KITTELSON & ASSOCIATES
101 S CAPITOL BOULEVARD, SUITE 600
BOISE, ID 83702
P 208.338.2683 F 208.338.2685

DRAFT MEMORANDUM

Date:	July 22, 2020	Project #: 23858
To:	Project Management Team	
From:	Mark Heisinger, EIT, Russ Doubleday, Nick Foster, AICP, RSP, and Matt Hughart, AICP; Kittelson & Associates Andrew Holder, Margot Halpin, Chris Weaver, and Mike Faha; Greenworks CJ Doxsee and Matt Hastie, AICP; Angelo Planning Group	
Project:	City of Ontario, Active Transportation Update and East Idaho Avenue Refinement Area Plan	
Subject:	Technical Memo #6: Draft Design Concepts	

This memorandum is part of the City of Ontario's update to its 2006 Transportation System Plan (TSP). This memorandum presents the draft design concept and proposed land use metrics for the East Idaho Avenue Refinement Area, proposed revisions and guidance for City street standards, and potential improvement areas to walking and biking routes to Ontario schools.

EAST IDAHO AVENUE REFINEMENT AREA

This section presents the draft design concept for the East Idaho Avenue Refinement Area, which includes East Idaho Avenue from the I-84 westbound ramp terminal intersection to the Snake River, and the adjacent commercial areas.

Existing Conditions

Technical Memorandum #2: Baseline Transportation Assessment (Reference 1) includes existing traffic operations and crash history analyses along the East Idaho Avenue corridor. Key findings from that analysis include:

- All study intersections meet ODOT and City mobility targets.
    - The most congested intersections in the study area are the East Idaho Avenue/East Lane and East Idaho Avenue/Goodfellow Street intersections, with volume-to-capacity (v/c) ratios of 0.80 and 0.83, respectively, during the PM peak hour.
- The East Idaho Avenue/Goodfellow Street and East Idaho Avenue/East Lane intersections both have crash rates higher than the 90th percentile crash rate for similar intersections in Oregon.
    - Crash activity at the East Idaho Avenue/Goodfellow Street was primarily in center of intersection (angle/turning) and on east/west approaches (rear-ends).

    - The East Idaho Avenue/East Lane intersection experienced the highest number of crashes in the study area; the highest number of rear-end crashes are on the eastbound approach and the majority of injury crashes are rear-end crashes.
- East Idaho Avenue has sidewalks and bike lanes within the Refinement Area, but it still has high pedestrian and bicycle levels of traffic stress due to high motor vehicle volumes and speeds.

Planned Intersection Projects

ODOT has developed concepts at the East Idaho Avenue/Goodfellow Street and East Idaho Avenue/East Lane intersections to improve intersection capacity and queue management. The concept at the East Idaho Avenue/East Lane intersection includes dual westbound left-turn lanes, dual receiving lanes on the south leg of the intersection, and extended eastbound left-turn lane storage back to the Goodfellow Street intersection. The concept at the East Idaho Avenue/Goodfellow Street intersection includes extended westbound left-turn lane storage back to the East Lane intersection. Figure 1 illustrates the concepts.

There is no timeline for when the concepts might be constructed. A sensitivity test of future traffic operations shows that both intersections are expected to reach ODOT mobility targets between year 2025 and year 2030. The sensitivity test assumed that traffic volumes would grow at an annual average growth rate of 3.3 percent. This growth rate was developed from historical automatic traffic recorder data on I-84, just south of East Idaho Avenue.

Not shown on the concept are potential low-cost strategies to reduce crashes at the intersections. Some potential strategies to consider include:

- Coordinating the signals (*our understanding is ODOT is currently considering this*)
- Converting the left-turn signals onto Goodfellow Lane to protected-only phasing
- Adding high visibility backplates to the signals on East Idaho Avenue

Draft Design Concept

The planned intersection improvements on East Idaho Avenue and the availability of ODOT right-of-way south of the roadway, present an opportunity to implement upgrades outside the roadway that would benefit people walking and biking and enhance the identity of Ontario. Figure 1 shows the draft design concept for the East Idaho Avenue Refinement Area. The concept includes a shared-use path south of the road, gateway treatments, future connections to the planned trail along the Snake River, and an overlook of the river. Enlargements of the Goodfellow Lane and East Lane intersections and the Snake River overlook area are included in Attachment “A.”

HOME DEPOT

WALMART

BEST WESTERN

ONTARIO MARKETPLACE

QUALITY INN

GOODFELLOW ST

NE EAST LN

MOVE ROAD BARRIER TO CREATE 10' WIDE SEPARATED SHARED-USE PATH ON BRIDGE (EXISTING CONDITION IS ON-STREET BIKE LANE AND SEPARATED SIDEWALK)

SHARED-USE PATH BECOMES STANDARD SIDEWALK AND ON-STREET BIKE LANE AT END OF BRIDGE

FUTURE FOOTBRIDGE OVER SLOUGH

CONNECTION BETWEEN SIDEWALK AND FUTURE RIVERFRONT TRAIL

SNAKE RIVER

84

30

E IDAHO AVE

EAST LN INTERSECTION ENLARGEMENT

GOODFELLOW ST. INTERSECTION ENLARGEMENT

OHL

TRAIL JUNCTION ROUNDABOUT

OVERLOOK

FUTURE RIVERFRONT TRAIL

TRAIL JUNCTION AND OVERLOOK ENLARGEMENT

MOVE ROAD BARRIER TO TO CREATE 12' WIDE SEPARATED SHARED-USE PATH ON OVERPASS (EXISTING CONDITION IS ON-STREET BIKE LANE AND SEPARATED SIDEWALK)

PRIMARY GATEWAY ELEMENT, VISIBLE FROM BOTH E. IDAHO AVE. AND I-84 WESTBOUND

EASTBOUND ON-STREET BIKE LANE REPLACED BY 12' WIDE SHARED-USE PATH

WALGREENS

SIDEWALK AND EASTBOUND ON-STREET BIKE LANE REPLACED BY 12' WIDE SHARED-USE PATH

EXISTING STORMWATER SWALE, ENHANCED

BIG 5

AARON'S

WINCO

MARSHALLS

DOLLAR TREE

OREGON DHS

WATER TREATMENT PLANT

LEGEND

TYPE 1 LANDSCAPE: ENHANCED IRRIGATED PLANTING

TYPE 2 LANDSCAPE: BASIC IRRIGATED - STREET TREES & PLANTS OR GRAVEL MULCH

TYPE 3 LANDSCAPE: NON-IRRIGATED FIELD GRASS

TYPE 4 LANDSCAPE: STORMWATER TREATMENT AREA PLANTING

PROPOSED STREET TREE

EXISTING STREET TREE

PRIMARY GATEWAY ELEMENT

SECONDARY GATEWAY ELEMENT

PROPOSED SHARED-USE PATH

FUTURE RIVERFRONT TRAIL

N

0 75 150 300

SCALE: 1" = 150'

Figure 1

OVERALL PLAN

EAST IDAHO AVENUE REFINEMENT AREA PLAN

Oregon Department of Transportation

ONTARIO Where Oregon Begins...

KITTELSON & ASSOCIATES, INC. TRANSPORTATION ENGINEERING/PLANNING

GREENWORKS

07.22.2020

Shared-Use Path

The primary upgrade proposed is to remove the eastbound bike lane from East Idaho Avenue and replace it with a shared-use path running through the publicly owned tracts on the south side of the road. Since East Idaho Avenue has high traffic volumes and traffic speeds, this off-street path will be more comfortable to a wider range of people biking than the existing on-street bike lane. It will also be more attractive to people walking since it is further from the busy road.

The shared-use path will create a key connection to a future riverfront trail along the Snake River, adding to the riverfront trail's planned connectivity to parks, natural areas, and other future trails around Ontario. The junction of the shared-use path with the riverfront trail will create a node that is a natural gathering and rest spot, and being on a higher terrace next to the river, it is an opportunity to create a scenic overlook.

To make the new shared-use path most effective, it should extend across both the I-84 overpass and the Highway 30 bridge across the Snake River. This will increase connectivity between the East Idaho Avenue Refinement Area and the rest of Ontario and Fruitland. It will also set the stage for similar improvements in the future beyond this corridor. Currently both bridges have on-street eastbound bike lanes plus sidewalks separated from the road by concrete barriers. Based on the information available, it appears that by moving the barriers toward the centerline (leaving 2 feet shy distance to the vehicular lanes) there will be room for a 12 feet wide shared-use path on the I-84 overpass, and a 10 feet wide shared-use path on the Snake River bridge, both separated from traffic by the barriers.

Gateway

East Idaho Avenue is the route many take to enter and leave Ontario and the State of Oregon, and I-84 crosses under East Idaho Avenue shortly after it enters Oregon. As such, the East Idaho Avenue Refinement Area is a highly visible opportunity to create a gateway that welcomes visitors (and returning residents) to the City and the State, as well as to create a strong visual identity for Ontario.

Gateways can take many forms, such as arches, columns, walls, banners, signage, special planting, sculpture, or combinations of these elements. A gateway may occupy a single spot or may consist of repeated elements along a route. Gateways are an opportunity to display public art, to highlight the unique local character, and to express civic pride.

Because of the major entry moments at either end of the East Idaho Avenue Refinement Area, we propose creating a series of gateway features that span the whole corridor. Primary gateway features would be prominently displayed near the toe of the Snake River bridge and at the east end of the I-84 overpass. The feature at the I-84 overpass would be visible both from East Idaho Avenue and from I-84 westbound. Between the primary gateway features, there would be several secondary gateway features along the south side of E. Idaho Ave. These secondary features would be smaller and simpler, but of the same theme and materials as the primary gateway features. Taken together, the series of

gateway elements can create a visual identity that ties the East Idaho Avenue Refinement Area together and expresses Ontario's character on a large scale.

Potential locations for gateway elements are shown in Figure 1 and in the draft design enlargements in Attachment "A." Descriptions and examples of gateway precedents are shown in Attachment "B."

Land Use

The project team has evaluated potential land-use strategies and metrics for the study area. A full memorandum summarizing this work is included as Attachment "C." This section summarizes the findings from the memorandum and how they support the draft design concept for the East Idaho Avenue Refinement Area.

Land use designations can influence how transportation facilities are designed and how they interact with the rest of the built environment. Land use metrics can be used as tools to assess the connection between land use and transportation facilities. The memorandum recommends land use metrics for the East Idaho Avenue Refinement Area that gradually increase the urbanization of the area to current conditions by increasing the efficiency of land use and transportation resources. The recommended land use metrics are as follows:

- **Setbacks**: Reduce the average distance between the primary business or building entrance(s) and the nearest sidewalk of bicycle facility.
- **Building Orientation**: Increase the percent of buildings with a direct pedestrian or bicycle connection to the nearest street or associated bicycle or pedestrian facility.
- **Land Use Mix**: Increase the mix of land uses within and among structures in neighborhood-oriented centers and community commercial centers.
- **Building, Pathway, & Parking Coverage:** Reduce the relative percentage of on-site parking areas and/or increase the relative percentage of on-site building coverage.
- **Parking Location**: Reduce the amount of parking located between the building and the street.
- **Block Size**: Reduce the overall block size and secondary or parallel street connections. Where reductions in block sizes are not feasible, increase internal connections through private shopping streets that contribute to smaller block sizes.

The memorandum also provides recommendations for potential code amendments. The amendments aim to increase the connection between land use and transportation by incorporating pedestrian-oriented development designs. The recommended code amendments are as follows:

- **Parking Location Requirements.** Zoning ordinance provisions can require parking to be located on the side or rear of buildings. Removing parking from the front of a store provides pedestrians with a safe, unobstructed path from a sidewalk to a building entrance.
- **Enhanced Landscape Standards.** Enhanced landscaping standards, including for parking areas can be applied to new development or redevelopment. Landscaping should be provided between parking areas and adjacent pathways and streets to provide separation.

Minimum landscape requirements should be applied to the interior portion of large parking areas. Interior landscaping improves the appearance of parking lots, provides much needed shade (particularly important in Eastern Oregon's warm climate), and creates options and/or incentives for low impact development approach (LIDA) stormwater facilities.

- **More Efficient Use of Parking.** Reducing the minimum parking requirements allows commercial developers the opportunity to use less space for parking and/or to construct other buildings for other uses or businesses. It also helps reduce the overall cost of construction. Implementing parking maximums with the flexibility to grant modifications to the standards would discourage builders from over-parking their sites and would encourage a closer study of parking supply and demand.
- **Mixed-use Areas.** Multi-family housing in commercial areas can be permitted to allow residents to reduce car travel for all daily activities, as well as prime location for senior housing. The C2H zone can be amended to allow high density residential and mixed commercial/residential uses as a conditional use.
- **Enhanced Pedestrian Connections.** Provisions could require pedestrian walkways through sites, connecting building entrances, and the public sidewalk, with safe crossings of streets, drives, and parking areas. The zoning ordinance can be amended to require development of internal bicycle and pedestrian connections and/or the creation of internal private streets that mimic public streets to increase overall connections.

STREET STANDARDS REVISIONS

The City's 2006 Transportation System Plan defines cross-sectional street standards for different roadway functional classifications. They are shown in Attachment "D." The street standards relate the design of the roadway to its desired function. This section contains proposed updates to the street standards to incorporate best practices for active transportation accommodation. The proposed updates are based on the recommendations and guidance of the following resources:

- ODOT's *Bicycle and Pedestrian Design Guide* (Reference 2)
- National Association of City Transportation Official's (NACTO) *Urban Bikeway Design Guide* (Reference 3)
- Oregon Transportation and Growth Management (TGM) Program's *Transit in Small Cities Primer* (Reference 4)
- ODOT's *Blueprint for Urban Design* (Reference 5)

The proposed revisions also include guidance for green street treatments, as described in this section.

Proposed Updates

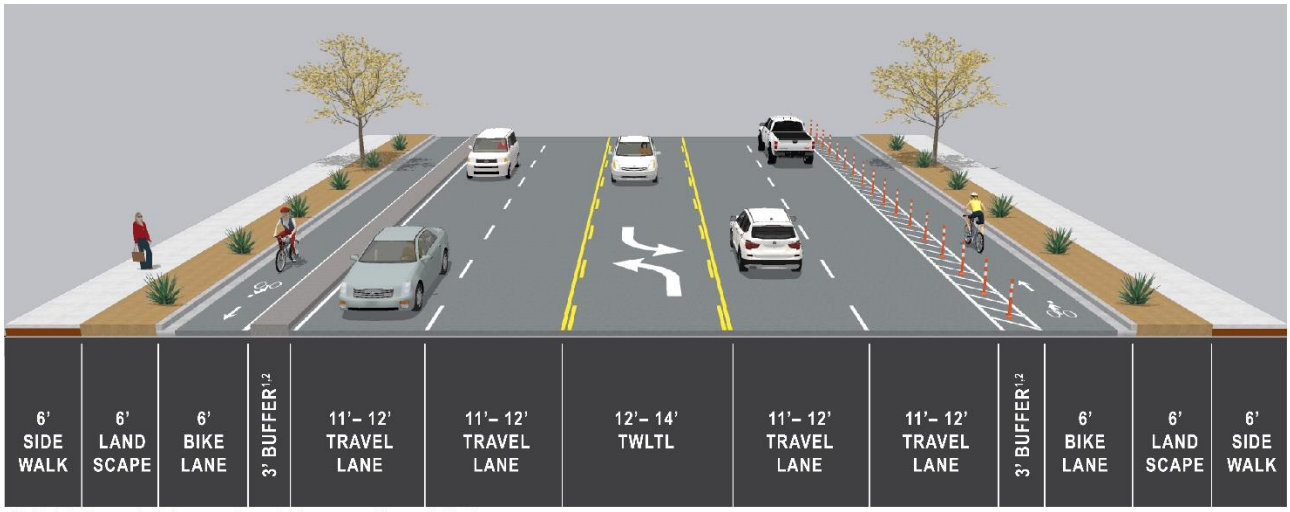
The proposed updates to the City's cross-sectional street standards are focused on active transportation facilities, but they also incorporate other recommended changes as per the reference documents listed previously. Figures 2-10 show the proposed cross-section standards. Table 1 lists the proposed updates by roadway functional classification. These cross-sections would be used to inform

the design of new or reconstructed roadways in the city, especially in regard to active transportation facilities.

