CITY OF BEND
SOUTHEAST AREA PLAN

Southeast Area Plan
Summary Report

Technical Appendix

Photo credit: David Leath

Table of Contents

- **Appendix A -** Applicable Plans and Programs
- **Appendix B -** SEAPAC Roles, Responsibilities, and Guidelines
- **Appendix C -** Public Involvement Plan
- **Appendix D -** Existing Conditions Report
- **Appendix E -** Market Analysis Snapshot
- **Appendix F -** Southeast Expansion Area Market and Land Use Analysis
- **Appendix G -** Vision and Guiding Principles
- **Appendix H -** Planned Transportation Infrastructure
- **Appendix I -** Draft Transportation Concepts
- **Appendix J -** Summary of Workshop 1
- **Appendix K -** Draft Land Use and Transportation Concepts
- **Appendix L -** Draft Open Space Concepts
- **Appendix M -** Tree Health Assessment
- **Appendix N -** Evaluation of Options for Industrial Lands and Land Use Updates
- **Appendix O -** Transportation Plan Update
- **Appendix P -** Summary of Open House 2
- **Appendix Q -** Summary of Open House 2 Online Survey
- **Appendix R -** Refined Land Use Plan
- **Appendix S -** Southeast Expansion Area Site Studies
- **Appendix T -** Refined Streets and Trails Plans
- **Appendix U -** Bend Transportation System Plan 2040 Project List
- **Appendix V -** Collector Street Design Elements for Southeast Area Plan
- **Appendix W -** Preliminary Transportation Infrastructure Needs
- **Appendix X -** Sewer Concept Plan
- **Appendix Y -** Southeast Area Plan Code Concepts
- **Appendix Z -** Southeast Area Plan Funding
- **Appendix AA -** Southeast Area Plan Code Summary
- **Appendix BB -** Southeast Area Plan Code Summary Update
- **Appendix CC -** Collector Street Design Elements 2.0
- **Appendix DD -** Plan and Code Changes Summary
- **Appendix EE -** Online Open House 3 Summary
- **Appendix FF -** Transportation Planning Rule Analysis and Infrastructure Needs
- **Appendix GG -** ODOT Facility Transportation Planning Rule Findings and Recommendations
- **Appendix HH -** Southeast Area Funding Plan
- **Appendix II -** Draft Comprehensive Plan and Development Code Amendments

Appendix A - Applicable Plans and Programs

CITY OF BEND
SOUTHEAST AREA PLAN

MEMORANDUM

TO: SOUTHEAST AREA PLAN PROJECT TEAM

FROM: DAMIAN SYRNYK AND ALLISON PLATT

DATE: NOVEMBER 14, 2018

RE: TECHNICAL MEMORANDUM #2: APPLICABLE PLANS AND PROGRAMS

Purpose

This memorandum summarizes the existing plans and programs applicable to the Southeast Area Plan (SEAP). It includes citations to existing plans and active hyperlinks to pdf documents on the Internet. The memorandum also presents information and hyperlinks by agency or district, with a particular focus on those agencies and districts that provide some public service to the Southeast Expansion Area, and/or have key infrastructure in the area. For this memorandum, the expansion area identified as "the Elbow" is referred to as the Southeast Expansion Area.

A. City of Bend Plans and Resources

1. Bend Comprehensive Plan.

The Bend Comprehensive Plan includes the following applicable policies in Chapter 11, Growth Management:

- General Area Planning Policies (Policy 11-21 to 28)
- Annexation Policies (Policy 11-41 to 50)
- General UGB Expansion Policies (Policy 11-51 to 55)
- The "Elbow" Policies (Policy 11-75 to 84)
- DSL Property Policies (Policy 11-65 to 74)
    - DSL is the expansion area just northeast of the Elbow expansion area.

The Comprehensive Plan includes several policies that relate to wildland urban interface especially as it relates to wildfires and fire prevention. These include policies in Chapter 2, Natural Features and Open Space; Chapter 10, Natural Forces; and

"Policy 2-12 The City shall evaluate and adopt standards for the types of landscaped materials and amount of open area buffers around structures that reduce the risk of loss from wildfires at the edge of the urban area.

"Policy 10-18: The City will adopt strategies to reduce wildfire hazard to lands inside the City and included in the Urban Growth Boundary. These strategies may, among others, include the application of the International Wildland-Urban Interface Code with modifications to allow buffers of aggregated defensible space or similar tools, as appropriate, to the land included in the UGB and annexed to the City of Bend."

The Comprehensive Plan also includes the following appendices that informed the City's decision to include the Southeast Expansion Area in the Urban Growth Boundary (UGB). These documents further outline the needs for land for needed housing and economic opportunities that will be met, in part, in the Southeast Expansion Area. These documents are available as downloadable pdfs through the following hyperlinks:

- Appendix C, Transportation System Plan and Integrated Land Use and Transportation Plan (2016)
- Appendix E, Economic Opportunities Analysis
- Appendix G, Water Public Facility Plan (2013)
- Appendix I, Collection System Public Facility Plan (2018)
- Appendix J, Buildable Lands Inventory
- Appendix K, Housing Needs Analysis
- Appendix L, Urbanization Report
- Appendix M, Urban Form Report

2. **Bend Development Code**

The Bend Development Code (BDC) includes the land use and development regulations applicable to the land use districts that implement the Comprehensive Plan designations of the Southeast Expansion area.

a. Title 2 Land Use Districts : Those listed in **bold** are zoned within the Southeast Expansion area.

- *Residential (UAR, SR 2½, RL, **RS**, **RM,** RM-10, **RH**)*
  - **RS- Residential Standard:** The Standard Density Residential District is intended to provide opportunities for a wide variety of residential housing types at the most common residential densities in places where community sewer and water services are available. The residential density range in this district is 4.0 to 7.3 dwelling units per gross acre.
  - **RM- Residential Medium Density:** The Medium Density Residential District is intended to provide primarily for the development of multifamily residential in areas where sewer and water service are available. The residential density range in the district is 7.3 to 21.7 units per gross acre and shall provide a transitional use area between other Residential Districts and other less restrictive areas.
  - **RH- Residential High:** The High Density Residential District is intended to provide land for primarily high density multifamily residential in locations close to shopping and services, transportation and public open space. The density range of the district

is 21.7 to 43.0 units per gross acre and shall provide a transitional use area between other Residential Districts and other less restrictive areas.

- *Commercial (CB, CC, CL, **CG**)*
  - **CG- Commercial General:** The General Commercial District provides a broad mix of commercial uses that have large site requirements, are oriented to the higher classification roadways and provide services to the entire City and surrounding area.

- *Mixed Use (**ME**, MR, PO, MU, MN)*
  - **ME- Mixed Employment:** The Mixed Employment Zone is intended to provide a broad mix of uses that offer a variety of employment opportunities. Where Mixed Employment Districts occur on the edge of the City, their function is more transitional in nature providing service commercial businesses and supporting residential uses in an aesthetic mixed environment. In this instance, when residential units are provided, the units shall be within easy walking distance to the commercial and employment uses.

- *Industrial (**IG**, IL)*
  - **IG- Industrial General:** This zone is intended to provide for the establishment of light and heavier industrial uses essential to the development of a balanced economic base in an industrial environment with a minimum conflict between industrial uses and nonindustrial uses.

- ***Public Facilities (PF)***
  - **PF-** This zone is intended to provide area for buildings and facilities that are owned and operated by Federal, State, or local governments, public utilities, special districts, or nonprofit organizations which are used to provide governmental or public services. This zone also provides for school sites, public park and recreational facilities, natural areas, trails, wetlands, and similar types of open space owned and managed by a local government or special district.

- ***Urbanizable Area District (UA)***
  - **UA**- This district is intended to preserve large areas of undeveloped or rural land for future urban development prior to annexation. The UA District promotes the livability, stability, safety and improvement of the City of Bend by allowing orderly development consistent with the Bend Comprehensive Plan. The land within the Southeast Expansion Area is currently zoned UA. Upon completion of the area plan, property owners may request annexation concurrently with a zone change to change their zoning from UA to the applicable zoning that implements their comprehensive plan designation.

b. Title 3 Design Standards
   - 3.1 Lot, Parcel, Block Design, Access, Circulation
   - 3.4 Public Improvement Standards

c. Title 4 Applications and Review Procedures
   - 4.9 Annexations

3. 2018 Urban Growth Boundary Implementation: Return on Investment Analysis

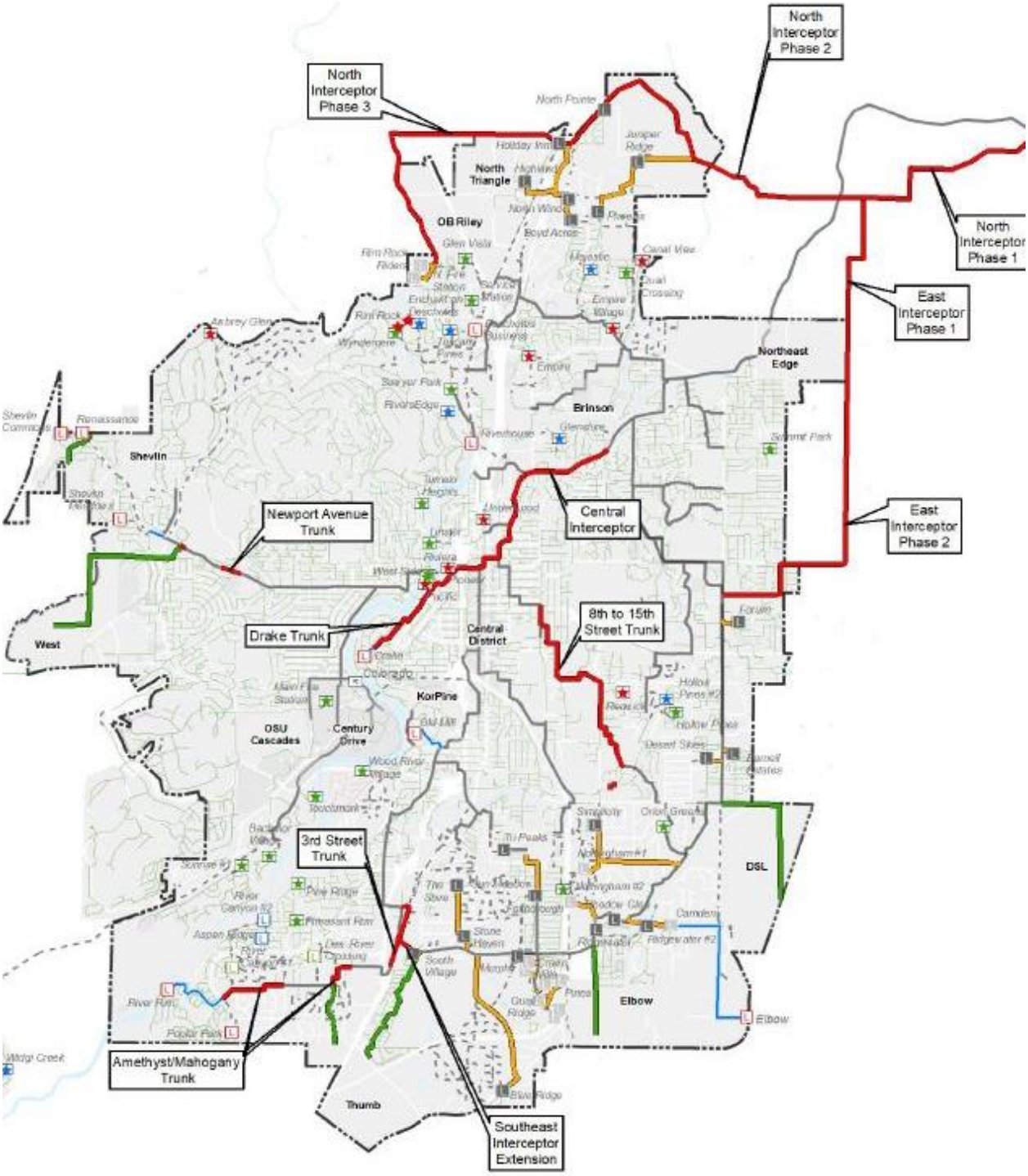
The Return on Investment Analysis (ROI) study was developed to assist City Council in making informed and strategic decisions about where to focus city resources and infrastructure investments between the City's identified nine "opportunity areas" and ten "expansion areas". It provides an in depth analysis of sewer, water, transportation, and capacity for other urban services (schools, parks, etc.). It analyzes the development readiness for the four expansion areas requiring a City initiated area plan (Southeast, Northeast, and North area which consists of OB Riley and the North Triangle) as well as the core "opportunity areas" (KorPine, East Downtown, Bend Central District, East Highway 20/Greenwood, and Central Westside/ Century Drive). The following summarizes the key findings of the ROI Study that pertain to the Southeast Expansion Area.

a. Sewer

2018 Collection System Public Facility Plan Projects identified in the 2018 Collection System Public Facility Plan (CSPFP) to serve the Elbow include:

- Year 1-5
  - Portion of Southeast lift station decommissioning - $1M ($15M total)
  - Local gravity trunk sewers extension - $2.5M
  - Local lift station- $600,000
  - Elbow force main - $2.9M
- 10+ year projects:
  - East Interceptor Phase 2 – required for buildout growth in south (including Elbow, DSL, and Thumb) - $15.6M

- Figure 13 Capital Improvement Program Overview- see image below


North Interceptor Phase 2
North Interceptor Phase 3
North Interceptor Phase 1
East Interceptor Phase 1
East Interceptor Phase 2
Central Interceptor
Newport Avenue Trunk
Drake Trunk
8th to 15th Street Trunk
3rd Street Trunk
Amethyst/Mahogany Trunk
Southeast Interceptor Extension
North Triangle
OB Riley
Northeast Edge
Brinson
Shevlin
West
Central District
KorPine
OSU Cascades
Century Drive
DSL
Elbow
Thumb

b. Water

The City adopted a Water Public Facility Plan (2013) for the UGB in 2013. Avion Water Company is the domestic water utility for the Southeast Expansion Area. Arnold Irrigation District provides irrigation water to patrons within the expansion area. The following are selected text from the ROI Study that summarizes Avion's and Arnold's infrastructure in the Southeast Expansion Area.

- ***Avion Water:*** Avion has constructed a new well off China Hat Road, and is extending a 24" water line currently in Knott Road to the north and east. This 24" water line will provide additional capacity for the expansion areas on the east side of Bend – Northeast Edge, DSL, and the Elbow.

- ***Arnold Irrigation District:*** Arnold Irrigation District (AID) is the irrigation district delivering irrigation water to areas in the south of Bend and south of the city limits. AID has a lateral that runs north of Knott Road into the Elbow Area, and is identified as the Ladera Lateral on their district map. The lateral delivers approximately 21 acres of irrigation water to five properties on Cabin Lane, and delivers water to some properties to the west and north of Mirramar Drive. AID also noted that the district has a number of facilities that go into Bend like fingers, but do not go through Bend like the canals and laterals of other irrigation districts.

c. Transportation

- ***2020 Bend TSP*** **(Ongoing)** The City is engaged in an update of the Transportation System Plan (TSP). The respective teams working on the TSP Update and the SEAP are coordinating on the transportation modeling and subsequent system improvements for the Southeast Expansion Area.

- ***2000 Bend TSP*** ***(updated in 2016)*** **(Comprehensive Plan Ch. 9, Appendix C).** The 2016 amendments to the TSP included several changes to serve the properties included in the Southeast Expansion Area. The 2016 updates included adopted new roads to serve UGB expansion areas as well as the adoption of the Integrated Land Use and Transportation Plan (ILUTP). This amendment identified both Knott Rd and SE 27th St to be minor arterials as well as identified 5 new Major Collector road alignments within the Elbow.

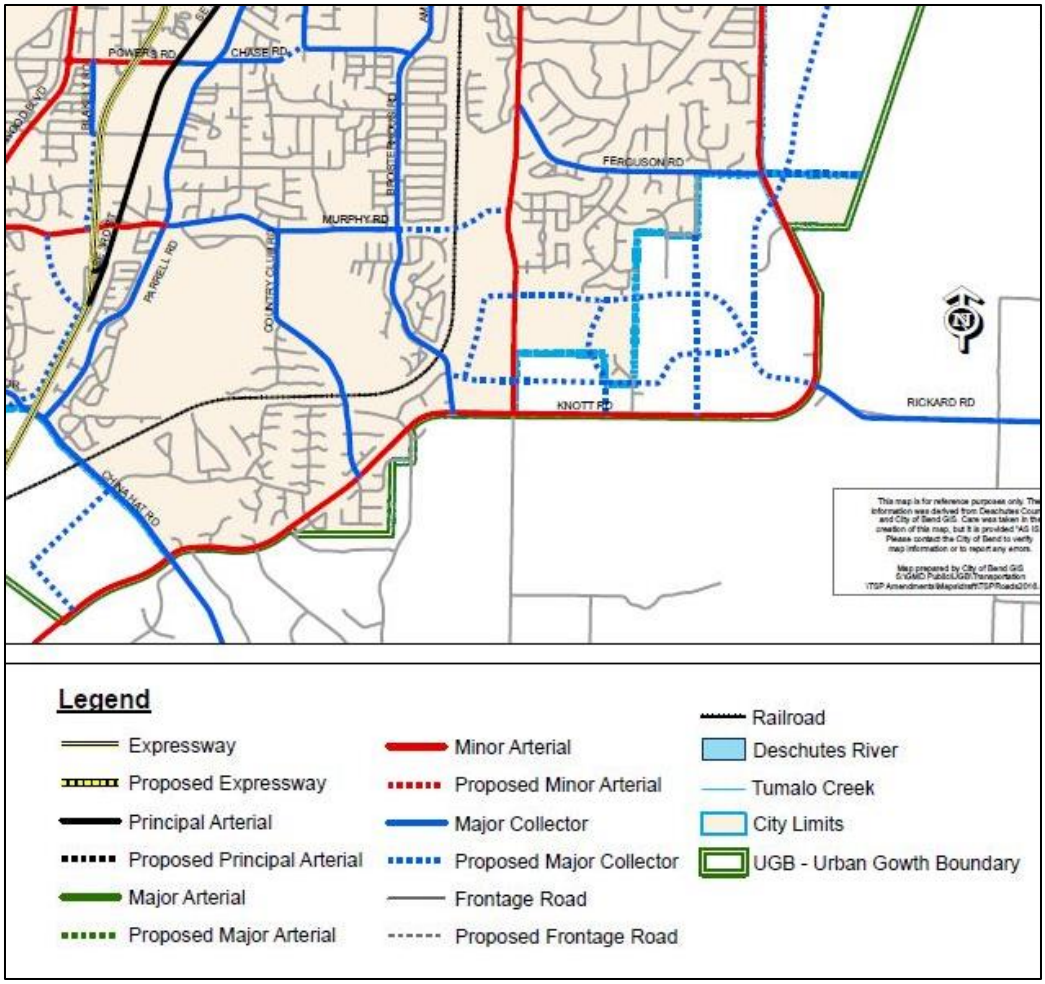


FIGURE 1. 2016 TSP: BEND URBAN AREA STREET SYSTEM

- Projects included:
    - Knott Rd, Minor Arterial (R19) upgrade with curbs, sidewalk on east side, bike lanes both direction- $700k, and;
    - SE 27th St, Minor Arterial (R14-18) upgrade with curbs, sidewalks, and bike lanes. The 2016 amendments also included the identification of
    - Five (5) proposed Major Collector roads identified (see map below):
        - 213, 214, 214b, 214c, 216, 224, 225, 226, 234, and, 235. Figure 1 is an excerpt from the ROI Study that displays the locations of these new roads within the Southeast Expansion Area.

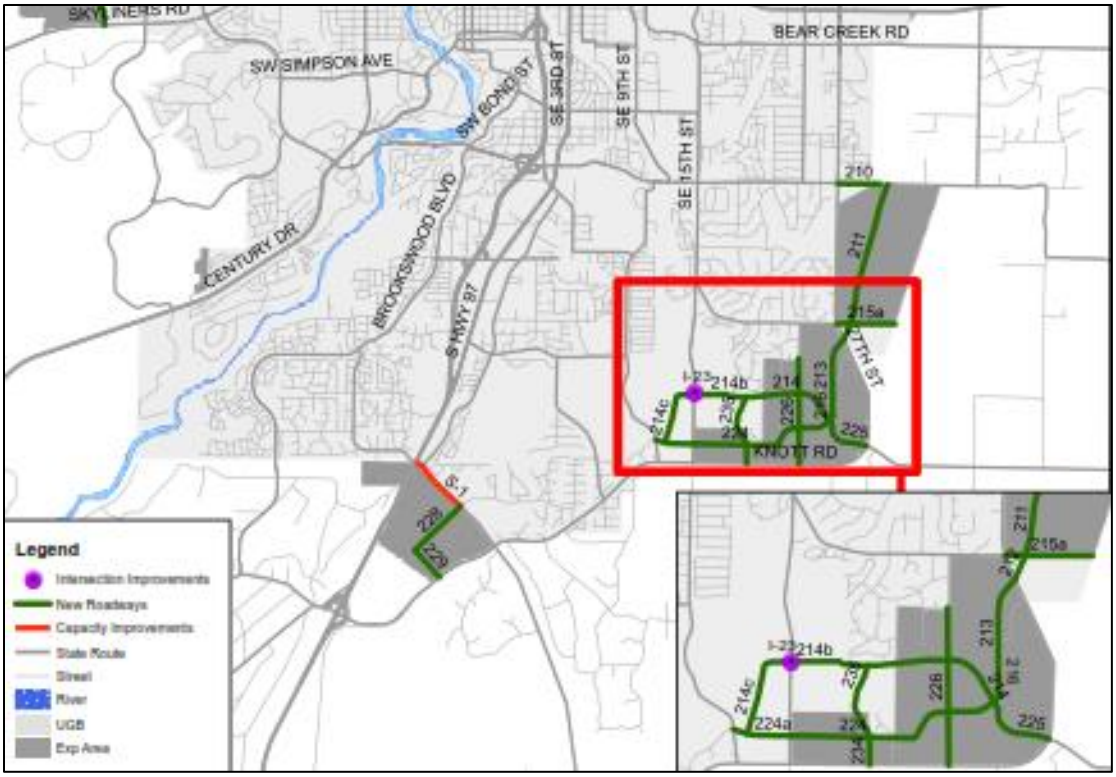


FIGURE 2: IDENTIFIED ROAD IMPROVEMENTS

- ***Integrated Land Use and Transportation Plan (ILUTP).*** This plan identified proposed land use and transportation strategies and policies to reduce vehicle miles traveled (VMT) and demonstrate progress towards increasing transportation choices and reducing automobile reliance in Bend. The plan set standards (performance measures) for activity density, complete street project implementation, household/employment transit access, access to commercial services, active transportation management agencies (TMAs) and transportation demand management (TDM) programs, and jobs-housing balance ratios in targeted areas.

- ***ROI Analysis Appendix B*: DKS Technical Memo, Area Plan Readiness Assessment (June 30, 2017).** All expansion areas are triggering US97 between Empire & Colorado Ave congestion. This report identified needed improvements (Class 5 cost estimates and mapped locations) for both the Elbow West Area and Elbow East Area, which were also discussed in the City's recent Return on Investment (ROI) analysis.

- ***Deschutes County TSP* (2012).** The ROI Study referenced the County's TSP because there are several County roads that will be in the jurisdiction of the City, at least two County roads that will connect to the Southeast Expansion Area, and several that may be affected due to increased traffic from the Southeast.

  Roads that were within County jurisdiction that now are "within" the UGB include:
  - 27th St (Ferguson to Rickard Rd)- identified as rural arterial in plan
  - Knott Rd (15th St to Rickard Rd)- identified as rural arterial in plan

County Roads that directly link to City/UGB expansion areas:
- Tekampe Rd (SE 15th St south of Knott Rd)
- Rickard Rd (East of Knott Rd/SE27th St intersection)

County roads that may be affected due to increased traffic in this area:
- Woodside Rd
- China Hat Rd
- Arnold Market Rd
- Knott Rd (US97 to UGB Boundary)
- Steven Rd
- Ward Rd

- ***ODOT Plans***. In addition to the transportation plans of the City and Deschutes County, the City consulted several of ODOT's transportation plans for the ROI Study. The following identifies ODOT's key planning documents with respect to the Southeast Expansion Area, including their hyperlinks.

  - **US97 Multi-agency Refinement Plan**: Long term facility plan for the Parkway. This plan will assess closure of all right in/right out intersections, ITS options, and Powers Rd intersection. Plan is expected to be complete by Fall of 2019.

  - **US 97 Baker Road Interchange Area Management Plan (IAMP)**: Earliest start date is Fall of 2019. This project will look for funding in the next biennium to upgrade the Baker Rd interchange to accommodate future growth.

  - **Oregon Transportation Plan,** including the following modal and topic plans
    - Public Transportation Plan
    - Bike/Ped Plan
    - Safety Action Plan
    - Transportation Options Plan
    - Highway Plan
    - Freight Plan
    - State Rail Plan

- ***ODOT Projects***. ODOT has several transportation improvement projects slated for the north end of Bend that involve Highways 20 and 97, and their intersections with Cooley Road and Empire Boulevard. Preliminary analysis demonstrates that development in the Elbow results in limited impacts to both Highway 20 and 97. Some potential projects that could potentially be triggered in transportation analysis include:

  - US 20/3rd St Empire to Greenwood to 11th- 2020 Construction
  - Archie Briggs Rd bridge (Northwest/OB Riley area)
  - US 97 Bowery to Romaine- 2021 Construction
  - US 20: Tumalo to Robal- 2021 Construction
  - ARTS Grant Phase I- Penn/Neff (8th to Medical Center), Reed/3rd
  - ARTS Grant Phase II- Greenwood Lane improvements (3rd to Wall), Hill/1st St

- US 97 Bend North Corridor- 2024 Construccion

- North area interchanges (INFRA grant- not funded)
  - US 97/Cooley Rd
  - US 20/Cooley Rd Roundabout
  - US 20 Corridor (Empire to Greenwood/27th)
  - Empire (3rd to Boyd Acres) – CITY

See Figure 2 for information on some of the ODOT projects listed above.

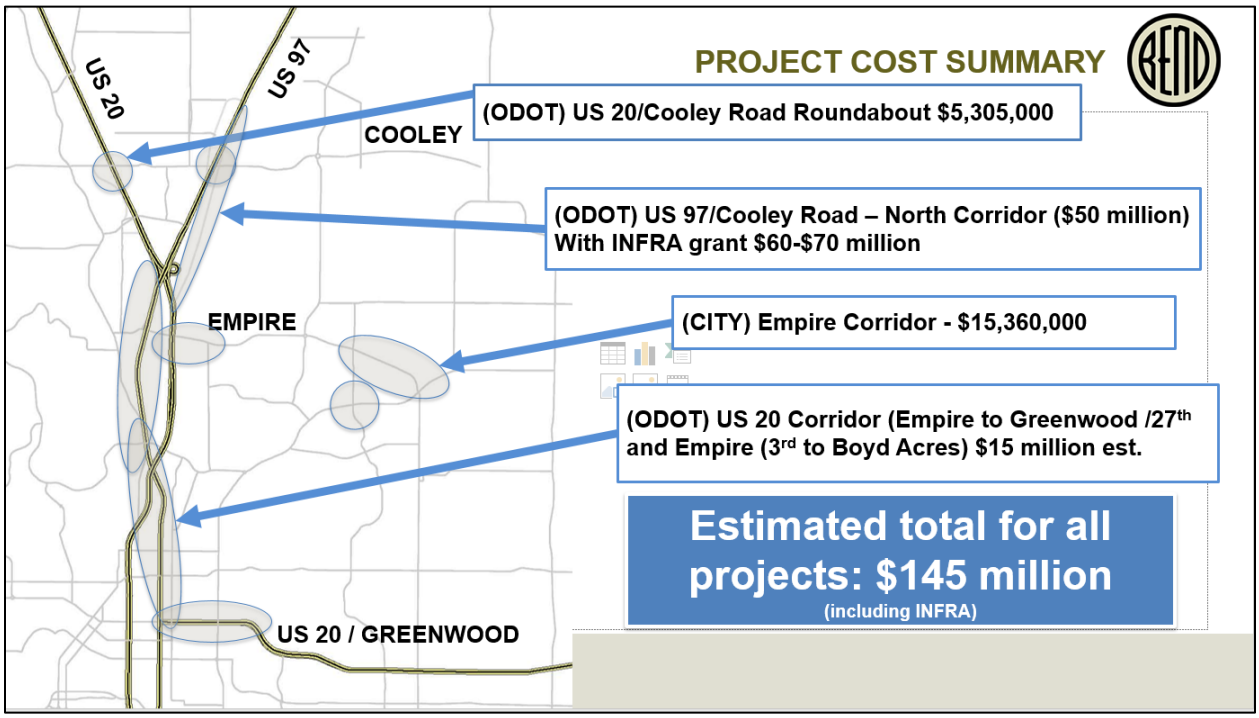


FIGURE 3: ODOT PROJECTS COST SUMMARY

B. Bend Parks and Recreation District Plans

On July 17, 2018, the Bend Park and Recreation District Board adopted a new Comprehensive Plan for their district. The new plan includes the following lists of parks, trails, and improvements in the Southeast Expansion Area.

- Planned Project-23: **High Desert Park Site.** The project is to develop a new community park at the High Desert Park site in the southeast corner of the Southeast Expansion Area. This project is not yet in the District's capital improvement program (CIP), and will need to go through a community needs/public input process. Development of the park site is expected to have high capital costs, but low planning and design effort.

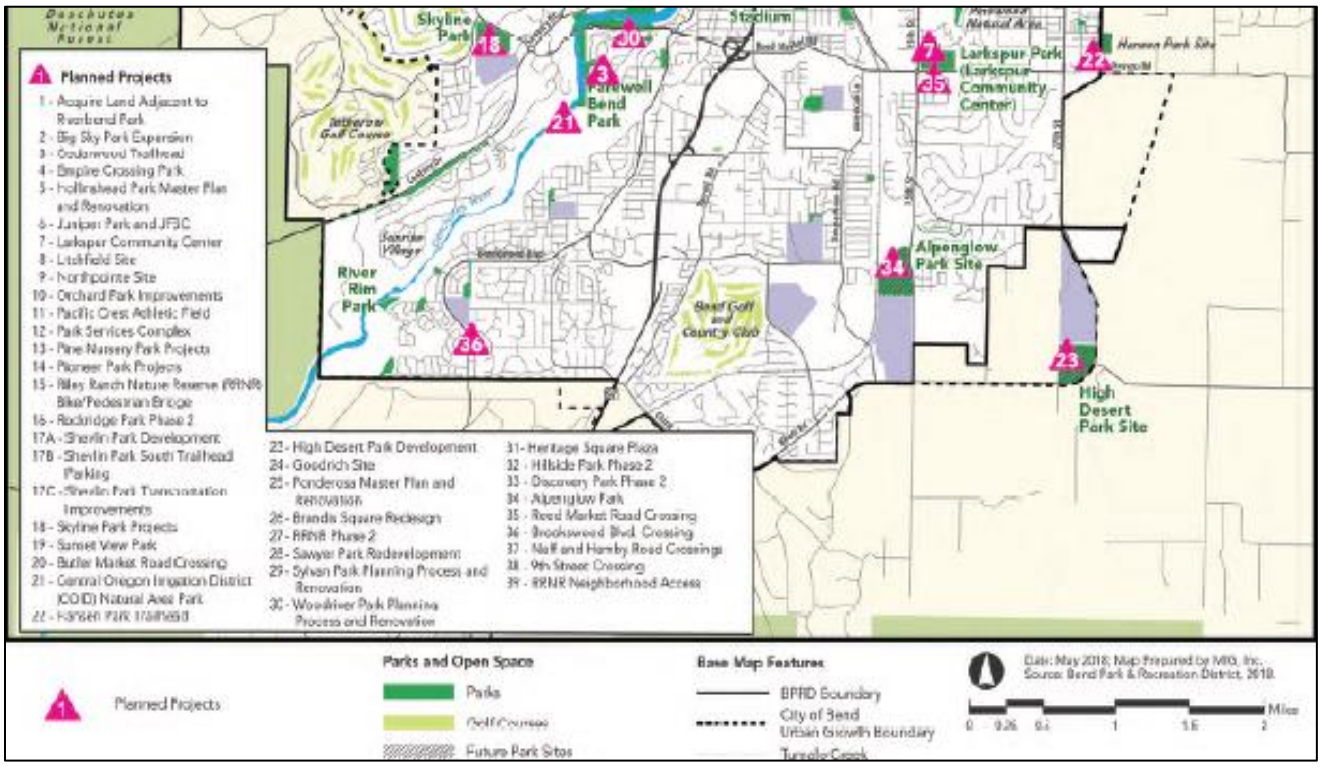


FIGURE 4: PLANNED PARK PROJECT SITES

- Planned Trails. The new District Comprehensive Plan includes a number of new trail projects in the Southeast Expansion Area:

    - High Desert Park Trails (Trail Project-19). This project is identified as a high priority. It includes two sections of trail, one from the TransCanda trail alignment to High Desert Park, connecting to a future 15th St trail. The second is a continuation of the trail from High Desert Middle School, connecting to the future TransCanada trail, and then proceeding south to the High Desert Park site.

    - TransCanada Trail (Trail Project-33)

    - Arnold Canal Trail & Trailhead (Trail Plan-3/1). This project is also identified as a High Priority. The goal of this project is to develop a trail on the Arnold Irrigation Canal Trail south of town, starting as Highway 97 on the west and terminating at Knott Rd on the east. The District will encourage other agencies to complete the alignment from Knott Rd to 15th St.“

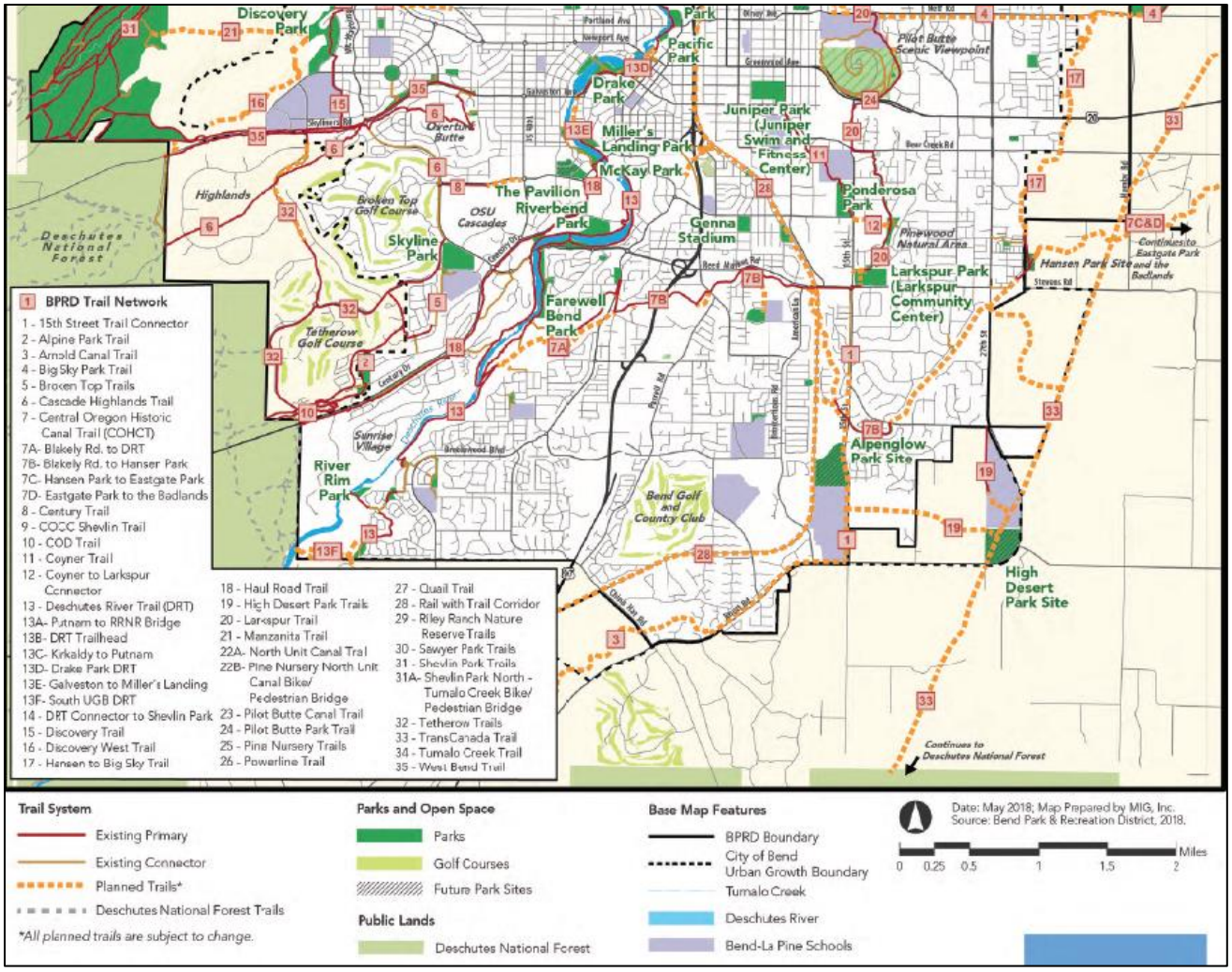


FIGURE 5: EXISTING AND PLANNED TRAILS

- Park Search Areas. In addition to park sites and trails, the District's Comprehensive Plan relied on Park Search Areas to evaluate whether an area was in need of a park, trail, or both. The forgoing noted that the Southeast Expansion Area has an existing park site, High Desert Park. The following summarizes the park search areas in the Southeast Expansion Areas, the types of parks identified as needed, and their priority.

    - Park Search Areas (See Figure 5 below). BPRD has identified areas to search for new parks.
        - Park Search Area 28, Neighborhood Park to serve new density
            - High priority
        - Park Search Area 29
        - Nearby (Park Search Areas 23 & 25)
        - Nearby (Park Search Area 27)
            - High priority
            - East of Elbow but could attract development to the Elbow area

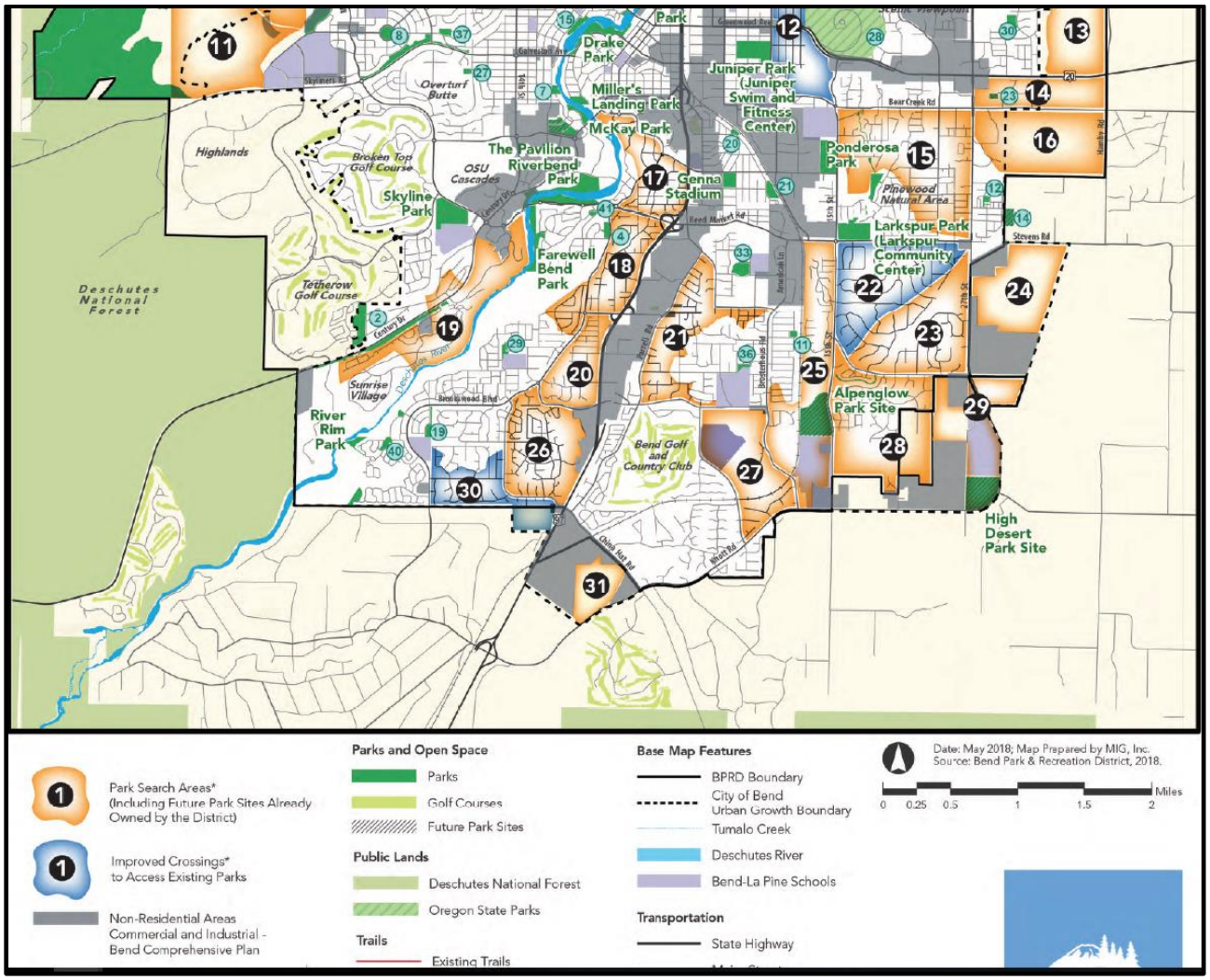


FIGURE 6. BPRD'S IDENTIFIED PARK SEARCH AREAS

C. Bend-La Pine Unified School District (BLPSD) Plans

In 2017, the Bend-LaPine School District revised their adopted ***2016 Sites and Facilities Report***. This report includes an inventory of existing elementary, middle, and high schools, and a projection of schools need by type. The following identifies the existing schools and school district properties in the Southeast Expansion Area.

- ***High Desert Middle School North Triangle site:*** 12+ acres in expansion area. Hold for potential future school site
- ***High Desert Middle School North Square:*** 5.5+ acres within UGB expansion area with public facilities designation and zone, combined with north triangle, hold for potential school site

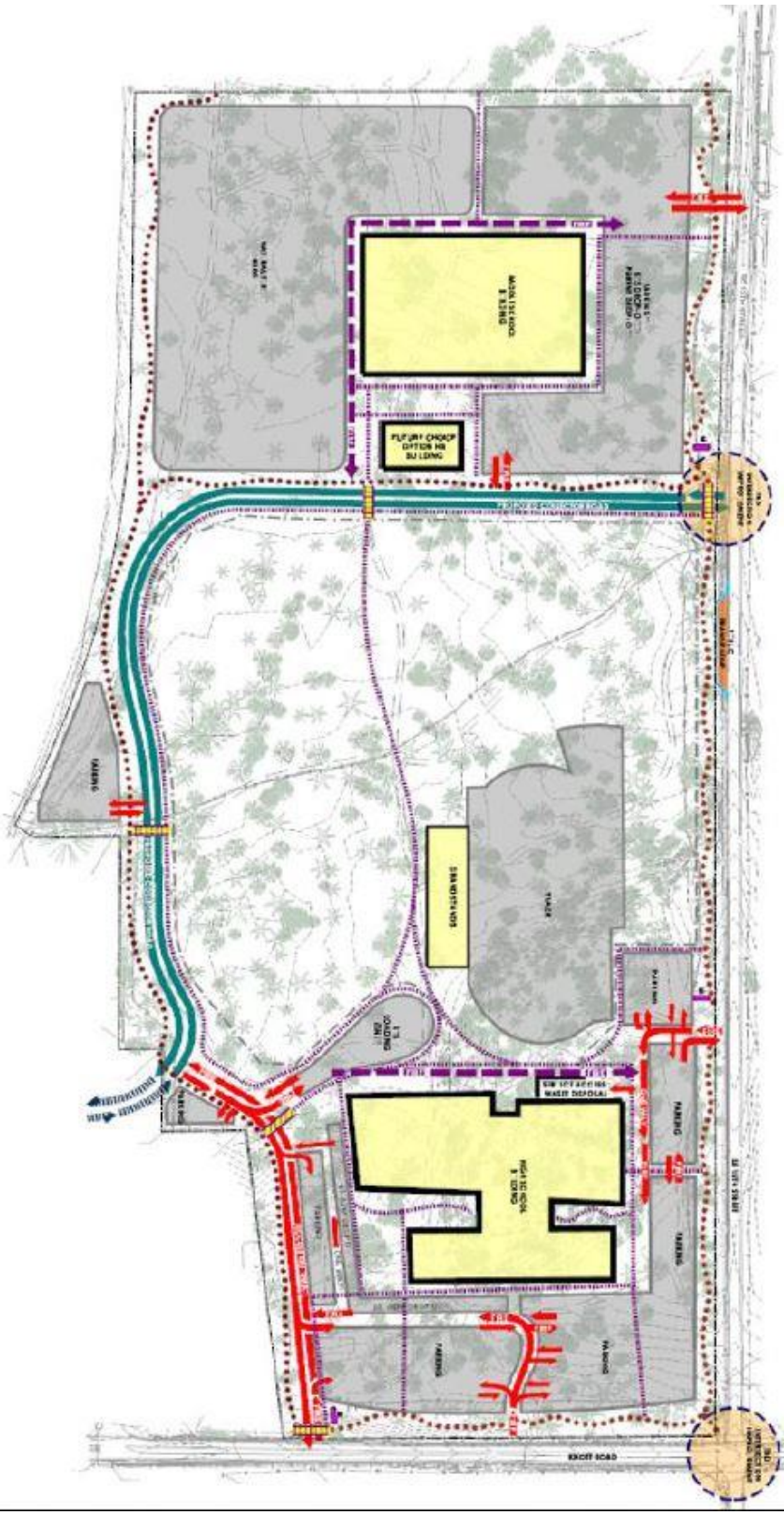
- ***High Desert Middle School South:*** Almost 28 acres, has a large natural gas line buried with a 100ft easement diagonally across property. Good location for future elementary school, however preferred location on the site will depend on final UGB plan

FIGURE 7. BLPSD HIGH DESERT MIDDLE SCHOOL SITE (NORTH TRIANGLE, NORTH SQUARE, AND SOUTH)

The School District is implementing the Sites and Facilities Report through their **2017-2021 Proposed Bond Projects Map**. This map identifies the following projects and their respective timelines. The master plan for the high school was adopted by Council on August 1, 2018.

- Bonded (funded) **High School on 15th St/Knott Rd** (Planned to be complete by 2021)- use link to view School District Master Plan (site and mobility plan)
- Planned Middle School just north of High School on 15th St (currently in Master Plan stages with CDD, not bonded)
- See Figure 8 for BLPSD coordinated map with CDD and BPRD for the 15th St school and trail plans on 15th St/Ward Property

FIGURE 8. PLANNED 15TH ST HIGH SCHOOL AND MIDDLE SCHOOL SITE PLAN



F. Wildfire Prevention

Greater Bend Community Wildfire Protection Plan (2016)

- ***International Wildland-Urban Interface Code (IWUIC)***
- Ranked Greater Bend and Southeast Bend as having a high risk for fire, extreme hazard area with moderate to low protection capabilities
- Identified primary hazards for the Southeast of Bend as:
  - Defensible Space- hazardous vegetation
  - Structural composition (roofing)
  - Insufficient access & evacuation routes
  - Poor condition of interior roads

G. Additional Resources

The hyperlinks that follow link to additional documentation, reports, and plans that are applicable to the development of the Southeast Area Plan.

- ***Transcanda Natural Gas Pipeline,*** known as the *Gas Transmission Northwest (GTN) LLC,* runs through Elbow area. This link opens a map of the pipeline alignment, which travels through the Southeast Expansion Area in a northeast to southwest direction. This 1,377 mile pipeline transports WCSB and Rockies natural gas to Washington, Oregon, and California. It connects with Tuscarora and Foothills gas lines. TransCanada owns 25.7% of the system through their interest in TC PipeLines, LP.

- ***City of Bend's Urban Growth Boundary Expansion Scenarios Evaluation Report***. This report presents the results of the City's analysis of alternative boundary scenarios, including evaluation of the expansion areas considered in 2015.
  - Pages 40-41 (The Elbow General advantages/disadvantages)

- ***Oregon Department of State Lands (DSL) Steven's Road Tract Property 2007 Master Plan.*** The State Land Board has adopted a Steven Road Tract Master Plan for a tract of land identified as Section 11, T18S, R12 EWM, aka the Stevens Road Tract.

Appendix B - SEAPAC Roles, Responsibilities, and Guidelines

CITY OF BEND
SOUTHEAST AREA PLAN

Roles, Responsibilities, and Guidelines:

SE Area Plan Advisory Committee

December 6, 2018

Bend's SE Area Plan Advisory Committee Role

As adopted in City Council Resolution #3135, the responsibilities of the SE Area Plan Advisory Committee (SEAPAC) are to:

1. Use the approved scope and schedule to provide input to the project team and recommendations to the Bend Planning Commission and Bend City Council.
2. Provide a forum for community input on the development of the area plan.
3. Advise the Project Team on the plan products as they are developed to ensure they satisfy the Project's goals, City plan policies, and responds to input from the community.
4. Respect a range of opinions, strive for consensus, and acknowledge points of mutual agreement. If consensus cannot be reached, a concurrence of a majority of the SEAPAC members present will be required to make recommendations to the Planning Commission and City Council.
5. Hold open, public meetings.

Meeting Guidelines

a. The agenda and SEAPAC discussions will be managed by the Chair, or someone designated by the Chair, which may include the project facilitator.

b. Meetings will begin and end on time. If agenda items cannot be completed on time, the group will decide if the meeting should be extended or if an additional meeting should be scheduled.

c. At times, the process will move quickly, so it will be essential to make decisions as efficiently as possible to stay on schedule. SEAPAC members will review materials prior to meetings and actively participate in the discussion and decision-making process at each meeting.

d. At the meetings, SEAPAC members will:

- Provide direct input as required to help reach group consensus;
- Share the available speaking time so that all SEAPAC members can be heard;
- Be respectful of a range of opinions;
- Focus on successfully completing the agreed upon agenda;
- Avoid side discussions when others are speaking;

- Voice concerns regarding agenda items as needed at the meeting, rather than voice concerns to consultants and staff after the meeting; and
- Strive for consensus and acknowledging points of mutual agreement.

e. The Chair will gather comments and perspectives from other SEAPAC members before a member speaks multiple times on an issue.

f. The Chair will provide opportunities for brief public comment or announcements at the beginning or end of each meeting. Public comment will generally not exceed 20 minutes of allotted meeting time with a maximum of 3 minutes per individual, unless consent of SEAPAC allows otherwise. Time permitting, the Chair may provide opportunities for public comment at other times of the meeting with the consent of the committee, such as immediately before SEAPAC makes a decision. The agenda may indicate specific items where public comment is invited.

g. Meeting summaries will be prepared for each meeting and distributed to SEAPAC members for review and approval.

h. When SEAPAC members identify issues that are outside the scope of the committee's purpose, the ideas will be documented in an "idea bin" for future use by others, and the group will continue with the agenda.

i. SEAPAC meetings are "public meetings" under Oregon's public meeting statutes. They will be duly noticed and open to the public. Committee members will conduct substantive discussions about SEAPAC business only at SEAPAC meetings and not outside the public meeting setting. City staff will advise SEAPAC of public meetings requirements.

j. Before taking action on recommendations, SEAPAC members will declare potential conflicts of interest, in accordance with Oregon law.

Decision Making

1. SEAPAC will make every effort to make decisions by consensus. Consensus is reached when all committee members either support or can live with the proposal, even if it is not each committee member's personal favorite.
2. If consensus cannot be reached, a vote will be taken. A majority of the SEAPAC members present must agree for a group decision to be made. Absent that, the opinions of the members, and vote tally, will be recorded and be represented as not reaching consensus or a decision.
3. A quorum is required to record a consensus or voted position of SEAPAC. A quorum of SEAPAC shall be a majority of the members appointed to serve.
4. Prior decisions made by the SEAPAC by consensus or vote may be reconsidered when there is a consensus or a majority vote approving a reconsideration. The City's project manager will inform SEAPAC of potential impacts to the budget and schedule when substantive issues are proposed for reconsideration.

Appendix C - Public Involvement Plan

CITY OF BEND
SOUTHEAST AREA PLAN

Technical Memorandum #4: Public Involvement Plan

PREPARED FOR: Southeast Area Plan Project Team

PREPARED BY: Joe Dills and Kyra Haggart, Angelo Planning Group

DATE: 12/17/2018

Introduction

This public involvement plan provides a working list of the public involvement activities taking place as part of the Southeast Area Plan. It is intended as a living document and includes notes about specific activities that are in-progress.

Overall Public Involvement Goals

The Southeast Area Plan Update community engagement process will:

- Provide early and ongoing opportunities for stakeholders to participate in the planning process;
- Facilitate equitable and constructive communication between the public and the project team;
- Empower residents and community members to become involved with the project;
- Provide the public with balanced and objective information to help them understand issues, alternatives, opportunities, and solutions;
- Offer reasonable accommodations to encourage participation of all stakeholders regardless of race, ethnicity, age, disability, income, or primary language; and
- Build on existing City communication networks, relationships, and resources.

Key Messages

Key messages summarize the **what**, **where**, **why**, and **how** of the process, and constitute the basic talking points when communicating with the public about the project. The entries below are a first draft for early phases of the process—they will change and expand as the project evolves.

- **What:** The City of Bend is developing an area plan for the Southeast Expansion Area. The goal of this plan is to encourage the development of a complete community (a place where people can live, work, shop and play) in the southeast area of Bend.
- **Where:** The Southeast Expansion Area is located at the southeast edge of Bend and contains approximately 479 acres of land outside of City limits and within the UGB. It is bordered by Knott Road to the south, SE 27th Street to the east, and the current City limits to the north and west.
- **Why:** The Southeast Expansion Area was identified when the City expanded the UGB in 2016 to accommodate projected population growth through the year 2028. The Southeast

Expansion Area is expected to provide capacity for the development of 820 housing units and 2,274 jobs, a key part of the City's land supply to serve forecasted growth.

- **How:** "For information and notifications about the Southeast Area Plan, you can sign up for project emails on the City's project web page. By signing up for project emails you will receive regular updates about the project and be reminded when important events, such as public meetings or open houses, will occur. For assistance or more information, you may contact:
  - Allison Platt, Senior Planner

    (541) 322-6394 / aplatt@bendoregon.gov
  - Damian Syrnyk, Senior Planner

    (541) 312-4919 / dsyrnyk@bendoregon.gov

  Public meetings include meetings of the Southeast Area Plan Advisory Committee (SEAPAC), community workshops, and briefings and hearings with the Bend Planning Commission and City Council."

Project Web Page and Email Lists

The City's project web page will play an important role in getting information to the public about this project, and also in receiving feedback from the public.

- The project web page will be the primary location for project information oriented to the public, including project background, objectives, schedule, upcoming meetings, meeting agendas and summaries, and project memoranda and reports.
- The project web page will include a place for people to sign up to receive regular project email updates via an interested parties email list.
- The project web page will allow community members to submit public input about the project. City staff will maintain a log of public input received via the project web page for use in public input summaries, and follow up on inquiries, as needed, in a timely manner.
- All outreach efforts should encourage community members to visit the project web page for more information.

Interested Parties Email List

The interested parties email list is intended for interested groups and individuals to receive ongoing email communications with current project information to keep them engaged and informed.

- The City will establish and maintain an interested parties email list. People on this list will be the recipients of regular project update emails.
- It is a goal to build the interested parties email list to be as robust as possible. All outreach efforts should encourage community members to sign up for the interested parties email list.

Project Updates

- Project updates should go out to the interested parties email list every 1-2 months to keep community members engaged and informed. Updates can and should occur more often when news is available.
- Email notifications may include:
  - Invitations to public events and meetings;
  - Reminders about online public surveys;

- Notices when meeting materials, memoranda, reports, or other deliverables are posted to the project web page

Early Outreach Program

Prior to the December SEAPAC meeting, City staff conducted an early outreach program to develop website materials, meet with project stakeholders, and learn about local concerns that can be addressed in the planning process. Those outreach efforts were very helpful in the preparation of this Public Involvement Plan.

Outreach Activities

The Southeast Area Plan process will be open and provide opportunities to participate for a wide variety of stakeholders and community members external to the City. A preliminary list of stakeholders is attached as Exhibit A. The Southeast Area Plan process will include the following types of outreach activities.

Advisory Committee Meetings

The City has established the Southeast Area Plan Advisory Committee (SEAPAC) to provide a forum for community input on the development of the Southeast Expansion Area Plan, provide feedback to the project team on project progress and the products developed for City Council adoption, and make recommendations to the Planning Commission and City Council. SEAPAC is comprised of 15 members (see Exhibit B).

- SEAPAC will be the central forum for stakeholder involvement and guidance to the project team. Information about the SEAPAC, including membership and meeting dates and materials, will be available on the project web page.
- SEAPAC meetings will be open to the public and include opportunities for public comment on the agenda.
- The consultant will provide sign-in sheets, document participant attendance, and write a summary of SEAPAC meetings, including public comment summaries, for each meeting. These summaries will be made available to the public on the project web page.

The anticipated SEAPAC meetings and their meeting topics are listed below. These are preliminary and subject to change, especially in response to issues and ideas that emerge during the process.

- **SEAPAC #1:** Orientation
- **SEAPAC #2:** Existing Conditions (Part 1: Context, Physical Site, Plan Designations, Parks, Trails, Schools), Market Analysis, Vision
- **SEAPAC #3:** Existing Conditions (Part 2: Transportation, Utilities Infrastructure, Tree Inventory and Health Assessment), Vision and Guiding Principles
- **SEAPAC #4:** Plan Concepts (Part 1)
- **SEAPAC #5:** Plan Concepts (Part 2)
- **SEAPAC #6:** Concept Plans
- **SEAPAC #7:** Refined Plans and Preliminary Implementation Ideas
- **SEAPAC #8:** Draft Plan and Implementation
- **SEAPAC #9:** Area Plan Report, Implementation Report

Community Workshops

Community Workshops are planned for hands-on engagement by community members and stakeholders. For each of the workshops, the consultant will:

- Prepare a meeting plan;
- Lead the preparation of workshop handouts, displays, presentations, and materials for small group exercises; and
- Summarize the input received in a Workshop Summary Report.

Preliminarily, the workshop dates and topics will be:

- **Workshop #1:** Existing conditions (early March 2019)
- **Workshop #2:** Plan concepts (late July 2019)
- **Workshop #3:** Draft plan, implementation (mid-January 2020)

Three online open houses will coincide with the Community Workshops. The City will provide notice prior to workshops, and lead the preparation, administering, and reporting from the online survey components of the online open houses. The consultant will provide graphic content, identify questions to be asked, and review materials and results summaries prepared by the City.

Public Event Notices

- Notice prior to public events including SEAPAC meetings and community workshops will be posted on the project web page, generally seven days in advance of the meeting.
- Notice prior to public events will be distributed to the interested parties email list, stakeholders, and interested local groups and organizations.
- Notice may also be posted in the local newspaper; adjacent neighborhood association publications; and at key locations such as on community bulletin boards.
- All notices will include information about, and a link to, the online public event survey for community members who are unable to attend the in-person event.
- Meeting notices must include an offer to make accommodations for people with disabilities with sufficient advance notice, with contact information for such notification.

Planning Commission and City Council Briefings

City staff will schedule regular check-ins with the Planning Commission and City Council (up to four each). The check-ins will be held after key meetings/events and for the purpose of providing updates and checking in on/establishing direction that the process and working products are on the right track. The goal is to use these check-ins to keep each body informed, check in on direction, and provide progress reports leading up to their respective work sessions and hearings.

Bend Advisory Boards Briefings

City staff will provide briefings for Bend Economic Development Advisory Board (BEDAB) as needed.

Coordination with City Departments

City staff will lead the coordination with, and involvement of, City departments. They will use existing communication structures and meetings to coordinate with City departments and stakeholders internal to the City. The “Operations Direct Reports” group is anticipated as being a primary meeting setting for on-going briefings and coordination with other departments. City staff will supplement this with other contact and involvement as needed.

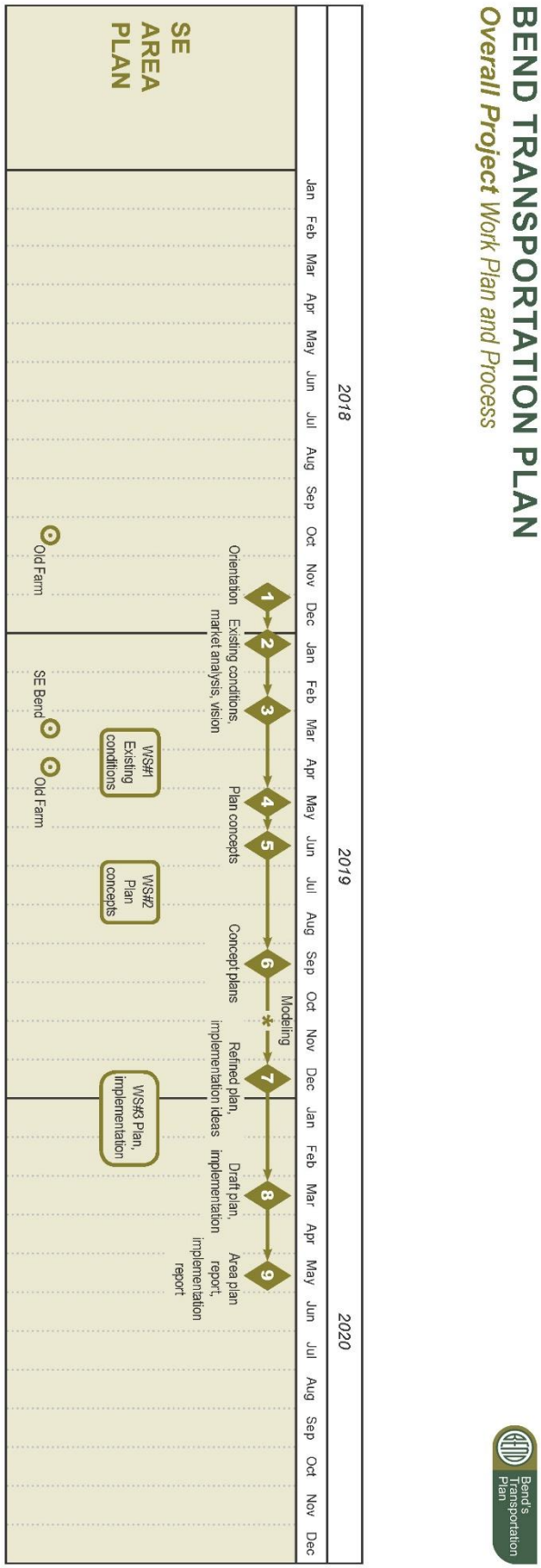
Other Outreach Efforts

In addition to the strategies identified above, the project management team should identify strategies and opportunities for direct outreach to reach community members who may not normally participate in planning projects. Ideas include:

- Tabling/flyers at City and public events
- Social media outreach, including Facebook and NextDoor
- Building on networks with existing community groups, such as:
  - Youth groups and schools
  - Senior centers
  - Rotary Club, City Club, and similar groups
  - Advocacy groups
  - Neighborhood Associations
  - Homeowners associations

Project Schedule

The project schedule is attached on the following page.


BEND TRANSPORTATION PLAN
Overall Project Work Plan and Process
Bend's Transportation Plan
2018
2019
2020
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
SE AREA PLAN
1 Orientation
2 Existing conditions, market analysis, vision
3
4 Plan concepts
5
6 Concept plans
Modeling
7 Refined plan, implementation ideas
8 Draft plan, implementation
9 Area plan report, implementation report
Old Farm
SE Bend
Old Farm
WS#1 Existing conditions
WS#2 Plan concepts
WS#3 Plan, implementation

Appendix A

Southeast Bend Area Plan

Stakeholders List – May 24, 2018

Prepared by Damian Syrnyk, Growth Management Department

Internal Stakeholders

1. City Manager's office
2. City Attorney's office
3. Community Development Department
4. Communications
5. Engineering and Infrastructure Planning
6. Growth Management
7. Streets
8. Utilities

External Stakeholders

1. Elbow Property Owners
2. Southeast Bend Neighborhood Association
3. Old Farm District Neighborhood Association
4. Bend LaPine School District
5. Bend Parks and Recreation District
6. Avion Water Company
7. Arnold Irrigation District
8. Cascade Natural Gas
9. Pacific Power
10. Natural gas transmission company that manages pipeline that bisects the southeast corner of the Elbow (need to follow up on name)
11. Oregon Department of Transportation
12. Deschutes County Community Development
13. Deschutes County Road Department
14. Property owners to the north and west
15. JL Ward Company (See 15th Street Opportunity Area)
16. Property owners to the south and east, outside of the UGB
17. Department of Land Conservation and Development
18. Department of State Lands
19. Deschutes County Solid Waste Department (Knott Landfill)

Appendix B

CITY OF BEND
SOUTHEAST AREA PLAN

Southeast Area Plan Advisory Committee

Roster

Property Owners:

- William Hubbert
- Anthony Oddo
- Jeff Reed
- Jacob Schumacher
- Dixon Ward
- Steve Wilson

Neighborhood Association, District, and Agency Representatives:

- Ken Atwell and Rachel Strickland - Southeast Bend Neighborhood Association
- Kip Barrett - Bend Economic Development Advisory Board
- Casey Bergh - Property owner adjacent to the Southeast Expansion Area
- Sarah Bodo - Bend Park and Recreation District
- Butch Hansen - Old Farm District Neighborhood Association
- Sharon Smith - Bend LaPine School District and Bend UGB TAC
- Rick Williams - Oregon Department of Transportation, Region 4
- Rachel Zakem - Central Oregon Intergovernmental Council, Transit

Appendix D - Existing Conditions Report

BEND SOUTHEAST AREA PLAN

EXISTING CONDITIONS REPORT

January 2019

CITY OF BEND
SOUTHEAST AREA PLAN

CONTENTS

INTRODUCTION 1

PROJECT BACKGROUND *1*

GEOGRAPHIC AREA *2*

REGIONAL PHYSICAL SETTING 6

NATURAL RESOURCES *6*

EXISTING LAND USE PATTERNS *11*

AREAS OF SPECIAL INTEREST *13*

PARKS AND OPEN SPACES *14*

TRAILS *17*

SCHOOLS 20

EXISTING AND PLANNED TRANSPORTATION CONDITIONS 22

TRANSPORTATION SYSTEM PLAN PROJECTS *23*

ACTIVE TRANSPORTATION CONDITIONS *25*

UTILITIES 28

WATER *28*

STORMWATER *33*

SEWER *33*

TRANSCANADA NATURAL GAS PIPELINE *35*

CASCADE NATURAL GAS *35*

SOCIAL AND ECONOMIC CONDITIONS 36

INTRODUCTION

PROJECT BACKGROUND

In 2016, the City of Bend updated it Comprehensive Plan and expanded the Urban Growth Boundary (UGB) to accommodate projected population growth through the year 2028. Through the expansion process, the City identified 10 “expansion areas” (shown in a red shade on Figure 1 below) totaling 2,380 acres. The Southeast Expansion Area, also referred to as “The Elbow,” was one of those expansion areas.

Following the Comprehensive Plan and UGB update process, the City evaluated strategies for implementing the new plan. The Southeast Expansion Area (“Study Area”) was identified in the City’s Return on Investment (ROI) study as being the best positioned expansion area for near-term development based on sanitary sewer investments (primarily the Southeast Interceptor) and low estimated impacts to state transportation facilities compared to other expansion areas.[1]

Now that the Southeast Expansion Area is inside the UGB, the City can begin planning for land use and infrastructure to meet the needs of future residents, and support future annexation and development. The goal of the Southeast Area Plan is to encourage the development of a complete community (a place where people can live, work, and play) in the southeast area of Bend.

1 In addition to recommending an area plan for the Southeast Expansion Area, the City’s ROI study recommended additional planning for Bend’s Core Area, adoption of housing incentives, and other strategies. https://www.bendoregon.gov/Home/ShowDocument?id=38852

GEOGRAPHIC AREA

In relation to Bend as a whole, the Study Area is located in the southeastern corner of the UGB. It contains approximately 479 acres of land outside the City limits and inside the UGB. The area is bordered by Knott Road to the south, SE 27th Street to the east, and the current City limits to the north and west. It is expected to provide capacity for at least 820 housing units and 2,274 jobs for the City of Bend, all of which will be necessary to serve forecasted growth.[2]

This report compiles information about the conditions within Southeast Expansion Area boundary, but it also considers the context of Southeast Bend, the entire City, and the broader regional landscape. Figure 2 illustrates the Study Area within the context of southeastern Bend. Consideration of this context will be important to ensuring that the Southeast Expansion Area becomes a complementary and connected neighborhood in Bend.

An existing conditions map of the Study Area is presented in Figure 3. The Southeast Expansion Area includes the High Desert Park site in the southeast corner, as well as High Desert Middle School to the north. The Deschutes County Landfill and Deschutes County Road Department are adjacent to the study area on the east side of 27th Street. To the west of the study area, the school district has plans for a future middle school and high school fronting on 15th Street, and the Bend Park & Recreation District is planning for the future Alpenglow Community Park on the 37-acre site to the north. The new high school is scheduled to open in the Fall of 2021. Figure 3 also shows the planned alignment of the Murphy Road extension to 15th Street.

East of 15th Street and north of the study area boundary is the 15th Street Ward Opportunity Area. This property is the largest vacant residentially-designated property within Bend's City limits. Consideration of this property in discussions about east-west transportation connections through the Study Area will be particularly important to ensuring a connected, complete community.

Native shrubs and trees in the Southeast Expansion Area

2 Table 2 of the ROI study provides estimated capacity for housing units and jobs in the UGB expansion areas. https://www.bendoregon.gov/Home/ShowDocument?id=38852

Figure 1. Citywide Context

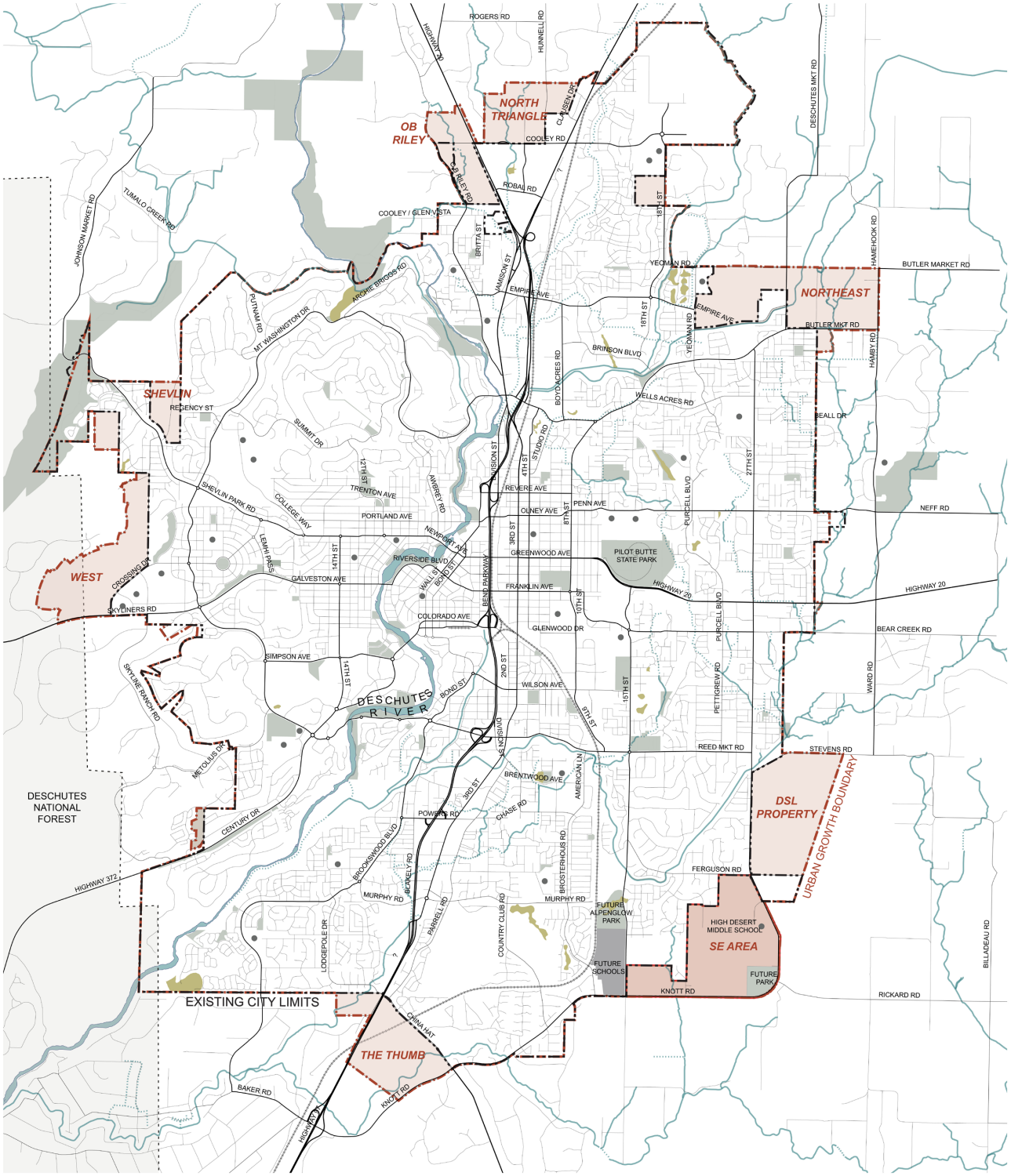


Figure 2. Southeast Bend Context

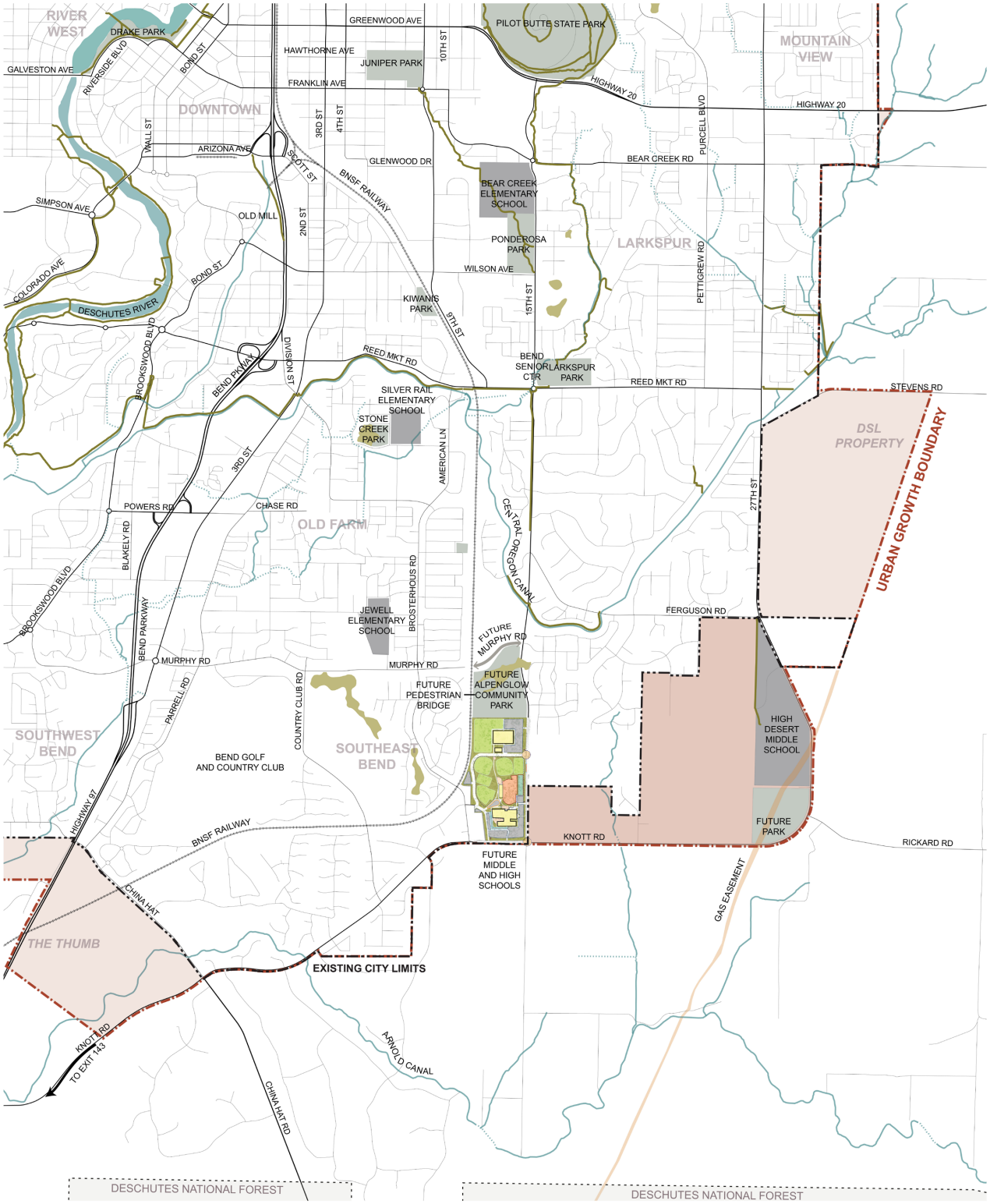
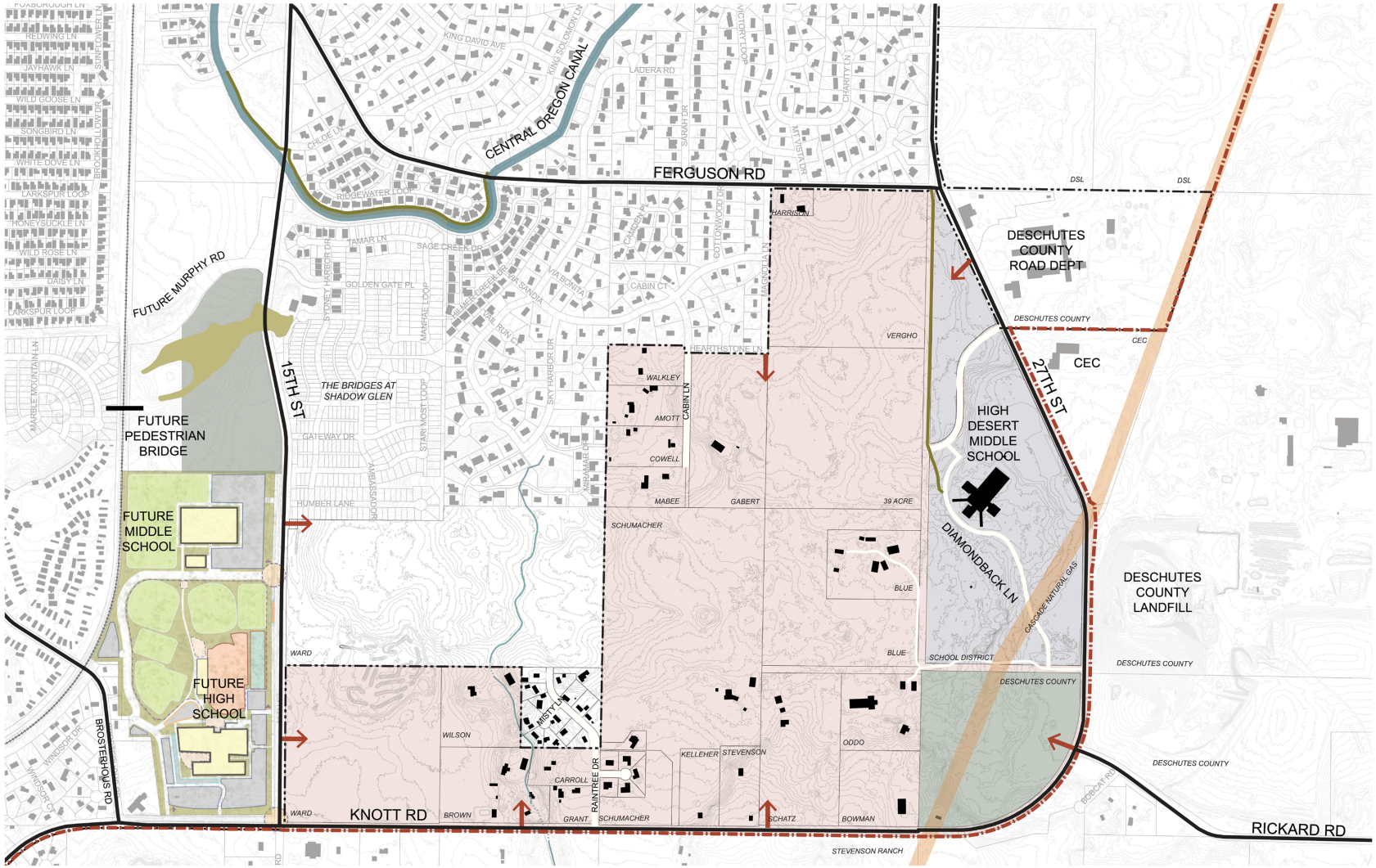


Figure 3. Study Area



This page intentionally left blank.

REGIONAL PHYSICAL SETTING

Bend is situated in a dramatic regional landscape between the coniferous forest and volcanoes of the high Cascades and the arid high desert that extends east to Idaho and Nevada. The Three Sisters are regional landmarks and views of these and other volcanoes on the western horizon are highly-valued. Other mountains aren't as prominent but still provide place markers for the region's identity. Public lands are cherished as intrinsic elements of the region's character and active recreational access to these lands is touted as a key part of Bend's livability. The study area is close to the Deschutes National Forest boundary, with opportunities for recreation and exploration of unique geological landmarks like buttes, basalt outcrops and ice caves. On this southeastern edge of the city, small farms and ranches, irrigated by canals, are layered between rapidly urbanizing neighborhoods and the national forest and Bureau of Land Management (BLM) boundaries.

NATURAL RESOURCES

Bend is characterized by an arid climate, with the southeastern portion of the City trending slightly colder than neighborhoods to the north and west. The area's natural vegetation consists primarily of juniper trees, ponderosa pines, and native grasses and small shrubs including sagebrush and bitterbrush. The Study Area's topography generally slopes from a high point near Cabin Lane to a low point at the High Desert Park site in the southeast corner, with an elevation drop of approximately 70'. A subtle break in drainage exists, with the three westernmost properties draining west and the rest of the area draining to the southeast. The topography is complex in places,

with basalt rock outcrops and steeper ridges running generally in a north-south orientation. Topography for the study area is shown on Figure 3.

The Central Oregon Canal, operated by the Central Oregon Irrigation District (COID) runs north of the study area, crossing SE 15th Street and Ferguson Road. One small canal runs through the study area: the Arnold Irrigation District's Ladera Lateral runs north from Knott Road to Cabin Lane for irrigation water deliveries.

Signature Trees and Tree Groves

Much of the land within the Southeast Expansion Area includes mature and healthy trees, with several notably large ponderosa pine and juniper trees. Ponderosa pines in particular are relatively hardy and can survive with redevelopment if roots are protected and adequate water continues to be available. A detailed survey of tree locations and sizes may be commissioned as an adjunct to this plan. Some private parcels include a wider range of ornamental trees, such as the Gabert property on Cabin Lane (see Figure 3), which was once a tree nursery and still hosts a grove of blue spruce trees.

Mature juniper tree in the Southeast Expansion Area

Rock Outcrops

The Southeast Expansion Area includes several notable large rock outcrops. These rock outcrops may pose challenges to the provision of infrastructure and utilities such as roads, but they also provide a distinct character to the area, special habitat conditions for native wildlife, and a reminder of the region's volcanic underpinnings. These outcrops have been successfully incorporated into other local parks and open spaces and historically have been protected within Areas of Special Interest (ASIs), which are discussed later in this report.

Basalt rock outcrop in the High Desert Middle School site

Views

Figure 6 below shows views visible from key points in the Southeast Expansion Area. Looking south, Horse Butte, Cabin Butte, Bessie Butte, and Paulina Peak can all be seen from Knott Road. Mt. Bachelor and the Three Sisters peaks can be seen looking west from various high points throughout the study area. Where possible, these views should be protected and enhanced by future development in the area.

View of Cabin Butte from Diamondback Lane

View of Horse Butte from SE 27th Street

Figure 4. Regional Landscape Context

REGIONAL LANDSCAPE CONTEXT

CITY OF BEND
SOUTHEAST AREA PLAN

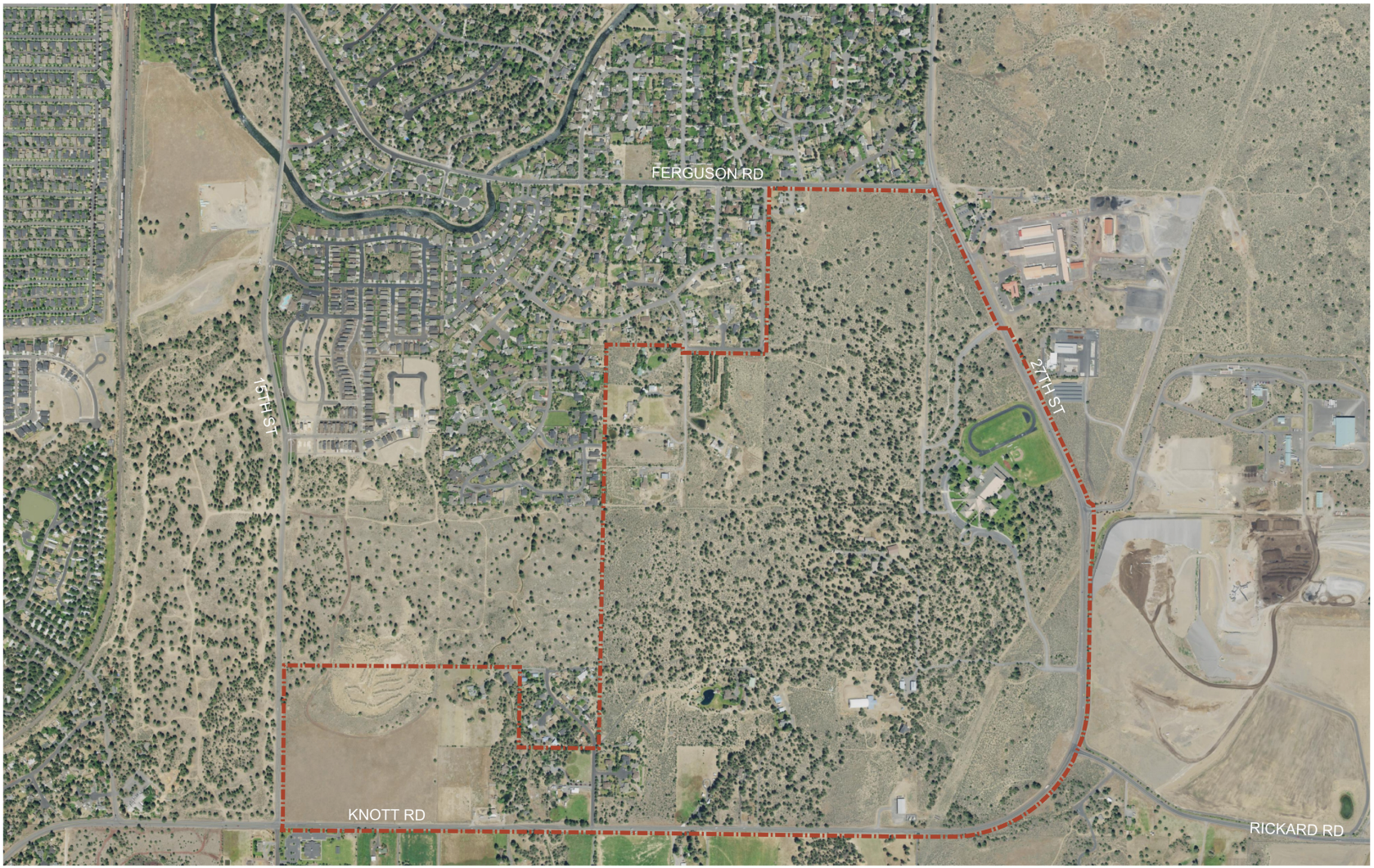
Bend UGB Expansion Areas

N

0 2.5 MI 5 MI

January 2019

Figure 5. Study Area – Aerial



STUDY AREA
AERIAL

CITY OF BEND
SOUTHEAST AREA PLAN

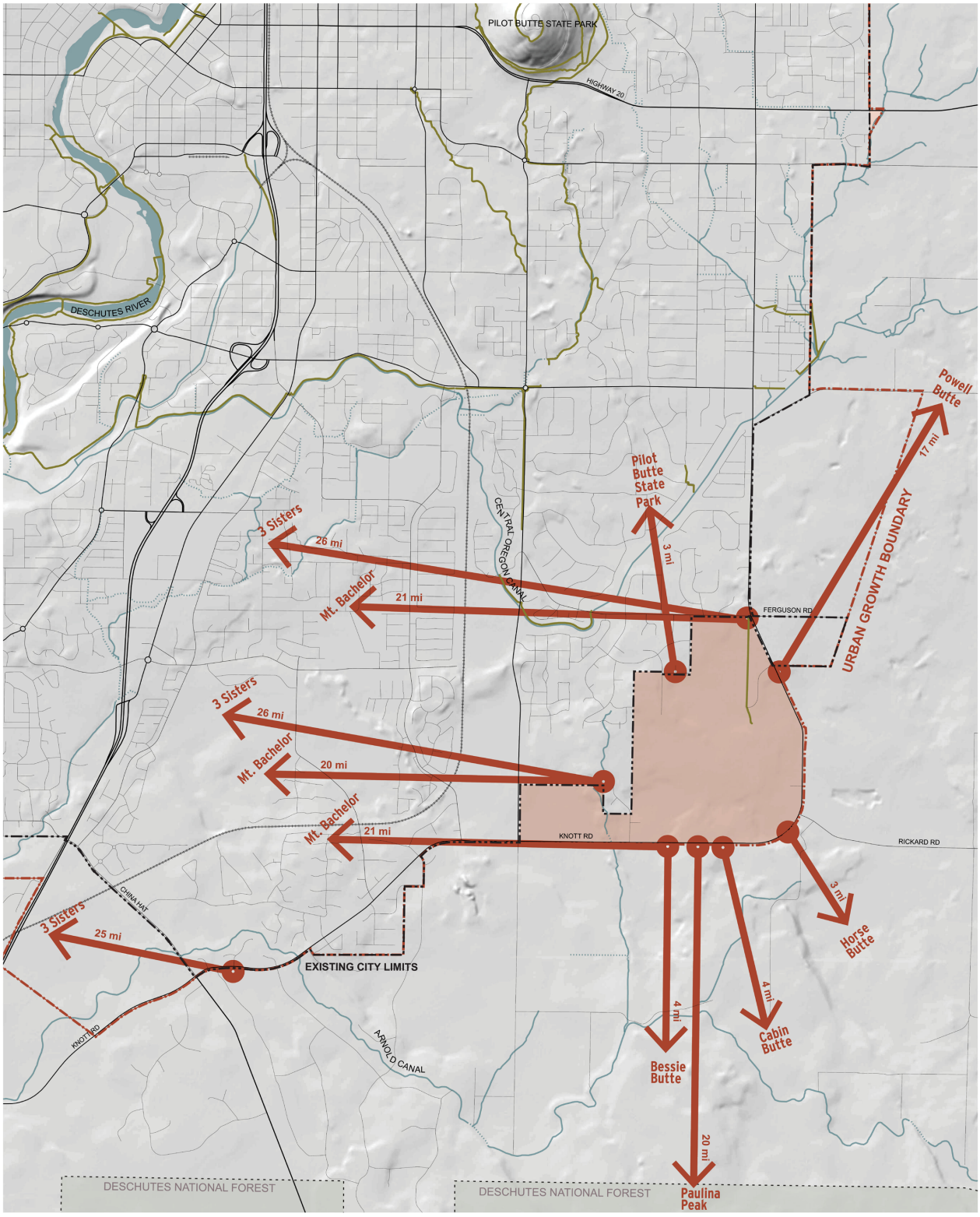
Study Area

N

0 300' 600' 1,200'

January 2019

Figure 6. Views from the Southeast Expansion Area



SOUTHEAST CONTEXT
VIEWS

CITY OF BEND
SOUTHEAST AREA PLAN

Railroad
Existing Trail
Project Area
Deschutes National Forest
Existing City Boundary
Urban Growth Boundary
Views
Canal
Piped Canal

N

0 800' 1600' 3,200'

January 2019

EXISTING LAND USE PATTERNS

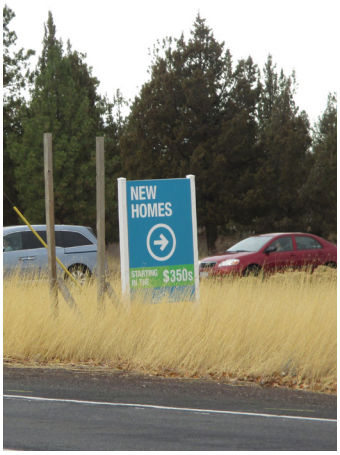
The Southeast Expansion Area consists of approximately 446 developable acres divided into 30 parcels that are owned by 27 different property owners. The largest parcel is the 74.5-acre lot owned by the Bend-La Pine School District, and the smallest parcels are the five roughly one-half-acre lots that make up the Knott's Landing subdivision on Keller Court. Although the average lot size in the Study Area is roughly 14 acres, only 10 of the 30 properties that make up the area are over 10 acres.

Having only recently been brought into the City's UGB the area is still largely undeveloped. Where development does exist, it is rural in nature. Active land uses in the area are primarily residential, with some existing businesses and institutional uses, including the middle school, future park site, and the Bend Bowmen Club. The area includes two existing businesses: High Desert Veterinary and the Bend Pet Resort.

Residence in the Southeast Expansion Area

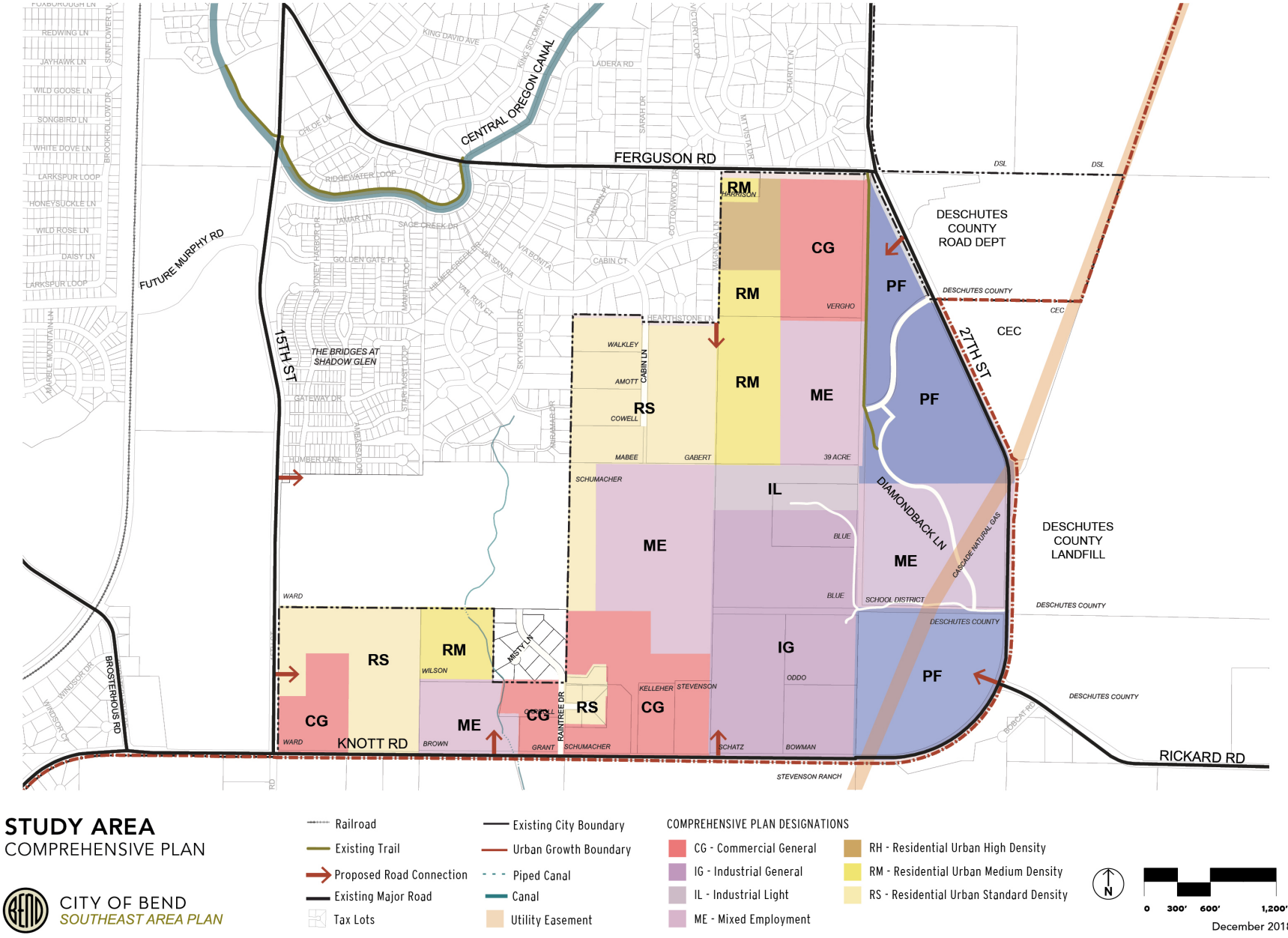
Land Use Districts

As shown in Figure 7, the Southeast Expansion Area includes residential, industrial, employment, commercial, mixed use, industrial, and public facilities comprehensive plan designations. These plan designations were adopted as part of the City's 2016 Comprehensive Plan amendments at the end of the UGB update process. They are the starting point for refinements that can be considered in the SEAP process. For more detailed information about the policies for each land use district in the Study Area, refer to Chapter 2 of Bend Development Code, Land Use Designations (BDC 2.0-2.8).



Land uses in the Southeast Expansion Area

Figure 7. Land Use Districts in the Southeast Expansion Area



AREAS OF SPECIAL INTEREST

Areas of Special Interest (ASIs) are important landscape features identified by the City of Bend that are intended to be preserved as potential private and public open spaces as growth occurs. The southeastern area of the City includes several areas that fall inside the Upland Areas of Special Interest Overlay Zone. The Overlay Zone is intended to protect valuable natural resources within the UGB while ensuring reasonable use of the property. Bend Development Code (BDC) establishes clear and objective design and development standards to protect these resources and preserve and enhance this vision for Bend's future livability .

There are no ASIs identified within the Southeast Expansion Area because it was not included in the UGB when the original ASI inventory was conducted. In the vicinity, a significant portion of the future Alpenglow Community Park site (shown in the study area map in Figure 3 on page 5) to the west of the Expansion Area is mapped as Upland ASI. Upland features consist of scattered rock outcrops, stands of trees, and dominant ridges and faults that are typical of the Central Oregon landscape. These areas contain high points or changes in elevation that break the line of sight so that the area retains a feeling of undeveloped open space.

ASI in the Alpenglow Community Park site.

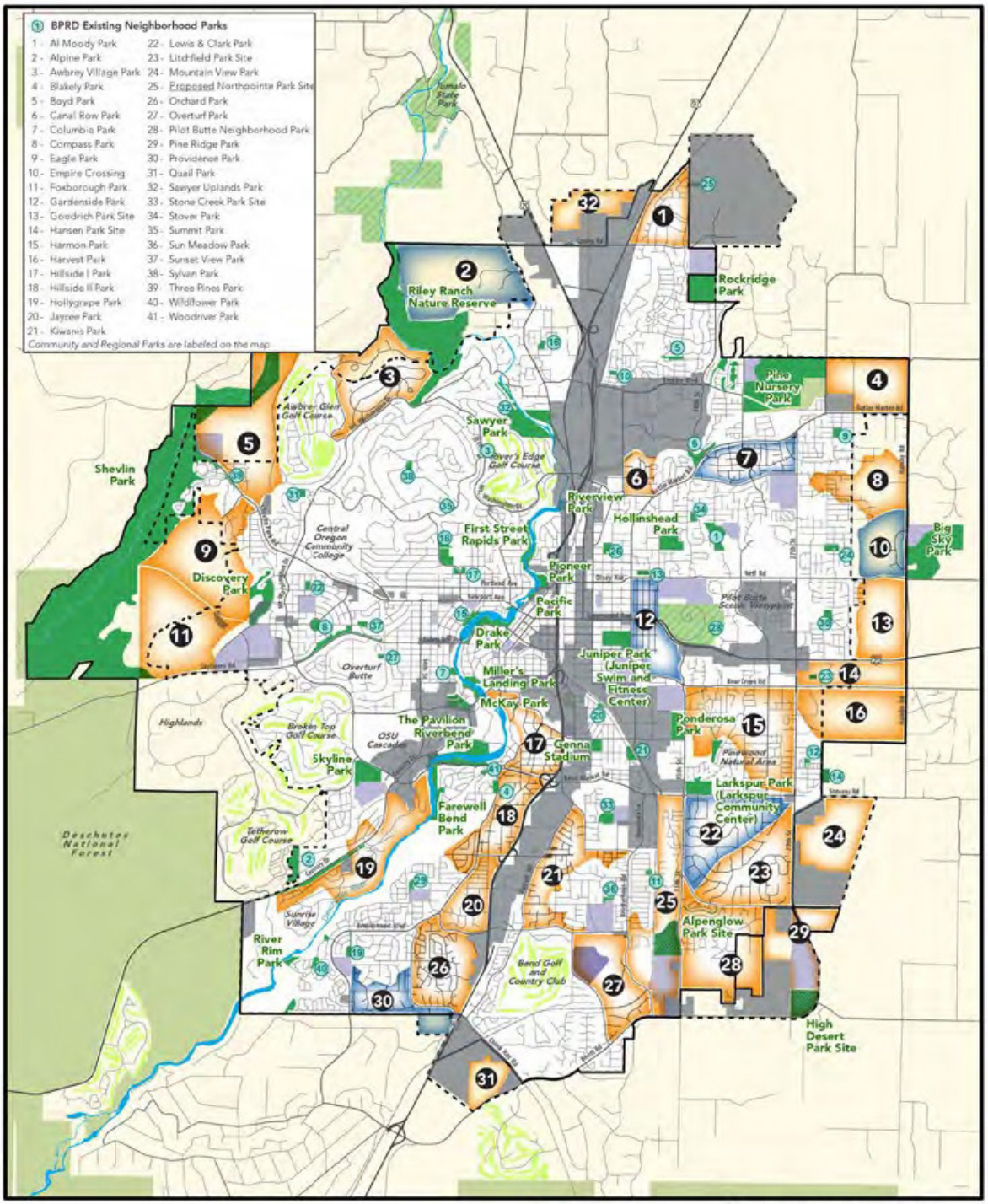
PARKS, OPEN SPACES, AND TRAILS

Bend is a community that places a high value on park and recreation opportunities. For the SEAP, it will be important to identify and preserve areas for parks and open spaces within the Southeast Expansion Area to serve future residents. The Bend Park & Recreation District (BPRD) updated their Comprehensive Plan—which serves as the guiding document for the next ten years of parks and recreation in Bend—in July 2018. The plan addresses future population growth by planning for more parks, trails, and amenities to serve future residents.

PARKS AND OPEN SPACES

Currently, 33 acres of the Study Area are owned by the BPRD. These acres make up the High Desert Park site, discussed in more detail below. The plan also identifies areas that are or will be deficient in neighborhood park facilities by defining “search areas” within the City. The BPRD has identified two park search areas which overlap partially with the Southeast Expansion Area. These are park search areas #28 and #29, shown in Figure 8. BPRD would look to acquire and develop neighborhood parks within these areas, to allow residents close-to-home opportunities to recreate and gather together. Neighborhood parks average about four acres in size and typically include amenities such as playgrounds, open lawn areas, and picnic shelters.

Figure 8. Bend Park & Recreation District Comprehensive Plan - Park Search Area Map



Park Search Area #	Page #
Area 1	93
Area 2	105
Area 3	89
Area 4	102
Area 5	102
Area 6	98
Area 7	97
Area 8	102
Area 9	104
Area 10	101
Area 11	99
Area 12	102
Area 13	103
Area 14	93
Area 15	104
Area 16	103
Area 17	98
Area 18	99
Area 19	103
Area 20	98
Area 21	103
Area 22	105
Area 23	104
Area 24	102
Area 25	87
Area 26	103
Area 27	99
Area 28	99
Area 29	98
Area 30	101
Area 31	104
Area 32	104

Planned Parks and Open Spaces

HIGH DESERT PARK SITE

To meet future demand for park and recreation opportunities in the Southeast Expansion Area, the District has identified High Desert Park as a future community park on the existing 33-acre site owned by BPRD in the southeast corner of the Study Area. BPRD acquired the site in 1992 as part of a land swap, which included a deed restriction with Deschutes County stating that the land should be used for public purposes.

BPRD had previously planned for the site to be developed as the High Desert Sport Complex, similar to Pine Nursery or Big Sky Park, with fields and lighting in order to take advantage of the adjacent employment land and transportation network.

The currently undeveloped park site is located outside the District boundary across from the Deschutes County landfill site. It is located one-quarter mile from High Desert Middle School and has native tree and shrub cover and several notable basalt rock outcrops. A TransCanada gas pipeline easement crosses the property. The SEAP will need to evaluate how the park site can work with a future road connection to Rickard Road, as shown on the City's Transportation System Plan Map for the roadway network.

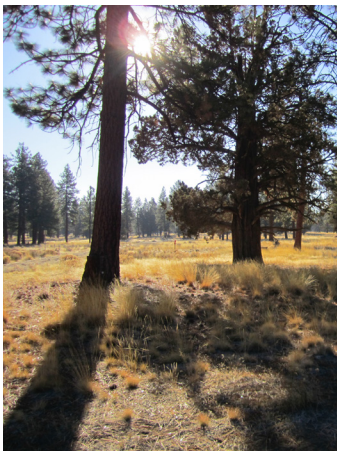
High Desert Park site

ALPENGLOW COMMUNITY PARK

Planning and design for the future Alpenglow Park is currently underway, with estimated completion in 2021. The 37-acre future park site is located west of the study area on the west side of SE 15th Street and is characterized by semi-arid high desert vegetation with mature stands of ponderosa pine, junipers, and a basalt ridge designated as an ASI by the City. The park is planned to include natural areas, large open turf play areas, picnic sites, parking, restrooms, and other unique amenities as identified through the planning, design, and public involvement processes.

Alpenglow Community Park site

Alpenglow Community Park site



Alpenglow Community Park site

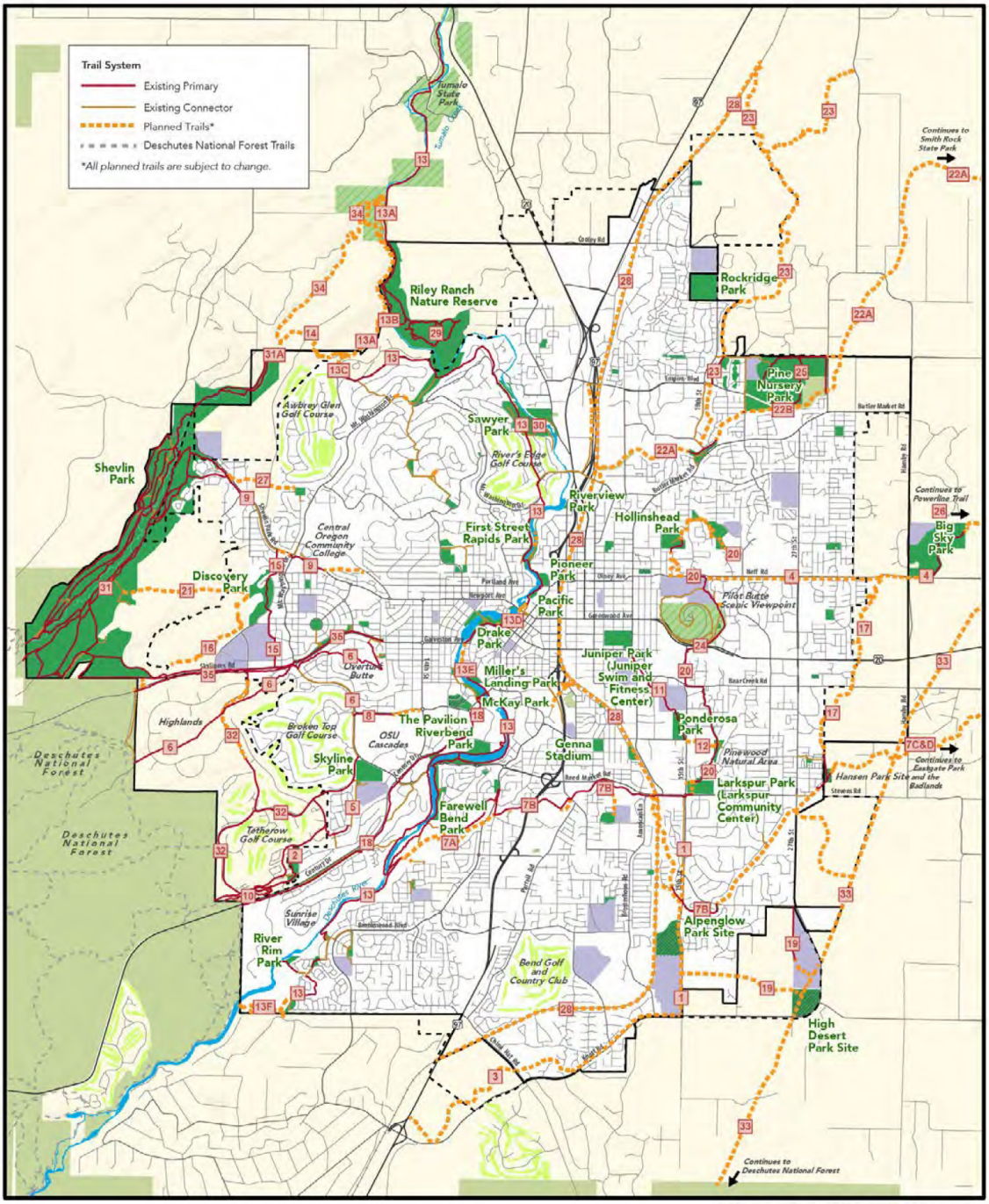
TRAILS

Figure 10 from the BPRD Comprehensive Plan illustrates existing and planned trails in Bend. There is one existing paved trail located inside the Southeast Expansion Area, which runs south from Ferguson Road to the High Desert Middle School (illustrated on Figure 3).

Existing trail looking north

Terminus of the existing trail at High Desert Middle School, looking south

Figure 10. Bend Park & Recreation District Comprehensive Plan - Trails Plan



Trail Plan Map #	Page #
1- 15th Street Trail Connector	114
3- Arnold Canal Trail	97
4- Big Sky Park Trail	114
7A- Central Oregon Historic Canal Trail (COHCT) Blakely Rd. to Deschutes River Trail (DRT)	88
7B- COHCT Blakely Rd. to Hansen Park	88
7C- COHCT Hansen Park to Eastgate Park	88, 114
7D- COHCT Eastgate Park to the Badlands	88, 114
8- Century Trail	114
9- COCC Shevlin Trail	114
12- Coyner to Larkspur Connector	114
13A- Putnam to Riley Ranch Nature Reserve (RRNR) Bridge	89
13B- DRT Trailhead	89
13C- Kirkaldy to Putnam	89
13D- Drake Park to DRT	89
13E- Galveston to Miller's Landing	90
13F- South UGB DRT	90, 108
14- DRT Connector to Shevlin Park	107
16- Discovery West Trail	97
17- Hansen to Big Sky Trail	101, 116
18- Haul Road Trail	91
19- High Desert Park Trails	98
21- Manzanita Trail	101
22A- North Unit Canal Trail	99
22B- Pine Nursery North Unit Canal Bike/Pedestrian Bridge	100
23- Pilot Butte Canal Trail	100
26- Powerline Trail	108, 114, 116
27- Quail Trail	105
28- Rail with Trail Corridor	114
31A- Shevlin Park North – Tumalo Creek Bike/Pedestrian Bridge	106
33- TransCanada Trail	106, 116
34- Tumalo Creek Trail	108

MAP 4: Trail Plan

Planned Trails

HIGH DESERT PARK TRAILS (TRAIL PROJECT #19)

BPRD plans develop two sections of trail connecting to the High Desert Park site. One section will connect from the future TransCanada Trail alignment in High Desert Park (discussed in more detail below) to the SE 15th Street and the planned 15th Street Trail. The second section is a continuation from existing trail from Ferguson Road to High Desert Middle School, connecting to the future TransCanada Trail and continuing south to High Desert Park. These planned trails would provide key pedestrian connections to and through the Study Area.

TRANSCANADA TRAIL (TRAIL PROJECT #33)

This trail, shown in Figure 10, is planned to run adjacent to the TransCanada high pressure gas line easement that crosses through the High Desert. The trail would connect to U.S. Forest Service (USFS) land to the south and to the Department of State Lands (DSL) property to the north. This trail project is not in the District's Capital Improvement Program (CIP) as it is expected to require more time than the 10-year planning horizon of the BPRD Comprehensive Plan.

15TH STREET TRAIL CONNECTOR (TRAIL PROJECT #1)

This trail, shown in Figure 10, would run parallel to SE 15th Street. Because it would be located within the City or County right-of-way, segments of this trail would not be developed or operated by BPRD but is still shown on the District's map because of its connection to other BPRD-operated trails. BPRD will build and maintain the portion of the 15th Street Connector Trail along Alpenglow Park and north to the Central Oregon Historic Canal Trail. This trail connection would provide important pedestrian access from the Southeast Expansion Area to other parts of the City.

ARNOLD CANAL TRAIL (TRAIL PROJECT #3)

The planned Arnold Canal Trail, shown in Figure 10, would run parallel to Arnold Irrigation Canal Trail through southeastern Bend. The trail would start at Highway 97 and connect to the 15th Street Trail Connector at the intersection of SE 15th Street and Knott Road in the southwestern corner of the Study Area. BPRD hopes to designate this planned trail for off-leash dog use in order to meet the public's unmet need for an off-leash dog trail within the District.

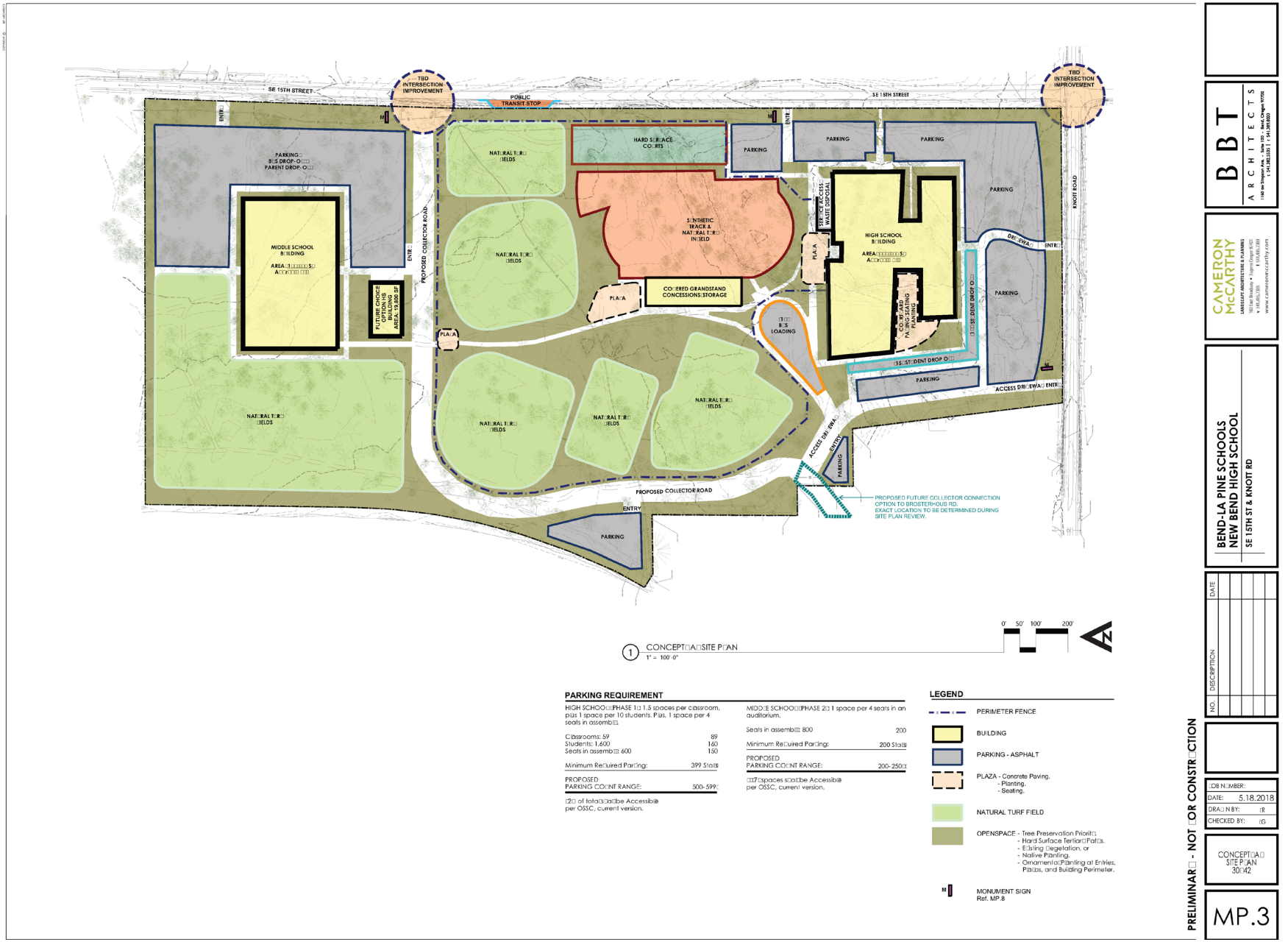
SCHOOLS

In 2017, the Bend-LaPine School District revised their adopted 2016 Sites and Facilities Report , which includes an inventory of existing elementary, middle, and high schools and projected future needs. The inventory shows 74.5 acres of the Southeast Expansion Area are currently owned by the District. The northern portion of this ownership is occupied by the High Desert Middle School. The southern portion of the site—approximately 30 acres bordering the High Desert Park Site to the south—is currently vacant and designated Mixed Employment.

The District recently received land use approval for a new high school and middle school to be located west of SE 15th Street (Figure 11). Planning for the high school is underway and is expected to be open as soon as the fall of 2021. As part of the development of this project the District plans to build a roundabout at the intersection of SE 15th Street and Knott Road, which is a project need that has been identified through the City's Transportation System Plan (TSP) update process.

East of 15th Street, the District has identified 21 acres for a future elementary school in the DSL expansion area located northeast of the Study Area (shown on Figure 1). Another elementary school will be needed in the Southeast Expansion Area to serve future residents.

Figure 10. Bend-La Pine School District Future Middle and High School Conceptual Plan



EXISTING AND PLANNED TRANSPORTATION CONDITIONS

The Southeast Expansion Area is bordered by Knott Road to the south, and SE 27th Street to the east. SE 15th Street runs north-south along the westernmost edge of the study area, and Ferguson Road runs east-west to the north. Rickard Road connects to SE 27th Street/Knott Road at the High Desert Park site and continues southeast outside the UGB. Only three local roads—Raintree Court, Diamondback Lane, and Cabin Lane—currently extend into the Study Area, which otherwise lacks an internal street network.

SE Knott, SE 15th, and SE 27th are designated as Minor Arterial streets in the Bend TSP. Ferguson and Rickard Roads are designated as Collectors. The TSP also identifies several future collectors through the Study Area to serve local circulation and reduce reliance on the higher speed arterial streets. The alignment of the future collectors within the Study Area are preliminary and will be refined during the SEAP process. Additionally, the SEAP process may consider a new “Neighborhood Collector” classification for internal streets running east-west through the study area. A number of these key roadways have been identified as needing safety and capacity improvements and upgrades, and as previously rural streets, they will likely need to be improved to the urban standard.

TRANSPORTATION SYSTEM PLAN PROJECTS

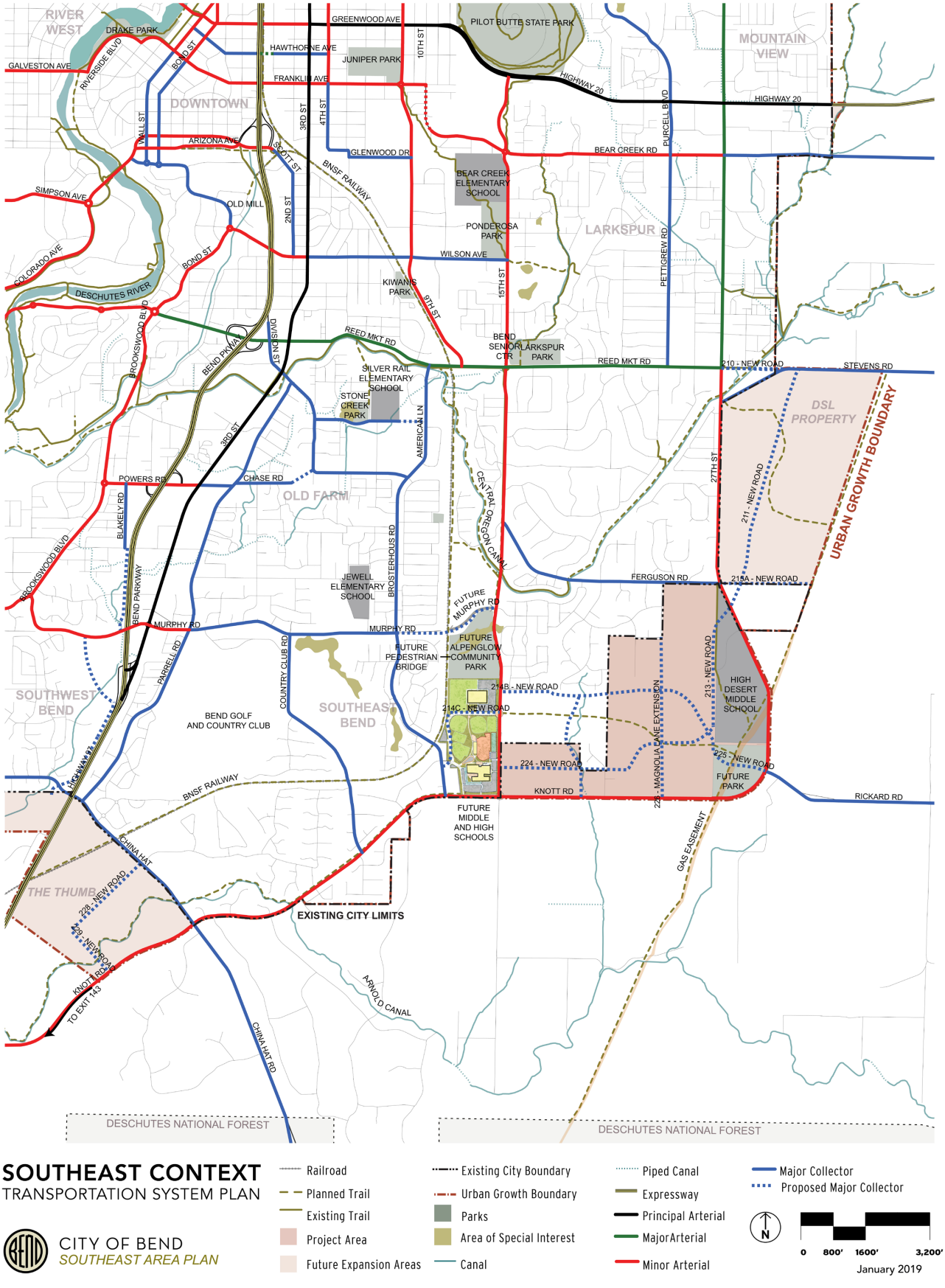
The City's adopted Transportation System Plan (TSP) , completed in 2001 and updated in 2016, identifies ten new roadway projects connecting to and through the Southeast Expansion Area, as shown in Figure 12 below. These projects include:

- Extension of Murphy Road to SE 15th Avenue
  - Work planned for summer 2019 through summer 2021
  - This extension is critical to improving response times for police and fire, as well as services for parks and schools
- 211 – New Collector Road
- 213 – New Collector Road
- 214, 214 b, and 214c – New Collector Road
- 215a – New Collector Road
- 224 and 224a – New Collector Road
- 225 – New Collector Road
- 226 – Extension of Magnolia Lane
- 234 and 235 – Extension of Raintree Court

The City is currently in the process of updating their TSP , which is expected to be completed and adopted by February 2020. The Southeast Area Plan and the TSP update are being conducted in close coordination by City staff, and projects and recommendations from both projects will inform each other throughout the process.

