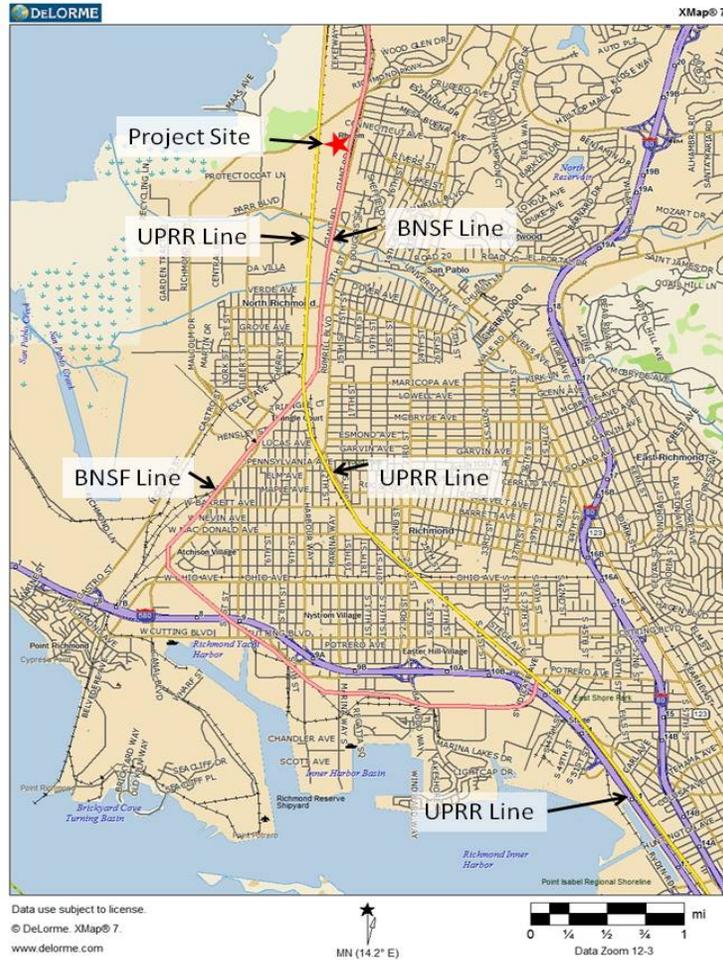


# Richmond Rail Connector Project

Located between Parr Boulevard and Richmond Parkway  
City of Richmond, California  
Project No. 0000020789

## Environmental Assessment Appendices



September 2012



**APPENDIX 1**

**Natural Environmental Study  
(Minimal Impacts)**

# Richmond Rail Connector Project Natural Environment Study (Minimal Impacts)

City of Richmond  
Contra Costa County

EA # 75-63304

**November 2011**

STATE OF CALIFORNIA  
Department of Transportation

Prepared By: *Lisa M. Patterson* Date: November 29, 2011  
Lisa M. Patterson (Revised: January 24, 2012)  
909-882-3612  
Tom Dodson & Associates  
for Caltrans Division of Rail

Approved By: *Bruce Roberts* Date: 2-9-2012  
Bruce Roberts, Project Manager  
~~510-622-8706~~ *916-654-7293*  
Caltrans, District 4 *75*

Concurred By: *B. Deunert* Date: 2/22/12  
Boris Deunert, Ph D., Senior Environmental Planner  
(510) 286-6371  
Caltrans, District 4



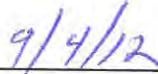
## ERRATA SHEET

### Property Acquisition Acreage Estimates

The final property acreage identified by the project proponents for acquisition was initially identified as 7.25 acres. However, as the project evolved and discussions were held with the property owners, the acreage identified for acquisition increased to 8.30 acres. This is the acreage shown on Figures 6a and 6b of the Environmental Assessment and the Initial Study. The acquisition of approximately 1.05 additional acres does not modify any of the findings in this technical study. All field surveys and impact forecasts were based on the biological study area described in the Natural Environment Study – Minimal Impacts (NES MI). The biological study area includes all areas that will be temporarily or permanently affected by the proposed project. Thus, this change in the acreage identified for property acquisition does not affect any of the conclusions contained in this NES MI biology resource technical study.



\_\_\_\_\_  
Tom Dodson  
Tom Dodson & Associates



\_\_\_\_\_  
Date

# 1. Summary

---

## 1.1 Project Summary

The Richmond Rail Connector Project (Project) consists of constructing an at grade connection track and related signal improvements between the BNSF Railway Company (BNSF) and Union Pacific Railroad (UPRR) lines in the vicinity of Richmond, California (Richmond). The proposed connection track and the associated railway improvements will occur along an approximate 1.25-mile segment between the two railroad track corridors. The project is located in the City of Richmond, Contra Costa County, California, in a portion of the Rancho San Pablo land grant lying within T2N R4W, MDBM as depicted in the USGS – Richmond, California Quadrangle, 7.5 Minute Series topographic map, Mont Diablo Meridian.

Project's primary purpose is to install an at-grade rail connection that allows BNSF trains to access UPRR's Martinez Subdivision north of Richmond rather than travel through the heart of downtown Richmond. Currently, BNSF trains have to travel through downtown Richmond to reach the Port of Oakland because there is no connector to the UPRR tracks north of Richmond. The UPRR tracks provide a more direct route to the Port. The project would benefit the residents of Richmond by reducing traffic delays due to slow moving trains at at-grade crossings; it would reduce air emissions; and it would reduce noise from train air horns and warning signals at grade crossings. In addition, it would reduce the need for BNSF trains to use tracks north of Richmond on the Martinez Subdivision, freeing up capacity and reducing conflicts for both UPRR and passenger trains

The Purpose and intended use of this Natural Environmental Study - Minimal Impacts (NES-MI) is to evaluate the onsite biological resources and determine the potential for occurrence of common and special-status species, their habitat, and other regulated habitats such as Waters of the United States including Wetlands, Waters of the State, and Streambed/Riparian resources within Project's Biological Study Area (BSA). The BSA is defined as the Project's proposed physical ground disturbance footprint, plus a buffer zone where indirect impacts may result from construction. Impacts within the Project's footprint and the BSA are detailed in Section 5.0 of this document.

The proposed project consists of a single at grade connector track and related signal improvements within an approximate 1.25 mile segment of track where the two track systems parallel each other and are located approximately one-quarter mile apart. Permanent and temporary impacts to biological resources will be limited to the maximum extent practical. The vast majority of the area within the BNSF and UPRR right-of-ways serving as the rail corridor in which the proposed connector track will be installed is highly disturbed and does not support native plant communities. The area proposed for the connection track is highly disturbed. There is a channel that transects the project parcel from east to west (Rheem Creek Channel) which has been improved at the eastern end for flood control purposes. It appears that this channel is maintained because it is relatively incised and is characterized by wetland herbaceous species. No permanent impacts are proposed to this channel because the project proposes a clear-span bridge over this creek. However, in order to construct the tracks and the clear-span bridge,

the Rheem Creek channel will be temporarily crossed with culvert pipes and earthen crossing. Once the bridge construction is complete, this temporary crossing will be removed, and the channel will be restored.

There is a second unnamed channel running parallel to the UPRR on the east side track's high fill. This channel runs between the industrial development and the track. It is characterized by both herbaceous wetland species and woody wetland species. Because the proposed connector tracks are joining the UPRR tracks on a curve, the tracks will require a 300-foot long corrugated metal pipe culvert crossing. This crossing will impact 0.32 acre of the channel. This fill as well as the temporary fill proposed on Rheem Creek will likely require regulatory permits from the U.S. Army Corps of Engineers (Corps), California Department of Fish and Game (CDFG), and the State Regional Water Quality Control Board (RWQCB). The need for a 1600 Streambed Alteration Agreement from the California Department of Fish and Game at this location will depend upon the whether or not the project falls under the interstate commerce preemption rule.

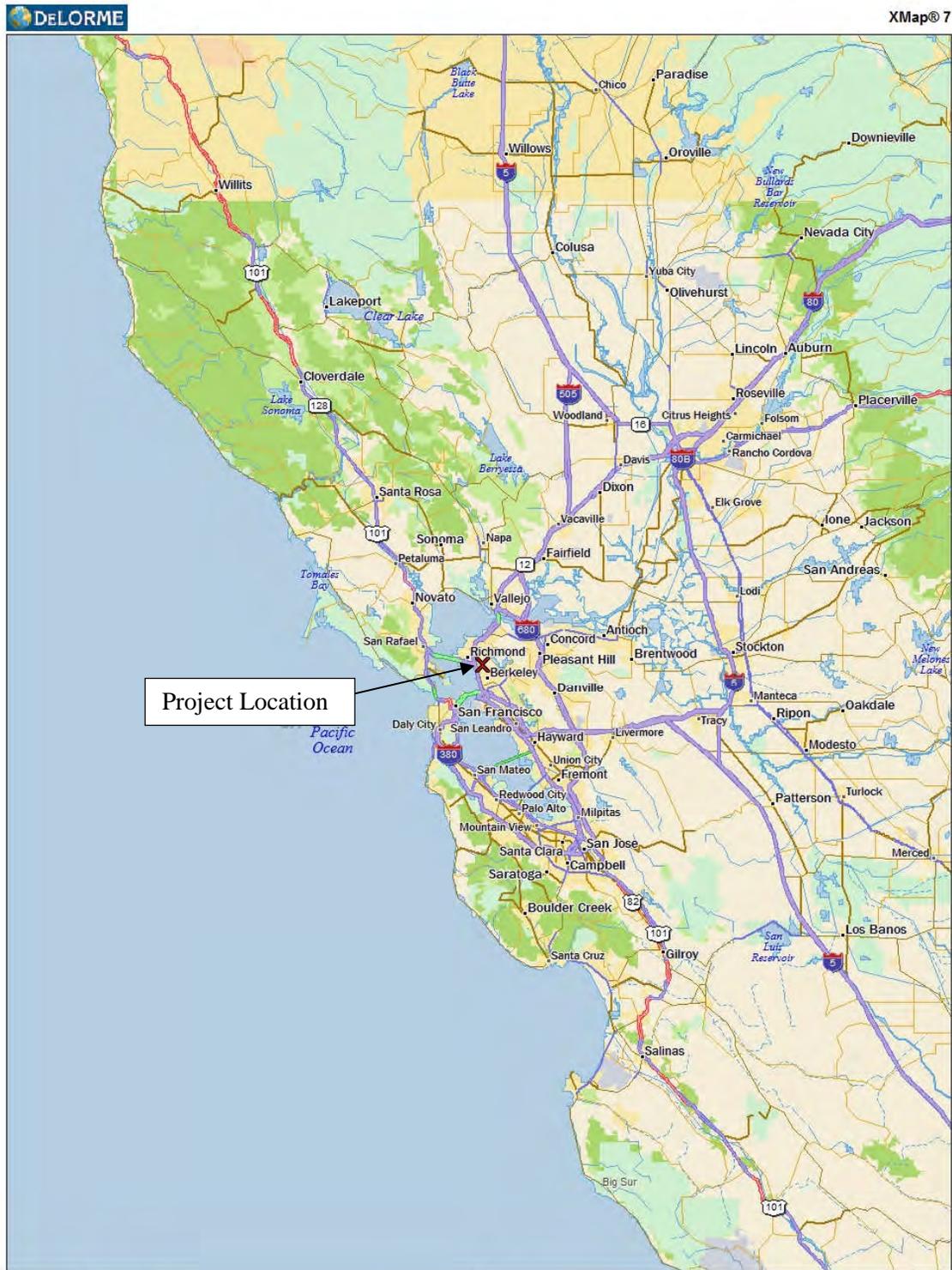
In 2006 and 2007 the East Contra Costa County HCP/NCCP (HCP/NCCP) was adopted. The participating entities are Contra Costa County, Contra Costa Flood Control District, East Bay Regional Park District, City of Brentwood, City of Clayton, City of Oakley, and City of Pittsburg. The City of Antioch did not participate, and is excluded from the coverage. The HCP/NCCP was designed to accommodate reasonable and expected growth of the participating jurisdictions. The proposed project is outside the plan area, and therefore no fee will be assessed.

## **1.2 Vegetation/Habitat Removal Information**

There are two areas where vegetation will be removed for the construction of the project. The first is the crossing at Rheem Creek. This area is characterized by a fairly incised channel, and no trees will be impacted at this crossing. The channel bottom has some wetland vegetation characterized by cattails and bulrush. Once construction is complete, the temporary impacts in this channel will be restored to their previous grade, and are expected to revegetate quickly naturally. If after one year, natural resoration to pre-project conditions has not occurred, the project proponent will remove any weedy species from the area, and transplants propogules from adjacent stock of bullrush and cattails.

The second area is the unnamed channel that runs parallel to the UPRR alignment. The crossing will remove approximately 8 willow trees. Because the channel is maintained regularly, these trees have been routinely cut, and there form is more shrub-like than tree-like. Because the channel is routinely maintained, replanting of trees in the temporary impact area is proposed.

Figure 1 - Regional Location Map



Data use subject to license.  
© DeLorme. XMap® 7.  
www.delorme.com

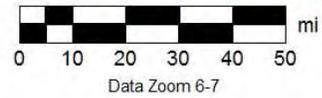
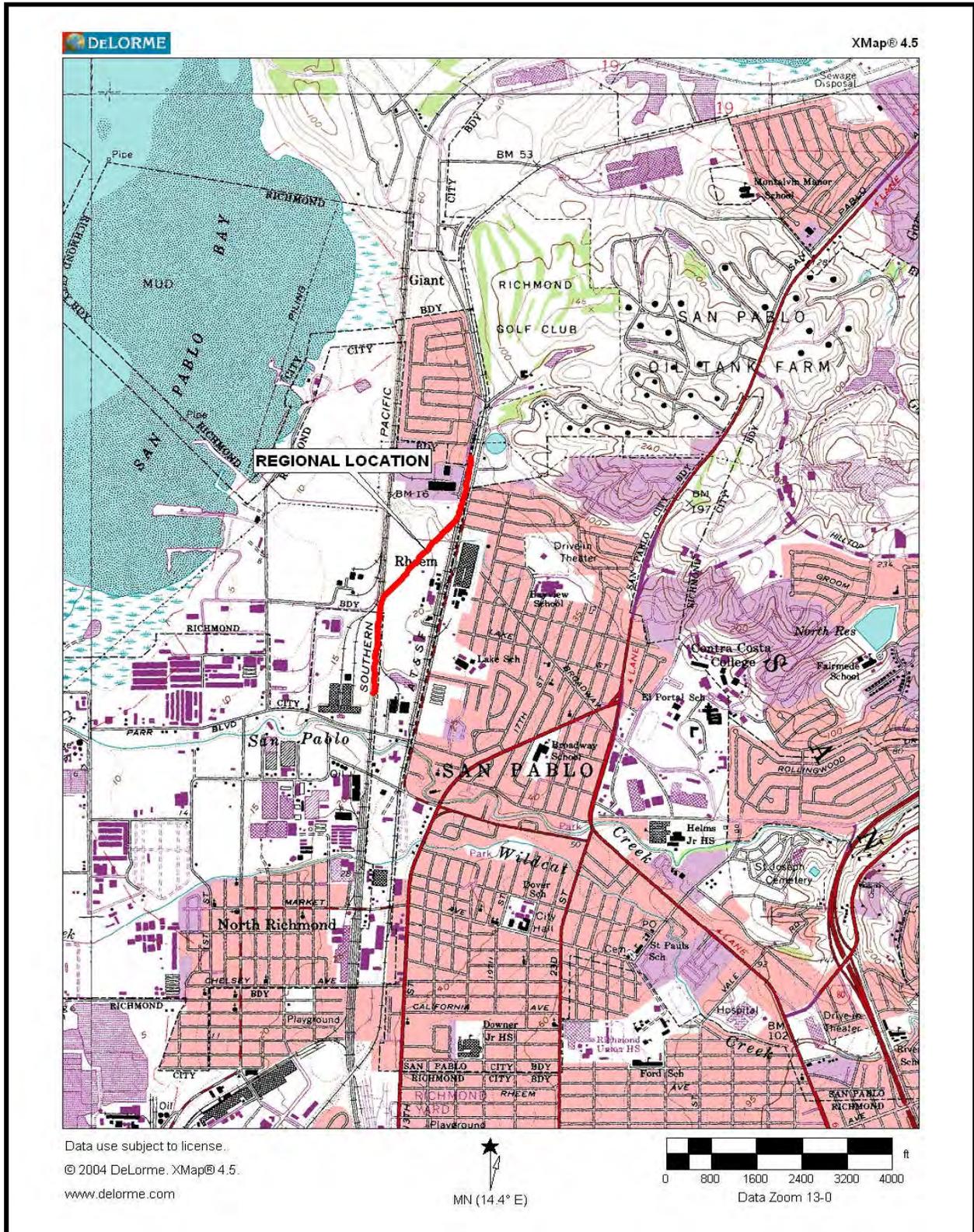


Figure 2 - Site Location Map



## 2. Introduction

---

The proposed Richmond Rail Connector Project (Project) consists of construction of an at-grade connection track between the BNSF Railway Company's (BNSF) Stockton Subdivision and Union Pacific Railroad's (UPRR) Martinez Subdivision in the northern portion of the City of Richmond(Richmond). The proposed connector track is located within Richmond and an unincorporated portion of Contra Costa County, California. Refer to Figure 1 for Regional Location Map and Figure 2 for Site Location.

The proposed project consists of a single connector track and related signal improvements within an approximate 1.25 mile segment of track where the two railroad track systems parallel each other and are located approximately one-quarter mile apart. Refer to aerial view of the project shown on Figure 3 for an overview of the proposed improvements within this segment of track.

The proposed site of the Richmond Rail Connector is on the rail corridor that connects the Port of Oakland to all points east of the Port - Northern California, the Central Valley, Southern California and the nation. It encompasses the BNSF rail lines from the Port to Barstow, and the Union Pacific rail lines from the Port south to Mojave or northeast to Nevada.

The corridor also serves as a major passenger corridor. Existing AMTRAK passenger service includes the Capitol Corridor and the San Joaquin Corridor route. The Capitol Corridor provides intercity rail service to eight Northern California counties. It had 1.7 million passengers in 2008 and is the third busiest Amtrak-operated route in the nation with 32 daily trains. The San Joaquin intercity passenger service operates between Bakersfield, Oakland and Sacramento and has the fifth highest ridership of any Amtrak service in the country. The current operating schedule includes eight daily intercity Amtrak trains. In addition, Amtrak runs four long-distance Amtrak passenger trains over the project alignment. In total, 44 passenger trains use this corridor.

The primary purpose of this project is to install an at-grade rail connection that allows BNSF trains to access UPRR's Martinez Subdivision north of Richmond rather than travel through the heart of downtown Richmond. Currently, BNSF trains have to travel through downtown Richmond to reach the Port of Oakland because there is no connector to the UPRR tracks north of Richmond. The UPRR tracks provide a more direct route to the Port. The BNSF and UPRR track alignments through Richmond are shown on Figure 3. The project would benefit the residents of Richmond by reducing traffic delays due to slow moving trains at at-grade crossings; it would reduce air emissions; and it would reduce noise from train air horns and warning signals at grade crossings. In addition, it would reduce the need for BNSF trains to use tracks north of Richmond on the Martinez Subdivision, freeing up capacity and reducing conflicts for both UPRR and passenger trains.

The need for this project is based on the following impacts imposed on the City of Richmond. For the past several years, BNSF voluntarily ran its intermodal freight trains serving the Port of Oakland on the UPRR track between Sacramento and Stege to avoid BNSF's own circuitous route through the center of Richmond. In May 2008, a Surface Transportation Board (STB) ruling stated that BNSF does not have the authority to operate its intermodal trains on this UP route. The STB ruling required BNSF

intermodal trains to travel through the center of Richmond accessing UP's Martinez Subdivision south of Richmond at Stege.

Trains using BNSF tracks through Richmond must travel a low maximum train speeds that often resulted in auto traffic blockages for extended periods of time at several closely-spaced grade crossings within Richmond. Additionally, BNSF trains accessing the Martinez Subdivision at Stege are slow and cumbersome and impact Capital Corridor and San Joaquin passenger and UP freight trains.

By substantially reducing the number of slow-moving intermodal trains in the center of the City, a connector would also relieve traffic congestion at nine grade crossings in downtown Richmond. Trains using BNSF tracks through Richmond must travel at low train speeds that often result in blocking traffic for extended periods of time at nine closely-spaced grade crossings within Richmond. The longer route and slow speeds increase the amount of time it takes BNSF trains to reach the Port of Oakland. The slow-moving BNSF trains accessing the Martinez Subdivision at Stege can also impact Capital Corridor and San Joaquin passenger and UPRR freight trains, reducing their on-time performance and reliability.

Both BNSF and UPRR freight rail operations currently serve the Port of Oakland. As a result of the decision by the STB, BNSF trains were directed to use its own tracks on the Stockton Subdivision from Stege east. The long intermodal freight trains were redirected through the core of the City of Richmond as shown on Figure 3. With installation of the proposed interconnect track as shown on Figure 2, the BNSF intermodal freight trains from the Port of Oakland will again be able to avoid the downtown Richmond track alignment and not conflict with UPRR and passenger rail operations on UPRR's Martinez Subdivision north of the proposed interconnect track, which is located just south of the Richmond Parkway. No other improvements are required to achieve the project purpose, which is to avoid intermodal freight train traffic through downtown Richmond. This discrete project fully accomplishes the project purpose.

The California Transportation Commission (CTC) concluded that this rail system improvement justified the expenditure of the funds and authorized the Richmond Rail Connector based on specific benefits cited in its approval, which included:

- *Reduces Richmond community impacts by relocating slow-moving intermodal trains*
- *Reduces emissions for idling vehicles at community grade crossings with the relocation of intermodal trains and supports the more efficient use of freight rail rather than trucks*
- *Improves efficiency and competitiveness by providing a more direct rail route to better serve Port of Oakland and Northern California*
- *Improves reliability and fluidity for the Martinez Sub freight and passenger rail users by providing a higher speed access for BNSF trains*
- *Enhances the value of the Tehachapi Corridor Rail Improvement project*
- *Improves Port of Oakland's competitiveness as first port of call*

The specific location for the Richmond Rail Connector was selected based on a review of the alignment of the two railroad tracks. Specifically, once the tracks cross Parr Boulevard, the whole alignment to the south is developed and would require displacement of existing development in order to connect the UPRR and BNSF tracks at the desired speed. Also, once north of Richmond Parkway there is no area available with sufficient length (~1.25 mile) to install the rail connector and maintain track speed, before

the rails begin to diverge. This is shown on the aerial photo provided in Figure 4. Both railroads conducted an evaluation of alternative locations and the project site located between the Richmond Parkway and Parr Boulevard is the only location available that met all of the connector site selection criteria.

The Purpose and intended use of this Natural Environmental Study - Minimal Impacts (NES-MI) is to evaluate the onsite biological resources and determine the potential for occurrence of common and special-status species, their habitat, and other regulated habitats such as Waters of the United States including Wetlands, Waters of the State, and Streambed/Riparian resources within Project's BSA. In addition this NES-MI identifies mitigation measures to reduce Project related impacts to resources.

Figure 3 - Site Aerial



### 3. Study Methods

---

Prior to beginning the field surveys, available information was reviewed from resources management plans and other relevant documents in order to determine locations and types of biological resources that have the potential to occur within and adjacent to the BSA. This investigation included a search of the California Department of Fish and Game's (CDFG) Natural Diversity Database (CNDDDB). The CNDDDB search was completed for the Richmond USGS – California, 7.5 Minute Series Topographic quadrangles.

Additionally, the following resources were used in identifying potential or known occurrences of sensitive biological resources within the proposed BSA

- *Contra Costa County General Plan*
- *East Contra Costa County HCP (August 2007)*
- *US Fish and Wildlife Service- Official List of Threatened and Endangered Species with the Potential to Occur in the Richmond USGS 7.5 Min Quadrangle*

The USGS topographic maps and Google Earth aerial imagery were also examined to determine the potential locations and types of Waters of the United States (Waters) including wetlands, and/or California Streambeds/Riparian (Streambed) resource areas.

#### 3.1 Preliminary Jurisdictional Delineation

A preliminary jurisdictional delineation was conducted on all areas within the BSA that have the potential to be subject to the regulatory jurisdiction of the US Army Corps of Engineers under Section 404 of the Clean Water Act or the Rivers and Harbor Act of 1897; the State Water Quality Control Board under Section 401 of the Clean Water Act, and California Department of Fish and Game under Section 1600 of the Fish and Game Code; using the following criteria:

##### 3.1.1 California Department of Fish and Game Section 1600

The CDFG takes jurisdiction over water flow areas, i.e., streams. These water flow areas are identified in the code as:

“...natural flow or bed, channel or bank of any river stream or lake designated by the department in which there is at any time an existing fish or wildlife resource or from which these resources derive benefit or will use material from the streambeds...”

In order to quantify the acreages of “streambed”, the channel impacts were staked in the field. then mapped and acreages were calculated from the mapping.

##### 3.1.2 U.S. Army Corps of Engineers “Waters of the United States”, excluding wetlands

The limits of “waters of the United States”, excluding wetland, are defined in 33 CFR 328.3(a) as those areas within the “ordinary high water mark” (OHWM). The OHWM is defined as:

“...that line on the shore established by the fluctuations of the water and indicated by physical characteristics such as clear natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.”

In order to quantify the acreages of “waters of the United States”, measurements of the channels channel impacts were staked in the field. then mapped and acreages were calculated from the mapping.

### 3.1.3 U.S. Army Corps of Engineers “Wetlands”

The conclusions of the Jurisdictional Delineation conducted in 2010 are based upon The U.S. Army Corps of Engineers' Wetland Delineation Manual, January 1987, Technical Report Y-87-1 (Manual). This Manual outlines a comprehensive approach based upon the presence of the following three parameters: wetland hydrology, hydrophytic vegetation, and hydric soils.

Wetland hydrology is present if the "sum total of wetness characteristics in areas that are inundated or have saturated soils for a sufficient duration to support hydrophytic vegetation" (Manual). Hydrophytic vegetation is "the sum total of macrophytic plant life growing in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content" (Manual). A positive hydrophytic vegetation indicator is present if the prevalence, characterized by the dominant species of a plant community or communities, of the vegetation is classified as hydrophytic vegetation. Dominant plant species are those that contribute more to the character of a plant community than other species present, as estimated or measured in terms of some ecological parameter (i.e., %cover, %density, etc.). Hydric soil is "soil that is saturated, flooded or ponded long enough during the growing season to develop anaerobic conditions that favor the growth and regeneration of hydrophytic vegetation.”

Using this Manual, a wetland determination is made when under "normal circumstances" an area has all three parameters present. An area is not functioning under normal circumstances if a positive indicator for one of the three parameters could not be found due to effects of recent human activities. If a particular site has been recently disturbed by natural or human activities, it may not meet the criteria of "normal circumstances". If this occurs it would be classified as an "Atypical Situation" meaning one or more parameters are not reliable indicators.

To complete this Jurisdictional Wetland Delineation, all three parameters were investigated: soils, hydrology, and vegetation. The Manual describes inundation greater than one month during the growing season to be a "very long duration", therefore areas that were ponded or were saturated at the surface or within the root zone (usually 1-12 inches) in both May and August were considered to be saturated for a very long duration. The hydrophytic vegetation is characterized by plant species that have "demonstrated an ability to achieve maturity and reproduce in an environment where all or portions of the soil within the root zone become, periodically or continuously, saturated or inundated during the growing season." (Reed) The National List of Plant Species That Occur in Wetlands was used to determine the indicator status of the dominant species of a community. The wetland area was delineated by looking for vegetation boundaries in the field between communities dominated by Facultative Wetland Species – Obligate Wetland Species and those dominated by Facultative Upland - Upland species, and comparing the hydrological and soils data along the vegetation transition.

Pedestrian-based field surveys of the BSA were conducted by Lisa Patterson (formerly Lisa Tollstrup) on May 26, 2009, August 27, 2009, March 1, 2011 and August 31, 2011 in order to assess general and dominant vegetation types, vegetation community sizes, habitat types, and wildlife and plant species present within the communities. Disturbance characteristics and all other animal signs were recorded. Typical site photos are shown in Appendix D. The primary focus of this field investigation was to determine the presence of any sensitive biological resources on the project site; and to determine the extent of jurisdictional “waters of the United States” under Section 404 of the Clean Water Act, including wetlands, and CDFG “Streambed” under Section 1600 of the CDFG Code. The following discussion outlines the specific criteria for the three types of jurisdictional areas: streambed, waters, and wetlands.

### 3.2 Habitat Assessment

The BSA was also assessed in the field for the potential to support special-status plant and animal species based on habitat suitability comparisons with reported occupied habitats. The following potential for occurrences definitions were utilized to assess the Project-related effects to species with the Project's footprint. Potential for occurrence designations were derived from Caltrans' standard environmental reference (Caltrans 2005):

**Absent [A]** - Species distribution is restricted by substantive habitat requirements, which do not occur or are negligible within the Project's physical disturbance footprint, and no further survey or study is necessary to determine the likely presence or absence of this species.

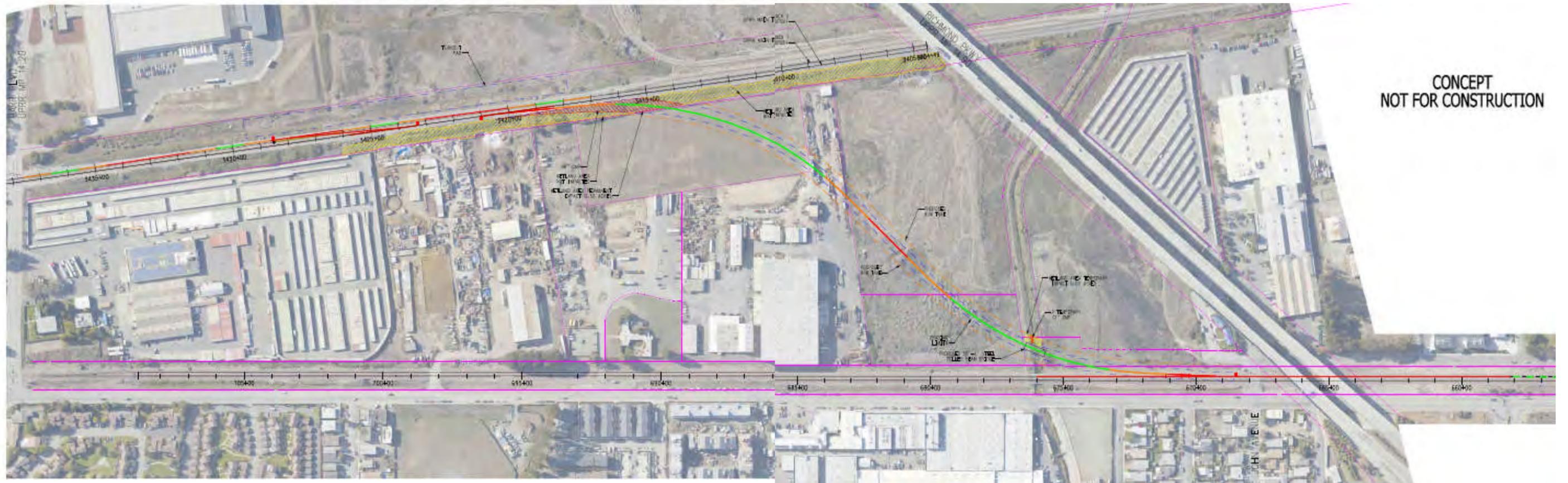
**Habitat Present [HP]** - Species distribution is restricted by substantive habitat requirements, which occur within the Project's physical disturbance footprint, and further survey or study may be necessary to determine the likely presence or absence of this species.

**Present [P]** - Species or species sign were observed within the Project's physical disturbance footprint.

**Critical Habitat [CH]** - The Project's footprint is located within a designated critical habitat unit.

No focused surveys were warranted for this site.

Figure 4 - Site Conceptual Plans



## 4. Environmental Setting

---

Contra Costa County is located on the eastern shoreline of the San Francisco-San Pablo Bay area, and south of the Suisun Bay and the Sacramento-San Joaquin River delta. Mount Diablo is situated near the center of the County at an elevation of 3,849 feet, overlooking the coastline to the west, the central valley and Sierra Nevada to the east, the winding river delta to the north, and the Santa Cruz Mountains to the south. The climate and environment of the County are typical of the coastal California regions, characterized by temperate summers nearing 90°F (degrees Fahrenheit) and cool, wet winters that dip to near freezing temperature. Average annual precipitation in the County is between 16 and 24 inches.

The BSA consists of an approximately 80-foot wide, .75-mile long proposed railway right-of-way corridor and two 0.25-mile long BNSF and UPRR railway segments at either end, located west of the intersection of Giant Road and the onramp of Richmond Parkway. The proposed alignment traverses southwest-northeast through mostly open fields near a mix of residential, light industrial, and commercial buildings. The ground surface is highly disturbed and has been recently disked. The terrain is relatively level, with elevations ranging between 15 to 25 feet above mean sea level. The existing railroad tracks at either end are located several feet higher than the rest of the BSA. Vegetation observed included foxtails (*Hordium sp.*), tumbleweeds (*Salsola iberica*), wild berries (*Ribes sp.*), dandelions (*Taraxacum officinale*), willows (*salix sp.*), shrubs (*Rhus trilobata*), and non-native grasses (*Bromus sp.*), with denser growth near the UPRR railroad track and within a drainage near the middle the BSA. Soils are made up of fine sand with silt and clays and some large rocks.

### Annual Climate

Richmond is characterized by a Mediterranean climate. The climate is slightly warmer than the coastal areas of San Francisco, the Peninsula, and Marin County; it is however more temperate than areas further inland. The average highs range from 57 °F (14 °C) to 73 °F (23 °C) and the lows between 43 °F (6 °C) to 56 °F (13 °C) year round, and September is, on average, the warmest month. January is on average the coldest month.

The rainy season begins in late October and ends in April with some showers in May. Most of the rain occurs during stronger storms which occur between November and March and drop 3.3 to 4.91 inches (125 mm) of rain per month. January and February are the rainiest months.

Like most of the Bay Area, Richmond is made up of several microclimates. Southern parts of the city and the ridges receive more fog than northern areas. Summer temperatures are higher in inland areas, where the moderating influence of San Francisco Bay is lessened. The average wind speed is 6 to 9 miles per hour with stronger winds from March through August; the strongest winds are in June.

### Soils and Topography

County general soils map (Soil Conservation Service 1977) identifies 1 soil association (distinctive patterns of soils in defined proportions) on the site. Soils are made up of fine sand with silt, loam, and clays and some large rocks formed from alluvial, sedimentary, and meta-sedimentary sources and have been formed in concert with the complex geologic history of the area. Many areas on the lower terraces

have been urbanized and/or altered by existing and past industrial practices. The Project Site has been filled. The property immediately to the east of the unnamed culvert crossing is a capped land fill, and the property to the north of Rheem Creek has been filled within the past ten years. Therefore, little native soils occur or are exposed on the site.

#### 4.1. Description of the Existing Biological and Physical Conditions

The vast majority of the alignment is disturbed and characterized by common disturbance oriented species. There are two channels (Rheem Creek and an unnamed channel) where riparian and wetlands habitats occur within the Project alignment. See Figure 4 - Project Design for channel locations. The following is a discussion of the general biological characteristics associated with the proposed right-of-way.