Table 1 Proposed Street Standard Updates

Roadway Functional Classification	Proposed Updates
Principal Arterial and Five-Lane Minor Arterial	• Replace conventional bike lane with a separated bike lane or shared use path. • Change travel lane width from 12 feet to a range of 11 feet to 12 feet. • Change two-way-left-turn-lane (TWLTL) width from 14 feet to range of 12 feet to 14 feet.
Three-Lane Minor Arterial	• Increase bike lane width from 5 feet to 6 feet • Add 3-foot wide painted buffer between bike lane and outside travel lane • Change travel lane width from 12 feet to a range of 11 feet to 12 feet. • Change two-way-left-turn-lane (TWLTL) width from 14 feet to range of 12 feet to 14 feet.
Collector with Bike Lanes	• Same as Three-Lane Minor Arterial, but painted buffer shown as optional
Neighborhood Collector	• Keep as is - add additional cross-section for "Neighborhood Collector with Bike Lanes"
Local Streets	• Keep as is – add additional cross-section for local streets that are designated bikeways
Skinny Local Streets	

The proposed updates shown in Table 1 aim to create a more safe and comfortable environment for people walking and biking on all roadway types. Raised or painted buffers benefit people biking on roadways with high traffic volumes and/or speeds by separating them from the traffic. Reducing the required cross-sectional width of vehicle travel lanes can help re-allocate roadway space to active transportation facilities and streetscape improvements. Further discussion of the proposed treatments is provided following the cross-section figures.



[1]Buffer includes a vertical element, such as raised concrete or flexposts/bollards.
[2]If the bike lane is grade separated (i.e., a raised bike lane) the buffer can be reduced to the curb separating the bike lane from the motor vehicle lane.

Figure 2 Principal Arterial and Five-Lane Minor Arterial Proposed Cross-Section

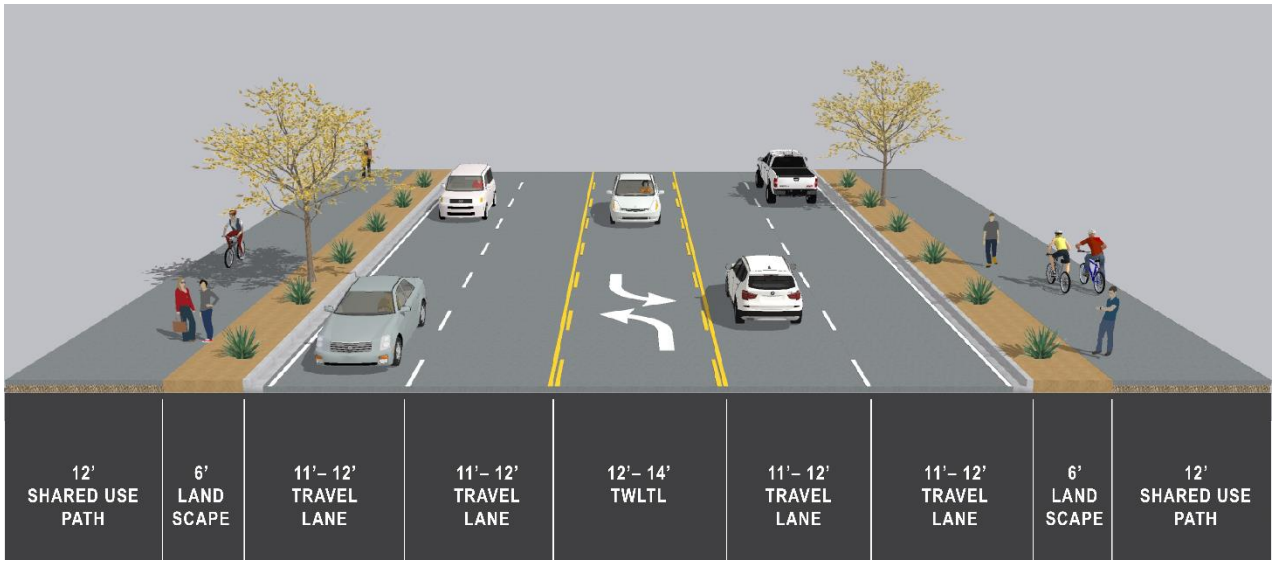


Figure 3 Principal Arterial and Five-Lane Minor Arterial Proposed Cross-Section – Shared-Use Path Option

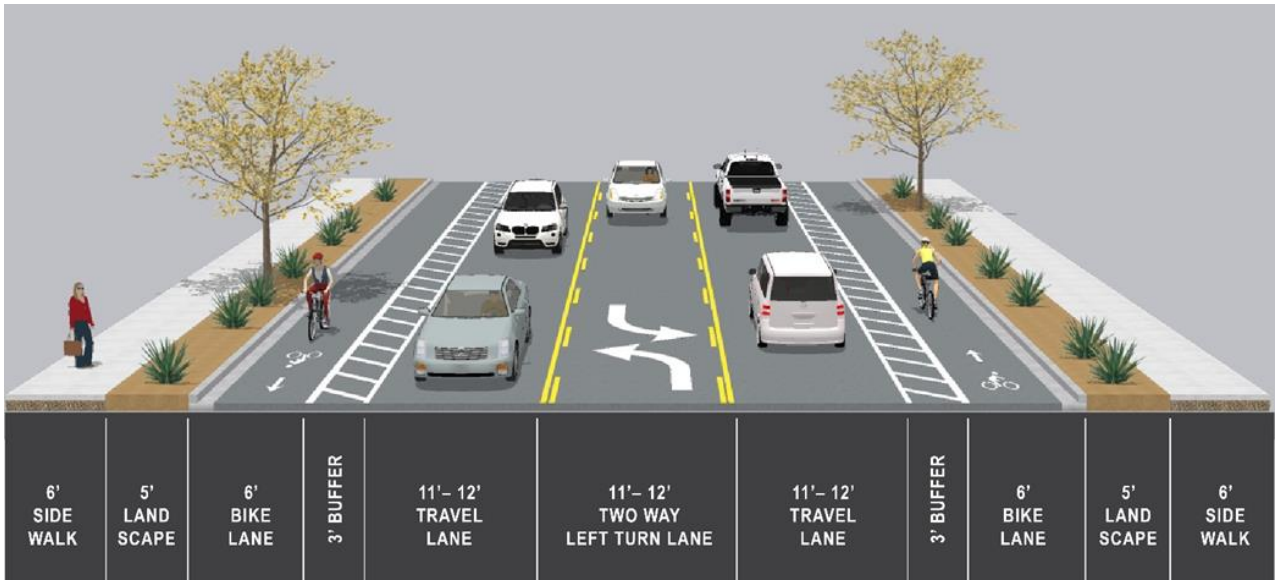
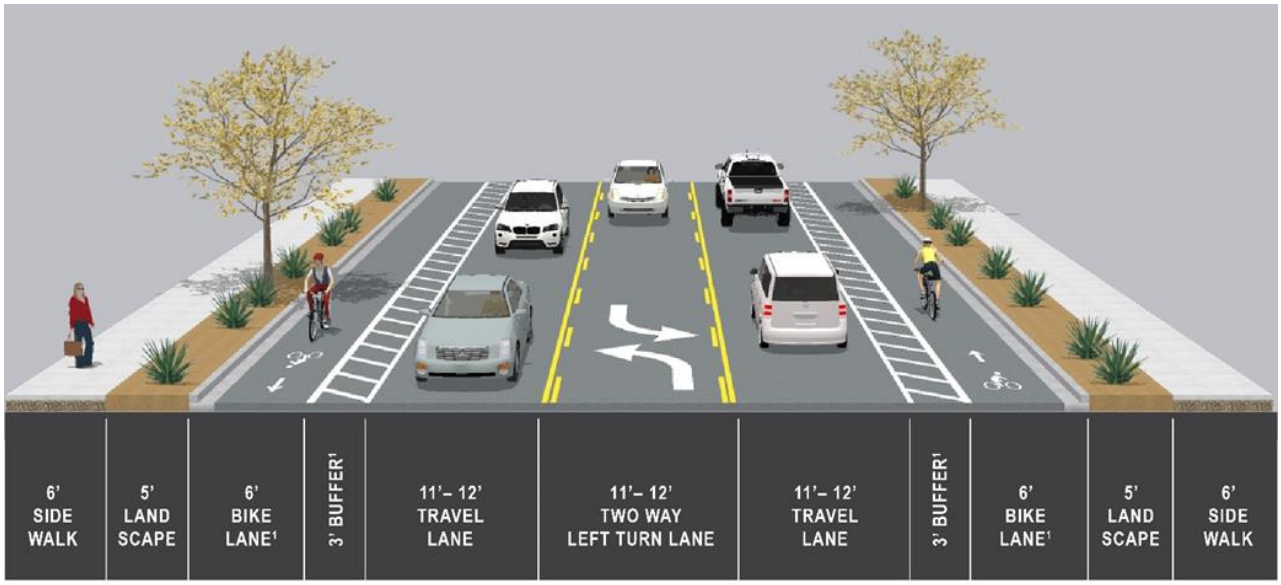
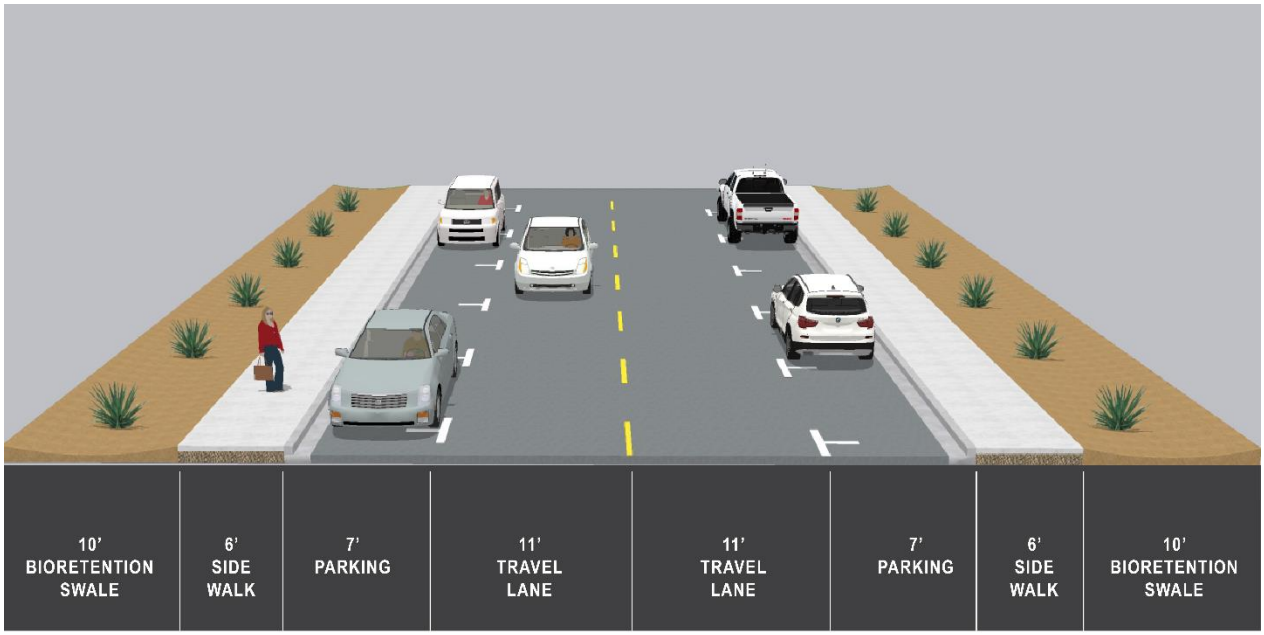


Figure 4 Three-Lane Minor Arterial Cross-Section



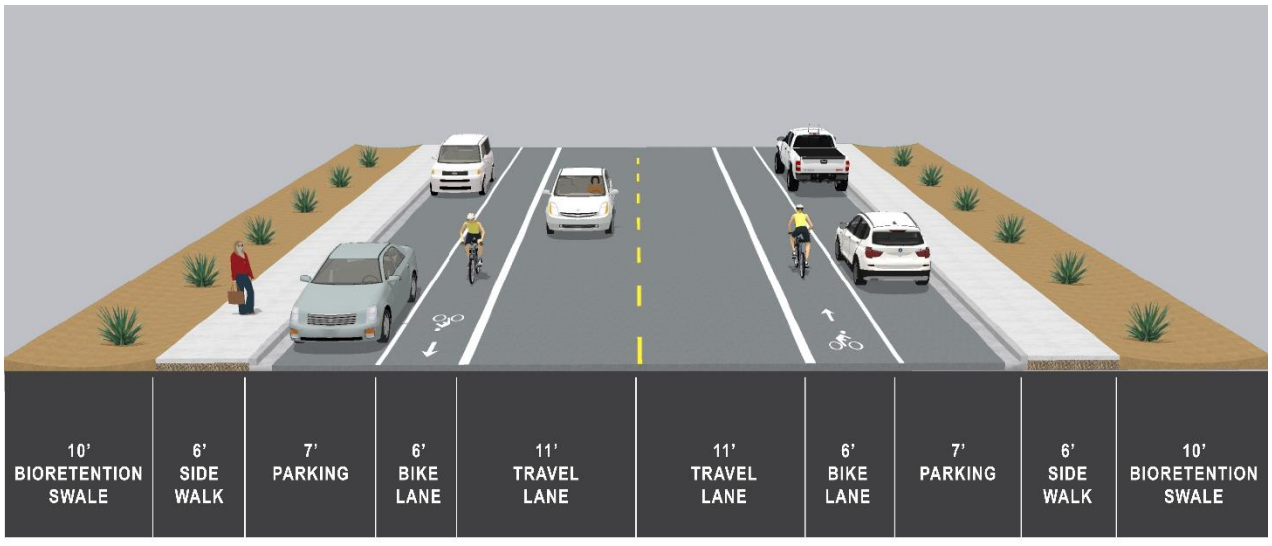
[1]Buffer recommended when roadway width is available

Figure 5 Three-Lane Collector Proposed Cross-Section



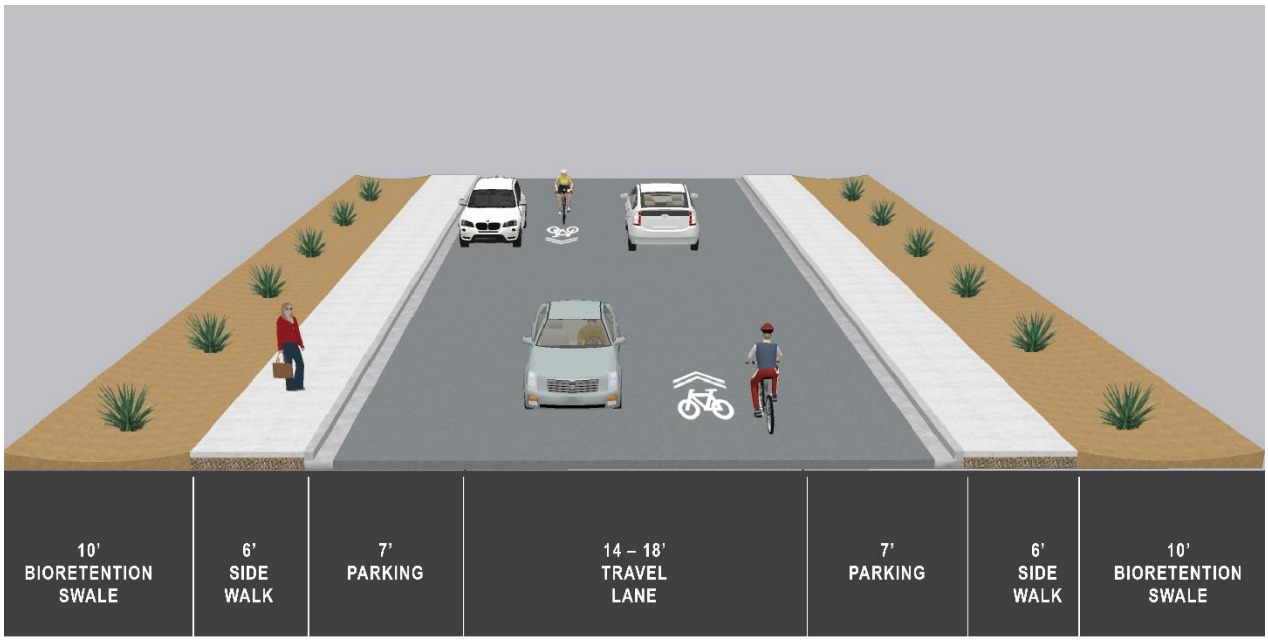
Note: Bioretention swales are not required on streets with grades greater than 2%

