

TECHNICAL MEMORANDUM #6 (Exit 210)

Pendleton IAMPs: Exit 210

Preferred Concept

Date: August 25, 2020

Project #: 24043

To: Technical Advisory Committee, Citizen Advisory Committee

From: Mark Heisinger, Nick Foster, AICP, RSP, and Matt Hughart, AICP

This memorandum describes and evaluates the preferred interchange and local circulation improvement concept developed for the Exit 210 Interchange Area Management Plan (IAMP). The preferred concept was developed through an evaluation process that included a high-level screening of initial interchange alternatives, a detailed evaluation of two selected alternatives, and feedback from the project's advisory committees.

SUMMARY OF CONCEPT EVALUATION

The Exit 210 interchange and local circulation improvement ideas were initially developed by members of the project team, the Technical Advisory Committee (TAC), and the Citizen Advisory Committee (CAC) to address known, and anticipated future, geometric and traffic operations and safety conditions. The project team distilled these ideas into unique concepts, which were evaluated in a tiered evaluation process against an established set of criteria. This evaluation was described in *Technical Memorandum #5* (Reference 1).

TAC/CAC Meeting #3 Results

The findings of *Technical Memorandum #5* were discussed at TAC/CAC Meeting #3, which was held on June 11, 2020. It was determined at the meeting that the preferred concept would be a combination of Concept #1 and Concept #5. The preferred concept would likely be implemented as a phased approach, beginning with components of Concept #5 and phasing in components of Concept #1 over a longer period of time as needed. The combined phased approach was chosen because it addresses the existing, and anticipated future, operational, safety, geometric, and access spacing issues at the interchange and allows for the greatest amount of access options to future development northeast of the interchange. The phased approach provides for components of the concept to be constructed as they are needed based on growth in the area.

PREFERRED CONCEPT

This section describes and evaluates the preferred concept for the Exit 210 interchange. Figure 1 shows a concept drawing of the preferred concept.

The fundamental components of the preferred concept are listed below. The letters before each component description correspond with the label ID's on Figure 1.

- A. **OR 11 Roadway Reallocation:** Reallocate the existing four-lane cross-section to a three-lane cross-section (i.e., one travel lane in each direction with a center turn lane) from the OR 11 / WB Ramp Terminal intersection to approximately 500 feet south of SE 9th Street where the existing bike lanes begin. The roadway reallocation will include sidewalks and bike lanes on both sides of OR 11. Before signal warrants are met at the Isaac Ave / OR 11 intersection, a pedestrian hybrid beacon (PHB) or rectangular rapid flashing beacon (RRFB) would be installed at the intersection.
- B. **Nye Avenue / 3rd Drive Intersection Relocation and Roundabout:** Relocate the Nye Avenue / 3rd Drive intersection approximately 100 feet to the south and convert the intersection to a roundabout. This improves access spacing with the EB Ramp Terminal / OR 11 intersection and increases intersection capacity.
- C. **Isaac Ave / OR 11 Intersection Signalization:** Signalize the Isaac Ave / OR 11 intersection to increase intersection capacity.
- D. **EB Ramp Terminal / OR 11 Intersection Signalization:** Signalize the EB Ramp Terminal / OR 11 Intersection and add an eastbound left-turn lane. This increases intersection capacity and mitigates queue spillback to adjacent intersections on OR11.
- E. **Kirk Avenue Realignment:** Realign Kirk Avenue approximately 700 feet north. Limit access at the existing Kirk Avenue alignment so that only northbound right-turns from OR 11 are allowed. This improves access spacing with the WB Ramp Terminal / OR 11 intersection and would allow a full access intersection to development northeast of the interchange.
- F. **Nye Avenue/SE Franklin Grade Road Extension and Underpass:** Extend Nye Avenue east via the SE Franklin Grade Road alignment. Construct an underpass under I-84 to provide access to the split diamond interchange and the land on the north side of I-84. The location shown in Figure 1 is conceptual and it is expected that the actual location will be determined in the final design stage of the project.
- G. **Split Diamond Interchange:** Convert the existing interchange to a split diamond interchange by relocating the westbound (WB) off-ramp and eastbound (EB) on-ramp to the east at the new SE Franklin Grade Road alignment. The SE Franklin Grade Road extension, described above, including the I-84 underpass could be built in conjunction with the interchange if it has not already been constructed.