##### 4.1.1 Vegetation Communities:

###### Urban/ Disturbed

This community occurs at the top of the slopes and in disturbed areas. The community is characterized by storksbill (*Erodium cicutarium*), foxtail chess (*Bromus madritensis*), wild oats (*Avena barbata*), ripgut brome grass (*Bromus diandris*), and foxtail fescue (*Vulpia myuros*). Other species occurring in this community are short-pod mustard (*Brassica geniculata*), barley (*Hordium vulgare*), *Amsinkia sp.*, and star thistle (*Centaurea melitensis*)

Due to the chronic disturbances as well as a recent burn within the proposed alignment, this area does not support a diverse fauna. The most common animal species observed on the site were dogs (*Canis lupus familiaris*) and beachy ground squirrels (*Otospermophilus beecheyi*). Other common species include western meadowlark (*Sturnella magna*), cottontail rabbits (*Sylvalegus audobonii*), and mourning doves (*Zenaida macroura*).

###### Wetlands in Rheem Creek

Bulrush and cattails have the potential to be temporarily impacted within the Project's BSA. They are typically dominated by erect, rooted, herbaceous hydrophytic plant species adapted to growing in conditions of prolonged inundation. Common plant species present in this wetland type include cattails (*Typha* spp.) and Wild-berry (*Rubus* sp.) This seasonally flooded wetlands are freshwater wetlands that support ponded or saturated soil conditions during winter and spring and are dry through the summer and fall until the first substantial rainfall. The vegetation is composed of wetland generalists, such as hyssop loosestrife (*Lythrum hyssopifolia*), cocklebur (*Xanthium* spp.), and Italian ryegrass (*Lolium multiflorum*) that typically occur in frequently disturbed sites, such as along streams.

###### Riparian/Streambed in unnamed channel

This channel is characterized as a highly disturbed drainage ditch that has spotty areas of Wild-berry (*Rubus* sp.) and willow trees (*Salix* sp.), and then other patches of non-native grasses and little or no vegetation. Approximately 0.32 acres of this channel will be permanently filled by the proposed Project. Additionally 0.25 acres will be temporarily impacted by the construction of the crossing.

#### 4.1.2 Disturbances

Typically the level of disturbance with the connector ROW is severe. The majority of the adjacent areas along the proposed alignment ranges from undisturbed native habitat to complete urbanization.

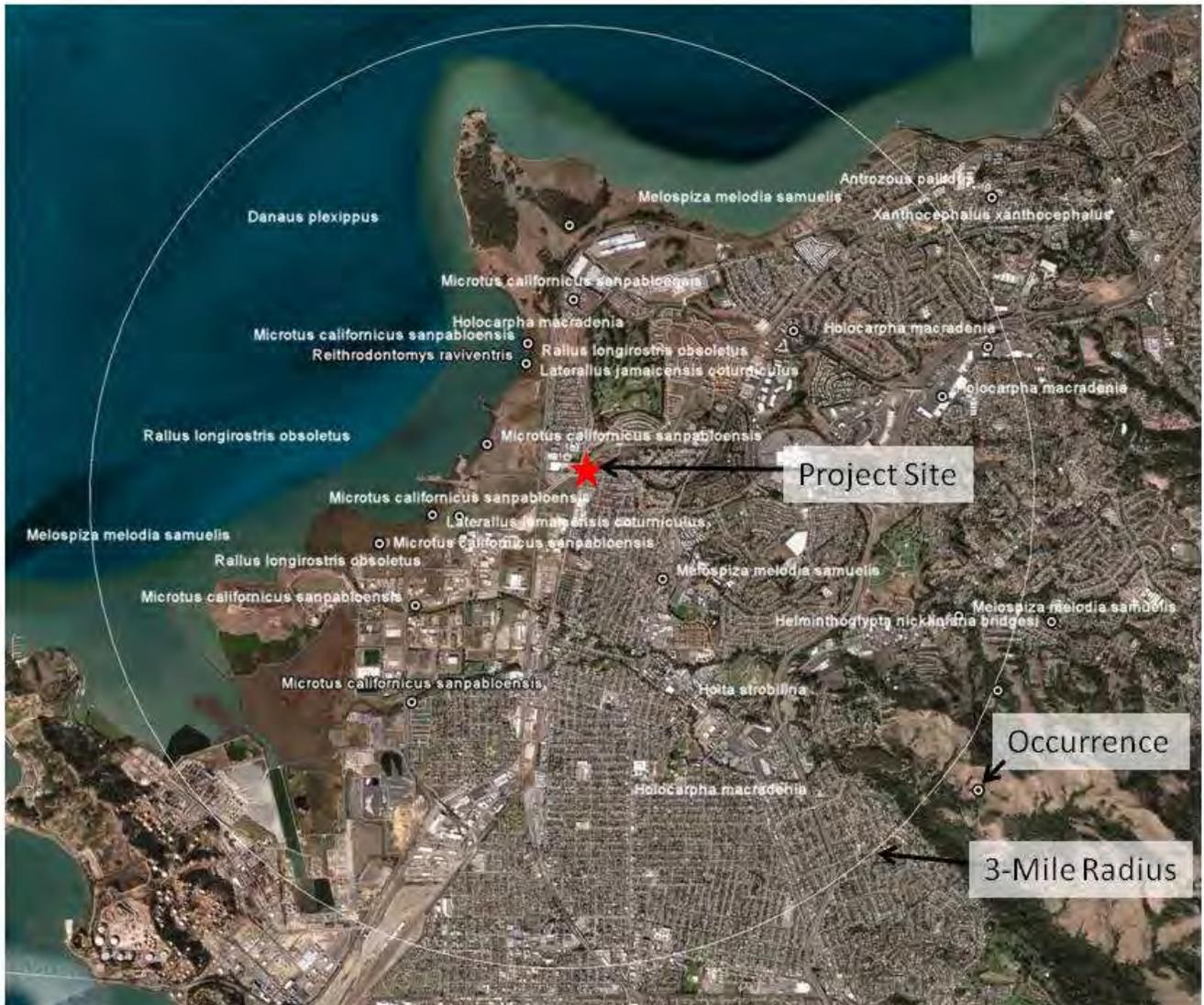
#### 4.1.3 Jurisdictional Determination

The result of the jurisdictional determination is that there are two features on the site that would be subject to regulatory jurisdiction by the US Army Corps of Engineers under Section 404 of the Clean Water Act or the Rivers and Harbor Act of 1897; the State Water Quality Control Board under Section 401 of the Clean Water Act, and California Department of Fish and Game under Section 1600 of the Fish and Game Code. These features are the Rheem Creek channel which traverses the site from east to west, and an unnamed drainage feature that runs parallel to the UPRR tracks on the east side. These features are depicted in Figure 4.

The proposed project would result in the temporary discharge of fill into 0.02 acre of the Rheem Creek channel for a temporary pipe culvert access crossing. The Rheem Creek crossing areas is characterized by wetland plant species, wetland hydrology, and wetland soils. Therefore, this feature meets the criteria for wetlands, and is regulated as such by the above referenced resource agencies.

The project would also result in the permanent fill of 0.32 acre, and temporary fill of the unnamed drainage channel for construction of a pipe culvert railroad crossing. This channel is characterized by hydrophytic vegetation using the facultative neutral test. However there are no hydric soils or wetland hydrology associated with this site. Therefore, this channel is characterized as a Waters of the US, and a Streambed; and is subject to regulation by the above referenced regulatory agencies as such.

Figure 5 - CNDDDB Occurrences Within a 3-Mile Radius of the Site



#### 4.2. Regional Species and Habitats of Concern

California Department of Fish and Game's CNDDDB for the Richmond USGS 7.5 Minute Quadrangle, and surrounding areas was searched as well as the U.S. Fish and Wildlife Service's Official List of Threatened and Endangered Species with the potential to occur the Richmond USGS 7.5 Minute Quadrangle. The following is a discussion of the species listed by the databases as occurring within Contra Costa County. Note the Species on the U.S. Fish and Wildlife Service's list are in bolded text.

**SPECIAL STATUS PLANT AND ANIMAL SPECIES KNOWN TO OCCUR  
OR POTENTIALLY OCCUR ALONG THE BNSF PROJECT ALIGNMENT**

Scientific Name	Common Name	Status Federal/State	Typical Habitat	Occurrence Potential
<i>Acipenser medirostris</i>	green sturgeon	None / Species of Concern	Spawns at temperatures of 8-14 Celsius preferring large cobble substrate but can use anywhere from clean sand to bedrock.	No suitable habitat occurs within the proposed project BSA. Thus no impacts can occur.
<i>Agelaius tricolor</i>	tricolor blackbird	None / Species of Concern	A colonial breeder that requires wetlands including a protected nesting substrate and insect prey within a couple of miles of the nesting site.	No suitable habitat occurs within the proposed project BSA. Thus no impacts can occur.
<i>Ambystoma californiense</i>	California tiger salamander	Endangered / None	This species utilizes temporary rain pools and permanent waters of the grasslands and open woodlands of low hills and valleys.	Suitable habitat is most likely lacking in the Planning Area for this species as a result of the intensive disturbances and urban uses. There are no vernal pools within the project BSA. Therefore, the proposed connector track project will not effect this species.
<i>Amphispiza belli belli</i>	Bell's sage sparrow	None / Species of Concern	Nests in dense stands of chemise in chaparral.	No suitable habitat occurs within the proposed project BSA. Thus no impacts can occur.
<i>Amsinkia grandiflora</i>	Large-flowered fiddleneck	Endangered/ Endangered	Occurs on valley and foothill grasslands, and in open oak woodlands on light soils	No suitable habitat occurs within the project area of BSA. With the exception of wetlands areas, the area of potential effect is highly disturbed. Additionally, this species was not observed during any of the field surveys; therefore, the probability of this species occurring within the BSA is very small.
<i>Anthicus antiochensis</i>	Antioch Dunes anthicid beetle	None / None	Known only from the Antioch Dunes.	The BSA does not include the Antioch Dunes, therefore, no suitable habitat occurs within the proposed connector track BSA.
<i>Anthicus sacramento</i>	Sacramento anthicid beetle	None / None	Restricted to sand dune areas.	The BSA does not include the Antioch Dunes, therefore, no suitable habitat occurs within the proposed connector track BSA.
<i>Anniella pulchra pulchra</i>	silvery legless lizard	None / Species of Concern	Prefers sandy or loose loamy soils under sparse vegetation with high moisture content.	No suitable habitat occurs within the proposed connector track BSA.

Scientific Name	Common Name	Status Federal/State	Typical Habitat	Occurrence Potential
<i>Apodemia mormo langei</i>	Lange's metalmark	Endangered/ None	Occurs in the stabilized dunes along the San Joaquin River. It is endemic to the Antioch Dunes	The BSA does not include the Antioch Dunes, therefore, no suitable habitat occurs within the proposed connector track BSA.
<i>Archoplites interruptus</i>	Sacramento Perch	Species of Concern/ None	Warm-water habitat in the San Joaquin River	No suitable habitat occurs in the proposed connector track project BSA.
<i>Arctostaphylos auriculata</i>	Mt. Diablo Manzanita	None/None	Chaparral	No suitable habitat occurs within the BSA. Further, this species was not observed with the BSA during any of the field surveys.
<b><i>Arctostaphylos auriculata</i></b>	Pallid Manzanita	Threatened/None	Chaparral	No suitable habitat occurs within the BSA. Further, this species was not observed with the BSA during any of the field surveys.
<i>Arclea herodia</i>	Great Blue Heron	None/Species of Concern	Common near the shores of open water and in wetlands over most of North and Central America as well as the West Indies and the Galápagos Islands. It is a rare vagrant to Europe, with records from Spain, the Azores and England	This species was observed within the BSA.
<i>Asio flammeus</i>	Short-eared owl	None/None	This species hunts in open grasslands, dunes, fresh and saltwater marshes and other open country. The species nests on the ground in a grass-lined depression that is often concealed in weeds or beneath shrubs. The species typically hunts for small mammals during the late afternoon onwards through the night.	No suitable habitat occurs within the proposed project BSA. Thus no impacts can occur.
<i>Aster lentus</i>	Suisun Marsh aster	None / None	This perennial, herbaceous member of the sunflower family occurs in brackish and salt marsh habitats of the eastern Bay Area. The plants are characterized by white to purple ray flowers.	No suitable habitat occurs within the proposed connector track BSA.
<i>Astragalus tener</i> var. <i>tener</i>	Alkali milk vetch	None / None	Alkali playa in valley and foothill grassland and in vernal pools.	According to CNDDB, this species may have been extirpated from the BSA.

Scientific Name	Common Name	Status Federal/State	Typical Habitat	Occurrence Potential
<i>Athene cunicularia</i>	burrowing owl	Species of Concern / None	Inhabits open fields and along berms where ground squirrel burrows occur.	Burrowing owl was not observed during any of the field surveys. Further, no sign of historical burrowing owl use was observed. Therefore the potential for this species to occur within BSA of this project is low.
<i>Atriplex joaquiniana</i>	San Joaquin Saltbush	Species of Concern / None	Found in chenopod scrub, alkali meadow, valley and foothill grassland.	No suitable habitat occurs within the proposed connector track BSA.
<i>Blepharizonia plumosa</i> ssp. <i>Plumose</i>	big tarplant	None / None	Grows in valley grassland and disturbed grassland habitats with dry soils. Blooms July to October.	This species is not known to occur in the vicinity of the proposed project. There is, however suitable habitat adjacent to the area BSA. The likelihood of this species being impacted by this project is low.
<i>Branchinecta mesovallensis</i>	Conservancy fairy shrimp	Species of Concern / None	This species is endemic to grasslands of the northern 2/3 of the central valley and is found in large, turbid pools.	No suitable habitat occurs within the proposed connector track BSA.
<i>Branchinecta lynchi</i>	Vernal pool fairy shrimp	Threatened / None	Found in vernal pools and small pond habitat.	No suitable habitat occurs within the proposed connector track BSA.
<i>Buteo regalis</i>	ferruginous hawk	None / Species of Concern	Inhabits open grasslands, sage brush flats, desert scrub low foothills surrounding valleys and fringes of pinyon-juniper habitats.	There are roosting and nesting sites adjacent to the proposed project. However, there is little to no foraging habitat that will be affected by the proposed project. Therefore, the proposed connector track will not adversely effect this species.
<i>Buteo swainsoni</i>	Swainson's hawk	Partners in Flight Priority Bird Species / Threatened	Typical habitat of the Swainson's hawk is open desert, sparse shrub lands, grassland, or cropland containing scattered, large trees or small groves. In California's Central Valley, the nests are typically at the edge of a narrow band of riparian vegetation, in isolated oak woodland, and in lone trees, roadside trees, or farmyard trees, as well as in adjacent urban residential areas (England et al. 1989).	There are roosting and nesting sites adjacent to the proposed project, However, there is little to no foraging habitat that will be affected by the proposed project. Therefore, the proposed connector track will not adversely effect this species.

Scientific Name	Common Name	Status Federal/State	Typical Habitat	Occurrence Potential
<i>Calochortus pulchellus</i>	Mt Diablo Fairy lantern	None/None	Chaparral, Valley Grassland, Foothill Woodland.	This species was not observed during any of the field surveys. Further, all known localities are south of the highway 4. There are none in proximity to the BSA. Therefore, the probability of this species occurring within the BSA is low.
<b><i>Charadrius alexandrinus nivosus</i></b>	Western snowy plover	Threatened/Species of Concern	The western snowy plover, in general, nests , feeds , and takes cover on sandy or gravelly beaches along the coast, on estuarine salt ponds , alkali lakes, and at the Salton Sea. On the Pacific coast, it nests on barren to sparsely vegetated sand beaches, dry salt flats in lagoons, dredge spoils deposited on beach or dune habitat , levees and flats at salt-evaporation ponds. In California, most of the breeding activity occurs on dune-backed beaches, barrier beaches, and salt evaporation ponds and it infrequently occurs on bluff-backed beaches.	No suitable habitat occurs within the proposed connector track BSA.
<i>Circus cyaneus</i>	northern harrier	None / Species of Concern	This species inhabits areas of tall, dense grasses, moist or dry shrubs, and the edges of row crops for nesting, cover, and feeding. Common food items are voles, frogs, small reptiles, crustaceans, and insects. Nests are built on the ground with shrubby vegetation.	This species was not observed during any of the field surveys. These birds could nest in grasslands or adjacent to marshes associated with the Project alignment. Although it is unlikely the proposed project will effect this species, construction staging areas should be checked prior to construction to insure no nests are disturbed.
<i>Clemmys marmorata</i>	western pond turtle	Species of Concern / Species of Concern	Inhabits fresh or brackish permanent or intermittent water bodies such as creeks and ponds.	No suitable habitat occurs within the proposed connector track BSA.
<i>Coelus gracillis</i>	San Joaquin dune beetle	Species of Concern/None	The species occurs in the dune habitat.	No suitable habitat occurs within the proposed connector track BSA.
<i>Cordylanthus mollis ssp mollis</i>	Soft Bird's-beak	Endangered/ Rare	Occurs in coastal marshes within the tidal zone	There is suitable habitat for this species within the saltwater marsh tidal zone. None were observed during the field surveys. Probability of occurrence is low to moderate.

Scientific Name	Common Name	Status Federal/State	Typical Habitat	Occurrence Potential
<i>Dowlingia pusilla</i>	Dwarf downingia	None/None	This annual member of the bellflower family Campanulaceae occurs rarely in vernal pools and roadside wetlands or ditches. Roadside ditches occur within and immediately adjacent to the project area. The flowers are low-growing and are blue to white with two small yellow spots near the throat.	No suitable habitat occurs within the proposed connector track BSA.
<i>Efferia antiochi</i>	Antioch efferian robberfly	Species of Concern/None	Known only from the Antioch Dunes and Fresno	No suitable habitat occurs within the BSA. Therefore, the proposed project will not impact this species.
<i>Elanus leucurus</i>	White-tailed Kite	Species of Concern/None	This species inhabits areas of tall, dense grasses, shrubs, farmlands and open country. The species mainly feeds on rodents and insects. Nests are typically built in tall trees near a water source. These birds forage in grasslands and grain fields adjacent to BNSF Alignment.	No suitable habitat occurs within the proposed connector track BSA.
<i>Empidonax trailii</i>	little willow flycatcher	None / Endangered	Found in extensive thickets of low, dense willows on the edge of wet meadows, ponds or backwaters.	No suitable habitat occurs within the proposed connector track BSA.
<i>Eriogonum Truncatum</i>	Mt. Diablo Buckwheat	None/None	The species is only known to live on Mount Diablo in Contra Costa County, California.	The proposed project does not occur within close proximity to the only known location. Further, this species was not observed during any of the field surveys, and the probability of occurrence is zero.
<i>Erodium macrophyllum</i>	Round-leafed Fillaree	None/None	This annual, herbaceous member of the geranium family (Geraniaceae) is known to occur in woodlands and grasslands, often on clay. The species is characterized by having undivided, basal, shallowly lobed leaves with white petals that are sometimes tinged red to purple.	The species was historically known from the Antioch Dunes, approximately 2.3 miles east of the project area. There is no suitable dune habitat within the proposed project BSA
<i>Erysimum capitatum ssp angustatum</i>	Contra Costa Wallflower	Endangered/ Endangered	Occurs on stabilized dunes near Antioch along the San Joaquin River.	No suitable habitat occurs within the project area. Therefore, the proposed project will not impact this species.

Scientific Name	Common Name	Status Federal/State	Typical Habitat	Occurrence Potential
<i>Eschscholzia rhombipetala</i>	Diamond-petaled California Poppy	Species of Concern/None	This species occurs very rarely on alkaline clay soils in open grasslands and fallow fields and is an annual member of the poppy family (Papaveraceae). The species is characterized by having a barrel shaped receptacle with no rim and small yellow petals (less than 1.5 centimeter). This species was presumed extinct until being rediscovered in 1992 on the Carrizo Plain. The occurrence from the Antioch Dunes, 2.3 miles east of the Project area, is considered extirpated.	There is no suitable habitat within the proposed project BSA.
<i>Eucyclogobius newberryi</i>	Tidewater goby	Endangered/Species of Concern	Goby inhabits lagoons formed by streams running into the sea in brackish and cool water. The tidewater goby prefers salinities of less than 10 ppt. These fish also prefer sandy bottoms with depths of 20–100 cm, near emergent vegetation beds.	No suitable habitat occurs within the proposed connector track BSA.
<i>Eumpos perotis californicus</i>	greater western mastiff bat	Species of Concern / Species of Concern	Uncommon resident that typically uses crevices in cliffs, high buildings, trees and tunnels for roosting.	No suitable habitat occurs within the proposed connector track BSA.
<i>Eryngium racemosum</i>	delta button celery / coyote thistle	None / Endangered	Found on seasonally inundated clay based floodplains.	Possible extirpated from this study's focal area according to the CNDDB.
<i>Falco peregrinus anatum</i>	American peregrine falcon	Unknown code / Endangered	Breeds near wetlands, lakes, rivers or other water on high cliffs, bands, dunes, mounds and human-made structures.	No suitable habitat occurs within the proposed connector track BSA.
<i>Fritillaria liliaceae</i>	Fragrant fritillary	Species of Concern/None	Coastal Prairie, Valley Grassland, Northern Coastal Scrub, wetland-riparian.	The closest occurrence of this species to the proposed alignment is a literature point on the north side of the Delta. There are no known localities near the proposed BSA. Further, this species was not observed during any of the field surveys, and the probability of occurrence is very low.
<i>Fritillaria agrestis</i>	Stink bells	None/None	Occurs in valley and foothill grasslands, and oak woodlands on clay flats	No suitable habitat occurs within the project area. Therefore, the proposed project will not impact this species.

Scientific Name	Common Name	Status Federal/State	Typical Habitat	Occurrence Potential
<i>Geothlypis trichas sinouosa</i>	Saltmarsh common yellowthroat	Species of Concern/None	This species occupies fresh and saltwater marshes with abundant vegetative cover, including bulrush, cattails and willows.	No suitable habitat occurs within the proposed connector track BSA.
<i>Hibiscus lasiocarpus</i>	California hibiscus	None/None	Occurs on freshwater riverbanks and low pest islands in sloughs.	This species was not observed during any of the field surveys, and the probability of occurrence is low.
<i>Idiostatus middlekaufi</i>	Middle Kauf's shield-back katydid	None/None	Known only from the Antioch Dunes and Fresno	No suitable habitat occurs within the project area. Therefore, the proposed project will not impact this species.
<b><i>Holocarpha macradenia</i></b>	Santa Cruz tarplant	Threatened/Endangered	Santa Cruz Tarweed inhabits terraced locations of valley or prairie grasslands with underlying sandy clay soils. Its characteristic habitat, the California coastal prairie ecosystem.	No suitable habitat occurs within the project area. Therefore, the proposed project will not impact this species.
<b><i>Hypomesus transpacificus</i></b>	delta smelt	Threatened / Threatened	Most often found at salinities less than 2 parts per trillion in the Sacramento and San Joaquin Delta.	No suitable habitat occurs within the proposed connector track BSA.
<i>Lampetra ayresi</i>	river lamprey	None / Species of Concern	Adults need clean, gravelly riffles. Amocoetes need sandy backwaters or stream edges with good water quality and temperatures below 25 Celsius.	No suitable habitat occurs within the proposed connector track BSA.
<i>Lampetra hubbsi</i>	Kern brook lamprey	None/None	Open fresh water rivers.	No suitable habitat occurs within the proposed connector track BSA.
<i>Lampetra tridentata</i>	Pacific lamprey	None/None	Open brackish waters.	No suitable habitat occurs within the proposed connector track BSA.
<i>Laterallus jamaicensis</i>	black rail	None / Threatened	Found in salt, brackish and freshwater marshes at low elevations.	No suitable habitat occurs within the proposed connector track BSA.
<i>Lathyrus jepsonii</i> var. <i>jepsonii</i>	delta tule-pea	None / None	Usually found on marsh and slough edges in freshwater and brackish marshes. Distribution is mostly restricted to the Sacramento and San Joaquin River Delta.	No suitable habitat occurs within the proposed connector track BSA.
<i>Legenere limosa</i>	legenere	None / None	Found in vernal pools.	No suitable habitat occurs within the proposed connector track BSA.

Scientific Name	Common Name	Status Federal/State	Typical Habitat	Occurrence Potential
<i>Lepidurus packardi</i>	vernal pool tadpole shrimp	Endangered / None	Vernal Pool, small pond habitat	No suitable habitat occurs within the proposed connector track BSA.
<i>Lilaeopsis masonii</i>	Mason's lilaeopsis	None / Rare	Grows in muddy or silty soil formed through river deposition or erosion in freshwater and brackish marshes and riparian scrub.	No suitable habitat occurs within the proposed connector track BSA.
<i>Limosella subulata</i>	Delta Mudwort	None/None	This perennial, herbaceous member of the figwort family (Scrophulariaceae) occurs in saltwater marshes and along shorelines.	The species is known from the immediate Project vicinity along the shores and sloughs adjacent to New York Slough. Project will not impact this area
<i>Lytta molesta</i>	molestan blister beetle	None / None	Common in dry vernal pools.	No suitable habitat occurs within the proposed connector track BSA.
<i>Masticophis flagellum ruddocki</i>	San Joaquin whipsnake	None / Species of Concern	Found in San Joaquin Valley in open, dry valley grassland and saltbush scrub with little or no tree cover. Needs mammal burrows for refuge and oviposition sites.	No suitable habitat occurs within the proposed connector track BSA.
<b><i>Masticophis literalis euryzanthus</i></b>	Alameda whipsnake	None / Species of Concern	Alameda whipsnake has commonly been reported as having a more specific association with chaparral and scrub plant communities as the habitat where it is most commonly found.	No suitable habitat occurs within the proposed connector track BSA.
<i>Myotis ciliolabrum (subulatus)</i>	small-footed myotis bat	None / None	This species ranges across the western half of North America from British Columbia, Alberta, and Saskatchewan in Canada, throughout most of the United States west of the 100th Meridian, and into central Mexico. They occur in deserts, chaparral, riparian zones, and western coniferous forest; it is most common above pinon-juniper forest.	No suitable habitat occurs within the proposed connector track BSA.
<i>Myotis evotis</i>	long-eared myotis bat	None / None	Prefers coniferous forests but is found in all brush, woodland and forest habitat from sea level to 9000 feet. Nursery roosts are located in buildings, crevices, spaces under bark and snags. Caves are used primarily as night roosts.	No suitable habitat occurs within the proposed connector track BSA.

Scientific Name	Common Name	Status Federal/State	Typical Habitat	Occurrence Potential
<i>Myotis thysanodes</i>	fringed myotis bat	None / None	Prefers pinyon-juniper, valley and foothill hardwood and hardwood-conifer habitat but is found in a wide variety of habitats.	No suitable habitat occurs within the proposed connector track BSA.
<i>Myotis volans</i>	long-legged myotis bat	None / None	Trees are used as day roosts while caves and mines are used as night roosts.	No suitable habitat occurs within the proposed connector track BSA.
<i>Myotis yumanensis</i>	Yuma myotis bat	None / None	Found in open forests and woodlands with water bodies for foraging.	No suitable habitat occurs within the proposed connector track BSA.
<i>Neotoma fuscipes riparia</i>	San Joaquin Valley woodrat	Endangered / Species of Concern	Found in riparian areas with a mix of brush and trees. Nesting sites are located in trees, snags and logs.	This species was not observed during any of the field surveys, and the probability of occurrence is low.
<b><i>Oncorhynchus kisutch</i></b>	Central Valley steelhead	Endangered / Species of Concern	Coho spend approximately the first half of their life cycle rearing and feeding in streams and small freshwater tributaries. Spawning habitat is small streams with stable gravel substrates. The remainder of the life cycle is spent foraging in estuarine and marine waters of the Pacific Ocean.	No suitable habitat occurs within the proposed connector track BSA.
<b><i>Oncorhynchus mykiss</i></b>	Central Valley steelhead	Threatened / Species of Concern	Requires a minimum water depth of 18 cm for upstream migration. Water velocity above 3 to 4 meters per second impedes upstream movement.	No suitable habitat occurs within the proposed connector track BSA.
<b><i>Oncorhynchus tshawytscha</i></b>	winter-run chinook salmon	Candidate / Species of Concern	Open water river habitat.	No suitable habitat occurs within the proposed connector track BSA.
<b><i>Pelecanus occidentalis californicus</i></b>	California brown pelican	Endangered/Species of Concern	California brown pelicans can be found along the entire length of California, primarily along the coast and on offshore islands.	No suitable nesting, roosting or foraging habitat occurs within the proposed connector track BSA.
<i>Perognathus inornatus</i>	San Joaquin pocket mouse	None / None	Requires friable soils in grasslands and blue oak savannahs.	No suitable habitat occurs within the proposed connector track BSA.
<i>Phrynosoma coronatum frontale</i>	California horned lizard	None / Species of Concern	Most common along sandy washes with scattered low bushes. Needs abundant supply of ants and other insects.	No suitable habitat occurs within the proposed connector track BSA.

Scientific Name	Common Name	Status Federal/State	Typical Habitat	Occurrence Potential
<i>Plecotus townsendii townsenii</i>	pacific western big-eared bat	Species of Concern / Species of Concern	Found throughout California most abundantly in mesic habitats. Requires caves, mines, tunnels, buildings or other human made structures for roosting. Roosting sites the most limiting resource (Zeimer, et al. 1990).	No suitable habitat occurs within the proposed connector track BSA.
<i>Plegadis chihi</i>	white-faced flycatcher	None / Species of Concern	Nests in dense tule thickets in shallow freshwater marshes.	No suitable habitat occurs within the proposed connector track BSA.
<i>Pogonichthys macrolepidotus</i>	Sacramento splittail	Threatened / Species of Concern	Inhabits slow moving river sections and dead end sloughs. Requires flooded vegetation for spawning and for foraging for its young.	No suitable habitat occurs within the proposed connector track BSA.
<b><i>Rallus longirostris obsoletus</i></b>	California clapper rail	Endangered/Species of Concern	The California Clapper Rail forages at the upper end of , along the ecotone between mudflat and higher vegetated zones, and in tidal sloughs. Mussels, clams, arthropods, snails, worms and small fish are its preferred foods, which it retrieves by probing and scavenging the surface while walking. The bird will only forage on mudflats or very shallow water where there is taller plant material nearby to provide protection at high tide.	No suitable habitat occurs within the proposed connector track BSA.
<b><i>Rana aurora draytonii</i></b>	California red-legged frog	Threatened / Species of Concern	Requires dense shrubby or emergent riparian vegetation closely associated with deep, still and slow moving water.  Requires 11 - 20 weeks of permanent water for larval development.	No suitable habitat occurs within the proposed connector track BSA.
<i>Rana boylei</i>	foothill yellow-legged frog	None / Species of Concern	Found in partly-shaded, shallow streams and riffles with rocky substrate in a variety of habitats. Needs some cobble-sized substrate for egg-laying and at least 15 weeks of water.	No suitable habitat occurs within the proposed connector track BSA.
<b><i>Reithrodontomys raviventris</i></b>	Salt marsh harvest mouse	Endangered/ Endangered	This species is known to occur in the salt marsh habitats adjacent to, and east of, Arcy Lane (near New York Slough)	No suitable habitat occurs within the proposed connector track BSA.
<i>Sagittaria sanfordii</i>	valley sagittaria	None / None	Grows in standing or slow moving freshwater ponds, marshes and ditches.	No suitable habitat occurs within the proposed connector track BSA.

Scientific Name	Common Name	Status Federal/State	Typical Habitat	Occurrence Potential
<i>Scaphiopus hammondi</i>	western spadefoot toad	None / DFG protected	This species utilizes temporary rain pools or slow moving permanent waters for breeding. Non-breeding habitat consists of open vegetation characterized by short grasses.	Suitable habitat is most likely lacking in the Planning Area for this species as a result of the intensive agricultural and urban uses. There are no vernal pools within the project impact areas. Therefore, the proposed connector track project will not effect this species.
<i>Speyeria callippe callippe</i>	Callippe silverspot butterfly	Endangered/None	This endangered subspecies occurs in only two grasslands spots in the San Francisco Bay Area, near Oakland and on San Bruno Mountain. Its native region is now extensively developed and heavily populated, leaving the butterfly endangered. The larvae eat one species of plant only, the yellow pansy, or "Johnny Jump-up" ( <i>Viola pedunculata</i> ). The female adults lay their eggs on the plant or nearby, and the larvae overwinter nearby in a silk pouch. In the spring they feed on the yellow pansy, molt four times, then pupate for two weeks in a nest of leaves which they glue together with silk.	The project site is outside the know locations for this species. Further, no suitable habitat occurs within the proposed connector track BSA.
<i>Spirinchus thaleichthys</i>	longfin smelt		Open water habitat	No suitable habitat occurs within the proposed connector track BSA.
<i>Sternula antillarum</i>	California least tern	Endangered/	This species can be found on lakes, rivers and estuaries, however it is strictly on the coast in some regions in California.	No suitable habitat occurs within the proposed connector track BSA.

Scientific Name	Common Name	Status Federal/State	Typical Habitat	Occurrence Potential
<b><i>Suaeda californica</i></b>	California sea blite		Suaeda californica, grows in a restricted area within the intertidal zone of salt marshes. It is threatened by anything that alters the hydrology of the area, such as changes in sedimentation, including dredging, erosion, and recreation. It requires a porous substrate high in nitrogen, which may come from decaying plant matter and bird droppings. Invasive plant species such as introduced ice plant threaten remaining occurrences and reintroductions.	No suitable habitat occurs within the proposed connector track BSA.
<i>Tuctoria greenei</i>	Greene's tuctoria	Endangered / Rare	Grows in vernal pools and valley and foothill grasslands.	According to the CNDDDB it has been extirpated from this study's focal area.

Bold Indicates the species occurs on the U.S. Fish and Wildlife Service's List

### 4.3 Vegetation

The vast majority of the alignment traverses routinely disturbed fields. As such the vegetation occurring is characterized by common disturbance-oriented species. The exception to this occurs in the two drainage features on the site. Riparian and wetland habitats occur within these features. The following are the vegetation community types within the Project's BSA.

#### 4.3.1 Urban/ Disturbed

This community occurs at the top of the slopes and in disturbed areas. The community is characterized by storksbill (*Erodium cicutarium*), foxtail chess (*Bromus madritensis*), wild oats (*Avena barbata*), riggut brome grass (*Bromus diandris*), and foxtail fescue (*Vulpia myuros*). Other species occurring in this community are short-pod mustard (*Brassica geniculata*), barley (*Hordium vulgare*), *Amsinkia sp.*, and star thistle (*Centaurea melitensis*)

#### 4.3.2 Emergent Wetlands in Rheem Creek

Bulrush and cattail stands have the potential to be impacted within the proposed area of potential effect. They are typically dominated by erect, rooted, herbaceous hydrophytic plant species adapted to growing in conditions of prolonged inundation. Common plant species present in this wetland type include willow trees (*Salix sp.*), cattails (*Typha spp.*) and Wild-berry (*Rubus sp.*) Seasonally flooded wetlands are freshwater wetlands that support ponded or saturated soil conditions during winter and spring and are dry through the summer and fall until the first substantial rainfall. The vegetation is composed of wetland generalists, such as hyssop loosestrife (*Lythrum hyssopifolia*), cocklebur (*Xanthium spp.*), and Italian ryegrass (*Lolium multiflorum*) that typically occur in frequently disturbed sites, such as along streams. Approximately 0.02 acre of this creek will be temporarily filled by the proposed Project.

#### 4.3.3 Riparian/Streambed in unnamed channel parallels to the UPRR

This channel is characterized as a highly disturbed drainage ditch that has spotty areas of Wild-berry (*Rubus sp.*) and willow trees (*Salix sp.*), and then other patches of non-native grasses and little or no vegetation. Approximately 0.32 acres of this channel will be permanently filled and 0.20 acre will be temporarily filled by the proposed Project.