Figure 6 Neighborhood Collector Proposed Cross-Section



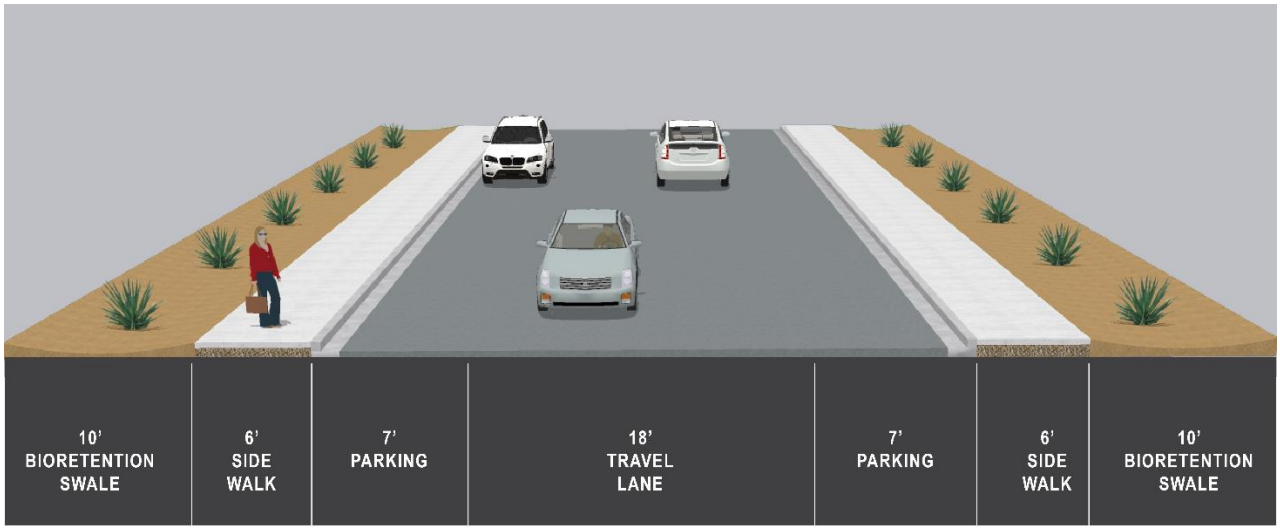
Note: Bioretention swales are not required on streets with grades greater than 2%

Figure 7 Neighborhood Collector with Bike Lanes Proposed Cross-Section



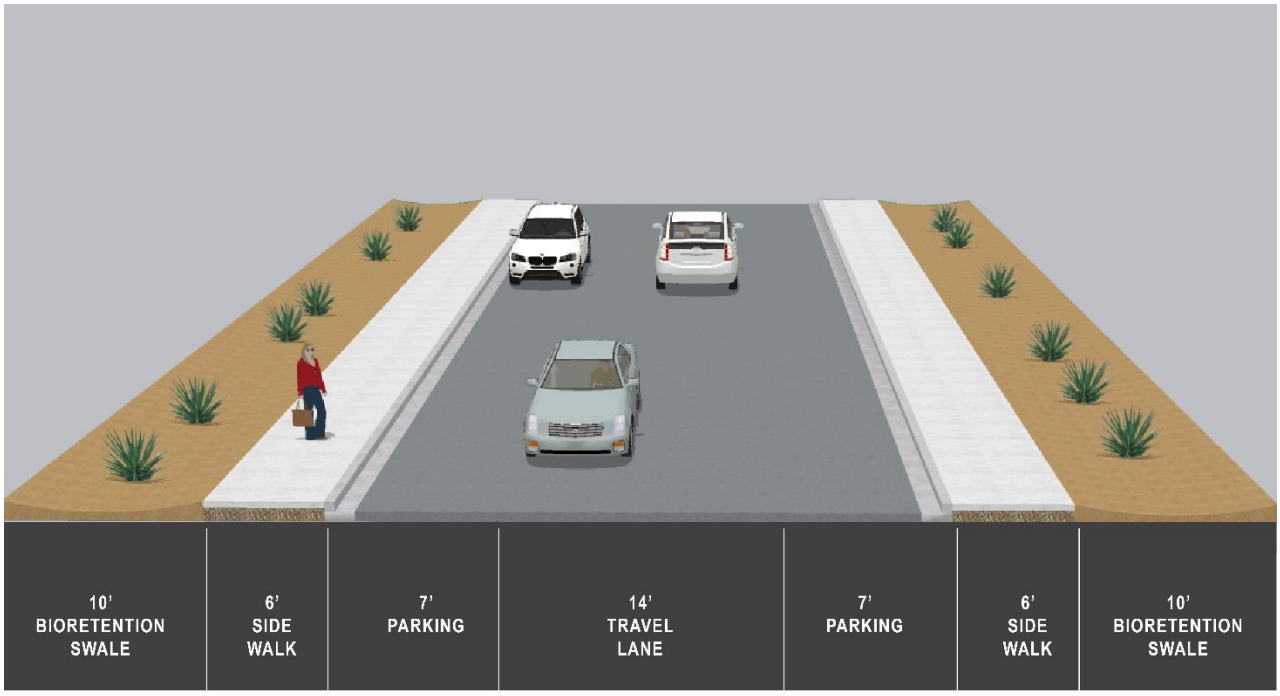
Note: Bioretention swales are not required on streets with grades greater than 2%

Figure 8 Local Street Designated as a Bikeway Proposed Cross-Section



Note: Bioretention swales are not required on streets with grades greater than 2%

Figure 9 Local Street Proposed Cross-Section



Note: Bioretention swales are not required on streets with grades greater than 2%

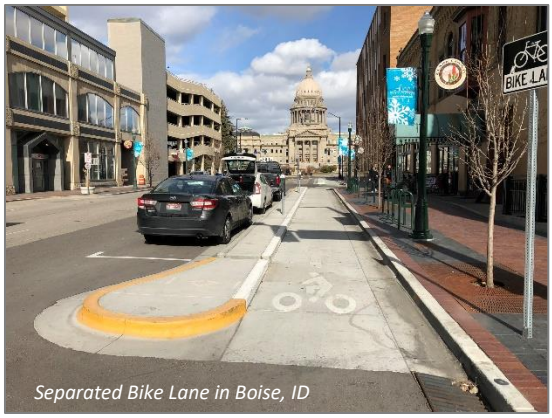
Figure 10 Skinny Local Street Proposed Cross-Section

Additional Guidance on Proposed Bicycle Facilities

These cross-sections introduce two new active transportation facility types: separated bike lanes and buffered bike lanes. More information on these two facility types is provided in this section. When selecting an appropriate bicycle facility for a given street, in addition to consulting these street standards, the latest design guidance and bikeway selection guidance provided by ODOT, NACTO, Federal Highway Administration (FHWA), American Association of State Highway and Transportation Officials (AASHTO), or similar organizations should be consulted. In some cases, the expected motor vehicle volume or speeds on a street may warrant considering a higher-level bike facility than what is shown in the cross-sections. Physical constraints may also necessitate modifying the widths in the cross-sections and these guiding documents can provide insights on acceptable minimum widths in these circumstances.

Separated Bike Lanes

One of the most significant proposed changes to the street sections is the inclusion of separated bike lanes, or shared-use paths, on Principal Arterials and Five-lane Minor Arterials. ODOT's *Blueprint for*



Separated Bike Lane in Boise, ID

Urban Design includes bikeway selection guidance (see Figure 3-7 in the document), based on a recent FHWA report, indicating that separated bikeways should be considered on streets with motor vehicle volumes above 6,5000 vehicles per day or speeds greater than 35 miles-per-hour (MPH). Both conditions are likely to exist on roadways with these functional classifications.

Separated bike lanes are denoted by the presence of vertical separation between the bike lane and the motor vehicle travel lane. The vertical element can include a variety of treatments, including a raised concrete median or plastic flexposts. A raised sidewalk-level bike lane would also be considered a separated bike lane, as would a shared-use path.

One key consideration with separated bike lanes is how they will be maintained. Existing street sweeping equipment may not fit between the vertical buffer and the curb. In this case, specialized equipment (e.g., a narrower sweeper, such as those used on pathways), may be used or a raised bike lane or shared-use path may be preferable.

Further design guidance for separated bike lanes can be found in the following resources:

- ODOT's *Bicycle and Pedestrian Design Guide*
- NACTO *Urban Bikeway Design Guide*
- FHWA *Separated Bike Lane Planning and Design Guide*

Buffered Bike Lanes


Buffered Bike Lane in Bend

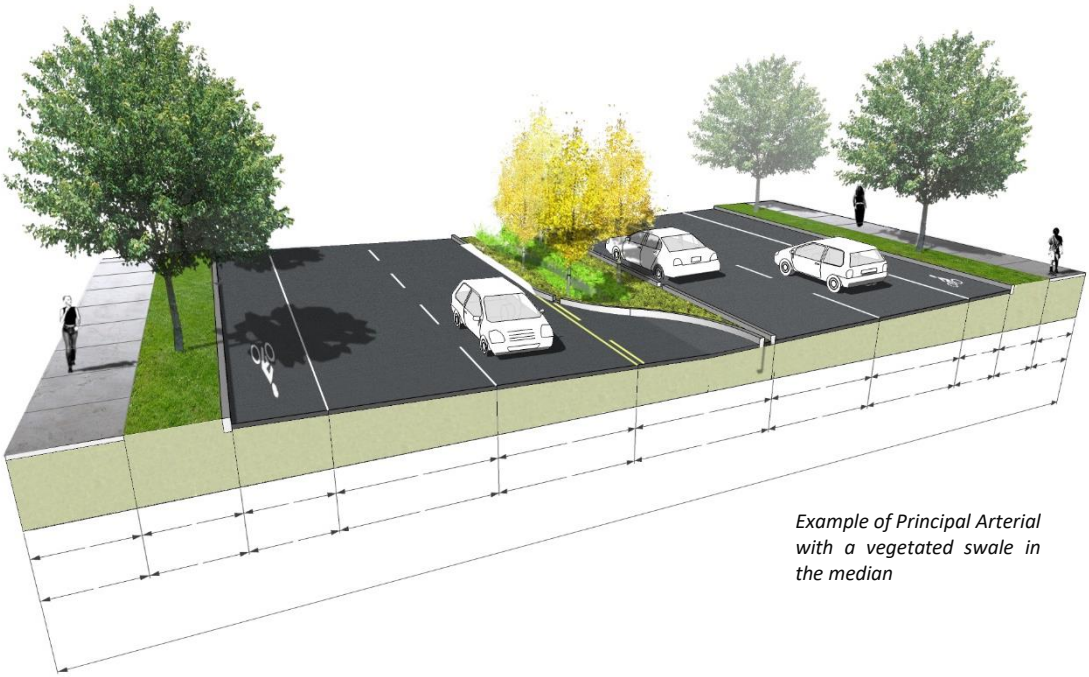
Buffered bike lanes are on-street lanes that include an additional striped buffer of typically 2-3 feet between the bicycle lane and the vehicle travel lane and/or between the bicycle lane and the vehicle parking lane. These are included in the Three-lane Minor Arterial cross-section, and recommended, but not required, in the Three-lane Collector cross-section.

Green Streets Applications

Most street sections contain some green street elements, such as bioswales and landscaping between the sidewalk and street. Options to further enhance these sections to include green street elements include:

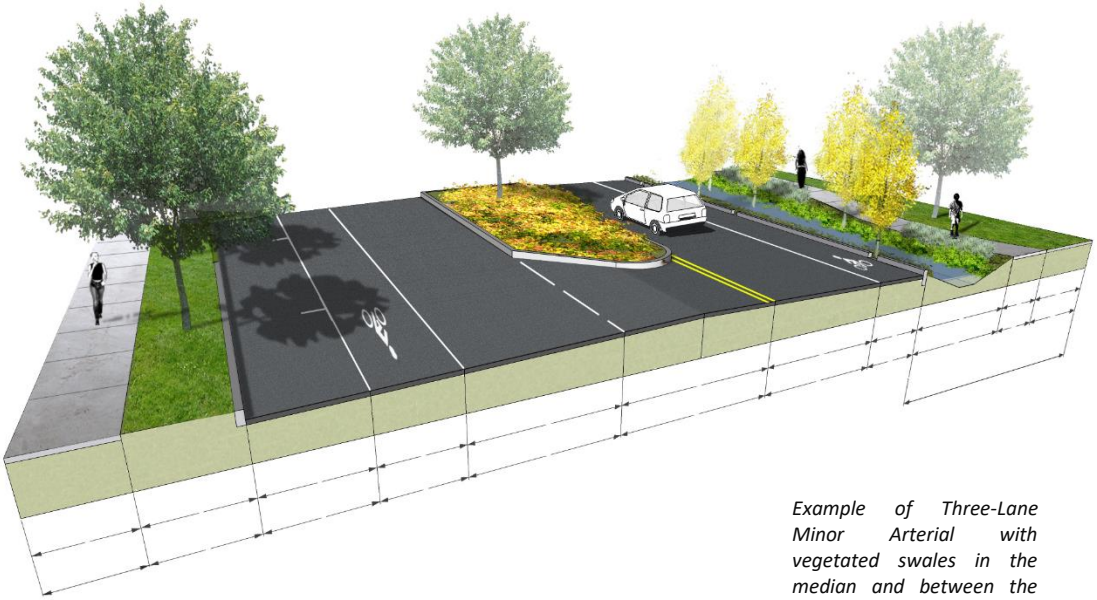
- *Principal Arterials*

- Replace the landscaping between the sidewalk and the street with a vegetated swale with native plants and trees – *this will likely require more width than the 6 feet shown for landscaping in the cross-section standard. Site-specific analyses may be required to determine the necessary width*.
- Replace the center-turn lane with a vegetated swale with native plants and trees.
- Infiltration basins with pedestrian seating and/or signage in areas with extra space.



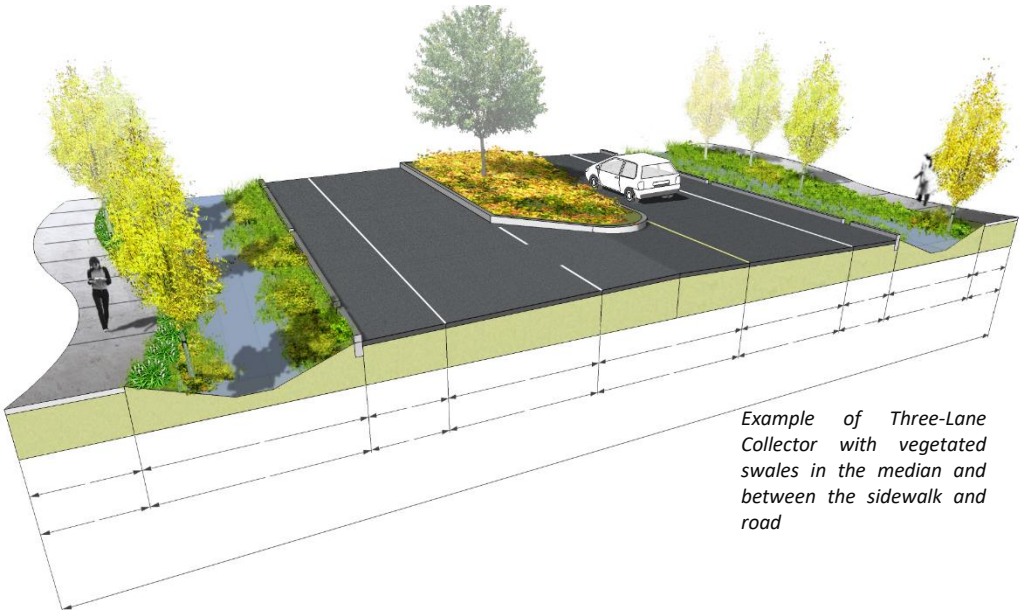
Example of Principal Arterial with a vegetated swale in the median

- *Three and Five-Lane Minor Arterials*
  - Replace the landscaping between the sidewalk and the street with a vegetated swale with native plants and trees – *this may require more width than the 6 feet shown for landscaping in the cross-section standard. Site-specific analyses may be required to determine the necessary width*.
  - Replace the center-turn lane with a vegetated swale with native plants and trees.