Pavement conditions on Raintree Court

Figure 11. Transportation System Plan Street Classifications and Projects in Southeast Bend



ACTIVE TRANSPORTATION CONDITIONS

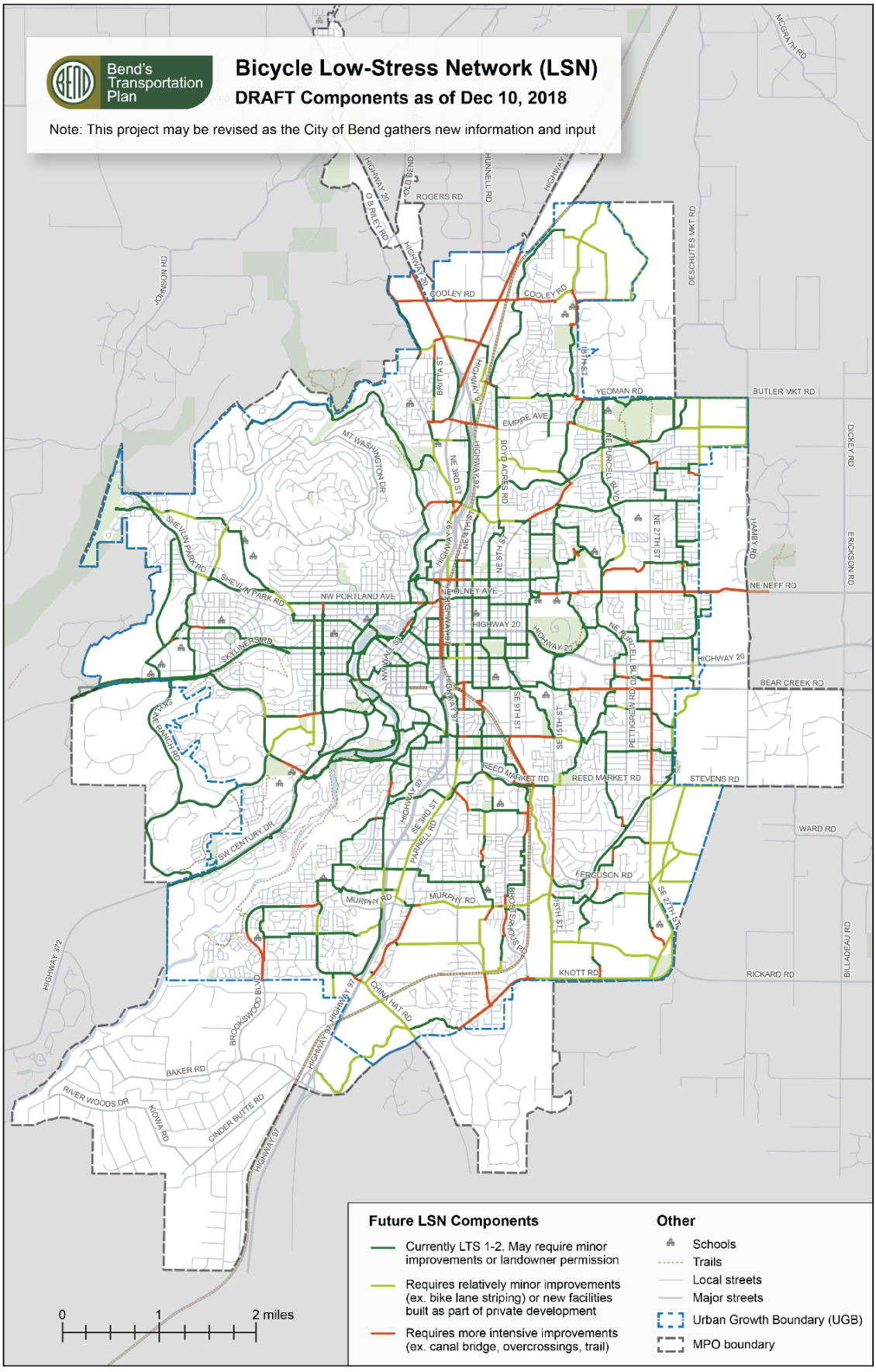
Low Stress Bike Network

The Low-Stress Bicycle Network (LSN) is a proposed future network of bikeways that would enable more Bend residents to get around the city safely and comfortably by bike. The network consists of bicycle facilities that are typically south after by the average person when considering a trip by bicycle, such as off-street paths and trails. The LSN takes a systematic approach to provide bicycle infrastructure using cost-effective design techniques on routes intersections, and roadways crossings in order to enhance safety, increase ridership, and facilitate livability in the City of Bend. The low-stress network, including recommended projects, implementing policies as well as design guidelines and standards, is being considered as part of the TSP update process.

The Southeast Expansion Area, given its location outside of current city limits and undeveloped nature, does not include many low-stress bicycle facilities. Existing facilities for cycling are primarily shoulder lanes on high-speed streets, as shown in the image below. There is currently just one facility within the expansion area that is identified as part of the low-stress network. This facility is the paved path that runs south from Ferguson Road to the High Desert Middle School. This path dates back to the 1980's; however, it has remained isolated and is not adequately connected to existing nearby neighborhoods. Through the area planning process, there will be an opportunity to identify and plan low stress bicycle routes in the expansion area and connections into the larger city network of low-stress bicycle routes.

Knott Road looking west

Figure 12. Draft Low Stress Network Map



Walksheds and Bikesheds

The typical walkshed is defined as a 5-minute, or ¼-mile walk, often expressed as a radius from or to destinations. This can serve as a useful structure for neighborhood planning by organizing neighborhoods around convenient walks to retail, neighborhood parks, transit stops and other neighborhood destinations. A wider radius, up to 15 minutes, could be considered for walking to larger community parks and schools—such as those planned west of SE 15th Street—and could also guide the shaping of 'safe routes to school' within that radius. Natural features such as trees groves or rock outcrops, canals, and major roadways can all present challenges to direct walking and biking routes, but in the Southeast Expansion Area topography is likely the primary constraint to access, especially across the steep ridges that run north-south from Knott Road.

Bikesheds tend to be more difficult to quantify due to a wide range in users' abilities, speeds, and the purpose of rides (i.e. for leisure, exercise, or commuting) but a standard bikeshed is commonly defined as a 15-minute bike ride at 10 miles per hour, or approximately 2.5 miles (roughly the distance from the Old Mill District to Alpenglow Community Park). Anecdotally, children bike across the Study Area on mountain bikes from The Bridges subdivision to High Desert Middle School, which is roughly a one-mile distance. The Southeast Area Plan can consider and include safe bike routes throughout because the entire Study Area is within a reasonable biking distance to the future Alpenglow Park and future middle and high schools on SE 15th Street.

Cyclist on Knott Road

UTILITIES

WATER

Avion Water

Avion Water is the primary water provider for the Southeast Expansion Area. They recently constructed a new well on China Hat Road and are planning to extend a 24-inch water line that currently runs along Knott Road to the north and east to provide additional capacity for future growth on the east side of Bend. A map of Avion Water lines is shown in Figure 13

Arnold Irrigation District

Arnold Irrigation District (AID) is the irrigation district delivering irrigation water to areas in the south of Bend and south of the city limits, including the Southeast Expansion Area, which falls within AID's zones 1 and 3 (Figure 14). AID has a lateral, referred to as the Ladera Lateral that runs north of Knott Road into the Southeast Expansion Area.

Drinking Well Locations

The study area contains a few private drinking water/irrigation wells, shown in Figure 15. The locations of these wells were recently field verified by City staff. For larger wells, such as those owned by the City of Bend, Avion Water, or Roats, surveys are done to model wellhead protection areas. If a water quality pollutant were to reach the underground drinking water aquifer, there is a period of time that pollutant could potentially be expected to be drawn up into the well. These are expressed typically as 1-year, 2-year, 5-year, or 10-year time of travel areas. For smaller wells that are not formally modeled, the State places a 500-foot wellhead protection buffer around the well. Figure 15 demonstrates the mapped locations of water and irrigation wells within and adjacent to the Southeast Expansion Area.

Oregon well construction standards (OAR 690-210-0030) require wells to be drilled at least fifty feet away from storm drainage systems (except for rain water gutter downspouts and drains that can be closer). However, other Oregon Administrative Rules (OAR 340-44) state that any stormwater Underground Injection Controls (UIC), such as dry wells or drill holes, cannot be located within 500-feet of a drinking water/irrigation well without a permit. Most UICs are able to obtain rule authorization rather than a permit, but this is not available if the UIC is within 500 feet of a domestic, irrigation, or industrial water supply well. In Bend, per Bend Code Title 16, if a water well is placed in a location that makes an existing stormwater drywell no longer able to be rule authorized, then the UIC owner can seek payment from the water well owner for the difference in cost between the rule authorization and permit compliance requirements.

These well locations are important to consider as road alignments and necessary stormwater drainage and infrastructure within the project area are identified. The City often uses dry wells or drill holes to manage stormwatetr. These will not be allowed within the 500 foot protection buffer of these verified well locations.

Figure 13. Avion Water Company Line Sizes

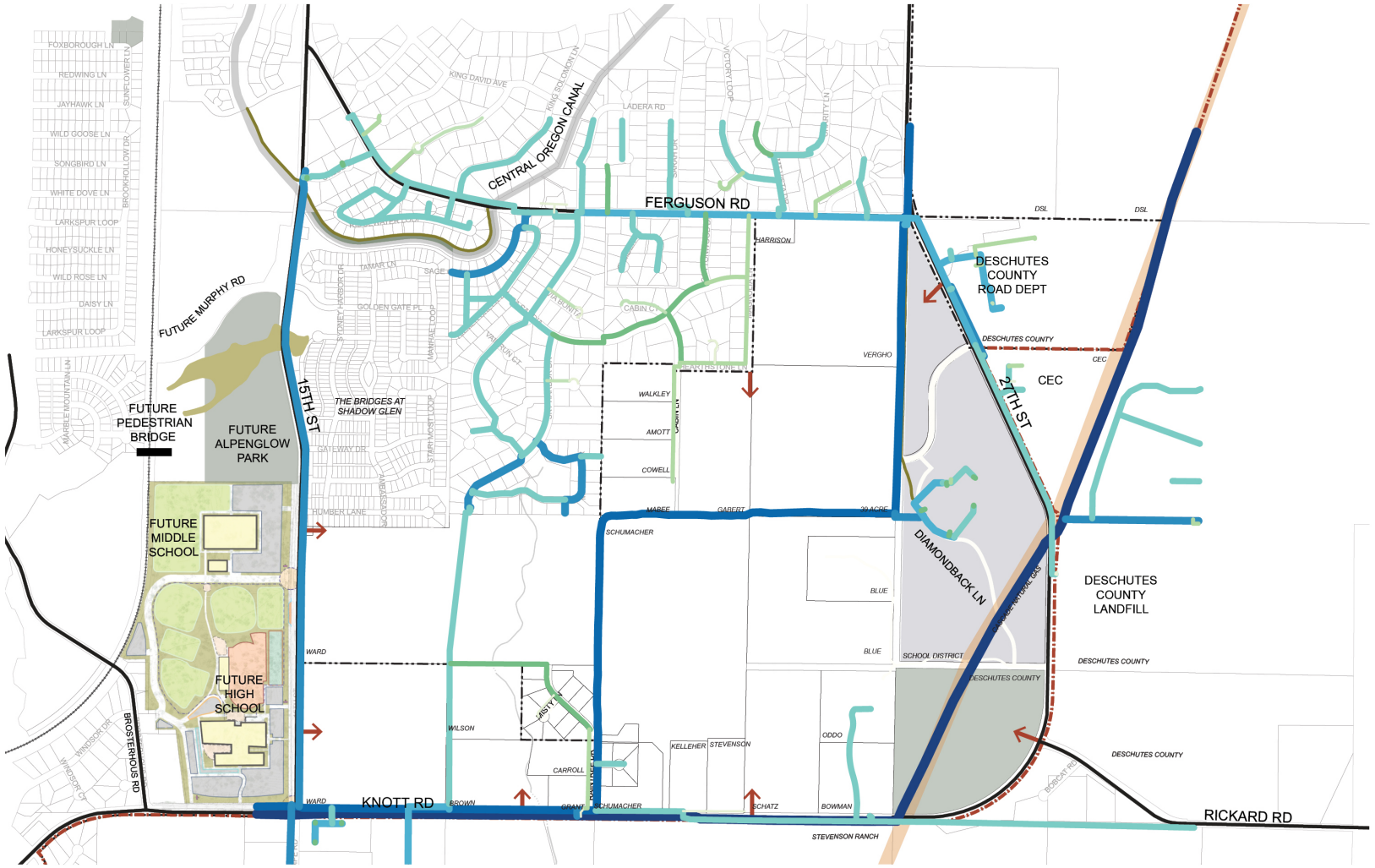


Figure 14. Arnold Irrigation District Map

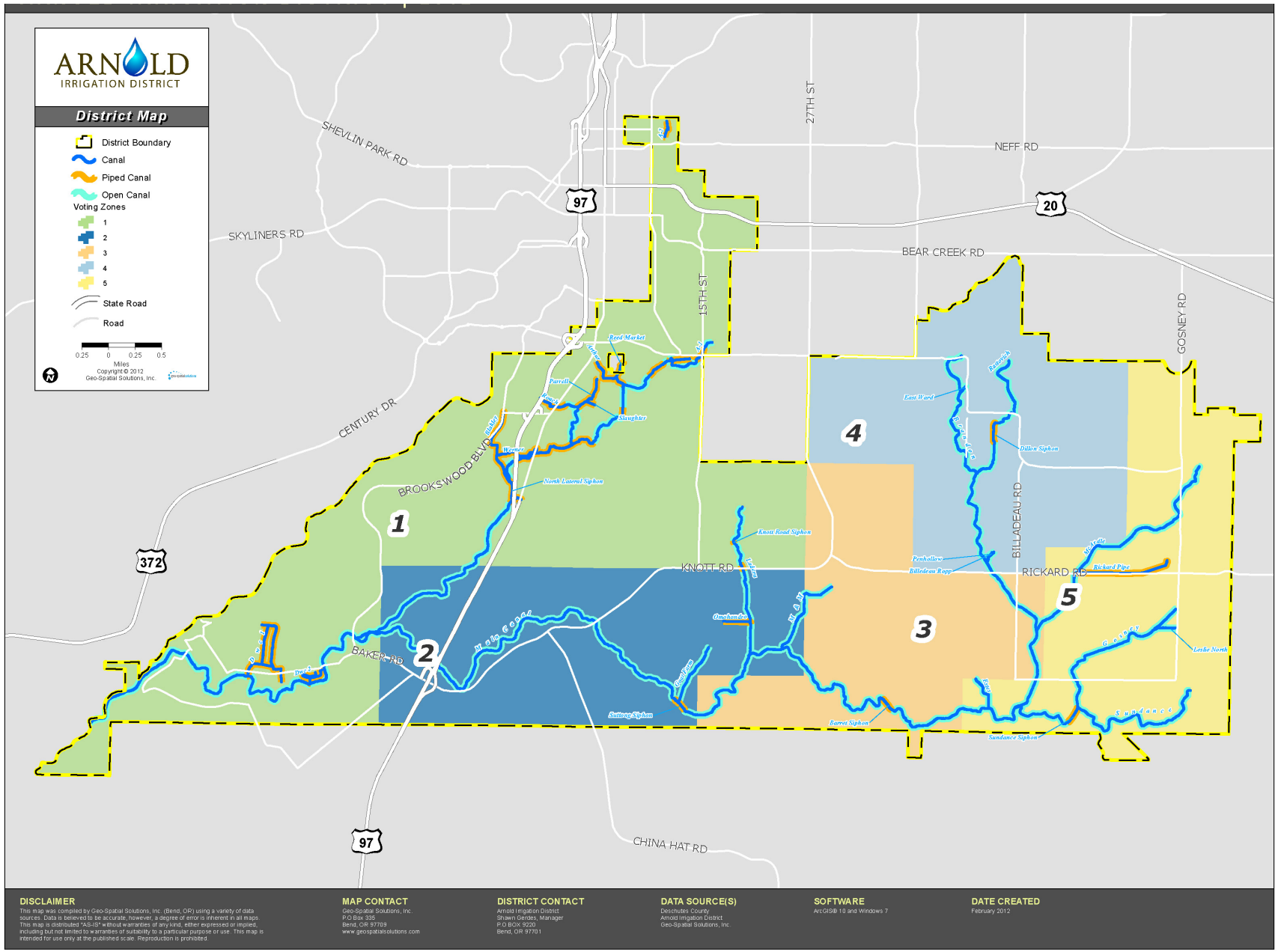
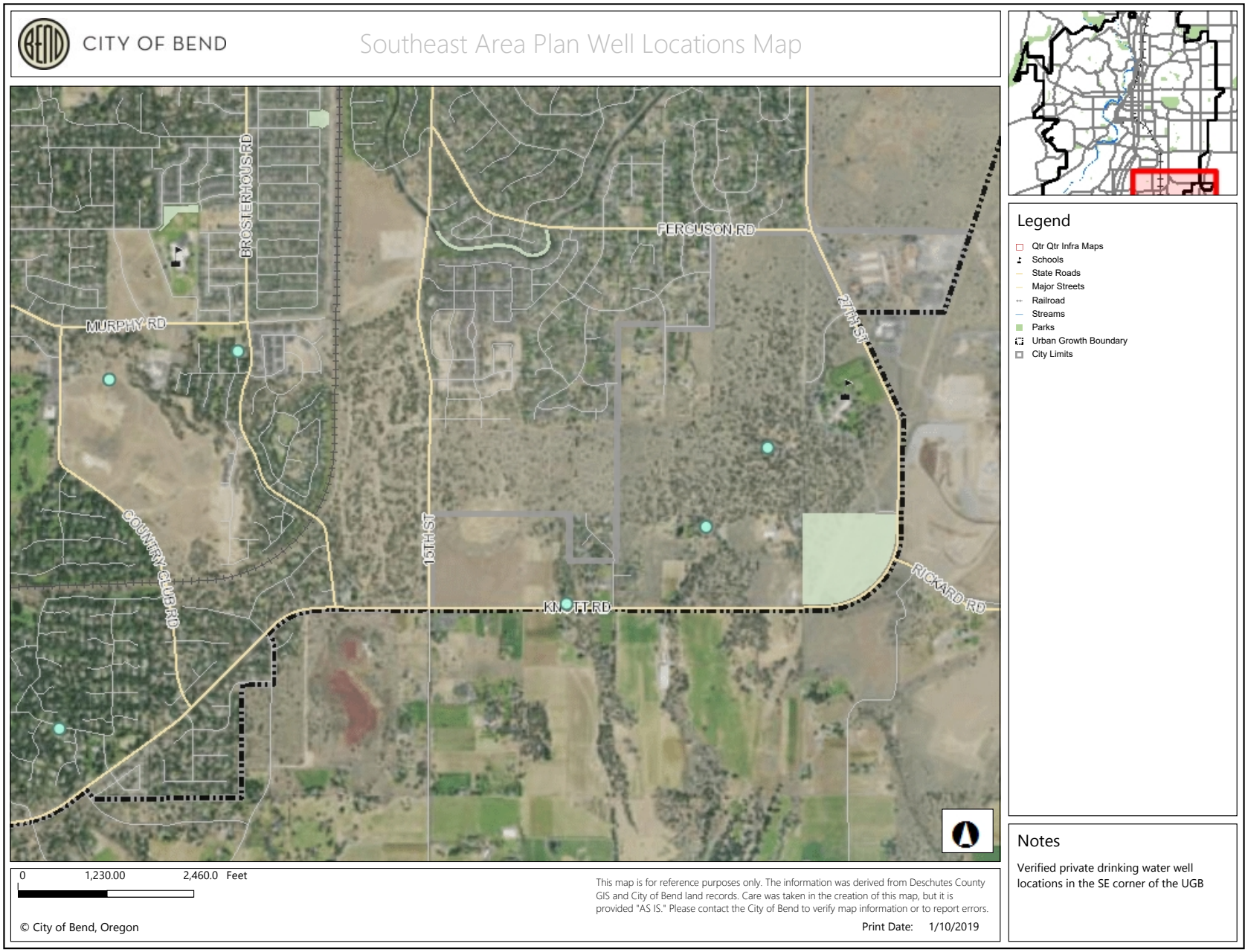


Figure 15. Verified Drinking Well Locations



STORMWATER

Discussions with City staff have identified a need to determine the lowest point for a future regional stormwater retention pond to serve the area.

SEWER

An existing sewer collection pipe runs along SE 15th Street adjacent to the study area and is expected to have the capacity to serve the first phases of development in the Southeast Expansion Area.

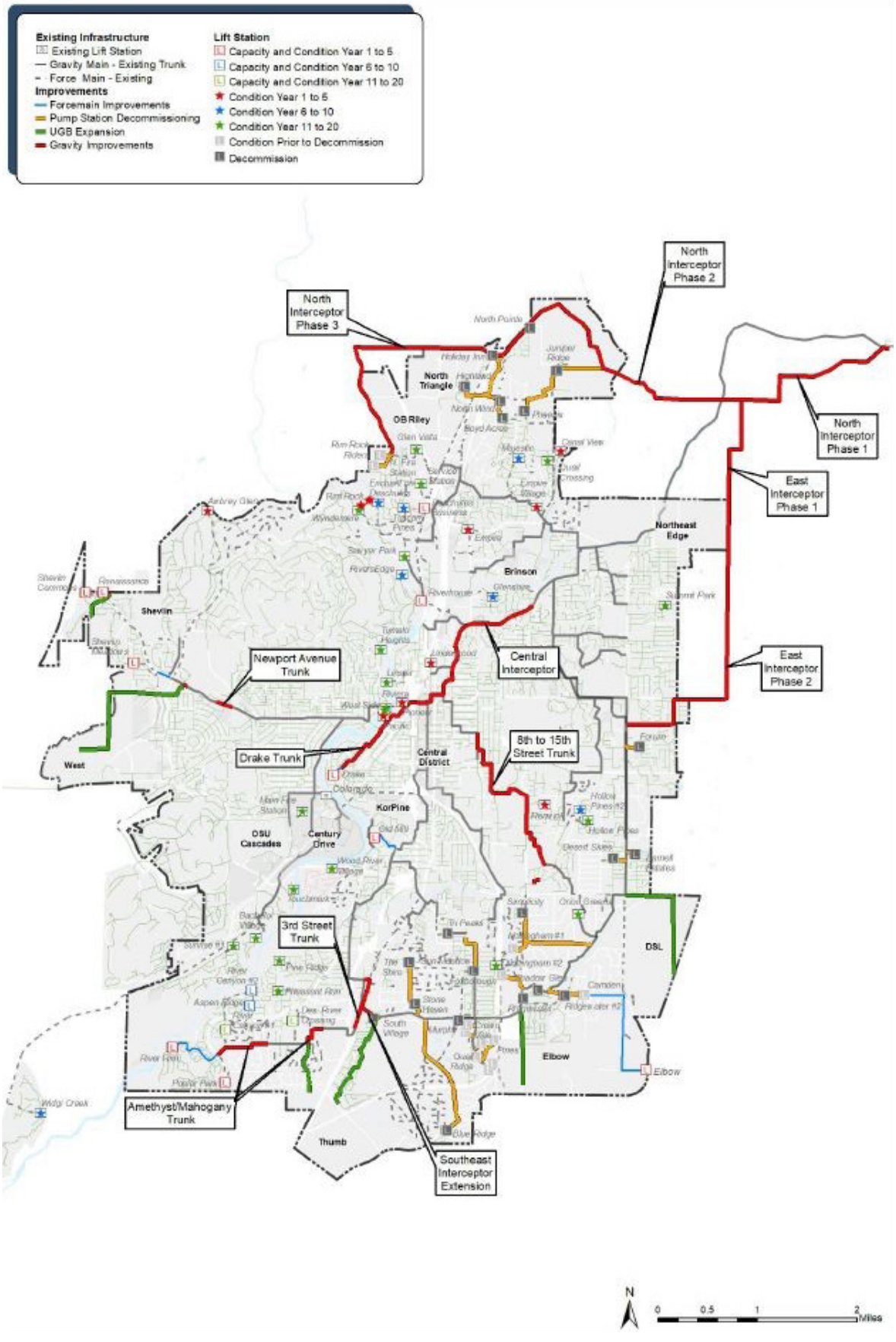
Projects identified in the 2018 Collection System Public Facilities Plan (CSPFP) to serve the Southeast Expansion Area include :

- Portion of Southeast lift station decommissioning
- Local gravity trunk extension (expected to be built by the School District)
- Local lift station and force main
- East Interceptor Phase 2 (required for buildout growth in southeast Bend; likely a 10+ year project)

The City also recently-completed construction of the Southeast Interceptor (SEI), a multi-purpose infrastructure addition to the City's sewer collection system that provides capacity for future development in southeast Bend.

The City of Bend has an on-call contract with MurraySmith and Associates (MSA) for future sewer modeling, and creation of a sanitary sewer plan to support the SEAP land use designations.

Figure 16. City of Bend 2018 Sewer/Collection System Public Facility Plan CIP Overview



TRANSCANADA NATURAL GAS PIPELINE

The TransCanada Natural Gas Pipeline is a high-pressure natural gas pipelines that extends between Kingsgate, British Columbia and Malin, Oregon, traversing a distance of 612 miles. A portion of the pipeline extends through the Southeast Expansion Area along an 83.75-foot land easement bisecting the High Desert Park Site. The pipelines that pass through the southeast corner of the Study Area consist of 36-inch and 42-inch diameter pipelines. TransCanada has specific design standards for roadways that cross the easement and TransCanada staff regularly work with engineers and developers on pipeline corridor and crossing agreements to ensure no adverse effects on the pipelines. The 83.75-foot land easement (see Figure 3) is demonstrated but not exact, so surveying prior to development will be required. TransCanada will cover the cost of surveying, with the exception of the cost of acquiring a Hydrovac excavation vehicle, which will be borne by a developer. It will be important to consider the location of the TransCanada pipeline and the design costs of crossing the easement when planning for future roads and development in the area.

CASCADE NATURAL GAS

Cascade Natural Gas (CNG) holds the role of distributing natural gas to the City of Bend, Cascade Natural Gas has a regulator, odorizing, and gate station located on the Bend Bowmen Club property (see Figure 3) on Knott Road. Their land easement consists of a gated area surrounding these facilities. The CNG easement connects to the TransCanada pipeline and to Knott Road. Existing CNG easements should be protected through the Southeast Area Plan process.

CNG odorizing facility on Knott Road

SOCIAL AND ECONOMIC CONDITIONS

The Southeast Area Plan project area has been developed with a rural residential development pattern that includes several public facilities. The project area includes a total of 21 existing single-family dwellings. There are no multifamily attached or other forms of housing in the project area.

In addition to the dwellings, there are two existing businesses, High Desert Veterinary and Bend Pet Resort. High Desert Veterinary is small animal and equine hospital. The Bend Pet Resort provides pet and dog boarding, along with grooming and training services.

High Desert Middle School is located off of 27th Street and accessed by Diamondback Lane. In addition to the school, the Bend Bowmen, an archer and bow hunting club, have a club house for their events within the expansion area on Knott Road.

With respect to the existing population, the City estimates that around 51 to 52 people live within the project area. This estimate is based on the assumptions of 2.45 persons per household and all residences occupied .

Appendix E - Market Analysis Snapshot

SOUTHEAST AREA PLAN
MARKET ANALYSIS SNAPSHOT

Bend is growing and changing

67,000
New residents forecasted to move to Bend between 2020 and 2040[1]

58%
Increase in the number of jobs in Bend since 2000[2]

"Bend is on the map! People want to live in Bend, but it is increasingly becoming less affordable."
- Project stakeholder

2,300
New households have formed in Bend since 2010[3]

The Southeast Expansion Area provides opportunities for...

...new businesses

52%
Land designated for commercial, industrial, and mixed employment uses

1-2
The majority of Bend businesses are small businesses, with just 1-2 employees on average[4]

Small businesses *present opportunities for economic growth in Bend. Mixed employment zones and commercial and industrial areas will provide opportunities for the flexible space demands of these small, but important, businesses.*

...new homes

25%
Land designated exclusively for residential uses, with capacity for about **820 housing units***

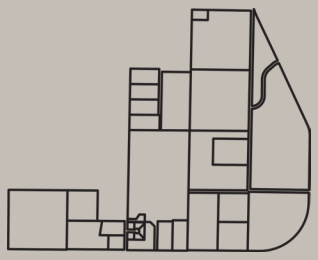
**Mixed employment designation also allows residential uses*

...housing choices

16%
Increase in the median sale price of homes since the beginning of 2017[5]

SOUTHEAST EXPANSION AREA

"The Elbow"



479 **ACRES**

31 **PARCELS**

27 **PROPERTY OWNERS**

"The Southeast Expansion Area is not a destination now, but it could one day serve as a community hub."

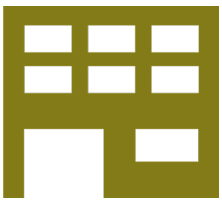
...new parks and schools

New schools and parks in and adjacent to the Southeast Expansion Area will create momentum for new development and will serve as community activity centers.

CITY OF BEND
SOUTHEAST AREA PLAN

Market Implications for the Area Plan

Industrial development such as small warehouses, manufacturing, and 'flex' development (a flexible blend of office and industrial uses) is seeing increased demand in Bend, and the Elbow could be an option for accomodating that demand



Office uses such as neighborhood services (accountants, dental offices, etc.) will rely upon surrounding residential uses and have limited market potential in the near-term until housing and transportation infrastructure has been built

Retail development is heavily reliant upon future residential development and infrastructure; once housing and transportation infrastrucutre has been built, there is market potential for neighborhood-scale and destination retail in the mid- to long-term

Affordable housing will require targeted implementation strategies and actions. To realize affordable housing development in the Southeast Expansion Area, the City will need to use many of its available tools and incentives.

Single-family housing development is the most likely to be successful due to high demand and relatively low development costs; most new residential construction in Bend remains single-family housing

Multi-family and "missing middle" housing (such as garden-style apartments, townhomes, and duplexes) may be limited in the near-term, but market potential will continue to grow as the Southeast Expansion Area becomes more of a recognizable neighborhood

[1] Source: Portland State University Population Research Center
[2] Source: U.S. Census Bureau, 2000 Decennial Census
[3] Source: U.S. Census Bureau, 2010 Decennial Census
[4] Source: Bureau of Labor Statistics, Quarterly Census of Employment and Wages Data
[5] Source: Central Oregon Association of REALTORS, 2017 Report

DRIVERS OF SUCCESS

Realizing the development of any land uses in the Southeast Expansion Area will require substantial infrastructure investment, and decisions regarding where and when that infrastructure investment is made.

Appendix F - Southeast Expansion Area Market and Land Use Analysis

Bend
Southeast Expansion Area
Market and Land Use Analysis

January 07, 2018

Prepared for:

City of Bend

CITY OF BEND
SOUTHEAST AREA PLAN

***Final* REPORT**

ECONorthwest
ECONOMICS • FINANCE • PLANNING

KOIN Center
222 SW Columbia Street
Suite 1600
Portland, OR 97201
503-222-6060

Acknowledgments

For over 40 years ECONorthwest has helped its clients make sound decisions based on rigorous economic, planning, and financial analysis. For more information about ECONorthwest: www.econw.com.

ECONorthwest prepared this report for the City of Bend. It received substantial assistance from Angelo Planning Group, City of Bend Staff, and numerous Bend community members, business owners, property owners, and other stakeholders.

That assistance notwithstanding, ECONorthwest is responsible for the content of this report. The staff at ECONorthwest prepared this report based on their general knowledge of real estate economics and on information derived from government agencies, private statistical services, the reports of others, interviews of individuals, or other sources believed to be reliable. ECONorthwest has not independently verified the accuracy of all such information and makes no representation regarding its accuracy or completeness. Any statements nonfactual in nature constitute the authors' current opinions, which may change as more information becomes available.

For more information about this report:

Lorelei Juntunen
juntunen@econw.com
KOIN Center
222 SW Columbia Street
Suite 1600
Portland, OR 97201
503-222-6060

Table of Contents

1 EXECUTIVE SUMMARY 3

1.1 DEVELOPMENT OPPORTUNITIES AND CONSTRAINTS 4
1.2 SUMMARY: REAL ESTATE MARKET OUTLOOK 7
1.3 FINDINGS ABOUT LAND USE TYPES 9
1.4 MARKET POTENTIAL FOR SPECIFIC DEVELOPMENT TYPES 10
1.5 IMPLICATIONS FOR THE SOUTHEAST EXPANSION AREA PLAN 14

2 INTRODUCTION 17

2.1 PURPOSE AND BACKGROUND 17
2.2 DATA, METHODS, AND STAKEHOLDER INTERVIEWS 19

3 MARKET AREA ANALYSIS 21

3.1 DEMOGRAPHIC TRENDS 21
3.2 ECONOMIC TRENDS 24

4 REAL ESTATE ANALYSIS 28

4.1 COMMERCIAL REAL ESTATE TRENDS 28
4.2 RESIDENTIAL REAL ESTATE TRENDS 47

5 CONCLUSIONS FOR MARKET POTENTIAL 57

5.1 REAL ESTATE MARKET OUTLOOK 58
5.2 IMPLICATIONS FOR SOUTHEAST EXPANSION AREA LAND USE DESIGNATIONS 60

This page intentionally blank

1 Executive Summary

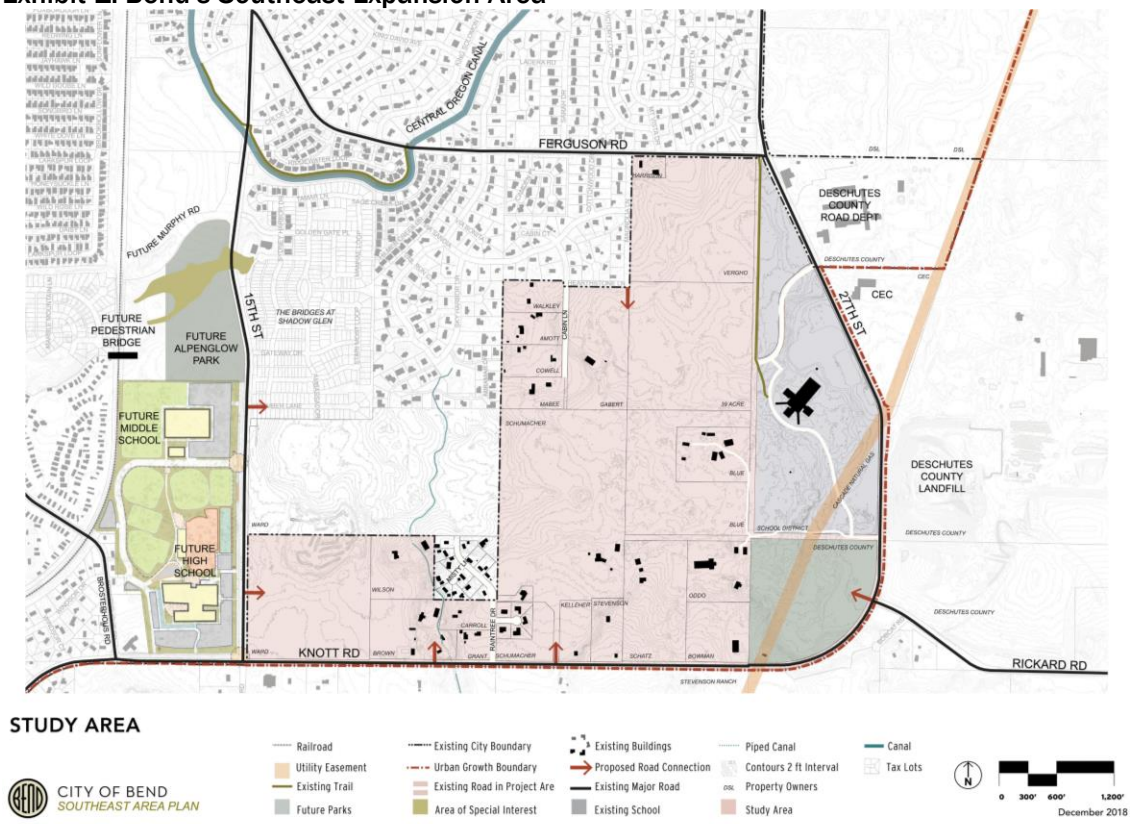
"The goal of this plan is to encourage the development of a complete community (a place where people can live, work, shop and play) in the southeast area of Bend."
CITY OF BEND, SOUTHEAST EXPANSION AREA PROJECT WEBSITE

ECONorthwest is a subcontractor to Angelo Planning Group (APG) on a City of Bend contract to evaluate the market potential for the Southeast Area Plan. The project area, known as the Southeast Expansion Area, or "The Elbow," consists of 479 acres that lie outside of the City limits in the southeast corner of the Urban Growth Boundary (UGB). It is planned to be a significant area of development for the City in the next decade and beyond.

The City would like to see the Southeast Expansion Area redevelop as a mixed-use employment and housing hub that can serve the needs of existing and future residents and employers. Phased development of the area will require a substantial investment in transportation and utility infrastructure, new public facilities such as parks and schools, and the coordinated action of many public and private partners, including 27 separate property owners. This analysis supports decision-making regarding development opportunities. Its purpose is to:

1. Outline the development opportunities and constraints that the City and its partners need to address to achieve the Comprehensive Plan goals for the expansion area.
2. Help stakeholders understand the form and scale of development that is likely to be possible in the expansion area given market conditions and trends.

Exhibit 1. Bend's Southeast Expansion Area



Source: City of Bend, Walker Macy

1.1 Development Opportunities and Constraints

This section presents an overview of some of the opportunities and constraints that participating partners will need to address in order to implement the City's goals for the expansion area. Citywide and local market trends suggest that the Southeast Expansion Area is well-positioned to develop into a complete community, provided that planning for the area can address and overcome infrastructure and other barriers to development.

Opportunities that Support Future Development

Citywide
Bend is well-positioned for economic growth, given the following growth factors: ▪ **Rapid population growth.** Since 2000, the population in Bend grew by 67 percent and is forecast to continue growing at an average annual growth rate of 2.5 percent. By 2040, the City is forecast to reach 154,000 people. ▪ **Quality of life.** Bend is attractive, located in a scenic, high-desert environment with ample access to outdoor recreation. ▪ **Accessibility.** Bend is reachable by major state highways and has good commercial air service. Accessibility will continue to improve as existing efforts to improve infrastructure systems are on track to accommodate increased usage.

- **Active real estate market.** Growth in Bend's real estate market is steady; residential development is increasing and most commercial real estate sectors are seeing low vacancies and increasing rents.
- **Job growth.** The number of jobs in Bend has increased by 58 percent since the year 2000. Local business are expanding and workers and independent contractors continue to move to the City—many state that they are attracted to the area given its high quality of life and plentiful outdoor amenities.

Southeast Expansion Area

The Southeast Expansion Area is well-positioned to become a community hub.

- **The Southeast Expansion Area is one of Bend's "release valve" expansion areas that has good development potential because infrastructure is more readily provided than in other expansion areas.** Given development pressures affecting the entire Bend community, the Southeast Expansion Area is primed for new development of all kinds, but—due primarily to its geographic location, topography, and planned infrastructure and community amenities—the area is especially ready for future residential development.
- **Employment land is scarce in Bend.** Bend's tight supply of easily developable industrial land means that there are currently few locations for business expansions or relocations. The Southeast Expansion Area provides an opportunity to capture future business growth; especially for mid-sized industrial users, e.g. breweries, small manufacturers, "makers" or craft industrial users, artisans, small inventory warehouses, etc.
- **Potential for a vibrant new "Complete Community" hub.** The lack of community and commercial services in southeast Bend creates an opportunity for a "complete community" hub to serve new and adjacent existing neighborhoods. As envisioned by Bend's Comprehensive Plan[1], complete communities provide a range of housing types, and many essential services and amenities needed for daily living, all connected by walking/biking paths and circulator streets. This concept for the area will also help achieve other City goals related to climate change and transportation options.
- **The foundation of Bend's economy is in small businesses.** Independent contractors, telecommuters, and small niche companies make up a sizeable portion of Bend's economy and many of these small companies are currently expanding. Planned mixed employment zones and commercial and industrial areas will provide opportunities for the flexible space demands of these small, but important, businesses.
- **Planned community anchors create opportunities.** Planned and funded new schools and parks in and adjacent to the Southeast Expansion Area will create momentum for new development and eventually provide community activity centers. These "anchor" locations provide opportunities and focus for capital investments and future area linkages.

Constraints that Limit Redevelopment

Citywide

Bend is one of the fastest growing cities in the country and is facing several growth-related challenges:

- **Lagging housing supply constrains economic development.** Despite an increased number of local housing starts, the housing supply is not keeping pace with the demands of Bend's

[1] City of Bend Comprehensive Plan, Chapter 11: Growth Management, Page 4

ever-growing population. Businesses are being held back because many prospective employees, at all income levels, are unable to find places to live.

- **Tight housing market is decreasing housing affordability for many Bend residents.** Affordable housing is increasingly out of reach for many Bend residents. The imbalance in the housing market—a result of housing development lagging behind housing demand—is raising the cost of housing at all price levels.
- **There are few easily buildable, serviced, large-scale industrial development sites remaining within the City**. The Bend area lacks easily unlocked large-scale industrial development sites. Large sites in expansion areas identified for future industrial development—such as Juniper Ridge and the DSL Area—all face infrastructure-related challenges, to varying degrees.

Southeast Expansion Area

There are several challenges that need to be addressed for the Southeast Expansion Area to develop and thrive:

- **Infrastructure constraints.** The biggest issue facing the City as it explores development in the Southeast Expansion Area is figuring out a cost-effective way to develop the necessary infrastructure in appropriate phases that spreads the cost burden across property owners and does not impede development.
    - **Integration with existing neighborhoods**. Connectivity to adjacent neighborhoods is limited due to the need to build out the transportation network in the area.
    - **Transportation and Access**. While the area has access to major state highways, it needs new roads and internal connectivity that can support a mix of commercial and residential units.
- **Policies to encourage a range of housing types and densities.** Meeting the demands of Bend's growing (and aging) population in the area will require a greater mix of housing types and forms than the market has delivered in southeast Bend in recent years. Further, enabling targeted affordable and workforce housing will be an additional challenge. The City has policies and regulations intended to guide a wide range of housing types, but realizing these developments in the Southeast Expansion Area will take concerted planning and partnerships.
- **Negative perceptions about the distant location of the area.** Prospective developers will need to overcome the stigma about the area's peripheral location. Stakeholders talked about how businesses see it as "way out there." In the current cycle, businesses are generally more attracted to the core and west side areas of Bend.
- **Zoning mismatch with development interest.** Stakeholders have a range of views of the plan zone designations. The City should continue to listen to stakeholders and keep an open mind about refinements to the adopted plan designations, consistent with overall policy objectives in the Comprehensive Plan.

1.2 Summary: Real Estate Market Outlook

Residential Real Estate

The City of Bend has seen increasing population growth and economic expansion since the Great Recession. Bend continues to be among the fastest-growing cities in the United States. These trends have translated to increased housing demand, which has driven up prices for housing above those in other cities in the region and has sparked renewed housing development activity. Like Bend's past trends, many of the City's new residents are older, with no children living at home. However, despite a demographic shift towards smaller households, most new construction remains single-family detached housing. Exhibit 2 provides a brief summary of residential market trends.

Exhibit 2. Bend Region Residential Market Trends

	Market Trends	Deliveries	Demand Drivers
Single-Family	Home prices continue to rise year over year. Housing starts are not keeping pace with housing demand.	After seeing a major slowdown in housing starts during the recession, Bend has seen year over year increases in single-family housing construction.	The primary demand driver is Bend's rapid population growth. Bend continues to see an influx of new residents, many of whom arrive with equity from sales of homes in more expensive housing markets.
Multifamily	Multifamily rents have steadily increased year over year since the recession. Multifamily vacancy has fluctuated over the same time period, but has recently started to tighten up. Bend area multifamily vacancy now hovers around 4 percent—a sign of a relatively tight rental market.	There were few multifamily housing deliveries to the Bend market since the recession until 2016. Since then deliveries have jumped to over 500 units per year. The vast majority of these units are rental units (as opposed to for-sale condominiums).	Bend multifamily rents are still relatively affordable compared to other metro regions in the west, but the overall lag in housing construction—for both rental and ownership housing products—is putting increasing pressure on the multifamily market. Rents are steadily rising as a result.

Source: ECONorthwest, CoStar, U.S. Census

Commercial/Industrial Real Estate

Bend's commercial real estate markets have responded to the rapidly accelerating recovery and expansion of the region's economy. Most markets are seeing shrinking vacancies and increasing rents—a sign of a strengthening real estate market.

Exhibit 3 provides a summary of recent commercial market trends.

Exhibit 3. Bend Region Commercial Real Estate Market Trends

	Market Trends	Deliveries	Demand Drivers
Industrial and Flex	Generally, rents have been on the rise and vacancies have been declining.	Multiple new industrial and flex buildings have been delivered to the Bend market since the recession. In the past decade new industrial development has been focused in the north and central areas of Bend.	Many businesses are expanding but there have been few new businesses moving to the Bend area. Recent leases show a demand for primarily smaller spaces (under 10,000 square feet), with the exception of build-to-suit projects, which tend to be larger (15,000 to 50,000 or more square feet).
Office	Vacancies have fluctuated widely over time and by subarea—the west side of Bend has historically had the highest office vacancies, whereas downtown and 3rd St have had the lowest. Rents have been on a steady rise since 2013.	There have been fewer office deliveries than other commercial real estate markets. The majority of Bend's office space was constructed before 2009. Recent deliveries have been relatively small sized projects of less than 10,000 square feet.	Office market trends are indicative of Bend's diffuse business market—most Bend companies have fewer than nine employees.
Retail	Rents have risen to 10-year highs and vacancies have fallen.	Since 2014, 178,000 square feet of new retail space has been delivered. Much of this retail space has been near Bend's core, and in the northern and western portions of the city.	Bend's retail market has made strong gains since the recession. The local population's relatively high wealth and the thriving tourist economy contribute to a growing retail scene.

Source: ECONorthwest, and CoStar

1.3 Findings about Land Use Types

Based on conversations with local stakeholders and findings from our research into real estate market trends, the Southeast Expansion Area is poised to accommodate a range of new development types. However, each new development type faces a set of market and physical development challenges. Exhibit 4 provides an overview of the general land use types proposed for the Southeast Expansion Area.

Exhibit 4. Land Use Type Potential Summary

Land Use Type	Plan Zone Designations	Research Findings and Stakeholder Input about this Development Type
Commercial		
Office	CG, ME	▪ Challenges to commercial development include high land costs, inadequate utility and transportation infrastructure, high building costs, fees, and lack of other commercial uses to drive traffic.
Industrial	IG, IL	▪ There is no more land that is easy to develop in Bend, despite local business interest in expansions.
Retail	CG, CL, ME	▪ Retail will be necessary to support housing development in the area, but on its own, it is not likely to be successful given the area's location and transportation access. ▪ Housing development will drive the need for retail in this area. ▪ There is an opportunity for a village-style retail hub if the area can attract enough people.
Residential		
Single-Family	RL, RM, RS	▪ Concentrating new housing near schools makes sense, but housing will also need to be located near commercial services. ▪ Rents are increasing, housing is limited, and land is scarce. Residential development needs to occur quickly.
Multifamily	RM, RS, RH	▪ Existing apartments are filling up quickly. ▪ Affordable and workforce housing should be part of the housing mix. ▪ Flexible zoning can allow a mix of higher density residential with employment uses. ▪ Construction costs are high relative to local market desires/demands, complicating efforts to attract financing to multifamily projects.

Source: ECONorthwest interviews with stakeholders

1.4 Market Potential for Specific Development Types

At the highest level, this analysis supports what Bend residents intuitively know: the City's macroeconomic situation is one of growth. Data show that the population is growing rapidly and it is expected to continue to do so in the future. Bend's economy also continues to expand, driven by population growth as workers from elsewhere are drawn to Bend's high quality of life.

The City of Bend Comprehensive Plan provides policy direction for the future of the Southeast Expansion Area. Policy 11-76 of the Plan succinctly describes the goal for future growth to achieve in this UGB expansion area:

"[The Southeast Expansion Area]… is intended to provide for employment uses to take advantage of good transportation access on Knott Road and 27th and existing city streets (and future improved access with the Murphy Extension) with a mix of residential uses providing a compatible transition from the employment lands to existing neighborhoods to the west. This mix of uses is also intended to increase the completeness of the existing low density neighborhoods.[2]"

Overall, our research shows that trends are headed in a positive direction for the planned land uses in the Southeast Expansion Area, and that the overall mix of uses is responsive to market conditions. That said, intentional phasing, investment in infrastructure, and planning for mixes of uses will be critical to successful implementation of the vision for the Southeast Area Plan. Over the course of the area's build-out market conditions are likely to shift, and near-term opportunities may need support to ensure that the long-term vision is achieved. *More detailed discussion is provided in the Conclusion Section of this report (Page 57).*

[2] City of Bend Comprehensive Plan, Chapter 11: Growth Management, Page 32

A Note about The Market Potential Estimates

These market potential estimates were created through a reconciliation of our Bend area market research, our discussions with local stakeholders, and our experience working on similar estimates in other regions.

The timeframes used in these estimates are related to the timing of infrastructure development and pre-development planning for the Southeast Expansion Area. That is, each timeframe is in relation to the initiation—the starting point—of infrastructure and land development in the area. These timeframes are not related to a current day starting point. This is an important distinction. There is substantial work that needs to take place to plan and implement a successful infrastructure plan before development can be initiated.

Market Potential Definitions

High	High market interest. Limited policy support or subsidy needed; that is, the market is likely to develop these uses with little public support.
Medium	Limited to prime locations where development is most likely to occur. Some development in this category are likely to require partnerships and intentional policy focus, e.g. regulations and incentives to promote missing middle housing
Low	Development will require public subsidy and targeted policy focus, e.g. strategic plans, dedicated funding, or specific programs to support these uses.

Market Potential for Commercial Land Uses

Retail

Exhibit 5. Southeast Expansion Area: Market Potential for Retail Uses

Development Type	Plan Zone Designations	Market Potential		
		Near-Term (0-5 years)	Mid-Term (5-10 years)	Long-Term (10-20 years)
Destination Retail	CG	Medium	High	High
Neighborhood Retail/Services	CG, ME	Medium	High	High
Boutique Retail	CG, ME	Low	Low	Medium
Restaurants/Cafes/ Brewpubs	CG, ME	Low	Medium	High
Grocery Stores	CG, ME	Low	Low	Medium

Source: ECONorthwest.

Office

Exhibit 6. Southeast Expansion Area: Market Potential for Office Uses

Development Type	Plan Zone Designations	Market Potential		
		Near-Term (0-5 years)	Mid-Term (5-10 years)	Long-Term (10-20 years)
Live-Work Units	ME	Low	Low	Low
Home-Offices	ME, RH, RM, RS	Medium	Medium	High
Neighborhood Services (Tax services, Dental offices, etc.	CG, ME	Medium	Medium	High
Corporate Offices	CG, ME	Low	Low	Medium

Source: ECONorthwest.

Industrial

Exhibit 7. Southeast Expansion Area: Market Potential for Industrial Uses

Development Type	Plan Zone Designations	Market Potential		
		Near-Term (0-5 years)	Mid-Term (5-10 years)	Long-Term (10-20 years)
Warehouse	IG, IL	High	High	High
Manufacturing	IG, IL	Medium	Medium	High
Distribution	IG, IL	Low	Low	Low
Flex	IG, IL, ME	Medium	High	High

Source: ECONorthwest.

Market Potential for Residential Land Uses

Exhibit 8. Southeast Expansion Area: Market Potential for Residential Land Uses

Development Type	Plan Zone Designations	Market Potential		
		Near-Term (0-5 years)	Mid-Term (5-10 years)	Long-Term (10-20 years)
Single-Family Example: detached single family homes	RS	High	High	High
Multifamily Example: a 20 unit apartment building	RH, RM, RS	Medium	Medium	High
Multifamily Mixed Use Example: a five story building with residential units over a commercial first floor	RH, ME	Low	Medium	Medium
Missing Middle Housing Example: townhomes or a cottage housing cluster	RM, RH	Medium	Medium	High
Affordable Housing* Example: Subsidized low income housing	RS, RM, RH	Low	Low	Low

Source: ECONorthwest. *Note: Affordable housing is a non-market use. Across all timeframes, affordable housing will require targeted strategy and actions to be achievable.

1.5 Implications for the Southeast Expansion Area Plan

There is market support for the land use designations proposed for the Southeast Expansion Area. Our research indicates that there is market support for the land use designations identified by the City for the Southeast Expansion Area. The market potential for each of these land uses varies from use to use and over the 20-year development timeframe.

> **Implication**: The City's vision for a complete community, as implemented through the land use designations, is possible to achieve over the development timeframe, but will require focused attention and investment for successful implementation. Some development types (lower density residential, for example) will require little public subsidy or targeted policy. Others, such as affordable multifamily housing, will require focused action and targeted incentive packages. Understanding that each land use does not begin at the same starting line will help the City guide policies, actions, and incentives to encourage desired land uses and to achieve Southeast Expansion Area policy goals.

Housing development will lead. Given population growth and demand for housing, residential development is likely to be the leading development type in the first phase of development; commercial and employment uses will be a crucial component of the Southeast Expansion Area but will serve to create a complete community and neighborhood amenities that drive housing sales / rents.

> **Implication**: The City should seek to phase infrastructure in a way that provides key connections in the area to support housing, which will likely be developed first, while providing connections to employment sites and mixed-use sites. Residential development in the SE 15th Opportunity Area, adjacent to the Southeast Expansion Area, will go a long way towards "jump-starting" other development by adding roads, water, and sewer infrastructure that can serve adjacent residentially designated land in the Southeast Expansion Area.
>
> Crucial to the success of housing development are new parallel public and private investments in retail, schools, and parks. Housing by itself does not create a sense of place; it needs supportive uses and amenities to attract residents and become a complete community.

Achieving diverse housing types will require intentional action. Without policy and financial support and incentives, multifamily rental or ownership housing, and cottage or missing middle housing types may be limited and/or may not be part of early development phases. While some of these housing types are in high demand across the City, without targeted planning and policy

support, developers may trend toward largely single-family development patterns.

> **Implication**: The City will need to actively plan for select portions of the Southeast Expansion Area to accommodate focused multifamily and/or missing-middle housing types, including accommodations for parking and nearby retail and civic amenities (e.g. parks, trails, etc.). Moreover, the City must continue its efforts to align housing policies with development incentives. Guidelines and regulations can regulate housing sizes, types, and densities; but more focused partnerships and targeted incentives are also necessary to achieve new housing development.

The City will need to take the lead in a proactive infrastructure funding and phasing plan. Some land uses in the Southeast Expansion Area are likely to develop before others but may not always be aligned with the most cost-effective infrastructure investments. Further, some property owners may be more prepared to develop their properties than others. Therefore, infrastructure must be sequenced in a way that successfully supports upcoming development but leverages existing or previous infrastructure investments.

> **Implications**: The City is well-positioned to organize and lead Southeast Expansion Area stakeholders to an achievable and balanced infrastructure development plan. The City should take the lead to develop an infrastructure funding plan that has buy-in from a broad range of stakeholders including property owners and representatives from adjacent neighborhoods, community institutions, and prospective employers. The process of developing that infrastructure plan should be transparent, and seek to balance costs across partners.

Small businesses present opportunities for future economic growth in Bend. The foundation of Bend's economy is in many small businesses. Independent contractors, telecommuters, and small niche firms are common Bend business types. Many of these companies have been quite successful, and in recent years business expansions have been accelerating. The path to success for the Southeast Expansion Area will, in part, rely on supporting these small but crucially important businesses.

> **Implications**: The City should seek policies and plan designations that support development types that allow for flexible spaces and varied uses. Mixed use zones are a start, but ultimately, it will take ongoing engagement and coordination with the local business community to ensure that the Southeast Expansion Area provides the sites and spaces demanded by future businesses.

Bend has a strong and urgent need for more affordable housing. The Bend housing market is increasingly expensive, creating increasing challenges for lower income households. There is and will continue to be demand for affordable housing to serve a range of households of various income levels across the community, including in the Southeast Expansion Area.

> **Implication:** For affordable housing to be successfully developed in the Southeast Expansion Area, the City should consider developing a targeted affordable housing plan. The plan would include a range of policy and incentive measures to guide and encourage affordable housing development. Policy measures in this plan could include targets for the number of units in the area and the depth of affordability of those units. Incentive measures could include land-banking, partnerships, and targeted financial incentives.

2 Introduction

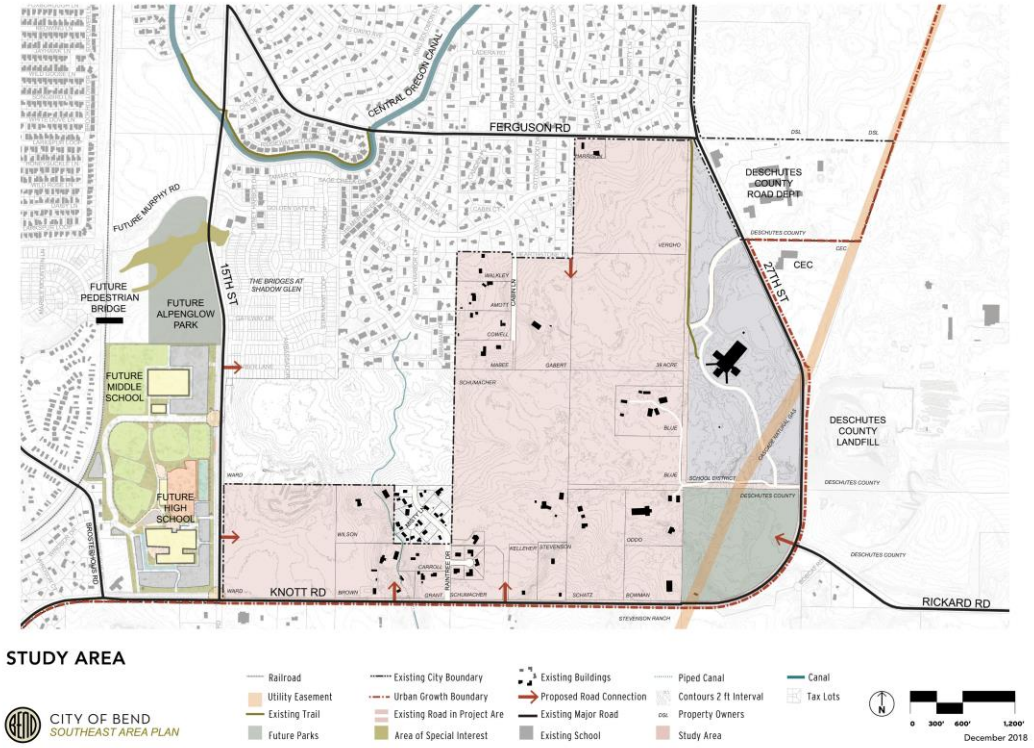
ECONorthwest is assisting a multi-disciplinary team led by Angelo Planning Group (APG) to develop an area plan for the Southeast Expansion Area, a.k.a the "Elbow," in the City of Bend, Oregon. This assessment examines demographic and real estate market trends to identify market support for various land uses allowed by the adopted comprehensive plan designations.

2.1 Purpose and Background

The purpose of this analysis is to identify and refine viable land uses for the Southeast Expansion Area. This report evaluates the market viability of various development types that are anticipated to locate in the expansion area and will also inform future discussions about the mix of uses in the area.

The Southeast Expansion Area, defined in the City of Bend's 2016 Urban Growth Boundary (UGB) expansion as "The Elbow," consists of 479 acres located outside the City limits in the southeast corner of the UGB. The area's developable land is divided into 31 parcels with 27 separate property owners. The area is bounded by Knott Road to the south, SE 27th Street to the east, and the current City limits to the west and north. The area includes High Desert Park, an undeveloped but designated City park; High Desert Middle School; several pockets of homes; and a few businesses. Exhibit 9 depicts the Southeast Expansion Area.

Exhibit 9. The Southeast Expansion Area



Source: The City of Bend, Walker Macy

The City of Bend's goal for the Southeast Expansion Area is *"to encourage the development of a complete community (a place where people can live, work, shop and play) in the southeast area of Bend.*[3]*"* The City's Comprehensive Plan indicates the types of complementary uses possible for the site. They include: "a mix of residential, commercial and industrial uses, including 122 gross acres of residential plan designations, 67 gross acres of commercial plan designations, 76 gross acres of industrial designations, 103 gross acres of mixed employment plan designations, and 75 gross acres of public facilities (excluding existing right of way)."[4]

To support the City's development goals, ECONorthwest defined the following objectives for this market analysis:

- Build from the base of land use policies that have been initiated for the Southeast Expansion Area to provide more clarity on the form and types of uses that the regulatory environment and the market together will allow and encourage.

[3] https://www.bendoregon.gov/government/departments/growth-management/land-use-planning/southeast-area-plan

[4] City of Bend. (2016). Bend Comprehensive Plan, page 132.

- Inform decision-makers on policy changes or amendments that would better align regulations with current and anticipated future market trends.
- Identify barriers that might hinder the realization of Southeast Expansion Area land use designations.
- Identify land use opportunities that further the vision and goals for the Southeast Expansion Area.
- Identify actions that the City of Bend can take to encourage successful development and community benefit outcomes in the Southeast Expansion Area.

With the key objectives of the market analysis in mind, the following questions guide the study's research:

- Given the current and projected future growth of the Bend community, and the Southeast Expansion Area's locational attributes, what land uses are likely to be in future demand in the Southeast Expansion Area?
- There is a lot of emphasis on industrial/commercial uses in the Southeast Expansion Area. What do local market trends and recent changes in business methods and needs tell us about what type and form of industrial/commercial properties to expect to be attracted to the area?
- Which specific market segments (e.g. housing, manufacturing, retail) will drive development in the Southeast Expansion Area, and which are more likely to be supportive uses?
- The Southeast Expansion Area will contain a range of different uses. Are there examples in the greater Northwest region of other newly developed areas that have successfully combined typically divergent land uses? And if so, how have local actors planned for and successfully managed these areas?
- For each market sector, at what rate can development be expected to unfold in the Southeast Expansion Area?

2.2 Data, Methods, and Stakeholder Interviews

In this study we drew from a variety of data sources to compile an understanding of the Bend Market. Source citations can be found on each page with quantitative data. We also relied on stakeholder interviews to fill in the gaps between data, and tell the local, qualitative story of the Bend area. We conducted these interviews in the summer and early fall of 2018. The interviewees represented property owners, economic development professionals, and local real estate brokers.

Interview summary points and quotes are included both within sections, and at times in call-out boxes in the summary pages for each section. Mixing the qualitative input from locals with on-the-ground knowledge and perspectives is crucial to understanding the entire story of Bend's market. Although we use direct quotes, to protect the anonymity of each respondent, we have not attributed any of them to individuals.

The following individuals were interviewed by ECONorthwest between July and October of 2018.

Exhibit 10. Stakeholder Interview List

Interviewee	Affiliation
Dixon Ward	Southeast Expansion Area Property Owner
Steve Wilson	Real Estate Broker and Developer
Brian Fratzky	Real Estate Broker and Developer
Jeff Reed	Real Estate Developer and Southeast Expansion Area Property Owner
Katy Brooks	Bend Chamber of Commerce
Greg Blackmore	Consultant and Developer

3 Market Area Analysis

In this section, we examine the demographic and economic market trends that will influence and inform future land uses in the Southeast Expansion Area.

3.1 Demographic Trends

Demographic Trend Summary

As of 2017, Bend's population was 86,765 people and has grown by 67 percent since 2000. Bend's population is expected to continue to grow at an average annual growth rate of 2.5 percent, according to Portland State University[5]. At this growth rate, Bend is forecast to grow by about 67,000 people by 2040. Bend is predominantly growing due to new people moving to the area (more than natural growth from births exceeding deaths). Migrants accounted for 84 percent of the new population in Deschutes County from 2000 to 2016.

Bend is also seeing demographic changes that will have implications for future housing demand. Since the year 2000:

- Bend's population aged 60 or older grew by 33 percent.
- Residents identifying as Hispanic or Latino increased by 206 percent, and the share of Bend's population that is Hispanic or Latino increased from five percent of the population to nine percent.
- The income characteristics of Bend households are changing. There are proportionally more wealthy households than there were in past decades. About 23 percent of Bend's households earn more than $100,000 per year, up from nine percent in 2000. In this same period, the *share* of lower income households decreased. However, the total number of low income households in Bend increased over this time period. The total number of households earning less than $25,000 per year increased from 5,623 households in 2000 to almost 7,000 by the latest U.S. Census Estimates.

Stakeholder Interview Findings:

- "Bend is on the map! People want to live in Bend, but it is increasingly becoming less affordable."
- "The Southeast Expansion Area is not a destination now, but it could one day serve as a community hub."

[5] Source: Population Research Center and PSU

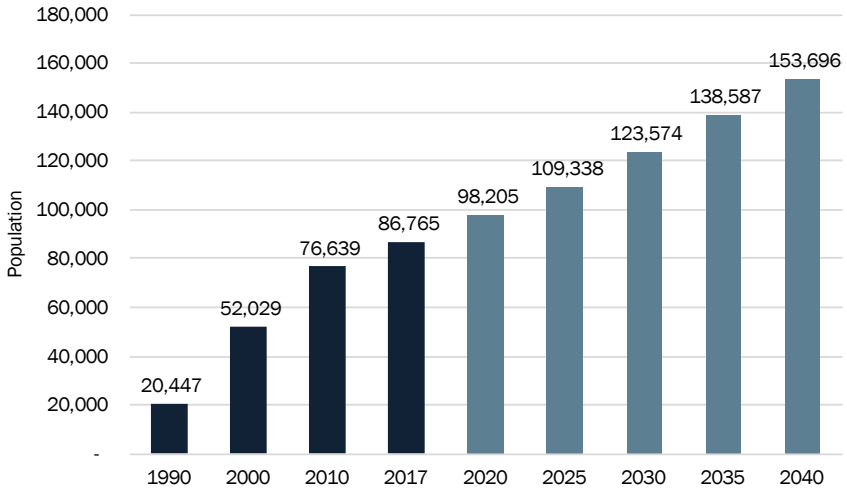
Bend Demographic Trends[6]

Demographic trends show how communities have grown and how they will shape future growth. The following summarizes key findings from our analysis.

Population in Bend grew by 67 percent from 2000 to 2017.

From 2020 to 2040, Bend's population is forecast to grow another 57 percent.

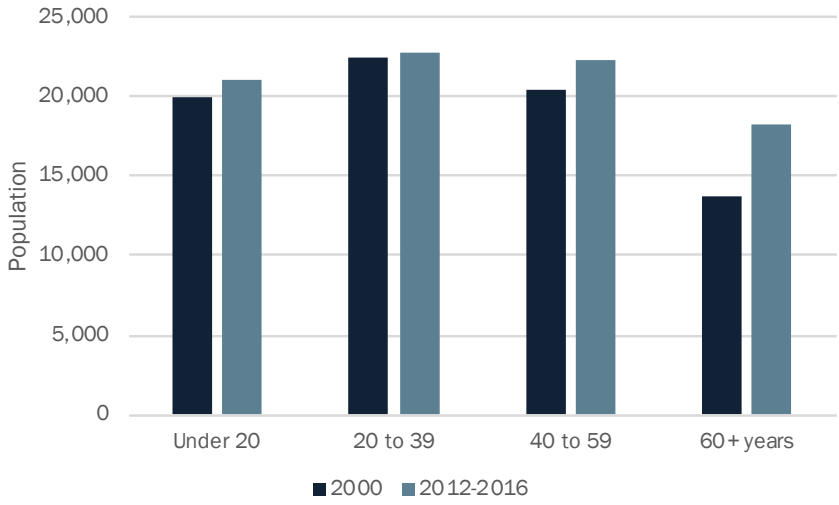
Exhibit 11. Population Growth and Forecasted Population, Bend UGB, 1990 through 2040
Source: Population Research Center and PSU.



Bend's population is aging. From 2000 to 2016, the population aged 60 or older increased by 33 percent.

Comparatively, those aged under 20 grew by six percent, those aged 20 to 39 grew by one percent, and those aged 40 to 59 grew by nine percent.

Exhibit 12. Age Distribution, Bend, 2000 to 2012-2016
Source: U.S. Decennial Census, 2000, Table P012. American Community Survey, 2012-2016, Table B01001.



[6] The American Community Survey pools data over five-year periods, which increases its statistical accuracy for smaller geographies with too few households to provide reliable one-year estimates.

A majority of population growth in Deschutes County is due to in-migration.

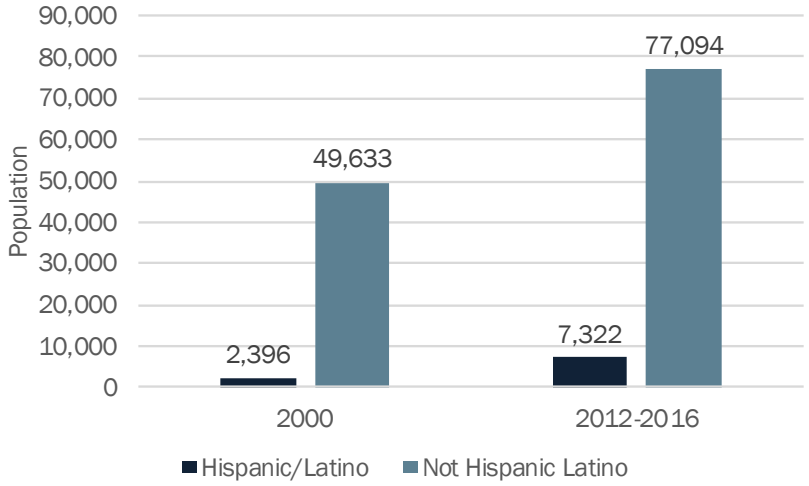
Exhibit 13. Migrant Share of New Population, Deschutes County, 2000 to 2016
Source: Portland State University Population Research Center.

Deschutes County	**61,268**	**51,344**	**84%**
	New Population	New Population From Migration	Proportion of Growth due to Migration
Oregon	**654,951**	**420,150**	**64%**
	New Population	New Migrant Population	Migrant Share of Growth

Bend's population became more ethnically diverse between 2000 and 2016.

The population identifying as Hispanic/Latino increased by 206 percent while the rest of the population increased by 55 percent.

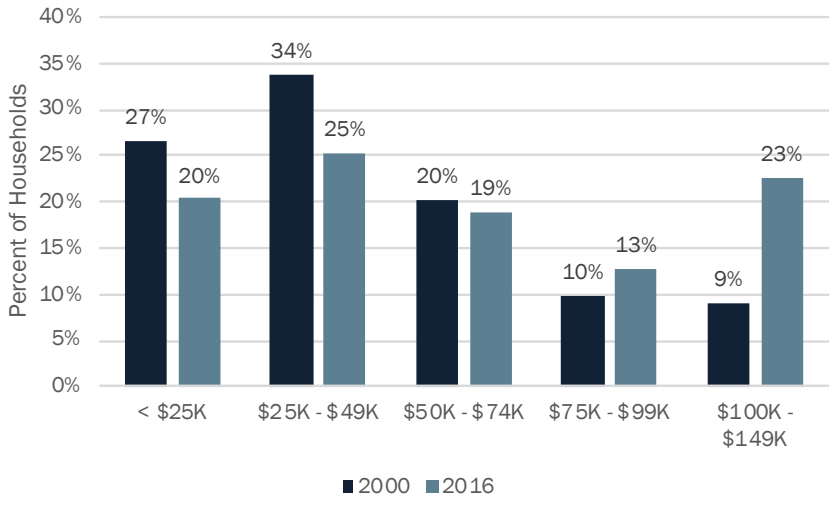
Exhibit 14. Ethnic Composition, Bend, 2000 to 2012-2016
Source: U.S. Decennial Census, 2000, Table P008. American Community Survey, 2012-2016, Table B03002.



As of 2016, about 54 percent of Bend households made $50,000 per year or more, compared to 39 percent of households in 2000.

The median household income in Bend was $55,625 in 2016, compared to $40,610 in 2000.

Exhibit 15. Household Income Distribution, Bend, 2012-2016
Source: U.S. Census, 2000 Decennial Census, SF3, Table DP-3 and ACS, 2012-2016, Table B19001.



3.2 Economic Trends

Economic Trend Summary

Bend's economy has seen strong growth since the Great Recession. At 3.6 percent, the City has one of the lowest unemployment rates in the state of Oregon[7]. Job growth has been substantial; since 2000, the number of jobs in Bend has grown by 58 percent[8]. Over the next decade, Bend is projected to see the most gains in employment in office/service, retail, and industrial jobs.

The Southeast Expansion Area is one of the largest undeveloped areas within Bend's Urban Growth Boundary. The City should account for the following economic trends when planning for the area:

- **Small businesses present opportunities for economic growth in Bend**. In 2013, the average size for a private business in Deschutes County was 8.5 employees per business, compared to the State average of 11.2 employees per private business.[9] Independent contractors, remote workers, and small start-ups are a sizable business sector in Bend's economy. Expansion area planning should consider the needs of these often-overlooked businesses.
- **With its mild climate and popular local outdoor amenities, Bend will continue to attract workers at all skill levels that are seeking a high quality of life location**. Bend is a highly desirable place to live, especially for those who enjoy outdoor activities. Maintaining and leveraging this employment population growth will require a continued focus on developing high-quality and attractive complete communities.

Stakeholder Interview Findings:

- Stakeholders opined that Bend is more resilient to market cycles than other cities due to the city's constant growth, and entrepreneurial nature of small businesses.
- "We have a higher number of people that work from home."
- "Demand is coming from small business. We're a city of nine person companies."
- "Lots of companies are expanding [in Bend]; not many are relocating [to Bend]."
- "Our tech sector wants to grow but they can't find enough skilled workers in the area. A couple companies have started small offices in Portland to fulfill their need for employees."
- Multiple stakeholders mentioned that many local companies rely on the Portland area distribution space and logistics support, instead of storing and shipping products from Bend.

In 2005, the City of Bend created a list of target industries to strengthen and widen the City's economic base[10]. Many of these industries have a strong role to play in the future development of the Southeast Expansion Area.

[7] Source: Bureau of Labor and Statistic

[8] Source: U.S. Decennial Census, 2000, Table DP-3. ACS, 2012-2016, Table S2405.

[9] US Bureau of Labor Statistics Quarterly Census of Employment and Wages

[10] City of Bend Economic Sector Targeting Report, 2005

Bend's Target Industries[11]

- **Higher Education, Health Care, and Hospitality –** According to the City of Bend, the mix of future uses in the Southeast Expansion Area is intended to "increase the level of completeness of the existing low density neighborhoods.[12]" Fostering growth in Bend's education and healthcare sectors will not only support residential growth in the area, but also create jobs in some of Bend's fastest growing industries.[13] The construction on a new high school is expected to be complete by 2021 with plans for a middle school and elementary school in the area (in addition to the middle school currently on site)[14]. These schools will become important community anchors for Southeast Expansion Area residents.

  Despite their recent growth, the healthcare and hospitality sectors are likely to play a more supportive role in the area.

- **Secondary Wood Products and Renewable Energy Resources** – The Bend City Council emphasized the importance of "Traded sector" industries in its 2005 Targeting Report, which refers to industries or businesses that sell their services or products beyond the local market area. Encouraging growth in Bend's Secondary Wood Products and Renewable Energy Resources industries will allow Bend to stay competitive in the broader regional economy. Several plan designations in the Southeast Expansion Area are appropriate for these uses—plus the area's easy access creates an attractive location for traded sector companies.

- **Aviation and Aerospace, Recreational Equipment, Specialty Manufacturing, and Information Technology** – These traded sector industries have been rapidly growing in Bend. Locally grown companies like Ruffwear and Hydroflask got their start only a few years ago, and now are nationally recognized brands with expanding product ranges. The Southeast Expansion Area could play a large role in supporting these, and other, local and growing businesses.

[11] For further discussion see the City of Bend's latest Economic Opportunity Analysis (EOA), Page 29.

[12] City of Bend Comprehensive Plan, Chapter 11: Growth Management, Page 32.

[13] US Census 2012-2016 ACS and City of Bend Economic Opportunities Analysis (2016)

[14] Bend LaPine School District

Economic Trends

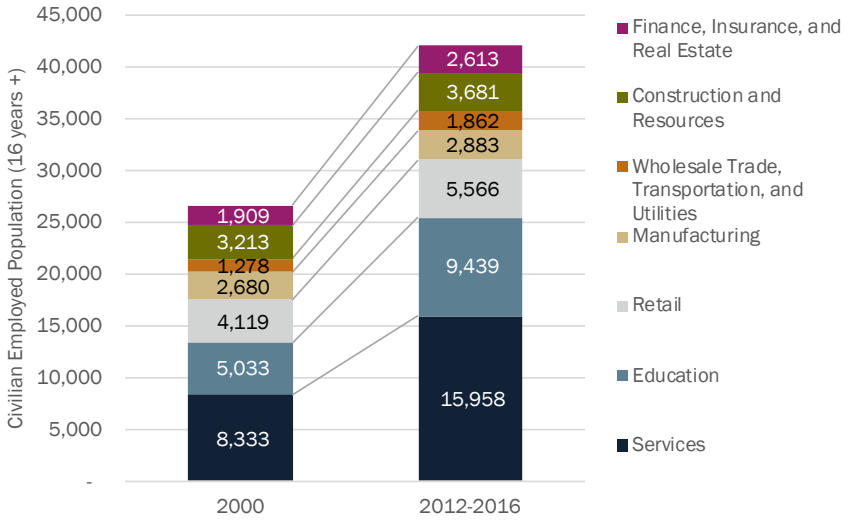
Economic trends show how economies are evolving and what that means for businesses and employees. The following data summarizes key findings from our analysis.

The number of jobs increased by 58 percent from 2000 to 2016.

From 2000 to 2016, the jobs to person ratio stayed relatively static at 0.50.

The services industry saw the largest percent increase from 2000 to 2016, growing by 92 percent. The manufacturing industry saw the smallest percent increase, growing by only 8 percent.

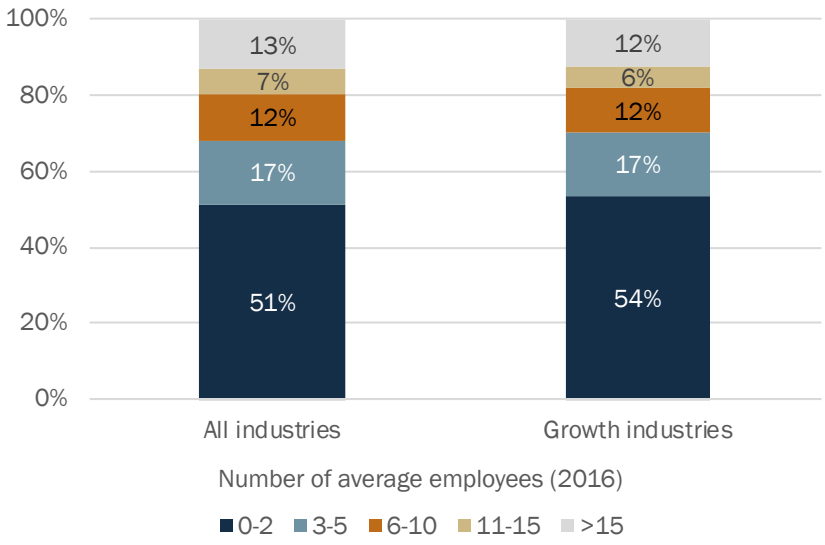
Exhibit 16. Industry by occupation for the civilian employed population 16 years and over, Bend, 2000 to 2012-2016
Source: U.S. Decennial Census, 2000, Table DP-3. ACS, 2012-2016, Table S2405.



The majority of businesses (51 percent) in Bend had an average of 0-2 employees in 2016.

The distribution of business sizes was about the same for businesses in Bend's five fastest growing industries (services, education, retail, wholesale trade, and finance and insurance.) 54 percent of these businesses had an average of one or two employees in 2016.

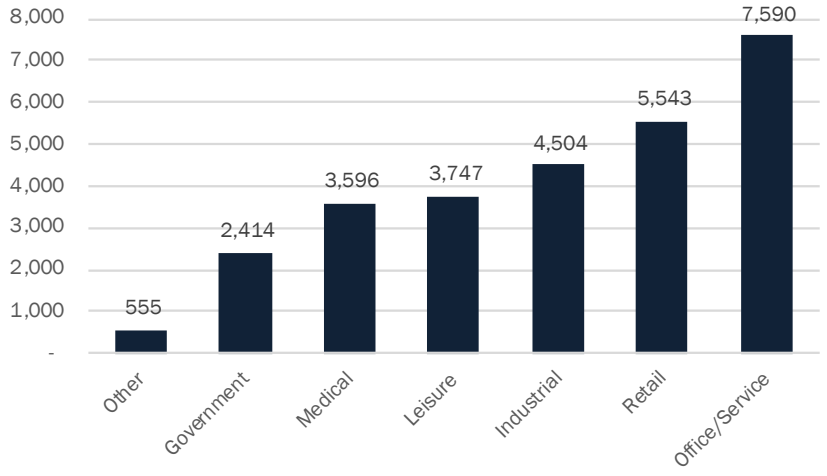
Exhibit 17. Business Size Distribution, Bend, 2016
Source: Bureau of Labor Statistics, Quarterly Census of Employment and Wages Data



In 2008, 45,840 people were employed in Bend (including shift workers).

Bend's employment forecast for 2028 shows employment growing by 61 percent (73,789 employees in 2028).

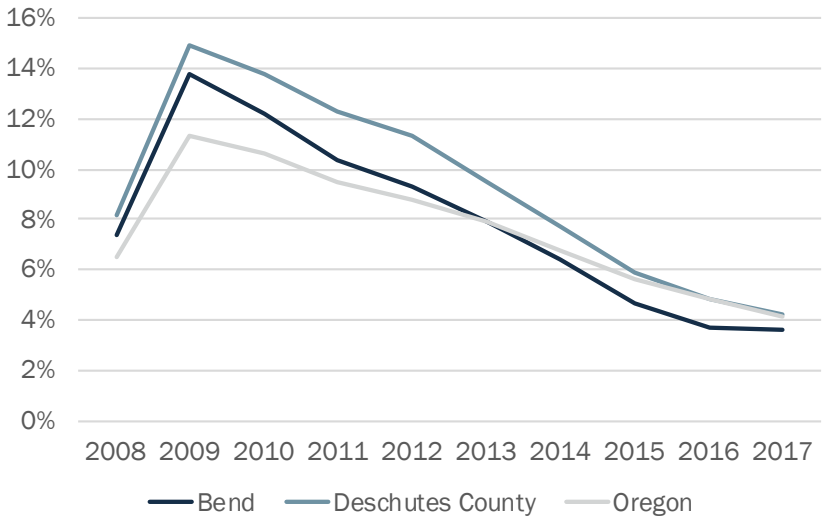
Exhibit 18. Forecasted New Employees, Bend, 2014 through 2028
Source: City of Bend. (2016). Bend Economic Opportunities Analysis, Bend's Growth to 2028.



Bend's unemployment rate dropped below the state's in 2013 and has remained below state levels since that point.

In 2017, Bend's unemployment rate was 3.6 percent. In comparison, unemployment in Deschutes County was at 4.2 percent, and unemployment in Oregon was at 4.1 percent.

Exhibit 19. Unemployment Rate, Bend, Deschutes County, Oregon, 2008 to 2017
Source: Bureau of Labor and Statistics



4 Real Estate Analysis

The market for new development in the Southeast Expansion Area is divided into *commercial* and *residential* real estate sectors.

- Commercial real estate is any non-residential property used for commercial profit-making purposes. It includes office, industrial, flex space, retail, and hotel development types.
- Residential real estate includes any product type that is developed for people to live in. It includes rental and ownership housing, including apartments, condominiums, single-family homes, townhomes, manufactured homes, and student housing.

4.1 Commercial Real Estate Trends

This section details Bend's commercial real estate conditions and identifies market drivers and trends that will influence the market appeal and viability of commercial uses in the Southeast Expansion Area.

Industrial and Flex Space: Industrial rents have risen, and vacancy rates have declined since 2010. However, there has been sporadic levels of construction since the Great Recession. Bend's flex real estate market follows a similar pattern, with vacancy rates declining since 2008 and rents per square foot reaching peak levels in 2018.

Office: Rents per square foot for office dipped in 2007 but began to rise again in 2013. Vacancy rates fluctuated sharply over the same period. The majority of office space was developed prior to 2009, but construction have increased slightly since 2014. Bend features a large amount of small businesses (under nine employees) and those that are looking for flexible workspaces.

Retail: The retail market has gained strength in the past few years. Retail rents per square foot rose to nearly $22 per square foot in third quarter of 2018. Vacancy rates fell sharply after 2013 from 7 percent to 2 percent. Since 2014, about 178,000 square feet of retail space have been developed.

Stakeholder Interview Findings:

- Commercial businesses considering development will look at other places first—the West Side has more draw.
- Some stakeholders see great opportunity and want the City to plan for that growth: "Southeast Bend will see the greatest amount of growth in the next 25 years."
- Challenges to commercial development include high land costs, inadequate utility and transportation infrastructure, zoning challenges, high building costs, SDC costs (real or perceived), and lack of other commercial uses to drive traffic.
- There is little easily developable industrial land in Bend, even though there are plenty of businesses expanding.
- Industrial development could be an opportunity in this area. Bend is seeing more examples of blended industrial/commercial development. These could include manufacturing, cannabis, and food/beverage options.

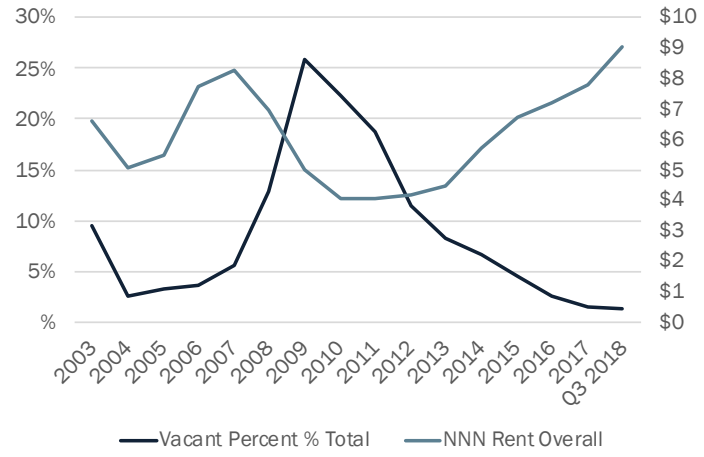
  Housing development will drive the need for retail and, to some extent, office space in this area. There is an opportunity for a village-style retail hub if there are enough people.

Industrial/Office Trends (Employment Areas)

The industrial real estate market includes buildings where raw materials and products are assembled, processed, and warehoused. These buildings tend to be large, often equipped with specialized machinery, and generally yield lower average rents per square foot than buildings in other commercial markets. Exhibit 20 and Exhibit 21 below show rent, vacancy, and absorption and delivery trends in the Bend industrial real estate market.

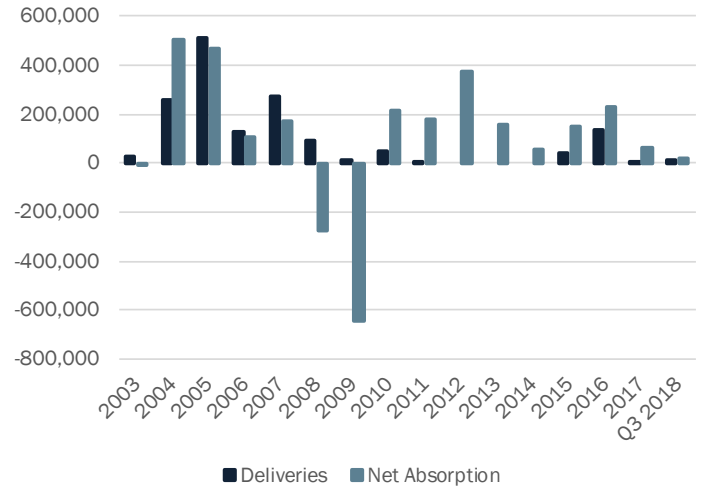
Since 2010, industrial rents per square foot have been on the rise and vacancy rates have been in decline. In the third quarter of 2018, industrial rents reached a high of $9 per square foot and vacancy rates dropped to about 1 percent.

Exhibit 20. Industrial Rent per Square Foot and Vacancy Rate, Bend, 2003 to 2018[15]
Source: Costar.



In 2017 and 2018, deliveries and net absorption in Bend's industrial real estate market were close to zero. The majority of Bend's industrial deliveries (77 percent of total sq. ft.) occurred prior to the Great Recession.

Exhibit 21. Industrial Deliveries and Absorption (square feet), Bend, 2003-2018
Source: Costar.



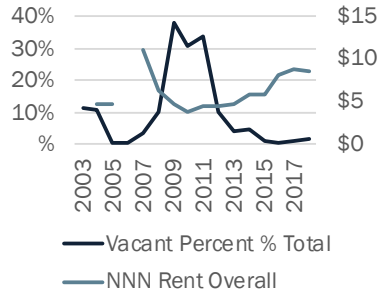
[15] NNN or "Triple Net Rents" refer to commercial real estate leases where the tenant is responsible for all space related expenses, e.g. utilities, property tax, janitorial services, etc.

INDUSTRIAL SUBMARKET

The industrial real estate market contains three main submarkets: manufacturing, warehousing, and distributing. Buildings in the manufacturing submarket process raw materials and intermediate products and may also contain office space. Warehouses and distribution centers are large buildings used for storing and distributing inventory.

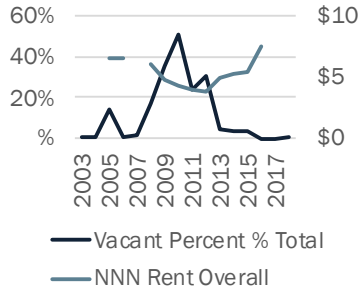
Rent per Square Foot and Vacancy Rate, Bend, 2003 to 2018[16]

Manufacturing



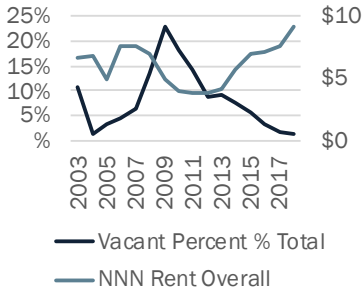
From 2003 to 2018, Bend had about 30 buildings in its manufacturing submarket. Vacancy rates peaked during the Great Recession at 31 percent and have since fallen to just over 1 percent. Conversely, rents per square foot have been on the rise since 2010, reaching nearly $9 per square foot in the third quarter of 2018.

Distribution



By the third quarter of 2018, Bend had 14 buildings in its industrial distribution submarket. Vacancy rates for this submarket peaked in 2010 at 51 percent. Since then, vacancy rates have fallen to less than 1 percent and rents per square foot have risen to nearly $8 per square foot.

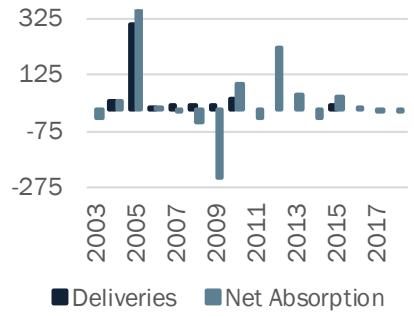
Warehouse



The majority of Bend's industrial buildings are classified as warehouses. There were 241 warehouses in the third quarter of 2018. Vacancy rates peaked in 2009 at 23 percent and fell to less than 2 percent in 2018. Rents per square foot rose from a low of about $4 in 2011 to over $9 in 2018.

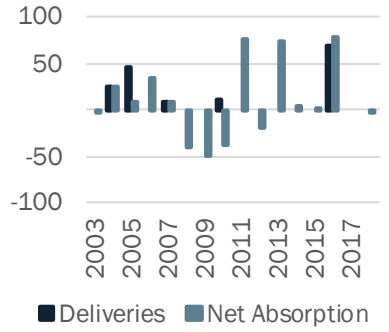
Deliveries and Absorption (in thousands of square feet), Bend, 2003 to 2018

Manufacturing



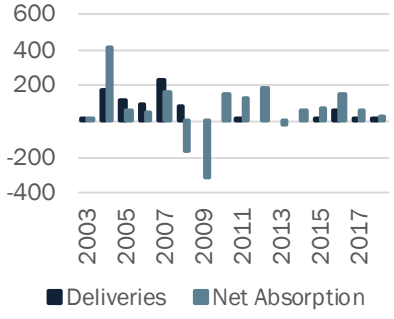
Nearly 70 percent of Bend's manufacturing square footage was delivered in 2005. Net absorption was high over the same period but fell during the recession. Following the downturn, net absorption peaked at around 217,000 square feet in 2012 but has remained relatively low since that point.

Distribution



Nearly 70,000 sq. ft. was delivered in the distribution submarket in 2015 after a long period in which the market had little to no deliveries. Net absorption fell in response to the Recession and has remained volatile since that time.

Warehouse



Around 86 percent of square footage deliveries in Bend's warehouse submarket occurred prior to 2009 and about 113,000 sq. ft. of warehouse space has been delivered since then. Net absorption has remained positive and relatively stable since 2014 at an annual average of nearly 75,000 sq. ft.

[16]Source: CoStar. A couple charts have gaps in the data series'. This is due to gaps in the datasets.

TRANSACTIONS

From 2017 to 2018, CoStar (a real-estate database) reported Bend as having a total of 44 transactions in its industrial real estate market. The selected leases below show a characteristic sample of recent industrial leasing activity.

Select New Industrial Leases (2017-2018)[17]

Image source: www.loopnet.com

20576-20580 NE Painters Street

Lease Information:
Tenant: Oregon Windshield
Rent per sq. ft: $12.36/mg (starting)
Sq. Ft. leased: 560
Sign date: Oct. 8, 2018

Building information:
Use type: manufacturing
Year built: 1989
Amenities: fenced lot
Rentable building area: 13,360 sq. ft.
Parking spaces: 8

1177 SE 9th Street

Lease Information:
Tenant: Machk Industries, LLC
Rent per sq. ft.: $9.60/nnn (starting)
Sq. ft. leased: 2,100
Sign date: April 21, 2018

Building information:
Use type: warehouse
Year built: 2005
Rentable building area: 10,500 sq. ft.
Parking spaces: 22

63032 Lower Meadow Drive

Lease Information:
Tenant: Auto work
Rent per sq. ft.: $10.20/nnn (starting)
Sq. ft. leased: 3,000
Sign date: April 6, 2018

Building information:
Use type: warehouse
Year built: 2007
Amenities: AC, fenced lot
Rentable building area: 12,000 sq. ft.
Parking spaces: 31

1560 NE 1st Street

Lease Information:
Tenant: Vent Pro
Rent per sq. ft.: $9.00/mg (starting)
Sq. ft. leased: 1,340
Sign date: March 5, 2018

Building information:
Use type: warehouse
Year built: 1974
Rentable building area: 17,640 sq. ft.

62885 Mercury Place

Lease information:
Tenant: JH Cosmetics
Rent per sq. ft.: $12.24/nnn (asking)
Sq ft. leased: 15,000
Sign date: Feb. 19, 2018

Building information:
Use type: warehouse
Year built: 1990
Amenities: mezzanine
Rentable building area: 15,000 sq. ft.

Image source: 42floors.com

[17] Unless otherwise noted, images, lease, and building information from CoStar.

CHARACTERISTICS OF NEW STRUCTURES

The table below includes a selection of recently constructed industrial buildings in Bend. As of mid-2018, all buildings were fully leased and ranged in size from 8,400 square feet to 69,367 square feet. CoStar provided estimated rents[18] for the new buildings that ranged from $5-6 per square foot to $7-9 per square foot on a triple net basis.

New Industrial Buildings

399 SW Shevlin Hixon Drive - Deschutes Brewery Warehouse Expansion
Year built: 2016
Estimated rent: $5-7 per sq. ft.

399 SW Shevlin Hixon Dr. is a fully leased warehouse with 38,541 sq. ft. of rentable building area. Located in Bend's Old Mill District, the building is currently occupied by Deschutes Brewery.

20750 Brinson Blvd – FedEx
Year built: 2016
Estimated rent: $5-6 per sq. ft.

The FedEx building is a fully leased distribution center with 69,367 sq. ft. of rentable building area and 18 parking spaces.

1020 SE Paiute Way
Year built: 2015
Estimated rent: $7-9 per sq. ft.

1020 SE Paiute Way is a fully leased warehouse with 8,400 sq. ft. of rentable building area and 25 parking spaces.

20760-20772 Carmen Loop
Year built: 2016
Estimated rent: $7-9 per sq. ft.

20760-20772 Carmen Loop is a fully leased warehouse with 8,400 sq. ft. of rentable building area and 15 parking spaces.

62890 Peerless Court
Year built: 2015
Estimated rent: $7-9 per sq. ft.

62890 Peerless Ct. is fully leased and has 9,946 sq. ft. of rentable building area and 19 parking spaces.

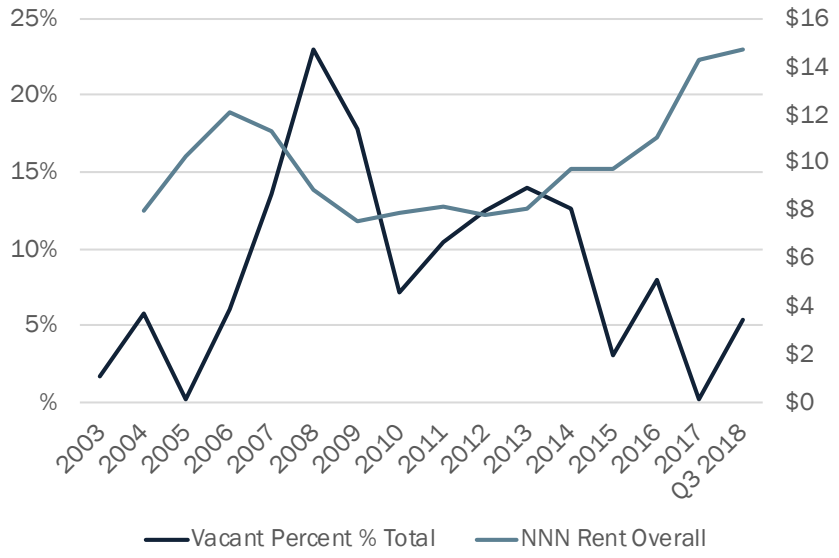
[18] CoStar estimates building rents based on the asking rent for the most recent tenant move-ins.

Flex Space

The flex real estate market includes buildings that offer flexible spaces that can accommodate a range of office, warehouse, or another type of commercial use such as research and development, medical, industrial, quasi-retail, or others. Exhibit 22 and Exhibit 23 below show rent, vacancy, and absorption and delivery trends in the Bend flex real estate market.

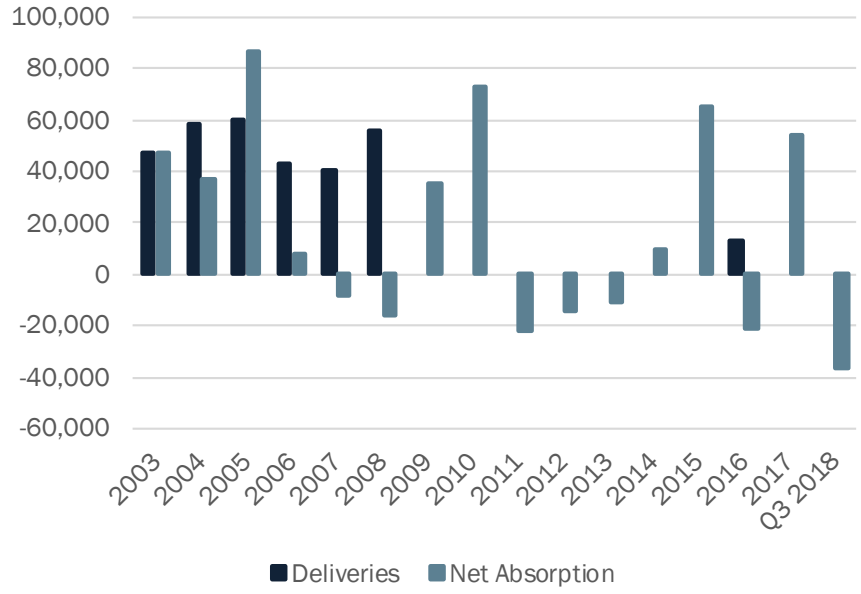
Bend's flex real estate market is relatively small, leading to data volatility. However, vacancy rates have been on a downward trend since 2008 and rents per square foot climbed to a high of about $15 in the third quarter of 2018.

Exhibit 22. Flex Rent per Square Foot and Vacancy Rate, Bend, 2003 to 2018
Source: Costar.



There have been only 13,500 sq. ft. of flex space delivered since 2008, which accounts for less than 5 percent of the total square feet available in the market. Net absorption has also been volatile, falling from around 54,000 sq. ft. in 2017 to around -36,000 sq. ft. in the third quarter of 2018.

Exhibit 23. Flex Deliveries and Absorption (square feet), Bend, 2003-2018
Source: Costar.



TRANSACTIONS

CoStar listed 15 flex leases that were signed within the last year. We have included a sample of three of those leases here. The amount of space leased varied from 944 square feet to 12,172 square feet in these buildings. The most recently leased flex buildings were older, with the newest built in 2001.

Select New Flex Leases in 2018[19]

63003 NE Plateau Drive

Lease information:
Tenant: Cush Core
Rent per sq. ft.: $9.00/nnn (starting)
Sq. ft. leased: 12,172
Sign date: July 30, 2018

Building information:
Use type: Light manufacturing
Year built: 2001
Rentable building area: 12,172 sq. ft.
Parking spaces: 23

20340 Empire Avenue

Lease information:
Tenant: Consider it Done Flooring
Rent per sq. ft.: $9.00/nnn (starting)
Sq. ft. leased: 1,668
Sign date: April 3, 2018

Building information:
Year built: 1981
Rentable building area: 9,335 sq. ft.
Parking spaces: 10

435 NE Alden Avenue

Lease information:
Tenant: Crawford Electric
Rent per sq. ft. $15.84/negotiable (starting)
Sq. ft. leased: 944
Sign date: February 15, 2018

Building information:
Year built: 1968
Rentable building area: 944

Image source: www.google.com/maps/

[19] Unless otherwise noted, images, lease, and building information from CoStar.

CHARACTERISTICS OF NEW FLEX STRUCTURES

Newer flex buildings built in Bend vary widely in terms of use, form, and size. However, little construction has occurred in the flex real estate market with only one new flex building added in 2016. The other most recently constructed flex buildings were built in 2008.

As with the industrial market, the size of the buildings varied widely from 1,808 square feet to 16,800 square feet. The most recently constructed flex buildings were all fully leased as of mid-2018.

New Flex Buildings

213 SW Columbia St - Bend Data Center
Year built: 2016
Estimated rent: $1-2 per sq. ft.

The Bend Data Center is fully leased with 13,500 sq. ft. of rentable building area and 15 parking spaces.

56 SE Bridgeford Blvd
Year built: 2008
Estimated rent: $9-11 per sq. ft.

56 SE Bridgeford Blvd is fully leased with 1,808 sq. ft. of rentable building area and 8 parking spaces.

20802 Sockeye Pl - Building 3 -Edge Business Center
Year built: 2008
Rent: $9 per sq. ft.

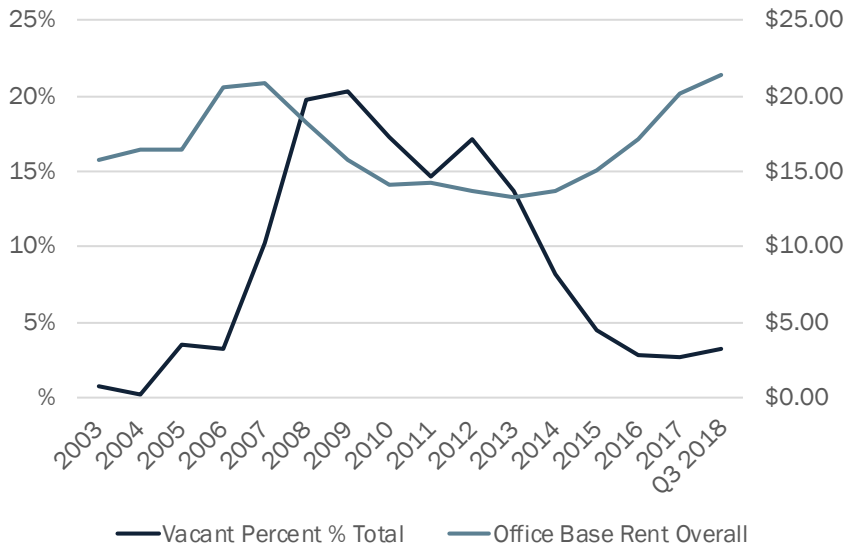
The fully leased Edge Business Center has 16,800 sq. ft. of rentable building area and 2 parking spaces.

Office

Buildings in the office real estate market are built to house employees. Buildings in this market are designed for comfort and to optimize workflow. Office buildings generally command higher rents per square foot than industrial and flex buildings. Exhibit 24 and Exhibit 25 below show rent, vacancy, and absorption and delivery trends in the Bend office real estate market.

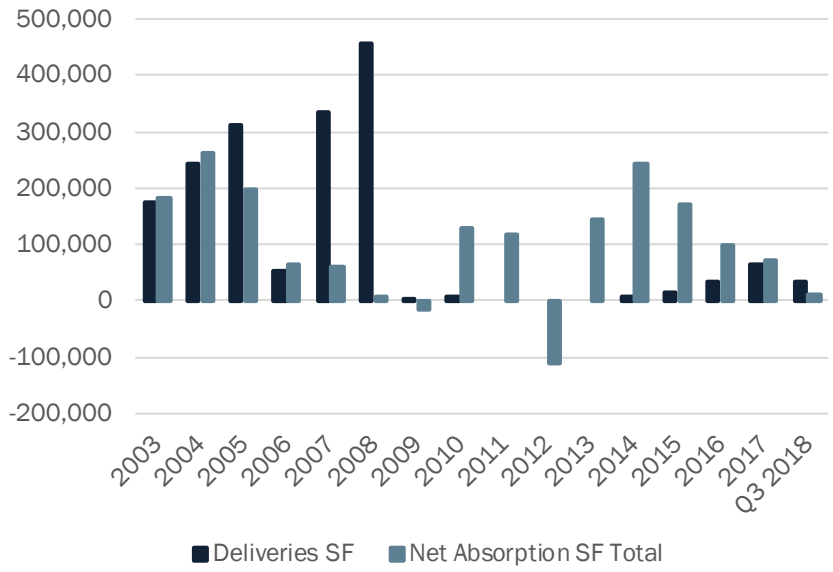
Rents per square foot in the Bend office real estate market dipped in 2007 but began to rise again in 2013. Vacancy rates fluctuated sharply over the same period. In the third quarter of 2018, office rent per square foot reached $21 and vacancy rates fell to about 3 percent.

Exhibit 24. Office Rent per Square Foot and Vacancy Rate, Bend, 2003 to 2018
Source: Costar.



The majority of office space was delivered prior to 2009, but deliveries have been on an upward trend since 2014, with nearly 65,000 sq. ft. of office space delivered in 2017. Net absorption has been declining since 2014 with about 12,000 sq. ft. of office space absorbed in the third quarter of 2018.

Exhibit 25. Office Deliveries and Absorption (square feet), Bend, 2003-2018
Source: Costar.



OFFICE LEASE TRANSACTIONS

The most recent office lease transactions show a wide range of office building ages and types.

New Office Leases in Past Year[20]

20706 High Desert Lane

Lease Information:
Tenant: Nanometrics
Rent per sq. ft.: $12.00/nnn (asking)
Sq. Ft. leased: 12,650
Sign date: Aug. 1, 2018

Building Information:
Year built: 2005
Rentable building area: 12,650 sq. ft.
Parking spaces: 30

Image source: www.google.com/maps/

700 NW Hill Street

Lease Information:
Tenant: Phillip H. Garrow LLC, Attorney at Law
Rent per sq. ft.: $24.36/fs (asking)
Sq. ft. leased: 1,320
Sign date: July 11, 2018

Building Information:
Year built: 2005
Rentable building area: 12,650 sq. ft.
Parking spaces: 30

2330 NE Division Street

Lease Information:
Tenant: Traci Benjamin-Guerrero
Rent per sq. ft.: $11.40/nnn (starting)
Sq. ft. leased: 760
Sign date: May 31, 2018

Building Information:
Year built: 1988
Rentable building area: 14,420 sq. ft.
Parking spaces: 63

20370 Empire Avenue

Lease Information:
Tenant: Camp Victory Personal Training
Rent per sq. ft.: $13.20/nnn (starting)
Sq. ft. leased: 1,464
Sign date: April 12, 2018

Building Information:
Year built: 1981
Rentable building area: 8,723 sq. ft.
Parking spaces: 37

Image source: www.loopnet.com

525 NE Greenwood Avenue

Lease Information:
Tenant: Eagle Wealth Management
Rent per sq. ft.: $21.00/nnn (asking)
Sq. ft. leased: 1,391
Sign date: June 4, 2018

Building Information:
Year built: 1935
Rentable building area: 1,658 sq. ft.

[20] Unless otherwise noted, images, lease, and building information from CoStar.

CHARACTERISTICS OF NEW STRUCTURES

The Bend office buildings listed below were constructed within the last five years. Bend's new office buildings tended to be higher-end and, as one would expect, command the highest office rents in the region.

2762 NW Crossing Dr.
Year built: 2014
Estimated rent: $26-32 per sq. ft.

2762 NW Crossing Dr. has 6,413 sq. ft. of rentable building area and 20 parking spaces. The property is located on the western edge of Bend and is fully leased. Some current tenants include: Harcourts the Garner Group, and Hidden Hills Construction Company.

721 SW Industrial Way - Crane Shed Commons
Year built: 2017
Rent: $27.55 per sq. ft.

As of the third quarter of 2018, the Crane Shed Commons was 81 percent leased. The property has 50,000 sq. ft. of rentable building area available.

1835 NW Pence Ln - Pence Medical Center
Year built: 2017
Estimated rent: $22-27 per sq. ft.

Pence Medical Center is fully leased with 9,445 sq. ft. of rentable building area and 14 parking spaces. The property is located in western Bend.

2357 NE Conners Ave - The Janis Building
Year built: 2016
Rent: $28.80 per sq. ft.

The Janis Building consists of medical offices and was 50 percent leased as of the third quarter of 2018. The Janis Building has 17,400 sq. ft. of rentable building area, 73 parking spaces, and is currently occupied by Bend Ophthalmology.

2155 NW Shevlin Park Rd - Shevlin Health & Wellness Center
Year built: 2016
Estimated rent: $22-27 per sq. ft.

Shevlin Health & Wellness Center has 5,100 sq. ft. of rentable medical office area, 30 parking spaces, and is fully leased. Central Oregon Eyecare currently rents the space.

Industrial and Commercial Site Considerations

The Southeast Expansion Area is being planned to accommodate a variety of industrial and commercial uses. However, due to physical site limitations and varied site by site future transportation access, some portions of the expansion area will be better positioned than others for these uses.

Many industrial uses, for example, tend to require large, rectangular lots (50 acres or larger) with less than 5 percent slope[21]. Other industrial uses—like many of those that are currently in demand in the current market—are smaller and require much less land. These developments require sites of 20 acres or less and many are suitable for sites of only a few acres in size. Office and commercial uses generally require smaller lots with 10-15 percent slopes or less. Exhibit 22 below summarizes site considerations for the City's Target Industries, as identified by Bend's recent Economic Opportunities Analysis.

Exhibit 26. Site Characteristics for Target Industries
Source: City of Bend. (2016). Economic Opportunities Analysis, Bend's Growth to 2028.

Site Category	Target Industries	Typical Site Size (Acres)	Topography	Land Use Buffers	Prefers Street Visibility	Suitability Level for Southeast Expansion Area
Large Industrial and Flex[22]	Renewable Energy, Information Technology	50 to 250	0% to 5% slope	Compatible with industrial or agricultural uses	No	Low
Medium Industrial and Flex	Specialty Manufacturing, Aviation - Aerospace, Secondary Wood Products, Recreation Equipment, Renewable Energy, Information Technology	10 to 75	0% to 5% slope	Compatible with industrial or agricultural uses	No	Medium
Small Industrial	Specialty Manufacturing, Aviation - Aerospace, Secondary Wood Products, Recreation Equipment, Renewable Energy, Information Technology	Less than 10	Less than 10% slope	Compatible with some commercial, industrial, or agricultural uses	No	High
Large Commercial / Office	Higher Education	10 to 50	Less than 10% slope	Compatible with commercial and mixed uses	Yes	High

[21] It should be noted that the City of Bend has designated two other UGB expansion areas for large lot industrial projects. These are: (1) the Juniper Ridge area, and (2) The DSL Properties. For further discussion see: The City of Bend Comprehensive Plan, Chapter 11, Growth Management, Pages 22-23

[22] Ibid.

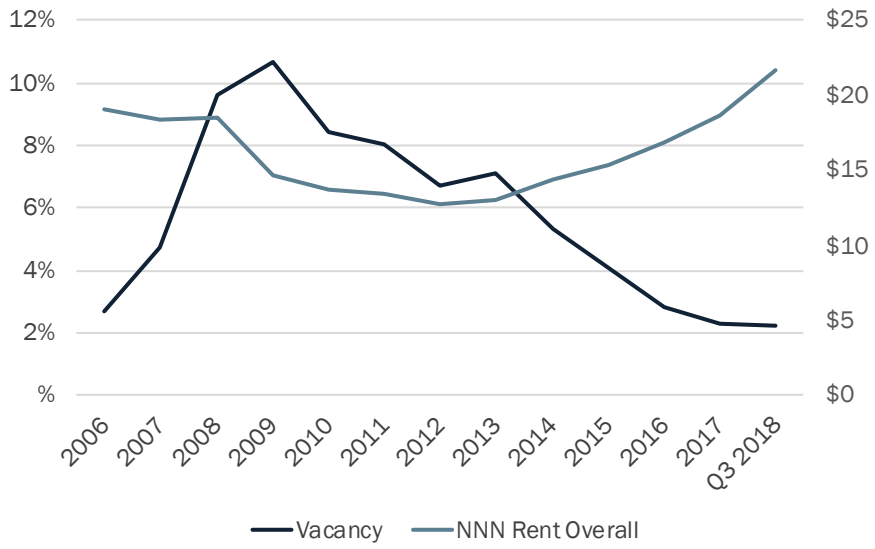
Site Category	Target Industries	Typical Site Size (Acres)	Topography	Land Use Buffers	Prefers Street Visibility	Suitability Level for Southeast Expansion Area
Medium Commercial / Office	Information Technology, Large medical offices, Hospitality, Higher Education	5 to 20	Less than 15% slope	Compatible with commercial and mixed uses	Yes	High
Small Commercial / Office	Small medical offices	Less than 2	Less than 15% slope	Compatible with commercial, mixed uses, and residential	Yes	High

Retail Trends

Buildings in the retail real estate market are configured to sell, display, and advertise products to the general public. Retail buildings are designed to be attractive and tend to be located in high-traffic, high-visibility areas. Exhibit 27 and Exhibit 28 below show rent, vacancy, and absorption and delivery trends in the Bend retail real estate market.

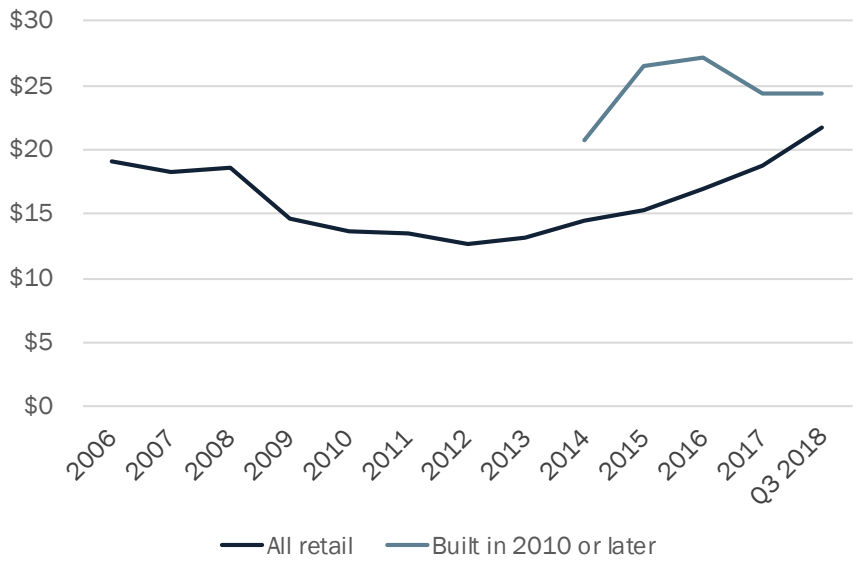
Retail rents per square foot rose to nearly $22 per square foot in the third quarter of 2018. Vacancy rates fell sharply after 2013 from 7 percent to 2 percent.

Exhibit 27. Retail Rent per Square Foot and Vacancy Rate, Bend, 2006 to 2018
Source: Costar.



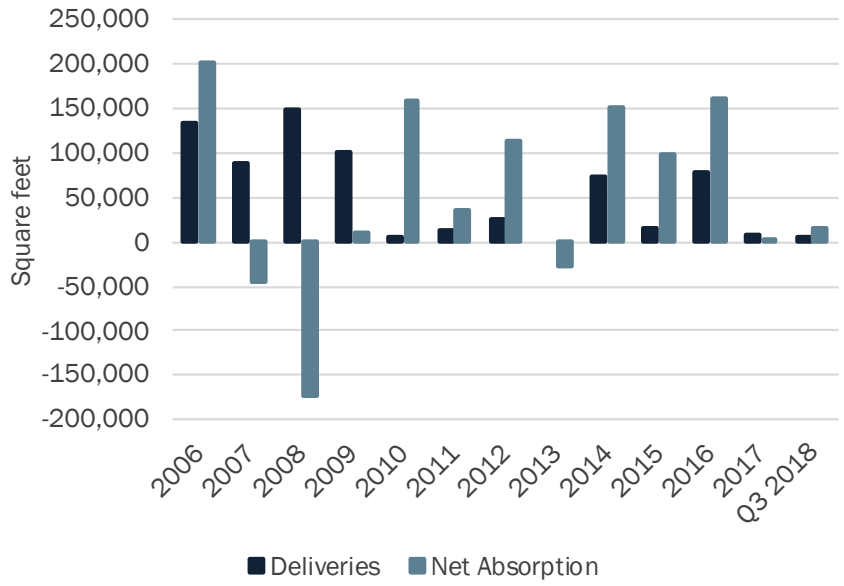
Between 2014 and 2018, newer buildings (built in 2010 or later) in Bend's retail market rented $7 higher per square foot than the market average.

Exhibit 28. Retail Rent per Square Foot Newer Buildings versus All Buildings, Bend, 2006-2018
Source: Costar.



Since 2014, about 178,000 sq. ft. of retail space have been delivered to Bend. This accounts for about 26 percent of all retail space deliveries (sq. ft.) since 2006.

Exhibit 29. Retail Deliveries and Absorption (square feet), Bend, 2006 to 2018
Source: Costar.



TRANSACTIONS

Most retail leases occurring within the past year were taken out in buildings that were ten or more years old. Retail space leased ranged from 731 square feet to 10,663 square feet.

Selected New Retail Leases in 2018[23]

1441 SW Chandler Avenue
Lease information:
Tenant: Cascade Lakes
Rent per sq. ft.: 18.00 nnn/(asking)
Sq. ft. leased: 1,026
Date signed: Oct. 1, 2018

Building information:
Year built: 2003
Rentable building area: 14,513 sq. ft.
Parking spaces: 0

Woodside Plaza, 1465 SW Knoll Avenue
Lease information:
Tenant: The Monterrey Company
Rent per sq. ft.: $22.20/nnn (starting)
Sq. ft. leased: 731
Sign date: Sept. 11, 2018

Building information:
Year built: 2006
Rentable building area: 4,357 sq. ft.
Parking spaces: 12

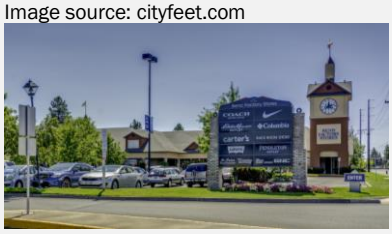
The Forum Shopping Center
2680 NE US 20 Hwy
Lease information:
Tenant: N/A
Rent per sq. ft.: $28.08/nnn (starting)
Sq. ft. leased: 1358
Sign date: June 22, 2018

Building information:
Year built: 1997
Rentable building area: 6,486 sq. ft.
Parking spaces: 1,237

Image source: cityfeet.com

Brookswood Meadow Plaza, 19530-19570 Amber Meadow Dr.
Lease information:
Tenant: Creative Wellness Studio
Rent per sq. ft.: $17.50/nnn (starting)
Sq. ft. leased: 1,254
Sign date: May 23, 2018

Building information:
Year built: 2009
Rentable building area: 16,068 sq. ft.



Bend Factory Stores, 61344 S Hwy 97
Lease information:
Tenant: Fusion Fitness
Rent per sq. ft.: $17.50/negotiable (asking)
Sq. ft. leased: 10,663
Sign date: March 14, 2018

Building information:
Year built: 1992
Rentable building area: 88,265 sq. ft.
Parking spaces: 439

Bend Town Center, 740 NE 3rd St
Lease information:
Tenant: 3rd Street Beverage
Rent per sq. ft.: $12.00/nnn (starting)
Sq. ft. leased: 10,400
Sign date: Nov. 17, 2018

Building information:
Year built: 1965
Rentable building area: 100,000 sq. ft.
Parking spaces: 350

Image source: visitcentraloregon.com

[23] Unless otherwise noted, images, lease, and building information from CoStar.

CHARACTERISTICS OF NEW STRUCTURES

Of the retail buildings built in the last six years and listed below, the highest CoStar estimated rent was $23-28 per square foot and the lowest was $13-16 per square foot (on various lease structures). Building sizes ranged from 3,375 square feet to 26,000 square feet.

631 NW Federal St.
Year built: 2017
Estimated rent: $13-16 per sq. ft.

631 NW Federal St., or Galveston Terrace, is a fully leased mixed-use retail and office building with 3,375 sq. ft. of rentable building area. Located in Bend's west side, the property is adjacent to 10 Barrel Brewing and other restaurants. The site is highly visible in a heavily trafficked area.

706 NE Greenwood Ave
Year built: 2015
Estimated rent: $23-38 per sq. ft.

The site has 4,328 sq. ft. of rentable building area and 18 parking spaces. As of the third quarter of 2018, the property was fully leased. Some current tenants include: Backporch Coffee Roasters, Emerald City Smoothie, Ark Animal Hospital, and Parilla Grill.

The Shops at Boyd Acres 20566 NE Gloucester Ln
Year built: 2015
Estimated rent: $16-20 per sq. ft.

The shops at Boyd Acres is a fully-leased retail property with 4,817 sq. ft. of rentable building area and 8 parking spaces. Located along US Hwy 20, the property's location is highly visible and well-trafficked.

1975 NE 20 Hwy
Year built: 2016
Estimated rent: $14-17 per sq. ft.

Kendall Volkswagen of Bend currently occupies 100 percent the 15,866 sq. ft. of retail space available at 1975 NE 20 Hwy. The property is freeway visible and located in a cluster with multiple other auto dealers.

Worthy Brewing, 495 NE Bellevue Drive
Year built: 2012
Estimated rent: $15-18 per sq. ft.

The site is currently occupied by Worthy Brewing, offers 26,000 sq. ft. of rentable building area.

Retail Site Considerations

One of the most important decisions retail store owners make is *where* to locate their business. Location determines the accessibility of the store, customers' interest in entering the store, and, for many types of retail, the sales potential of the establishment. In addition to geographical accessibility, a retail owner must ensure that the location is one that is saturated with potential customers. There are a number of factors that act as strong predictors of preferences within a community. By identifying the preferences and tendencies of consumers, a retail owner will be able to predict the success of their store.

Technological advances have changed consumer behavior and retail success dramatically. The growth of e-commerce makes it even more challenging for traditional brick-and-mortar stores to survive. This can create unwillingness for local, "mom and pop" type shops to open their doors in certain communities. Understanding how community members tend to use technology (willingness to order items online or find better prices elsewhere) and their access to technology (smartphones, internet) is crucial to measuring the success of a given store.

Geographic location and the households that together form the community, impact the survival of a retail store. If a store's products are not aligned with the preferences of its potential customers, the store will fail. A significant amount of data collection and analysis must be performed before deciding to open a store in a new location. A summary of criteria considered when evaluating a potential establishment's viability in a given area includes[24]:

- **Population Size and Characteristics.** Total size and density, age distribution, average educational level, total disposable income, per capita disposable income, occupation distribution, percentage of residents owning a home
- **Availability of Labor.** Management, management trainees, clerical
- **Closeness to Sources of Supply.** Delivery costs, timeliness, number of manufacturers, number of wholesalers, availability and reliability of product lines
- **Economic Base.** dominant industry, extent of diversification, growth projections, freedom from economic and seasonal fluctuations, availability of credit and financial facilities
- **Competitive Situation.** Number and size of existing competition, evaluation of competitor strength/weaknesses, short-run and long-run outlook, level of saturation

[24] Trading-Area Analysis (2008). https://www.slideshare.net/akira9515/tradingarea-analysis-presentation

- **Availability of Store Locations.** Number and type of store locations, access to transportation, owning versus leasing opportunities, zoning restrictions, costs
- **Regulations.** Taxes, licensing, operations, minimum wages, zoning

To illustrate this point, ECONorthwest assembled a range of generic commercial uses and standardized factors that owners may consider when weighing whether a given location will detract or enhance their businesses' viability. This helps to explain why some areas have an easier or more difficult time attracting particular uses in their neighborhood or community.

Exhibit 30. Factors Influencing the Location of Retail Uses
Source: ECONorthwest compiled generic determinants from a range of sources for illustrative purposes only.

Retail Types	Population Factors	Locational Factors
Mid-Small Grocery Store (10,000 to 40,000 sq. ft.)	6,000 to 8,000 people per store	Clustered near other retail uses; High Visibility and Access
Supermarket (50,000 to 100,000 sq. ft)	10,000 people within 8 to 10-minute drive	Formulated for suburban shopping centers
Coffee Shop	15,000 to 20,000 people per store	Convenient access for pedestrians and drivers
Movie Theater	8,000 to 9,000 people per screen	Located at least 4 to 5 miles from another theater (film zone)

Retail businesses in the Southeast Expansion Area will rely upon customers from existing neighborhoods and future residents of the area. While retail is unlikely to lead development of the area, it will play an important supportive role to housing in the initial phases of development. That is, retail provides demanded services, products, and amenities that residents demand close to their homes.

4.2 Residential Real Estate Trends

This section provides an assessment of *residential real estate trends* for Bend's single-family and multifamily housing markets. It addresses factors such as housing mix, housing tenure, vacancy, new housing development (particularly for multifamily uses), residential sales, and rental costs.

Summary of Residential Real Estate Trends

Bend is an attractive place to live. Since 2010, around 2,300 new households formed in Bend. In this same period, family households with children decreased and household sizes grew smaller. About 70 percent of all households are one or two-person households, a 13 percent increase from 2000.

Today, the majority of housing in Bend is single-family detached housing (74 percent), though the share of single-family detached housing has decreased from 77 percent in 2000. Bend's existing housing mix may limit options for non-family households and family households without children, which account for 72 percent of Bend's household mix.

Despite the high demand for housing, single-family home vacancy rates have increased since 2000 from 6 to 9 percent in the 2012-2016 period, and multifamily vacancy rates have remained around 4 percent, on average, since 2000. However, the single-family vacancy trend could be the result of many Bend homes being out of reach for many Bend residents. Home sales prices along with multifamily rents have been climbing steadily in recent years. Just in the past year the median home sale price in Bend has risen by 16 percent[25].

Stakeholder Interview Findings:

- Design the Southeast Expansion Area so people can live and work in the district.
- The Southeast Expansion Area has fewer locational advantages than Bend's west side. It is further away from downtown and outdoor amenities. New residential development will need to address this with connectivity and an appropriate mix of land uses.
- Concentrating new housing near schools makes sense, but housing will also need to be located near commercial services.
- People come to Bend to get out of larger cities. Balancing residential efficiency with housing preferences is key. Residents want yards.
- Affordable housing and workforce housing (for households earning < 80% of MFI) is needed, and demand is greater than supply.
- Rents are increasing, housing is limited, and land is scarce. Residential development needs to occur quickly.

Multifamily rents have also been on the rise. Multifamily rents per square foot increased from $0.87 in 2000 to $1.32 in the third quarter of 2018, signaling the desirability of housing in Bend.

[25] Source: Central Oregon Association of REALTORS. Median home sale price from the first quarter of 2017 to the third quarter of 2018.

The increasing housing costs in Bend are putting more and more pressure on lower income households. The City has real affordable housing challenges. Bend has a deficit of housing—by about 3,500 units—for households with the lowest incomes (those earning less than $25,000 per year). Further, about 30 percent of Bend's population earns 50 percent of Median Family Income or less ($34,800 or less).