### 4.4 Animals

Due to the chronic disturbances, surrounding industrial uses, major arterial and highway road features, and adjacent construction, this area does not support a diverse fauna. The most common species observed on the site were dogs (*Canis lupus familiaris*) and beachy ground squirrels (*Otospermophilus beecheyi*). Other common species include western meadowlark (*Sturnella magna*), cottontail rabbits (*Sylvalegus audobonii*), and mourning doves (*Zenaida macroura*). A complete list of species observed on site is included as Appendix A

## 5. Project Impacts

---

The BNSF indicates the need for the acquisition of up to about 7.25 acres (consisting of an 80-foot right-of-way for the entire approximate 0.75 mile length of connection track). The entire acquired right of way will be disturbed during construction. The properties to be acquired include the previously disturbed industrial lands and the Rheem Creek crossing.

There will also be fill placed within the BNSF and UPRR existing right of way. Approximately 7.25 acres of fill will be added to the existing railroad high-fill. This acreage includes a turnout pad that will be constructed in order to construct the crossover train tracks within the UPRR alignment. See Figure 4 for construction features.

**Table 2: CONSTRUCTION IMPACTS**

Location (Mile Post)	Type of Impact	Acreage of Impacts
New Crossing over Rheem Creek.	Clear-span Bridge - no permanent impacts: Temporary culvert for access in order to construct track and bridge.	Temporary Impacts - 0.02 Acre
Unnamed channel culvert parallel to the UPRR	Fill Channel/Riparian Habitat Temporary Construction Impacts Permanent fill for culvert crossing	Permanent Impacts - 0.32 Acre Temporary Impacts - 0.15 Acre
Upland Fill	Fill to create the new railroad road bed and turnout pads. Acquired Lands BNSF Right of Way UPRR Right of Way including Pads	7.25 Acres 5 Acres 2.25 Acres
	Total Impacts	Acres

The proposed project will not effect any State or Federally listed species nor is will it adversely effect any designated critical habitat of any Federally listed species. Therefore the project poses "no effect" findings to listed species.

## 6. Mitigation Measures

Most of the project areas is characterized by disturbed ruderal fields and industrial areas. There are no sensitive biological habitats within these areas. Therefore, the only mitigation measure proposed for the entire site, is the avoidance of vegetation and ground disturbance during the nesting bird nesting season, February 15th to September 1st.

The Project proposes to mitigate the temporary impacts to wetlands in Rheem Creek by restoring the channel to pre-construction grade and re-vegetating the disturbed areas with cuttings from adjacent plants. The area will be weeded while the native vegetation becomes established.

It is not feasible due to right-of-way and hydrology constraints to create habitat on site. The Federal Rail Road Administration requires that railroads maintain the vegetation near the tracks and creating vegetated mitigation areas is not an option within these areas. Further any habitat that was created would have limited biological value due to the existing land uses and the proposed rail facility. Therefore, the unavoidable permanent impacts to 0.32 acres of the unnamed channel that parallels the UPRR tracks will be mitigated by the purchase of credits in an "in lieu" fee program or bank within the general area of the project site. Restoration or Enhancement credits are envisioned for this project.

## 7. Permits Required

---

It is anticipated that the project will be required to obtain several permits including, but not necessarily limited to: a Section 404 permit from the U.S. Army Corps of Engineers (Corps); a California Regional Water Quality Control Board (RWQCB) 401 Water Quality Certification; a California Department of Fish and Game (CDFG) Streambed Alteration Agreement (1601 or 1603 Agreement); a construction stormwater discharge permit – National Pollutant Discharge Elimination System (NPDES) through filing a Notice of Intent with the State Water Resources Control Board and compiling and implementing a Storm Water Pollution Prevention Plan (SWPPP), which is overseen by the local RWQCB.

## 8. References

---

- AOU (American Ornithologists' Union). 1998. Check-List of North American Birds. Seventh Edition. American Ornithologists' Union, Washington, D.C. 829 pp.
- Baxter, Randall. 1999. Splittail Abundance and Distribution Update. California Department of Fish and Game- Central Valley Bay Delta Branch.
- Bent, A.C. 1938. Life histories of North American birds of prey. Part 2. U.S. Natl. Mus. Bull. 170. 482pp.
- Best, T.L. 1996. *Lepus californicus*, Mammalian Species, Publication of the American Society of Mammalogists, pp. 1-10.
- Blus, L.J. 1996. Effects of pesticides on owls in North America. *J. Raptor Research* 30: 198-206.
- Botelho, E.S. and P.C. Arrowood. 1998. The effect of burrow site use on the reproductive success of a partially migratory population of western burrowing owls (*Speotyto cunicularia hypugaea*). *J. Raptor Research* 32: 233-240.
- Bronson, F.H. and O.W. Tiemeir. 1959. The relationship of precipitation and black-tailed jack rabbit populations in Kansas. *Evolution* 40:194-198.
- Bronson, F.H. and O.W. Tiemeir. 1958. Reproduction and age distribution of black-tailed jack rabbits in Kansas. *Journal of Wildlife Management* 22:409-414.
- Brown, J.H. and B.A. Harney. 1993. Population and community ecology of heteromyid rodents in temperate habitats. In H.H. Genoways and J.H. Brown (eds.) *Biology of the Heteromyidae*, Special Publication No. 10 of the American Society of Mammalogists, pages 618-651.
- Brown, J.H. and G.A. Lieberman. 1973. Resource utilization and coexistence of seed-eating desert rodents in sand dune habitats. *Ecology* 54:788-797.
- Brown, J.W., H.A. Wier, and D. Belk. 1993. New records of fairy shrimp (Crustacea: Anostraca) from Baja California, Mexico. *The Southwestern Naturalist* 38(4): 389 - 390.

- Brylski, P., L. Barkley, B. McKernan, S.J. Montgomery, R. Minnich, and M. Price. 1993. Proceedings of the Biology and Management of Rodents in Southern California Symposium. San Bernardino County Museum, Redlands, California, June 26, 1993. Presented by the Southern California Chapter of the Wildlife Society.
- Butts, K.O. 1973. Life history and habitat requirements of burrowing owls in western Oklahoma. Unpublished MS thesis, Oklahoma State University, Stillwater. 188 pp. California Science and Engineering Associates. 1996. Final threatened and endangered species survey, March Air Reserve Base, Riverside County, California.
- California Department of Fish and Game  
1998. Endangered and Threatened Animals of California, 7pp.  
1998. Endangered, Threatened and Rare Plants of California, 13pp.  
1995. Staff Report on Burrowing owl mitigation. State of California.  
1984. Guidelines for assessing effects of proposed developments on rare and endangered plants and plant communities, 2pp.  
1992. Natural communities. (Update of Holland, R., 1986)
- CDFG (California Department of Fish and Game). 2005. California's Plants and Animals. Habitat Conservation Planning Branch Web Page. [www.dfg.ca.gov/hcpb/species](http://www.dfg.ca.gov/hcpb/species). Sacramento, CA.
- California Natural Diversity Data Base (NDDDB). 2012 Annotated record search for special animals, plants and natural communities – Avena, Escalon, Riverbank, Stockton East and Stockton West quadrangles. Natural Heritage Division, Sacramento, California.
- CNPS (California Native Plant Society). 2001. Inventory of Rare and Endangered Plants of California – sixth edition. Rare Plant Scientific Advisory Committee, David P. Tibor, Convening Editor. California Native Plant Society. Sacramento, CA.
- Clayton, K.M and J.K. Schmutz. 1999. Is the decline of burrowing owls, *Speotyto cunicularia* in prairie Canada linked to changes in the Great Plains ecosystems? *Bird Conservation International* 9: 163-185.
- Contra Costa County. 2005. Draft East Contra Costa County Habitat Conservation plan and Natural Community Conservation Plan. Prepared for East Contra Costa County Habitat Conservation Plan Association, Contra Costa County Community Development Department. Prepared by Jones and Stokes, San Jose, CA.
- Costa, W.R., K.A. Nagy, and V.H. Shoemaker. 1976. Observations of the behavior of jackrabbits (*Lepus californicus*) in the Mojave Desert. *Journals of Mammalogy* 57:399-402.
- Coulombe, H.N. 1971. Behavior and population ecology of the burrowing owl, *Speotyto cunicularia*, in the Imperial Valley of California. *Condor* 73: 162-176.
- Coulombe, H.N. 1970. Physiological and physical aspects of temperature regulation in the burrowing owl *Speotyto cunicularia*. *Comp. Biochem. Physiol.* 35: 307-337.

- DeSante, D.F. and E.D. Ruhlen. 1995. (Draft) A census of burrowing owls in California, 1991-1993.
- Dudek and Associates, Inc. 1999. "Draft Proposal", Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP), Riverside Integrated Plan (RCIP). Prepared for County of Riverside Transportation and Land Management Agency. Unpublished report. Encinitas, California. August.
- Edmonds, V.W. 1973. Longevity of the pocket mouse. *The Southwestern Naturalist* 17:300-301.
- Ehrlich, P.R., D.S. Dobkin, and D. Wheye. 1992. *Birds in Jeopardy*. Stanford University Press, Stanford, California.
- Eng, L.L., D. Belk and C.H. Eriksen. 1990. California Anostraca: distribution, habitat and status. *Journal of Crustacean Biology* 10: 247 - 277.
- Eriksen, C. and D. Belk. 1999. Fairy Shrimps of California's Puddles, Pools, and Playas. Mad River Press, Inc., Eureka, California.
- French, A.R. 1993. Physiological ecology of the heteromyidae: economics of energy and water utilization. In Genoways, H.H. and J.H. Brown (eds.) *Biology of the Heteromyidae*, Special Publication No. 10, The American Society of Mammalogists, pp. 509-538.
- Green, G.A. 1983. Ecology of breeding burrowing owls in the Columbia basin, Oregon. M.Sc. Thesis. Oregon State University, Corvallis.
- Green, G.A. 1983. Ecology of breeding burrowing owls in the Columbia Basin, Oregon. Unpublished MS thesis, Oregon State University, Corvallis. 51 pp
- Green, G.A., R.G. Anthony. 1989. Nesting success and habitat relationships of burrowing owls in the Columbia Basin, Oregon. *Condor* 91: 347
- Grinnell, J. and A.H. Miller. 1944. *The Distribution of the Birds of California*. Pacific Coast Avifauna Number 27. Copper Ornithological Club, Berkeley, California. Reprinted by Artemisia Press, Lee Vining, California; April 1986. 617 pp.
- Hall, E.R. 1981. *The Mammals of North America*. John Wiley and Sons, New York. 2 Vol. 1181 pp.
- Hathaway, S.A., D.P. Sheehan, and M.A. Simovich. 1996. Vulnerability of branchiopod cysts to crushing. *Journal of Crustacean Biology* 16(3): 448 - 452.
- Hathaway, S.A. and M.A. Simovich. 1996. Factors affecting the distribution and co-occurrence of two southern Californian anostracans (Branchiopoda), *Branchinecta sandiegonensis* and *Streptocephalus wootonii*. *Journal of Crustacean Biology* 16(4): 669 - 677.
- Haug, E.A., B.A. Millsap, and M.S. Martell. 1993. Burrowing Owl (*Speotyto cunicularia*). In *The Birds of North America*, No. 130 (A. Poole and F. Gill, Eds.) . Philadelphia: The Academy of Natural Sciences; Washington, D.C.: The American Ornithologists' Union.
- Hayden, P., J.J. Gambino, and R.G. Lindberg. 1966. Laboratory breeding of the little pocket mouse, *Perognathus longimembris*. *Journal of Mammalogy* 47:412-423.

- Hickman, James C., Ed. 1993. *The Jepson Manual: Higher Plants of California*. University of California Press, Berkeley, California.
- Hjertaas, D.G. 1997. Recovery plan for the burrowing owl in Canada. *Journal of Raptor Research Report* 9:107-111.
- Hjertaas, D., S. Brechtel, K. De Smet, O. Dyer, E. Haug, G. Holroyd, P. James, and J. Schmutz. 1995. National Recovery Plan for the Burrowing Owl. Report No. 13. Ottawa: Recovery of the Nationally Endangered Wildlife Committee. 33 pp.
- Holland, Robert F., Ph.D. 1986. *Preliminary Descriptions of the Terrestrial Natural Communities of California*. California Department of Fish and Game Nongame Heritage Program (now Natural Heritage Division), Sacramento. October.
- Holland, V.L. and Keil, David J. 1990. *California Vegetation*, 4th ed. El Corral Publications, San Luis Obispo, California.
- James, P.C. and R.H.M. Espie. 1997. Current status of the burrowing owl in North America: an agency survey. *Journal of Raptor Research Report* 9:3-5.
- James, P.C., and T.J. Ethier. 1989. Trends in the winter distribution and abundance of burrowing owls in North America. *American Birds* 43:1224-1225.
- Jameson, E.W. Jr. and H.J. Peeters. 1988. *California Mammals*. University of California Berkeley Press. 403 pp.
- Jennings, M. and M. Hayes. 1994. *Amphibian and Reptile Species of Special Concern in California* (draft). California Department of Fish and Game.
- Kenagy, G.J. 1973. Daily and seasonal patterns of activity and energetics in a heteromyid rodent community. *Ecology* 54:1201-1219.
- Kennard, J.H. 1975. Longevity records of North American birds. *Bird-banding* 46: 55-73.
- Lincer, J.L. and K. Steenhof [eds]. 1997. The burrowing owl, its biology and management: including the Proceedings of the First International Symposium. *Raptor Research Report Number* 9.
- Lutz, R.S. and D.L. Plumpton. 1999. Philopatry and nest site reuse by burrowing owls: implications for productivity. *J. Raptor Research* 33: 149-153.
- MacCracken, J.G., D.W. Uresk, and R.M. Hansen. 1985. Vegetation and soils of burrowing owl nest sites in Conata Basin, South Dakota. *Condor* 87:152-154.
- Maza, B.G., N.R. French, and A.P. Aschwanden. 1973. Home range dynamics in a population of heteromyid rodents. *Journal of Mammalogy* 54:405-425.
- Meserve, P.L. 1976. Food relationships of a rodent fauna in a California coastal sage scrub community. *Journal of Mammalogy* 57:300-319.
- Millsap, B.A. and C. Bear. 1992. Connector-brooding by Florida Burrowing Owls. *Wilson Bull.* 102: 313-317.

- National Geographic Society. 1983. *Field Guide to the Birds of North America*. National Geographic Society, Washington, D.C.
- Pacific Southwest Biological Services. 1991. Western Riverside County Multi-species Habitat Conservation Plan.
- Patten, M.A., S.J. Myers, C. McGaugh, and J.R. Easton. ca 1992. Los Angeles pocket mouse (*Perognathus longimembris brevinasus*). Unpublished report by Tierra Madre Consultants, Riverside, California.
- Price, M.V. and S.H. Jenkins. 1986. Rodents as seed consumers and dispersers. In *Seed Dispersal*, Academic Press, Australia, pp. 191-235.
- Reichman, O.J. and M.V. Price. 1993. Ecological aspects of heteromyid foraging. In H.H. Genoways and J.H. Brown (eds.) *Biology of the Heteromyidae*, Special Publication No. 10 of the American Society of Mammalogists, pages 539-574.
- Remsen, J.V., Jr. 1978. Bird species of special concern in California. Calif. Dept. Fish and Game, Sacramento. Wildl. Manage. Admin. Rep. No. 78-1. 54pp.
- Sawyer, J.O. and Keeler-Wolf, T. 1995. *A Manual of California Vegetation*. California Native Plant Society. Sacramento, CA.
- Schmutz, S.M., and J.S. Moker. 1991. A cytogenetic comparison of some North American owl species. *Genome* 34: 714-717.
- Sibley, D. 2000. National Audubon Society *The Sibley Guide to Birds*. Published by Alfred A. Knopf, Inc., New York, NY.
- Simovich, M.A. and S.A. Hathaway. 1997. Diversified bet-hedging as a reproductive strategy of some ephemeral pool anostracans (Branchiopoda). *Journal of Crustacean Biology* 17(1): 38 - 44.
- Skinner, M.W. and B. M. Pavlik, eds. 1994. *Inventory of Rare and Endangered Vascular Plants of California*, 5<sup>th</sup> edition. California Native Plant Society, Sacramento, California.
- State of California. 1991. Annual Report on the Status of California State Listed Threatened and Endangered Animals and Plants. Natural Heritage Division, Department of Fish and Game, Sacramento, California.
- Stebbins, Robert C. 1985. *A Field Guide to Western Reptiles and Amphibians*. Houghton Mifflin, Boston, Massachusetts.
- Terres, John K. 1980. *The Audubon Society Encyclopedia of North American Birds*. Knopf. New York, New York.
- Thomsen, L. 1971. Behavior and ecology of burrowing owls on the Oakland Municipal airport. *Condor* 73: 177-192.
- Trulio, L. 1997. Burrowing owl demography and habitat use at two urban sites in Santa Clara County, California. *Journal of Raptor Research Report* 9:84-89.

- Trulio, L.A. 1995. Passive relocation: a method to preserve burrowing owls on disturbed sites. *J. Field Ornithology* 66: 99-106.
- U.S. Department of Agriculture. 1971. *Soil Survey of Contra Costa Area, California*. Soil Conservation Service, Washington, D.C. / USDA-SCS (U.S. Department of Agriculture-Soil Conservation Service). 1980. Soil Survey of Contra Costa County, California. In cooperation with University of California Agricultural Experiment Station.
- U.S. Fish and Wildlife Service). 1988. National List of Plant Species That Occur in Wetlands: 1988 National Summary. U.S. Government Printing Office.
- Wellicome, T.I. 1997. Reproductive performance of burrowing owls (*Speotyto cunicularia*): effects of supplemental food. *Journal of Raptor Research Report* 9: 68-73.
- Whitaker, J.O. Jr., W.J. Wrenn, and R.E. Lewis. 1993. Parasites. In H.H. Genoways and J.H. Brown (eds.) *Biology of the Heteromyidae*, Special Publication No. 10 of the American Society of Mammalogists, pages 386-478.
- Zarn, M. 1974. Burrowing Owl, Report No. 11. Habitat management series for unique or endangered species. Bureau of Land Management, Denver. 25 pp.
- Zeiner, D.C., W.,F. Laudenslayer, Jr., K.E. Mayer, M. White. Editors. 1990. *California's Wildlife*. Volume 2. Birds. State of California, Department of Fish and Game. Sacramento, California. 731 pp.
- Zeiner, D.C., W.R. Laudenslayer, Jr., K.E. Mayer and M. White. 1990b. *California's Wildlife*, Volume 3. Mammals. State of California, Department of Fish and Game. Sacramento, California.
- Zeiner, D.C., W.F. Laudenslayer, Jr., K.E. Mayer, and M. White, eds. 1988-1990. *California's Wildlife*. Volumes I, II, III. California Statewide Wildlife Habitat Relationships System, California Department of Fish and Game. Sacramento, CA.
2003. List of California Terrestrial Natural Communities Recognized by The California Natural Diversity Database. Wildlife and Data Analysis Branch, The Vegetation Classification and Mapping Program, Sacramento, CA.
2006. Online Sixth Inventory of Rare Plants. <http://cnps.web.aplus.net/cgi-bin/inv/inventory.cgi>.
2012. List of endangered and threatened species that may occur in or be affected by projects in the Antioch North, Honker Bay, and San Francisco North quadrangles. Sacramento, CA.
1991. Soil Survey of San Mateo County, Eastern Part, and San Francisco County, California.
1995. Hydric Soils of California.
- Kopchik, John. 2005. County of Contra Costa, personal communication by phone, October 20.

## 9. Appendix

---

# APPENDIX A

## SPECIES LIST

### APPENDIX A

### SPECIES LIST

#### PLANT SPECIES

##### Angiospermea: Dicotyledonae

Amarantheceae  
Amaranthus sp.

Anacardiaceae  
Toxicodendron diversilobum

Apiaceae  
Cicuta douglasii

Asteraceae  
Ambrosia acanthicarpa  
Anthemis sp.  
Centaurea melitensis  
\*Carduus pycnocephalus  
Haploppus squarrosus  
Heterotheca grandiflora  
\*Helminthotheca echioides  
Nemizonia pugensis  
Pluchea odorata  
\*Sonchus oleraceus  
\*Lactuca serriola  
Xanthium strumarium

Boraginaceae  
Amsinckia sp.

Brassicaceae

##### Flowering plants: Dicots

Amaranth Family  
Pigweed

Sumac Family  
Pacific poison-oak

Parsley Family  
Western waterhemlock

Sunflower Family  
Ann. Bur-sage  
Mayweed  
Star thistle  
Italian thistle  
Common Sunflower  
Telegraph weed  
Ox Tongue  
Spikeweed  
  
prickly tongue  
Milkweed

Borage Family  
Fiddleneck

Mustard Family

**Richmond Rail Connector**

**Natural Environmental Study(Minimal Impact)**

Brassica nigra  
Lepidium latifolium  
Raphanus sativus

Black mustard  
pepperweed  
radish

Chenopodiaceae  
salsola tragus  
\*Bassia hyssopifolia

Goosefoot family  
Russian thistle (Tumbleweed)

Cyperaceae  
Scirpus acutus

Equisetaceae  
Equisetum telmateria

Horse-tail Family  
horsetail

Fabaceae  
\*Melilotus indicus  
Lotus wrangelianus  
\*Vicia villosa

Yellow sweet clover  
California Lotus

Geraneaceae  
Erodium cicutarium  
Geranium carolinianum

Geranium Family  
Filaree

Malvaceae  
\*Lavatera cretica

Polygonaceae  
Polygonum sp

Buckwheat Family  
Smartweed

Rosaceae  
\*Rubus discolor

Salicaceae  
Salix sp.

**Angiospermae: Monocotyledonae**

Cyperaceae  
Carex sp

Juncaceae  
Juncus sp.

Poaceae  
\*Avena fatua  
Bromus rubens  
Bromus tectorum  
Bromus diandris  
Vulpia myuros  
\*Hordeum marinum  
\*Lolium perenne  
\*Cortaderia selloana  
Paspalum distichum

Typhaceae  
Typha latifolia

**Flowering Plants: Monocots**

Sedge Family  
Sedge

Juncus Family  
Juncus

Grass Family  
Oats  
Red brome  
Cheat grass  
Ripgut  
Fescue

**ANIMAL SPECIES**

**Reptilia**

Iguanidae  
scloperous occidentalis

**Aves**

Anser  
Branta canadensis

Carpodacus  
Carpodacus mexicanis

Columbidae  
Zenaida macroura

Corvidae  
Corvus brachyrhynchos

Emberizidae  
Melospiza melodia

Mimidae  
Mimus polyglottos

**Mammalia**

Leporidae  
Sylvilagus auduboni

Sciuridae  
Spermophilus beecheyi

Canidae  
Canis lupus familiaris  
Vulpes vulpes

**Reptiles**

Iguanids  
Western Fence Lizard

**Birds**

Geese  
Canada Goose

Finches  
House finch

Pigeons and doves  
Mourning Dove

Crows and Jays  
American Crow

Sparrow, Warblers, Tanangers  
Song sparrow

Mockingbirds and Thrashers  
Northern mockingbird

**Mammals**

Rabbits and hares

Squirrels, chipmunks  
California ground squirrel

Foxes, wolves and dogs  
dog  
red fox

**APPENDIX B**  
**SITE PHOTOGRAPHS**

Site Photograph #1 – Rheem Creek at Crossing



Site Photograph #2 – Unnamed Channel at Culvert Crossing



Site Photograph #2 – Typical upland view October 2011



Site Photograph #4 – Typical upland view December 2011



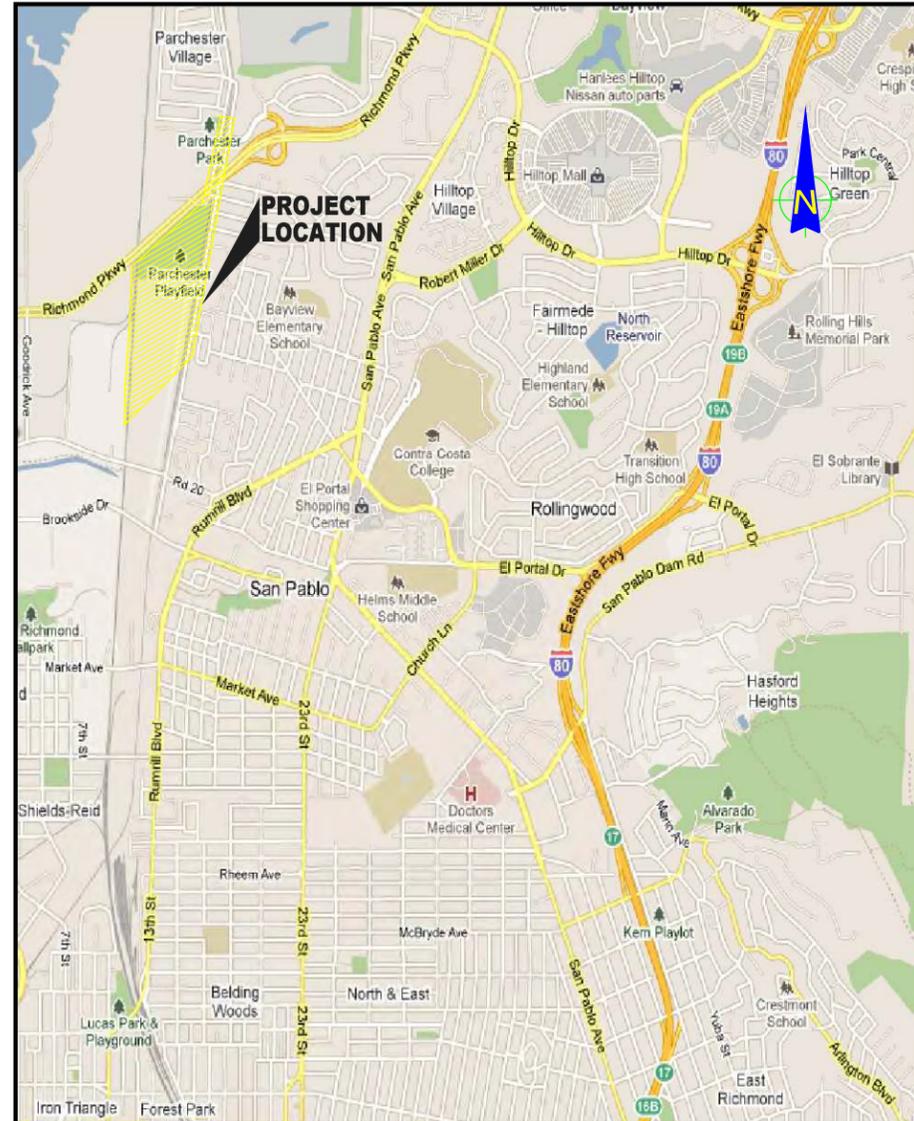
**APPENDIX C**

**Construction Plans 60%**



**UNION PACIFIC  
RAILROAD**

# **RICHMOND RAIL CONNECTION**



**VICINITY MAP**  
NOT TO SCALE

**LINE SEGMENT 7200  
STOCKTON SUBDIVISION  
MP 1187.01 TO MP 1185.87**

**60% SUBMITTAL**

**DATE: September 9, 2011**



J:\Projects\BNSF\48\_Rheem\Drawings\17048ck01.sht  
10/29/12 AM  
10/18/2011

PROJECT NUMBER	
COST ELEMENT	
LINE ITEM	
CONTRACT DESIGNATOR	
PHYSICAL ENTITY	
WORK ELEMENT	

J:\Projects\BNSF\48\_Rheem\Drawings\17048ck02.sht  
10/29/14 AM  
10/18/2011

PROJECT NUMBER	0
COST ELEMENT	
LINE ITEM	
CONTRACT DESIGNATOR	
PHYSICAL ENTITY	
WORK ELEMENT	

DRAWING NUMBER	DRAWING TITLE	SHEET NUMBER
<b>GENERAL</b>		
CK-01	COVER SHEET	001
CK-02	INDEX OF DRAWINGS	002
CK-03	GENERAL NOTES, ABBREVIATIONS & SYMBOLS	003
CK-04	KEY MAP	004
<b>SURVEY CONTROL</b>		
VA-01	SURVEY CONTROL	005
<b>TRACKWORK</b>		
RC-01	TYPICAL CROSS-SECTIONS	006
RP-01	TRACK & PLAN PROFILE - SHEET 1 OF 5 BNSD 664+00 TO BNSD 663+00	007
RP-02	TRACK & PLAN PROFILE - SHEET 2 OF 5 CNXN 10+00 TO BNSD 664+00	008
RP-03	TRACK & PLAN PROFILE - SHEET 3 OF 5 CNXN 25+00 TO CNXN 10+00	009
RP-04	TRACK & PLAN PROFILE - SHEET 4 OF 5 UP02 3430+00 TO CNXN 8+00	010
RP-05	TRACK & PLAN PROFILE - SHEET 5 OF 5 UP02 3445+00 TO UP02 3430+00	011
RT-01	TRACK GEOMETRY DATA - SHEET 1 OF 2	012
RT-02	TRACK GEOMETRY DATA - SHEET 2 OF 2	013

DRAWING NUMBER	DRAWING TITLE	SHEET NUMBER
<b>EARTHWORK</b>		
RX-01	CROSS-SECTIONS - SHEET 1 OF 5	014
RX-02	CROSS-SECTIONS - SHEET 2 OF 5	015
RX-03	CROSS-SECTIONS - SHEET 3 OF 5	016
RX-04	CROSS-SECTIONS - SHEET 4 OF 5	017
RX-05	CROSS SECTIONS - SHEET 5 OF 5	018
<b>CIVIL</b>		
CP-01	GRADE CROSSING PLAN & PROFILE - JOHN ST. - SHEET 1 OF 1	019
<b>UTILITIES</b>		
UA-01	UTILITY PLAN - SHEET 1 OF 5 - BNSD 664+00 TO BNSD 653+00 MP 1186.10 TO MP 1185.87 (BNSF)	020
UA-02	UTILITY PLAN - SHEET 2 OF 5 - CNXN 10+00 TO BNSD 664+00 MP 1186.36 TO MP 1186.10 (BNSF)	021
UA-03	UTILITY PLAN - SHEET 3 OF 5 - CNXN 25+00 TO CNXN 10+00 MP 1186.61 TO MP 1186.36 (BNSF)	022
UA-04	UTILITY PLAN - SHEET 4 OF 5 - UP0120+00 TO UP018+00 - MP 17.36 TO MP 17.62 (UPRR)	023
UA-05	UTILITY PLAN - SHEET 5 OF 5 - UP013445+00 TO UP013430+00 - MP 17.20 TO MP 17.36	024
<b>STRUCTURES</b>		
S-01	RICHMOND RAIL CONNECTOR BRIDGE NUMBER 1186.3	025
S-02	CORRUGATED PIPE CULVERT	026

DRAWING NUMBER	DRAWING TITLE	SHEET NUMBER

**60% SUBMITTAL**

Information confidential  
all plans, drawings, specifications and/or information  
furnished herewith shall  
remain the property of the  
Burlington Northern Santa Fe  
Railway and shall be held  
confidential and shall  
not be used for any purpose  
not provided for in agreements  
with the Burlington Northern  
Santa Fe Railway