H:\2A\24043 - Pendleton IAMPs (207 & 210)\dwg\Lane Configurations Exit 210_AEG.dwg Aug 17, 2020 - 5:35pm - mheisinger Layout Tab: Preferred Concept



- Implementation Independent of Development
- Implementation Driven by Regional Growth or Interchange Area Development
- Implementation Driven by Interchange Area Development

Exit 210 Preferred Concept
 Conceptual Drawing
 Pendleton, OR

Figure
 1

Phasing Plan

Phasing will primarily be contingent on the location and scale of future development. Factors such as roadway or intersection capacity and funding will also affect phasing. Some components can be implemented once funding is available. Implementation of other components may be driven by broader regional growth or development in the immediate interchange area. The components of the preferred concept and descriptions of the factors that will affect their phasing order are shown in Table 4. The triggers for each component are also identified in Figure 1.

Table 1 Preferred Concept Phasing Triggers

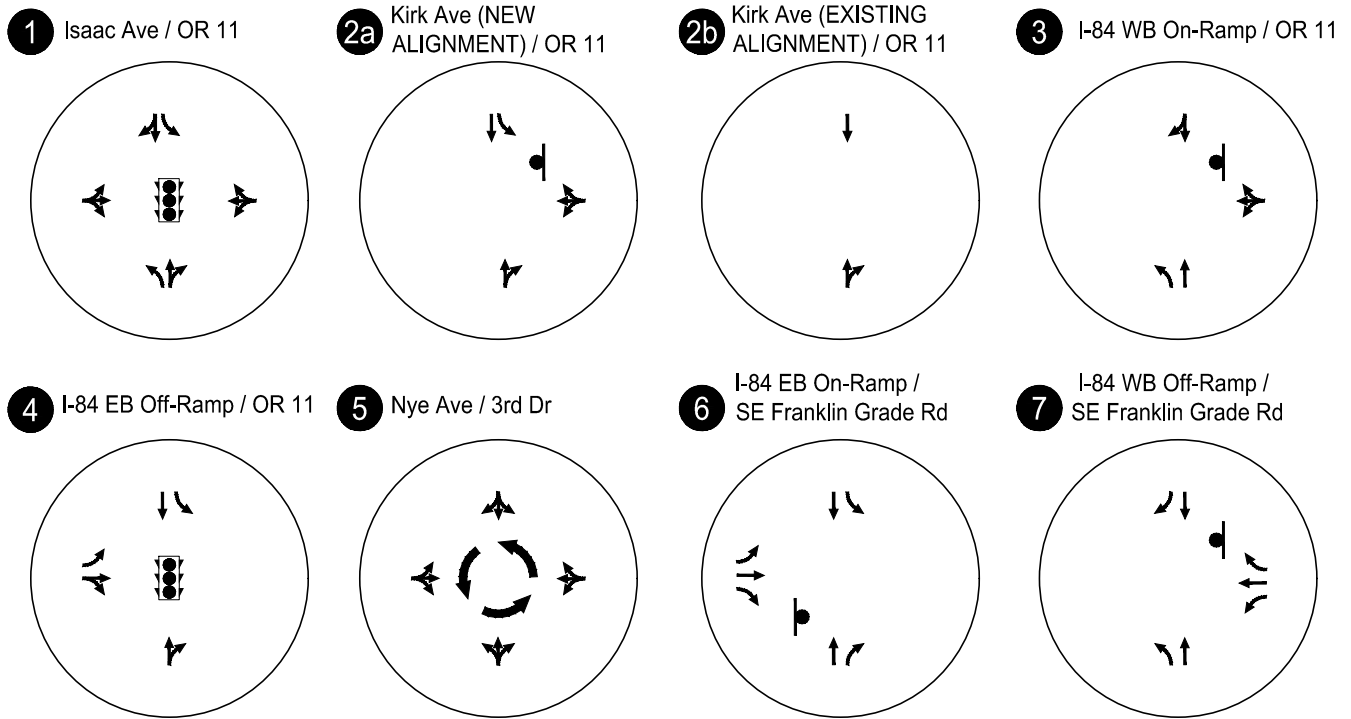
Component ID	Component	Trigger for Component
A	OR 11 Roadway Reallocation	When funding can be made available. <i>Can be implemented independent of development.</i>
B	Nye Avenue / 3rd Drive Intersection Relocation and Roundabout	When the intersection volume-to-capacity (v/c) ratio reaches 0.90, when queues during the typical peak hour interfere with operations at the I-84 EB ramp terminal, or when crash patterns occur that could be mitigated by this project. <i>Driven by either regional growth or local interchange area development.</i>
C	Isaac Ave / OR 11 Intersection Signalization	When the intersection no longer meets ODOT’s mobility target and signal warrants are met or when the crash history signal warrant is met. <i>Driven by either regional growth or local interchange area development.</i>
D	EB Ramp Terminal / OR 11 Intersection Signalization	When the intersection no longer meets ODOT’s mobility target and signal warrants are met or when the crash history signal warrant is met. <i>Driven by either regional growth or local interchange area development.</i>
E	Kirk Avenue Realignment	Development northeast of the Exit 210 interchange. This would likely be built as part of the first phase of development before the split diamond interchange or Nye Avenue/ SE Franklin Grade Road extension are built. <i>Driven by development in local interchange area.</i>
F/G	SE Franklin Grade Road Extension and Underpass/Split Diamond Interchange and Nye Avenue	Development northeast of the Exit 210 interchange requiring more direct access from the interchange. The connection to Nye Avenue can be built as part of a subsequent phase after the interchange. <i>Driven by development in local interchange area.</i>

