

APPENDIX B

Rail Crossing Evaluation Process

COACT Rail Planning, 2009

Purpose

This evaluation process reflects the work completed by the COACT Rail Committee in 2009, both for developing initial priority rankings for grade separating or closing existing public at-grade rail crossings on the BNSF mainline (as shown on the attached spreadsheet); and for establishing a framework through which at-grade crossings can be evaluated within any range of solutions which might be applied to improve their conditions (addressing root causes of safety, operational, mobility, economic, or other quality of life issues). This process also reflects and provides a means of involving multiple and diverse stakeholders in priority ranking, or in related or subsequent decision-making processes.

Approach & Assumptions

Through field work, literature/internet reviews, previous experience, and ongoing discussions, the COACT Rail Committee recognized that each at-grade crossing is different – in terms of road, rail, and other modal uses and operations, geometries, surrounding land uses, control devices, noise and switching operational impacts, etc.

The approach taken in organizing and assessing to deal with such a variety of the many different crossings, issues, and options was to create a standard framework for evaluation. So the Rail Team decided to apply a process by assuming a long-term perspective, framing the criteria and analysis by asking these questions for each existing public at-grade crossing on the BNSF mainline: What would the proposed ultimate *solution* look like (assuming elimination by bridge crossing or closure)? How much would it cost? How could it be prioritized against other at-grade crossings in Central Oregon?

The assumption was made that improvement costs would only be developed for the grade-separation (bridging) improvements, and not the closures. This is because the costs of closures themselves would be very minimal compared to grade-separation, and any impact-related costs of a closure (rerouting or upgrading roads) could be addressed within the below criteria points.

The assumption was made that grade-separation improvement scoping and cost estimating would not be made for the COPR line under this current 2009 planning effort (see *Other Recommendations* below), with the exception of Prineville Junction.

Specific assumptions and justification for evaluating each at-grade crossing, scoping an alternative to grade separate (by bridge) or close, mitigating roadway access, and cost estimating are in Appendix A *Rail Crossing Scoping Report*, along with the scope findings, sketches, and cost estimates for each. Also see http://www.odot.state.or.us/GIS_Maps/

Criteria & Evaluation

Various criteria was used, and should continue to be used, to evaluate and rank each crossing relative to assumed elimination (bridge crossing or closure). Also within the criteria, various measurements, both qualitative and quantitative, were used and applied as summarized by the following:

1. *Crossing Safety Benefit*: Reflecting the benefit of eliminating the likelihood and severity of potential for crashes at the existing crossing, including a range of factors including number of tracks at the crossing, the roadway classification / traffic volumes / speeds / number of lanes, rail traffic / speeds, visibility, geometry, and the ODOT hazard index (*jacqua*) rating system.

The ODOT Rail Division Team member provided recommended ratings of 1 (low benefit), 2 (medium benefit), and 3 (high benefit)

2. *Emergency Services Benefit*: Reflecting the benefit of eliminating existing or future impediments of rail operations for emergency service (e.g., fire, ambulance, police, traffic incident) response routes and times. For example the switching and operations area on the BNSF line across Reed Market in Bend regularly blocks street traffic for extended periods at any of day, which is a significant impact in establishing fire/medic stations and routes decisions.

Each local jurisdiction represented on the COACT Rail Committee gathered input from their local emergency service providers, who gave recommended ratings of 1 (low benefit), 2 (medium benefit), and 3 (high benefit) for crossings within their jurisdiction.

3. *Congestion Relief Benefit*: Reflecting the benefit of eliminating existing or future effects of the restrictions (e.g., current / allowed number of lanes, amount of gate stop time per day) at the existing crossing, including a range of factors including roadway traffic volumes, rail traffic and switching operations, proximity of other road connections / traffic signals / congestion, proximity of key land uses such as commercial/industrial centers or airports, frequency of community events, roadway classification, etc.