Future development will need to account for Bend's changing household composition and the ability of households to pay for housing. To accommodate new growth and changing household compositions, the City of Bend estimates that it will need a residential density of about 7.2 dwelling units per net acre citywide. This is a 26 percent increase over Bend's historical densities of 5.7 dwelling units per acre. To acknowledge this need, the City adopted recommendations for a more diverse planned housing mix. The mix gets closer to a balance between single-family detached homes and multifamily and single-family attached homes.[26]

To meet the needs of current and future residents, Bend will need to continue its focus on providing opportunities for compact and more affordable housing types (e.g. single-family attached housing, missing middle housing, and apartments) as well as subsidized affordable housing.

[26] City of Bend. (August 31, 2016). Bend Housing Needs Analysis, Bend's Growth to 2028.

Household Trends

In the city of Bend 2,278 new households have formed since 2010.

Exhibit 31. Household Formations, 2010 and 2012-2016

Source: U.S. Census Bureau, 2010 Decennial Census, SF1 Table QT-P11 and 2012-2016 ACS, Table S1101.

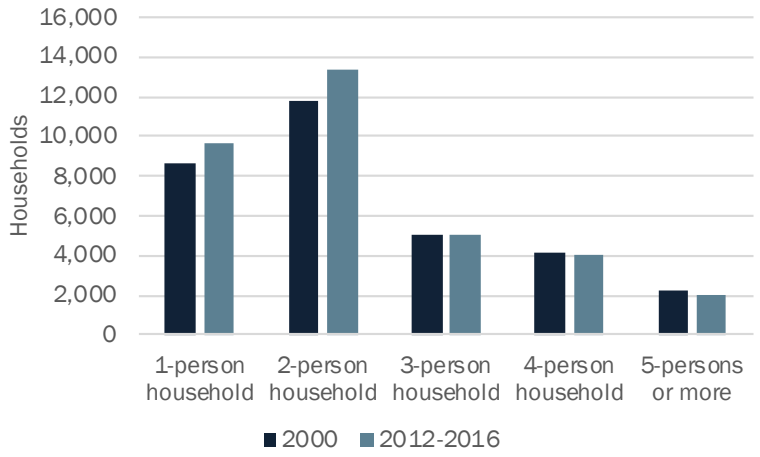
31,790	34,068	2,278
Households 2010	Households 2012-16	New Households 2000 to 2012-2016

Almost 70 percent of Bend's households are one- or two-person households.

As of 2016, 28 percent of households in Bend were 1-person households, 39 percent were 2-person, 15 percent were 3-person, 12 percent were 4-person, and 6 percent were 5-person or more households.

Exhibit 32. Household Size, Bend, 2010 to 2012-2016

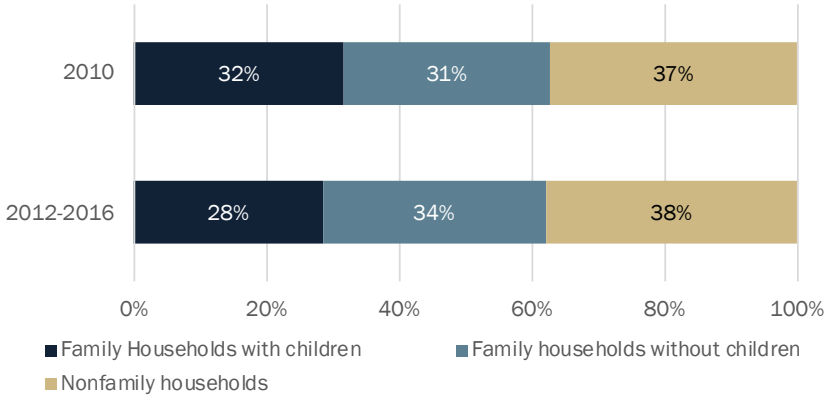
Source: U.S. Census Bureau, 2010 Decennial Census, SF1 Table QT-P11 and 2012-2016 ACS, Table B25009.



About 38 percent of households in Bend are non-family households. Of the 62 percent of family households, 28 percent have children.

Exhibit 33. Household Composition, Bend 2010 to 2012-2016

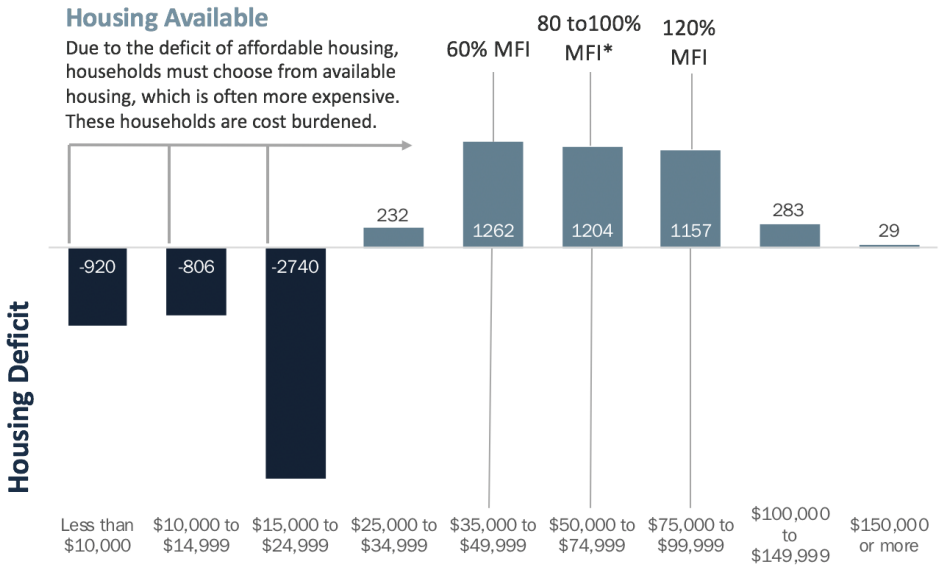
Source: U.S. Census Bureau, 2010 Decennial Census, SF1 Table P20 2012-2016 ACS, Table DP02.



Housing Affordability Trends

Bend's housing market data illustrates the increasing housing affordability issue faced by many in the community. Most apparent, there is a deficit of housing in Bend for households with the lowest incomes—those households earning less than $25,000 annually.

Exhibit 34. Affordable Housing Costs and Units by Income Level, Bend, 2016
Source: U.S. Department of HUD, Median Family Income (MFI), Deschutes County, 2017. U.S. Census Bureau, 2012-2016, ACS Table B19001, B25075, and B25063. Note: MFI in Deschutes County was $64,000 in 2017.



The following Exhibit cross references the number of households and their incomes with the type of suitable financially attainable housing product types. The data shows demand for a diversity of housing types citywide.

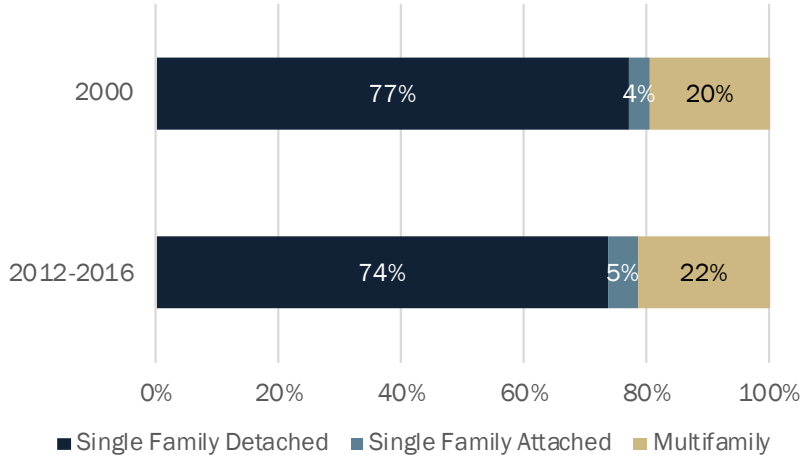
Exhibit 35. Financially Attainable Housing Products, Bend, 2018
Source: U.S. Census, ACS 2012-2016, Table B19001. HUD Median Family Income, Deschutes County ($69,600), 2018.

Market Segment by Income	Income Range	Number of households	Percent of Households	Financially Attainable Products	
				Owner-occupied	Renter-occupied
High (120% or more of MFI)	$83,520 or more	10,607	31%	All housing types; higher prices	All housing types; higher prices
Upper Middle (80%-120% of MFI)	$55,680 to $83,520	6,452	19%	All housing types; lower values	All housing types; lower values
Lower Middle (50%-80% of MFI)	$34,800 to $55,680	6,500	19%	Single-family attached; condominiums; duplexes; manufactured on lots	Single-family attached; detatched; manufactured on lots; apartments
Lower (30%-50% of less of MFI)	$20,880 to $34,800	5,309	16%	Manufactured in parks	Apartments; manufactured in parks; duplexes
Very Low (Less than 30% of MFI)	Less than $20,880	5,200	15%	None	Apartments; new and used government assisted housing

Single-Family and Multifamily Housing Trends

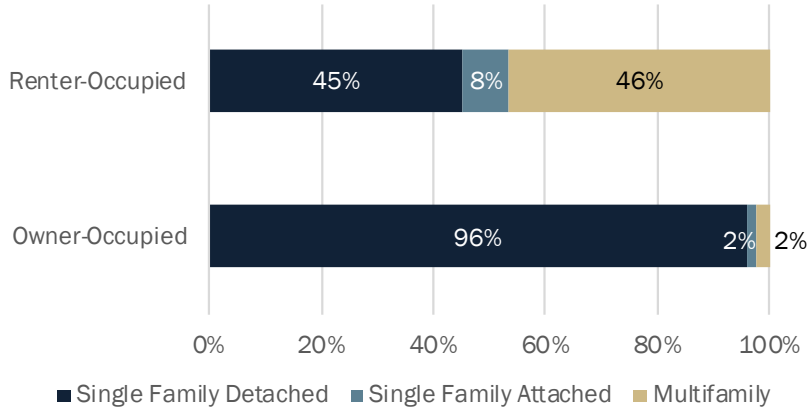
From 2000 to 2016, the share of single-family detached housing decreased slightly while the share of multifamily housing increased slightly.

Exhibit 36. Change in Housing Mix, Bend, 2000 and 2012-2016
Source: U.S. Census Bureau, 2000 Decennial Census, SF3 Table H030, and 2012-2016 ACS Table B25024.



Almost all homeowners (96 percent) live in single-family detached housing, while only 45 percent of renters live in single-family detached housing.

Exhibit 37. Housing Units by Type and Tenure, Bend, 2012-2016
Source: U.S. Census Bureau, 2012-2016 ACS Table B25032.



As of 2016, 9 percent of Bend's housing stock was vacant.

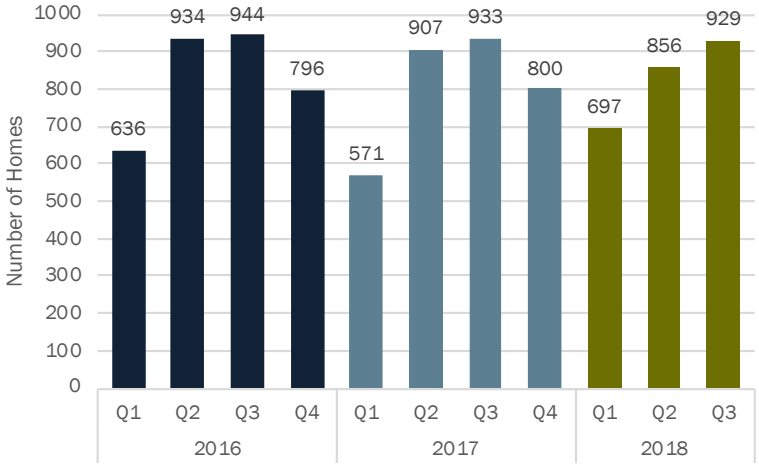
Exhibit 38. Percent of Housing Units that are Vacant, 2000, 2010, 2012-2016
Source: U.S. Census Bureau, 2000 Decennial Census SF1 Table QT-H1, 2010 Decennial Census SF1 Table QT-H1, 2012-16 ACS Table B25002.

6%	12%	9%
Vacancy 2000	Vacancy 2010	Vacancy 2012-16

Single-Family Development

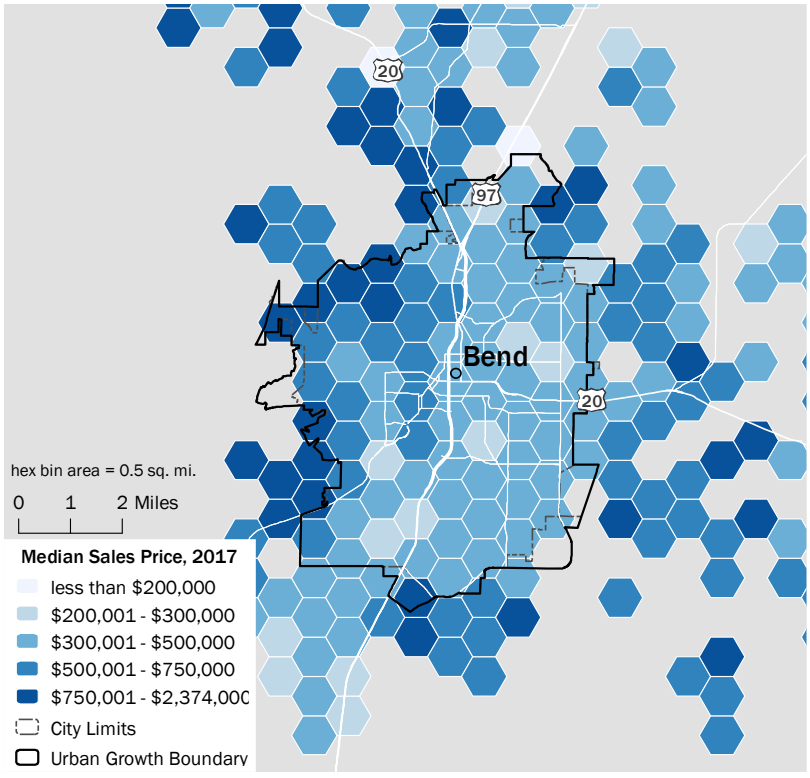
Home sales remain steady. By the third quarter of 2018, 2,482 homes sold in Bend. In 2017, about 3,210 homes sold in Bend and in 2016 3,310 homes sold in Bend.

Exhibit 39. Home Sales Volume, Bend, 2016, 2017, and 2018
Source: Costar. Central Oregon Association of REALTORS, 2017 Report. Data includes residential sales of single-family homes, manufactured homes, mobile homes, condos, deed share, townhomes, and timeshares.



Median home sale prices range widely across the Bend area. The highest priced homes are located in areas to the west, and those outside of the City's Urban Growth Boundary

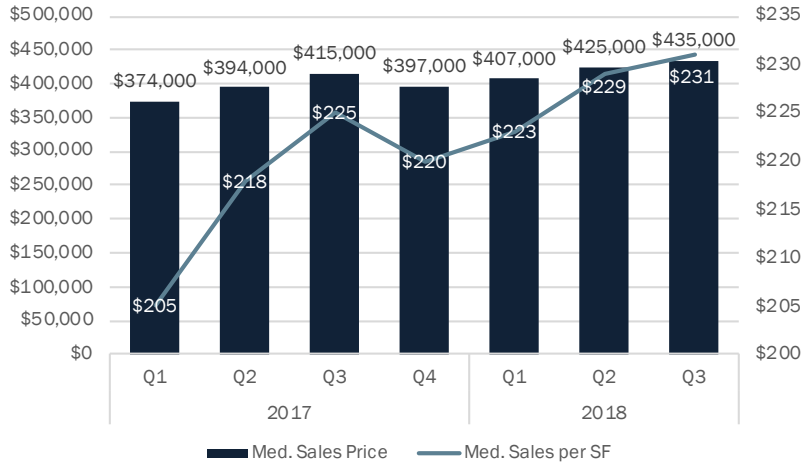
Exhibit 40. Median Sale Price, Bend, 2017
Source: Costar. Central Oregon Association of REALTORS, 2017 Report.



The median sale price for a home in the third quarter of 2018 was $435,000 or about $231/sq. ft. From the third quarter of 2017 to the third quarter of 2018, the median sale price for a home increased by about $20,000 or about five percent.

Exhibit 41. Median Sales Price and Median Sales per SF, Bend, 2017 and 2018

Source: Central Oregon Association of REALTORS, 2018 Report. Data includes residential sales of single-family homes, manufactured homes, mobile homes, condos, deed share, townhomes, and timeshares.

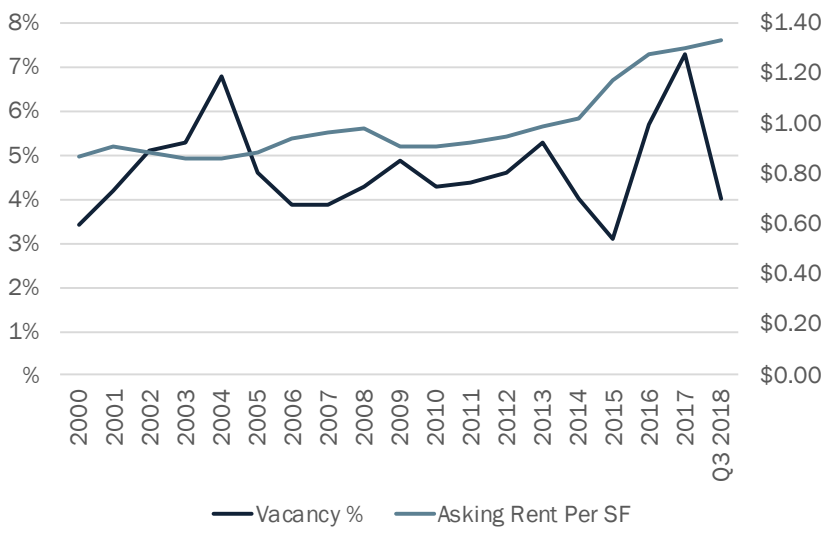


Multifamily Development

Since 2000, asking rent for multifamily units increased. In this same time, vacancy rates remained volatile, but relatively constant (on average) at around 4 percent.

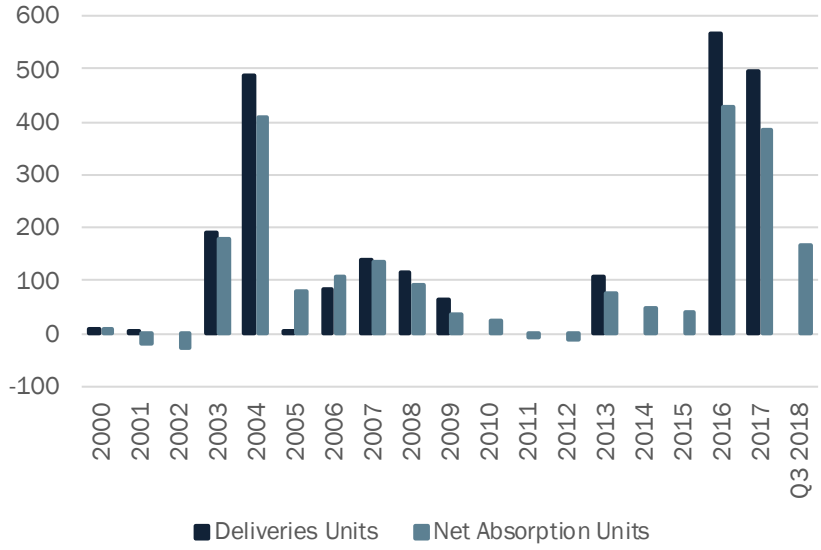
Multifamily rents in Bend increased from $0.87 per square foot in 2000 to $1.33 per square foot in the third quarter of 2018.

Exhibit 42. Multifamily Rent and Vacancy, Bend, 2000 to 2018 Q3
Source: Costar.



Bend received more multifamily units in 2016 and 2017 than it did in 2000 through 2008 combined. Unit absorption remained positive since 2013.

Exhibit 43. Multifamily Deliveries and Absorption, Bend, 2000 to 2018 Q3[27]
Source: Costar.



[27] "Delivered" refers to housing units that have been newly constructed and are available for occupation in the market.

CHARACTERISTICS OF NEW MULTIFAMILY DEVELOPMENTS[28]

Image Source: http://pacificcrestaffordablehousing.org/

Azimuth 314
NW Shevlin Park Rd. & NW Cross Dr., Bend
Currently Under Construction – Opening Fall 2018

- Low-Rise, Affordable Housing
- 50 units
- 1-bedroom (50) and 2-bedroom (50%) units

- Average Asking Rent per unit: N/A
- Average SF per unit: 590 SF

Image Source: https://www.seasonsapthomes.com/Gallery.aspx#mosaic-gallery-0-11

Seasons at Farmington Reserve
61560 Aaron Way, Bend
Year built: 2017

- Garden Style, Market Rate Housing
- 228 units
- 1-bedroom (63%) and 2-bedroom (37%) units

- Average Asking Rent per unit: $1,489
- Average SF per unit: 916 SF

Image Source: https://rangeapartments.com/

Range
3001 NW Clearwater Dr., Bend
Year built: 2017

- Garden Style, Market Rate Housing
- 132 units
- 1-bedroom (83%) and 2-bedroom (17%) units

- Average Asking Rent per unit: $1,401
- Average SF per unit: 692 SF

Image Source: https://www.thealexanderbend.com/

The Alexander
1125 NE Watt Way, Bend
Currently Under Construction – Opening Spring 2019

- Low-Rise, Market Rate Housing (for Seniors)
- 136 units
- 1-bedroom units (100%)

- Average Asking Rent per unit: N/A
- Average SF per unit: 684 SF

[28] Unless otherwise noted, images, lease, and building information from CoStar.

Residential Development Considerations

Bend is facing an increasing challenge to support the development of affordable homes for households with the lowest incomes, but there is demand for housing of all types of homes at most price points. Recent population trends suggest increasing demand for smaller homes, attached housing, and multifamily projects.

The City of Bend should take intentional steps to plan and incentivize a range of housing types in the Southeast Expansion Area to meet the needs of its future residents.

Exhibit 44. Implications for Housing Products, Affected by Demographic Trends
Source: City of Bend. (August 31, 2016). Bend Housing Needs Analysis, Bend's Growth to 2028. Images from Bend's Envision Tomorrow Residential Buildings Presentation (August 4, 2014) and Danielson Grove cottages in Kirkland.

… for Millennials

An influx of Millennials will increase need for affordable housing for renters and homeowners such as: small single-family dwellings, cottages, accessory dwelling units, duplexes, townhomes, garden apartments, and apartments.

The size of dwelling units will vary depending on household size, from single-person households to households with children. Millennials are likely to choose housing in areas closer to services and activities, such as downtown Bend and nearby neighborhoods.

…for Baby Boomers

Baby Boomers will make a range of housing choices as they age, from continuing to remain in their homes as long as possible, to downsizing to smaller dwellings, to moving into group housing (e.g., assisted living facilities or nursing homes) as their health fails.

As Baby Boomers age, they will need: small single-family dwellings, cottages, accessory dwelling units, townhomes, apartments, and condominiums. Baby Boomers who move are likely to choose housing in areas with nearby shopping, health care and other services, such as neighborhoods with integrated services or in downtown Bend.

…for Multigenerational Households

Multigenerational households will need affordable housing that can accommodate their larger households.

Growth in this cohort will increase need for affordable housing for renters and homeowners such as: single-family dwellings (both smaller and larger sized dwellings), duplexes, larger townhomes, garden apartments, and apartments.

Ownership opportunities for multigenerational households will focus on moderate-cost ownership opportunities, such as single-family dwellings on a small lot or in a more suburban location, duplexes, and townhomes.

5 Conclusions for Market Potential

At the highest level, this analysis supports what Bend residents intuitively know: the City's macroeconomic situation is one of growth. Data show that the population is growing rapidly and it is expected to continue to do so in the future. Bend's economy also continues to expand, driven by population growth as workers from elsewhere are drawn to Bend's high quality of life.

In this section, we summarize our findings from this analysis, and describe the implications of those findings for the proposed land use designations in the Southeast Expansion Area.

5.1 Real Estate Market Outlook

Commercial/Industrial Real Estate

Bend's commercial real estate markets have responded to the rapidly accelerating recovery and expansion of the region's economy. Most markets are seeing shrinking vacancies and increasing rents—a sign of a strengthening real estate market. Exhibit 45 provides a summary of commercial market trends.

Exhibit 45. Bend Region Commercial Real Estate Market Trends

	Market Trends	Deliveries	Demand Drivers
Industrial and Flex	Generally, rents have been on the rise and vacancies have been declining.	Multiple new industrial and flex buildings have been delivered to the Bend market since the recession.	Many businesses are expanding but there have been few new businesses moving to the Bend area. Recent leases show a demand for primarily smaller spaces (under 10,000 square feet), with the exception of build-to-suit projects, which tend to be larger (15,000 to 50,000 or more square feet).
Office	Vacancies have declined steadily since 2012 and have leveled off since that time. Rents have been on a steady rise since 2013.	There have been fewer deliveries than in other commercial real estate markets sectors. The majority of Bend's office space was constructed before 2009. Recent deliveries have been relatively small sized projects of less than 10,000 square feet.	Office market trends are indicative of Bend's diffuse business market—most Bend companies have fewer than nine employees.
Retail	Rents have risen to 10-year highs and vacancies have fallen considerably.	Since 2014, 178,000 square feet of new retail space has been delivered. Much of this retail space has been near Bend's core, and in the northern and western portions of the city.	Bend's retail market has made strong gains since the recession. The local population's relatively high wealth and the thriving tourist economy contribute to a growing retail scene.

Source: ECONorthwest, and CoStar

Residential Real Estate

The City of Bend has seen increasing population growth and economic expansion since the Great Recession. Bend continues to be among the fastest-growing cities in the United States. These population growth trends have translated to increased housing demand, which has driven up prices for housing above those in other cities in the region and has sparked renewed housing development activity. Like Bend's past trends, many of the City's new residents are older, with no children living at home. However, despite a demographic shift towards smaller households, most new construction remains single-family detached housing. Exhibit 46 provides a brief summary of residential market trends.

Exhibit 46. Bend Region Residential Market Trends

	Market Trends	Deliveries	Demand Drivers
Single-Family Example: Single family detached homes	Home prices continue to rise year over year. Housing starts are not keeping pace with housing demand.	After seeing a major slowdown in housing starts during the recession, Bend has seen year over year increases in single-family housing construction.	The primary demand driver is Bend's rapid population growth. Bend continues to see an influx of new residents, many of whom arrive with equity from sales of homes in more expensive housing markets.
Multifamily Example: Apartment buildings	Multifamily rents have steadily increased year over year since the recession. Multifamily vacancy has fluctuated over the same time period, but has recently started to tighten up. Bend area multifamily vacancy now hovers around 4 percent—a sign of a relatively tight rental market.	There were few multifamily housing deliveries to the Bend market since the recession until 2016. Since then deliveries have jumped to over 500 units per year. The vast majority of these units are rental units (as opposed to for-sale condominiums).	Bend multifamily rents are still relatively affordable compared to other metro regions in the west, but the overall lag in housing construction—for both rental and ownership housing products—is putting increasing pressure on the multifamily market. Rents are steadily rising as a result.

Source: ECONorthwest, CoStar, U.S. Census

5.2 Implications for Southeast Expansion Area Land Use Designations

The City of Bend Comprehensive Plan provides policy direction for the future of the Southeast Expansion Area. Policy 11-76 of the Plan succinctly describes the goal for future growth to achieve in this UGB expansion area:

"[The Southeast Expansion Area]… is intended to provide for employment uses to take advantage of good transportation access on Knott Road and 27th and existing city streets (and future improved access with the Murphy Extension) with a mix of residential uses providing a compatible transition from the employment lands to existing neighborhoods to the west. This mix of uses is also intended to increase the completeness of the existing low-density neighborhoods.[29]"

The mention of "completeness" is intentional. As noted in several places in Bend's Comprehensive Plan, the City sees "Complete Communities" as a key ingredient to guide future land use decisions. The Plan describes Complete Communities as, *"…having varied housing options and many of the essential services and amenities needed for daily living, including quality public schools, parks and open spaces, shops and services, all within a convenient walking and biking distance. Complete communities should also have convenient access to public transportation and employment areas.[30]"*

The Land Use Plan Designations for the Southeast Expansion Area are designed to achieve the Complete Community goal with a mix of uses. The Land Use Plan Designations for the Southeast Expansion area are as follows:

Exhibit 47. Southeast Expansion Area Land Use Designations (Acreages)

Land Use	Area (Acres)	Portion of Sub-Total (Percent)	Development Potential (2028)	Development Potential (2040)	Alternative Metric
Residential	122	25%	819 Housing Units	882 Housing Units	820 Housing Units
RS	77	16%	47% Multi-family Units		47% Multi-family Units
RM	36	8%	36% Single-Family Detached		17% Single-Family Attached
RH	9	2%	17% Single-Family Attached		
Commercial	67	14%			
Industrial	76	16%			
Mixed Employment	103	22%	2,274 Jobs	2,277 Jobs	
Public Facilities	75	16%			
Other	36	8%			
Developable Land Subtotal	**479**				

Source: City of Bend (Note: Right of Way (ROW) is not included in the summation of areas. Residential uses are also permitted as a limited use in Commercial and Mixed Employment areas.)

[29] City of Bend Comprehensive Plan, Chapter 11: Growth Management, Page 32

[30] Ibid. Page 4

Realizing development of *any* land uses in the Southeast Expansion Area will require substantial infrastructure investment, and decisions regarding where and when that infrastructure investment is made. Our discussion of implications describes how the market will respond once a successful infrastructure plan has been implemented.

Overall, our research shows that trends are headed in a positive direction for the planned land uses in the Southeast Expansion Area, and that the overall mix of uses is responsive to market conditions. That said, intentional phasing, investment in infrastructure, and planning for mixes of uses will be critical to successful implementation of the vision for the Southeast Area Plan. Over the course of the area's build-out market conditions are likely to shift, and near-term opportunities may need support to ensure that the long-term vision is achieved.

A Note about The Market Potential Estimates

These market potential estimates were created through a reconciliation of our Bend area market research, our discussions with local stakeholders, and our experience working on similar estimates in other regions.

The timeframes used in these estimates are related to the timing of infrastructure development and pre-development planning for the Southeast Expansion Area. That is, each timeframe is in relation to the initiation—the starting point—of infrastructure and land development in the area. These timeframes are not related to a current day starting point. This is an important distinction. There is substantial work that needs to take place to plan and implement a successful infrastructure plan before development can be initiated.

Market Potential Definitions

High	High market interest. Limited policy support or subsidy needed; that is, the market is likely to develop these uses with little public support.
Medium	Limited to prime locations where development is most likely to occur. Some development in this category are likely to require partnerships and intentional policy focus, e.g. regulations and incentives to promote missing middle housing
Low	Development will require public subsidy and targeted policy focus, e.g. strategic plans, dedicated funding, or specific programs to support these uses.

Commercial Land Uses

Retail

Retail uses respond to the needs and demands of the local population. Some retail development types have larger population catchment areas than others. Others rely upon adjacencies with other popular destinations. Due to macro-economic trends, emerging technology, and the rapid increase of online shopping, the retail real estate market nationwide is in a transformational period, complicating long-range estimates. Nevertheless, people continue to shop at stores and go to restaurants, and there will be a need for retail real estate in the future.

The market potential in the Southeast Expansion Area for retail is heavily reliant upon future residential development in the area, and the location, type, and quality of retail establishments that will come to occupy the area.

In the near-term, retail of all types will be a challenging land use to develop.

- Existing low-density neighborhoods provide a limited number of shoppers for new retail outlets, and perceptions of the Southeast Expansion Area are generally that it is distant from commercial centers of Bend. Once transportation infrastructure is in place, the market potential for destination retail will increase.
- Residential and neighborhood scale retail (such as hair salons, coffee shops) are mutually supportive, and should be planned together. Appropriately-scaled retail drives residential rents and sales prices, and retail cannot be successful without an appropriate number of nearby households.
- Types of retail that rely upon a critical mass of population in a surrounding geography (grocery stores), or amenity rich walkable environments like Bend's downtown (boutique retail) will be challenging retail development types for the Southeast Expansion Area until it is close to final build-out.

Exhibit 48. Southeast Expansion Area: Market Potential for Retail Uses

Development Type	Plan Zone Designations	Market Potential		
		Near-Term (0-5 years)	Mid-Term (5-10 years)	Long-Term (10-20 years)
Destination Retail	CG	Medium	High	High
Neighborhood Retail/Services	CG, ME	Medium	High	High
Boutique Retail	CG, ME	Low	Low	Medium
Restaurants/Cafes/ Brewpubs	CG, ME	Low	Medium	High
Grocery Stores	CG, ME	Low	Low	Medium

Source: ECONorthwest.

Office

Depending on the specific development type, office real estate can either act as a supportive use (neighborhood services) or can be an anchor use that attracts other uses to it (corporate offices). Like many cities of its size, Bend has a concentration of corporate offices in a select few areas. Office uses that provide neighborhood services are much more spread out across the city. These neighborhood office uses include such businesses as veterinarian clinics, small law offices, and tax preparation services, among others.

Because of its location away from other concentrations of office users, the Southeast Expansion Area is unlikely to attract corporate offices until later phases of development. To do so any earlier would likely require a targeted recruitment strategy and development incentives.

Neighborhood services—accountant offices, dental offices, etc.—act in a similar fashion to neighborhood retail. That is, they support and rely upon surrounding residential uses. This office development type will have limited market potential until close to full build-out.

Exhibit 49. Southeast Expansion Area: Market Potential for Office Uses

Development Type	Plan Zone Designations	Market Potential		
		Near-Term (0-5 years)	Mid-Term (5-10 years)	Long-Term (10-20 years)
Live-Work Units	ME	Low	Low	Medium
Home-Offices	ME, RH, RM, RS	Medium	Medium	High
Neighborhood Services (Tax services, Dental offices, etc	CG, ME	Medium	Medium	High
Corporate Offices	CG, ME	Low	Low	Medium

Source: ECONorthwest.

Industrial

Industrial real estate ranges from small auto-shops to large factories and distribution facilities. As was discussed earlier in this report, the Southeast Expansion Area has not been designated for large lot industrial properties and recent market trends are showing an increasing demand for smaller and more flexible industrial development types. With those assumptions and trends in mind, industrial development has an overall higher market potential than some other real estate sectors.

Appropriately sized warehouses, manufacturing, and flex development types have a positive but limited market potential in the near-term. The market potential for these development types will increase as transportation infrastructure reaches full build-out. Warehouses and manufacturing buildings are relatively inexpensive building types. If land costs are competitive and there is adequate transportation access, these types of developments are usually quick to respond to market demand.

Flex industrial space, a development type that—as the name suggests—can nimbly provide a flexible blend of office and industrial space to meet the needs of individual tenants, will also become an attractive industrial use type early on. The range of small businesses in Bend, from small technology companies to outdoor gear startups, are a good fit for flex industrial space.

In most cases, distribution industrial developments require large lots for cross-dock facilities, truck parking and turn-around, as well as immediate interstate highway access. There are other locations in Bend that are generally better suited for this development type than the Southeast Expansion Area.

Exhibit 50. Southeast Expansion Area: Market Potential for Industrial Uses

Development Type	Plan Zone Designations	Market Potential		
		Near-Term (0-5 years)	Mid-Term (5-10 years)	Long-Term (10-20 years)
Warehouse	IG, IL	High	High	High
Manufacturing	IG, IL	Medium	Medium	High
Distribution	IG, IL	Low	Low	Low
Flex	IG, IL, ME	Medium	High	High

Source: ECONorthwest.

Residential Land Uses

Generally, the primary driver for residential real estate is population growth. Bend's historic and projected future population growth rate is higher than most cities in the United States. The continued influx of people to Bend will drive the residential market for the foreseeable future.

While the households that make up Bend's population and its new residents is varied in terms of size and incomes, population trends indicate that Bend households are getting smaller (fewer children) and wealthier. At the same time, there is a growing demand for housing for lower income households. Meeting the future needs of Bend's households will require a wide range of new unit types.

To respond to Bend's recent population growth, the local residential real estate market has expanded more rapidly than other real estate sectors. Single family home development has been steadily increasing and multifamily development has recently started to pick up.

The City of Bend has designated 25 percent of the land in the Southeast Expansion Area exclusively for residential uses. The mixed employment zone, which is not included in that residential tally, also allows residential as a limited use.

The future market potential for residential land uses in the Southeast Expansion Area strong, but varies by residential development type.

- Single-family home development, due to its generally high demand and relatively low development costs, is the most likely to be successful.
- "Garden-style" wood frame multi-family housing, a relatively inexpensive to build development type could be achievable in the near to mid-term depending the location, adjacent or nearby amenities, and the quality of the project itself. In the long-term, once the Southeast

Expansion Area is more built-out with community amenities in place, and transportation infrastructure linking the area to other parts of the City, the market potential for this type of multi-family housing increases.

- Smaller scale multi-family housing such as townhomes, duplexes, and other "missing middle" development types are likely to be achievable in limited situations initially, but market potential will continue to grow as the Southeast Expansion Area becomes more of a recognizable neighborhood.
- Mixed-use multifamily housing—typically a building with residential units over a first floor of commercial spaces—will face tough challenges in the near-term, but development viability will increase in later development phases. Mixed-use multifamily development is an expensive and complex development type. While there are select cases of this development type under-construction in Bend today, they are located in highly desirable areas where they can command the highest area rents. To achieve mixed-use multifamily development in the near-term and likely well into future timeframes, will require strategic partnerships, and a package of incentives or subsidies.
- Affordable housing, which is defined as housing that is sold or leased at rates lower than market rates, will—as it does in most if not all situations—require targeted implementation strategies and actions. The City of Bend already has a strong affordable housing program. To realize affordable housing development in the Southeast Expansion Area, the City will need to use many of its available tools and incentives.

Exhibit 51. Southeast Expansion Area: Market Potential for Residential Land Uses

Development Type	Plan Zone Designations	Market Potential		
		Near-Term (0-5 years)	Mid-Term (5-10 years)	Long-Term (10-20 years)
Single-Family	RS	High	High	High
Multi-family	RH, RM	Medium	Medium	High
Multi-family Mixed Use	RH, ME	Low	Low	Medium
Duplexes, Townhomes/Missing Middle Housing	RS, RM, RH	Medium	Medium	High
Affordable Housing*	RS, RM, RH	Low	Low	Low

Source: ECONorthwest. *Note: Affordable housing is a non-market use. Across all timeframes, affordable housing will require targeted strategy and actions to be achievable.

Appendix A. Bend's Housing Market

ECONorthwest works with the Central Oregon Association of Realtors (COAR) to create quarterly and annual single-family home market reports. To support this market analysis, we have included two recent report summaries for the Bend market— (1) the 2018 Third Quarter Bend Report, and (2) the 2017 Bend Market Overview Report.

Bend Third Quarter Report, 2018

The Central Oregon housing market continued to see home price appreciation across most of the region in the third quarter of 2018. Other data points—days on market, sales volume, etc.—varied from city to city. Altogether, the region continues on a stable path forward through 2018.

Here are some of the economic highlights from the third quarter of 2018:

- **Bend:** Bend recently updated the comprehensive and zoning plans to match, removing the need for property owners to pay for compliance. Bend has also approved planning funds for the UGB expansion area known as the Elbow in SE Bend.
- **La Pine:** In early 2019, La Pine will begin $25 million in infrastructure improvements to connect two neighborhoods to the city's water system. The project will bring water and sewer to 275 developed homes and undeveloped lots.
- **Madras:** The Madras Municipal Airport has received more than $2.5 million in federal grants to help with much needed repairs and upgrades.

(Cont. on next page)

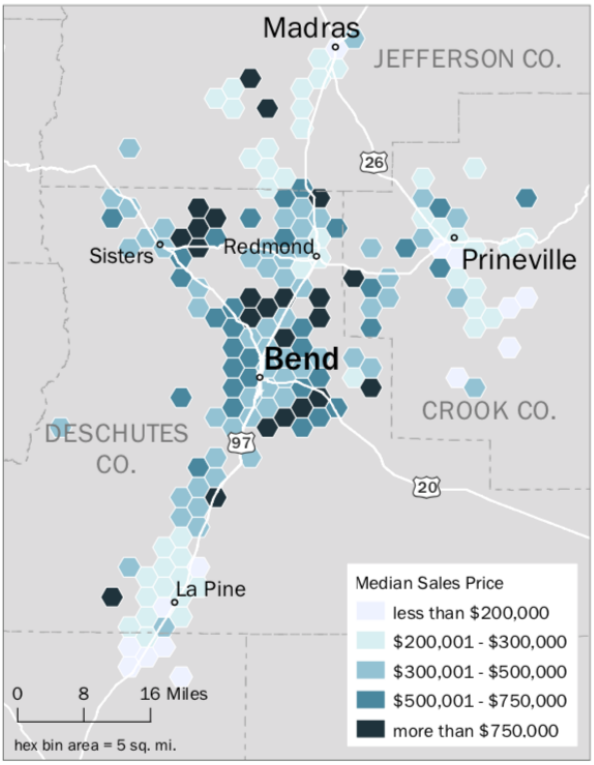
Median Sales Price and Median Sales Volume by Submarket

	Price	Volume
Bend	$435,000	929
Crook County	$249,950	126
Jefferson County	$218,500	81
La Pine/Three Rivers South	$262,000	176
Redmond/Terrebonne/ Crooked River Ranch	$309,701	402
Sisters	$416,824	86
Sunriver	$412,000	89

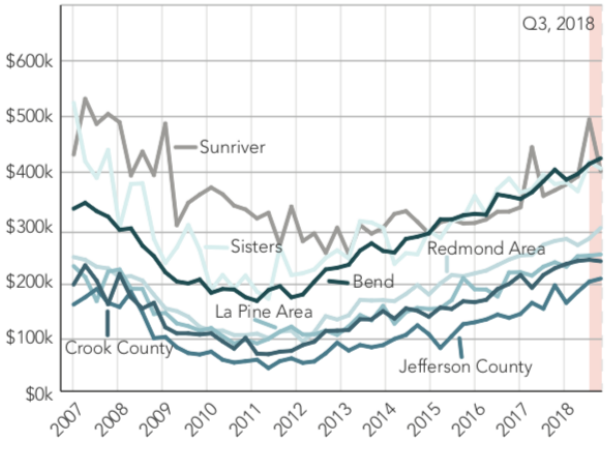
For All Submarkets

	Current vs. Prev. QTR		Current QTR vs. Same QTR Last Year	
Units Sold	↑	8.44%	↓	-0.74%
Med. Price	↑	1.1%	↑	8.35%

Median Regional Sales Price



Submarket Comparison—Median Home Sold Prices, Quarterly, 2007–2018



About the data used in this report:

To produce this report, ECONorthwest compiled and organized data from COAR's MLS database. All questions related to data accuracy and verification should be directed to COAR.

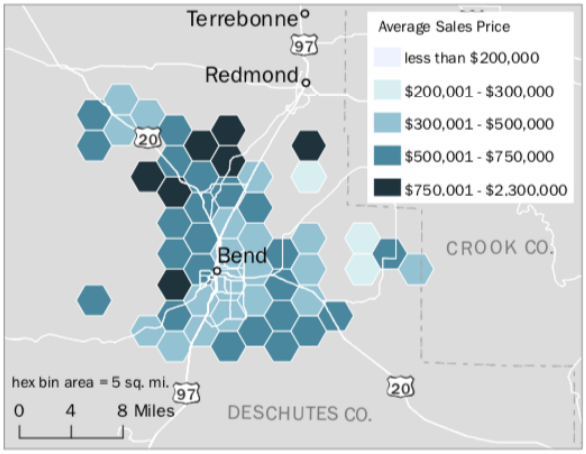
ECONorthwest
ECONOMICS · FINANCE · PLANNING

Central Oregon Association of REALTORS

Bend Overview, 2017

Homes in Bend continue to be in high demand and fetch some of the highest prices in all of Central Oregon. Bend saw growth in home sale prices in 2017, while sales volume remained on par with 2016. Both number of homes sold and days on market were similar to 2016. Average home prices increased each quarter over 2017, but with only slight increases on a per square foot basis. The price premium for new homes sales in Bend was minimal, showing the strong demand for all homes in the submarket. In 2017, 24 percent of all home sales in the Bend submarket were all cash sales.

Average Sales Price



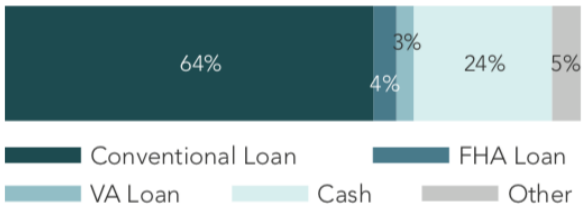
Home Pricing

Existing	New	New Construction Premium
$466,358	$468,904	0.45%

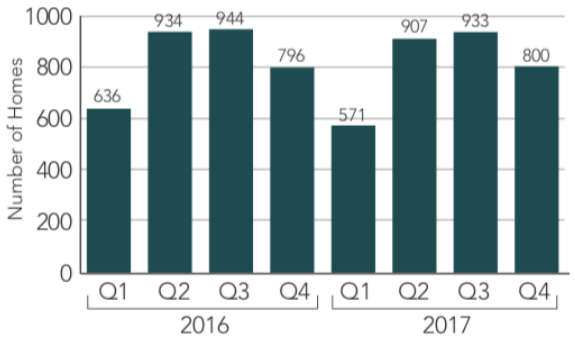
New Construction Sales

New Units Sold	New Units as a % of Total Units
717	22.33%

Home Financing

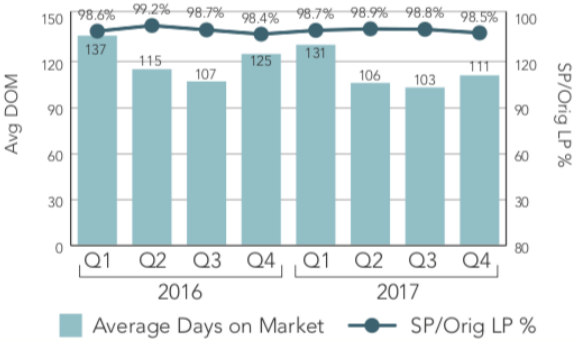


Sales Volume



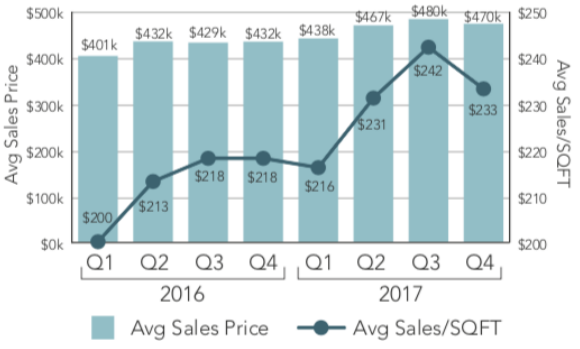
	Current vs. Prev. QTR	
For Sale	↑	39.63%
Sold	↓	-14.26%

Avg. DOM & Sales Price vs. Listing Price



	Current vs. Prev. QTR		Current vs. Prev. Year	
DOM	↑	8.6%	↓	-7.07%
Sold/Orig LP Diff. %	↓	-0.31%	↓	-0.03%

Avg. Sales Price & Average Sales per SQFT



	Current vs. Prev. QTR		Current vs. Prev. Year	
Avg. Price	↓	-2.07%	↑	9.71%

Appendix G - Vision and Guiding Principles

CITY OF BEND
SOUTHEAST AREA PLAN

Vision and Guiding Principles

PREPARED FOR: SEAPAC Members

COPY TO: Southeast Area Plan PMT

PREPARED BY: Joe Dills and Kyra Haggart, Angelo Planning Group

DATE: February 21, 2019

This memorandum proposes a draft vision statement and set of guiding principles for the Southeast Area Plan. The vision and principles in this memorandum were drafted based on input and information discussed at the second meeting of the Southeast Area Plan Advisory Committee (SEAPAC) on January 17, 2019. A summary of SEAPAC's visioning brainstorming is included at the end of this document.

Vision Statement

Our vision is that the Southeast Expansion Area becomes a complete and walkable community and a welcome addition to Southeast Bend. Houses, businesses, parks and schools are compatible neighbors, and have well-planned transitions between them. The mix of uses are highly connected by neighborhood streets, paths, and open spaces. The area has an active and vibrant outdoor life; it is a place where neighbors are out walking, biking, and interacting daily. The Southeast Expansion Area is a unique and successful community in Bend.

Guiding Principles

- **Create a complete community.** Implement the Comprehensive Plan's guidance for a mix of uses and refine that direction with ideas from the area-planning process.
- **Design and build a walkable and connected transportation network.** Create a network of connected streets and paths that serve all travel modes and are walkable and bike-friendly. Build "sidewalks to somewhere." Implement the City's low stress bike network plan. Lay the groundwork for an area that is well-served by public transportation.
- **Create vibrant public spaces**. Plan for public spaces such as streets, parks, schools, and commercial centers, so there is a vibrant outdoor life throughout the community.
- **Preserve views and the natural landscape.** Integrate views, trees, and rock outcrops into new development and public spaces.
- **Create a sense of identity.** Plan the Southeast Expansion Area so that, when built, it will be recognized as a distinctive place with a strong sense of identity. All development—public and private—will contribute to reinforcing this sense of place.
- **Support a thriving employment area.** Guide the plan so that target industries and businesses are attracted by the unique advantages of locating in this area, and so that residents of the Southeast Expansion Area have the opportunity to live and work in their community.
- **Deliver needed infrastructure.** Create funding strategies, phasing plans, and other actions to ensure that needed infrastructure is delivered in a timely and predictable manner.

- **Develop an economically viable plan.** The plan is fully implementable because it is appealing to the market, cost-effective, and addresses fiscal realities. The infrastructure needed to support new development in the area can be built because funding mechanisms are aligned with needs and costs.

Results from Visioning Brainstorming Exercise

SEAPAC #2 – January 17, 2019

Imagine you had to leave SE Bend to go live on a South Sea Island. You return in 20 years, and the SE Area Plan, has been successfully implemented. You really like what you see. What do you see?

- A livable neighborhood where you don't need to drive to access services, kids can bike and walk to school, and the roads are not congested
- A complete neighborhood with commercial services to support it, does not have industrial development
- Transitions between uses with no abrupt edges, mixed uses between commercial and lower density residential
- Capitalize on what makes the southeast area special (like buttes, views, open spaces), and people have access to the neighborhood services they need
- Easy connectivity, people can walk and bike, safe crossings on Knott Road, multimodal transportation with trails throughout the area, takes into consideration future transformations in technology and lifestyle
- Walkable and bikeable southeast area, no need to own a car to get around, the area is well-served by public transportation
- Transitions between uses, development does not have negative impacts on existing homes in the area, public open spaces where you can interact with your neighbors
- High school is built, transitions between uses, mix of businesses, mixed use development, mix of residential densities and housing types, walkability, a community feel, transitions between industrial, commercial, and residential uses
- There's a ballgame going on at the park, there's a brewery across the street with a tasting room and food pod that people are walking across the street to get to from the game, there are transitions between uses, people are getting out in public spaces connecting and interacting
- The southeast area is a neighborhood people want to live in, residential development near the schools, commercial and industrial development near major roads as buffers along the edge
- Development and housing are economically viable, complete communities
- The area is built out to be custom and unique, not cookie cutter
- There is a place to take kids to play, can walk somewhere to get coffee, mixed use development, don’t build right up to the road, preserve natural areas and features like rock outcrops to show kids what the area used to look like
- Walkability, jobs are close to schools and homes, need employment near homes so people can walk to work

- The area is completely built out because we created a vision and a plan that the market wanted and the community wanted, people want to live there, it is a vibrant community, and the schools are successful, sense of entrepreneurism

Appendix H - Planned Transportation Infrastructure

CITY OF BEND
SOUTHEAST AREA PLAN

Planned Transportation Infrastructure

PREPARED FOR: Southeast Area Plan Advisory Committee

PREPARED BY: Southeast Area Plan Project Team

DATE: February 14, 2019

This memorandum highlights key findings from several recent and ongoing analyses of the transportation system within and near the Southeast Area Plan (SEAP) study area. These studies have identified multimodal improvement options that are relevant to the potential opportunities and constraints associated with buildout of the SEAP area.

The relevant studies include:

- Bend Transportation System Plan Update (ongoing)
- Murphy Corridor Project (ongoing)
- Bend Parkway Study (ongoing)
- Bend Transportation System Development Charge (TSDC) Update (completed in 2018)
- Bend-La Pine School District (BLSD) 15th Street Master Plan (BLSD Master Plan) Transportation Impact Analysis
- Alpenglow Park Master Plan

Figure 1 documents key projects identified from these studies. The following subsections provide additional background and context that is helpful to the planning of SEAP.

Background

The SEAP study area and surrounding lands reflect the existing rural characteristics prevalent in the area. The transportation system currently in-place to serve these lands has primarily been constructed to rural Deschutes County standards with limited facilities available for non-auto modes (as shown in Figure 2). Over time, areas of the street system have been upgraded to urban standards, such as along SE 15th Street near the frontage of The Bridges at Shadow Glen development. The planned new high school to the northwest of the Knott Road/SE 15th Avenue and proposed Alpenglow Park will also provide urban upgrades along their site frontages.

Nearly all of the local, collector and arterial intersections in the study area are controlled by stop-signs, reflective of the lower traffic volumes associated with the more rural character. To date, no roundabouts or traffic signals have been constructed south of Reed Market Road and east of Brosterhous Road within the Bend Urban Growth Boundary.

The SEAP will identify the traffic control needs and multimodal infrastructure improvements both within and connecting to the Southeast Expansion Area to accommodate urban buildout of the area. One key aspect for consideration is how this infrastructure is phased as lands develop to ensure the safety of all modes of travel within and adjacent to the Southeast Expansion Area.

Roadway Improvements

Key roadway projects identified through other ongoing studies intended to directly serve or provide access to the SEAP study area are shown in Table 1 and in Figure 1.

Table 1. Roadway Improvement Projects

Project	Project Source	Description	Status
Murphy Road Extension	Bend TSP, TSDC, Murphy Corridor Project	• Urban upgrade of existing Murphy Road sections • Murphy Road extension from Brosterhous Road to 15th Street • Intersection improvements at Country Club Road, Brosterhous Road, and 15th Street	Murphy extension scheduled for completion by 2021 Urban upgrade and intersection improvements not programmed
Chase Road Extension	Bend TSP, TSDC	• Extension from Chase Road to Brosterhous Road	Not programmed
Brosterhous Road Urban Upgrade	TSDC	• Urban upgrade of existing roadway	Not programmed; will likely occur with site frontage and/or public improvements
Knott Road Urban Upgrade	Bend TSP	• Urban upgrade of existing roadway	Not programmed; will likely occur with site frontage and/or public improvements
27th Street Urban Upgrade	Bend TSP	• Urban upgrade of existing roadway	Not programmed; will likely occur with site frontage and/or public improvements
15th Street Improvements	Bend TSP	• Urban upgrade	Partially programmed; will likely occur with site frontage and/or public improvements. BLSD Master Plan and Alpenglow Park Master Plan to complete site frontage improvements.
Knott Road Improvements	Bend TSP	• Urban upgrade	Partially programmed; will likely occur with site frontage and/or public improvements. BLSD Master Plan to complete site frontage improvements.
New Collector between 15th and Brosterhous	Bend TSP, BLSD Master Plan	• New collector street as part of high school site development	Scheduled for completion by 2021

Intersection Improvements

Key intersection projects planned in or in the vicinity of the SEAP are shown in Table 2 and in Figure 1.

Table 2. Intersection Improvement Projects

Project	Project Source	Description	Status
Programmed Intersection Improvements			
Murphy Road & Brosterhous Road	Murphy Corridor Project, TSDC	• Construct roundabout as part of Murphy Corridor Project	Scheduled for completion by 2021
Murphy Road & 15th Street	Murphy Corridor Project, TSDC	• Construct roundabout as part of Murphy Corridor Project	Scheduled for completion by 2021
Knott Road & 15th Street	TSDC & BLSD Master Plan	• Construct roundabout as part of high school site development	Scheduled for completion by 2021
Brosterhous Road & New Collector Road	TSP, BLSD Master Plan	• Construct stop-controlled intersection as part of high school site development	Scheduled for completion by 2021
Planned Intersection Improvements			
Knott Road & Brosterhous Road	TSDC & BLSD Master Plan	• Construct roundabout	Not programmed; identified as mitigation measure for next phase of BLSD Master Plan
Murphy Road & Country Club Drive	Murphy Corridor Project (partial), TSDC	• Design roundabout. Murphy Corridor Project will not construct intersection improvements	Not programmed
New Collector & 15th Street	Bend TSP, BLSD Master Plan	• Construct roundabout	Not programmed; identified as mitigation measure for next phase of BLSD Master Plan
Knott Road/Country Club Drive	TSDC	• Construct roundabout	Not programmed
Knott Road/China Hat Road	TSDC	• Construct roundabout	Not programmed
Ferguson Road & 15th Street	TSDC	• Construct roundabout	Not programmed
US 20 & Hamby Road	ODOT Roadway Safety Audit	• Construct roundabout	Not programmed
Possible Intersection Improvements			
SEAP Collector Road Connections with Knott Road, 27th Street, and Ferguson Road	Bend TSP (partially)	• Construct roundabout	Not programmed. Needs guidance from SEAP

Interchange Improvements

Traffic to/from the SEAP study area will access the Bend Parkway at one of the five southern Bend Parkway connection points. Table 3 discusses each. The location of these are shown in Figure 1. All of these access locations are being evaluated as part of the ongoing Bend Parkway Study which will further inform more specific improvement options.

Table 3. Interchange Improvement Projects

Project	Project Source	Description	Status
Reed Market Interchange	Parkway Study	• Major upgrades to the interchange and surrounding area. No project has been specifically identified.	Not programmed
Powers Road Interchange	Parkway Study	• Improvement likely either an overcrossing or full interchange.	Not programmed
Murphy Road Interchange	Parkway Study, Murphy Overcrossing Project	• Improvement likely completion of north bound on-ramp and south bound off-ramp	Not programmed
Baker Road/Knott Road Interchange	Parkway Study	• ODOT plans to pursue a specific interchange planning process which will identify specific improvements	Not programmed
US 97/Ponderosa Street/China Hat Road	Parkway Study, Bend TSP	• Bend TSP recommends construction of a Ponderosa Street to China Hat Road overcrossing.	Not programmed

Figure 1. Planned Transportation Improvements

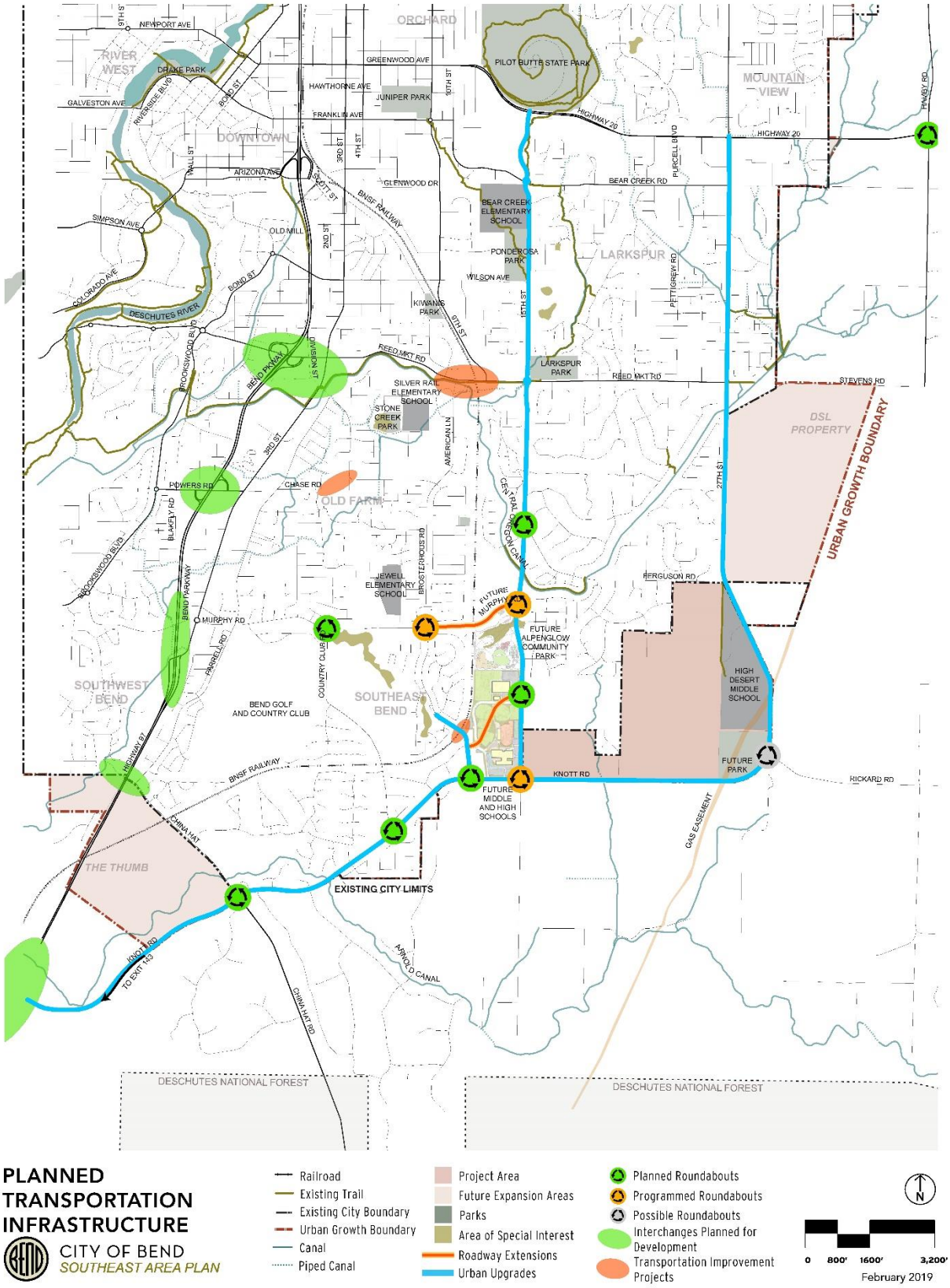
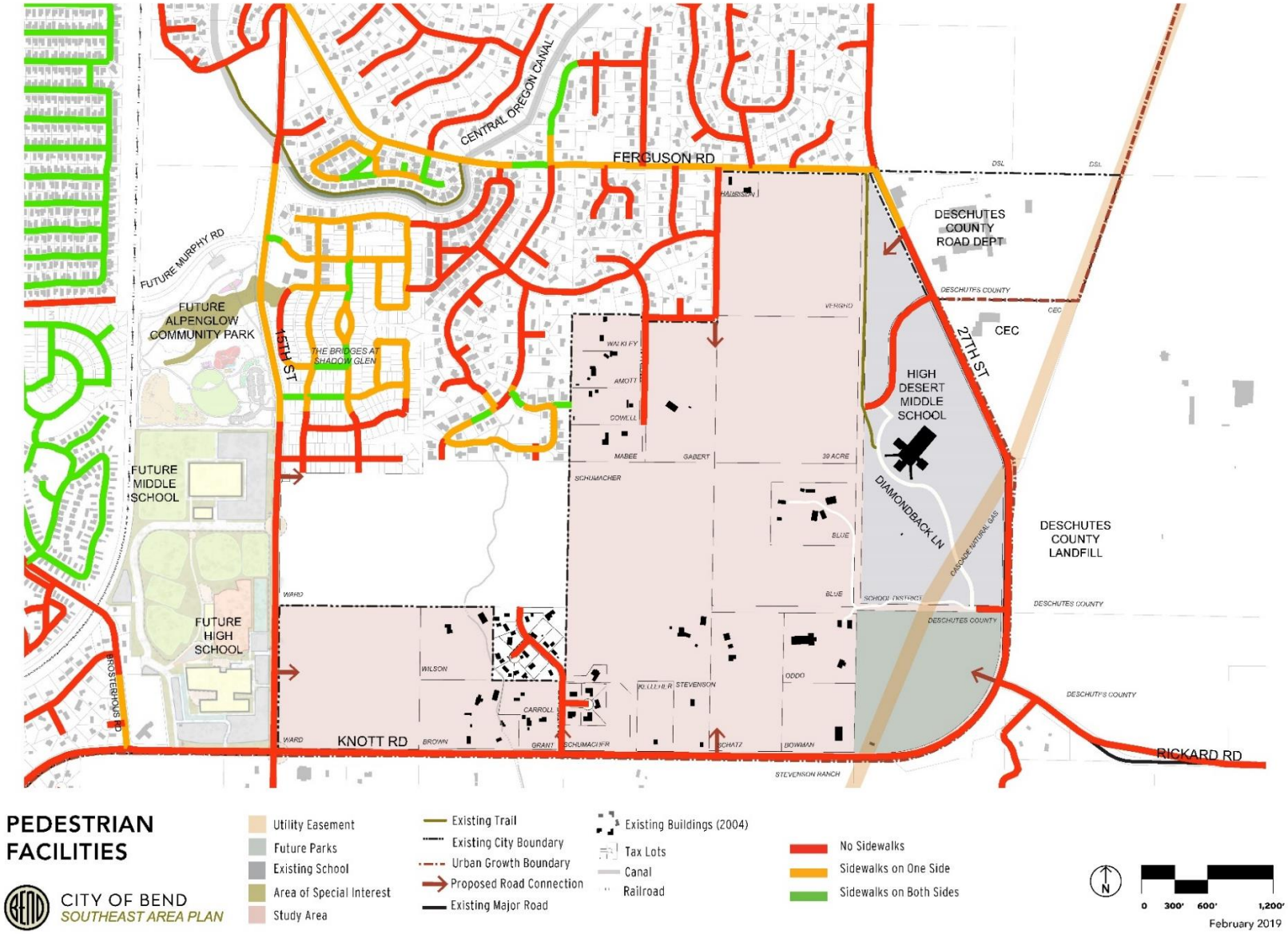


Figure 2. Pedestrian Facilities



Appendix I - Draft Transportation Concepts

CITY OF BEND
SOUTHEAST AREA PLAN

Draft Transportation Plan Concepts

PREPARED FOR: Southeast Area Plan Advisory Committee

PREPARED BY: Southeast Area Plan Project Team

DATE: February 14, 2019

This memorandum provides a brief overview of draft transportation plan concepts for streets and active transportation (bicycle and pedestrian facilities) for the Southeast Area Plan (SEAP). Please see the attached graphics for the working plan concepts.

Streets Plan Concept

Overall, the draft Streets Plan Concept is an update of the ideas that were adopted in Bend's Transportation System Plan during the 2016 Urban Growth Boundary (UGB) expansion process. The street plan in the current TSP was recognized as being very conceptual at the time of adoption and was expected to be refined during the area planning process. The draft Streets Plan Concept prepared for SEAP includes the proposals described below.

Neighborhood Collectors

Three "neighborhood collector" streets are shown in blue. They connect:

- SE 15th Street to Rickard Road (which will continue west to Brosterhous)
- Ferguson Road to Knott Road
- The center of the 15th Street Opportunity Area (Ward property) to Knott Road

The neighborhood collector is a new classification of street proposed for Bend. The intent is to combine the connectivity function of collector streets with a neighborhood-friendly design that supports the vision for the SEAP. The team is working on the details of the neighborhood collector cross-section and will share a working design with the Southeast Area Plan Advisory Committee (SEAPAC) on February 21st.

Options for the Rickard Road Connection

Creating a direct and logical east-west connection from SE 15th Street to Rickard Road is very important for good connectivity. There are several considerations regarding the alignment: (1) the impact on the future High Desert Park site; (2) whether a diagonal section of street cuts through one or more properties along the route; and (3) how direct the alignment is for attracting east-west trips. Three options (labeled A, B, and C in the Streets Plan Concept diagram) are provided.

Framework Local Streets and Potential Road Connections

Potential local streets are shown in black. These "framework locals" are intended to show a basic level of connectivity within the project area. At this point, they are illustrative of a connected street pattern that is consistent with the vision. Bend has the option of adopting the

framework local street plan as a zoning standard to be met, with the flexibility for a developer to propose "substantially equal connectivity.[1]"

The black arrows are illustrative of where the City would want to see street connections in the future. Some arrows are stubs to existing streets. Others are indications of how a block pattern might be developed. The potential connections are subject to the specific land uses proposed in the future.

Other Elements

Other aspects of the Street Plan include:

- Continuous parallel routes to Knott Road and 27th Street. This concept is very important to reducing the use of Knott Road or SE 27th Street for local trips (and thereby reducing left turns on and off those larger streets).
- Connections between the Southeast Expansion Area and the DSL Expansion Area. The Street Plan Concept creates good connections to Ferguson Road. By building a roundabout at the intersection of Ferguson Road and SE 27th Street, and extending Ferguson Road to the east, so the Southeast Expansion Area and the DSL Expansion Area will be well-connected.

Active Transportation Plan Concept

The Active Transportation Plan Concept is the plan for pedestrian and bicycle facilities in the Southeast Expansion Area. It includes:

- Paved multi-use trails along all arterial and collector streets.
- Implementation of the Bend Park and Recreation District's (BPRD) High Desert Park Trail, which connects the future middle and high schools and the future Alpenglow Park on SE 15th Street to High Desert Middle School, the future High Desert Park site, and Rickard Road to the east.
- Trails connecting High Desert Middle School to adjacent properties.
- A portion of the TransCanada Trail, a major regional trail, which runs through the High Desert Park Site. Two potential undercrossing for the trail are shown on 27th Street and Knott Road.
- Connections to existing trails in The Bridges and along the Central Oregon Irrigation Canal.
- Connections to planned trails in the BPRD Comprehensive Plan, including the Arnold Canal Trail and the 15th Street Trail.
- All local streets will be developed to include low-stress bicycle facilities and sidewalks.

[1] The City of Wilsonville has successfully adopted this approach in their Frog Pond Area Plan and West Frog Pond Master Plan.

Appendix J - Summary of Workshop 1

CITY OF BEND
SOUTHEAST AREA PLAN

Summary of Workshop #1

PREPARED FOR: Southeast Area Plan Project Management Team

PREPARED BY: Kyra Haggart, APG

DATE: 4/4/2019

Introduction

This memorandum provides a summary of the information provided, and results from, the Southeast Area Plan public workshop on March 21, 2019.

Event Summary

Date: Thursday, March 21, 2019
Time: 6:00 pm – 8:00 pm
Location: Nativity Lutheran Church, 60850 SE Brosterhous Road, Bend, OR

Attendance:
Approximately 53 community members attended the workshop.

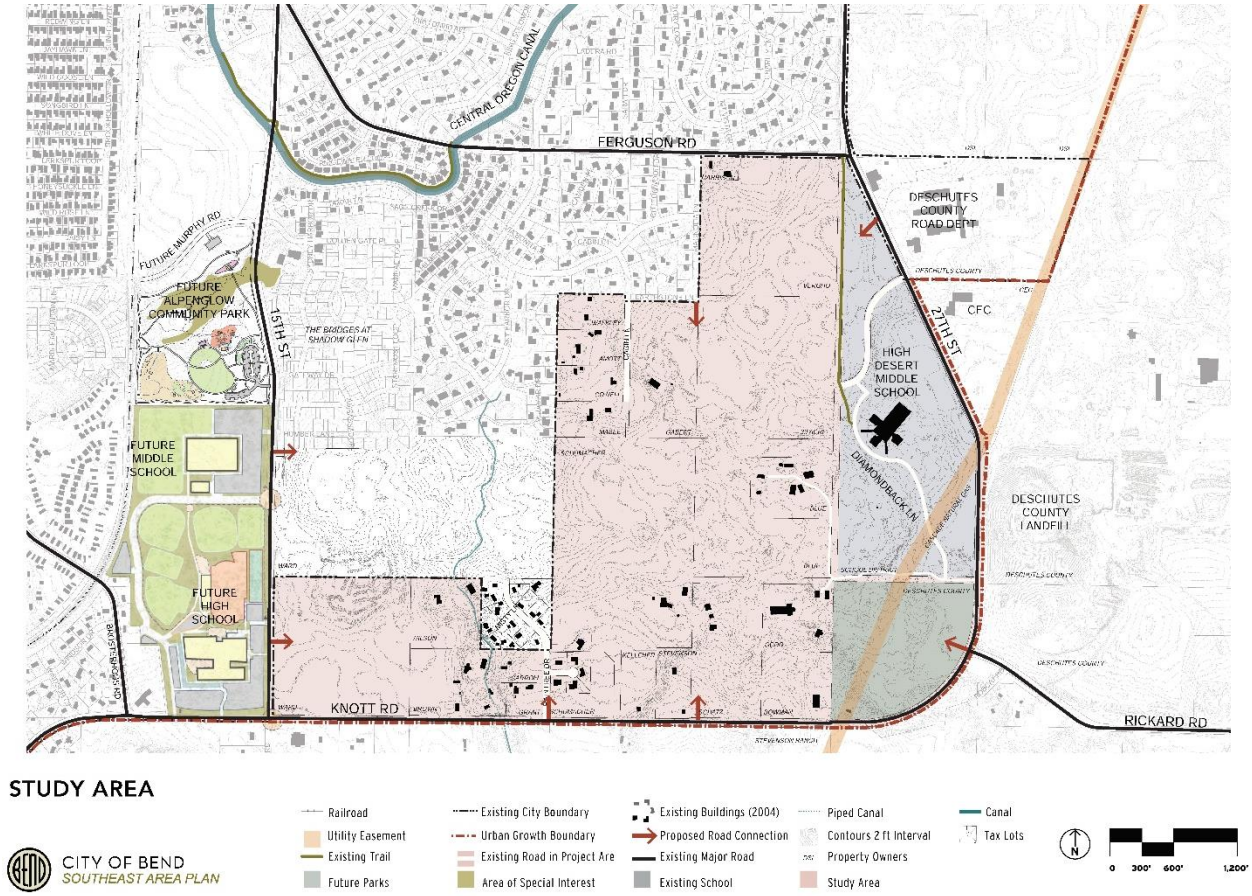
Information Provided

Information about the following topics was presented on display boards, with staff available for discussion and to answer questions:

- Project overview, including a project schedule and regional context maps
- Project vision and guiding principles
- Existing land uses and Comprehensive Plan designations
- Summary of the market analysis
- Transportation, including the existing Transportation System Plan (TSP) network, trails, pedestrian and bicycle facilities, and planned improvements
- Concept plans for future parks and schools in the area
- Water, sewer, and stormwater service information

The Southeast Area Plan study area is shown in Figure 1 below. A copy of the display boards are available in the "Meeting Schedules and Materials" section of the project website: https://www.bendoregon.gov/government/departments/growth-management/land-use-planning/southeast-area-plan

Figure 1. Study Area



Workshop Results and Discussion

Attendees of the workshop were able to provide input on the project through several different methods:

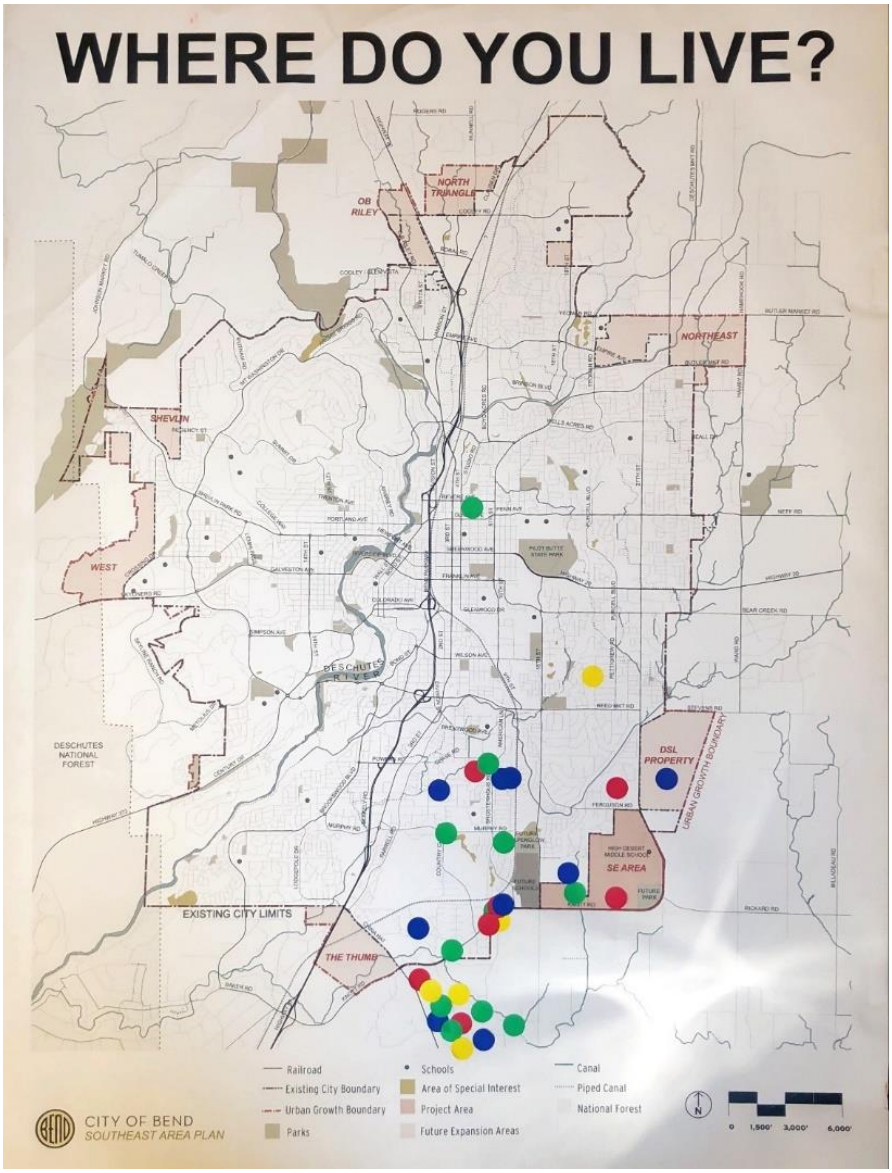
- Five display boards included opportunities for attendees to provide topic-specific input by adding sticky dots or written notes
- Comment forms were available to gather input on anything that was not covered at the open house, and to offer feedback of the overall effectiveness of the open house
- Easel pads were placed around the room for attendees to write general comments about the project or the area
- Staff were available at each display board station to have discussions with attendees, answer questions, and listen to input

Engagement Boards

Where Do You Live?

A board at the entrance to the workshop invited attendees to place a dot on a map of the City to indicate where they live. A total of 32 dots were placed on the map. The results are shown in Figure 2 below.

Figure 2. Results of the "Where Do You Live?" Engagement Board



Guiding Principles

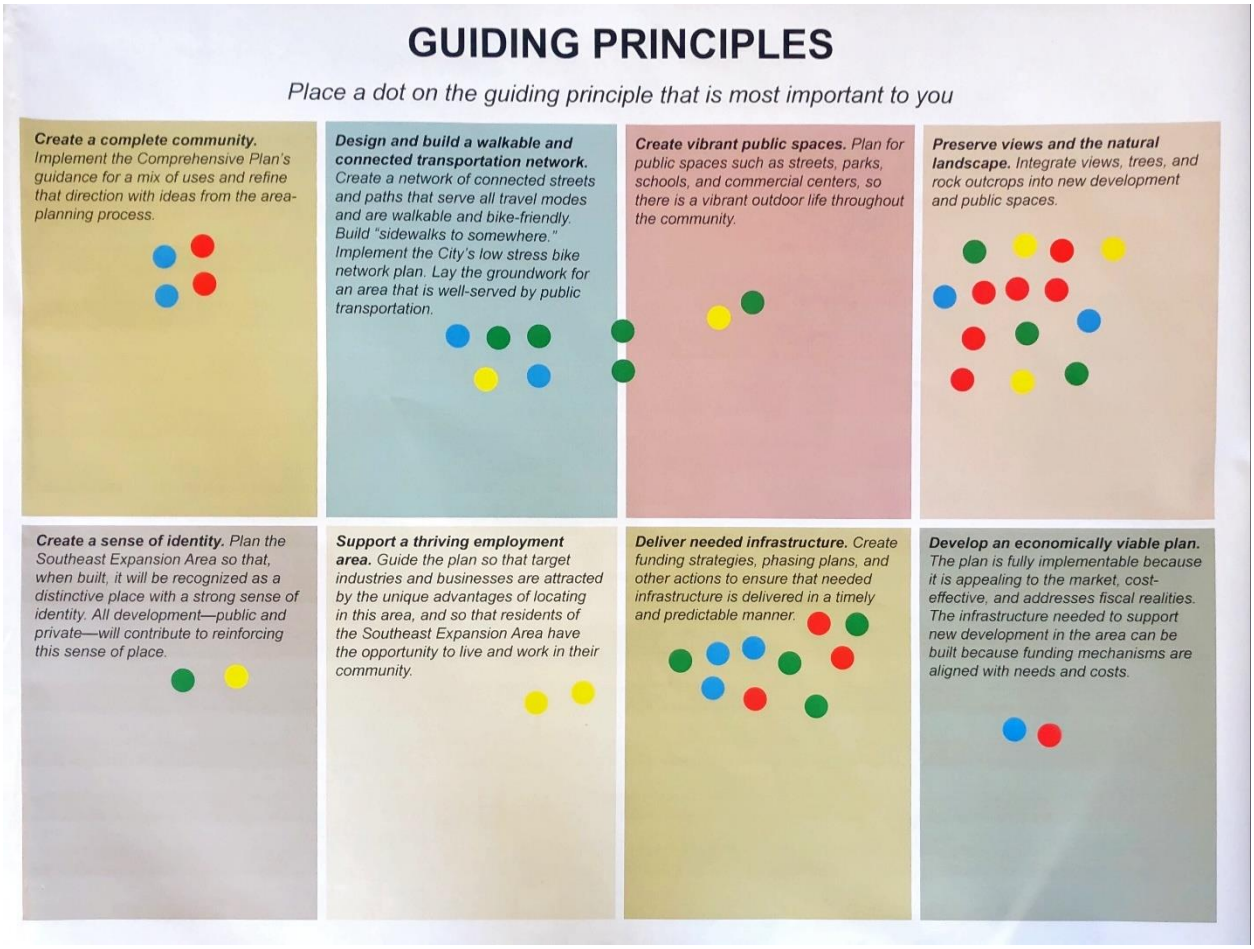
A board at the Vision and Guiding Principles station invited attendees to place a dot on the guiding principle that is most important to them. A total of 43 dots were placed on the board, and distributed as follows:

- Create a complete community – 4 dots
- Design and build a walkable and connected transportation network – 7 dots
- Create vibrant public spaces – 4 dots
- Preserve views and the natural landscape – 14 dots
- Create a sense of identity – 2 dots
- Support a thriving employment area – 2 dots

- Deliver needed infrastructure – 10 dots
- Develop an economically viable plan – 2 dots

The results of the exercise are shown in Figure 3 below.

Figure 3. Results of the "Guiding Principles" Engagement Board



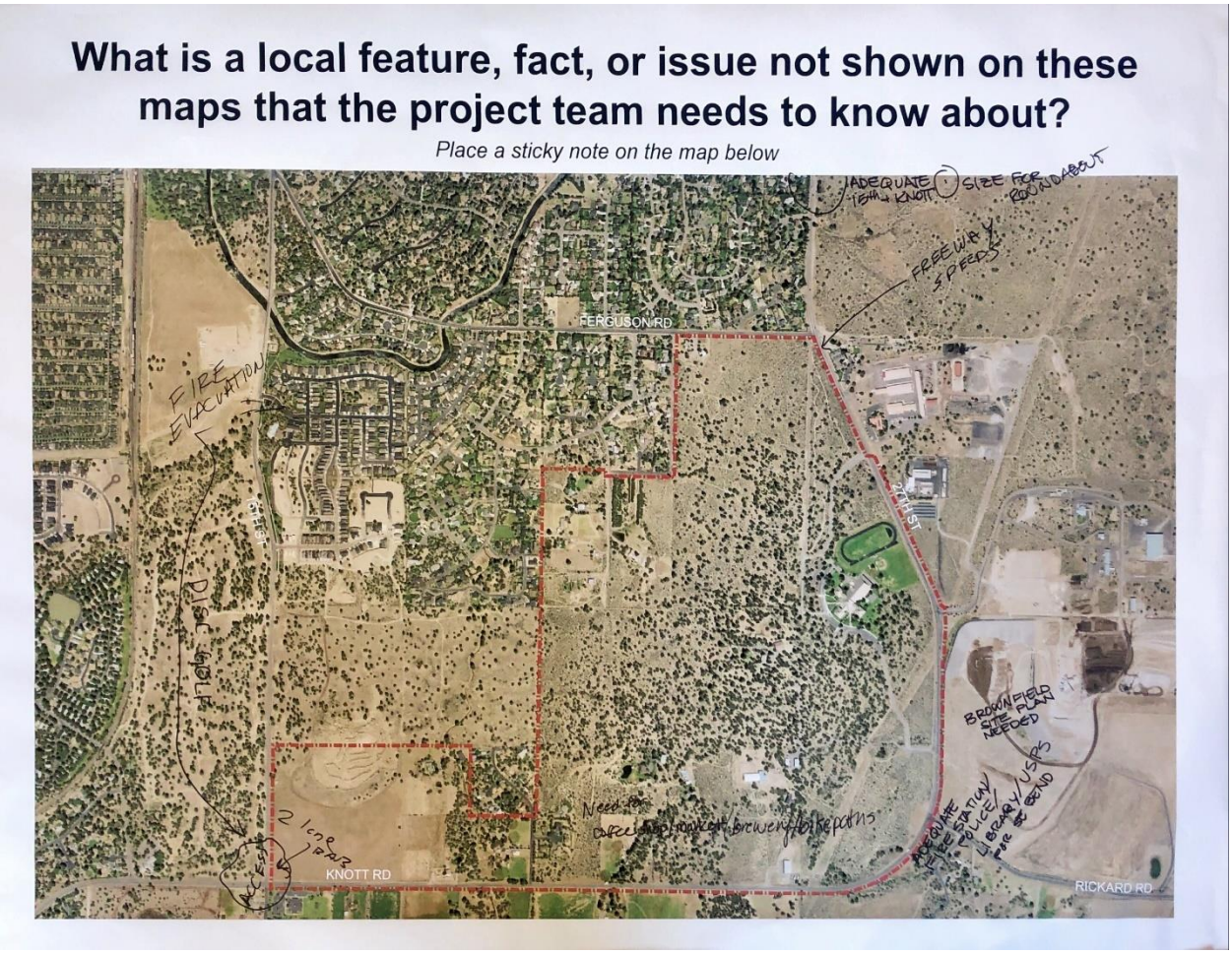
What is a local feature, fact, or issue not shown on these maps that the project team needs to know about?

A board at the Existing Land Uses station showed an aerial image of the Southeast Expansion Area and asked attendees to write a note on the map indicating a local feature, fact, or issue that the project team should be aware of. The results are shown in Figure 4 below. Notes included:

- The location of an existing disc golf course west of 15th Street at the site of the future high and middle schools
- The need for area residents to establish fire evacuation routes
- The location of a future roundabout at the intersection of 15th Street and Knott Road
- High-speed issues on 27th Street
- The need for a coffee shop, market, or brewery and bike paths in the Southeast Expansion Area
- The need for a brownfield site plan for the Deschutes County Land fill

- The need for a fire station, police station, library, and post office to be located in southeast Bend.

Figure 4. Results of the "Local Feature, Fact, or Issue" Engagement Board



Development Types

A board at the Market Analysis station showed photographs of different types of commercial, industrial, mixed employment, and residential development and asked attendees to place a dot on the types of development that they liked. A total of 25 dots were placed on the board. (Note: dot colors vary but do not indicate preference.)

For commercial development, attendees largely preferred the photograph of commercial development on NW Crossing Drive, with some other dots placed on photos of commercial buildings on NW Galveston Avenue, Colorado Avenue, and Dean Swift Road. For industrial development, two attendees placed dots on a photo of an industrial building on NW Lolo Drive in Northwest Crossing, with two other dots placed on photos of industrial development on SE Business Way and SE Bridgeford Boulevard. For mixed employment development, three attendees placed dots on an office building on NW Charbonneau Street, and one dot each was placed on photos of buildings on NE 2nd Avenue and NE Jamison Street. For the residential development section, most attendees preferred the images of single-family detached housing on NW Galveston Avenue, and a multifamily complex on Westridge Avenue. Dots were also placed on images of single-family detached homes on Brookhollow Drive and Clairaway Avenue. The results are shown in Figure 5 below.

Figure 5. Results of the "Development Types" Engagement Board

Transportation Issues

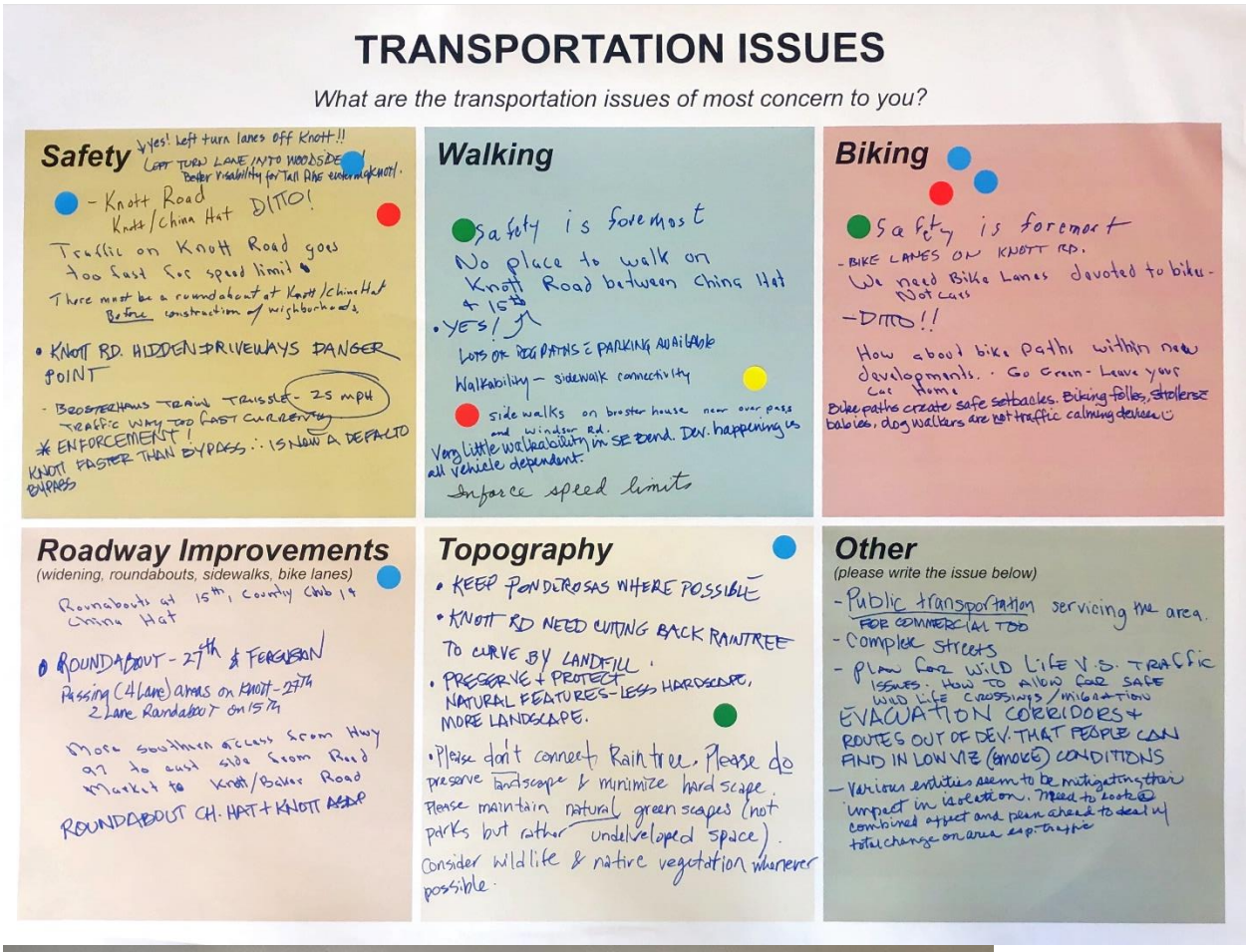
A board at the transportation station asked attendees to place dots or write comments on the transportation issues of most concern to them. The issues presented included safety, walking, biking, roadway improvements (i.e. widening, roundabouts, sidewalks, bike lanes), topography, or "other." The board received a total of 13 sticky dots, as well as a number of more specific written comments, which are summarized below. The results of the exercise are shown in Figure 6 below.

- Safety
  - Three dots
  - Comments about the need for left turn lanes and improved visibility on Knott Road
  - Concerns about the speeds on Knott Road
  - The need for a roundabout at Knott Road and China Hat Road prior to the construction of new neighborhoods
  - Concerns about the speeds crossing the train trestle on Brosterhous Road
  - The need for enforcement of speed limits throughout the southeast area
  - The use of Knott Road as a "de-facto bypass" for the east side of Bend
- Walking

  - Three dots
  - Comment about the importance of pedestrian safety
  - Specific comments about the lack of pedestrian facilities on Knott Road between China Hat Road and 15th Street; on Brosterhous Road near the overpass, and on Windsor Road
  - The desire for lots of paths and parking in the area
  - Concerns about walkability, sidewalk connectivity, and existing sidewalk gaps
  - Concern about the lack of walkability in southeast Bend generally
  - The need to enforce speed limits for pedestrian safety
- Biking
  - Four dots
  - Comment about the importance of bike safety
  - Comments about the need for bike lanes on Knott Road
  - Comment about the need for bike lanes that don't get used as a shoulder by cars
  - Desire to see bike paths included as part of new development
  - Desire for bike paths that create safe setbacks and can also be used for pedestrians
- Roadway Improvements
  - One dot
  - Comments about the need for roundabouts at Country Club Drive and Knott Road, China Hat Road and Knott Road, and 27th Street and Ferguson Road
  - Comments about the need for passing lanes on Knott Road and 27th Street
  - Comments about the need for more access to southeast Bend from Highway 97 south of Reed Market Road
  - Concern that the traffic circle proposed at 15th Street and Knott Road should be two lanes rather than one
- Topography
  - Two dots
  - Desire to retain existing ponderosa pine trees where possible
  - Comment about the need for improved visibility on Knott Road at Raintree Drive and at the curve by the Deschutes County Landfill
  - Comment about the importance of preserving natural features and undeveloped open spaces, and considering wildlife and native vegetation
  - Concern about extending Raintree Drive north and connecting to larger roads
- Other
  - Comment about the need to have public transportation that services both residential and commercial development in the area
  - Desire for complete streets in the area
  - Comment about the need to plan for wildlife, including safe crossings and migrations for local wildlife

- Comment about the need to establish evacuation corridors and routes that people could take during the event of a fire, even with low visibility due to smoke
- Comment about the need to look at the plan holistically and plan for the effects of new development such as traffic

Figure 6. Results of the "Transportation Issues" Engagement Board



Comment Forms, Easel Pads, and Discussions with City Staff

A summary of the comments received through the voluntary comment forms, easel pads, and discussions with City staff is provided below:

- The need to consider historic preservation through the planning process
- The need to plan fire evacuation routes and emergency access
- Desire to have the Fire Department more involved in the planning process
- Concerns that Knott Road and 27th Street are being used as an east side bypass to Highway 20
- Desire to see businesses in the area that provide neighborhood services and create a sense of place, including restaurants, grocery stores, and coffee shops
- Desire to have City staff from different departments coordinating on this and other planning processes
- Desire to preserve the rural/agricultural character of the area concern about losing the history of the area and sense of place
- Support for the City requiring developers to pay for the provision of infrastructure such as sewer, rather than homeowners or the City
- The area is part of the Wildland-Urban Interface so there is a need to regulate development to conform to FireWise standards
- Need to pay attention to design standards, transitions, and landscaping/open spaces
- Fear that developers will have too much say and leeway in how the area is developed
- Consider impacts of new development on all surrounding areas, including those in the County, not just what is inside the UGB and city limits
- Consider light pollution and noise pollution from new development
- Need for better access to eastern Bend from Highway 97 south of Powers
- Desire to see more bike lanes and paths
- Traffic controls and/or roundabouts are needed on Knott Road, especially at China Hat Road
- Concerns about safety of the railroad overpass on Brosterhous Road
- Need for enforcements of traffic speeds throughout the area
- Concerns about turning movements along Knott Road at various intersections
- Request for more commercial zoning and less industrial zoning
- Need to maintain water quality and green spaces through swales or curb cuts
- Concern that the traffic circle proposed at 15th Street and Knott Road should be two lanes rather than one
- Concern about impacts of new development on wildlife
- General concerns about growth in Bend

Appendix K - Draft Land Use and Transportation Concepts

CITY OF BEND
SOUTHEAST AREA PLAN

Draft Land Use and Transportation Concepts

PREPARED FOR: SEAPAC
COPY TO: Project Management Team
PREPARED BY: Joe Dills and Kyra Haggart, APG
DATE: April 25, 2019

Introduction

The purpose of this memorandum is to introduce the draft plan concepts to be discussed by the Southeast Area Plan Advisory Committee (SEAPAC) on May 2. The topics are:

- **Land Use** - walkable neighborhoods, land use precedents, draft land use designation refinements, and land use transitions "toolbox"
- **Transportation** – streets, trails

The attached plan concept sheets—referred to as "boards" in this memo—are formatted into visual summaries for each of the topics; they describe key issues, principles, built examples, and the draft concepts. The boards are intended to support SEAPAC discussion and direction regarding refinements. Once finalized, they will serve as the materials presented at the next community workshop on July 11, 2019, and in the corresponding online workshop.

How the concepts were developed: outreach meetings with property owners and stakeholders

At its February meeting, SEAPAC discussed preliminary concepts for streets and trails. The discussion concluded with direction to the team to meet with property owners and stakeholders for more property-specific input. Accordingly, the project team arranged and hosted two rounds of informal discussions with property owners to:

- Listen to property owner perspectives and questions regarding the plan and the future uses of their properties;
- Provide information, and;
- Review working concepts for land use and transportation.

Participants in the meetings are listed below in Table 1.

Table 1 – Participants in the Owner/Stakeholder Meetings

Owner/Stakeholder Meetings	Round 1
West Area	
Central Area	
East/North Area	
Owner/Stakeholder Meetings	Round 2
West Area	
Central Area	
East/North Area	

The project team also visited the project area several times, evaluating potential locations for future intersections along Knott Road; land use options for the central Knott Road area that has constrained sight distance; and other existing conditions relevant to future land uses and transportation improvements. The team worked with City staff from various departments to further develop and refine the plan concepts.

The result of the above-described work is the set of boards attached to this memo. The draft recommendations integrate project direction (such as the vision and guiding principles), property owner and stakeholder input, continued study of site conditions, and working ideas from the project team.

Land Use

The following sections summarize key points from the land use boards.

Walkable Neighborhoods

- Four conceptual “neighborhoods” are shown that are approximately one-quarter-mile from center to edge. This dimension is a good rule of thumb for a 5-minute walking distance.
- To varying degrees, each neighborhood has a variety of housing options, services, and public destinations such as parks and schools, consistent with the Vision and Guiding Principles.
- The land use precedents boards show examples from one of the Pacific Northwest’s best built examples of a walkable neighborhood: Northwest Crossing in Bend. The Southeast Area Plan will be developed with a sense of place based on its own unique characteristics, but many of the planning principles—such as those guiding walkable neighborhoods and transitions between land uses—will be the same.
- Sunnyside Village in Happy Valley, Oregon is another good example of how 20+ properties were coordinated into a successful walkable neighborhood through the guidance of an Area Plan.

Land Use Precedents

- The Land Use Precedents boards are a compilation of pictures of existing local land uses. Similar land use images were presented at the March 21 community workshop; the photos included on the precedent boards are the ones that were favored by community members.
- The images are included as background information for the draft land use designation refinements.

Draft Land Use Designation Refinements

- **Sheet 1 – Existing Plan Designations and Proposed Refinement Areas.** This annotated map displays the existing adopted land use designations in the area, and summarizes input from property owners and stakeholders that is proposed as refinements to the currently adopted plan designations on the following sheets.
- **Sheet 2 – Draft Refined Plan Designations and Options** – This map displays what the land use plan would look like if all of the changes on Sheet 1 were implemented, including options for the central Knott Road area described below.
- **Central Knott Road Area Options** – Sheet 2 shows options for the land use designations in the central area of Knott Road, near Raintree Drive. These options are proposed because Knott Road has very limited "sight distance" due to the two ridges east and west of Raintree Drive. The area planning process provides more site-specific information than was available during the Urban Growth Boundary (UGB) expansion process. The project team recommends that SEAPAC reconsider the existing General Commercial (CG) designation in this area due to access and safety constraints associated with the sight distance situation. Three options are shown for how the land uses might be revised. In discussions with property owners and stakeholders, the idea to reconsider the land uses in this area was broadly supported.

The Transitions Toolbox

- This board presents ideas to implement the part of the Vision Statement that addresses compatibility between uses, which states: "…*Houses, businesses, parks and schools are compatible neighbors, and have well-planned transitions between them…".*
- The basic idea is to require new development to provide transitions such as open spaces or multi-use paths between significant changes in use. For flexibility, a menu of optional transition tools would be provided. A land use map would indicate where transitions would be required.
- The attached Transitions Toolbox is the first draft of the map and the menu of transition tools. *Note: this map currently shows the existing adopted land use designations and will be updated to reflect the refined land use designations once they have been finalized.*
- The initial set of transition tools includes: streets, multi-use paths, landscaping, additional setbacks, and natural features.

Transportation

The following sections summarize key points from the transportation boards.

Existing Transportation Issues

- This board summarizes key challenges and needs for the transportation plan concepts:
    - High speeds on Knott Road and 27th Street.

- Limited sight distance in the central section of Knott Road. The mapped "Sight Distance Limited Area" is the approximate area between the two ridge lines, plus 500 additional feet to the west and east of the ridges.
- Sidewalks, bike lanes, proper drainage and other "urban upgrades" will be needed as development occurs adjacent to rural roads such as Knott Road and 27th Street.
- The basic collector-level roads needed are an east-west connection from 15th Street to 27th Street, and a north-south connection from Knott Road to Ferguson Road. The alignment of these roads should balance topography, creating reasonable development parcels, sight distance, and safety.

Street Plan

- **Connection from 15th Street to 27th Street** – This collector alignment runs from the planned roundabout on 15th Street to a proposed new roundabout on 27th Street in the northeast neighborhood of the study area. Previously, the team had looked at alternatives further south in an effort to connect to Rickard Road. However, the Rickard Road connection has too many challenges (crossing the park and school properties and crossing the natural gas pipeline). The new alignment provides a strong east-west axis connecting all neighborhoods in the area and provides good routes between the planned new middle and high schools and High Desert Middle School and to the future commercial center at Ferguson Road and 27th Street.
- **Connection from Knott Road to Ferguson Road** – This neighborhood collector connection aligns with Magnolia Lane, as previously shown. The intersection with Knott Road is located near the Bowman Club. This location optimizes sight distance and is responsive to topography in the area.
- **Raintree Drive** – A right in/right out/left in intersection is recommended to improve safety, given the limited sight distance in this area. At the north end of Raintree Drive, the northbound vehicular connection would be made. The southbound connection would be limited to pedestrians, bicycles, and emergency access to minimize cut through traffic and turning movements on Knott Road.
- **Local street connection from Knott Road to the 15th Street Opportunity Area** – This two-lane local street is recommended to organize circulation within the neighborhood, provide an option to use 15th Street for local trips, and serve adjacent development. The intersection is placed to create separation from the 15th Street/Knott Road roundabout and adequate sight distance to the east.
- **Other framework local streets and connections** – The framework local streets shown on the street plan are illustrative of future connectivity. The arrows indicate currently stubbed streets that would be connected in future development plans.

Trails

The Trails Concept is coordinated with the Street Concept and addresses pedestrian and bicycle needs previously documented for the study area. It includes:

- Paved multi-use trails along all new and existing arterial and collector streets.
- Implementation of the Bend Park and Recreation District's (BPRD) High Desert Park Trail, which connects the future middle and high schools and the future Alpenglow Park on SE 15th Street to High Desert Middle School, the future High Desert Park site, and Rickard Road to the east.
- Trails connecting High Desert Middle School to adjacent properties.

- A portion of the TransCanada Trail, a major regional trail, which runs through the High Desert Park Site. Two potential undercrossing for the trail are shown on 27th Street and Knott Road.
- Connections to existing trails in The Bridges development and along the Central Oregon Irrigation Canal.
- Connections to planned trails in the BPRD Comprehensive Plan, including the Arnold Canal Trail and the 15th Street Trail.
- All local streets will be developed to include low-stress bicycle facilities and sidewalks.

Next Steps to Further Develop the Plan Concepts

SEAPAC Meeting 4 (May 2) – SEAPAC will discuss the concepts and direct follow-up work by the project team

SEAPAC Meeting 5 (June 6) – SEAPAC will review and discuss “V2s” of the concepts, along with additional plan concepts (e.g. parks and schools, open space and natural resources).

Community Workshop (July 11) – The plan concepts will be shared with the broader community in a hands-on workshop, coupled with an on-line workshop.

Appendix L - Draft Open Space Concepts

CITY OF BEND
SOUTHEAST AREA PLAN

Open Space Plan Concepts

PREPARED FOR: Southeast Area Plan Advisory Committee (SEAPAC)

PREPARED BY: Project Team

DATE: May 24, 2019

Introduction

The purpose of this memorandum is to introduce draft open space concepts to be discussed by the Southeast Area Plan Advisory Committee (SEAPAC) on June 6th. The open space concepts are intended to illustrate: (1) existing landscape features, including areas difficult to develop, that could become part of future open spaces; and (2) conceptual plan elements that can guide the plan's implementation and enhance its context-sensitivity.

Open space is addressed in several parts of the vision and guiding principles, as noted below.

From the Vision Statement:

> *Our vision is that the Southeast Expansion Area becomes a complete and walkable community and a welcome addition to Southeast Bend. Houses, businesses, parks and schools are compatible neighbors, and have* ***well-planned transitions between them. The mix of uses are highly connected by neighborhood streets, paths, and open spaces. The area has an active and vibrant outdoor life****; it is a place where neighbors are out walking, biking, and interacting daily. The Southeast Expansion Area is a unique and successful community in Bend. (emphasis added)*

From the Guiding Principles:

- **Create vibrant public spaces**. Plan for public spaces such as streets, parks, schools, and commercial centers, so there is a vibrant outdoor life throughout the community.
- **Preserve views and the natural landscape.** Integrate views, trees, and rock outcrops into new development and public spaces.
- **Create a sense of identity.** Plan the Southeast Expansion Area so that, when built, it will be recognized as a distinctive place with a strong sense of identity. All development—public and private—will contribute to reinforcing this sense of place.

Open Space Themes

The attached plan concept "boards" are formatted as visual summaries of the following themes, that progressively build the case for areas worth considering as future parks and open spaces:

a. **Slope Analysis and BPRD Park Search Areas (Figure 1) –** This map illustrates where the land is relatively flat and accessible (0-5%, white areas) and categories of steeper slope (darker areas are steeper slopes, over 15%, which presents many challenges to development and circulation). The map reveals the many basalt rock outcrops in the project area.

   As described previously to SEAPAC, and as shown on this map, the District's Comprehensive Plan used "search areas" to locate potential new parks. They anticipate

two new neighborhood parks to serve this area, in addition to the High Desert Park Site. Similarly, the Bend La Pine School District anticipates locating a new elementary school. Both of these land uses will be important contributors to new open space that can be integrated with existing open space and landscape features.

b. **Ridges, Outcrops and Habitat Connections (Figure 2) –** On this map, a series of ridges, generally oriented in a north-south direction, and other more isolated significant rock outcrops are highlighted as potential park/ open space areas. The ridges could provide linear trail connections as well as habitat corridors. The four distinct ridges along Knott Rd have potential to provide further habitat connections to the Deschutes National Forest, just 1.5 miles to the south.

c. **Views (Figure 3) –** Key mountain and butte views from potential open spaces and existing park / school areas are noted on this map. Such views are a cherished part of living in Bend and can provide a distinct sense of place for new parks.

d. **Trees "In Good Condition" (per April 2019 tree survey) (Figure 4) –** A survey in April 2019 located and assessed the health of trees within the project area. This map illustrates the trees determined to have canopies in good condition displayed with other open space features. In some areas, these trees coincide with the potential park corridors, outcrops or ridges described above. The Tree Health Assessment (April 2019 tree survey) is attached as part of the SEAPAC Meeting #5 packet.

e. **Areas of Interest (Figure 5) –** A survey in April 2019 located potential areas of interest in the study area, which includes rock outcroppings, habitat trees and historical evidence of fire.

f. **Composite Open Space Analysis (Figure 6) –** This map combines the themes described above as an integrated summary. It is worth noting that many of the potential open spaces are located south of the current Park Search Areas, a result of the Southeast Study Area boundaries being delineated after the BPRD Comprehensive Plan.

g. **Precedent Images (Figure 7) –** This board provides local examples of the types of open space and features that could be part of the SE Area Plan as well as some identifiable 'textures' that could provide inspiration to future park designers.

The above-described boards are intended to support SEAPAC discussion and direction regarding refinements. Once finalized, they will serve as the materials presented at the next community workshop on July 11, 2019, and in the corresponding online workshop.

Figure 1. BPRD Park Search Areas

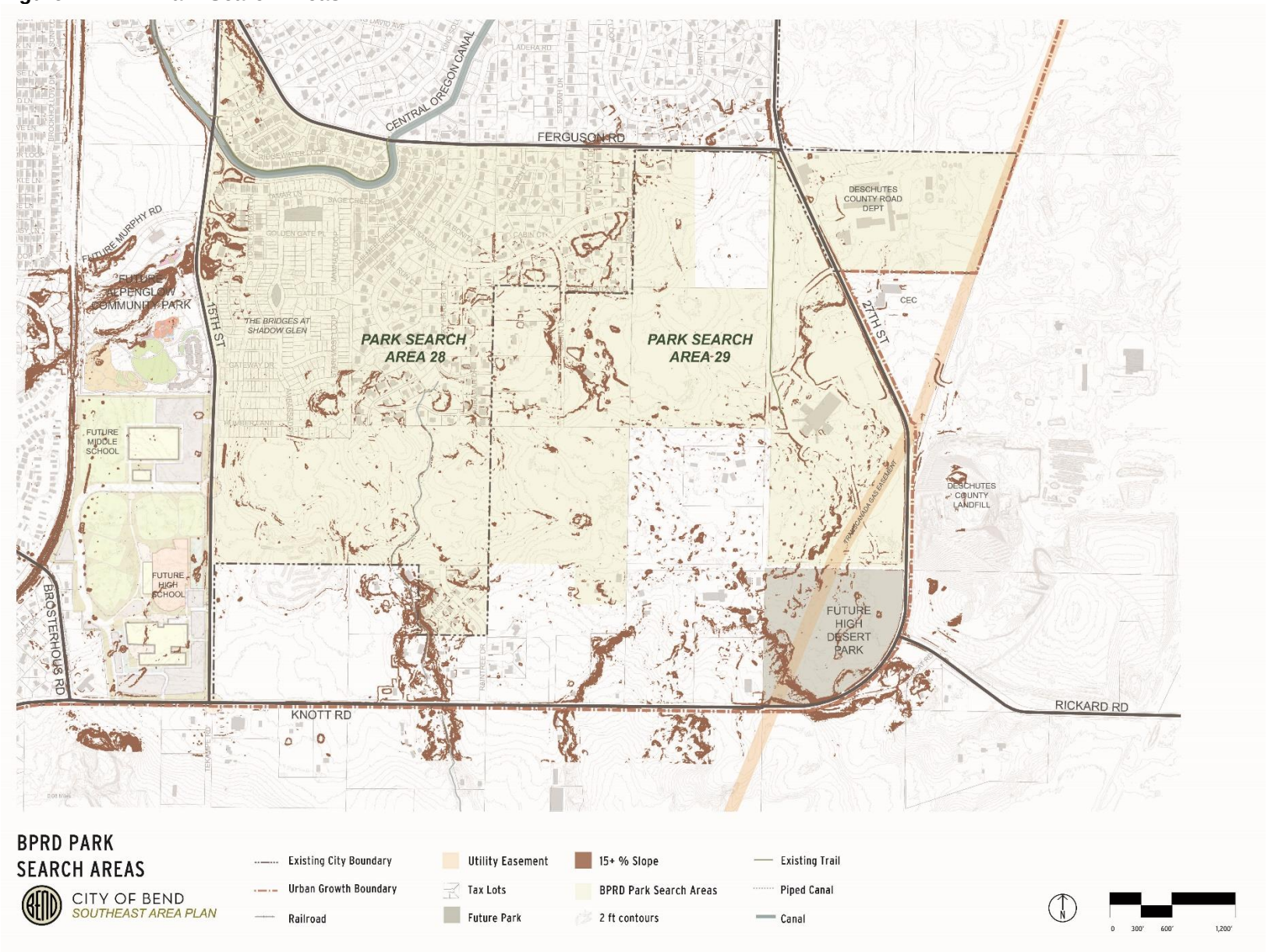


Figure 2. Ridges, Outcrops, Habitat Connections

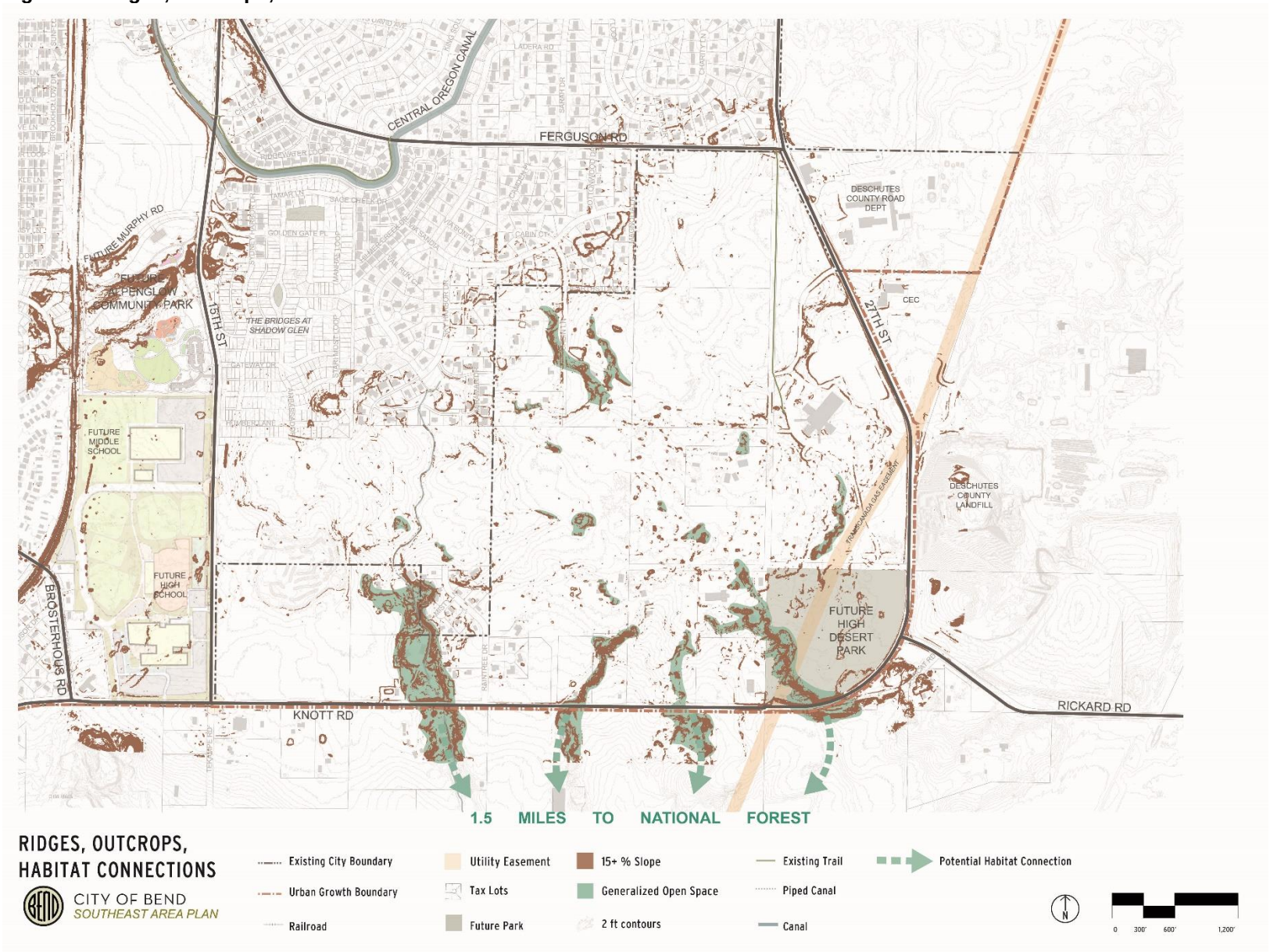


Figure 3. Views

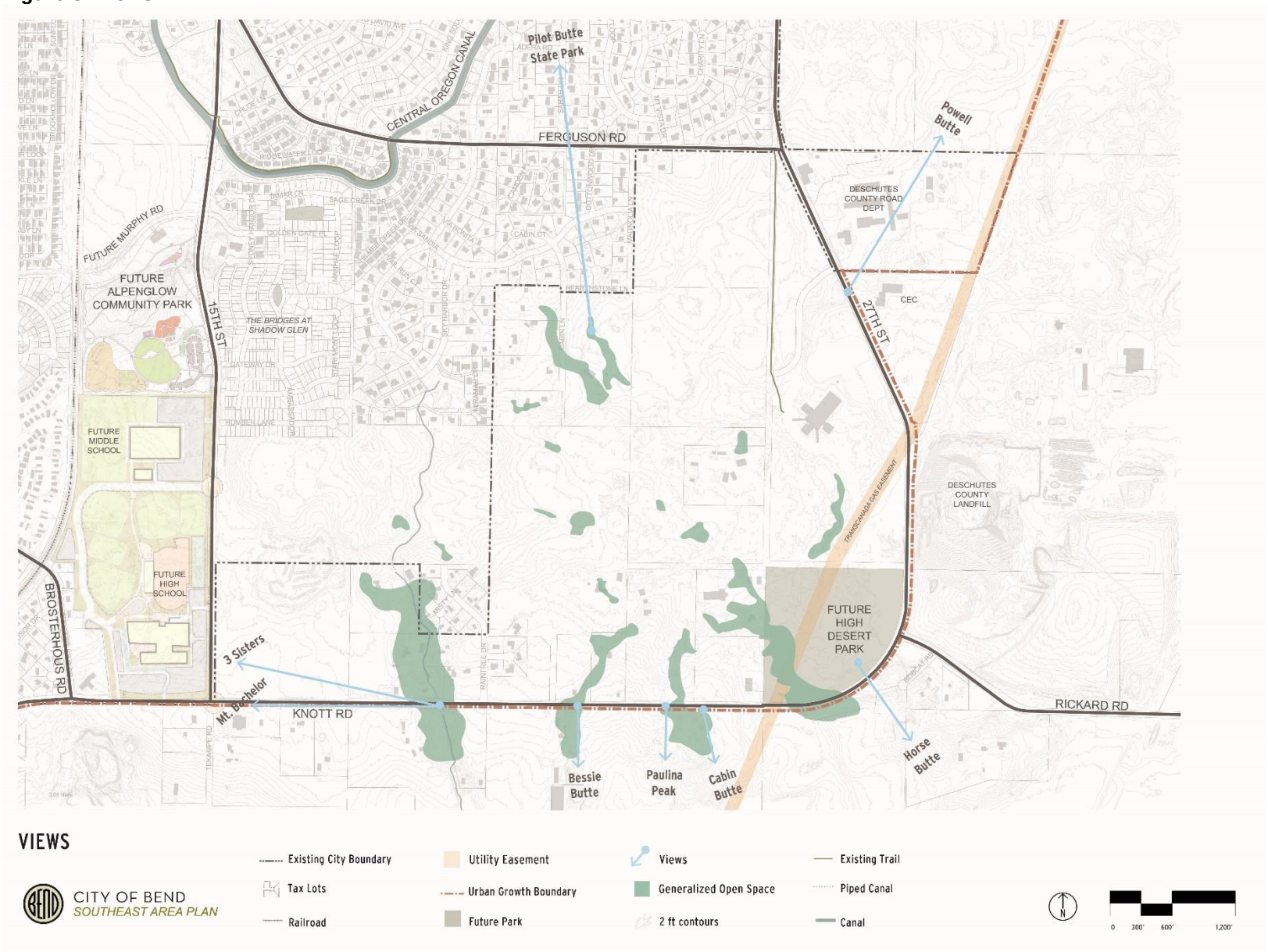


Figure 4. Trees in Good Condition

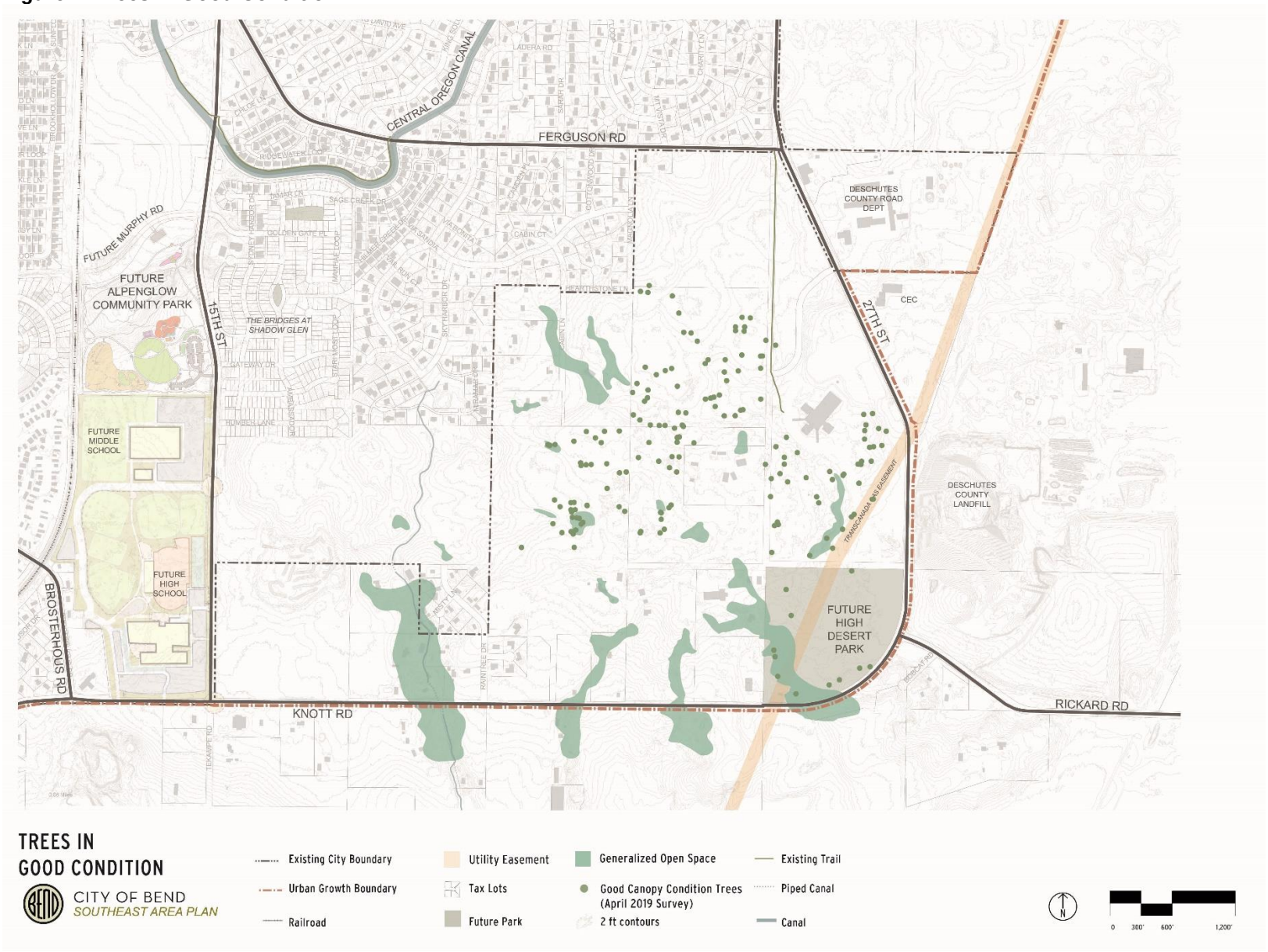


Figure 5. Areas of Interest

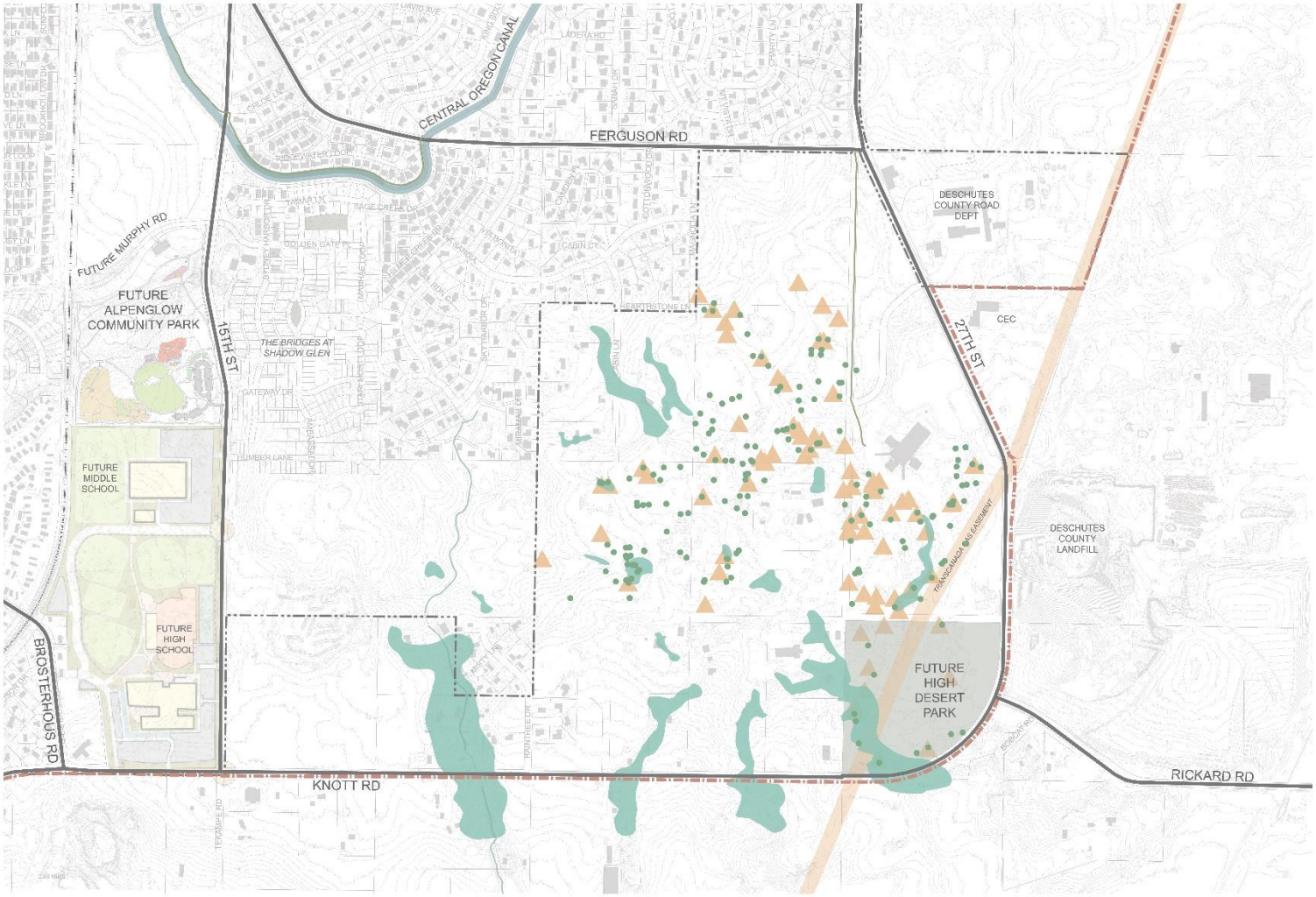


Figure 6. Composite Open Space Analysis

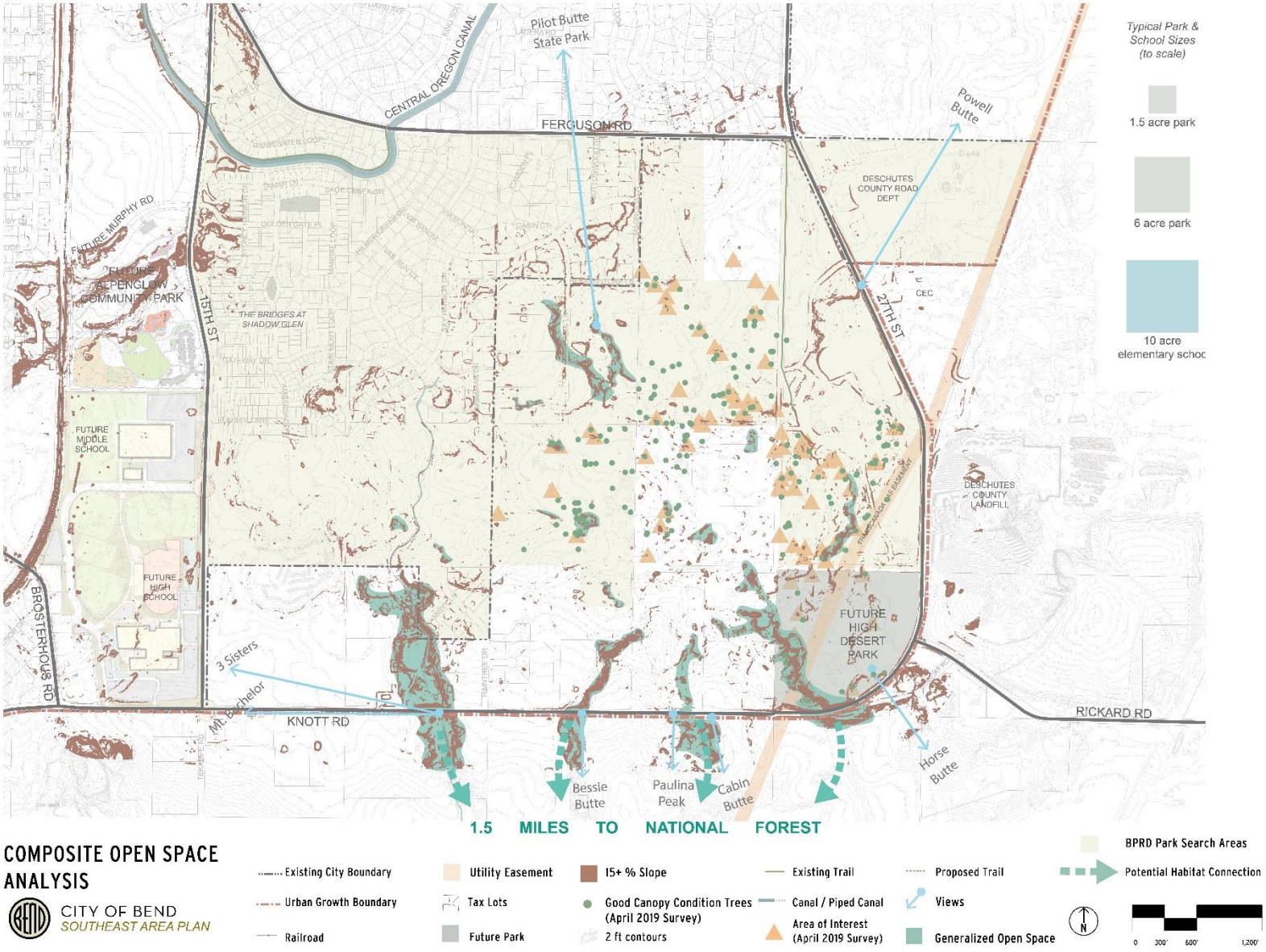
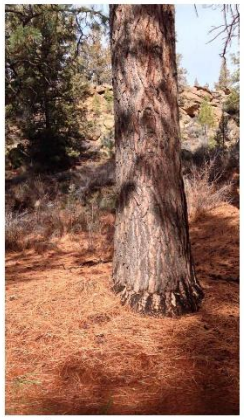


Figure 7. Precedent Images

Tree Stands

Basalt Outcrops

Large Individual Trees



Ponderosa Pine

Habitat Corridors

Neighborhood Park

Elementary School

Landscape Textures

OPEN SPACE
PRECEDENT IMAGES

CITY OF BEND
SOUTHEAST AREA PLAN

Appendix M - Tree Health Assessment

Tree Health Assessment for:

City of Bend

Growth Management Department

Prepared by:

Brett Huet
ISA Board Certified Master Arborist RM-7448BUM
ISA Certified Municipal Specialist
ISA Certified Utility Specialist
ISA Tree Risk Assessment Qualified
TCIA Certified Treecare Safety Professional #02477

Summary

This report is a general assessment of tree health, areas of special interest (ASI), and wildlife habitat in the Southeast Expansion Area prior to development of the area. This report will be followed by a detailed inventory map and impact report.

