eastside Property outlined in black is set forth in Exhibit 3.

B. Reasons for Including the Eastside Property in the UGB.

The Eastside Property is an excellent candidate to be included in the UGB expansion for the following reasons:

- Located immediately east of and adjacent to the City boundary, so not dependent upon including intervening properties

- Designated urban reserve, so highest priority for inclusion in the UGB under ORS 197.298(1)
- Ranked by City staff in "highest quartile" for consistency with Goal 14 factors
- Prime for urbanization because it is flat with no inventoried resources
- Largely undeveloped, so suitable for future development
- Readily serviceable by City of Bend sanitary sewer with an existing eight-inch sanitary sewer mainline located on the opposite side of Eagle Road
- Readily serviceable by Avion Water Company with an existing 12-inch domestic water line located within Eagle Road right-of-way
- Proximate to existing parks, schools, and transportation facilities
- General disadvantages identified for the Northeast Edge properties (parcelization, limited capacity for development, lack of connectivity) are not applicable

For these reasons, the Steering Committee should recommend including the Eastside Property in the UGB at this time.

3. Conclusion.

For the reasons stated above, the Steering Committee should modify the preferred expansion scenario to include the Eastside Property and the Westside Property. We will appear at your meeting on October 22 and welcome the opportunity to address any of your questions at that time.

Thank you for your consideration of the points in this letter.

