

## Background on OR 18 Fort Hill Evaluation of Concepts

This document describes the detailed evaluation process for the system connectivity and interchange concepts in the project study area. The project team conducted this analysis to ultimately recommend three potential concepts to advance for public review in Spring 2021.

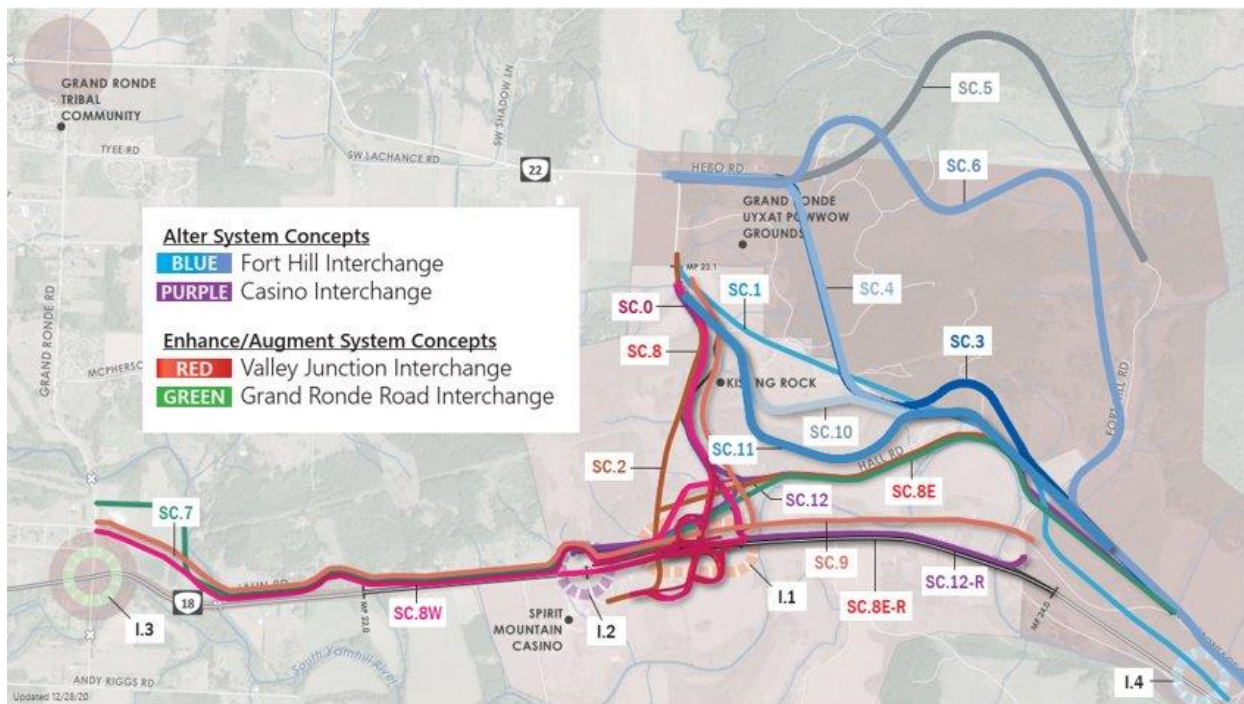
### Evaluating system connectivity concepts against project goals

Twelve (12) potential system connectivity concepts were identified by the Steering Committee. They fell into two groups:

- Concepts that *alter the system* by rerouting OR 22 away from the Valley Junction intersection to the existing OR 18/Fort Hill Road interchange (blue concepts).
- Concepts that *enhance or augment the existing system* through realignment of OR 22 through Kissing Rock area and utilizing a potential new interchange at either Valley Junction (red concepts), existing Spirit Mountain Casino interchange (purple concepts), or Grand Ronde Road (green concepts).