Example of Three-Lane Minor Arterial with vegetated swales in the median and between the sidewalk and road

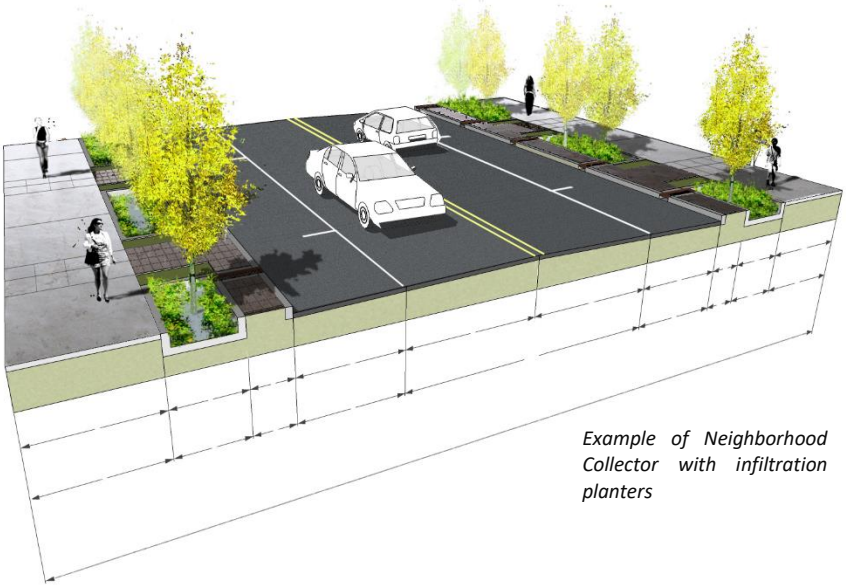
- *Three-Lane Collectors*
    - Replace the landscaping between the sidewalk and the street with a vegetated swale or infiltration planter with native plants and trees.
    - Replace the center-turn lane with a vegetated swale with native plants and trees.



Example of Three-Lane Collector with vegetated swales in the median and between the sidewalk and road

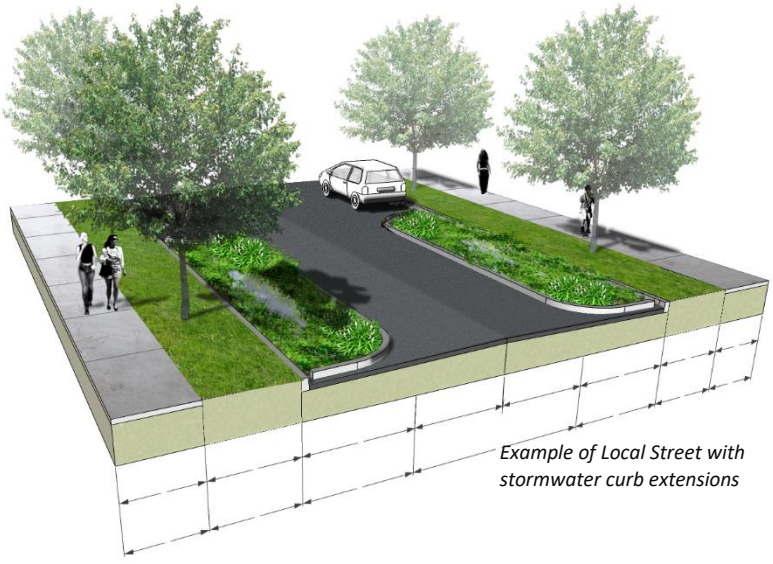
- *Neighborhood Collector*

- Replace the bioretention swale with a vegetated swale or infiltration planter with native plants and trees between the sidewalk and the street.



Example of Neighborhood Collector with infiltration planters

- *Local Streets*
  - Stormwater curb extensions.
  - Replace the bioretention swale with a vegetated swale or infiltration planter with native plants and trees between the sidewalk and the street.



Example of Local Street with stormwater curb extensions

A key consideration in Ontario is providing streetscape elements that minimize irrigation requirements. Using native plants and trees can help meet this goal. Attachment "E" provides more information on

potential green street treatments and two case studies of green street projects in Bend and Sisters that may provide useful examples of these treatments and the use of native plantings.

Off-Street Paths and Trails

ODOT's *Bicycle and Pedestrian Design Guide* and AASHTO's *Guide for the Development of Bicycle Facilities* provide guidance for off-street shared-use paths and should be referenced in the planning and design of these facilities. Key design highlights from these manuals includes:

- **Path width** – 12 feet or wider in urban or suburban areas or rural areas with high activity; 10 feet in rural areas.
    - Eight feet can be an acceptable minimum at pinch points or where volumes are expected to be minimal.
- **Lateral Clearance** – Three feet is the recommended distance between the edge of the path and obstructions or slopes.
    - Fences or other barriers should be placed at least two feet from the edge of the path.
- **Grades** – Americans with Disabilities Act (ADA) requirements must be met for any path intended for use as a transportation corridor.

An example design toolbox for off-street paths is shown in Attachment "F."

Other Resources

This section discusses resources for active transportation planning and design and how these resources can provide guidance to the City.

Blueprint for Urban Design: ODOT's Approach for Design in Oregon Communities (ODOT)

ODOT adopted the *Blueprint for Urban Design* in 2020. It documents urban design practices and guidance. The document focuses on how facilities should be designed to fit the unique context of the urban environment and community needs by highlighting flexibility in ODOT design criteria. ODOT intends to incorporate the principles in this document into the next update to the Highway Design Manual. It should be referenced for any projects on ODOT highways.

Examples of activities that would be addressed by the Blueprint of Urban Design are as follows:

- Defining the urban context of a roadway to determine its needs and context-based design criteria
- Identifying opportunities for flexibility in existing design criteria
- Evaluating the trade-offs of design elements based on the needs of different roadway users
- Selecting active transportation facilities based on roadway type

Bicycle and Pedestrian Design Guide (ODOT)

The *Bicycle and Pedestrian Design Guide* is included as Appendix L of ODOT's *Highway Design Manual*. The document provides design criteria and design guidance for a variety of active transportation facilities, including on-road bike facilities, sidewalks, pathways, transit stop connections, enhanced crossings, and intersection treatments for people walking and biking. The document also provides guidance on best practices for project selection and implementation.

Urban Bikeway Design Guide (NACTO)

The *Urban Bikeway Design Guide* provides a toolbox of design-guidance and tactics to create complete streets that are safe and enjoyable for bicyclists. The guide provides recommended design criteria and treatments for bikeway. It includes guidance on bike lanes, intersection treatments, bicycle signals, and bicycle boulevards. The guide also includes an inventory of case studies of the design and implementation of urban bikeway facilities in the US.

Transit in Small Cities: A Primer for Planning, Siting, and Designing Transit Facilities in Oregon (Oregon TGM)

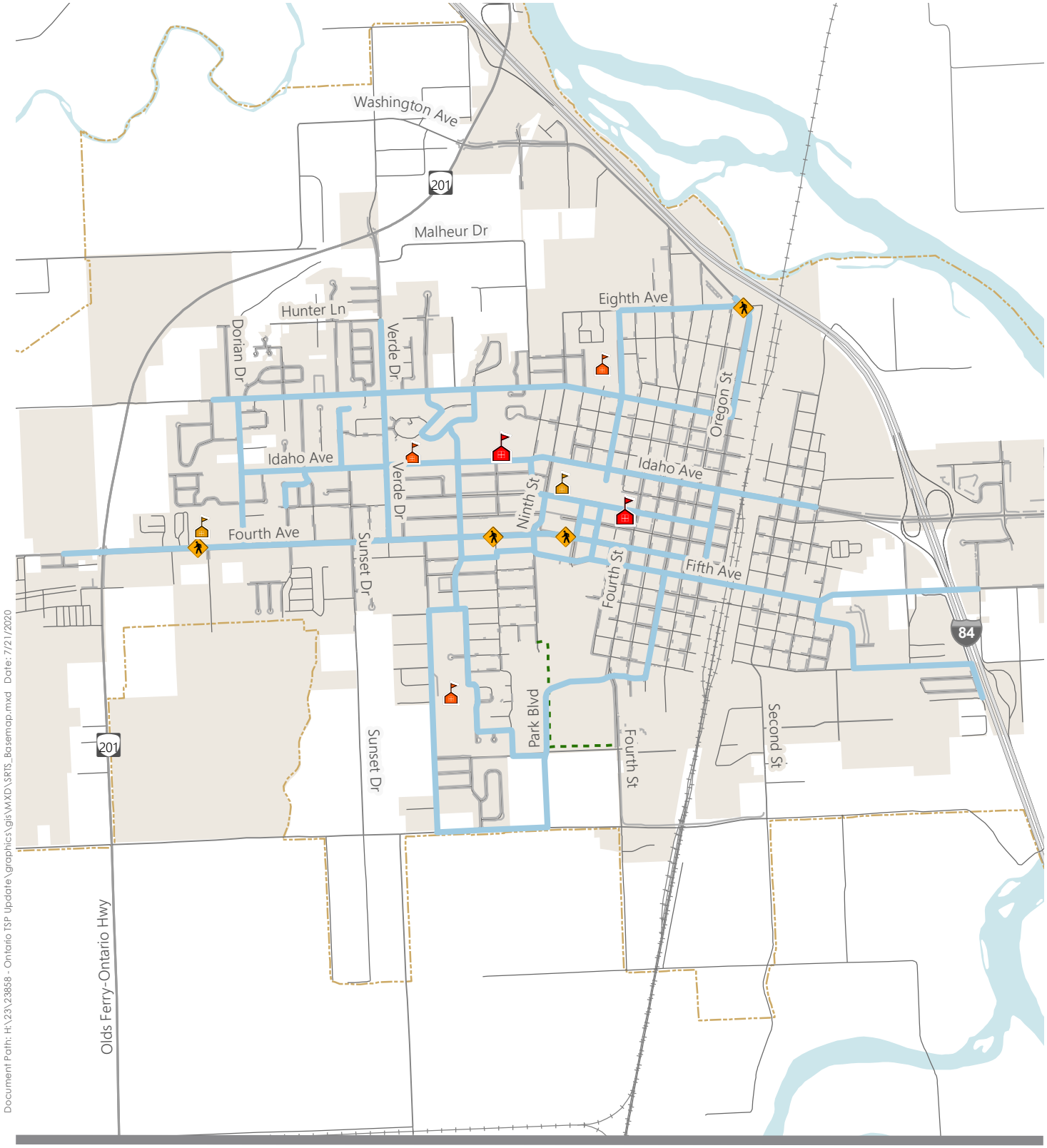
The Transit in Small Cities primer provides guidance on planning, designing, and locating transit facilities for small-city transit providers in Oregon. The document focuses on transit facilities that support multimodal transit facilities. It references successful Oregon examples to provide relevant advice and illustrate best practices.

SAFE ROUTES TO SCHOOL

The City of Ontario has established a desirable Safe Routes to School (SRTS) network that provides access to the city's three public elementary schools, middle school, and high school, as well as a K-8 Catholic school and a K-12 charter school. Figure 11 shows the city's existing desired Safe Routes to School network.

The project team reviewed this network against existing walking and biking infrastructure to identify locations that may benefit from improvements (e.g., sidewalk gaps, crossing enhancements). Several roads on the SRTS network lack sidewalks on one or both sides of the road. Figure 12 shows which roads on the network have complete sidewalks (i.e., they span the entire block) on both sides of the street, complete sidewalks on one side of the street, or no complete sidewalks on either side of the street. As shown, there are a lack of complete sidewalks around Alameda Elementary School in the south part of Ontario and around May Roberts Elementary School in the north part of Ontario. Additionally, stakeholder outreach identified additional sidewalk gaps around Alameda Elementary School.

In addition, Figure 12 shows intersections along this network that may benefit from crossing improvements. These improvements could include installing ADA curb ramps, adding crosswalk



Safe Routes to School
Rectangular Rapid Flashing Beacon
Elementary School
Junior/Senior High School
Private School/Charter School
Multi-Use Path (Under Construction)
Sidewalks
Urban Growth Boundary
City Limits

Figure 11

KITTELSON & ASSOCIATES

Safe Routes to School

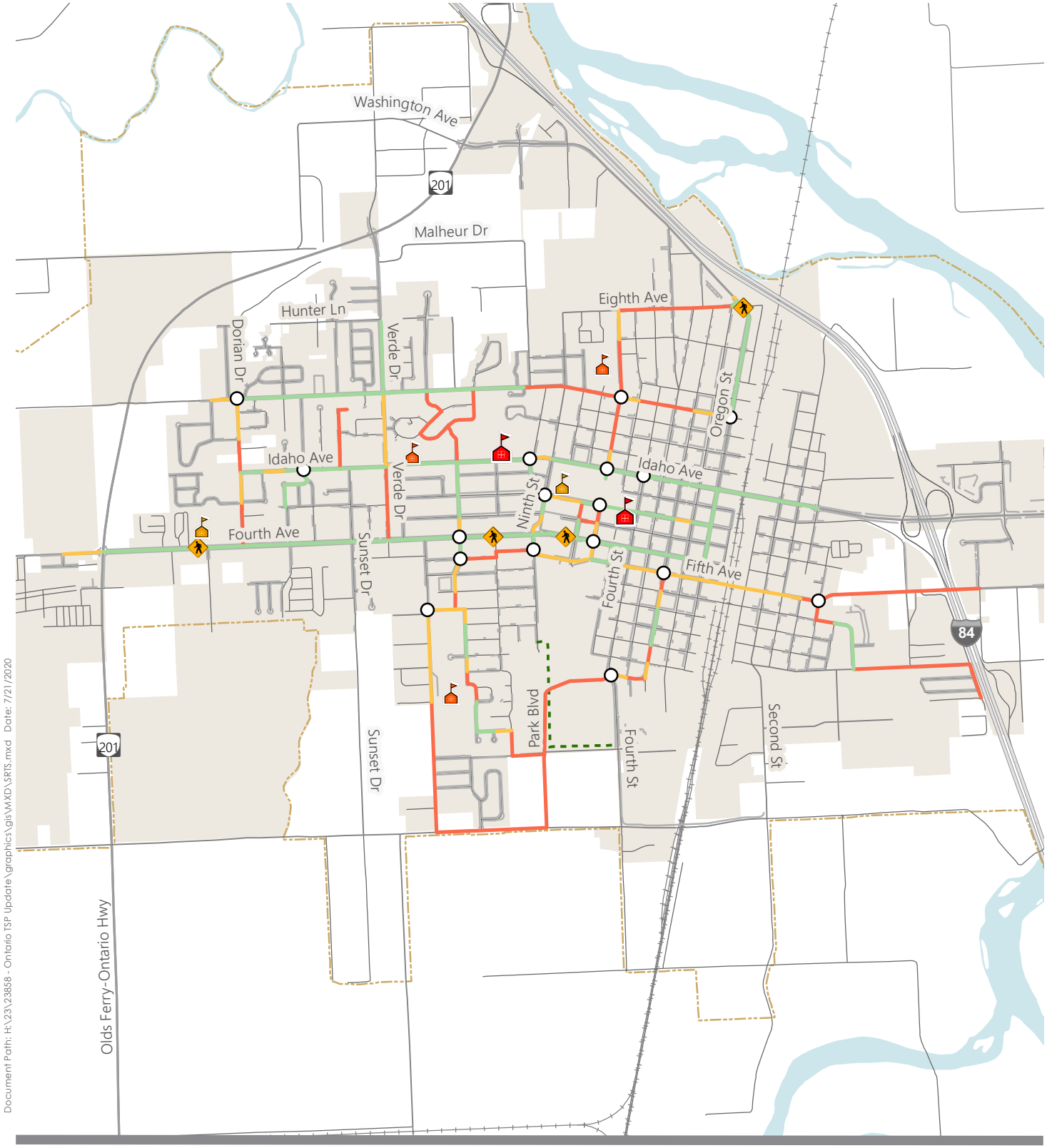


Figure 12

Safe Routes to School Sidewalks and Curb Ramps

KITTELSON & ASSOCIATES

striping, increasing crosswalk visibility through markings and/or signage, intersection control changes (such as STOP signs), and rectangular rapid flashing or other beacons. Potential treatments for these locations will be identified in a later task in this project.

NEXT STEPS

The findings of the memorandum will be presented at TAC Meeting #2 and at an online community open house. Feedback received from the TAC and the community will be used refine the draft design concept of East Idaho Avenue and the other elements contained in this memorandum.

REFERENCES

1. Kittelson and Associates. *City of Ontario, Active Transportation Update and East Idaho Avenue Refinement Area Plan Technical Memorandum #2: Baseline Transportation Assessment*. 2020.
2. Oregon Department of Transportation. *Bicycle and Pedestrian Design Guide (Appendix L to the Highway Design Manual)*. 2011.
3. National Association of City Transportation Officials. *Urban Bikeway Design Guide*. 2012.
4. Oregon Transportation and Growth Management Program. *Transit in Small Cities*. 2013.
5. Oregon Department of Transportation. *Blueprint for Urban Design*. 2020.