Operations Evaluations Results

The assumed lane configurations for the preferred concept are shown in Figure 2. The year 2040 AM and PM motor vehicle traffic volumes and operations are shown in Figure 3 and Figure 4, respectively. All intersections are projected to operate under-capacity and meet ODOT mobility targets with the lane configurations shown in Figure 2. It should be noted that signalization of the Kirk Avenue / OR 11 and I-84 WB Ramp Terminal / OR 11 intersections may be required to meet ODOT mobility targets, depending on the timing of development northeast of the Exit 210 interchange and the construction of the split diamond interchange. Operations worksheets are shown in Attachment “A.”

Future Safety Effects

The crash histories at the study intersections and along the study area roadways were reviewed in the *Existing Conditions: Transportation System Operations* memorandum (Reference 2). Crash reduction factors (CRFs) for the roadway and intersection treatments were identified for Concept #1 and Concept



LEGEND

- # - Study Intersections
- ⬇ - Stop Sign
- ⬆ - Lane Movement
- ⦿ - Roundabout
- 🚦 - Traffic Signal

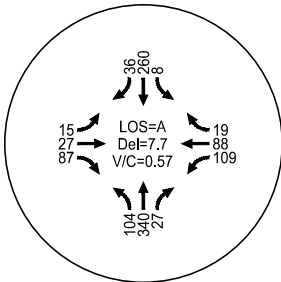
Lane Configurations Preferred Concept - Exit 210 Pendleton, OR

