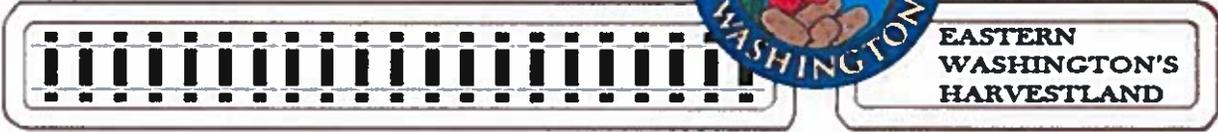


*Connell Rail Interchange*



*On-Track  
For Growth!*



# ALTERNATES



# Technical Memorandum

Date: Wednesday, September 09, 2015  
Project: City of Connell – Connell Rail Interchange Study  
To: Jed Crowther (City of Connell)  
From: Paul Weber (HDR)

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Subject: **City of Connell – Connell Rail Interchange Study – Evaluation of Alternative Alignments**

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## Background

The Columbia Basin Railroad (CBRW) and BNSF Railway desire to expand and modernize the Connell Rail Interchange. This will enhance the ability of the railroads to perform interchange of longer trains while minimizing the time interchange operations interfere with mainline operations and capacity. The improvements will allow for better overall service and directly improving transit times for unit trains. A new interchange will allow for reduced delays to automotive traffic at Adams and Clark Street at-grade crossings within Connell.

The current interchange is limited to exchanging approximately 2,000 feet of trains without significant delays to automotive traffic and the railroad themselves. Based on an average rail car length of 60 feet, this would equate to approximately a 31-car train with two locomotives. The typical daily train that would be interchanged at Connell is 44 cars long. Periodically trains are shorter than the current average train, but at least 50% of the time one or both of the railroads are unnecessarily delayed or experience inefficiencies at the interchange.

A new interchange capable of handling complete trains will be more efficient for both railroads, as well as reducing the delay times experienced by automotive traffic at the public road crossings, and providing enhancement related to safety. Currently some of the switch moves over the grade crossings are performed with a shove move; meaning that railroad cars are pushed across the crossing without the enhancement of the locomotives lights, horn, and bell. (These crossing are currently equipped with shoulder mounted lights and gates.) A new configuration will eliminate the need for shove movements over the grade crossings, and will allow the BNSF and CBRW to conduct timely train inspections in a location away from areas prone to congestion and delay.

Primary goals of a new or reconfigured interchange include:

- Allow trains traveling on the BNSF line, from either direction up to 7500' in length to enter the new interchange tracks without reverse movements or breaking trains into pieces.
- Allow interchange related operations, such as removing or reconfiguring power, to take place clear of the BNSF main track.
- Allow the BNSF or CBRW to stage a train for interchange and not block arriving or departing trains. The minimum number of tracks necessary for this to take place is three parallel tracks. (This allows two trains to be present on interchange tracks and allow for run-around moves / repositioning of power to take place on the third track.) It is not anticipated the interchange need to allow for the arrival and departure of two 7500 foot long trains simultaneously. (A loaded and empty unit train at Connell at the same time.)

- Reduce train occupation time durations at the Adams and Clark Street at-grade crossings in Connell.
- Possibly enhance opportunities for rail access to industrial development areas by providing a lead track that does not directly connect to the BNSF main track – but is instead connected using one of the interchange tracks. (This avoids the cost of a main track connection and the limitation of having to occupy the main track to serve the industrial lead.)

## Alternatives

This Technical Memorandum (TM) discusses the concept design, technical aspects, and opinion of probable construction cost estimate for three possible interchange location alternatives.

The proposed concept alternates reflect the minimum requirements described in the *Initial Engineering Basis of Design (EBOD)* - August 2015 document. Refer to Section 1.2 and 1.4 of the EBOD for additional details.

The three alternates are designated as South, Middle, and North Alternatives. See attached Exhibits 1, 2 and 3. The South Alternative has been presented previously and has been referred to as the initial Proposed Concept or Initial Concept Layout.

The Middle and North Alternate have been developed as alternates for consideration and comparison.