The Southeast Expansion Area was recently brought into the City's Urban Growth Boundary. The Bend Comprehensive Plan identifies that this area shall provide for a mix of residential, commercial, and industrial uses with capacity for a minimum of 820 housing units.

The Southeast Area Plan Advisory Committee, a Council-appointed committee tasked to oversee the development of the Southeast Area Plan, has identified preserving views and the natural landscape as one of their guiding principles. This report will help ensure that the Southeast Area Plan integrates views, trees, and rock outcrops into new development and public spaces.

Observations:

The Southeast Expansion Area is an arid environment which is consistent with many of Central Oregon's high desert forests. Species diversity is low in the undeveloped area which is comprised of only Ponderosa Pine (Pinus ponderosa) and Juniper (Juniperus occidentalis).

The Ponderosa Pines appear to be in stable health overall however there are some stress indicators such as minor drought stress and sequoia pitch moth (Synanthedon sequoiae). However, there were no signs of beetle infestation at the time of this assessment.There are a significant number of Junipers within the study area ranging from overcrowded dense stands to single mature trees surrounded by bitterbrush and sagebrush. Some Juniper stands exhibit signs of dwarf mistletoe. While the overcrowding of Junipers present wildfire risk and compete for nutrients with Ponderosa Pine, they are still an essential part of this area's species biodiversity.

There are also a significant amount of trees with a 24" diameter at breast height (DBH) or greater. Trees with a 24" DBH and greater present significant value for to the environment by providing greater canopy volume, faster CO2 absorption than newly planted trees, and age diversity in the urban forest. By identifying the location of these trees prior to construction, there is data that can be considered when laying out infrastructure.

Ponderosa Pine Health

Sequoia pitch moth, which is common in Central Oregon, will start flying from approximately May until September and will lay their eggs in the crevices of bark, near wounds or recent pruning cuts. When the larvae hatch, they bore into the cambium layer and create a shallow cavity where they feed on the phloem. The tree's defense mechanism is to produce pitch and force the larvae out. The pitch mass then encapsulates the larvae throughout the winter, where the pupa emerges as an adult. The pitch masses are usually found at the branch collar and

often occur year after year creating numerous pitch masses. These can be aesthetically displeasing but usually do not cause mortality in established trees. Management options can be as simple as restricting pruning while sequoia pitch moth is active, removal of pitch masses and baited lure traps for the male sequoia pitch moth.

Signs of any secondary beetle infestation were not evident at the time of assessment. There were no consistent patterns of decline or clear evidence of infestation that occurs commonly with beetles. Evidence of an infestation typically occurs with a progression of crown dieback that will affect numerous adjacent trees, which was not currently present on site.

Pitch masses from sequoia pitch moth activity. Photo by BH

After pitch masses are removed, the larvae are often exposed and can be removed. Photo by BH

Evidence of successive years of infestation. Older mass on right, new on left. Photo by BH

Photo of drought stress in Ponderosa Pine Photo by BH

Juniper

The Junipers on site vary from very dense stands to single mature trees surrounded by bitterbrush and sagebrush. Many areas with junipers have large groupings of trees that are very overcrowded. Again, this forces the existing trees to compete for water and nutrients as well as have the growth patterns stunted from overcrowding. This type of crown spacing is very conducive to wildfires in that there is continuity of fuel.

Junipers encroaching the Ponderosa Pines Photo by BH

Overcrowded Junipers creating continuous fuel loading Photo by BH

Mature Juniper with good crown spacing Photo by BH

In several of these groupings, dwarf mistletoe (Phoradendron juniperinum) was observed. Dwarf mistletoe parasitizes its host by sinking a root like structure into the host and taking water and nutrients. It produces its own chlorophyll and will grow back if the “leaves” are removed. This would be considered a minor issue for the Juniper’s overall health. Generally, these areas consist on minor twig and branch dieback. There are some advantages that dwarf mistletoe can

provide for the local bird community and is one way dwarf mistletoe gets from tree to tree. Management options are to remove by pruning the affected branches.

Dwarf Mistletoe established on a Juniper tree Photo by BH

Areas of Special Interest (ASI)

Areas of Special Interest (ASI) is a land use designation used to represent and protect areas that have features typical of Central Oregon, such as tree groves rock outrcroppings and cindercones, or areas that represent important wildlife areas. The City designated 33 ASIs within the City's UGB in 1999 with the support of a volunteer group that ranked natural areas using the following criteria: habitat value, trees and vegetation, natural features, existing/anticipated conflicts with adjacent land uses, wildlife linkages to other sites, scenic resources, public access, and type of water present.

The Southeast Expansion Area was not within the UGB at the time these ASIs were designated and therefore does not currently contain ASIs. Through this assessment, it was apparent that there are several candidates within the expansion area that might meet the qualifications of an ASI. The area is host to numerous rock outcroppings, habitat trees and historical evidence of fire.

Prior to development of the area, it is important to identify areas where Ponderosa Pines and Junipers have a 24” diameter at breast height (DBH) and greater. An inventory of these trees will be helpful while considering the layout of improvements in the area. The committee may want to consider establishing tree protection zones early in the project. By preserving several mosaic islands of tree groupings, bitterbrush and sagebrush will help to maintain wildlife habitat in the area. Dead tree snags provide refuge for the eagle community in the area and areas can be identified to preserve their habitat. If needed, these dead habitat snags can be reduced in height for safety. In areas that will not be developed, thinning the junipers and masticating some of the brush will be helpful.

This area, as it develops, will move the urban, wildland interface further southeast towards Knott Road and SE 27th Street. The area will transform from an undeveloped high desert forest to an urban housing and employment hub. However there is an opportunity through this process to designate ASIs in order to integrate views, trees, rock outcrops, and wildlife protection into new development and public spaces.

Appendix N - Evaluation of Options for Industrial Lands and Land Use Updates

CITY OF BEND
SOUTHEAST AREA PLAN

SE Area Plan – Evaluation of Options for Industrial Lands and Land Use Updates

PREPARED FOR: Southeast Area Plan Advisory Committee (SEAPAC)

COPY TO: File

PREPARED BY: Project Team

DATE: May 30, 2019

Overview

This memo is intended to support discussion by SEAPAC of options for lands designated for industrial uses in the Southeast Expansion Area. The practical question is: how much flexibility is there to change lands with adopted Industrial designations, as has been requested by several property owners and discussed by SEAPAC? The memo provides options discussed to-date and a recommended direction for the Land Use Plan.

Initial City Council Guidance to SEAPAC

The attached "Option A" map shows the Comprehensive Plan designations adopted as part of the Bend Urban Growth Boundary (UGB) expansion process in 2016. The plan designations were established in the context of the citywide evaluation of land needs, UGB Remand compliance, and UGB update. For employment, the City identified lands that would meet the need for different types of businesses and jobs, such as industrial, office, retail, and hospitality. Several products were developed to determine how much employment land would be needed in the future. All of these products were adopted by the City Council as appendices to the Bend Comprehensive Plan. These products include:

1. **A Buildable Lands Inventory (BLI).** This document included an inventory of all of the acres within the UGB that were planned for commercial, office, industrial, mixed employment, and public facility use.
2. **An Economic Opportunities Analysis (EOA).** This document includes an evaluation of demographic and economic trends related to jobs, a forecast of future employment by industry, and an estimate of the number of sites by size (e.g. number of sites less than five acres) that would be needed over the planning period.
3. **An Urbanization Report.** This document relied on the BLI and EOA to determine how many jobs could be accommodated inside the UGB based on the inventory of existing employment lands and the estimation of sites needed for future employment. The report then considered and evaluated actions the City could take—such as changing development code standards—to provide more capacity for jobs within the UGB, including in those lands that were part of the UGB expansion. The report also evaluated the adopted UGB scenario and its potential for providing land for both housing and jobs.

The Council's decision to approve the 2016 UGB expansion both added land to the boundary and identified comprehensive plan designations for these new lands to identify which properties were intended to accommodate new housing, mixed use development, or employment. In the

Southeast Expansion Area, the designations were applied at a high level, with the intent to be refined through a subsequent area planning process.

The City Council's direction to SEAPAC and to the project team comes from two sources. The first is the Bend Comprehensive Plan, Chapter 11, Growth Management. This chapter includes Policies 11-75 through 11-84 regarding the planning for land uses in the "Elbow" (Southeast Expansion Area). The second is the Project Goals (Section 1) of Resolution 3135, through which the City Council directed city staff to form SEAPAC. This direction provides for some flexibility for: (1) tweaks of land use designations; (2) trades of designations, like for like. Neither Chapter 11 of the Comprehensive Plan nor Resolution 3135 provide an option to entirely abandon the plan designations that were adopted through the UGB expansion process.

State Requirements

City staff have met twice with staff from the Department of Land Conservation and Development (DLCD) since the May 2nd SEAPAC meeting. Overall, DLCD has serious concerns about making significant changes to the acreages of industrially designated lands within the Southeast Expansion Area. However, they do recognize that site-specific information gathered through the area planning process has identified slope and access constraints on some parcels. In light of this, their position is listed below under "Strong Recommendations."

DLCD's position is:

"Concerns

- Loss of light industrial land for Bend's economic and employment base
- Changing the designation of land that was recently committed to satisfy a 20-year need for industrial acreage
- Loss of jobs, entrepreneurial environment, labor force, business; harm to local target industry competitive advantages

Strong Recommendations

1. Replace industrial designations with industrial designations concurrent with the re-designation of the Southeast Expansion Area.
2. If (1) is not possible, combine these elements below:
    a. Commit to replacing the loss of light industrial (IL) in the near term (within three to five years).
    b. Refrain from re-designating any more than half of the light industrial acres in the Southeast Expansion Area, at a maximum. To do otherwise would be inconsistent with the 2016 EOA.
    c. Retain the performance of the same number of non-retail jobs as originally envisioned in the Southeast Expansion Area.
    d. Remove residential uses from the Southeast Expansion Area Plan District Mixed Employment (ME) designation in areas where the designations have changed from industrial to ME.
    e. Allow residential uses through subarea-specific master plans where the zoning and development code will enable production of the same number of non-retail employment jobs in the master plan area."

    (Source: Communication with DLCD, 5/24/19)

Premises for Changes to the Industrial Designations

The project team offers the following premises in the interest of moving the land use plan forward.

1. **The plan will include industrial uses, with other uses.** The City is committed to planning for land uses in the Southeast Expansion Area to serve the overall purpose originally intended—an area with a mix of employment uses (including industrial) and residential uses providing compatible transitions from the employment lands to the existing neighborhoods to the west and north. This intent is consistent with SEAPAC's vision and guiding principles for the area.
2. **State requirements provide side boards and some flexibility.** The State's requirements are not what some property owners would want, but they do provide guidance on what the state will support. A lack of state support may manifest as an appeal of the local decision associated with adopting the Area Plan. Such appeals are costly, time consuming, and create uncertainty for the City and landowners eager to begin entitlement and development. State requirements also provide a small measure of flexibility to re-designate up to half of the existing 76 acres of industrially designated lands (38 acres). With this comes a commitment from the City to replace the remaining industrial lands in the near term (e.g. three to five years.) One way to approach this commitment is to incorporate it in a policy and recommend its adoption to the City Council with the Area Plan. This course of action is not without risk, but is an option.
3. **Light Industrial (IL) designations can be applied to several properties, to frame up a compromise.** DLCD is requiring retention of at least 38 acres of industrial land (along with the other conditions noted). One approach would be to group this acreage on multiple adjacent properties, each one contributing a portion of its land to the area's industrial acres need.
4. **Focus Light Industrial designations on less sloped areas.** The slope and access restrictions identified by more detailed mapping, field work, resident input, and SEAPAC discussion are real. That said, there are broad areas within the employment lands that have 0-5% slopes and are suitable for light industrial uses.
5. **Buffer the existing school and park properties.** Use more flexible and transitional land uses (e.g. ME-SEAP) and buffer standards adjacent to the High Desert Middle School and the future High Desert Park site, while still contributing land for jobs.
6. **Retain rock outcrops and the best trees.** The rock outcrops and trees in the area are important natural features and are an asset that should be integrated into future site planning.
7. **Updates to the Light Industrial district are needed.** The City's existing IL designation should be updated to be specific to the unique conditions in the Southeast Expansion Area by creating an IL-SEAP zone. More impactful industrial uses (e.g. auto wrecking yards) would not be permitted. Based on the 2019 Market and Land Use Analysis, industrial uses can be limited to those identified as most favorable or more likely to be established in the Southeast Expansion Area. These uses may be limited to manufacturing, flex space, warehouse, and distribution. The Bend Development Code provides examples of how these types of uses are limited to be more compatible in different neighborhoods around Bend.

Options for the Land Use Plan

Three options have been discussed to date by the project team and SEAPAC. These represent a progression of plan development rather than three equal options. At this point, the project team favors Option C as the plan showing the best balance of the various considerations and

constraints. The land use plan is of course intended to work in concert with the plans for transportation, open space, infrastructure and infrastructure funding.

The options are:

- **Option A –** Leave the plan designations as drawn and adopted by the UGB expansion process.
- **Option B –** Refine the land use as proposed to SEAPAC at the May 2nd meeting. This option changes General Industrial designations to Light Industrial, without a reduction in the amount of industrial land.
- **Option C –** This option re-designates half of the industrial land to other designations (primarily Mixed Employment), and implements the premises listed above. It is intended as a compromise that goes as far as possible toward meeting various interests, while still within the side boards set by DLCD.

The property-specific changes between Option A (adopted) and Option C (proposed) are summarized below. References to IL-SEAP or ME-SEAP refer to updated versions of the zone districts that would be prepared as part of the area plan process (see notes following the table).

Table 1. Proposed Refinements to Adopted Plan Designations

Property	Changes from Options A to C	Comments
"39 Acre" Reed	10 acres from RM to IL-SEAP	The IL-SEAP area is mostly 0-5% slope and has future collector access. It is a large ownership with multiple land uses.
Schumacher (north)	10 acres ME to IL-SEAP (northeast corner) Reshape RS from west edge to northwest corner Southern CG area changed to RM	The IL area is mostly 0-5% slope and has future collector access. It is a large ownership with multiple land uses. RM in the south: addresses access limitations for CG uses; is responsive to some slope limitations; increases compatibility near Keller Court and Raintree Drive residential uses.
Blue (Granacki)	Change most acreage from IL-IG mix to ME-SEAP West edge is IL-SEAP (note: co-development with Blue property, as indicated by owners)	ME-SEAP is a transitional employment zone next to the school property.
Blue	West half of property changed from IL-GI mix to IL-SEAP East half of property changed from IL/IG mix to ME-SEAP	The IL-SEAP area is mostly 0-5% slope and has future collector access. ME-SEAP is a transitional employment zone next to the school property.
Oddo and Bowman	Change IG to ME-SEAP	ME-SEAP is a transitional employment zone next to the park property.
Schatz	Change IL to RS	Property is too variably sloped for IL and ME uses. RS continues the residential pattern from the west.
Stevenson	Change CG to RS	Property has steep ridge in north area, leaving an isolated flatter area in it south half that will not have good access for CG or ME uses due to sight distance limitations.
Kelleher, Grant, Carroll, and Schumacher (south)	Change CG to RM	Property is too sloped and access-restricted for CG uses. RM continues the residential pattern from the west and north.

Keller Court	Change RS to RL	The existing subdivision is built out at RL density.
Brown, Wilson, and Ward properties	No changes, except reshaping of CG designation on Ward property	CG re-shaped to provide better commercial frontage and potential for access.

Updates to IL and ME Zones

As noted previously, the IL and ME zones should be updated to be specific to the Southeast Expansion Area, creating IL-SEAP and ME-SEAP zones. For IL-SEAP, more impactful uses (e.g. auto wrecking yards) would be removed. Based on the 2019 Market and Land Use Analysis, Industrial uses can be limited to those identified as most favorable and more likely to be established in the Southeast Expansion Area. These uses may be limited to manufacturing, flex space, warehouse, and distribution. The Bend Development Code provides examples of how these types of uses are limited to be more compatible in different neighborhoods around Bend. Per DLCD's requirements, the ME-SEAP zone would only include residential uses in specific master plans where the code will enable production of the same number of non-retail employment jobs in the master plan area as occupied by the residential uses. This provision needs clarification from the state, but their overall intent is to avoid losing non-retail job potential to residential uses.

Figure 1. Option A

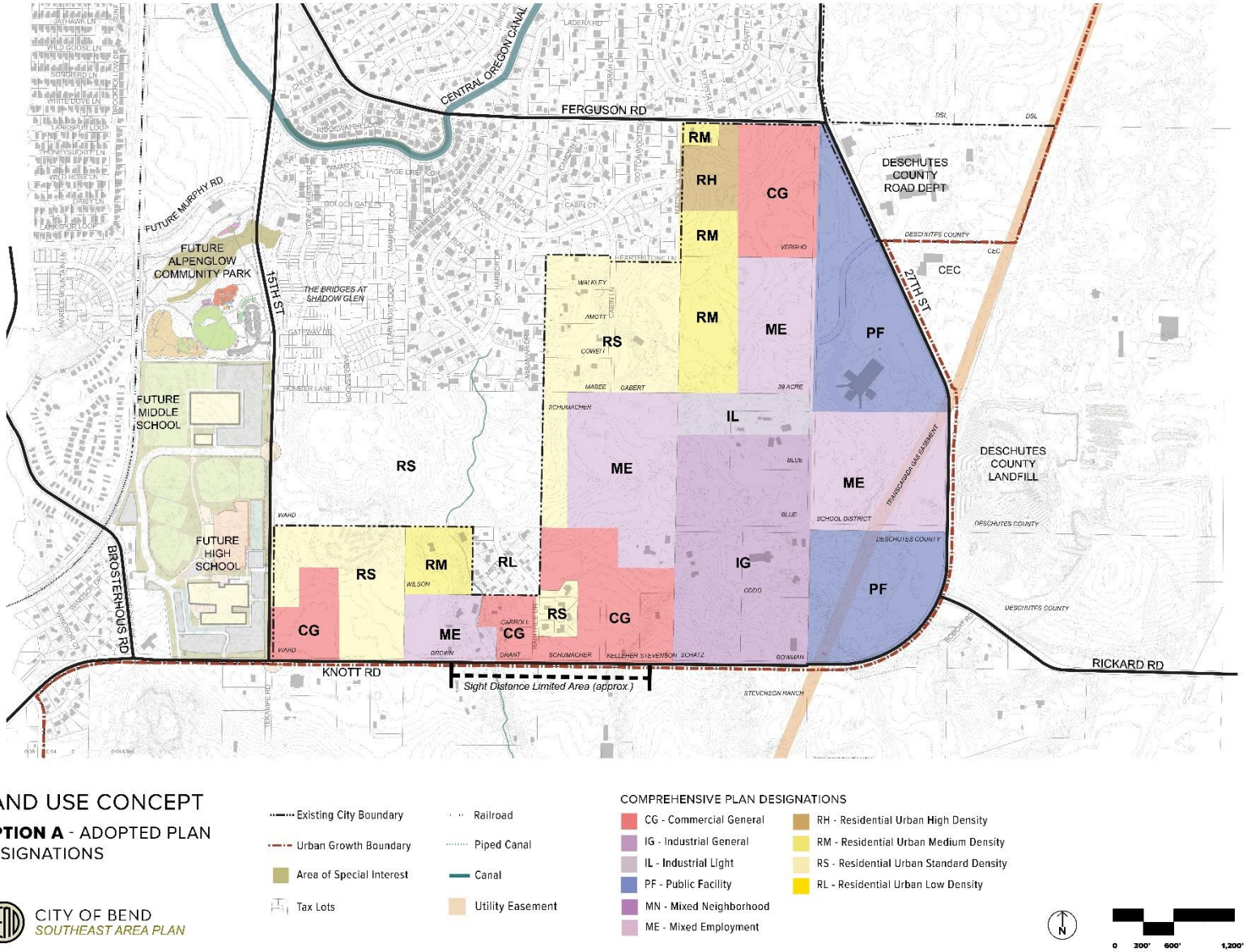


Figure 2. Option B

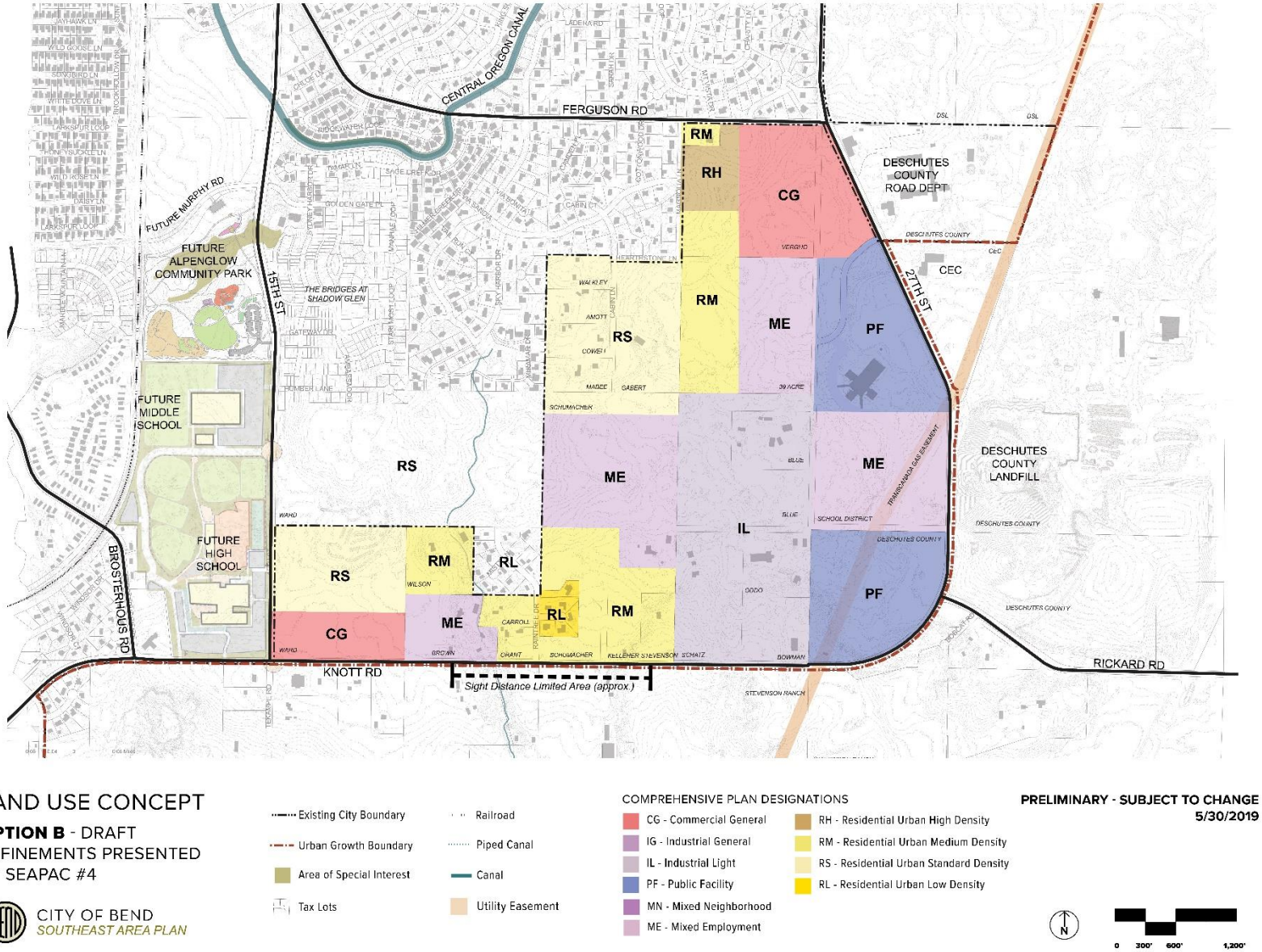
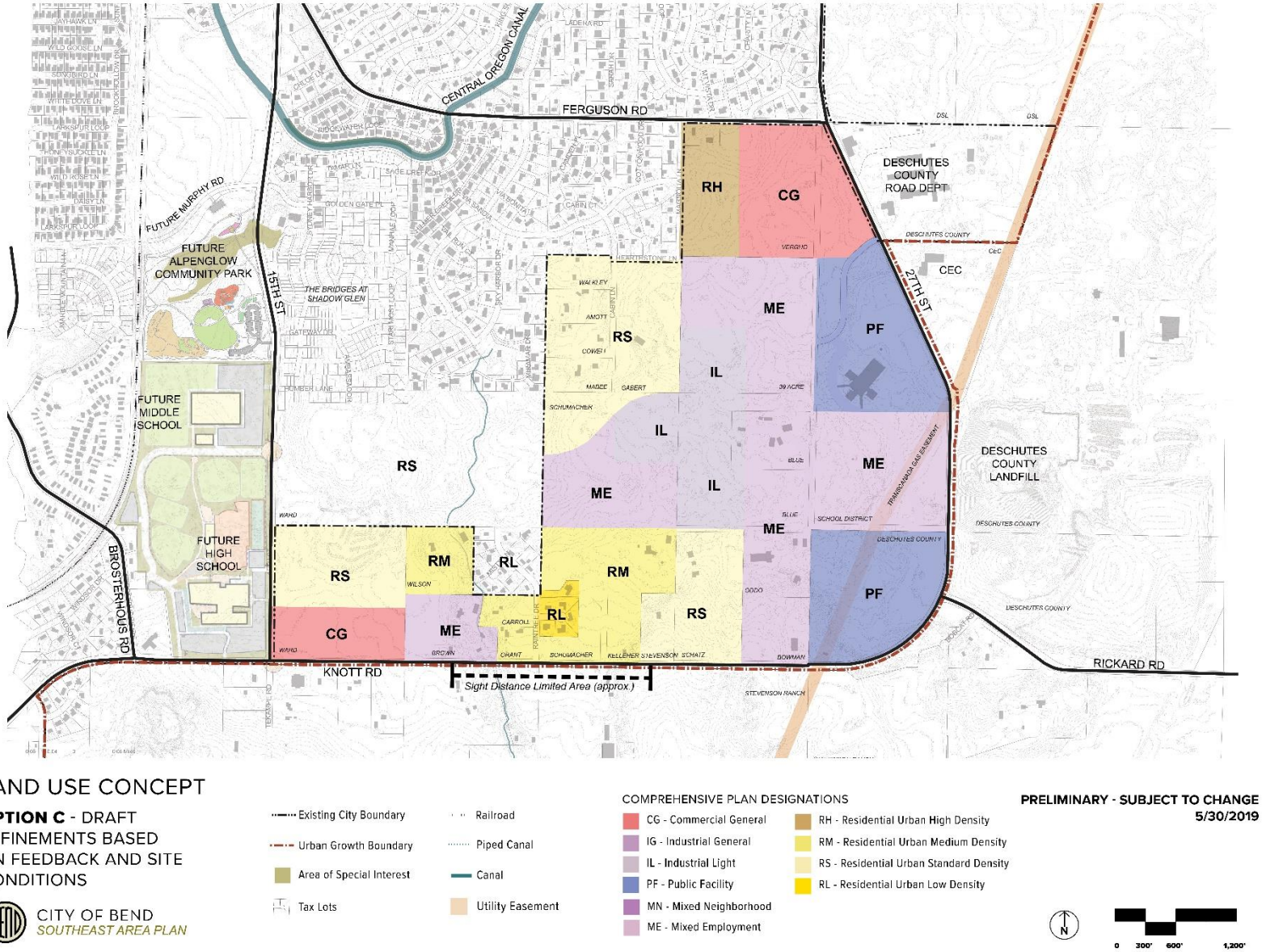


Figure 3. Option C



Appendix O - Transportation Plan Update

CITY OF BEND
SOUTHEAST AREA PLAN

Transportation Plan Update

PREPARED FOR: Southeast Area Plan Advisory Committee

PREPARED BY: Project Team

DATE: May 30, 2019

Introduction

This memorandum describes updates to the working transportation plan for the Southeast Area Plan (see Figure 1). Information is provided to address transportation issues discussed by the Committee (SEAPAC) at the May 2nd SEAPAC meeting. The draft plan, as directed by SEAPAC, will be shared with the community at the Community Workshop on July 11, and finalized in subsequent SEAPAC meetings in the fall.

Updates to the Draft Street Plan

1. **Intersection types for new intersections are generalized, not specified as roundabouts.**
    - This change is intended to be responsive to comments made about the number and cost of roundabouts.
    - Staff notes that Bend's adopted policy is that, for arterial and collector intersections, roundabouts are the standard intersection type.
    - Traffic modelling and analysis will be conducted this fall. That data will be used to help identify the traffic control needed at intersections. This work will be ready for review and discussion by SEAPAC at the December SEAPAC meeting.
    - Looking ahead, there are intersection options available for the various locations, and traffic data will be used to evaluate those options. For example, a "mini-roundabout" or stop sign controlled intersection may be appropriate for interior parts of the project area; and exterior collector intersections with Knott Road or 27th Street, e.g. may operate acceptably with two-way stop control.
2. **Clarification of street extensions from adjacent areas.**
    - The street stubs that meet local street standards (Sydney Harbor Drive, Ambassador Drive, Via Sandia Drive, and Raintree Drive) are noted as planned local street extensions.
    - The street stubs that are undersized older roads (e.g. the four 20-foot streets off of Miramar Drive) are noted as "street or path extension to be determined at development review." This provides flexibility to assess what connectivity will be most appropriate in the context of the development review process.
    - As previously drawn, Raintree Drive has restricted left-turn access onto Knott Road to remove the crash potential caused by limited sight-distance along that section of Knott Road. With this change, it is not necessary to further restrict access to/from the north for Raintree Drive. This change from previous versions better integrates the Raintree subdivision into the neighborhood and further

ensures safety by allowing residents served by Raintree to access their homes to and from the north rather than restrict access to and from Knott Road.

3. **Simplification of the "Framework Local" streets** – The dashed lines and arrows have been updated to simplify the illustration of Framework Local streets and potential street connections. As a reminder, Framework Local streets convey important connections between collector streets and within the plan area. The City's block and connectivity standards will also guide creation of the local network, but these streets help set the "framework". All street classifications are subject to further review when traffic modelling data is available.

Other Transportation Issues

Collector alignments

As noted previously, the alignments of the planned collectors are conceptual. They are "point A to point B" connections, with flexibility for the specific alignments to respond to existing conditions, property lines and future land use.

Western North-South Framework Local Street

At the May meeting, SEAPAC received comments that the north-south local street shown on the draft street plan (between the Brown, Ward and Wilson properties) should not be included. The basic opinion was that the project area land uses and street network should be separated from the busy road conditions on Knott Road, and that not including this connection would support that outcome. There was also mention of road spacing standards, and statements to the effect that streets should only be placed every half mile along an arterial street.

The project team offers the following comments on these issues:

- From a street network perspective, the connection provides needed connectivity and access to local services for future neighborhood residents. It will be an important route that allows local residents to access the neighborhood without relying solely on 15th Street, while supporting local circulation within the neighborhood.
- The connection also supports emergency access for the area.
- Locally, it is needed to provide access to the Wilson property, and a coordinated street pattern that provides access to the adjacent Ward and Brown properties.
- The adopted TSP shows a collector street following the alignment of Raintree Drive. With the sight-distance-safety problems at Raintree, that location is not advisable. The framework local replaces its connectivity function in a safer, feasible location.
- The City plans for collectors to be located at half mile spacing, where feasible. However, that planning standard does not mean that the only permitted connection is a collector every half mile.
- Traffic modelling will further enlighten the role of this connection and its role in the local circulation network. The team will model the area with the connection "turned on" and "turned off' to test how trips are distributed.
- The intersection of this framework local and the east-west collector will be determined following traffic analysis. If it is a stop sign controlled intersection, it won't draw cut-through traffic off the arterials.

"Frontage Road" Idea

SEAPAC has also received comments proposing a frontage road along the Knott Road frontages of the Brown and Ward properties. No specific plan has been provided.

While it is difficult to examine this idea without a plan, the project team offers the following general perspectives:

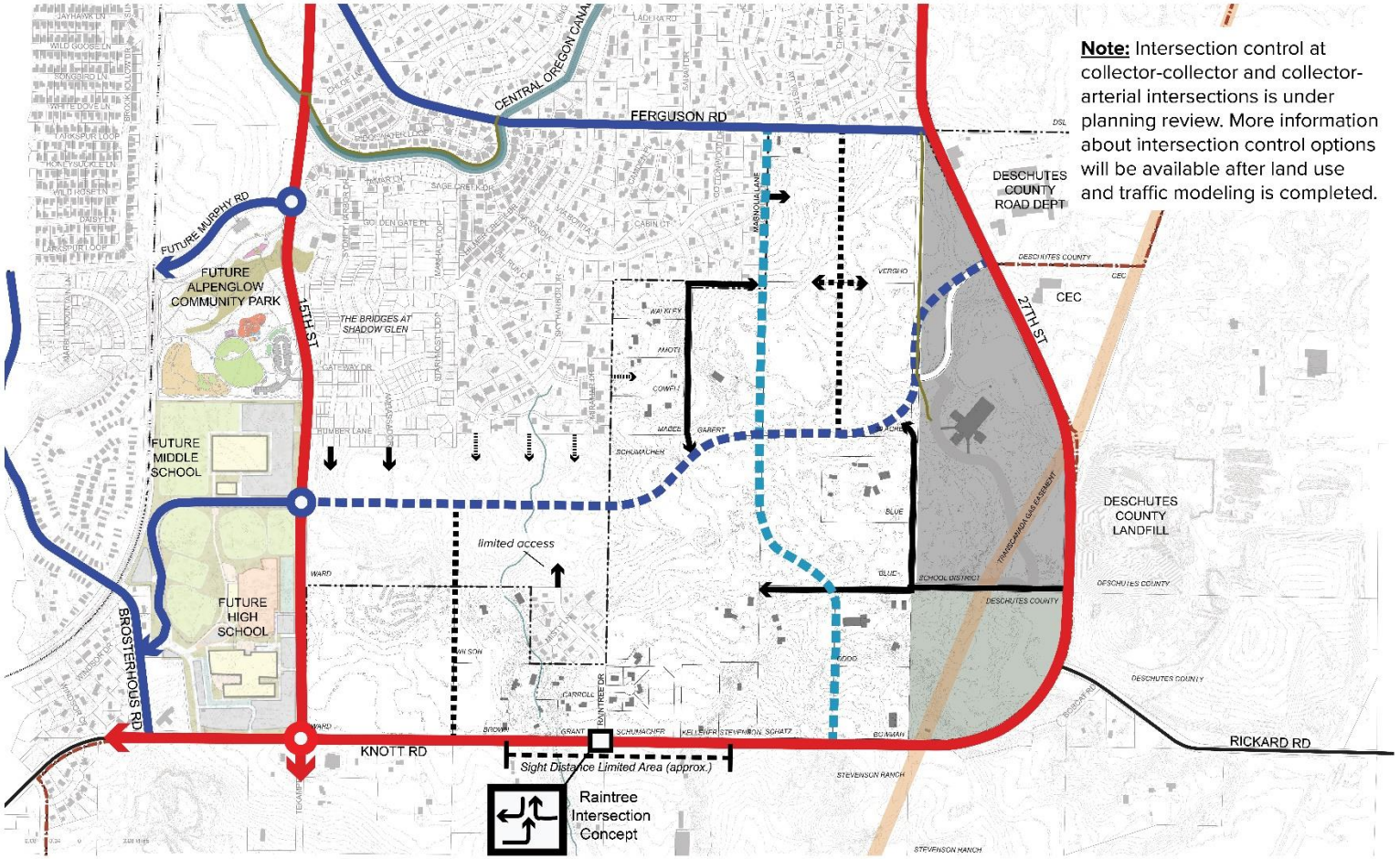
- Safety is, and will continue to be, one of the paramount concerns along Knott Road. A key element of safety is to limit the number of conflict points for those using Knott Road and those accessing properties along Knott Road. A frontage road system may increase the number of conflict points by adding multiple intersections and driveways along Knott Road between 15th Street and Raintree Drive.
- A frontage road would add cost and require additional right-of-way. It is unlikely a frontage road will have a corresponding cost reduction to the improvements of Knott. Staff's sense is that the benefit of a frontage road is primarily for local traffic accessing the adjacent properties. A frontage road is unlikely to change the (to be determined) cross section needed for Knott Road, because Knott carries so much through traffic.
- A frontage road could potentially be a more pleasant pedestrian setting, as it would provide a set-back sidewalk, but continuity for the multi-use path along Knott would also be necessary. If the frontage road only provided a mixed, shared road for people bicycling, it would not provide an advantage.
- Looking beyond the Area Plan process, property owners along Knott Road can propose local circulation (which may include a frontage road) at future development reviews.

Next Steps

SEAPAC Meeting 5 (June 6) – SEAPAC will review updated concepts for land use and transportation, along with additional plan concepts for open space.

Community Workshop (July 11) – The working plan concepts will be shared with the broader community in a workshop, coupled with an on-line workshop.

Figure 1. Draft Street Plan



Appendix P - Summary of Open House 2

CITY OF BEND
SOUTHEAST AREA PLAN

Summary of Open House #2

PREPARED FOR: Southeast Area Plan Project Management Team

PREPARED BY: Kyra Haggart, APG

DATE: 7/24/2019

Introduction

This memorandum provides a summary of the information provided, and results from, the Southeast Area Plan community open house held on July 11, 2019.

Event Summary

Date: Thursday, July 11, 2019
Time: 6:30 p.m. – 8:30 p.m.
Location: Bend Municipal Court, 555 NE 15th Street, Bend

Attendance:
Approximately 28 community members attended the workshop.

Information Provided

Information about the following topics was presented on display boards, with staff available for discussion and to answer questions:

- Project overview, including a project schedule and study area maps
- Project vision and guiding principles
- Existing transportation conditions and background information about street classifications, street spacing standards, and safety issues
- Draft street and trails plans, including collector road alignment options
- Existing land uses and market analysis background

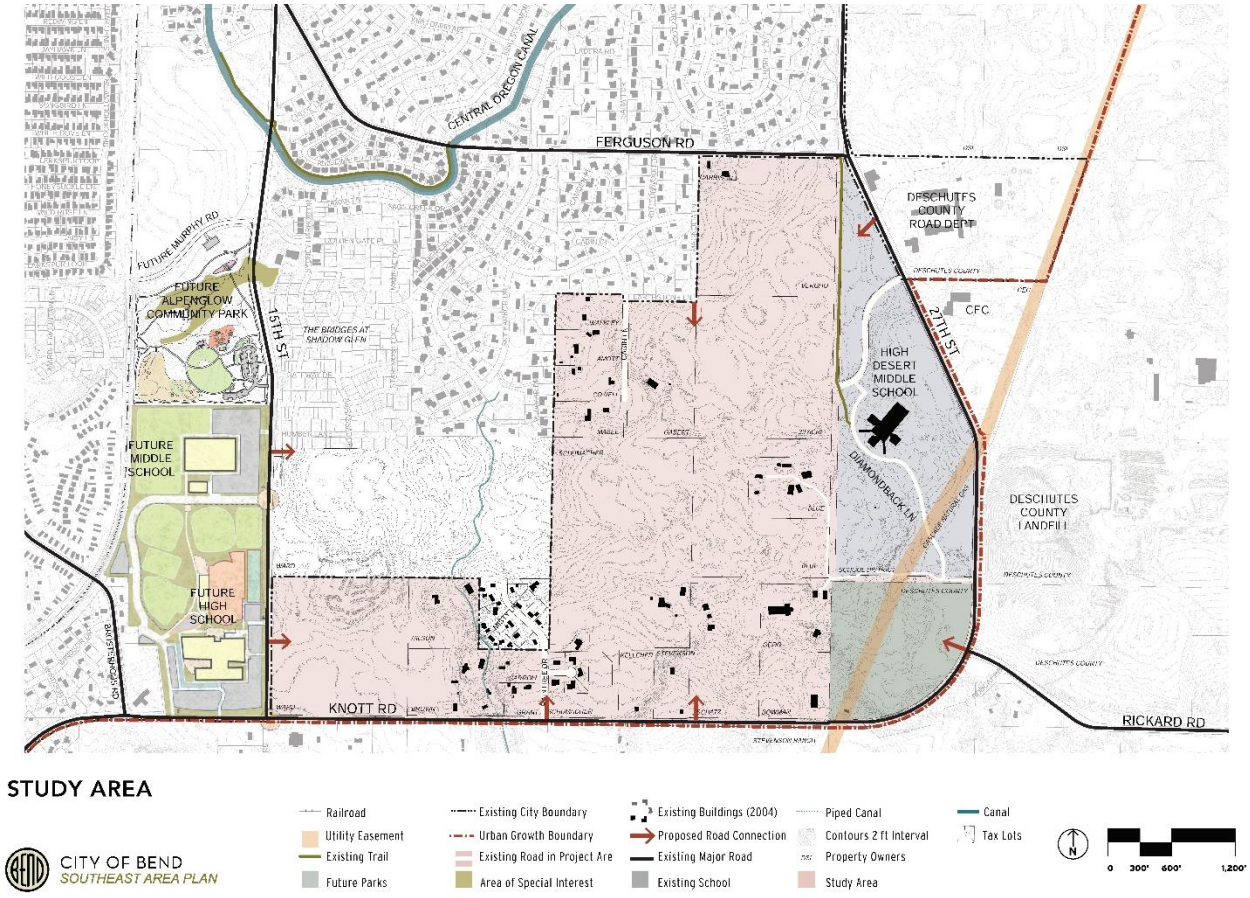
- Direction received from the City Council and State regarding comprehensive plan designations and employment land
- Three draft land use plan alternatives
- Land use transition information and site studies
- Principles for walkable areas
- Natural features inventory

The information presented was organized into four stations:

1. Project Overview
2. Draft Streets & Trails Concepts
3. Draft Plan Concepts
4. Natural Features Inventory

The Southeast Area Plan study area is shown in Figure 1 below. A copy of the display boards are available in the "Meeting Schedules and Materials" section of the project website: https://www.bendoregon.gov/southeastareaplan

Figure 1. Study Area



Workshop Results and Discussion

Attendees of the workshop were able to provide input on the project through several different methods:

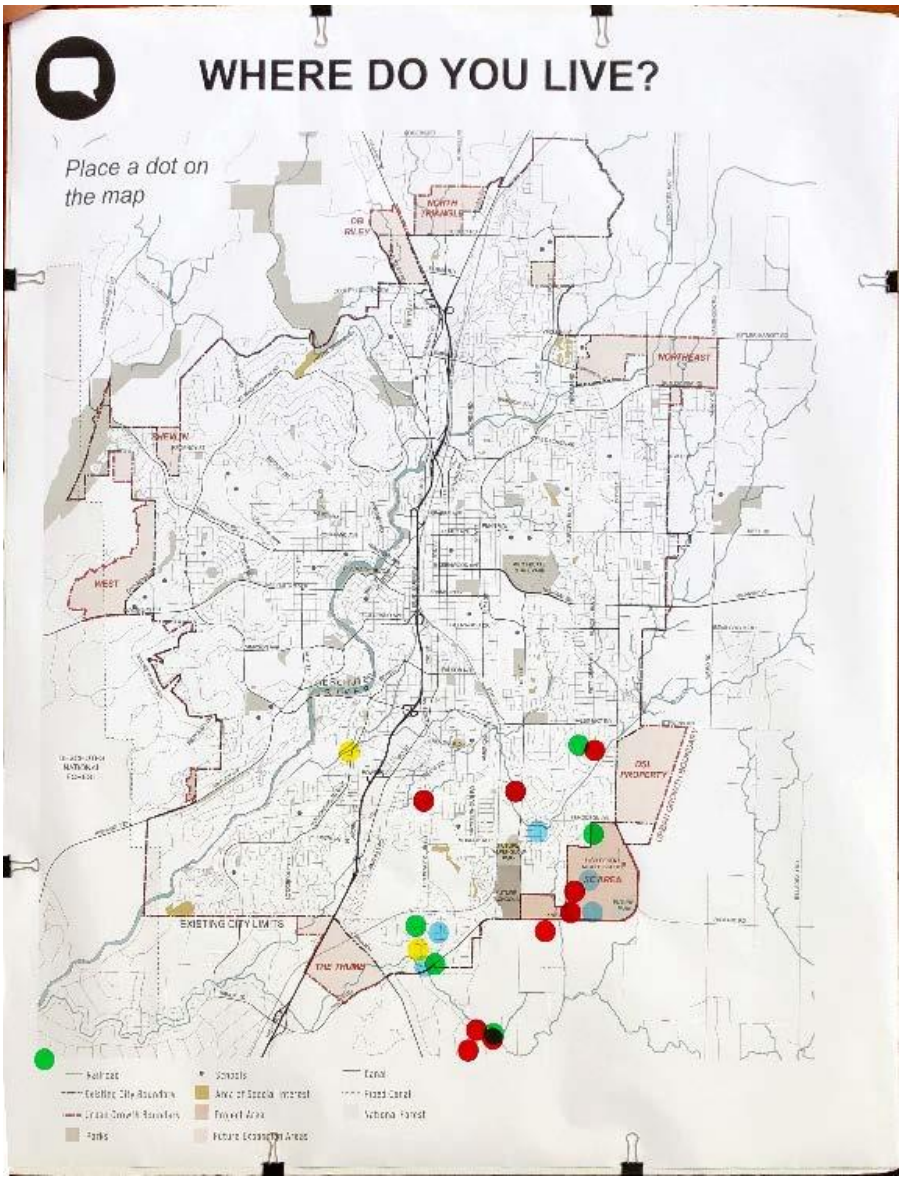
- Four of the display boards included opportunities for attendees to provide topic-specific input by adding sticky dots or written notes.
- Comment forms were available to gather input on anything that was not covered at the open house, and to offer feedback of the overall effectiveness of the open house.
- Flip chart pads were placed around the room for attendees to write general comments about the project or the area.
- Staff were available at each display board station to have discussions with attendees, answer questions, and listen to input.

Engagement Boards

Where Do You Live?

A board at the entrance to the workshop invited attendees to place a dot on a map of the City to indicate where they live. A total of 22 dots were placed on the map. The results are shown in Figure 2 below.

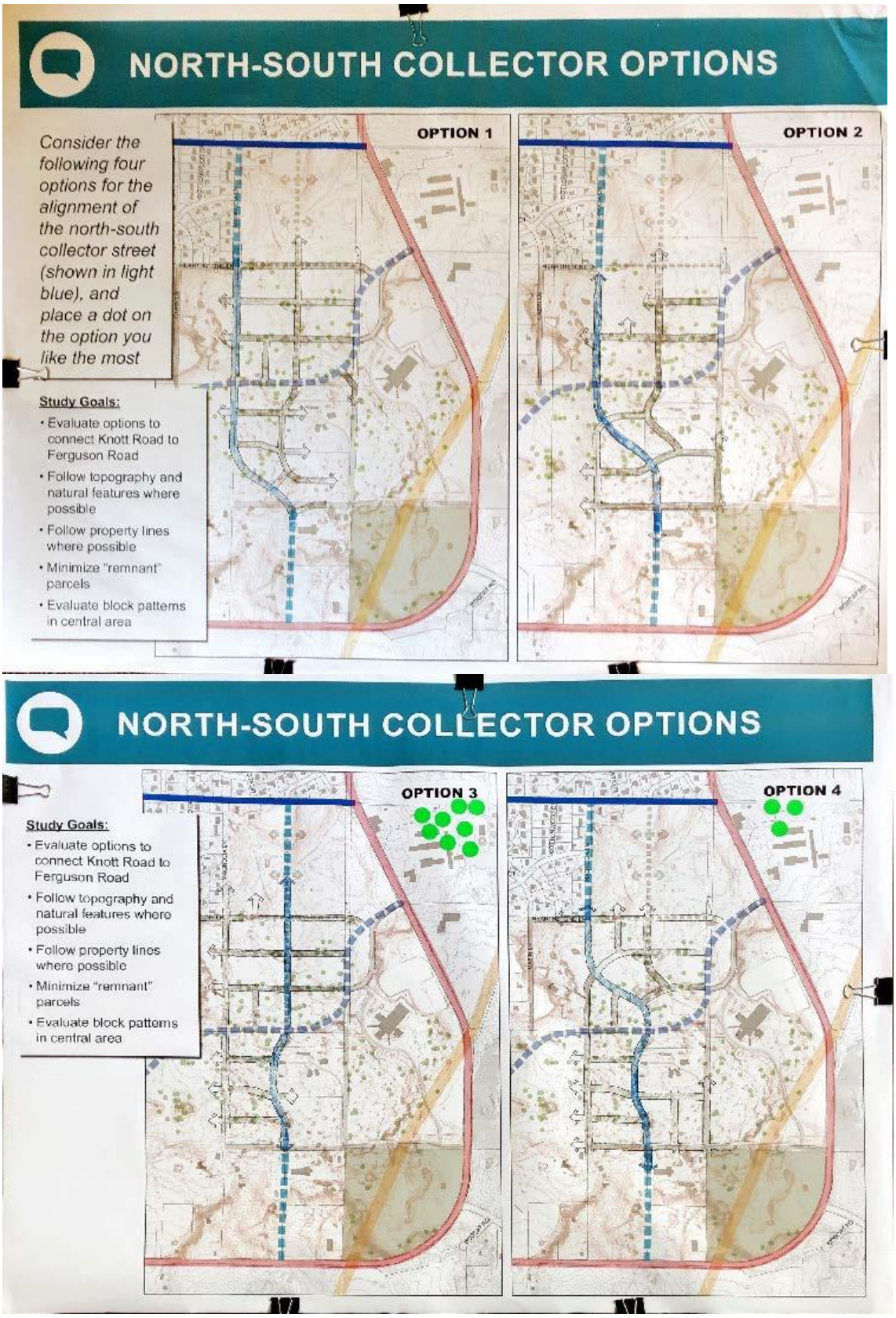
Figure 2. Results of the "Where Do You Live?" Board



North-South Collector Options

A set of two boards at the Draft Streets & Trails Concepts station invited attendees to consider four options for the alignment of a new collector street that would run north-south through the study area as part of the draft street plan. Attendees placed a dot on the image of the option that they liked the most. A total of 11 dots were placed on the map. Eight attendees voted for Option 3 and three attendees voted for Option 4. The results are shown in Figure 3 below. During discussion with attendees, the project team heard a strong preference for Option 3.

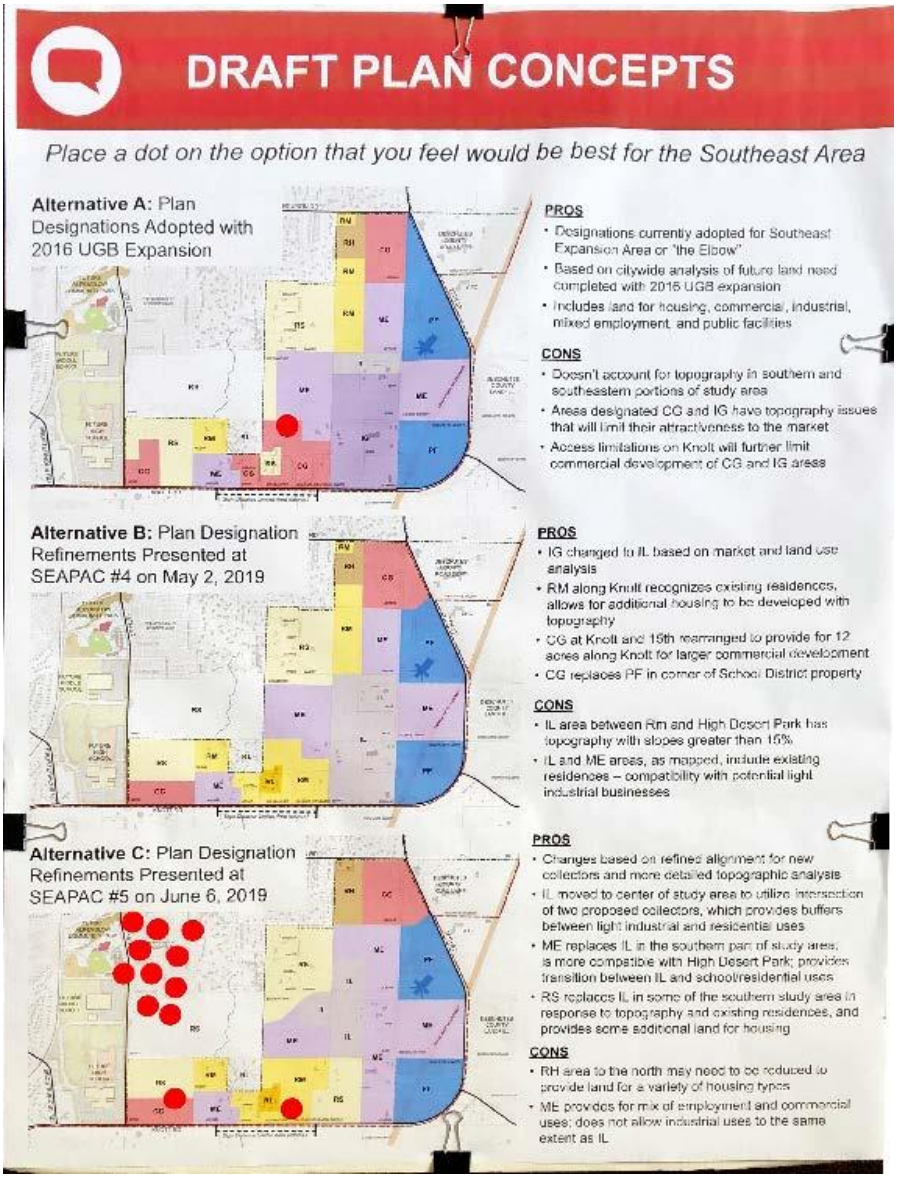
Figure 3. Results of the North-South Collector Options Boards



Draft Plan Concepts

A board at the Draft Plan Concepts station invited attendees to place a dot on the draft land use plan that they liked the most. The board included three alternatives for land use designations in the area, as well as pros and cons of each alternative. A total of 13 dots were placed on the map. 12 attendees voted for Alternative C, and one voted for Alternative A. The results are shown in Figure 4 below. During discussions with attendees, the project team heard generally positive comments about the "evolution" of the plan and how it addressed input and discussions to date.

Figure 4. Results of the Draft Plan Concepts Board



Comment Forms, Easel Pads, and Discussions with City Staff

A summary of the comments received through the voluntary comment forms, easel pads, and discussions with City staff is provided below:

- Landscaping and good design is essential to this area. It can make the ME and LI look good (like parts of American Lane).

- The transitions toolbox map should show a transition area along Knott at the residential properties.
- Look at RS on Knott with possible ME as a buffer.
- Desire for an east-west road north of Knott.
- Emergency evacuation of subdivisions and few exits/entrances is very slow and may be dangerous for fire location.
- Consider fewer “collectors” and more options for movement in four directions.
- Need good bike trails – require them.
- Follow City of Bend Exterior Lighting Code and ensure all new lighting is directed downward and no light pollution. Currently this is a nice dark sky friendly area, please keep it that way.
- Concern about fast food restaurants being allowed in CG zones.

Appendix Q - Summary of Open House 2 Online Survey

CITY OF BEND
SOUTHEAST AREA PLAN

Summary of Open House #2 Online Survey

PREPARED FOR: Southeast Area Plan Project Management Team

PREPARED BY: Kyra Haggart, APG

DATE: 8/23/2019

Introduction

This memorandum provides a summary of the results from the Southeast Area Plan Southeast Area Plan Online Survey. The Online Survey was open for 20 days from Thursday, July 11, 2019 through Wednesday, July 31, 2019. The Online Survey coincided with the Southeast Area Plan Open House #2, which took place on Thursday, July 11, 2019 from 6:30 pm – 8:30 pm at the Bend Municipal Court. The Online Survey provided the opportunity to share project information with community members who were unable to attend the in-person event and solicit their feedback regarding the Southeast Area Plan. A link to the Online Survey was posted to the City's website and Facebook page, was advertised on NextDoor, and was sent to the project's interested parties email list. The Online Open House received a total of 63 responses.

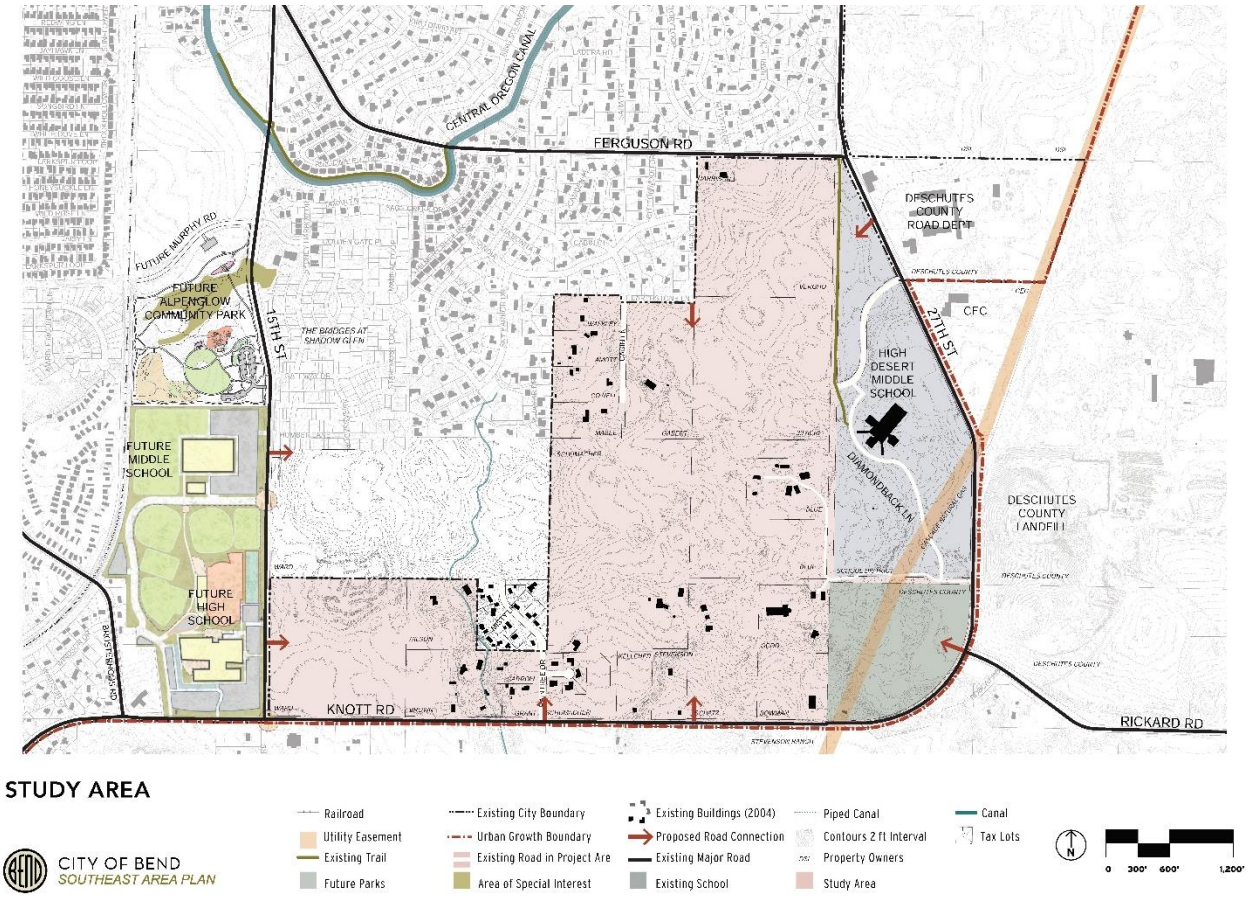
Information Provided

Information about the following topics was presented on display boards:

- Project overview, including a project schedule and study area maps
- Project vision and guiding principles
- Existing transportation conditions and background information about street classifications, street spacing standards, and safety issues
- Draft street and trails plans, including road alignment options
- Existing land uses and market analysis background
- Direction received from the City Council and State regarding employment land
- Three draft land use plan alternatives
- Land use transition information and site studies
- Principles for walkable areas
- Natural features inventory

The Southeast Area Plan study area is provided for reference in Figure 1 below.

Figure 1. Southeast Area Plan Study Area



Online Survey Results

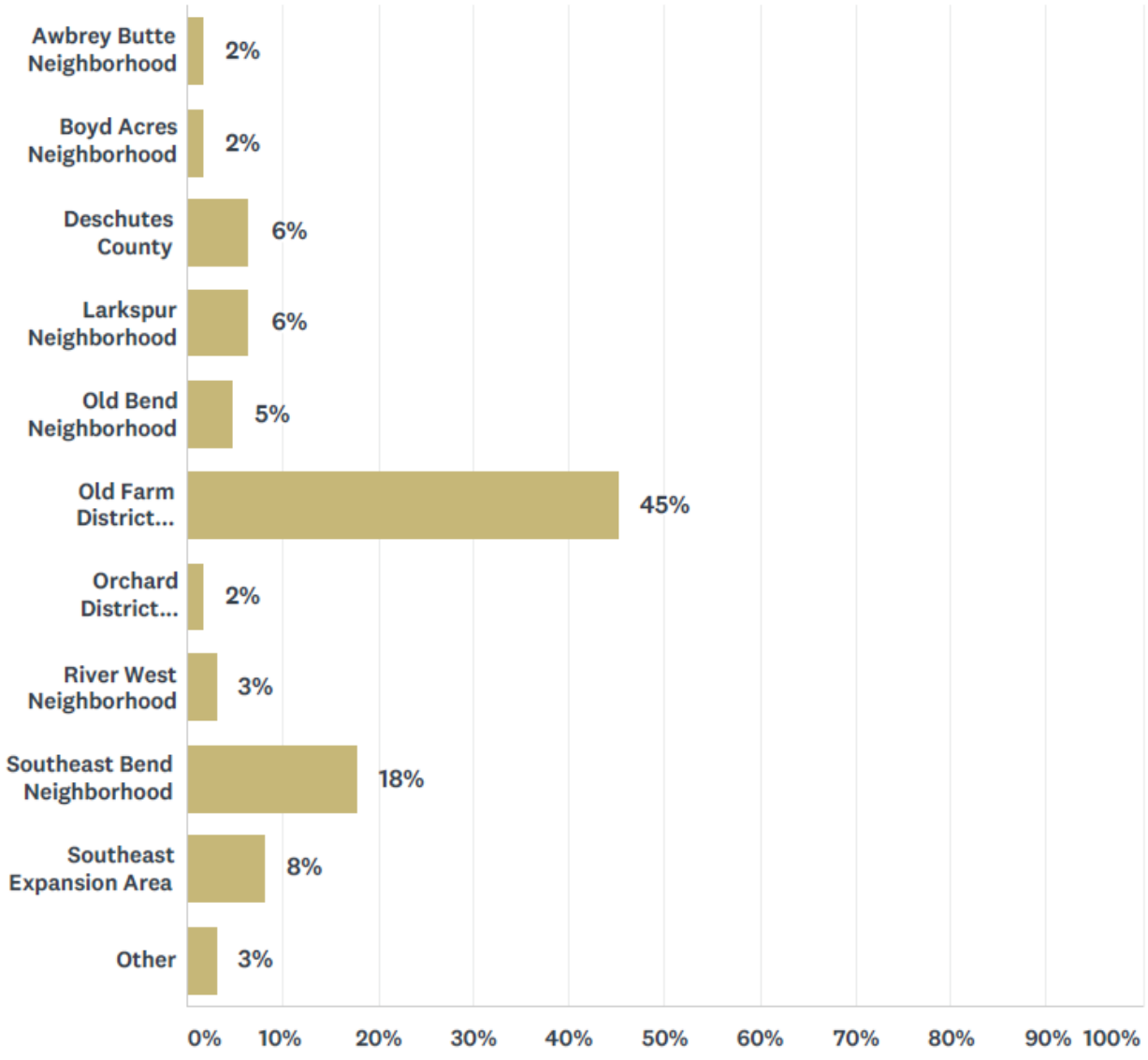
Respondents to the Online Survey were able to provide input regarding specific land use and transportation alternatives, as well as general open-ended feedback about the project.

Introduction Page

Where Do You Live?

Respondents were asked to select the neighborhood or area of Bend where they live. A map of the neighborhoods in Bend was provided for reference. The results are shown in Figure 2 below. Responses to the “Other” option included Woodside Ranch and Brightenwood Estates.

Figure 2. "Where do you live?" Results

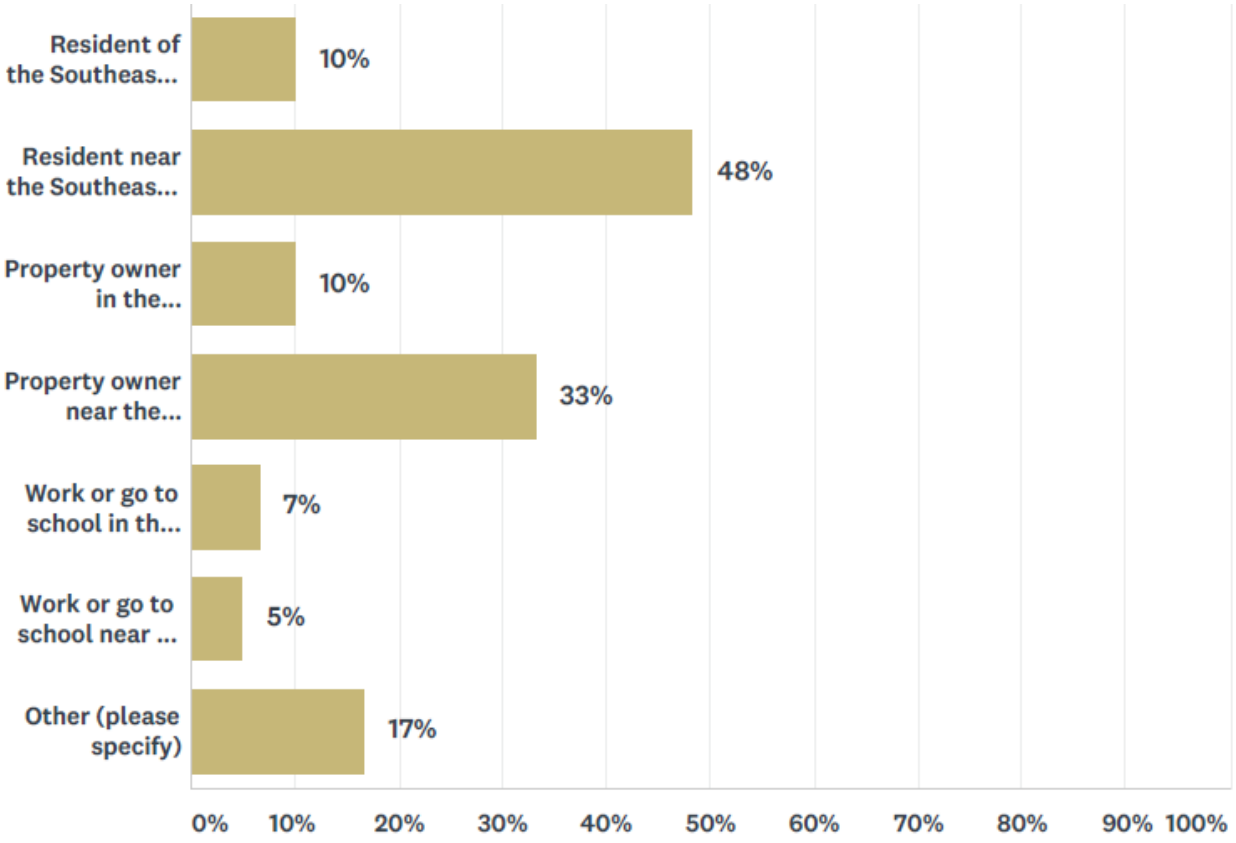


Why are you interested in this project?

Respondents were asked about their interest in the Southeast Area Plan. The results are shown in Figure 3 below. Responses to the "Other" option included the following:

- General interest in the growth of Bend
- Use Knott Road
- Realtor
- Interest in community involvement

Figure 3. Project Interest Results

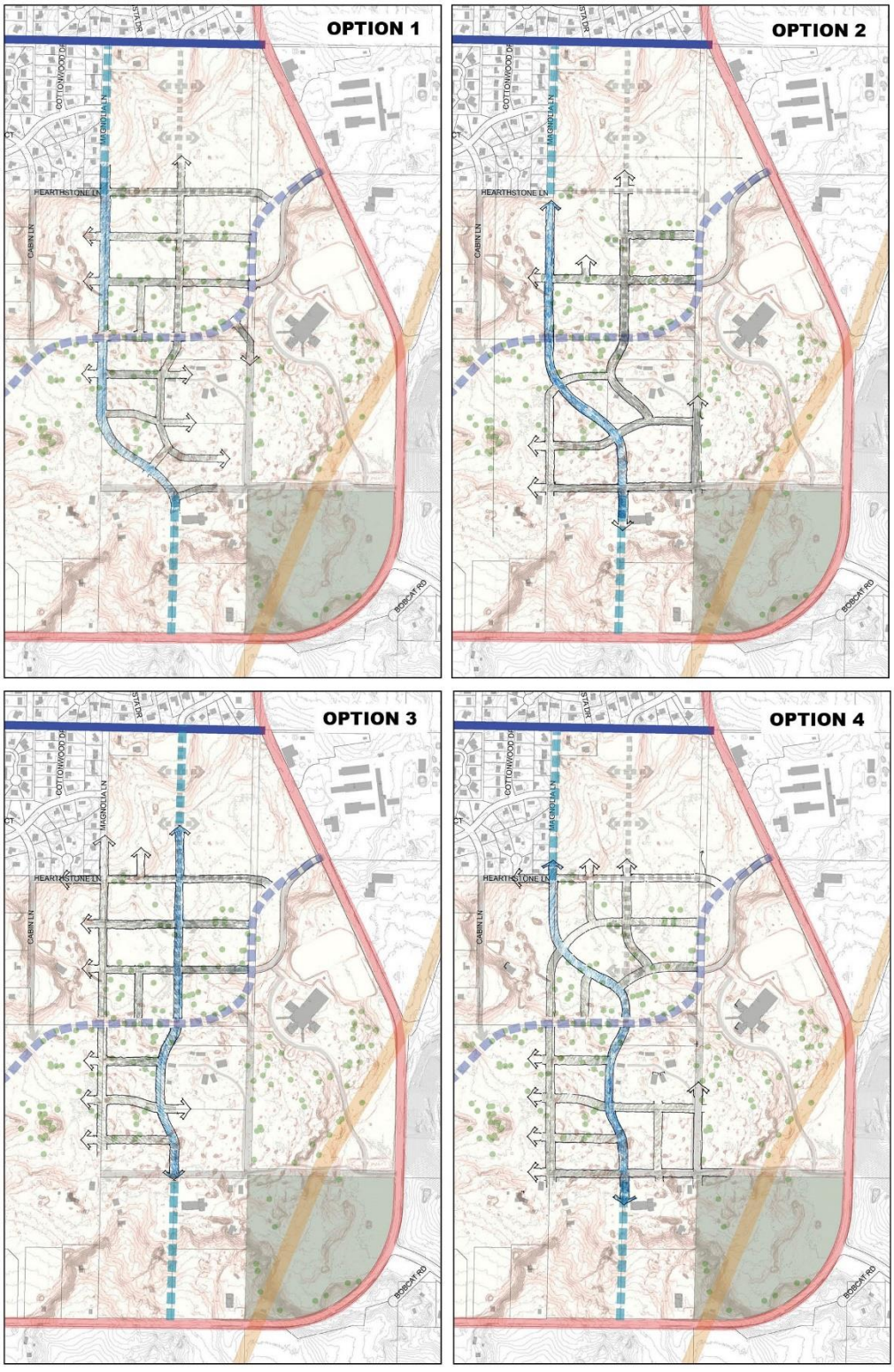


Draft Streets & Trails Concepts Page

North-South Collector Options

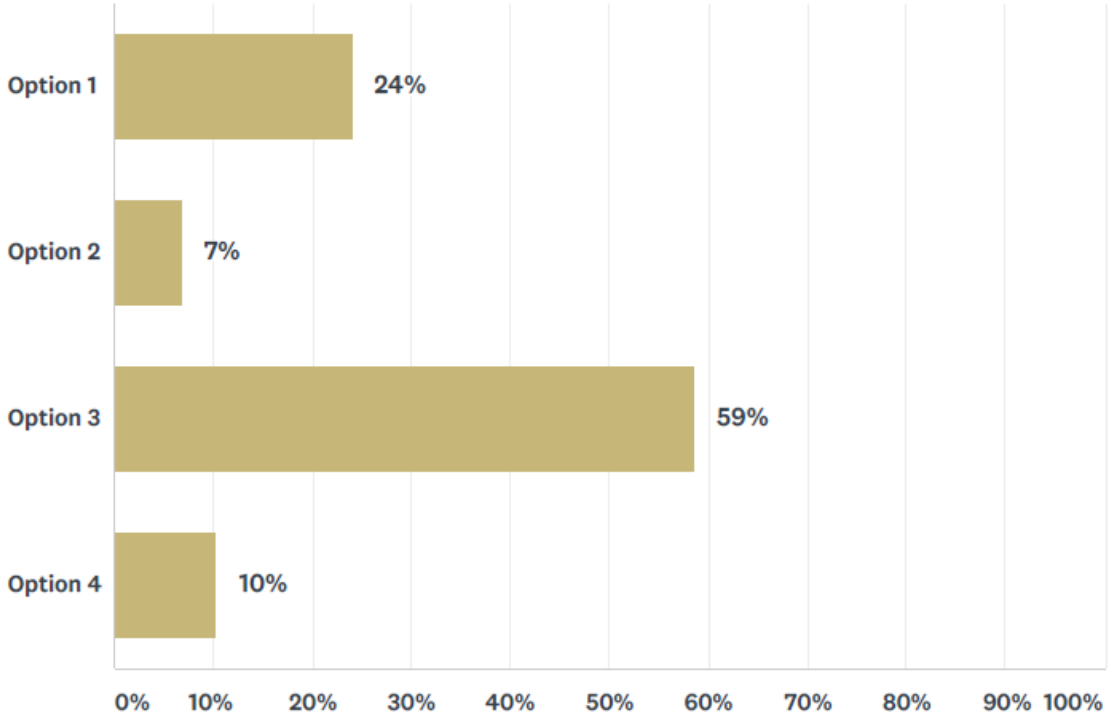
The Online Survey invited participants to consider four options for the alignment of a new collector street that would run north-south through the study area as part of the draft street plan. The four options are shown in Figure 4 below.

Figure 4. North-South Collector Options



A total of 29 survey participants responded to the question, with 17 of them (59%) indicating a preference for Option 3. Seven respondents voted for Option 1, two voted for Option 2, and three voted for Option 4. The results are shown in Figure 5 below.

Figure 5. North-South Collector Options Results



General Transportation Comments

Respondents were also asked if they had any other comments or suggestions about the options for the alignment of the new north-south collector street, or about transportation in the Southeast Expansion Area generally. Responses included:

- Support for Option 3 in order to prevent increased traffic on Magnolia Lane, which is currently a quiet residential street.
- Consider impacts to families that live on Magnolia Lane before making it a busy collector street.
- Desire to preserve the quiet neighborhood character without much traffic and with open spaces.
- Maintain Magnolia Street as a local street.
- Limit intersections on the new collector to increase traffic flow.
- Design the new collector with traffic calming as part of the original construction.
- Add a traffic circle on Ferguson Road at 15th Street and 27th Street.
- Add turn lanes, bike lanes, and safe sidewalks on Ferguson Road.
- Concern about the traffic heading toward Highway 97.
- Desire to see improvements and lower speed limits on Knott Road.
- New collector should be wide enough to accommodate buffered bike lanes on both sides.
- Need for designated walking and biking trails on the east side of Bend.

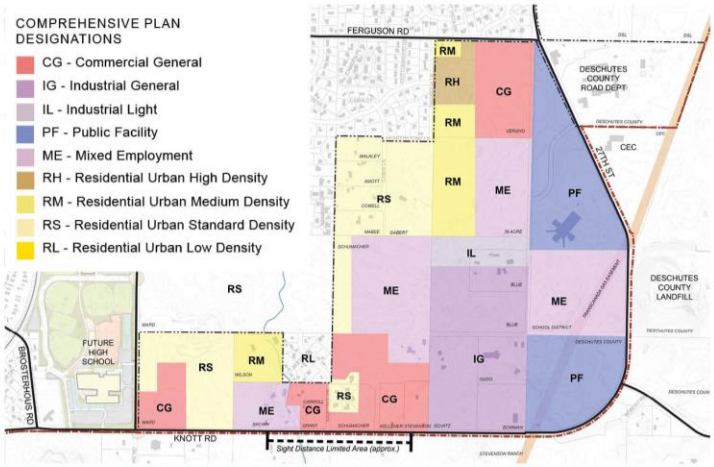
- Honor existing unpaved footpaths through the Southeast Expansion Area as rights-of-way in the plan.
- Desire for more gravel trails as opposed to paved trails.
- Desire to have public restrooms provided at new parks.
- Need for safe crosswalks across Ferguson Road.

Draft Land Use Plan Concepts

Draft Plan Concepts

The Online Survey invited participants to consider three alternatives for the refinement of land use designations in the Southeast Expansion Area, shown in Figure 6 below.

Figure 6. Land Use Alternatives

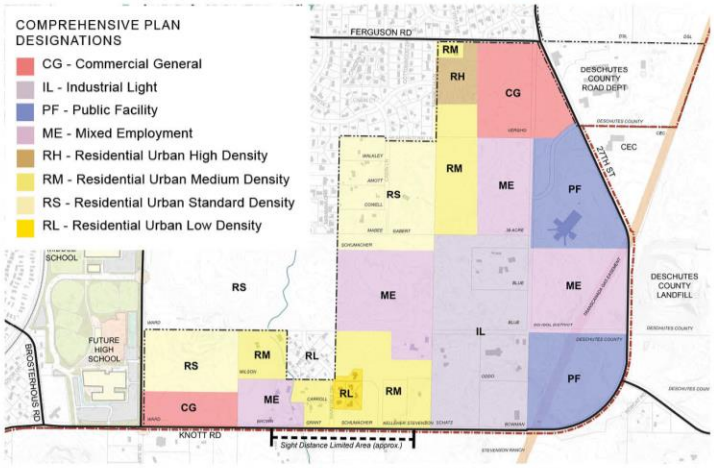


PROS

- Designations currently adopted for Southeast Expansion Area or "the Elbow"
- Based on citywide analysis of future land need completed with 2016 UGB expansion
- Includes land for housing, commercial, industrial, mixed employment, and public facilities

CONS

- Doesn't account for topography in southern and southeastern portions of study area
- Areas designated CG and IG have topography issues that will limit their attractiveness to the market
- Access limitations on Knott will further limit commercial development of CG and IG areas

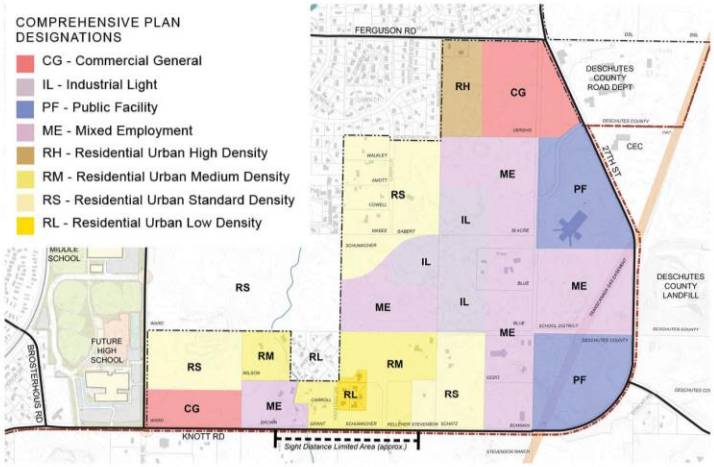


PROS

- IG changed to IL based on market and land use analysis
- RM along Knott recognizes existing residences, allows for additional housing to be developed with topography
- CG at Knott and 15th rearranged to provide for 12 acres along Knott for larger commercial development
- CG replaces PF in corner of School District property

CONS

- IL area between Rm and High Desert Park has topography with slopes greater than 15%
- IL and ME areas, as mapped, include existing residences – compatibility with potential light industrial businesses



PROS

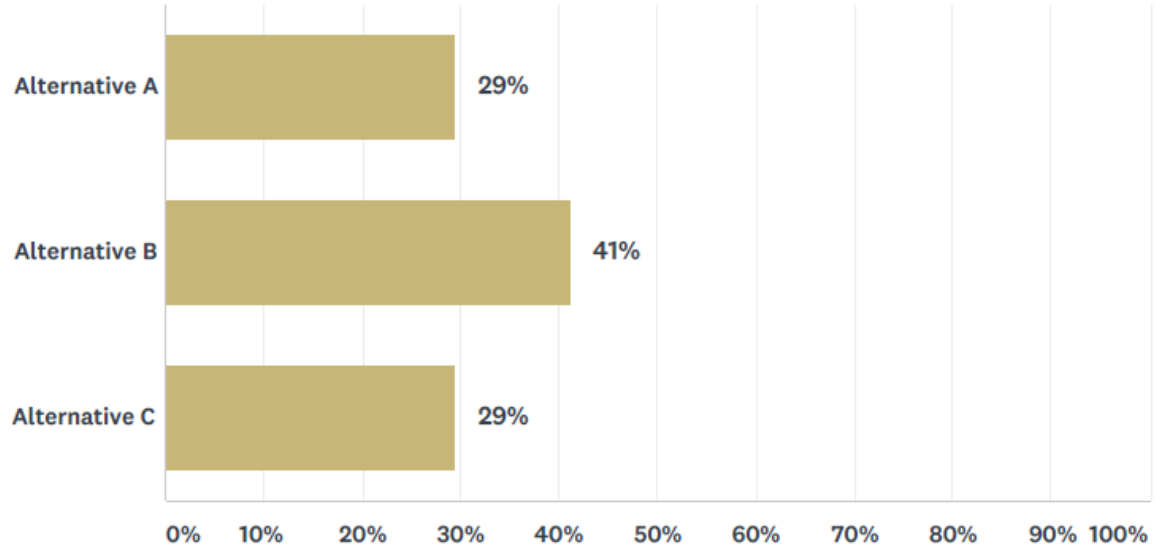
- Changes based on refined alignment for new collectors and more detailed topographic analysis
- IL moved to center of study area to utilize intersection of two proposed collectors, which provides buffers between light industrial and residential uses
- ME replaces IL in the southern part of study area; is more compatible with High Desert Park; provides transition between IL and school/residential uses
- RS replaces IL in some of the southern study area in response to topography and existing residences, and provides some additional land for housing

CONS

- RH area to the north may need to be reduced to provide land for a variety of housing types
- ME provides for mix of employment and commercial uses; does not allow industrial uses to the same extent as IL

A total of 17 survey participants responded to the question. Five respondents (29%) voted for Alternative A, seven (41%) voted for Alternative B, and five (29%) voted for Alternative C. The results are shown in Figure 7 below.

Figure 7. Land Use Alternatives Results



General Land Use Comments

Respondents were also asked if they had any other comments or suggestions about the land use alternatives, or about land use in the Southeast Expansion Area generally. Responses included:

- Concern that the future park should be adjacent to residential rather than industrial/mixed employment land uses so that it has a population to serve.
- Question regarding requirements for a buffer between high- and low-density residential uses.
- General dislike of commercial uses in the area.

Natural Features Inventory

Survey participants were asked if they had any comments or suggestions about the natural features inventory, or if there were any notable features the team missed. Responses included:

- There are many mature trees in the area between 27th Street, Ferguson Road, and Magnolia Lane that don't appear to be marked on the inventory map, but that should be preserved if possible.
- Support for considering the natural features in the planning process.
- The area is largely flat so topography should not be much of a concern.

General Comments

General comments included:

- Support for the new uses that will come to Southeast Expansion Area.
- Desire to maintain Magnolia Lane as a quiet residential street.
- Concern about the volume of vehicle traffic on surrounding roads.

Appendix R - Refined Land Use Plan

CITY OF BEND
SOUTHEAST AREA PLAN

Refined Land Use Plan

PREPARED FOR: Southeast Area Plan Advisory Committee (SEAPAC)

COPY TO: Project Team

PREPARED BY: Joe Dills and Kyra Haggart, APG

DATE: September 12, 2019

Introduction

The purpose of this memorandum is to introduce the draft refined land use plan to be discussed by the Southeast Area Plan Advisory Committee (SEAPAC) on Thursday, September 26. The refined plan for land use designations in the Southeast Expansion Area is presented in Figure 4. The project team is seeking SEAPAC approval of the land use plan for use by the team in the next phase of analysis: transportation and sewer modeling, and funding plan analysis and development.

Concept Development

Figure 1 presents the land use designations that were adopted as part of the Bend Urban Growth Boundary (UGB) expansion process in 2016. The plan designations were established in the context of the citywide evaluation of land needs, UGB Remand compliance, and update of the City's Comprehensive Plan. In the Southeast Expansion Area, the designations were applied at a high level, with the intent to be refined. Through this area planning process, SEAPAC and the project team have had the opportunity to further analyze and refine these land use designations. Refinements to the land use plan have been made based on input and analysis from the following three areas:

- A more detailed analysis of physical conditions and constraints, including topography and transportation access and safety;
- Input from SEAPAC members and the broader community of southeast Bend; and
- Direction from the City Council and the State Department of Land Conservation and Development (DLCD).

The land use designations adopted for the Southeast Expansion Area in 2016 were intended to provide for a mix of employment and residential uses providing compatible transitions from the employment lands to the existing neighborhoods to the west and north. This intent is consistent with SEAPAC's vision and guiding principles for the area. Although the refinement process is flexible in terms of where the land use designations adopted in 2016 can be located within the Southeast Expansion Area, the ability to change the mix of uses is limited by both State requirements and policy direction from the City's Comprehensive Plan regarding the provision of a mix of housing types and employment opportunities.[1]

Land Use Concept Alternatives

[1] For more information about Council and State direction regarding land use refinements, please refer to the memo beginning on page 29 of the meeting packet from SEAPAC #5: https://www.bendoregon.gov/home/showdocument?id=41835

Four alternatives for refining the adopted land use designations have been discussed to-date by the project team and SEAPAC. These alternatives do not represent four equal options; rather, they represent a progression of plan development through detailed site analysis and responsiveness to community feedback. The options are:

- **Option A (Figure 1) –** This option would retain the plan designations as adopted by the 2016 UGB expansion process.
- **Option B (Figure 2) –**This option, which was brought to SEAPAC at their meeting on May 2, changes General Industrial (IG) designations to Light Industrial (LI), without a reduction in the total amount of industrial land. It also converts the area along central Knott Road previously designated as General Commercial (CG) to residential in response to slope constraints and concerns about transportation access and safety.
- **Option C (Figure 3) –** This option was brought to SEAPAC at their meeting on June 6, as well as the subsequent community open house on July 11. It was developed as a compromise between resident concerns and wishes, and state and local requirements. The land use plan includes the minimum amount of industrial land allowed by DLCD (38 acres). It re-designates half of the Light Industrial (LI) acreage shown in Option B to other designations, including Mixed Employment (ME) and Standard and Medium Density Residential (RM and RS), in response to topographic constraints and community concerns about compatibility and walkability.
- **Option D (Figure 4) –** This option represents a refinement of Option C based on feedback received from residents of the area and community members at the in-person and online open house, while maintaining capacity for the mix of housing and employment uses identified in the City's Comprehensive Plan. Key changes include lowering the density of residential designations adjacent to existing neighborhoods, including along Magnolia Way and Keller Court/central Knott Road, to address compatibility concerns and provide for smooth transitions between land uses and densities.

At this point, the project team recommends Option D, presented in Figure 4, as the refined plan showing the best balance of the various considerations and constraints. The refined land use plan will be used by the project team to model transportation impacts as well as sewer infrastructure. It will also be used for analyzing infrastructure funding and developing the funding plan.

Housing and Employment Capacity

The City's Comprehensive Plan includes policies that guide land use planning in the Southeast Expansion Area.[2] These policies include metrics to ensure that the capacities for housing and jobs that were intended for the area are met during the area planning and refinement process. Table 1 lists the acres of each land use designation required by the comprehensive plan compared to the acres of each land use designation present in the refined plan (Option D).

[2] The Growth Management chapter (Chapter 11) of the Comprehensive Plan includes area-specific policies for land added to the UGB in 2016, including the Southeast Expansion Area ("the Elbow"). Policies 11-75 through 11-84 are specific to and guide the area planning process for the Southeast Expansion Area.

Table 1. Land Use Designation Acres

LAND USE DESIGNATION	COMPREHENSIVE PLAN GUIDANCE (GROSS ACRES)	OPTION D CAPACITY (GROSS ACRES)	REASON FOR DIFFERENCE
RESIDENTAL (RL, RS, RM, RH)	122	153	Detailed slope analysis of the Southeast Expansion Area revealed numerous topographic constraints that would likely impact the feasibility of commercial and industrial uses. Residential development has more flexibility in areas with steep slopes. Additionally, SEAPAC members and residents of the area expressed concerns about compatibility with existing low-density residential neighborhoods, as well as planned and program uses for the area such as parks and schools.
Low Density Residential (RL)	n/a	10	The Comprehensive Plan does not cite a minimum requirement for low density residential land uses. The project team converted 10 acres of land to low density residential in several locations where existing homes have already been built in a low density residential land use pattern.
Standard Density Residential (RS)	77	97	After doing a detailed analysis of topography and site distance constraints it was determined that the area surrounding the Keller Court subdivision along Knott Road is more appropriately designated for residential land uses rather than commercial. The designation of standard density residential in the area is reflective of the team's consideration of slopes, transportation safety, and input from residents regarding compatibility with existing uses.
Medium Density Residential (RM)	36	36	The retention of 36 acres of medium density residential land is consistent with the original intention of the Southeast Expansion Area to provide for a mix of housing, as well as the City's intention to plan for needed housing.
High Density Residential (RH)	9	10	The retention of 10 acres of high density residential land uses is consistent with the original intention of the Southeast Expansion Area to provide for a mix of housing, as well as the City's intention to plan for needed housing.
COMMERCIAL (CG)	67	43	A detailed analysis of topography and site distance constraints along Knott Road revealed that the area surrounding the Keller Court subdivision is not a good location for commercial uses. Two steep ridgelines run through the area creating transportation safety, visibility, and access issues and limiting the capacity for a larger commercial development to occur. Guidance from DLCD indicated that they were not concerned with changes to commercial designations.

			Two commercial nodes are proposed in the southwest and northeast corners of the Southeast Expansion Area to provide capacity for commercial development and jobs. These locations are both relatively flat and have good existing transportation access and visibility, making them ideal locations for future commercial activity.
INDUSTRIAL (IL, IG)*	76	38	The reduction in land designated for industrial uses is consistent with the feedback from DLCD: (1) a minimum of 38 acres must be retained in the Southeast Expansion Area; and, (2) Bend is obligated to replace the amount of industrial land removed from the area in a future Comprehensive Plan update. The change is also reflective of the project team's detailed topography analysis, and feedback from SEAPAC, residents, and community members, and the results of the project's market analysis. The industrial land retained is designated as light industrial, which will allow for uses that are more compatible with the area's unique topography and existing land uses. The light industrial designation provides opportunities to meet the demand for "flex" development (a blend of office and industrial uses) that are seeing increasing demand in Bend.
MIXED EMPLOYMENT (ME)	103	140	In order to provide additional job capacity while addressing topography and compatibility constraints, much of the land previously designated for industrial uses was re-designated to mixed employment. Mixed employment uses have a more flexible development pattern that better suits the topography of the area and provide transitions from commercial and industrial land uses to residential ones.
PUBLIC FACILITIES (PF)	75	66	The reduction in land for public facilities is due to the re-designation of the northern 11 acres of the School District property for commercial uses.

* Per a communication with DLCD on May 24, 2019, the Southeast Expansion Area was included in the UGB in 2016 to provide for a number of land needs, including industrial land. DLCD's strong recommendation was to maintain a minimum of 38 acres of industrial land for jobs in the Southeast Expansion Area. This change is a reduction from the 76 acres required by the City's Comprehensive Plan policy adopted in 2016 during the UGB expansion process, which was approved by DLCD. This reduction includes a requirement that the City commit to replacing the loss of light industrial land elsewhere in the city in the near term (within three to five years).

Figure 1. Option A - Land Use Designations Adopted in 2016 UGB Expansion

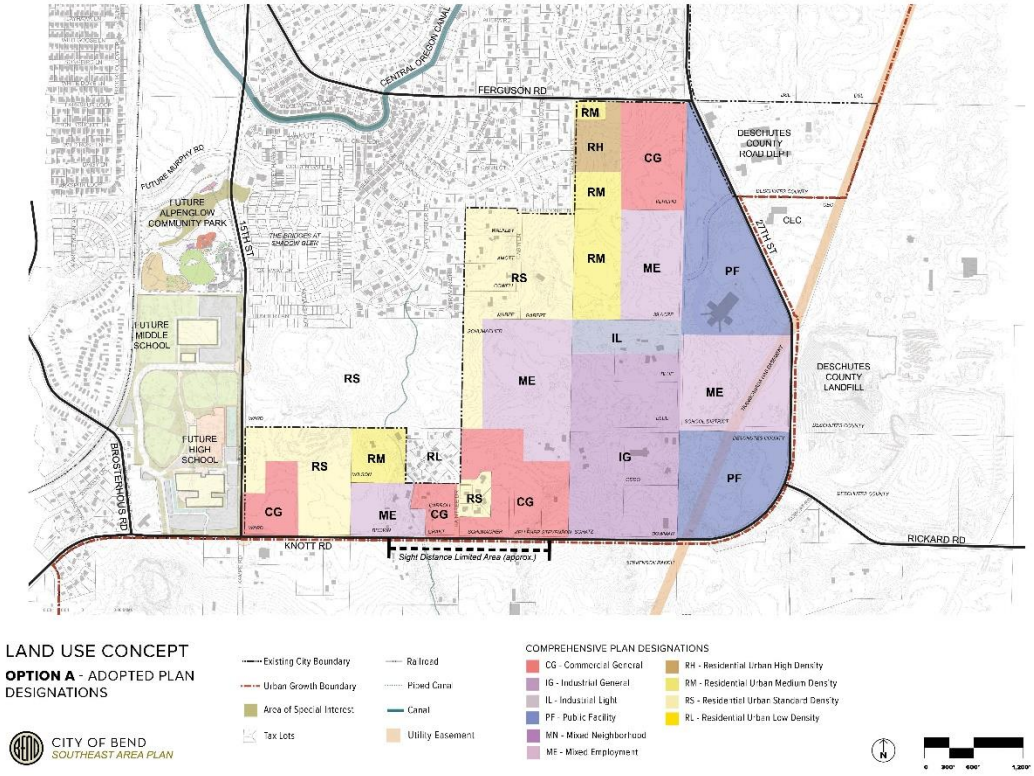


Figure 2. Option B - Land Use Designations Presented at SEAPAC #4 on May 2

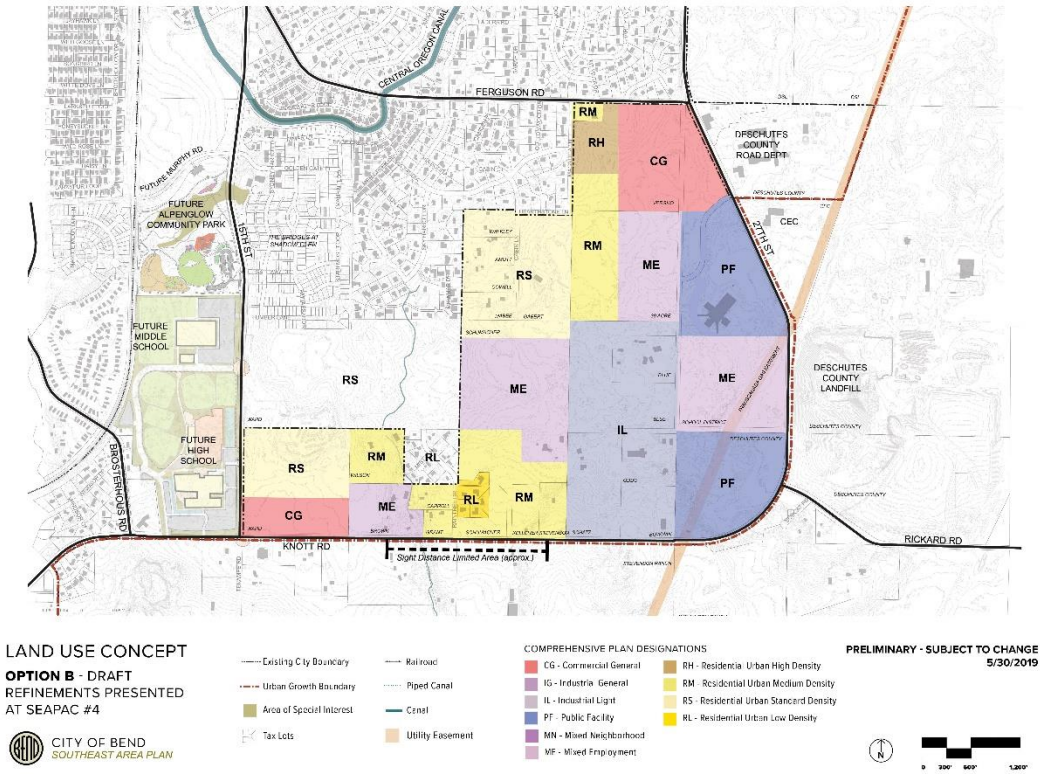


Figure 3. Option C - Land Use Designations Presented at SEAPAC #5 on June 6 and Community Open House on July 11

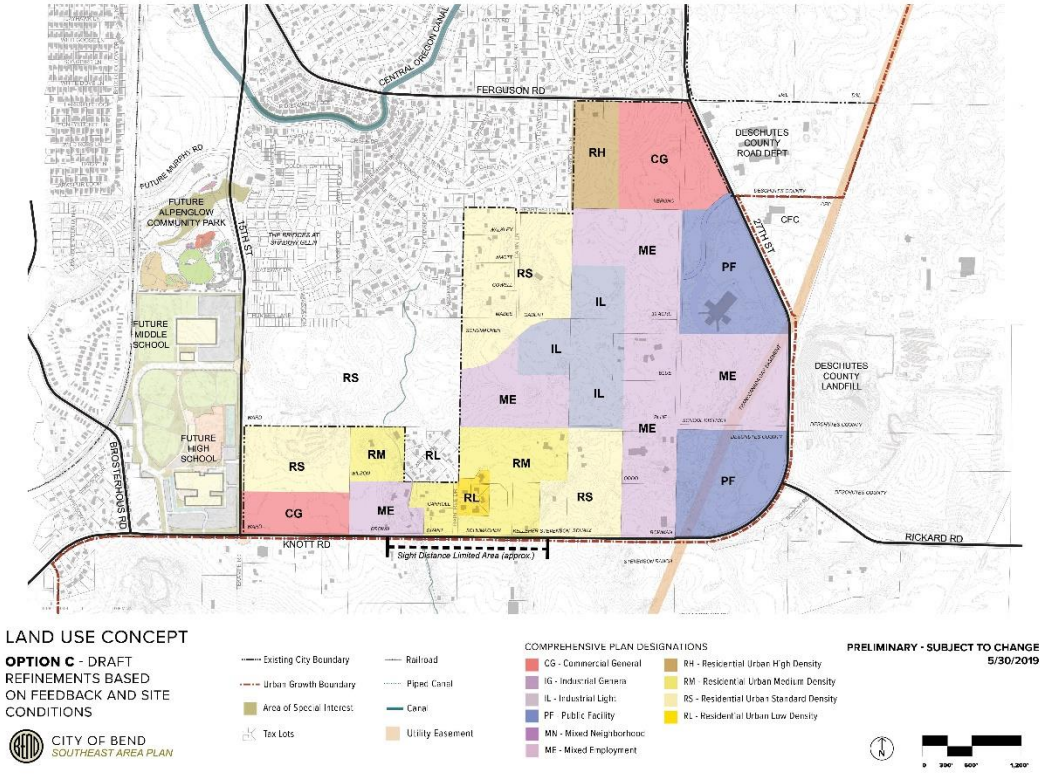
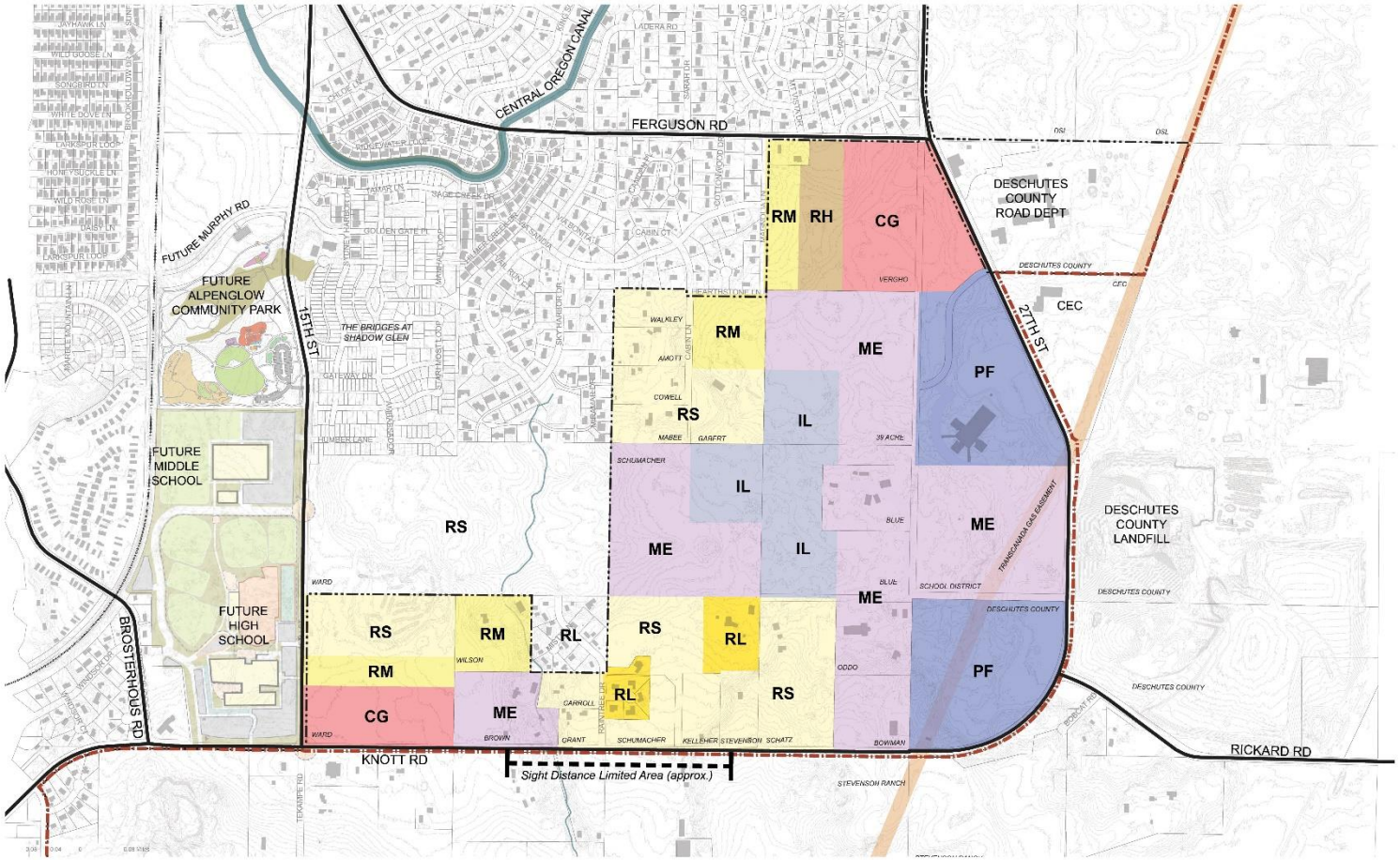


Figure 4. Option D – Refined Land Use Plan based on Site Analysis and Community Feedback



LAND USE CONCEPT

OPTION D - PREFERRED
LAND USE REFINEMENT

CITY OF BEND
SOUTHEAST AREA PLAN

- Existing City Boundary
- Urban Growth Boundary
- Area of Special Interest
- Tax Lots
- Railroad
- Piped Canal
- Canal
- Utility Easement

COMPREHENSIVE PLAN DESIGNATIONS

- CG - Commercial General
- IG - Industrial General
- IL - Industrial Light
- PF - Public Facility
- MN - Mixed Neighborhood
- ME - Mixed Employment
- RH - Residential Urban High Density
- RM - Residential Urban Medium Density
- RS - Residential Urban Standard Density
- RL - Residential Urban Low Density

PRELIMINARY - SUBJECT TO CHANGE
9/10/2019

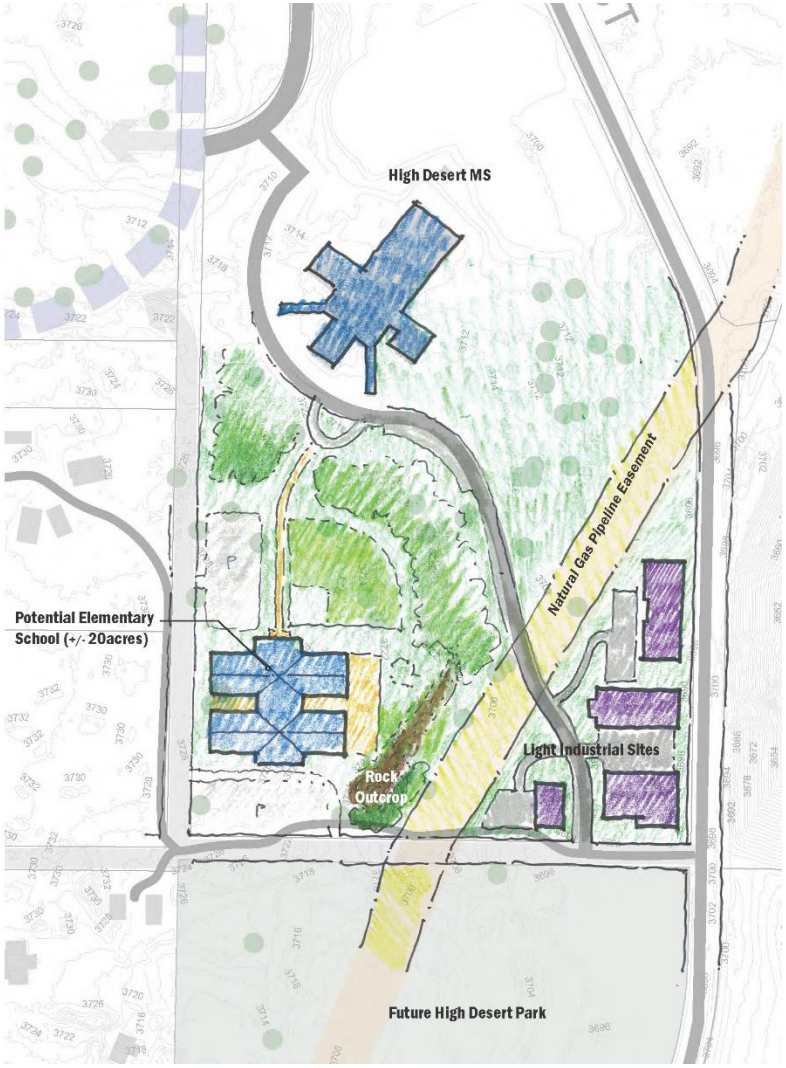
N

0 300' 600' 1,200'

Appendix S - Southeast Expansion Area Site Studies

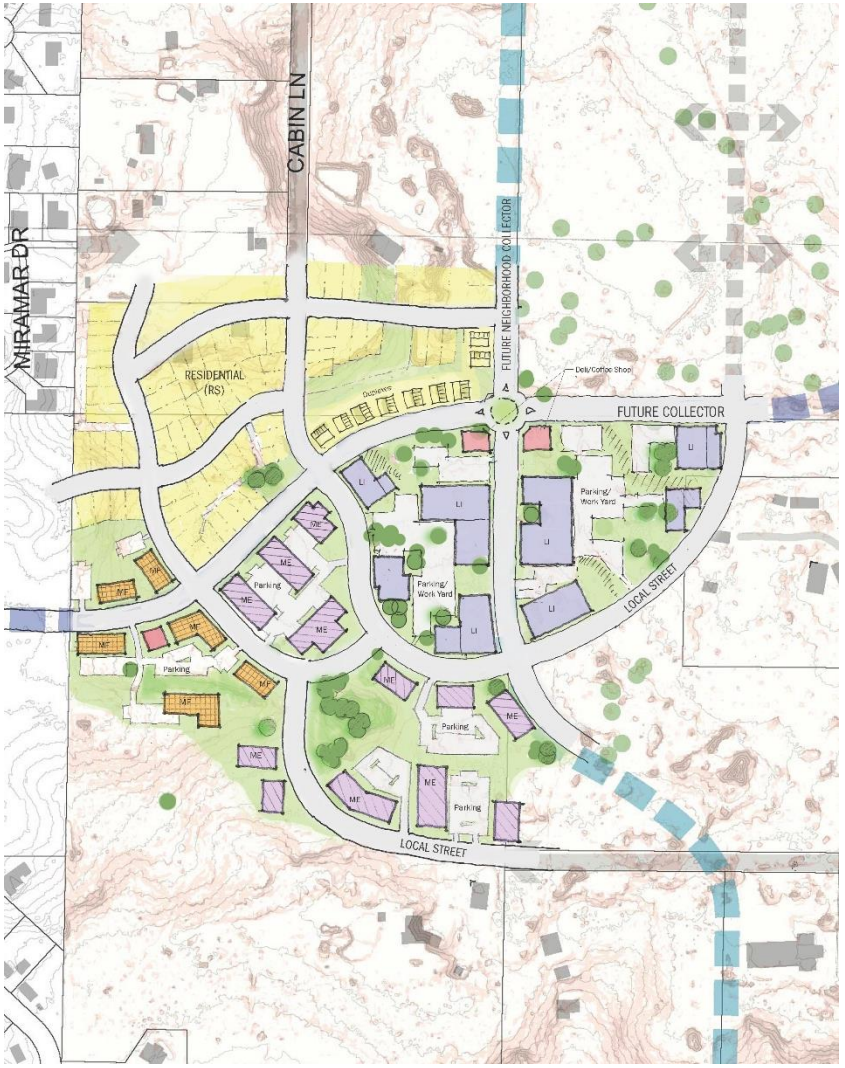
Southeast Expansion Area Site Studies

School District Property



Southeast Expansion Area Site Studies

Light Industrial/Mixed Employment Area

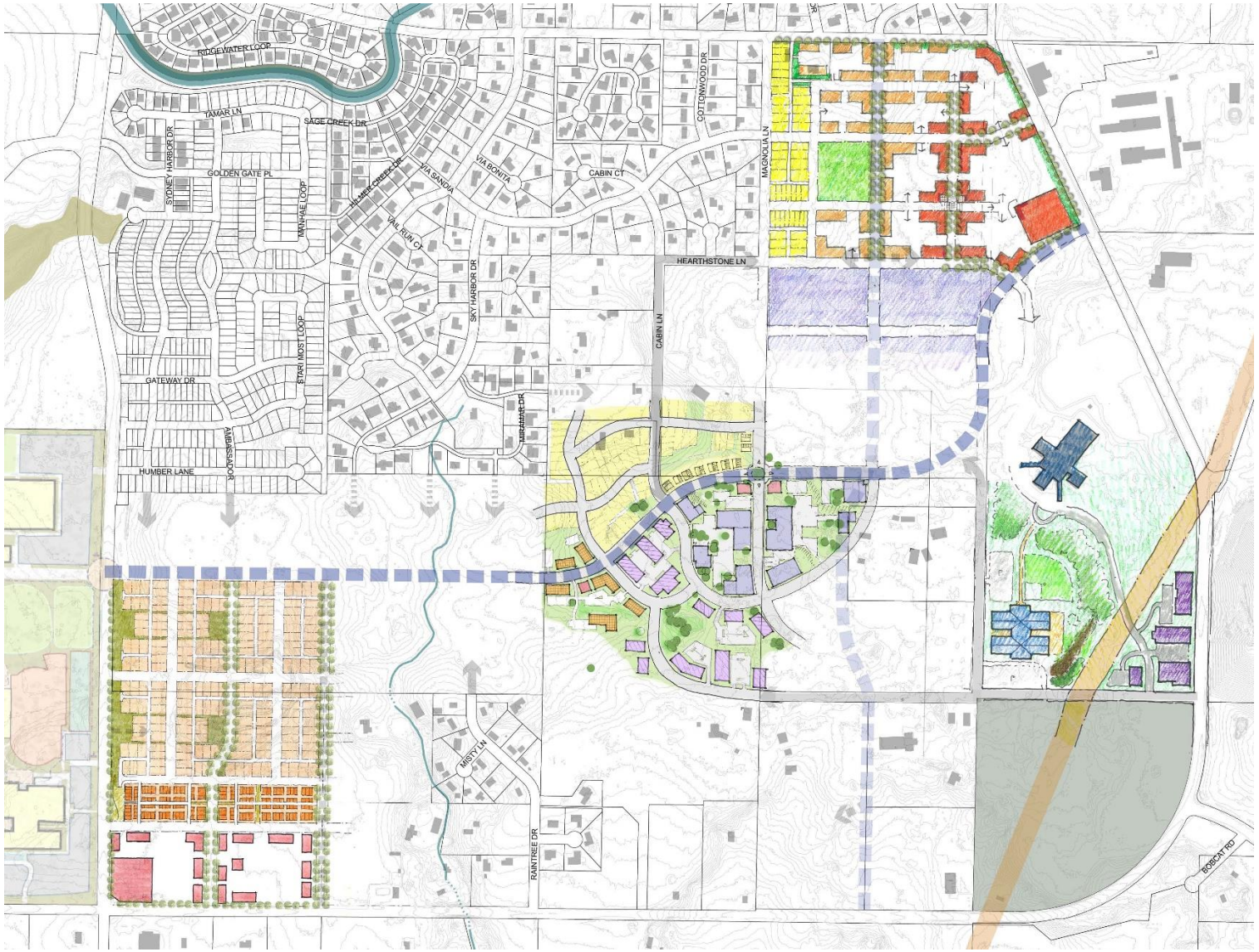


Southeast Expansion Area Site Studies
Southwest Town Center and Ward Opportunity Site

Southeast Expansion Area Site Studies
Northeast Town Center

Southeast Expansion Area Site Studies

Composite Map



Appendix T - Refined Streets and Trails Plans

CITY OF BEND
SOUTHEAST AREA PLAN

Refined Streets and Trails Plans

PREPARED FOR: Southeast Area Plan Advisory Committee (SEAPAC)

COPY TO: Project Team

PREPARED BY: Joe Dills and Kyra Haggart, APG

DATE: September 12, 2019

Introduction

The purpose of this memorandum is to introduce the refined street plan to be discussed by the Southeast Area Plan Advisory Committee (SEAPAC) on Thursday, September 26. The refined plan for the transportation network in the Southeast Expansion Area is presented in Figure 1. The project team is seeking SEAPAC approval of the refined street plan for use by the team in the next phase of analysis: transportation and sewer infrastructure modeling, and funding plan analysis and development.

Plan Development

The street plan shown in Figure 1 has been refined based on feedback from SEAPAC members and area residents, existing and planned development adjacent to the Southeast Expansion Area, and a more detailed analysis of transportation issues. Key transportation issues and concerns considered include:

- High speeds on Knott Road and 27th Street.
- Limited sight distance in the central section of Knott Road. The mapped “Sight Distance Limited Area” is the approximate area between the two ridge lines, plus 500 additional feet to the west and east of the ridges.
- Sidewalks, bike lanes, proper drainage and other “urban upgrades” will be needed as development occurs adjacent to rural roads such as Knott Road and 27th Street.
- The basic collector-level roads needed are an east-west connection from 15th Street to 27th Street, and a north-south connection from Knott Road to Ferguson Road. The alignment of these roads should balance topography, creating reasonable development parcels, sight distance, and safety.

Key Concepts of the Refined Plan

- **Connection from 15th Street to 27th Street:** This new collector street provides a strong east-west route connecting all neighborhoods in the area and provides good connections between High Desert Middle School, the planned new middle and high schools west of 15th Street, and the future neighborhood commercial node at Ferguson Road and 27th Street.
- **Connection from Knott Road to Ferguson Road:** This collector provides a needed north-south connection through the area, providing access to new neighborhoods, commercial centers, and employment opportunities. The alignment has been refined since it was presented at the May 2 SEAPAC meeting to reflect feedback both from SEAPAC and from the community-wide open house on July 11. The refined alignment provides a more direct route from Ferguson Road in the north at the intersection with Ferguson Court south to

Knott Road. This location optimizes sight distance and is responsive to topography in the area. The route follows existing tax lot boundaries where possible.

- **Raintree Drive:** A right in/right out/left in intersection is recommended to improve safety, given the limited sight distance in this area. At the north end of Raintree Drive, the northbound vehicular connection would be made. The southbound connection would be limited to pedestrians, bicycles, and emergency access to minimize cut through traffic and turning movements on Knott Road.
- **Framework local streets and connections:** The framework local streets shown on the street plan are illustrative of future connectivity. The arrows indicate currently stubbed streets that would be connected in future development plans.

Intersection control at collector-collector and collector-arterial intersections is under planning review. More information about intersection control options will be available after transportation modeling is completed.

Trail Plan

The refined trail plan presented in Figure 2 is coordinated with the street plan and addresses pedestrian and bicycle needs previously documented for the study area. It includes:

- Paved multi-use trails along all new and existing arterial and collector streets.
- Implementation of the Bend Park and Recreation District's (BPRD) High Desert Park Trail, which connects the future middle and high schools and the future Alpenglow Park on SE 15th Street to High Desert Middle School, the future High Desert Park site, and Rickard Road to the east.
- Trails connecting High Desert Middle School to adjacent properties.
- A portion of the TransCanada Trail, a major regional trail, which runs through the High Desert Park Site. Two potential undercrossing for the trail are shown on 27th Street and Knott Road.
- Connections to existing trails in The Bridges development and along the Central Oregon Irrigation Canal.
- Connections to planned trails in the BPRD Comprehensive Plan, including the Arnold Canal Trail and the 15th Street Trail.
- All local streets will be developed to include low-stress bicycle facilities and sidewalks.