Figure 2

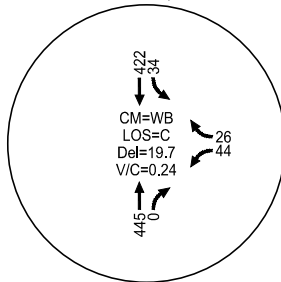
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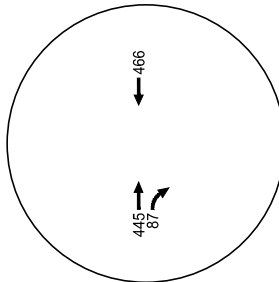
1 Isaac Ave / OR 11



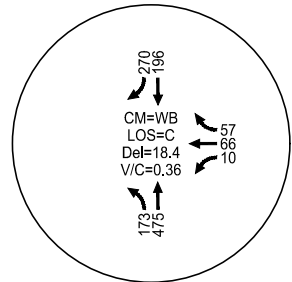
2a Kirk Ave (NEW ALIGNMENT) / OR 11



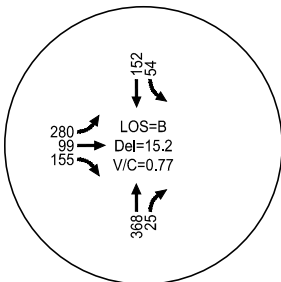
2b Kirk Ave (EXISTING ALIGNMENT) / OR 11



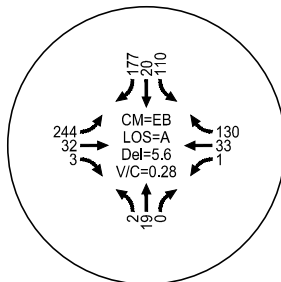
3 I-84 WB On-Ramp / OR 11



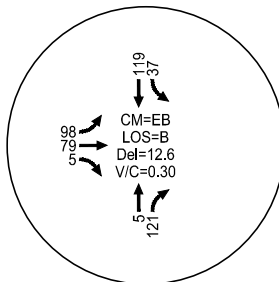
4 I-84 EB Off-Ramp / OR 11



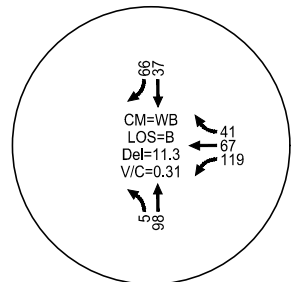
5 Nye Ave / 3rd Dr



6 I-84 EB On-Ramp / SE Franklin Grade Rd



7 I-84 WB Off-Ramp / SE Franklin Grade Rd



LEGEND

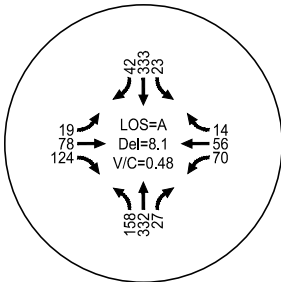
- # - Study Intersections
- CM - Critical Movement
- LOS - Level of Service
- Del - Vehicle Delay (s)
- V/C - Volume-To-Capacity Ratio

Year 2040 AM - Traffic Volumes and Operations
Preferred Concept - Exit 210
Pendleton, OR

