

US 97 PARKWAY PLAN – LEVEL 2 EVALUATION

November 19, 2019 Policy Board and TAC Meeting

Agenda

2

- Project Status and Related Planning Efforts
- Level 2 Evaluation
 - Review TM #7
 - Discussion
- Powers/Murphy Road
 - Review TM #8
 - Discussion
- Outreach
- Implications for Investment Strategy
- Next Steps

Status and Schedule

Task	2018		2019			2020				
	SUM	FALL	WIN	SPR	SUM	FALL	WIN	SPR	SUM	
Goals	■									
Existing & Future Conditions		■	■	■	■					
Develop Alternatives				■	■					
Evaluate Alternatives						■	■	■	■	
Investment Strategy								■	■	
Draft & Final Plan									■	■
Adoption										■
PUBLIC INPUT/MEETINGS										
Public Input		● SURVEY						● ONLINE OPEN HOUSE		
Sounding Board		①						②		
Technical Advisory Committee		①		②				③		
Policy Board		①						②	③	

Level 2 Evaluation

- Project Bundles A and B (from TM #6) modeled
- Additional RIRO closure + Ramp Meter Bundle run to help differentiate the benefits of other projects
- No-Build Conditions used as a scoring baseline
- Evaluation Criteria from Methodology Memo applied
- Scored by performance measure, -2 to +2 scale
- Safety was weighted double
- When projects conflict, recommendation based on highest score

Study Areas

- Corridor-Wide
- North Area
- Central Area
- South Area



Corridor Wide Projects – Evaluation Results

- Ramp Metering
- RIRO Closures/Modifications
- Ramps to Standard Length
- Active Transportation Prioritization
- TSMO

Ramp Metering Evaluation Results

□ Pros

- Safety
- Travel time reliability
- Mobility on Parkway (merges)
- Decreases VMT (short out-of-direction Parkway trips reduced)

□ Cons

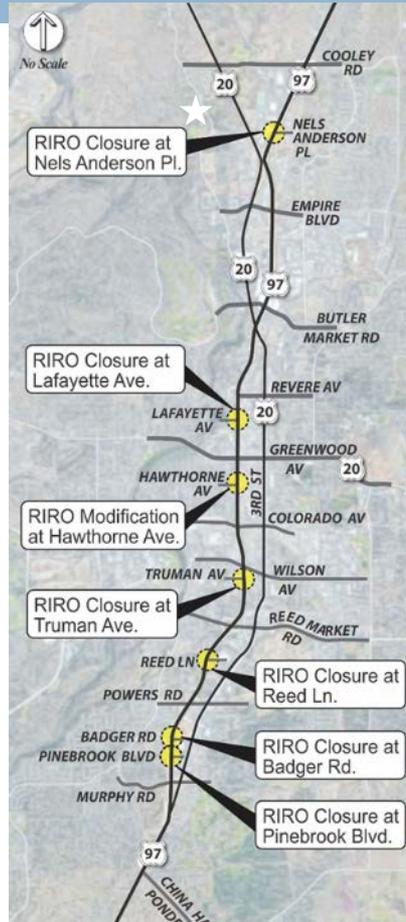
- Local System Mobility
- Local System Travel Time Reliability

**Score = 12: Recommended for Implementation Planning
(assumed not to be needed in near-term)**

RIRO Closure Evaluation Results

□ Pros

- Safety
- Travel time reliability
- Mobility on ODOT System
- Cost Effective
- Key for corridor management with ramp meters
- Phased implementation (e.g. Nels Anderson)



□ Cons

- Local System Mobility
- Increase in local system VMT
- Degrades local travel time reliability

Score = 17: Recommended for Implementation Planning
(implementation would likely be phased)

Ramps to Standard Length Evaluation Results

□ Pros

- Safety
- Benefit to ramp meters (increased acceleration distance)

□ Cons

- High cost at some locations

□ Tier 1 Recommendations

- Hawthorne Exit Deceleration Lane
- Reed Market SB Off-Ramp
- Revere Ave NB On-Ramp

Score = 7: Tier 1 Recommended for Implementation Planning (implementation would likely be phased)

Active Transportation Improvements

□ Tier 1

- Cooley Rd
- Butler Market Rd
- Olney Ave
- Greenwood Ave
- Hawthorne Ave
- Franklin Ave

□ Tier 1 Continued

- Canal/Garfield Ave
- Badger/Pinebrook Blvd
- Murphy Rd
- China Hat Rd – NEW
- Baker/Knott Rd

Score = 16: Recommended for Implementation

Planning (implementation would likely be phased)

Active Transportation Improvements

□ Tier 2

- Robal Rd
- Empire Ave
- Revere Ave
- Aune Rd

□ Tier 2

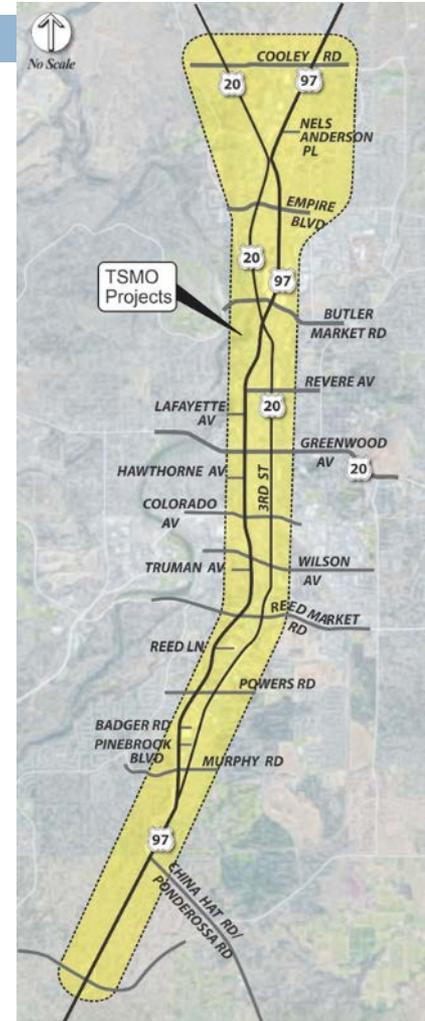
- Wilson Ave
- Reed Market Rd
- Powers Rd