Figure 1. Refined Street Plan

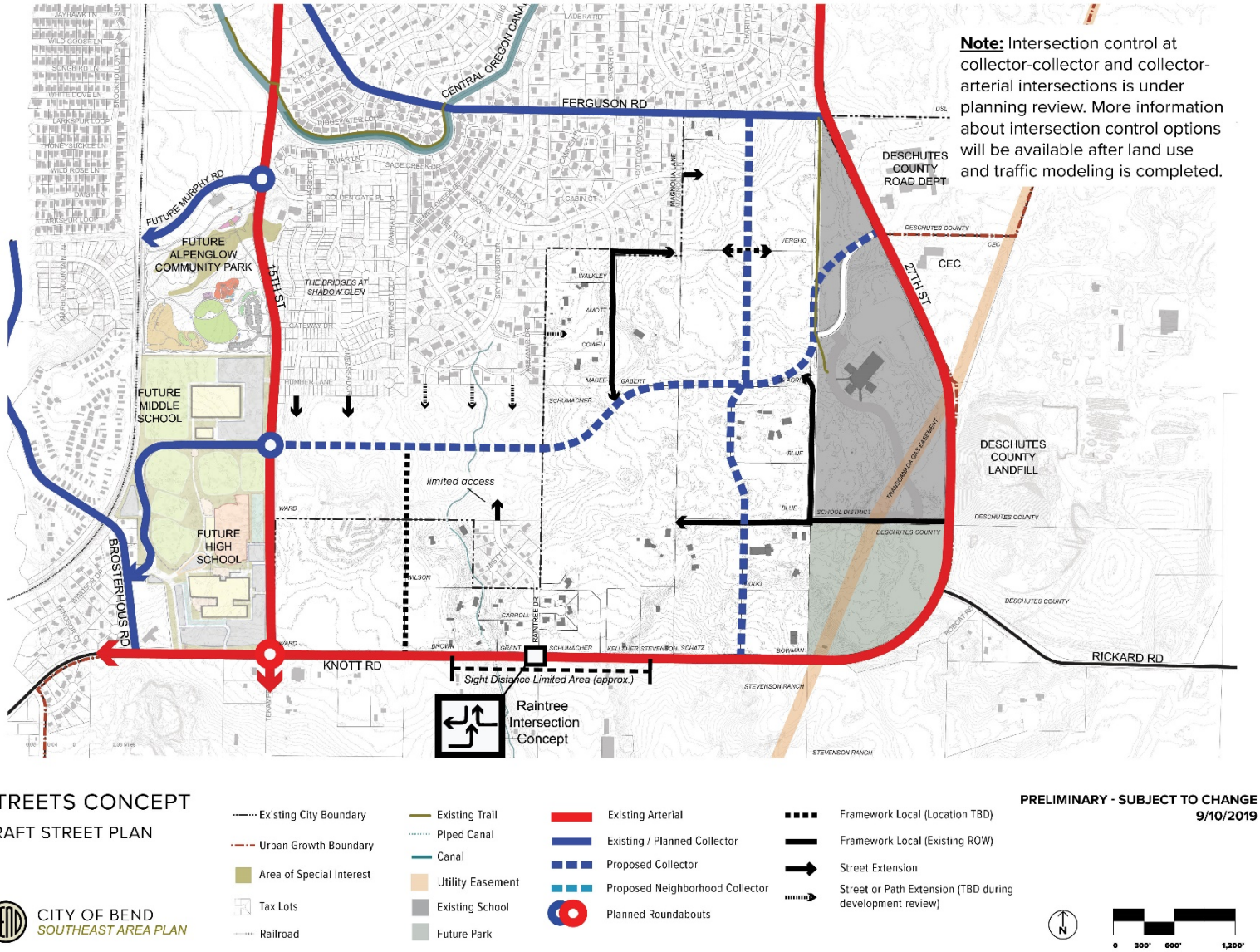
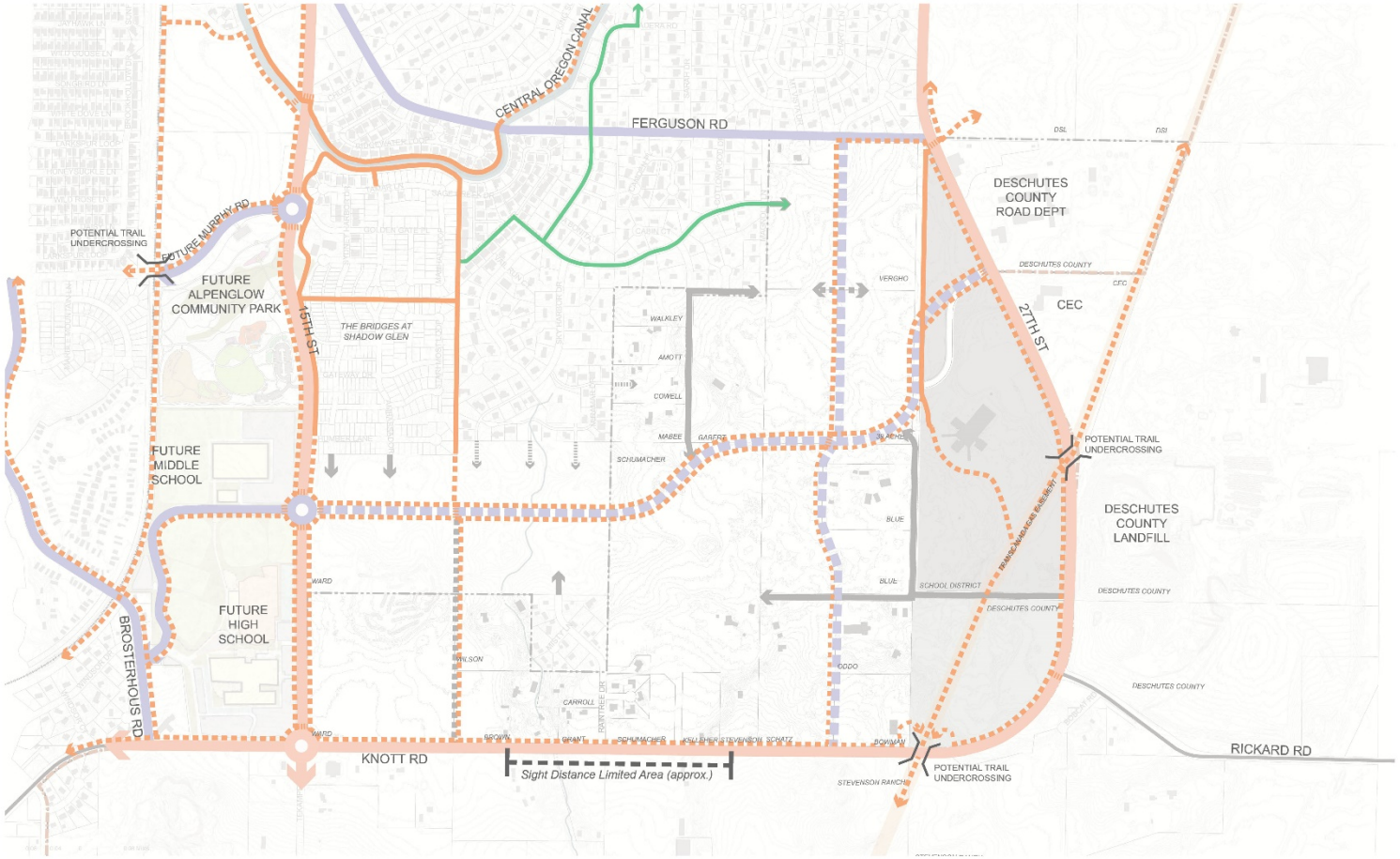


Figure 2. Refined Trail Plan



Appendix U - Bend Transportation System Plan 2040 Project List

Bend Transportation System Plan 2040 Project List – Southeast Expansion Area Projects

PREPARED FOR: Southeast Area Plan Advisory Committee

COPY TO: Southeast Area Plan Project Team, Southeast Area Plan Project File

PREPARED BY: Damian Syrnyk, Senior Planner

DATE: September 3, 2019

The City of Bend has been engaged in a project to update the City's Transportation System Plan (TSP). The TSP Project has been running concurrently with the work on the Southeast Area Plan and has been informed by the work of the Southeast Area Plan Advisory Committee (SEAPAC). This memorandum identifies and describes the transportation projects included in the TSP 2040 Project List for the roads adjacent to and within the Southeast Expansion Area. The purpose of this memorandum is to summarize the relevant data and projects for the Southeast Expansion Area. There are no action items proposed for SEAPAC; this memorandum is informational and is intended to serve as a reference for the committee's ongoing work on transportation improvements for the Southeast Expansion Area.

You will find enclosed excerpts from two memoranda prepared for the TSP Project. Each excerpt provides a list of the projects identified for improving existing roads or constructing new roads in or adjacent to the Southeast Expansion Area. The two documents referenced include: 1) the June 20, 2019 Bend Transportation Plan 2040 Project List approved by the Steering Committee for the TSP on July 1, 2019 with these changes; and 2) the August 22, 2019 Project and Program Evaluation and Preliminary Priorities shared with the Citywide Transportation Advisory Committee (CTAC)[1].

Included are figures that display the locations of projects in the Southeast Expansion Area (Elbow) and tables that identify and describe the projects. You can view **an interactive map** that displays the current 2040 Project List at the **TSP project website**. The enclosed materials describe projects for 15th Street, Knott Road, 27th Street, and the two new collectors intended to serve the lands within the Southeast Expansion Area. Two of the projects refer to intersection improvements where roads intersect with Ferguson Road.

Knott Road, 15th Street, and 27th Street are classified as Minor Arterials. An arterial is a restricted access street designed to move large volumes of traffic through the urban area or to different neighborhoods. The following tables present the minimum improvement standards for

[1] The August 22, 2019 memorandum starts at page 11 of the meeting packet.

Minor Arterials from the Bend Development Code (BDC) Chapter 3.4, Public Improvement Standards.

Table 1: Minimum Improvement Standards for Minor Arterials

Minimum Right-of-Way	Minimum Pavement Width	Planter Strips	Max. Grade	Sidewalks Both Sides	Bike Lanes	Curbs
100’	56’	5’	6%	Yes	Yes	Yes

For Minor Arterials constructed in commercial and industrial zones, the minimum turn lane/median island with is either 11’ or 16’.

Ferguson Road and the main interior east-west and north-south roads for the Southeast Expansion are Collectors. Collectors are designed to serve the context of their land use, which may be commercial, residential, or employment areas. Collectors are designed as complete streets to serve all modes and all abilities along and across the street. Ferguson Road is designated a Major Collector on the adopted TSP Road System Map. The two new collectors proposed for the Southeast Expansion Area are under consideration for a new collector standard to be adopted either as part of the Southeast Area Plan or through the TSP update process[2].

Table 2: Minimum Improvement Standards for Collectors

Minimum Right of Way	Minimum Pavement Width	Planter Strip	Max Grade	Sidewalks on Both Sides	Bike Lanes	Curbs
80’	56’	5’	8%	6’	Yes	Yes

Similar to Minor Arterials, the minimum turn lane/median island width for collectors in commercial and employment zones is either 11’or 16’.

The 2040 Project List for the TSP includes several projects that will upgrade both 27th Street and Knott Road to urban standards for minor arterials. Four of these projects include upgrades to 27th Street from Ferguson Road south to Knott Road. Three are focused on improving the segment of Knott Road from 27th Street west to 15th Street. These projects include improvements of the paved surface of each road along with adding curbs and sidewalks to both sides of the roadway. Figure 1 identifies these projects by their project number; new road projects have a three-digit project number with projects for existing roads beginning with a capital “R.” Figure 1 identifies several projects for Knott Road, 27th Street, and the two new

[2] The two collectors contemplated for the Southeast Expansion Area have been included in the work to date for both the TSP update and the Southeast Area Plan. The two projects are moving concurrently, with the first project to be heard and adopted by City Council likely to be the project in which the new collector standards are adopted.

collectors by their project number. Table 3 follows and provides the description and preliminary cost of each project.

Figure 1. Recommended Expansion Area Driven Projects for Southeast Expansion Area

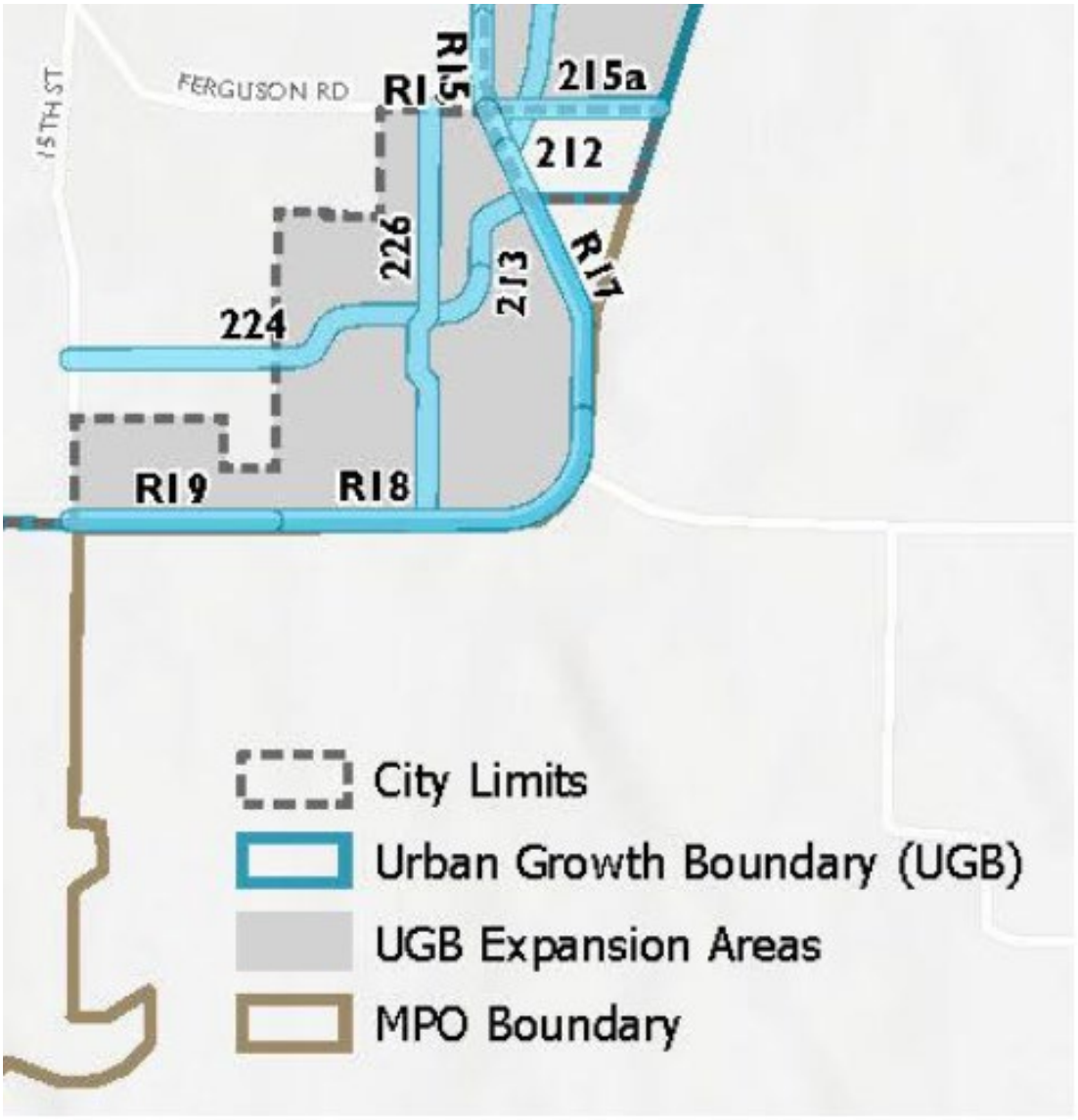


Table 3: Baseline Transportation Projects for Southeast Expansion Area

Project ID	Project	Description/Location	Total Cost	City Proportionate Cost	Addresses Near or Long Term Capacity Need	Notes
213	New Road in the Elbow UGB expansion area	Construct a two lane collector	$4,000,000	$4,000,000	Near	On LSN and Key Route 8, supports expansion area, improves connectivity and access.
224	New Road in the Elbow UGB expansion area	Construct a two lane collector	$10,200,000	$10,200,000	Long	Supports expansion area, improves connectivity and access.
226	New Road in the Elbow UGB expansion area	Construct a two lane collector	$7,100,000	$7,100,000	Near	Supports expansion area, improves connectivity and access.
R14	SE 27th Street rural Road upgrade from Stevens Road to Ferguson Road	Includes curb, sidewalk, and bike lane on east side of 27th Street	$1,300,000	$1,300,000	Near	On LSN, improves pedestrian safety, supports expansion area, improves functionality.
R15	SE 27th Street rural Road upgrade from Ferguson Road to Diamondback Lane	Includes curb and sidewalk on east side, bike lanes for both directions on 27th Street	$600,000	$600,000	Near	On LSN, improves pedestrian safety, supports expansion area, improves functionality.
R16	SE 27th Street rural Road upgrade from Diamondback Lane to access road	Includes curb and sidewalk on east side of 27th Street	$100,000	$100,000	Long	On LSN, improves pedestrian safety, supports expansion area, improves functionality.
R17	SE 27th Street rural Road upgrade from access road to Knott Road	Includes curbs and sidewalks on both sides of 27th Street	$1,300,000	$1,300,000	Long	On LSN, improves pedestrian safety, supports expansion area, improves functionality.
R18	Knott Road rural Road upgrade from 15th Street to Raintree Court	Includes curbs, sidewalks and bike lanes for both	$500,000	$500,000	Near	On LSN, improves pedestrian safety, supports expansion area, improves functionality.

		directions on Knott Road				
R19	Knott Road rural Road upgrade from Raintree Court to SE 27th Street	Includes curbs, sidewalks and bike lanes for both directions on Knott Road	$5,500,000	$5,500,000	Near	On LSN, improves pedestrian safety, supports expansion area, improves functionality
R14	SE 27th Street rural Road upgrade from Stevens Road to Ferguson Road	Includes curb, sidewalk, and bike lane on east side of 27th Street	$1,300,000	$1,300,000	Near	On LSN, improves pedestrian safety, supports expansion area, improves functionality.
Total Project Costs			**$30,600,000**	**$30,600,000**		

Figure 2 identifies a mid-term project that will support development in the Southeast Expansion Area. Project B-17 includes safety and corridor improvements for the 15th Street Corridor. Table 4 below provides more details on the project description.

Figure 2. Recommended Mid-term priorities for Southeast Expansion Area

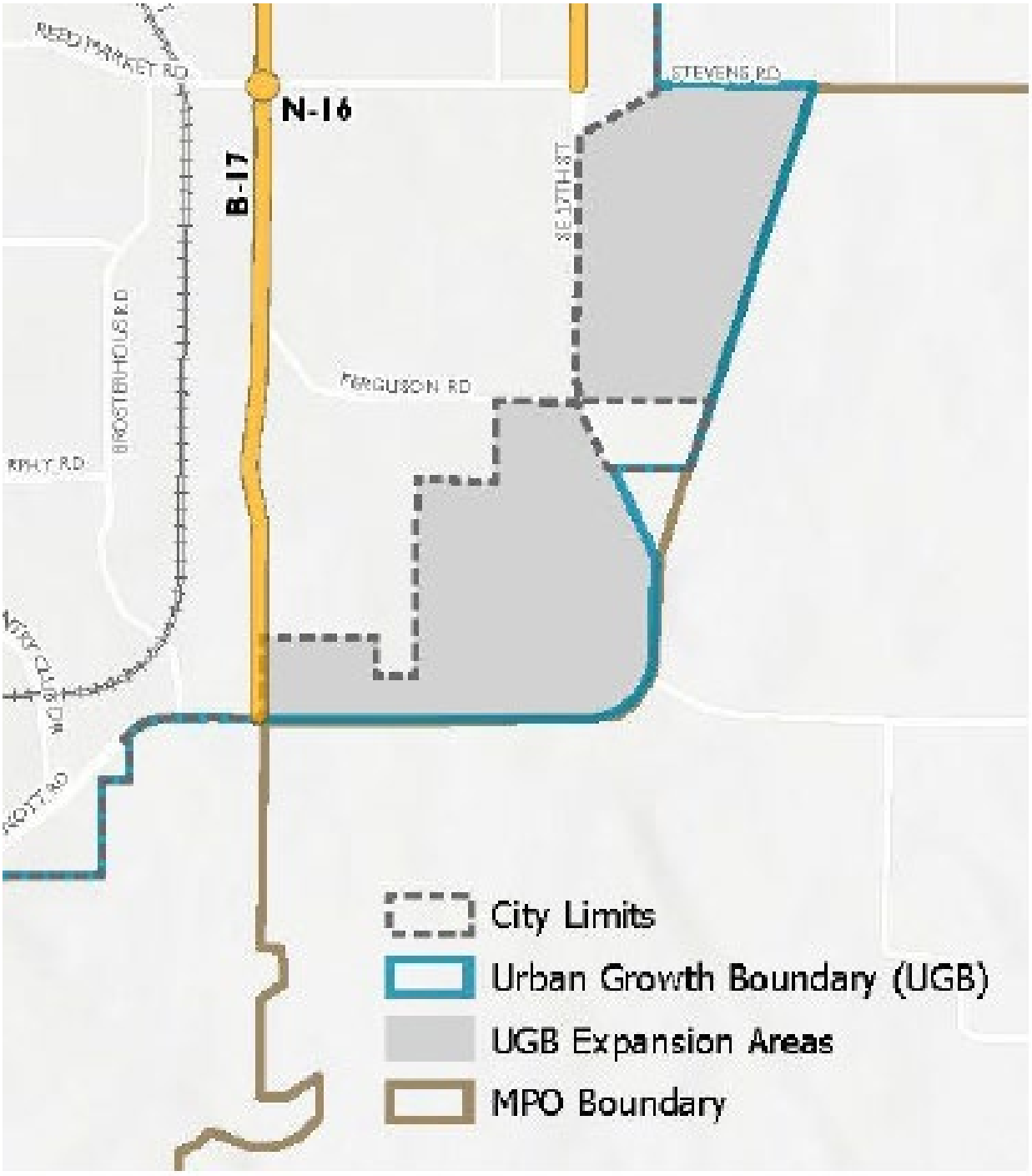


Table 4. 2040 Project List - Projects for the Southeast Expansion Area

Project Number	Project	Project Description	Total Cost	City Proportionate Cost	Addresses Near or Long Term Capacity need	Notes
B-17	15th Street corridor safety and capacity improvements	From US 20 to Reed Market Road, Includes roundabouts at key intersections, including Wilson Avenue, Ferguson Road, and Knott Road	$20,500,000	$20,500,000	Long	On LSN and Key Route 1, improves safety, serves opportunity area, improves functionality and encourages alternative modes. Includes a segment of Key Route 1 (from SE 15th Knott to Reed Market).

Note: Please note that project B-17 includes an intersection improvement in the form of a roundabout where 15th Street intersects with Ferguson Road.

Table 5 identifies projects and programs that provide benefits citywide. These projects and programs are not geographically specific and therefor are not mapped. Programs for citywide pedestrian and bicycle facility development and maintenance are included in this list.

Table 5. 2040 Project List – Citywide Projects and Programs Not Mapped

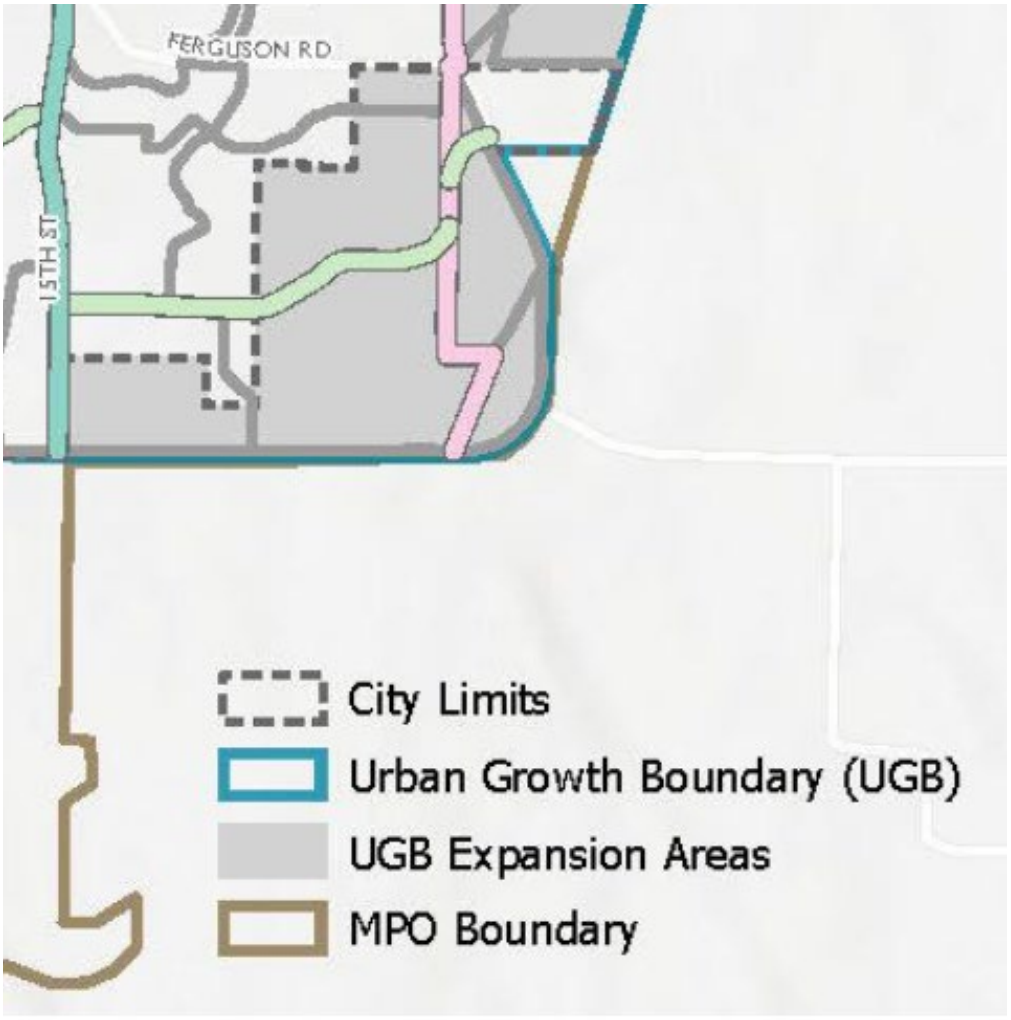
Project IDs	Combined Program	Description	Funding Approach	Notes
T-1	Address Capital Needs backlog to maintain a state of Good Repair for New Capital Projects	City program to address capital needs backlog to maintain a state of good repair for new capital projects, including reconstruction of streets, signals, bridges, and other transportation infrastructure.	Reserved funding (Estimated at $500k to $1 million per year)	Program to ensure operation and maintenance funding associated with new capital projects.
C-16	TDM Program for major employers and institutions	TDM program for major employers and institutions.	To-be determined based on future FWG, CTAC, and City evaluation.	Travel demand modeling has shown TDM implementation to be an effective tool for addressing

				future and existing congestion by limiting demand on the transportation system.
N-7, T-4	Transportation Safety Action Plan (TSAP) implementation	Safety projects and programs as defined by the Transportation Safety Action Plan including street lighting.	To-be determined based on future FWG, CTAC, and City evaluation.	Improving transportation safety is a goal of the Bend TSP and has been continually highlighted as a priority among CTAC members. Incorporating a street lighting program into the TSAP implementation program is consistent with systemic countermeasure recommendations made by the TSAP effort.
T-2, LSN, 1TBKE	Bicycle Program	This includes implementing the bicycle Low Stress Network, Neighborhood Greenways, wayfinding, crossings, and traffic calming.	To-be determined based on future FWG, CTAC, and City evaluation.	This is a comprehensive program to facilitate bicycle travel within the city. Program would include implementation and updates to the bicycle Low Stress Network Plan.
T-3, P-1, P- 2, N-8	Pedestrian Program	This includes creating of a Pedestrian Master Plan to identify and prioritize pedestrian system improvements (local, collector, arterial sidewalk infill), transit access, safe routes to schools and parks, and wayfinding.	To-be determined based on future FWG, CTAC, and City evaluation.	This is a comprehensive pedestrian program to plan for and implement pedestrian infill and enhancement projects, including the Pedestrian System Master Plan and safe routes to school program. This may include enhanced access to transit facilities in collaboration with Cascades East Transit.
T-5	Bicycle and Pedestrian facility maintenance Program	City program to improve snow and debris clearing along key pedestrian and bicycle facilities.	To-be determined based on future FWG, CTAC, and City evaluation.	Program will require coordination with partner agencies, including the Bend Parks and Recreation District, which own and maintain key elements of the walking and biking system within Bend.

C-20	Parking pricing and management in downtown Bend	Implement the 2017 Downtown Parking Plan.	To-be determined based on future FWG, CTAC, and City evaluation.	Program will be coordinated with other City of Bend parking efforts and may be consolidated within a citywide program, as appropriate.
C-19, N-6	Traffic Signal Coordination improvements along signalized corridors, including freight and transit Signal Priority	Includes US 97 (mainline and ramp terminals), 3rd Street, 27th Street, Colorado/Arizona couplet, and US 20 (3rd Street and Greenwood) corridors.	To-be determined based on future FWG, CTAC, and City evaluation.	Program will require coordination with partner agencies, especially ODOT, which maintains traffic signals within the city

Figure 3 and Table 6 identify the Key Routes for bicycle and pedestrian travel through the Southeast Expansion Area. Figure 3 identifies the Key Routes by color. Key Routes in the Southeast Expansion Area include 15thStreet, the approximate location of the new east-west collector, and the approximate location of the new north-south collector. Table 6 describes the Key Routes and critical projects needed to complete these routes.

Figure 3. Key Walking and Bicycling Routes for Southeast Expansion Area



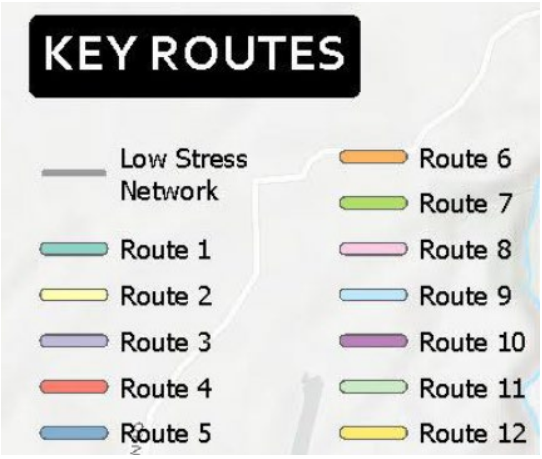


Table 6. Recommended Low-Stress Bicycle Network Projects on Key Routes – Southeast Expansion Area

Key Routes and Projects	Project Extents	Facility Type & Description	Cost Projection
ROUTE 1: Juniper Ridge to SE Elbow: Route runs north-south through the central portion of Bend connecting SE 15th Shared Use Path, 6th Street Neighborhood Greenway, Boyd Acres Shared Use Path			
R1-D	SE 15th Street: Reed Market Road to 300' south of King Hezekiah	**Shared use path adjacent to roadway:** Convert an existing curb-tight sidewalk to a separated shared use path.	$930,000
ROUTE 8: 27th St: Route runs north-south connecting neighborhoods to services and transit			
R8-A	27th St**:** Hwy 20 to Reed Mkt Rd	**Shared use path adjacent to road:** Close sidewalk gap along 27th Street and create a low-stress bikeway.	$2,020,000
ROUTE 11: Route runs east-west primarily on CIP Project Murphy Road connecting Elbow across 3rd Street and Parkway (continuous route uses parts of Route 1 and Route 9)			

There are no critical projects identified for Route 11 because this route is being developed through (1) the Murphy Corridor Improvement project, and (2) the planning for the new east-west collector in the Southeast Expansion Area. This project improves Murphy Road between Parrell Road and Brosterhous Road and extends Murphy from Brosterhous to 15th Street from 3rd Street to a new intersection of Murphy Road with 15th Street. This project includes construction of a shared use path on the north side of Murphy that will be eight to ten feet in width and five foot bike lanes and six foot sidewalks on the south side. Between 15th Street and 27th Street, Route 11 follows the direction of the proposed east-west collector.

Appendix V - Collector Street Design Elements for Southeast Area Plan

CITY OF BEND
SOUTHEAST AREA PLAN

Collector Street Design Elements for Southeast Area Plan

PREPARED FOR: Southeast Area Plan Advisory Committee

COPY TO: Southeast Area Plan Project Team, Southeast Area Plan Project File

PREPARED BY: Damian Syrnyk, Senior Planner

DATE: September 12, 2019

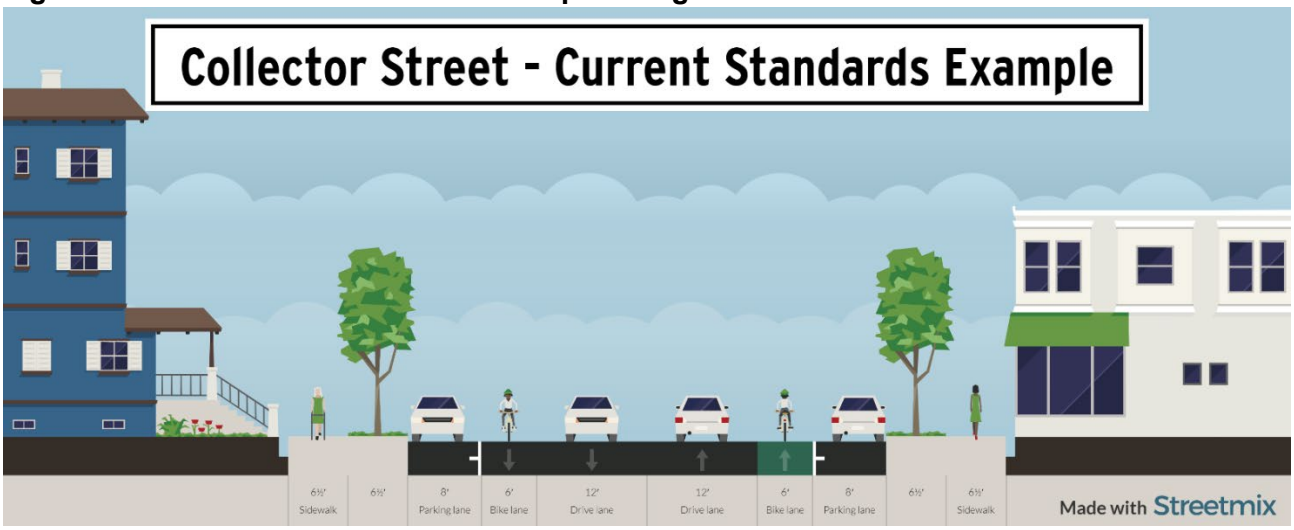
This memorandum outlines a transportation issue for SEAPAC's consideration and direction at the September 26, 2019 meeting. The Project Team requests SEAPAC's direction and feedback on a proposed alternative collector standard that can be implemented for the new collectors in the Southeast Expansion Area.

To date, SEAPAC has considered the alignments of two new collector streets within the Southeast Expansion Area. In Bend, streets fall into one of three Functional Classifications for design and construction, including collectors[1]. Streets classified as a "collector" are those that are intended to be used for the movement of traffic, bicycles, and pedestrians between arterials and local streets. Collectors are designed to serve the context of their land use, which may be commercial, residential, or employment. They are designed as complete streets to serve all modes and all abilities along and across the street. Most collectors in Bend will have two travel lanes and may have a center turn lane or median, depending on land use context and access needs. The abutting land use directs the main design elements of the street, such as access, posted speed, inclusion of on-street parking, sidewalk width, and bikeway design treatment.

The City's existing collector standards are addressed in both the City's Development Code and in the Standards and Specifications.

[1] The functional classification of a road is the class or group of roads to which the road belongs. There are three main functional classes as defined by the United States Federal Highway Administration: arterial, collector, and local.

Figure 1. Collector Cross Section Example using StreetMix



The example in Figure 1 uses a right of way width of 80 feet, and includes sidewalks, bike lanes, and on-street parking on both sides. The travel lanes are 12 feet each, and planting strips with street trees are 6.5 feet wide. As labeled, this example would have 52 feet of curb-to-curb pavement—a very wide street. The City's Development Code includes improvement standards for public roadways, including collectors. The current improvement standards for collectors are summarized below from Chapter 3.4, Public Improvement Standards.

Table 1: Minimum Improvement Standards for Collectors in Residential Zones

Minimum Right of Way	Minimum Pavement Width	Planter Strip	Max Grade	Sidewalks on Both Sides	Bike Lanes	Curbs
80'	56'	5'	8%	6'	Yes	Yes

Table 2: Minimum Improvement Standards for Collectors in Commercial, Employment Zones

Minimum Right of Way	Minimum Pavement Width	Planter Strips	Minimum Turn Lane/Median Island Width	Maximum Grade	Direct Site Access	Sidewalks Both Sides	Curbs
80'	56'	5'	11'/16'	6%	Yes	6'	Yes

The City's Development Code also includes different cross sections for collector roads in some Special Planned Districts[2]. In these areas, a "neighborhood collector" is allowed. The cross section for this type of collector varies by district. The following table summarizes neighborhood collector standards in comparison to those for a standard collector. The neighborhood collector standards are currently only allowed within Special Planned Districts, not citywide.

Table 3: Comparison of Existing Major Collector and Example Special Planned District "Neighborhood" Collector

	Major Collector	"Neighborhood Collector"

[2] See Chapter 2.7 of the Bend Development code, Special Planned Districts.

Right of Way (ROW)	80 feet	70 feet
Pavement width	56 feet	36 feet
Travel lane width	14 to 16 feet	11 to 12 feet
Median/Center Turn Lane	11'/16' (for commercial, employment areas)	Not included in current special planned district street standards (turn "pockets" may be provided as needed)
Sidewalks	6 feet	6 feet or provided through 10 foot path
Bike Lanes	6 feet	6 feet or provided through 10 foot path
Path	N/A	10 feet
Planting Strip	6 feet	4 to 6 feet

Through the update of the Transportation System Plan (TSP), the City is reviewing its existing Functional Classifications and cross sections. It is likely that the "major collector" designation will be replaced by a single "collector" designation, with alternative cross sections available, depending on context.

If SEAPAC is interested in providing direction to the TSP process on a new collector design that could be applied to the Southeast Expansion Area, there are several factors to consider that are consistent with the SEAP vision, guiding principles, and discussions to-date:

- **Narrower travel lanes.** For example, an 11-foot-wide travel lane encourages slower speeds for traffic flows and provides additional room for sidewalks and bicycle facilities.
- **Traffic calming.** One of the concerns we have heard at both SEAPAC meetings and open houses is traffic speeds and taking steps to slow traffic. A narrower travel lane width, along with other traffic calming techniques such as roundabouts, buffered bike lanes, curb extensions, and special crosswalk treatments, can help to keep motor vehicle speeds within the desired limits.
- **Separated Multi-Use Path.** One of the benefits of providing a 10-foot multi-use path, even on one side, is that it provides a connection to existing and planned trails. In the Southeast Expansion Area, the Bend Park & Recreation District (BPRD) has planned for the High Desert Park Trail between 15th Street and the High Desert Park site on 27th Street and Knott Road. A 10-foot paved path adjacent to and within the ROW for the planned east-west collector could provide that connection.
- **On street parking.** Allowing on street parking may require additional right of way or an easement for parking. SEAPAC may wish to consider allowing on-street parking in commercial or employment areas (e.g. CG, ME, IL).
- **Land use compatibility.** The above tables show that the standards for a collector built through residential zones is different from the standard when a collector is built through commercial or employment zones. All of the design elements discussed above (parking, traffic calming, narrower lanes, etc.) could be applied to specific land use contexts and contribute to the SEAP vision for a walkable community.

- **Stormwater considerations.** Best practices for enhancing stormwater retention are to encourage narrower roadways with less impermeable surfaces and/or to include bioswales and other low impact development features within the right of way to capture and treat stormwater runoff.

For Discussion – Potential Design Elements for an Alternative Collector Standard

The new alternative collector design could be incorporated in the Development Code and in the Standards and Specifications as one of the allowed design configurations for a collector, serving as the alternate to the traditional collector standard. Certain elements would remain constant, such as right of way and travel lane widths, with other components flexing to best suit the surrounding land use context.

- **Right of Way (ROW)** – Keep at 80 feet to allow for flexing of elements described below
- **Travel Lane Width** – Reduce to 11 feet
- The following elements may flex depending on land use context (e.g. more residential vs. more commercial/employment)
    - **Sidewalk** – from 6 feet to up to 12 feet.
    - **Bike Lane** – 6 feet plus two (2) feet for a buffer
    - **Path** – 10 to 12 feet if located on the side of a street without sidewalk and bike lane, separated from travel lanes and for two-way pedestrian and bicycle travel
    - **Planting Strip** – 4 to 6 feet on each side to include street trees, bioswales, and/or landscaping; street trees could be planted in tree wells in areas with narrower sidewalk widths or in areas where sidewalk space wants to be maximized
- **On Street Parking** – along the entire street or only in areas where on-street parking may be needed, e.g. commercial, employment areas; curb-extensions are features that would be considered with the design for on street parking
- **Median/Turn Lane** – consider including for intersections that are not controlled with a stop sign or roundabout, e.g. turning movements to and from one street instead of a four-way intersection

Appendix W - Preliminary Transportation Infrastructure Needs

KITTELSON & ASSOCIATES
354 SW UPPER TERRACE DRIVE, SUITE 101
BEND, OR 97702
P 541.312.8300

MEMORANDUM

Date: November 26, 2019 Project #: 21926.12

To: Southeast Area Advisory Committee
Cc: City of Bend Staff
From: Matt Kittelson, PE, Julia Kuhn, PE, Bryan Graveline, & Jacki Gulczynski
Project: Southeast Area Plan
Subject: Preliminary Transportation Infrastructure Needs

This memorandum summarizes our preliminary transportation analysis of the impacts and needs associated with Refined Land Use Plan (Option D) for the Southeast Expansion Area. The purpose of this analysis is to identify potential transportation needs associated with buildout of the Urban Growth Boundary (UGB) expansion area. These infrastructure needs and findings may be refined as the outcomes are vetted through a multiagency review process.

BACKGROUND

The City of Bend has initiated a planning process for the Southeast Expansion Area to identify revisions to the adopted land use plan and the necessary infrastructure to support annexation of that land into the city. This memorandum summarizes an evaluation of the transportation needs associated with the refined land use plan.

ANALYSIS METHODOLOGY

This analysis can help inform the identification of specific projects and associated costs included in the forthcoming infrastructure plan for the UGB expansion area. The identified needs support the anticipated buildout of the Southeast Plan area over a 20-year horizon period. The team has worked with City of Bend staff to identify an appropriate study area to assess transportation needs. The following summarizes the intersections evaluated.

DRAFT

Intersections Evaluated:

- 15th St & Reed Market Rd
- 15th St & Ferguson Rd
- 15th St & Murphy Rd (Murphy Road Extension)
- 15th St & Knott Rd
- Country Club Rd & Murphy Rd
- Brosterhous Rd & Murphy Rd (Murphy Road Extension)
- US 97 NB Diverge at Murphy Road
- US 97 SB Merge at Murphy Road
- 27th St & Diamondback Ln
- 27th St & US 20
- 27th St & Reed Market Rd
- 27th St & Stevens Rd
- 27th St & Ferguson Rd
- 27th St & Rickard Rd
- US 97 SB Ramp & Knott Rd
- US 97 NB Ramp & Knott Rd
- China Hat Rd & Knott Rd
- Knott Rd & Country Club Dr
- Knott Rd & Brosterhous Rd
- Knott Rd & Raintree Ct
- Parrell Rd & China Hat Rd
- US 97 & China Hat Rd
- Magnolia Ln & Ferguson Rd
- 15th St & New Collector Road (Future intersection)
- Knott Road & Local Framework Road (Future Intersection)
- Knott Rd & New Collector Road (Future Intersection)

We evaluated these intersections under the following scenarios:

- **Existing Conditions (2019)**: This scenario evaluates the study intersections based on existing traffic volumes and traffic control. It is useful to identify intersections that exceed applicable mobility standards today. Results from this scenario are not presented in this memorandum because most intersections meet current mobility standards today.
- **Year 2040 No Build Scenario:** This scenario evaluates the study intersections based on existing traffic control assuming a 2040 land use scenario where Bend growth is NOT accommodated within the Southeast Area Plan boundaries. In other words, other areas of Bend and its surroundings grow MORE to account for a retention of rural zoning within the Southeast Area Plan study area. This scenario is for analysis purposes only and used to determine a baseline for transportation impacts.
- **Year 2040 Build Scenario:** This scenario evaluates the study intersections based on existing traffic control assuming a 2040 land use scenario consistent with the refined Land Use Plan, as proposed by the ongoing Southeast Area Plan process. This scenario is useful to determine transportation impacts relative to the Year 2040 No Build Scenario.

DRAFT

TRAVEL DEMAND MODELING

We utilized the Bend-Redmond travel demand model to estimate future year volume forecasts as well as to approximate the distribution of trips associated with the Southeast Area Plan lands. The travel demand model forecasts were used to estimate Year 2040 No Build Scenario traffic volumes assuming the Southeast Area Plan lands remain with the existing rural zoning. It was also used to generate and regionally distribute the potential Southeast Area Plan area trips to estimate Year 2040 Build Scenario assuming development of the areas consistent with the revised land use plan.

Based on these travel forecasts, we evaluated each study intersection to determine the ultimate intersection form necessary to support travel demand consistent with the Year 2040 Build Scenario. We have noted where intersection improvements are currently planned as part of City or other adopted plans. The following section describes the findings of this analysis.

YEAR 2040 INTERSECTION NEEDS & MITIGATION MEASURES

Figure 1 summarizes our preliminary transportation analysis findings based on the Year 2040 No Build Scenario and Year 2040 Build Scenario. This analysis assumes construction of the ongoing Murphy Road extension, including construction of roundabouts at the Murphy Road/Brosterhous Road and Murphy Road/15th Street intersections. It also assumes construction of a roundabout at the 15th Street/Knott Road intersection, which is programmed for construction in 2020.

As shown, the following study intersections were shown to exceed applicable mobility standards under all scenarios:

- 15th Street & Reed Market Road
- 15th Street & Ferguson Road
- Country Club Road & Murphy Road
- 27th Street & Ferguson Road
- US 97 SB Ramps & Knott Road
- US 97 NB Ramps & Knott Road
- China Hat Road & Knott Road
- Country Club Road & Knott Road
- Brosterhous Road & Knott Road

With the exception of 27th Street/Ferguson Road and the US 97/Knott Road interchange, all these intersections have previously been identified for improvement by a relevant planning study[1]. Table 1 presents necessary mitigation measures to address these needs. Figure 2 shows mitigation needs by intersection.

[1] Bend Transportation System Plan, City of Bend Transportation System Development Charge, in-process US 97 Parkway Study, or improvement conditioned as part of an approved development.

DRAFT

Table 1. Transportation Mitigation Measures to Address Intersection Needs under No Build and Build Scenarios

Intersection	Mitigation Measure[1]	Meets Mobility Standards?	Notes
15th Street & Reed Market Road	**Expand to Multi-lane Roundabout**	Yes	May require additional turn lanes
15th Street & Ferguson Road	**Partial Multi-lane Roundabout**	Yes	May require some multilane approaches
Country Club Road & Murphy Road	**Single-lane Roundabout**	Yes	Intersection design part of ongoing Murphy Road corridor project
27th Street & Ferguson Road	Single-lane Roundabout	Yes	-
US 97 SB Ramps & Knott Road	None	No	US 97/Knott Road interchange is subject to a forthcoming improvement study
US 97 NB Ramps & Knott Road	None	No	US 97/Knott Road interchange is subject to a forthcoming improvement study
China Hat Road & Knott Road	**Single-lane Roundabout**	Yes	-
Country Club Road & Knott Road	**Single-lane Roundabout**	Yes	-
Brosterhous Road & Knott Road	**Single-lane Roundabout**	Yes	-

[1]Previously identified mitigation measures identified in **bold**

The following additional intersections were shown to exceed applicable mobility standards assuming development of the Southeast Area Plan land use plan under their current intersection control and configuration:

- 27th Street & US 20
- 27th Street & Reed Market Road
- 27th Street & Diamondback Lane
- 15th Street & New Collector

Table 2 presents necessary mitigation measures to address these intersections needs. Figure 2 shows mitigation needs by intersection.

DRAFT

Table 2. Transportation Mitigation Measures to Address Intersection Needs under Build Scenario

Intersection	Mitigation Measure[1]	Meets Mobility Standards?	Notes
27th Street & US 20	**Intersection Improvement Project Identified in Bend TSP**	No	Mitigation measure to be coordinated with ODOT
27th Street & Reed Market Road	Multi-lane Roundabout	Yes	Intersection would serve as key access to DSL UGB expansion area
27th Street & Diamondback Lane	Single-lane Roundabout	Yes	New Collector Road & 27th Street connection
15th Street & New Collector	**Single-lane Roundabout**	Yes	New Collector Road & 15th Street intersection. Previously identified improvement as part of development applications.

[1]Previously identified mitigation measures identified in **bold**

SOUTHEAST AREA ROADWAY NETWORK ANALYSIS

Our transportation analysis also provides preliminary assessment of the function of the proposed Southeast Area Plan roadway network. The following summarizes key findings from that analysis:

- The planned north-south and east-west collectors are expected to be sufficient as 2-lane or 3-lane roads to accommodate the travel demand anticipated from the refined land use plan. These roadways should be supported by a robust network of connected local roads to provide a balanced use of the collector road network for all travel modes.
- The north-south road identified as a "framework local road" was found to be an important connection to support access to and from the commercial and residential lands near the intersection of 15th Street & Knott Road. Traffic volumes suggest the roadway would operate as a high volume local road or a low volume collector.
- Traffic volumes suggest intersections internal to the Southeast Area Plan will operate as side-street stop-controlled facilities, with the exception of the intersection of north-south and east-west collector road. That intersection may require a high order intersection form, such as a mini-roundabout or single-lane roundabout, based on future travel patterns. The project team will further explore this need as this analysis is refined.

PEDESTRIAN CROSSING CONSIDERATIONS

The location and type of pedestrian crossing treatments that could be included in the Southeast Area will depend heavily on adjacent land uses and roadway facility types. The Southeast Area Plan land use scenario is designed to promote pedestrian activity by way of creating complete neighborhoods and a robust multimodal transportation network.

As development plans within the Southeast Area Plan become available, the following criteria should be considered when siting and design improved pedestrian crossings:

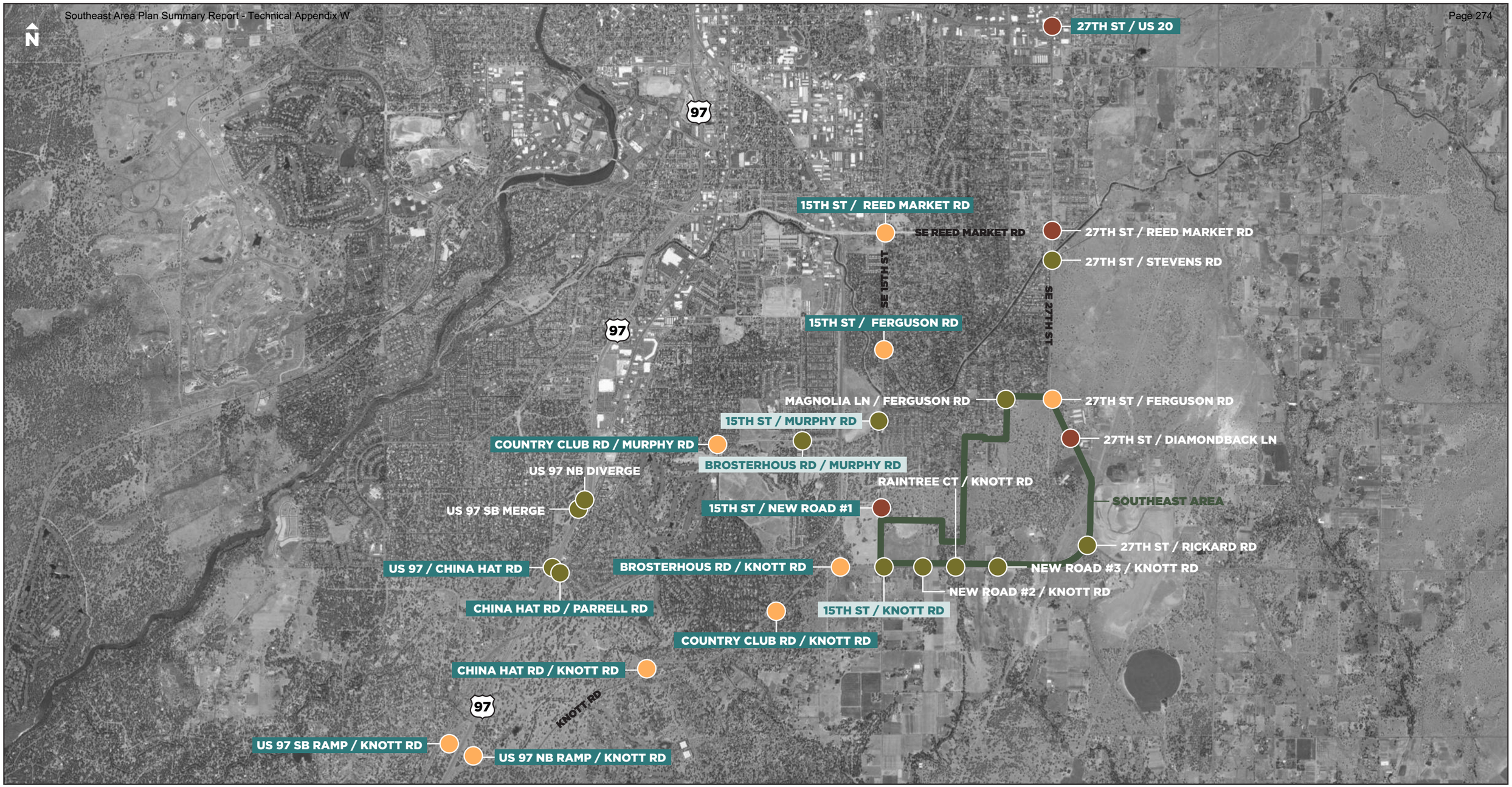
- Adjacent land uses
- Size and type of roadway
- Known or expected pedestrian travel patterns
- Proximity to improved intersection

In addition to these criteria, the selection of specific crossing types should consider current research and standards. For example, current crossing design should consider criteria included in *Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations, FHWA, 2005*, which provides guidance on the selection of an appropriate crossing type given a variety of conditions.

NEXT STEPS TO IDENTIFY SOUTHEAST AREA PLAN INFRASTRUCTURE NEEDS

The project team is working with the City of Bend and ODOT to identify reasonable contributions from the Southeast Area Plan to address these intersection needs. The outcomes of those conversations will be presented to the advisory committee at a forthcoming Southeast Area Plan advisory committee meeting and included in the Infrastructure Funding Plan.

DRAFT



- Meets Mobility Standards In All Scenarios
- Exceed Mobility Standards In Build Scenarios
- Exceeds Mobility Standards In All Scenarios
- TEXT Currently Planned Intersection Improvement
- TEXT Improvement Currently Under Construction

Figure 1

DRAFT SEAP 2040 Operations Results

Bend, OR

N

SE REED MARKET RD

15TH ST / REED MARKET RD

27TH ST / REED MARKET RD

SE 27TH ST

97

15TH ST / FERGUSON RD

SE 15TH ST

UNDER CONSTRUCTION

27TH ST / FERGUSON RD

COUNTRY CLUB RD / MURPHY RD

27TH ST / DIAMONDBACK LN

2-3 LANE COLLECTOR

15TH ST / NEW ROAD #1

2-3 LANE COLLECTOR

2 LANE LOCAL / COLLECTOR

BROSTERHOUS RD / KNOTT RD

NEW ROAD #3 / KNOTT RD

NEW ROAD #2 / KNOTT RD

COUNTRY CLUB RD / KNOTT RD

KNOTT RD

CHINA HAT RD / KNOTT RD

97

US 97 SB RAMP / KNOTT RD

US 97 NB RAMP / KNOTT RD

- Single Lane Roundabout
- Multilane Roundabout
- Forthcoming IAMP
- Two-Way Stop Controlled
- Southeast Area Plan Boundary
- New Road

Figure 2

DRAFT SEAP 2040 Mitigation Measures

Bend, OR

Appendix X - Sewer Concept Plan

TECHNICAL MEMORANDUM

DATE: November 25, 2019

PROJECT: On-Call Modeling, Wastewater Collection

TO: City of Bend, Oregon

FROM: Sven MacAller, P.E.
Shad Roundy, P.E.

RE: Southeast Area Plan, Sewer Concept Plan

Background

The Southeast Area (also known as "The Elbow") in the City of Bend, Oregon (City) was identified in the 2016 Urban Growth Boundary (UGB) Expansion Study as a priority growth area. The area is approximately 480 acres and includes High Desert Park and High Desert Middle School. Boundaries of the Southeast Area include Knott Road to the south, 27th Street to the east, and the existing City limits to the north and west.

An area plan is being developed that includes land use/zoning, roadways, and sewer infrastructure. This technical memo outlines a concept for sewer infrastructure including gravity sewer and force main alignments and the location of a regional pump station. Preliminary sizing of infrastructure is also summarized. The sewer concept is based on land use data and roadway planning adopted by the Southeast Area Plan Advisory Committee (SEAPAC) on September 26, 2019 and verified with residential and employment data from the City's 2016 UGB Expansion Study.

Summary

The Southeast Area sewer infrastructure concept plan documented in this technical memorandum is summarized in Figure 1 and Table 1. The infrastructure plan includes six gravity collector sewers ranging in size from 8 to 18-inches, one regional pump station, and one 12-inch force main. Local neighborhood sewers are excluded from the plan. Based on topography, approximately 50-percent of the service area will be served by the regional pump station. Preliminary cost estimates are presented in Table 1. The cost estimates associated with the gravity sewer alignment 1 located in 15th Street are not discounted for work currently being performed by the Bend LaPine School District to extend gravity sewer service to future schools adjacent to 15th Street.

Figure 1- Sewer Concept Plan

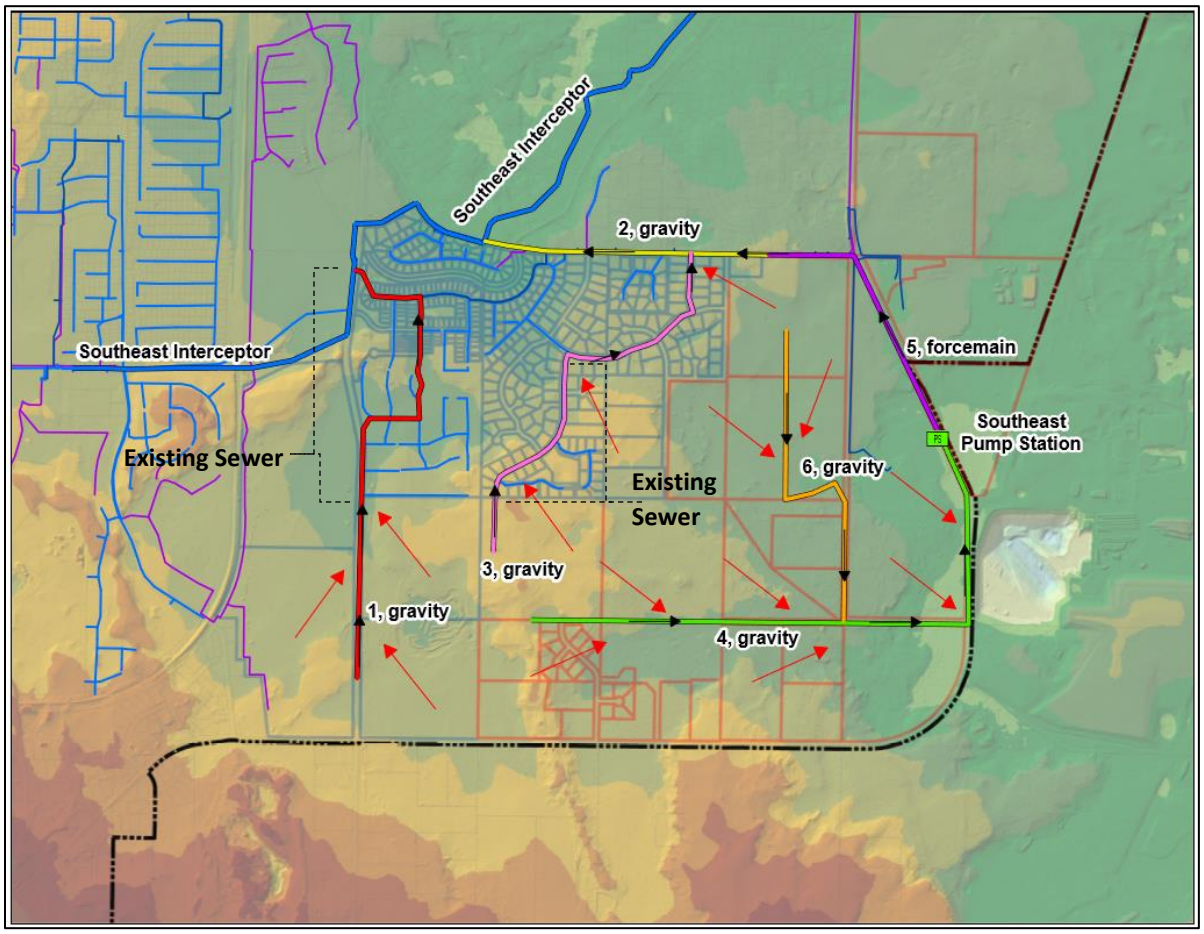


Table 1 - Sewer Infrastructure Summary and Costs

New Infrastructure	Preliminary Sizing (inches or gallons per minute, gpm)	Length (feet)	Cost Estimate, Low Markup ($million)[1]	Cost Estimate, High Markup ($million)[1]
1, gravity[2, 3]	8-inch, 12-inch	1,650 8-inch, 1,500 12-inch	1.2	1.8
2, gravity	18-inch	3,100	1.3	1.9
3, gravity[3]	8-inch	2,700	1.3	1.9
4, gravity	8-inch, 12-inch	3,350 8-inch, 3,550 12-inch	2.8	4.1
5, force main	12-inch	3,200	1.3	1.8
6, gravity	12-inch	4,100	1.8	2.7
Pump Station	1,250 gpm	n/a	3.5	5.1
Total			13.2	19.3

Table 1 Notes:

Note 1. All cost estimates are Class 5 budget estimates in millions of dollars, as established by the *American Association of Cost Engineers*. This preliminary estimate class is used for conceptual screening and assumes project definition maturity level below two percent. The expected accuracy range is -20 to -50 percent on the low end, and +30 to +100 percent on the high end. The cost estimates are consistent with the definition of OAR 660-011-0005(2) and OAR 660-011-035. Cost estimates are intended to be used as guidance in establishing funding requirements at the project planning level based on information available at the time of the estimate. Estimates exclude land acquisition, financing, and inflation. Low markup is a factor of 2.1 times labor and material costs. High markup is a factor of 3.1 times labor and material costs. Cost estimates were performed in 2019 dollars based on The Engineering News Record Construction Cost Index (ENR CCI) basis of 12026.45 (February 2019).

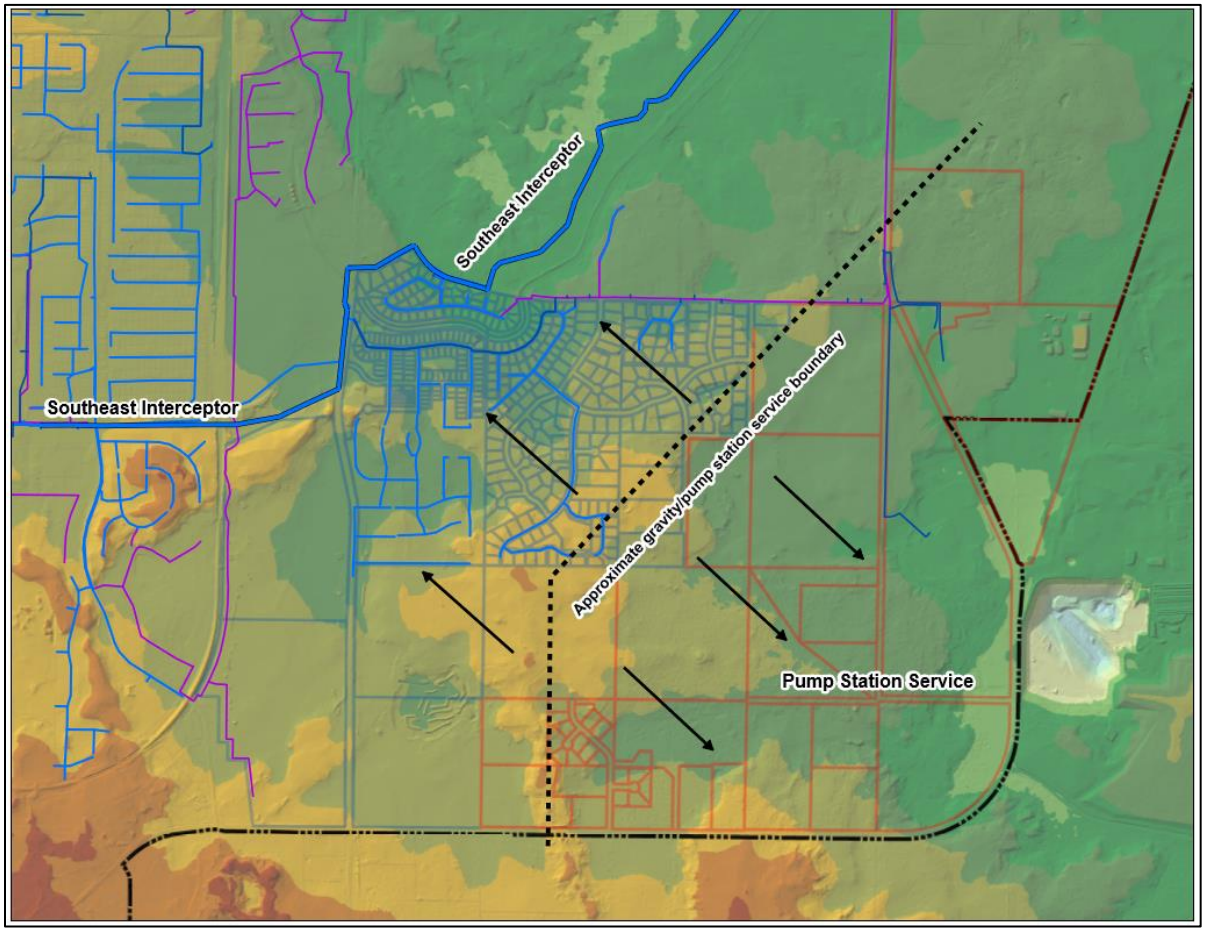
Note 2. The cost estimates associated with the gravity sewer alignment 1 located in 15th Street are not discounted for work currently being performed by the Bend LaPine School District to extend gravity sewer service to future schools adjacent to 15th Street.

Note 3. Alignments 1 and 3 connect to existing piping. The existing piping is excluded from the length and cost estimates unless an upsize is required.

Topography and Sewer Service Overview

The Southeast Area will be served by the Southeast Interceptor. Due to topography, some of the area will be served via gravity while other portions will be served by a regional pump station. A ridge splits the area approximately in half from the southwest corner to the northeast corner. Areas north and west of this boundary can be served via gravity sewers while areas to the south and east of the boundary will be served via pump station. Figure 2 illustrates the general ground surface topography and approximate boundary between gravity and pump station service areas.

Figure 2 – Topography and Service Overview



Sewer Infrastructure

Sewer infrastructure will utilize the road corridors approved by SEAPAC on September 26th 2019. Figure 3 shows the sewer infrastructure concept with numbering for each sewer alignment. Sewer alignments 1 and 3 will serve the area via gravity. Alignment 1 currently connects to the Southeast Interceptor. An extension of the existing gravity pipeline will serve the future middle and high schools as well as any other development along 15th Street. The Bend LaPine School District is responsible for funding a portion of Alignment 1 and the concept presented in this plan should be coordinated with their work. Alignment 3 will serve existing properties on Sky Harbor Drive and future development south of

Miramar Drive. The sewer improvement will connect to existing 8-inch piping in Sky Harbor Drive extending the pipeline further south by approximately 500 feet. The sewer improvement also includes new piping on Via Sandia Street and Cottonwood Drive connecting the existing Sky Harbor Drive pipeline to the new collector sewer on Ferguson Road (alignment 2).

Alignment 2 will be a gravity sewer that extends from the high elevation point on Ferguson Road to King Solomon Lane where it will connect to the South East Interceptor. This sewer will convey flow from sewer alignment 2 as well as flow from the South East Area Pump Station. The Ferguson Road sewer will also be used to decommission the existing Camden and Ridgewater Pump Stations.

A pump station is required to serve the southeastern portions of the area. Two gravity sewers will contribute flow to the Southeast Pump Station, alignment 6 and alignment 4. The pump station will be located just east of the High Desert Middle School on SE 27th Street. The force main will continue north on SE 27th and turn west on Ferguson Road before connecting to the gravity sewer (alignment 2) on Ferguson Road. This pump station location may also serve portions of the DSL property, another UGB expansion area.

An overview of sewer alignments is shown in Figure 3. Figure 3 includes the transportation infrastructure plan as a background layer, while Figure 4 includes a ground surface elevation background layer. Black arrows on both figures indicate flow direction, while the red arrows on Figure 3 indicate general direction of sewer service.

Figure 3 – Preliminary Sewer Service Overview

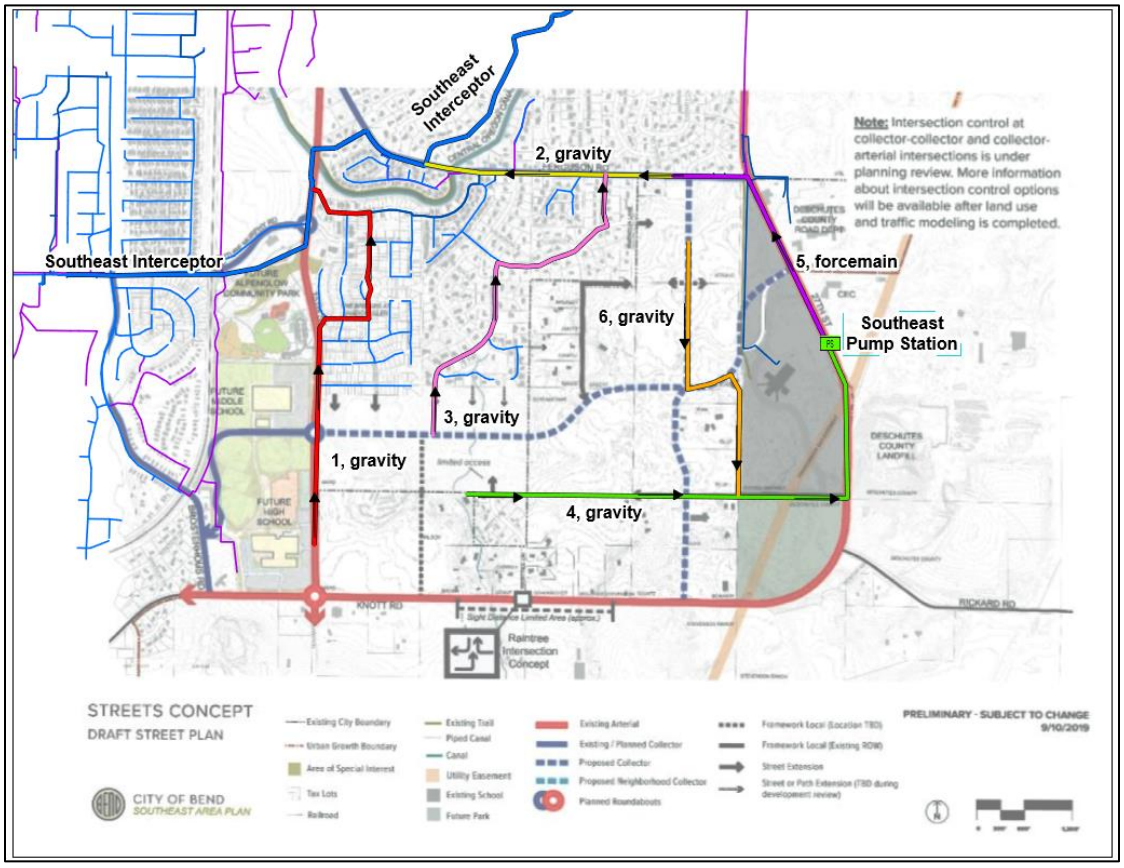
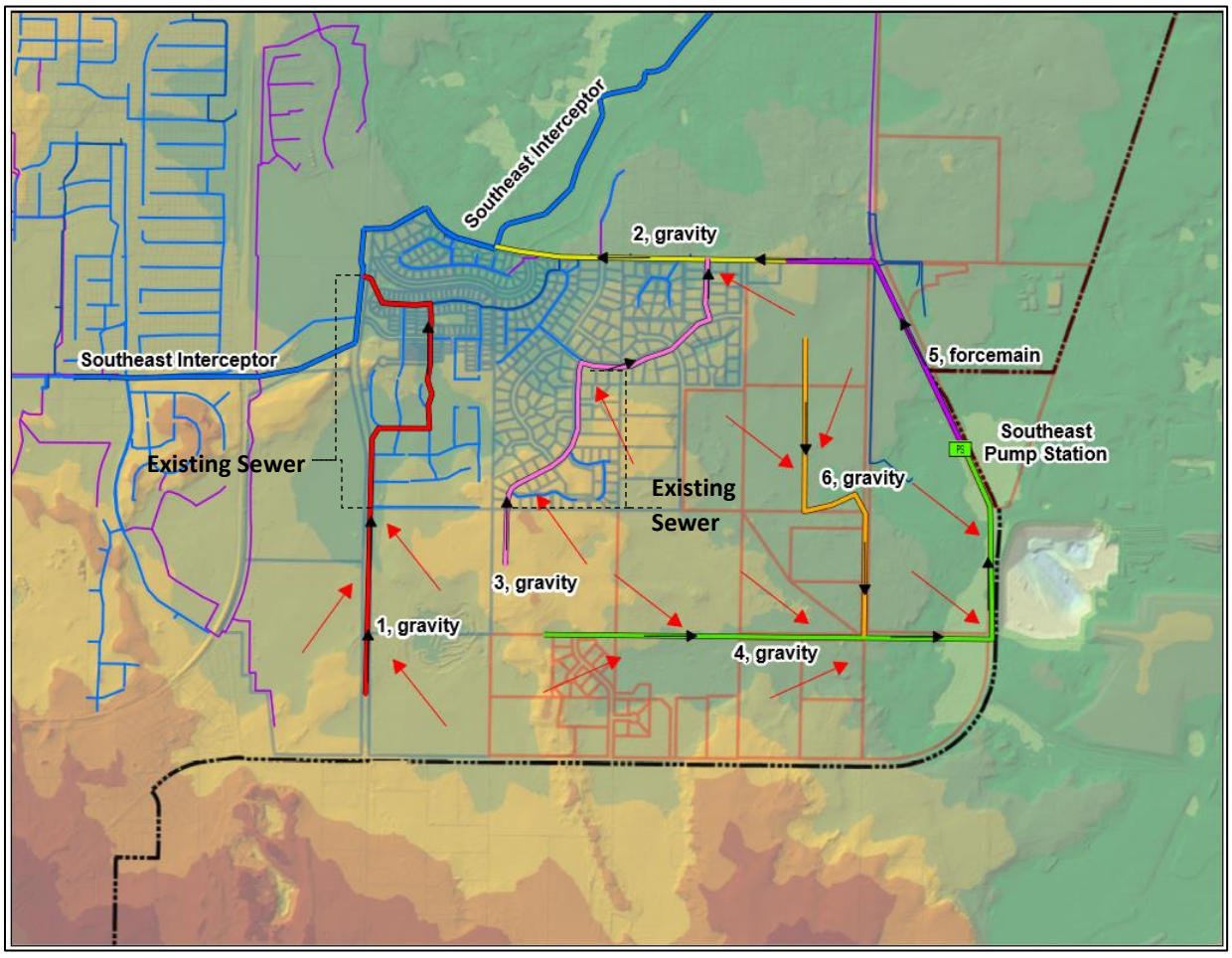


Figure 4- Preliminary Sewer Service Overview



Flow Rates and Infrastructure Sizing

Flow rates are based on land use/zoning approved by SEAPAC on September 26th 2019 and confirmed with assumptions from the City's 2016 UGB Expansion Study and 2018 Collection System Public Facility Plan Update. Average dry weather flow rates are calculated based on household or employment density per acre multiplied by unit flow factors of 130 gallons per housing unit per day and 45 gallons per employee per day. School properties were reviewed to ensure a minimum of 350 gallons per acre per day flow rate. Household and employment densities were adjusted to comply with total households and employees identified for the Elbow from the City's 2016 UGB Expansion Study (820 households and 2,290 employees). A peaking factor of 1.7 was used for average flow to peak dry weather flow, and a factor of 4 was used for average flow to peak wet weather flow. In addition to the design peak wet weather flow rate, a low flow dry weather and maximum build-out peak wet weather flow were developed to evaluate sewer infrastructure under low and high flow scenarios. The low dry weather flows were developed using planned vacancy within the service area. The high wet weather flow was developed using maximum zoning densities. The low and high flow scenarios are used for a sensitivity analysis to check for low scour velocities and surcharging of infrastructure during peak wet flow conditions. Table 2 provides a summary of flow rates and sizing calculated for each sewer line and the force main. Pipes were sized to convey the design peak wet weather flow without surcharging.

Table 2 – Flow and Sizing Summary

Alignment	Sizing (inches or total dynamic head, TDH)	Average Flow (gpm)	Peak Dry Weather Flow (gpm)	Design Peak Wet Weather Flow (gpm)	Low Dry Weather Flow (gpm)	Buildout Max Peak Wet Weather Flow (gpm)
1, gravity[1]	8-inch and 12-inch	100	180	400	155	425
2, gravity (includes flow from Pump Station and Profile 3)	18-inch	325	590	1,300	615	1,990
3, gravity[1]	8-inch	40	70	160	80	160
4, gravity	8-inch	60	100	225	150	200
4, gravity (downstream of 6)	12-inch	130	240	5,300	255	1,030
5, force main[2,3]	12-inch	280	500	1,250	520	1,800
6, gravity	12-inch	75	140	300	105	840
Pump Station[2]	67-77 feet TDH[4]	280	500	1,250	520	1,800

Note:
1, Sizing refers to new infrastructure, existing infrastructure remains “as-is”
2, Includes additional flow from DSL property
3, Force main sized to convey 1,250 gpm at 3.5 feet per second
4, Total dynamic head may vary based on wet well depth

Sewer Profiles

Sewer profiles have been developed for each sewer alignments. Profiles include a ground surface and hydraulic grade line for peak dry and peak wet weather flow. Profiles have been developed to reduce overall depth while still meeting minimum slope requirements and allow for connections to existing infrastructure or pump station decommissioning. Profiles are shown for each alignment in Appendix 1.

Preliminary Cost Estimates

Cost estimates for the sewer infrastructure were developed. Preliminary costs are planning-level estimates using the approach from the Public Facility Plan Update (2018) and UGB Expansion Study (2016). All cost estimates are Class 5 budget estimates, as established by the *American Association of Cost Engineers*. This preliminary estimate class is used for conceptual screening and assumes project definition maturity level below two percent. The expected accuracy range is -20 to -50 percent on the low end, and +30 to +100 percent on the high end. The cost estimates are consistent with the definition of OAR 660-011-0005(2) and OAR 660-011-035. Cost estimates are intended to be used as guidance in establishing funding requirements at the project planning level based on information available at the time of the estimate. Estimates exclude land acquisition, financing, and inflation. Cost estimates were performed in 2019 dollars based on *The Engineering News Record Construction Cost Index* (ENR CCI) basis of 12026 (February 2019).

Unit cost rates include materials, installation, and surface restoration in three categories (arterial, local, and dirt). Unit installation and material costs vary by both pipe diameter and depth. Unit cost markups are included for design and administration costs, mobilization, traffic control, erosion control, and contractor's overhead.

Some capital projects include significant unknowns at a planning level assessment. To account for unknowns related to canal crossings, and rock blasting, capital projects are given a cost estimate range representing standard and above average markups. These markups are presented in Table 3.

Table 3
Unit Cost Markups

Markup Category	Markup
Design and Administration	30%
Construction Mobilization	10%
Traffic Control and Erosion	9%
Contractor Overhead and Profit	15%
Subtotal	64%
Construction Contingency Low End	30%
Construction Contingency High End	80%
Overall Markup	2.1 (low) to 3.1 (high)

Preliminary cost estimate ranges for the Southeast Area sewer infrastructure concept are presented in Table 4. The cost estimates associated with the gravity sewer alignment 1 located in 15th Street are not discounted for work currently being performed by the Bend LaPine School District to extend gravity sewer service to future schools adjacent to 15th Street.

Table 4
Sewer Concept Preliminary Cost Estimates

New Infrastructure	Preliminary Sizing (inches or gpm)	Length (feet)	Cost Estimate, Low Markup ($million)[1]	Cost Estimate, High Markup ($million)[1]
1, gravity[2, 3]	8-inch, 12-inch	1,650 8-inch, 1,500 12-inch	1.2	1.8
2, gravity	18-inch	3,100	1.3	1.9
3, gravity[3]	8-inch	2,700	1.3	1.9
4, gravity	8-inch, 12-inch	3,350 8-inch, 3,550 12-inch	2.8	4.1
5, force main	12-inch	3,200	1.3	1.8
6, gravity	12-inch	4,100	1.8	2.7
Pump Station	1,250 gpm	n/a	3.5	5.1
Total			13.2	19.3

Table 4 Notes:

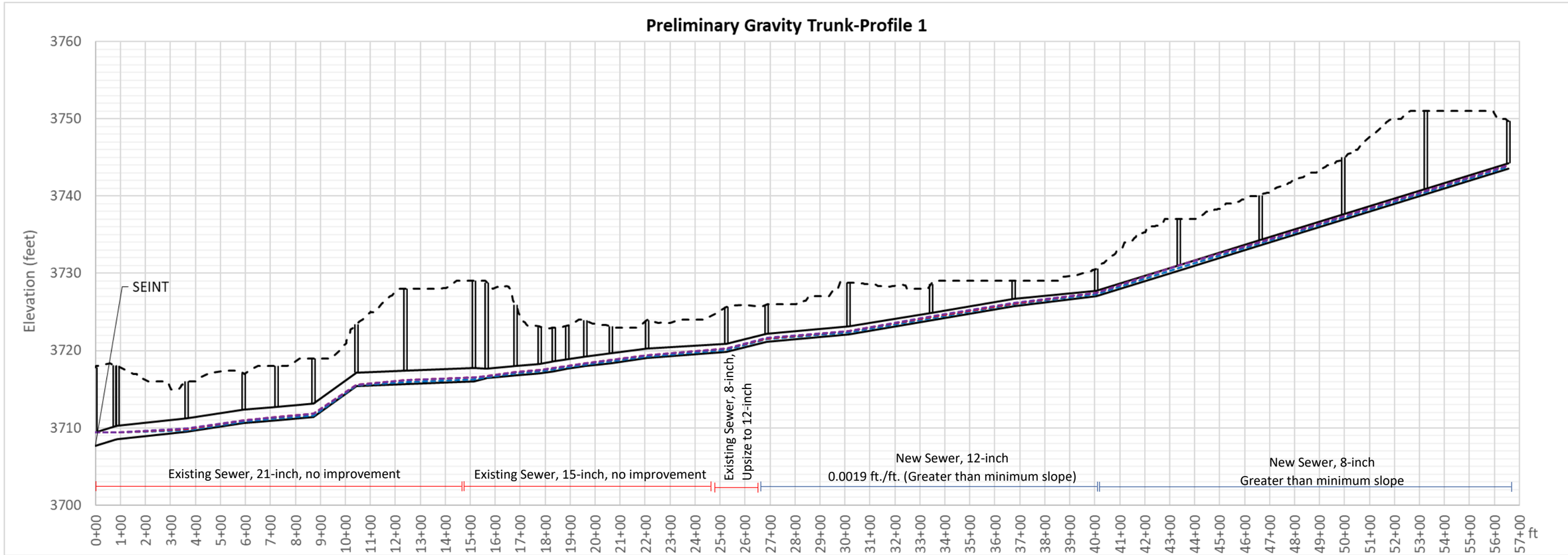
Note 1. All cost estimates are Class 5 budget estimates in millions of dollars, as established by the *American Association of Cost Engineers*. This preliminary estimate class is used for conceptual screening and assumes project definition maturity level below two percent. The expected accuracy range is -20 to -50 percent on the low end, and +30 to +100 percent on the high end. The cost estimates are consistent with the definition of OAR 660-011-0005(2) and OAR 660-011-035. Cost estimates are intended to be used as guidance in establishing funding requirements at the project planning level based on information available at the time of the estimate. Estimates exclude land acquisition, financing, and inflation. Low markup is a factor of 2.1 times labor and material costs. High markup is a factor of 3.1 times labor and material costs. Cost estimates were performed in 2019 dollars based on The Engineering News Record Construction Cost Index (ENR CCI) basis of 12026.45 (February 2019).

Note 2. The cost estimates associated with the gravity sewer alignment 1 located in 15th Street are not discounted for work currently being performed by the Bend LaPine School District to extend gravity sewer service to future schools adjacent to 15th Street.

Note 3. Alignments 1 and 3 connect to existing piping. The existing piping is excluded from the length and cost estimates unless an upsize is required.

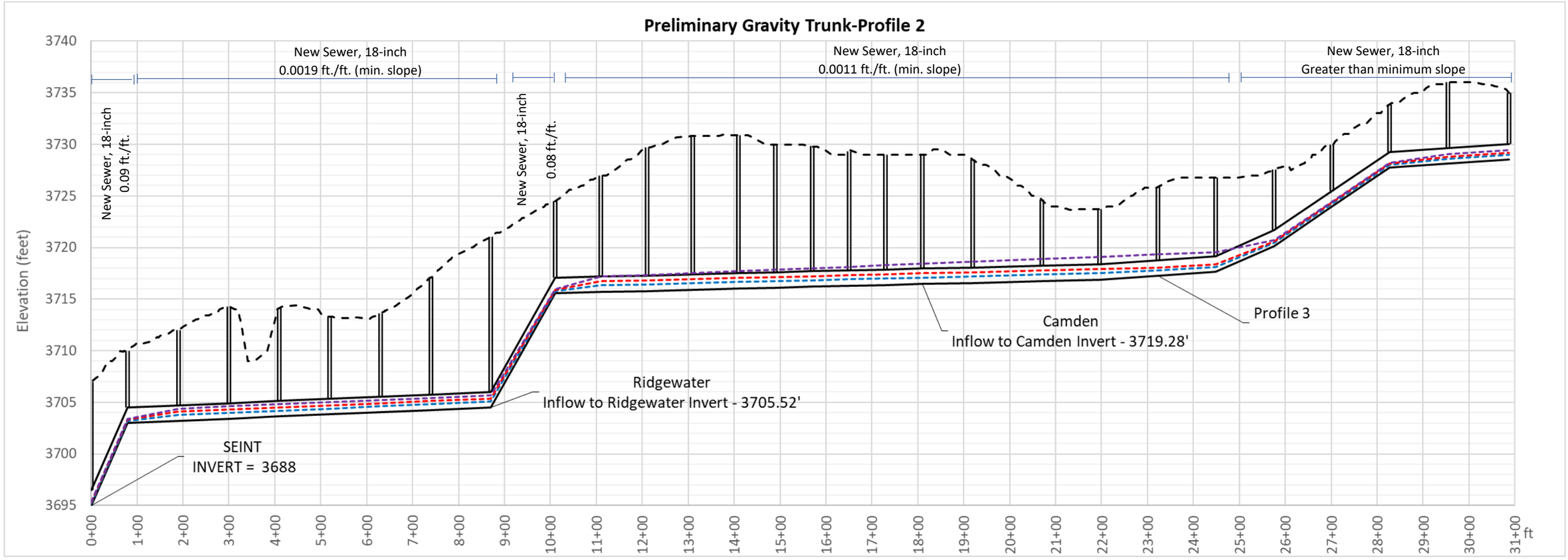
Appendix 1 – Sewer Profiles

Red line indicates design peak wet weather flow hydraulic grade line
Blue line represents low flow dry weather hydraulic grade line, used for scour velocity sensitivity analysis
Purple line represents a full build out condition, used for sizing sensitivity analysis



Flow Scenario	Min d/D	Max d/D	Min Vel. (fps)	Max Vel. (fps)
DWF	0.1	0.4	1.3	3.0
Peak WWF	0.1	0.6	1.8	4.3
Build Out Sensitivity Analysis	0.1	0.7	1.8	4.5

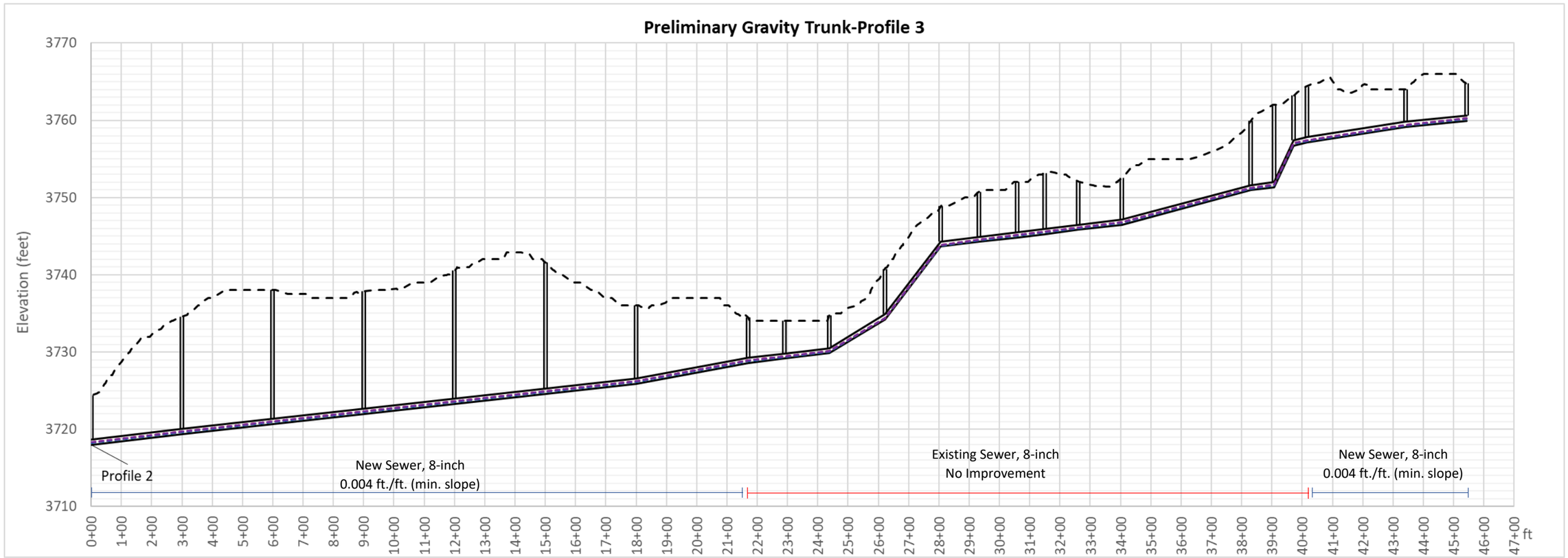
Comments- Low velocities are in the existing portion of this alignment sized at 21-inches. New infrastructure has velocity of 2.5 to 3 fps under peak dry weather flow conditions. Gravity alignment 1 will serve future middle and high schools as well as any other development along 15th Street. The Bend LaPine School District is responsible for funding a portion of Alignment 1 and the concept presented in this plan should be coordinated with their work.



Flow Scenario	Min d/D	Max d/D	Min Vel. (fps)	Max Vel. (fps)
DWF	0.1	0.4	1.8	8.6
Peak WWF	0.2	0.7	2.2	11.8
Build Out Sensitivity Analysis	0.3	d/D > 1.0, surcharging < 1 ft	2.5	13.5

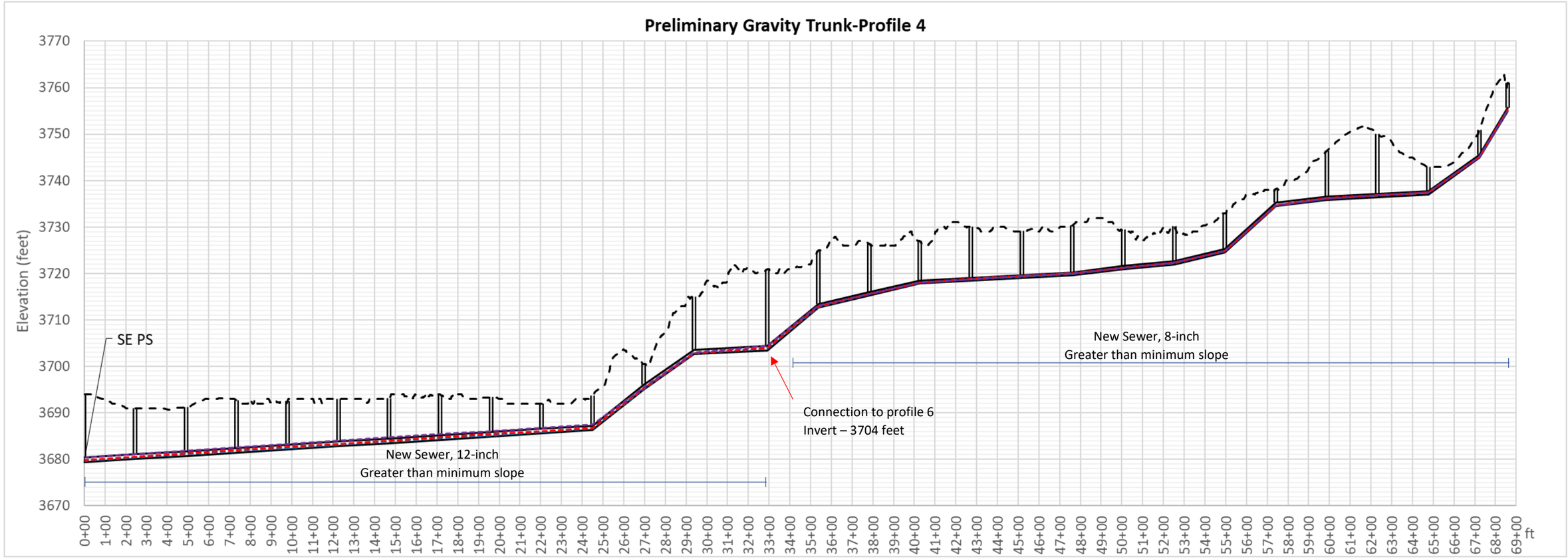
Comments- Alignment is driven by decommissioning of Ridgewater lift station and trying to minimize depth. Low velocities are in the middle section of the profile with slope of 0.0011 ft./ft. Slope could be increased but would result in increased depth (greater than 15 ft.).

Infrastructure is sized to prevent surcharging using flow rates developed from planned population and employment for the Elbow (red hydraulic gradeline). The buildout sensitivity scenario includes flow rates generated assuming maximum population and employment density within the service area. This scenario is used to verify that infrastructure is sized adequately to prevent excessive surcharging for any potential redevelopment in the future (purple hydraulic gradeline).



Flow Scenario	Min d/D	Max d/D	Min Vel. (fps)	Max Vel. (fps)
DWF	0.2	0.4	1.4	3.9
Peak WWF	0.3	0.5	2.1	5.6
Build Out Sensitivity Analysis	0.3	0.5	2.1	5.6

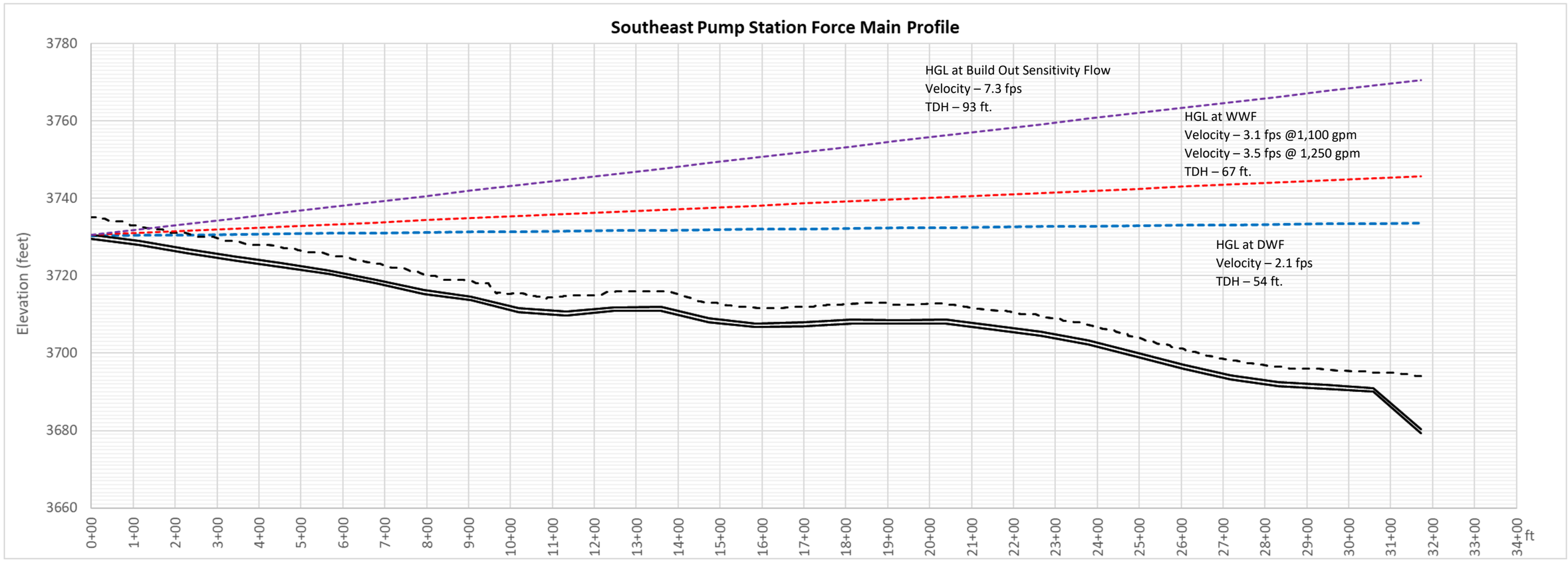
Comments- Velocity could be increased with increased slope, result would be increased depth (greater than 17feet).



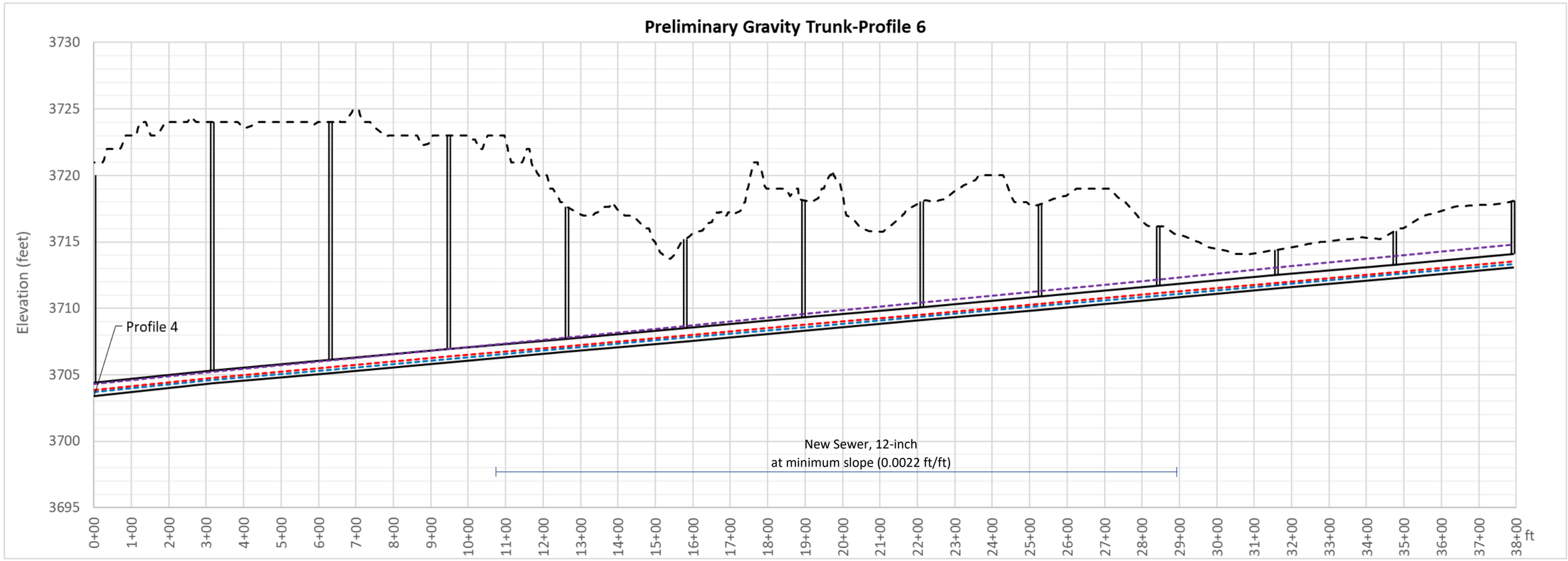
Flow Scenario	Min d/D	Max d/D	Min Vel. (fps)	Max Vel. (fps)
DWF	0.2	0.5	1.7	6.2
Peak WWF	0.3	0.7	1.8	6.8
Build Out Sensitivity Analysis	0.3	d/D > 1.0, surcharging < 1 ft	2.5	13.5

Comments- Profile is driven by need to connect with profile 6 and desire to reduce depth. Velocity could be improved in both profile 4 and profile 6, this would result in increased depth for both profiles (greater than 17 feet for profile 4)

Infrastructure is sized to prevent surcharging using flow rates developed from planned population and employment for the Elbow (red hydraulic gradeline). The buildout sensitivity scenario includes flow rates generated assuming maximum population and employment density within the service area. This scenario is used to verify that infrastructure is sized adequately to prevent excessive surcharging for any potential redevelopment in the future (purple hydraulic gradeline).



Diameter (nominal, inches)	Flow Rate (gpm)	Total Dynamic Head (TDH, ft)	Velocity (fps)
12	1250	67-77 (dependent on wet well depth)	3.5



Flow Scenario	Min d/D	Max d/D	Min Vel. (fps)	Max Vel. (fps)
DWF	0.17	0.3	2	2
Peak WWF	0.31	0.4	2	2
Build Out Sensitivity Analysis	0.52	d/D > 1.0, surcharging < 1 ft	2	3

Comments- Profile 6 could be re-routed further east, potentially along Diamondback Ln to reduce depth at downstream end.

Infrastructure is sized to prevent surcharging using flow rates developed from planned population and employment for the Elbow (red hydraulic gradeline). The buildout sensitivity scenario includes flow rates generated assuming maximum population and employment density within the service area. This scenario is used to verify that infrastructure is sized adequately to prevent excessive surcharging for any potential redevelopment in the future (purple hydraulic gradeline).

Appendix Y - Southeast Area Plan Code Concepts

Southeast Area Plan Code Concepts

PREPARED FOR: Southeast Area Plan Advisory Committee (SEAPAC)

COPY TO: File

PREPARED BY: Project Team

DATE: November 18, 20193

Overview

This memo is intended to support discussion by SEAPAC regarding development code concepts to implement the Southeast Area Plan. This memo outlines some of the regulatory tools proposed to capture ideas discussed during the planning process and implement the vision for the Southeast Expansion Area. As used here, code “concepts” are the basic ideas for tailored zoning regulations for the plan. Following SEAPAC discussion, the project team will convert the concepts into detailed code amendments for review.

Special Planned Districts

Special Planned Districts are used by the City of Bend to provide more detail about the type of development intended for a specific area than is typically identified by the City’s zoning code or Comprehensive Plan. Once adopted, Special Planned Districts create standards for the development of land within the plan boundaries that may supersede those of the underlying zone. Regulatory tools that can be adopted as part of a Special Planned District include:

- Overlay land use districts
- Permitted land uses
- Design standards
- Landscape standards
- Development standards
- Special street standards
- Access and circulation standards
- Parking requirements
- Transportation mitigation plan

The following table provides some examples of existing Special Planned Districts in the City and the tools and standards they use to regulate development.

Table 1. Examples of Special Planned Districts in Bend

DISTRICT	REGULATORY TOOLS USED
NORTHWEST CROSSING	• Overlay Districts • Development Standards • Special Street Standards
CENTRAL OREGON COMMUNITY COLLEGE	• Permitted Uses • Development Standards

	• Parking Requirements • Access and Circulation • Special Street St
JUNIPER RIDGE	• Overlay Districts • Permitted Uses • Development Standards • Transportation Mitigation Plan
MURPHY CROSSING	• Overlay Districts • Permitted Uses • Development Standards • Special Street Standards
15TH STREET SCHOOL OVERLAY	• Permitted Uses • Development Standards • Design Standards • Access and Circulation • Landscape Standards • Parking Requirements • Special Street Standards • Transportation Mitigation Plan

Recommended Concepts for the Southeast Area Plan

The Project Team recommends developing a Special Planned District for the Southeast Expansion Area that would include the following concepts:

1. Land use districts with the permitted and conditional uses tailored to implement the Southeast Area Plan;
2. Design standards to ensure quality design and compatibility with surrounding neighborhoods;
3. Requiring buffers and transition areas where non-residential uses are located adjacent to residential neighborhoods;
4. Outdoor lighting regulations that prevent light pollution due to new development; and
5. Landscape standards that encourage the integration of natural features such as significant rock outcrops and large trees into site design.

As with all of Bend's Special Planned Districts, the Southeast Area Special Planned District would incorporate new ideas, like those listed above, with existing uses and code standards that are appropriate to retain and apply.

The following table is the first step in defining the modifications to uses for land use districts in the Southeast Expansion Area. The four remaining code concepts are addressed in the attached code concept sheets.

Table 2. Permitted Uses in the Southeast Area Plan

LAND USE DISTRICT	USE MODIFICATIONS
RESIDENTIAL (RS, RM, RH)	All uses allowed under Table 2.1.200, except the following: 1. Repair services conducted entirely within a building; including vehicle repair, small engine repair, and similar uses. Those uses not permitted in the RS, RM, and RH Zones are not allowed in the Southeast Expansion Area.

GENERAL COMMERCIAL (CG)	All uses allowed under Table 2.2.300, <u>including the following additions</u>: 1. Multifamily housing constructed with commercial development. Those uses not permitted in the CG Zone are not allowed in the Southeast Expansion Area.
MIXED EMPLOYMENT (ME)	All uses allowed under Table 2.3.200, <u>including the following additions</u>: 1. Residential uses included with new mixed-use development. 2. Residential uses included with new development proposed through a master plan proposed under BDC Chapter 4.5, Master Planning and Development Alternatives. Housing allowed under BDC Table 2.3.200 must satisfy BDC 4.5.200(E)(3). 3. Veterinary Clinics, for both small and large animals.
LIGHT INDUSTRIAL (IL)	All uses allowed under Table 2.4.300, <u>except the following</u>: 1. Heavy Manufacturing, assembly, and processing of raw materials and recycling 2. Junk yards, automobile wrecking yards, and similar uses 3. Marijuana related uses 4. Marijuana grow sites and marijuana producing 5. Marijuana wholesale 6. Marijuana processing of cannabinoid concentrates and cannabinoid products 7. Processing of cannabinoid extracts And <u>adding a new use</u>: 1. Flex Space Proposed definition of Flex Space (from 2019 Market and Land Use Analysis): Flex Space refers to buildings that offer flexible spaces that can accommodate a range of office, warehouse, or another type of commercial use such as research and development, medical, industrial, and quasi-retail.

LIGHT INDUSTRIAL CONCEPTS

What standards exist in the code today?

PERMITTED USES

Examples of uses permitted in Light Industrial zones include:

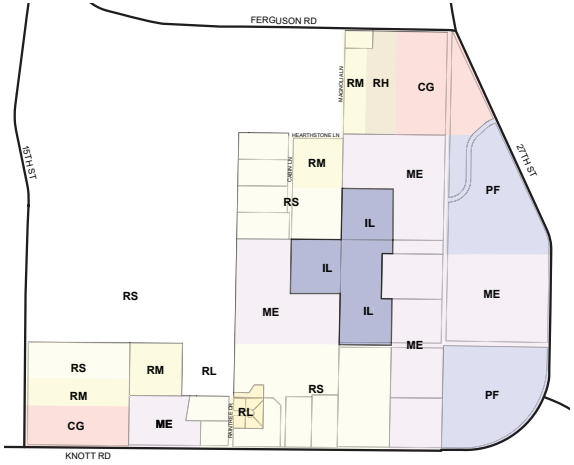
- Light manufacturing, fabrication, and repair of goods
- Research and development facilities
- Production office
- Food and beverage processing and packaging
- Medical and dental laboratories and veterinary clinics
- Mini-storage warehouse
- Commercial parking lot

SITE AND BUILDING DESIGN

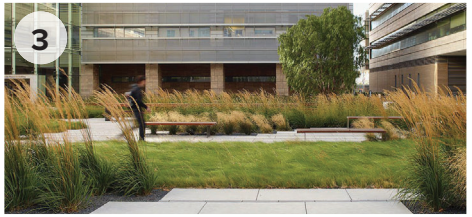
- **Setbacks.** Buidings are required to be set back a minimum of 10 feet from the street. No structure can be constructed within 20 feet of an adjacent residential zone.
- **Orientation.** Buildings must be oriented to minimize adverse impacts such as noise, glare, dust, etc. Industrial elements that are outside buildings must be located away from residential areas, schools, and parks.
- **Buffers.** A minimum 20-foot-wide buffer is required between Light Industrial development and all adjacent residential zones. Buffers must provide landscaping to screen industrial activities from residential uses.
- **Building Facade.** Street-facing facades longer than 75 feet must include a variety of architectural features such as windows, doors, offsets, projections, detailing, or changes in materials to provide visual interest.
- **Landscaping.** A minimum of 15% of each industrial site must be landscaped, with at least 75% of that area visible to the public. Landscape materials can include trees, shrubs, plants, and outdoor hardscape features such as patios, decks, plazas, or paved dining areas.

Draft new concepts for the Southeast Expansion Area

- **Prohibited Uses.** Prohibit heavy manufacturing, junk yards, and marijuana-related uses in Light Industrial districts in the Southeast Expansion Area.



- **New Uses.** Add Flex Space as a new permitted use in Light Industrial zones. Flex Space accomodates a range of office, warehouse, or commercial uses such as research and development, medical, industrial, and quasi-retail.
- **New Design Standards.**
  - Require a 20-foot-wide landscape buffer along all sidewalks and trails (photos 5 and 6).
  - Locate most parking behind buildings to improve the aesthetics and pedestrian friendliness of the streetscape (photos 1 and 4).
  - Include a list of preferred facade treatments, such as stone, brick, or wood (photos 1 and 2).



BUFFERS & TRANSITION AREAS

What standards exist in the code today?

LANDSCAPE BUFFERS

A landscape buffer is required between residential zones and the following non-residential zoning districts. The landscape buffer should include trees, shrubs, and ground cover and must provide both a visual and auditory buffer from adjacent non-residential uses.

- Commercial Zones (CB, CC, CL, CG) – 5 foot minimum width
- Mixed Use Zones (ME, MR, PO, MU, MN) – 10 foot minimum width
- Industrial Zones (IG, IL) – 20 foot minimum width

Landscape buffers are also required to separate large parking or maneuvering areas from adjacent streets or buildings, and to screen any type of mechanical equipment, outdoor storage, manufacturing, or service and delivery areas.

Landscape materials can include:

- Live trees, shrubs, and ground cover plants
- Hardscape features such as patios, decks, plazas, or paved dining areas
- Non-plant ground covers such as bark dust or chips
- Stormwater facilities such as landscaped bio-swales

BUILDING SETBACKS

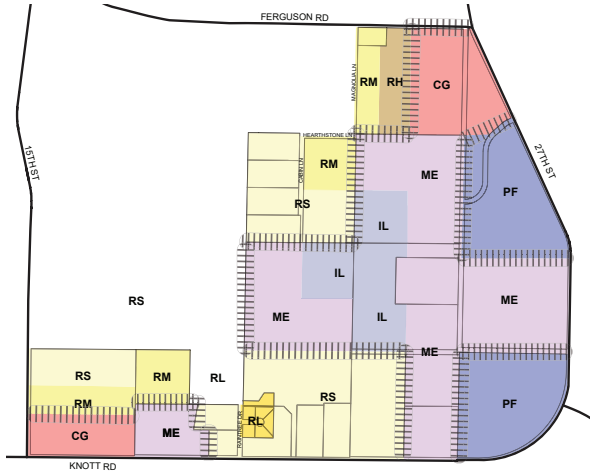
Building setbacks improve fire protection, sunlight and air circulation, noise buffering, and visual separation between buildings. Nonresidential buildings that are adjacent to a residential zone must be set back a minimum of 10 feet in commercial and mixed use zones, or 20 feet in industrial zones.

Landscaping and natural features provide a buffer for this office building

Landscaping and street trees provide a transition between a cafe and neighboring homes

Draft new concepts for the Southeast Expansion Area

The following map shows potential transition areas where the code could require the use of additional treatments to promote compatibility between land uses.



The plan could include a "toolbox" of preferred treatments, such as those shown in the photos below. One or more of these treatments would be required to buffer the transition between different land uses. Streets, such as Magnolia Lane, Hearthstone Lane, and the two new proposed collector roads, can also be used to provide separation between adjacent land uses.

Street

Multi-Use Path

Landscaping

Additional Setback

Natural Feature

Green Alley

INTEGRATING NATURAL FEATURES IN DEVELOPMENT

What standards exist in the code today?

LANDSCAPE CONSERVATION AND DEVELOPMENT REVIEW

Bend's landscape conservation standards are intended to incorporate significant native trees and vegetation into the landscapes of new developments. The preservation of existing natural features including trees, vegetation, and special terrain features as a condition of approval for new subdivisions, paritions, and conditional use permits. Development sites containing significant trees (defined by measuring tree diameter at breast height) are sometimes required to submit a Tree Protection Plan with their development application.

Significant vegetation identified during the site design process is generally required to be retained unless it prevents the development of public streets, utilities, needed housing, or other permitted land uses. If a proposed development is able to show that it will preserve stands of trees or significant individual trees the City may allow reductions in setbacks, parking, or landscaping requirements, density transfers, increased lot coverage, or increased lot sizes for subdivisions or partitions.

UPLAND AREAS OF SPECIAL INTEREST OVERLAY ZONE

Areas of Special Interest (ASIs) are areas designated by the City where the natural landscape will be preserved as growth occurs. Significant features can include rock outcrops, stands of trees, ridges, and faults. These areas typically contain high points or changes in elevation that break the line of sight so that the area retains a feeling of undeveloped open space. Areas within an ASI overlay are subject to special development standards that are intended to restrict new development to protect vegetation and other natural features.

Any individual or organization can apply to have an area containing significant natural features designated as a new ASI. New designations are determined by the City based on a scoring system methodology.

Draft new concepts for the Southeast Expansion Area

The Southeast Expansion Area is home to a unique and complex landscape with numerous signature trees and tree groves, areas of dense native vegetation, rock outcrops, and ridges.

If desired, the Southeast Area Plan process could develop a modified landscape conservation standard requiring all new development to map significant natural features and preserve a certain percentage of the total significant area in the final development plan.

Additionally, property owners are ***allowed***, but ***not required***, to apply to designate portions of their property containing sigificant natural features as ASIs. Significant natural features can include:

Areas designated as ASIs could serve the following purposes in the Southeast Expansion Area:

- Provide a visual and physical buffer between adjacent land uses
- Retain a feeling of undeveloped open space in the area
- Preserve habitat for native plant and animal species
- Conserve the "natural character" of Bend

OUTDOOR LIGHTING

What standards exist in the code today?

Outdoor lighting is used to illuminate residential neighborhoods, commercial and industrial areas, public spaces, and roadways and walkways. This includes lighting for buildings, recreation facilities, parking lots, landscaping, streets, holiday celebrations, and construction sites.

All outdoor lighting fixtures are required to either be full cut-off fixtures (fixtures that project all light in a downward direction) or to have a shielding method that directs light downward. Outdoor lights are not permitted to shine directly or cast a glare onto adjacent properties.

Examples of full cut-off lighting

Businesses and institutions with outdoor lighting are encouraged to extinguish their lights at the end of the working day, and outdoor lighting used for sporting events or other outdoor performances must be extinguished within one hour after conclusion of the final event of the day.

Some types of low-wattage or temporary outdoor lighting are exempt from these standards, including:

- Decorative residential lighting
- Commercial or industrial lighting used to highlight driveways or landscaping
- Lighting for correctional institutions
- Temporary holiday decorations
- Temporary lighting for carnivals, fairs, or movie productions
- Top-mounted lighting for U.S. flags
- Roadway, utility, or building construction that does not exceed 60 days in any one location
- Lighting used to highlight art features within a traffic circle or roundabout
- Sports and recreation facilities, provided that the lights are extinguised within an hour after the final event of the day

Draft new concepts for the Southeast Expansion Area

Existing City standards regarding outdoor lighting provide a strong foundation for preventing unnecessary light pollution. Additional standards for the Southeast Area Plan will be determined through discussions with SEAPAC.

Additionally, the project team will review the Model Lighting Ordninance produced by the International Dark-Sky Association for ideas relevant to the Southeast Expansion Area, and may consider adopting additional standards that would apply in addition to or supersede existing standards in Section 3.5.200 of the Bend Development Code.

Appendix Z - Southeast Area Plan Funding

CITY OF BEND
SOUTHEAST AREA PLAN

Southeast Area Plan Funding Memo

PREPARED FOR: SEAPAC

PREPARED BY: Project Team

DATE: March 12, 2020

Requests to SEAPAC and Next Steps

At your December 3, 2019 meeting, the project team presented an Annotated Outline and Working Draft for the Southeast Area Plan Infrastructure Funding Plan. ECONorthwest prepared the draft dated November 25, 2019 (See Agenda Item No. 6) that outlined the transportation and sewer projects needed to serve development in the Southeast Expansion Area, including their respective costs.

The project team asks that SEAPAC members review the information presented in this memorandum and bring comments and questions to the March meeting. The goal of that meeting is informational—to achieve a common understanding of the SE Expansion Area's infrastructure project costs, the funding tools that could be brought to bear to pay for the infrastructure, and the potential approaches for funding the infrastructure's development. This memorandum builds on the above-referenced memo discussed in December.

In addition, City staff would like to know if property owners would like to attend small group meetings, as has been done throughout the SEAP process, to discuss infrastructure funding in more detail. If so, those meetings will be scheduled in March and April.

Introduction

The purpose of this memorandum is to provide information that will inform the SE Area Plan (SEAP) Infrastructure Funding Plan. The City does not have the ability to fund the infrastructure required for the SE Area to develop. Any solution to the infrastructure challenges will involve substantial private investment, which includes investment from property owners in the SE Area. The focus here is two-fold:

1. **Education** – Infrastructure funding has a lot of technical aspects. There are funding tools, cost and revenue metrics, legal explanations, and City practices that are both complicated and comprehensive. The intent of this memorandum is to summarize that information, as a first educational step, to set the stage for discussions about which funding approach is the most appropriate and viable strategy for transportation and sewer infrastructure funding.

2. **Funding Options** – Over the past several months, the project team has evaluated numerous parameters to consider in funding infrastructure for the SE Expansion Area. In this memorandum, we offer several high-level funding options to frame the issues and (hopefully) move the group towards a workable funding strategy for the SEAP.

This memorandum is organized as follows:

- **Infrastructure Costs in the SE Expansion Area.** A concise account of the project-by-project costs for the infrastructure that will need to be funded to enable development in the Area. This information has been updated since shared with you in the December 3, 2019 meeting packet. *Note: we only summarize transportation and sewer infrastructure costs. Avion Water District is the water utility for the Area. As of yet, water infrastructure costs are not known by the City of Bend.*

- **Issues and Challenges.** A brief description of issues and challenges with serving the area with infrastructure.

- **Funding Tools: 101**. An overview of funding tools potentially available to fund infrastructure projects.

- **Infrastructure Funding Options.** A discussion about the range of possible strategic funding options that could be used—likely in combination—to fund SE Expansion Area infrastructure.

Infrastructure Costs in the SE Expansion Area

This section presents sewer and transportation infrastructure costs applicable to the SE Area as a whole, and for subsets of the entire area. It is organized by infrastructure type. A total tally of all estimated infrastructure costs, minus the water infrastructure, is presented at the end of the section.

Sewer Project Costs

The SE Area Sewer Plan identified eight needed infrastructure projects: six (6) gravity lines, one (1) force main, and one (1) pump station. The Class 5 estimate cost for all of these projects ranges from $12.6 million to $18.4 million. These are area-wide improvements needed to serve all of the properties, and do not include individual property connections that would be developed through the land entitlement process.

The analysis divided the SE Area into east and west subareas. The division between these subareas follows the two sewer catchment zones identified in the Sewer Plan (i.e. the West Catchment Area and the East Catchment Area). With sewer planning complete, planning level infrastructure costs are also known for both sewer catchment subareas:

- The East Catchment Area (343 vacant acres) encompasses three gravity lines (i.e. gravity lines 2, 4, and 6), the force main (line 5), and the pump station. The Class 5 estimate cost for these projects ranges from $10.7 million to $15.6 million.

- The West Catchment Area (144 vacant acres) encompasses three gravity lines (i.e. gravity line 1, 3a, and 3b). The Class 5 estimate cost for these projects ranges from $1.85 million to $2.76 million.

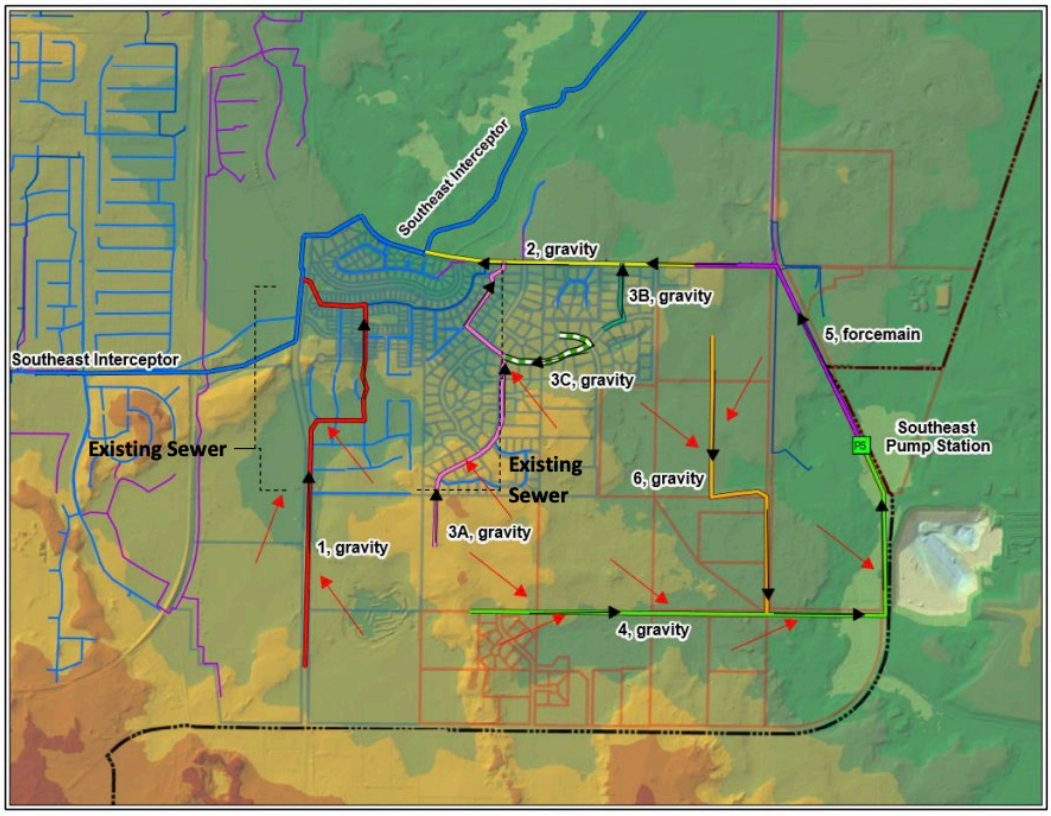
Estimated sewer infrastructure costs are summarized in Exhibit 1 and projects are displayed in Exhibit 2.

Exhibit 1. Sewer Infrastructure Projects and (Class 5) Cost Estimates (2019 dollars)

Infrastructure	Estimated Costs (Low)	Estimated Costs (High)
1 – gravity	$1.2 million	$1.8 million
2 – gravity	$1.3 million	$1.9 million
3a – gravity	$0.29 million	$0.43 million
3b – gravity	$0.36 million	$0.53 million
4 – gravity	$2.8 million	$4.1 million
5 – force main	$1.3 million	$1.8 million
6 – gravity	$1.8 million	$2.7 million
Pump Station	$3.5 million	$5.1 million
TOTAL Costs	**$12.6 million**	**$18.4 million**

Source: Jacobs and Murraysmith.

Exhibit 2. Sewer Infrastructure Projects Concept Plan



Source: Jacobs and Murraysmith.

Note: Line 3C is not included in Exhibit 1 because it is being designed and constructed as a part of the City's Septic to Sewer Conversion Program.

Transportation Project Costs

The City of Bend's draft Transportation System Plan (TSP) update identifies and includes 17 projects that will support development in the SE Expansion Area, including new roads, new roundabouts, street and frontage improvements. The estimated cost for all of these projects is $49.3 million.

Individual transportation projects, and corresponding cost estimates, are outlined in Exhibit 3.

Exhibit 3. Transportation Projects and Cost Estimates (2018 dollars)

Location	Mitigation	Estimated Costs
15th St / Ferguson Rd	Single Roundabout	$3,700,000
27th St / Ferguson Rd	Single Lane Roundabout	$3,700,000
China Hat Rd / Knott Rd	Single Lane Roundabout	Paid through Citywide TSDC(1)
Knott Rd / Country Club Dr	Single Lane Roundabout	Paid through Citywide TSDC
15th St / Reed Market Rd	Expand to a Multilane Roundabout	Paid through Citywide TSDC
Knott Rd / New Road #2	TWSC (2) improvements	$100,000
Knott Rd / New Road #3	TWSC* improvements	$100,000
27th St / Diamondback Ln	Single Lane Roundabout	$3,700,000
Knott Rd / Brosterhous Rd	Single Lane Roundabout	Built by Others
Murphy Rd / Country Club Dr	Single Lane Roundabout	Murphy Corridor Project
27th St / Reed Market Rd	Multilane Roundabout	Built by Others
15th St / New Road #1	Single Lane Roundabout	Built by Others
East-West Collector	New Road	$7,200,000
Local Framework Road	New Road	$2,000,000
North-South Collector	New Road	$8,700,000
East-West Collector/North-South Collector Roundabout	Single Lane Roundabout	$3,700,000
Knott Rd/27th St	Frontage Improvements	$16,425,000
TOTAL Costs(3)	**-**	**$49,325,000**

Source: Kittelson Associates.

(1) Note: "TSDC" is an acronym for Transportation System Development Charges which are discussed in the Funding Tools: 101 section below

(2) Note: "TWSC" is an acronym for two-way stop-controlled intersection.

(3) Note: Cost estimates are based on the ongoing TSP update but continue to be refined through the Southeast Area Plan analysis. Additional cost estimate adjustments may occur as the transportation mitigation package is further refined.

Summary of Total Infrastructure Costs

Combined, the SE Expansion Area sewer and transportation infrastructure costs are estimated to be in the range of $62 million to $68 million. As a recap, the City does not have the ability, nor is it required, to fund the infrastructure required for the SE Area to develop. Any solution to the infrastructure challenges will involve substantial private investment, which includes investment from property owners in the SE Area.

Exhibit 4. Summary of Estimated Infrastructure Costs, SE Expansion Area

	Low	High
Sewer	$12,600,000	$18,400,000
Transportation	$49,325,000	$49,325,000
TOTAL Costs	**$61,925,000**	**$67,725,000**

Source: Jacobs, Murraysmith, and Kittelson Associations.

Note: Estimated water infrastructure costs are unknown as of this date. Project team staff are developing water infrastructure cost estimates for the SEAP.

Issues and Challenges

The following is a summary of issues and challenges that must be addressed to arrive at a viable infrastructure funding strategy for the SE Expansion Area.

- **The SE Expansion Area has many properties and development is likely to occur incrementally**. There are 27 individual ownerships within the SE Expansion Area. While the number of property owners may change over time, the funding plan should not rely on an assumption of a "master developer" approach as has been done with Bend's West and Northeast expansion areas. Rather, the funding plan should work if the parcel pattern stays largely the same as we see today, and the area develops in a series of relatively small, individual projects. However, the plan should be flexible enough to accommodate future property consolidation.