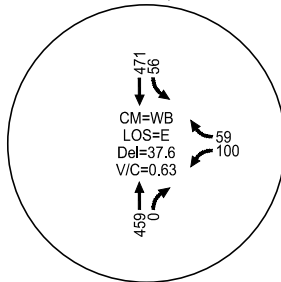
Figure
3



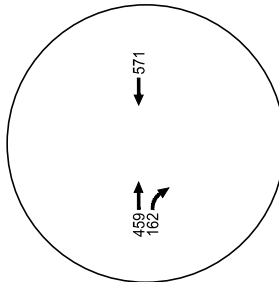
1 Isaac Ave / OR 11



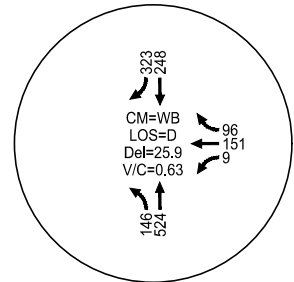
2a Kirk Ave (NEW ALIGNMENT) / OR 11



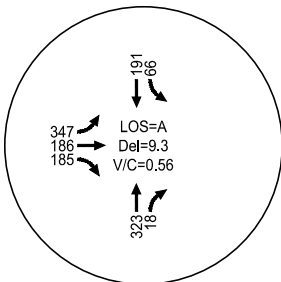
2b Kirk Ave (EXISTING ALIGNMENT) / OR 11



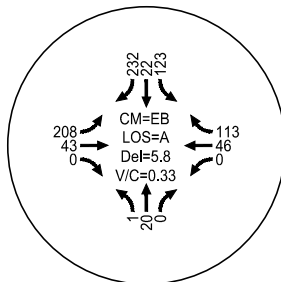
3 I-84 WB On-Ramp / OR 11



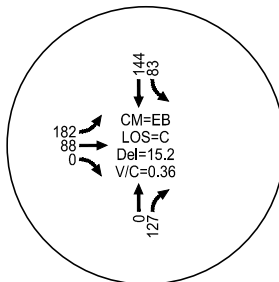
4 I-84 EB Off-Ramp / OR 11



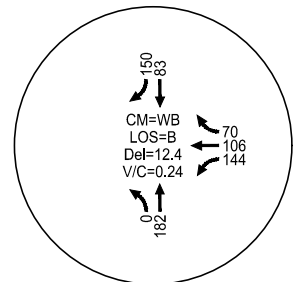
5 Nye Ave / 3rd Dr



6 I-84 EB On-Ramp / SE Franklin Grade Rd



7 I-84 WB Off-Ramp / SE Franklin Grade Rd



LEGEND

- # - Study Intersections
- CM - Critical Movement
- LOS - Level of Service
- Del - Vehicle Delay (s)
- V/C - Volume-To-Capacity Ratio

Year 2040 PM - Traffic Volumes and Operations
Preferred Concept - Exit 210
Pendleton, OR

Figure
4

H:\2\24043 - Pendleton IAMPs (207 & 210)\dwgs\lane configurations Exit 210_AEG.dwg Aug 17, 2020 - 5:40pm - mhelsinger Layout Tab: Future PM - Preferred

#5 in *Technical Memorandum #5*. The CRFs are used to estimate the potential reduction in crashes that could occur with the implementation of the preferred concept.

There are not CRFs for each treatment proposed in the preferred concept (e.g., there is no CRF for converting a standard diamond interchange into a split diamond interchange). Therefore, not all treatments are analyzed. Table 2 shows the treatments for which CRFs are readily available.

Table 2 Crash Reduction Factors

Countermeasures Considered	CRF ¹	Appropriate Intersections/Segments
Convert intersection with minor-road stop control to traffic signal	67% (Angle-Related Crashes) - 143% (Rear-End Crashes)	<ul style="list-style-type: none"> SE Isaac Ave / OR 11 I-84 EB Ramp Terminal / OR 11
Convert intersection with minor-road stop control to modern roundabout	82% (Injury/Fatal Crashes)	<ul style="list-style-type: none"> SE Nye Ave / 3rd Drive
Convert 4-Lane Roadway to 3-Lane Roadway with Center Turn Lane	29% (All Crashes)	<ul style="list-style-type: none"> OR 11 (I-84 WB Ramp Terminal to SE Isaac Ave)

¹ODOT Crash Reduction Factor List

Table 3 shows the adjusted crash rates at the study intersections and roadway segments, based on the application of the CRFs presented in Table 2. The preferred concept is expected to reduce the study intersection and roadway segment crash frequencies in the study area.