DESIGNED BY	A. CRAFT
DRAWN BY	A. COSS
CHECKED BY	P. MAHONEY
APPROVED BY	M. CANAS
DATE	SEPTEMBER 09, 2011




**PATTERSON & ASSOCIATES, INC.**  
725 TOWN & COUNTRY RD  
SUITE 300  
ORANGE, CA 92668

BNSF RAILWAY  
RICHMOND RAIL CONNECTION

INDEX OF DRAWINGS

CONTRACT NO.	
DRAWING NO.	CK-02
REVISION	0 SHEET NO. 002
SCALE	NO SCALE

# GENERAL NOTES

- CONTRACTOR SHALL COMPLY WITH ALL LOCAL, STATE, AND FEDERAL SAFETY CODES AND REGULATIONS AND THE SPECIFICATIONS FOR THIS CONTRACT.
- ALL CONSTRUCTION ACTIVITIES SHALL BE SCHEDULED AND COORDINATED THROUGH THE ENGINEER, INCLUDING THE VARIOUS COMPANIES, AGENCIES AND OTHER CONTRACTORS WHO MAY BE AFFECTED BY THIS WORK. ALL REQUIRED PERMITS INCLUDING RAILROAD RIGHT-OF-ENTRY PERMITS NEEDED FOR THE WORK SHALL BE OBTAINED BY THE CONTRACTOR UNLESS OTHERWISE NOTED. THE CONTRACTOR SHALL COMPLY WITH ALL RAILROAD OCCUPANCY REQUIREMENTS INCLUDING INSURANCE REQUIREMENTS AND USE OF AND PAYMENT FOR RAILROAD FLAGMEN.
- HORIZONTAL AND VERTICAL CONTROL POINTS FOR THE TRACK LAYOUT ARE IDENTIFIED IN THE CONTRACT DOCUMENTS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO UTILIZE THESE CONTROL POINTS TO ASSURE THAT ALL FACILITIES INCLUDED IN THIS PROJECT ARE CONSTRUCTED AT THE CORRECT VERTICAL AND HORIZONTAL LOCATIONS.
- THE BURLINGTON NORTHERN SANTA FE RAILWAY WILL CONSTRUCT ALL TRACKWORK. TRACKWORK DONE BY BNSF WILL INCLUDE ALL MATERIAL FROM THE TOP OF THE SUBBALLAST AND UP. THE CONTRACTOR IS RESPONSIBLE FOR ALL GRADING WORK BELOW THE TOP OF SUBBALLAST. GRADING WORK CONSISTS OF SUBGRADE PREPARATION AND PLACEMENT OF SUBBALLAST TO GRADES INDICATED ON THE PLANS.
- POSITIVE DRAINAGE MUST BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION TO PREVENT PONDING OF WATER.
- THE CONTRACTOR SHALL COMPLY WITH THE STATE OF CALIFORNIA NPDES PERMIT REGARDING THE TREATMENT OF WATER BEFORE DISCHARGING OFF OF BNSF R/W.
- CONTRACTOR SHALL SUBMIT A PHASING PLAN TO THE ENGINEER FOR APPROVAL PRIOR TO CONSTRUCTION. ANY MODIFICATIONS TO THIS PHASING PLAN SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL.
- LIMITS OF GRADING AS SHOWN ON THE PLANS ARE APPROXIMATE. WHERE LIMIT OF GRADING IS ADJACENT TO A BRIDGE, CROSSING, OR OTHER FACILITY, GRADING SHALL PROVIDE FOR A CONTINUOUS GRADE SO THAT THE RAILROAD CAN SUBSEQUENTLY LAY TRACK WITH NO ADDITIONAL WORK.
- SECTION 4216/4217 OF THE GOVERNMENT CODE REQUIRES A DIG ALERT IDENTIFICATION NUMBER BE ISSUED BEFORE A "PERMIT TO EXCAVATE" IS VALID. THE CONTRACTOR SHALL CALL THE UNDERGROUND SERVICE ALERT (1-800-422-4133) TWO WORKING DAYS PRIOR TO CONSTRUCTION TO OBTAIN A DIG ALERT ID NUMBER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING THE FIBER OPTIC LINES.
- THE CONTRACTOR SHALL BECOME FAMILIAR WITH LEGISLATION OUTLINING PROCEDURES FOR LOCATING UTILITIES BY HAND EXCAVATION AND COMPLY WITH ITS DIRECTIVE.
- PRIOR TO EACH CONSTRUCTION ACTIVITY WITHIN BNSF RIGHT-OF-WAY, THE CONTRACTOR SHALL NOTIFY BNSF'S SIGNAL REPRESENTATIVE.
- THE CONTRACTOR SHALL PROTECT ALL BNSF SIGNAL FACILITIES IN PLACE.
- THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS FOR CONFLICTS WITH EXISTING UTILITIES, SIGNAL CABLES / EQUIPMENT AND/OR OTHER ITEMS THAT MIGHT IMPAIR CONSTRUCTION ACTIVITIES. INCONSISTENCIES FOUND SHALL BE REPORTED TO THE ENGINEER.
- REPAIRS TO FACILITIES INTENDED TO REMAIN IN PLACE SHALL BE MADE BY THE CONTRACTOR AT THE CONTRACTOR'S EXPENSE UNLESS OTHERWISE STATED BY THE ENGINEER.
- ALL EXCAVATED WASTE MATERIAL SHALL BE IMMEDIATELY REMOVED FROM THE SITE. ONSITE STORAGE OF EXCAVATED WASTE MATERIAL SHALL NOT BE PERMITTED AT ANY TIME.
- ON-SITE CONSTRUCTION BY OTHERS, INCLUDING ROUTINE MAINTENANCE WORK, (BNSF FORCES, BNSF SIGNAL CONTRACTOR, AMTRAK, FIBER OPTIC, UTILITIES, ETC.) MAY OCCUR DURING THE CONSTRUCTION PERIOD OF THIS CONTRACT. THE CONTRACTOR SHALL COORDINATE CONSTRUCTION ACTIVITIES THROUGH THE ENGINEER SO AS TO MINIMIZE INTERFERENCE WITH OTHERS.
- PRIOR TO COMMENCING WORK, ALL EXISTING SITE CONDITIONS SHALL BE FIELD VERIFIED WITH THE ENGINEER TO ASCERTAIN THE LIMITS OF WORK ACTIVITIES. THE CONTRACTOR SHALL SUBMIT AND RECEIVE THE ENGINEER'S APPROVAL OF THE CONTRACTORS PROJECT SCHEDULE AND OPERATIONS PLAN. EACH ITEM OF WORK SHALL BE DESCRIBED AND ACCOUNTED FOR IN THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL REFER TO THE SPECIFICATIONS FOR FURTHER INFORMATION REGARDING SUBMITTAL REQUIREMENTS.
- RAIL TRAFFIC DISRUPTIONS SHALL BE KEPT TO A MINIMUM. DISRUPTIONS IN RAIL TRAFFIC THAT MAY BE REQUIRED SHALL BE COORDINATED WITH THE ENGINEER BEFOREHAND. NO SUCH WORK SHALL BE COMMENCED WITHOUT THE ENGINEER'S APPROVAL. WORK AFFECTING THE MOVEMENT OF TRAINS WILL BE UNDER THE AUTHORITY AND OVERALL CONTROL OF THE ENGINEER OR HIS REPRESENTATIVE. AMTRAK CAPITAL CORRIDOR COMMUTER TRAIN OPERATIONS AND FREIGHT TRAFFIC MUST BE MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD.
- THE CONTRACTOR SHALL NOT PLACE MATERIAL AND/OR EQUIPMENT WITHIN 25 FEET OF AN ACTIVE TRACK AT ANY TIME WITHOUT PRIOR APPROVAL OF THE ENGINEER.
- EXISTING RAILROAD SIGNAGE (INCLUDING SPEED SIGNS) SHALL BE MAINTAINED DURING THE CONSTRUCTION PERIOD. ALL RAILROAD SIGNAGE SHALL BE FULLY RESTORED UPON COMPLETION OF EACH DAYS WORK IN ACCORDANCE WITH BNSF ENGINEERING STANDARDS. PRIOR TO CONSTRUCTION, BNSF STANDARD PROJECT NOTICE SIGNS SHALL BE PLACED AT LOCATIONS AS DIRECTED BY THE ENGINEER. NO TRESPASSING SIGNS SHALL BE PLACED IN ACCORDANCE WITH BNSF STD DWG 3068 AND AS SHOWN ON THE DRAWINGS.
- ALL WORK SHALL BE COORDINATED WITH BNSF'S SIGNAL ENGINEER, SIGNAL FORCES AND SIGNAL CONTRACTOR THRU THE ENGINEER. WORK WILL BE PHASED TO EFFECT THE CONTINUED OPERATION OF EXISTING SIGNAL SYSTEM DURING CONSTRUCTION. IN NO INSTANCE MAY WORK PROCEED IN ANY AREA WITHOUT ADVANCE APPROVAL OF BNSF'S SIGNAL ENGINEER. THE CONTRACTOR SHALL LOCATE ALL SIGNAL AND COMMUNICATION CONDUITS, CABLES, WIRES, OR OTHER TRACK, TRACK BED, AND RIGHT-OF-WAY.
- WALKWAYS SHALL BE PLACED AS REQUIRED BY CALIFORNIA PUBLIC UTILITIES COMMISSION GENERAL ORDER NO. 118 AND 26D FOR ALL NEW CONSTRUCTION, UNLESS NOTED OTHERWISE.
- DIMENSIONS SHOWN IN PARENTHESES INDICATE APPROXIMATE EXISTING DIMENSIONS. WHERE ELEVATIONS ARE SHOWN IN PARENTHESES AT JOIN LOCATIONS, THE CONTRACTOR SHALL VERIFY THESE ELEVATIONS PRIOR TO CONSTRUCTION AND JOIN FEATURES AT EXISTING ELEVATIONS.
- ALL EXISTING FENCES ALONG THE RIGHT-OF-WAY SHALL BE PROTECTED IN PLACE, UNLESS NOTED OTHERWISE. AT THE OPTION OF THE CONTRACTOR, FENCING MAY BE REMOVED TO FACILITATE CONSTRUCTION; HOWEVER, FENCING MUST BE REPLACED, IN KIND, AND THE CONSTRUCTION SITE MUST REMAIN SECURE AT ALL TIMES.
- THE CONTRACTOR SHALL CONSTRUCT GRADE CROSSING IMPROVEMENTS AS SHOWN IN THE PLANS, EXCEPT THAT AC PAVEMENT SHALL BE PLACED WHERE NEW CONCRETE CROSSING PANELS ARE SHOWN (TO BE INSTALLED BY BNSF). BNSF WILL REMOVE THIS AC PAVEMENT WHEN THE TRACK IS ACTUALLY CONSTRUCTED, AT A LATER DATE. TRACK GRADING AND SUBBALLAST PLACEMENT SHALL BE UNIFORM THROUGH THE CROSSING, MATCHING THE GRADING AND SUBBALLAST AT EACH END OF THE CROSSING.

- DEFINITIONS:
- A. TRACK OUTAGE: TRACK WHICH IS OUT OF SERVICE FOR A GIVEN PERIOD OF TIME.
  - B. ACTIVE TRACK: TRACK ON WHICH TRAINS ARE OPERATING AND INTERRUPTION OF SERVICE MAY OCCUR ONLY WITHIN AN APPROVED "WINDOW", AS DEFINED BELOW.
  - C. FOULED TRACK: TRACK IS FOULED WHEN AN OBSTRUCTION INCLUDING A WORKING CREW, IS WITHIN 20 FEET FROM THE CENTERLINE OF THE TRACK OR WHEN AN OVERHEAD OBSTRUCTION IS PLACED WITHIN 22'-6" ABOVE THE TOP OF RAIL. WORK MAY BE PERFORMED UNDER THE PROTECTION OF A RAILROAD FLAGMAN.
  - D. WINDOW: A GIVEN PERIOD OF TIME BETWEEN OPERATING TRAINS WHERE A TRACK MAY BE TAKEN OUT OF SERVICE, WITH THE STIPULATION THAT THE TRACK SHALL BE BACK IN SERVICE AT THE END OF THE GIVEN PERIOD OF TIME.

&	AND	E	EAST or EASTERLY or EASTING
@	AT	Ea	SUPERELEVATION, ACTUAL
°	DEGREE(S)	EC	END OF CURVE
'	FOOT or FEET or MINUTE(S)	EF	EACH FACE
"	INCH or INCHES or SECOND(S)	EGL	ENERGY GRADE LINE
%	PERCENT	EL or ELLEV	ELEVATION
#	POUND or NUMBER	EQ	EQUAL or EQUATION
△	CENTRAL ANGLE OF CIRCULAR CURVE	EW	EACH WAY
2500	2500 SPUR TRACK	Eu	SUPERELEVATION, UNBALANCED
AC	ASPHALT CONCRETE	EX or EXIST	EXISTING
AP	ANGLE POINT	EXMT or EMT	EXISTING MAIN TRACK
APE	AREA OF POTENTIAL EFFECT	EMT1	EXISTING MAIN TRACK 1
APPROX	APPROXIMATELY	EMT2	EXISTING MAIN TRACK 2
APWA	AMERICAN PUBLIC WORKS ASSOCIATION	EMT	FREIGHT
AVE	AVENUE	F	FIRE HYDRANT
BC	BEGINNING OF CURVE	FL	FLOWLINE
BLVD	BOULEVARD	FS	FINISHED SURFACE
BNSF	BURLINGTON NORTHERN SANTA FE RAILWAY	FT	FOOT or FEET
		G	GRADE
BM	BENCHMARK	G1	GRADE ENTERING VERTICAL CURVE
BR	BRIDGE	G2	GRADE EXITING VERTICAL CURVE
CB	CATCH BASIN	ga	GAGE
CC	CENTER OF CURVE	GB	GRADE BREAK
CIP	CAST IRON PIPE OR CAST IN PLACE	GM	GAS MATER
C/L or C	CENTERLINE	GRD	GROUND
CONC	CONCRETE	GV	GAS VALVE
CMP	CORRUGATED METAL PIPE	HGL	HYDRAULIC GRADE LINE
CP	CONTROL POINT	HORIZ	HORIZONTAL
CORR	CORRUGATED	HP	HIGH POINT or HIGH PRESSURE
CS	CURVE TO SPIRAL	I	TOTAL INTERSECTION ANGLE
CT	CONCRETE TIES	INV	INVERT
DC	DEGREE OF CURVE	L	LENGTH
DESC	DESCRIPTION	Lc	LENGTH OF CURVE (CIRCULAR)
DI	DUCTILE IRON	LF	LINEAR FOOT or LINEAR FEET
DIP	DUCTILE IRON PIPE	LH	LEFT HAND
DOT	DEPARTMENT OF TRANSPORTATION	LP	LOW POINT
DR	DRIVE	Ls or LS	LENGTH OF SPIRAL
DU	DUCT	LT	LEFT
DWG	DRAWING	MAX	MAXIMUM
E	EAST or EASTERLY or EASTING	MH	MANHOLE
Ea	SUPERELEVATION, ACTUAL		

# ABBREVIATIONS

MIN	MINIMUM	RH	RIGHT HAND
MP	MILEPOST or MEDIUM PRESSURE	RPM	RAISED PAVEMENT MARKER
MSST	MAIN STREET SPUR TRACK	RR	RAILROAD
MT	MAIN TRACK	RT	RIGHT
MTD	MULTIPLE TILE DUCT	S	SOUTH or SOUTHERLY or SLOPE
N	NORTH or NORTHERLY or NORTHING	SC	SPIRAL TO CURVE
NMT1	NEW MAIN TRACK 1	SDMH	STORM DRAIN MANHOLE
NMT2	NEW MAIN TRACK 2	SF	SQUARE FOOT or SQUARE FEET
NMT3	NEW MAIN TRACK 3	SO	SOUTHERN
NO	NUMBER or NORTHERN	SMH or SSMH	SANITARY SEWER MANHOLE
NTS	NOT TO SCALE	STA	STATION
OD	OUTSIDE DIAMETER	STD	STANDARD
OP	OVERPASS	ST	STREET or SPIRAL TO TANGENT
OTM	OTHER TRACK MATERIAL	SUB	SUBDIVISION
O, TO O,	OUT TO OUT	T	TANGENT
P or PSGR	PASSENGER	TC	TRACK CENTER(S) or TOP OF CURB
PB	PULLBOX	TC	TOP OF GRATE
PC	POINT OF CURVE	TGC	THE GAS COMPANY
PCC	POINT OF COMPOUND CURVATURE or PORTLAND CEMENT CONCRETE	T.O. or TO	TURNOUT
PI	POINT OF INTERSECTION	T/R or TOR	TOP OF RAIL
PIP	PROTECT IN PLACE	TF	TRACK FOOT or TRACK FEET
PITO	POINT OF INTERSECTION OF TURNOUT	TRK	TRACK
POB	POINT OF BEGINNING	TS	TANGENT TO SPIRAL
POE	POINT OF ENDING	TT	TIMBER TRANSITION TIES
POT	POINT ON TANGENT	TYP	TYPICAL
PRC	POINT OF REVERSE CURVATURE	UD	UNDERDRAIN
PROP	PROPOSED	UNO	UNLESS NOTED OTHERWISE
PS	POINT OF SWITCH	UP	UNDERPASS
PT	POINT OF TANGENT	UPRR	UNION PACIFIC RAILROAD
PVC	POINT OF VERTICAL CURVE or POLYVINYL CHLORIDE (PIPE)	V	VELOCITY
PVI	POINT OF VERTICAL INTERSECTION	VAR	VARIES
PVT	POINT OF VERTICAL TANGENT	VCP	VITRIFIED CLAY PIPE
R	RADIUS or RATE OF CHANGE	VERT	VERTICAL
RCB	REINFORCED CONCRETE BOX	W	WEST or WESTERLY
R/W	RIGHT-OF-WAY	WM	WATER METER
RCP	REINFORCED CONCRETE PIPE	WV	WATER VALVE
RD	ROAD	XING	CROSSING
		XO	CROSSOVER

# SYMBOLS

	EXISTING	PROPOSED		EXISTING	PROPOSED
ASPHALT			TIMBER		
BALLAST			TRACK		
CANTILEVER WITH DUAL SIGNALS			TRACK TO BE REMOVED		
CANTILEVER WITH SIGNALS			TRACK TO BE UPGRADED		
CITY OR COUNTY BOUNDARY			TRACK TO BE RAISED (VERTICAL REALIGNMENT)		
CONCRETE			TURNOUT MANUAL		
CROSSING GATE & FLASHING LIGHTS (CPUC STD #9)			CROSSOVER MANUAL		
SIGNAL SHELTER			TURNOUT POWER		
FENCE			CROSSOVER POWER		
CROSSING GATE					
HEADWALL					
MILEPOST					
POINT OF SWITCH					
POINT OF VERTICAL INTERSECTION					
RAILROAD SIGNAL (SINGLE UNIT)					
RAILROAD SIGNAL (DOUBLE UNIT)					
RIGHT-OF-WAY					
FLASHING LIGHTS (CPUC STD #8)					
SUBGRADE EARTH					

# CURVE DATA

<b>CURVE MT1-1151C</b>	←	CURVE NUMBER
Dc = 1° 12'	←	DEGREE OF CURVE
V = 80(P) / 70(F)	←	DESIGN SPEED (TIMETABLE SPEED)
Ea = 2 1/2"	←	ACTUAL SUPERELEVATION
Vmax(P) = 81	←	MAXIMUM SPEED THRU CURVE FOR PASSENGER TRAINS (ASSUMES Eu-3")
Vmax(F) = 73	←	MAXIMUM SPEED THRU CURVE FOR FREIGHT TRAINS (ASSUMES Eu-2")
Ls = 240'	←	LENGTH OF SPIRAL(S)
Lc = 468'	←	LENGTH OF CIRCULAR PORTION OF CURVE

J:\Projects\BNSF\48\_Rheem\Drawings\17048ck03.sht 10:29:17 AM 10/18/2011

PROJECT NUMBER	
COST ELEMENT	
LINE ITEM	
CONTRACT DESIGNATOR	
PHYSICAL ENTITY	
WORK ELEMENT	

# 60% SUBMITTAL

REV	DATE	DESCRIPTION	BY	SUB	APP
-----	------	-------------	----	-----	-----

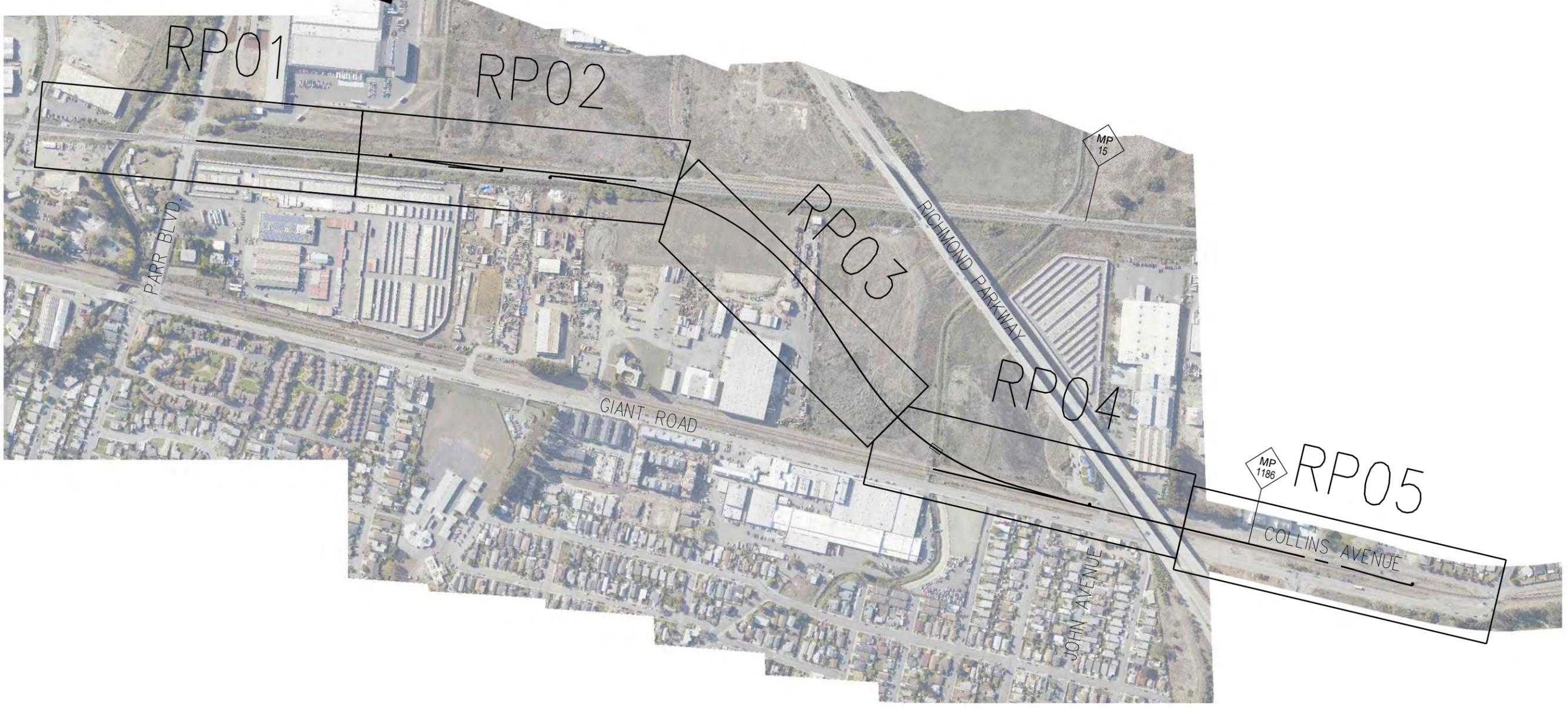
DESIGNED BY: A. CRAFT  
 DRAWN BY: A. COSS  
 CHECKED BY: P. MAHONEY  
 APPROVED BY: M. CANAS  
 DATE: SEPTEMBER 09, 2011

**PATERSON & ASSOCIATES, INC.**  
 725 TOWN & COUNTRY RD SUITE 300  
 ORANGE, CA 92668

BNSF RAILWAY  
 RICHMOND RAIL CONNECTION

CONTRACT NO. \_\_\_\_\_  
 DRAWING NO. CK-03  
 REVISION 0 SHEET NO. 003  
 SCALE NONE

GENERAL NOTES, ABBREVIATIONS & SYMBOLS



J:\Projects\BNSF\48\_Rheem\Drawings\17048ck04.sht  
10/29/2011 10:29:20 AM  
10/18/2011

PROJECT NUMBER	COST ELEMENT	LINE ITEM	CONTRACT DESIGNATOR	PHYSICAL ENTITY	WORK ELEMENT

REV	DATE	DESCRIPTION	BY	SUB	APP

**NOT FOR CONSTRUCTION**  
**60% SUBMITTAL**

Information confidential  
all plans, drawings, specifications, and/or information furnished herewith shall remain the property of the Burlington Northern Santa Fe Railway and shall be held confidential and shall not be used for any purpose not provided for in agreements with the Burlington Northern Santa Fe Railway.

DESIGNED BY A. CRAFT  
DRAWN BY A. COSS  
CHECKED BY P. MAHONEY  
APPROVED BY M. CANAS  
DATE SEPTEMBER 09, 2011

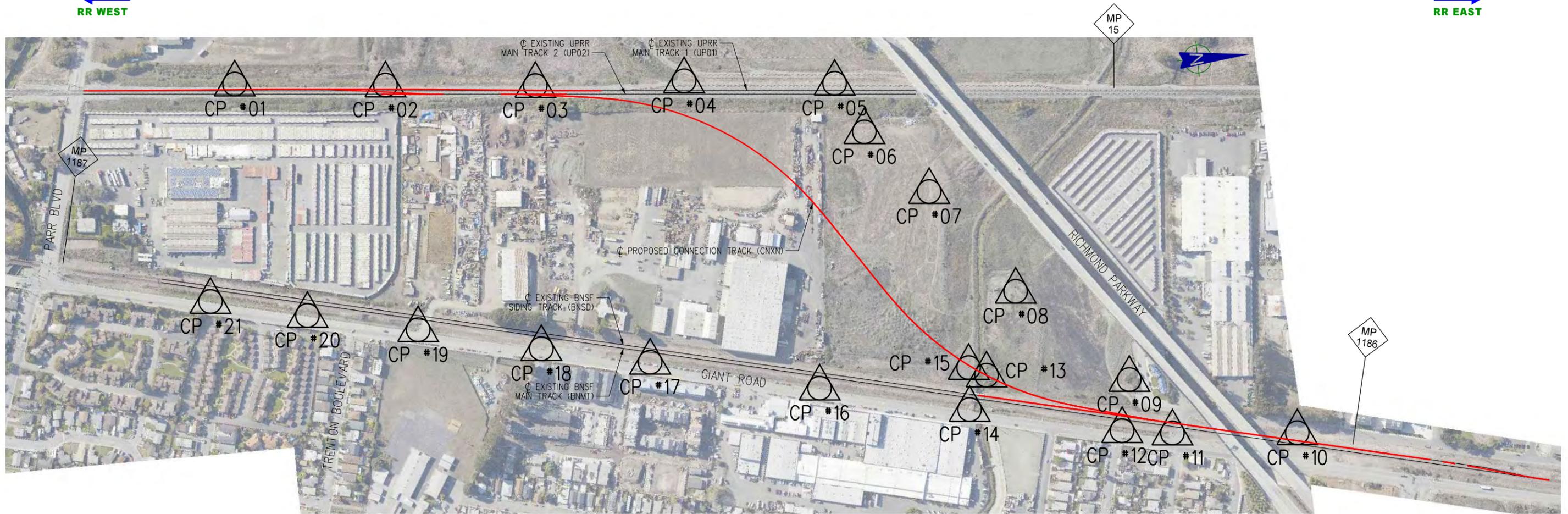


BNSF RAILWAY  
RICHMOND RAIL CONNECTION  
DEGRAW TO BAYARD  
KEY MAP

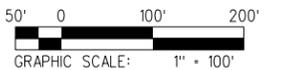
CONTRACT NO.	
DRAWING NO.	CK-04
REVISION	0 SHEET NO. 004
SCALE	NO SCALE

TO RICHMOND, CA  
←  
RR WEST

TO CALWA, CA  
→  
RR EAST



PLAN



SURVEY CONTROL POINTS

POINT	NORTHING	EASTING	ELEVATION	STATIONS	DESCRIPTION	APPROXIMATE LOCATION
CP #01	6025857.738	2180753.410	22.760	XXXX+XX.XX	REBAR AND CAP	27 FT WEST OF EXISTING UPO1 TRACK AT APPROXIMATE MP 1186.15
CP #02	6025916.400	2181350.808	24.795		REBAR AND CAP	22 FT WEST OF EXISTING UPO1 TRACK AT APPROXIMATE MP 1186.26
CP #03	6025972.541	2181945.066	23.745		REBAR AND CAP	20 FT WEST OF EXISTING UPO1 TRACK AT APPROXIMATE MP 1186.38
CP #04	6026007.479	2182536.546	22.640		REBAR AND CAP	39 FT WEST OF EXISTING UPO1 TRACK AT APPROXIMATE MP 1186.49
CP #05	6026071.952	2183132.814	20.870		REBAR AND CAP	29 FT WEST OF EXISTING UPO1 TRACK AT APPROXIMATE MP 1186.60
CP #06	6026274.565	2183233.067	23.160		REBAR AND CAP	150 FT EAST OF EXISTING UPO2 TRACK AT APPROXIMATE MP 1186.63
CP #07	6026534.248	2183468.397	21.900		REBAR AND CAP	387 FT EAST OF EXISTING UPO2 TRACK AT APPROXIMATE MP 1186.67
CP #08	6026960.112	2183775.701	20.285		REBAR AND CAP	430 FT WEST OF EXISTING BNSD TRACK AT APPROXIMATE MP 1186.74
CP #09	6027349.987	2184194.263	25.125		REBAR AND CAP	147 FT WEST OF EXISTING BNSD TRACK AT APPROXIMATE MP 1186.83
CP #10	6027621.446	2184841.470	27.825		REBAR AND CAP	31 FT WEST OF EXISTING BNSD TRACK AT APPROXIMATE MP 1186.95
CP #11	6027577.347	2184346.165	26.975		REBAR AND CAP	26 FT EAST OF EXISTING BNMT TRACK AT APPROXIMATE MP 1186.86
CP #12	6027549.610	2184147.643	24.805		REBAR AND CAP	44 FT EAST OF EXISTING BNMT TRACK AT APPROXIMATE MP 1186.82
CP #13	6027281.300	2183629.898	22.060		REBAR AND CAP	84 FT WEST OF EXISTING BNSD TRACK AT APPROXIMATE MP 1186.72
CP #14	6027410.856	2183550.487	23.020		REBAR AND CAP	46 FT EAST OF EXISTING BNMT TRACK AT APPROXIMATE MP 1186.71
CP #15	6027244.869	2183561.803	21.270		REBAR AND CAP	104 FT WEST OF EXISTING BNSD TRACK AT APPROXIMATE MP 1186.70
CP #16	6027272.259	2182963.217	23.665		REBAR AND CAP	47 FT EAST OF EXISTING BNMT TRACK AT APPROXIMATE MP 1186.59
CP #17	6027108.398	2182300.476	23.080		REBAR AND CAP	39 FT EAST OF EXISTING BNMT TRACK AT APPROXIMATE MP 1186.46
CP #18	6027015.467	2181873.735	26.105		REBAR AND CAP	47 FT EAST OF EXISTING BNMT TRACK AT APPROXIMATE MP 1186.38
CP #19	6026896.110	2181392.226	22.535		REBAR AND CAP	42 FT EAST OF EXISTING BNMT TRACK AT APPROXIMATE MP 1186.29
CP #20	6026799.389	2180958.400	22.495		REBAR AND CAP	47 FT EAST OF EXISTING BNMT TRACK AT APPROXIMATE MP 1186.21
CP #21	6026709.125	2180578.940	23.100		REBAR AND CAP	47 FT EAST OF EXISTING BNMT TRACK AT APPROXIMATE MP 1186.13

60% SUBMITTAL

DESIGNED BY A. CRAFT  
DRAWN BY A. COSS  
CHECKED BY P. MAHONEY  
APPROVED BY M. CANAS  
DATE SEPTEMBER 09, 2011



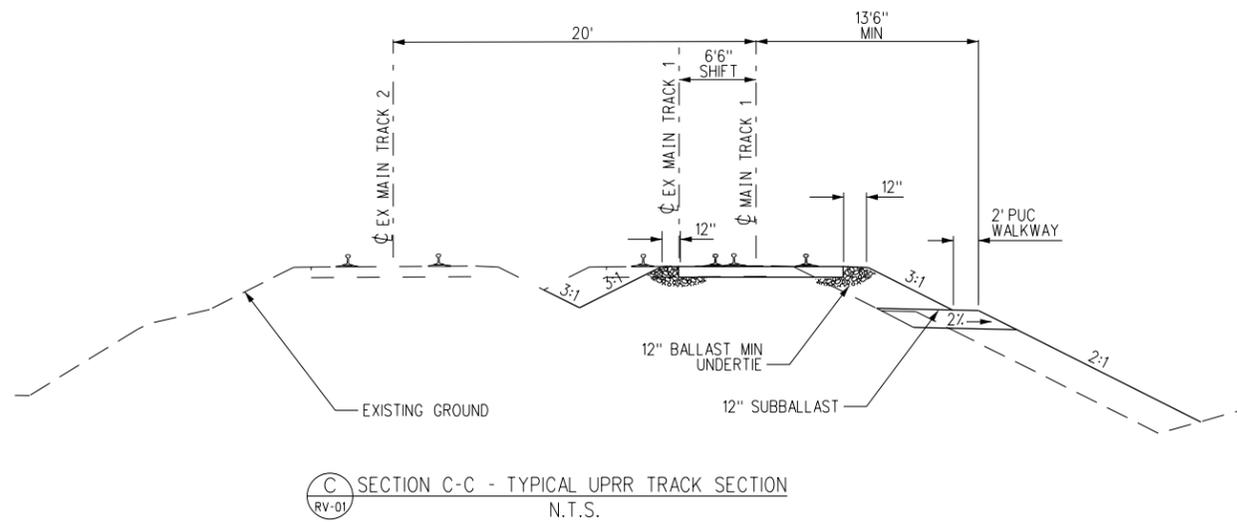
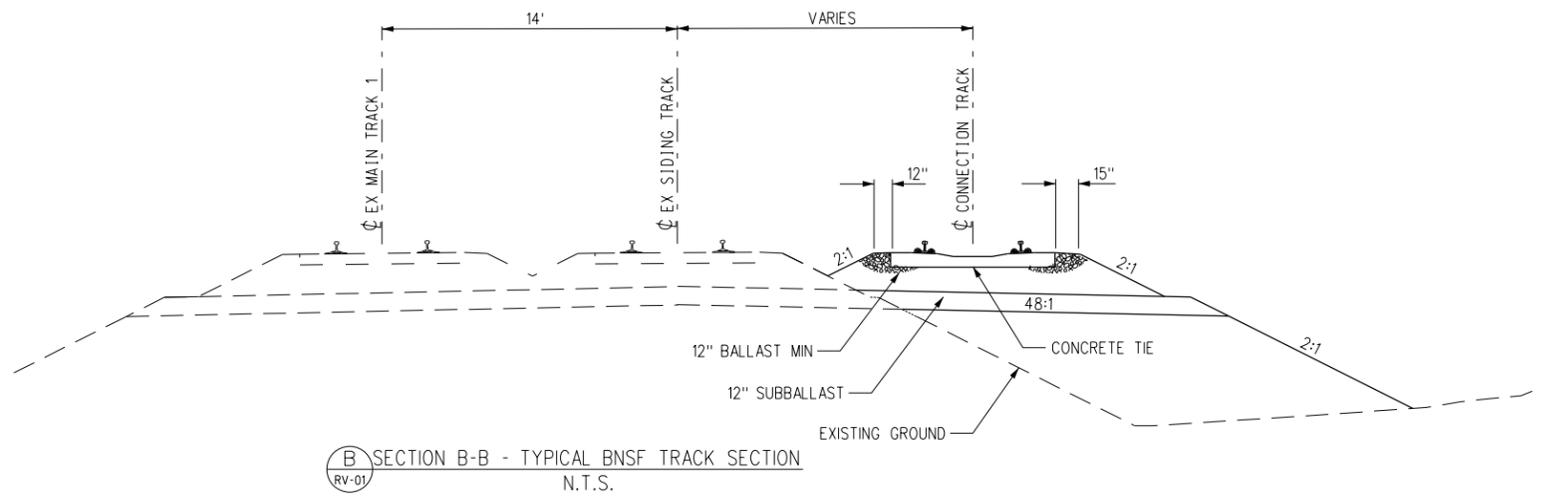
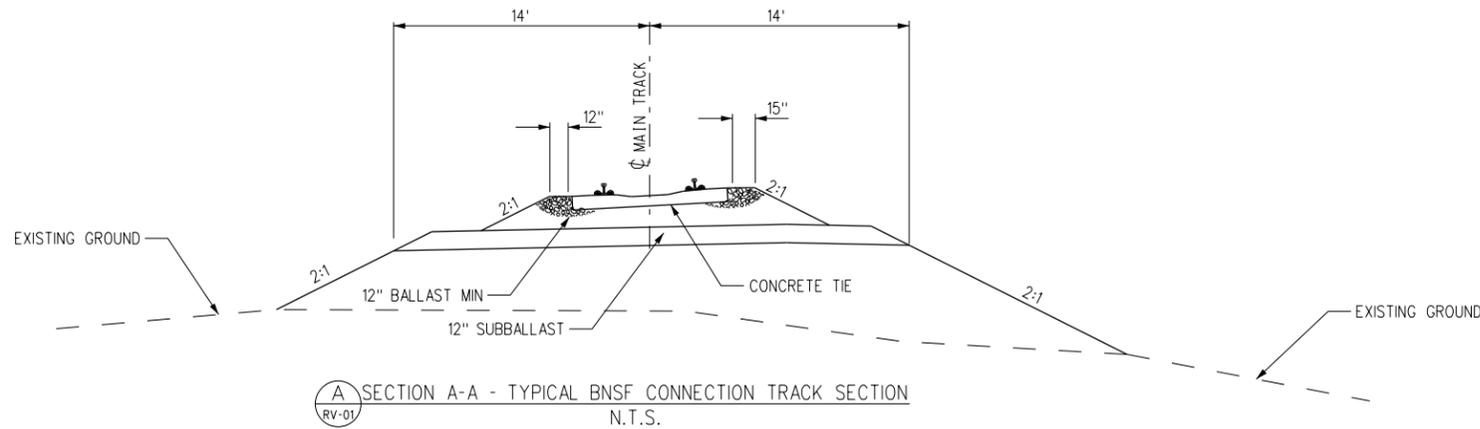
BNSF RAILWAY  
RICHMOND RAIL CONNECTION  
SURVEY CONTROL

CONTRACT NO.  
DRAWING NO. VA-01  
REVISION 0 SHEET NO. 005  
SCALE AS SHOWN

J:\Projects\BNSF\48\_Rheem\Drawings\17048vo01.sht  
10:29:30 AM  
10/18/2011

PROJECT NUMBER  
LINE ITEM  
CONTRACT DESIGNATOR  
PHYSICAL ENTITY  
WORK ELEMENT

REV DATE DESCRIPTION BY SUB APP



J:\Projects\BNSF\48\_Rheem\Drawings\17048RCC01.sht  
10/29/11 10:29:33 AM  
10/18/2011

PROJECT NUMBER	
COST ELEMENT	
LINE ITEM	
CONTRACT DESIGNATOR	
PHYSICAL ENTITY	
WORK ELEMENT	

**60% SUBMITTAL**

Information confidential  
all plans, drawings, specifications and/or information furnished herewith shall remain the property of the Burlington Northern Santa Fe Railway and shall be held confidential and shall not be used for any purpose not provided for in agreements with the Burlington Northern Santa Fe Railway.