All of the system connectivity concepts are shown in **Error! Reference source not found.**

**Figure 1: System connectivity concepts**



Each of these proposals were scored based on evaluation criteria tied to the project goal. Concepts with the highest scores were selected for more advanced study. The evaluation criteria and performance measures for this scoring are as follows:

**Table 1: Evaluation Criteria**

Criteria		Performance Measures
<b>SAFETY</b>		
<b>S1</b>	<b>Concept reduces crash frequency and severity</b>	Safety characteristics defined as speed, sight distance, turning radius, lane width, barrier protection. 5=significantly improves safety for all design characteristics, 3=moderately improves safety, 1=does not address safety characteristics
<b>S2</b>	<b>Concept reduces potential conflicts</b> <ul style="list-style-type: none"> <li>- Between vehicles</li> <li>- Between vehicles and pedestrians</li> <li>- Between vehicles and bicyclists</li> <li>- Between bicyclists and pedestrians</li> </ul>	Does the alternative reduce potential conflicts? 5=eliminates conflicts, 3=reduces conflicts and improves safety, 1=does not address safety characteristics
<b>S3</b>	<b>Concept improves comfort and reduces level of stress for multi-modal users</b> <ul style="list-style-type: none"> <li>- Including people walking, using mobility devices, biking, and using transit</li> </ul>	Separation from motorized travel, connectivity to pedestrian facilities. 5=full separation from motorized travel with direct connection to existing bike/ped facilities, 3=partial/minimal separation from motorized travel, 1=no change from existing condition
<b>S4</b>	<b>Concept helps meet (or move in the direction of) spacing standards</b> (access management and interchange spacing)	Does the concept help with spacing and access of facilities for safe operation and function? 5=improved safety, 3=moderate improvement in safety, 1=minimal to no improvement in safety
<b>S5</b>	<b>Concept improves timing gap for turning movements</b>	Is gap spacing and time improved? 5=gap spacing and time significantly improved, 3=gap spacing and time minimally improved, 1=no

		improvement or increase in gap spacing and time
<b>S6</b>	<b>Concept improves safety for river users</b>	Clearance from structures/foundations for those using river. 5=improves safety for users, 3=no change from current condition for users, 1=increases hazards for users.
<b>S7</b>	<b>Concept enhances emergency lifeline routes (also Resiliency)</b>	Is emergency lifeline route improved? 5=significantly improved, 3=minimally improved, 1=no improvement for emergency lifeline route
<b>S8</b>	<b>Concept maintains or enhances emergency services access (also Resiliency)</b>	Is emergency access improved? 5=emergency access significantly improved, 3=emergency access minimally improved, 1=no improvement for emergency access
<b>MOBILITY</b>		
<b>M1</b>	<b>Concept helps meet OHP mobility targets (or HDM v/c standards for new construction)</b>	Meets Oregon Highway Plan mobility targets. 5=Meets all or most targets, 3=meets a few targets, 1=meets no targets
<b>M2</b>	<b>Concept improves multimodal LOS</b>	Concept improves level of service for vehicles, pedestrians, bicyclists and transit. 5=significantly improves level of service, 3=moderate change in level of service, 1=no change/negative impact to level of service.
<b>M3</b>	<b>Concept does not hinder freight operations</b>	Impacts to freight operations: 5= No weight restrictions on bridges are needed and vertical clearances are adequate, 3=Weight restrictions on bridges or reduced vertical clearance are needed, 1=Weight restrictions and reduced vertical clearance are needed.
<b>M4</b>	<b>Concept improves circulation (also Safety)</b> - Reduce the number of new stop conditions (that stop free flow movement)	Improves the existing circulation for vehicular travel. 5=enhances circulation, 3=no change to existing travel, 1=negative impact to existing circulation.