Table 3: Crash Rate¹ Assessment

Study Intersection or Segment	Observed Crashes/Year ¹	Preferred Concept Adjusted Crashes/Year
SE Isaac Avenue / OR 11	1.00	0.75
SE Kirk Avenue / OR 11	0	0 ²
I-84 WB Ramp Terminal / OR 11	0.40	0.40
I-84 EB Ramp Terminal / OR 11	0.80	0.68
SE Nye Avenue / SE 3rd Drive	0	0 ²
OR 11 (I-84 WB Ramp Terminal to SE Isaac Ave)	1.2	0.85
Total	3.40	2.68

¹Observed crashes per year from 2013 to 2017.

² The number of crashes per year in the long-term is likely more than 0; however, no crashes were reported at this intersection from 2013 to 2017.

Cost Estimates

Table 4 shows the cost estimates for the different components of the preferred concept. The cost estimates assume a construction contingency cost of 20 percent, and construction engineering and preliminary engineering costs of 15 percent. The total cost of the preferred concept is estimated to be about \$22.8 million. Detailed cost estimate sheets are shown in Attachment "B."

Table 4 Preferred Concept Cost Estimate

Component ID	Component	Estimated Cost
A	OR 11 Roadway Reallocation	\$1,800,000
B	Nye Avenue / 3rd Drive Intersection Relocation and Roundabout	\$2,100,000
C	Isaac Ave / OR 11 Intersection Signalization	\$500,000
D	EB Ramp Terminal / OR 11 Intersection Signalization	\$500,000
E	Kirk Avenue Realignment	\$5,300,000
F	Nye Avenue/SE Franklin Grade Road Extension	\$2,900,000 - \$5,600,000 ¹
G	Split Diamond Interchange at SE Franklin Grade Road	\$6,900,000 - \$9,700,000 ²
Total		\$22,800,000

¹Lower cost is only for the extension of Nye Avenue. The higher cost includes the I-84 underpass and SE Franklin Grade Road extension.

²Lower cost is only for the split diamond interchange. The higher cost includes the I-84 underpass and SE Franklin Grade Road extension.

The cost of the OR 11 Roadway Reallocation (Component ID “A”) is primarily attributable to the construction of sidewalks on the roadway. The Nye Avenue Road Extension and Split Diamond Interchange (Component ID’s “F” and “G”) may be constructed independently of each other and would both require a new I-84 underpass. A range of costs is shown for the Nye Avenue Road Extension and Split Diamond Interchange to show the cost of each component with and without the I-84 underpass and the SE Franklin Grade Road extension.

Access Plan

The project team has developed a preliminary access management plan for the Operations and Access Study Area (OASA) that reflects the preferred interchange concept. The plan aims to move access locations in the OASA towards ODOT’s access spacing standards through consolidation of driveways and relocation of public streets. Some of these access changes would need to be implemented with the interchange reconfiguration and others are anticipated to occur over time as properties develop or redevelop.

As Table 5 shows, there are 50 accesses within the OASA. Table 5 also summarizes the proposed access management plan for the Exit 210 OASA for accesses located within ODOT’s ¼-mile spacing standard. Accesses shaded grey are located within ¼ mile of the interchange ramp terminals. A map showing the locations of each access is shown in Figure 5.

Table 5 Exit 210 IMSA Access Inventory

Access Number	Roadway	Approach Type	Side of Roadway	What Does the Access Serve?	Proposed Access Management Plan Action Under Preferred Concept
1	OR 11	Public	West	Isaac Ave	No changes are proposed to accesses located outside of ODOT’s ¼-mile spacing standard.
2	OR 11	Public	East	SE 5 th St	
3	OR 11	Public	East	Kirk Ave	Relocate Kirk Avenue approximately 700 feet north. Access would still be within ¼-mile of I-84 WB ramp terminal intersection.
4	3 rd Dr	Public	Both	Nye Ave	Relocate 3 rd Drive / Nye Avenue intersection approximately 200 feet south. Access would still be within ¼ mile of I-84 WB ramp terminal intersection.