The existing tracks in the project area include:

- BNSF Main Track - A portion of the Lakeside Subdivision, running north east to south – southwest. This segment of the BNSF Subdivision is considered to have heavy train traffic. The track speed limit through the City of Connell (the area of the South Alternate) is up to 45MPH for both freight trains and passenger trains. Track curvature and grades in the coulee to the north of Connell (where the Middle and North Alternates are proposed) limit speeds to 35MPH for both passenger and freight. Train traffic on this track segment is dispatched from Fort Worth, Texas using Centralized Traffic Control (CTC) and a wayside signal system.
- BNSF Connell (Controlled) Siding – the siding has a capacity of 8110 feet and connects to the BNSF Main Track at MP 108.25 and MP 109.94. This siding is used for meeting and passing trains and is also dispatched and controlled in the same manner at the BNSF Main Track.
- BNSF Auxiliary Tracks – the auxiliary tracks in Connell include the existing interchange tracks, industry tracks, and other miscellaneous tracks. These tracks are non-controlled tracks and are operated using Rule 6.28 (Other than Main Track) of the General Code of Operating Rules (GCOR). This rule uses visual means to occupy, make movements and avoid other trains.
- CBRW Main Track – A portion of the 1<sup>st</sup> Subdivision comes from the north and west and connects to BNSF Auxiliary tracks at CBRW MP 186.90 and BNSF MP 110.45. In the area of the interchange the CBRW operates its main track under Rule 6.13 (Yard Limits) which uses visual rule as a means to occupy, make movements and avoid other trains (when wayside signals are not present.)

**Descriptions of the three interchange alternates:**

- **South** – The South Alternate is positioned parallel to existing BNSF main track between MP 112.55 and MP 110.45. It connects to the main track at MP 112.55 and 110.65 using #15 turnouts. It includes two 7500 foot capacity tracks and one 3,600 foot capacity track. A track extension (lead track) between MP 110.45 and 110.65 will be used by the CBRW to reach the existing BNSF Auxiliary tracks for interchange movements which allow interchange to take place clear of BNSF signalized track.
- **Middle** – The Middle Alternate is positioned generally parallel to existing the CBRW main track between MP 186.14 and 184.67. It connects to CBRW Main at MP 186.14, MP 185.57, and 184.70 with #11 turnouts. It includes one 7500 foot capacity track and one 3,600 foot capacity track. The Middle alternate also includes a track extension (lead track) running between CBRW MP 184.65 and BNSF MP 107.25. The BNSF connection uses a #15 Turnout.
- **North** – the North Alternate is positioned generally parallel to existing BNSF main track between MP 106.05 and MP 104.50. It connects to the main track at MP 106.15 and 104.45 using #15 turnouts. It includes two 7500 foot capacity tracks and one 3,600 foot capacity track. The North alternate includes a track extension (lead track) running between BNSF MP 106.10 and CBRW MP 183.25.

The rail concepts alternatives are based on the assumptions presented in the Initial EBOD document, Section 1.4 and the following:

- The North and Middle Alternates have not yet been presented to BNSF.
- Grades of the proposed interchange tracks for all three alternatives exceed the desired maximum design grade because they run adjacent to the existing main tracks which exceed 0.5 %.
- The Middle alternate has only one new 7,500 track because the CBRW existing main track is entirely clear of BNSF main track and therefore the CBRW existing main can provide the function of the other 7,500' long track found in the other alternates.
- The bridge and retaining structures indicated in the alternates are approximate concepts only and based on very limited information.
- The new interchange would be operated as a joint facility of the BNSF and CBRW. This means that regardless of ownership, the new track facilities would be used by both railroads as defined in an operating agreement between the two railroads.

**Other clarifications:**

- The three concepts presented are not the only potential alignments. However, they are reasonable alternatives to consider and are comparable because they each meet all of the Basis of Design criteria identified in the EBOD.
- The concept layouts are not based on actual topographic survey. Sources of data and information used to develop the alternative layouts include:

1. Inferworks software which provides topographic data based on available USGS map data.
  2. Franklin and Adams County Assessors property search sites which provided property boundary and ownership information.
  3. CBRW and BNSF Historical Track Charts used for existing track information.
  4. U.S. Fish and Wildlife Service, National Wetlands Inventory to identify any conflicts in areas of alternative construction around waterways.
  5. United States Department of Agriculture, National Resources Conservation Service Web Soil Survey web data used to identify any potential soil and construction issues.
  6. ESRI ArcGIS used for aerial imagery information.
- Availability or proximity to existing utilities for serving potential industrial sites was not considered in the development of the alignments.

## Opinion of Construction Cost Estimate

HDR has prepared Order of Magnitude – Opinion of Construction Cost Estimates for each interchange alternative. The cost estimates include all foreseeable items related to the construction including but not limited to; engineering design, civil elements to construct the roadbed for the tracks, railroad elements to construct the tracks, permitting, construction management, utility accommodations, erosion control measures, and other details. An overall 30% contingency is included which is typical to assign for this level of estimate detail. The following assumptions are specific to each alternative estimate:

- Area of clearing and grubbing includes the entire earthwork footprint to remove organics and other potential debris which cannot be reintroduced into the subgrade construction.
- Top soil stripping depth is assumed to be 6" average over 70% of each alternate's footprint.
- Engineering Geotextile fabric would be used on 50% of the earthwork footprint of each alternative to mitigate any poor subgrade conditions encountered during construction.
- Stormwater treatment and disposal is assumed to be handled by track side ditches.
- Rock excavation for each of the alternatives was based on available soils data and is a percentage of the overall excavation ranging from 20% to 30%, and estimated quantities assume vertical rock excavation.
- Subballast will be 1 foot deep and includes the area of the adjacent to track access roads.
- Borrow sources are assumed to be in close proximity and provided at limited cost to the project.
- Retaining walls are assumed to be an average of 10' tall at all potential wall areas.
- The estimate includes a limited utility accommodation allowance and is not based on specific known data or information.
- Costs for industrial leads (if presented) are not included.
- Costs assume work provided within a public works project without Buy America requirements. The estimate accounts for certain elements of work within BNSF Right of Way that must be performed by BNSF (such as track and signal work) due to union agreements.

The Order of Magnitude Construction Cost for each alternative, rounded to the nearest ten-thousand dollars, is estimated to be:

- South Alternative - \$19,240,000
- Middle Alternative - \$23,480,000
- North Alternative - \$33,287,000

The primary factors influencing the difference in cost between the alternatives include:

- The Middle Alternate uses the existing CBRW main track as one of the interchange tracks.
- The North Alternate requires the largest amount of track, earthwork and bridges.
- The North and Middle Alternates require the purchase of more property outside of the BNSF and CBRW right-of-way.

Initial observations:

- None of the alternates require the demolition of any structures.
- None of the alternates displace any businesses.
- None of the alternates take land out of agricultural production.
- Interchange operations take place away from the central part of Connell and blocking of at-grade crossings will be reduced.
- All the alternates require construction and mitigation within 100 year flood plains.
- All the alternates are equivalent result in the same number of trains crossing the City of Connell at-grade crossings related to the interchange of normal manifest traffic.
- BNSF will construct track and other “covered” items of work within BNSF right-of-way due to union agreements. This should not be considered a benefit or a disadvantage; however, all aspects of construction off BNSF right of way can be competitively bid and performed.
- It appears that only the South Alternate has the possibly of enhancing industrial areas with rail access (lead track).

## Benefits and Disadvantages of Each Alignment

Each alignment has benefits and disadvantages. Because the alignments are similar, only items of distinction between the alignments are mentioned.

### Benefits of the South Alternative

- Can be constructed with minimal interruptions to current operations.
- Least expensive.
- Smallest area of disturbance.
- Requires least amount of private land acquisition.
- Impacts the least number of drainages
- Provides potential railroad access to a future industrial development area. (Industrial lead track has grade of over 1.5% and less than 2%.)

### Disadvantages of the South Alternative

- May require modification of SR 260 overpass.
- Grades of the interchange tracks are approximately 0.7%

#### **Benefits of the Middle Alternative**

- Unit trains (from the East on BNSF) interchanged between the CBRW and the BNSF will not travel through Connell (travel across Connell at-grade crossings)
- A large percentage of the work can be constructed off of BNSF right-of-way and competitively bid.
- Requires the least amount of track to be built.

#### **Disadvantages of the Middle Alternative**

- Cannot be constructed without interruptions to current operations.
- Requires purchase of property (quantity more than the South Alternate and less than the North Alternates)
- Higher anticipated cost than South Alternate.
- Grades of the interchange tracks are 1%. (Steepest track grade of all of the alternates.)

#### **Benefits of the North Alternative**

- Can be constructed with minimal interruptions to current operations.
- Unit trains being interchanged from the CBRW to the BNSF for Eastbound movement (and trains from the east being interchanged from BNSF and CBRW) do not require power to be repositioned. (The North and Middle Alternates will typically require the repositioning of power because trains to and from the east on the BNSF will reverse direction on the CBRW.
- Unit trains (from the East on BNSF) interchanged between the CBRW and the BNSF will not travel through Connell (travel across Connell at-grade crossings).
- A large percentage of the work can be constructed off of BNSF right-of-way and competitively bid.
- Normal manifest interchange trains likely block crossings the least between the alternates.

#### **Disadvantages of the North Alternative**

- Requires most private land acquisition.
- Largest area of disturbance.
- Highest anticipated cost.
- Grades of the interchange tracks are 0.87% (max.)
- Impacts the greatest number of drainages.
- Impacts the existing Cohan Rd grade separation.

#### **Recommendations**

The proposed South Alternate is the most beneficial option related to cost, operations and land impacts. The South Alternate;

- Meets all minimum design criteria.