	<ul style="list-style-type: none"> <li>- Positive/negative change in speed, sight distance, lane width</li> <li>- Concept introduces barrier protection</li> </ul>	
<b>M5</b>	<b>Concept improves connectivity to walkways and trails for non-motorized travel</b> (also Community and Equity)	Improves the ability of non-motorized travel to circulate in the corridor. 5=improves existing circulation, 3=no change to existing circulation, 1=negative impact to circulation.
<b>M6</b>	<b>Concept reduces congestion along project corridor</b>	Measure of congestion reduction in the corridor. 5=improves existing congestion, 3=no change to existing congestion, 1=negative impact to congestion.
<b>COMMUNITY AND EQUITY</b>		
<b>Q1</b>	<b>Concept is supported by Title VI and EJ Populations</b>	Based on feedback from engagement tools, concept receives support from local and tribal communities. 5=highly supports. 3=moderately supports. 1=minimal/no support.
<b>Q2</b>	<b>Concept is consistent with other plans and policies</b> (project purpose and need, goals, Oregon Highway Plan, Polk County TSP, CTGR TSP)	Consistent=5. Not consistent=0.
<b>Q3</b>	<b>Concept supports economic development</b>	Supports economic development. 5=highly supports or aids in economic development to the area. 3=moderately supports or aids in economic development to the area. 1=minimal/no support or aid to economic development.
<b>Q4</b>	<b>Concept improves multimodal mobility in areas with high concentration of Title VI and EJ populations</b>	Improves the ability of non-motorized travel to circulate in the corridor. 5=improves existing circulation, 3=no change to existing circulation, 1=negative impact to circulation.

<b>Q5</b>	<b>Concept mitigates against negative impacts on local businesses</b>	Casino or other businesses are affected. 5=no significant impacts, 3= some impacts, 1=major impacts
<b>Q6</b>	<b>Concept does not disproportionately impact areas with high concentration of Title VI and EJ populations</b>	Based on local Census block groups, Title VI population are affected. 5=no/minimal impacts, 3= some impacts, 1=major impacts
<b>Q7</b>	<b>Concept improves connectivity to walkways and trails for non-motorized travel (also Mobility)</b>	Improves the ability of non-motorized travel to circulate in the corridor. 5=improves existing circulation, 3=no change to existing circulation, 1=negative impact to circulation.
<b>Q8</b>	<b>Concept mitigates against physical impacts to recreation use in corridor</b>	Number of physical encroachments altering recreation use along the Corridor. 5=improvements and no impact to recreation use, 3=some impact to recreation use, 1=major impact to recreation use
<b>Q9</b>	<b>Concept enhances setting through compatibility of bridge aesthetics in community</b>	Bridge aesthetics are compatible with community. 5=enhances setting, 3=no change to existing setting, 1=negative impact to existing setting.
<b>Q10</b>	<b>Concept mitigates against adverse impacts to significant cultural resources</b>	Cultural resources impacted. 5=no significant impacts, 3= some impacts, 1=major impacts
<b>COST &amp; IMPLEMENTATION</b>		
<b>C1</b>	<b>Concept cost is optimized and within budget</b> - ROW - Roadway - Bridge - Access - Maintenance / Lifecycle	What is the relative cost of the road or bridge alternative? 5=Lowest cost, 3=Mid-range cost, 1=Highest cost
<b>C2</b>	<b>Concept mitigates against negative impacts on businesses</b>	Businesses and residents affected during constructions. 5=no/minimal impacts, 3=

	<b>and residents during construction</b>	some impacts outside ROW, 1=major impacts outside of ROW
<b>C3</b>	<b>Concept does not have a significant impact or mitigation costs for:</b> - Environmental: cultural, historical, geotechnical	What is the relative cost of the road? 5=Lowest cost, 3=Mid-range cost, 1=Highest cost
<b>C4</b>	<b>Concept detour distance and duration are low impact to users</b>	Number of miles of detour. 5=No detour required, 1=Greater than 5 mile detour required.
<b>C5</b>	<b>Concept uses detour for a functional phase of the facility and interchange</b>	What is the relative cost of the road? 5=Lowest cost, 3=Mid-range cost, 1=Highest cost
<b>C6</b>	<b>Concept utilizes functionally independent phases</b> (Independent Utility)	What is the relative cost of the road? 5=Lowest cost, 3=Mid-range cost, 1=Highest cost
<b>C7</b>	<b>Concept construction duration is low impact to users</b> (bridges and structures)	Length of bridge construction 5=Can use ABC (accelerated bridge construction), 3=No potential ABC, completion within one year, 1=longer duration than one year
<b>C8</b>	<b>Concept requires Goal Exception</b>	Concept does not require goal exception=5. Concept does require goal exception=0.
<b>RESILIENCE</b>		
<b>R1</b>	<b>Concept enhances emergency lifeline routes</b> (also Safety)	Is emergency lifeline route improved? 5=significantly improved, 3=minimally improved, 1=no improvement for emergency lifeline route
<b>R2</b>	<b>Concept improves non-highway connections throughout corridor</b>	Are non-highway connections improved? 5=connections significantly improved, 3=connections minimally improved, 1=no improvement for non-highway connections