**Score = 16: Recommended for Implementation Planning
(implementation would likely be phased)**

TSMO Projects Evaluation Results

Recommend Projects

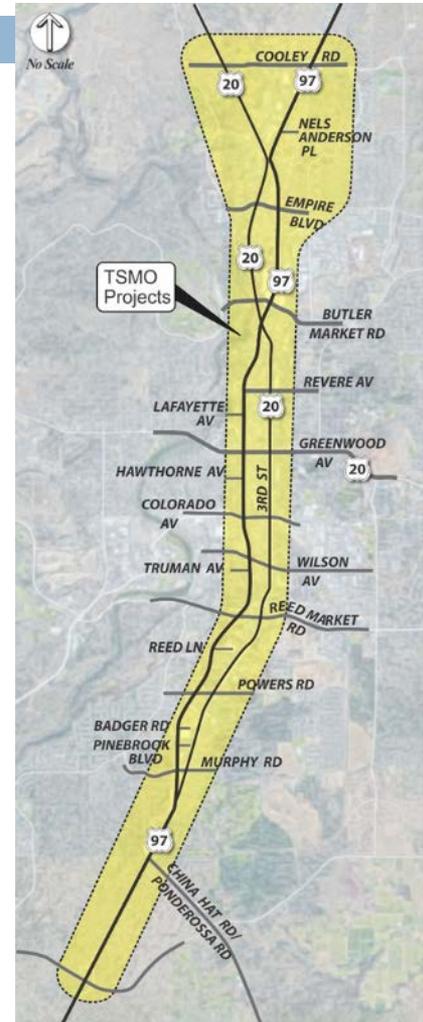
- Incident Management (Score = 16)
- Weather Warning System (Score = 15)
- Variable Speed Signs (Score = 13)
- Enhanced Signal Operations at Ramp Terminals (Score = 12)
- Shoulders Built to Standard (Score = 10)
- Travel Information Signing (Score = 8)



All Recommended for Implementation Planning

TSMO Projects Evaluation Results

- Recommended for near-term/interim Implementation
 - ▣ Transit Signal Priority (Score = 9)
 - ▣ Freight Signal Priority (Score = 8)
- Recommended for bundling with other related projects
 - ▣ Roadside Traveler Information Dissemination (Score = 8)



All Recommended for Implementation Planning

North Study Area Project – FEIS Evaluation Results

□ Pros

- Safety
- Travel Time Reliability
- Decreased delay
- Improved ODOT intersection operations
- New N-S multi-modal connections

□ Cons

- Cost
- Increased demand on 3rd Street south of Empire

Score = 20: Recommended for Implementation per ongoing US 97 North Corridor Study

Central Study Area Projects

- US 97 Auxiliary Lanes
- Butler Market Road Projects
- Revere Avenue Project
- Colorado Avenue Projects

US 97 Auxiliary Lanes Evaluation

Results

Two Projects: SB Auxiliary Lane from Empire to Butler Market and NB Auxiliary Lane from 3rd Street to Empire

□ Pros

- Safety
- Travel time reliability
- Mobility on ODOT System

□ Cons

- Benefits focused on motor vehicles

Score = 17: Recommended for Implementation Planning

Butler Market Rd SB Frontage Rd Evaluation Results

□ Pros

- Safety
- Reduces local system congestion on Butler Market Rd
- Mobility on ODOT system
- Potential low stress N-S multi-modal connection

□ Cons

- Signal timing could be challenging on Butler Market, but could use a roundabout instead

Score = 14: Recommended for Implementation Planning

Butler Market Rd SB Off-Ramp Evaluation Results

Southbound Off-Ramp Terminal Signal/Roundabout

□ Pros

- ▣ Safety
- ▣ Mobility on ODOT system

□ Cons

- ▣ Signal option would be challenging with railroad crossing and 3rd Street intersection

Score = 16: Recommended for Implementation Planning

Butler Market Rd/4th Street Evaluation Results

Signal or Roundabout at Butler Market Rd and 4th Street

□ Pros

- ▣ Mobility on local system
- ▣ Reduced queue impacts to US 97 ramps
- ▣ Reduced delay

□ Cons

- ▣ Ultimate selected option should be the same control type as the southbound off-ramp (two signals or two roundabouts)

Score = 14 (signal)/17 (roundabout): Supported by the Parkway Study for Implementation Planning through the TSP

Revere Avenue Lane Re-channelization Evaluation Results

□ Pros

- Multi-model benefits to the Revere Avenue corridor
- Removes split phasing at multiple intersections
- Consistent with the City's Low Street Bicycle Network

□ Cons

- Minor delay increase for SB off-ramp at Revere Avenue

Score = 11: Supported by the Parkway Study for Implementation Planning through the TSP

Colorado Ave Diamond Interchange – Evaluation Results



Colorado Ave Diamond Interchange – Evaluation Results

□ Pros

- Safety
- Improves operations at both ramp terminals

□ Cons

- Significant ROW Impacts
- Configuration not ideal for highest demand movements
- High capital costs

Score = 8: Not Recommended for Implementation

Colorado Avenue – Northbound Ramps Signal

□ Pros

- Safety
- Mobility
- Low Cost

□ Cons

- Not the complete solution, does not address issues at southbound ramps

Score = 18: Recommended for Implementation Planning

In addition, a coordinated project addressing local accessibility related to the Core Area, including the Aune and Sisemore Extensions and exploring reconfiguration options for the southbound ramps is **recommended for implementation planning.**