- **Sewer in the "East Catchment Area" is a challenge**. As discussed above, the SE Expansion Area contains two drainage basins that dictate how and where new sewer infrastructure can be developed. The "West Catchment Area" drains west and can be served by gravity systems that largely exist today, or that will be in place soon. The "East Catchment Area" drains east and requires three new gravity lines, a pump station, and force mains. There are three main challenges for the East Catchment Area system:

  – At an estimated cost of $15.6 million, no single development could afford to create the needed improvements;

  – The routing and location of the facilities are such that they are "off-site" from most of the properties they will serve; and,

  – Except for a small area near Ferguson Road which could potentially be served by gravity or interim facilities, no urban development can occur in the East Catchment Area until a majority of the complete system is built and operational.

- **Roundabouts are needed but are costly and will require an area-wide funding tool**. The three roundabouts in the eastern part of the plan area are the appropriate intersection treatments at 27th/Ferguson, 27th/Diamondback, and the internal intersection of the two

new collectors. Per the transportation analysis, they will safely manage the expected future traffic volumes. They are estimated to cost $3.7 million each, which is likely too high a cost for most development projects to carry alone. Each roundabout serves multiple properties and the network as a whole, so an "area-wide" funding tool, such as a System Development Charge for transportation improvements in the Southeast Expansion Area or a Local Improvement District, is needed to fund them. They may not be needed on "day one", so there is an opportunity to collect funds over time and fund them at a targeted point in the growth of the area.

- **Funding tools and their revenue streams need to consider the timing of infrastructure improvements (and vice versa).** There are several types of funding tools that could be deployed to fund SE Expansion Area infrastructure (see the next section). Each of these funding tools has its own mechanism for collecting revenue and allocating it to projects. Some, like a Local Improvement District, enable the City to use "day one" cash flows to borrow money to support infrastructure projects. Others, like System Development Charges, collect fees linked to new development and therefore delay borrowing for infrastructure projects until cash flows have accumulated.

- **This can be a "which comes first" situation**—if a funding tool is chosen that relies on new development but development cannot happen without new infrastructure, how can development move forward? The implication of this issue is that timing and phasing considerations must be brought to the forefront when selecting an infrastructure funding option.

- **There is an opportunity to streamline transportation reviews and the allocation of cost responsibilities to proposed development**. Development in Bend, as in most cities, typically undergoes a cycle of transportation analysis during the development review process. The typical steps are:

  – Developer's proposal;

  – Transportation analysis and determination of impacts; and then,

  – Decisions regarding the transportation improvement obligations by the developer.

  This situation occurs project by project and is time consuming for all parties. The City of Bend is working to streamline and clarify this process and has had recent successes negotiating master plan agreements in the West and Northeast expansion areas. These agreements identify—up front—which transportation improvements are required and when they must be built. For the SE Area Plan, the question is: how might a similar process be created that works for the likely incremental development pattern and multiple annexation agreements that will occur?

Funding Tools: 101

This section provides brief descriptions of existing sources and potential new funding tools available to address the challenges identified in the previous section. It is organized by infrastructure type.

More information about potential new tools is presented in Appendix A.

Sewer Funding Options

The City's existing tools, outlined below, may be used to fund sewer infrastructure projects:

- **Sewer System Development Charge (SSDC).** SSDCs are charges on new development, and some redevelopment, which occurs within the City. Revenues are used to fund growth-related capital improvements that are on the City's adopted SSDC project list, as prioritized by the Bend City Council. The City's SSDC is based on equivalent dwelling units (EDU). In 2019 the SSDC rate was $4,891 per single-family dwelling, duplex (per unit), and townhome (per unit). The rate for multifamily housing and mobile homes in parks is $3,913 (per unit). Motels, board, and rooming houses is $1,956 (per room). Currently, there are no SE Expansion Area sewer projects on the Sewer SDC eligible list.

- **Sewer Utility Fee.** A sewer utility fee is typically assessed to all businesses and households in a jurisdiction or geographic area. The City already imposes a monthly sewer utility fee. Currently, the utility rate for a single-family dwelling unit is $36.42 per month, plus $3.82 per 100 cubic feet of average winter quarter water usage (WQA). Multifamily dwelling units are charged a base rate of $14.39, plus $3.82 per 100 cubic feet of WQA. Non-residential customers are charged a base rate of $36.42 per month, plus $3.82 per 100 cubic feet of WQA.

In addition to these currently established funding tools, the City has considered the following new tools to fund sewer projects. These are:

- **Supplemental SSDC.** Supplemental Sewer SDCs are additional one-time fees that are typically paid at the time of building permit issuance. These fees are layered on top of the City-wide SSDCs. These fees are paid by new development within a defined geographic area and are therefore potentially applicable for the SE Expansion Area. Supplemental SSDC funds may be used for SSDC-eligible capital projects that increase capacity and benefit/serve the defined area, or to reimburse the City for City projects funded through existing revenue sources or debt. A supplemental SSDC can be implemented without a public vote.

- **Local Improvement District (LID).** An LID is a type of special assessment district where property owners are assessed a fee to pay for capital improvements that are necessary to serve new development within the LID boundary. Projects that benefit multiple property owners in the SE Expansion Area may be funded by LID assessments. LIDs allow for cost-sharing among property owners that face the same need for costly infrastructure to develop their properties; it removes the burden of these costly projects from one developer alone. The City has had several previously successful sewer LID projects, for projects that cost anywhere from approximately $88,000 up to approximately $4.4 million. Either the City Council on its own motion or on petition of property owners may initiate formation of an LID.

- **Reimbursement District:** A reimbursement district is a cost sharing mechanism, typically initiated by a developer. The purpose is to provide a reimbursement method to the developer of an infrastructure improvement, through fees paid by property owners at the

time the property benefits from the improvement. A developer applies to create a Reimbursement District by demonstrating benefit to properties beyond their own. In addition, the size of the improvement must be measurably greater than would otherwise be ordinarily required for the initial development. The City's Municipal Code governs the creation and structure of Reimbursement Districts, but does not currently authorize district creation in areas that are not annexed into the City.

Transportation Funding Options

The City has one primary, existing tool which may be used to fund transportation infrastructure projects in the SE Expansion Area:

- **City-wide Transportation System Development Charge (TSDC).** TSDCs are charges on new development, and some redevelopment, which occurs within the City. Revenues are used to fund growth-related capital improvements that are on the City's adopted TSDC project list, as prioritized by Council. Projects can only be funded if they are on the adopted TSDC project list, which is how, for example, the Murphy overcrossing, benefitting the SEAP area, was funded. Transportation projects that benefit the SE Area Plan need to be added to the TSDC list or funded through another mechanism to be developed. The City's TSDC rate, as of January 1, 2020, is $8,000 per equivalent dwelling unit (EDU).

The following funding tools, in addition to this currently established tool, will need to be considered to fund transportation projects in the Area. The City's Transportation System Plan identified the first two tools (listed below) as suitable for Expansion Area's in Bend.

- **Supplemental TSDC.** Supplemental TSDCs are additional one-time fees that are typically paid at the time of building permit issuance. These fees are layered on top of the City-wide TSDCs. These fees are paid by new development within a defined geographic area for TSDC-eligible capital projects that increase capacity and benefit/serve the defined area. TSDCs are therefore potentially applicable for the SE Expansion Area. A supplemental TSDC can be implemented without a public vote.

- **Local Improvement Districts (LIDs).** As previously discussed, LIDs are a type of special assessment district where adjacent property owners are assessed a fee to pay for capital improvements within the LID boundary. Local street infrastructure improvements that benefit specific properties in a defined area may be funded by LID assessments. LIDs may be appropriate for use in the SE Expansion Area to finance infrastructure that is needed to develop properties within the specific LID boundary. The City has regulations that allow LIDs. However, to date LIDs have not been widely used for transportation infrastructure in the Bend area.

- **Reimbursement District:** As previously discussed, reimbursement districts are a cost sharing mechanism, typically initiated by a developer. Street improvements are eligible projects as long as they demonstrate benefit to properties beyond their own.

As helpful context, a range of other tools that are generally suitable and appropriate for transportation projects were identified in the Transportation System Plan planning process.

Infrastructure Funding Options

The project team has considered a wide range of approaches that could fund infrastructure for the SE Expansion Area. In this section, we present three broad funding options that, together, represent a spectrum of choices about how costs are allocated, which funding tools are used, when infrastructure development would occur, and how responsive the tools are to the issues and challenges described above. Each of these options could have multiple scenarios.

Given the reality of incremental development of the SEAP project area, the SEAP funding plan may identify two types of strategies: (1) a “toolbox” of flexible funding options available for case-by-case use, negotiated as part of annexation agreements; and (2) a “recommended” approach that City Council can consider for new tools such as a Supplemental TSDC.

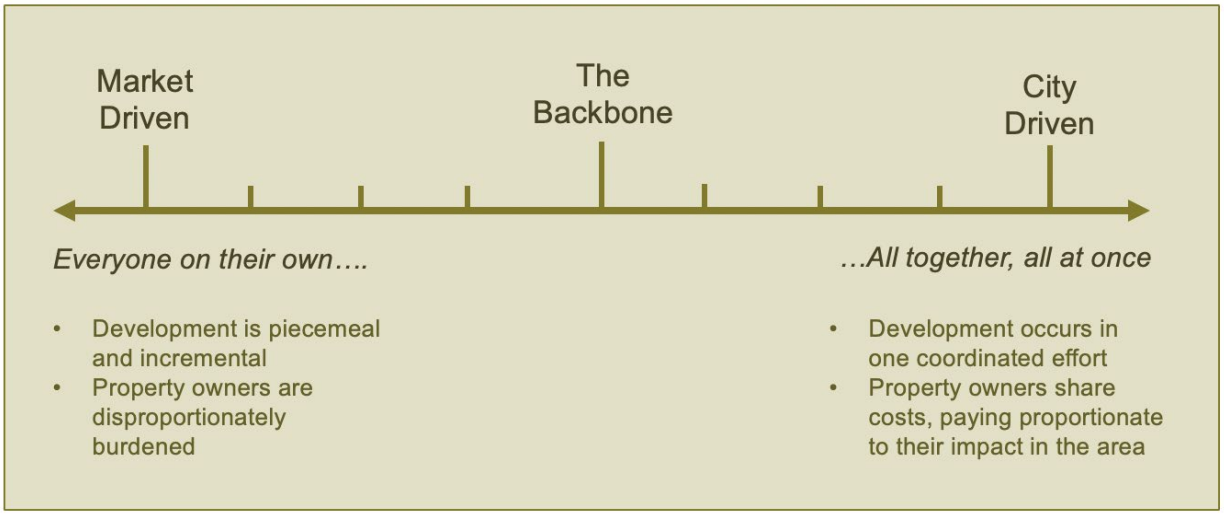
These high-level funding options are:

- **Market Driven.** (“Everyone on their own”) This approach aligns with existing practices, where property owners and developers are individually responsible for paying for the infrastructure their properties need to enable onsite development. This approach requires that property owners/developers are responsible for sewer connections to their property, collector streets, and street frontage improvements. With the exception of public capital improvements already programmed, this funding option leaves infrastructure development largely up to the private sector to identify funding without public sector support.

- **City Driven.** (“All together, all at once”) This approach relies on a funding mechanism that spreads specific infrastructure costs across all property owners in the SE Expansion Area. Funds to pay for the infrastructure would need to be generated through the implementation of a new funding tool(s). An LID is likely the most suitable tool for the job; however, to make this option work, the LID would require a full, one-time annexation of the entire SE Expansion Area (because the City of Bend can only establish an LID for lands within the City limits). This funding option could be effective at promoting near-term development but would levy fees on existing property owners from “day one.” It would also require a coordinated annexation process, which presents many challenges.

- **The Backbone.** (“Targeted placement of investments; shared heavy lifting of major infrastructure”) This approach is the “defined development driven” alternative which focuses on enabling near-term development by funding specific “backbone” infrastructure projects. The intent is to catalyze development, building momentum and accruing infrastructure supportive fees at the same time. One approach would be to create cost-sharing funding mechanisms that encourage near-term development of the East Catchment Area (described later in the section).

Exhibit 5. Funding Approaches Illustrated as a Continuum of Options



Source: ECONorthwest.

Note: The project team understands that there are benefits to approaches at each end of the spectrum. This graphic is intended to illustrate these approaches as ends of a spectrum with the goal of informing other potential approaches.

Once a recommended Funding Option is established, it would be adopted as part of the SEAP package of adoption products, described as an "Action" within the SEAP appendix of the Comprehensive Plan. As such, the funding strategy would offer guidance but would also be subject to further decisions by the City Council to be effective. An annexation agreement process would be used to "lock in" specific obligations for specific annexing properties. Moreover, the adopted funding strategy would not preclude negotiated, unique funding approaches worked out in annexation agreements.

The Backbone Funding Option: High Level Description

The Market Driven and City Driven approaches demonstrate strategies on opposite ends of the range of funding options. Either property owners and developers incrementally, individually, and disproportionately pay for projects (or portions of projects) as they develop their properties—or—all property owners (across the entire area) contribute payments to all or a large subset of projects required to unlock and move development forward. Each of these options have their trade-offs and both are unlikely to alleviate all of the issues and challenges described in this memorandum. The Backbone Funding Option, which is described at a high level here, attempts to find a middle ground.

The following high-level Backbone approach is preliminary, subject to change, requires further discussion with and direction from the City Council. It is provided solely for discussion. It is not intended to suggest that any decisions have been made, or that the City has settled on a particular policy or approach for funding and developing SE Area infrastructure.

- *Sewer:* The City could lead construction, and participate in funding, for the trunk sewer improvements needed for the East Catchment Area, where gravity service is not available. Where gravity service is available—primarily the West Catchment Area—property owners/developers would fund and build sewer lines.

To move ahead on the above-described sewer improvements, the City would need the assurance that "X" acres of land has annexed or will annex, and annexation agreements specify what the private sector will fund and build.

- *Transportation:* Property owners/developers would be responsible for developing the transportation needed to support their development: collector streets, local streets, trails and all street frontages (including 27th Street and Knott Road). An area-wide fee instrument, such as a Supplemental TSDC could fund a proportional share of key "backbone" improvements that would benefit the overall transportation network. A long-term funding strategy would be needed for the full urban upgrades to 27th Street and Knott Road (they are currently listed for "Long Term: 15-20 years" funding in the draft TSP update).

  The selected "backbone" funding improvements would be the transportation projects that complement the sewer system's East Catchment Area. This approach to transportation has the potential to:

  – Provide the funding needed for these projects;

  – Increase the certainty of transportation costs and predictability for how/when projects will be built;

  – Relieve property owners and the City of multiple, incremental transportation reviews over time – replacing those reviews with a coordinated system and simplified fee structure.

Appendix A. Funding Tool Descriptions

This section identifies and describes a range of funding tools that are potentially suited to paying for infrastructure projects in the SE Expansion Area. With some exceptions, these tools can be used for either sewer or transportation capital project costs.

Tools marked with an asterisks (*) were identified in the City's Transportation System Funding Plan as suitable and appropriate for transportation projects in Expansion Areas generally.

- System Development Charge (rate increase) *
- Supplemental System Development Charges *
- Utility Fee (rate increase)
- Local Improvements Districts *
- General Obligation Bond *
- Reimbursement Districts

System Development Charges (SDCs) rate increase

The City of Bend has both a Sewer System Development Charge (SSDC) and a Transportation System Development Charge (TSDC). Growth-related *sewer* capital improvements are funded by SSDCs and growth-related *transportation* capital improvements are funded by TSDCs, which are assessed on new development. Existing rates for each SDC are as follows:

- In June 2019, Bend City Council increased their TSDCs to $8,000 per PM peak hour trip effective January 1, 2020. A possible rate increase was considered during the City's Transportation System Plan planning process. The City evaluates whether SDCs need to be increased on an annual basis.

- For fiscal year 2019-20 that began July 1, 2019, the City of Bend's SSDC rate is $4,891 per single-family dwelling, duplex (per unit), and townhome (per unit). The rate for multifamily housing and mobile homes in parks is $3,913 (per unit). Motels, boarding, and rooming houses is $1,956 (per room).

SDCs are fees paid by land developers and are intended to reflect the increased capital costs incurred by a municipality or utility as a result of a development (in most states, they are called "impact fees"). Enabling legislation (ORS 223.297-223.314) provides a uniform framework that all local governments must follow to collect SDCs. SDC revenue can only be used to fund capital improvements for water supply, wastewater collection, drainage and flood control, transportation, or parks and recreation.

Local jurisdictions must adopt a method for calculating the charges that sets the fee to reflect the actual cost of the needed capital improvements to which the fee is related. SDC rates typically vary by the type of development.

Considerations

- *Efficiency*
  - *Stability.* SDCs are more volatile and unpredictable than many funding sources, as they are tied directly to the level of development that happens within a jurisdiction.
  - *Administrative Ease.* Virtually all jurisdictions in Oregon collect some form of SDC.
  - *Flexibility.* SDC funds can be used for the portion of project costs that increase capacity to accommodate new development and/or the portion of project costs that increased capacity to accommodate development that has already been constructed or is under construction. They must be used for capital projects and may not be used for operations or programs.
- *Equity.* SDCs are calculated based on the increased demand that a new development will place on the system (e.g. transportation or sewer system).
- *Political Acceptability*. Virtually all local jurisdictions in Oregon use SDCs to fund transportation and/or sewer improvements. Although developers likely oppose higher SDCs, the general public understands the principle that "new development should pay for itself," and SDCs do not increase taxes on existing residents and businesses.
- *Legality*. SDCs are allowed in Oregon to fund transportation and sewer improvements.
- *Additional Funding Potential.* SDC funds can be used for the portion of project costs that increase capacity to accommodate new development and/or the portion of project costs that increased capacity to accommodate development that has already been constructed or is under construction.

Supplemental System Development Charges

Supplemental System Development Charges are a tool to finance infrastructure needed as a result of growth. They work in the same way that System Development Charges work, but are an *additional* one-time fee paid by developers. The additional charge is intended to reflect the increased capital costs incurred by a municipality or utility company as a result of a development.

Considerations

- *Efficiency*
  - *Stability.* Dependent on growth and whether there is an increase in smaller developments or larger developments.
  - *Administrative Ease.* SDCs are already collected in the City. The collection of additional fees would not interfere with the existing system to collect.
  - *Flexibility.* Statute establishes that SDCs may be used only for capital improvements, defined as facilities or assets used for: water, wastewater, storm water, transportation, and parks.
- *Equity.* SDCs are only charged to developers developing projects which would drive up the cost of capital improvements for water, wastewater, storm drainage, and transportation. Affordable housing units are exempt from the fee in Bend. Properties that were never connected to the water or wastewater pipes of the City are also exempt from Supplemental Sewer SDCs.
- *Political Acceptability.* Resistance from developers could make this tool less politically acceptable. Supplemental system development charges could also act as a disincentive for the development that the City is seeking to encourage.
- *Legality.* ORS 223.297-223.314, known as the SDC Act, provides a “uniform framework for the imposition of system development charges by governmental units to provide equitable funding for orderly growth and development in Oregon's communities and to establish that the charges may be used only for capital improvements.”
- *Additional Funding Potential*. The increase in total SDC revenues over time further suggests that development in Oregon cities is increasing, even in smaller cities outside of the Metro region.

Utility Fee (rate increase)

A fee for specific utilities, such as sewer, water, transportation, or stormwater, is assessed to all businesses and households in a jurisdiction. The fee may be flat or based on a metric (e.g. water usage, trip generation, etc.).

Considerations

- *Efficiency*
  - *Stability.* Monthly fees that vary only according to base and volume provide a consistent, predictable source of funding.
  - *Administrative Ease.* Many cities in Oregon have utilities in place. The City of Bend has an existing sewer utility fee.
  - *Flexibility.* Revenues could be used for flexibly for either capital improvements or operations, maintenance, and program administration. The fee must be used for costs associated with the fee purpose. For example, a transportation utility fee would be used for roadway construction; repair, maintenance, and preservation of the transportation system; sidewalks; bike/pedestrian; operations; and administration. A sewer or water fee would apply the same concept.
- *Equity.* Because the fee is the same each month, varies only according to base and volume, and generally imposed on every household or employer, it is regressive in nature. The fee may be structured in a way to improve equity. For example, the City of Hillsboro has implemented a fee discount and waiver program to improve equitability of their transportation utility fee.[1] They offer five waiver types: vacancy waiver, hardship waiver (based on annual / monthly household income), unemployment waiver, motor vehicle discount, and transit pass discount.
- *Political Acceptability.* Based on success in other cities, the public seems to prefer fees to other taxes. Establishing any new fee, however, is not always well received at first.
- *Legality.* In Oregon, cities can enact a utility fee, including fee increases, by ordinance or resolution. The City Code allows City Council to add or increase fees without a public vote.
- *Additional Funding Potential.* Utility Fees can generate revenue via a flat fee or metric-based generation. A jurisdiction has some flexibility in who/what the fee is imposed on (particular if a waiver/discount option is introduced). A jurisdiction may also choose one methodology for residential purposes and another methodology for commercial purposes.

[1] Hillsboro, Oregon. Discount and Waiver Programs, Transportation Utility Fee (TUF). https://www.hillsboro-oregon.gov/departments/public-works/transportation/transportation-utility-fee/discount-waiver-programs

Local Improvement Districts (LIDs)

LIDs can be used to fund specific capital improvements for transportation or sewer. An LID is a type of special assessment district where nearby property owners are assessed a fee to pay for capital improvements, such as streetscape enhancements, underground utilities, or shared open space.

Local infrastructure improvements that benefit specific properties, in a defined area, may be funded by LID assessments. To establish an LID, local jurisdictions would meet with property owners expected to benefit from a proposed transportation improvement. Once an agreement is reached on the portion of funding to come from the LID, the jurisdiction would sell bonds to finance the project, and the bonds would be repaid through annual payments by affected property owners within the LID. The amount of funding raised through LIDs would depend on the specific capital projects they would fund.

Considerations

- *Efficiency*
  - *Stability.* Revenue is fairly stable and predictable once enacted and does not require high administrative costs to oversee the program once the infrastructure improvement is completed.
  - *Administrative Ease.* LIDs have relatively low ongoing administrative costs and require no upfront capital investment. However, LIDs require significant program administration and public outreach to convince property owners to voluntarily assess themselves to pay for infrastructure. Establishing multiple large LIDs could be challenging.
  - *Flexibility.* LIDs can be used for all forms of infrastructure but must be used for capital improvements, not operations or programs.
- *Equity.* LIDs charge property owners within the district, which is not a direct fee paid by city-wide users of the system. However, the charges established by the LID should be proportional to the benefits individual property owners will enjoy.
- *Political Acceptability*. Revenue sources that are not already in use tend to be less politically acceptable than existing sources. The creation of LIDs usually requires extensive political outreach, to garner support from property owners who will be asked to pay for the capital improvement. If property owners believe they will receive tangible benefits from the capital improvement, then the political acceptability is relatively high.
- *Legality.* LIDs are legally allowed in Oregon. Bend Code 2.10.005 provides the governing rules and procedures to create an LID.
- *Additional Funding Potential.* The revenue capacity for LIDs is more of a political question than a technical question. LIDs have the potential to fund significant transportation and sewer projects that can cost in the millions of dollars. However, due to political acceptability, LIDs tend to be fairly humble.

General Obligation (GO) Bond

General obligation (GO) bonds are a temporary increase in property tax rates. Proceeds from GO bonds can only be used for capital projects. State law allows local governments to issue general obligation debt for infrastructure improvements. GO bond levies typically last for 20 to 30 years. Bend's charter requires a public vote for any new tax, regardless of the term. GO bonds must be approved by a public vote.

Evaluation

- *Efficiency*
  - *Stability.* Property tax revenues from GO bonds are predictable and stable, given limits on assessed value growth enacted by Measures 5, 47, and 50 in the 1990s.
  - *Administrative Ease.* Collection mechanisms are already in place for property taxes.
  - *Flexibility.* Property taxes can be approved for a wide range of services; however, general obligation bonds are limited to capital projects.
- *Equity.* Property taxes do not always provide a strong connection between users of a capital project/system and the people who pay the property taxes. However, the tax is subject to a public vote, which implies this tool could only be used in situations where the public believes it is a fair use of funds.
- *Political Acceptability.* General obligation bonds are widely used tools across Oregon. In 2011, the City of Bend approved a general obligation bond to finance $30 million in transportation projects. The League of Oregon Cities finds: the continued high rate of passage of bonds suggests that voters are generally supportive of city tax increases when necessary to pay for services and capital construction. However, the risk with relying on GO bonds are that they require a vote to pass; revenue is not collected if the bond fails at the polls.
- *Legality.* The tool is legal and allowed in Oregon. Under ORS 287A.001-287A.145 General Obligation debt can be incurred for capital costs, including costs associated with acquisition, construction, improvement, remodeling, furnishing, equipping, maintenance or repair, having an expected useful life of more than one year. This does not include maintenance and repair (the need for which could be reasonably anticipated), supplies, and equipment that are not intrinsic to a structure. A public vote is required.
- *Additional Funding Potential.* Revenue capacity is development on debt limitations (which varies depending upon type of local government) and political acceptability of the magnitude of the bond.

Reimbursement Districts

A Reimbursement District is a cost sharing mechanism, typically initiated by a developer. The purpose is to provide a reimbursement method to the developer of an infrastructure improvement, through fees paid by property owners at the time the property benefits from the improvement. A developer applies to create a Reimbursement District by demonstrating benefit to properties beyond their own. In addition, the size of the improvement must be measurably greater than would otherwise be ordinarily required for the improvement

Applications typically include: a fee sufficient to cover the cost of administrative review, a description of the project, properties that would be impacted, and a detailed methodology and calculation of how the estimated costs would be reimbursed by payments from benefitted properties over a specified timeframe. A report from the City Engineer is generated in review of the submitted application. After a public hearing process, the council will approve, reject or modify the proposal. The approval of a Reimbursement District results in a resolution and distribution of notice among benefitted properties before construction can begin.

Benefitted properties must pay the Reimbursement Fee when they make a physical connection to the improvement (or in the case of a sewer project, when the benefitted property creates an impervious surface that drains into the public sewer) within the Reimbursement District Area. Reimbursement fees are collected by the City and are distributed to the developer for the duration of the Reimbursement District, which are typically 10 years.

Considerations

- *Efficiency*
  - *Stability.* The developer (applicant or installer) fronts the cost and is paid back over time by any/all property owners who initiate their benefit to the improvement, regardless of their acquisition of the property.
  - *Administrative Ease.* Reimbursement Districts require City staff involvement to review the application, conduct an engineering report, make a decision through a public hearing process, and collect Reimbursement Fees for the duration of the Reimbursement District agreement term.
  - *Flexibility.* Eligible Reimbursement District projects typically include (but are not limited to) construction or connections of a sewer, water, storm water or street improvements.
- *Equity.* Fees are calculated and based on proportional benefits that a new development would provide to nearby property owners. The fee encourages development by ensuring compensation to the installer who fronts the payment on behalf of all benefiting property owners.
- *Political Acceptability.* They generally work best when a developer or property owner would be highly motivated to construct a particular segment of infrastructure, for example, when one segment of infrastructure serves a large development parcel or parcels, and that infrastructure is necessary to allow development to occur. Benefitted property owners arguably have an option to connect to the infrastructure improvement and incur the Reimbursement Fee.
- *Legality.* Reimbursement Districts are legal in Oregon. Bend Code 2.20.005 provides the governing rules and procedures to create a Reimbursement District.
- *Additional Funding Potential.* The cost to be reimbursed to the applicant shall be limited to the cost of construction, engineering, and right-of-way acquired as part of the project.

Appendix AA - Southeast Area Plan Code Summary

Southeast Area Plan Code Summary

PREPARED FOR: Southeast Area Plan Advisory Committee (SEAPAC)

COPY TO: File

PREPARED BY: Project Team

DATE: February 27, 2020

Overview

This memorandum provides a summary of the latest draft Bend Development Code amendments that will implement the Southeast Area Plan and vision. At SEAPAC Meeting #7 (December 3, 2019), the project team presented SEAPAC, for their review and consideration, a memo outlining high-level development code concepts. Since that time, staff has been working to draft regulations that reflect the ideas and concepts discussed during the SEAPAC #7 meeting and throughout the planning process. Below is a summary of the draft Bend Development Code amendments.

As previously discussed, the proposed amendments will create an Area Plan for the Southeast Expansion Area which will provide more detail about the type of development intended for the area than is typically identified by the City's zoning code or Comprehensive Plan. Once adopted, it will create standards for the development of land within the plan boundaries that will supersede (where applicable) those of the underlying zone.

For SEAPAC Meeting #8 (March 12, 2020), the project team requests feedback from SEAPAC on the proposed Bend Development Code amendments. Following SEAPAC's feedback and discussion, the project team will incorporate the committee's comments and return with a more detailed draft for final review and recommendation.

Recommended Concepts for the Southeast Area Plan

The following is a summary of the concepts for the Southeast Area Plan that were reviewed and discussed at the SEAPAC Meeting #7 (December 3, 2019). For each of these topics, updates are summarized in the Code Summary section.

1. Land use districts with the permitted and conditional uses tailored to implement the Southeast Area Plan.
2. Design standards to ensure quality design and compatibility with surrounding neighborhoods. As discussed, design standards for employment uses are intended to be straightforward and easy to implement.
3. Requiring buffers and transition areas where non-residential uses are located adjacent to residential neighborhoods.
4. Landscape standards that integrate natural features such as significant rock outcrops and large trees into site design and focus on the most significant features.

Southeast Area Plan Code Summary

The following is a summary of the current work-in-progress for the Comprehensive Plan and Bend Development Code SEAP amendments:

COMPREHENSIVE PLAN

New and amended policies to:

- Ensure the adequacy of Industrial lands needed for industrial jobs (related to re-designated Industrial lands)
- Remove the requirement for a master plan application at time of annexation if the annexed property is part of an adopted area plan
- Reflect proposed SEAP plan designation changes (i.e. number of acres from IL to ME)

BDC Chapter 2.7 – SPECIAL PLANNED DISTRICTS, REFINEMENT PLANS, AREA PLANS AND MASTER PLANS

New Southeast Area Plan

Residential Districts (RS, RM, and RH):

- Exclude repair services, conducted entirely within a building including vehicle repair, small engine repair, and similar uses in residential zones.
- Require residential uses on collector streets be oriented to the street (to avoid long fence walls and unmaintained streetscapes).

General Commercial Districts (CG):

- Establish a minimum and maximum 10’ setback with allowed increases when a usable public space is provided.
- Establish the requirement for “Main Streets” in the two Commercial districts and provide design and use standards for Main Streets including corner treatments, entries, and limitations on ground floor residential development.
- Allow standalone residential uses on sites not fronting Main Streets or Arterials and establish special standards for standalone residential uses in the CG zone, including building orientation to the street, minimum densities, permitted uses (proposed to be the same as RH density and uses), and include live-work as a permitted use in the CG zone.
- Limit/prohibit large-scale, non-commercial users, such as school, parks, and other public/institutional uses, in the CG zone to preserve adequate land for employment capacity (jobs), neighborhood commercial uses, mixed-use, and commercial-supportive higher density residential uses. The proposed land use plan for the Southeast Area Plan includes more land designated for residential and mixed employment uses, and less land for General Commercial.
- Prohibit parking from being located between the building and the primary street frontage.

Mixed Employment Districts (ME):

- Include live-work as a permitted use.
- Allow for a limited percentage of residential use on the ground floor to accommodate entries, residential-related parking, etc.
- Allow for existing uses (such as veterinary clinics and kennels) that are not allowed in the ME zone, to be treated as permitted uses. Expansions of such uses greater than 25%, would be subject to conditional use criteria.

Light Industrial Districts (IL):

- Prohibit the following uses otherwise permitted in the IL zone:
    - Heavy Manufacturing, assembly, and processing of raw materials and recycling;

  - Junk yards, automobile wrecking yards, and similar uses;
  - Marijuana grow sites and marijuana producing;
  - Marijuana wholesale;
  - Marijuana processing of cannabinoid concentrates and cannabinoid products; and
  - Processing of cannabinoid extracts.
- Include a 20' minimum landscaped setback on arterials and collectors, or when located adjacent to or across the street from a residential zone.
- Include the following additional Design Standards:
  - Emphasized building entries;
  - Encouragement of durable, quality materials including, but not limited to, brick, stone, concrete, and wood;
  - Encourage exterior design features such as materials, texture, color, and trim detailing on all building elevations visible to public streets and pedestrian paths, and adjacent to non-industrial districts; and
  - Prohibit parking from being located between the IL building and the street.

Public Facility Districts (PF):

- Allow the following uses as permitted uses (instead of conditional uses). These uses would only be permitted for community or regional parks established in the Southeast Area Plan.
  - Ball fields, sport complexes, and similar outdoor recreational areas that have night lighting or amplified sound systems; and
  - Park sites with outdoor amphitheater or facilities for community events such as music or theater performances and similar events.

Tree Preservation and Rock Outcropping Standards

- On a development site, require retention of at least 50 percent of all trees measuring 24" or greater as measured four feet above the ground (known as DBH, "diameter at breast height") unless exempted (dead, diseased, dying, hazardous, or emergency).
- Prohibit development from occurring in specific rock outcropping areas, which will be mapped in the code. *Note*: The project team will be seeking specific feedback from SEAPAC on the size of sites this should apply to (i.e. on development sites greater than 5 acres).

Street Standards

- Require the two collectors (E/W connecting 15th St to 27th St, and N/S connecting Ferguson Rd to Knott Rd) to be constructed to the alternative collector standard identified in the code.

Bicycle, Pedestrian, and Trail Connectivity

- Require dedication and construction of low stress bicycle facilities and urban trails where identified for Southeast Expansion Area to provide connections to schools, parks, and other destinations.
- Require coordination with Bend Parks and Recreation District (BPRD) for trails identified in their Comprehensive Plan Urban Trails Map.

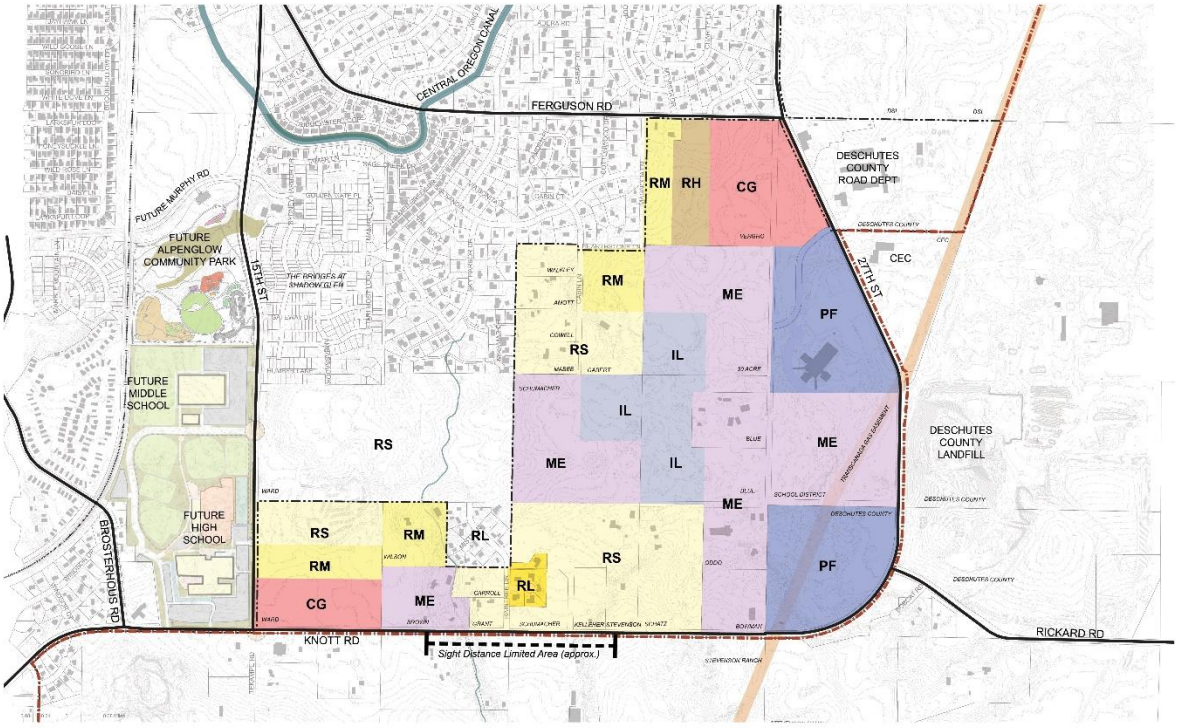
- Provide flexibility in selecting final alignment of trail facilities in order to minimize trail grade, accommodate street crossings and other safety issues, and to fit the context of the natural terrain and topographic/geographic constraints.
- Require trails to be built to a minimum of 10 feet in width, conform to accessibility requirements, and be allowed as part of the alternative standard collector.
- Ensure trails can be used to meet open space requirements for master plans.

Chapter 4.1 – DEVELOPMENT REVIEW AND PROCEDURES, CHAPTER 4.2 – MINIMUM DEVELOPMENT STANDARDS REVIEW, SITE PLAN REVIEW AND DESIGN REVIEW, CHAPTER 4.3 – SUBDIVISIONS, PARTITIONS, REPLATS AND PROPERTY LINE ADJUSTMENTS, and Chapter 4.5 – MASTER PLANNING AND DEVELOPMENT ALTERNATIVES

- Clarify review procedures for area plans.

Chapter 4.9 – ANNEXATIONS

- Remove the requirement for an area plan or master plan for annexations that meet certain requirements and are located within an area that already has an approved Area Plan (such as the Southeast Expansion Area once the SEAP is adopted). Such annexations will still be required to meet the Master Plan approval criteria.



RECOMMENDED
LAND USE CONCEPT

CITY OF BEND
SOUTHEAST AREA PLAN

- Existing City Boundary
- Urban Growth Boundary
- Area of Special Interest
- Tax Lots
- Railroad
- Piped Canal
- Canal
- Utility Easement

COMPREHENSIVE PLAN DESIGNATIONS

- CG - Commercial General
- IG - Industrial General
- IL - Industrial Light
- PF - Public Facility
- ME - Mixed Employment
- RH - Residential Urban High Density
- RM - Residential Urban Medium Density
- RS - Residential Urban Standard Density
- RL - Residential Urban Low Density

SUBJECT TO CHANGE
2/28/2020

N

0 300' 600' 1,200'

Appendix BB - Southeast Area Plan Code Summary Update

CITY OF BEND
SOUTHEAST AREA PLAN

Southeast Area Plan Code Summary

PREPARED FOR: Southeast Area Plan Advisory Committee (SEAPAC)

COPY TO: File

PREPARED BY: Project Team

DATE: July 23, 2020

Overview

This memorandum provides a summary of the latest draft Bend Development Code (BDC) amendments that will implement the Southeast Area Plan (SEAP) and vision. At SEAPAC Meeting #8 (June 4, 2019), the project team presented SEAPAC, for their review and consideration, a memo outlining high-level development code concepts. This previous memo outlined proposed use changes for the different zoning districts within the SEAP, and additional development and use standards.

Since that time, staff has been working to draft regulations that reflect the ideas and concepts discussed by SEAPAC during the June 4th SEAPAC #8 meeting. Below is a summary of the draft BDC amendments which incorporate these ideas and concepts.

The purpose for considering changes to the BDC for the SEAP is to provide more detail about the type of development intended for the area than is typically identified by the City's zoning code or Comprehensive Plan. Once adopted, it will create standards for the development of land within the plan boundaries that will supersede (where applicable) those of the underlying zone.

For SEAPAC Meeting #9 (July 30, 2020), the project team requests feedback from SEAPAC on the proposed BDC amendments presented in this memorandum. Following SEAPAC's feedback and discussion, the project team will incorporate the committee's comments and prepare these for public review and comments during an online open house scheduled for August 2020.

Southeast Area Plan Code – Topics, Discussion, and Recommendations

The following is a summary of the code topics discussed at SEAPAC Meeting #8 (June 4, 2020) along with project team's recommendations on how to address them in the BDC.

Residential Zones

1. Alley access/street orientation. At SEAPAC Meeting #8, staff presented the concept of alley access and street orientation standards that would require residential lots located in the RS (standard residential) zone to have alley access and be oriented to the arterial or collector, when applicable. The committee discussed this potential requirement and a committee member expressed concern with marketability and livability of RS residential units that front arterials and collectors.

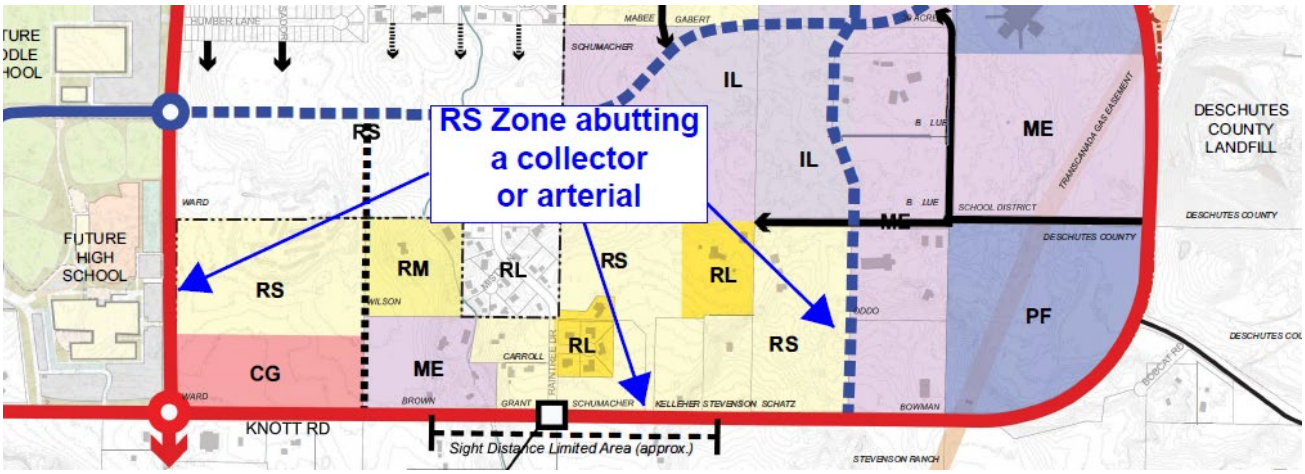
The existing BDC Section 3.1.200(E)(1) requires:

> *"New lots and parcels created through land division that have frontage onto an arterial or collector street shall provide alternative options for access as indicated below:*

1. Residential lots or parcels not intended for multifamily housing shall provide alley access to the individual lots fronting onto the arterial or collector."

Based on feedback from SEAPAC, as well as the existing BDC requirement for alley access and limited area of applicability for this requirement in the SEAP (as shown in Figure 1 below), staff is recommending that no additional requirements for alley access or building orientation standards be added.

Figure 1. Locations where RS zone abuts a collector or arterial



Commercial Zones

1. Automobile-Oriented and Automobile-Dependent Uses and Facilities. In the BDC, retail sales and service that are classified as "auto-oriented" include those that allow drive up or drive-through facilities. Drive-through facilities are those that are designed to allow drivers to remain in their vehicles before and during an activity on the site (e.g. coffee, banking). BDC Section 3.6.300(A)(1) regulates the development of auto-oriented uses that include uses such as banks, coffee huts, and retail with drive-through pharmacies. BDC Section 3.6.300(A)(2) addresses gas stations. The standards in Sections 3.6.300(A) are intended to provide a vibrant, storefront character, slow traffic, and encourage walking and transit use

The project team recommends the following changes to support the development of auto-oriented uses in a manner consistent with the vision for the SEAP as a walkable community. These changes include:

- Prohibit drive-up, drive-in, or drive-through drives or lanes to be located between a building and a public or private street.
- Prohibit drive-in and drive-through facilities from being oriented towards a public street or private street.
- Prohibit standalone commercial and public parking as a permitted use.
- Automobile Services and Gas Station:
  - Require a minimum 10' landscape buffer with a mature vegetation height of at least three feet within three years of planting between all onsite vehicular circulation areas and the street.
  - Require the primary building (i.e. gas station convenience store) to be located adjacent to the street (at the 10' minimum/maximum building setback requirement) and to include a street-oriented pedestrian entrance.

2. Marijuana Businesses in the CG Zone. There are several marijuana related uses currently allowed in the CG Zone under BDC 2.3.300, including:

a. Medical marijuana dispensary and marijuana retailer

b. Marijuana wholesale (More than 75% of sales are wholesale)

c. Marijuana Testing, Research and Development Facilities

With respect to these uses in the CG zone, the project team recommends the following:

- No additional regulations for dispensaries and retailers. These uses are already regulated under BDC 3.6.300(P)(4)(d).
- Prohibit marijuana wholesale. This would be consistent with the direction proposed for this use in the IL and ME Zones.
- Allow testing, research, and development facilities. This is also consistent with other similar uses in the SSEAP.

Regarding dispensaries, these uses are regulated under BDC 3.6.300(P)(4)(d):

> *d. Medical Marijuana Dispensaries. No medical marijuana dispensary may operate or conduct business within:*
>
> *i. One thousand feet of a public or secondary school for which attendance is compulsory under ORS 339.020 (2013); or a private or parochial elementary or secondary school, teaching children as described in ORS 339.030(1)(a) (2013);*
>
> *ii. One thousand feet of another medical marijuana dispensary;*
>
> *iii. One hundred fifty feet of a licensed child care facility, as defined in BDC Chapter 1.2; or*
>
> *iv. One hundred fifty feet of a Bend Park and Recreation District developed park facility including neighborhood parks, community parks, regional parks, natural areas, urban plazas and community river parks, or an Oregon State Park.*

The project team does not recommend any changes to how dispensaries are allowed in the CG Zone because each CG zone in the SEAP abuts or will be across a public street from a school. The CG designated area in the north abuts High Desert Middle School; the CG designated at the corner of 15th St and Knott Road is across the street from the new high school.

3. Standalone Residential Uses in the CG Zone. Staff is recommending amendments to allow for standalone residential uses in the CG zone, with the following standards and limitations:

- Standalone residential uses in the CG zone that are not part of a vertical or horizontal mixed-use development are limited to the following uses: Multifamily Residential, Attached Single-Family Townhomes, and Accessory Dwelling Units (ADUs)
- Must not be located on a development site that fronts a “Shopping Street” or arterial.
- Must meet the minimum density standards for the RH zone (21.7 units/gross acre)
- Must meet specific development and design standards for standalone residential uses in commercial zones to ensure compatibility with the surrounding commercial development, consistent with similar requirements for residential uses located in commercial areas in other parts of the City. These standards include:
  - 10’ minimum/maximum setback
  - street orientation standards

- minimum transparency requirements (25% ground floor, 20% upper levels)
- simple building articulation standards
- parking standards (1 space per dwelling unit, 0.5 parking space per affordable dwelling unit)
- open space requirement exception when located within a ¼ mile of a public park

4. "Shopping Streets". The existing BDC section 2.2.500.C.2, requires a "shopping street" with specific pedestrian-oriented design standards, when multiple-building development is contemplated on parcels or lots that are 10 acres or greater. In addition to the existing requirements in section 2.2.500(C)(2), the project team recommends a requirement that a shopping street be identified at the time of master plan, site plan, annexation, and/or subdivision for properties that are 20 acres or greater and contain 10 acres or more of area with a comprehensive plan map designation of Commercial General. Staff is recommending additional design elements be required, including:

- Shopping street length requirements (a minimum of 400' long) with ground floor commercial development required on both sides.
- Prohibiting vehicular access from a shopping street.
- Requiring parking to be located behind primary structures.
- Prohibiting some uses otherwise allowed in the CG zone, including: Automobile Dependent and Automobile Oriented Retail Sales and Services, Drive-In and Drive-Through Facilities, standalone Commercial and Public Parking, standalone residential, and Commercial Storage

Mixed Employment Zone

1. Automobile-Oriented and Automobile-Dependent Uses and Facilities in the ME Zone. Like the CG Zone, retail sales and service uses that are auto-oriented are permitted subject to the standards under BDC 3.6.300(A). However, the ME Zone addresses restaurant/food and beverage services separately. Those uses without a drive-through are permitted; those with a drive-through are allowed as conditional use. This means that in addition to the standards in BDC 3.6.300(A), such uses are also subject to the processes, standards, criteria, and potential conditions for conditional uses under BDC Chapter 4.4.

For drive-throughs in the ME Zone, the project team recommends eliminating the conditional use permit and applying the same changes proposed above for such uses in the CG Zone.

2. Marijuana Businesses in the ME Zone. There are several Marijuana businesses allowed in the Mixed Employment (ME) Zone under BDC 2.3.200. These uses include the same uses already allowed in the ME Zone:

- Medical marijuana dispensary and marijuana retailer
- Marijuana wholesale (More than 75% of sales are wholesale)
- Marijuana Testing, Research and Development Facilities

Dispensaries and retailers are regulated in the ME Zone according to BDC 2.3.200(C)(2)(b):

> *b. In the ME Zone, retail sales and service uses and medical marijuana dispensary and marijuana recreational retailer uses shall not exceed 50,000 square feet ground floor, except that on property five acres or greater retail sales and service uses shall not exceed 75,000 square feet.*

In addition, dispensaries and marijuana retailers are regulated under BDC 3.6.300(P)(2)(d), like they are in the CG Zone.

With respect to Marijuana businesses in the ME Zone, the project team recommends the following:

- Make no SEAP specific changes for dispensaries and retailers in SEAP. Such uses are already regulated under the base zone (here, ME) and the standards in the Bend Development Code.
- Like the CG and IL Zones, prohibit marijuana wholesale in the ME Zone
- Allow testing, research, and development facilities, in the ME Zone, as these are consistent with similar uses in the ME Zone.

3. Housing in the ME Zone. Several types of housing, with the exception of single-family detached housing, are allowed in the ME Zone under BDC 2.3.200. These types include:

- Attached single family townhomes
- Two- and Three-Family Housing
- Multi-family Residential
- Temporary Housing
- Accessory Dwelling Units

These residential uses/types of housing are regulated under BDC 2.3.200(C)(1):

> *1. New Residential Uses. In order to ensure that the ME and PO Zones retain a focus on employment uses, new residential uses in the ME and PO Zones are limited as follows:*
>
> *a. Residential uses that are part of a mixed-use development in which nonresidential uses occupy at least the floor area equivalent to the entire ground-floor area of the development are permitted.*
>
> *b. Residential uses that are part of a mixed-use development in which nonresidential uses occupy less than the floor area equivalent to the entire ground-floor area of the development are conditional.*
>
> *c. Residential uses that are not part of a mixed-use development are prohibited.*

With respect to the types of housing allowed as part of a mixed-use development, mixed-use may include either vertical or horizontal development, and may also be attached or detached buildings.

In addition to the types of housing listed above, the project team has recommended adding live/work dwelling units to the list of allowed types of housing in the ME Zone. The term “live/work dwelling unit” refers to a structure or portion of a structure that combines a nonresidential use that is allowed in the zone with a residential livable space. A live/work dwelling unit is allowed instead of, or in addition to, a home business as defined by the BDC

With respect to housing in the ME zone, the project team recommends allowing live/work dwelling units as a permitted use and type of housing. The team does not recommend any further changes to the code for housing in the ME Zone.

Light Industrial Zone

1. Design Standards. In addition to the existing standards in BDC 2.4.700, the proposed changes include:

a. A requirement for primary building entries to be emphasized with architectural features such as awnings, projections, recesses, changes in materials or similar features and to also include pedestrian scaled elements such as lighting and signage.

b. Encouragement of the use of durable, quality materials (including brick, stone, concrete, concrete masonry units, and wood) and exterior design features (including change in materials, texture, color and trim detailing) in order to break up large building facades and create a human scale.

2. Parking. Prohibiting parking from being located between the primary structure and front property line.

3. Setbacks. Staff reviewed the feedback from SEAPAC and the existing buffering and setback requirements in the IL zone and is recommending no changes be made. The existing setbacks are as follows:

> *Front Yard Setbacks: The minimum front yard setback is 10 feet.*
>
> *Rear and Side Yard Setbacks: None, except when abutting a Residential Zone the setbacks are as follows: 20 feet; portions of buildings or structures that exceed 35 feet in height shall be set back an additional one-half foot for each foot by which the building height exceeds 35 feet.*

Public Facility Zone

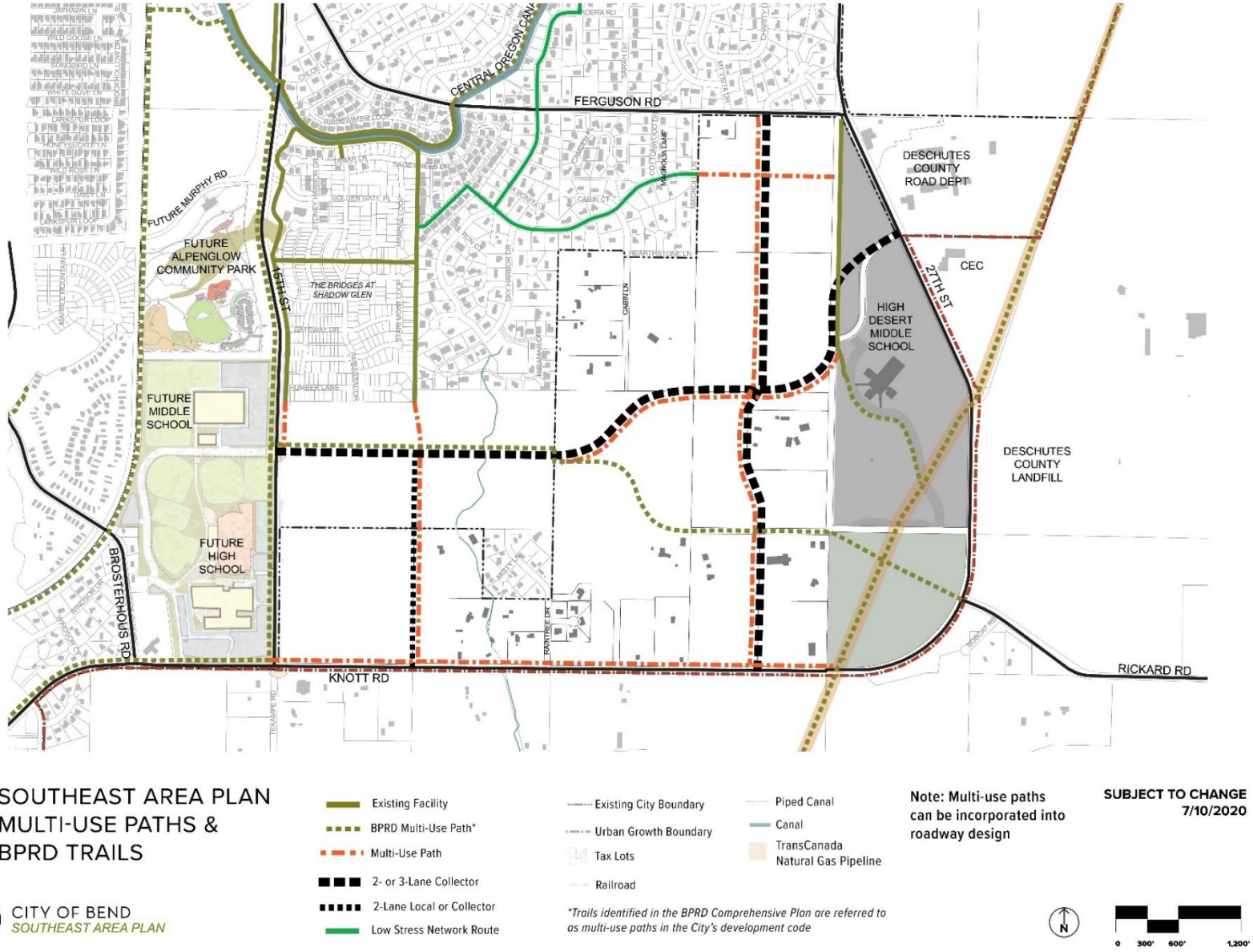
Based on the feedback from SEAPAC #8, the project team proposes no changes to the existing permitted and conditional uses currently allowed in the PF Zone. Sarah Bodo will give a presentation on the Bend Park and Recreation District's process for developing a plan for an individual park, such as High Desert Park.

Multi-use Paths and Trails

The presentation for this code will include one change to the map shared with SEAPAC at your June 4th meeting. The attached map shows the location of the multi-use path that parallels the east-west collector through the Ward/Pahlisch property on the north side to match the plan for the development of Easton. Paths and trails must be constructed according to their alignment shown on the map, and in conjunction with roadway construction, a land division, or site development.

Multi-use paths and trails constructed outside of a road right of way must be at least 10 feet wide and located within an easement that will be dedicated to the public. Trails constructed outside of the public right of way may be used to satisfy open space requirement for master plans and/or landscaping requirement for site plans.

Figure 2. Southeast Area Plan Multi-Use Paths & BPRD Trails



Significant Trees and Rock Outcrops

Based on feedback from SEAPAC #8, the project team conducted additional field work and site study analysis to develop the following draft tree and rock outcrop regulations. Field visit results and analysis will be presented at the July 30th SEAPAC meeting.

Significant Trees

In SEAP, BDC Section 3.2.200 Land Conservation and Section 16.10.100 Tree Preservation Standards would apply. In addition to BDC Section 3.2.200, a minimum requirement of 50% of trees 24" or greater would be required to be preserved in SEAP. These could be incorporated into required open space and landscaping. Additional incentives would be available for preserving trees greater than 24" DBH or tree groves that go beyond those in the existing tree ordinance, See BDC 3.2.200(D). The following are proposed incentives for preserving significant trees in SEAP:

- Reductions of setbacks up to **30** percent.
- Reduction of required on-site parking up to **15** percent.
- Increased lot coverage up to **20** percent.
- Reduced landscape coverage up to **ten** percent.
- Allow reduced lot sizes to preserve individual significant trees or tree groves.

Note: the proposed incentives shown above will be reviewed with SEAPAC at the July 30, 2020 meeting.

Rock Outcrops

Recommendations to incorporate natural rock outcrops into SEAP development include two approaches:

1. **Reduced landscape requirements** when **existing rock outcrops** are incorporated into the development's landscaping.
2. The **required preservation** of **significant rock outcrops**, with specified exceptions.

Reduced landscape requirements

Developments in SEAP that incorporate existing (on-site) rock outcrops, defined as rocks or clusters of naturally occurring lava rock, into their landscaping can qualify for reduced ground cover requirements in BDC 3.2.300(D) from 80% plant ground cover required to 50%.

Preservation of significant rock outcrops

The location of significant rock outcrops would need to be provided with a survey through the development review process for master plans, site plans, and subdivisions. Significant rock outcrops, defined as clusters of naturally occurring lava rocks, that meet the below criteria, would be required to be preserved:

- Have a height at one point above the surrounding terrain of **8 feet** or more
- Are over 3,000 square feet in area

The total area of preserved rock outcrops areas would not need to exceed more than 3% of total parcel size. Certain exceptions would be made available such as:

- Where public or shared infrastructure could not be sited elsewhere
- If minimum density is not achievable.

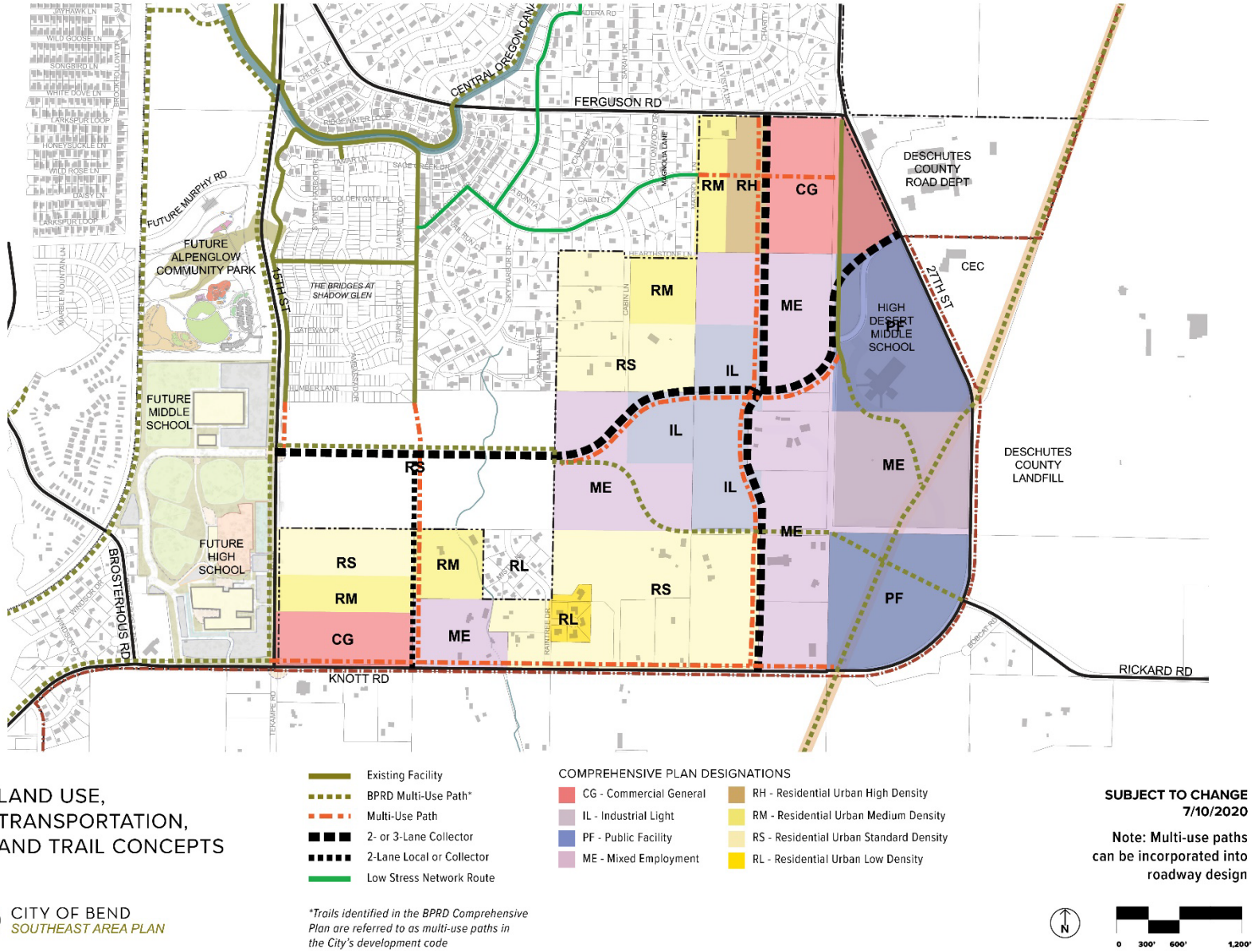
- Soft surface trails would be able to be developed within significant rock outcrop areas, as allowed in the ASI code, BDC Section 2.7.700(E).

Incentives would be made available for the area preserved for rock outcrops including:

- Reductions of setbacks up to **30** percent.
- Reduction of required on-site parking up to **15** percent.
- For public facilities, an increase in maximum parking allowed by **15** percent.
- Increased lot coverage up to **20** percent.
- Reduced landscape coverage up to **ten** percent
- Reduced landscaping requirements for plant ground cover.

Note: the proposed incentives shown above this text will be reviewed with SEAPAC at the July 30, 2020 meeting.

Figure 3. Southeast Area Plan Land Use, Transportation, and Trail Concepts



Appendix CC - Collector Street Design Elements 2.0

CITY OF BEND
SOUTHEAST AREA PLAN

Collector Street Design Elements for Southeast Area Plan V2.0

PREPARED FOR: Southeast Area Plan Advisory Committee

COPY TO: Southeast Area Plan Project Team, Southeast Area Plan Project File

PREPARED BY: Damian Syrnyk, Senior Planner

DATE: July 17, 2019

Overview

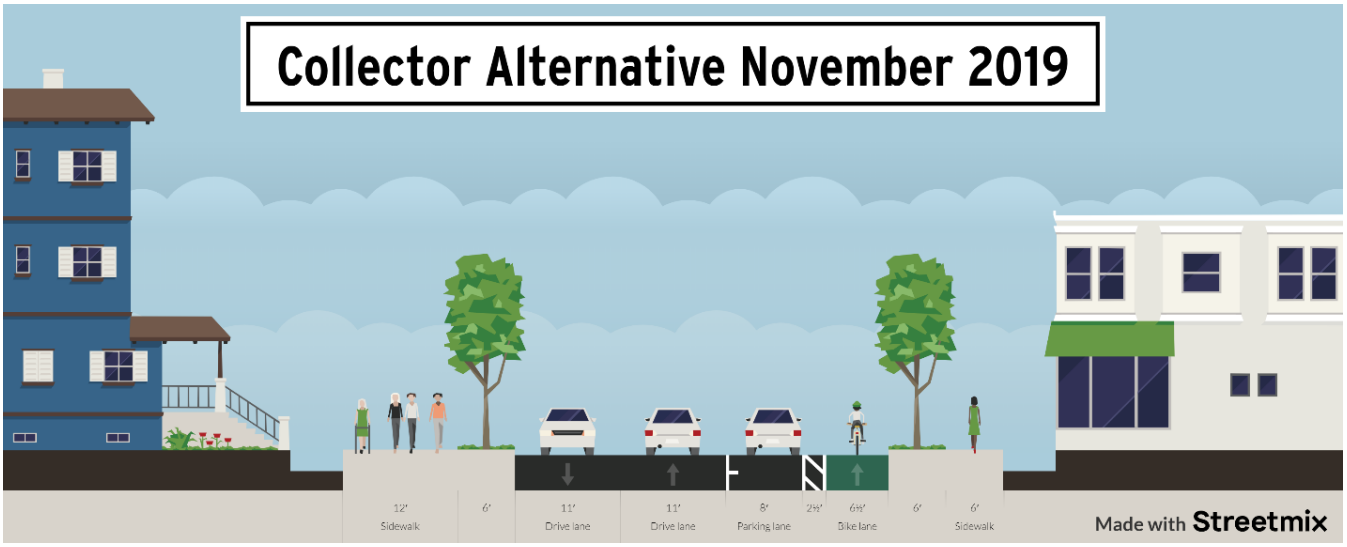
This memorandum presents the final draft of a proposed alternative standard for collector streets. The project team outlined a proposed alternative collector standard for SEAPAC's consideration and direction at your September 26, 2019 meeting. SEAPAC provided feedback the project team used to make several changes to the proposed alternative standard. This memorandum also includes several examples of how the alternative collector standard can be modified based on the land use context, for example, whether it's primarily residential, mixed use, or more commercial and employment focused.

The project team requests SEAPAC's review and feedback on the enclosed proposed alternative collector standard. For reference, you will find a link to the September 26, 2019 meeting packet that includes the September 12th memorandum to SEAPAC (see Agenda Item No. 7).

Proposed Design Elements for an Alternative Collector Standard

Figure 1 presents an example of a cross section for a collector street using the alternative standard.

Figure 1. Cross section of Collector Street using Alternative Standard



The following presents the elements of the alternative collector standard, with highlighted text indicating changes made since the September 2019 SEAPAC meeting. If SEAPAC approves of the alternative standard as proposed in this memorandum, the project team will prepare draft code amendments incorporating the standard in Chapter 3.4, Public Improvements, of the Bend Development Code (BDC). BDC 3.4.200, Transportation Improvement standards, is the appropriate section in which to incorporate the alternative standard.

Required Elements – These standards are minimums that must be met with development of a collector street under this standard.

- Right of Way (ROW) –80 feet
- **Travel Lane Width** – 11 feet (when separated by left-turn lane, pedestrian safety island, etc.); 11.5 feet when opposing lanes are immediately adjacent (head-on).
- **Bike Lane** – 6 feet plus a buffer of 2 ½ for car door opening buffer (or buffer to moving traffic)
- **Driveway Access** – Access will be allowed per BDC 3.1400 Vehicular Access Management. There is no change proposed for this alternative standard.
- **On Street Parking** – If on-street parking is provided, it shall be designed and constructed according to BDC 3.3.500, On-Street Parking Design Standards. On-street parking may require an additional easement to ensure the other elements of the collector road right of way satisfy those above. Curb extensions are required around on-street parking at intersections to ensure everyone can see each other at crosswalks.

Flexible Elements - The following elements may flex depending within the proposed ranges

- **Sidewalk** – from 6 feet to up to 8 feet
- **Multi-Use Path** – 10 to 12 feet if located on the side of a street, separated from travel lanes and for two-way pedestrian and bicycle travel
- **Planting Strip** – 4 to 6 feet on each side to include street trees, bioswales, and/or landscaping; street trees could be planted in tree wells in areas with narrower sidewalk widths or in areas where sidewalk space wants to be maximized
- **Median/Turn Lane** – Consider including for intersections that warrant a left-turn lane (e.g. the intersection of the east-west collector with north-south collector) or when additional enhancement is warranted for a pedestrian crosswalk (safety island).

For reference, this memorandum includes a proposed new Table F that would be added to BDC 3.4.200 to reflect the new alternative collector standard, including both fixed and flexible elements.

Proposed Table F: Alternative Improvement Standards for Dedicated Public Collector Roads

Minimum Right of way	Minimum travel lane width	Planter strips	Minimum Left-Turn Lane/Median Island Width (2)	Maximum Grade	Direct Site Access (3)	Sidewalks Both Sides (4)	Curbs
80’	11’ / 11.5’	4’ to 6’	13’/10’	6%	Yes	6’ to 8’’	Yes

Requirements

1. Travel lanes must be at least 11 feet in width (11.5 feet when opposing flow is immediately adjacent (head-on)).

2. The first dimension is the minimum required width of the left-turn lane while the second dimension applies to the raised median width constructed between intersections, or at intersections.

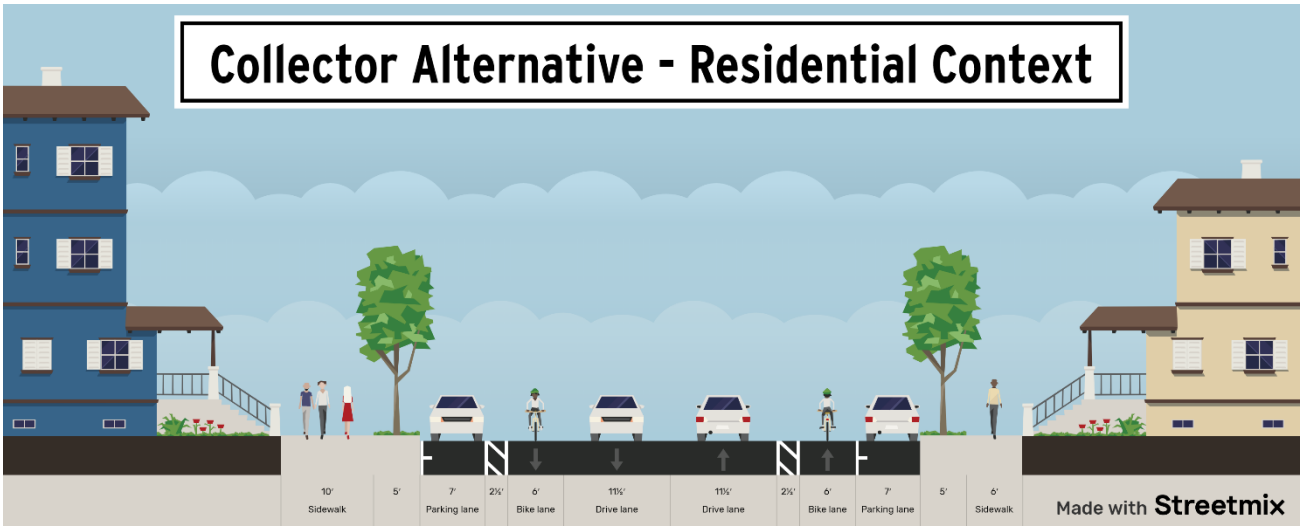
3. Site access allowed per BDC 3.1.400, Vehicular Access Management

4. A sidewalk is not required on the side of a collector developed under this standard if a multi-use path is provided and is at least 10 feet side for two-way travel. This type of path is dedicated for pedestrian and bicycle trips only.

Examples of Collector Alternative Standard in Different Land Use Contexts

The following cross sections provide three different examples of using the alternative collector standard, including examples with and without on-street parking, and one including a left-turn lane. These examples are intended to be illustrative.

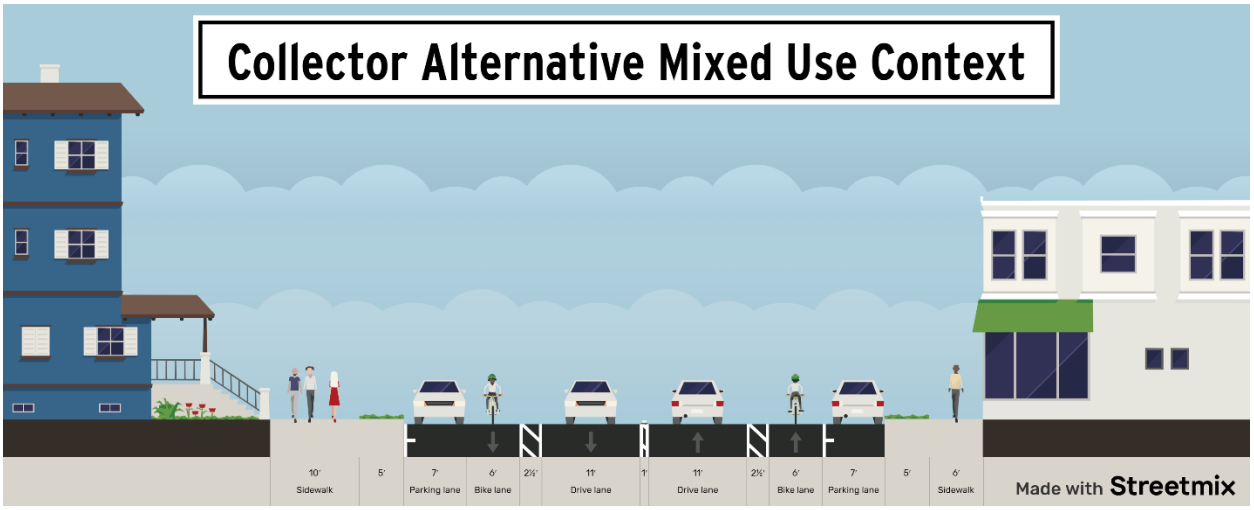
Figure 2. Residential Context



Notes:

- 10’ sidewalk on the left (north side or east side) of street represents a multi-use path
- Park/Landscape strip of five (5) includes six inches on each side for concrete curbs abutting sidewalk and the parking lane. The strip for landscaping would be four (4) feet in width.
- Drive lanes are shown in this example at 11’-6” to reflect the 1’ narrow double yellow centerline stripe between the lanes.
- Buffers of 2.5’ provided between bicycle lanes and on-street parking for car door opening. Buffers can be placed between bike lane and moving traffic lane instead.

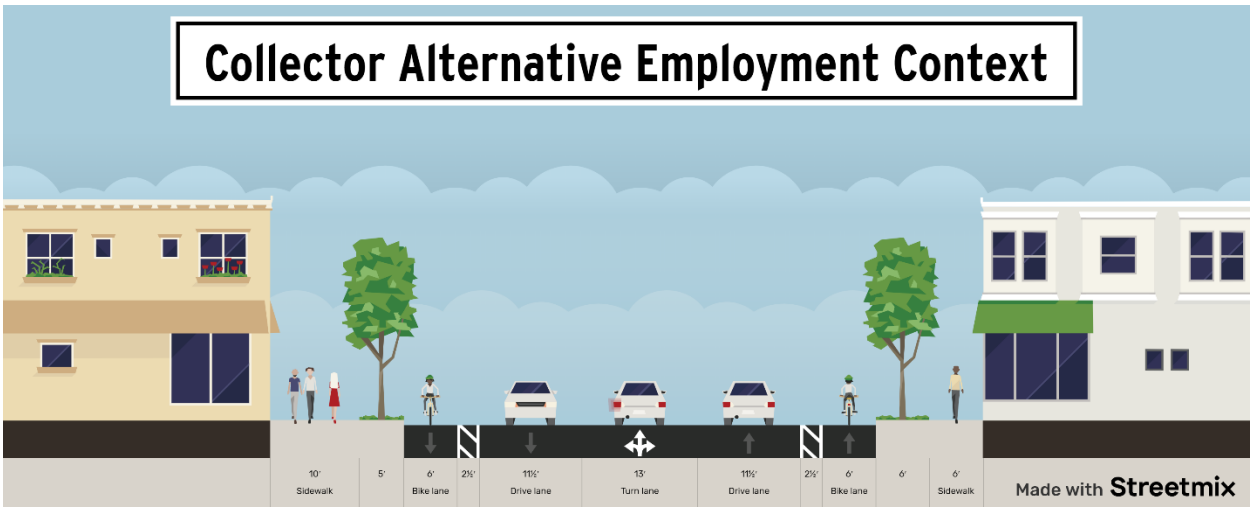
Figure 3. Mixed Employment/Mixed Use Context



Notes:

- 10’ sidewalk on the left (north side or east side) represents a multi-use path
- On-street parking slightly wider
- Bike lanes both 6 feet with 2.5’ buffers (buffers can be moved out to between travel lanes)
- Both cross sections for a more residential context and a mixed-use context are similar

Figure 4. Employment/Industrial Context



Notes:

- 10’ sidewalk on left (north or east side) side represents multi-use path
- On-street parking replaced with a left-turn lane (assuming approach to intersection)
- Room left over to expand planting strips, sidewalk, and/or bike lanes

Appendix DD - Plan and Code Changes Summary

CITY OF BEND
SOUTHEAST AREA PLAN

Plan and Code Changes Summary

PREPARED FOR: Southeast Area Plan Advisory Committee

COPY TO: Project File

PREPARED BY: Project Team

DATE: September 24, 2020

Purpose

This memorandum outlines and summarizes the proposed changes to the Bend Comprehensive Plan and the Bend Development Code (BDC) developed for implementing the Southeast Area Plan. The changes summarized reflect those proposed to and discussed with SEAPAC at your December 3, 2019; June 4, 2020; and July 30, 2020 meetings.

The proposed changes to the Comprehensive Plan include adding new policies related to industrial and commercial lands in the Southeast Expansion area and modifying existing policies for the Elbow to reflect changes to the land use map for the Southeast. The proposed changes to the Development Code include a new section for the Southeast Area Plan in Chapter 2.7 of the Bend Development Code, Special Planned Districts, Refinement Plans, Area Plans, and Master Plans. In addition, the Development Code changes including conforming amendments in several section to ensure consistency with the additions to Chapter 2.7.

Comprehensive Plan Amendments

The Southeast Area Plan proposes a number of changes to both the text and the adopted map of the Bend Comprehensive Plan. The proposed changes to the Comprehensive Plan Map reflect the changes adopted through the SEAP process, and include the proposed changes to the plan designations for certain properties in the Southeast Expansion Area.

The proposed changes to the text of the Bend Comprehensive Plan for SEAP include new and amended policies to:

- Ensure an adequate supply of Industrial lands needed for industrial jobs (related to re-designated Industrial lands);
- Ensure the adequate supply of commercial lands needed for jobs in commercial zones (related to re-designated Commercial lands);
- Remove the requirement for a master plan application at time of annexation if the annexed property is part of an adopted area plan; and
- Reflect proposed SEAP plan designation changes (i.e. number of acres converted from IG and IL to ME).

The proposed policies for Industrial and Commercial lands are proposed to be added to Chapter 6, Economy, of the Comprehensive Plan. The proposed policy changes related to the Southeast Area Plan affect policies in Chapter 11, Growth Management, of the Comprehensive Plan.

Development Code Amendments

The proposed amendments to the Bend Development Code for the SEAP include the addition of a new section to Chapter 2.7, “Special Planned Districts, Refinement Plans, Area Plans, and Master Plans.” This memorandum focuses on outlining and summarizing the components of the new Section in BDC Chapter 2.7. The proposed conforming amendments in other parts of the Development Code are minor, but available upon request.

Special Planned Districts are used by the City of Bend to provide more detail about the type of development intended for a specific area than is typically identified by the City’s zoning code or Comprehensive Plan. Once adopted, Special Planned Districts create standards for the development of land within the plan boundaries that may supersede those of the underlying zone. This is the case with the Southeast Area Plan.

The proposed Southeast Area Plan code (additions to BDC Chapter 2.7) consists of the following components:

- Proposed changes to the allowed uses in the zones of SEAP—some new uses are allowed, several are prohibited;
- Development and design standards in the Commercial and Light Industrial zones;
- Standards for development of trails and multi-use paths;
- Specific standards for preservation of natural features; and
- Alternative collector design standards for the east-west (NE Caldera Drive) and north-south collectors.

The zones/zoning districts referred to below are those that implement a designation on the Comprehensive Plan Map (e.g. RS, Standard Density Residential). The purpose for these amendments is to ensure the development of the Southeast Expansion Area is consistent with the Vision and Guiding Principles for the Southeast Area Plan. One of the goals underlying the prohibition of certain uses was the goal of limiting certain uses that had “industrial” characteristics—for example, uses that would generate, noise, dust, odors, vibrations, and truck traffic. This was based in part on the Market and Land Use Analysis, as well as the goal to allow the types of uses more compatible in a neighborhood setting (e.g. research and development, flex space).

Summary of Changes to Allowed Land Uses

The following outlines the changes to the allowed land uses in the districts within SEAP. The SEAP Code will address existing land uses, including those that were lawfully established prior to the adoption of the SEAP Code. Such uses that are not conforming to the proposed code will be considered permitted uses. Expansion or enlargement of such uses will be subject to the provisions of BDC Chapter 4.2, Minimum Development Standards Review, Site Plan Review and Design Review.

Residential Districts (RS, RM, and RH)

The SEAP Code does not propose any changes to the allowed uses or standards in these districts. The permitted and conditional uses allowed in Residential Districts under Table 2.1.200 of the BDC are allowed in the Residential Districts of SEAP.

General Commercial District (CG)

The SEAP Code includes the following changes to the allowed uses and development standards in the CG District of the Southeast Expansion Area.

Allowed Land Uses

- All land uses allowed in the CG District under Table 2.2.300 of the BDC and including:
  - Standalone residential uses on sites not fronting Shopping Streets or Arterials and establish special standards for standalone residential uses in the CG zone, including building orientation to the street, transparency requirements, and minimum densities.
  - Live-work townhomes as a permitted use in the CG zone.
  - Certain auto-oriented/auto-dependent uses (e.g. drive-throughs) to be permitted uses subject to specific site and design criteria in the Southeast Area Plan to encourage the pedestrian character.
- The following land uses are limited or prohibited in the CG District of SEAP:
  - Large-scale, non-commercial institutional users such as government facilities, schools, parks, and other public/institutional uses are limited to preserve CG zones for their primary commercial function.
  - Wholesale sales of marijuana are prohibited.

Development/Design Standards

- A minimum and maximum 10’ setback with allowed increases when a usable public space is provided.
- The requirement for main streets (“Shopping Streets”) in the two CG districts and design and use standards including specific design elements for street length, vehicular access and parking location, and prohibition of certain uses along Shopping Streets that would otherwise be allowed in the CG Zone.
- Parking is not allowed to be located between the building and the primary street frontage.

Mixed Employment District (ME)

The SEAP Code includes the following changes to the uses allowed in the ME District of the SEAP.

- All permitted and conditional uses allowed in the ME District under Table 2.3.200 of the BDC, including the following additional uses:
  - Live-work townhomes are allowed as a permitted use.
  - A limited percentage of residential use on the ground floor to accommodate entries, residential-related parking.
  - Auto-dependent/auto-oriented uses such as drive-throughs are allowed as permitted uses and subject to the same siting and design criteria as those permitted in the CG zone.
- The only land use prohibited in the ME District of SEAP is Wholesale sales of marijuana.

Light Industrial District (IL)

The SEAP Code includes the following changes to the uses allowed in the IL District of the SEAP.

Allowed Land Uses

- All land uses currently allowed in the IL District under Table 2.4.300, except that the following are prohibited in the IL District of SEAP:
  - Heavy Manufacturing, assembly, and processing of raw materials and recycling; and Marijuana grow sites and marijuana producing.

Design/Development Standards

- The IL District in SEAP includes design standards for building entrances and exterior facades.
- Parking must be located behind a primary structure when abutting an arterial street.

Public Facilities District (PF)

The SEAP Codes includes the following change to the allowed land uses in the PF District of the SEAP.

- All permitted and conditional uses allowed in the PF District under Table 2.6.200 of the BDC are allowed in the PF District of the SEAP.
- Certain uses, such as ball fields, outdoor performance areas with amplified sounds, are permitted outright instead of conditionally, provided certain siting standards are met. The option for a conditional use permit is still available if these standards can't be met.

Summary of Development Standards

In addition to the above changes to the allowed land uses, there are several development standards proposed for the SEAP Code. These standards include:

- Preservation of significant trees and rock outcrops for their integration with future development.
- Construction of multi-use paths and trails consistent with an adopted map.
- Construction of the two collectors consistent with alternative collector standards to provide flexibility for certain element to support biking and walking in the Southeast.

Significant Trees and Rock Outcrops

The code for SEAP includes the following standards for preserving/integrating significant trees and rock outcrops with development in the Southeast. These standards would apply in addition to those in Section 3.2.200, Landscape Preservation, of the Bend Development. At least 50% of trees that are greater than or equal to 24" in diameter at breast height (DBH) would need to be preserved on site. Rock outcrops over 3,000 square feet in area and at least eight feet in height would need to be preserved and integrated into proposed development. The proposed code provides a number of incentives such as reduced setbacks, reduced off-street parking, and greater lot coverage to support the integration of significant trees and rock outcrops. The proposed code also allows some exceptions, such as for public utilities, when the minimum density can't be achieved, and for tree preservation requirements for large buildings, those over 40,000 square feet in size and their accessory uses (e.g. ballfields, required parking).

Multi-Use Paths and Trails

The proposed code for SEAP includes requirements for the construction of multi-use paths consistent with the proposed map for paths and trails in the Southeast Expansion Area. The alignments for paths and trails follow the proposed collector road system in SEAP, and/or follow alignments for trails incorporated in the Bend Park and Recreation District 2018 Comprehensive Plan for trails. Multi-use path construction would need to occur concurrently with development, within public rights of way or within easements dedicated to the appropriate entity.

Alternative Collector Standards

The SEAP Code incorporates a cross-section and standards for the proposed East-West (aka SE Caldera Drive) and North-South collectors. The purpose is to allow for more flexible construction of collectors based on the land use context. The proposed standards allow for narrower travel lanes so that other elements such as bike lanes, sidewalks, and multi-use paths could be incorporated and provide for multi-modal travel. This is consistent with one of the

Guiding Principles of SEAP to “Design and build a walkable and connected transportation network.”

Appendix EE - Online Open House 3 Summary

CITY OF BEND
SOUTHEAST AREA PLAN

Summary of Online Open House #3

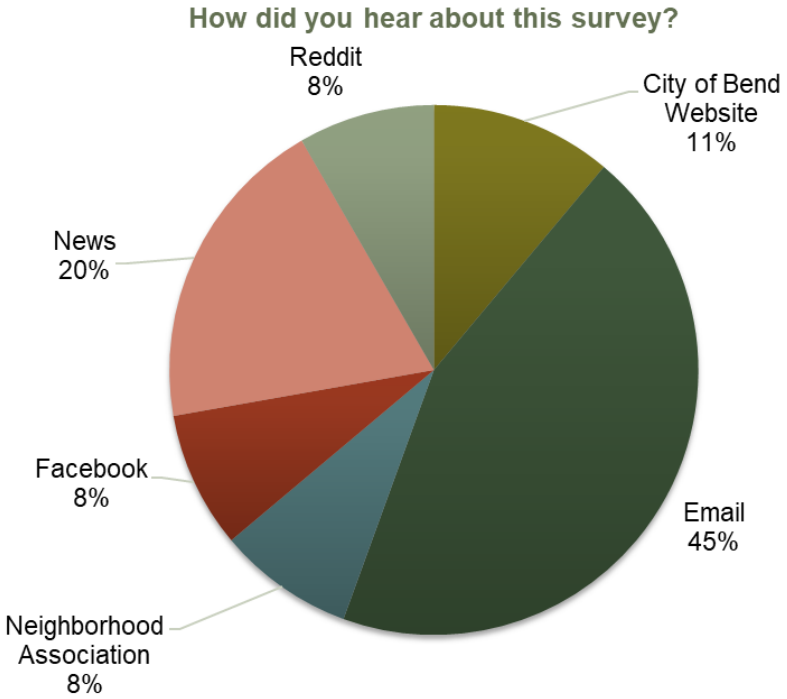
PREPARED FOR: SEAPAC

PREPARED BY: Kyra Haggart and Joe Dills, APG

DATE: 11/24/2020

Introduction

This memorandum provides a summary of the results from the Southeast Area Plan Online Open House #3. The Online Open House, which included an informational component as well as five sets of survey questions, was available for 21 days from Thursday, October 22 through Thursday, November 12, 2020. A link to the Online Open House was posted to the City's website, Facebook page, and Nextdoor; advertised on local news channels; and sent to the project's interested parties email list. The Online Open House received 161 views and 47 responses to the survey questions.



Information Provided

The Online Open House summarized key information that is included in the Southeast Area Plan Summary Report, including:

- History and background on the project's role in planning for future growth in Bend;
- Recommended land use plan;
- Community design concepts;
- Recommended street framework and planned transportation improvement projects;

- Recommended multi-use path framework; and
- A summary of the amendments proposed to the City's development code to implement the project's recommendations.

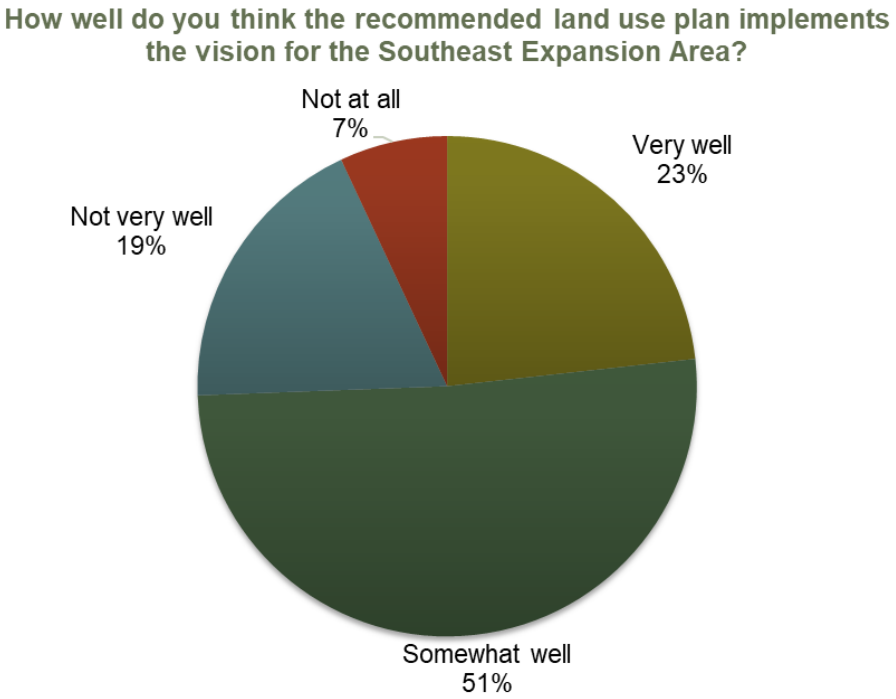
Online Survey Results

Online Open House participants had the opportunity to provide comments indicating their level of support for the land use plan, transportation and multi-use path frameworks, community design concepts, and code concepts. Long-form responses were also accepted and are included as Attachment A to this memo.

Land Use

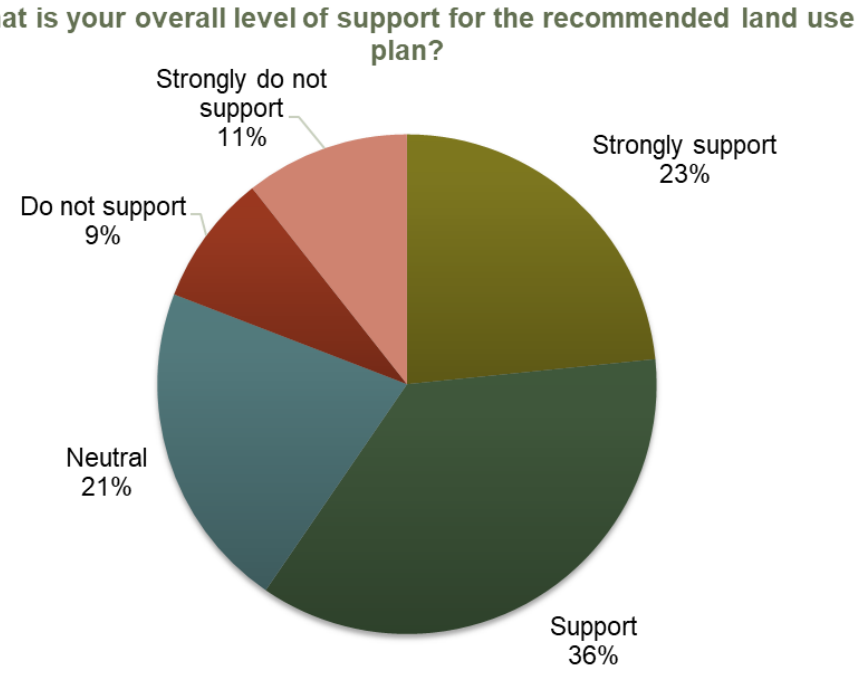
How well do you think the recommended land use plan implements the vision for the Southeast Expansion Area?

- **Very well:** 10 (23% of responses)
- **Somewhat well:** 22 (51% of responses)
- **Not very well:** 8 (19% of responses)
- **Not at all:** 3 (7% of responses)



What is your overall level of support for the recommended land use plan?

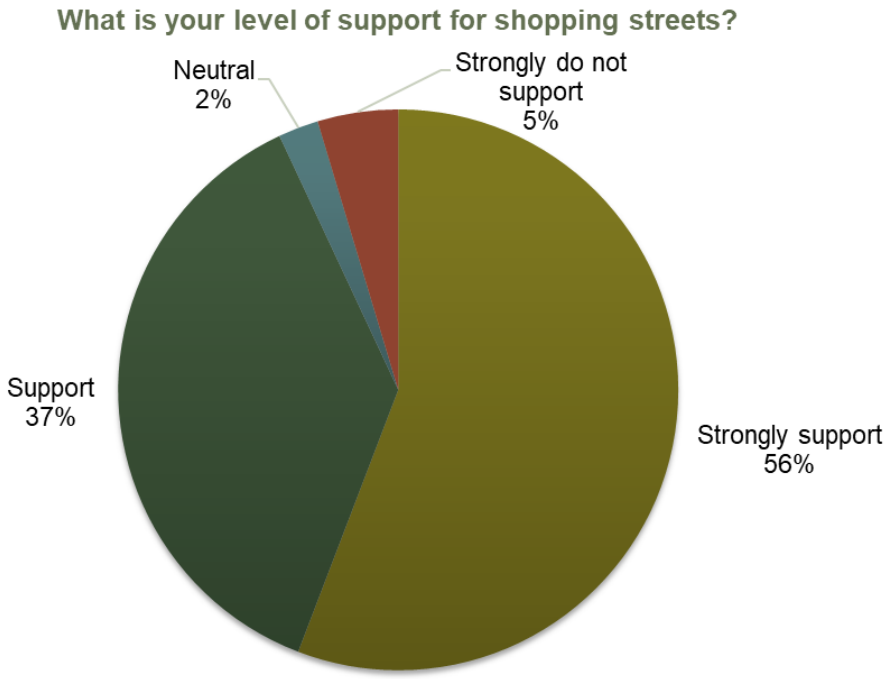
- **Strongly support:** 11 (23% of responses)
- **Support:** 17 (36% of responses)
- **Neutral:** 10 (21% of responses)
- **Do not support:** 4 (9% of responses)
- **Strongly do not support:** 5 (11% of responses)



Community Design

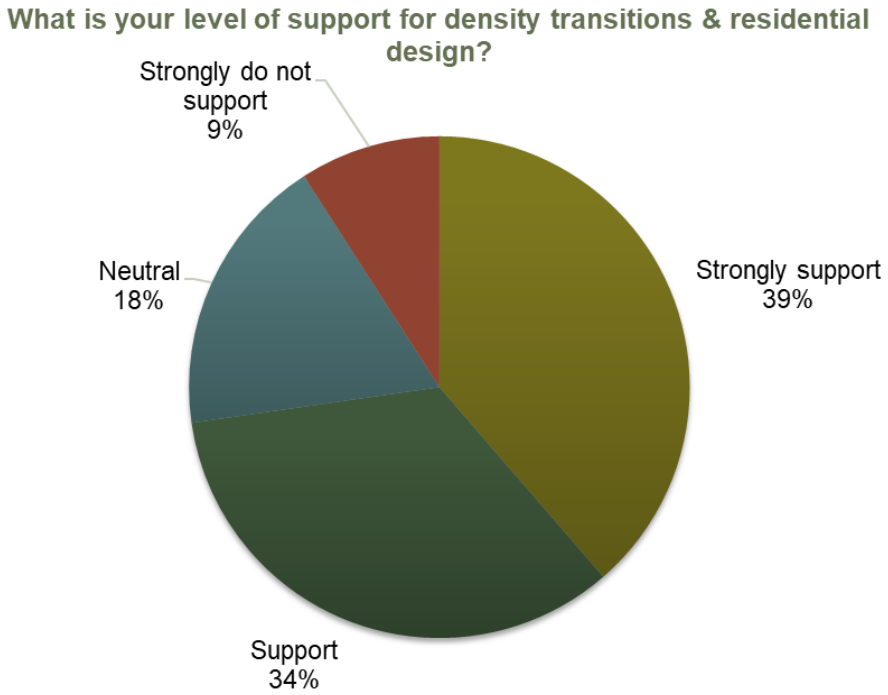
What is your level of support for shopping streets?

- **Strongly support:** 24 (56% of responses)
- **Support:** 16 (37% of responses)
- **Neutral:** 1 (2% of responses)
- **Do not support:** 0 (0% of responses)
- **Strongly do not support:** 2 (5% of responses)



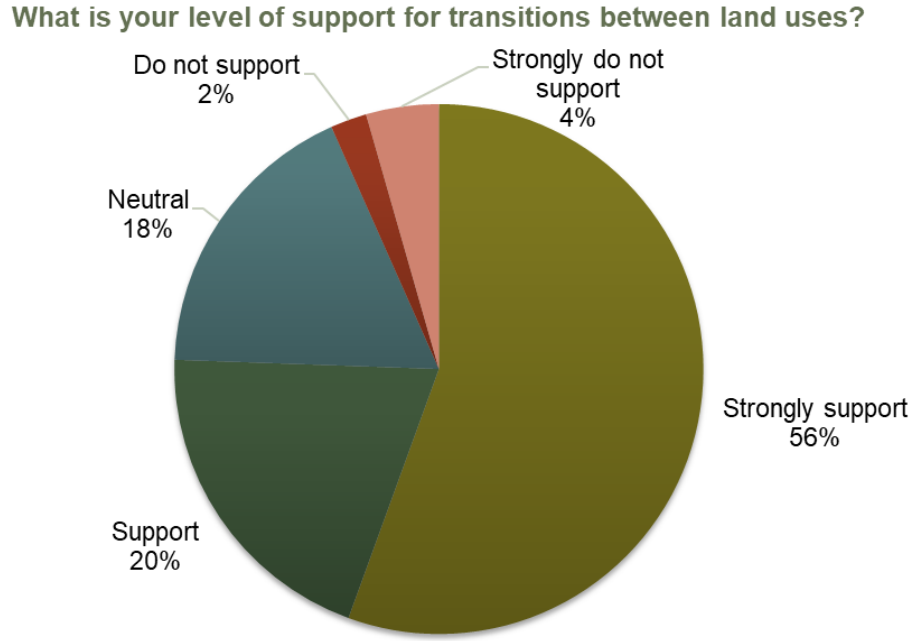
What is your level of support for density transitions & residential design?

- **Strongly support:** 17 (39% of responses)
- **Support:** 15 (34% of responses)
- **Neutral:** 8 (18% of responses)
- **Do not support:** 0 (0% of responses)
- **Strongly do not support:** 4 (9% of responses)



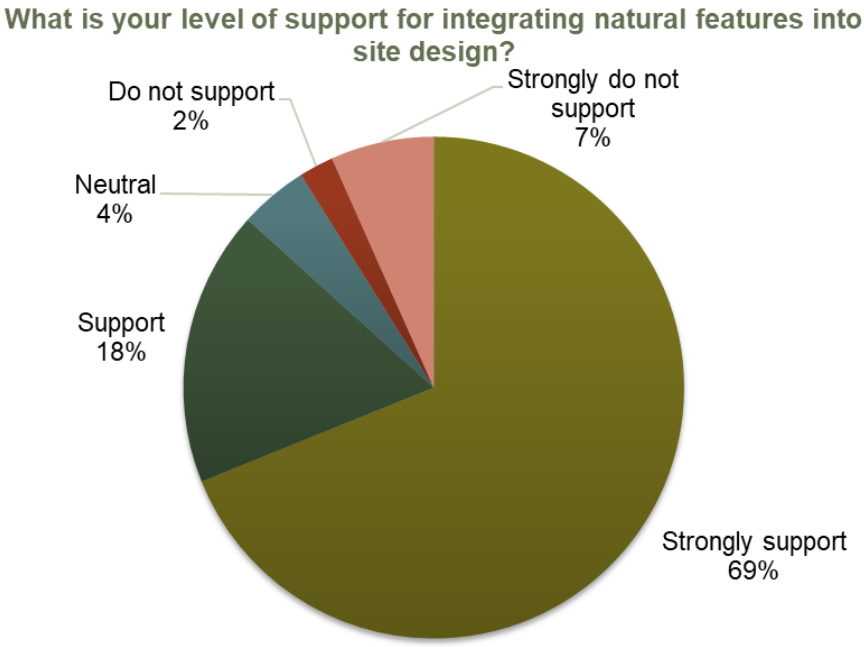
What is your level of support for transitions between land uses?

- **Strongly support:** 25 (56% of responses)
- **Support:** 9 (20% of responses)
- **Neutral:** 8 (18% of responses)
- **Do not support:** 1 (2% of responses)
- **Strongly do not support:** 2 (4% of responses)



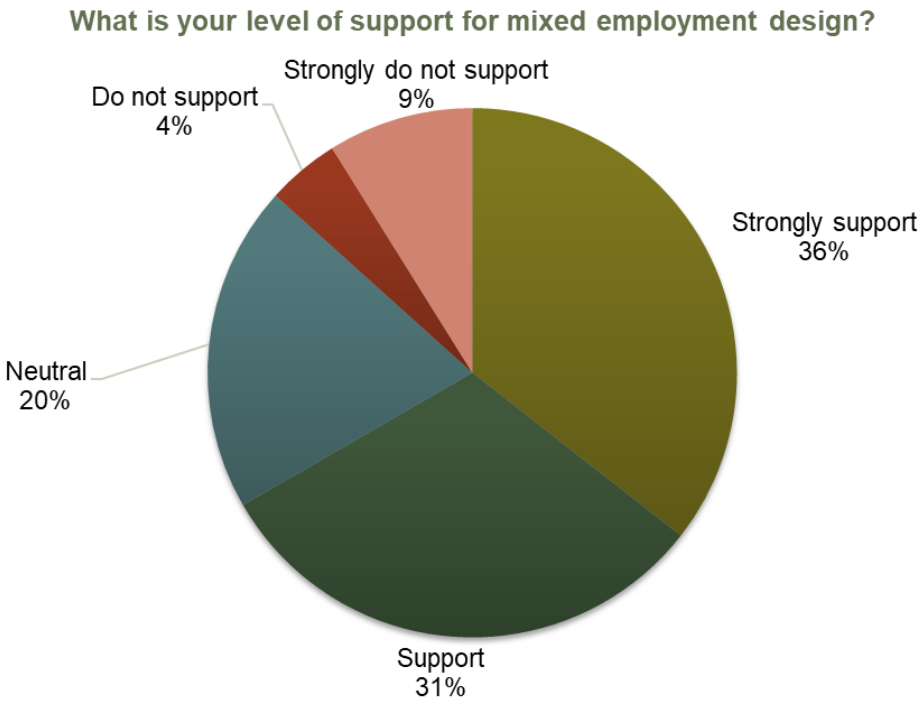
What is your level of support for integrating natural features into site design?

- **Strongly support:** 31 (69% of responses)
- **Support:** 8 (18% of responses)
- **Neutral:** 2 (4% of responses)
- **Do not support:** 1 (2% of responses)
- **Strongly do not support:** 3 (7% of responses)



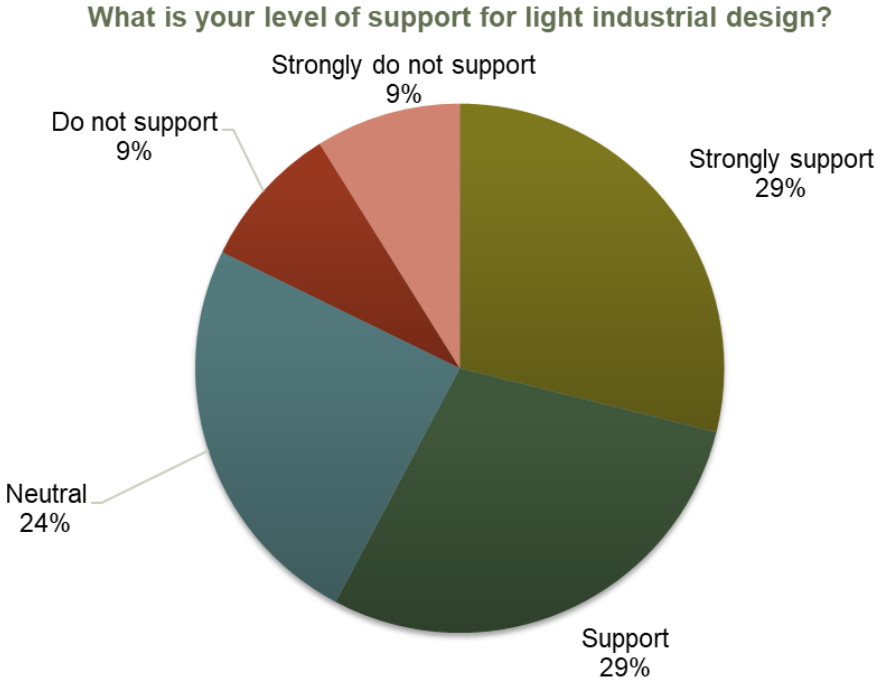
What is your level of support for mixed employment design?

- **Strongly support:** 16 (36% of responses)
- **Support:** 14 (31% of responses)
- **Neutral:** 9 (20% of responses)
- **Do not support:** 2 (4% of responses)
- **Strongly do not support:** 4 (9% of responses)



What is your level of support for light industrial design?

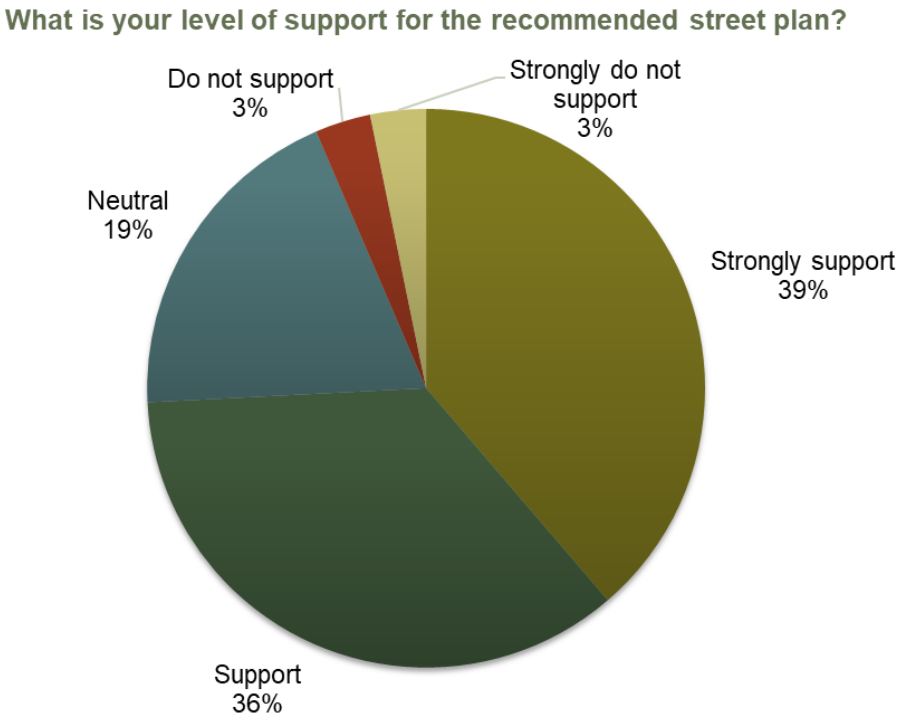
- **Strongly support:** 13 (29% of responses)
- **Support:** 13 (29% of responses)
- **Neutral:** 11 (24% of responses)
- **Do not support:** 4 (9% of responses)
- **Strongly do not support:** 4 (9% of responses)



Transportation

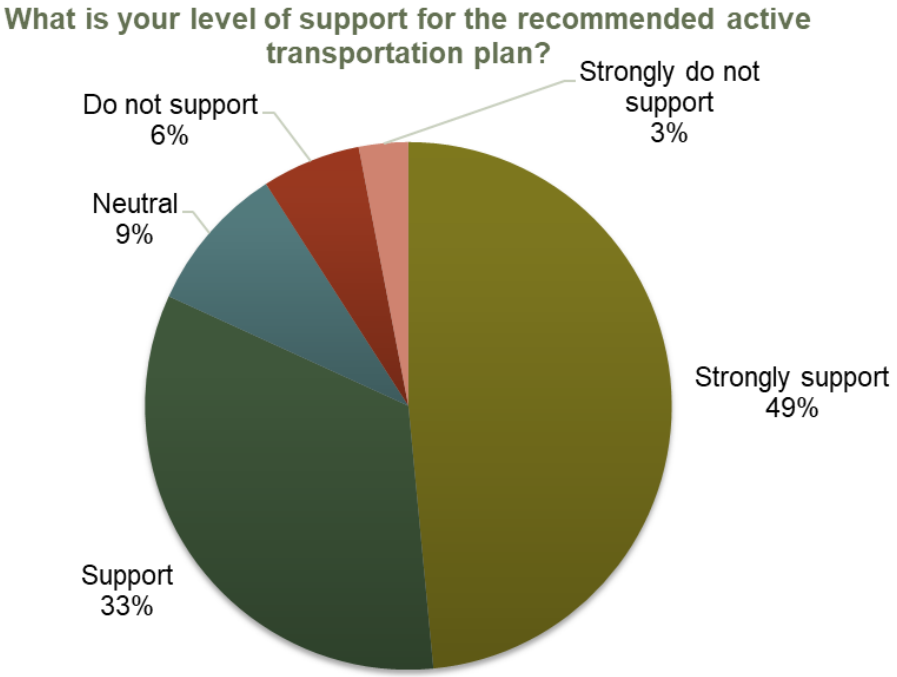
What is your level of support for the recommended street plan?

- **Strongly support:** 12 (40% of responses)
- **Support:** 11 (37% of responses)
- **Neutral:** 6 (20% of responses)
- **Do not support:** 1 (3% of responses)
- **Strongly do not support:** 1 (3% of responses)



What is your level of support for the recommended active transportation plan?

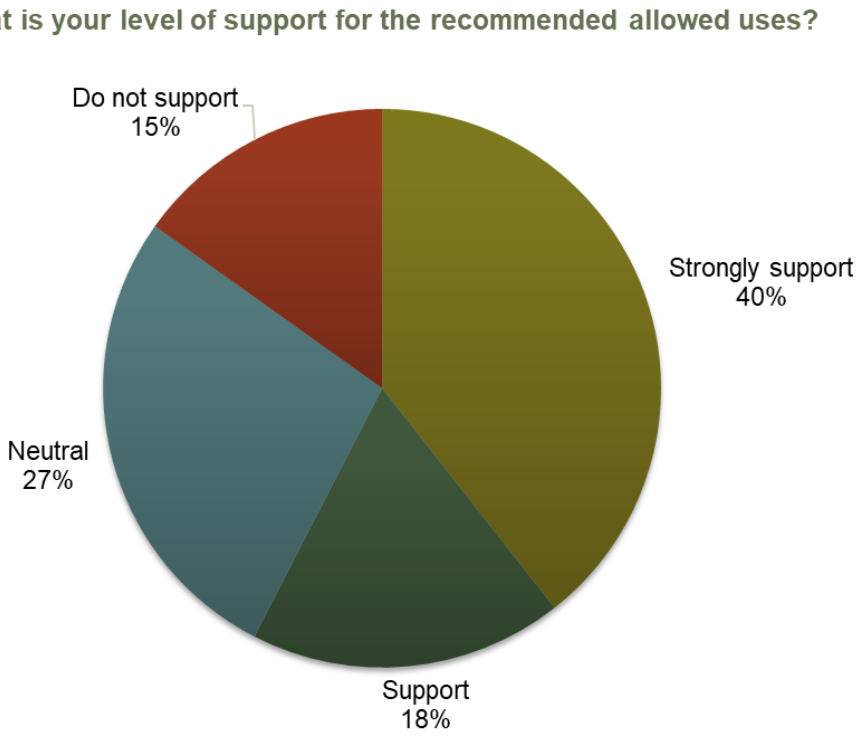
- **Strongly support:** 16 (49% of responses)
- **Support:** 11 (33% of responses)
- **Neutral:** 3 (9% of responses)
- **Do not support:** 2 (6% of responses)
- **Strongly do not support:** 1 (3% of responses)


What is your level of support for the recommended active transportation plan?
Strongly do not support 3%
Do not support 6%
Neutral 9%
Strongly support 49%
Support 33%

Code Concepts

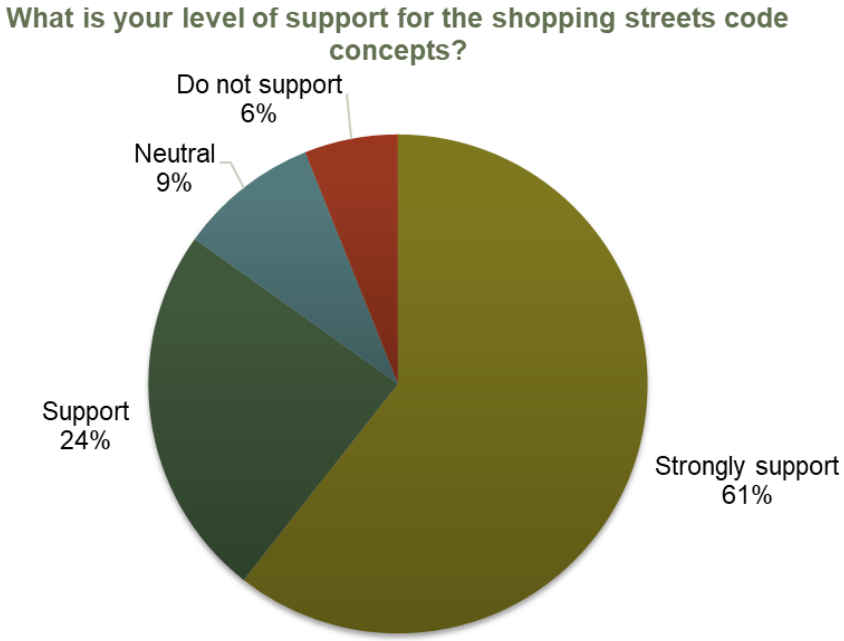
What is your level of support for the recommended allowed uses?

- **Strongly support:** 13 (40% of responses)
- **Support:** 6 (18% of responses)
- **Neutral:** 9 (27% of responses)
- **Do not support:** 5 (15% of responses)
- **Strongly do not support:** 0 (0% of responses)



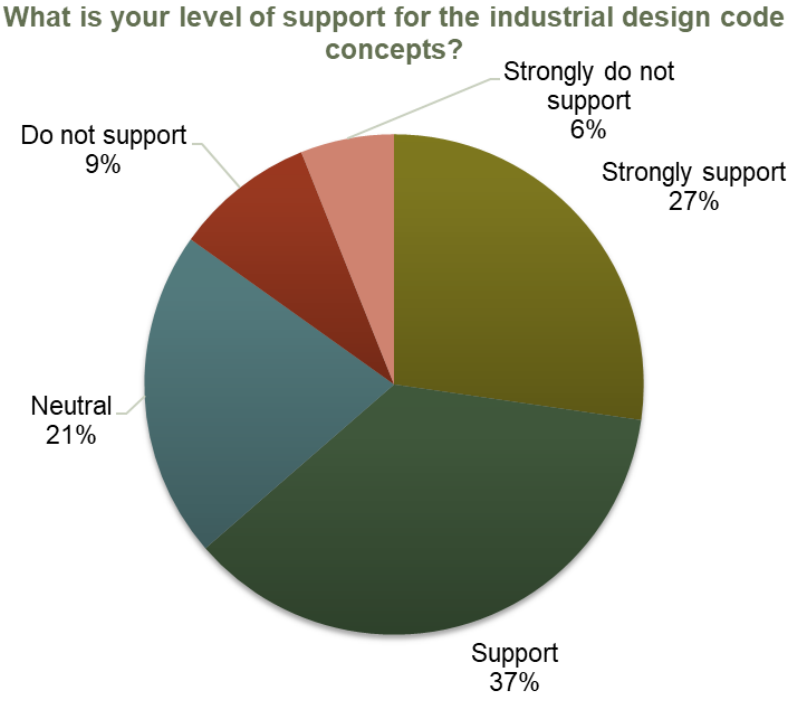
What is your level of support for the shopping streets code concepts?

- **Strongly support:** 20 (61% of responses)
- **Support:** 8 (24% of responses)
- **Neutral:** 3 (9% of responses)
- **Do not support:** 2 (6% of responses)
- **Strongly do not support:** 0 (0% of responses)



What is your level of support for the industrial design code concepts?

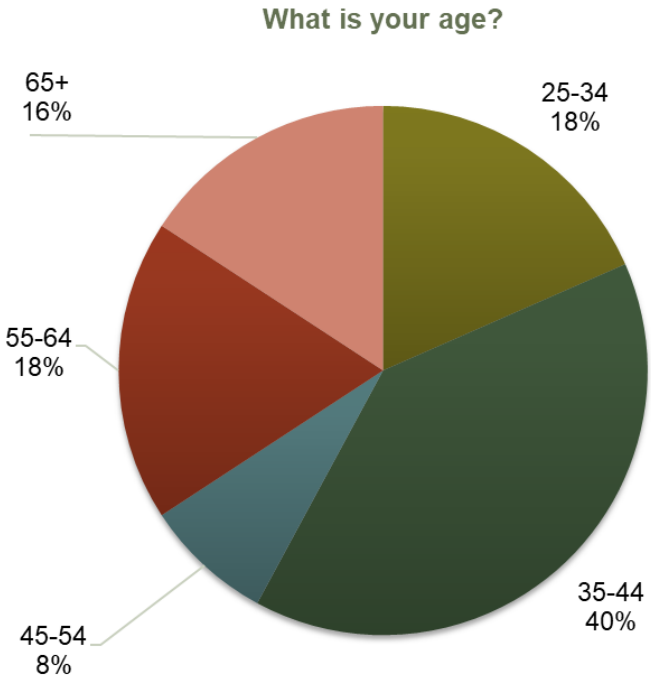
- **Strongly support:** 9 (27% of responses)
- **Support:** 12 (37% of responses)
- **Neutral:** 7 (21% of responses)
- **Do not support:** 3 (9% of responses)
- **Strongly do not support:** 2 (6% of responses)



Participant Information

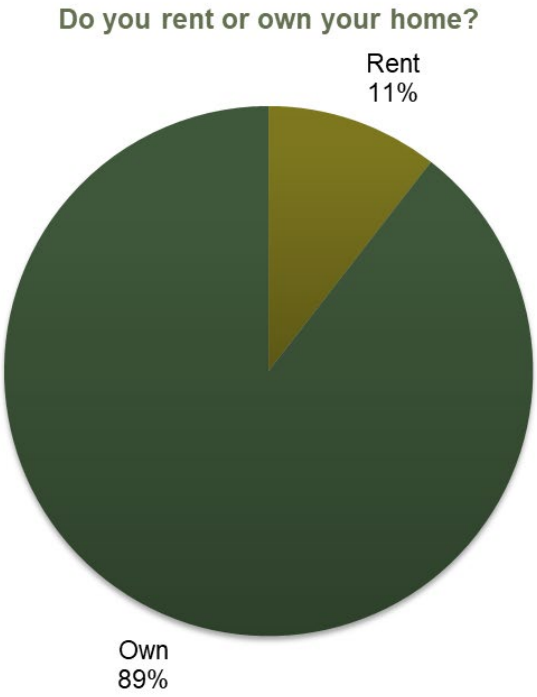
What is your age?

- **25-34:** 7 (18% of responses)
- **35-44:** 15 (40% of responses)
- **45-54:** 4 (8% of responses)
- **55-64:** 7 (18% of responses)
- **65+:** 6 (16% of responses)



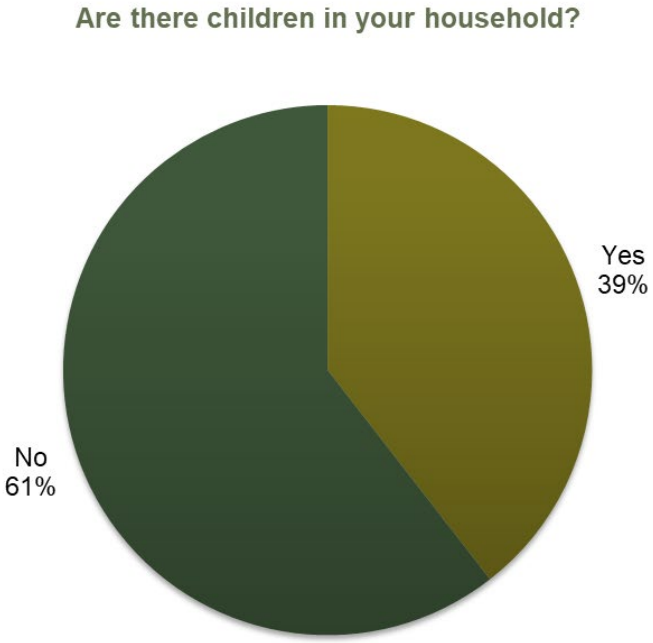
Do you rent or own your home?

- **Rent:** 4 (11% of responses)
- **Own:** 34 (89% of responses)



Are there children in your household?

- **Yes:** 15 (39% of responses)
- **No:** 23 (61% of responses)



CITY OF BEND
SOUTHEAST AREA PLAN

Summary of Online Open House #3: Attachment A – Long-Form Responses

Is there anything you would change about the recommended land use plan?

- Where I see light industrial zones touching residential zones without a buffer - in two areas on the map - I think that is bad. Surround the IL zone completely with the mixed employment would improve it.
- The commercial zones seem well placed
- It seems like the park should be in the middle and the light industrial areas on the outskirts. The park is nowhere near the residential areas; will this encourage people to get in their cars to go to the park? If the park is already fixed in place, then how about relocating some of the residential, so it is within walking distance of the park, and move the light industrial near the major roads, so employees and customers have more direct vehicle access to the jobs and services in those businesses, without having to go through residential areas?
- Please reclassify the CG and RH designated areas bordering Ferguson. The neighborhood directly across from this area on Ferguson Rd. is RL. High density housing and commercial properties are a stark contrast to this and will impact the existing neighborhood in a significant way. We do need high density housing and commercial land in this part of Bend, but it doesn't need to be on the Ferguson border with an existing neighborhood. Consider swapping this area with the designated High Desert Park Site, which is also served by higher classification roadways that will allow easy access to the whole Bend community. Other options for CG and RH land include the area currently designated RM bordering Knott Rd. and the ME land where 27th and Knott merge. Swapping these land classifications will lessen the impact from the development of this area significantly without sacrificing the need for affordable housing and city-wide services.
- Is there a way to define the uses in the industrial district? Might have some conflict between early industrial operations (trucks beeping, grinding, other noise) and the school and residential areas.
- The placement of RH is VERY VERY poorly thought out. It is located on 3 sides by RL, which is a some what uncommon zoning for Bend. "The Low Density Residential District consists of large urban residential lots ... The residential density range in this district is 1.1 to 4.0 dwelling units per gross acre." "The High Density Residential District is intended to provide land for primarily high density multifamily residential in locations close to shopping and services, transportation and public open space. The density range of the district is 21.7 to 43.0 units per gross acre and must provide a transitional use area between other Residential Districts and other less restrictive areas." While the elbow may eventually have features that support RH, it's proposed location is squarely in an area surrounded by RL so the roughly 2 houses per acre neighborhood could be dwarfed by a 43 unit apartment complex (per acre). It doesn't fit the neighborhood profile.
- We are across the street from the uppermost northwest boundary of this area. What I can't understand is why the residential areas are SEPARATED from the PARKS and SCHOOLS by commercial and employment development?? How does that create a livable, walkable community for families? Look at NWX where homes ring the parks NOT commercial areas.

And why in the world is the zone for heavier industry buried in the center of the neighborhood?? It should be out near the dump and major roads. Seems like the parks department should swop land and be more centrally located to actually serve the community residents of both the existing and proposed neighborhoods.

- Also, please don't allow developers to flatten and destroy all the natural features that make this landscape beautiful like they did at Reed Market and 15th. There are old Ponderosas and Junipers and wonderful lava rock outcroppings and ridges throughout this area. They belong. I am not opposed to developing this land. Just don't destroy it. "
- Mixed use area seems to cover a very large area
- I think infrastructure is most important, meaning widening roads to accommodate excess traffic. Unlike what has been done near the new high school and additional homes. The 15th street corridor should have been widened.
- Infrastructure, specifically traffic plans, need to be rolled out for community approval before any further progression of planning. The City's biggest downfall has been inadequate traffic and parking plans with limited future vision. They just finished the 15th/Knott Rd roundabout and only made it one-lane! What are you thinking? This needs to have much more capacity- in two years it will be inadequate, let alone in 10 years when all this is in-place. Brosterhouse is still a country lane with a narrow underpass, now expected to handle hugely increased flow. Look at the poor planning on the "Murphy road corridor", and you can see why we have no confidence in traffic planning or projections for future volumes.
- "There is nothing in the simple map plan that addresses open spaces, and the vision of a walkable community with parks, paths and open spaces. The city should develop these concepts further and pay attention to tensions between mixed uses in existing planned areas - e.g. dogs, bikes, electric bikes, scooters, boards; versus pedestrians. I think further mixing of these uses in Bend should be studied for safety and potential conflicts before proceeding with the now totally absent ""walkable"" and ""open"" part of the plan. Look at what the forest service does for example with mixed use trails as well as other cities. My opinion is wheeled personal transport should be separated from pedestrians on feet and paws. e.g. create bike/scooter, etc. paths that are separate from WALKways.
- The intent of ""Mixed Employment"" areas is totally unclear, and the Light Industrial in the middle of a primarily residential community. These need more thinking and explanation."
- Increased restrictions on the use of any residential property for AirBNB or short-term rentals. The city has been lax and absent in administering current AirBNB restrictions. Any future developments should attempt to significantly limit, if not completely ban, short-term rentals. Although many members of city council profit from short-term rentals (which is a conflict of interest when implementing restrictions, the city needs to start since short-term rentals are overrunning the city and causing spikes in rental prices for long-term residents.
- It doesn't seem like any thought has been given to helping people get out of their cars and use alternate transportation. For example... the small commercial area is all on either "corner" of the zone and there doesn't seem to be any way to avoid 27th. Are there plans for a connected system of off road bike paths to help kids get to school on bikes or help their parents get to the store on bikes?
- I realize Bend is growing and we need additional development but my concern is in overloading the already busy streets and infrastructure. Reed Market Rd will be completely impassable with the addition of thousands of people moving to the east side. The train already creates long waits an congestion - when is that overpass scheduled to be completed? And Knott Rd, which is a rural rd, will become like a highway.