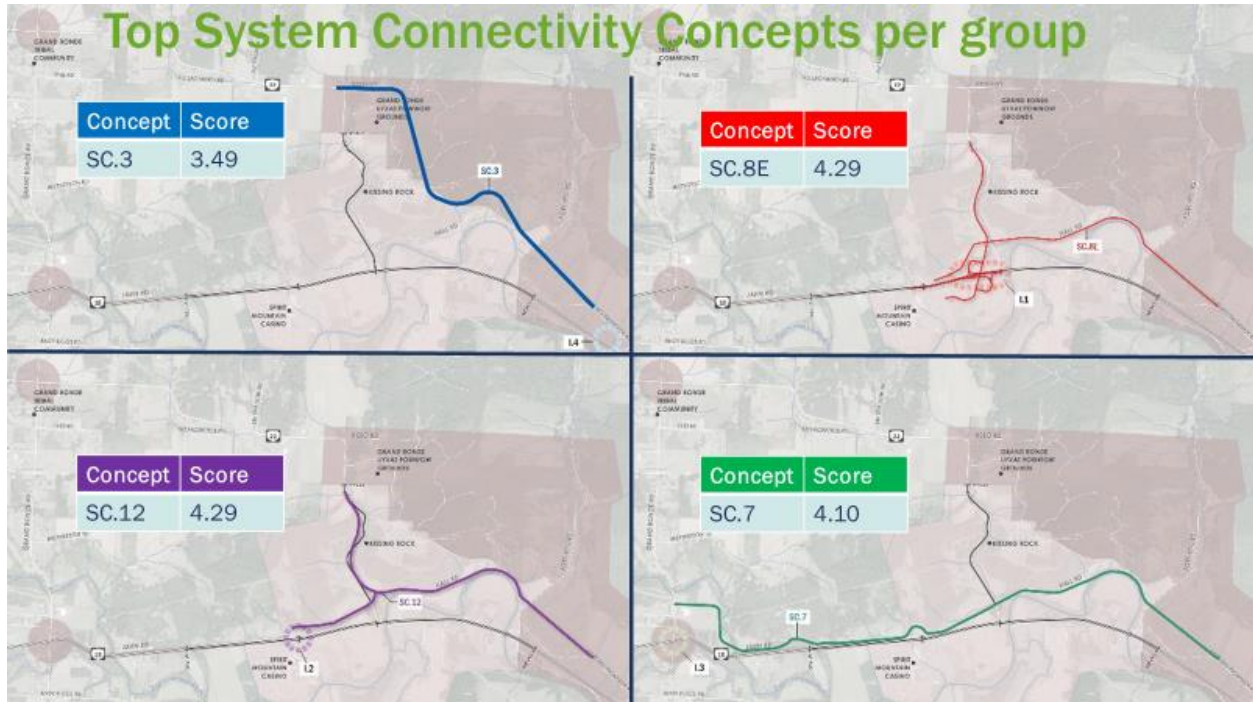
<b>R3</b>	<b>Concept improves multimodal integration with roadway</b> - Includes people walking, using mobility devices, biking, and using transit	integration with motorized travel and access for bus, bicycle and pedestrian facilities. 5=full integration with motorized travel with direct access to bus, bike/ped facilities, 3=partial/minimal integration with motorized travel, 1=no change from existing condition
<b>R4</b>	<b>Concept improves emergency services access and response time</b> (also Safety)	Is emergency access improved? 5=emergency access significantly improved, 3=emergency access minimally improved, 1=no improvement for emergency access
<b>R5</b>	<b>Concept improves seismic resiliency</b>	What is the seismic resilience of the bridge alternative? 5=New bridge (Operational), 3=bridge widening with Phase 2 retrofit (Operational), 1=bridge widening with Phase 1 retrofit (Life Safety)
<b>R6</b>	<b>Concept enhances resiliency of route</b>	What is the remaining service life of the bridge alternative? 5=New bridge, 3=bridge widening with Phase 2 retrofit (Operational), 1=bridge widening with Phase 1 retrofit (Life Safety)
<b>ENVIRONMENT</b>		
<b>E1</b>	<b>Concept has low impact to natural resources</b>	Number of impacts to viewshed: 5= no major change in current natural features, 3=impacts in one or two natural features that can be addressed, 1=major impacts that significantly alter the existing natural features
<b>E2</b>	<b>Concept provides environmental enhancement</b>	Number of enhancements: 5= major environmental enhancements, 3=moderate environmental enhancements, 1=no environmental enhancements
<b>E3</b>	<b>Concept considers fish passage in design</b>	Impacts to fish passage: 5= Open fish channel, 3=Bridge piers in water, 1=Bridge piers in water and channel restriction