South Study Area Projects

- Reed Market Road Projects
- China Hat Road
- Baker/Knott Road

Reed Market/US 97 SPUI Evaluation Results



Reed Market/US 97 SPUI Evaluation Results

□ Pros

- Safety
- Meets ODOT Mobility Target at interchange
- Reduces delay

□ Cons

- Queueing issues caused by other bottlenecks on Reed Market remain
- High Cost
- Negative impacts to bike/ped on Reed Market Road
- ROW impacts

Score = 4: Not Recommended for Implementation

Reed Market/US 97 NB Off-ramp Widening Evaluation Results

□ Pros

- More queue storage

□ Cons

- The intersection control improvement at the NB ramp terminal negates most of the benefits from this project
- ROW impacts

Score = 7: Not Recommended for Implementation

Reed Market/3rd Street Left Turn Lane Evaluation Results

□ Pros

- ▣ Safety
- ▣ Removes split phasing, enhances capacity
- ▣ Reduces queue spillback impacts to interchange
- ▣ Improves local system travel time reliability
- ▣ Funded through the Bend CIP

□ Cons

- ▣ Increases ped crossing distances at the intersection

Score = 12: Supported by the Parkway Study for Implementation Planning through the TSP

Reed Market/US 97 NB Off-ramp Signal/Roundabout Evaluation Results

□ Pros

- Safety
- Mobility and queuing improvement for NB off-ramp terminal
- Opportunity for new bike/ped crossing on Reed Market
- Relatively low cost

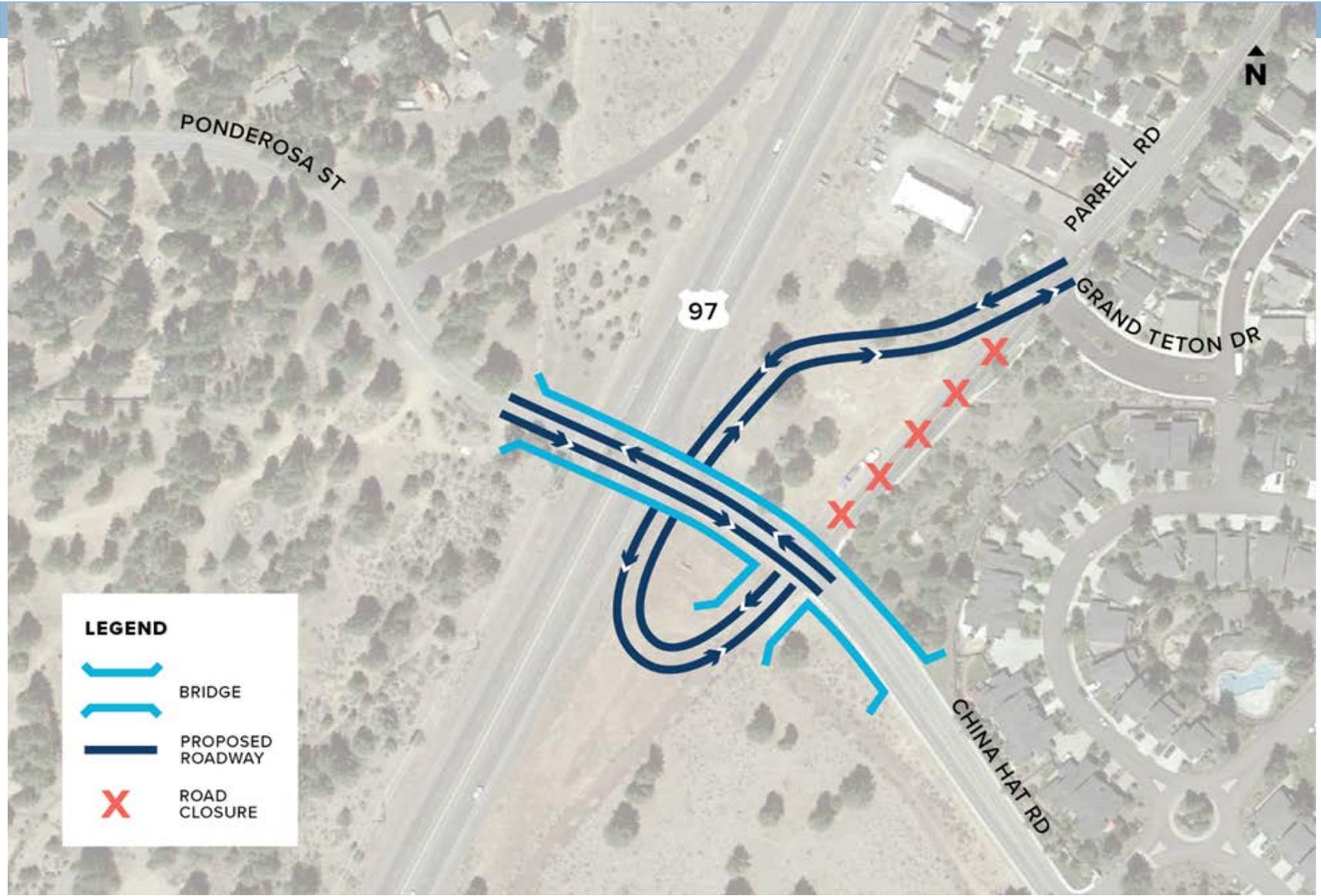
□ Cons

- Does not fix the issues at this location on by itself, such as left turn conflicts at Reed Market/Division Street

Score = 13: Recommended for Further Consideration

In addition, a study of the Reed Market Corridor from Bond St to 3rd St is **recommended for implementation planning** to identify a coordinated solution