ATTACHMENTS

A. East Idaho Avenue Refinement Area Draft Design Concept
B. East Idaho Avenue Refinement Area Gateway Precedents
C. East Idaho Avenue Refinement Area Land Use Metrics Memorandum
D. Street Standard Cross Sections from 2006 Transportation System Plan
E. Green Street Project Case Studies and Toolbox
F. Off-Street Path Toolbox

Attachment A East Idaho Avenue Refinement Area Draft Design Concept

HOME DEPOT

WALMART

BEST WESTERN

ONTARIO MARKETPLACE

QUALITY INN

GOODFELLOW ST

NE EAST LN

SNAKE RIVER

MOVE ROAD BARRIER TO CREATE 10' WIDE SEPARATED SHARED-USE PATH ON BRIDGE (EXISTING CONDITION IS ON-STREET BIKE LANE AND SEPARATED SIDEWALK)

SHARED-USE PATH BECOMES STANDARD SIDEWALK AND ON-STREET BIKE LANE AT END OF BRIDGE

FUTURE FOOTBRIDGE OVER SLOUGH

CONNECTION BETWEEN SIDEWALK AND FUTURE RIVERFRONT TRAIL

EAST LN INTERSECTION ENLARGEMENT

E IDAHO AVE

GOODFELLOW ST. INTERSECTION ENLARGEMENT

TRAIL JUNCTION ROUNDABOUT

OVERLOOK

FUTURE RIVERFRONT TRAIL

TRAIL JUNCTION AND OVERLOOK ENLARGEMENT

MOVE ROAD BARRIER TO TO CREATE 12' WIDE SEPARATED SHARED-USE PATH ON OVERPASS (EXISTING CONDITION IS ON-STREET BIKE LANE AND SEPARATED SIDEWALK)

PRIMARY GATEWAY ELEMENT, VISIBLE FROM BOTH E. IDAHO AVE. AND I-84 WESTBOUND

EASTBOUND ON-STREET BIKE LANE REPLACED BY 12' WIDE SHARED-USE PATH

WALGREENS

SIDEWALK AND EASTBOUND ON-STREET BIKE LANE REPLACED BY 12' WIDE SHARED-USE PATH

EXISTING STORMWATER SWALE, ENHANCED

BIG 5

AARON'S

WINCO

MARSHALLS

DOLLAR TREE

OREGON DHS

WATER TREATMENT PLANT

OHL

LEGEND

TYPE 1 LANDSCAPE: ENHANCED IRRIGATED PLANTING

TYPE 2 LANDSCAPE: BASIC IRRIGATED - STREET TREES & PLANTS OR GRAVEL MULCH

TYPE 3 LANDSCAPE: NON-IRRIGATED FIELD GRASS

TYPE 4 LANDSCAPE: STORMWATER TREATMENT AREA PLANTING

PROPOSED STREET TREE

EXISTING STREET TREE

PRIMARY GATEWAY ELEMENT

SECONDARY GATEWAY ELEMENT

PROPOSED SHARED-USE PATH

FUTURE RIVERFRONT TRAIL

N

0 75 150 300

SCALE: 1" = 150'

Figure 1

OVERALL PLAN

EAST IDAHO AVENUE REFINEMENT AREA PLAN

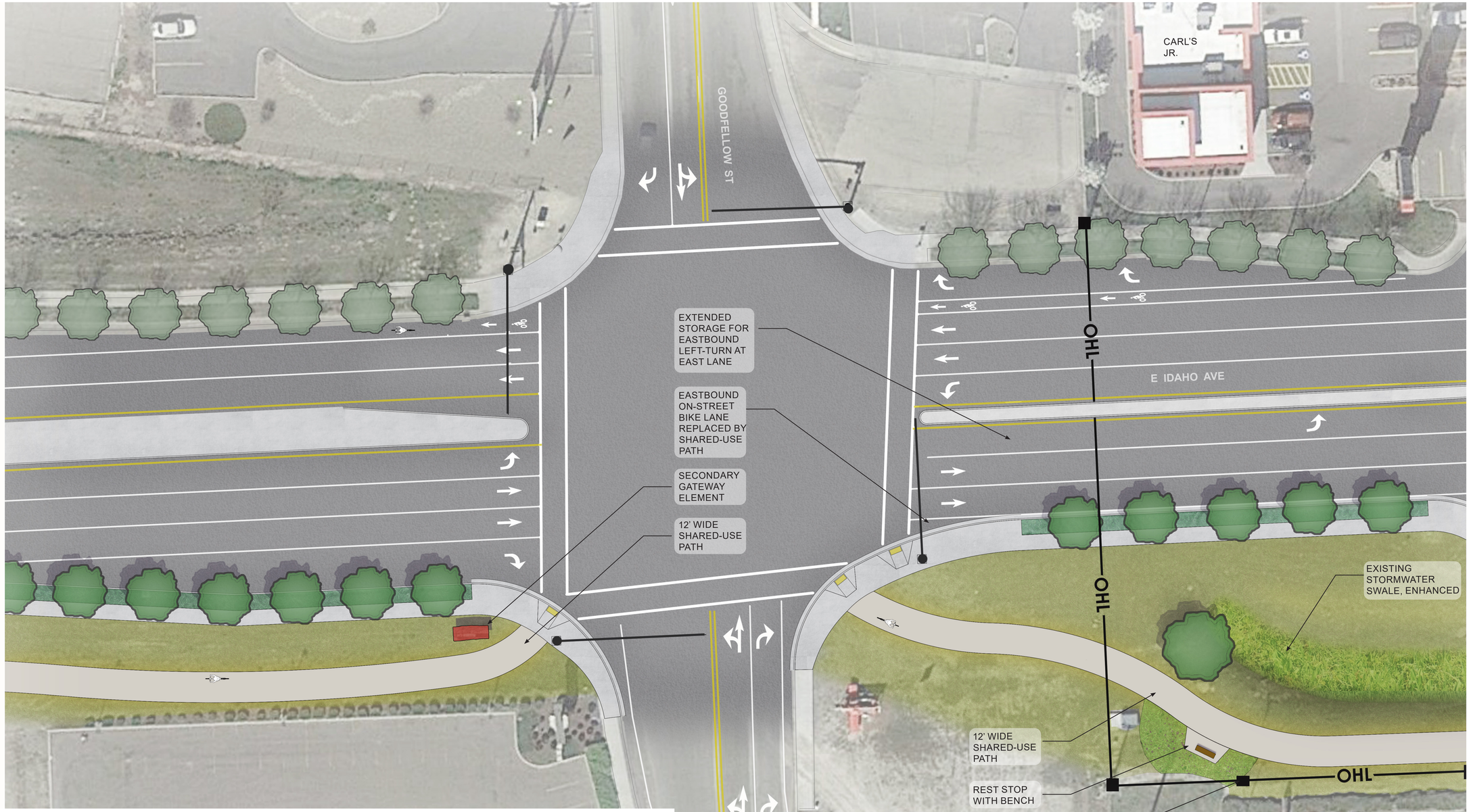
Oregon Department of Transportation

ONTARIO Where Oregon Begins...

KITTELSON & ASSOCIATES, INC. TRANSPORTATION ENGINEERING/PLANNING

GREENWORKS

07.22.2020



LEGEND

TYPE 1 LANDSCAPE: ENHANCED IRRIGATED PLANTING

TYPE 2 LANDSCAPE: BASIC IRRIGATED - STREET TREES & PLANTS OR GRAVEL MULCH

TYPE 3 LANDSCAPE: NON-IRRIGATED FIELD GRASS

TYPE 4 LANDSCAPE: STORMWATER TREATMENT AREA PLANTING

N

0 10 20 40

SCALE: 1" = 20'

GOODFELLOW ST. INTERSECTION ENLARGEMENT PLAN

EAST IDAHO AVENUE REFINEMENT AREA PLAN

Oregon Department of Transportation

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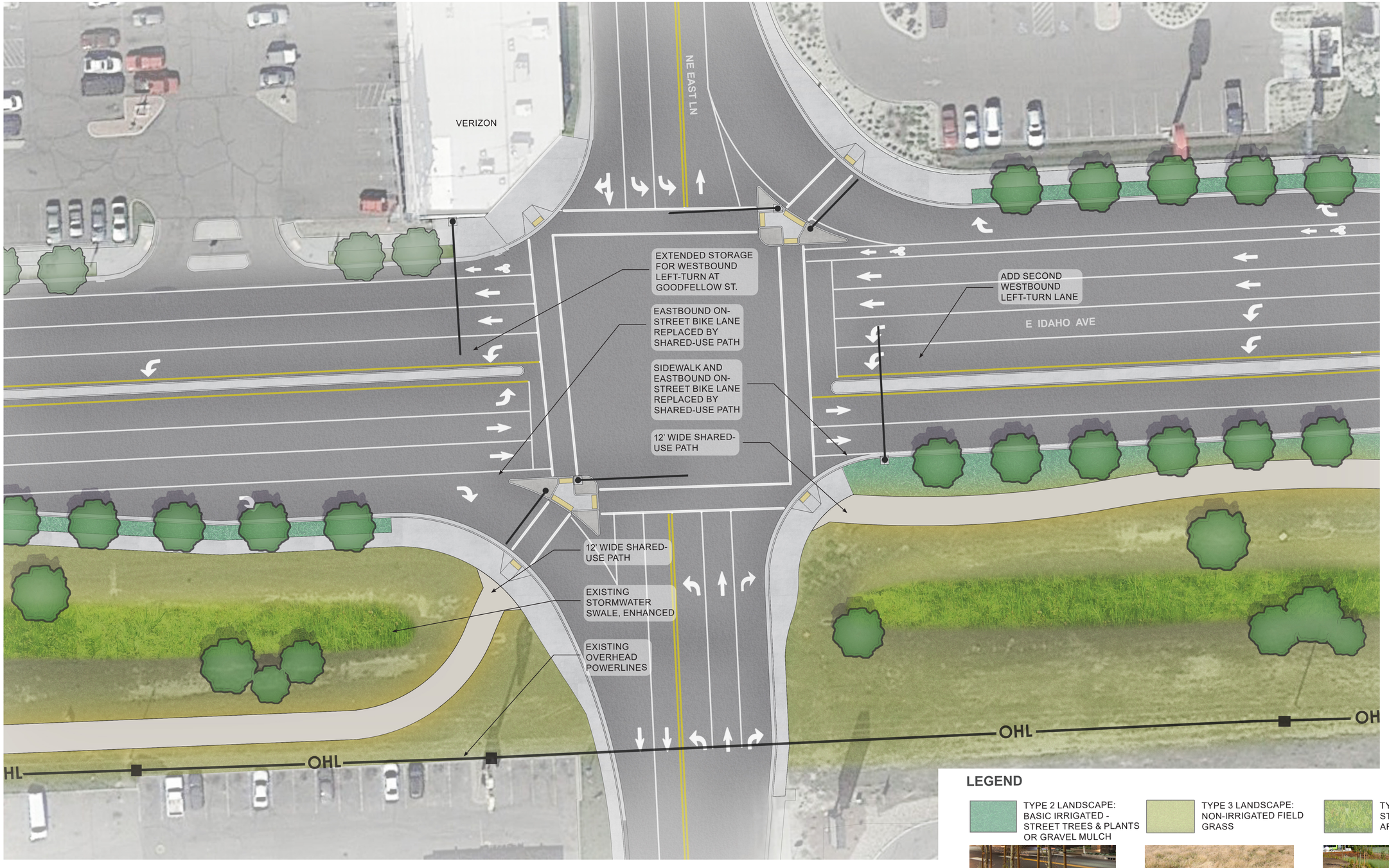
GREENWORKS

07.22.2020



N

0 10 20 40

SCALE: 1" = 20'

LEGEND

TYPE 2 LANDSCAPE: BASIC IRRIGATED - STREET TREES & PLANTS OR GRAVEL MULCH

TYPE 3 LANDSCAPE: NON-IRRIGATED FIELD GRASS

TYPE 4 LANDSCAPE: STORMWATER TREATMENT AREA PLANTING

EAST LN. INTERSECTION ENLARGMENT PLAN

EAST IDAHO AVENUE REFINEMENT AREA PLAN

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GREENWORKS

07.22.2020

FUTURE CONNECTION TO RIVERFRONT TRAIL FROM EXISTING SIDEWALK

PRIMARY GATEWAY FEATURE

SECONDARY GATEWAY FEATURE

EXISTING BRIDGE HAS A WESTBOUND BIKE LANE BUT NO SIDEWALK ON THE NORTH SIDE

EXISTING BRIDGE HAS EASTBOUND BIKE LANE AND A SEPARATED SIDEWALK ON THE SOUTH SIDE.

E IDAHO AVE 30

SNAKE RIVER

PRIMARY GATEWAY FEATURE

12' WIDE SHARED-USE PATH REPLACES SIDEWALK AND EASTBOUND BIKE LANE

10' WIDE SHARED-USE PATH

MOVE TRAFFIC BARRIER TO COMBINE BIKE LANE AND SIDEWALK

FUTURE RIVERFRONT TRAIL

12' WIDE SHARED-USE PATH CONNECTS TO FUTURE RIVERFRONT TRAIL

SECONDARY GATEWAY FEATURE

EXISTING POWER POLES AND OVERHEAD LINES, TYP.

EXISTING VEHICULAR CROSSING OVER SLOUGH (FILL)

EXISTING SLOUGH

TRAIL JUNCTION ROUNDABOUT

OVERLOOK WITH BENCHES, RAILING, AND INTERPRETIVE SIGNAGE

SECONDARY GATEWAY FEATURE

FUTURE RIVERFRONT TRAIL

EXISTING TRANSFORMER / UTILITY BOX, TYP.

LEGEND

TYPE 1 LANDSCAPE: ENHANCED IRRIGATED PLANTING

TYPE 2 LANDSCAPE: BASIC IRRIGATED - STREET TREES & PLANTS OR GRAVEL MULCH

TYPE 3 LANDSCAPE: NON-IRRIGATED FIELD GRASS

TYPE 4 LANDSCAPE: STORMWATER TREATMENT AREA PLANTING

TRAIL JUNCTION AND OVERLOOK ENLARGEMENT

EAST IDAHO AVENUE REFINEMENT AREA PLAN

N

0 10 20 40

SCALE: 1" = 20'

Oregon Department of Transportation

ONTARIO Where Oregon Begins...

KITTELSON & ASSOCIATES, INC. TRANSPORTATION ENGINEERING/PLANNING

GREENWORKS

07.22.2020

Attachment B East Idaho Avenue Refinement Area Gateway Precedents

Gateway Precedents

> Gateway: *"[A]n entrance corridor that heralds the approach of a new landscape and defines the arrival point as a destination. The goal of gateway planning is to arrange this landscape so that it rewards the viewer with a sense of arrival and a positive image of the place."* From Michael Barrette, "Planning Basics for Gateway Design," Zoning News (December 1994).

<u>Gateway Intention:</u>

- Highly visible opportunity to welcome visitors & locals to the town or neighborhood
    - Represents an arrival point as a destination
    - Rewards viewer with a sense of arrival and positive image / identity of the place
- Express civic identity in visual form
- Common examples of gateways:
    - Sculpture / public art (see Joseph & Portland precedents below)
        - Highlight the unique local character & express civic pride
    - Series of columns
        - Material representative of the area / local geology
    - Banners
    - Township "welcome" sign (See Madras precedent below)
        - Subtle still feels welcoming, see Lyle precedent below
    - Landscaping
        - Trees, minimum planting in dry climate
        - Can also include ornamental stone design and patterns in landscape beds, especially in low-water environments
    - Literal gateway or archway (see Troutdale precedent below)
    - Decorative walls & architectural elements
- Can be a single or repeated element

Precedent Examples & Images:

- Madras, Oregon
    - Sculptural element, flag pole, town name at north and south entrances of town
    - Family of repeated elements (north & south entrances)

(source: google maps)

(source: google maps)

- Joseph, Oregon
    - Welcome Sign at entrance of downtown strip
    - Statues along main street (as a repeating element)
        - Creates continuity, signals to viewer that you are still in the designated area
        - Serves as placemaking tool as well as historical education opportunity
    - Native, upkept landscaped area & curb extensions
        - Traffic calming design
        - Encourages pedestrian usage, less car dominant

(source: City of Joseph)

- Troutdale, Oregon
    - Welcome Sign with town phrase
    - Archway / Gateway across road

(source: Google Earth)

- Portland, Oregon
    - Sculpture marks beginning of the Hawthorne bridge (image 1)
    - Traditional stone arch marks entrance of historic neighborhood (image 2)
    - Perforated weathered steel, metal lettering, landscaping & pedestrian oriented plaza marks entrance of main boulevard (images 3 and 4)

(source: 2.ink Studio / Landezine)

- Public art can be used as an icon, create an identity
    - Claus Oldenberg's Spoon Bridge & Cherry in Minneapolis Sculpture Garden

    - Gateway Island in Ashland, Oregon, titled "Threshold" by Seattle-based artist Susan Zoccola

Attachment C East Idaho Avenue Refinement Area Land Use Metrics Memorandum

MEMORANDUM

Land Use Metrics for Ontario Design Concepts (Task 4.1)

Ontario Active Transportation Update and East Idaho Avenue Refinement Area Plan

DATE	July 10, 2020
TO	Project Management Team
FROM	Matt Hastie and Clinton "CJ" Doxsee, APG
CC	Nick Foster and Matt Hughart, KAI

OVERVIEW

This memorandum presents land use metrics that are intended to assess improved connections between land use and transportation facilities and planning. This memorandum also presents potential future amendments to the City's development code that are intended to improve accessibility for pedestrians, bicyclists, and transit users in Ontario.