DESIGNED BY	A. CRAFT
DRAWN BY	C. NATHAN
CHECKED BY	P. MAHONEY
APPROVED BY	M. CANAS
DATE	SEPTEMBER 09, 2011

**BNSF RAILWAY**

**UNION PACIFIC RAILROAD**

**PATTERSON & ASSOCIATES, INC.**  
725 TOWN & COUNTRY RD  
SUITE 300  
ORANGE, CA 92668

BNSF RAILWAY  
RICHMOND RAIL CONNECTION  
TYPICAL CROSS-SECTIONS

CONTRACT NO.	
DRAWING NO.	RC-01
REVISION	0 SHEET NO. 006
SCALE	NO SCALE

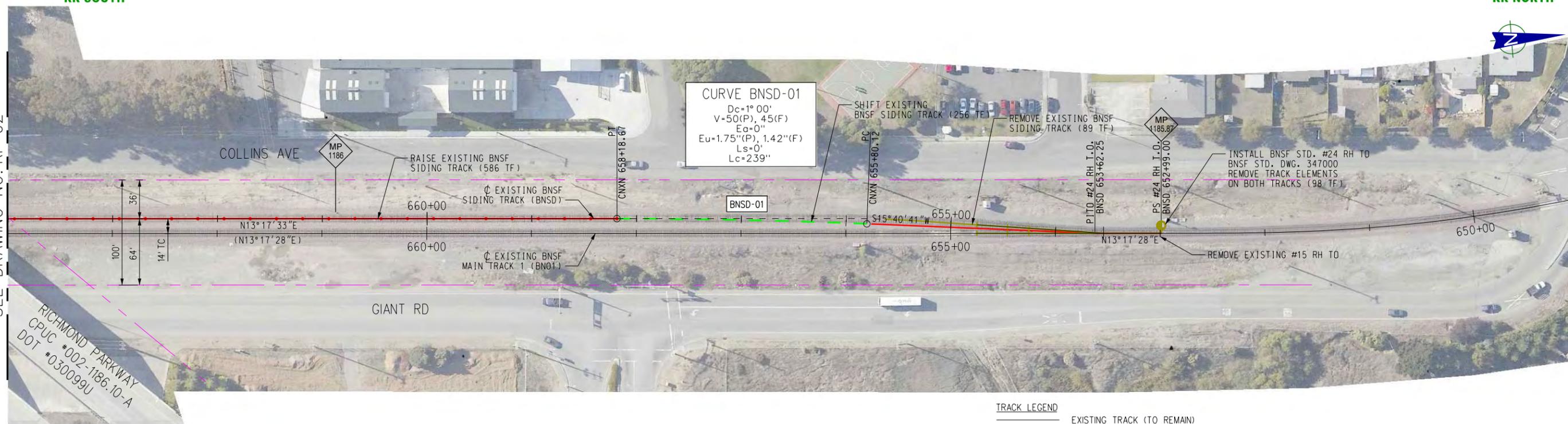
REV	DATE	DESCRIPTION	BY	SUB	APP

TO RICHMOND, CA  
RR SOUTH

TO CALWA, CA  
RR NORTH



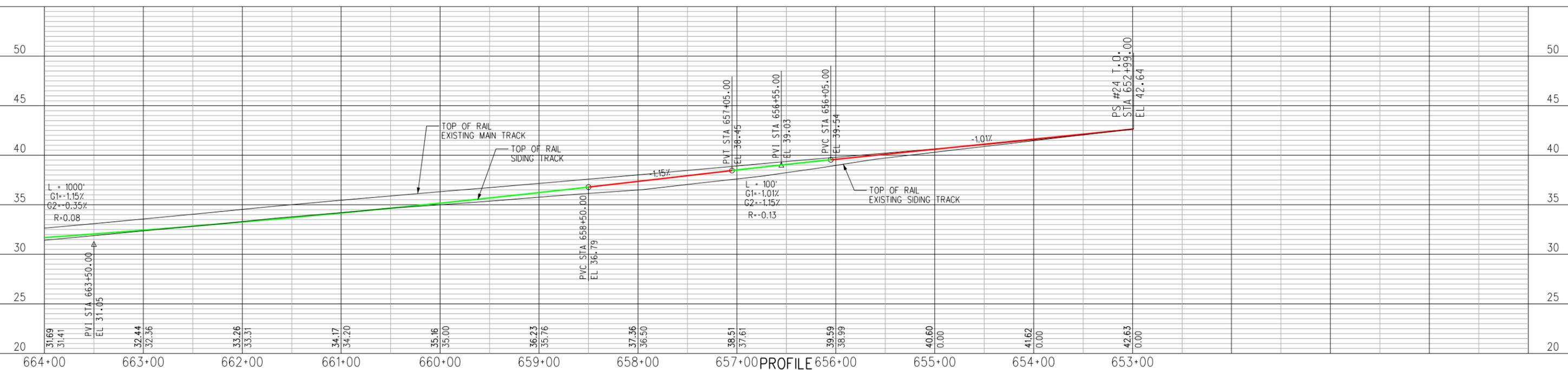
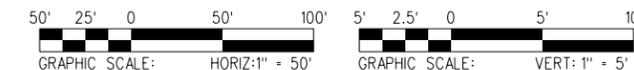
MATCH LINE - BNSD 664+00  
SEE DRAWING NO. RP-02



PLAN

TRACK LEGEND

- EXISTING TRACK (TO REMAIN)
- - - EXISTING TRACK (TO BE REMOVED)
- EXISTING TRACK (TO BE RAISED)



PROFILE

J:\Projects\BNSF\48\_Rheem\Drawings\17048RPO1.sht  
10:29:37 AM  
10/18/2011

NOT FOR CONSTRUCTION  
**60% SUBMITTAL**

Information confidential  
all plans, drawings, specifications, and/or information furnished here with shall remain the property of the Burlington Northern Santa Fe Railway and shall be held confidential and shall not be used for any purpose not provided for in agreements with the Burlington Northern Santa Fe Railway

DESIGNED BY: A. CRAFT  
DRAWN BY: A. COSS  
CHECKED BY: M. CANAS  
APPROVED BY: M. CANAS  
DATE: SEPTEMBER 09, 2011



BNSF RAILWAY  
RICHMOND RAIL CONNECTION  
PLAN AND PROFILE - SHEET 1 OF 5  
BNSD 664+00 TO BNSD 653+00  
MP 1186.10 TO MP 1185.87 (BNSF)

CONTRACT NO.  
DRAWING NO. RP-01  
REVISION 0 SHEET NO. 007  
SCALE AS SHOWN

PROJECT NUMBER	LINE ITEM	CONTRACT DESIGNATOR	PHYSICAL ENTITY	WORK ELEMENT

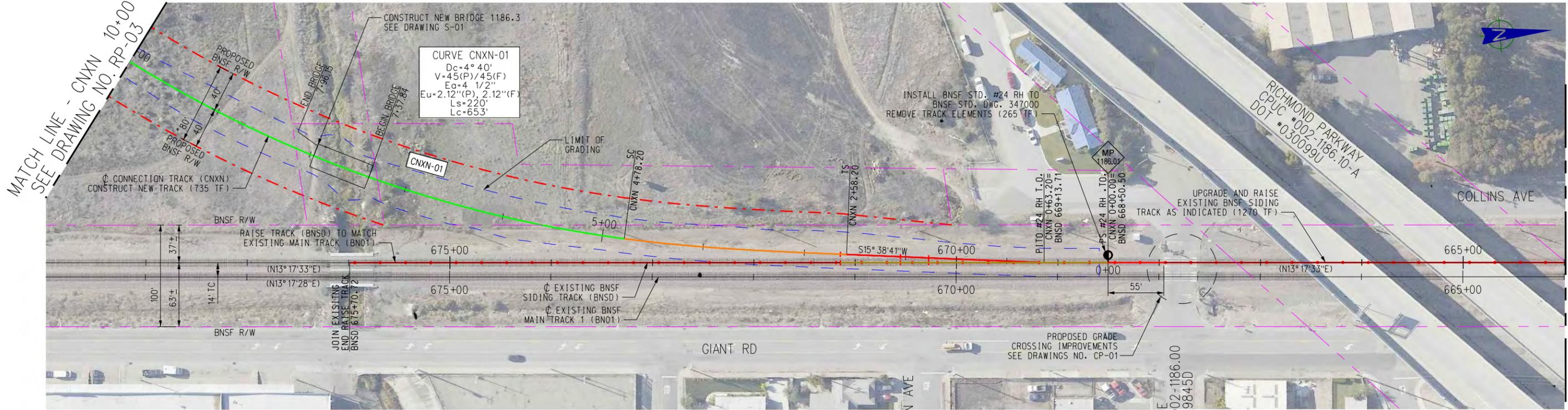
REV	DATE	DESCRIPTION	BY	SUB	APP

TO RICHMOND, CA

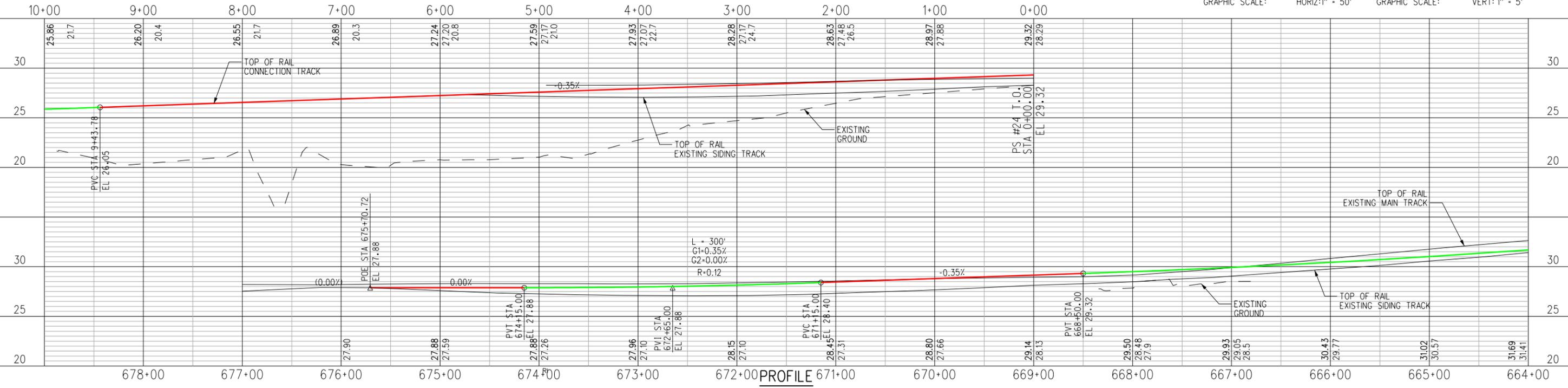
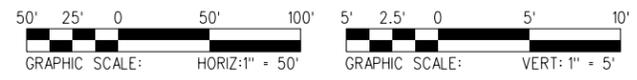
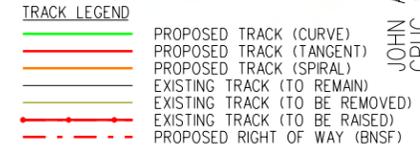
RR WEST

TO CALWA, CA

RR EAST



PLAN



PROFILE

60% SUBMITTAL

Information confidential  
 all plans, drawings, specifications, and/or information furnished herewith shall remain the property of the Burlington Northern Santa Fe Railway and shall be held confidential and shall not be used for any purpose not provided for in agreements with the Burlington Northern Santa Fe Railway

DESIGNED BY: A. CRAFT  
 DRAWN BY: A. COSS  
 CHECKED BY: M. CANAS  
 APPROVED BY: M. CANAS  
 DATE: SEPTEMBER 09, 2011



**PATTERSON & ASSOCIATES, INC.**  
 725 TOWN & COUNTRY RD  
 SUITE 300  
 ORANGE, CA 92668

**BNSF RAILWAY**  
**RICHMOND RAIL CONNECTION**  
 PLAN AND PROFILE - SHEET 2 OF 5  
 CNXN 10+00 TO BNSD 664+00  
 MP 1186.36 TO MP 1186.10 (BNSF)

CONTRACT NO.  
 DRAWING NO. RP-02  
 REVISION 0 SHEET NO. 008  
 SCALE AS SHOWN

J:\Projects\BNSF\48\_Rheem\Drawings\17048RP02.sht  
 10/29/11 10:29:43 AM  
 10/18/2011

PROJECT NUMBER	LINE ITEM	CONTRACT DESIGNATOR	PHYSICAL ENTITY	WORK ELEMENT

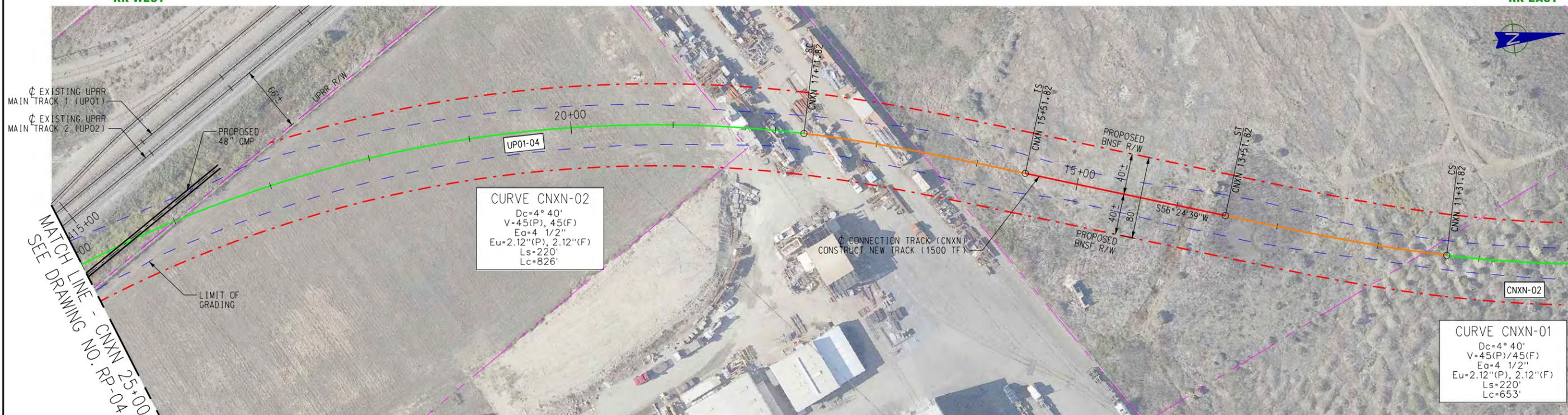
REV	DATE	DESCRIPTION	BY	SUB	APP

TO 10TH STREET (UPRR)

RR WEST

TO CALWA, CA (BNSF)

RR EAST



MATCH LINE - CNXN 10+00  
SEE DRAWING NO. RP-02

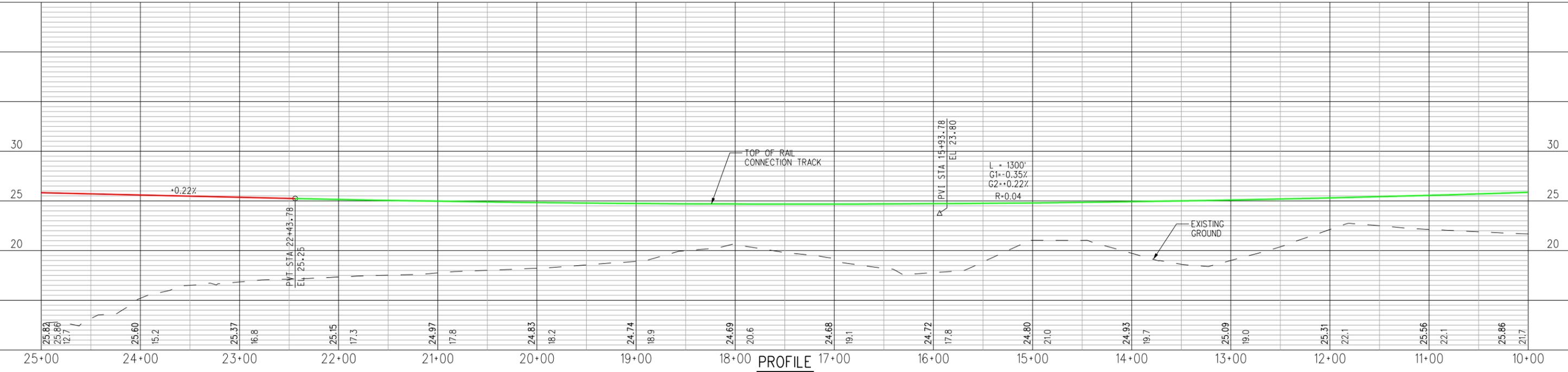
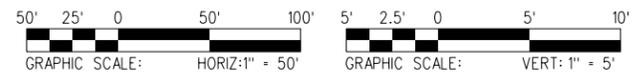
MATCH LINE - CNXN 25+00  
SEE DRAWING NO. RP-04

**CURVE CNXN-02**  
 Dc=4° 40'  
 V=45(P), 45(F)  
 Ea=4 1/2"  
 Eu=2.12"(P), 2.12"(F)  
 Ls=220'  
 Lc=826'

**CURVE CNXN-01**  
 Dc=4° 40'  
 V=45(P)/45(F)  
 Ea=4 1/2"  
 Eu=2.12"(P), 2.12"(F)  
 Ls=220'  
 Lc=653'

- TRACK LEGEND**
- PROPOSED TRACK (CURVE)
  - PROPOSED TRACK (TANGENT)
  - PROPOSED TRACK (SPIRAL)
  - EXISTING TRACK (TO REMAIN)
  - PROPOSED RIGHT OF WAY (BNSF)

PLAN



PROFILE

J:\Projects\BNSF\48\_Rheem\Drawings\17048RP03.sht  
10/29/19 AM  
10/18/2011

PROJECT NUMBER	COST ELEMENT	LINE ITEM	CONTRACT DESIGNATOR	PHYSICAL ENTITY	WORK ELEMENT

**NOT FOR CONSTRUCTION**  
**60% SUBMITTAL**

Information confidential all plans, drawings, specifications, and/or information furnished herewith shall remain the property of the Burlington Northern Santa Fe Railway and shall be held confidential and shall not be used for any purpose not provided for in agreements with the Burlington Northern Santa Fe Railway.

DESIGNED BY	A. CRAFT
DRAWN BY	A. COSS
CHECKED BY	M. CANAS
APPROVED BY	M. CANAS
DATE	SEPTEMBER 09, 2011

**BNSF RAILWAY**

**UNION PACIFIC RAILROAD**

**PATTERSON & ASSOCIATES, INC.**  
725 TOWN & COUNTRY RD  
SUITE 300  
ORANGE, CA 92668

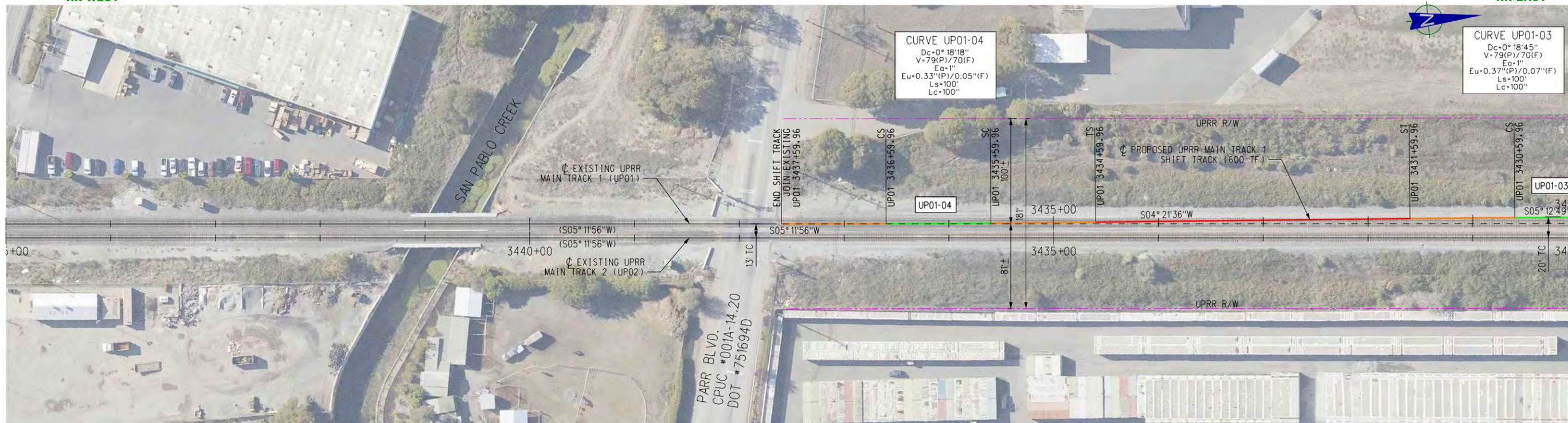
**BNSF RAILWAY**  
**RICHMOND RAIL CONNECTION**  
 PLAN AND PROFILE - SHEET 3 OF 5  
 CNXN 25+00 TO CNXN 10+00  
 MP 1186.61 TO MP 1186.36 (BNSF)

CONTRACT NO.	
DRAWING NO.	RP-03
REVISION	0 SHEET NO. 009
SCALE	AS SHOWN



TO 10TH STREET  
RR WEST

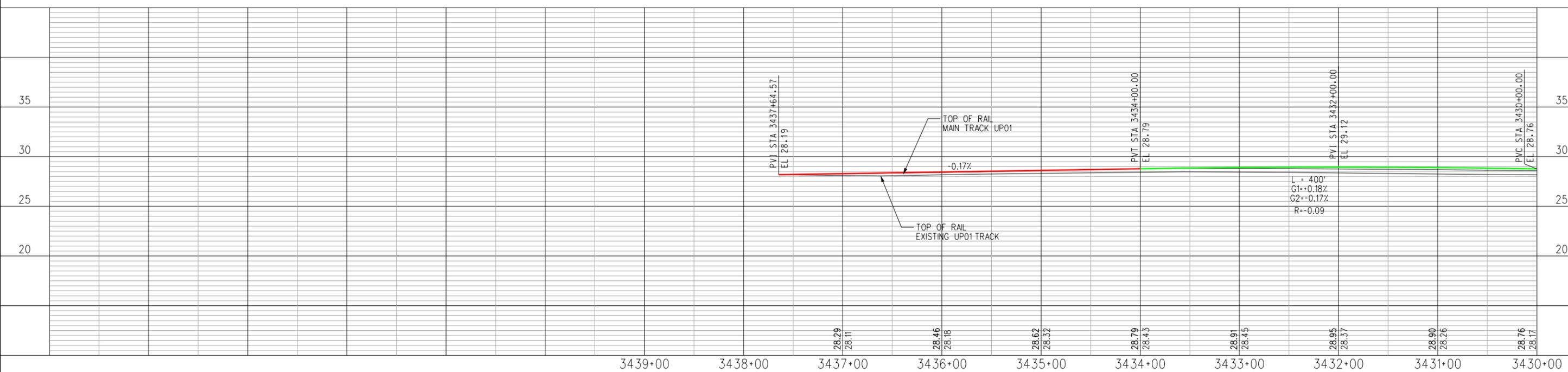
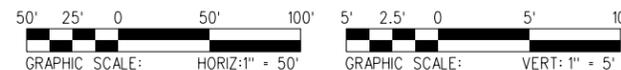
EAST ROSEVILLE, CA  
RR EAST



MATCH LINE - UP02 3430+00  
SEE DRAWING NO. RP-04

- TRACK LEGEND**
- PROPOSED TRACK SHIFT (CURVE)
  - PROPOSED TRACK SHIFT (TANGENT)
  - PROPOSED TRACK SHIFT (SPIRAL)
  - EXISTING TRACK (TO REMAIN)
  - EXISTING TRACK (TO BE SHIFTED)

PLAN



J:\Projects\BNSF\48\_Rheem\Drawings\17048RPO5.sht  
10:30:04 AM  
10/18/2011

PROJECT NUMBER	COST ELEMENT	LINE ITEM	CONTRACT DESIGNATOR	PHYSICAL ENTITY	WORK ELEMENT

**NOT FOR CONSTRUCTION**  
**60% SUBMITTAL**

Information confidential  
all plans, drawings, specifications, and/or information furnished herewith shall remain the property of the Burlington Northern Santa Fe Railway and shall be held confidential and shall not be used for any purpose not provided for in agreements with the Burlington Northern Santa Fe Railway.

DESIGNED BY	A. CRAFT
DRAWN BY	A. COSS
CHECKED BY	M. CANAS
APPROVED BY	M. CANAS
DATE	SEPTEMBER 09, 2011



BNSF RAILWAY  
RICHMOND RAIL CONNECTION  
PLAN AND PROFILE - SHEET 5 OF 5  
UP02 3445+00 TO UP02 3430+00  
MP 17.20 TO MP 17.36

CONTRACT NO.	
DRAWING NO.	RP-05
REVISION	0 SHEET NO. 011
SCALE AS SHOWN	

REV	DATE	DESCRIPTION	BY	SUB	APP

J:\Projects\BNSF\48\_Rheem\Drawings\17048r101.sht  
 10/30/10 AM  
 10/18/2011

PROJECT NUMBER	
COST ELEMENT	
LINE ITEM	
CONTRACT DESIGNATOR	
PHYSICAL ENTITY	
WORK ELEMENT	

P-CNXXN												
CURVE NO.	DESC	BEARING	DISTANCE	STATION	NORTHING	EASTING	Dc	RADIUS	△	L	Ea/Eu SPEED	
#24 RHTO	PS	S13°15'32"W	63.20	0+00.00	2184317.794	6027529.920						
	PITO	S15°38'41"W	195.00	0+63.20	2184256.276	6027515.424						
	TS			2+58.20	2184068.501	6027462.838						
CNXXN 01	SC		220.00	4+78.20	2183858.591	6027397.237					Ea=4-1/2" Eu=2.12" V=45(P), 45(F)	
	PI				2183545.520	6027278.458	4°40'00"	1228.11	30°30'08"	653.62		334.85
	CS			11+31.82	2183336.063	6027017.211						
	ST		220.00	13+51.82	2183208.981	6026837.724						
	TS	S56°24'39"W	200.00	15+51.82	2183098.337	6026671.122						
CNXXN 02	SC		220.00	17+71.82	2182971.254	6026491.635					Ea=4-1/2" Eu=2.12" V=45(P), 45(F)	
	PI				2182702.630	6026156.590	4°40'00"	1228.11	38°32'47"	826.00		429.43
	CS			25+97.82	2182283.755	6026061.943						
	ST		220.00	28+17.82	2182066.731	6026026.361						
	TS	S07°36'02"W	201.11	30+18.93	2181867.384	6025999.761						
#24 RHTO	PS	S05°12'49"W	63.25	30+82.18	2181804.396	6025994.014						
	PITO											

P-BNSD												
CURVE NO.	DESC	BEARING	DISTANCE	STATION	NORTHING	EASTING	Dc	RADIUS	△	L	Ea/Eu SPEED	
#24 RHTO	POB	S13°17'28"W	.00	652+99.00	2185824.101	6027900.208						
	PS	S13°17'28"W	63.25	652+99.00	2185824.101	6027900.208						
	PITO	S13°17'28"W	.00	653+62.25	2185762.545	6027885.666						
BNSD 01	PI	S15°40'41"W	217.87	653+62.25	2185762.545	6027885.666					Ea= 0" Eu=1.42" V=45	
	PC			655+80.12	2185552.777	6027826.790						
	PI				2185437.924	6027794.554	1°00'00"	5729.65	2°23'08"	238.55		119.29
	PT			658+18.67	2185321.829	6027767.126						
	PS	S13°17'33"W	1031.67	668+50.34	2184317.794	6027529.920						
#24 RHTO	PITO	S13°17'33"W	63.21	669+13.55	2184256.285	6027515.388						
	POE	S13°17'33"W	786.29	676+99.84	2183491.057	6027334.600						

P-UP01												
CURVE NO.	DESC	BEARING	DISTANCE	STATION	NORTHING	EASTING	Dc	RADIUS	△	L	Ea/Eu SPEED	
UP01-01	POB	S05°11'56"W	70.15	3416+29.81	2182275.363	6026022.965					Ea=1" Eu=0.27"(P) 0.00(F) V=79(P), 70(F)	
	TS		100.00	3416+99.96	2182205.501	6026016.608						
	SC			3417+99.96	2182105.920	6026007.461						
	PI				2182056.138	6026002.800	0°17'54"	19211.88	0°17'54"	100.00		50.00
	CS		100.00	3418+99.96	2182006.380	6025997.881						
UP01-02	ST	S05°47'43"W	300.00	3419+99.96	2181906.883	6025987.870					Ea=1" Eu=0.37"(P) 0.07(F) V=79(P), 70(F)	
	TS		100.00	3422+99.96	2181608.416	6025957.577						
	SC			3423+99.96	2181508.919	6025947.564						
	PI				2181459.161	6025942.642	0°17'27"	19697.75	0°17'27"	100.00		50.00
	CS		100.00	3424+99.96	2181409.380	6025937.972						
#24 RHTO	ST		100.00	3425+99.96	2181309.801	6025928.801						
	PS	S05°12'49"W	190.71	3427+90.67	2181119.882	6025911.471						
	PITO	S05°12'49"W	61.06	3428+51.73	2181059.132	6025905.322						
UP01-03	TS	S05°12'49"W	8.23	3428+59.96	2181050.877	6025905.175					Ea=1" Eu=0.30"(P) 0.02(F) V=79(P), 70(F)	
	SC		100.00	3429+59.96	2180951.282	6025896.179						
	PI				2180901.477	6025891.771	0°18'45"	18337.38	0°18'45"	100.00		50.00
	CS		100.00	3430+59.96	2180851.648	6025887.635						
	ST		100.00	3431+59.96	2180751.976	6025879.544						
UP01-04	TS	S04°35'19"W	300.00	3434+59.96	2180452.938	6025855.544					Ea=1" Eu=0.33"(P) 0.05(F) V=79(P), 70(F)	
	SC		100.00	3435+59.96	2180353.265	6025847.455						
	PI				2180303.436	6025843.322	0°18'18"	18779.51	0°18'18"	100.00		50.00
	CS		100.00	3436+59.96	2180253.630	6025838.924						
	ST		100.00	3437+59.96	2180154.033	6025829.951						
POE	S05°11'56"W	4.59	3437+64.55	2180149.465	6025829.536							

SPIRAL DATA										
SPIRAL	LS	θ	X	Y	P	LT	ST	TS	I	
P-CNXXN										
BNMT-01 - IN	220.00	5°07'55"	219.82	6.56	1.64	109.97	146.73	73.39	566.90	40°45'58"
BNMT-01 - OUT	220.00	5°07'55"	219.82	6.56	1.64	109.97	146.73	73.39	566.89	
BNMT-02 - IN	220.00	5°07'55"	219.82	6.56	1.64	109.97	146.73	73.39	667.94	48°48'37"
BNMT-02 - OUT	220.00	5°07'55"	219.82	6.56	1.64	109.97	146.73	73.39	667.95	

SPIRAL DATA										
SPIRAL	LS	θ	X	Y	P	LT	ST	TS	I	
P-UP01										
UP01-01 - IN	100.00	0°08'57"	100.00	0.09	0.02	50.00	66.67	33.33	150.03	0°35'47"
UP01-01 - OUT	100.00	0°08'57"	100.00	0.09	0.02	50.00	66.67	33.33	149.97	
UP01-02 - IN	100.00	0°08'44"	100.00	0.08	0.02	50.00	66.67	33.33	149.93	0°34'54"
UP01-02 - OUT	100.00	0°08'44"	100.00	0.08	0.02	50.00	66.67	33.33	150.07	
UP01-03 - IN	100.00	0°09'22"	100.00	0.09	0.02	50.00	66.67	33.33	150.03	0°37'30"
UP01-03 - OUT	100.00	0°09'22"	100.00	0.09	0.02	50.00	66.67	33.33	149.97	
UP01-04 - IN	100.00	0°09'09"	100.00	0.09	0.02	50.00	66.67	33.33	149.94	0°36'37"
UP01-04 - OUT	100.00	0°09'09"	100.00	0.09	0.02	50.00	66.67	33.33	150.06	

**60% SUBMITTAL**

REV	DATE	DESCRIPTION	BY	SUB	APP
-----	------	-------------	----	-----	-----

DESIGNED BY A. CRAFT  
 DRAWN BY A. COSS  
 CHECKED BY P. MAHONEY  
 APPROVED BY M. CANAS  
 DATE SEPTEMBER 09, 2011



BNSF RAILWAY  
 RICHMOND RAIL CONNECTION  
 TRACK GEOMETRY DATA  
 SHEET 1 OF 2

CONTRACT NO.	
DRAWING NO.	RT-01
REVISION	0 SHEET NO. 012
SCALE	NO SCALE

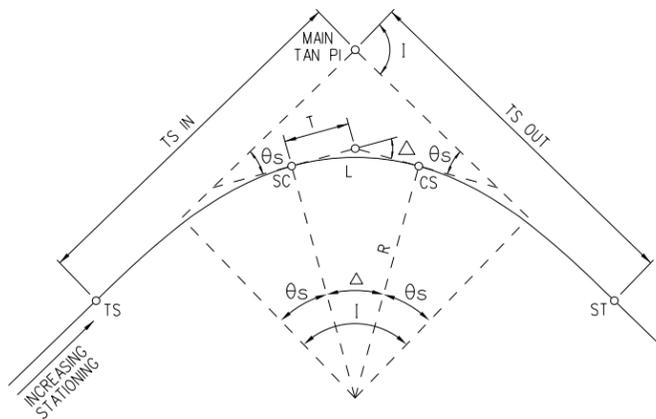


FIGURE A  
CIRCULAR CURVES  
WITH SPIRAL TRANSITION

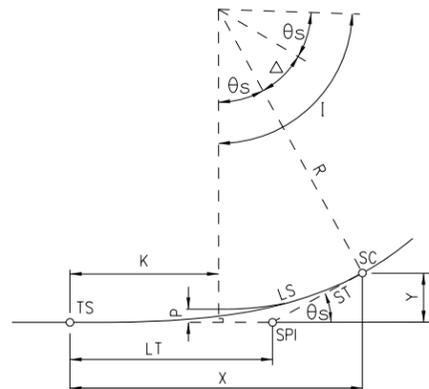


FIGURE C  
SPIRAL TRANSITION CURVE

- I - TOTAL INTERSECTION ANGLE
- $\theta_s$  - SPIRAL ANGLE =  $\frac{LS \cdot D_c}{200}$
- $\Delta$  - CENTRAL ANGLE OF CIRCULAR CURVE =  $I - 2\theta_s$
- R - RADIUS OF CIRCULAR CURVE
- T - TANGENT LENGTH OF CIRCULAR CURVE =  $R \tan \frac{\Delta}{2}$
- L - LENGTH OF CIRCULAR CURVE =  $\frac{\Delta}{D_c} \times 100$
- TS - TANGENT TO SPIRAL
- SC - SPIRAL TO CURVE
- CS - CURVE TO SPIRAL
- ST - SPIRAL TO TANGENT

MAIN TAN PI - POINT OF INTERSECTION OF MAIN TANGENTS  
 (TS IN) - TANGENT LENGTH OF COMPLETE CURVE =  $(R+P) \tan \frac{I}{2} + K$   
 (TS OUT)

(WHEN SPIRALS OF EQUAL LENGTH  
 ARE USED ON BOTH SIDES OF  
 CIRCULAR CURVE, SEE FIGURE C,  
 FOR P AND K).

SPIRAL TRANSITION CURVE DATA:  
 THE SPIRAL USED IS DEFINED BY THE BARNETT SPIRAL.