Very truly yours,

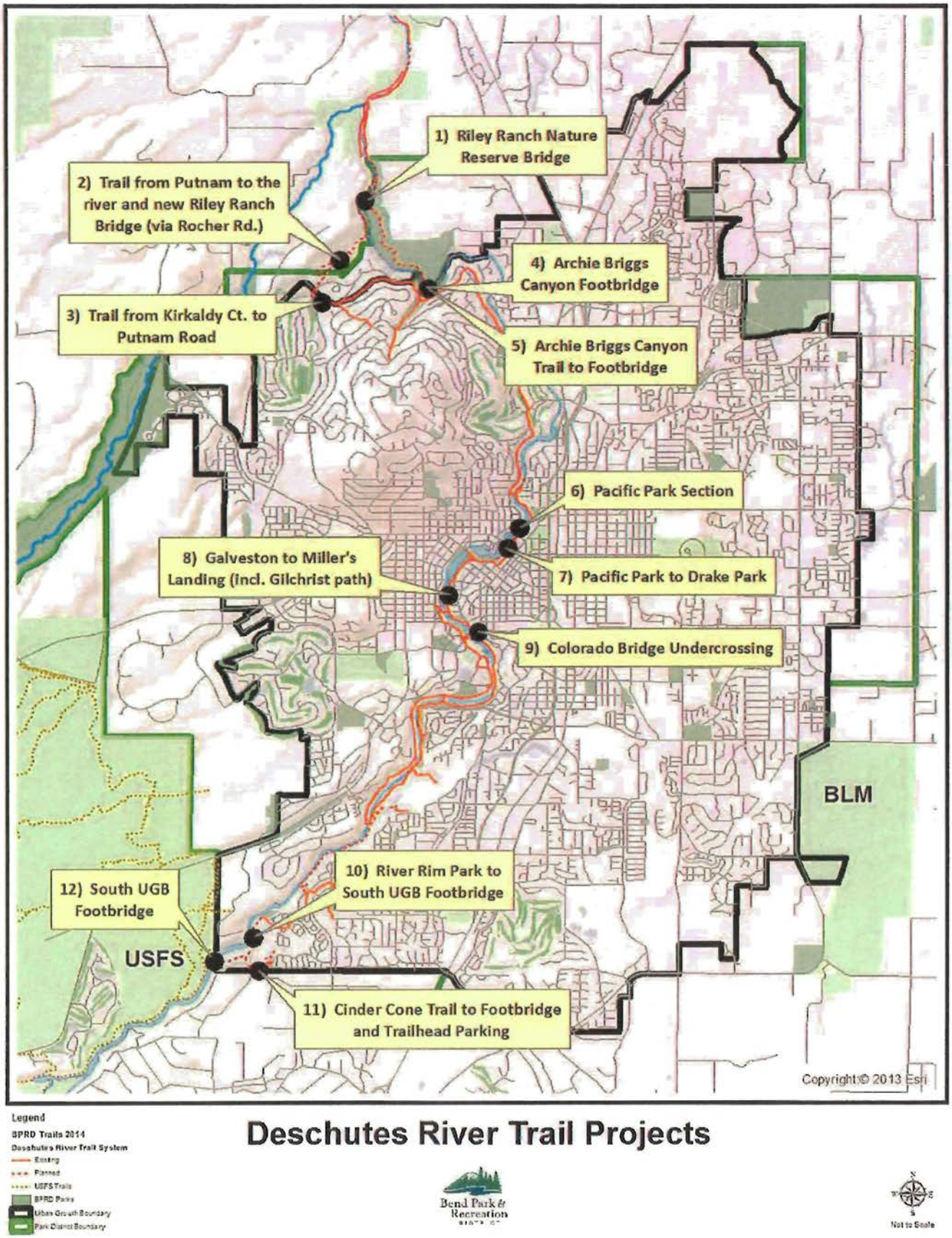
Michael C. Robinson

Encls.

cc: Matt Harrell (via email) (w/encls.)
Seth King (via email) (w/encls.)

Google Maps O. B. Riley Rd & Cooley Rd

Imagery ©2015 Google, Map data ©2015 Google 1000 ft



Project Map (http://bendparksandrec.org/current_projects/project-map/)

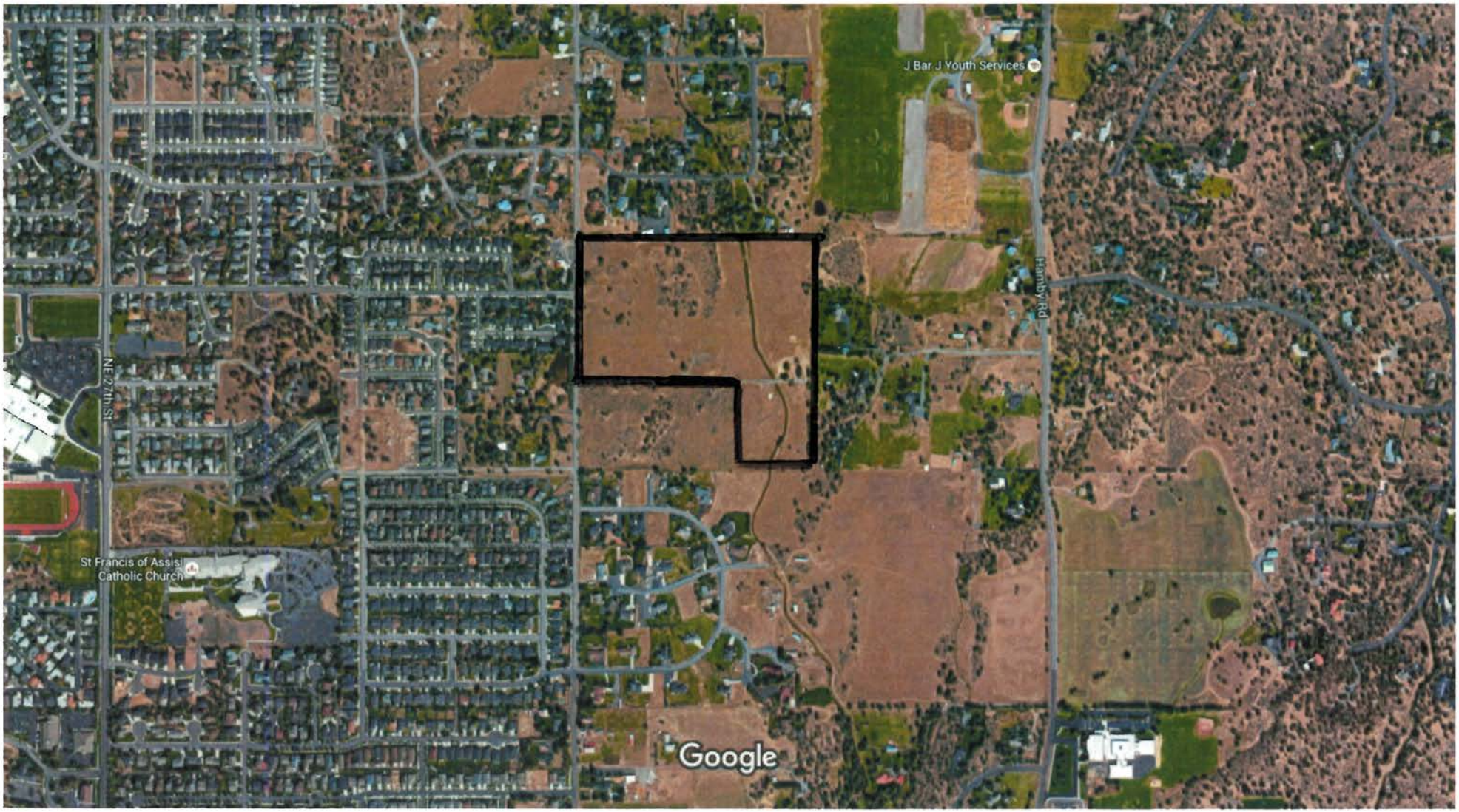
Bond-Funded Projects (http://bendparksandrec.org/current_projects/bond-funded-projects/)