- We need some type of cute little shopping area with a small grocery store. It would be similar to that on Brookswood Drive.
- There should be more higher density housing, additional small parks, and bicycle/walker friendly transportation options.
- Higher density (townhomes, duplexes) residential throughout, more parks
- Where in this plan do you include a round about at China Hat and Knott Road? It's one of the most overdue improvements for one of the most dangerous intersections in SE Bend. With all of the new homes and new cross roads that all feed right back into Knott Road, how can you possibly leave this out of your master plan? It's a daily gamble trying to get out of our communities on blind corners like Tall Pine and Pine Vista Drives with cars rolling through at average speeds of 50- 65 mph. You have exhausted the use of law enforcement for speed control which only works while it is in progress. A round about is the only way to slow traffic for us on this dangerous stretch road. It was our understanding that a round about at this intersection was supposed to part of this plan. Please do not move forward without this round about.
- The key will be successful implementation particularly around High Desert Middle School. There is potential for user conflicts as business and school traffic occur at the same time during peak hours. I noticed the school is surrounded by commercial and mixed employment on all sides. This means walkers and bikers to school will have to pass through these zones to get to school. Wide paths, open spaces, and safety will be key.
- Increase commercial slightly and decrease mixed employment. This side of town really needs a grocery store, gas station, ...
- I do not support as this high density plan does not take into consideration that Knott/27th is a two lane road. There is not plan it appears for moving a higher density traffic. Why is it that Bend wants to continue to grow in population but doesn't want to invest in the infrastructure to move the increased population more efficiently. Single lane roundabouts, two lane roads, one bypass with a 45 mph speed limit. There is no good access east to west and the city of Bend wants to build more neighborhoods, more schools, put in more businesses in a rural part of Bend that has already seen a 100% increase in traffic with no plan for building better roads. I, as a rural resident of Bend, absolutely do not support this plan.
- Unlikely to achieve the vision because it does not have enough density and is too car-centric
- 1. Reduce RS and increase RM zoning. Use RM zones as a buffer between 15th & Knott and the RS zones. This area, intended to provide most amenities within close proximity, is an ideal location to increase housing density. 2. Relocate IL zoning to the plot currently shown as ME zoning along 27th (bounded by PF zoning at the north and south ends). This will allow for better IL access (direct from 27th) as well as reduce issues common with IL zoning adjacent to residential zoning (noise, smells, etc). 3. Add a small neighborhood park site in the northwestern section of residential zoning to give residents another option within safer (ie not through ME/IL zoning) walking access. 4. Butting the unnamed north/south thoroughfare into Ferguson so close to the 27th Street intersection as shown will likely cause serious access and safety issues; consider installing a roundabout to replace that awkward intersection.
- The SE area of Bend has never had any neighborhood commercial services, excluding Expressway. Will 10% of the area designed for commercial services be sufficient for the needs of our area? We need a full service grocery store. Also, there are some major traffic arteries in our area (15th St, 27th St, Ferguson and Knott Rd). Will multi-use paths be designed so residents may walk or ride their bikes to future services in our area without the threat of car traffic?

- Somewhat concerned about traffic flow from the light industrial districts onto 15th street.
- I'd like to see some community garden options in the mix. Bend doesn't seem to have them broadly. It seems like a great way to build community while being outside. And you can't get greenery back!
- I would be proactive in designing spaces with social distancing and outdoor recreation in mind. As the pandemic continues, our needs are evolving. A restaurant row would be nice - if it included greenspace for outdoor seating year round. Public wash stations, UV disinfecting spots, and warm up spots would also be helpful. Maybe an incubation area - where small business owners could learn from each other or have discounted rent to encourage small business growth. Pods for food carts. Maybe give the area it's own distinct ""district"" feel as it's away from the core of the city.
- I want to see that the new plans incorporate zoning and other options to allow the existing businesses to remain where they are instead of having to try to re-locate in this high demand real estate market.
- I like the vision and most of what I see depicted here. I would like to see neighborhood centers identified; at least I didn't catch where they would be. There seems a lack of small well-dispersed neighborhood parks, just one big park at the edge. I sense Bend needs more high-density housing, including affordable housing and less new lower to standard density single-family housing. I think we need to move towards no new single family housing on undeveloped land. Where will large industrial development occur in Bend, assuming there is a need? Some may need to go here. Should public transit be addressed in this plan? It seems that 27th Street, 15th, Knott Road will become very crowded, especially also considering development outside the immediate area. Will Murphy help alleviate further congestion on Reed Market and 3rd Street?
- We support the SEA Vision of a complete walkable community with open spaces, bike and walk paths Many landscaped area with Lots of TREES. NW Crossing influence in our area would be great..
- Very happy and to not see heavy manufacturing in this area.
- Scrap it completely. Just another high density housing project. Another reason to leave this city!
- I don't think the high density works well at that already busy intersection 15th/ 27th
- Eliminate the light industrial section. Replace with public facilities or residential.
- Like the idea that you can live, work, play in the same neighborhood
- We are VERY disappointed that you are considering the middle school as community space. Many people enjoy the open space and large lots on this end of town, and this development plan ruins what we like about it. We do not want to become another area like around NW Crossing with hundreds of homes and very few shops jam-packed together. But, of course, on this side of town the city will build as cheaply as possible. Please consider the livability of Bend, not just the profits for developers, builders, and the City of Bend. Expand lot sizes, widen roads, don't let builders put square boxes on postage stamp lots, don't try to smash in thousands of people with high density housing in this small area.

Is there anything you would change about the community design concepts for the Southeast Area Plan?

- When can we start making this happen!?!

- As mentioned earlier, and consistent with the idea of transitions between zones, don't abut the residential zones with IL - that seems wrong straight off the bat.
- Pull your people-centered uses (residential, shopping, and commercial) up to the street to maximize the opportunity for vibrant public life between homes/businesses and the public right of way.
- Please use a European approach to bike path design, where the bike lane is either a multi-use path completely removed from the roadway, or the bike lane is literally above the curb, next to the sidewalk, instead of being in the road. Winter weather makes bike lanes in Bend unusable. What's the point of having a bike lane that can only be used half of the year? Also, mixed employment and light industrial design should be oriented to creating pedestrian-friendly streetscapes, with parking lots behind buildings, unlike the examples in many of the photos here, where parking is in front of or completely surrounding buildings.
- Solar setbacks/maximum height requirements. I don't want my property in RL to be dwarfed by a sun-blocking building. DARKSKY approved lighting. I can currently see the Milky Way most nights. Light pollution must be curtailed with smart, directed light, only when necessary.
- I am not clear on which specific transitions would be implemented between land uses. I am very concerned about the transitions between current RL district land and new RH and CG land.
- Too many apartments and small homes causing too much population density should keep the single family home design that is already in the area. Too many homes leading to over crowding on this side of town
- How will the area adapt if the detailed plans don't match today's reality - or tomorrow's? What if we need more dense housing, or more commercial, or something else?
- Again, the traffic plans are unrealistic. You seem to think if you make car traffic difficult it will disappear. That will not happen in semi-rural Oregon. Every household will still have 2-3 vehicles. Everyone will not sell their cars and buy a bike to ride in the winter. You showed the Mt. Washington before/after as an example. Have you driven on Mt Washington drive lately? The “development” looks nice, but the streets are impossible. All this new housing is going to generate MUCH more vehicular traffic and we are already under-served on Knott Road/27th.
- Mixed use pathways are a growing problem in other areas of Bend with conflicts between pedestrians, dogs, and bicycles, scooters, boards, etc. and especially the growing use of heavier and higher speed electric devices. The safety of this needs to be studied and addressed. A great example is the city of Morro Bay, California where walkways on the waterfront are separated from a separate bikeway. US Forest Service and China has been addressing this for years. Bend needs to have a transportation/pedestrian expert study this before expanding the multi use pathways in the city.
- I don't understand what Mixed Employment use is, and it is a large percentage of the plan. Also, so far no mention of parks and open spaces and pathways.
- The design is good but the sad truth is Bend is slowly becoming more & more urban and less & less the community we all moved here to live in. I would like to see Bend keep some of the rural feel it had 20 years ago in at least part of the city.
- Emphasize shopping streets with good bicycle access.
- There needs to be plenty of parking on street and for individual businesses. Although this will be a very pedestrian friendly area, crowded parking will be a deterrent to visiting businesses.

- I live in the NW not the SE and therefore don't have a dog in the hunt. That said, the development actions taken in any part of Bend reflect upon the character of the City. Based on the text of this overview and the pictures presented as visual examples of how the plan will be implemented, I feel its a good direction. That said, I feel very strongly that City Planners and Developers must actually construct what is being depicted. Additionally, I feel it's very important that natural environmental features (i.e. rock / stone formations, existing "mature" trees) be preserved. THE BEND DEVELOPMENT CODE SHOULD BE AMENDED TO ENSURE THAT MATURE TREES ARE PRESERVED. CURRENT CODE IS TOO AMBIGUOUS & DEVELOPERS ARE NOT HELD ACCOUNTABLE!
- No, we have lived in SE Bend since 2007 and have been incredibly eager for there to be more businesses, grocery, etc. within safe walking and/or biking distance from our home. This is VERY welcome news!! Thank you for creating the online open house, we are excited to see this development begin and to hear more about what businesses might be coming closer to our neighborhood.
- A well thought out plan and a good positive move forward for Bend's expansion
- Minimize IL zoning and keep it completely separated from residential zoning. Focus on providing walking paths separate from vehicular streets (either completely separate or a landscape buffer between) to encourage pedestrian traffic. Ensure landscaping is native and drought-tolerant, but attractive.
- Give it it's own personality. Make sure there are ample places for distancing year-round. Hire local artists to really make the area beautiful.
- I don't think that the example plans and previous photos do enough to retain the natural areas in the design. Specifically I think that the City of Bend and Deschutes County allow for the complete removal of mature trees from sites to make it easier for developers to complete their plans, instead of trying to retain some of these natural features into the development plans. A vibrant neighborhood-based community would require that to reflect the true essence of Bend and Central Oregon.
- The ideas seems good without having thorough knowledge of the site-specific details. Some of earlier comments on Land Use may apply.
- Landscaping, wide paths soften and calm the ares.. Love your examples.. Density transition/Residential Design needs softening. (maybe setbacks from street)
- High Density buildings shold have larger setbacks than your photos show
- Would like to see more landscaped areas in the Light Industrial and High Residential area. Especially, the High Residential area seem stark
- Would be really cool to see this area be very self sufficient to cut down on driving. A "main street" or downtown area connected by safe paths into dense neighborhoods

Is there anything you would change about the transportation concepts for the Southeast Area Plan?

- Excited to have safe, walkable and bikeable areas that connect to shopping and parks. Again...when can we get this going!?!
- Bike and ped paths need to be physically separated and protected from cars.
- Please prioritize a roundabout at Ferguson and 27th. That intersection is very dangerous because of the volume of traffic, and the angle of the street at the intersection. This is particularly problematic when the roads are icy.

- Multiuse paths and protected bikeways are more desirable!
- I am happy to see that a roundabout at the Ferguson Rd/27th intersection is in the plan. This is already needed.
- Please add a dead-end sign for Ferguson Ct. so that drivers/bikes/pedestrians using the new north-south collector do not try to use it as an alternative to 27th for travel north.
- I am looking forward to the active transportation network shown in the plan. SE Bend doesn't have a very good network of paths right now, so having a way to navigate safely by foot and bike through this new area is important to me. I'm hoping that the paths will be divided from the streets by a greenway (not sure if that is the correct term - basically a narrow strip of grass/trees/landscaping).
- N/S collector between Ferguson and Knott is going to introduce A LOT of traffic onto a short stretch of Ferguson for vehicles trying to continue North on 27th. You have CG and RH traffic that will all head that direction either going towards 27th or 15th. That collector should be routed to terminate at the proposed 27th and Ferguson roundabout. At rush hour, I foresee traffic backing up on Ferguson trying to enter 27th, blocking that intersection. Also single lane roundabouts on 27th is incredibly short-sighted. 27th is now the 2nd most important N/S road in Bend aside from the Parkway. These need to be planned as 2 lane roundabouts. Traffic is already high on this road and completion of the SEAP plan will multiply the traffic on this road.
- I am a cyclist that lives in River Rim off of Brookswood. Cycling on Knott is extremely dangerous, especially between 15th and Rickard. This is unfortunate since that is the main access to a lot of cycling out in the country. The number of trucks and contractors hauling stuff to the landfill makes the road even more dangerous, and also leaves a lot of debris on the roadway. This plan needs to make sure there are much wider shoulders or a dedicated two way bike lane to travel between the Parkway and Rickard. Very BIG problem.
- Does not address well enough the proposed new housing will lead to increased traffic and congestion
- Again, this is the biggest problem with the plan. Its OK as far as it goes, but it underestimates the traffic flow and has no vision of the future. Why do we always need to "redo" our streets after 5 years because they weren't planned well to begin with? 27th/Knott is a major traffic corridor, not a "minor arterial"- lots of large trucks use it to bypass Bend from Hwy 20 to Hwy 97, and it is the ONLY way to get traffic from the FORUM/HOSPITAL area to SE Bend/ DRW/Sunriver/La Pine. What about the dangers of entering traffic from Woodside, Country Club, Tall Pine, China Hat? If you want to have this major plan approved you will need to do a better job addressing our traffic issues.
- Separate walkways/sidewalks from bicycle and other personal transport paths. See my previous comments regarding this.
- A roundabout @ 15th & Ferguson needs to be completed ASAP before any additional development is done. The school, park & existing homes are creating a mess already.
- I see no mention of how public transit has been considered in this planning.
- Surrounding roads (27th and Reed Market) are already heavily used. 27th street already needs to be expanded and this plan would just make the situation worse.
- This improvement is a long-term priority for the City of Bend but may be incrementally constructed by properties within SEAP through applicable frontage improvements as development occurs.

- This is not acceptable. There should be no long term plans or reliance on developers to implement. The surrounding roads should be upgraded before any development begins to allow the area to grow. Perhaps the upfront costs could be included in development fees.
- Be sure to include bike parking!
- Required traffic noise mitigation measures including rubber coated streets, landscape sound buffering strips along arterial and collector streets, including Ferguson Road. Also, lower speed limits; lower Ferguson to 30 or 35 mph.
- Turning left out of High Desert Middle School to go North on 27th is very unsafe. We need some kind of solution for this, at the VERY minimum a flashing yellow light.
- Where is the bus? There needs to be even more of a grid to help walkers/bikers traverse these long distances. How about a more dense grid of bike/walk only paths?
- This looks to be a solid plan that minimizes the impact on the established local roadways.
- Ensure that the Ferguson/27th Street connection is addressed properly at the start of development. The transportation section didn't address the north/south thoroughfare that is shown on the zoning maps as dead-ending into Ferguson just west of 27th, and this condition would cause serious issues if not addressed. Waiting until the City has the funds to install a roundabout at Ferguson/27th (which is ideal) might be too late to prevent issues with that intersection.
- I'd like to see where Alpenglow park and the paths in that plan interact with these proposed transportation concepts. I like how there are lots of paths for folks. One concern is that there might not be enough, especially when trying to get from Broster to the new area.
- I feel that it is very shortsighted for the City of Bend and Deschutes County to consider this type of plan without properly considering Highway 97 access. With the addition of this development, you will do nothing but put a further burden upon the full North/South access points at Knott/Baker Rd, Powers Rd, and Reed Market Rd. This is before the possibility of a development at the Stevens Rd tract has even been factored in. With ODOT considering the removal of the non-merge points along the highway, and the opening of Caldera High School, it seems like this high density plan will only exacerbate the transportation issues that are falling short in this area of Bend not. Also, there are only so many residents you can add who will not require their own transportation to access the lakes for their kayaks, or mtn bikes to the trails, etc. The current community transportation options just don't cover those needs.
- I like more bike-pedestrian emphasis. Should public transportation be addressed?
- It seems that 27th Street, 15th, Knott Road will become very crowded, especially also considering development outside the immediate area. Will Murphy help alleviate further congestion on Reed Market and 3rd Street?"
- We love your plan. We also believe, as you do, that Knott Road IS NOT BIKE FRIENDLY and appreciate you addressing this problem. We were serious road cyclist and needed a route to HWY 20 heading East to put on some miles. It was scary and dangerous conditions on Knott & 27th. Now that we are older, we will really enjoy the bike paths that are not adjacent to roads. Your plan is well thought out and we appreciate your work. Please don't let developers alter this plan so they can build a little more on your public area. Question: Will SEAP bike/trail paths lead to the mountain where we can continue on the new Forest Road paths?
- We love the roundabouts! Bike paths, walkways.
- Seems "spot on"!

- I think more could be done to increase active transport in this area

Is there anything you would change about the community design concepts for the Southeast Area Plan?

- Allowed uses seem a bit restrictive. Not sure of the rationale behind limiting wholesale marijuana production and sales when that is otherwise allowed in these zones. Also don't understand the "prohibition of certain uses along Shopping Streets that would otherwise be allowed in the CG Zone." Why would there be restrictions on uses that are otherwise allowed by code?
- Do not allow auto-oriented/auto-dependent uses, or the shopping streets will not work as intended.
- If developers will actually buy into this plan, I think it would be a great addition. Doubt that anyone's interested in doing it though.
- The following comments all apply to the RS district code: Under the current Development Code, RS districts have a conditional allowance for temporary housing. What is meant by that, and is it appropriate for this area? Amend current Development Code to limit maximum height of RS buildings in SE area to 40 feet instead of 45 feet. Amend Chapter 3.3 in Development Code to require at least 2 off-street parking spaces per 2 bedroom unit. In part D.1.d (also BDC 3.6.200(C)), add an exemption for the SE area such that affordable dwelling units are required to conform to the same parking standards as non-affordable units. Do not allow credit for on-street parking. Do not allow existing roads to count toward on-street parking.
- One thought I had is that there needs to be a way to allow/facilitate outdoor, street side dining and cafes. This can really add to the "village" and social/interactive experience.
- I would prefer Bend not expand beyond its current boundaries. If you do choose to expand at least 25% should be public park space rather than 15%. Also developers who build here should be taxed to improve the overall infrastructure of Bend. This should not be a give away to developers and big business interests
- Personally I feel that the City of Bend needs to consider the impact that continual growth and sprawl will have on the community. I have lived in Bend for 16 years and like others have witnessed a great deal of change. I understand that Bend is a popular place to live but feel that continual growth and development year after year does not increase the quality of life for the general population. Why must we love places to death only to witness their ultimate demise as another crowded and expensive with little connection between its community members? Regardless if more homes are built, local property values will continue to rise. As a result, I disagree with the ‘selling point’ of build more and real estate will become more affordable. Please think about the future of the city and do your part to help preserve what is left of a wonderful place to love and live in.
- Unless I missed it, there is nothing about open spaces, parks, pathways in the plan. Please see my comments in other sections about hazards of mixed use pathways.
- A little concerned about industrial use, but if kept to clean industries with limited large truck traffic, it could work.
- Absurd that you're allowing drive-thru businesses down there. You have an opportunity to make this feel more like a neighborhood, and things like that detract from that possibility. Zoning for shopping streets should explicitly prohibit strip malls with large front parking areas. We don't need another version of 3rd or 27th down there.

- Include some off-street public parking behind shopping streets as well as covered bicycle parking
- I support not allowing marijuana sales, facilities, and businesses in this area. As far as I can tell, marijuana sales, etc. will be a prohibited use in the SEAP, and I agree it should not be allowed in this area.
- Thank you for your work to make this a wonderful places to live! Let's make this area awesome and another reason to love Bend!
- CG has too much parking so the shopping streets probably wont work as intended.
- Why allow standalone residential within the CG zone? Live/Work makes sense, but standalone is confusing unless it's a way of allowing existing residences to remain. Remove the allowance for drive-thrus in the ME zone. That zone should be focused on providing essential services mixed with residential. Require development in the ME zone to be similar to "shopping streets" – extremely walkable. Minimize IL zoning and relocate so it doesn't abut residential zoning."
- No! But I'd love to hear more about how you'd encourage new businesses to fill this zone from day 1.
- I think that a better job has got to be done to ensure that this more rural part of Bend is not simply absorbed to look like NW Crossing. Based on the photo examples, it appears that is exactly what the City of Bend and their leadership has planned. I feel if the neighborhood it so be located there it should not adversely impact the existing homes & businesses.
- I would like to see neighborhood centers identified; at least I didn't catch where they would be. There seems a lack of small well-dispersed neighborhood parks, just one big park at the edge. I sense Bend needs more high-density housing, including affordable housing and less new lower to standard density single family housing. I think we need to move towards no new single-family housing on undeveloped land. Where will large industrial development occur in Bend, assuming there is a need? Some may need to go here. (This is a repeat of what I wrote earlier under Land Use).
- Again, we love what NW Crossing has done with their Light Industrial Building that recently went up near Washington & Skyliner. They are beautiful.
- Large Landscaped Setback from streets, especially 15th and 27th street.

Is there anything else you would like to tell us?

- Lots of great work in here. Excited to see this area start taking shape and provide more options and amenities for those of us living in the southeast part of town.
- "Thanks for taking the time to be transparent and open about the design and project. It is exciting to see all that is planned and look forward to how it will impact our community.
- Sidenote: On Brosterhous, under the train bridge near the new high school there is a blind corner that drivers speed on. With the new high school and increased pedestrian traffic, it could create a safety issue. Would be great to explore some options to curb speeding."
- I'm wondering if the two commercial zones were combined there would be more opportunity for developers to create more meaningful shopping experiences. An example being NW Crossing vs something like Newport/Galveston area. I believe the term is "place making". To be fair, I can't really gauge the area of the space so easily from looking at a map as others might.
- I'm not happy about the plan overall because part of my reason for buying my home in this area was the rural feel. But I know that this kind of "progress" is inevitable. I hope this plan

includes a full service grocery store. I'm finding more and more the need to time my trip to the grocery store to avoid traffic jams. I know that putting Murphy Rd. through will help, but I doubt it will offset all the building. Please make sure that a grocery store is top priority!

- Please make more of an effort to listen to and communicate with land owners in areas abutting the expansion area. I have property that borders this space, and despite attending open houses and community meetings, responding to surveys, and speaking at committee meetings, I haven't heard anyone directly address the concerns I have. I have been told multiple times that this is only a draft, but this draft is starting to become reality. I understand that this is extremely complicated and there are a lot of stakeholders; not all of them will be happy with the final product. If my suggested changes can't be made, I would like someone in a position of influence to have a real conversation with me about the reasons so I at least understand it. I am trying hard to not be a NIMBY and to support this area and especially affordable housing in Bend. But I really feel ignored and disenfranchised in this process.
- I hate the makeup of the committee. Too many SEAP landowners in the mix (who don't even live in the area) deciding how profitable their land is going to be and not enough community makeup. I've been raising the same points over and over again but told nothing has been "set in stone." Well, the location of the RH zoning has never changed and never been addressed. It has been located there since before the committee even had a meeting and not once have I seen it talked about in meeting minutes. This plan really needs to look closer at how it affects the neighbors to the north, and traffic patterns on existing streets, not at today's levels, but what it will be in 10 years. I know bend has a problem with planning for the future (cough...Reed Market), but get your act together and figure it out before this becomes another problem area developed because of greed.
- We need basic shopping opportunities- good grocery stores, NO big box stores
- We need gathering spaces- library, coffee shops (NOT Starbucks), places to sit with friends outside
- We need green, open spaces within the developed areas- think Park Blocks
- We need local restaurants (no chains)
- We need safe pathways for walking to the district from nearby areas, preferably away from traffic
- We need safe crossing for Knott Road.
- I am a retired environmental scientist who has worked in health and safety divisions of large businesses. I tend to notice health/safety issues and areas where risks could be better mitigated. Hence my comments about mixed use pathways. There is better current technology out there to fix the problems. Mixed use pathways work in low density areas like Sunriver, but not so much the more you increase density. It's already a problem at the Old Mill, and in the Elbow plan it could be worse.
- Please leave some of the larger Ponderosa’s as development proceeds. It adds character, saves on water and provides habitat for SE Bend’s current occupants.
- There is only one grocery store serving the 27th corridor and it is Safeway. For this area to be truly livable, a grocery store is a must.
- Overall, I think the committee has done a good job of developing a design with potential to provide a livable neighborhood in this area. I really appreciate the focus on combining commercial (shopping, restaurants, etc) and employment with residential, as this combination is missing from much of Bend. I believe that providing for those elements in this area will help decrease the traffic demand on Reed Market and 27th by providing a closer shopping and employment option for southeast Bend residents.

- The improvements to 15th St are nice - wide sidewalks on both sides of the street. However, it would have minimized taxpayer costs and disruption to neighbors if the projects to install the sewer line had been planned better. Fifteenth St have been ripped up intermittently for many years, beginning with installation of infrastructure for the Bridges neighborhood. Residents in this area have seen the street and sidewalks laid only to have them ripped up and reinstalled. Is there no long term planning?
- Good effort. I wished I could have attended some of the planning meetings to learn more about the specific area and issues, and gauge community acceptance. This is much better than just letting development happen as it may.
- We will need neighborhood centers and employment that provide most of the needs of local residents. Bend's roads cannot accommodate many more people driving all over town to get what they need.
- You have done a great job. We are so WORRIED that the South East development would be bungled up with cheap housing crammed into every available vacant spot of land. Planned developments can satisfy growth but keep aesthetics beautiful and calm. We recently visited Irvine, CA. One of the best and first planned city. We traveled down roads with large landscaped set backs, but, still had dense housing inside these set backs. This was developed 50 years ago and is still very pleasant and holding value. Large developments of cheaply built homes become slums of some sort. I believe your plan is very good and will keep blight out. THANK YOU FOR MAKING SEAP 'CLASSY'!
- Is there a way to put code restrictions on new housing to keep a standard of development that would mirror your vision and keep lesser expensive homes being bought by investors, then renting them out to tenants that don't care and degrade the area because they don't take care of the property. Reference Reed Market Road just west of the train track between Centenntial & 6th Street. Glenngarry Pl, Glenncoe Pl. When new, they looked good, but, quickly owners moved out. What happened? Light Industrial moved in?
- How about setting CCR in developments that mentioned things like, no parking cars off the driveway in landscaped areas. I know communities do put restrictions on letting weeds grow, different problems. We need to stop this from happening in our town. We like your plan. Keep Oregon beautiful!

Appendix FF - Transportation Planning Rule Analysis and Infrastructure Needs

KITTELSON & ASSOCIATES
1001 SW EMKAY DRIVE, SUITE 140
BEND, OR 97702
P 541.312.8300

MEMORANDUM

Date: December 2, 2020 Project #: 21926.12

To: Southeast Area Plan Advisory Committee
Cc: City of Bend Staff

From: Matt Kittelson, PE, Julia Kuhn, PE, & Jacki Gulczynski
Project: Southeast Area Plan
Subject: Transportation Planning Rule Analysis & Infrastructure Needs

This memorandum documents the analysis and key findings associated with proposed modifications to the Bend Comprehensive Plan within the Southeast Area Plan (SEAP) area. As discussed herein, this analysis is consistent with the recently adopted Bend Transportation System Plan, including the "reasonably likely to be funded" list of projects throughout the City and near SEAP. This prioritized list of "reasonably likely to be funded list" of projects was developed through an extensive public process and reflects the community's vision for addressing multimodal transportation needs and improved safety for all travelers. Findings presented in this study will be useful as the City works to identify a funding plan to support growth within SEAP. The infrastructure needs presented herein consider both the development of the SEAP lands as well as other developable lands within the city (including those to the east of the SEAP). As such, the infrastructure needs and funding options can be used to help the City plan for other developable lands nearby.

As part of the SEAP planning process, the City is also pursuing a legislative action to address compliance of the Area Plan for the Southeast UGB expansion area with the Oregon Administrative Rule (OAR) 660-012-0060 ("the Transportation Planning Rule (TPR)). The TPR requires local governments to maintain consistency between the Comprehensive Plan and other land use regulations and the TSP. As part of evaluating compliance with the TPR, local jurisdictions must demonstrate that planned transportation facilities will be adequate to serve planned land uses. This memorandum addresses the transportation effects of the SEAP land uses with the "reasonably likely to be funded" list from the TSP. This memorandum also addresses specific transportation needs within the SEAP neighborhood.

As presented herein, we conclude the following:

- The reasonably likely to be funded list within the TSP is appropriate to accommodate future land use growth within the Bend UGB, including SEAP. The intersections of 15th Street/Reed Market Road and 27th Street/Reed Market Road are forecast to operate over capacity under the "No Urbanization of SEAP" scenario but operate at capacity under the "Urbanization of

SEAP" scenario[1]. As such, the SEAP Urbanization does not result in a significant effect on City facilities, as defined by the TPR.

- Funding at two ODOT intersections on the reasonably likely to be funded list will rely partially on monies generated by future development within SEAP. Accordingly, a proportionate share contribution equivalent to $323 per weekday PM peak hour trip will be assessed at the time of development permit. This "ODOT trip fee" will be used to help fund construction of changes at the US 97/Reed Market intersection and along the US 20 corridor (i.e., the US 20/27th Street intersection).
- Funding of the multimodal network of streets and intersections within the SEAP will be provided through a combination of City and private development funds. In addition, each of the property owners will be responsible for paying the Transportation System Development Charge (TSDC), providing the applicable site-frontage improvements to adjacent streets at the time of development, and paying the ODOT trip fee.

BACKGROUND

In 2016, the City of Bend expanded its Urban Growth Boundary (UGB) by 2,380 acres to accommodate future homes and jobs. This expansion was spread across 10 areas. As part of this process, the City issued findings related to the compliance of its proposed UGB expansion with relevant state, regional and local policies, and plans. As outlined in Section 8.4.3 of these findings, the City relied on provisions within the State's Administrative Rules found in 660-024-0020(1) that allow deferral of addressing the state's TPR requirements associated with the necessary zone changes for each of the areas. As such, each of the expansion areas must address the TPR requirements associated with the needed zone changes for annexation.

As part of the TPR assessment, a preliminary analysis of transportation needs associated with the SEAP was prepared in late 2019. Since that time, the City has refined the planned land use associated with future development of SEAP properties and developed the reasonably likely to be funded list for the TSP. With these activities completed, this memorandum contains an updated analysis of TPR compliance associated with the SEAP and addresses two specific topics:

- Can the reasonably likely to be funded list also accommodate urbanization and development of the SEAP lands and/or are additional solutions needed to address documented needs?

[1] A slight improvement in traffic operations is noted for these intersections under the "Urbanization of SEAP" scenario due to a redistribution of trips associated the homes and jobs anticipated within SEAP. These intersection capacity findings are also consistent with the UGB expansion and associated findings.

- In addition to the citywide list, what additional transportation solutions specifically within the bounds of the SEAP land help facilitate future development?

This analysis can help inform the ongoing development of the citywide and SEAP area funded plan. Both the TSP funding plan and the SEAP-specific funding plan reflect the City's future leveraging of a variety of funding sources, including public-private partnerships.

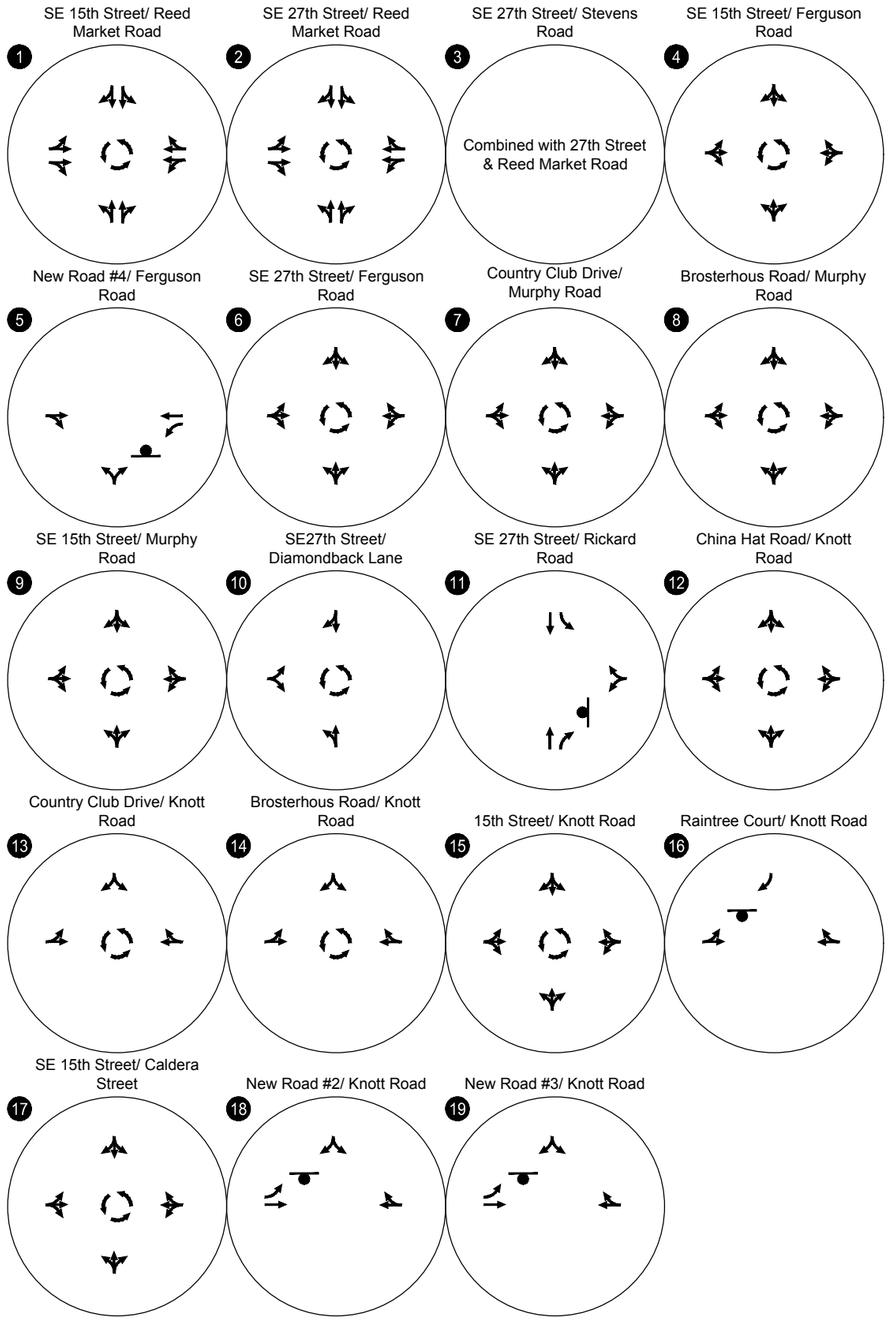
STUDY AREA

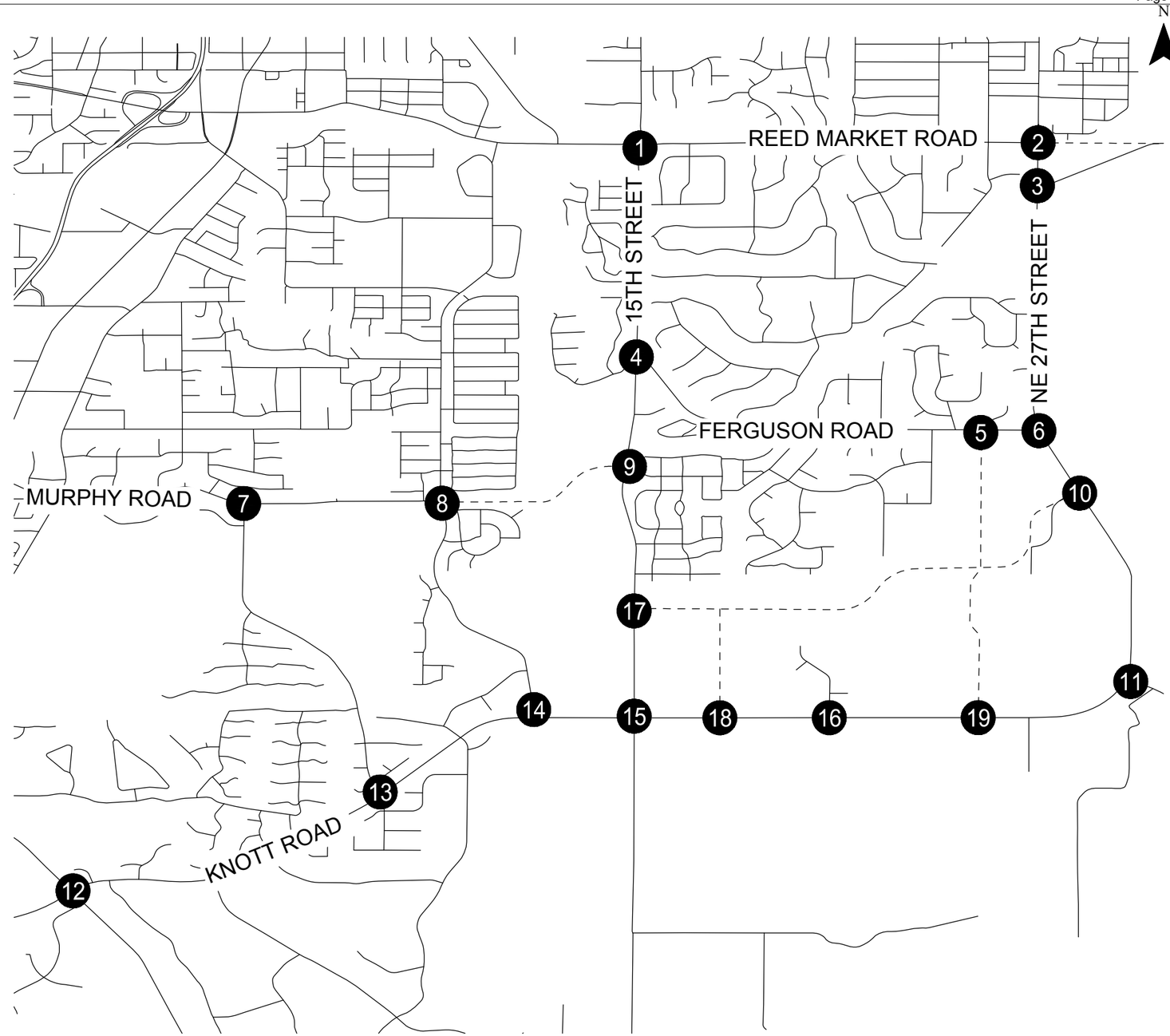
For the purposes of defining an intersection that is "significantly impacted" by an amendment, the City of Bend Development Code (BDC) Section 4.7.500.B requires that all intersections within one mile of the area that are anticipated to experience an increase of 50 or more peak hour trips must be reviewed for significant impacts. Further, per the same BDC section, all amendments and zone changes must use the City's travel demand forecasting model whose results are then post-processed to perform intersections analyses.

Based on the BDC requirements as well as ongoing collaborative efforts between the City of Bend and the Oregon Department of Transportation (ODOT), the analysis presented herein considers future intersection operations at nineteen (19) existing or future city intersections that had the potential to be significantly impacted. These are shown in Figure 1. A separate document addresses the TPR-related impacts of SEAP lands on affected ODOT facilities; accordingly, this analysis only reflects TPR-related impacts on existing and planned city facilities.

To test for the significant impact on planned city facilities, the following land use/transportation scenarios were evaluated:

- **Year 2040 No Urbanization of SEAP Scenario:** This scenario evaluates year 2040 operations at the study intersections assuming implementation of the reasonably likely to be funded projects, including onsite SEAP roads assumed as part of the TSP, and buildout of the lands within the UGB but not within the SEAP boundaries. This scenario serves as a baseline for TPR comparison.
- **Year 2040 Urbanization of SEAP Scenario:** This scenario evaluates operations at the study intersections assuming implementation of the reasonably likely to be funded projects, including onsite SEAP roads assumed as part of the TSP, and buildout of the lands within the UGB and urbanization of the lands within the SEAP boundaries. This urbanization scenario is consistent with the refined Land Use Plan, as proposed by the ongoing Southeast Area Plan process.





- STOP SIGN
- TRAFFIC SIGNAL
- ROUNDABOUT

2040 Bend TSP Reasonably Likely Lane Configuration
Bend, Oregon

Figure 01

H:\21121926 - Bend Transportation System Plan\SE Bend Area Plan\report\figs\SEAP - Bubble Figures.dwg Aug 26, 2020 - 10:37am - jguiczynski Layout Tab: Future Lane Conf

KITTELSON & ASSOCIATES

YEAR 2040 TRAFFIC FORECASTS

Per the TPR, communities throughout Oregon plan for a coordinated system of transportation policies, programs and facilities to meet the coordinated Population and Employment Forecasts. The TSP and SEAP planning processes used the Bend-Redmond travel demand model (BRM), developed by ODOT, as one of the tools used to help evaluate land use and transportation choices, and more specifically compliance with the TPR. As noted above, the use of this model is also identified as part of addressing BDC 4.7 requirements.

As part of developing the land use inputs for the BRM for both the TSP and the SEAP, the City used the scenario planning tool "Envision Tomorrow" to evaluate and plan for ways to accommodate statewide coordinated population and employment growth. Based on an allocation of the coordinated forecasts throughout the UGB, the "Envision Tomorrow" outputs for the SEAP area through 2040 include the type and density of land use growth listed below. Exhibit 1 illustrates the land use designations for the SEAP area.

- Residential
  - 910 Single Family Homes
  - 776 Multi Family Homes
- Employment
  - 966 Retail Employees
  - 931 Office Employees
  - 767 Industrial Employees
  - 114 Hotel/Hospitality Employees
- Civic Uses
  - 23 Public/Civic Employees
  - 600 Student Elementary School

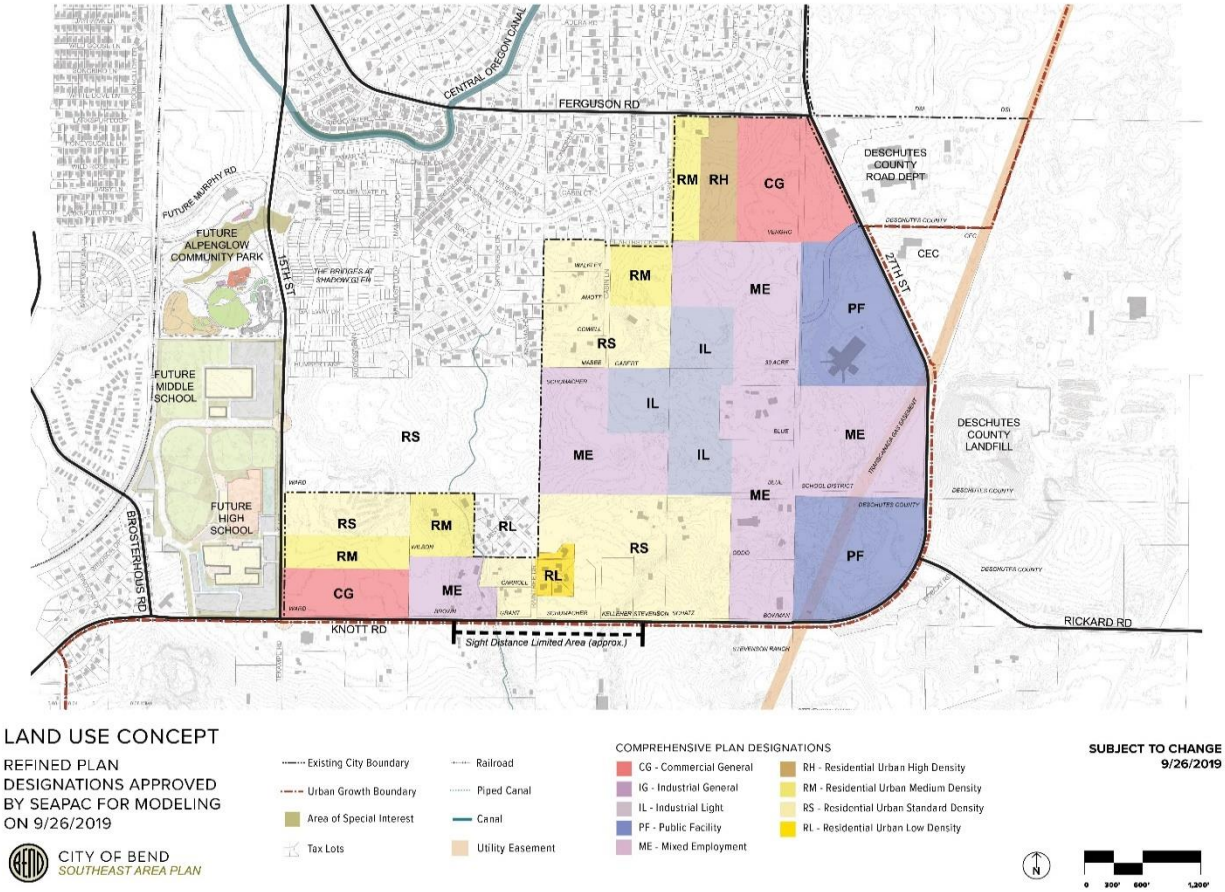


Exhibit 1. Proposed SEAP Land Use Designations

These land use forecasts are not reflective of proposed development plans, but rather representative of possible development that could occur given the proposed comprehensive plan designations and assumed market conditions both within the SEAP as well as other potential growth areas in the UGB. Actual development that occurs in the SEAP over the next twenty years will depend on market conditions, phasing of infrastructure (particularly sewer), and the resulting possible land use types allowable within the identified Comprehensive Plan designations proposed.

YEAR 2040 INTERSECTION NEEDS

Of the 19 study intersections included in the TPR analyses, the reasonably likely to be funded list includes 12 locations where roundabouts will be constructed or expanded. The anticipated changes to these intersections is summarized below.

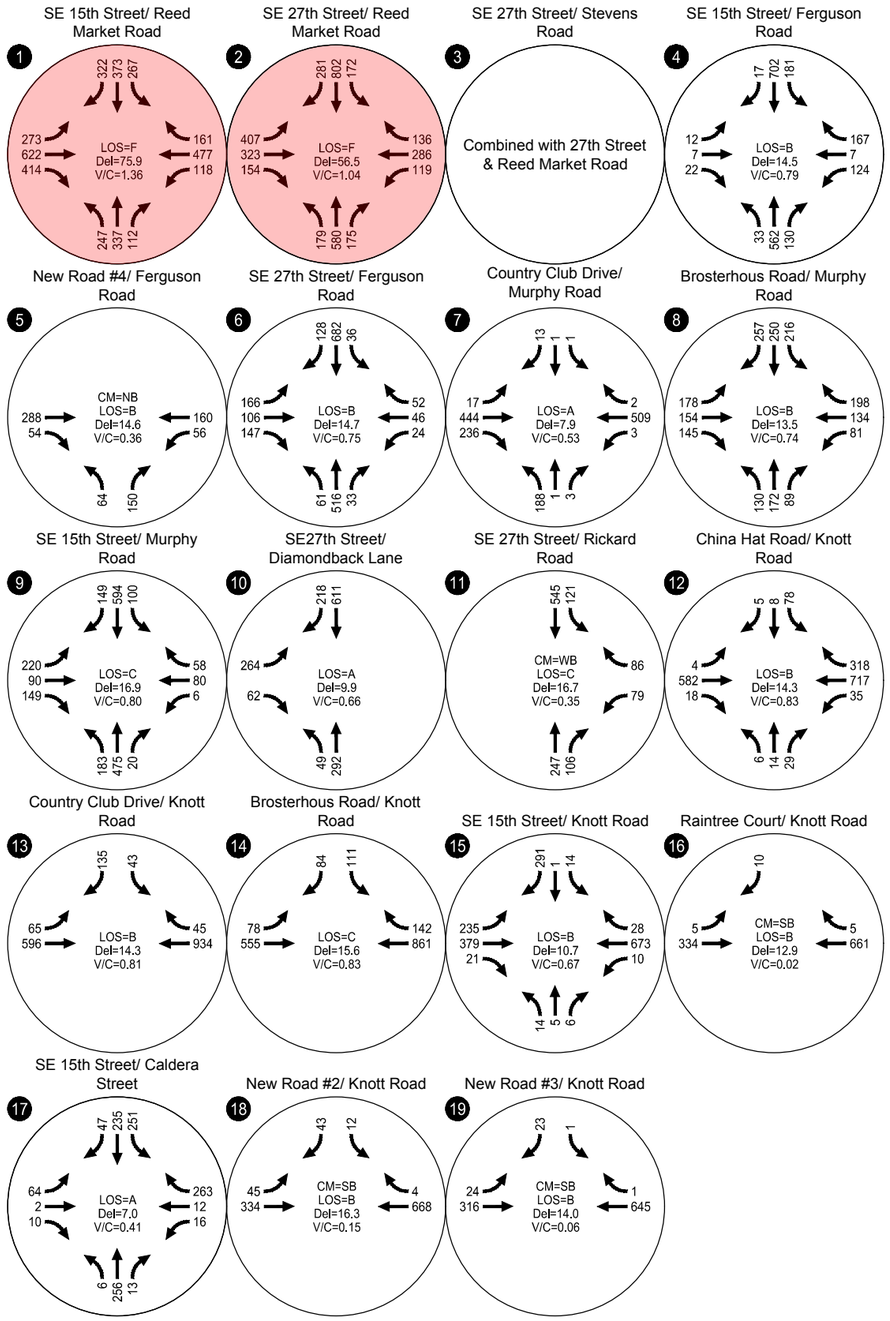
- Three single lane roundabouts currently under construction or recently constructed along Murphy Road at the Country Club Road, Brosterhous Road and 15th Street intersections as well as one at the Knott Road/15th Street intersection.

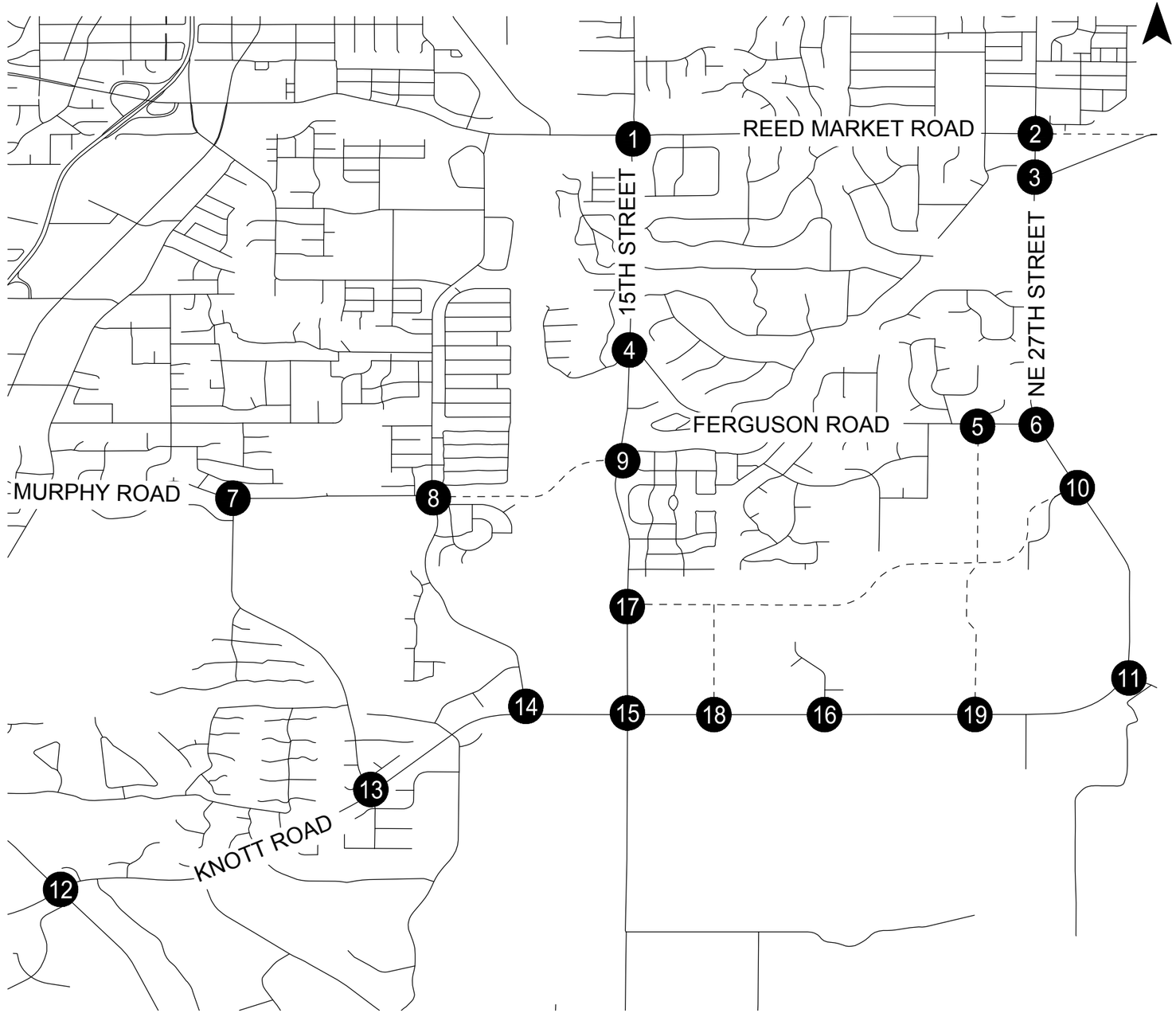
- Planned expansion of the existing roundabout at the 15th Street/Reed Market Road intersection.
- New Roundabouts at 27th Street/Reed Market Road, 15th Street/Ferguson Road, 27th Street/Ferguson Road, China Hat Road/Knott Road, Country Club/Knott Road, Brosterhous Road/Knott Road, and 15th Street/East-West Collector Street ("Caldera Street") just to the west of the SEAP lands.

Within the TSP, the planned roundabouts are identified to be funded by a variety of mechanisms, including existing sources, such as Transportation System Development Charges (TSDC), and future proposed sources. The City also funds infrastructure through reasonable contributions from developments through the development review process.

The BRM was used to estimate future year volume forecasts under year 2040 associated with overall UGB growth as well as development of the SEAP lands under both the No Urbanization and Urbanization scenarios. Both scenarios assume implementation of the reasonably likely to be funded project list, including the 12 locations identified above. Based on these travel forecasts, we evaluated each study intersection to determine whether the projects in the reasonably likely to be funded list can also accommodate the Urbanization scenario and to identify the specific intersections needs within the SEAP boundaries that have not otherwise been identified as part of the TSP.

Figure 1 illustrated the 2040 lane configurations and traffic control based on the Bend TSP "reasonably likely to be funded" project. List. Figure 2 and Figure 3 show the 2040 intersection operational results for the "No Urbanization of SEAP Scenario" and the "Urbanization of SEAP Scenario," respectively.



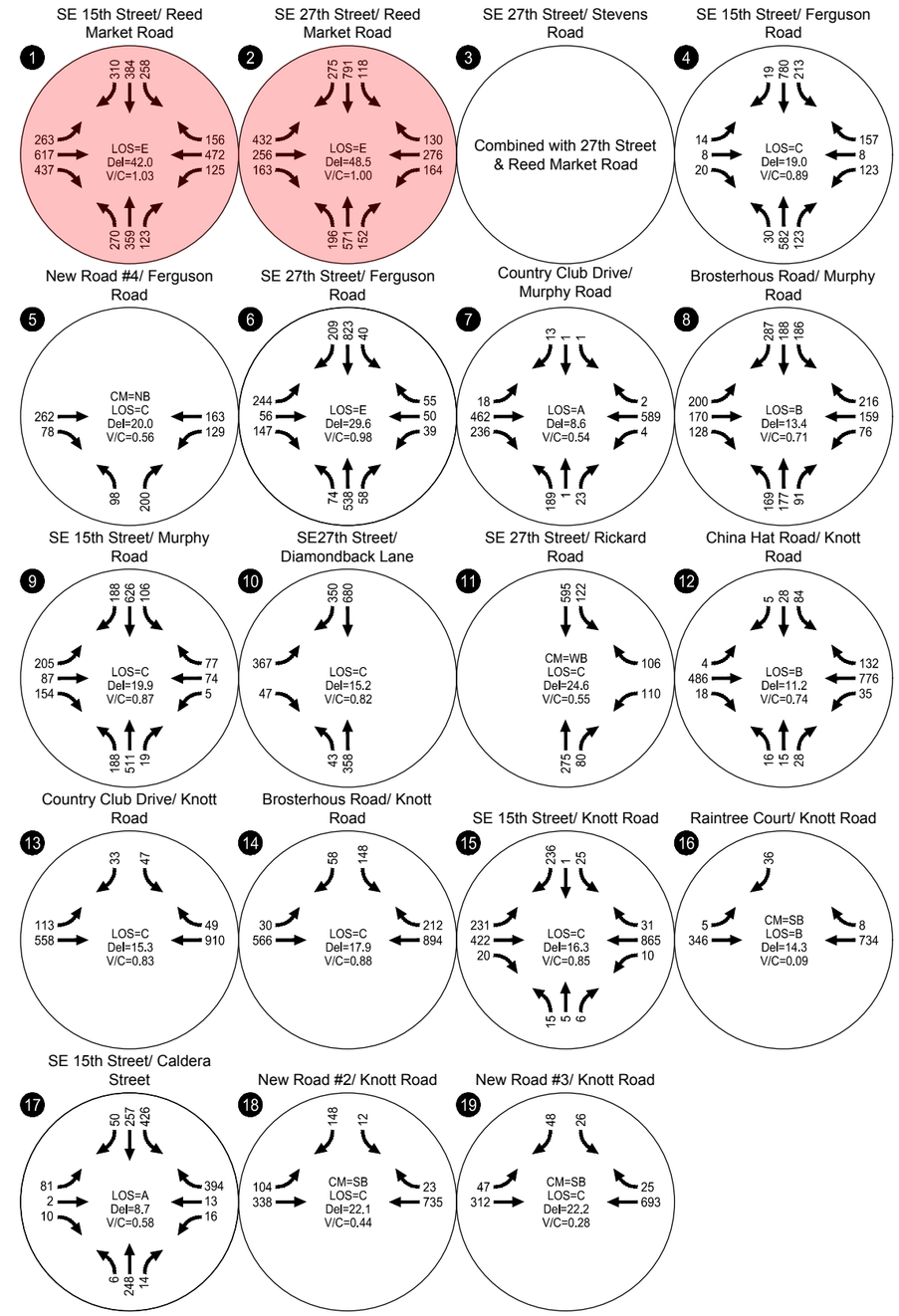


2040 No Urbanization Weekday PM Peak Hour Traffic Conditions
Bend, Oregon

Figure 02

KITTELSON & ASSOCIATES

H:\21\21926 - Bend Transportation System Plan\SE Bend Area Plan\report\figs\SEAP - Bubble Figures.dwg Aug 26, 2020 - 10:37am - jguiczynski Layout Tab: No Urbanization



2040 Urbanization Weekday PM Peak Hour Traffic Conditions
Bend, Oregon

Figure
03

H:\21\21926 - Bend Transportation System Plan\SE Bend Area Plan\report\figs\SEAP - Bubble Figures.dwg Aug 26, 2020 - 10:38am - jguiczynski Layout Tab: Urbanization

KITTELSON & ASSOCIATES

As shown in Figures 2 and 3, the reasonably likely to be funded improvements can accommodate both the No Urbanization and the Urbanization scenario land use and traffic forecasts at most intersections and still enable acceptable operations in the year 2040 consistent with Bend standards. The intersections of 15th Street/Reed Market Road and 27th Street/Reed Market Road are forecast to operate over capacity under the "No Urbanization of SEAP" scenario but operate at capacity under the "Urbanization of SEAP" scenario. As noted previously, a slight improvement in traffic operations is noted for these intersections under the "Urbanization of SEAP" scenario due to a redistribution of trips associated the homes and jobs anticipated within SEAP. *Accordingly, the reasonably likely to be funded list and planned improvements within the TSP is appropriate to accommodate future land use growth within the Bend UGB, including SEAP. As such, we conclude that the SEAP Urbanization does not result in a significant effect on City facilities, as defined by the TPR.*

In addition to the Citywide needs addressed through the TSP, the SEAP analyses also identified more localized needs within the SEAP area. As shown in Figure 3, the following projects are needed to support multimodal circulation within and access to the future SEAP neighborhoods as well as to provide for acceptable intersection operations in the future. These projects are not currently on the "reasonably likely to be funded list" or identified as "Expansion Area Driven" projects[2] that are within the SEAP area.

Expansion Area Driven Projects

- The construction of Caldera Street (the east-west collector street) between 15th and 27th Streets; and
- A new north-south collector street ("North-South" Collector") between Knott Road and Ferguson Road.

Projects to Support Localized Needs and Circulation

- A new north-south local framework street between Knott Road Caldera Street; this roadway provides an important connection to the commercial and residential lands near the 15th Street/Knott Road intersection;
- A single lane roundabout at the 27th Street/Diamondback Lane intersection;
- A single lane roundabout at the north-south collector/Caldera Street intersection;
- A westbound left-turn lane on Ferguson Road at the new north-south collector intersection;

[2] As defined by the Bend TSP, the timing of Expansion Area Projects is driven by significant land development nearby. They may include improvements that are implemented through various means, including an area-planning process such as SEAP. Specific timing for implementation of projects is dependent on market conditions related to the pace of development in specific areas. These projects and programs contribute to the overall multimodal system and are an important component of the TSP.

- Elimination of southbound left-turn movements at the Raintree Court/Knott Road intersection due to sight distance constraints; and,
- An eastbound left-turn lane on Knott Road at the new local framework and at the new north-south collector road intersections.

The SEAP lands will also be supported by a network of local streets that will be planned as individual properties are developed within the new neighborhood. In addition, with the two roundabouts noted above, all of the remaining intersections within SEAP are forecast to operate acceptably as side-street stop-controlled intersections.

WALKING AND BICYCLING FACILITIES

In conjunction with the SEAP process, the project team and advisory committee have prepared a bicycle and pedestrian plan that supports the land use and roadway network planning. This system includes key walking and biking routes, neighborhood greenways, and multi-use paths. Notably, a multi-use path network is planned along Caldera Street, the north-south collector, along Knott Road, and the local framework road. These facilities will connect to existing and planned regional Bend Parks and Recreation District (BPRD) routes which connect to local and citywide recreational destinations and employment centers. Non-vehicular travel will also be supported by a connected network of local streets.

YEAR 2040 ODOT INTERSECTION CONSIDERATIONS

As noted above, an analysis of ODOT intersections that had the potential to be significantly affected by SEAP urbanization has been documented under separate cover. Per the associated ODOT analysis, funding of two locations on the reasonably likely to be funded list in the TSP will rely partially on monies provided through SEAP development. These include:

- *US 97/Reed Market Road* – The specific changes to this facility have not been identified but will be defined through a future study, as noted within the TSP. In lieu of a specific project, the City of Bend and ODOT previously agreed on an improvement and cost basis for proportionate share contributions related to the northbound ramp terminal. This proportionate share methodology was developed through the Discovery West UGB expansion process. Proportionate share contributions to address SEAP impacts include:
    - Construction of a traffic signal at the northbound ramp terminal; per the mitigation plan identified as part of the Discovery West UGB expansion process in 2019, this improvement was estimated to be $660,000.
    - Future interchange evaluation study which is estimated to cost $500,000 per the Bend TSP.

- The combined cost of the signal and interchange study are estimated at $1,160,000. Based on a proportionate share of 12 percent of the growth in traffic anticipated at the interchange, the SEAP private property contributions would be $139,200.

- *US 20/27th Street* – the TSP identifies the need for corridor improvements along US 20 between 15th Street and the eastern UGB; the estimated cost of these improvements is $10 million. Within this corridor, three intersections and the corridor segment are noted for improvement; accordingly, the proportionate share methodology assumes that the cost is equally divided between the three intersections and the corridor itself (i.e., approximately 25 percent for each of the overall project cost). Using this methodology, US 20/27th Street intersection would represent $2.5 million of the $10 million corridor project. Based on a growth in traffic of 27 percent at this intersection, the SEAP private property contributions would be $675,000.

Contributions to the funding at these two ODOT locations results in a fee of $323 per weekday PM peak hour trip associated with future property development within SEAP.

SEAP FUNDING PLAN CONSIDERATIONS

In total, approximately $21.6 million in transportation-related infrastructure is needed within the SEAP area that is not already accounted for in the reasonably likely to be funded list[3]. These SEAP-specific projects, as highlighted in the above sections, will likely be paid for by a combination of City and private development funds. In addition, each of the property owners will be responsible for paying the TSDC, providing the applicable site-frontage improvements to adjacent streets at the time of development, and paying the ODOT trip fee.

CONCLUSIONS

This analysis, in combination with the SEAP land use planning and TSP efforts, fulfills the City's obligations associated with the TPR deferral findings. As concluded herein:

- The reasonably likely to be funded list within the TSP is appropriate to accommodate future land use growth within the Bend UGB, including SEAP. The intersections of 15th Street/Reed Market Road and 27th Street/Reed Market Road are forecast to operate over capacity under the "No Urbanization of SEAP" scenario but operate at capacity under the "Urbanization of

[3] The $21.6 million estimate is preliminary and subject to change. Transportation costs, funding tools, and coordination of funding strategies with other projects in SE Bend are currently under review.

SEAP" scenario[4]. As such, the SEAP Urbanization does not result in a significant effect on City facilities, as defined by the TPR.

- Funding at two ODOT intersections on the reasonably likely to be funded list will rely partially on monies generated by future development within SEAP. Accordingly, a proportionate share contribution equivalent to $323 per weekday PM peak hour trip will be assessed at the time of development permit for use at the US 97/Reed Market intersection and the US 20 corridor (i.e., the US 20/27th Street intersection).
- Funding of the multimodal network of streets and intersections within the SEAP will be provided through a combination of City and private development funds. In addition, each of the property owners will be responsible for paying the Transportation System Development Charge (TSDC), providing the applicable site-frontage improvements to adjacent streets at the time of development, and paying the ODOT trip fee.

No additional transportation analysis is needed to demonstrate that the SEAP urbanization is consistent with the requirements of the TPR.

[4] As previously noted, a slight improvement in traffic operations is noted for these intersections under the "Urbanization of SEAP" scenario due to a redistribution of trips associated the homes and jobs anticipated within SEAP. These findings are consistent with the recent UGB expansion and associated findings.

Appendix A - Non Urbanized Operational Analysis Worksheets

HCM 6th TWSC
5: New Road #4 & Ferguson Rd

07/31/2020

Intersection	
Int Delay, s/veh	4.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	288	54	56	160	64	150
Future Vol, veh/h	288	54	56	160	64	150
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	1	-	-	-2	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	3	0	0	0	33	0
Mvmt Flow	288	54	56	160	64	150

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	342	0	587	315
Stage 1	-	-	-	-	315	-
Stage 2	-	-	-	-	272	-
Critical Hdwy	-	-	4.1	-	6.73	6.2
Critical Hdwy Stg 1	-	-	-	-	5.73	-
Critical Hdwy Stg 2	-	-	-	-	5.73	-
Follow-up Hdwy	-	-	2.2	-	3.797	3.3
Pot Cap-1 Maneuver	-	-	1228	-	424	730
Stage 1	-	-	-	-	675	-
Stage 2	-	-	-	-	707	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1228	-	404	730
Mov Cap-2 Maneuver	-	-	-	-	404	-
Stage 1	-	-	-	-	644	-
Stage 2	-	-	-	-	707	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.1	14.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	588	-	-	1228	-
HCM Lane V/C Ratio	0.364	-	-	0.046	-
HCM Control Delay (s)	14.6	-	-	8.1	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	1.7	-	-	0.1	-

HCM 6th TWSC

11: SE 27th St & Rickard Rd

07/31/2020

Intersection	
Int Delay, s/veh	3.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	79	86	249	106	121	545
Future Vol, veh/h	79	86	249	106	121	545
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	0	-	-	70	135	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	8	5	6	1	2	4
Mvmt Flow	79	86	249	106	121	545

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1036	249	0	0	355	0
Stage 1	249	-	-	-	-	-
Stage 2	787	-	-	-	-	-
Critical Hdwy	6.48	6.25	-	-	4.12	-
Critical Hdwy Stg 1	5.48	-	-	-	-	-
Critical Hdwy Stg 2	5.48	-	-	-	-	-
Follow-up Hdwy	3.572	3.345	-	-	2.218	-
Pot Cap-1 Maneuver	250	782	-	-	1204	-
Stage 1	779	-	-	-	-	-
Stage 2	438	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	225	782	-	-	1204	-
Mov Cap-2 Maneuver	225	-	-	-	-	-
Stage 1	701	-	-	-	-	-
Stage 2	438	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16.7	0	1.5
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	470	1204	-
HCM Lane V/C Ratio	-	-	0.351	0.1	-
HCM Control Delay (s)	-	-	16.7	8.3	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	1.6	0.3	-

HCM 6th TWSC
16: Raintree Ct & Knott Rd

07/31/2020

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕				↱
Traffic Vol, veh/h	5	334	0	0	661	5	0	0	0	0	0	10
Future Vol, veh/h	5	334	0	0	661	5	0	0	0	0	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	4	0	0	4	0	0	0	0	0	0	0
Mvmt Flow	5	334	0	0	661	5	0	0	0	0	0	10

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	666	0	0	334	0	0	1013	1010	334	-	-	664
Stage 1	-	-	-	-	-	-	344	344	-	-	-	-
Stage 2	-	-	-	-	-	-	669	666	-	-	-	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	-	-	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	-	-	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	-	-	3.3
Pot Cap-1 Maneuver	933	-	-	1237	-	-	219	242	712	0	0	464
Stage 1	-	-	-	-	-	-	676	640	-	0	0	-
Stage 2	-	-	-	-	-	-	450	460	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	933	-	-	1237	-	-	213	240	712	-	-	464
Mov Cap-2 Maneuver	-	-	-	-	-	-	213	240	-	-	-	-
Stage 1	-	-	-	-	-	-	671	636	-	-	-	-
Stage 2	-	-	-	-	-	-	440	460	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0	0	12.9
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	933	-	-	1237	-	-	464
HCM Lane V/C Ratio	-	0.005	-	-	-	-	-	0.022
HCM Control Delay (s)	0	8.9	0	-	0	-	-	12.9
HCM Lane LOS	A	A	A	-	A	-	-	B
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	0.1

HCM 6th TWSC

18: Knott Rd & New Road #2

07/31/2020

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	45	334	668	4	12	43
Future Vol, veh/h	45	334	668	4	12	43
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	45	334	668	4	12	43

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	672	0	-	0	1094	670
Stage 1	-	-	-	-	670	-
Stage 2	-	-	-	-	424	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	919	-	-	-	237	457
Stage 1	-	-	-	-	509	-
Stage 2	-	-	-	-	660	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	919	-	-	-	225	457
Mov Cap-2 Maneuver	-	-	-	-	225	-
Stage 1	-	-	-	-	484	-
Stage 2	-	-	-	-	660	-

Approach	EB	WB	SB
HCM Control Delay, s	1.1	0	16.3
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	919	-	-	-	373
HCM Lane V/C Ratio	0.049	-	-	-	0.147
HCM Control Delay (s)	9.1	-	-	-	16.3
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.2	-	-	-	0.5

HCM 6th TWSC
19: Knott Rd & New Road #3
07/31/2020

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	24	316	645	1	1	23
Future Vol, veh/h	24	316	645	1	1	23
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	26	343	701	1	1	25

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	702	0	-	0	1097	702
Stage 1	-	-	-	-	702	-
Stage 2	-	-	-	-	395	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	895	-	-	-	236	438
Stage 1	-	-	-	-	491	-
Stage 2	-	-	-	-	681	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	895	-	-	-	229	438
Mov Cap-2 Maneuver	-	-	-	-	229	-
Stage 1	-	-	-	-	477	-
Stage 2	-	-	-	-	681	-

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	14.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	895	-	-	-	422
HCM Lane V/C Ratio	0.029	-	-	-	0.062
HCM Control Delay (s)	9.1	-	-	-	14.1
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2

MOVEMENT SUMMARY

Site: 1 [1 Reed Market Rd / 15th St Mulitlane]

Reed Market Rd / 15th St
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: 15th St												
3	L2	270	3.0	0.755	30.2	LOS D	4.9	126.1	0.82	1.13	1.97	24.7
8	T1	359	2.0	0.755	30.0	LOS D	5.0	126.4	0.82	1.13	1.96	25.3
18	R2	123	0.0	0.755	29.7	LOS D	5.0	126.4	0.82	1.13	1.96	25.0
Approach		752	2.0	0.755	30.0	LOS D	5.0	126.4	0.82	1.13	1.96	25.0
East: Reed Market Rd												
1	L2	125	2.0	0.651	20.1	LOS C	3.9	100.0	0.71	0.92	1.47	28.3
6	T1	472	3.0	0.651	20.3	LOS C	3.9	100.0	0.70	0.92	1.47	28.3
16	R2	156	8.0	0.651	20.7	LOS C	3.8	99.4	0.70	0.92	1.48	27.7
Approach		753	3.9	0.651	20.4	LOS C	3.9	100.0	0.70	0.92	1.47	28.2
North: 15th St												
7	L2	258	2.0	0.800	30.0	LOS D	7.1	182.0	0.80	1.19	2.15	24.9
4	T1	384	3.0	0.800	30.0	LOS D	7.2	182.7	0.80	1.19	2.15	25.1
14	R2	310	0.0	0.800	29.7	LOS D	7.2	182.7	0.81	1.19	2.14	24.9
Approach		952	1.8	0.800	29.9	LOS D	7.2	182.7	0.80	1.19	2.15	25.0
West: Reed Market Rd												
5	L2	263	1.0	1.034	69.9	LOS F	27.0	686.7	1.00	2.33	5.43	17.6
2	T1	617	3.0	1.034	70.1	LOS F	27.0	686.7	1.00	2.33	5.44	17.5
12	R2	437	2.0	1.034	70.0	LOS F	27.0	686.7	1.00	2.33	5.44	17.2
Approach		1317	2.3	1.034	70.0	LOS F	27.0	686.7	1.00	2.33	5.44	17.4
All Vehicles		3774	2.4	1.034	42.0	LOS E	27.0	686.7	0.86	1.52	3.12	22.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 2 [2 Reed Market Rd / 27th St- Mit ONLY]

Reed Market Rd / 27th St
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: 27th Street												
3	L2	213	11.0	0.852	38.1	LOS E	9.5	253.5	0.88	1.42	2.62	22.9
8	T1	621	7.0	0.852	35.7	LOS E	10.3	268.5	0.89	1.43	2.61	23.8
18	R2	165	0.0	0.852	33.8	LOS D	10.3	268.5	0.90	1.43	2.60	23.8
Approach		999	6.7	0.852	35.9	LOS E	10.3	268.5	0.89	1.43	2.61	23.6
East: Reed Market Road												
1	L2	178	2.0	0.694	29.3	LOS D	3.5	89.8	0.84	1.07	1.76	25.0
6	T1	276	2.0	0.694	29.3	LOS D	3.5	89.8	0.84	1.07	1.76	25.3
16	R2	130	2.0	0.694	29.3	LOS D	3.5	89.8	0.84	1.07	1.76	25.0
Approach		584	2.0	0.694	29.3	LOS D	3.5	89.8	0.84	1.07	1.76	25.2
North: 27th Street												
7	L2	128	4.0	0.969	52.5	LOS F	20.1	522.7	0.94	1.93	4.09	20.3
4	T1	860	5.0	0.969	52.4	LOS F	20.4	524.3	0.95	1.93	4.08	20.3
14	R2	299	2.0	0.969	52.1	LOS F	20.4	524.3	0.95	1.93	4.08	19.9
Approach		1287	4.2	0.969	52.4	LOS F	20.4	524.3	0.95	1.93	4.08	20.2
West: Reed Market Road												
5	L2	470	3.0	1.004	72.6	LOS F	15.9	406.5	1.00	2.01	4.85	16.9
2	T1	278	2.0	0.975	65.4	LOS F	13.4	342.7	0.96	1.83	4.28	18.2
12	R2	177	5.0	0.975	65.6	LOS F	13.4	342.7	0.96	1.83	4.28	17.9
Approach		925	3.1	1.004	69.1	LOS F	15.9	406.5	0.98	1.93	4.57	17.5
All Vehicles		3795	4.2	1.004	48.5	LOS E	20.4	524.3	0.92	1.66	3.46	20.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

MOVEMENT SUMMARY

Site: 4 [4 15th Street / Ferguson Rd]

15th Street / Ferguson Rd
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: 15th St												
3	L2	30	0.0	0.696	14.1	LOS B	9.8	251.8	0.63	0.71	1.04	31.2
8	T1	582	5.0	0.696	14.3	LOS B	9.8	251.8	0.63	0.71	1.04	30.9
18	R2	123	0.0	0.696	14.1	LOS B	9.8	251.8	0.63	0.71	1.04	30.1
Approach		735	4.0	0.696	14.3	LOS B	9.8	251.8	0.63	0.71	1.04	30.8
East: Ferguson Rd												
1	L2	123	0.0	0.376	9.2	LOS A	1.6	41.7	0.59	0.63	0.71	32.3
6	T1	8	50.0	0.376	11.5	LOS B	1.6	41.7	0.59	0.63	0.71	31.4
16	R2	157	3.0	0.376	9.4	LOS A	1.6	41.7	0.59	0.63	0.71	31.1
Approach		288	3.0	0.376	9.4	LOS A	1.6	41.7	0.59	0.63	0.71	31.6
North: 15th St												
7	L2	213	3.0	0.885	25.6	LOS D	34.6	879.9	0.95	1.19	1.86	26.7
4	T1	780	2.0	0.885	25.6	LOS D	34.6	879.9	0.95	1.19	1.86	26.6
14	R2	19	0.0	0.885	25.5	LOS D	34.6	879.9	0.95	1.19	1.86	26.0
Approach		1012	2.2	0.885	25.6	LOS D	34.6	879.9	0.95	1.19	1.86	26.6
West: Ferguson Rd												
5	L2	14	1.0	0.080	7.8	LOS A	0.2	6.1	0.62	0.62	0.62	33.3
2	T1	8	3.0	0.080	7.9	LOS A	0.2	6.1	0.62	0.62	0.62	33.1
12	R2	20	2.0	0.080	7.8	LOS A	0.2	6.1	0.62	0.62	0.62	32.1
Approach		42	1.9	0.080	7.8	LOS A	0.2	6.1	0.62	0.62	0.62	32.7
All Vehicles		2077	2.9	0.885	19.0	LOS C	34.6	879.9	0.78	0.93	1.38	28.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

MOVEMENT SUMMARY

Site: 6 [6 27th Street / Ferguson Rd]

27th Street / Ferguson Rd
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: 27th Street												
3	L2	74	9.0	0.719	16.7	LOS C	9.8	260.9	0.68	0.94	1.40	29.8
8	T1	538	9.0	0.719	16.7	LOS C	9.8	260.9	0.68	0.94	1.40	29.8
18	R2	58	2.0	0.719	16.5	LOS C	9.8	260.9	0.68	0.94	1.40	29.1
Approach		670	8.4	0.719	16.7	LOS C	9.8	260.9	0.68	0.94	1.40	29.7
East: Ferguson Rd												
1	L2	39	2.0	0.229	8.6	LOS A	0.8	19.4	0.59	0.59	0.59	33.1
6	T1	50	2.0	0.229	8.6	LOS A	0.8	19.4	0.59	0.59	0.59	32.9
16	R2	55	2.0	0.229	8.6	LOS A	0.8	19.4	0.59	0.59	0.59	31.9
Approach		144	2.0	0.229	8.6	LOS A	0.8	19.4	0.59	0.59	0.59	32.6
North: 27th Street												
7	L2	40	2.0	0.980	41.9	LOS E	56.7	1487.4	1.00	1.71	2.73	22.6
4	T1	823	8.0	0.980	42.1	LOS E	56.7	1487.4	1.00	1.71	2.73	22.5
14	R2	209	0.0	0.980	41.8	LOS E	56.7	1487.4	1.00	1.71	2.73	22.1
Approach		1072	6.2	0.980	42.0	LOS E	56.7	1487.4	1.00	1.71	2.73	22.4
West: Ferguson Rd												
5	L2	244	2.0	0.752	25.8	LOS D	6.2	158.8	0.81	1.14	1.92	26.0
2	T1	56	2.0	0.752	25.8	LOS D	6.2	158.8	0.81	1.14	1.92	25.9
12	R2	147	6.0	0.752	26.1	LOS D	6.2	158.8	0.81	1.14	1.92	25.3
Approach		447	3.3	0.752	25.9	LOS D	6.2	158.8	0.81	1.14	1.92	25.8
All Vehicles		2333	6.0	0.980	29.6	LOS D	56.7	1487.4	0.85	1.31	2.06	25.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

MOVEMENT SUMMARY

Site: 7 [7 Country Club Rd / Murphy Rd]

Country Club Rd / Murphy Rd
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: Country Club Rd												
3	L2	189	0.0	0.248	6.6	LOS A	0.9	23.1	0.49	0.46	0.49	32.6
8	T1	10	0.0	0.248	6.6	LOS A	0.9	23.1	0.49	0.46	0.49	32.4
18	R2	23	0.0	0.248	6.6	LOS A	0.9	23.1	0.49	0.46	0.49	31.5
Approach		222	0.0	0.248	6.6	LOS A	0.9	23.1	0.49	0.46	0.49	32.4
East: Murphy Rd												
1	L2	14	0.0	0.549	9.8	LOS A	3.2	80.4	0.49	0.37	0.49	33.3
6	T1	589	0.0	0.549	9.8	LOS A	3.2	80.4	0.49	0.37	0.49	33.1
16	R2	12	0.0	0.549	9.8	LOS A	3.2	80.4	0.49	0.37	0.49	32.1
Approach		615	0.0	0.549	9.8	LOS A	3.2	80.4	0.49	0.37	0.49	33.1
North: Country Club Rd												
7	L2	11	0.0	0.049	5.6	LOS A	0.2	3.9	0.51	0.48	0.51	34.5
4	T1	11	0.0	0.049	5.6	LOS A	0.2	3.9	0.51	0.48	0.51	34.3
14	R2	13	0.0	0.049	5.6	LOS A	0.2	3.9	0.51	0.48	0.51	33.2
Approach		35	0.0	0.049	5.6	LOS A	0.2	3.9	0.51	0.48	0.51	34.0
West: Murphy Rd												
5	L2	18	0.0	0.556	9.0	LOS A	3.8	95.4	0.20	0.08	0.20	33.6
2	T1	462	1.0	0.556	9.0	LOS A	3.8	95.4	0.20	0.08	0.20	33.4
12	R2	236	0.0	0.556	9.0	LOS A	3.8	95.4	0.20	0.08	0.20	32.4
Approach		716	0.6	0.556	9.0	LOS A	3.8	95.4	0.20	0.08	0.20	33.1
All Vehicles		1588	0.3	0.556	8.9	LOS A	3.8	95.4	0.36	0.25	0.36	33.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

MOVEMENT SUMMARY

Site: 8 [8 Brosterhous Rd / Murphy Rd]

Brosterhous Rd / Murphy Rd
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: Brosterhous Rd												
3	L2	169	3.0	0.540	12.2	LOS B	3.6	92.7	0.64	0.78	1.04	31.1
8	T1	177	7.0	0.540	12.3	LOS B	3.6	92.7	0.64	0.78	1.04	30.9
18	R2	91	2.0	0.540	12.1	LOS B	3.6	92.7	0.64	0.78	1.04	30.1
Approach		437	4.4	0.540	12.2	LOS B	3.6	92.7	0.64	0.78	1.04	30.8
East: Murphy Rd												
1	L2	76	2.0	0.544	12.1	LOS B	3.8	95.3	0.65	0.79	1.05	31.7
6	T1	159	2.0	0.544	12.1	LOS B	3.8	95.3	0.65	0.79	1.05	31.5
16	R2	216	2.0	0.544	12.1	LOS B	3.8	95.3	0.65	0.79	1.05	30.6
Approach		451	2.0	0.544	12.1	LOS B	3.8	95.3	0.65	0.79	1.05	31.1
North: Brosterhous Rd												
7	L2	186	2.0	0.708	16.2	LOS C	9.1	231.5	0.74	1.01	1.45	29.8
4	T1	188	4.0	0.708	16.2	LOS C	9.1	231.5	0.74	1.01	1.45	29.6
14	R2	287	2.0	0.708	16.2	LOS C	9.1	231.5	0.74	1.01	1.45	28.8
Approach		661	2.6	0.708	16.2	LOS C	9.1	231.5	0.74	1.01	1.45	29.3
West: Murphy Rd												
5	L2	200	3.0	0.558	11.8	LOS B	4.2	108.1	0.63	0.76	0.99	31.3
2	T1	170	2.0	0.558	11.8	LOS B	4.2	108.1	0.63	0.76	0.99	31.2
12	R2	128	5.0	0.558	11.9	LOS B	4.2	108.1	0.63	0.76	0.99	30.2
Approach		498	3.2	0.558	11.8	LOS B	4.2	108.1	0.63	0.76	0.99	31.0
All Vehicles		2047	3.0	0.708	13.4	LOS B	9.1	231.5	0.67	0.85	1.16	30.4

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 9 [9 15th St / Murphy Rd]

15th St / Murphy Rd
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: 15th St												
3	L2	188	2.0	0.759	18.5	LOS C	11.9	300.9	0.80	1.14	1.69	29.0
8	T1	511	2.0	0.759	18.5	LOS C	11.9	300.9	0.80	1.14	1.69	28.9
18	R2	19	0.0	0.759	18.4	LOS C	11.9	300.9	0.80	1.14	1.69	28.2
Approach		718	1.9	0.759	18.5	LOS C	11.9	300.9	0.80	1.14	1.69	28.9
East: Golden Gate Pl												
1	L2	5	0.0	0.247	8.7	LOS A	0.8	21.1	0.60	0.60	0.60	33.7
6	T1	74	2.0	0.247	8.9	LOS A	0.8	21.1	0.60	0.60	0.60	33.5
16	R2	77	0.0	0.247	8.7	LOS A	0.8	21.1	0.60	0.60	0.60	32.5
Approach		156	0.9	0.247	8.8	LOS A	0.8	21.1	0.60	0.60	0.60	33.0
North: 15th St												
7	L2	106	0.0	0.868	24.9	LOS C	26.8	675.6	0.97	1.42	2.23	27.1
4	T1	626	1.0	0.868	25.0	LOS C	26.8	675.6	0.97	1.42	2.23	26.9
14	R2	188	2.0	0.868	25.0	LOS D	26.8	675.6	0.97	1.42	2.23	26.3
Approach		920	1.1	0.868	25.0	LOS C	26.8	675.6	0.97	1.42	2.23	26.8
West: Murphy Rd												
5	L2	205	2.0	0.619	15.8	LOS C	4.5	114.1	0.73	0.93	1.35	29.5
2	T1	87	2.0	0.619	15.8	LOS C	4.5	114.1	0.73	0.93	1.35	29.4
12	R2	154	2.0	0.619	15.8	LOS C	4.5	114.1	0.73	0.93	1.35	28.6
Approach		446	2.0	0.619	15.8	LOS C	4.5	114.1	0.73	0.93	1.35	29.2
All Vehicles		2240	1.5	0.868	19.9	LOS C	26.8	675.6	0.84	1.18	1.77	28.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 10 [10 27th St / Diamondback Ln]

27th St / Diamondback Ln (N)
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: 27th Street												
3	L2	43	2.0	0.425	8.6	LOS A	1.9	48.7	0.51	0.46	0.52	33.5
8	T1	358	5.0	0.425	8.7	LOS A	1.9	48.7	0.51	0.46	0.52	33.3
Approach		401	4.7	0.425	8.7	LOS A	1.9	48.7	0.51	0.46	0.52	33.3
North: 27th Street												
4	T1	680	2.0	0.822	18.5	LOS C	11.2	285.6	0.47	0.20	0.47	29.3
14	R2	350	4.0	0.822	18.6	LOS C	11.2	285.6	0.47	0.20	0.47	28.5
Approach		1030	2.7	0.822	18.6	LOS C	11.2	285.6	0.47	0.20	0.47	29.0
West: Diamondback Ln												
5	L2	367	2.0	0.552	13.3	LOS B	3.6	90.9	0.69	0.84	1.14	29.7
12	R2	47	2.0	0.552	13.3	LOS B	3.6	90.9	0.69	0.84	1.14	28.8
Approach		414	2.0	0.552	13.3	LOS B	3.6	90.9	0.69	0.84	1.14	29.5
All Vehicles		1845	3.0	0.822	15.2	LOS C	11.2	285.6	0.52	0.40	0.63	30.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

MOVEMENT SUMMARY

Site: 12 [12 China Hat Rd / Knott Rd]

China Hat Rd / Knott Rd
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: China Hat Rd												
3	L2	16	0.0	0.071	5.0	LOS A	0.2	5.8	0.46	0.41	0.46	34.9
8	T1	15	0.0	0.071	5.0	LOS A	0.2	5.8	0.46	0.41	0.46	34.7
18	R2	28	0.0	0.071	5.0	LOS A	0.2	5.8	0.46	0.41	0.46	33.6
Approach		59	0.0	0.071	5.0	LOS A	0.2	5.8	0.46	0.41	0.46	34.2
East: Knott Rd												
1	L2	35	0.0	0.735	13.8	LOS B	7.9	199.1	0.32	0.12	0.32	31.4
6	T1	776	1.0	0.735	13.8	LOS B	7.9	199.1	0.32	0.12	0.32	31.2
16	R2	132	1.0	0.735	13.8	LOS B	7.9	199.1	0.32	0.12	0.32	30.3
Approach		943	1.0	0.735	13.8	LOS B	7.9	199.1	0.32	0.12	0.32	31.1
North: China Hat Rd												
7	L2	84	0.0	0.177	7.3	LOS A	0.6	14.6	0.56	0.56	0.56	32.4
4	T1	28	13.0	0.177	8.0	LOS A	0.6	14.6	0.56	0.56	0.56	32.1
14	R2	5	0.0	0.177	7.3	LOS A	0.6	14.6	0.56	0.56	0.56	31.3
Approach		117	3.1	0.177	7.5	LOS A	0.6	14.6	0.56	0.56	0.56	32.3
West: Knott Rd												
5	L2	4	0.0	0.446	7.8	LOS A	2.2	56.7	0.35	0.23	0.35	34.3
2	T1	486	4.0	0.446	7.9	LOS A	2.2	56.7	0.35	0.23	0.35	34.0
12	R2	18	0.0	0.446	7.8	LOS A	2.2	56.7	0.35	0.23	0.35	33.0
Approach		508	3.8	0.446	7.9	LOS A	2.2	56.7	0.35	0.23	0.35	33.9
All Vehicles		1627	2.0	0.735	11.2	LOS B	7.9	199.1	0.35	0.20	0.35	32.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

MOVEMENT SUMMARY

Site: 13 [13 County Club Rd / Knott Rd]

County Club Rd / Knott Rd
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
East: Knott Rd												
6	T1	910	5.0	0.825	19.8	LOS C	11.1	288.5	0.66	0.44	0.71	28.9
16	R2	49	0.0	0.825	19.7	LOS C	11.1	288.5	0.66	0.44	0.71	28.2
Approach		959	4.7	0.825	19.8	LOS C	11.1	288.5	0.66	0.44	0.71	28.8
North: Country Club Rd												
7	L2	47	3.0	0.131	7.5	LOS A	0.4	10.5	0.57	0.57	0.57	32.7
14	R2	33	0.0	0.131	7.3	LOS A	0.4	10.5	0.57	0.57	0.57	31.7
Approach		80	1.8	0.131	7.4	LOS A	0.4	10.5	0.57	0.57	0.57	32.3
West: Knott Rd												
5	L2	113	0.0	0.567	9.5	LOS A	3.3	89.2	0.23	0.10	0.23	32.9
2	T1	558	10.0	0.567	9.8	LOS A	3.3	89.2	0.23	0.10	0.23	32.5
Approach		671	8.3	0.567	9.8	LOS A	3.3	89.2	0.23	0.10	0.23	32.6
All Vehicles		1710	6.0	0.825	15.3	LOS C	11.1	288.5	0.48	0.31	0.52	30.4

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

MOVEMENT SUMMARY

Site: 14 [14 Brosterhous Rd / Knott Rd]

Brosterhous Rd / Knott Rd
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
East: Knott Rd												
6	T1	894	3.0	0.880	23.4	LOS C	15.9	407.9	0.54	0.21	0.54	27.6
16	R2	212	4.0	0.880	23.5	LOS C	15.9	407.9	0.54	0.21	0.54	26.9
Approach		1106	3.2	0.880	23.4	LOS C	15.9	407.9	0.54	0.21	0.54	27.5
North: Brosterhous Rd												
7	L2	148	4.0	0.338	10.5	LOS B	1.3	33.2	0.63	0.67	0.77	31.0
14	R2	58	6.0	0.338	10.6	LOS B	1.3	33.2	0.63	0.67	0.77	30.0
Approach		206	4.6	0.338	10.6	LOS B	1.3	33.2	0.63	0.67	0.77	30.7
West: Knott Rd												
5	L2	30	14.0	0.553	10.3	LOS B	2.9	77.7	0.40	0.26	0.40	32.6
2	T1	566	9.0	0.553	10.1	LOS B	2.9	77.7	0.40	0.26	0.40	32.7
Approach		596	9.3	0.553	10.1	LOS B	2.9	77.7	0.40	0.26	0.40	32.7
All Vehicles		1908	5.2	0.880	17.9	LOS C	15.9	407.9	0.50	0.28	0.52	29.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

MOVEMENT SUMMARY

Site: 15 [15 15th St / Knott Rd]

15th St / Knott Rd
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: 15th St												
3	L2	15	11.0	0.040	5.7	LOS A	0.1	3.0	0.48	0.42	0.48	33.0
8	T1	5	25.0	0.040	6.3	LOS A	0.1	3.0	0.48	0.42	0.48	32.9
18	R2	6	25.0	0.040	6.3	LOS A	0.1	3.0	0.48	0.42	0.48	31.7
Approach		26	16.9	0.040	5.9	LOS A	0.1	3.0	0.48	0.42	0.48	32.7
East: Knott Rd												
1	L2	10	25.0	0.853	24.2	LOS C	25.0	635.5	0.91	1.30	2.04	27.2
6	T1	865	2.0	0.853	23.5	LOS C	25.0	635.5	0.91	1.30	2.04	27.5
16	R2	31	0.0	0.853	23.4	LOS C	25.0	635.5	0.91	1.30	2.04	26.9
Approach		906	2.2	0.853	23.5	LOS C	25.0	635.5	0.91	1.30	2.04	27.5
North: 15th St												
7	L2	25	0.0	0.408	11.4	LOS B	1.8	46.1	0.66	0.73	0.91	32.0
4	T1	1	0.0	0.408	11.4	LOS B	1.8	46.1	0.66	0.73	0.91	31.9
14	R2	236	0.0	0.408	11.4	LOS B	1.8	46.1	0.66	0.73	0.91	31.0
Approach		262	0.0	0.408	11.4	LOS B	1.8	46.1	0.66	0.73	0.91	31.1
West: Knott Rd												
5	L2	231	1.0	0.537	8.8	LOS A	3.3	85.6	0.20	0.08	0.20	32.8
2	T1	422	4.0	0.537	8.9	LOS A	3.3	85.6	0.20	0.08	0.20	32.6
12	R2	20	8.0	0.537	9.0	LOS A	3.3	85.6	0.20	0.08	0.20	31.6
Approach		673	3.1	0.537	8.8	LOS A	3.3	85.6	0.20	0.08	0.20	32.6
All Vehicles		1867	2.4	0.853	16.3	LOS C	25.0	635.5	0.61	0.77	1.19	29.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

MOVEMENT SUMMARY

Site: 17 [17 15th St / Caldera St]

15th St / Caldera St
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: 15th Street												
3	L2	6	2.0	0.311	7.6	LOS A	1.2	30.1	0.52	0.51	0.52	34.3
8	T1	248	2.0	0.311	7.6	LOS A	1.2	30.1	0.52	0.51	0.52	34.1
18	R2	14	2.0	0.311	7.6	LOS A	1.2	30.1	0.52	0.51	0.52	33.1
Approach		268	2.0	0.311	7.6	LOS A	1.2	30.1	0.52	0.51	0.52	34.1
East: New Road												
1	L2	16	2.0	0.425	8.4	LOS A	1.9	48.7	0.49	0.43	0.49	33.8
6	T1	13	2.0	0.425	8.4	LOS A	1.9	48.7	0.49	0.43	0.49	33.6
16	R2	394	2.0	0.425	8.4	LOS A	1.9	48.7	0.49	0.43	0.49	32.6
Approach		423	2.0	0.425	8.4	LOS A	1.9	48.7	0.49	0.43	0.49	32.6
North: 15th Street												
7	L2	426	2.0	0.577	9.5	LOS A	4.0	101.5	0.21	0.08	0.21	31.9
4	T1	257	2.0	0.577	9.5	LOS A	4.0	101.5	0.21	0.08	0.21	31.7
14	R2	50	2.0	0.577	9.5	LOS A	4.0	101.5	0.21	0.08	0.21	30.8
Approach		733	2.0	0.577	9.5	LOS A	4.0	101.5	0.21	0.08	0.21	31.8
West: New Road												
5	L2	81	2.0	0.126	6.2	LOS A	0.4	10.4	0.51	0.51	0.51	32.6
2	T1	2	1.0	0.126	6.2	LOS A	0.4	10.4	0.51	0.51	0.51	32.5
12	R2	10	2.0	0.126	6.2	LOS A	0.4	10.4	0.51	0.51	0.51	31.5
Approach		93	2.0	0.126	6.2	LOS A	0.4	10.4	0.51	0.51	0.51	32.5
All Vehicles		1517	2.0	0.577	8.7	LOS A	4.0	101.5	0.36	0.28	0.36	32.4

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

Appendix B - Urbanized Operational Analysis Worksheets

HCM 6th TWSC
5: New Road #4 & Ferguson Rd

07/31/2020

Intersection	
Int Delay, s/veh	7.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	232	78	129	163	98	200
Future Vol, veh/h	232	78	129	163	98	200
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	1	-	-	-2	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	3	0	0	0	33	0
Mvmt Flow	232	78	129	163	98	200

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	310	0	692	271
Stage 1	-	-	-	-	271	-
Stage 2	-	-	-	-	421	-
Critical Hdwy	-	-	4.1	-	6.73	6.2
Critical Hdwy Stg 1	-	-	-	-	5.73	-
Critical Hdwy Stg 2	-	-	-	-	5.73	-
Follow-up Hdwy	-	-	2.2	-	3.797	3.3
Pot Cap-1 Maneuver	-	-	1262	-	366	773
Stage 1	-	-	-	-	708	-
Stage 2	-	-	-	-	601	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1262	-	329	773
Mov Cap-2 Maneuver	-	-	-	-	329	-
Stage 1	-	-	-	-	636	-
Stage 2	-	-	-	-	601	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.6	19.9
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	535	-	-	1262	-
HCM Lane V/C Ratio	0.557	-	-	0.102	-
HCM Control Delay (s)	19.9	-	-	8.2	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	3.4	-	-	0.3	-

HCM 6th TWSC
11: SE 27th St & Rickard Rd

07/31/2020

Intersection	
Int Delay, s/veh	4.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	110	106	275	80	122	595
Future Vol, veh/h	110	106	275	80	122	595
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Stop	-	None	-	None
Storage Length	0	-	-	70	135	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	8	5	6	1	2	4
Mvmt Flow	110	106	275	80	122	595

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1114	275	0	0	355	0
Stage 1	275	-	-	-	-	-
Stage 2	839	-	-	-	-	-
Critical Hdwy	6.48	6.25	-	-	4.12	-
Critical Hdwy Stg 1	5.48	-	-	-	-	-
Critical Hdwy Stg 2	5.48	-	-	-	-	-
Follow-up Hdwy	3.572	3.345	-	-	2.218	-
Pot Cap-1 Maneuver	224	757	-	-	1204	-
Stage 1	758	-	-	-	-	-
Stage 2	414	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	201	757	-	-	1204	-
Mov Cap-2 Maneuver	201	-	-	-	-	-
Stage 1	681	-	-	-	-	-
Stage 2	414	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	24.6	0	1.4
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	395	1204	-
HCM Lane V/C Ratio	-	-	0.547	0.101	-
HCM Control Delay (s)	-	-	24.6	8.3	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	3.2	0.3	-

HCM 6th TWSC
16: Raintree Ct & Knott Rd

07/31/2020

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕				↱
Traffic Vol, veh/h	5	346	0	0	734	8	0	0	0	0	0	36
Future Vol, veh/h	5	346	0	0	734	8	0	0	0	0	0	36
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	4	0	0	4	0	0	0	0	0	0	0
Mvmt Flow	5	346	0	0	734	8	0	0	0	0	0	36

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	742	0	0	346	0	0	1112	1098	346	-	-	738
Stage 1	-	-	-	-	-	-	356	356	-	-	-	-
Stage 2	-	-	-	-	-	-	756	742	-	-	-	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	-	-	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	-	-	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	-	-	3.3
Pot Cap-1 Maneuver	874	-	-	1224	-	-	188	215	702	0	0	421
Stage 1	-	-	-	-	-	-	666	633	-	0	0	-
Stage 2	-	-	-	-	-	-	403	425	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	874	-	-	1224	-	-	171	213	702	-	-	421
Mov Cap-2 Maneuver	-	-	-	-	-	-	171	213	-	-	-	-
Stage 1	-	-	-	-	-	-	661	629	-	-	-	-
Stage 2	-	-	-	-	-	-	369	425	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0	0	14.3
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	874	-	-	1224	-	-	421
HCM Lane V/C Ratio	-	0.006	-	-	-	-	-	0.086
HCM Control Delay (s)	0	9.1	0	-	0	-	-	14.3
HCM Lane LOS	A	A	A	-	A	-	-	B
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	0.3

HCM 6th TWSC

18: Knott Rd & New Road #2

07/31/2020

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	107	338	735	23	12	148
Future Vol, veh/h	107	338	735	23	12	148
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	107	338	735	23	12	148

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	758	0	-	0	1299	747
Stage 1	-	-	-	-	747	-
Stage 2	-	-	-	-	552	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	853	-	-	-	178	413
Stage 1	-	-	-	-	468	-
Stage 2	-	-	-	-	577	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	853	-	-	-	156	413
Mov Cap-2 Maneuver	-	-	-	-	156	-
Stage 1	-	-	-	-	410	-
Stage 2	-	-	-	-	577	-

Approach	EB	WB	SB
HCM Control Delay, s	2.4	0	22.1
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	853	-	-	-	368
HCM Lane V/C Ratio	0.125	-	-	-	0.435
HCM Control Delay (s)	9.8	-	-	-	22.1
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.4	-	-	-	2.1

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	47	312	693	25	26	48
Future Vol, veh/h	47	312	693	25	26	48
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	51	339	753	27	28	52

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	780	0	-	0	1208	767
Stage 1	-	-	-	-	767	-
Stage 2	-	-	-	-	441	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	837	-	-	-	202	402
Stage 1	-	-	-	-	458	-
Stage 2	-	-	-	-	648	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	837	-	-	-	190	402
Mov Cap-2 Maneuver	-	-	-	-	190	-
Stage 1	-	-	-	-	430	-
Stage 2	-	-	-	-	648	-

Approach	EB	WB	SB
HCM Control Delay, s	1.3	0	22.2
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	837	-	-	-	289
HCM Lane V/C Ratio	0.061	-	-	-	0.278
HCM Control Delay (s)	9.6	-	-	-	22.2
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.2	-	-	-	1.1

MOVEMENT SUMMARY

Site: 1 [1 Reed Market Rd / 15th St Mulitlane]

Reed Market Rd / 15th St
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: 15th St												
3	L2	247	3.0	0.435	13.2	LOS B	1.7	43.1	0.61	0.71	0.95	29.4
8	T1	337	2.0	0.779	28.7	LOS D	6.3	159.5	0.79	1.14	2.02	26.0
18	R2	112	0.0	0.779	28.5	LOS D	6.3	159.5	0.79	1.14	2.02	25.3
Approach		696	2.0	0.779	23.2	LOS C	6.3	159.5	0.73	0.99	1.64	27.0
East: Reed Market Rd												
1	L2	118	2.0	0.951	50.2	LOS F	16.6	423.7	0.92	1.77	3.78	20.8
6	T1	477	3.0	0.951	50.2	LOS F	16.6	423.7	0.92	1.77	3.78	20.7
16	R2	161	8.0	0.270	9.6	LOS A	0.7	19.1	0.51	0.51	0.52	31.8
Approach		756	3.9	0.951	41.6	LOS E	16.6	423.7	0.83	1.50	3.09	22.4
North: 15th St												
7	L2	267	2.0	1.065	81.3	LOS F	29.3	748.0	1.00	2.52	6.23	16.2
4	T1	373	3.0	1.065	81.3	LOS F	29.3	748.0	1.00	2.52	6.23	16.1
14	R2	322	0.0	0.523	14.7	LOS B	2.5	63.7	0.64	0.77	1.10	29.8
Approach		962	1.7	1.065	59.0	LOS F	29.3	748.0	0.88	1.94	4.51	19.0
West: Reed Market Rd												
5	L2	273	1.0	1.361	191.3	LOS F	88.5	2255.2	1.00	4.65	12.93	9.2
2	T1	622	3.0	1.361	191.4	LOS F	88.5	2255.2	1.00	4.65	12.93	9.1
12	R2	414	2.0	0.627	17.3	LOS C	4.0	102.2	0.66	0.86	1.32	28.8
Approach		1309	2.3	1.361	136.3	LOS F	88.5	2255.2	0.89	3.45	9.26	11.6
All Vehicles		3723	2.4	1.361	75.9	LOS F	88.5	2255.2	0.84	2.20	5.35	16.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 2 [2 Reed Market Rd / 27th St]

Reed Market Rd / 27th St
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: 27th Street												
3	L2	195	11.0	0.929	52.9	LOS F	12.7	339.6	0.91	1.68	3.44	20.0
8	T1	630	7.0	0.929	49.9	LOS E	14.1	364.3	0.92	1.69	3.45	20.7
18	R2	190	0.0	0.929	47.4	LOS E	14.1	364.3	0.94	1.70	3.46	20.8
Approach		1015	6.5	0.929	50.0	LOS F	14.1	364.3	0.92	1.69	3.45	20.6
East: Reed Market Road												
1	L2	129	2.0	0.632	24.5	LOS C	2.9	74.8	0.80	0.99	1.54	26.6
6	T1	286	2.0	0.632	24.5	LOS C	2.9	74.8	0.80	0.99	1.54	26.8
16	R2	136	2.0	0.632	24.5	LOS C	2.9	74.8	0.80	0.99	1.54	26.4
Approach		551	2.0	0.632	24.5	LOS C	2.9	74.8	0.80	0.99	1.54	26.6
North: 27th Street												
7	L2	187	4.0	0.985	54.9	LOS F	23.6	611.5	0.98	2.07	4.34	19.8
4	T1	872	5.0	0.985	54.8	LOS F	23.8	613.5	0.98	2.07	4.34	19.8
14	R2	305	2.0	0.985	54.5	LOS F	23.8	613.5	0.99	2.07	4.34	19.5
Approach		1364	4.2	0.985	54.8	LOS F	23.8	613.5	0.99	2.07	4.34	19.8
West: Reed Market Road												
5	L2	442	3.0	1.044	84.2	LOS F	19.5	497.7	1.00	2.23	5.70	15.6
2	T1	351	2.0	1.044	84.2	LOS F	19.5	497.7	1.00	2.23	5.70	15.8
12	R2	167	5.0	1.044	84.4	LOS F	19.4	497.7	1.00	2.23	5.70	15.6
Approach		961	3.0	1.044	84.2	LOS F	19.5	497.7	1.00	2.23	5.70	15.7
All Vehicles		3892	4.2	1.044	56.5	LOS F	23.8	613.5	0.95	1.86	4.05	19.4

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

MOVEMENT SUMMARY

Site: 4 [4 15th Street / Ferguson Rd]

15th Street / Ferguson Rd
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: 15th St												
3	L2	33	0.0	0.666	12.8	LOS B	7.5	193.3	0.56	0.54	0.78	31.7
8	T1	562	5.0	0.666	13.0	LOS B	7.5	193.3	0.56	0.54	0.78	31.5
18	R2	130	0.0	0.666	12.8	LOS B	7.5	193.3	0.56	0.54	0.78	30.7
Approach		725	3.9	0.666	13.0	LOS B	7.5	193.3	0.56	0.54	0.78	31.3
East: Ferguson Rd												
1	L2	124	0.0	0.382	9.2	LOS A	1.7	43.2	0.59	0.63	0.71	32.3
6	T1	7	50.0	0.382	11.5	LOS B	1.7	43.2	0.59	0.63	0.71	31.5
16	R2	167	3.0	0.382	9.4	LOS A	1.7	43.2	0.59	0.63	0.71	31.2
Approach		298	2.9	0.382	9.4	LOS A	1.7	43.2	0.59	0.63	0.71	31.6
North: 15th St												
7	L2	181	3.0	0.789	17.7	LOS C	17.4	443.7	0.71	0.75	1.14	29.4
4	T1	702	2.0	0.789	17.7	LOS C	17.4	443.7	0.71	0.75	1.14	29.3
14	R2	17	0.0	0.789	17.6	LOS C	17.4	443.7	0.71	0.75	1.14	28.6
Approach		900	2.2	0.789	17.7	LOS C	17.4	443.7	0.71	0.75	1.14	29.3
West: Ferguson Rd												
5	L2	12	1.0	0.071	7.0	LOS A	0.2	5.5	0.58	0.58	0.58	33.8
2	T1	7	3.0	0.071	7.2	LOS A	0.2	5.5	0.58	0.58	0.58	33.5
12	R2	22	2.0	0.071	7.1	LOS A	0.2	5.5	0.58	0.58	0.58	32.5
Approach		41	1.9	0.071	7.1	LOS A	0.2	5.5	0.58	0.58	0.58	33.1
All Vehicles		1964	2.9	0.789	14.5	LOS B	17.4	443.7	0.63	0.65	0.93	30.4

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

MOVEMENT SUMMARY

Site: 6 [6 27th Street / Ferguson Rd]

27th Street / Ferguson Rd
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: 27th Street												
3	L2	61	9.0	0.637	13.3	LOS B	6.5	173.1	0.59	0.71	1.00	31.2
8	T1	516	9.0	0.637	13.3	LOS B	6.5	173.1	0.59	0.71	1.00	31.2
18	R2	33	0.0	0.637	13.0	LOS B	6.5	173.1	0.59	0.71	1.00	30.4
Approach		610	8.5	0.637	13.3	LOS B	6.5	173.1	0.59	0.71	1.00	31.1
East: Ferguson Rd												
1	L2	24	0.0	0.173	7.1	LOS A	0.6	14.6	0.55	0.55	0.55	34.1
6	T1	46	0.0	0.173	7.1	LOS A	0.6	14.6	0.55	0.55	0.55	33.9
16	R2	52	0.0	0.173	7.1	LOS A	0.6	14.6	0.55	0.55	0.55	32.9
Approach		122	0.0	0.173	7.1	LOS A	0.6	14.6	0.55	0.55	0.55	33.5
North: 27th Street												
7	L2	36	0.0	0.754	15.9	LOS C	8.3	219.0	0.56	0.42	0.64	30.4
4	T1	682	8.0	0.754	16.1	LOS C	8.3	219.0	0.56	0.42	0.64	30.2
14	R2	128	0.0	0.754	15.9	LOS C	8.3	219.0	0.56	0.42	0.64	29.4
Approach		846	6.4	0.754	16.0	LOS C	8.3	219.0	0.56	0.42	0.64	30.1
West: Ferguson Rd												
5	L2	166	2.0	0.612	16.2	LOS C	4.2	106.8	0.73	0.93	1.35	29.5
2	T1	106	0.0	0.612	16.1	LOS C	4.2	106.8	0.73	0.93	1.35	29.4
12	R2	147	6.0	0.612	16.4	LOS C	4.2	106.8	0.73	0.93	1.35	28.5
Approach		419	2.9	0.612	16.2	LOS C	4.2	106.8	0.73	0.93	1.35	29.1
All Vehicles		1997	5.9	0.754	14.7	LOS B	8.3	219.0	0.61	0.62	0.90	30.4

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

MOVEMENT SUMMARY

Site: 7 [7 Country Club Rd / Murphy Rd]

Country Club Rd / Murphy Rd
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: Country Club Rd												
3	L2	188	0.0	0.209	6.0	LOS A	0.8	19.1	0.46	0.42	0.46	32.5
8	T1	1	0.0	0.209	6.0	LOS A	0.8	19.1	0.46	0.42	0.46	32.3
18	R2	3	0.0	0.209	6.0	LOS A	0.8	19.1	0.46	0.42	0.46	31.4
Approach		192	0.0	0.209	6.0	LOS A	0.8	19.1	0.46	0.42	0.46	32.5
East: Murphy Rd												
1	L2	3	0.0	0.455	8.1	LOS A	2.3	58.4	0.42	0.31	0.42	34.2
6	T1	509	0.0	0.455	8.1	LOS A	2.3	58.4	0.42	0.31	0.42	34.0
16	R2	2	0.0	0.455	8.1	LOS A	2.3	58.4	0.42	0.31	0.42	32.9
Approach		514	0.0	0.455	8.1	LOS A	2.3	58.4	0.42	0.31	0.42	34.0
North: Country Club Rd												
7	L2	1	0.0	0.020	4.9	LOS A	0.1	1.5	0.48	0.39	0.48	35.6
4	T1	1	0.0	0.020	4.9	LOS A	0.1	1.5	0.48	0.39	0.48	35.4
14	R2	13	0.0	0.020	4.9	LOS A	0.1	1.5	0.48	0.39	0.48	34.3
Approach		15	0.0	0.020	4.9	LOS A	0.1	1.5	0.48	0.39	0.48	34.4
West: Murphy Rd												
5	L2	17	0.0	0.528	8.4	LOS A	3.5	87.9	0.06	0.01	0.06	33.9
2	T1	444	1.0	0.528	8.4	LOS A	3.5	87.9	0.06	0.01	0.06	33.7
12	R2	236	0.0	0.528	8.4	LOS A	3.5	87.9	0.06	0.01	0.06	32.7
Approach		697	0.6	0.528	8.4	LOS A	3.5	87.9	0.06	0.01	0.06	33.4
All Vehicles		1418	0.3	0.528	7.9	LOS A	3.5	87.9	0.25	0.18	0.25	33.5

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

MOVEMENT SUMMARY

Site: 8 [8 Brosterhous Rd / Murphy Rd]

Brosterhous Rd / Murphy Rd
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: Brosterhous Rd												
3	L2	130	3.0	0.480	10.8	LOS B	2.7	70.9	0.61	0.71	0.88	31.9
8	T1	172	7.0	0.480	10.9	LOS B	2.7	70.9	0.61	0.71	0.88	31.7
18	R2	89	2.0	0.480	10.7	LOS B	2.7	70.9	0.61	0.71	0.88	30.8
Approach		391	4.5	0.480	10.8	LOS B	2.7	70.9	0.61	0.71	0.88	31.5
East: Murphy Rd												
1	L2	81	2.0	0.472	10.1	LOS B	2.8	69.9	0.59	0.67	0.81	32.6
6	T1	134	2.0	0.472	10.1	LOS B	2.8	69.9	0.59	0.67	0.81	32.4
16	R2	198	2.0	0.472	10.1	LOS B	2.8	69.9	0.59	0.67	0.81	31.4
Approach		413	2.0	0.472	10.1	LOS B	2.8	69.9	0.59	0.67	0.81	32.0
North: Brosterhous Rd												
7	L2	216	2.0	0.739	17.0	LOS C	11.4	292.0	0.75	1.02	1.51	29.4
4	T1	250	4.0	0.739	17.0	LOS C	11.4	292.0	0.75	1.02	1.51	29.3
14	R2	257	2.0	0.739	17.0	LOS C	11.4	292.0	0.75	1.02	1.51	28.5
Approach		723	2.7	0.739	17.0	LOS C	11.4	292.0	0.75	1.02	1.51	29.0
West: Murphy Rd												
5	L2	178	3.0	0.580	13.1	LOS B	4.3	111.4	0.67	0.84	1.14	30.8
2	T1	154	2.0	0.580	13.1	LOS B	4.3	111.4	0.67	0.84	1.14	30.7
12	R2	145	5.0	0.580	13.2	LOS B	4.3	111.4	0.67	0.84	1.14	29.8
Approach		477	3.3	0.580	13.1	LOS B	4.3	111.4	0.67	0.84	1.14	30.4
All Vehicles		2004	3.0	0.739	13.5	LOS B	11.4	292.0	0.67	0.84	1.16	30.4

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

MOVEMENT SUMMARY

Site: 9 [9 15th St / Murphy Rd]

15th St / Murphy Rd
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: 15th St												
3	L2	183	2.0	0.723	16.8	LOS C	9.8	248.9	0.76	1.05	1.53	29.6
8	T1	475	2.0	0.723	16.8	LOS C	9.8	248.9	0.76	1.05	1.53	29.5
18	R2	20	0.0	0.723	16.7	LOS C	9.8	248.9	0.76	1.05	1.53	28.7
Approach		678	1.9	0.723	16.8	LOS C	9.8	248.9	0.76	1.05	1.53	29.5
East: Golden Gate Pl												
1	L2	6	0.0	0.224	8.2	LOS A	0.8	19.0	0.59	0.59	0.59	33.9
6	T1	80	2.0	0.224	8.4	LOS A	0.8	19.0	0.59	0.59	0.59	33.7
16	R2	58	0.0	0.224	8.2	LOS A	0.8	19.0	0.59	0.59	0.59	32.7
Approach		144	1.1	0.224	8.3	LOS A	0.8	19.0	0.59	0.59	0.59	33.3
North: 15th St												
7	L2	100	0.0	0.796	19.1	LOS C	17.8	449.3	0.82	1.10	1.67	29.1
4	T1	594	1.0	0.796	19.1	LOS C	17.8	449.3	0.82	1.10	1.67	28.9
14	R2	149	2.0	0.796	19.2	LOS C	17.8	449.3	0.82	1.10	1.67	28.1
Approach		843	1.1	0.796	19.1	LOS C	17.8	449.3	0.82	1.10	1.67	28.8
West: Murphy Rd												
5	L2	220	2.0	0.618	15.4	LOS C	4.6	117.1	0.73	0.93	1.33	29.7
2	T1	90	2.0	0.618	15.4	LOS C	4.6	117.1	0.73	0.93	1.33	29.5
12	R2	149	2.0	0.618	15.4	LOS C	4.6	117.1	0.73	0.93	1.33	28.7
Approach		459	2.0	0.618	15.4	LOS C	4.6	117.1	0.73	0.93	1.33	29.3
All Vehicles		2124	1.5	0.796	16.9	LOS C	17.8	449.3	0.76	1.01	1.48	29.4

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 10 [10 27th St / Ferguson Rd]

27th St / Ferguson Rd
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: 15th St												
3	L2	49	2.0	0.324	6.7	LOS A	1.3	34.1	0.40	0.31	0.40	34.4
8	T1	292	2.0	0.324	6.7	LOS A	1.3	34.1	0.40	0.31	0.40	34.2
Approach		341	2.0	0.324	6.7	LOS A	1.3	34.1	0.40	0.31	0.40	34.3
North: 15th St												
4	T1	611	1.0	0.656	11.4	LOS B	5.4	137.3	0.30	0.13	0.30	32.4
14	R2	218	2.0	0.656	11.4	LOS B	5.4	137.3	0.30	0.13	0.30	31.4
Approach		829	1.3	0.656	11.4	LOS B	5.4	137.3	0.30	0.13	0.30	32.1
West: Murphy Rd												
5	L2	264	2.0	0.409	9.6	LOS A	2.0	49.8	0.59	0.65	0.76	31.3
12	R2	62	2.0	0.409	9.6	LOS A	2.0	49.8	0.59	0.65	0.76	30.3
Approach		326	2.0	0.409	9.6	LOS A	2.0	49.8	0.59	0.65	0.76	31.1
All Vehicles		1496	1.6	0.656	9.9	LOS A	5.4	137.3	0.39	0.29	0.42	32.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

MOVEMENT SUMMARY

Site: 12 [12 China Hat Rd / Knott Rd]

China Hat Rd / Knott Rd
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: China Hat Rd												
3	L2	6	0.0	0.064	5.3	LOS A	0.2	5.1	0.49	0.45	0.49	35.2
8	T1	14	0.0	0.064	5.3	LOS A	0.2	5.1	0.49	0.45	0.49	35.0
18	R2	29	0.0	0.064	5.3	LOS A	0.2	5.1	0.49	0.45	0.49	33.9
Approach		49	0.0	0.064	5.3	LOS A	0.2	5.1	0.49	0.45	0.49	34.4
East: Knott Rd												
1	L2	35	0.0	0.826	18.4	LOS C	13.2	332.1	0.38	0.13	0.38	29.5
6	T1	717	1.0	0.826	18.4	LOS C	13.2	332.1	0.38	0.13	0.38	29.3
16	R2	318	1.0	0.826	18.4	LOS C	13.2	332.1	0.38	0.13	0.38	28.5
Approach		1070	1.0	0.826	18.4	LOS C	13.2	332.1	0.38	0.13	0.38	29.1
North: China Hat Rd												
7	L2	78	0.0	0.127	6.4	LOS A	0.4	10.4	0.53	0.53	0.53	32.6
4	T1	8	13.0	0.127	7.0	LOS A	0.4	10.4	0.53	0.53	0.53	32.2
14	R2	5	0.0	0.127	6.4	LOS A	0.4	10.4	0.53	0.53	0.53	31.5
Approach		91	1.1	0.127	6.4	LOS A	0.4	10.4	0.53	0.53	0.53	32.5
West: Knott Rd												
5	L2	4	0.0	0.519	8.9	LOS A	2.9	74.6	0.35	0.21	0.35	33.7
2	T1	582	4.0	0.519	9.0	LOS A	2.9	74.6	0.35	0.21	0.35	33.5
12	R2	18	0.0	0.519	8.9	LOS A	2.9	74.6	0.35	0.21	0.35	32.5
Approach		604	3.9	0.519	9.0	LOS A	2.9	74.6	0.35	0.21	0.35	33.4
All Vehicles		1814	1.9	0.826	14.3	LOS B	13.2	332.1	0.38	0.18	0.38	30.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

MOVEMENT SUMMARY

Site: 13 [13 County Club Rd / Knott Rd]

County Club Rd / Knott Rd
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
East: Knott Rd												
6	T1	934	5.0	0.811	18.3	LOS C	9.2	240.0	0.50	0.25	0.50	29.4
16	R2	45	0.0	0.811	18.2	LOS C	9.2	240.0	0.50	0.25	0.50	28.7
Approach		979	4.8	0.811	18.3	LOS C	9.2	240.0	0.50	0.25	0.50	29.4
North: Country Club Rd												
7	L2	43	3.0	0.295	10.0	LOS B	1.1	26.9	0.63	0.65	0.70	32.5
14	R2	135	0.0	0.295	9.9	LOS A	1.1	26.9	0.63	0.65	0.70	31.4
Approach		178	0.7	0.295	9.9	LOS A	1.1	26.9	0.63	0.65	0.70	31.7
West: Knott Rd												
5	L2	65	0.0	0.560	9.4	LOS A	3.2	86.8	0.21	0.09	0.21	33.1
2	T1	596	10.0	0.560	9.7	LOS A	3.2	86.8	0.21	0.09	0.21	32.8
Approach		661	9.0	0.560	9.7	LOS A	3.2	86.8	0.21	0.09	0.21	32.8
All Vehicles		1818	5.9	0.811	14.3	LOS B	9.2	240.0	0.41	0.23	0.42	30.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

MOVEMENT SUMMARY

Site: 14 [14 Brosterhous Rd / Knott Rd]

Brosterhous Rd / Knott Rd
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
East: Knott Rd												
6	T1	861	3.0	0.833	19.9	LOS C	10.4	265.3	0.65	0.37	0.65	28.8
16	R2	142	4.0	0.833	20.0	LOS C	10.4	265.3	0.65	0.37	0.65	28.1
Approach		1003	3.1	0.833	19.9	LOS C	10.4	265.3	0.65	0.37	0.65	28.7
North: Brosterhous Rd												
7	L2	111	4.0	0.312	9.9	LOS A	1.1	29.2	0.61	0.64	0.70	31.6
14	R2	84	6.0	0.312	10.0	LOS A	1.1	29.2	0.61	0.64	0.70	30.6
Approach		195	4.9	0.312	9.9	LOS A	1.1	29.2	0.61	0.64	0.70	31.2
West: Knott Rd												
5	L2	78	14.0	0.571	10.5	LOS B	3.1	84.6	0.35	0.21	0.35	32.4
2	T1	555	9.0	0.571	10.3	LOS B	3.1	84.6	0.35	0.21	0.35	32.4
Approach		633	9.6	0.571	10.3	LOS B	3.1	84.6	0.35	0.21	0.35	32.4
All Vehicles		1831	5.6	0.833	15.6	LOS C	10.4	265.3	0.54	0.34	0.55	30.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com

MOVEMENT SUMMARY

Site: 15 [15 15th St / Knott Rd]

15th St / Knott Rd
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: 15th St												
3	L2	14	11.0	0.027	5.3	LOS A	0.1	2.1	0.46	0.38	0.46	32.9
8	T1	2	25.0	0.027	5.9	LOS A	0.1	2.1	0.46	0.38	0.46	32.7
18	R2	3	25.0	0.027	5.9	LOS A	0.1	2.1	0.46	0.38	0.46	31.6
Approach		19	14.7	0.027	5.4	LOS A	0.1	2.1	0.46	0.38	0.46	32.6
East: Knott Rd												
1	L2	5	25.0	0.650	13.4	LOS B	7.5	190.7	0.60	0.64	0.91	31.2
6	T1	673	2.0	0.650	12.7	LOS B	7.5	190.7	0.60	0.64	0.91	31.7
16	R2	13	0.0	0.650	12.6	LOS B	7.5	190.7	0.60	0.64	0.91	30.9
Approach		691	2.1	0.650	12.7	LOS B	7.5	190.7	0.60	0.64	0.91	31.6
North: 15th St												
7	L2	4	0.0	0.391	9.7	LOS A	1.8	45.3	0.61	0.67	0.78	33.0
4	T1	1	0.0	0.391	9.7	LOS A	1.8	45.3	0.61	0.67	0.78	32.9
14	R2	291	0.0	0.391	9.7	LOS A	1.8	45.3	0.61	0.67	0.78	31.9
Approach		296	0.0	0.391	9.7	LOS A	1.8	45.3	0.61	0.67	0.78	31.9
West: Knott Rd												
5	L2	235	1.0	0.495	8.0	LOS A	2.9	74.7	0.09	0.02	0.09	33.1
2	T1	379	4.0	0.495	8.0	LOS A	2.9	74.7	0.09	0.02	0.09	32.9
12	R2	21	8.0	0.495	8.1	LOS A	2.9	74.7	0.09	0.02	0.09	31.9
Approach		635	3.0	0.495	8.0	LOS A	2.9	74.7	0.09	0.02	0.09	32.9
All Vehicles		1641	2.2	0.650	10.3	LOS B	7.5	190.7	0.40	0.40	0.57	32.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com
Organisation: KITTELSON AND ASSOCIATES INC | Processed: Wednesday, July 15, 2020 9:03:16 AM
Project: H:\21\21926 - Bend Transportation System Plan\SE Bend Area Plan\operations analysis\SIDRA\No Urbanization - PM.sip8

MOVEMENT SUMMARY

Site: 17 [17 15th St / Caldera St]

15th St / Caldera St
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: 15th St												
3	L2	6	11.0	0.332	7.7	LOS A	1.1	31.5	0.41	0.34	0.41	33.7
8	T1	256	25.0	0.332	8.2	LOS A	1.1	31.5	0.41	0.34	0.41	33.5
18	R2	13	25.0	0.332	8.2	LOS A	1.1	31.5	0.41	0.34	0.41	32.3
Approach		275	24.7	0.332	8.1	LOS A	1.1	31.5	0.41	0.34	0.41	33.4
East: Knott Rd												
1	L2	16	25.0	0.303	7.8	LOS A	1.2	30.2	0.46	0.41	0.46	33.7
6	T1	12	2.0	0.303	6.9	LOS A	1.2	30.2	0.46	0.41	0.46	34.3
16	R2	263	0.0	0.303	6.8	LOS A	1.2	30.2	0.46	0.41	0.46	33.3
Approach		291	1.5	0.303	6.9	LOS A	1.2	30.2	0.46	0.41	0.46	33.4
North: 15th St												
7	L2	251	0.0	0.413	6.8	LOS A	2.2	54.6	0.16	0.06	0.16	33.3
4	T1	235	0.0	0.413	6.8	LOS A	2.2	54.6	0.16	0.06	0.16	33.2
14	R2	47	0.0	0.413	6.8	LOS A	2.2	54.6	0.16	0.06	0.16	32.2
Approach		533	0.0	0.413	6.8	LOS A	2.2	54.6	0.16	0.06	0.16	33.2
West: Knott Rd												
5	L2	64	1.0	0.087	4.9	LOS A	0.3	7.2	0.43	0.37	0.43	33.2
2	T1	2	4.0	0.087	5.0	LOS A	0.3	7.2	0.43	0.37	0.43	33.0
12	R2	10	8.0	0.087	5.2	LOS A	0.3	7.2	0.43	0.37	0.43	32.0
Approach		76	2.0	0.087	5.0	LOS A	0.3	7.2	0.43	0.37	0.43	33.1
All Vehicles		1175	6.3	0.413	7.0	LOS A	2.2	54.6	0.31	0.23	0.31	33.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SIDRA INTERSECTION 8.0 | Copyright © 2000-2019 Akcelik and Associates Pty Ltd | sidrasolutions.com
Organisation: KITTELSON AND ASSOCIATES INC | Processed: Wednesday, August 26, 2020 10:42:56 AM
Project: H:\21\21926 - Bend Transportation System Plan\SE Bend Area Plan\operations analysis\SIDRA\No Urbanization - PM.sip8

Appendix GG - ODOT Facility Transportation Planning Rule Findings and Recommendations

KITTELSON & ASSOCIATES
1001 SW EMKAY DRIVE, SUITE 140
BEND, OR 97702
P 541.312.8300

MEMORANDUM

Date:	December 2, 2020 Project #: 21926
To:	Allison Platt, Brian Rankin, Damian Syrnyk, BreAnne Gale, and Elizabeth Oshel, City of Bend
From:	Matt Kittelson & Julia Kuhn
Project:	Southeast Expansion Area Plan
Subject:	ODOT Facility Transportation Planning Rule (TPR) Findings and Recommendations

In 2016, the City of Bend expanded its Urban Growth Boundary (UGB) by 2,380 acres to accommodate future homes and jobs. This expansion was spread across 10 areas. As part of this process, the City issued findings related to the compliance of its proposed UGB expansion with relevant state, regional and local policies, and plans. As outlined in Section 8.4.3 of these findings, the City relied on provisions within the State's Administrative Rules found in 660-024-0020(1) that allow deferral of addressing the state's Transportation Planning Rule (TPR) requirements associated with the necessary zone changes for each of the areas. As such, each of the expansion areas must prepare an Area Plan or Master Plan and address the TPR requirements associated with the needed zone changes for annexation.