LS = LENGTH OF SPIRAL (TS TO SC)  
 $\delta_s = \frac{\theta_s \pi}{180}$        $\theta_s = \frac{LS \cdot D_c}{200}$   
 $X = LS \left( 1 - \frac{\delta_s^2}{10} + \frac{\delta_s^4}{216} \right)$   
 $Y = LS \left( \frac{\delta_s}{3} - \frac{\delta_s^3}{42} \right)$   
 $P = Y - R(1 - \cos \theta_s)$   
 $K = X - R \sin \theta_s$   
 $ST = \frac{Y}{\sin \theta_s}$   
 $LT = X - \frac{Y}{\tan \theta_s}$

$D_c = 2 \sin^{-1} (50/R) =$  DEGREE OF CURVE (CHORD DEFINITION)

SPI - SPIRAL POINT OF INTERSECTION

NOTE:  $D_c, \theta_s, \Delta,$  AND  $I$  ARE IN DEGREES.  
 $\delta_s$  - EXPRESSED IN RADIAN.  
 ALL OTHERS DIMENSIONS ARE FEET.

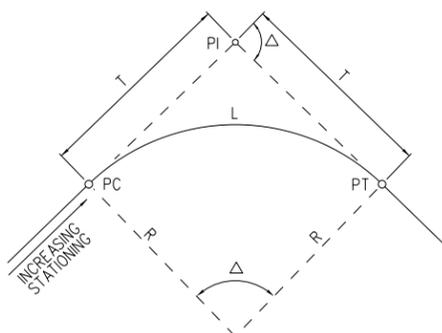


FIGURE B  
SIMPLE CIRCULAR CURVE

- R = RADIUS OF CIRCULAR CURVE
- $\Delta$  = CENTRAL ANGLE OF CIRCULAR CURVE
- $T = R \tan \frac{\Delta}{2}$
- $L = \frac{\Delta}{D_c} \times 100$
- $D_c = 2 \sin^{-1} (50/R) =$  DEGREE OF CURVE (CHORD DEFINITION)

J:\Projects\BNSF\48\_Rheem\Drawings\17048r102.sht  
 10:30:12 AM  
 10/18/2011

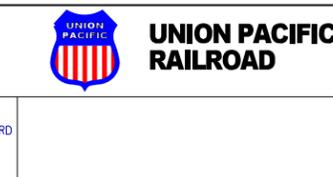
PROJECT NUMBER	LINE ITEM	CONTRACT DESIGNATOR	PHYSICAL ENTITY	WORK ELEMENT

**60% SUBMITTAL**

REV	DATE	DESCRIPTION	BY	SUB	APP

Information confidential  
 all plans, drawings, specifications and/or information furnished herewith shall remain the property of the Burlington Northern Santa Fe Railway and shall be held confidential and shall not be used for any purpose not provided for in agreements with the Burlington Northern Santa Fe Railway.

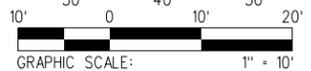
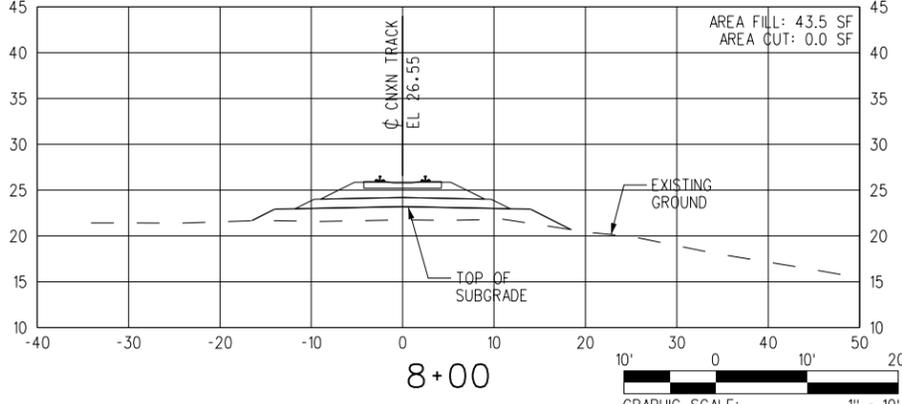
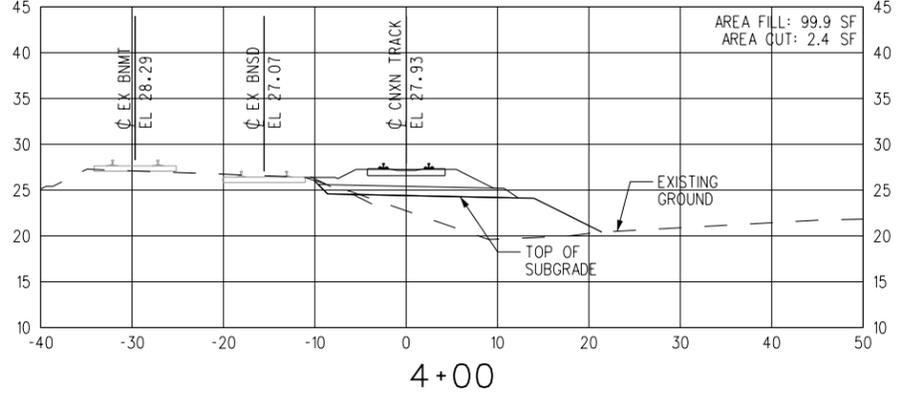
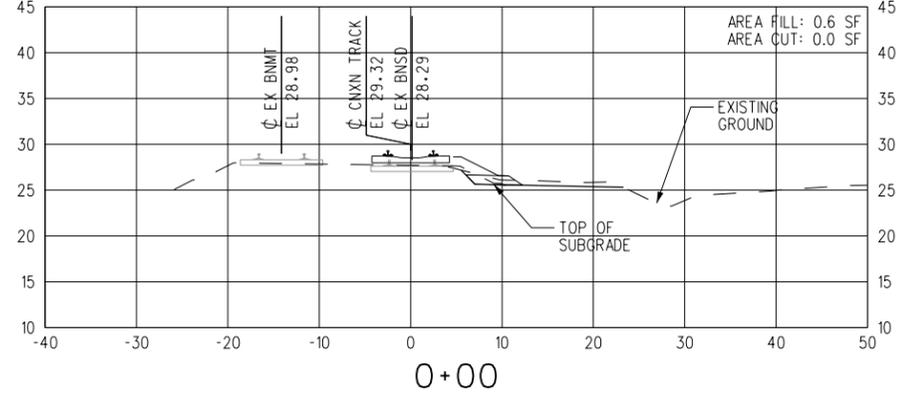
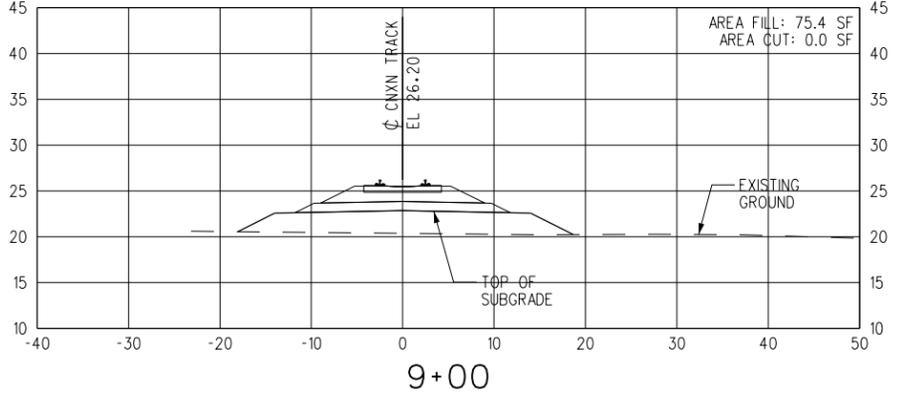
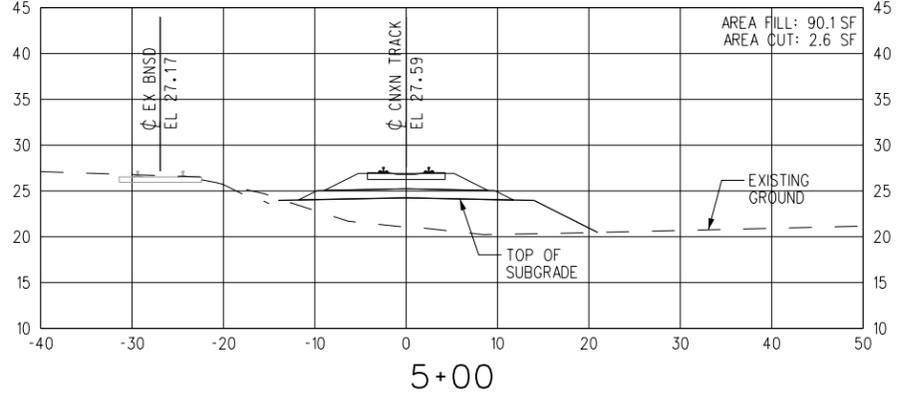
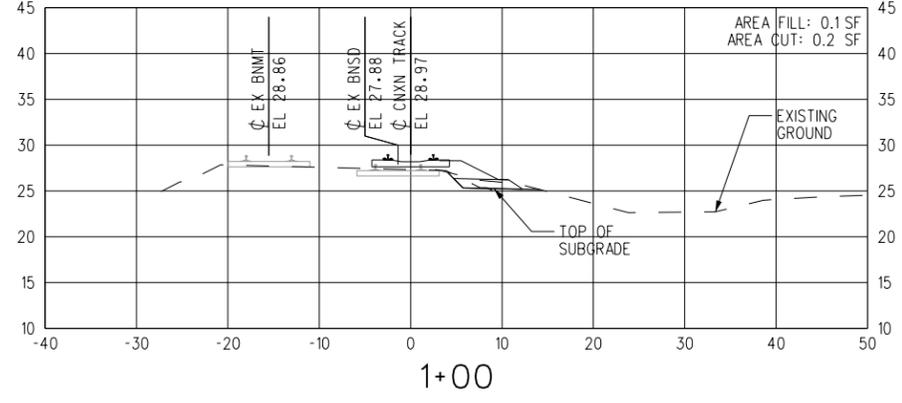
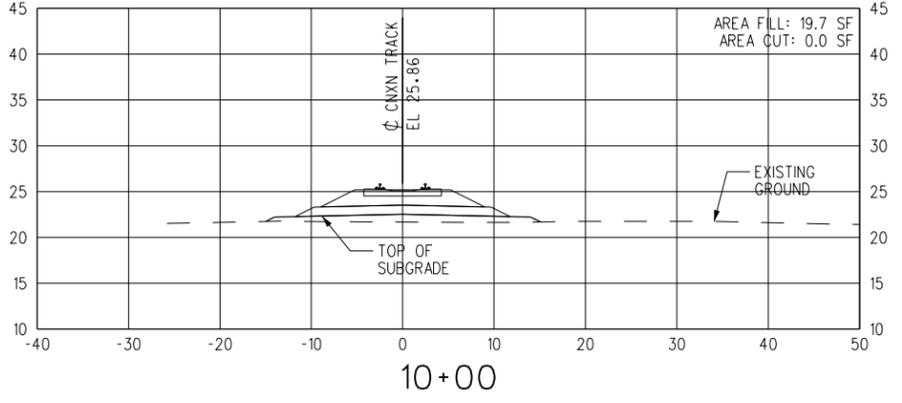
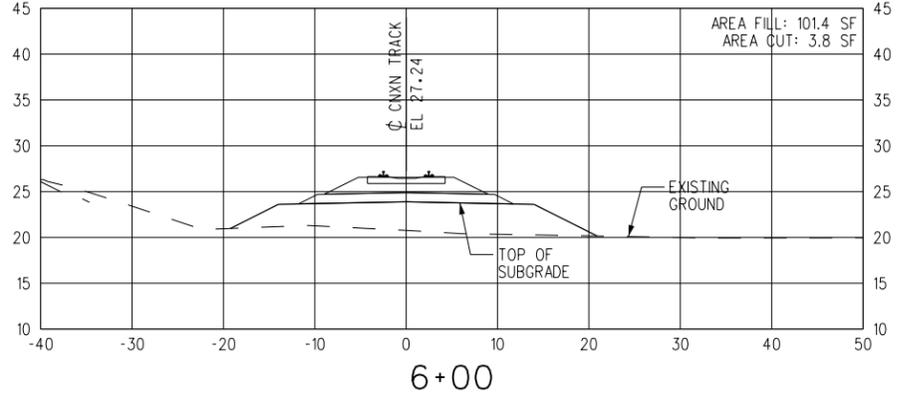
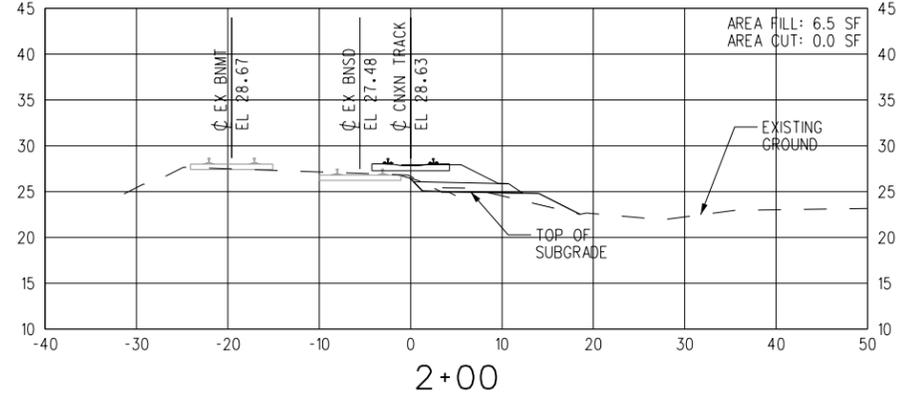
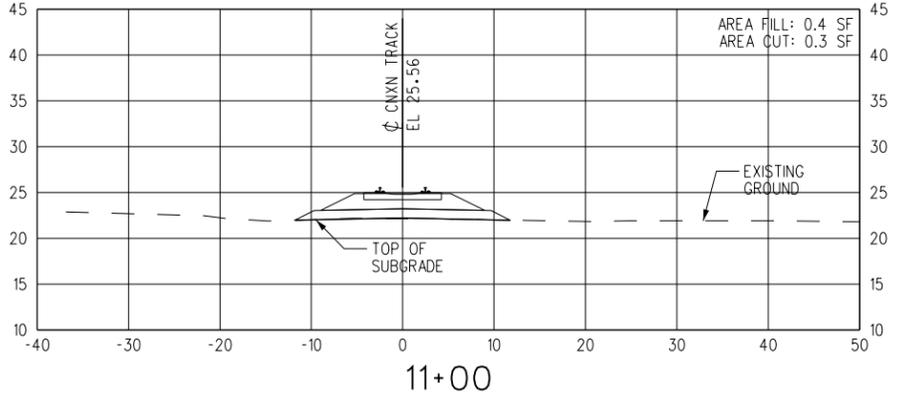
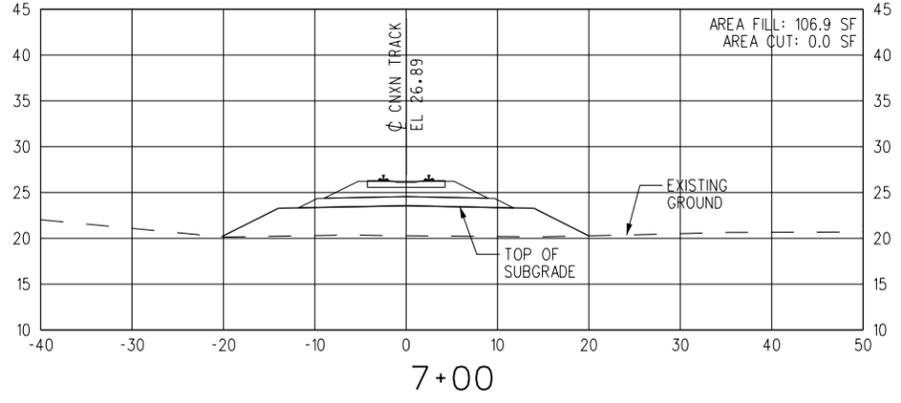
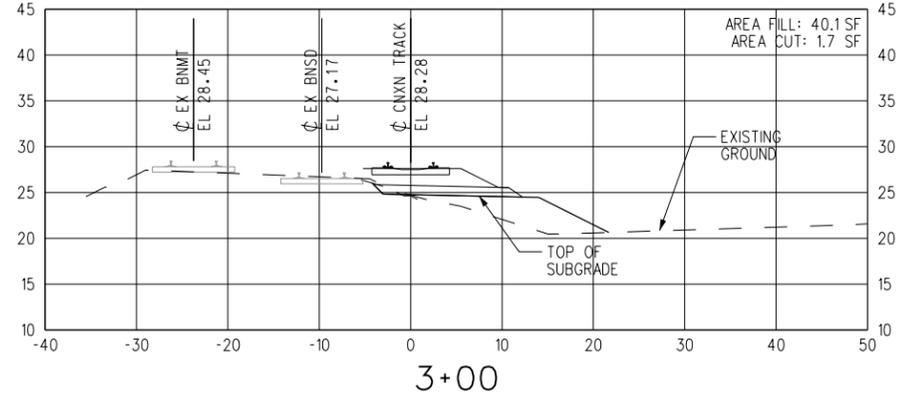
DESIGNED BY A. CRAFT  
 DRAWN BY A. COSS  
 CHECKED BY P. MAHONEY  
 APPROVED BY M. CANAS  
 DATE SEPTEMBER 09, 2011



BNSF RAILWAY  
 RICHMOND RAIL CONNECTION  
 TRACK GEOMETRY DATA  
 SHEET 2 OF 2

CONTRACT NO.	
DRAWING NO.	RT-02
REVISION	0 SHEET NO. 013
SCALE	NO SCALE

J:\Projects\BNSF\48\_Rheem\Drawings\17048r\01.sht  
 10:30:15 AM  
 10/18/2011



PROJECT NUMBER	COST ELEMENT	LINE ITEM	CONTRACT DESIGNATOR	PHYSICAL ENTITY	WORK ELEMENT

REV	DATE	DESCRIPTION	BY	SUB	APP

**NOT FOR CONSTRUCTION**  
**60% SUBMITTAL**

Information confidential  
 all plans, drawings, specifications, and/or information furnished herewith shall remain the property of the Burlington Northern Santa Fe Railway and shall be held confidential and shall not be used for any purpose not provided for in agreements with the Burlington Northern Santa Fe Railway.

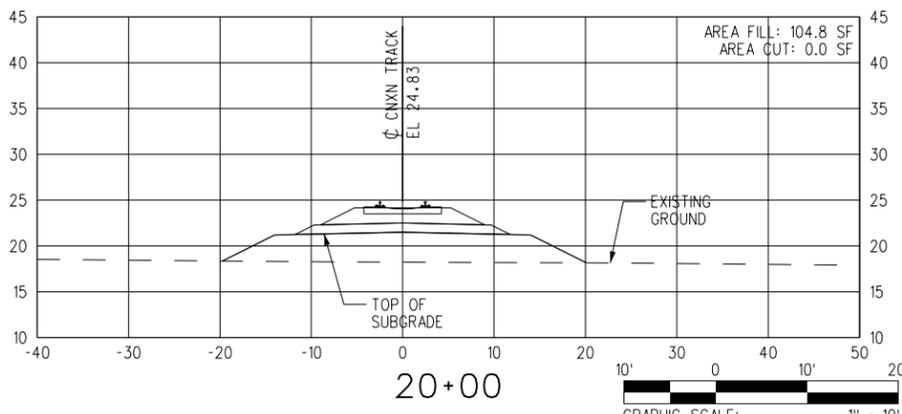
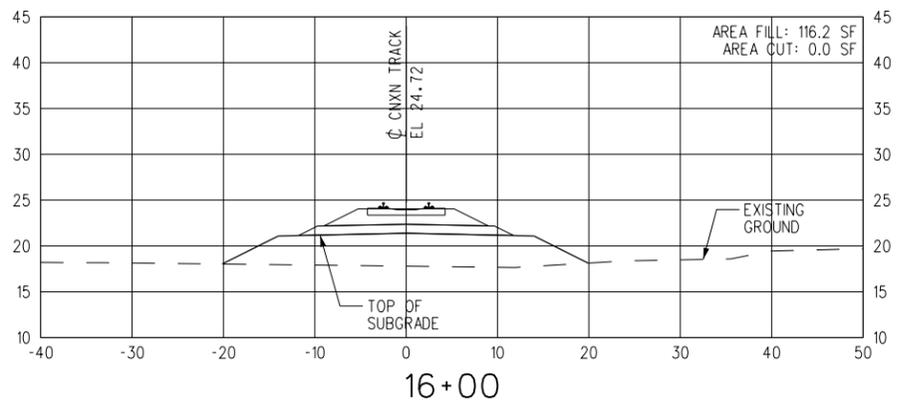
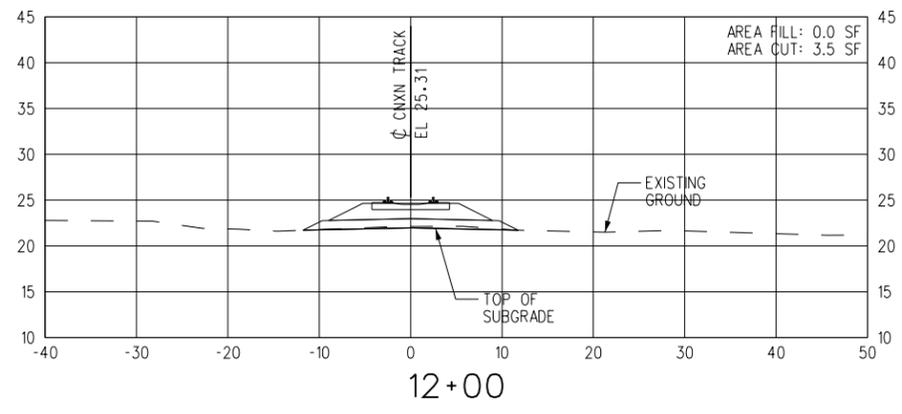
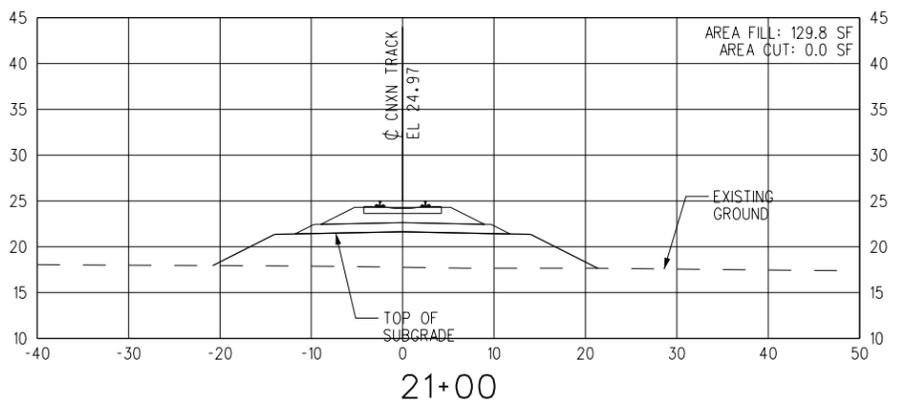
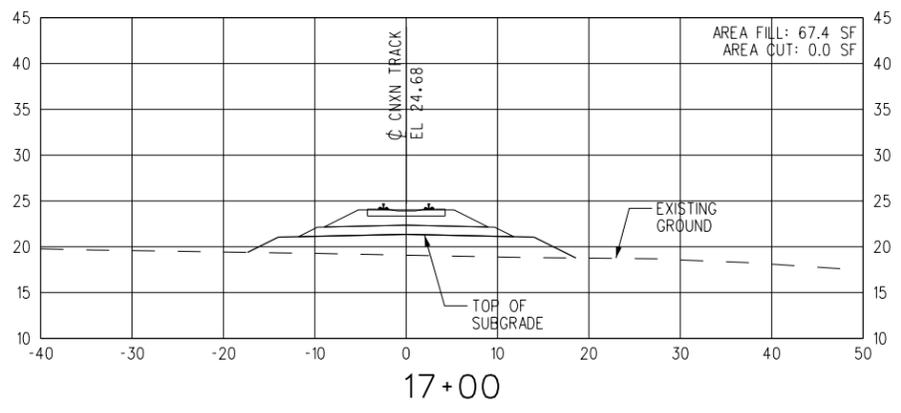
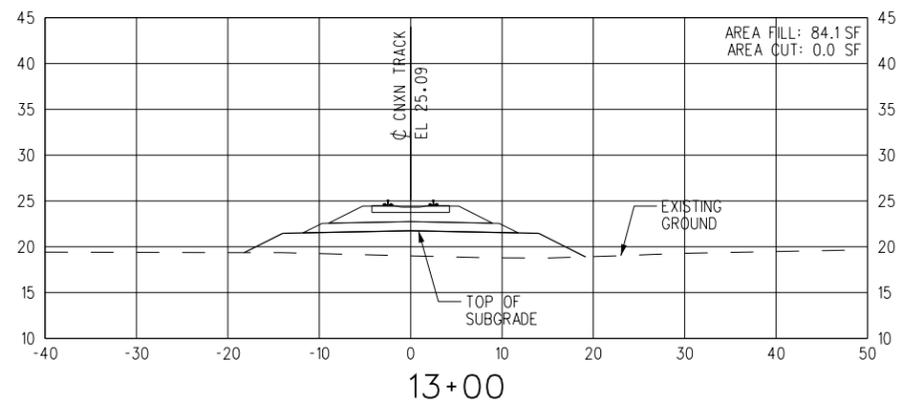
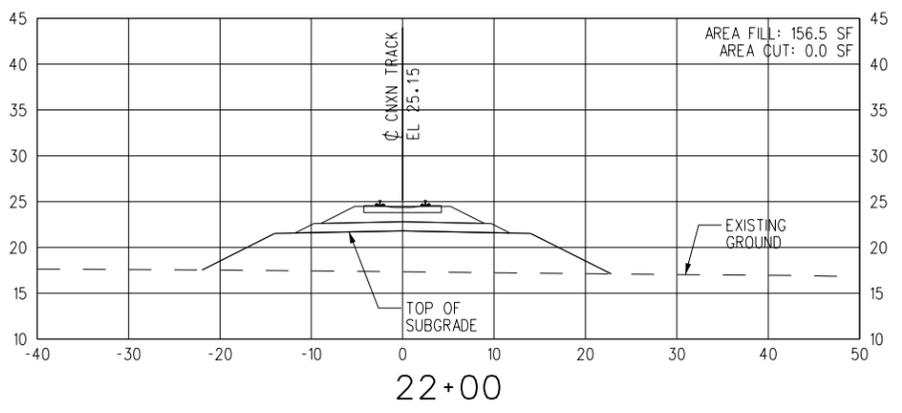
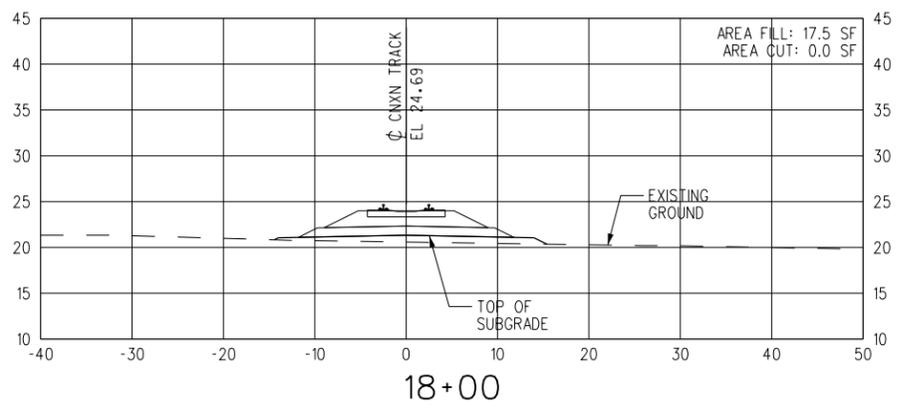
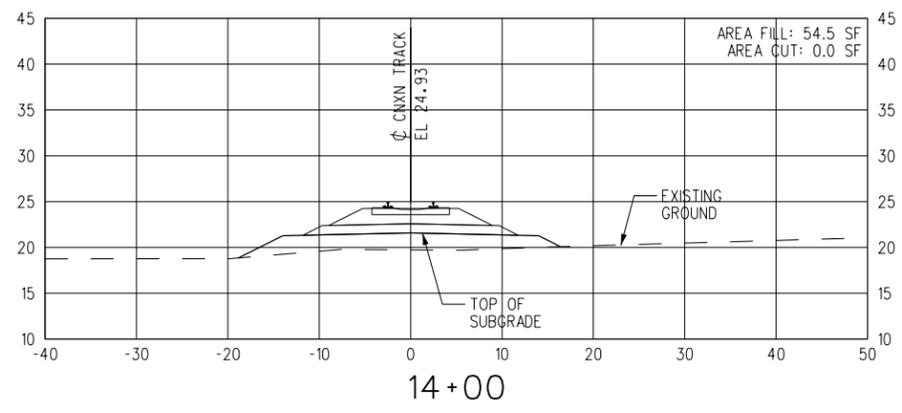
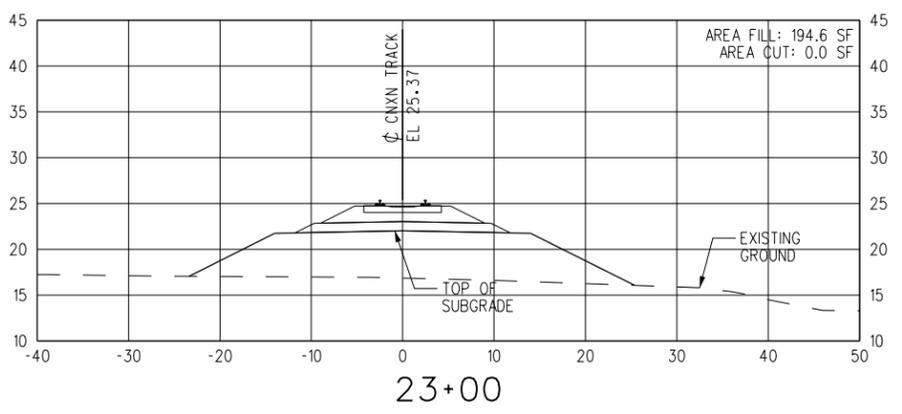
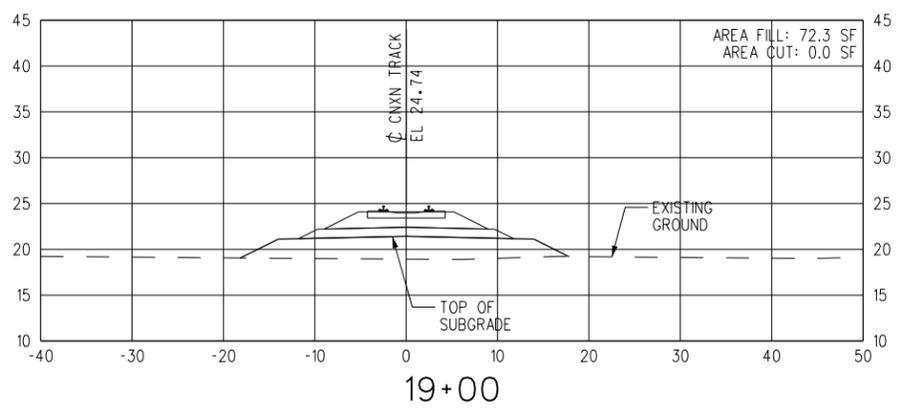
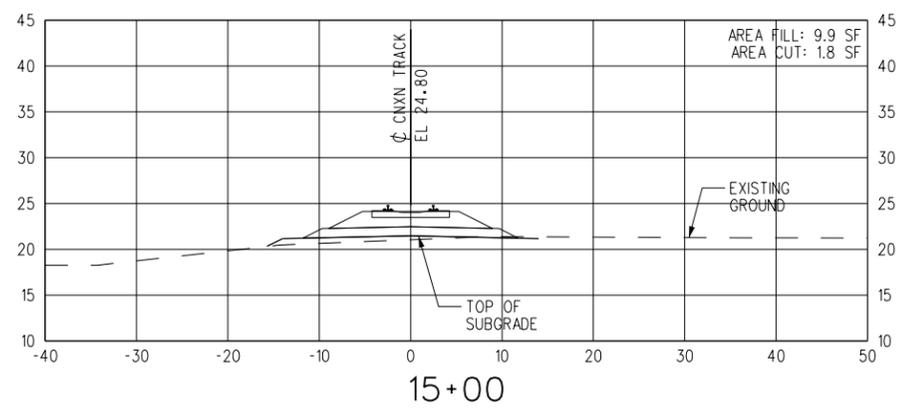
DESIGNED BY: A. CRAFT  
 DRAWN BY: A. COSS  
 CHECKED BY: M. CANAS  
 APPROVED BY: M. CANAS  
 DATE: SEPTEMBER 09, 2011



BNSF RAILWAY  
 RICHMOND RAIL CONNECTION  
 CROSS-SECTIONS - SHEET 1 OF 5  
 CNXN 0+00 TO CNXN 11+00

CONTRACT NO.  
 DRAWING NO. RX-01  
 REVISION 0 SHEET NO. 014  
 SCALE AS SHOWN

J:\Projects\BNSF\48\_Rheem\Drawings\17048r.x02.sht  
 10:30:18 AM  
 10/18/2011



PROJECT NUMBER	COST ELEMENT	LINE ITEM	CONTRACT DESIGNATOR	PHYSICAL ENTITY	WORK ELEMENT

REV	DATE	DESCRIPTION	BY	SUB	APP

<b>NOT FOR CONSTRUCTION</b>		<b>60% SUBMITTAL</b>	Information confidential all plans, drawings, specifications, and/or information furnished herewith shall remain the property of the Burlington Northern Santa Fe Railway and shall be held confidential and shall not be used for any purpose not provided for in agreements with the Burlington Northern Santa Fe Railway.
<b>DESIGNED BY</b> A. CRAFT			
<b>DRAWN BY</b> A. COSS		 	
<b>CHECKED BY</b> M. CANAS			
<b>APPROVED BY</b> M. CANAS			
<b>DATE</b> SEPTEMBER 09, 2011			