Bond Projects Map (http://bendparksandrec.org/current_projects/bond-funded-projects/map/)

04898

Exhibit 3

Google Maps eagle ave neff bend or



Imagery ©2015 Google, Map data ©2015 Google 500 ft

URBAN GROWTH BOUNDARY REMAND

BEND

Recommendations from the Boundary and Growth Scenarios Technical Advisory Committee to the UGB Steering Committee:

Scenario 2.3, with the following refinements:

A. Retain the same footprint in the west area, while:
    a. Reducing medium and high density units in the west, moving them to NE, DSL, and Elbow
        i. Result is a more balanced mix of housing types in NE and West
B. Add more employment and medium/high density residential to the NE

Recommendation was approved with 10 members in support, 3 opposed, 1 abstain

URBAN GROWTH BOUNDARY REMAND

BEND

Sign in Sheet

Meeting: UGB #11 Boundary TAC

Date: 10/8/15

Location:

Name	Organization	Email Address
Mike Maier	Deschutes County	
Kendall Bramigg	owner	
Gary Vodden		randal.rr@gmail.com
Christen Brown	Resident	christenbrown@bendtel.net
Ruth W. Williamson	Bend 2030	
Ed ELKINS	OWNER	thumper2@centurylink.net
ROD TOMCHO	MEMB UGB TAC	
Mykl Connor		
Mary Newbold	COLW	
TONY DeBONE	DESCHUTES COUNTY	TONYD@DESCHUTES.ORG
TIM ELLIOTT	ATTY	YOU have.
JIM BRYANT	ODOT	

URBAN GROWTH BOUNDARY REMAND

BEND

Sign in Sheet

Meeting: UGB #11 Boundary TAC

Date: 10/8/15

Location:

Name	Organization	Email Address
John Russell	DSL	
Lori Murphy	MILLER NASH	Lori.Murphy@millernash.com
Dale VanValkenburgh	Books	
Scott Edelman	DLCD	
Mike Sellens	Home Owner	Coatssellens@AOL.Com
Ron Ross	The Commiter	
Sharon Smith		
Alissa Cordner	COFMS, Whitman College	alissa.cordner@gmail.com
Rondo		ran.boozelle@gmail.com
Sasha Russell	City of Bend	

URBAN GROWTH BOUNDARY REMAND

BEND

Sign in Sheet

Meeting: Boundary TAC

Date: 10-22-2015

Location: Barnes / Sawyer

Name	Organization	Email Address
Dale VanVulkenburg	Boundary TAC	
Bill Galloway	SEBNA	BGALLOWAY@BENDBROADBAND.COM
Scott Edelman	DLCD	
Suzanne Butterfield	Swalley ID	suzanne@swalley.com
Myles Conway	Mardenlan	mconway@mardenlin.com
Kendall Brannigg	Owner of land	Kendallkeelo gmail
Rocklands Dunn	Planning Comm	
Wayne Purcell	Self	wayne@riversedgegolf.com
Judy Clinton	self	
Julie Brown	Self	julie brown1001@gmail.com
Ruth Williamson	Bend 2030	
Rod Tomcho	TAC UGB	
Kelli Murdoch	Miller Nash	
Jeff Reed	NAI Cascade	jreed@naicascade.com
Jer Camarata		JER@SWALLEY.COM
Gardner Williams	SSCC	
Jim Bryant	ODOT	

URBAN GROWTH BOUNDARY REMAND

BEND

Sign in Sheet

Meeting: TAC UGB

Date: 10/22/15

Location: Barnes

Name	Organization	Email Address
Bill Wagner	Bend PC	
Christen Brown	—	
Tim Elliott	Anderson RANCH	Tim@eahorneys.com
Tia Lewis	Coats / Shevlin Sand & Gravel	
Tony DeBone	Deschutes County	
AJ Johnson	NeSTAC	
Liz Dicksm	Hurley Re KC	eadicksm@hurley-re.com
RC Lane		rclane54@gmail.com