Each COACT Rail Committee member with road jurisdiction for each crossing provided recommended ratings of 1 (low benefit), 2 (medium benefit), and 3 (high benefit) for crossings within their jurisdiction.

4. *Economic Opportunities Benefit*: Reflecting the benefit of providing economic opportunities or removing impacts / impediments to economic opportunities at the existing crossing, including a range of factors including existing or potential commercial / tourism / industrial businesses and land uses (include potential rail served), freight mobility enhancements / impacts (both rail and truck), potential redevelopment benefits and costs, etc.

COACT Rail Committee members from Economic Development for Central Oregon (EDCO) provided recommended ratings of 1 (low benefit), 2 (medium benefit), and 3 (high benefit).

5. *Local Jurisdiction Priority*: Reflecting the local jurisdiction staff perspective on their priorities for bridging or closing each at-grade crossing, considering a range of general factors such as effects on adjacent or nearby land uses and growth opportunities, public safety, local roadway route continuity and circulation, pedestrian and bicycle needs.

Each local jurisdiction represented on the COACT Rail Committee local jurisdiction provided ratings of 1 (low priority), 2 (medium priority), and 3 (high priority) for crossings within their jurisdiction.

6. *Railway Operator's Priority*: Reflecting the Railway operator's staff priorities on the benefit of bridging or closing the at-grade crossing, considering a range of general factors such as safety, operating efficiencies and costs, travel speeds, capacity, long term improvement plans.

The COACT Rail Committee representative from the ODOT Rail Division gathered input from BNSF and COPR staff, and provided ratings of 1 (low priority), 2 (medium priority), and 3 (high priority) for crossings within their jurisdiction.

7. *Phasing / Financing Opportunities*: Reflecting the likelihood of the opportunity and ability to implement the proposed grade separation or closure for the at-grade crossing, including a range of factors such as ability to phase, readiness of the project to construct, or proximity of other forthcoming large construction projects where value and efficiencies of combining may exist.

COACT Rail Committee members from ODOT Region 4 provided ratings of 1 (low, not phase-able, no other nearby projects, not ready), 2 (medium, any one of: phase-able, other nearby project, readiness), and 3 (at least two of: phase-able, other nearby project, readiness).

8. *Land Use Impacts*: Reflecting the relative ability for a grade-separation or closure to avoid or minimize impacts to surrounding community oriented land uses and transportation system connections to those land uses, such as for residential or farmlands.

COACT Rail Committee members from ODOT Region 4 requested assistance from ODOT Region 4 planning staff, who provided ratings of 1 (most impact, causes: significant out-of-direction travel, affects more than 6 homes or farm parcels, costly impacts to road system), 2 (moderate impact, causes: moderate out-of-direction travel, affects more than 2 homes or farm parcels, some impacts to road system), and 3 (low impact, causes: no or very minimal out-of-direction travel, affects less than 2 homes or farm parcels, no or very minimal impacts to road system).

First, numbered rankings (1, 2, 3) for the 8 criteria points for each at-grade crossing were then added together (maximum score of 24). The Rail Team elected not to weight the criteria points, or develop a more elaborate system of scoring beyond 1, 2, 3, because the level of complexity to weight and further break down the evaluation would reach beyond the benefits for decision-making. The method they used (and recommend for future evaluation) provides the Rail Team

members with a means of looking at how each crossing compares across the jurisdictions, instead of within each jurisdiction.

Second, these total scores were then factored against the total grade-separation cost estimate (dividing each ranking by the total cost estimate, then multiplying by \$10M) to create a simple numerical “Benefit-Cost Index” for each crossing. For example, if the total grade-separation cost is \$3.8M and the benefit ranking is 15, the Benefit-Cost Index is 15 divided by 3.8 multiplied by 10, equaling 39. The number 39 is not significant in terms of the direct “value” or return-on-investment of creating the grade separation. It does, however, provide another helpful means for Rail Team members to look at how each crossing compares, in this case for relative value of one crossing improvement to the others across the jurisdictions.