China Hat Road Overcrossing Evaluation Results



China Hat Road Overcrossing Evaluation Results

□ Pros

- Safety
- Travel time reliability
- Mobility benefits at 3rd/Murphy
- New multi-model crossing of US 97
- Provides relief to Parrell Road when combined with “South Frontage Road”

□ Cons

- Some ROW Impacts

Score = 19: Recommended for Implementation Planning

Frontage Road from Ponderosa to Baker Evaluation Results

□ Pros

- New multi-model N-S facility parallel to US 97

□ Cons

- ROW Impacts
- High Cost
- Rail conflicts



Score = 4: Not Recommended for Implementation

Baker/Knott/US97 Signals/ Roundabouts Evaluation Results

□ Pros

- ▣ Meets ODOT mobility targets (both options)

□ Cons

- ▣ Cost

Score = 15: Recommended for further consideration through an IAMP

Summary of Recommendations

Project Category	Projects Recommended for Implementation ¹
Corridor-Wide Projects	Ramp Meters
	Close All RIRO Except RI (exit from Parkway) at Hawthorne Ave
	Ramps improved to standard lengths
	Active transportation improvements (Crossings)
	Shoulders built to standard
	Weather warning system
	Variable speed signs
	Incident management
	Enhanced signal operations at ramp terminals
	Traveler information signing
	Roadside Traveler Information Dissemination (only if bundled with other strategies)
North Study Area	FEIS projects

¹These projects will be further prioritized for short, medium, and long term in the investment strategy

Summary of Recommendations Con't

Project Category	Projects Recommended for Implementation ¹
Central Study Area	Auxiliary lane Empire Blvd to Butler Market Rd SB
	Auxiliary lane 3rd St to Empire Blvd NB
	Butler Market SB frontage road to interchange
	Butler Market Roundabout (or signal) at SB off ramp
	Butler Market Roundabout (or signal) at 4 th Ave (Through the TSP)
	Revere Avenue Lane Reconfiguration (Through the TSP)
	Colorado Avenue Signal (or roundabout) at NB ramp
	Colorado Avenue Improvement to SB ramp intersection pending TSP and Core Area Plan connectivity recommendations
South Study Area	Reed Market Refinement Study from Bond Street to 3 rd Street
	Dedicated left turn lane Reed Market Rd and 3 rd St (Through the TSP)
	Powers Road Interchange
	China Hat Overcrossing (pending Murphy to Ponderosa Frontage Road)
	IAMP at Baker Rd/Knott Rd interchange
	Murphy Tight Diamond Interchange (See Technical Memorandum #8)
	North Frontage Road (See Technical Memorandum #8)
	South Frontage Road (See Technical Memorandum #8)

¹These projects will be further prioritized for short, medium, and long term in the investment strategy

Murphy-Powers Analysis (TM #8)