<b>E4</b>	<b>Concept has low impact on wetlands, habitat, land use, historical, cultural, archeological, and other resources</b>	Number of impacts to resources: 5= no impact to resources, 3=moderate impact to resources, 1=major impacts
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Below in Figure 2 are the concepts that had top evaluation criteria scores in each concept group.

Figure 2: Top system connectivity concepts per group



These are:

- Top Blue concept – SC.3 system connectivity concept connects to Fort Hill Interchange
- Top Red concept – SC.8E system connectivity concept connects to Valley Junction Interchange concept
- Top Purple concept – SC.12 system connectivity concept connects to Spirit Mountain Casino Interchange concept
- Top Green concept – SC.7 system connectivity concept connects to Grand Ronde Road Interchange concept

For these four system connectivity concepts, the project team conducted further analysis on congestion, travel time and whether a land use goal exception would be needed. The table below shows a high-level summary comparing the top scoring concepts.

**Table 2: Evaluation summary of system connectivity scores**

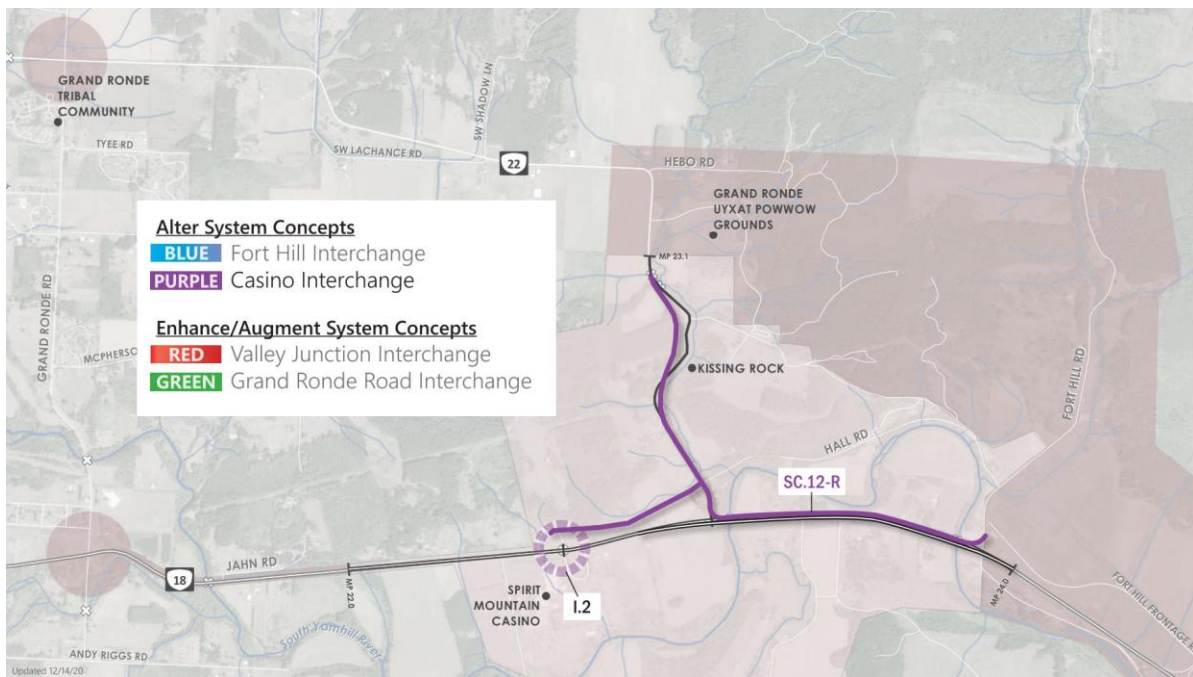
<b>Evaluation Criteria</b>	<b>SC.3 (Blue)</b>	<b>SC.7 (Green)</b>	<b>SC.8E (Red)</b>	<b>SC.12 (Purple)</b>
Safety	4.0	4.0	4.5	4.5
Mobility	3.7	4.3	4.7	4.3
Community and Equity	3.1	4.2	4.4	4.4
Cost and Implementation	3.3	3.7	4.2	4.2
Resilience	3.7	4.3	5.0	4.3
Environment	3.3	4.0	3.0	4.0
<b>Average Rating</b>	<b>3.49</b>	<b>4.10</b>	<b>4.29</b>	<b>4.29</b>
Goal Exception Needed?	Yes	No	Maybe	No