Third, as information was gathered, including the rankings for each criteria point, the Rail Team members also provided comments and notes to highlight about each at-grade crossing, which might be helpful for clarifying priorities, context, or reference to support future decision-making for each location. This also provides a means to address other issues to consider for prioritization, such as the proximity of one crossing with another and opportunity to consolidate, known site-specific rail operation activities, proximity of the crossing to a school, special project financing opportunities, etc.

Establishing COACT Priorities

Finally, the information gathered and placed in [Central Oregon Rail Crossings Table](#), in whole was used to establish a recommended COACT priority for eliminating each at-grade, as **High**, **Medium**, or **Low**. The important aspect of developing these recommendations was an ability for the Rail Team to reach consensus, based on their roles and involvement in gathering the information, reviewing the proposed scopes and cost estimates, sharing the notes, and providing and discussing the recommended rankings for each criteria point. Generally speaking, those locations the Rail Team agreed to recommend as High priorities consistently reflected the much higher of total benefit rankings scores, or the much higher of the cost-benefit index scores. In most cases, a high benefit ranking was accompanied by an average benefit-cost.

The COACT priority High/Medium/Low rankings be used to help the COACT members establish resource priorities for further project development, partnership development, funding requests, agreements, and other decision-making opportunities. However, it is the recommendation of the Rail Team to not ignore the lower priority locations, as the decision-making approach should be on-going and *opportunity-driven*. Examples:

- There may be a low-cost improvement or closure that can be accomplished incidental or at high value related to another forthcoming project in the area.
- The criteria of a specific funding source may fit very well with one of the lower priority crossing locations, based on its context.
- Several lower priority locations, such as recommended for closure, might be combined into a single project at low cost and high value, or as part of a multiple-party agreement to achieve specific goals.

2009 Recommended High Priorities for Grade-Separation (north to south)

BNSF Line / Belmont Lane & Bear Drive (Jefferson County/Madras)

The recommendation is to connect Bear Drive to Belmont Lane, close the Bear Drive crossing, and construct a bridge for Belmont Lane to cross under the BNSF line, total cost ~\$4,000,000. This is a high priority because it eliminates two at-grade crossings with a low cost and low impact, on an important route for Jefferson County.

BNSF / COPR Lines (Prineville Jct)/O'Neil Highway (Deschutes County/Redmond)

The recommendation is to realign O'Neil Highway north of Prineville Junction, with a bridge crossing of the BNSF line on the new O'Neil Highway alignment, and connect O'Neil Highway into North Canal Boulevard west of Prineville Junction, total cost is ~\$18,000,000. This is a high priority because it: 1) eliminates two multi-line at-grade crossings with O'Neil Highway, 2) it resolves a freight truck length restriction for one of the most important aggregate haul routes in Central Oregon, 3) for US 97 safety it re-orientes the aggregate haul route from O'Neil Highway to the new interchange at the north end of the US 97 Redmond Reroute, and 4) it is an integral component for the development of a modal hub for Prineville Junction (see freight mobility component of the COACT rail planning report).

BNSF Line / Airport Way (Deschutes County/Redmond)

The recommendation is to construct a bridge for Airport Way to cross under the BNSF line, total cost ~\$14,000,000. This is a high priority because the cost is not significantly high, and because Airport Way is a direct link to the US 97/Yew Avenue interchange, providing access to a major activity center including the Deschutes County Fairgrounds/Expo Center, the regional airport for Central Oregon Airport (Roberts Field), industrial lands, commercial lands, the planning 19th Street extension; as well as an alternative route to OR 126 and Prineville.

BNSF Line / Deschutes Market Road (Deschutes County)

The project to construct a bridge for Deschutes Market Road to cross over the BNSF line will be completed in 2009, total cost ~\$7,000,000.