Access Number	Roadway	Approach Type	Side of Roadway	What Does the Access Serve?	Proposed Access Management Plan Action Under Preferred Concept
5	3 rd Dr	Private	West	Red Lion Hotel	Revisit access location and configuration when property redevelops
6	3 rd Dr	Private	East	Vacant Commercial Lot	Revisit access location and configuration when property redevelops
7	Nye Ave	Public	South	SW 3 rd Pl	No changes are proposed to accesses along Nye Avenue as they are not anticipated to have a safety or operational impact to the Exit 210 interchange ramps.
8	Nye Ave	Private	North	Residential Driveway	
9	Nye Ave	Private	North	Residential Driveway	
10	Nye Ave	Private	North	Residential Driveway	
11	Nye Ave	Private	North	Residential Driveway	
12	Nye Ave	Private	North	Residential Driveway	
13	Nye Ave	Public	South	SW 2 nd St	
14	Nye Ave	Private	North	Residential Driveway (undeveloped lot)	
15	Nye Ave	Private	North	Residential Driveway (undeveloped lot)	
16	Nye Ave	Private	North	Residential Driveway (undeveloped lot)	
17	Nye Ave	Private	North	Residential Driveway	
18	Nye Ave	Private	South	Office Building	
19	Nye Ave	Private	North	Hampton Inn	
20	Nye Ave	Private	South	Utility/Maintenance Yard	
21	Nye Ave	Private	South	Residential Apartments	
22	Nye Ave	Private	North	Hampton Inn	
23	Nye Ave	Private	South	Utility/Maintenance Yard	
24	Nye Ave	Private	North	Office Building	
25	Nye Ave	Private	North	Office Building	
26	Nye Ave	Private	South	Office Building	
27	Nye Ave	Private	South	Office Building	
28	Nye Ave	Private	North	Office Building	
29	Nye Ave	Private	North	Office Building	
30	Nye Ave	Public	South	SE 3 rd St	
31	Nye Ave	Private	South	Red Lion Hotel	
32	Nye Ave	Private	North	Office Building	
33	Nye Ave	Private	North	Parking Lot	
34	Nye Ave	Private	North	Chevron	
35	Nye Ave	Private	North	Chevron	
36	Nye Ave	Private	North	Chevron	
37	Nye Ave	Private	South	Red Lion Hotel	
38	Nye Ave	Private	South	Vacant Commercial Lot	
39	Nye Ave	Private	South	Vacant Commercial Lot	
40	Nye Ave	Private	North	Sinclair	
41	Nye Ave	Private	North	Sinclair	
42	Nye Ave	Private	North	Shari's	
43	Nye Ave	Private	North	Shari's	
44	Nye Ave	Private	South	Best Western	
45	Nye Ave	Private	South	Best Western	
46	Nye Ave	Private	North	Motel 6	
47	Nye Ave	Private	South	SE 6 th St	
48	Nye Ave	Private	North	Super 8	
49	Nye Ave	Private	South	Holiday Inn	
50	Nye Ave	Private	North	Residential Driveway	