Travel Time (from OR 22/Grand Ronde Rd. intersection to Fort Hill interchange)	6:17 min	7:16 min	6:00 min	7:11 min

## Further refinement of system connectivity concept SC.12

Based on the preliminary OR 18 widening, alignment, and bridge staging work, and further refinement efforts to the SC.12 concept, the project team also recommended the SC.12-R (Revised) concept shown in Figure 3. Preliminary evaluations show that this refinement to SC.12 may include the following additional benefits:

- Provides a shorter, more direct route to the Fort Hill interchange.
- Serves properties north of OR 18 between the two South Yamhill River bridges and reduces the need to develop a separate frontage roadway.

**Figure 3: Revised system connectivity concept SC.12**



## Developing corresponding interchange location concepts

Once the system connectivity concepts were narrowed to the top three, fifteen (15) potential interchange location concepts were identified by the Steering Committee. The identified plausible concepts have been split by potential interchange location and tied to most promising system connectivity concepts. These include:

- Top Purple concept – Spirit Mountain Casino Interchange concept connects to SC.12-R system connectivity concept.
- Top Red concept – Valley Junction Interchange location concept connects to SC.8E system connectivity concept.

The potential interchange locations from the most promising system connectivity concepts, shown below, include:

- Top Purple concept (1) – I2.9: West Diamond – Figure 4
- Top Purple concept (2) – I2.1: Double Dog Bone Diamond – Figure 5
- Top Red concept – I1.0: Parclo B (EA Concept) – Figure 6