BNSF Line / Cooley Road (Deschutes County/Bend)

The recommendation is to construct a bridge for Cooley Road to cross under the BNSF line, total cost ~\$24,000,000 (note: estimate is relative to a larger improvement around the US 97/Cooley Road intersection). This is a high priority because the crossing location is: 1) very close to the signalized US 97/Cooley Road intersection, a key location and current bottleneck/safety problem for US 97 in Bend; 2) on a critical economic link for the City of Bend in terms of future employment lands and arterial road system expansion; and 3) generally very high concern for the area in terms of crossing safety.

Note: As of 2009, extensive planning, evaluation, and project development as occurred for the transportation systems surrounding the BNSF/Cooley Road over-crossing, among ODOT / City of Bend / Deschutes County and other stakeholders. Here is good reference web site: <http://www.us97solutions.org/>

BNSF Line / Reed Market Road (Deschutes County/Bend)

The recommendation is to construct a bridge for Reed Market Road to cross over the BNSF line, total cost ~\$18,000,000. This is a high priority because it ranks very high among all affected stakeholders in every benefit criteria categories, highlighting the relationship to the main BNSF switching and crew operations on the *Oregon trunk*, significantly impacting safety, emergency services, congestion, economics, and rail operator needs; also the route is along the City's key east-west arterial (major collector) with regional significance and benefits the state highway system.

Note: As of 2009, extensive planning, evaluation, and project development as occurred for the transportation systems surrounding the BNSF/Reed Market Road over-crossing, by the City of Bend. Here is good reference web site: http://www.ci.bend.or.us/reed_market.html

BNSF Line / Baker Road (Deschutes County/Bend)

The recommendation is to construct a bridge for Baker Road to cross over the BNSF line, total cost ~\$36,000,000. This is a high priority because Baker Road is part of the southern beltline on the south side of Bend, where a crossing will have high benefits for emergency services, congestion relief, and rail operations; and with regional significance and benefits for the state highway system.

BNSF Line / US 97 (Deschutes County/La Pine), Wickiup Junction

The recommendation is to construct a bridge for US 97 to cross over the BNSF line, total cost ~\$31,000,000. This is a high priority because it is the only remaining at-grade rail crossing on US 97 in Oregon, and ranks very high among stakeholders across all of the benefit criteria categories among stakeholders (moderate for phasing/financing), highlighting that it is one of the highest statewide grade-separation priorities for ODOT. Also the currently endorsed improvement resolves a significant safety issue at the US 97 Burgess Road, immediately south of the railway crossing, which approaching capacity making the access hazardous from Burgess Road on and off US 97.

Note: As of 2009, extensive planning, evaluation, and project development as occurred for the transportation systems surrounding the BNSF/Reed Market Road over-crossing, by the City of Bend. With funding, the project can be ready for construction as early as 2012. Here is good reference web site:

http://www.oregon.gov/ODOT/HWY/REGION4/US97_Wickiup_Jct/US97_Wickiup_Jct.shtml

Other Evaluation Recommendations

Interim At-grade Crossing Improvements

The [Rail Crossings Table](#) has a column which identifies for each existing at-grade location on the BNSF and COPR the status of Existing Crossing Type, as one of the following:

- *Active*, which means the crossing is *protected* with automatic gates and lights.
- *P/S*, which means the crossing is *passively protected* with cross-bucks and a stop sign.
- *P/Y*, which means the crossing is *passively protected* with cross-bucks and a yield sign.
- *P/Y*, which means the crossing is *passively protected* with cross-bucks, a yield sign on one side, and a stop sign on the other side.

The [Table](#) also includes an adjacent column which identifies a recommended Interim Safety Improvement for each P/S location, as one of the following:

- *3-Active*, which means the crossing is a high priority to replace the passive signs with automatic gates and lights.
- *2-Active*, which means the crossing is a medium priority to replace the passive signs with automatic gates and lights.
- *1-Active*, which means the crossing is a low priority to replace the passive signs with automatic gates and lights.