Given this deferral finding, the City of Bend is preparing the Southeast Area Plan (SEAP) to implement the applicable goals and policies of the City's Comprehensive Plan and to identify the transportation and infrastructure needs to serve the land uses within the expansion area. Also, the City recently adopted its Transportation System Plan (TSP) that identifies the transportation-related projects, programs and policies needed to support the City's growth and community health over the next twenty years.

As part of the SEAP, the project team has identified the vehicular, pedestrian, and bicycle facilities needed to support the anticipated development of the 479 developable acres included in the expansion area. In total, approximately $21.6 million in transportation-related infrastructure is needed within the bounds of the expansion area; a funding plan for construction of the multimodal infrastructure is in-process, but will likely be paid for by a combination of City and private development funds. In addition, each of the property owners will be responsible for paying the Transportation System Development Charge (TSDC) at the time of development.

In addition to addressing the transportation needs within the SEAP area, the funding plan is outlining an approach for property owners to contribute their proportionate share to several City-owned intersections within the UGB. Specifics of the funding plans are still being refined but are likely to include contributions by multiple SEAP property owners towards the following intersections:

- 15th Street/Ferguson Road
- 27th Street/Ferguson Road
- 27th Street/Diamondback Lane
- Knott Road/Local Framework Road
- Knott Road/New North-South Collector

As part of the SEAP transportation analyses and to address the TPR findings, the project team has identified two ODOT-owned intersections where proportionate share contributions are appropriate as part of urbanization of the SEAP. The remainder of this memorandum outlines the methodology and findings related to the ODOT intersections and the TPR analysis.

SEAP ANTICIPATED DEVELOPMENT

As part of the TSP, the City identified the locations anticipated to accommodate the growth in households and jobs over the next twenty years; the SEAP expansion area was identified to accommodate approximately 1,686 households and 2,778 new jobs in the commercial, office, industrial, and hotel sectors as well as an elementary school for 660 students and 23 civic/public employees.

TRANSPORTATION PLANNING RULE (TPR) ANALYSIS

The Oregon Transportation Planning Rule (TPR) implements Statewide Planning Goal 12, "Transportation." OAR Section 660-012-0060(1) and (2) apply to amendments to zoning map designations and establish a process for evaluating an amendment's impacts on the transportation system. Operational analyses are required to assess whether the amendment will "significantly affect" planned or existing facilities on the transportation system.

The transportation analyses required by TPR has identified the locations at City and ODOT intersections where vehicular trips associated with the SEAP expansion area could travel. Further details are summarized in the SEAP transportation infrastructure needs analysis. A summary of the findings associated with the analyses is provided below.

For the purposes of defining an intersection that is "significantly impacted" by an amendment, the City of Bend Development Code (BDC) Section 4.7.500.B requires that all intersections within one mile of the area that are anticipated to experience an increase of 50 or more peak hour trips must be reviewed for significant impacts. Further, per the same BDC section, all amendments and zone changes must *"use*

the current transportation model used by the City or other approved model as approved by the City Engineer. The applicant's engineer must use the model projections post processed using NCHRP 255 and sound professional engineering standards as the basis for determining turning-movement volumes for the required intersection analysis."

As part of the TPR and BDC Section 4.7.500.B requirements, the project team identified that urbanization of the SEAP could contribute 50 or more trips to the following ODOT locations:

- *US 97/Reed Market* – trips generated by SEAP jobs and households are estimated to be 12 percent of the overall growth[1] in traffic anticipated here between 2018 and 2040; and,
- *US 20/27th Street* – trips generated by SEAP jobs and households are estimated to be 27 percent of the overall growth in traffic anticipated here between 2018 and 2040.

A summary of this analysis is presented in Table 1. More detailed results are included in Appendix A.

Table 1. PM Peak Hour Trip Distribution Review

Facility	PM Peak Hour Trips Added	Impact to Facility per TPR
US 97/Reed Market Road	+112	Yes
US 97/Murphy Road	+39	No
US 97/Powers Road	+21	No
US 97/Baker Road	+39	No
US 20/27th Street	+226	Yes

Note: PM Peak Hour trips added reported based on interchange ramp terminal with highest number of added trips

Typically, the TPR and BDC require a comparison of trips anticipated under the existing zoning designation versus those associated with the proposed amendment. However, due to the deferral findings associated with the UGB adoption process, the SEAP project team identified the US 97/Reed Market Road and US 20/27th Street intersections as locations where 50 weekday PM peak hour trips could travel from SEAP (versus those locations that could experience an incremental increase in trip-making of 50 peak hour trips between the urbanization and non-urbanization scenarios). The recently adopted TSP identified that both intersections are anticipated to exceed mobility targets in 2040[2]. The

[1] Percent growth calculations are based on "PM Peak Hour Trips Added" as shown in Table 1 and post-processed existing and future year intersection turning movement data developed for the Bend TSP and Bend Parkway Plan, as applicable.

[2] The Project & Program Evaluation and Preliminary Priorities Memo developed during the TSP process includes information about modelling results, including locations of proposed projects that would address near or long term capacity needs, discusses both the US97/Reed Market and US20/27th Street locations that was used to help inform project priorities.

addition of the SEAP trips will further degrade the performance of these two intersections below the minimum acceptable performance targets adopted by ODOT. Therefore, the impacts to these ODOT facilities will need to be mitigated through "on balance" solutions; accordingly, proportional contributions to these intersection changes, as identified in the TSP, are warranted by future development of the SEAP area.

Changes to both intersections are included in the City's "reasonably likely to be funded" list of projects in the TSP. This list was shaped and evaluated through an extensive Citywide Transportation Advisory Committee (CTAC), Steering Committee and public engagement process. Projects identified through the TSP accommodate the needs associated with supporting the continued economic growth between now and 2040 within the UGB including the SEAP area. Further, per TPR requirements, the reasonably likely to be funded list has been coordinated with ODOT, the Bend MPO, CET, and other transportation stakeholders. The TSP funding strategy notes that the list of projects will rely on a variety of City, State, Federal, and private investment.

Within the reasonably likely to be funded list, the two locations identified above are anticipated to be improved as follows:

- *US 97/Reed Market Road* – The specific changes to this facility have not been identified but will be defined through a future study, as noted within the TSP. In lieu of a specific project, the City of Bend and ODOT previously agreed on an improvement and cost basis for proportionate share contributions related to the northbound ramp terminal. This proportionate share methodology was developed through the Discovery West UGB expansion process. Proportionate share contributions to address SEAP impacts include:
    - Construction of a traffic signal at the northbound ramp terminal; per the mitigation plan identified as part of the Discovery West UGB expansion process in 2019, this improvement was estimated to be $660,000.
    - Future interchange evaluation study which is estimated to cost $500,000 per the Bend TSP.
    - The combined cost of the signal and interchange study are estimated at $1,160,000. Based on a proportionate share of 12 percent of the growth in traffic anticipated at the interchange, the SEAP private property contributions would be $139,200.
- *US 20/27th Street* – the TSP identifies the need for corridor improvements along US 20 between 15th Street and the eastern UGB; the estimated cost of these improvements is $10 million. Within this corridor, three intersections and the corridor segment are noted for improvement; accordingly, the proportionate share methodology assumes that the cost is equally divided between the three intersections and the corridor itself (i.e., approximately 25 percent for each of the overall project cost). Using this methodology, US 20/27th Street intersection would represent $2.5 million of the $10 million corridor project. Based on a growth in traffic of 27 percent at this intersection, the SEAP private property contributions would be $675,000.

Based on land use scenario planning tools and information from the ITE *Trip Generation Manual*, the allocated households and jobs that could develop within the SEAP could generate a total of 2,523 weekday PM peak hour trips[3]. Using this basis, the cost per trip for private property contributions to the two reasonably likely to be funded ODOT-related projects identified through the TSP and BDC evaluation would be calculated as:

- $814,200 in proportionate share contributions / 2,523 PM peak hour trips = $323 per PM peak hour trip generated by SEAP.

SUMMARY

Based on the analyses summarized herein, urbanization of the SEAP area will require significant contributions towards transportation infrastructure within the expansion area, towards City owned intersections, and $323 per trip contribution to two ODOT owned intersections. These contributions provide consistency with the BDC 4.7 requirements, the Transportation Planning Rule (TPR) and the City's growth management policies and UGB findings related to the Southeast Area.

[3] The City is currently considering modifications to the Bend Comprehensive Plan in the SEAP planning process. Specific development applications consistent with the Comprehensive Plan may result in different trip generation characteristics for the lands within SEAP. Current trip generation estimates presented are useful for cost per trip calculations and intended to be representative of order of magnitude outcomes based on coordinated land use planning completed by the City of Bend.

Appendix A PM Peak Hour Added Trip Calculations

Select Zone Analysis of Southeast Area Plan TAZs under 2040 Scenario

No Urbanization Scenario: Assumes SEAP area retains a rural zoning designation with little to no development occuring through 2040. BRM TAZ structure within the SEAP area also includes lands adjacent to but not part of SEAP, which is reflected in the trip totals presented.

Urbanization Scenario: Assumes SEAP area develops consistent with proposed Comprehensive Plan designations. BRM TAZ structure within the SEAP area also includes lands adjacent to but not part of SEAP, which is reflected in the trip totals presented.

Net Change: Calculates the difference between the "urbanization" and "no urbanization" scenarios. This represents "new" trips associated with the urbanization of the SEAP area by removing trips associated with lands adjacent to but not part of SEAP, as included in the "no urbanization" and "urbanization" trip totals presented.

No Urbanization

	Entering Trips by Leg				
Intersection	**North**	**South**	**East**	**West**	**Subtotal**
US97/Baker SB Ramp	1	0	18	15	34
US97/Baker NB Ramp	0	0	18	15	33
US97/Murphy SB Ramp	0	12	24	10	46
Murphy Rd/3rd St	0	1	31	26	58
US 97/Powers SB Ramp	0	0	6	5	11
US97/Powers NB Ramp	0	0	25	5	30
US97/Reed SB Ramp	20	0	58	52	130
US97/Reed NB Ramp	0	0	63	72	135
US20/27th St	98	165	6	53	322

Urbanization

	Entering Trips by Leg				
Intersection	**North**	**South**	**East**	**West**	**Subtotal**
US97/Baker SB Ramp	0	0	43	25	68
US97/Baker NB Ramp	4	0	43	25	72
US97/Murphy SB Ramp	0	16	40	17	73
Murphy Rd/3rd St	0	1	58	40	99
US 97/Powers SB Ramp	0	0	13	9	22
US97/Powers NB Ramp	0	0	42	9	51
US97/Reed SB Ramp	47	0	99	91	237
US97/Reed NB Ramp	0	0	109	138	247
US20/27th St	161	302	9	76	548

Net Change

	Entering Trips by Leg				
Intersection	**North**	**South**	**East**	**West**	**Subtotal**
US97/Baker SB Ramp	-1	0	25	10	34
US97/Baker NB Ramp	4	0	25	10	39
US97/Murphy SB Ramp	0	4	16	7	27
Murphy Rd/3rd St	0	0	27	14	41
US 97/Powers SB Ramp	0	0	7	4	11
US97/Powers NB Ramp	0	0	17	4	21
US97/Reed SB Ramp	27	0	41	39	107
US97/Reed NB Ramp	0	0	46	66	112
US20/27th St	63	137	3	23	226

Appendix HH - Southeast Area Funding Plan

CITY OF BEND
SOUTHEAST AREA PLAN

Southeast Expansion Area Funding Plan

PREPARED FOR: Southeast Area Plan Advisory Committee
PREPARED BY: Project Team
DATE: December 3, 2020

Contents

Purpose 1
The Funding Plan as a Flexible "Action Plan" 2
SEAP Funding Strategies and Recommendations 3
Issues, Challenges and Opportunities 4
Infrastructure Projects and Costs 6
SEAP Revenue 11
Funding Tools 12
Potential Funding Packages for Backbone Infrastructure – A Preliminary Analysis 15
Appendix A. SEAP Revenue Details 21

Purpose

The purposes of the Southeast Area Funding Plan are to:

1. Identify funding strategies and recommendations needed to fund infrastructure for the Southeast Area Plan (SEAP).
2. Describe key issues, opportunities, and challenges for infrastructure funding.
3. Summarize the major transportation and sanitary sewer infrastructure, and their costs, needed to support development of the plan.
4. Estimate development-related revenue potentially generated by the plan.
5. Describe potential funding tools.

The Funding Plan as a Flexible “Action Plan”

The SEAP Funding Plan is an “Action Plan” intended as part of the adoption package for the SEAP. In Bend’s Comprehensive Plan, “Action Items” are advisory recommendations that set a direction for plan and policy implementation (in this case, the direction for SEAP infrastructure funding) while retaining flexibility for the specifics of that implementation.

This Funding Plan provides guidance for funding needs, tools and strategies, while recognizing the potential for unique solutions to be identified and implemented in the future. This approach is particularly suited to the funding of SEAP infrastructure because of: (1) the dynamic nature of development in Southeast Bend; and, (2) the unknowns regarding the timing of annexation and development of properties within the SEAP boundary.

The funding plan is needed because the City, on its own, does not have the capability, nor is it required, to fully fund all of the infrastructure needed for development within the SEAP area. Funding for infrastructure to serve areas of new development is typically funded through a mix of private development sources and government sources, many of which are discussed in this memorandum. This Funding Plan describes how infrastructure needed for the SEAP Area can be funded. The approach will require a combination of existing sources from the City, new funding tools, and private property owner/developer contributions. *Funding decisions will be made by the City Council in the future. This plan recognizes that further study of, and options for, specific funding methods may be required.*

Methods

This Funding Plan was created through a collaborative process involving discussions with the Southeast Area Project Advisory Committee (SEAPAC), technical work by the project team, and extensive coordination with infrastructure stakeholders. The process, and this plan, focused on transportation and sanitary sewer master planning and funding strategies. Water infrastructure and funding will be identified by the Avion Water Company, in coordination with the City. Storm water infrastructure will be required of developers as part of the development review process. Parks planning has been integrated into the SEAP process, but development and funding of parks will be led by the Bend Park & Recreation District.

The process was iterative, but generally followed the steps listed below:

- **Land use and transportation planning:** Land use and development assumptions, by plan designation, were derived from the SEAP Land Use Plan. These data provided the basis for infrastructure planning and revenue projections.
- **Infrastructure projects and costs:** Project cost estimates were collected for transportation and sanitary sewer infrastructure. Cost estimates for the project were provided by Kittelson & Associates, Inc. (transportation) and Murraysmith/Jacobs (sanitary sewer), and further refined by City staff.
- **Revenue forecasting:** ECONorthwest developed revenue projections to estimate the amount of revenue that would be generated from applicable funding tools.
- **Coordination:** City staff undertook extensive coordination with: potential developers for the Department of State Lands (DSL) property; developers for the “Easton” project adjacent to SEAP (a master plan was approved by the City while this plan was being prepared); the updated Bend Transportation System Plan (also approved during the SEAP process); and, the Oregon Department of Transportation.

- **Funding Plan:** The findings from these steps led to the development of this report.

Stakeholder engagement and partner consultations took place intermittently across all of these steps.

SEAP Funding Strategies and Recommendations

The **funding strategies** described below are high-level approaches intended to support the successful funding of infrastructure for the SE Expansion Area. The **recommendations to the City Council** are recommended actions—a set of steps for evaluating and making decisions about specific funding solutions. Together, the strategies and recommendations comprise the "flexible action plan" described on page one of this report.

Funding Strategy

The overall strategies for funding SEAP infrastructure are to:

1. Use a variety of funding tools that can be flexibly applied as Council decisions are made and conditions change over time.

2. Proactively coordinate cost-sharing between the SEAP project area and other areas of development in Southeast Bend (e.g. DSL and Easton).

3. Evaluate and implement areawide funding tools (e.g. supplemental system development charges) needed to catalyze infrastructure development. Provide flexibility for interim infrastructure solutions (e.g. sewer connection) that allow initial SEAP development to proceed prior to long term solutions being implemented.

Recommendations to the City Council

The project team recommends that the Council undertake the following actions:

1. **Adopt the SEAP Funding Plan as part of the SE Area Plan package**. The Funding Plan will be a guiding "Action Plan" that provides direction but also flexibility for future Council decisions.

2. **Following adoption of SEAP, evaluate a package of transportation improvements to be funded by a new, Supplemental Transportation SDC (TSDC).** An initial project list is included in this Funding Plan. The final list should be coordinated with updated information on how other projects will be potentially funded in SE Bend.

3. **Direct staff to scope the upcoming Sewer Master Plan Update to ensure that plan evaluates how the SEAP east sewer system could be implemented**, including: evaluation of the east sewer system as a City-led project; inclusion of east SEAP as part of the City's CIP program for trunk sewer improvements; and, how the City could be reimbursed for its up-front investments. In the interim, this recommendation would not preclude negotiation of interim sewer implementation strategies for individual properties or developments.

These funding strategies and recommendations were developed after careful consideration of both the challenges and opportunities discovered through the SEAP process, which are described below.

Issues, Challenges and Opportunities

The following is a summary of issues and challenges that must be addressed to arrive at a viable infrastructure funding strategy for the SE Expansion Area.

- **The SE Expansion Area has many properties and development is likely to occur incrementally**. There are 27 individual ownerships within the SE Expansion Area. In 2020, there are only a few properties in SEAP known that intend to develop in the near term. While the number of property owners may change over time, the funding plan should not rely on an assumption of a "master developer" approach as has been done with Bend's West and Northeast expansion areas. Rather, the funding plan should work if the parcel pattern stays largely the same as we see today, and the area develops in a series of relatively small, individual projects. However, the plan should be flexible enough to accommodate future property consolidation.

- **Sewer in the "East Catchment Area" is a significant capital investment and will span many properties. City leadership will be needed to coordinate and build the east sewer system.** The SE Expansion Area contains two drainage basins that dictate how and where new sewer infrastructure can be developed. The "East Catchment Area" drains east and requires new gravity lines, a pump station, and force mains. There are three main challenges for the East Catchment Area system:

  – At an estimated cost of $15.6 million for east basin-related improvements, it is assumed that no single development could afford to build the needed improvements;

  – The routing and location of the facilities are such that they are "off-site" from most of the properties they will serve; and,

  – Except for areas near Ferguson Road which could potentially be served by gravity or interim facilities, no urban development can occur in the East Catchment Area until a majority of the complete system is built and operational.

  The "West Catchment Area" drains west and can be served by gravity systems that largely exist today, or that will be in place soon. The "West Catchment Area" sewer projects are being developed concurrently with ongoing and expected development.

- **Roundabouts are needed but are costly and will require an area-wide funding tool**. The three roundabouts in the eastern part of the plan area are the appropriate intersection treatments at 27th/Ferguson, 27th/Diamondback, and the internal intersection of the two new collectors. Per the transportation analysis, they will safely manage the expected future traffic volumes. They are estimated to cost $3.8 million each, which is likely too high a cost for most development projects to carry alone. Each roundabout serves multiple properties and the network as a whole, so an "area-wide" funding tool, such as a Supplemental Transportation System Development Charge for transportation improvements in the Southeast Expansion Area or a Local Improvement District, is needed to fund them. They may not be needed on "day one", so there is an opportunity to collect funds over time and fund them at a targeted point in the future.

- **Funding tools and their revenue streams need to consider the timing of infrastructure improvements (and vice versa).** There are several types of funding tools that could be deployed to fund SE Expansion Area infrastructure (see page 12).

Each of these funding tools has its own mechanism for collecting revenue and allocating it to projects. Some, like a Local Improvement District, enable the City to use “day one” cash flows to borrow money to support infrastructure projects. Others, like System Development Charges, collect fees linked to new development and therefore delay borrowing for infrastructure projects until cash flows have accumulated.

- **Alignment is needed between the timing of development and the timing of infrastructure – phased infrastructure can help.** If a funding tool is chosen that relies on new development but development cannot happen without new infrastructure, how can development move forward? The implication of this issue is that timing and phasing considerations must be brought to the forefront when selecting an infrastructure funding option.

- **There is an opportunity to streamline transportation reviews and the allocation of cost responsibilities to proposed development.** Development in Bend, as in most cities, typically undergoes a cycle of transportation analysis during the development review process. The typical steps are: developer’s proposal; transportation analysis and determination of impacts; and then, decisions regarding the transportation improvement obligations by the developer.

  Incremental transportation analyses occur project by project and are time consuming and duplicative for all parties. The City of Bend is working to streamline and clarify this process and has had recent successes negotiating master plan agreements in the West and Northeast expansion areas. These agreements identify—up front—which transportation improvements are required and when they must be built. For the SE Area Plan, the question is: how might a similar process be created that works for the likely incremental development pattern and multiple annexation agreements that will occur?

- **There is a significant opportunity for cost sharing and infrastructure coordination between major developments in Southeast Bend**. There are opportunities for infrastructure cost sharing—specifically between SEAP, and the Easton and DSL properties. Determining specific cost allocations will require time, negotiation, and Council review.

The following is a discussion of SEAP projects costs, expected revenue streams, and available funding tools. This is followed by a preliminary analysis of potential SEAP funding packages.

Infrastructure Projects and Costs

Transportation

The City of Bend's adopted and acknowledged 2020 Transportation System Plan (TSP) update identifies and includes 15 projects that will support development in the SEAP Area, including new roads, new roundabouts, trails and multi-use paths, and, street and frontage improvements, as well as off-site improvements on the ODOT system. The initial estimated cost for projects that would need to be included in the SEAP Funding Plan was $49.3 million. Since then, several updates including recent development approvals and activity, passage of the City's General Obligation (GO) Bond, project cost refinements, and further analysis to understand transportation mitigations between SEAP and DSL have resulted in a cost estimate that is now closer to $41.6 million. The timeframe for development of this system is estimated at 20+ years.

The following is a summary of the transportation improvements needed in the Southeast Area to support full buildout of the SEAP Area (see Exhibit 1. Transportation Projects and Cost Estimates (2019 dollars)). Several of these projects have identified funding sources including the recent voter-approved GO Bond that will provide the City with the funding needed to construct the 15th/Ferguson roundabout improvement for example. Current improvements to Murphy Road are being funded by the City's existing Capital Improvement Program (CIP), which is funded through a blend of Transportation System Development Charges and Franchise Fees. Other projects have been or are expected to be triggered and mitigated by adjacent private development, such as a roundabout at 15th Street and the new east-west collector at the west end of the Easton master plan. Projects that have identified and expected funding sources are therefore excluded from the SEAP Funding Plan total costs, as depicted in Exhibit 1.

Like all expansion areas in Bend, the SEAP Area must demonstrate how the Oregon's Transportation Planning Rule (TPR, OAR 660-012) has been met. For the recently annexed Westside Area and Petrosa Master Plan area, a per-trip fee was calculated and adopted by agreement as the tool for coordinating a proportional contribution to the state system and complying with the TPR. For the Discovery West development project in the Westside Area, a $229 fee per trip was apportioned by development phase and tied to the project's estimated proportionate share of growth trips that would affect ODOT facilities. A similar approach will be used for allocating TPR fees in the SEAP Area. The City of Bend is currently in discussions with ODOT about TPR compliance. The TPR fee for the SEAP Area has yet to be established. Therefore, off-site improvements needed on the ODOT system are not included in Exhibit 1.

Exhibit 1. Transportation Projects and Cost Estimates (2019 dollars)

Location	Mitigation	Estimated SEAP Costs or Identified Funding Source
15th St / Ferguson Rd	Single Lane Roundabout	Included in GO Bond (City-led)
27th St / Ferguson Rd	Single Lane Roundabout	$3,800,000
China Hat Rd / Knott Rd	Single Lane Roundabout	Citywide TSDC eligible(1) (not programmed)
Knott Rd / Country Club Dr	Single Lane Roundabout	Citywide TSDC eligible (not programmed)
15th St / Reed Market Rd	Expand to a Multilane Roundabout	Included in GO Bond (City-led)/Citywide TSDC eligible
27th St / Diamondback Ln	Single Lane Roundabout	$3,800,000
Knott Rd / Brosterhous Rd	Single Lane Roundabout	Built by Others
Murphy Rd / Country Club Dr	Single Lane Roundabout	Paid through Citywide TSDC (Murphy Corridor Project)
27th St / Reed Market Rd	Multilane Roundabout	Built by Others
15th St / New Road #1 (SE Caldera Drive)	Single Lane Roundabout	Built by Others
East-West Collector	New Road	$7,400,000
Local Framework Road	New Road	$2,100,000
North-South Collector	New Road	$9,000,000
East-West Collector/North-South Collector Roundabout	Single Lane Roundabout	$3,800,000
Knott Rd / 27th St(3)	Frontage Improvements including two TWSC(2) improvements	$11,700,000(5)
TOTAL Costs (4)	**-**	**$41,600,000**

Source: Kittelson Associates.

(1) Note: “TSDC” is an acronym for Transportation System Development Charges.

(2) Note: “TWSC” is an acronym for two-way stop-controlled intersection.

(3) Note: Knott/27th Street costs include a ¾ build of a 3-lane arterial including turn lane improvements and pedestrian and bicycle facilities (multi-use path) on the side of facility within the UGB.

(4) Note: Cost estimates are based on the ongoing TSP update using $2018 plus a 3% construction cost index escalation for purposes of the SEAP Funding Plan. They assume the City is in the lead to build and construct projects, some estimates such as the 27th/Knott frontage costs have been refined through SEAP analysis. Additional cost estimate adjustments may occur as the transportation mitigation package is further refined.

(5) Note: For purposes of Funding Packages discussed later in the memo, a portion of the Knott/27th project costs were split into a portion assumed to be paid by private development ($1.45M) and remaining costs that were considered in the TSDC calculation ($10.26M).

Sewer

A Southeast Area Sewer Plan was prepared by Murraysmith/Jacobs.[1] It identifies nine needed infrastructure projects: seven (7) gravity lines, one (1) force main, and one (1) pump station. The Class 5 estimate cost for all of these projects ranges is $18.4 million for the total system, and $15.6 million when assumptions for already-programmed improvements are subtracted as noted in Exhibit 2. These are area-wide improvements needed to serve both the SEAP area as well as some adjacent properties and areas including the 15th Street Opportunity Area (Easton Master Plan) and existing residential neighborhoods in the Southeast. Project costs do not include individual property connections that would be developed through the land entitlement process.

The sewer plan divides the SE Area into east and west "catchment areas" based on topography and gravity flow. Planning level system improvements and infrastructure costs for the catchment areas are listed below.

- **The East Catchment Area** (364 acres[2]) encompasses three gravity lines (i.e. gravity lines 2, 4, and 6), the force main (line 5), and the pump station. The Class 5 estimated costs for these projects is $15.6 million.
- **The West Catchment Area** (79 acres[2]) encompasses four gravity lines (gravity line 1, 3a, 3b, and 3c). All four lines are either constructed or assumed to be programmed for construction and are therefore not included in the SEAP Funding Plan

Total estimated sewer infrastructure costs are summarized in Exhibit 2 and the projects are displayed in Exhibit 3.

[1] Southeast Area Plan, Sewer Concept Plan Technical Memorandum from Jacobs and Murraysmith to City of Bend regarding On-Call Modeling, Waste Water Collection. Dated November 25, 2019 and presented to SEAPAC at the December 3, 2019 meeting.

[2] Acreage totals for east and west catchment area assume land that is available for development, excluding developed land and non-developable land needed for right of way, open space and "other uses" that are neither housing nor employment such as churches.

Exhibit 2. Sewer Infrastructure Projects and (Class 5) Cost Estimates (2019 dollars)

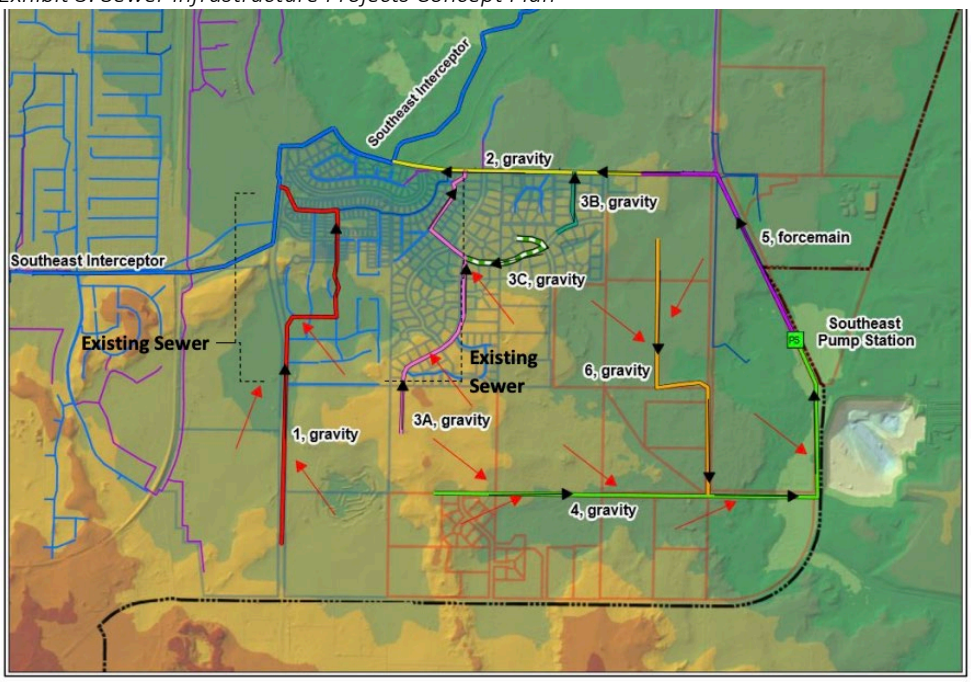
Infrastructure	Estimated SEAP Costs or Identified Funding Source
1 – gravity	Built by Private Development
2 – gravity	$1.9 million
3a – gravity	Funded by Citywide Rates/Programs
3b – gravity	Funded by Citywide Rates/Programs
3c – gravity	Funded by City Septic to Sewer Program
4 – gravity	$4.1 million
5 – force main	$1.8 million
6 – gravity	$2.7 million
Pump Station	$5.1 million
TOTAL SEAP Costs	**$15.6 million**

Source: Jacobs and Murraysmith.

(1) Cost estimates are intended to be used as guidance. They are Class 5 planning level estimates based on information available at the time of the estimate. Estimates exclude land acquisition, financing, and inflation.

(2) Identified funding sources are assumptions. Final decisions on funding from citywide rates/programs are made by the City Council.

Exhibit 3. Sewer Infrastructure Projects Concept Plan



Source: Jacobs and Murraysmith.

In addition, the City is exploring alternative sewer facility options that could serve both the Department of State Lands (DSL) site as well as the Southeast Area. As this analysis is further explored, the system costs and proportion attributable to SEAP development may change. This

on-going cost refinement and coordination for the area's sanitary sewer system is an example of why a flexible funding strategy is the best approach for the SEAP Funding Plan.

Summary of Total Infrastructure Costs

Combined, the SEAP sewer and transportation infrastructure costs without presently identified funding sources are estimated to be $57.2 million, in addition to projects identified above as being funded by others, SDCs, sewer rates, or the City's GO Bond. Any solution to the infrastructure challenges will involve substantial private investment, which includes investment from property owners and or developers in the Southeast Area. It is important to note that this analysis and Funding Plan does not consider water infrastructure costs needed for the area, which will be determined by the Avion Water Company.

Exhibit 4. Summary of Estimated Infrastructure Costs (Planning Level 5), SEAP Area

	Estimated Infrastructure Costs
Sewer	$15,600,000
Transportation	$41,600,000
TOTAL Costs	**$57,200,000**

Source: Jacobs, Murraysmith, and Kittelson Associations.

Note: Estimated water infrastructure costs are unknown as of this date.

SEAP Revenue

Development of the SE Expansion Area will add hundreds of new homes and space for dozens of businesses to the City of Bend. Once complete, the area is projected to house over 3,000 residents in over 1,200 housing units and contain over 2,800 jobs. In this way, the new community will add to the vitality of Bend by providing homes, jobs, and community destinations for the City's growing population and economy, consistent with Bend's Comprehensive Plan.

The development of the SEAP project area will also provide the City with additional sources of revenue to fund services and capital projects. In addition to property taxes, city-wide system development charges and utility fees resulting from SE Expansion Area development will support infrastructure projects citywide. We have conducted a threshold-level analysis of three revenue sources that will result from SE Expansion Area development. These sources are:

- Transportation System Development Charges[3]
- Sewer System Development Charges
- Sewer Utility Fee

The analysis shows that system development charges from SE Expansion Area development would provide over $36 million for citywide infrastructure projects. In addition, over $940,000 in annual sewer fees would be collected on an ongoing basis (Exhibit 5).

Exhibit 5. Summary of Estimated Revenue Potential from Existing, City-wide Revenue Sources, SE Expansion Area (at full build-out)

	Transportation SDC Revenue Estimate (Total)	Sewer SDC Revenue Estimate (Total)	Sewer Utility Fee Revenue Estimate (Annual)
Residential Development	$7,745,000	$5,572,000	$641,000
Commercial Development	$19,951,000	$3,532,000	$303,000
Total	**$27,696,000**	**$9,104,000**	**$944,000**

Source: Calculations by ECONorthwest using Envision development assumptions and the City of Bend's 2020-2021 Fee Schedule.

For more detailed tables and assumptions, see Appendix A.

[3] Based on findings from Bend's Transportation System Plan: all existing, city-wide transportation SDC revenues generated in Bend, including revenue produced from SE Expansion Area development, is assumed to be committed to paying debt obligations on transportation projects that have *already* been built or to projects in the City's existing Capital Improvement Program. This pre-allocation of revenue is anticipated through 2030. In 2031 through 2040, it is also likely that existing city-wide transportation SDC revenue will be pre-committed to on-going debt payments.

Non-committed transportation SDC revenue at the City's existing rate and/or additional city-wide transportation SDC revenue generated through a rate increase is assumed to go toward prioritized transportation projects identified in Bend's Transportation System Plan. Some of these transportation projects are located in the SE Expansion Area and are currently eligible to receive these funds.

Funding Tools

This section describes funding tools that hold the most promise for application in the SE Expansion Area. It is organized by infrastructure type; with a description of transportation tools first, followed by descriptions of funding tools for sewer infrastructure. Funding tools for water infrastructure are not included in the discussion as these are the responsibility of the Avion Water Company.

The intent of this section is to provide the reader with an understanding of how each of the funding tools function and key considerations for their use. The *Potential Funding Packages* section later in this document describes how these tools can be combined to deliver infrastructure to the SE Expansion Area.

Transportation Funding Tools

The City has one primary, existing tool which may be used to fund transportation infrastructure projects:

- **City-wide Transportation System Development Charge (TSDC).** TSDCs are charges on new development, and some redevelopment, which occurs within the City. Revenues are used to fund growth-related capital improvements that are on the City's adopted TSDC project list, as prioritized by the City Council. Projects can only be funded if they are on the adopted TSDC project list. The existing TSDC list does not include projects within SEAP, as the project list was developed in 2011 prior to the SEAP area's inclusion in the UGB. However, the list does include projects within existing City limits that benefit the SEAP area, which is how, for example, the Murphy overcrossing, is funded. Transportation projects that benefit the SEAP Area could be added to the TSDC list.

The City's TSDC rate for fiscal year 2020-21 is $8,136 per single family dwelling (SFD). This rate is not the maximum possible under the current methodology. A revision of the methodology and/or project list could result in a higher rate and additional funding. The City is planning to revisit the TSDC methodology and project list in 2021. Projects that are currently TSDC-eligible are presented in Exhibit 1[4].

In addition to the city-wide TSDCs, Bend voters recently approved a general obligation bond to pay for transportation improvements.

- **Safe Travel & Traffic Improvements General Obligation (GO) Bond.**[5] On November 3, 2020, City of Bend voters approved Transportation Bond Measure 9-135. The bond will provide funding for specific transportation projects identified in the bond package. SEAP Projects included in the GO Bond include the Ferguson Road/15th Street intersection improvements and the Reed Market/15th intersection as part of a larger Reed Market Overcrossing project. In addition, the GO Bond provides funding for 12 key walking and bicycling routes including funds to implement the east-west and north-south multi-use paths envisioned in the area.

Additional funding tools will be needed to fully address the transportation infrastructure needs of the SEAP Area. We anticipate that a combination of the following tools will be needed to

[4] Citywide TSDC eligible projects have been excluded from the SE Expansion Area funding analysis as they are assumed to be funded.

[5] For more information about the GO Bond: https://www.bendoregon.gov/city-projects/safe-travel

address the Area's transportation infrastructure needs. All of these funding tools can only be applied after annexation into City limits[6]. At this time, all the SEAP properties are outside of City limits. Despite this condition, there are options for a phased approach. Properties that share benefits from a transportation project and that are jointly ready to annex into the City could form an LID or reimbursement district. In a later phase, a secondary LID or reimbursement district could be formed for more area-wide transportation improvements.

- **Supplemental TSDC.** Supplemental TSDCs are additional one-time fees that are typically paid at the time of building permit issuance. These fees are in addition tothe City-wide TSDCs. These fees are paid by new development within a defined geographic area for TSDC-eligible capital projects that increase capacity and benefit/serve the defined area. TSDCs are therefore potentially applicable for the SE Expansion Area. A supplemental TSDC can be implemented by City Council without a public vote.

- **Local Improvement Districts (LIDs).** LIDs are a type of special assessment district where property owners within an established LID boundary are assessed a fee to pay for capital improvements that benefit those properties. The LID assessment begins once the district is formed and does not wait for the property to develop (unlike a reimbursement district, discussed below). LIDs may be appropriate for use in the SEAP Area to finance infrastructure that is needed to develop properties within subareas of the SEAP, or possibly the area as a whole. The City already has regulations that allow LIDs. However, to date LIDs have not been widely used for transportation infrastructure in the Bend area.
- **Reimbursement District:** A reimbursement district is a cost sharing mechanism, typically initiated by a developer. The purpose is to reimburse the developer that constructs an improvement that benefits multiple properties (or an entire area) through fees paid by benefitted property owners at the time those other properties develop. A developer applies to create a Reimbursement District by demonstrating benefit to properties beyond their own. In addition, the size of the improvement must be measurably greater than would otherwise be ordinarily required for the initial development. Much like an LID, the City's Municipal Code governs the creation and structure of Reimbursement Districts but does not currently authorize district creation in areas that are not annexed into the City.

Sewer Funding Tools

The City has two primary infrastructure funding tools for sewer; a sewer system development charge (SSDC) and a sewer utility fee. The SSDC is levied on new development. Residents and commercial businesses are responsible for paying the sewer utility fee once their sewer service is available and connected. These two tools are defined as follows:

- **Sewer System Development Charge (SSDC).** SSDCs are charges on new development, and some redevelopment, which occurs within the City. Revenues are used to fund growth-related capital improvements that are on the City's adopted SSDC project list, as prioritized by Council. The SSDC is based on equivalent dwelling units (EDU). The fiscal year 2020-21 SSDC rate is $4,974 per single-family dwelling, duplex (per unit), and townhome (per unit). The rate for multifamily housing and mobile homes in parks is $3,979 (per unit). Motels, board, and rooming houses

[6] Some funding tools can be implemented concurrently or roughly concurrently with property annexation into the city. Annexation and each of the funding tools have their own independent processes, which may be capable of occurring on corresponding timelines so that annexation and funding tool implementation are at least roughly contemporaneous.

is $1,990 per room. Currently, there are no eligible SEAP Area sewer projects on the Sewer SDC list. Important to the use of SDCs in the SE Area, the Bend City Code has a “common scheme” policy that allows adjacent properties to pool SDCs. This means that SDC costs could be shared between multiple property owners, in some cases easing the cost burden on individual properties.

- **Sewer Utility Fee.** A sewer utility fee is typically assessed to all businesses and households in a jurisdiction or geographic area. The City already imposes a monthly sewer utility fee and could consider increasing the city-wide utility rate. The fiscal year 2020-21 utility rate for a single-family dwelling unit is $37.51 per month, plus $3.93 per 100 cubic feet of average winter quarter water usage (WQA). The charge for multifamily dwelling units includes base rate of $14.82 per month, plus $3.93 per 100 cubic feet of WQA. The non-residential customer rate includes a base rate of $37.51 per month, plus $3.93 per 100 cubic feet of WQA.

In addition to these currently established funding tools, the City could rely on other new tools to fund sewer projects:

- **Supplemental SSDC.** Supplemental Sewer SDCs are additional one-time fees that are typically paid at the time of building permit issuance. These fees are in addition to the City-wide SSDCs. These fees are paid by new development within a defined geographic area and are therefore potentially applicable for the SE Expansion Area. Supplemental SSDC funds may be used for SSDC-eligible capital projects that increase capacity and benefit/serve the defined area, or to reimburse the City for City projects funded through existing revenue sources or debt. A supplemental SSDC can be implemented without a public vote.

- **Supplemental Sewer Utility Fee.** As noted above, a Supplemental Sewer Utility Fee can be applied to a specific geographic area. This fee would be layered on top of the citywide utility fee. If created for the purpose of reimbursing capital investments by the City (such as for the SEAP east sewer system), it would be calibrated to recapture a target amount of revenue over an estimated period of time. This fee could be used in combination with other tools, such as a Supplemental SSDC, to spread reimbursement over multiple sources of revenue.

- **Local Improvement District (LID).** As stated in the transportation section, a LID is a type of special assessment district where adjacent property owners are assessed a fee to pay for capital improvements that are necessary to serve new development within the LID boundary. Projects that benefit multiple property owners in the SE Expansion Area may be funded by LID assessments. LIDs allow for cost-sharing among property owners that need the same costly infrastructure to develop their properties; it removes the burden of these costly projects from one developer alone. The City has previously had successful sewer LID projects, for projects that ranged from approximately $88,000 to $4.4 million. Like a LID that would fund transportation infrastructure, properties that would benefit from the LID would need to be annexed into the City prior to the LIDs formation.

- **Reimbursement District.** As previously discussed, reimbursement districts are a cost sharing mechanism, typically initiated by a developer. Sewer improvements are eligible projects as long as they demonstrate benefit to properties beyond their own. Properties must be annexed into the City prior to the district’s formation.

Potential Funding Packages for Backbone Infrastructure – A Preliminary Analysis

Potential SEAP Funding Packages

To better understand how the SEAP Funding Plan could be implemented, the project team tested various funding packages using a variety of funding tools. Exhibit 6 summarizes the packages tested—they are labeled Backbone Options A-1, A-2 and Option B. These packages strive to enable near-term development by funding specific “backbone” infrastructure projects—those that are essential for unlocking multiple properties. The intent is to catalyze new development, while building momentum and accruing infrastructure supportive fees at the same time. In addition, the team tested a ‘Minimal City Contribution” option, in which property owners and developers are individually responsible for paying for the infrastructure of their properties to enable onsite development.

Increasingly, and in light of the COVID-19 pandemic related downturn in the economy, the City’s preferred funding approach has centered toward selecting these types of “backbone” approaches where targeted public funds are used catalyze private investment. The Minimal City Contribution option is presented to understand the implications if the City is to provide a minimal monetary contribution to support infrastructure delivery in the Southeast Area.

Exhibit 6. Potential SEAP Funding Packages – Test Packages for Analysis

Baseline Assumptions	*Backbone Options A-1 & A-2*	*Backbone Option B*	*Minimal City Contribution*
Transportation *Base assumptions* in all Options assume that all internal roadways and paths are paid by private development: • East-West Collector • North-South Collector • Local Framework Road • Multi-use paths	Below projects paid by developers through a Supplemental T-SDC[7]: • 27th/Diamondback Roundabout • East-West Collector/North-South Collector Roundabout • 50% of costs for Knott Rd/27th Street frontage improvements[8], remaining 50% paid by private development	Same Supplemental T-SDC as Backbone Options A-1 & A-2.	All transportation projects, without identified funding sources, are 100% developer funded without additional support from the City through funding tools.
	27th/Ferguson Roundabout: 50% of costs are paid by others and 50% is paid by Southeast Area private development.	27th/Ferguson Roundabout is added to Citywide TSDC list.	
Sewer *Base assumptions* include the following: • 100% of Gravity Line 3a, 3b and 3c are funded through citywide rates and programs (ie. Septic to Sewer) • Gravity line 1 is built by development projects (e.g. Caldera High School.	City funds Gravity Line 2 through citywide rates and programs. *Portion of* east basin projects paid with an LID, remaining paid by City rates: • Gravity Lines 4, 6 • Force Main • Pump Station ***Option A-1****:* 50% funded with LID, 50% City of Bend ***Option A-2:*** 75% funded with LID, 25% City of Bend	City funds/builds major sewer infrastructure needs in East Basin including: • Gravity Line 2 • Force Main (Line 5) • Pump Station Remaining gravity lines funded by private development: • Gravity Lines 4,6	100% of east basin projects paid by private development, without support from additional funding tools.

[7] For purposes of the Supplemental T-SDC calculations, the Ward & Wilson properties were excluded. It is likely that development of these properties will precede SEAP funding tool implementation.

[8] Project costs include a ¾ build of a 3-lane arterial that includes a multi-use path within the Urban Growth Boundary and the roadway built to the curb (including curb) to the Urban Growth Boundary side of the street. For purposes of the supplemental T-SDC analysis, frontage improvement costs on the Ward property were excluded from the analysis.

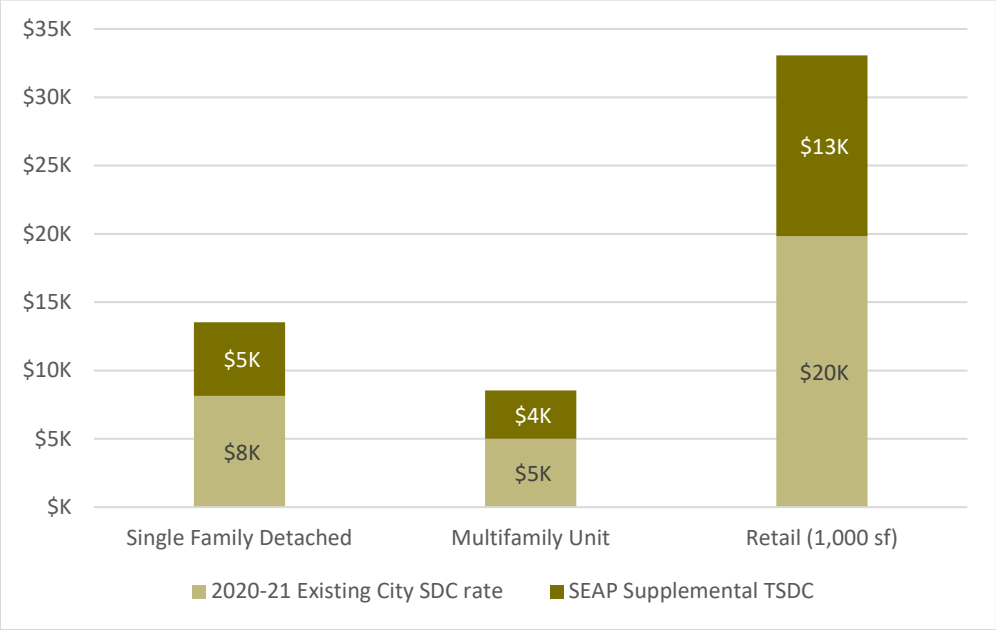
Analysis

Transportation

With the above-listed assumptions, the new Supplemental TSDC would raise approximately $12.7 million over time to support the development of the 27th/Diamondback Roundabout, E-W Collector/N-S Collector Roundabout and half of the Knott Rd/27 Street frontage improvements[7].

Exhibit 7 provides an estimate of the tested Supplemental TSDC[9] in addition to existing TSDCs for three example development types[10]. In this tested package, it is estimated that a single family detached unit would pay a supplemental TSDC of $5,400 in addition to the existing citywide rate of $8,136 resulting in a total fee of $13,536. The estimated costs are preliminary and intended for analysis only—they are subject to change. Oregon law prescribes methodologies for calculating SDCs. Complying with the statute would require a review that is beyond the scope of this preliminary analysis but would be needed if the Council chose to establish the new Supplemental TSDC.

Exhibit 7. Impact of Estimated Supplemental TSDC on Example Developments in SEAP combined with City's existing 2020-21 TSDC rates



Sewer

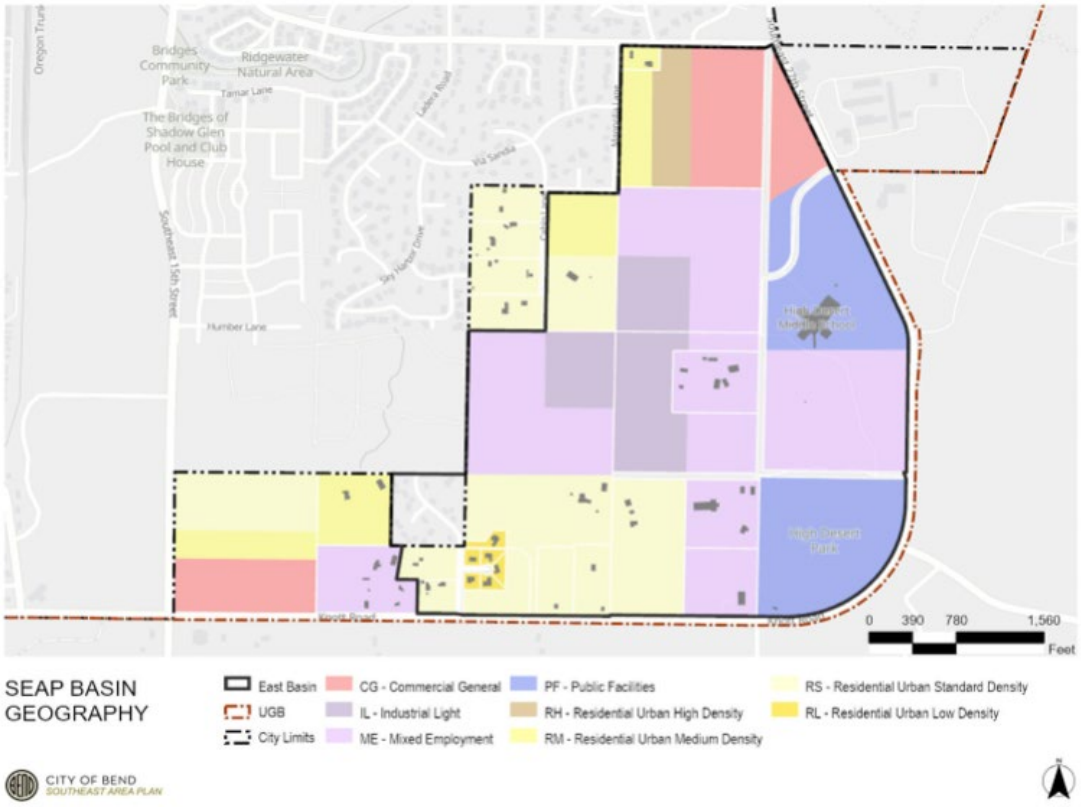
As described previously in this memo, the East Catchment Area, depicted in Exhibit 8, requires backbone sanitary sewer improvements and an areawide funding tool. Interim facilities may enable some development to occur, but ultimately, the backbone system will need to be constructed.

---

[9] For purposes of the Supplemental T-SDC calculations, the Ward & Wilson properties were excluded. It is likely that development of these properties will supersede SEAP funding tool implementation.

[10] The example development type for retail uses FY 2020-21 rates for a shopping center development that is under 100,000 square feet (sq ft.). 2020-21 TSDC rates for retail (1,000 sq. ft.) vary between $1,196 for furniture stores to $121,770 for fast food restaurants with drive-throughs and no indoor seating.

Figure 8. SEAP Sewer Basin Geography



This analysis tested several options for funding the east sewer system. The assumptions for the options are:

All Options: Sewer improvements funded by the City through citywide rates, which would necessitate future Council action, or another future source (e.g. a grant):

- Gravity Lines 3a, 3b and 3c. Gravity Line 3c is already programmed. Since these lines primarily serve adjacent areas to SEAP, they are not included as costs in the SEAP Funding Packages.

Sewer Backbone Option A: City funds Gravity Line 2 and remaining costs are split between a Local Improvement District (LID) funding a portion of needed improvements and City contributions through existing sewer rates or another future source (e.g. a grant). Two options were tested:

- ***Option A-1:*** 50/50 split. 50% of east basin costs paid with LID, 50% contribution from the City through existing sewer rates or another funding source (e.g. a grant). This results in a total of $8.75 million contribution from the City.

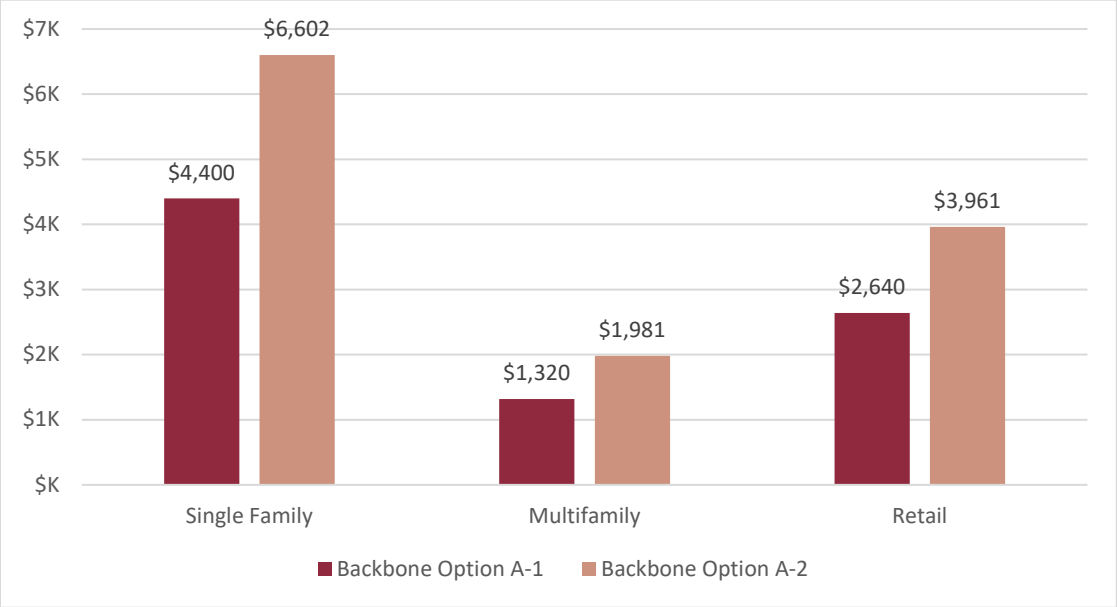
- ***Option A-2***: 75/25 split. 75% of east basin costs paid with LID, 25% contribution from the City through existing sewer rates or another future source (e.g. a grant). This results in a total of $5.3 million contribution from the City.

LIDs must be located within the City limits. Therefore, most or all of the east basin area must annex before the east sewer project is funded (although preliminary design may precede the LID).

Exhibit 9 provides an estimate of the average cost per acre per generalized development type for the LID portion of the options, amortized over 10 years. Figures are based on generalized densities per acre for each development type.

Sewer Backbone Option B: City funds Gravity Line 2, force main (Line 5) and the pump station needed to serve the East catchment area. This results in a total of $8.8 million contribution from the City.

Exhibit 9. Average Cost per Acre for an Amortized LID (Option A-1 & A-2) by Development Type, East Basin Area Sewer System Improvements

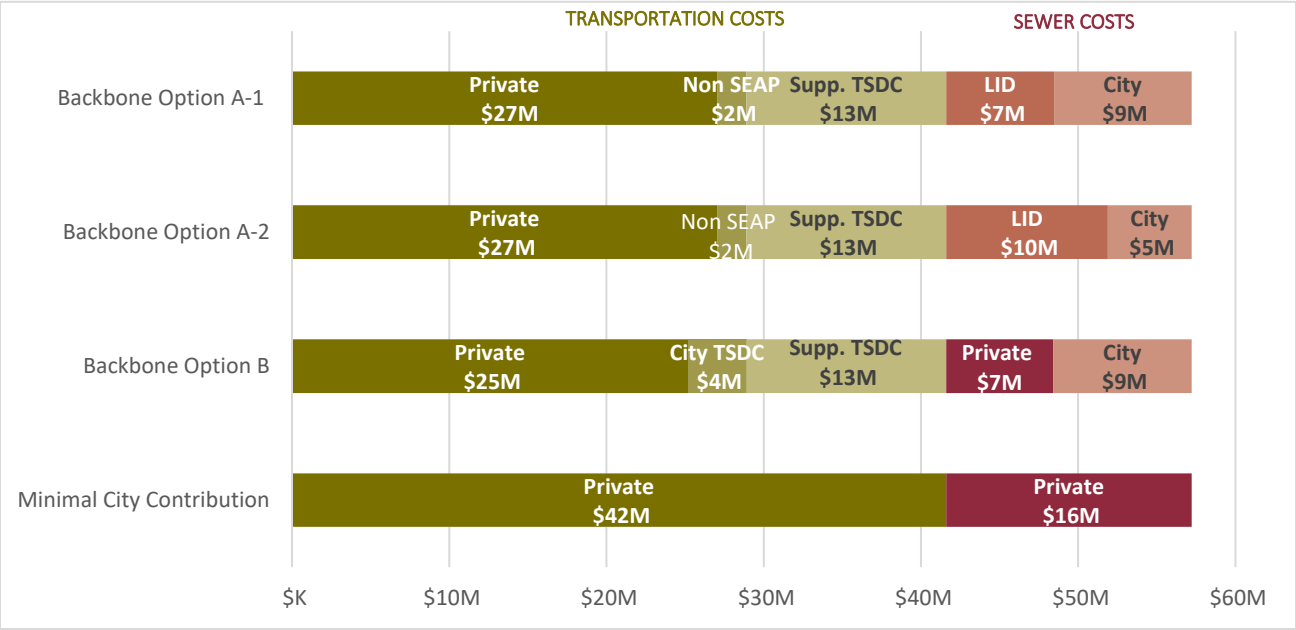


As with the transportation analysis, the above estimates are preliminary and subject to change. They are intended to provide an initial estimate of potential costs associated with varying levels of City participation in the east sewer system. Besides the test packages analyzed above, there are multiple options for how the City could front the costs of initial east sewer system and be reimbursed. For example, the City could borrow funds via a revenue bond, and plan for the reimbursement to be paid by some combination of a Supplemental Sewer SDC, Supplemental Sewer Utility Fee, and potentially citywide rates.

Total Costs

Exhibit 10 below shows how total infrastructure costs in the SEAP area are addressed in each of the funding options. In each option, a share of these total costs was allocated to a specific funding mechanism/responsible party.

Exhibit 10. SEAP Funding Tools and Sources by Funding Options Analyzed



Appendix A. SEAP Revenue Details

This appendix presents additional details about the SEAP revenue projections presented in the SE Area Funding Plan. The appendix is organized by funding source.

Transportation System Development Charge (SDC) Revenue

Exhibit A1 shows that revenue from the City of Bend's existing Transportation SDC rates will generate approximately $27.7 million at full-build out of the SE Expansion Area.

The analysis is based on using SDC rates from the City of Bend's 2020-21 Fee Schedule. Assumed rates for commercial development is based on the most commonly used rates as follows:

- Retail: Specialty Retail Rate per 1,000 SF of Gross Floor Area
- Office: General Office Rate per 1,000 SF of Gross Floor Area
- Industrial: Warehouse Rate per 1,000 SF of Gross Floor Area
- Public/Civic: Elementary School Rate per Student (assuming 400 students)
- Hotel/Hospitality: Assuming 1.6 hotel rooms per acre in the ME-EM zoned area (6.4 acres) and 3.8 hotel rooms per acre in the CG zoned area (5.8 acres)

Exhibit A 1. Estimated Revenue Potential from Existing, City-wide Transportation System Development Charges, SE Expansion Area (at full build-out)

Development Type	Count of Units	Total Building Sq. Ft. Assumption	Transportation SDC Fee Rate	Est. Revenue at Existing Rate
Residential				
Multifamily (DU)	549	n/a	$5,001	$2,745,549
Townhome (DU)	137	n/a	$4,185	$573,345
Single Family (DU)	544	n/a	$8,136	$4,425,984
Sub-Total	**1,230**	**-**	**-**	**$7,774,878**
Commercial				
Retail	-	1,555,550	$7,646	$11,893,735
Office	-	358,730	$5,886	$2,111,485
Industrial	-	1,421,282	$3,786	$5,380,974
Public / Civic (students)	400	-	$961	$384,400
Hotel / Hospitality (rooms)	38	-	$4,746	$180,348
Sub-Total	**-**	**3,361,633**	**-**	**$19,950,942**
Total Revenue	**-**	**-**	**-**	**$27,695,820**

Source: Calculations by ECONorthwest using Envision development assumptions and the City of Bend's 2020-2021 Fee Schedule.

Note: DU is dwelling unit.

Sewer System Development Charge (SDC) Revenue

Exhibit A2 and Exhibit A3 show that revenue from the City of Bend's existing Sewer SDC rates will generate approximately $5.6 million at full-build out of the residential uses and $5.3 million at full build out of the commercial uses in the SE Expansion Area (for a total of $10.8 million).

The analysis is based on using SDC rates from the City of Bend's 2020-21 Fee Schedule. Assumed rates for commercial development are generally based on the most commonly used rates as follows:

- Retail: Retail Store: one (1) EDU for the first 2,000 square feet and 0.50 EDU for each additional 2,000 square feet of gross floor area (GFA). The analysis modifies the rate slightly to 0.55 EDUs per 2,000 GFA based on an assumed average for building with 20,000 GFA.
- Office: Bank and office, except medical, dental, and veterinary - 1 EDU per 2,000 SF of GFA
- Industrial: Industrial, manufacturing, beverage processors, commercial warehouse - 0.09 EDU per employee for domestic wastewater only. Industrial wastewater not assessed.
- Public/Civic: Elementary School – 0.08 EDU per person (400 students and 23 employees)
- Hotel/Hospitality: Motels, boarding and room housings - 0.04 EDU per room

Exhibit A 2. Estimated Revenue Potential from Existing, City-wide Sewer System Development Charges, SE Expansion Area (at full build-out of residential uses)

Development Type	Count of Development Type	Sewer SDC Fee Rate	Est. Revenue at Existing Rate
Residential	**Units**		
Single Family	544	$4,974	$2,705,856
Townhome	137	$4,974	$681,438
Multifamily	549	$3,979	$2,184,581
Total	**1,230**	**-**	**$5,571,875**

Source: Calculations by ECONorthwest using Envision development assumptions and the City of Bend's 2020-2021 Fee Schedule.

Exhibit A3. Estimated Revenue Potential from Existing, City-wide Sewer System Development Charges, SE Expansion Area (at full build-out of commercial uses)

Development Type	Count of Rooms	Total Building Sq. Ft.	Employees	EDUs	Estimated Revenue
Commercial					
Retail	n/a	1,555,550	966	428	$2,127,877
Office	n/a	358,730	931	179	$892,336
Industrial	n/a	1,421,282	767	69	$343,206
Public / Civic	n/a	26,071	23	34	$168,121
Hotel / Hospitality	38	-	114	15	$75,605
Total	**-**	**-**	**2,802**	**725**	**$3,607,145**

Source: Calculations by ECONorthwest using Envision development assumptions and the City of Bend's 2020-2021 Fee Schedule.

Sewer Utility Fee Revenue

Exhibit A4 shows that revenue from the City of Bend's existing sewer utility rates will generate approximately $944,000 per year at full-build out of the SE Expansion Area. The analysis is based on using sewer utility rates from the City of Bend's 2020-21 Fee Schedule. The analysis for "non-residential" does not include extra strength charge for industrial users.

Exhibit A 4. Estimated Revenue Potential from Existing, City-wide Sewer Utility Fee, SE Expansion Area (at full build-out)

Development Type	Count of Dev. Type at Full Build-Out	WQA Assumption in cu. Ft. (per unit)	Existing Monthly Rate	WQA Volume Charge per 100 cu. ft.	Revenue at Existing Rate
Single Family Unit	544	448	$37.51	$3.93	$359,800
Townhomes Unit	137	448	$37.51	$3.93	$90,611
Multifamily Unit	549	358	$14.82	$3.93	$190,323
Non-Residential	459	448	$37.51	$3.93	$303,294
Total	**-**	**-**	**-**	**-**	**$944,028**

Source: Calculations by ECONorthwest using Envision development assumptions and the City of Bend's 2020-2021 Fee Schedule.

Appendix II - Draft Comprehensive Plan and Development Code Amendments

DRAFT
Development Code Update
November 19, 2020

Prepared by: Community Development Department

Note:

Text in underlined typeface is proposed to be added

Text in ~~strikethrough~~ typeface is proposed to be deleted.

***Indicates where text from the existing code has been omitted because it will remain unchanged.

Staff comments are ***bold and italicized***

Bend Comprehensive Plan

Chapter 6, Economy

6-23 The City must replace lands designated for industrial land uses on the Comprehensive Plan map that are subsequently changed to non-industrial designations through adoption of an area plan. The City will ensure these lands are replaced either through a rezoning of land within the UGB and/or an amendment to the UGB to ensure an adequate supply of industrial land for industrial jobs.

Master Planning Policies

11-35 Master plans are required for developments over 20 acres unless otherwise specified in the Development Code. Properties in UGB expansion areas where a master plan is required are shown on Figure 11-~~4~~7.

11-36 Where an approved City-initiated Area Plan exists, the City may find that some or all elements of a required master plan have been addressed and satisfied if they are already addressed by the Area Plan.

11-37 Approval of a City-initiated Area Plan that encompasses one or more properties over 20 acres (including abutting land in common ownership) does not exempt such properties from master plan ~~requirements~~ approval criteria.

Annexation Policies

11-50 Properties over 20 acres (including adjacent property in common ownership) ~~as of the adoption of the UGB expansion~~ (shown on Figure 11-74) are subject to master plan requirements unless they are part of an adopted area plan ~~, regardless of property acreage upon annexation~~. When properties are over 20 acres (including adjacent property in common ownership) and are part of an approved area plan they are subject to the master plan approval criteria.

Northeast – Butler Market Village:

11-56 ~~The City will initiate an Area Plan for the Northeast – Butler Market Village area. The Area Plan will address policies 11-57 through 11-63. Prior to completion of the Area Plan, annexations in this area must be a minimum of 40 contiguous acres and be the subject of a master plan application, which includes a framework level Area Plan for the rest of the subarea. Following adoption of the Area Plan, annexation and development of individual properties or groups of properties of any size, consistent with the Area Plan, may be approved.~~

The Northeast- Butler Market Village Expansion Area includes the Petrosa Master Plan. Properties of any size located within the Petrosa Master Plan may apply to annex and develop, consistent with the Petrosa Plan. Annexation and development of individual properties or groups of properties of any size outside of the Petrosa Master Plan must comply with policies 11-57 and 11-60 through 11-63, and may be approved in compliance with the Bend Development Code.

The Elbow a.k.a. Southeast Expansion Area

11-75 The City ~~will initiate~~ adopted an Area Plan for the Elbow area, also known as the Southeast Expansion Area, which became effective on (insert date). The Area Plan ~~will~~ addresses policies 11-76 through 11-86. ~~Prior to completion of the Area Plan, annexations in this area must be a minimum of 40 contiguous acres and be the subject of a master plan application which includes a framework level Area Plan for the rest of the subarea. Following adoption of the Area Plan, a~~Annexation and development of individual properties or groups of properties of any size, consistent with the Area Plan, may be approved in compliance with the Bend Development Code.

11-77 This area ~~shall~~ provides for a mix of residential, commercial and industrial uses, including ~~at least~~ 153 ~~122~~ gross acres of residential plan designations, ~~67~~ 43 gross acres of commercial plan designations, ~~76~~ 38 gross acres of industrial designations, at least ~~103~~ 140 gross acres of mixed employment plan designations, and ~~75~~ 66 gross acres of public facilities (excluding existing right of way).

11-78 In order to provide sufficient housing capacity and mix, the residential plan designations ~~shall~~ include ~~at least 77~~ 105 acres of RS, ~~36~~ 35 acres of RM, and ~~9~~ 10 acres of RH (excluding existing right of way). ~~Alternatively, the Area Plan may demonstrate that this area will provide capacity for a minimum of 820 housing units, including at least 17% single family attached housing and at least 47% multifamily and duplex/triplex housing types. The Area Plan may include and rely on plan designations, zones, special plan districts, and/or other binding development regulations to demonstrate compliance with the specified mix and capacity.~~

***

11-85 The City will ensure that a total of 38 acres designated for industrial land uses on the Comprehensive Plan map with the 2016 UGB expansion that were subsequently changed to non-industrial designations through adoption of the Southeast Area Plan will be replaced to ensure an adequate supply of industrial land for industrial jobs. The City will designate new industrial lands on the Comprehensive Plan map through a rezoning of land within the UGB and/or an amendment adding land to the UGB, and within five years of the City Council's adoption of the Southeast Area Plan.

11-86 The City will ensure that a total of 43 acres of land designated for Commercial land uses on the Comprehensive Plan map with the 2016 UGB expansion that were subsequently changed to non-employment designations through adoption of the Southeast Area Plan will be replaced to ensure an adequate supply of commercially designated land for commercial uses. The City will complete an inventory of existing Commercial lands and evaluation of need for new Commercial lands within seven years of the City Council's adoption of the Southeast Area Plan. The City may replace these of commercial lands through a rezoning of land within the UGB, an amendment to the UGB that adds land for commercial land uses, or some combination of the two.

North Triangle

11-122 The City will initiate an Area Plan for the North Triangle area. The Area Plan will address policies 11-123 through 11-131~~. Prior to completion of the Area Plan, annexations in this area must be a minimum of 40 contiguous acres and be the subject of a master plan application. Following adoption of the Area Plan which includes a framework level Area Plan for the rest of the subarea, annexation and development of individual properties or groups of properties of any size, consistent with the Area Plan, may be approved.~~ Prior to completion of the Area Plan, annexations in this area must be a minimum of 40 contiguous acres and be the subject of a master plan application which includes a framework level Area Plan for the rest of the subarea. Following adoption of the Area Plan, annexation and development of individual properties or groups of properties of any size, consistent with the Area Plan, may be approved in compliance with the Bend Development Code.

OB Riley area:

11-116 The City will initiate an Area Plan for the OB Riley area. The Area Plan will address policies 11-117 through 11-121. Prior to completion of the Area Plan, annexations in this area must be a minimum of 40 contiguous acres and be the subject of a master plan application which includes a framework level Area Plan for the rest of the subarea. Following adoption of the Area Plan, annexation and development of individual properties or groups of properties of any size, consistent with the Area Plan, may be approved in compliance with the Bend Development Code.

***

11-122 The City will initiate an Area Plan for the North Triangle area. The Area Plan will address policies 11-123 through 11-131. Prior to completion of the Area Plan, annexations in this area must be a minimum of 40 contiguous acres and be the subject of a master plan application. Following adoption of the Area Plan which includes a framework level Area Plan for the rest of the subarea, annexation and development of individual properties or groups of properties of any size, consistent with the Area Plan, may be approved in compliance with the Bend Development Code.

***

Bend Development Code

CHAPTER 1.2

DEFINITIONS

***

Low Stress Facility: Transportation infrastructure, including, but not limited to protected bike lanes, separated pathways, crossings, sidewalks, and neighborhood greenways, that have a Level of Traffic Stress (LTS) of either 1 or 2, as calculated per the ODOT Analysis and Procedures Manual.

***

CHAPTER 2.7

SPECIAL PLANNED DISTRICTS, REFINEMENT PLANS, AREA PLANS AND MASTER PLANS

***

2.7.3XXX Southeast Area Plan

2.7.3XXX Purpose

The purpose of the Southeast Area Plan is to implement Bend Comprehensive Plan policies regarding the Elbow UGB Expansion Area (Southeast Expansion Area), under Chapter 11 of the Bend Comprehensive Plan. This area plan creates development standards for the districts within the Southeast Expansion Area. The land use and development standards will:

A. Provide a varied mix of housing types and densities that reflects the City's commitment to providing a variety of housing choices;

B. Support employment and light industrial uses such as in-demand flex space;

C. Create neighborhood commercial developments that will serve both future new residents and residents in existing, adjacent neighborhoods;

D. Establish compatible transitions between existing and future development;

E. Provide public facilities and amenities such as neighborhood parks, community parks, and schools; and

F. Implement the relevant policies of the Bend Comprehensive Plan 11-75 through 11-86.

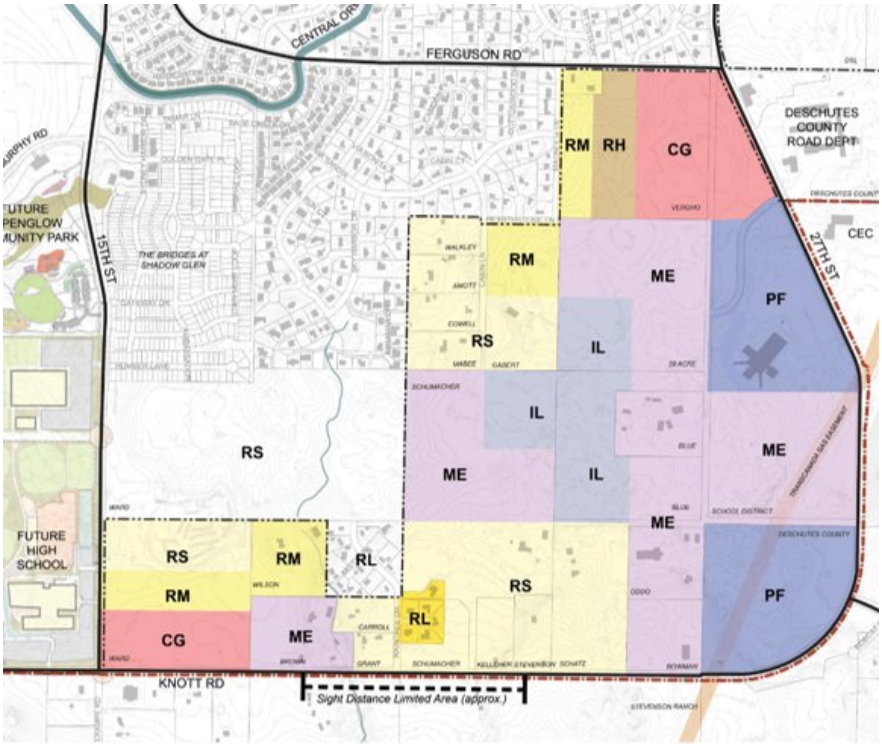
2.7.3XXX Definitions

Live/work townhome means a residential townhome unit in which a minimum of 50 percent of the unit's ground floor square footage is used as commercial.

2.7.3XXX Applicability

A. In addition to the provisions of the underlying zone, the Southeast Area Plan standards apply to lands within the Southeast Area Plan as identified on Figure XXX. Where there is a conflict between the provisions of the BDC and those of the underlying zone or other portions of the Development Code, the provisions of the Southeast Area Plan will control. The final determination of the zone boundary will be established at the time of subdivision platting and right-of-way dedication or site plan review.
B. The standards in this Section may not be modified by a master plan approval, except as allowed by BDC 4.5.100.F, Modifications to Approved Area Plans, Master Plans, PUDs and Special Planned Districts.
C. Existing Uses. Uses that are not in conformance with the provisions in this section but that were lawfully established prior to the adoption of this code are considered a permitted use for that site on which they were established. Expansion or enlargement will be allowed subject to the provisions of BDC Chapter 4.2, Minimum Development Standards Review, Site Plan Review and Design Review.

Figure 2.7.3XXX Southeast Area Plan



2.7.3### General Commercial Districts (CG).

A. Permitted Uses.

1. All uses permitted or conditionally permitted in Table 2.2.300 except the following, which are prohibited:
   a. Marijuana Wholesale (more than 75% of sales are wholesale)
   b. Commercial and Public Parking
2. Live/Work Townhomes.
3. Accessory dwelling units, single-family attached townhomes, duplexes, triplexes, and multifamily.

B. Front Setbacks. 10’ minimum, 10’ maximum.

1. Exceptions.

   a. The maximum setback standard may be increased to accommodate an approved usable public space with pedestrian amenities (e.g., extra-wide sidewalk, multi-use path, plaza, outdoor dining area or landscaped area with seating) between the building and front property line. This exception does not apply to Shopping Streets under BDC 2.7.3##(C).

b. Fences (except if 3.5 feet or less in height for outdoor patios and dwelling units), storage and parking are not allowed in the front setback.

c. Awnings, marquees, balconies, overhangs, fabric tensile structures, building appendages, or other projections may extend into the front setback.

d. When abutting a shopping street, no front yard setback is required when an entrance to the building is oriented to the front lot line and the building is abutting a sidewalk 10 feet or wider in a public or private street right-of-way.

C. Shopping Street.

1. Properties over 20 acres (including abutting land in common ownership), that contain 10 acres or greater of area with a plan designation of General Commercial (CG), are required to provide a minimum of one "shopping street." The shopping street must be identified and designated at the time of master plan, site plan, land division, and/or annexation with a development application and identified on the plat and development agreement, if applicable. In addition to the required elements in BDC 2.2.500.C.2, a "shopping street" must comply with the following standards:

a. The length of the shopping street must have a minimum block length of 300 feet.

b. Off-street Parking must be located behind the primary structure.

c. Vehicular access is not permitted from a shopping street.

2. The following uses are prohibited on sites abutting a Shopping Street: Residential uses that are not part of a mixed-use development, Automobile Dependent and Automobile Oriented Retail Sales and Services, Drive-In and Drive-Through Facilities, standalone Commercial and Public Parking, and Commercial Storage. Ground-floor residential uses on shopping street frontages are prohibited except ground-floor entrances or breezeways are permitted for housing located above or behind a nonresidential storefront use.

D. Special Standards and Regulations for Certain Uses.

1. Standalone residential uses, including live/work townhome dwelling units, that are not part of a mixed-use development must meet the following standards:

a. Location. Must not be located on a development site that has frontage on a "Shopping Street" or arterial.

b. Density. The minimum residential density standards of the RH Zone apply. There is no maximum density.

c. Development Standards. The following table provides numerical development standards for standalone residential uses, including live/work townhomes that are not part of a mixed-use development.

Table 2.7.XXX

Standards	CG	ME
Minimum lot area	**No minimum**	**No Minimum**
Minimum lot width	**15 feet**	**15 feet**
Minimum front setback (see subsection 2.7.3###.B of this section)	**10 feet**	**None**
Maximum front setback (see subsection 2.7.3###.B of this section)	**10 feet**	**10 feet**
Rear and Side setback	**None**	**None**

d. Design Standards. These standards are in addition to the regulations of BDC Chapter 4.2, Minimum Development Standards Review, Site Plan Review and Design Review, but replace the design standards of the CG zoning district and all the standards in BDC 3.6.200(D), Single-Family Attached Townhomes, BDC 3.6.200(H), Duplex and Triplex Development and BDC 3.6.200(I), Residential Uses within Commercial Districts.

i. Building and Entry Orientation. Each building must provide a primary building entrance oriented to each abutting street.

ii. Transparency. Facades must include transparency/glazing (i.e. glass windows and/or glass doors) totaling a minimum of 25% of the ground level wall area and 20% on the upper level(s) wall area, as shown in Figure XXXX. Ground level wall area includes the exterior wall area up to 10 feet above the finished grade.

Figure XXXXX

iii. Building Articulation. One or more of the following façade treatments must be incorporated on each level of all street-facing facades:

(A) Building offsets (projections or recesses) at least two feet deep and six feet wide;

(B) Upper level balconies (projecting or recessed) at least six feet wide;

(C) Building canopies, awnings, pergolas, architectural sun shade structures, or similar weather protection (minimum projection of four feet for overhead weather protection when located on the ground level and over a sidewalk or other pedestrian space);

(D) Transparency at least five percent greater than the minimum required by subsection 2.7.3###(D)(1)(d)(ii);

(E) Recessed building entries at least six feet wide;

(F) Use of masonry material (i.e. brick, brick veneer, stone, concrete, or stucco) for a minimum of 75% of the total wall area of the street facing façade level as measured from floor-to-floor height, not including windows; and/or

(G) On upper levels, use of two or more façade materials and/or façade colors.

e. Parking. The minimum number of required off-street vehicle parking spaces is established below. The number of parking spaces provided by any particular use in ground surface parking lots must not exceed the required minimum number of spaces provided by Table 3.3.300, Required Off-Street Vehicle Parking Spaces by more than 50 percent. Spaces provided on-street, or within the building footprint of structures, such as in rooftop parking, or under-structure parking, or in multi-level parking above or below surface lots, do not apply toward the maximum number of allowable spaces. Parking spaces provided through “shared parking” also do not apply toward the maximum number.

i. Single-family attached townhome, duplex, triplex, and multifamily residential: 1 space per dwelling unit.

ii. Affordable housing projects in accordance with BDC 3.6.200(C)(1-3). 0.5 spaces per affordable dwelling unit.

f. Open Space. The provisions in BDC 2.1.1000 apply with the following exception:

i. The common open space requirement in BDC 2.1.1000(B)(1) does not apply to any property with a residential building located within one-quarter mile of a public park; and there is a direct, accessible, and maintained trail or sidewalk between the development and the park that does not cross an arterial or collector street.

g. Lots and parcels may have one access point, except as authorized in BDC 3.1.400(F)(4)(c).

2. Live/Work Townhomes. In addition to the applicable standards in 2.7.3###.D.1 above, Live/Work Townhomes must meet the following standards:

a. Residential ground livable space is limited to a maximum of 50 percent of the ground floor square footage, excluding the garage.

b. Residential ground livable space must be located above or behind the commercial space and must not be located adjacent to the street.

c. The ground floor commercial space must have visibility, signage and access from the street.

d. Vehicular alley access is required to preserve the pedestrian orientation of the commercial space.

e. A live/work townhome is allowed instead of, or in addition to, home occupation as defined by this code.

f. The location of lots or parcels where live/work townhomes may be developed must be included with the development application,

g. Live/Work Townhome Lot and Parcel Standards:

i. The lot and parcel requirements of the RM Zone in BDC 2.1.300 and 2.1.500 apply to live/work townhomes, except that the minimum side setback is zero feet.

ii. There is no maximum lot coverage standard for live/work townhomes.

3. Public and Institutional Uses. Public and Institutional Uses are limited to a development site of no more than five acres.

4. Automobile-Oriented and Automobile-Dependent Uses and Facilities. Where permitted, automobile-oriented uses and automobile-dependent facilities must meet all of the following standards. The standards are intended to provide a vibrant, storefront character, slow traffic, and encourage walking and transit use.

a. Drive-In and Drive-Through Facilities. Drive-in and drive-through facilities, such as teller machines, service windows, drop-boxes and similar features associated with the drive-up and drive-through components of restaurants, banks and similar uses, must meet all of the following standards:

i. Primary buildings must meet the front setback requirements in 2.7.3###(B) above.

ii. Drive-up, drive-in, and drive-through drives or lanes must not be located between a building and a public or private street.

iii. Drive-in and drive-through facilities (i.e. drive-through pick up windows) must not be oriented towards a public street.

b. Automobile Services and Gas Station: The following special standards apply to automobile service stations and gas stations:

i. A landscape buffer 10 feet or wider with a mature vegetation height of at least three feet within three years of planting is required between all onsite vehicular circulation areas and the street.

ii. The primary building must meet the minimum building setback requirements in 2.7.3###(B) above.

iii. A minimum of one pedestrian entrance must be oriented to the street.

2.7.3### Mixed Employment Districts (ME).

A. Permitted Uses.

1. All uses permitted or conditionally permitted in Table 2.3.200 except the following, which is prohibited:
   a. Marijuana Wholesale (more than 75% of sales are wholesale).
2. Live/work townhomes.
3. Automobile-Oriented and Automobile-Dependent Uses and Facilities (including uses with a *drive-through).
4. Government facilities where the public is generally not received (e.g., public safety, utilities, school district bus facilities, public works yards, transit and transportation, and similar facilities), on property owned by school district.

B. Special Standards and Regulations for Certain Uses.

1. Residential Uses identified as “L” in Table 2.3.200. Residential Uses identified as “L” in Table 2.3.200, are subject to the limitations set forth in 2.3.200.C. except that commercial or public/institutional uses are only required to occupy at least 75% of the floor area equivalent to the entire ground-floor area of

the development. The commercial or public/institutional uses must be constructed prior to or concurrently with the residential uses.

2. Live/Work Townhomes. Live/Work townhomes must meet the following standards:
   i. Residential ground floor livable space is limited to a maximum of 50 percent of the ground floor square footage, excluding the garage.
   ii. Residential ground floor livable space must be located above or behind the commercial space and must not be located adjacent to the street.
   iii. The ground floor commercial space must have visibility, signage and access from the street.
   iv. Vehicular alley access is required to preserve the pedestrian orientation of the commercial space.
   v. A live/work townhome is allowed instead of, or in addition to, home occupation as defined by this code.
   vi. The location of lots where live/work townhome dwellings may be sited must be included with the development application.
3. Automobile-Oriented and Automobile-Dependent Uses and Facilities (including uses with a *drive-through). Automobile-Oriented and Automobile-Dependent Uses and Facilities. Where permitted, automobile-oriented uses and automobile-dependent facilities must meet all of the following standards. The standards are intended to provide a vibrant, storefront character, slow traffic, and encourage walking and transit use:

   a. Drive-In and Drive-Through Facilities. Drive-in and drive-through facilities, such as teller machines, service windows, drop-boxes and similar features associated with the drive-up and drive-through components of restaurants, banks and similar uses, must meet all of the following standards:
      i. The maximum front setback for primary buildings is 10 feet.
      ii. Drive-up, drive-in, and drive-through drives or lanes must not be located between a building and a public or private street.
      iii. Drive-in and drive-through facilities (i.e. drive-through pick up windows) must not be oriented towards a public street.

2.7.3### Light Industrial Districts (IL).

A. Permitted Uses. All uses permitted or conditionally permitted in Table 2.4.300 except the following which are prohibited:
   1. Heavy Manufacturing, assembly, and processing of raw materials and recycling
   2. Marijuana grow sites and marijuana producing

B. Design Standards. In addition to the applicable standards in BDC 2.4.700, the following design standards apply:

1. Building Entries. Primary building entries must include architectural features such as awnings, projections, recesses, changes in materials or similar features. Entries must also include pedestrian scaled elements including but not limited to lighting and signage.
2. Materials and Design. Durable, quality materials including but not limited to brick, stone, concrete, concrete masonry units, and wood must be included on a minimum of 20% of each façade in order to break up large building facades and create a human scale.
3. Parking. Parking must not be located between the primary structure and a property line abutting an arterial street.

2.7.3### Public Facilities Districts (PF).

A. Permitted and Conditional Uses. All uses permitted or conditionally permitted in Table 2.6.200.

B. Uses under (B)(1) are permitted outright on a community park in the Southeast Area Plan. Uses under (B)(2) may be permitted outright on a community park in the Southeast Area Plan if they comply with BDC 2.7.XXXX(B)(3) :

1. Ball fields, sport complexes, and similar outdoor recreational areas that have night lighting or amplified sound systems
2. Park sites with outdoor amphitheater or facilities for community events such as music or theater performances, and similar events
3. In addition to the applicable criteria contained in Chapter 4.2 Minimum Development Standards Review, Site Plan Review and Design Review the following uses and must comply with these additional standards:
    a. Music performances, or theater performances that use amplified sounds systems are conducted on portions of the park located at least 100 feet from a property line
    b. Outdoor performance facilities such as stages and amphitheaters must face toward property lines that abut the higher classification street.

2.7.3XXX Tree Preservation and Rock Outcropping Standards.

A. Applicability. “The following preservation and landscaping standards are required in addition to the requirements in BDC 3.2, Landscaping, Street Trees, Fences and Walls

B. Tree Preservation. For properties two acres or larger, at least 50 percent of all trees measuring 24 inches or greater or larger stands of trees as measured four feet above the ground (known as DBH, “diameter at

breast height") must be retained on site unless exempted in subsection (C) of this section. The following exceptions are permitted to implement this subsection:

1. Reduction of setbacks up to 30 percent.
2. Reduction of required on-site parking up to 15 percent.
3. Increased lot coverage up to 20 percent.
4. Reduced landscape coverage up to 10 percent.
5. Reduction to lot dimensions, including lot size, by up to 10 percent to preserve individual significant trees or tree groves.

C. Exemptions:

1. Where the minimum density for the zone cannot be met without removing more than 50 percent of the trees with a DBH of 24 inches or greater, after exhausting all available incentives in subsection 1, up to 70 percent may be removed to accommodate the minimum density as demonstrated on the Tree Protection Plan.
2. If a development site contains an individual building larger than 40,000 square feet, more than 50 percent of the trees with a DBH of 24 inches or greater may be removed to accommodate buildings, accessory uses (e.g. ball fields), and required parking as demonstrated on the Tree Protection Plan. Trees not within the building footprint or foot print of the accessory use(s) or required parking must be retained.
3. Trees within an existing public right of way, in existence on the date this code becomes effective (effective date) are not required to be protected under these regulations.

C. Rock Outcrops. Existing on-site rock outcrops, defined as lava rocks or clusters of naturally occurring lava rock that are incorporated into the development's landscaping that do not qualify as Significant Rock Outcrop Areas, may be credited toward meeting the minimum landscape area standards in 3.2.300.C. Credit will be granted based on the total square footage of the preserved rock outcrop area.

D. Significant Rock Outcrop Areas. Significant Rock Outcrop Areas are defined as rocks or clusters of naturally occurring rock that 1) have at least one point a height of at least 8 feet from the surrounding terrain, and 2) are over 3,000 square feet in area.

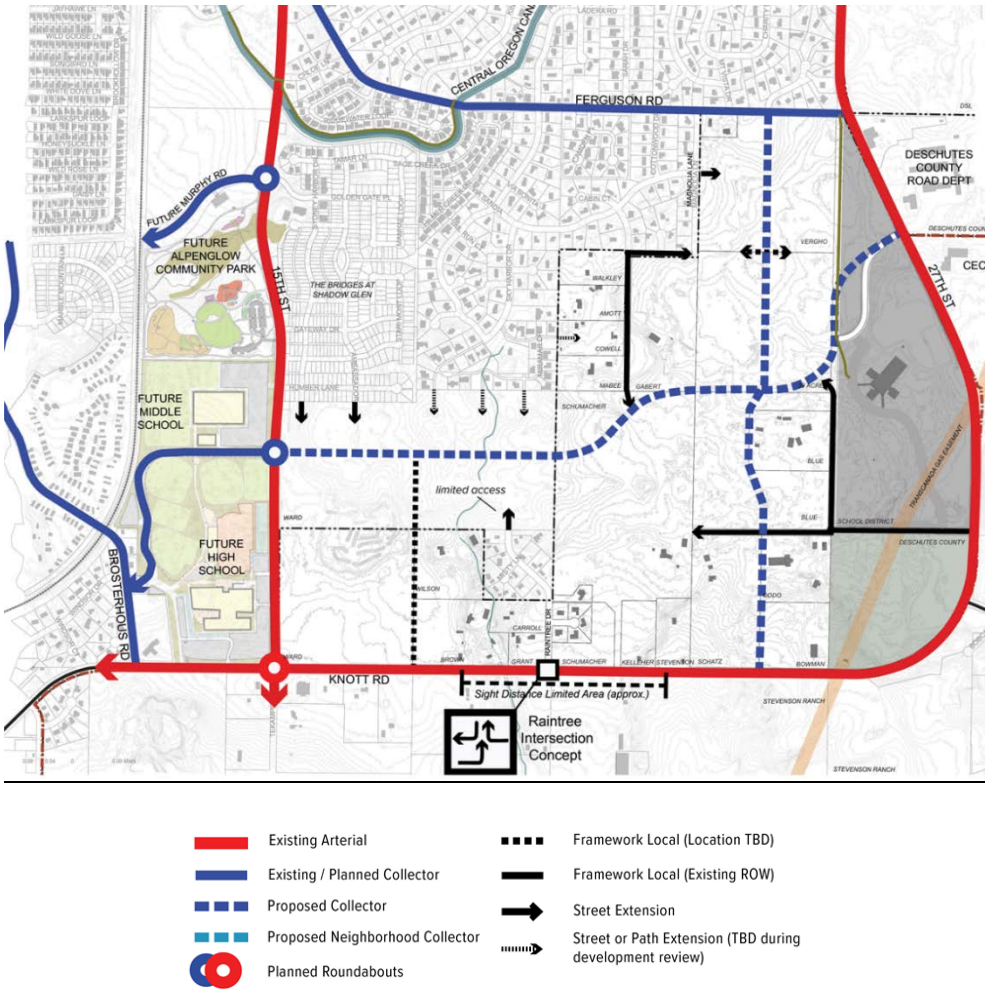
1. Mapping Required. Significant Rock Outcrop Areas must be identified in an inventory and a map, and included with a development application.
2. Protection Standards.
   a. No development may occur in a Significant Rock Outcrop Area except, pedestrian amenities, multi-use trails, and multi-use paths, unless exempted in subsection (D)(1)(4) of this section.
   b. Grading, operation of vehicles and heavy equipment, and storage of supplies and construction materials are prohibited within a Significant Rock Outcrop Area, except as approved in writing by the City for installation of streets and public utilities that are located within public and/or private streets and/or easement. Such approval will only be granted after the City concludes in writing that there is no other reasonable alternative to avoid the protected area. The written approval must include the specific facts that support the conclusion.

3. The City may allow one or more of the following exceptions when a Significant Rock Outcrop Area is preserved:
   a. Reductions of setbacks up to 30 percent.
   b. Reduction of required on-site parking up to 15 percent.
   c. Increased lot coverage up to 20 percent.
   d. For public facilities, an increase in maximum parking by up to 15 percent.
   e. Reduced landscape area requirements. Significant Rock Outcrop Areas may be credited toward meeting the minimum landscape area standards in BDC 3.2.300(C). Credit will be granted based on the total square footage of the preserved area.
4. Exemptions:
   a. If a Significant Rock Outcrop Area exceeds more than three percent of a total development site area, the area in excess of three percent may be developed and is not subject to the Protection Standards in subsection (D)(2).
   b. Where the minimum density for the zone cannot be met without removing significant rock outcrop areas after exhausting all available incentives identified in subsection (D)(3) as demonstrated in an inventory and map. Significant rock outcrop areas not located within the building footprint or foot print of the accessory use(s) or accessory structure(s) must be retained.
   c. Significant rock outcrops located within a public right of way in existence on the date this code becomes effective (insert effective date) not required to be preserved under these regulations.

2.7.3### Collector Street Standards

The Southeast Area Plan includes two new collector streets shown in Figure 2.7. ### Below.

Figure 2.7.####, Street Plan for Southeast Area Plan



The collector street that connects 15th Street and 27th Street is identified as the East-West collector or as SE Caldera Drive. The collector street that connects Ferguson Road to Knott Road is identified as the North-South collector. Each street must be constructed according to the alternative collector standard in Table 2.7.3### The actual location may be different than as shown on this diagram, as long as the connectivity between arterials is maintained, and precise alignments will be determined at Master Plan or Site Plan.

Table 2.7.3##: Alternative Improvement Standards for Dedicated Public Collector Roads

Minimum Right of way	**Minimum travel lane width**	**Planter strips**	**Minimum Turn Lane/Median Island Width (2)**	**Maximum Grade**	**Bike Lanes (5)**	**Direct Site Access (3)**	**Sidewalks Both Sides (4)**	**Curbs**
80’	11’/11.5’	4’ to 6’	13’/10’	6%	6.5’ + 2.5’	Yes	6’ to 8’	Yes

Requirements

1. Travel lanes must be at least 11 feet in width (11.5 feet when opposing flow is immediately adjacent (head on)).

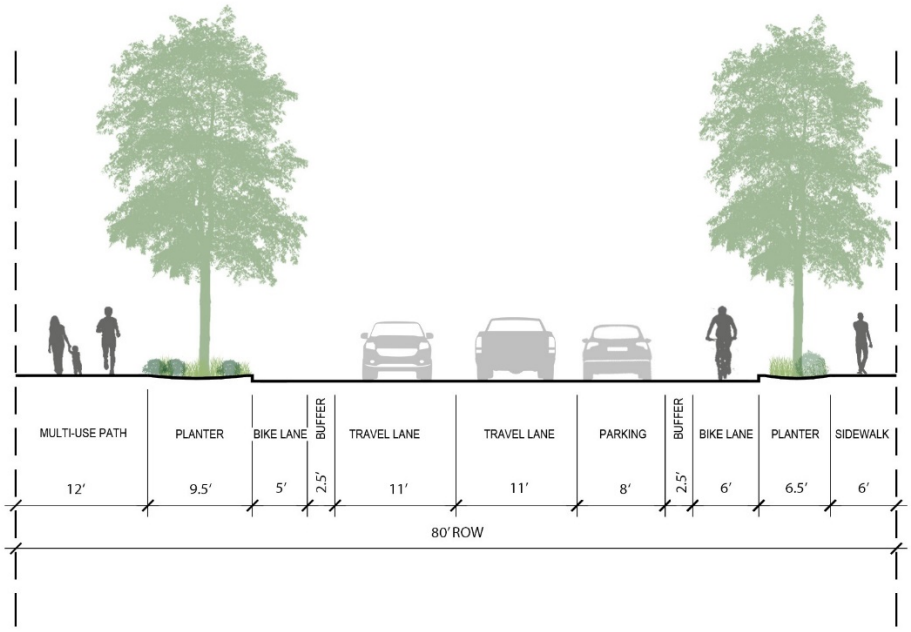
2. The first dimension is the minimum required width of the turn lane while the second dimension applies to the raised median width constructed between intersections.

3. Site access allowed per BDC 3.1.400, Vehicular Access Management

4. A sidewalk is not required on the side of a collector developed under this standard if a multi-use path is provided and is at least 12 feet on one side for two-way travel. This type of path is dedicated for pedestrian and bicycle trips only.

5. Bike lanes must be at least 6.5 feet in width and include a buffer of 2.5 feet for car door opening.

Figure 2.7.####, Cross Section for Alternative Collector Standard



2.7.3### Arterial Street Cross Section Standards for 27th Street and Knott Road

The Southeast Area Plan abuts sections of 27th Street and Knott Road, as shown in Figure 2.7.3## above. The following arterial road standards shall apply to improvements of the sections of 27th Street and Knott Road that abut the Southeast Area Plan.

Minimum Right of way	Minimum Pavement Width	Sidewalk w/Shared Use Path	Planter strips	Bike Lanes	Travel Lane width	Left turn Lane	Median Safety Island
100'	52'	12' (4)	VARIES	6' + 2.5' buffer	11'	13' (1)	10'

Notes:

1. Two-way left turn lanes and safety islands are standard on all arterial and collector roadways unless otherwise permitted through an approved development application. Landscape medians may be required by the City Engineer, when authorized by the Bend Code and Standards and Specifications.

2. Parking is not permitted on arterial streets. Parking on collector streets is permitted as directed by the Bend Development Code.

3. These cross sections provide Level of Stress 1 and 2 for walking and biking, as calculated per the ODOT Analysis and Procedures Manual.

4. Wider pedestrian paths are required by the Transportation System Plan's Low Stress Network and Key Route maps. When matching existing conditions on the corridor or as required by an approved development application, widths may be allowed to vary with approval of the City Engineer.

5. Streets to be constructed at the right of way centerline unless otherwise approved by the City Engineer.

6. Where sidewalks/multi-use paths are constructed outside the right of way, additional dedication of right of way or access easement shall be provided to the appropriate agency for the property where the sidewalk/multi-use path is located.

2.7.3### Bicycle Facilities and Multi-Use Paths

The Southeast Area Plan includes an interconnected network of complete streets that provides safe, optimized travel of all modes. Low Stress Bicycle facilities and Multi-Use Paths will provide connections to schools, parks, destinations, as well as cross-City travel. Multi-Use Paths can be used to provide low-stress facilities through the area. Multi-Use Paths will serve as Primary Trails, as represented in BPRD's Comprehensive Plan, for the Bend Park and Recreation District and will require coordination with the District, as detailed below.

A. All development is subject to standards identified in BDC 3.1.300 Multi-Modal Access and Circulation in addition to the standards established below.
   1. Multi-use paths as shown on Figure X must be developed in conjunction with roadway construction or as part of land division. If no land division precedes or accompanies site development, construction of the path must occur with site development.
   2. Multi-use Path Locations.
      a. Multi-use paths will be located in the general alignment as shown on Figure X. The paths may be incorporated into a roadway design. The actual location will be approved by the City through the development review process, and in consultation with the Bend Park and Recreation District where applicable, in order to accommodate site development, minimize grade, accommodate street crossings and other safety issues, and to fit the context of the natural terrain and topographic/geographic constraints.

b. Multi-use paths can be constructed in place of a sidewalk, at a minimum of 6 feet from the curb.

3. Multi-use paths must be a minimum of 10 feet in width.

4. Multi-use paths developed outside of the right-of-way must be located within a 20-foot wide easement and be dedicated to the appropriate public agency as part of the following applicable development application. See Figure X for multi-use paths that will be owned and maintained by the Bend Park and Recreation District (BPRD).

   i. Site Plan Review applications. The easement must be granted to the appropriate agency prior to final occupancy.

   ii. Land Division Applications. The easement must be granted to the appropriate agency and shown on the final plat, prior to recording.

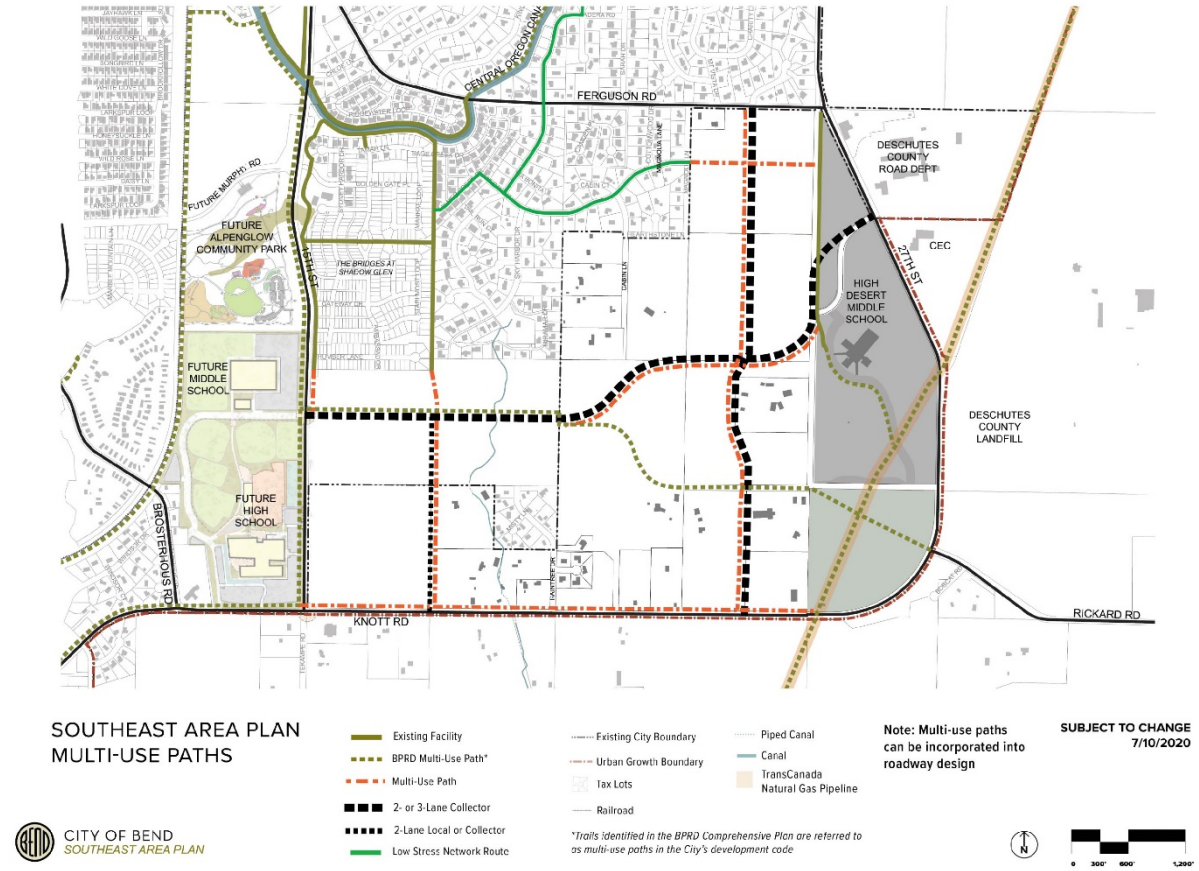
5. Multi-use path easements may be used to meet either open space requirements for a master plan under BDC 4.5 or landscaping for a site plan review under BDC 4.2.

B. Enhanced crosswalks, where identified by the City, must be provided to complete the walking and bicycling networks.

C. Multi-Use Paths must be developed and constructed as a paved surface and to a minimum of 10 feet in width and as a low-stress facility in accordance with the ODOT Analysis and Procedures Manual. Where approved by the City, multi-use paths may be located in place of the sidewalk and must be located at minimum of six feet from the roadway travel lanes. See alternative collector standard in Figure X.

Multi-Use Path surfaces must conform to accessibility requirements. Asphalt, brick/masonry pavers, or other durable surface that makes a smooth surface texture, and conforms to accessibility requirements, may be allowed as determined by the City.

Figure 2.7.####, Multi-Use Paths in Southeast Area Plan



***

Chapter 2.8

URBANIZABLE AREA DISTRICT (UA)

2.8.100 Purpose and Applicability.

A. Purpose. The Urbanizable Area (UA) District is intended to preserve large areas of undeveloped or rural land for future urban development prior to annexation. The UA District promotes the livability, stability, safety and improvement of the City of Bend by allowing orderly development consistent with the Bend Comprehensive Plan.

B. Applicability. The provisions of the UA District apply to all land inside the Urban Growth Boundary but outside the City limits, except for the land withdrawn from the City of Bend by the County by City Resolution 2459.

The UA District will automatically be removed upon annexation to the City and the zoning that implements the Bend Comprehensive Plan designation for the property will apply.

C. Development Applications

1. Area and Master Planning. The City has the authority to process area plans under BDC Chapters 4.1, Development Review and Procedures, and 4.6; Land Use District Map and Text Amendments (Type IV process),master plans under BDC Chapters 4.5, Master Planning and Development Alternatives and 4.6; Land Use District Map and Text Amendments (Type III process); land divisions and site plan review applications in the UA District prior to annexation. However, development of the property with the uses authorized by the area or master plan may only occur after annexation.

2. The City has the authority to process development applications for uses authorized in BDC Table 2.8.200, Permitted Land Uses and for land divisions consistent with Table 2.8.300, Lot Area and Dimensions.

***

Chapter 4.1

DEVELOPMENT REVIEW AND PROCEDURES

***

4.1.1325 Modification of Approval.

A. An approval may be modified at any time after a decision becomes final.

B. Modification Review Procedures.

1. A modification that does not have significant additional impacts on surrounding properties must be reviewed only under the criteria applicable to the aspect(s) of the proposal that are to be modified.

2. A modification that has significant additional impacts on surrounding properties must be reviewed under all criteria applicable to the entire approval and may, at the discretion of the City, require the filing of a new application.

3. A modification must not be considered to have significant additional impacts on surrounding properties if the identified impacts could be addressed under the applicable provisions of this code at the time of future development (e.g., a future site plan review or conditional use permit application).

4. A modification that is a new proposal must be filed as a new application.

C. An application for a modification of a Type I approval must be processed as a Type I application. All other modifications must be processed as a Type II application unless elevated to a Type III process by the Development Services Director.

D. The original approval time limitation is governed by BDC 4.1.1310.

E. Modifications of development approvals must meet the approval criteria required in subsection (B) of this section in the appropriate corresponding section of this code (e.g., modification of a site plan review approval is subject to BDC Chapter 4.2; modification of a conditional use permit is subject to BDC Chapter 4.4, modification of a master plan, area plan or special planned district is subject to the applicable sections in BDC Chapter 4.5). For modifications of a master plan, PUD or special planned district approved under land use regulations in place prior to April 14, 2017, see subsection (F) of this section.

F. Modifications of a master plan, PUD or special planned district approved under land use regulations in place prior to April 14, 2017, must meet the approval criteria required in subsection (B) of this section in one of the following sections in BDC Chapter 4.5, Master Planning and Development Alternatives:

1. The modification of a master plan, PUD or special planned district that is primarily for residential uses is subject to the applicable approval criteria in BDC 4.5.200(D).

2. The modification of a master plan, PUD or special planned district that is primarily for institutional uses is subject to the applicable approval criteria in BDC 4.5.300(E).

3. The modification of a master plan, PUD or special planned district that is primarily for employment uses is subject to the applicable approval criteria in BDC 4.5.400(D).

***

CHAPTER 4.2

MINIMUM DEVELOPMENT STANDARDS REVIEW, SITE PLAN REVIEW AND DESIGN REVIEW

****

4.2.500 Site Plan Review.

***

D. Site Plan Review Approval Criteria. The City shall approve, approve with conditions, or deny the proposed Site Plan Review application based on the following criteria:

***

9. The proposal is in substantial conformance with any applicable approved master plan, master facilities plan, refinement plan, area plan and/or special planned district.

CHAPTER 4.3

SUBDIVISIONS, PARTITIONS, REPLATS AND PROPERTY LINE ADJUSTMENTS

****

4.3.300 Tentative Plan.

***

E. Criteria for Subdivision, Partition or Replat Approval. The Review Authority shall not approve a tentative plan for a proposed subdivision, partition or replat unless the Review Authority finds that the subdivision, partition or replat will satisfy the following criteria of approval:

***

9. The proposal is in substantial conformance with any applicable approved master plan, master facilities plan, refinement plan, area plan, and/or special planned district.

***

Chapter 4.5
MASTER PLANNING AND DEVELOPMENT ALTERNATIVES

***

4.5.100 Master Plan General Provisions.

F. Modifications to Approved Area Plan, Master Plans, PUDs and Special Planned Districts.

1. The following modifications to a master plan, area plan, PUD or special planned district may be approved with a land division or with an application in compliance with BDC Chapter 4.2, Minimum Development Standards Review, Site Plan Review, and Design Review, unless the Development Services Director elevates the application to the Planning Commission for hearing as a Type III application.

***

4.5.200 Community Master Plan.

A. Purpose. The community master plan is intended to provide complete neighborhoods with varied housing options, services, and amenities needed for daily living, including public schools, parks and open spaces, shops, and services, all within a convenient walking or biking distance. The community master plan is also intended to provide convenient access to public transportation and employment areas.

B. Applicability.

1. Community master plans in conformance with this section may be submitted for any property or combination of properties three acres or larger in size.

2. Community master plans are required for any property or combination of adjacent properties under common ownership totaling 20 acres or larger unless exempted below.

a. Exemptions.

i. When a property is 40 acres or larger and is part of a proposed land division or property line adjustment application where all the proposed lots/parcels will be 20 acres or larger, a community master plan will not be required until further development is proposed for the newly created lots/parcels; however, lots or parcels smaller than 20 acres may be created and developed prior to an approved community master plan application if they are intended for schools and/or parks.

ii. When a property is 20 acres or larger and a majority of it includes an existing development (e.g., golf course), a community master plan will not be required unless there are two land division applications submitted of the parent property within a five-year period. A community master plan will be required to be processed prior to submitting the second land division application during the five-year period.

iii. The City determines that the master plan category is an institutional master plan or employment master plan.

iv. The property is part of a special planned district in BDC Chapter 2.7, Special Planned Districts, Refinement Plans, Area Plans and Master Plans. Properties that are part of an approved Area Plan must comply with the approval criteria of this Chapter in addition to the land division or Site Plan Review criteria at the time of development.

v. The property is part of a master plan or planned unit development approved prior to April 14, 2017, and remains in effect or has initiated the use according to BDC 4.1.1315.

***

4.5.300 Institutional Master Plan.

A. Purpose. The institutional master plan is intended to facilitate an efficient and flexible review process for development of institutions which control large areas of land within the City, contain a greater intensity of development than surrounding areas, are a source of substantial employment, and are usually located adjacent to residential neighborhoods. An institutional master plan is intended to permit flexibility, while providing a level of understanding by the community and neighboring properties about the future growth of the institution.

B. Applicability.

1. Institutional master plans in conformance with this section may be submitted for any property or combination of properties three acres or larger in size.

2. Unless exempted below, institutional master plans in conformance with this section are required for any property or combination of adjacent properties under common ownership at the date of adoption of this code for the following:

   a. Institutions of higher education: 10 acres or larger.

   b. All other institutions: 20 acres or larger.

3. Exemptions. Unless the applicant elects to apply for an institutional master plan, the following are exempt:

   a. The property is part of a special planned district in BDC Chapter 2.7, Special Planned Districts, Refinement Plans, Area Plans and Master Plans. Properties that are part of an approved Area Plan must comply with the approval criteria of this Chapter in addition to the land division or Site Plan Review criteria at the time of development.

   b. Cemeteries and public maintenance facilities in existence prior to 2016.

   c. The City determines that the master plan category is a community master plan or employment master plan.

***

4.5.400 Employment Master Plans.

A. Purpose. The employment master plan is intended to provide a method by which the City may permit a variety of commercial and/or industrial development types, designs or arrangements that may not be permissible under traditional zoning regulations yet still provide for the ability to plan for full build-out of large employment centers. The employment master plan will provide a mechanism to achieve development which will contribute to the diversification of the City's economic base.

B. Applicability.

1. Employment master plans in conformance with this section may be submitted for any property or combination of properties three acres or larger in size.

2. Employment master plans in conformance with this section are required for any property or combination of adjacent properties under common ownership totaling 20 acres or larger at the date of adoption of this code, unless exempted below.

3. Exemptions. Unless the applicant elects to apply for an employment master plan, the following are exempt:

   a. The property is part of a special planned district in BDC Chapter 2.7, Special Planned Districts, Refinement Plans, Area Plans and Master Plans. Properties that are part of an approved Area Plan must comply with the approval criteria of this Chapter in addition to the land division or Site Plan Review criteria at the time of development.

   b. The City determines that the master plan category is a community master plan or institutional master plan.

***

Chapter 4.9
ANNEXATIONS

***

4.9.300 Review Procedures

A. Annexation. The following general processes apply to all annexation proposals:

1. Annexations are reviewed using the Type III or Type IV process as determined by the City, based on a consideration of the factors for treating an application as quasi-judicial or legislative. Since annexations are a jurisdictional transfer, the City Council is the sole review authority.
2. City Council approval of annexations will be by ordinance.
3. Notice of the City Council hearing to consider the annexation proposal must follow the notification process required for the Type III or Type IV application, except a notice of the hearing must be published in a newspaper of general circulation in the City once each week for two successive weeks

prior to the day of hearing, and notices of the hearing must be posted in four public places in the City for a like period.

B. ~~Area and Master Planning~~ ~~Land Use Approval~~ Development Review Requirements.

1. Unless exempted in subsection (B)(1)(a) of this section, expansion areas as shown in Figure 4.9.300 will require ~~area and/or master plan~~ land use approval in accordance with Table 4.9.300 prior to or concurrently with annexation. For properties located within an approved Area Plan, also see subsection (B)(2) of this section. The exemptions to master planning in BDC Chapter 4.5, Master Planning and Development Alternatives, are not applicable to properties in the Urbanizable Area (UA) District. ~~Development in expansion areas must comply with the applicable Bend Comprehensive Plan Specific Expansion Area Policies in Table 4.9.300.~~

a. ~~1.~~ Exemptions from Area and Master Planning.

i. ~~a.~~ Land not subject to an area plan or master plan as shown in Figure 4.9.300, Expansion Areas.

ii. ~~b.~~ Public elementary schools on lots or parcels smaller than 20 acres. Notwithstanding BDC 3.4.400(A), an interim septic system may be installed if approved by the Department of Environmental Quality and the School District agrees to connect to the sewer system when it becomes available. Applicant must submit the following in addition to the requirements of BDC Chapter 4.7, Transportation Analysis:

(A) ~~i.~~ An analysis of walking, biking and transit facilities to destinations within the UGB for a distance of one mile from the boundary of the school site along and across arterial and collector roadways to accommodate safe, accessible and convenient access to and from the school. Based on the analysis, the City may require, through an annexation agreement or other binding mechanism, improvements to ensure safe and accessible paths of travel to and from the school, which may include walking, biking, provision of transit stops and/or accessibility improvements, including compliant curb ramps along the access routes.

iii. ~~c.~~ City-initiated annexations of property intended for uses such as publicly owned rights-of-way or City-initiated annexation of additional lands brought into the Urban Growth Boundary

for affordable or market rate housing, in programs such as authorized under Oregon House Bill 4079, or other specified uses as authorized by Oregon statute.

iv. Annexation and development of individual properties or groups of properties of any size located within the Northeast- Butler Market Village Expansion Area but outside of the Petrosa Master Plan.

v. For areas subject to these exemptions, an applicant~~s may~~ must submit ~~annexation and~~ a development ~~applications for processing~~ proposal for the entirety of the annexation area ~~concurrently~~ under the anticipated zoning district prior to annexation for evaluation of compliance with the applicable approval criteria (e.g., a Site Plan Review proposal is subject to BDC Chapter 4.2.500.D and a land division is subject to BDC 4.300.E)) and Specific Expansion Area Policies in the Bend Comprehensive Plan Chapter 11, Growth Management. ~~Any development approvals will be final decisions for processing purposes but will not be effective until completion of annexation.~~

2. Properties located within an approved area plan must comply with the following prior to or concurrently with annexation:
   a. An applicant must provide a development proposal (e.g., Site Plan Review or land division) for the entire property for evaluation of compliance with the applicable approval criteria (e.g., a Site Plan Review proposal is subject to BDC Chapter 4.2.500.D and a land division is subject to BDC 4.3.300.E), and Specific Expansion Area Policies in the Bend Comprehensive Plan Chapter 11, Growth Management.
   b. In lieu of a master plan application for any property or combination of adjacent properties under common ownership totaling 20 acres or larger, the applicable master plan approval criteria in BDC Chapter 4.5, Master Planning and Development Alternatives will be assessed along with the approval criteria of the respective development proposal cited above in subsection (2)(a).
3. Final procedural steps and decision issuance for concurrent development applications will occur immediately after the annexation becomes effective.

Figure 4.9.300

Expansion Areas

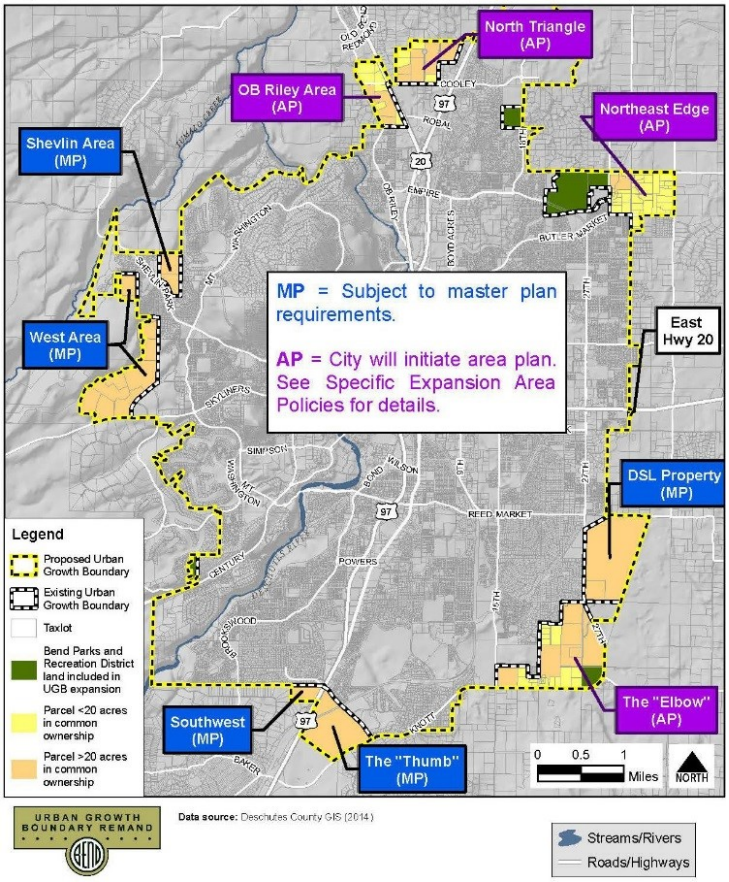


Table 4.9.300 – Specific Expansion Area Policies and Land Use Approval Requirements

Expansion Area	Bend Comprehensive Plan Specific Expansion Area Policies	Land Use Approval Required Prior to or Concurrently with Annexation
Northeast – Butler Market Village	11-56 through 11-63	~~Property located outside of the Petrosa Master Plan will require a Site Plan Review and Design Review site plan or land division proposal that demonstrates how the entire property will be developed.~~ See BDC 4.9.300(B)(1)(a)(iv)
East Highway 20	11-64	See BDC 4.9.300(B)(1)(a)(i)

Expansion Area	Bend Comprehensive Plan Specific Expansion Area Policies	Land Use Approval Required Prior to or Concurrently with Annexation
DSL Property	11-65 through 11-74	Master plan in compliance with BDC Chapter 4.5, Master Planning and Development Alternatives.
The Elbow	11-75 through 11-84	Southeast Area Plan approved. See BDC 4.9.300(B)(2).
The Thumb	11-85 through 11-91	Master plan in compliance with BDC Chapter 4.5, Master Planning and Development Alternatives.
Southwest	11-92 through 11-99	Master plan in compliance with BDC Chapter 4.5, Master Planning and Development Alternatives.
West Area#3	11-100 through 11-108	Master plan in compliance with BDC Chapter 4.5, Master Planning and Development Alternatives.
~~Shevlin Area~~	~~11-109 through 11-115~~	~~See BDC 2.7.3XXX, Shevlin Area Master Plan~~
OB Riley Area	11-116 through 11-121	Area plan in compliance with BDC 2.7.100. Prior to completion of the Area Plan, annexations in this area must be a minimum of 40 contiguous acres and be the subject of a master plan application which includes a framework level area plan for the rest of the subarea. Following adoption of the area plan, annexation and development of individual properties or groups of properties of any size, consistent with the Area Plan, may be approved.
North Triangle	11-122 through 11-131	Area plan in compliance with BDC 2.7.100. Prior to completion of the Area Plan, annexations in this area must be a minimum of 40 contiguous acres and be the subject of a master plan application which includes a framework level Area Plan for the rest of the subarea. Following adoption of the Area

Expansion Area	Bend Comprehensive Plan Specific Expansion Area Policies	**Land Use Approval Required Prior to or Concurrently with Annexation**
		Plan, annexation and development of individual properties or groups of properties of any size, consistent with the Area Plan, may be approved.