The land use metrics presented in this memorandum will inform the development of design concepts in *Technical Memorandum #6: Design Concepts*.

Every trip begins and ends with a pedestrian trip. Pedestrian accessibility provides the ease and convenience to reach a destination by walking, bicycling, or transit. Safety means that exposure to vehicle accidents and other hazards is minimized, giving people a sense of comfort to choose to walk. This requires attention to how the built environment for land uses and transportation facilities are designed.

LAND USE CONTEXT

The land use context is an important factor for determining appropriate transportation planning and design. Land uses tend to follow a development pattern that transitions from urban to suburban to rural. The mix and density of specific types of land uses can be expected within each transitional area.[1]

[1] Several associations and organizations provide planning and design guidance for contextualizing land use and transportation. Project team members should consider and review recent publications from the following sources for more

Characteristics that help define an area's development pattern include building setbacks, orientation, and coverage; the degree to which uses are mixed; the amount and location of parking; and size of blocks. For example, urban areas typically include higher density housing and mixed-use buildings that are oriented to and located near the street with minimal on-site parking. Rural areas on the other hand typically feature low-density, single-use housing that may not necessarily be oriented to or close to the street and may have prominent areas in front for parking.

The City of Ontario is primarily suburban in context, but also includes urban and rural elements. The characteristics that define most of Ontario as suburban include medium to large setbacks, intermittent building orientations towards the street, medium or low on-site building coverage, and medium to large amounts of parking. Block sizes in Ontario generally have more urban characteristics, featuring a gridded network of small blocks throughout most of the central parts of the City, including areas that otherwise have suburban characteristics. The part of Ontario that features primarily urban characteristics is generally located in the old downtown area around S Oregon Street. Conversely, the rural areas in Ontario are generally located outside of City limits, but within the City's Urban Growth Boundary (UGB).

The East Idaho Avenue Refinement Area also exhibits suburban land use context. The Refinement Area has a smaller range of characteristics. They include large setbacks; building coverage is relatively low and buildings are not generally oriented to the street; large amounts of parking are located between the building and the street; the area does not feature a mix of residential and commercial uses; and block sizes are large.

Table 1 below provides a summary of the characteristics that help define the land use context for the Study Area and East Idaho Avenue Refinement Area.

Table 1: Ontario Study Area and East Idaho Avenue Refinement Area Land Use Context Summary

LAND USE CONTEXT	CHARACTERISTIC
Setbacks	Study Area Setbacks are medium to large for commercial areas and shallow to medium for residential uses. Commercial uses are generally not situated near the street lot line. Residential uses are generally setback consistent with development standards. Refinement Area Setbacks are medium to large for commercial areas. Very few of the commercial uses are situated near the street lot line.

in-depth guidance: Oregon Department of Transportation (ODOT); American Association of State Highway Transportation Officials (AASHTO); National Cooperative Highway Research Program (NCHRP); Federal Highway Administration (FHWA); Institute of Transportation Engineers (ITE); National Association of City Transportation Officials (NACTO)

LAND USE CONTEXT	CHARACTERISTIC
Building Orientation	Study Area Buildings with front doors that can be accessed from the sidewalk or along a pedestrian path are intermittent for commercial and residential uses. Refinement Area Most of the buildings in the refinement area do not have a front door that can be accessed from the street via a pedestrian path
Land Use Mix	Study Area Mixed-use residential and commercial uses are minimal to none. Residential and commercial uses are generally separated and not mixed. Refinement Area There are no mixed-use residential and commercial areas. The predominant use in the area is commercial, with a minor amount of light industrial uses. The heavy commercial zone that covers most of the area does not allow for residential or mixed residential/commercial uses.
Building Coverage	Study Area The percent of the overall site, and specifically the area adjacent to the street that is developed with buildings is low for commercial uses and medium for residential uses. Refinement Area Like the overall Study Area, the percent of the overall site that is developed with commercial buildings is low.
Parking	Study Area Parking areas typically are located between the building and the street for most commercial and residential uses. Parking areas are medium to large for commercial uses. The availability of on-street parking varies for commercial uses and is typically available for residential uses. Refinement Area Conditions are similar to the overall Study Area, except that on-street parking is not available in the Refinement Area.
Block Size	Study Area The average size of blocks adjacent to residential uses are medium to small for residential uses and large to medium for commercial uses. Some blocks are not well defined for commercial uses. Refinement Area The average size of blocks in the Refinement Area are typically large. Most blocks are not well defined.

The adjacent land use realm is typically outside of the public right-of-way but includes elements that directly interact with street uses and form the character of the place. Street and trail designs should help achieve desired land use goals, while site planning and building design of adjacent land uses can help support walking, bicycling, and transit.

There is a wide variety of land uses in small cities that create a variety of land use realms. The land use realms range from having buildings immediately adjacent to the sidewalk to having buildings separated from the street by large surface parking areas.

LAND USE METRICS

Land use metrics are intended to assess improved connections between land use and transportation facilities. For the purposes of applying land use metrics to transportation design concepts, this memorandum focuses on metrics that gradually increase the urbanization of an existing area relative to the current conditions. The intent is to increase the efficiency of land use and transportation resources. Typically, this means that new development or redevelopment is more compact and uses only as much land as is necessary. It also seeks to fully utilize the existing capacity of transportation facilities where available, recognizing that most people in Ontario will continue to travel to and from the area in cars.

The land use metrics focus on the characteristics that help define the land use context. They will provide guidance in assessing whether proposed improvements increase safety and accessibility in comparison to the existing development pattern. The metrics are not intended to be used as standards with quantifiable threshold requirements.

Setbacks

Reduce the average distance between the primary business or building entrance(s) and the nearest sidewalk of bicycle facility

Most of the uses in Ontario exhibit suburban characteristics with medium to large setbacks. Building setbacks determine the scale of the streetscape. Buildings with minimal or no setbacks help reduce vehicle speeds and provide direct access to destinations. Buildings that are set back further from the street, with parking between the building and the street, create conditions that can promote higher vehicle speeds and reduce driver vigilance. Reducing the average distances that buildings are set back from the street will help foster a more welcoming and safer environment for pedestrians and bicyclists using the streets.

Building Orientation

Increase the percent of buildings with a direct pedestrian or bicycle connection to the nearest street or associated bicycle or pedestrian facility.

There is a mix of buildings in Ontario that are oriented to the street. The availability of a pedestrian connection between the building and the street is also mixed. Where a building cannot be located adjacent to the street, pedestrian connections between the buildings and sidewalk or bicycle facility should be included, and to the extent feasible should provide a direct link between the two. Providing pedestrian connections between the building and the street reduces people's exposure to hazards, including having to cross drive aisles in parking areas or travel across vegetated or undeveloped stretches of land.

Land Use Mix

Increase the mix of land uses within and among structures in neighborhood-oriented centers and community commercial centers.

Most of Ontario does not have mixed-use areas currently except for some areas in the downtown core. Mixed-use development brings compatible land uses closer together. Increasing the mix of commercial and residential land uses can help create more compact development that accommodates shorter trips between destinations. This in turn creates the options for people walk or ride bicycles to reach typical destinations.

Building, Pathway, & Parking Coverage

Reduce the relative percentage of on-site parking areas and/or increase the relative percentage of on-site building coverage.

The overall percentage of on-site building coverage in Ontario medium for residential uses and low for commercial uses. Conversely, the overall percentage of on-site parking area coverage medium for residential uses and high for commercial uses. Building coverage and the size of parking areas are related in that they typically do not occupy the same space on a property. In other words, increasing the amount of one will require a reduction in the other after a certain point. Surface parking areas often cover more ground than the buildings they serve, causing buildings to be separated from each other. Reducing the amount of parking to what is necessary for typical use allows buildings to be located closer together and/or to occupy a greater portion of the site. Doing so increases the vibrancy of the area, supports the possibility of mixed uses and decreases the cost of development, thereby making it more financially feasible.

Parking Location

Reduce the amount of parking located between the building and the street.

Parking areas for commercial uses are typically located between the building and the street in most of Ontario, contributing to larger building setbacks. Parking areas can be located on the side or behind the building, allowing for the buildings to be set back closer to the street and providing the benefits described above. Locating parking on the side or behind the building also provides pedestrians and bicyclists with a safe, unobstructed path between the sidewalk and building entrance.

Block Size

Reduce the overall block size and secondary or parallel street connections. Where reductions in block sizes are not feasible, increase internal connections through private shopping streets that contribute to smaller block sizes

Most of Ontario has a relatively well-connected network of gridded streets. However, some areas, notably the East Idaho Avenue Refinement Area, have large blocks and a disconnected street system. Disconnected streets isolate land uses and force all trips, regardless of mode, onto higher classification streets without regard for their ultimate destination, contributing to unnecessary roadway congestion or exposure to hazardous areas. An interconnected street system provides linkages to local shopping, services, housing, and amenities.

CODE AMENDMENT RECOMMENDATIONS

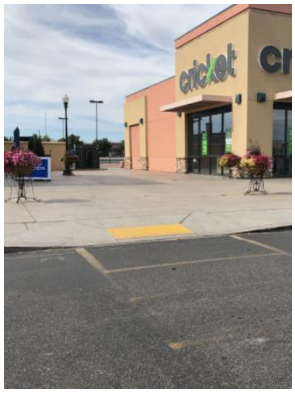
This memo includes general recommendations for potential future code amendments. These recommendations were described in *Technical Memorandum #3: East Idaho Refinement Area Land Use Assessment*. Technical Memorandum #3 was focused on the East Idaho Refinement Area; however, the recommendations also have applicability to the overall Study Area.

Increasing the connection between land use and transportation requires an approach to site planning that incorporates pedestrian-oriented development designs. For example, standards that require large setbacks, vast areas of landscaping, and walls between parking lots and streets result in barriers to pedestrian and bicycle accessibility because the create unsafe, inconvenient, or unpleasant conditions. The code recommendations seek to orient building entrances to sidewalks, break up large areas of surface parking with pathways and landscaping, and provide direct, safe, and comfortable access to buildings.

Inflexible, one-size-fits-all standards discourage mixed-use development. Typically, development codes limit the types of uses that can be mixed, provide design standards, and depending on location, limit or boost allowable density. Allowing high-density residential and mixed commercial/residential uses increases the ease for people to walk or ride their bicycle. It should be noted that a number of the following strategies have been implemented for developments within the Refinement Area, but development code provisions could be strengthened to ensure more consistent application of them.

- **Parking Location Requirements.** ZO provisions can require parking to be located on the side or rear of buildings. Parking and vehicle drives should not be located between building entrances and streets with pedestrian activity. Surface parking areas should be oriented behind or to the side of a building, with access from shared driveways. This provides pedestrians with a safe, unobstructed path from a sidewalk to a building entrance.
- **Enhanced Landscape Standards.** Enhanced landscaping standards, including for parking areas can be applied to new development or

redevelopment. Landscaping should be provided between parking areas and adjacent pathways and streets to provide separation. Minimum landscape requirements should be applied to the interior portion of large parking areas. Interior landscaping improves the appearance of parking lots, provides much needed shade (particularly important in Eastern Oregon's warm climate), and creates options and/or incentives for low impact development approach (LIDA) stormwater facilities.



- **More Efficient Use of Parking.** The amount of parking required for development, either as required by the ZO or by market demands, is the biggest determining factor for a building's footprint on the site and has a significant impact on the cost of development. Reducing the minimum parking requirements allows commercial developers the opportunity to use less space for parking and/or to construct other buildings for other uses or businesses. It also helps reduce the overall cost of construction. Implementing parking maximums with the flexibility to grant modifications to the standards would discourage builders from over-parking their sites and would encourage a closer study of parking supply and demand.

- **Mixed-use Areas.** Multi-family housing in commercial areas can be permitted to allow residents to reduce car travel for all daily activities, as well as prime location for senior housing. Permitting multi-family buildings in commercial areas allows developers to respond to several market conditions simultaneously. The C2H zone can be amended to allow high density residential and mixed commercial/residential uses as a conditional use.
- **Enhanced Pedestrian Connections.** Poor bicycle and pedestrian connectivity often force people to drive. Poor or non-existent connections between adjacent buildings in commercial areas discourages people from walking or bicycling between businesses. Provisions should require pedestrian walkways through sites, connecting building entrances, and the public sidewalk, with safe crossings of streets, drives, and parking areas. The ZO can be amended to require development of internal bicycle and pedestrian connections and/or the creation of internal private streets that mimic public streets to increase overall connections.

Attachment D Street Standard Cross Sections from 2006 Transportation System Plan

7.1.3. Road Design Standards

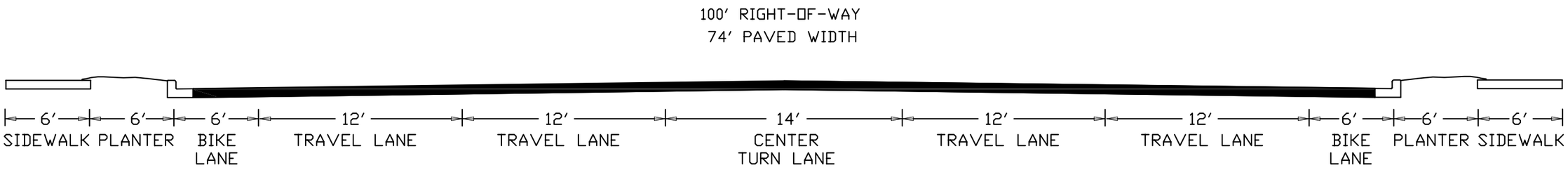
Road classification standards relate the design of a roadway to its function. The function is determined by operational characteristics such as traffic volume, operating speed, safety, and capacity. Road standards are necessary to provide a community with roadways which are relatively safe, aesthetic, and easy to administer when new roadways are planned or constructed. They are based on experience, and policies and publications of the profession.

The typical road cross sections by roadway classification are summarized in Table 7-1 and shown in Figures 7-2, 7-3, 7-4, 7-5a, 7-5b, 7-6a, 7-6b, 7-7a, 7-7b and 7-8.

The road and access management design standards for ODOT facilities can be referenced in the 1999 Oregon Highway Plan and Highway Design Manual. Appendix D contains the ODOT access management design standards that can be found in the 1999 Oregon Highway Plan.