- Concepts
- Sensitivity Testing
- Evaluation Results
- Recommendations

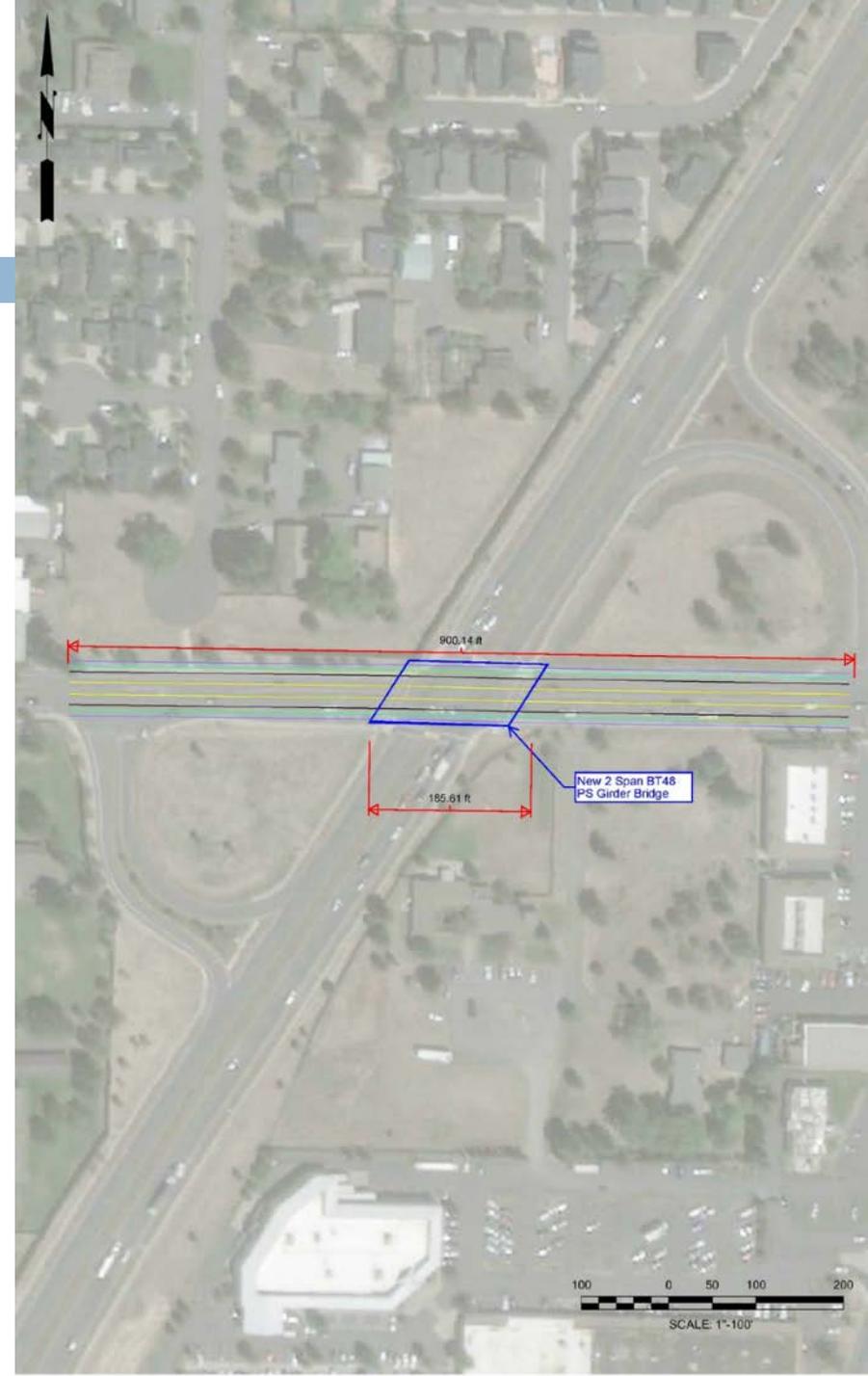
US 97/Powers Tight Diamond Concept

- ❑ Matches existing conditions, lane configuration
- ❑ Consistent with other overcrossings
- ❑ Ramps per standard – 3-5% grade
- ❑ Some ROW impacts to SE and NW
- ❑ Cost: \$24,700,000



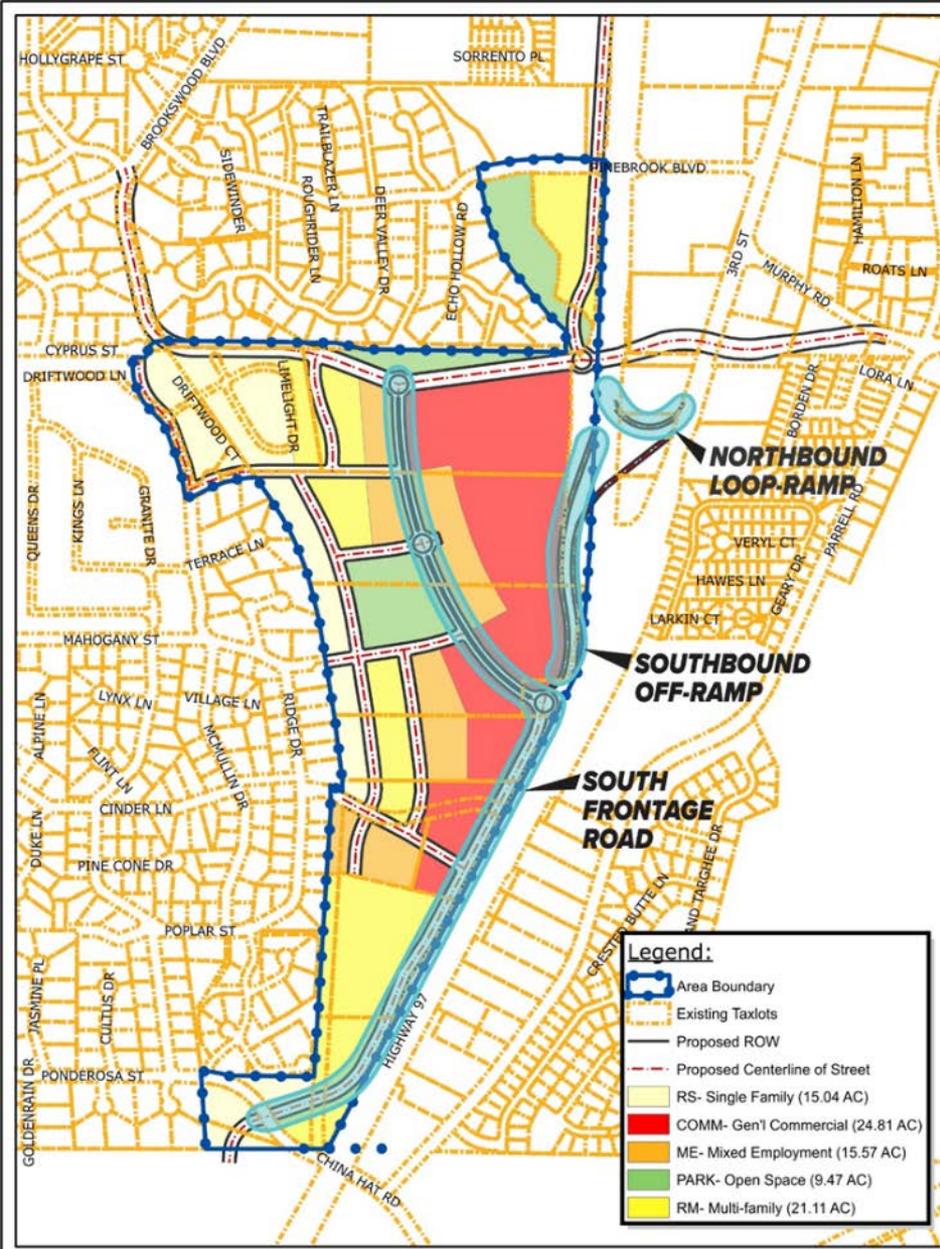
US 97/Powers Overcrossing Concept

- Assumptions and constraints the same as the interchange
- No significant ROW impacts
- Cost: \$8,000,000



South Parkway Refinement Plan Concepts

- Southbound Off-Ramp
- Northbound Loop On-Ramp
- “South Frontage Road”