All of the high priority locations for grade separation currently have Active protection and do not need to be upgraded. The Rail Team 2009 recommendation is for COACT to be proactive in upgrading all current passively protected crossings to Active by 2029, focusing on the 3-Active's first, depending on the timing of any opportunity to close or grade separate the crossing within this same the twenty years. Note the statewide work of making interim improvements to at-grade crossings is led by the ODOT Rail Division, and they administer a federal grade crossing protection program on a statewide priority basis as funding is available. They are currently working on installing Active protection at Gem Lane and Dover Lane in Jefferson County.

New Crossings

The [Rail Crossings Table](#) contains a list of five New Proposed BNSF Mainline Crossings. These locations are also accompanied by preliminary criteria rankings, similar to those used for the existing at-grade crossings list above, as they best apply. The difference of course is that the criteria is used to prioritize within the opportunities for new road extensions across the rail line, and not in comparison with priorities for the needs at existing at-grade crossings. The assumption for these new proposed crossings is that they will be built with bridge crossings and not at-grade, at least in the long term. So for example, the assumption is that they would all be equal in rating them for crossing safety benefit and railway operator benefit.

Also note the evaluation here is very preliminary. So the Rail Team recommendation is that additional work should be done to evaluate the scope and cost estimates, and to make final priority recommendations, including potential interim solutions.

Quartz Avenue in Redmond is the only currently known location on the list where a local jurisdiction (City of Redmond) is seeking a new interim at-grade crossing. BNSF and the ODOT Rail Division have stated opposition to this or any new at-graded crossings within the corridor. The Rail Team recommendation is that this issue needs to be addressed immediately, starting with resolution on these areas:

- The road network needs expansion, including benefit to the state highway system.
- Design, access, land use impacts, and cost feasibility create major issues for initially constructing a grade separation.
- The COACT Rail Team supports a specific incremental strategy (proposed interim at-grade crossing), which includes completing long-term design for grade-separation (including consideration of BNSF rail alignment *shift* to the east), finance plan for grade-separation, and closure/grade separation of at least one existing and comparable (e.g., similar traffic volumes) at-grade crossing within the corridor.

City of Prineville Railway (COPR) At-Grade Crossings

The recommendation for existing at-grade crossings on the COPR is that (outside of Prineville Junction, and outside of opportunities from interim improvements such as upgrading from passive to active protection) grade separations and closures will be generally lower in priority for COACT, than those existing crossings on the BNSF mainline. However, as noted above for the BNSF mainline, this does not suggest ignoring lower priority locations, as the decision-making approach should be on-going and *opportunity-driven*.

The [Rail Crossings Table](#) does provide rankings under the benefit criteria points, but it does not reflect scoping recommendations (closure or grade-separation) or cost estimates for potential elimination of the at-grade crossings on the COPR line. The Rail Team defers to the representatives from COPR to provide such scoping recommendations, as they choose to in the future.

Existing Grade-separated Crossing Improvement Needs

The [Rail Crossings Table](#) lists current bridges (under and over crossings) on the BNSF Line. The Rail Team has not made recommendations on needs or priorities for future upgrades, improvements, expansions or preservation work on these crossings. This was considered a low priority relative to the need to address existing at-grade crossing issues. However, they do recommend that each road jurisdiction present to COACT in the future their needs for such improvements, to be maintained in the COACT Needs List, where there may be future consideration to prioritize them for funding within the Area.

Existing At-grade Crossings on BNSF spurs

The [Rail Crossings Table](#) lists current at-grade crossings on spurs to the BNSF Line. The Rail Team has not made recommendations on needs or priorities for improvements to these locations. This was considered a low priority relative to the need to address existing at-grade crossing issues. However, as noted above for the BNSF mainline, this does not suggest ignoring lower priority locations, as the decision-making approach should be on-going and *opportunity-driven*.