NEXT STEPS

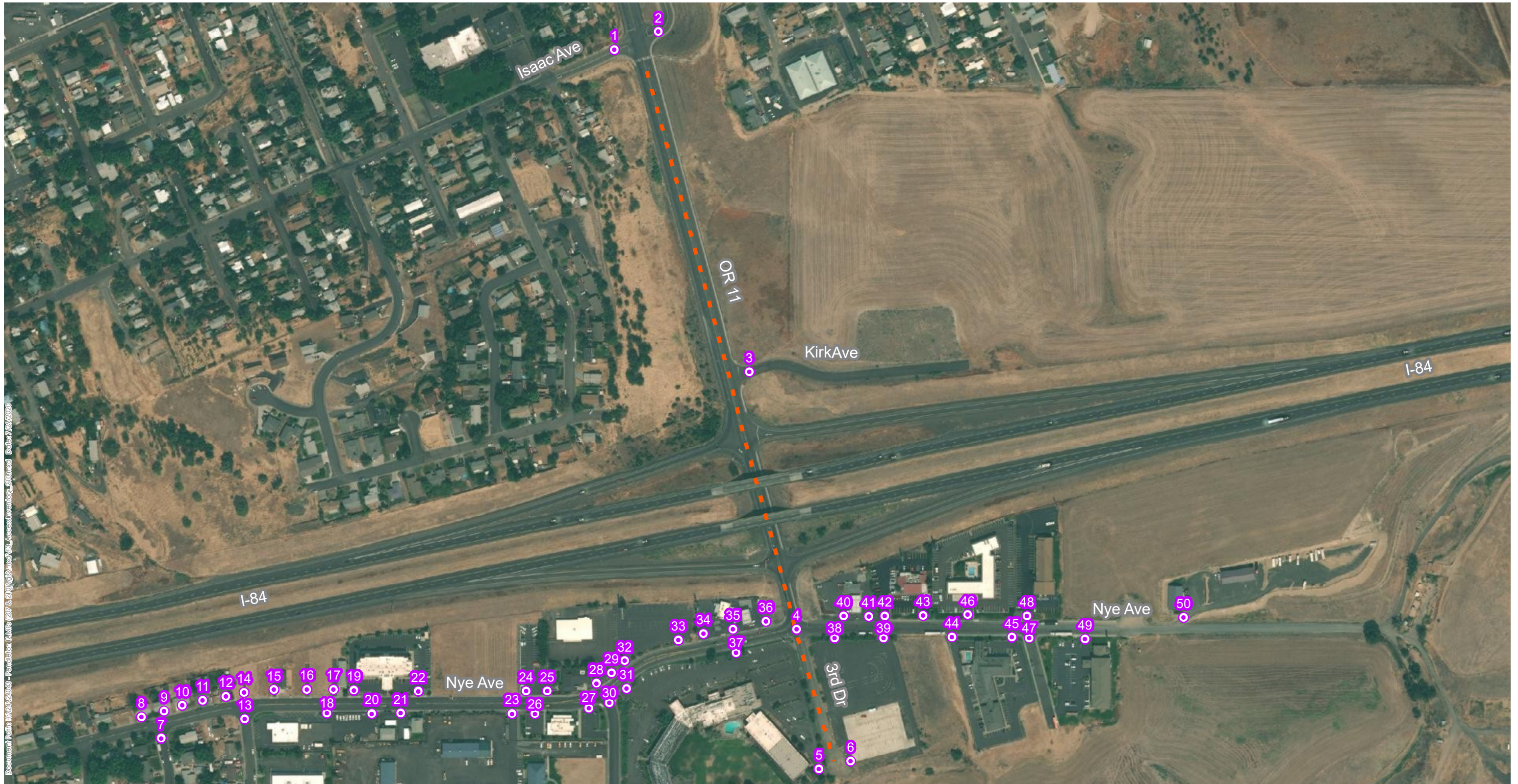
The preferred concept will be presented to the general public for feedback. That feedback will be used to refine the preferred concept for the Exit 210 interchange, which will be incorporated into the draft IAMP. Recommended code changes and supporting ordinances for implementation of the IAMP will be developed and presented in after the preferred concept is refined.

REFERENCES

1. Kittelson and Associates, Inc. *Pendleton IAMPs: Exit 210 – Detailed Evaluation of Select Concepts*. 2020.
2. Kittelson and Associates, Inc. *Pendleton IAMPs: Exit 210 – Existing Conditions: System Inventory*. 2019.

ATTACHMENTS

- A. Traffic Operations Worksheets
- B. Cost Estimate Worksheets



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- Access Location - Driveway/Roadway
- Minimum 1320' IAMP Limits