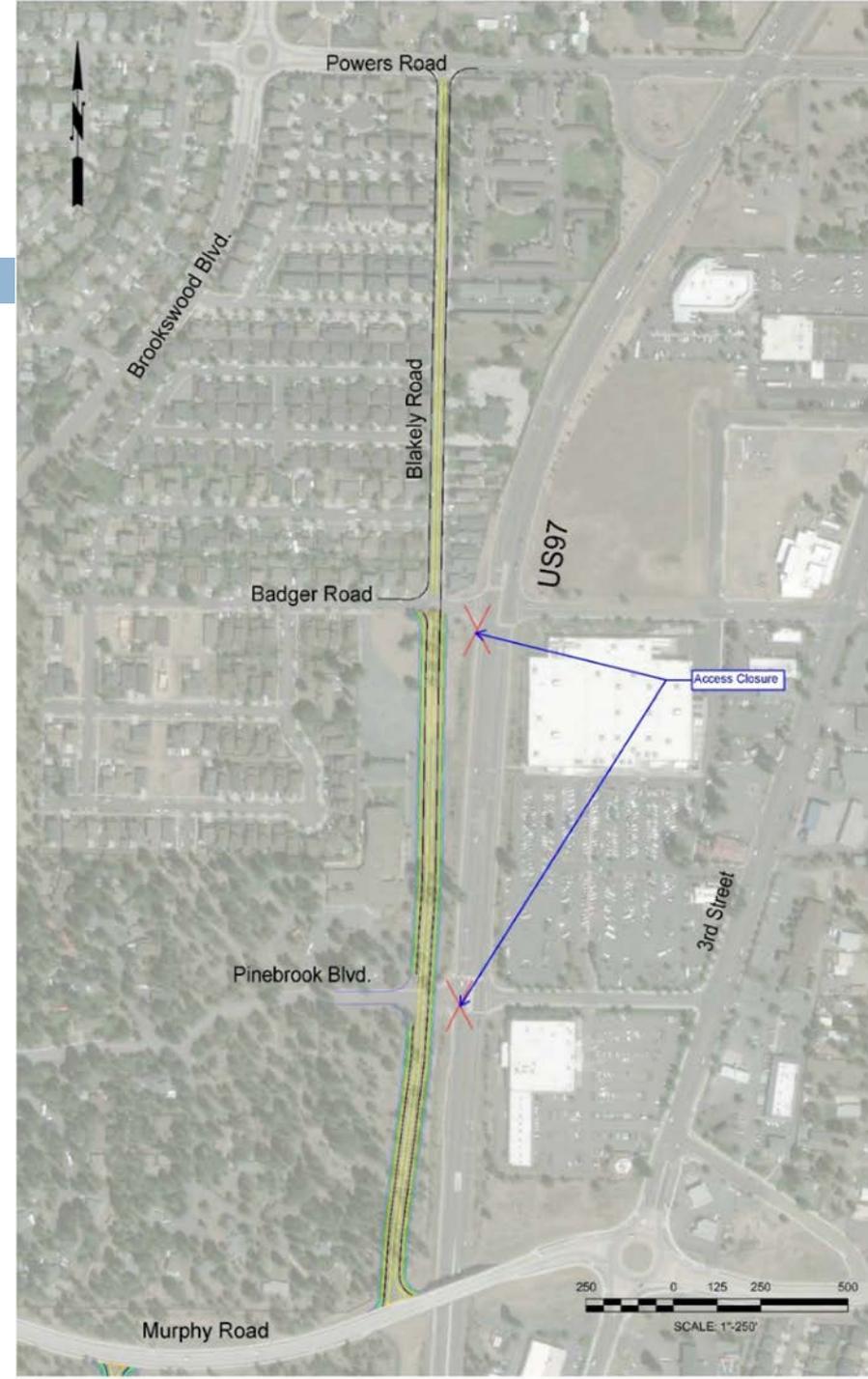
Murphy Crossing - Preferred Plan



0 100 200 400 600 800 Feet

North Frontage Road Concept

- ❑ Match existing proposed typical sections for the 3rd Street bridge
- ❑ Designed to City of Bend standards as a local street improvement
- ❑ Significant ROW impacts
- ❑ Cost: \$15,200,000