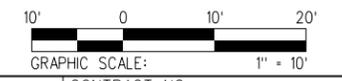
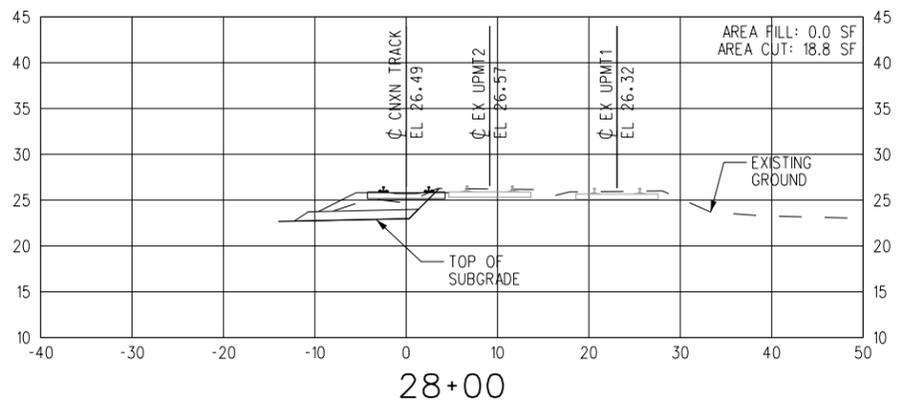
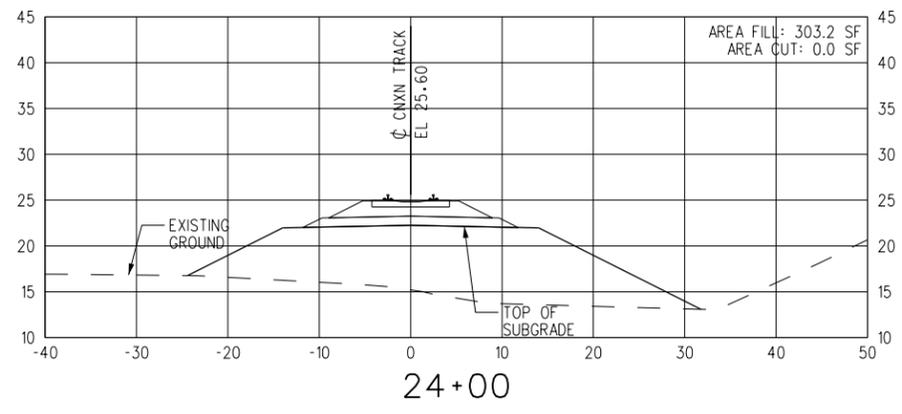
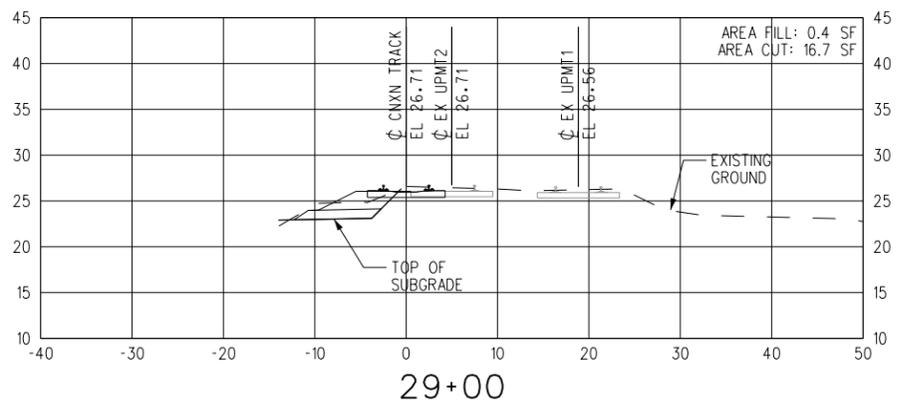
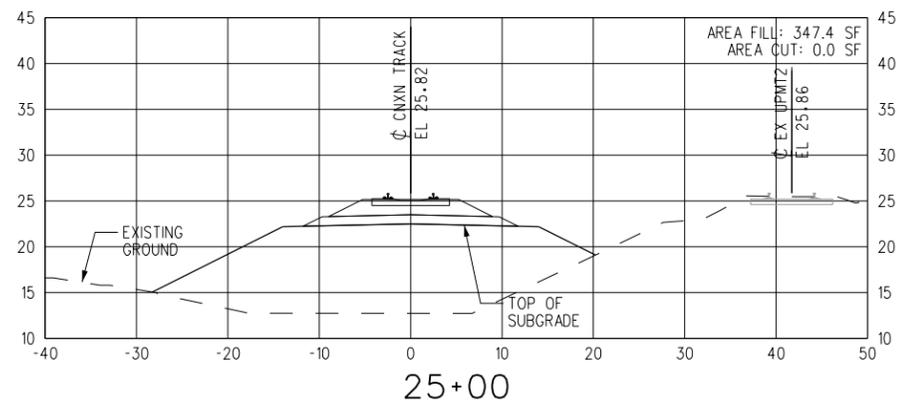
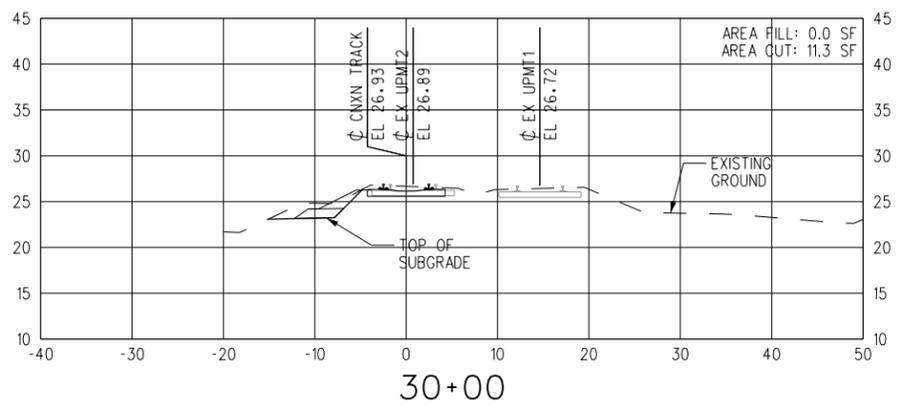
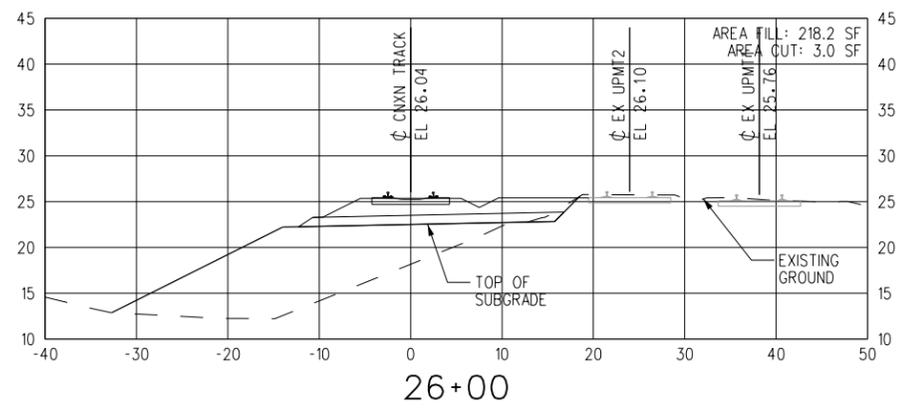
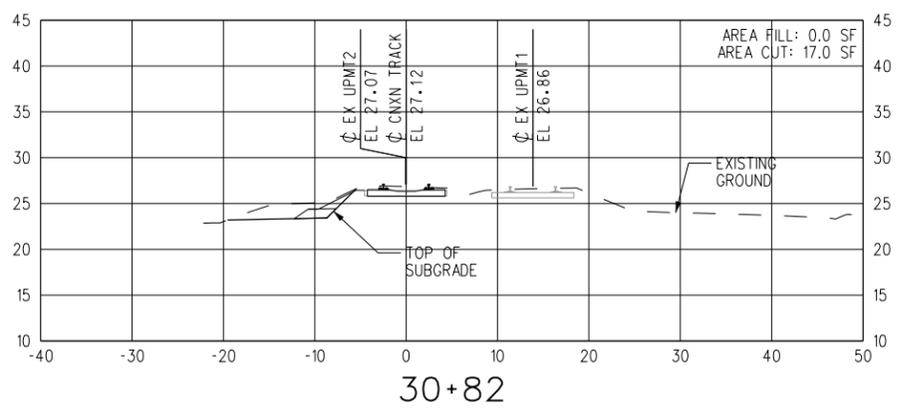
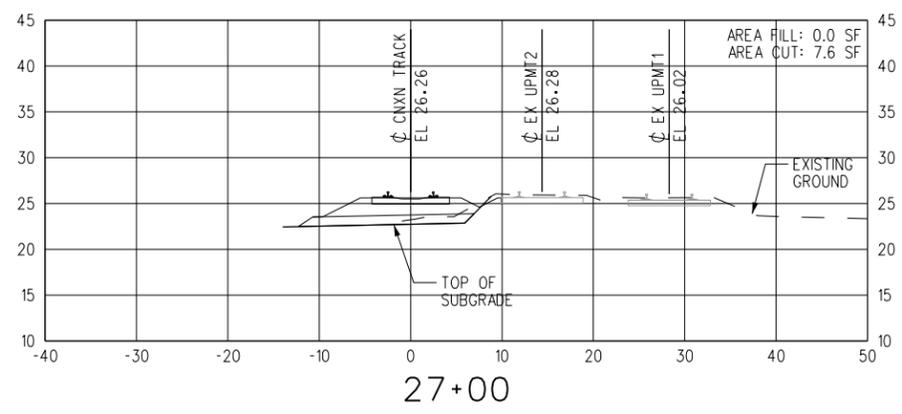



**BNSF RAILWAY**  
**RICHMOND RAIL CONNECTION**

CROSS-SECTIONS - SHEET 2 OF 5  
 CNXN 12+00 TO CNXN 23+00

CONTRACT NO.	
DRAWING NO.	RX-02
REVISION	SHEET NO. 015
SCALE	AS SHOWN

J:\Projects\BNSF\48\_Rheem\Drawings\17048r\03.sht  
 10:30:20 AM  
 10/18/2011



PROJECT NUMBER	COST ELEMENT	LINE ITEM	CONTRACT DESIGNATOR	PHYSICAL ENTITY	WORK ELEMENT

**NOT FOR CONSTRUCTION**  
**60% SUBMITTAL**

Information confidential  
 all plans, drawings, specifications, and/or information furnished herewith shall remain the property of the Burlington Northern Santa Fe Railway and shall be held confidential and shall not be used for any purpose not provided for in agreements with the Burlington Northern Santa Fe Railway.

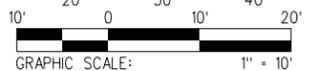
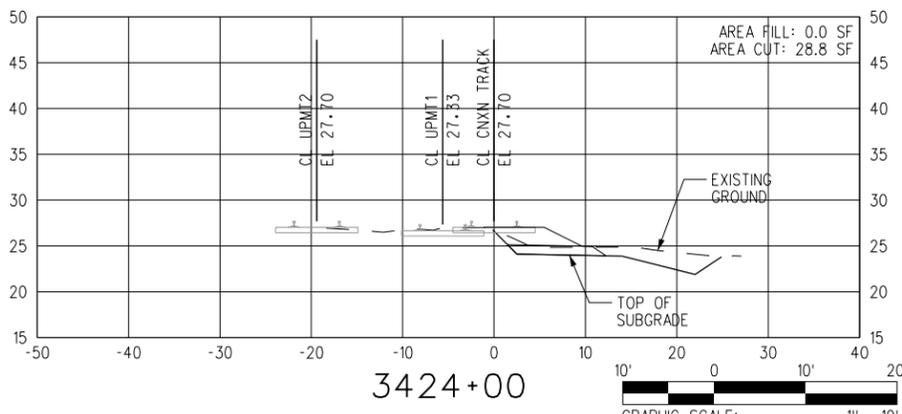
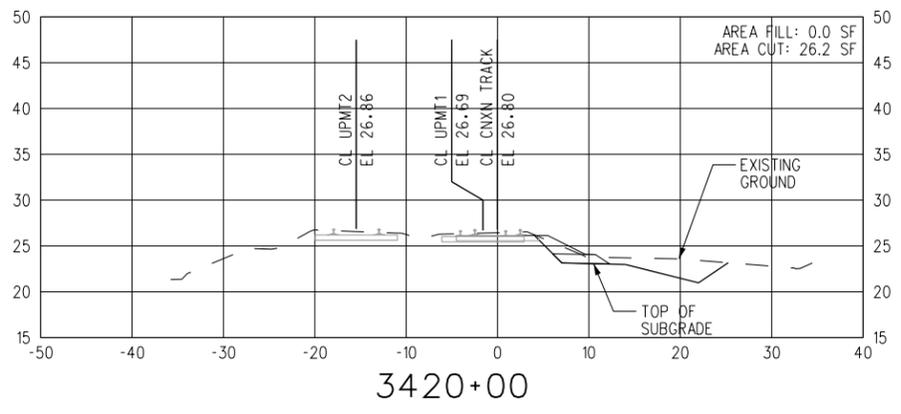
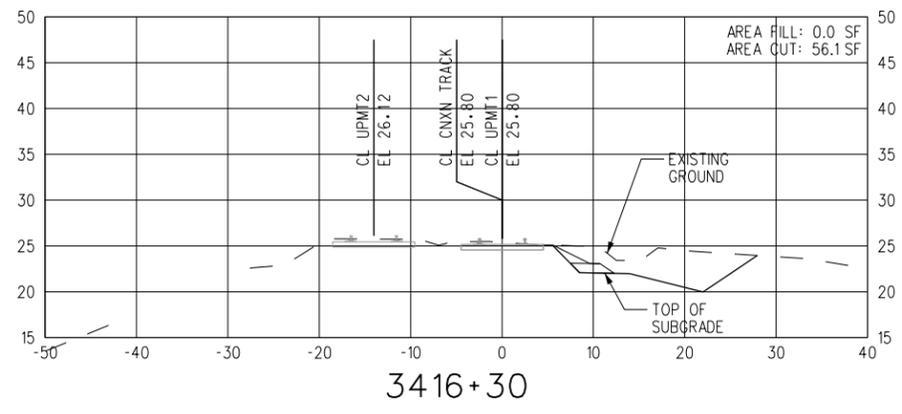
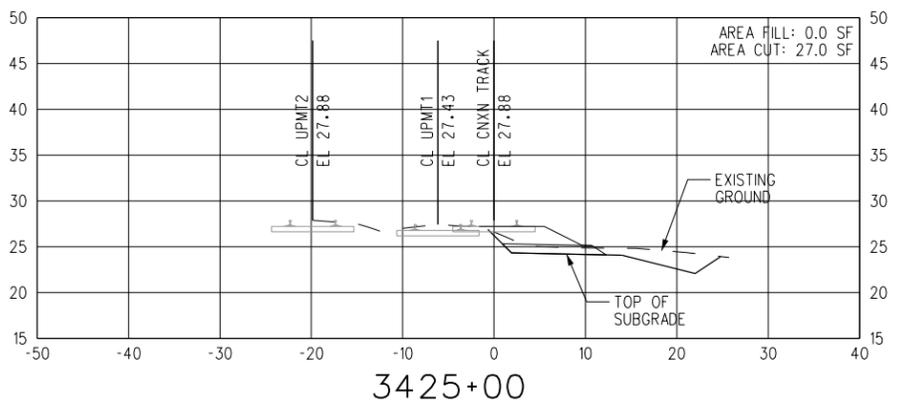
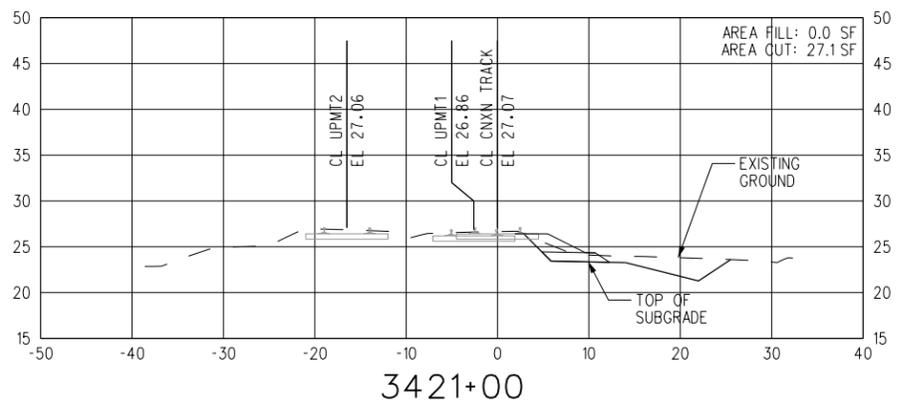
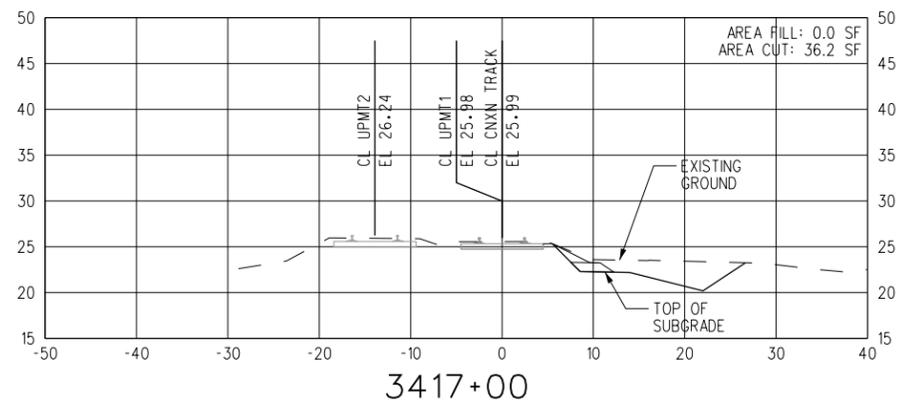
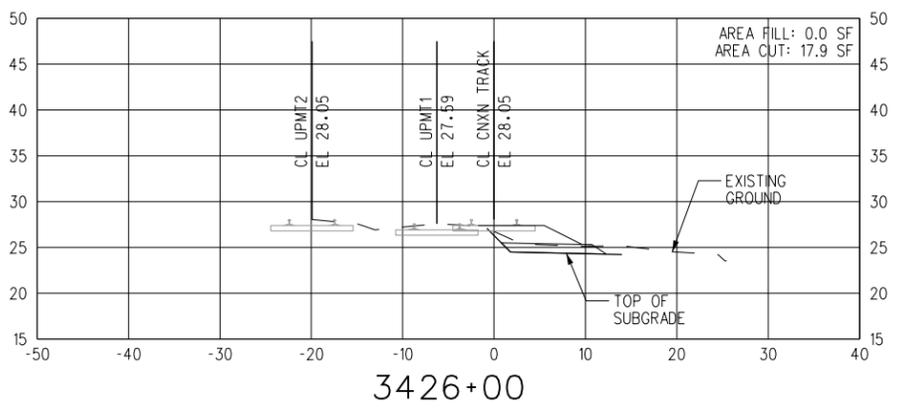
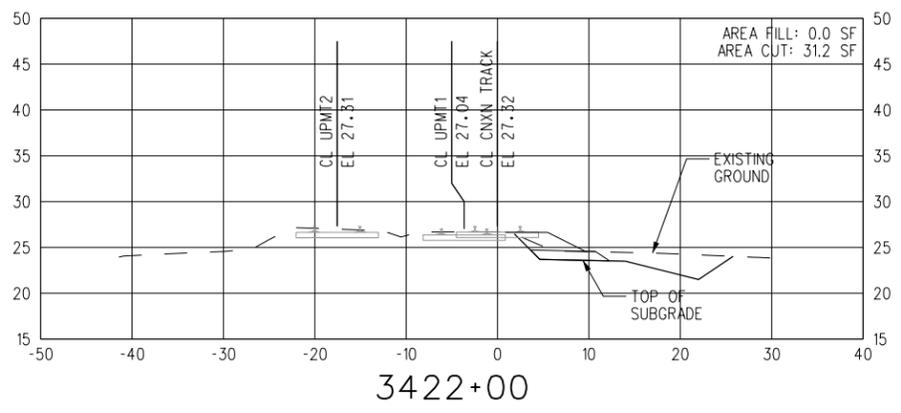
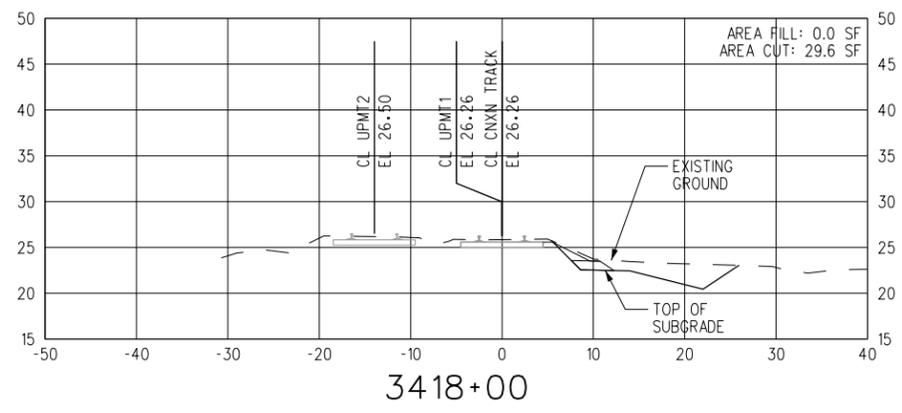
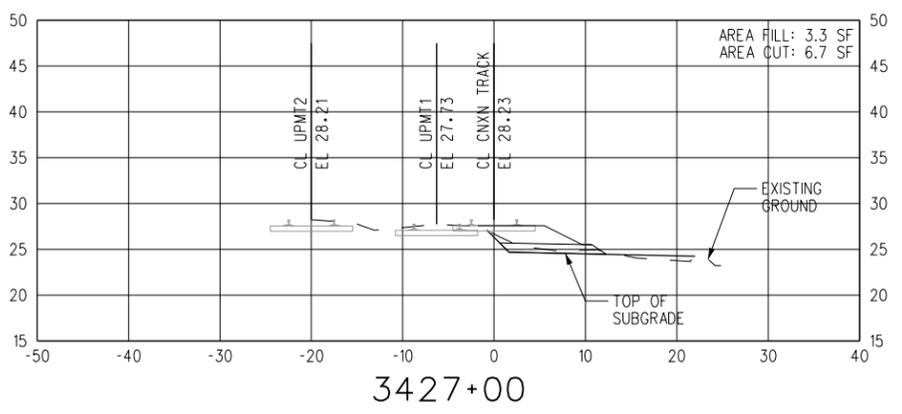
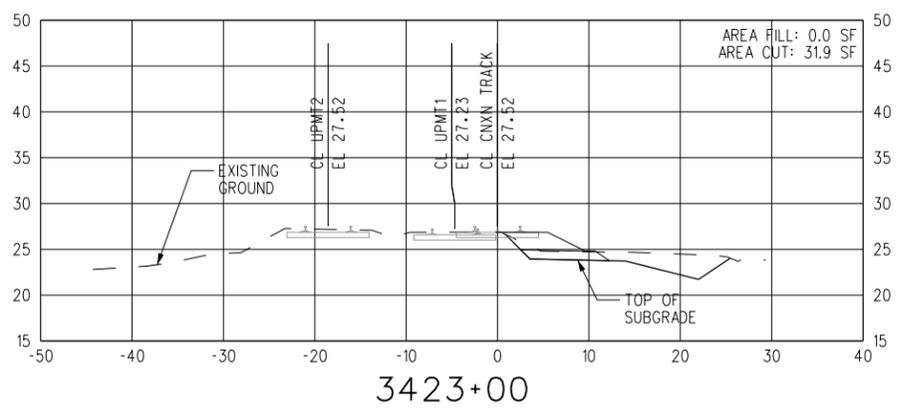
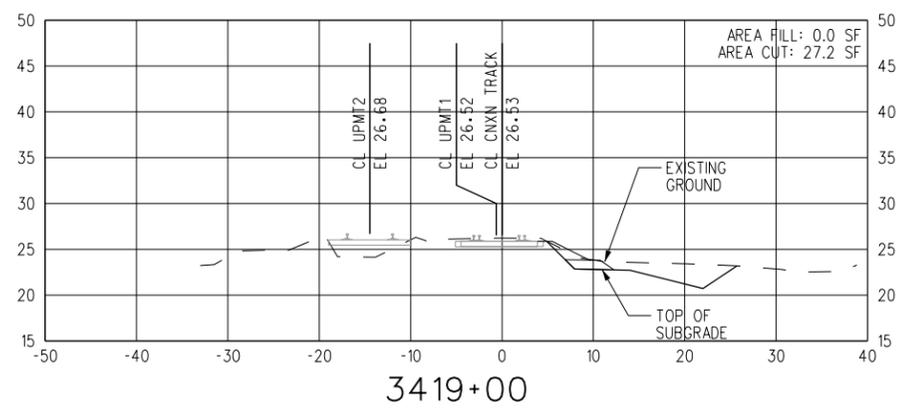
DESIGNED BY: A. CRAFT  
 DRAWN BY: A. COSS  
 CHECKED BY: M. CANAS  
 APPROVED BY: M. CANAS  
 DATE: SEPTEMBER 09, 2011



BNSF RAILWAY  
 RICHMOND RAIL CONNECTION  
 CROSS-SECTIONS - SHEET 3 OF 5  
 CNXN 24+00 TO CNXN 30+82

CONTRACT NO.	
DRAWING NO.	RX-03
REVISION	0 SHEET NO. 016
SCALE AS SHOWN	

J:\Projects\BNSF\48\_Rheem\Drawings\17048r\04.sht  
10/30/24 AM  
10/18/2011



PROJECT NUMBER	COST ELEMENT	LINE ITEM	CONTRACT DESIGNATOR	PHYSICAL ENTITY	WORK ELEMENT

REV	DATE	DESCRIPTION	BY	SUB	APP

**NOT FOR CONSTRUCTION**  
**60% SUBMITTAL**

Information confidential  
all plans, drawings, specifications, and/or information furnished herewith shall remain the property of the Burlington Northern Santa Fe Railway and shall be held confidential and shall not be used for any purpose not provided for in agreements with the Burlington Northern Santa Fe Railway.

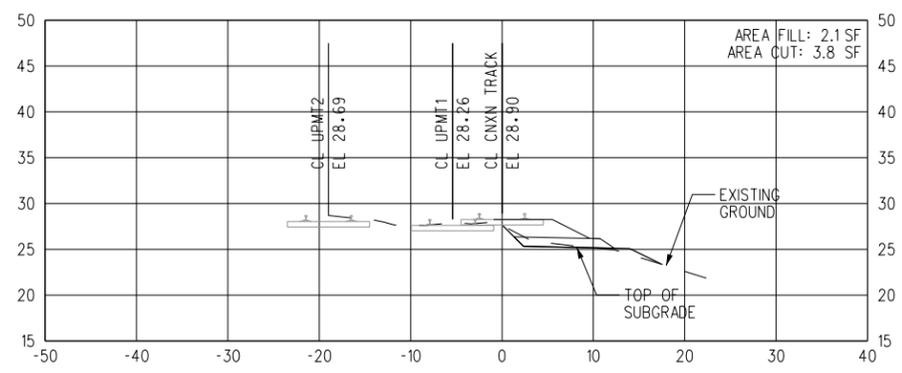
DESIGNED BY: A. CRAFT  
DRAWN BY: A. COSS  
CHECKED BY: M. CANAS  
APPROVED BY: M. CANAS  
DATE: SEPTEMBER 09, 2011



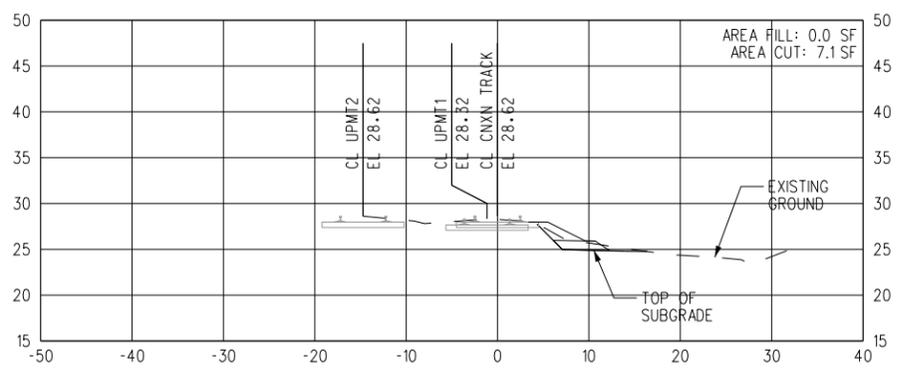
BNSF RAILWAY  
RICHMOND RAIL CONNECTION  
CROSS-SECTIONS - SHEET 4 OF 5  
UP01 3416+30 TO UP01 3427+00

CONTRACT NO.  
DRAWING NO. RX-04  
REVISION 0 SHEET NO. 017  
SCALE AS SHOWN

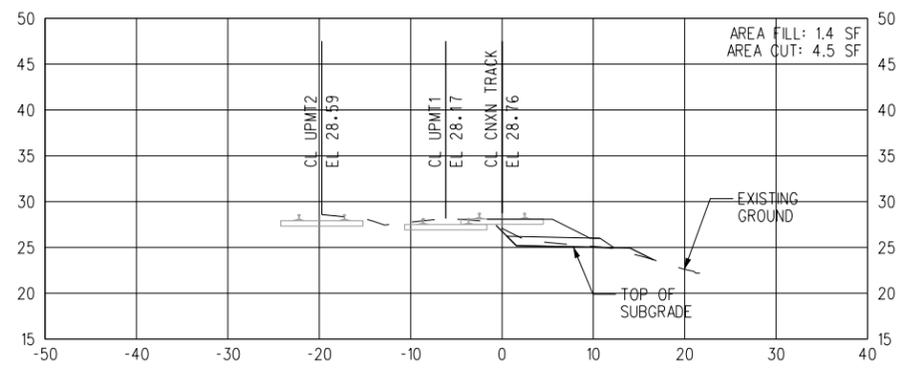
J:\Projects\BNSF\48\_Rheem\Drawings\17048r05.sht  
 10:30:27 AM  
 10/18/2011



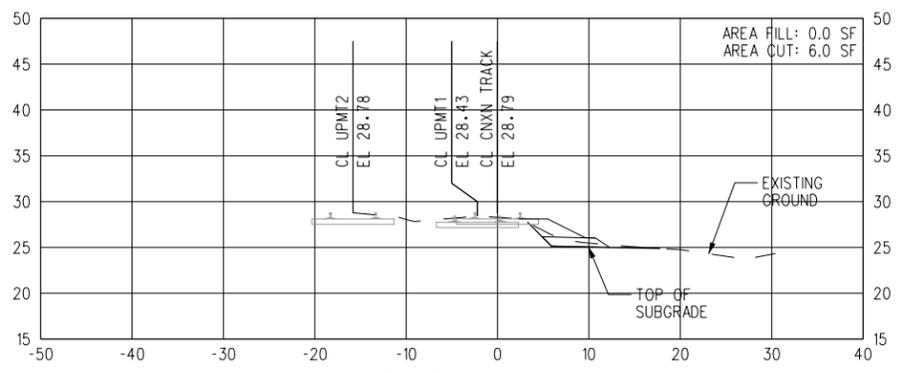
3431+00



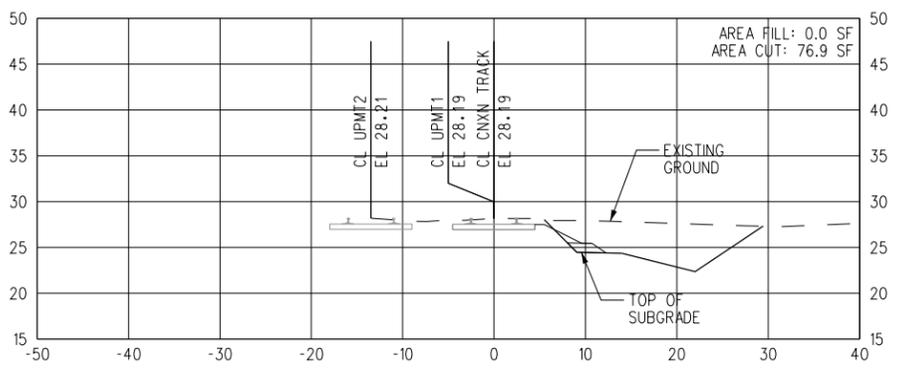
3435+00



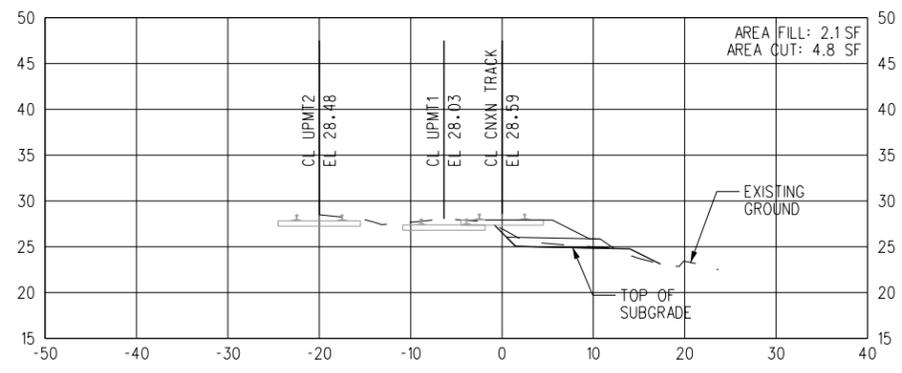
3430+00



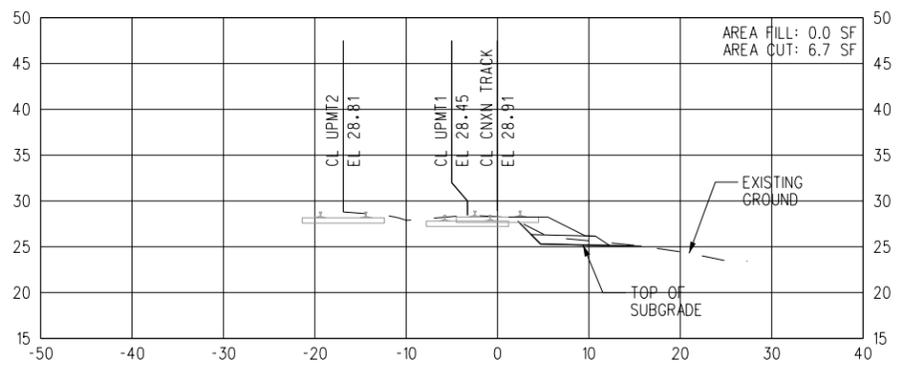
3434+00



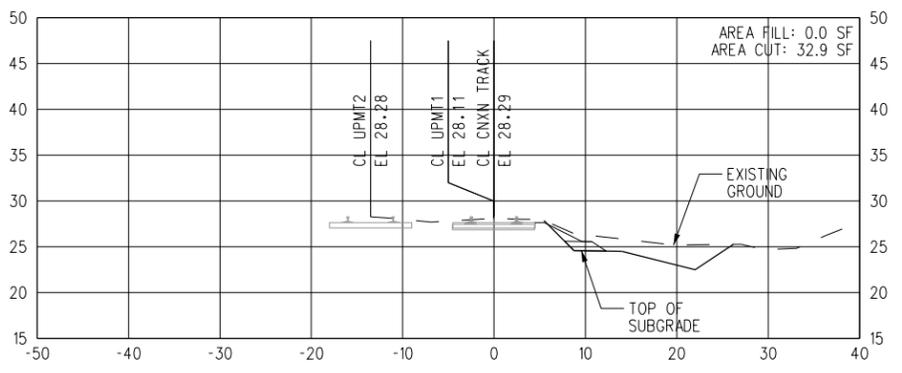
3437+65



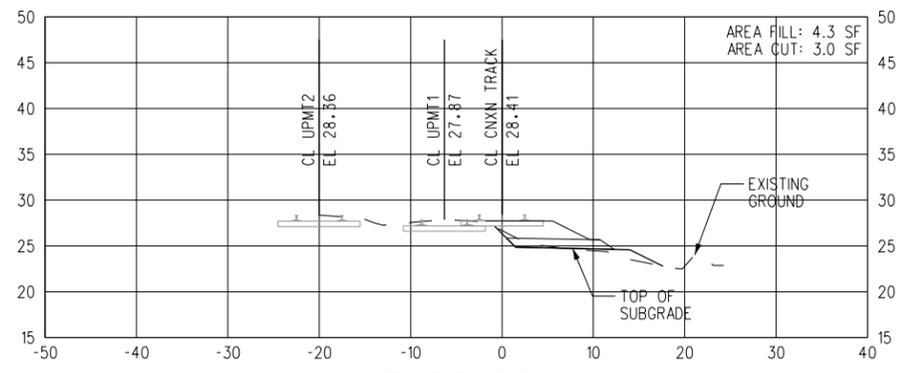
3429+00



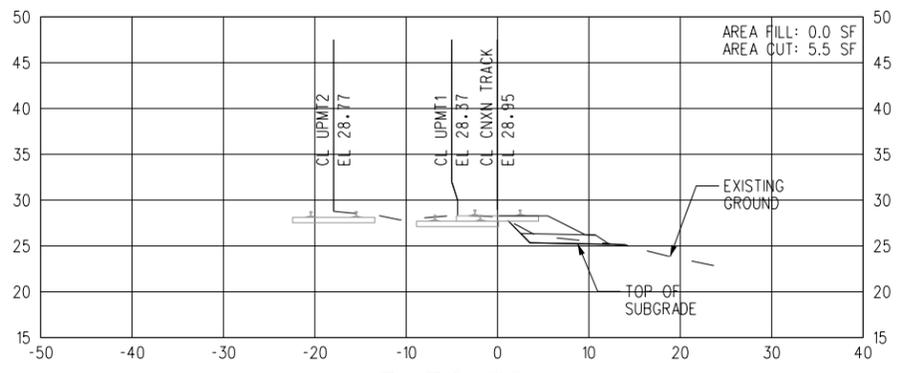
3433+00



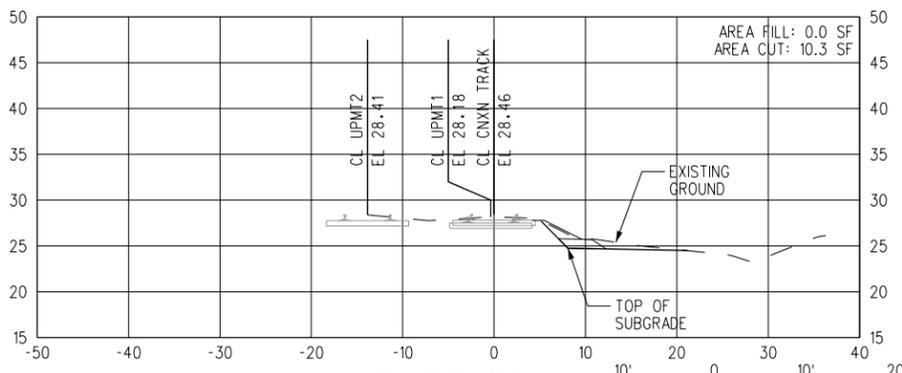
3437+00



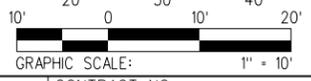
3428+00



3432+00



3436+00



**NOT FOR CONSTRUCTION**  
**60% SUBMITTAL**

Information confidential  
 all plans, drawings, specifications, and/or information furnished herewith shall remain the property of the Burlington Northern Santa Fe Railway and shall be held confidential and shall not be used for any purpose not provided for in agreements with the Burlington Northern Santa Fe Railway.