**Figure 4. I2.9: West Diamond**

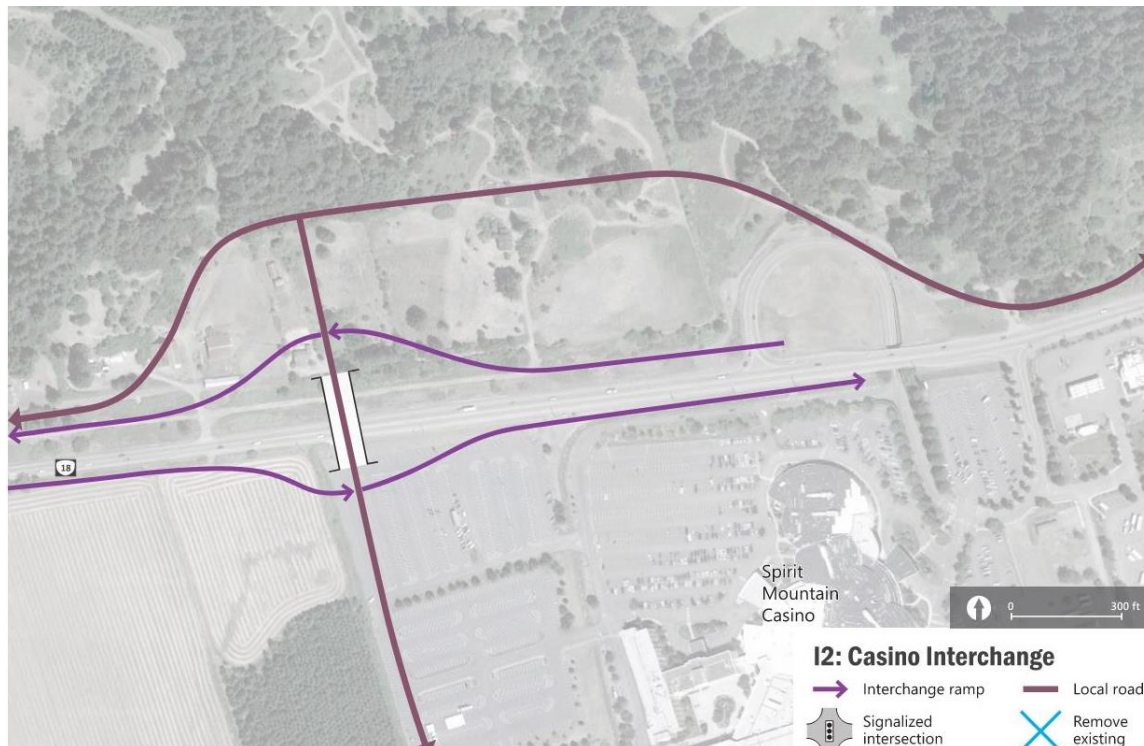


Figure 5. I2.1: Double Dog Bone Diamond

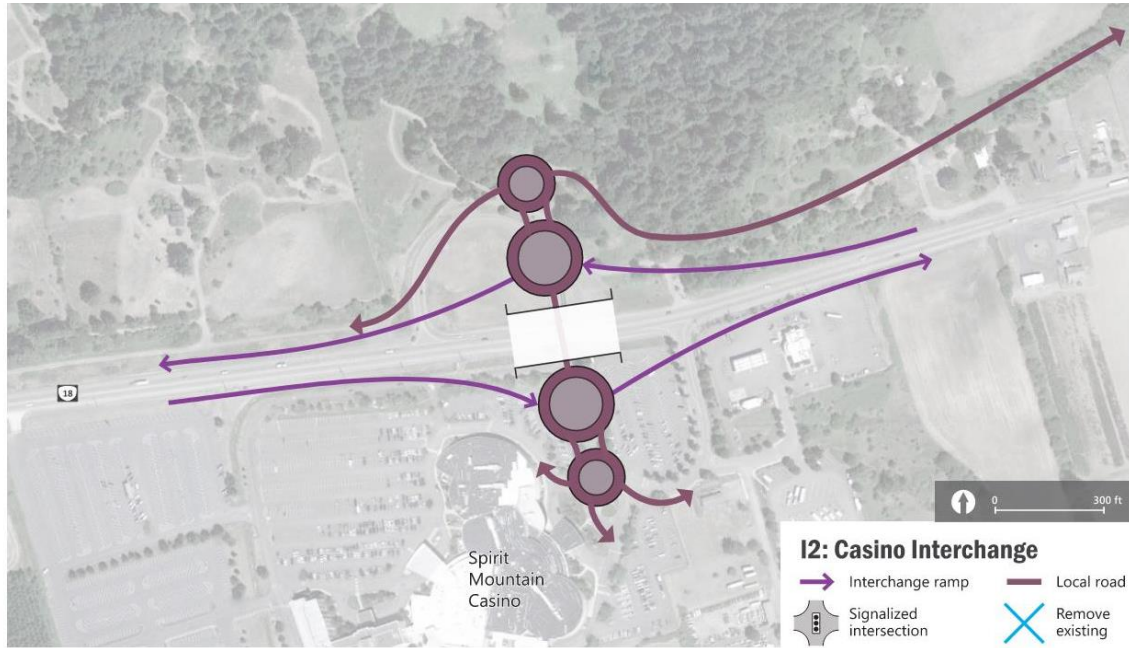
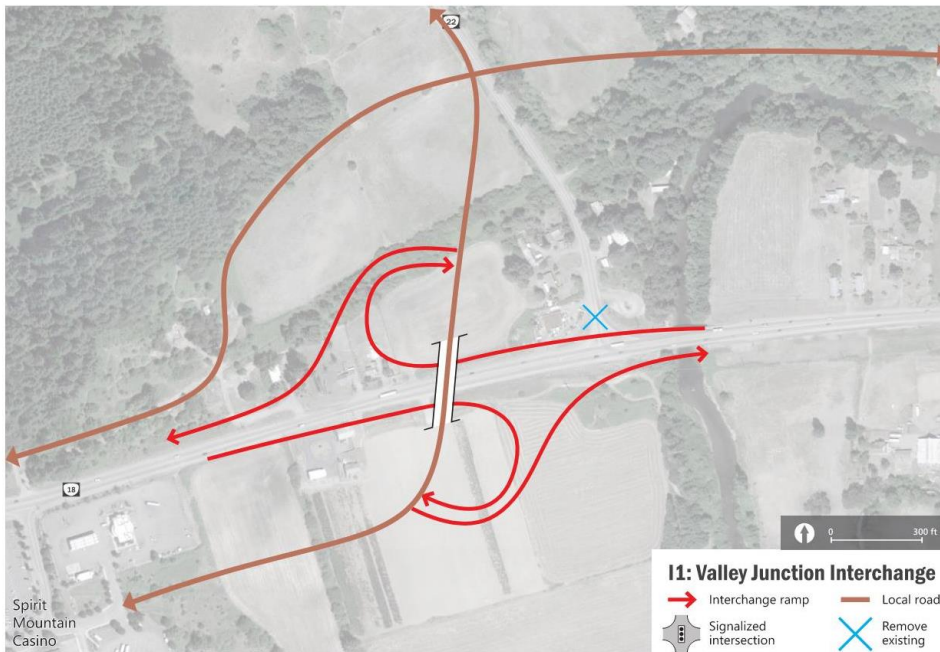


Figure 6. I1.0: Parclo B (EA Concept)



Using similar evaluation criteria and performance measures as for system connectivity concepts, shown in Table 1, the initial interchange location concepts were compared and scored. Table 3 summarizes the average rating for each criteria and overall average rating for most promising interchange location concepts.

**Table 3: Evaluation summary for interchange concepts**

<b>Evaluation Criteria</b>	<b>I2.9 (Purple 1)</b>	<b>I2.1 (Purple 2)</b>	<b>I1.0 (Red)</b>
Safety	3.8	3.8	4.3
Mobility	4.0	4.0	4.3
Community and Equity	3.9	4.0	4.2
Cost and Implementation	3.8	3.5	3.9
Resilience	3.7	3.7	4.3
Environment	4.0	4.0	4.0
<b>Average Rating</b>	<b>3.86</b>	<b>3.82</b>	<b>4.17</b>
Quadrants impacted?	4	4	2
Dominant Movements Made with Right-turn?	No	Yes	Yes

Based on feedback from the Steering Committee, the project team has advanced the top three system connectivity and interchange locations concepts for public comment and review.