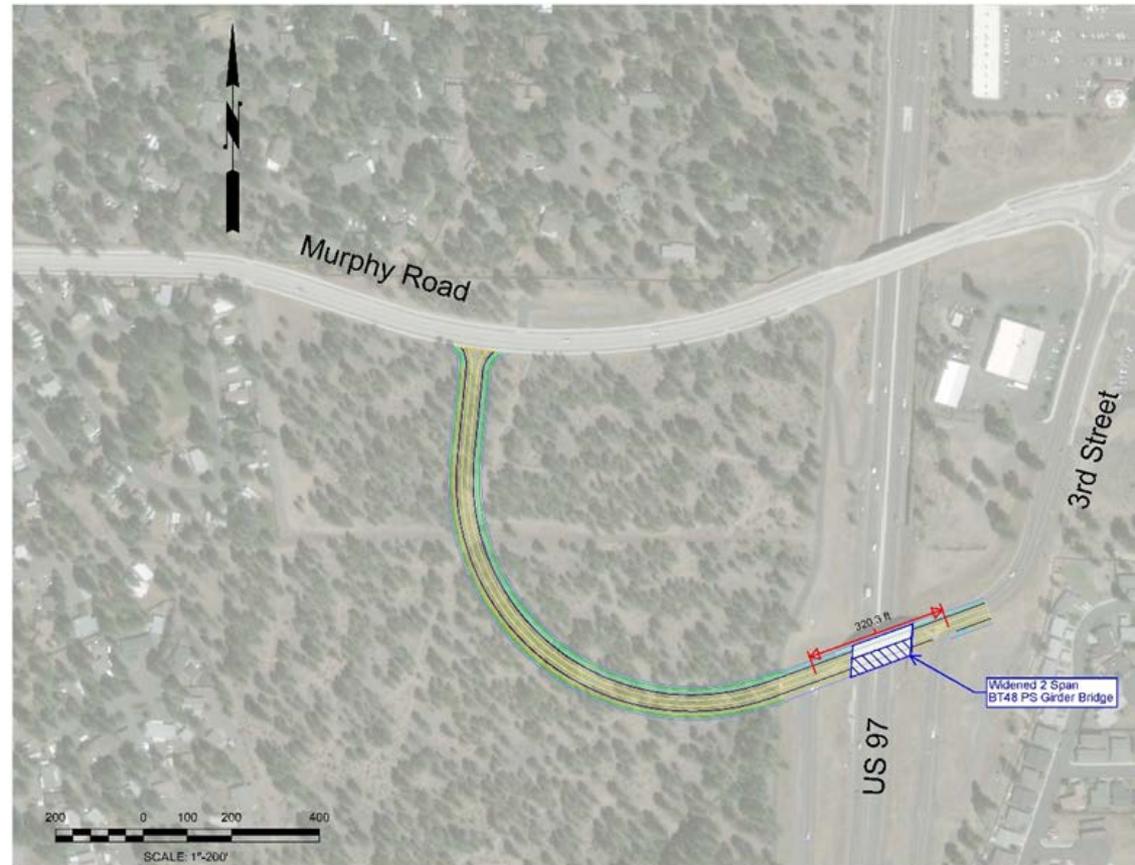
Murphy Tight Diamond Concept

- Widen bridge and add ramps for full interchange
- Match Murphy Road cross section
- Designed to standards
- Ramp at 3% grade
- Cost: \$11,900,000 not including ROW

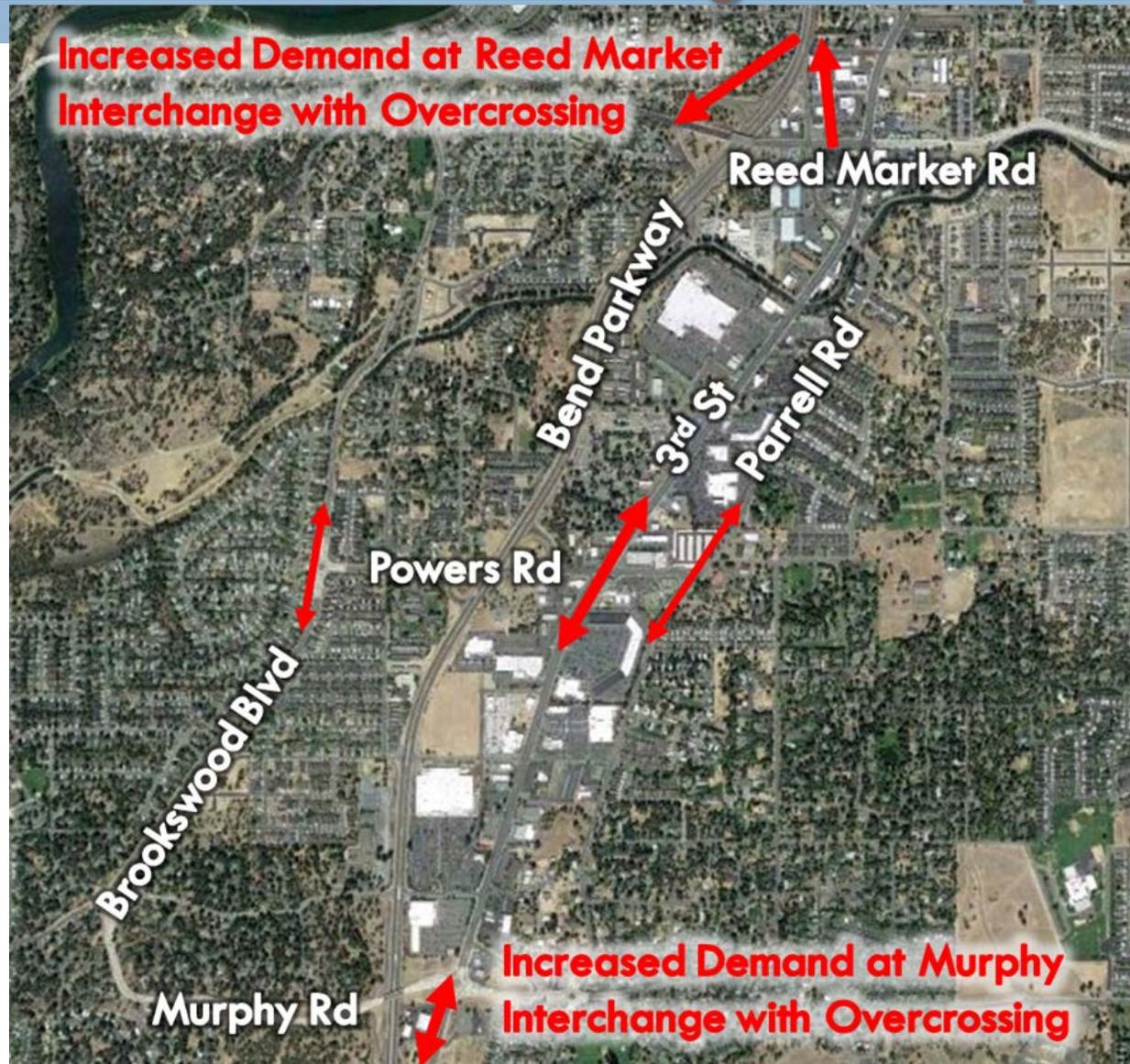


West Loop Frontage Road Concept

- Connects the southbound ramp terminal to Murphy Road
- Would likely connect terminate at Murphy Road with a roundabout
- \$10,900,000



Sensitivity Findings - Powers Diamond vs Powers Overcrossing Concepts



Sensitivity Findings – Murphy Diamond vs Murphy Crossing Concepts



Powers Road Overcrossing Concept Evaluation Results

□ Pros

- Safety
- Travel Time Reliability
Benefits to Parkway
- Provides low stress crossing of Parkway for bikes/peds
- Minor ROW impacts

□ Cons

- Degrade Travel Time reliability on 3rd Street
- Shifts volume to Reed Market Interchange
- Shifts volume to 3rd/Murphy
- Shifts more volume to Brookswood Blvd