Table 7-1. Street Standards

Type of Street	Minimum Right of Way Width (feet)	Pavement Width (feet)
Principal Arterial	100’	74’+
Minor Arterial	70’-100’	48’-74’+
Collector	60’-70’	38’-48’
Neighborhood Collector	60’	36
Local Street	50’	32’
Skinny Local Street	50’	28’
Radius For Turn Around at End of Cul-de-Sac	50’	40’



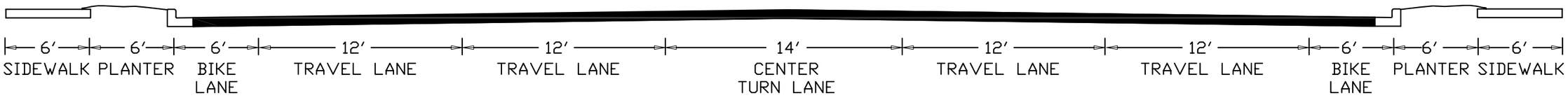
PRINCIPAL ARTERIAL WITH BIKE LANES

NOT TO SCALE

City of Ontario Transportation System Plan

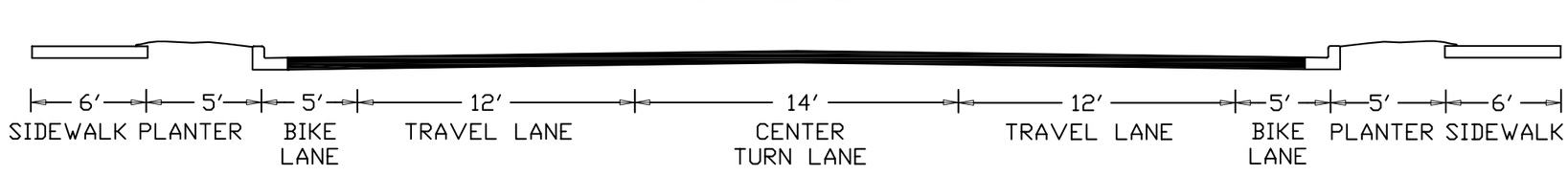
Figure 7-2
Typical Roadway Cross Section Standards
Principal Arterial

100′ RIGHT-OF-WAY
74′ PAVED WIDTH



FIVE LANE MINOR ARTERIAL WITH BIKE LANES

70′ RIGHT-OF-WAY
48′ PAVED WIDTH

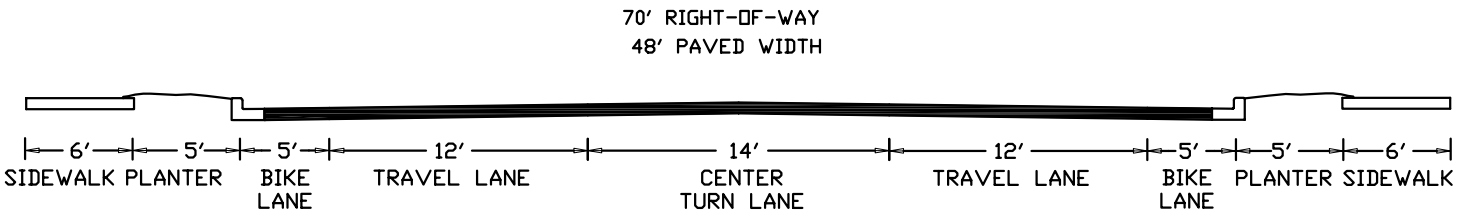


THREE LANE MINOR ARTERIAL WITH BIKE LANES

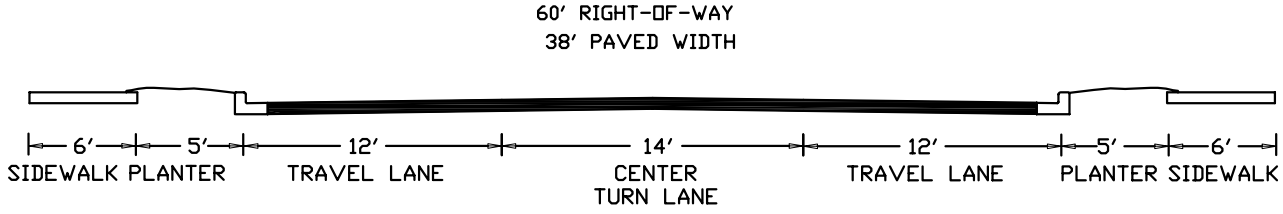
NOT TO SCALE

City of Ontario Transportation System Plan

Figure 7-3
Typical Roadway Cross Section Standards
Minor Arterial



COLLECTOR WITH BIKE LANES



COLLECTOR WITHOUT BIKE LANES

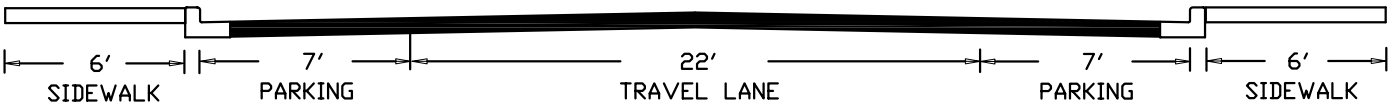
City of Ontario Transportation System Plan

NOT TO SCALE

Figure 7-4
Typical Roadway Cross Section Standards
Collector

60′ RIGHT-OF-WAY

36′ PAVED WIDTH

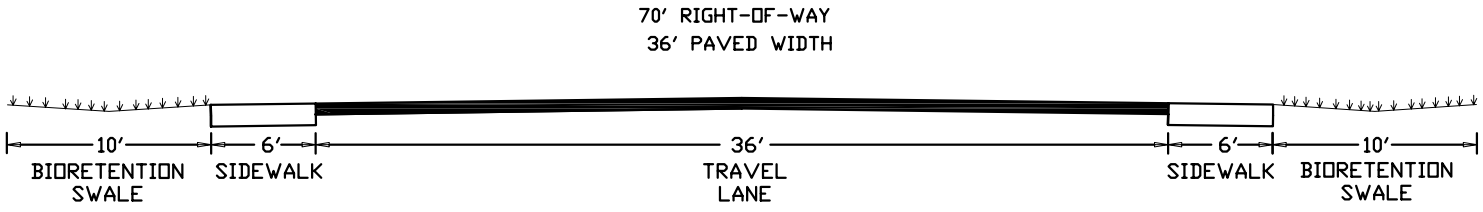


NEIGHBORHOOD COLLECTOR (parking 2 sides)
FOR STREETS WITH GRADES GREATER THAN 2%

City of Ontario Transportation System Plan

NOT TO SCALE

Figure 7-5a
Typical Roadway Cross Section Standards
Neighborhood Collector Greater Than 2%



NEIGHBORHOOD COLLECTORS WITH GRADES EQUAL TO OR LESS THAN 2%

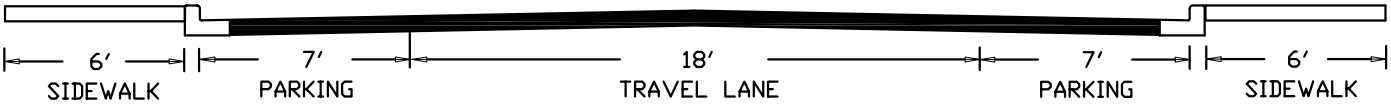
City of Ontario Transportation System Plan

NOT TO SCALE

Figure 7-5b
Typical Roadway Cross Section Standards
Neighborhood Collector Equal to or Less Than 2%

50′ RIGHT-OF-WAY

32′ PAVED WIDTH



LOCAL STREET (parking 2 sides)

FOR STREETS WITH GRADES GREATER THAN 2%

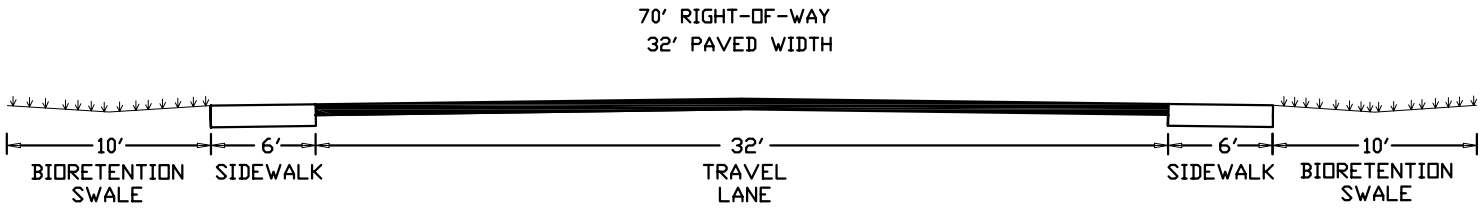
City of Ontario Transportation System Plan

NOT TO SCALE

Figure 7-6a

Typical Roadway Cross Section Standards

Local Street Greater Than 2%

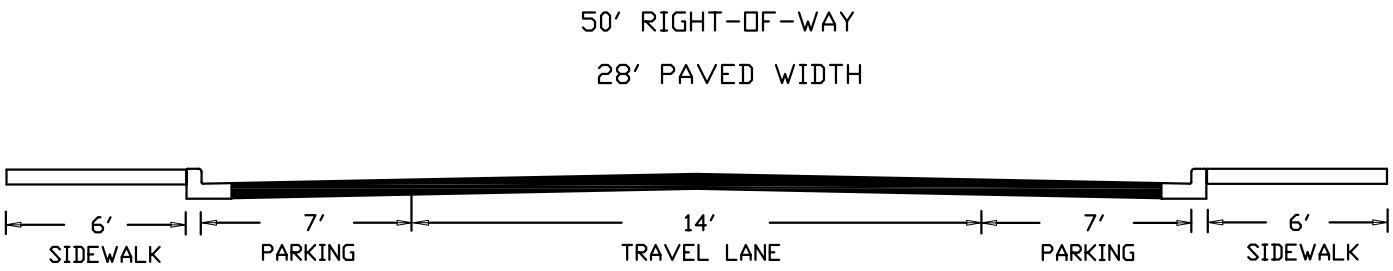


LOCAL STREETS WITH GRADES EQUAL TO OR LESS THAN 2%

City of Ontario Transportation System Plan

NOT TO SCALE

Figure 7-6b
Typical Roadway Cross Section Standards
Local Street Equal to or Less Than 2%

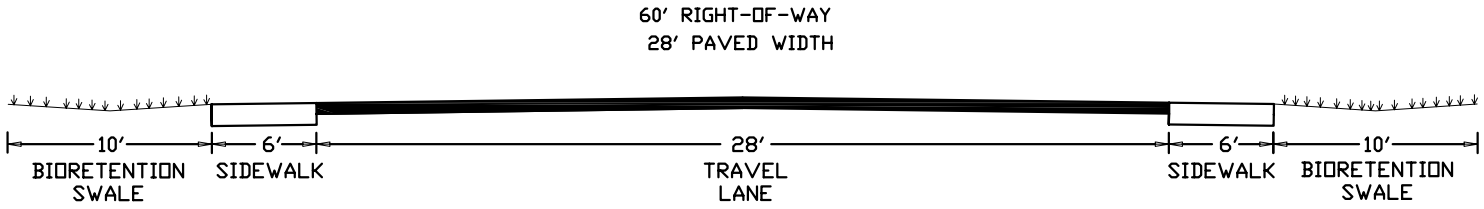


SKINNY LOCAL STREETS (parking 2 sides)
FOR LOCAL STREETS WITH GRADES GREATER THAN 2%

City of Ontario Transportation System Plan

NOT TO SCALE

Figure 7-7a
Typical Roadway Cross Section Standards
Skinny Local Street Greater Than 2%

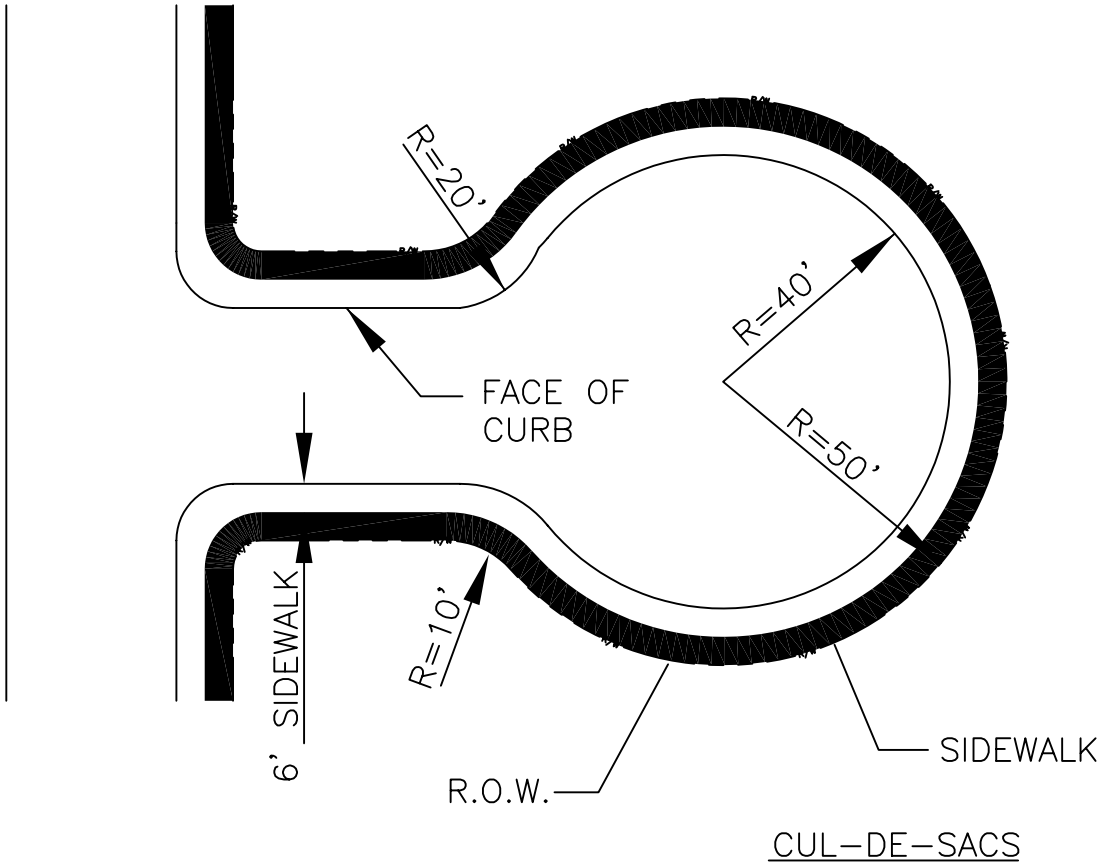


SKINNY LOCAL STREETS WITH GRADES EQUAL TO OR LESS THAN 2%

City of Ontario Transportation System Plan

NOT TO SCALE

Figure 7-7b
Typical Roadway Cross Section Standards
Skinny Local Street Equal to or Less Than 2%



City of Ontario Transportation System Plan

NOT TO SCALE

Figure 7-8
Typical Roadway Cross Section Standards
Cul de Sac Turn Around

Attachment E Green Street Project Case Studies and Toolbox

Green Street Examples

Example: Sisters Cascade Ave. Streetscape

- Stormwater Swale with dry eastern Oregon plant palette

Curb cut at curb extension stormwater infiltration planter

Curb cut at curb extension stormwater infiltration planter

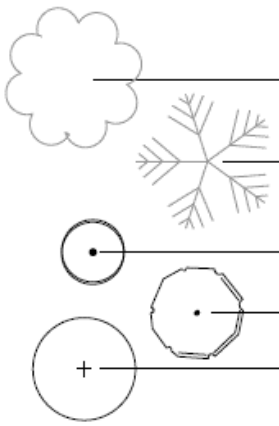
Bench at stormwater infiltration planter

Native plants in stormwater infiltration planter

Sisters Cascade Ave. Streetscape Plant List:

- Copied from Greenworks Sisters Streetscape project.
- See Supplemental Info folder for more information

Master Plant Legend and Notes



BOTANICAL NAME	COMMON NAME	PLANT TYPE. SPACING
Trees		
Existing Deciduous Tree to Remain		
Existing Conifer Tree to Remain		
Populus tremula 'Erecta'	Swedish Columnar Aspen	2.5" Caliper, B&B, Branched @ 6'
Acer rubrum 'Armstrong'	Armstrong Maple	2.5" Caliper, B&B, Branched @ 6'
Acer grandidentatum 'Rocky Mountain Glow'	Rocky Mountain Glow Maple	2.5" Caliper, B&B, Branched @ 6'
Shrubs/Grasses/Groundcover		
Arctostaphylos patula	Greenleaf Manzanita	1 Gal. Cont., Space as shown
Artemisia arbuscula	Dwarf Sagebrush	1 Gal. Cont., Space as shown
Calamagrostis brachytrycha	Korean Feather Reed Grass	2 Gal. Cont., Space as shown
Calamagrostis x acutiflora 'Stricta'	Feather Reed Grass	2 Gal. Cont., Space as shown
Caryopteris x clandonensis 'Dark Knight'	Bluebeard	1 Gal. Cont., Space as shown
Cornus alba 'Bailhalo'	Ivory Halo Dogwood	5 Gal. Cont., Space as shown
Chrysothamnus viscidiflorus	Green Rabbitbrush	2 Gal. Cont., Space as shown
Perovskia atriplicifolia 'Little Spire'	Little Spire Russian Sage	1 Gal. Cont., Space as shown
Pinus mugo 'Slowmound'	Mugo Pine	5 Gal. Cont., Space as shown
Purshia tridentata	Bitterbrush	2 Gal. Cont., Space as shown
Rudbeckia fulgida 'Early Bird Gold'	Black-eyed Susan	1 Gal. Cont., Space as shown
Salvia dorrii	Purple Sage	1 Gal. Cont., Space as shown
Achillea 'Moonshine'	Yarrow	1 Gal. Cont., Space at 12" O.C. triangular spacing
Aubrieta deltoidea	Rock Cress	1 Gal. Cont., Space at 12" O.C. triangular spacing
Deschampsia caespitosa 'Northern Lights'	Autumn Moor Grass	1 Gal. Cont., Space at 12" O.C. triangular spacing
Festuca glauca 'Boulder Blue'	Boulder Blue Fescue	1 Gal. Cont., Space at 12" O.C. triangular spacing
Festuca idahoensis 'Siskiyou Blue'	Idaho Blue Fescue	1 Gal. Cont., Space at 12" O.C. triangular spacing
Pennisetum alopecuroides 'Hameln'	Fountain Grass	1 Gal. Cont., Space at 12" O.C. triangular spacing
Sesleria autumnalis	Autumn Moor Grass	1 Gal. Cont., Space at 12" O.C. triangular spacing