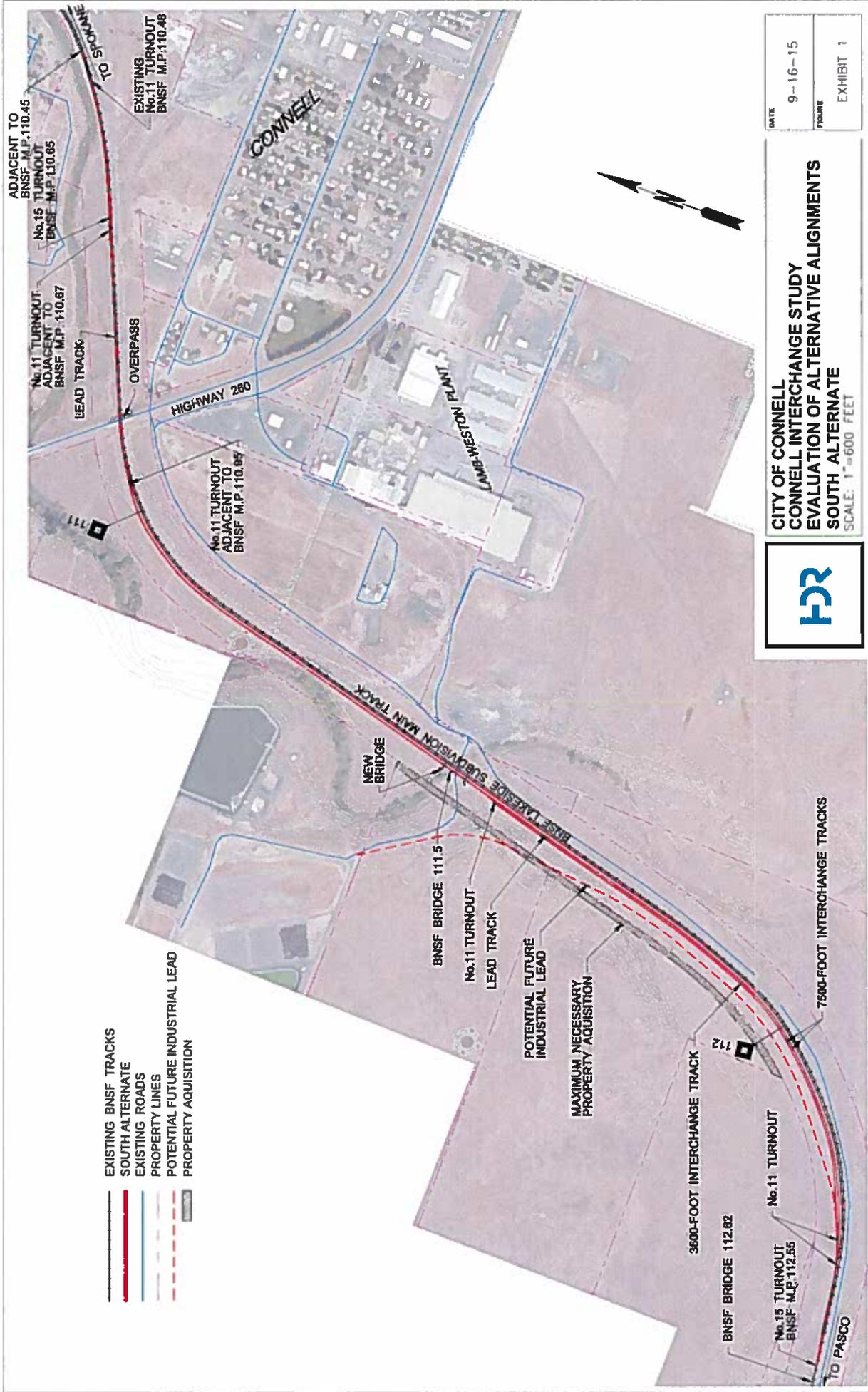


- Has the smallest overall footprint.
- Provides potential for future industrial rail access.
- Requires the least amount of land acquisition.
- Appears to be the least expensive.

**Attachments**

- Exhibit 1 – South Alternate Concept – 1 Page
- Exhibit 2 – Middle Alternate Concept – 2 Pages
- Exhibit 3 – North Alternate Concept – 2 Pages
- Exhibit 4 – Order of Magnitude Concept Alternatives Cost Estimate – 1 Page





- EXISTING BNSF TRACKS
- SOUTH ALTERNATE
- EXISTING ROADS
- PROPERTY LINES
- - - POTENTIAL FUTURE INDUSTRIAL LEAD
- ▭ PROPERTY ACQUISITION

DATE	9-16-15
FIGURE	EXHIBIT 1

**CITY OF CONWELL  
 CONWELL INTERCHANGE STUDY  
 EVALUATION OF ALTERNATIVE ALIGNMENTS  
 SOUTH ALTERNATE**  
 SCALE: 1"=600 FEET