Score = 10: Not Recommended for Implementation

Powers Road Tight Diamond Interchange Concept Evaluation Results

□ Pros

- Safety
- Manages ramp queues
- Meets ODOT mobility standards at ramp terminals
- Provides low stress crossing of Parkway for bikes/peds
- Could be phased if full access is provided at Murphy

□ Cons

- High Cost
- ROW Impacts

Score = 14: Recommended for Implementation Planning

Murphy Crossing Plan Ramps

Evaluation Results

□ Pros

- Free-Flow ramp terminals
- Low Cost (excluding the South Frontage Road)
- Leverages other TSP projects

□ Cons

- Potential safety issues from tight radii northbound on-ramp
- Degrades operations at 3rd/Murphy
- Southbound off-ramp Requires the South Frontage Road to function
- ROW impacts
- Potential impacts to existing Murphy Bridge

Score = 9: Not Recommended for Implementation

Murphy Tight Diamond Concept Evaluation Results

□ Pros

- Safety
- Meets ODOT mobility targets at ramp terminal IF Powers remains full access
- Completes low-stress bike/ped crossing of US 97 (with West Loop Frontage Road)
- Could be phased
- Provides opportunity for land use west of US 97 to avoid the 3rd/Murphy intersection

□ Cons

- Potential impacts to Les Schwab property
- Would need some form of the West Loop Frontage Road to realize full access/circulation benefits

Score = 17: Recommended for Implementation Planning

North Frontage Road Concept Evaluation Results

□ Pros

- Provides opportunity to complete N-S low-stress bike/ped connection near the Parkway
- Improves operations at multiple local system intersections
- Shift some traffic off Brookwood Blvd
- Could be phased

□ Cons

- ROW Impacts
- High Cost

Score = 15: Recommended for Implementation Planning

South Frontage Road Concept Evaluation Results

□ Pros

- Improves operations at multiple local system intersections
- Shifts “Thumb” traffic off Parrell when combined with China Hat Overcrossing

□ Cons

- ROW Impacts
- High Cost

Score = 13: Recommended for Implementation Planning

West Loop Frontage Road Concept Evaluation Results

□ Pros

- Improves operations at 3rd/Murphy
- Provides opportunity for land use west of US 97 to avoid the 3rd/Murphy intersection (when combined with Murphy tight diamond)

□ Cons

- ROW Impacts
- Cost (but has funding options)
- Would require some re-design of current South Frontage Road Concept

Score = 13: Recommended for Implementation Planning

Combined Murphy Improvements

- Build Tight Diamond Interchange first
- West Loop Frontage Road should be built before commercial development
- \$22,800,000



Combined Murphy Improvements

Powers – Murphy Recommendations

- Murphy Tight Diamond Interchange – highest priority
- Powers Road Tight Diamond Interchange – next priority
- North frontage road – priority based on timing of closure of Badger and Pinebrook RIRO access
- West Loop Frontage Road – priority based on development west of the Murphy interchange
- South Frontage Road – Priority based on development of the “Thumb” and China Hat Overcrossing construction

Public Outreach

- Survey and Sounding Board #1 reviewed conditions and obtained input on vision and needs
- Additional outreach on evaluation and preliminary recommendations planned for this Fall
 - ▣ Sounding Board #2: November 20
 - ▣ Virtual Open House: November 25-December 13
 - ▣ Will be accompanied by additional outreach to Title VI communities to reach broader audience

Title VI: Demographic Profile

- 92% non-Hispanic (of which 93% are white alone)
- Residents 65+ increased 3% over 10 years, other age groups remained steady
- 93% are English only speakers; 30% of Spanish speakers speak English “Less than very well”
- Housing cost burden for renters +5% over 10 years; homeowner costs decreased 10%
- Poverty rate has decreased overall, share of persons 65+ in poverty has slightly increased

Respondents to the 2018 Parkway survey (1,799 responses) generally consistent with Bend’s demographic profile, with some underrepresentation from low-income groups.

Title VI: Takeaways

- Bend does not appear to have any one particularly prominent Title VI population.
- Residents **65 years and older** are a growing population that may benefit from additional outreach.
- **Low-income** populations may have been underrepresented in previous outreach and can be more difficult to engage due to limited availability.
- Low-income groups and seniors may be reached by direct outreach to social service organizations, services for senior citizens, schools, and/or locations where seniors and low-income residents regularly visit such as shopping centers.

Title VI: Outreach Contacts

Senior Citizen Services

- Larkspur/Bend Senior Center

Shopping Centers

- Walmart
- Fred Meyer
- Albertsons
- Bend River Promenade
- Grocery Outlet
- Safeway

Schools

- Bend-La Pine School District
- Central Oregon Community College
- Highland Elementary School

Social Service Organizations

- Latino Community Association
- Central Oregon Council on Aging
- Cascade Youth & Family Center
- Bend Senior Center at Camp Marshal
- Cascade Youth & Family Center
- Central Oregon Collective
- Open Arms Adult Day Service
- Shared Future Coalition
- Heart of Oregon Corps
- Big Brothers Big Sisters
- Boys & Girls Clubs of Bend
- J Bar J Youth Services
- Neighbor Impact
- Healy Heights Head Start
- Center for Independent Living

Neighborhood Associations (Adjacent)

- SE Bend Neighborhood Association
- SW Bend Neighborhood Association
- Boyd Acres
- Old Bend Neighborhood Association
- River West Neighborhood Association
- Orchard District Neighborhood Association
- Old Farm District Neighborhood Association

Next Steps

- Review evaluation of alternatives: November-December 2019
- Investment Strategy: January-February 2019
 - ▣ MPO TAC/Policy Board review
- Draft Parkway Plan: Spring 2020
 - ▣ MPO TAC/Policy Board review
- City, MPO and OTC Adoption: Summer 2020