Central Oregon Stormwater Plant Palette

- Consider sticking solely with plants that require no irrigation once established

Native Plants for Rain Gardens in Central Oregon

Common Name	Botanical Name	Shade	Part Shade	Sun	Ongoing Irrigation Needed*	No Irrigation once established
Wax Currant	*Ribes cereum*		X	X		X
Desert Spray	*Holodiscus dumosus*			X		X
Desert Sweet	*Chamaebatiaria millefolium*			X		X
Native Yucca	*Yucca glauca*			X		X
Idaho Fescue	*Festuca idahoensis*		X	X		X
Scarlet Gilia	*Ipomopsis aggregata*		X	X		X
Prairie Lupine	*Lupinus lepidus*		X	X		X
Indian Blanket Flower	*Gaillardia aristata*		X	X		X
Purple Sage	*Salvia dorrii*		X	X		X
Native Globemallow	*Sphaeralcea munroana*		X	X		X
Blue Flax	*Linum lewisii*		X	X		X
Penstemons	*Penstemon spp.*		X	X		X
Oregon Sunshine	*Eriophyllum lanatum*			X		X
Sulfur Buckweat	*Eriogonum umbellatum*			X		X
Thymeleaf Buckweat	*Eriogonum thymoides*			X		X
Oval Leaf Buckweat	*Eriogonum ovalifolium*			X		X
Native Creeping Phlox	*Phlox diffusa, P. douglasii or P.hoodii*		X	X		X
Pussytoes	*Antennaria microphylla*		X	X		X
Thread leaf Yellow Fleabane	*Erigeron linearis*		X			X
Creeping Oregon Grape	*Mahonia repens*	X	X			X
Pacific Bleeding Heart	*Dicentra Formosa*	X	X		X	
Western Columbine	*Aquilegia Formosa*	X	X		X	
Native Woods Strawberry	*Fragaria vesca*	X	X		X	
Snowberry	*Symphoricarpus racemosus*	X	X			
Subalpine Spirea	*Spirea densiflorus*	X	X		X	
Serviceberry	*Amelanchier alnifolia*	X	X			X
Native Blue eyed Grass	*Sisyrinchium idahoense*	X	X		X	
Native Wild Geranium	*Geranium maculatum*	X	X		X	
Birch Leaf Spirea	*Spirea betulifolia*	X	X		X	
Chokecherry	*Prunus virginiana*	X	X	X	X	
Catmint	*Nepeta X faasenii*	X	X		X	
Tall Alumroot	*Heuchera chlorantha*	X	X		X	
Woods Rose	*Rosa woodsi*	X	X	X	X	
Blue Elderberry	*Sambucus carulea*	X	X	X	X	
Tufted Hairgrass	*Deschampsia caespitosa*	X	X	X	X	X (shade)

* Irrigation needed after first dry season. Most plants will require some irrigation to become established.

Attachment F Off-Street Path Toolbox

Off-street Path Design Toolbox

Types of paths:

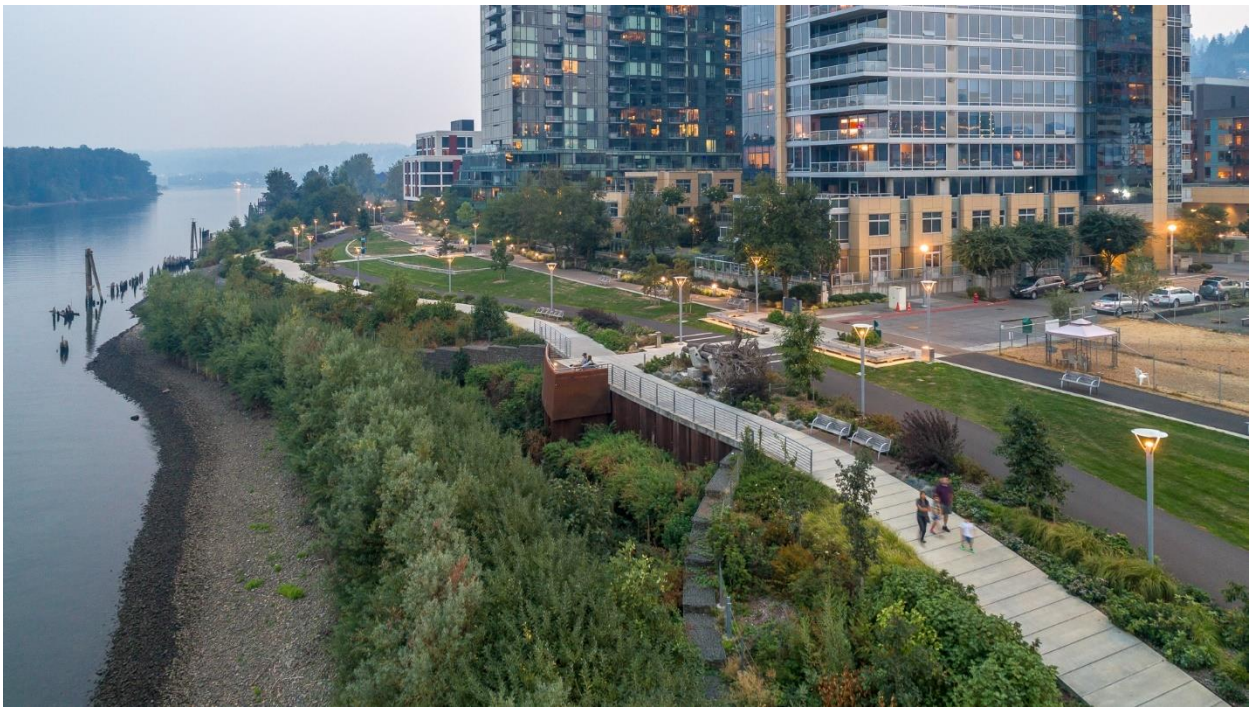
- **Shared-use path** (also known as Mixed-use Path)
  - Physically separated from motor vehicle traffic and used by bicyclists, pedestrians, and other non-motorized users
  - Typically located in an independent alignment, such as a greenbelt, abandoned railroad, or other green space.
  - Intended uses:
    - Serves as a piece of a network of on-road and off-road bike facilities to connect users bough within and through a township.
    - Connects parks and other green spaces safely off-road
    - Residential connection and/or school access
    - Common commuting routes from residential areas to business centers
  - An off-street path is intended to supplement a larger network of on-road bike facilities (does not act as a substitute)
  - Intended user groups:
    - Bicyclists
    - Wheelchair users (motorized & non-motorized)
    - Walkers, people with baby strollers, people walking dogs
    - Inline Skaters, Rollerbladers
    - Runners
    - Equestrian
      - Can be accommodated with an adjacent bridle trail (soft surface trail)
      - See soft surface trails section below
  - Design criteria:
    - The recommended paved width for two-directional shared-use path is 12’ – 14’, with a minimum width of 10’. In some limited cases, a reduced width of 8’ is allowable to get through pinch-points, utility boxes, road barriers, etc. but should not be sustained at that smaller width for long distances.
      - 2’ graded area on either side is recommended with a maximum 1:10 slope
      - Serves as a safe place for bikers or other pedestrians to swerve as well as to drain stormwater
      - Total paved width = 10’ – 14’
      - Total graded width= 14’ – 18’
    - Recommended minimum paved width for a one-directional shared use path is 6’ – 8’.
      - Keep in mind, one-way paths often will be used as two-way facilities unless effective measures are taken to assure one-way operation
      - A minimum 2’ wide graded area (both sides) with a maximum 1:10 slope
    - A minimum of 3’ is preferred for clearance to trees, poles, walls, fences, guardrails, or other vertical obstructions

        - However, if clearance (from edge of pave to obstruction) is less than 5', a barrier or safety rail should be used
    - Maximum lean angle: 20 degrees; minimum curve: 60' at 18 mph
    - Slopes:
        - Between 0.5%-5% grade; no steeper than adjacent roadway
        - Maximum cross-slope 2% (1% recommendation)
- Examples:

(source: Greenworks PC)

(source: Greenworks PC)

- Example of parallel but separated pedestrian and bike paths



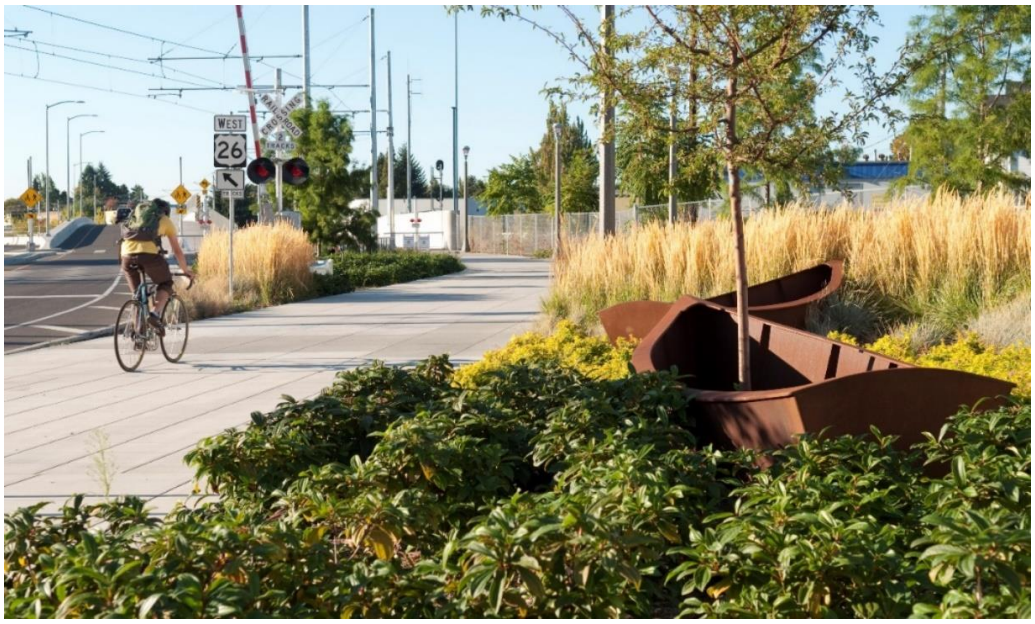
(source: SWA/Balsley)

(source: Greenworks PC)

- **Sidepaths** *(recommended for E Idaho Ave)*
  - Constructed within the right-of-way of a road and roughly parallel to that road.
  - Cyclists and pedestrians along a side-path will have increased interactions with motor vehicles at driveways and intersections compared to a shared-use path in an independent alignment.
    - However, they will have far less interaction than a shared lane or an on-road separated bike lane
    - Can offer safer, more accessible experience for users of all ages and abilities as compared to on-road facilities in heavy traffic environments
  - Maintains small town community character
    - Path can oscillate within the right-of-way and does not necessarily need to remain perfectly aligned to road
    - Opportunity here to insert “pause spaces” and pedestrian amenities such as trees for shade, wayfinding signs, seating, bike racks, etc.
  - Ideal for Collector Roads & Highways
    - For use on arterial links on the regional or local biking / walking network
  - Design criteria:
    - Similar to a two-directional multi-use path, the minimum recommended paved width of the path is 10’, however a reduced width of 8’ is allowable to get through pinch-points, road barriers, etc. but should not be sustained at that width for long distances.

- A minimum 5’ wide separation between the path and road is desirable to demonstrate to both the cyclist and motorist that the path functions as an independent facility
    - In instances where this separation is not possible, a physical barrier is recommended
- Landscaping:
    - Trees and landscaping can be used in buffer to provide shade for users and help absorb stormwater runoff as well as act as a physical barrier
    - Provide 3’ horizontal clearance between trees and pathway to minimize cracking & heaving of the paved surface

- Examples:

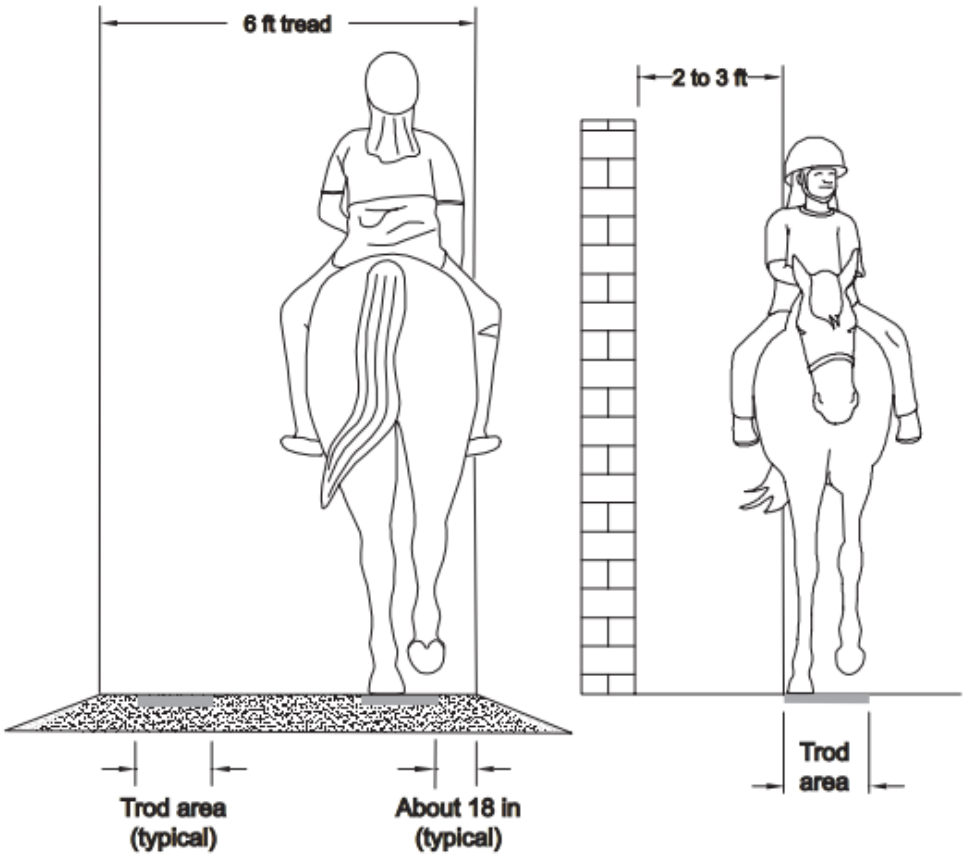


(source: Greenworks PC)

(source: Alta Planning + Design)

(source: Alta Planning + Design)

- **Unpaved Paths**
  - May be appropriate for rural or recreational paths
  - Intended Users:
    - Equestrian
    - Gravel bike riders
    - Walkers / runners
  - Typical materials:
    - Crushed stone
    - Stabilized earth
    - Limestone screenings
  - Design criteria:
    - Minimum 6’ wide path



(source: USFS Equestrian Design Guidebook p. 3)

  - Trails must have enough space for stock to feel at ease.
    - Horses tend to trod 18” from the edge of the tread, except while passing (see example A above)

        - Riders tend to guide horses 2-3’ away from buildings and obstacles (see example B above)
    - Limiting Factors:
        - Some users cannot traverse an unpaved path
        - May cause drainage issues

(source: NPS, labeled for re-use)

(source: unknown)

Information Sources:

- *Bicycle Facility Toolbox, Colorado Springs, Toole Design Group (https://coloradosprings.gov/sites/default/files/cos_bikes_draft_appendix_b.pdf)*
- *Off-Road facilities Part 1: Shared Use Path Design, Toole Design Group (http://www.pedbikeinfo.org/pdf/Webinar_PBIC_LC_100912_AASHTO_5.pdf)*
- *Small Town and Rural Design Guide, Alta Planning + Design (https://ruraldesignguide.com/)*
- *Equestrian Design Guidebook for Trails, Trailheads and Campgrounds, USFS (https://www.fs.fed.us/t-d/pubs/pdfpubs/pdf07232816/pdf07232816dpi72pt03.pdf)*