DESIGNED BY: A. CRAFT  
 DRAWN BY: A. COSS  
 CHECKED BY: M. CANAS  
 APPROVED BY: M. CANAS  
 DATE: SEPTEMBER 09, 2011



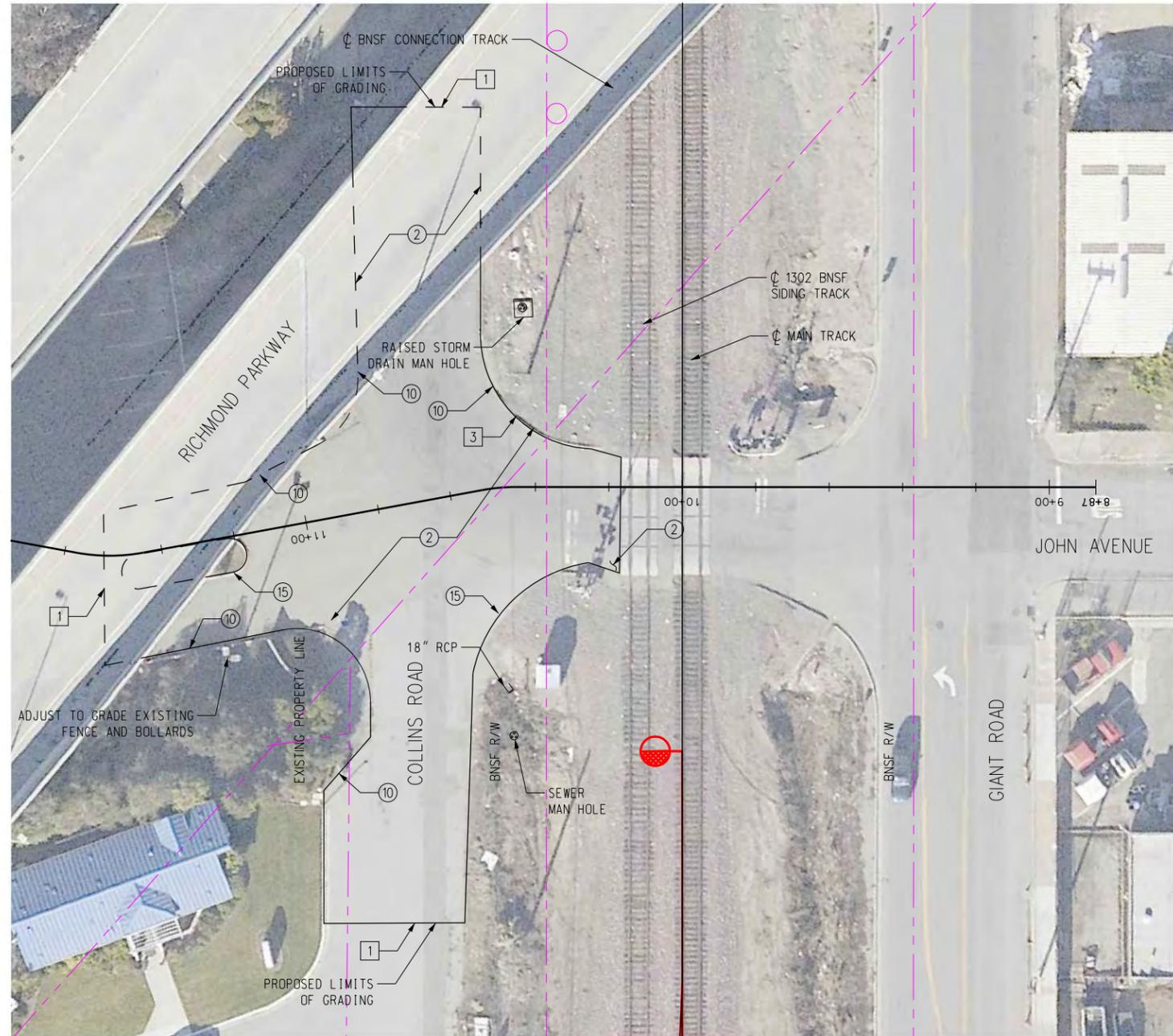
BNSF RAILWAY  
 RICHMOND RAIL CONNECTION  
 CROSS-SECTIONS - SHEET 5 OF 5  
 UP01 3428+00 TO UP01 3437+65

CONTRACT NO.  
 DRAWING NO. RX-05  
 REVISION 0 SHEET NO. 018  
 SCALE AS SHOWN

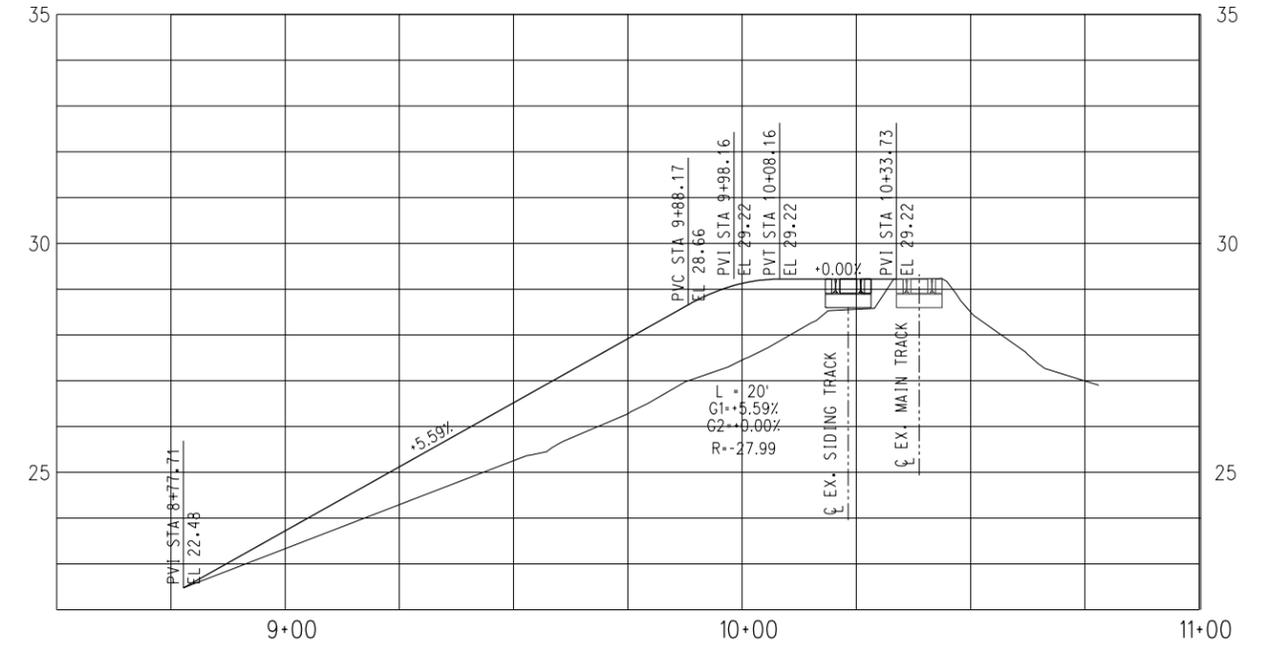
PROJECT NUMBER	COST ELEMENT	LINE ITEM	CONTRACT DESIGNATOR	PHYSICAL ENTITY	WORK ELEMENT

REV	DATE	DESCRIPTION	BY	SUB	APP

J:\Projects\BNSF\48\_Rheem\Drawings\17048cp01.sht  
 10:30:44 AM  
 10/18/2011



PLAN



PROFILE

REMOVAL NOTES:

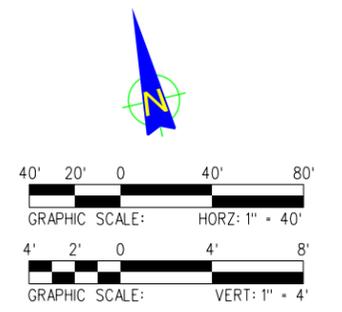
- 1 SAWCUT LINE.

CONSTRUCTION NOTES:

- 2 REMOVE AND CONSTRUCT NEW FULL DEPTH ASPHALT PAVEMENT, MATCH EXISTING SECTION (MINIMUM 4" AC/ 6" AB REQUIRED).
- 3 CONSTRUCT AC APRON AND JOIN EXISTING GROUND AT A MAXIMUM 8:1 SLOPE.
- 10 CONSTRUCT NEW CURB AND GUTTER  
 CONSTRUCT TRACK SECTION PER BNSF STD. DWG NO. 2259 WITH 12" MIN. BALLAST
- 15 CONSTRUCT NEW CONCRETE CURB

NOTES

- 1. DETAILED SURVEY INFORMATION PENDING
- 2. DESIGN AS DEPICTED, SUBJECT TO CHANGE PENDING FINAL SURVEY



PROJECT NUMBER	COST ELEMENT	LINE ITEM	CONTRACT DESIGNATOR	PHYSICAL ENTITY	WORK ELEMENT

REV	DATE	DESCRIPTION	BY	SUB	APP

**60% SUBMITTAL**

Information confidential all plans, drawings, specifications, and/or information furnished herewith shall remain the property of the Burlington Northern Santa Fe Railway and shall be held confidential and shall not be used for any purpose not provided for in agreements with the Burlington Northern Santa Fe Railway.

DESIGNED BY	
DRAWN BY	
CHECKED BY	
APPROVED BY	
DATE	SEPTEMBER 09, 2011

BNSF RAILWAY  
 RICHMOND RAIL CONNECTION  
 JOHN AVENUE CROSSING  
 PLAN AND PROFILE

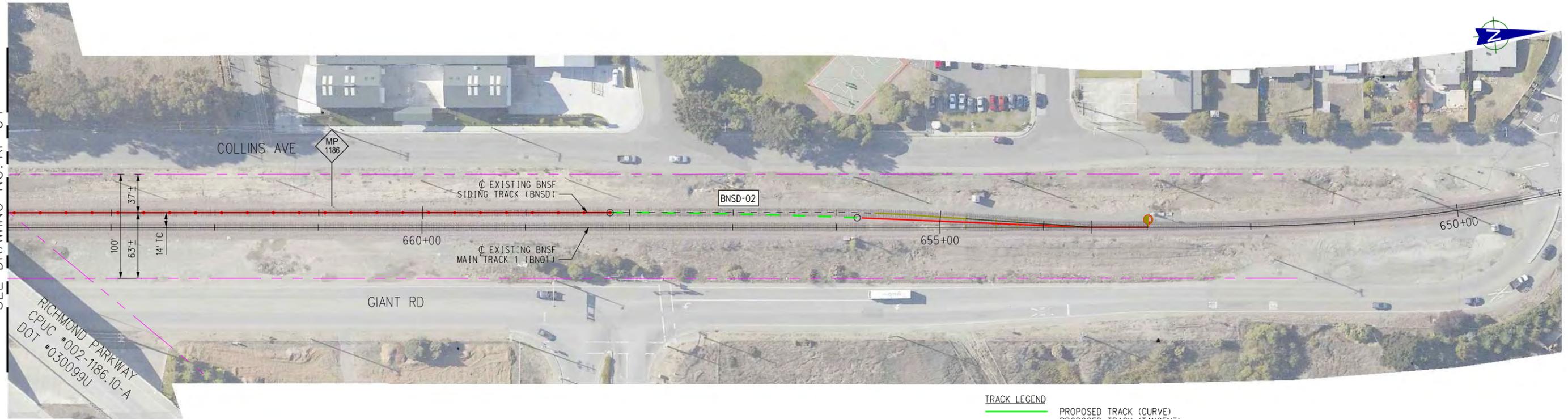
CONTRACT NO.	
DRAWING NO.	CP-01
REVISION	0 SHEET NO. 019
SCALE AS SHOWN	

TO RICHMOND, CA  
RR SOUTH

TO CALWA, CA  
RR NORTH

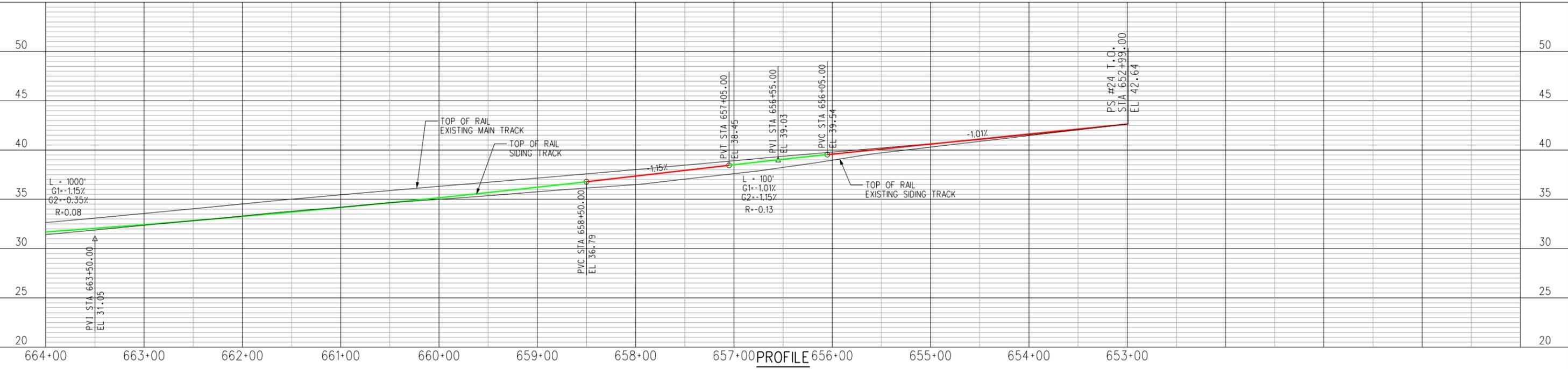
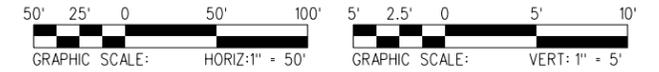


MATCH LINE - BNO1 664+00  
SEE DRAWING NO. RP-04



PLAN

TRACK LEGEND	
	PROPOSED TRACK (CURVE)
	PROPOSED TRACK (TANGENT)
	EXISTING TRACK (TO REMAIN)
	EXISTING TRACK (TO BE REMOVED)



PROFILE

J:\Projects\BNSF\48\_Rheem\Drawings\17048UA01.sht  
10:30:51 AM  
10/18/2011

PROJECT NUMBER	COST ELEMENT	LINE ITEM	CONTRACT DESIGNATOR	PHYSICAL ENTITY	WORK ELEMENT

NOT FOR CONSTRUCTION  
**60% SUBMITTAL**

Information confidential all plans, drawings, specifications, and/or information furnished here with shall remain the property of the Burlington Northern Santa Fe Railway and shall be held confidential and shall not be used for any purpose not provided for in agreements with the Burlington Northern Santa Fe Railway.

DESIGNED BY	A. CRAFT
DRAWN BY	A. COSS
CHECKED BY	M. CANAS
APPROVED BY	M. CANAS
DATE	SEPTEMBER 09, 2011



BNSF RAILWAY  
RICHMOND RAIL CONNECTION  
UTILITY PLAN - SHEET 1 OF 5  
BNSD 664+00 TO BNSD 653+00  
MP 1186.10 TO MP 1185.87 (BNSF)

CONTRACT NO.	
DRAWING NO.	UA-01
REVISION	0 SHEET NO. 020
SCALE AS SHOWN	

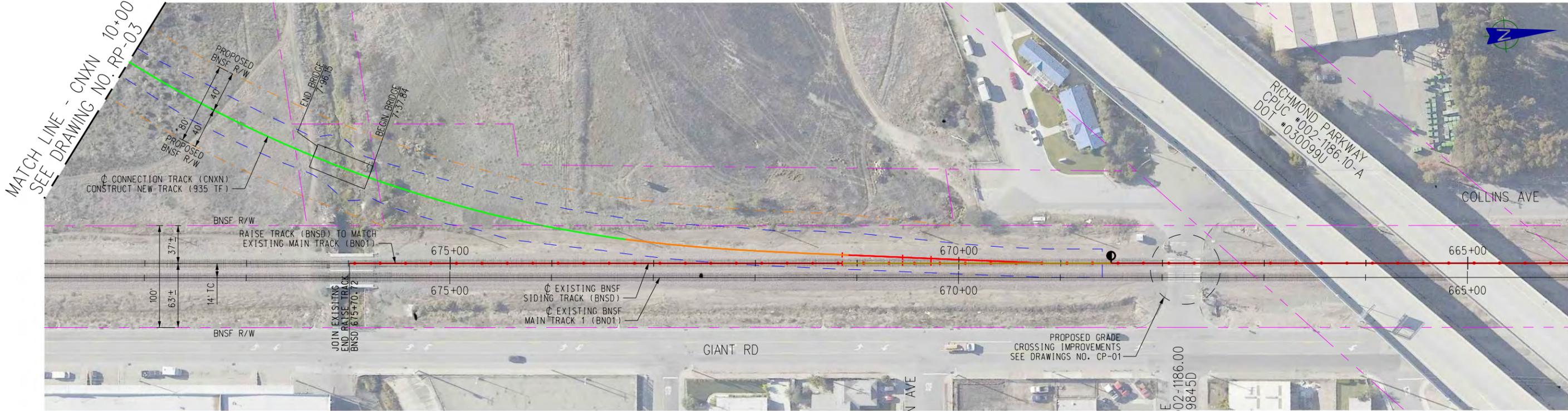
REV	DATE	DESCRIPTION	BY	SUB	APP

TO RICHMOND, CA

TO CALWA, CA

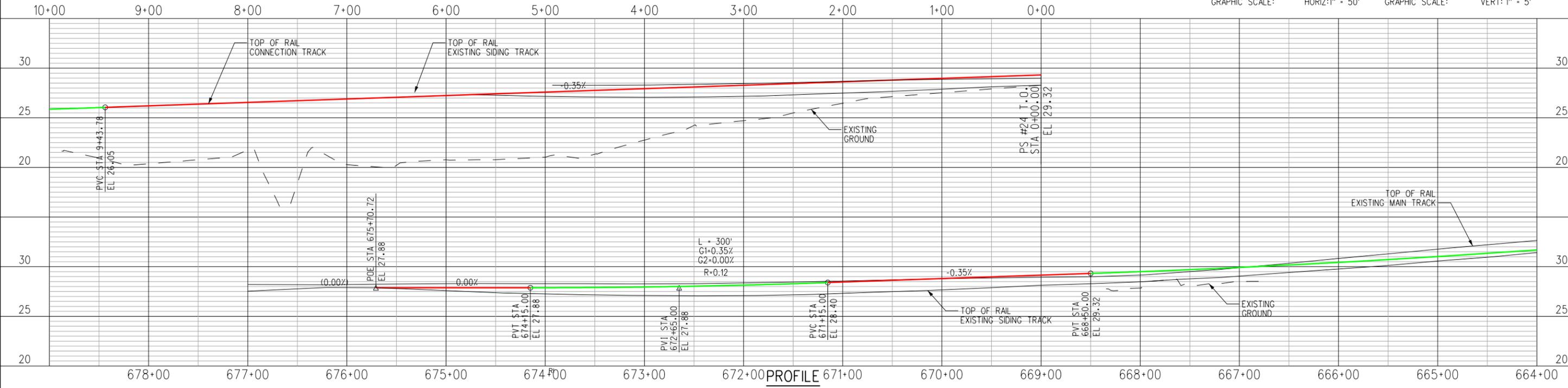
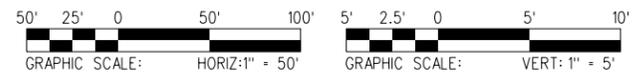
RR SOUTH

RR NORTH



PLAN

- TRACK LEGEND**
- PROPOSED TRACK (CURVE)
  - PROPOSED TRACK (TANGENT)
  - PROPOSED TRACK (SPIRAL)
  - EXISTING TRACK (TO REMAIN)
  - EXISTING TRACK (TO BE REMOVED)
  - - - PROPOSED RIGHT OF WAY (BNSF)



PROFILE

J:\Projects\BNSF\48\_Rheem\Drawings\17048UA02.sht  
 10:30:55 AM  
 10/18/2011

PROJECT NUMBER	
COST ELEMENT	
LINE ITEM	
CONTRACT DESIGNATOR	
PHYSICAL ENTITY	
WORK ELEMENT	

60% SUBMITTAL

Information confidential all plans, drawings, specifications, and/or information furnished here with shall remain the property of the Burlington Northern Santa Fe Railway and shall be held confidential and shall not be used for any purpose not provided for in agreements with the Burlington Northern Santa Fe Railway.

DESIGNED BY	
DRAWN BY	
CHECKED BY	
APPROVED BY	
DATE	SEPTEMBER 09, 2011

**BNSF RAILWAY**

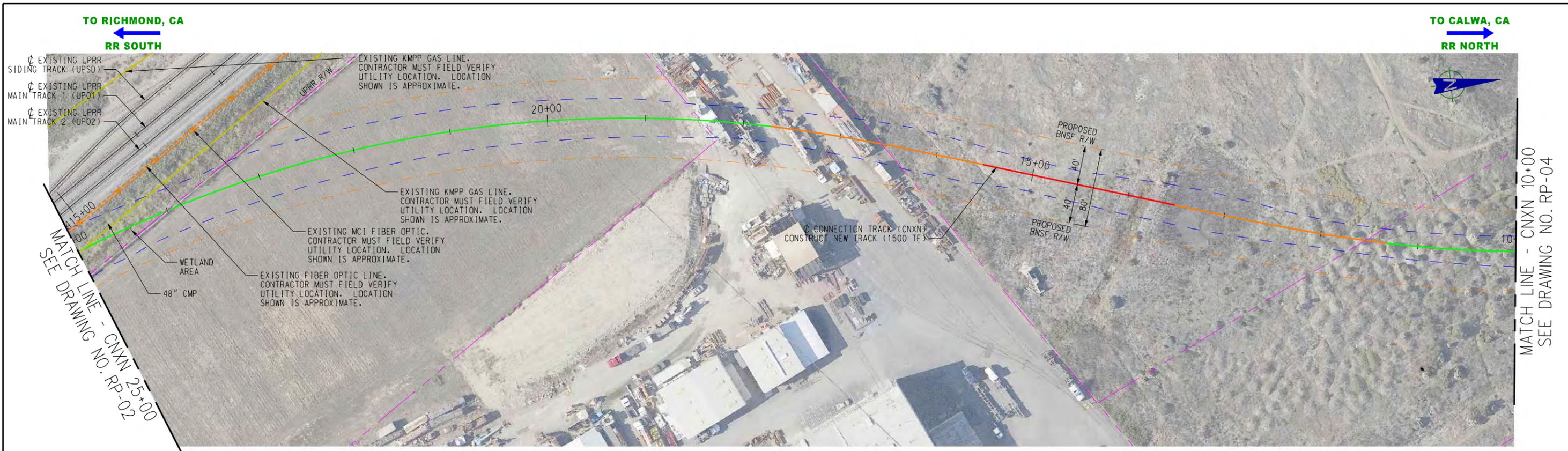
**UNION PACIFIC RAILROAD**

**PATTERSON & ASSOCIATES, INC.**  
 725 TOWN & COUNTRY RD  
 SUITE 300  
 ORANGE, CA 92668

**BNSF RAILWAY**  
**RICHMOND RAIL CONNECTION**

UTILITY PLAN - SHEET 2 OF 5  
 CNXN 10+00 TO BNSD 664+00  
 MP 1186.36 TO MP 1186.10 (BNSF)

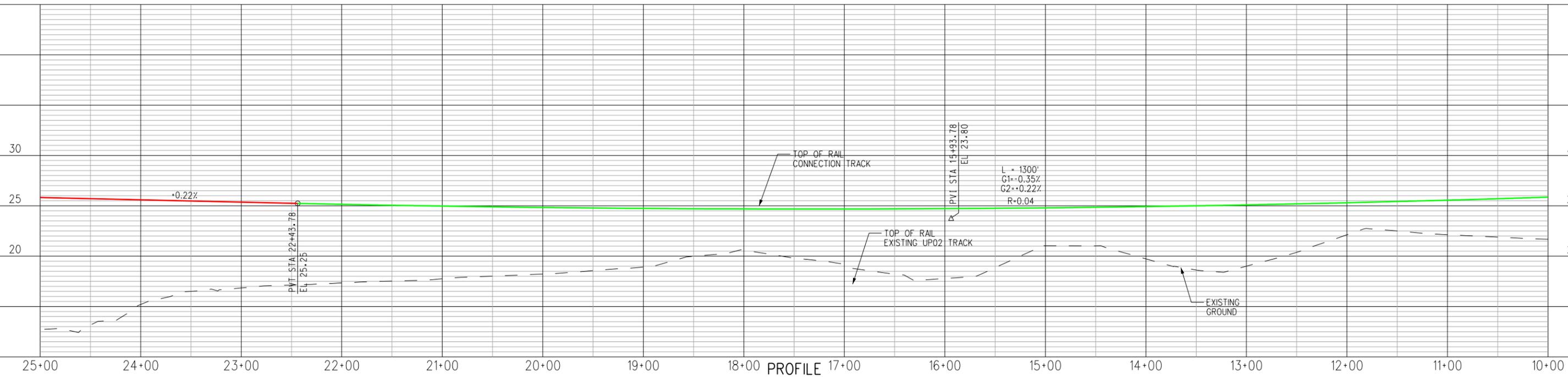
CONTRACT NO.	
DRAWING NO.	UA-02
REVISION	0
SHEET NO.	021
SCALE	AS SHOWN



- TRACK LEGEND**
- PROPOSED TRACK (CURVE)
  - PROPOSED TRACK (TANGENT)
  - PROPOSED TRACK (SPIRAL)
  - EXISTING TRACK (TO REMAIN)
  - - - PROPOSED RIGHT OF WAY (BNSF)



**PLAN**



**PROFILE**

J:\Projects\BNSF\48\_Rheem\Drawings\17048UA03.sht  
 10:31:00 AM  
 10/18/2011

PROJECT NUMBER	LINE ITEM	CONTRACT DESIGNATOR	PHYSICAL ENTITY	WORK ELEMENT

**NOT FOR CONSTRUCTION**  
**60% SUBMITTAL**

Information confidential all plans, drawings, specifications, and/or information furnished here with shall remain the property of the Burlington Northern Santa Fe Railway and shall be held confidential and shall not be used for any purpose not provided for in agreements with the Burlington Northern Santa Fe Railway.

DESIGNED BY	A. CRAFT
DRAWN BY	A. COSS
CHECKED BY	M. CANAS
APPROVED BY	M. CANAS
DATE	SEPTEMBER 09, 2011

**BNSF RAILWAY**

**UNION PACIFIC RAILROAD**

**PATTERSON & ASSOCIATES, INC.**  
 725 TOWN & COUNTRY RD  
 SUITE 300  
 ORANGE, CA 92668

**BNSF RAILWAY**  
**RICHMOND RAIL CONNECTION**

UTILITY PLAN - SHEET 3 OF 5  
 CNXN 25+00 TO CNXN 10+00  
 MP 1186.61 TO MP 1186.36 (BNSF)

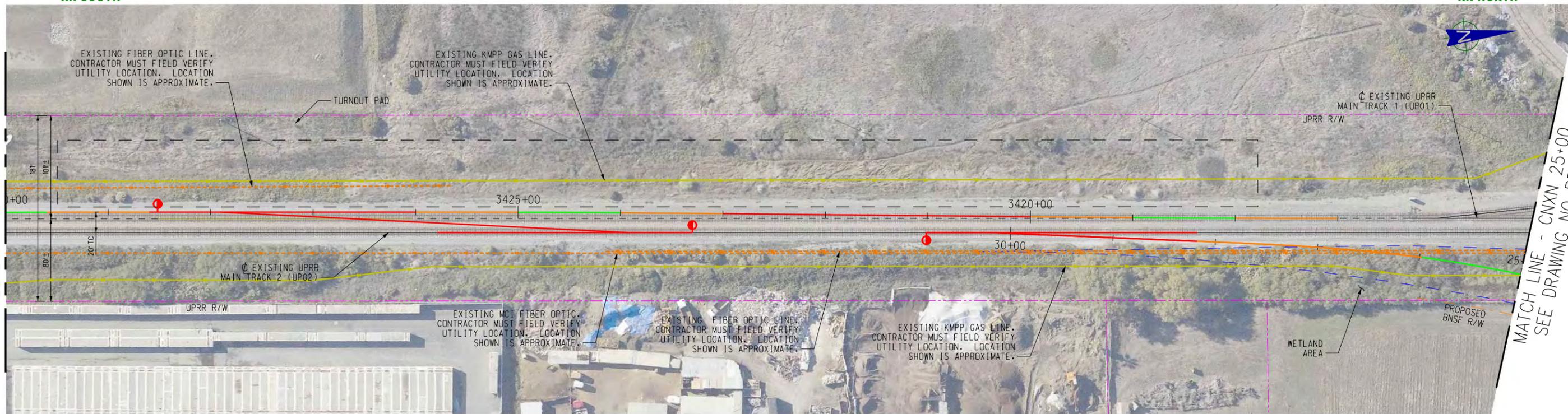
CONTRACT NO.	
DRAWING NO.	UA-03
REVISION	0 SHEET NO. 022
SCALE AS SHOWN	

TO RICHMOND, CA  
RR SOUTH

TO CALWA, CA  
RR NORTH

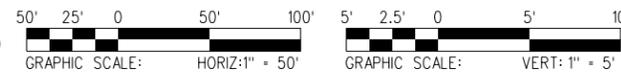
MATCH LINE - UP01 3430+00  
SEE DRAWING NO. RP-01

MATCH LINE - CNXN 25+00  
SEE DRAWING NO. RP-03



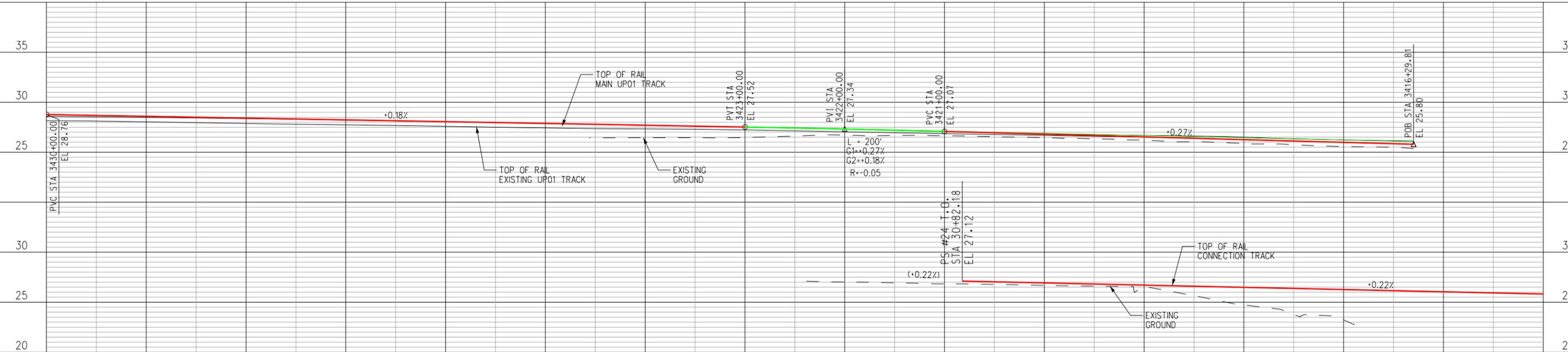
TRACK LEGEND

- PROPOSED TRACK (CURVE)
- PROPOSED TRACK (TANGENT)
- PROPOSED TRACK (SPIRAL)
- - - PROPOSED TRACK SHIFT (CURVE)
- - - PROPOSED TRACK SHIFT (TANGENT)
- - - PROPOSED TRACK SHIFT (SPIRAL)
- EXISTING TRACK (TO REMAIN)
- - - EXISTING TRACK (TO BE REMOVED)
- - - EXISTING TRACK (TO BE SHIFTED)
- - - PROPOSED RIGHT OF WAY (BNSF)



PLAN

3430+00 3429+00 3428+00 3427+00 3426+00 3425+00 3424+00 3423+00 3422+00 3421+00 3420+00 3419+00 3418+00 3417+00 3416+00 3415+00



PROFILE

J:\Projects\BNSF\48\_Rheem\Drawings\17048UA04.sht  
10/31/05 AM  
10/18/2011

PROJECT NUMBER	COST ELEMENT	LINE ITEM	CONTRACT DESIGNATOR	PHYSICAL ENTITY	WORK ELEMENT

NOT FOR CONSTRUCTION  
**60% SUBMITTAL**

Information confidential all plans, drawings, specifications, and/or information furnished here with shall remain the property of the Burlington Northern Santa Fe Railway and shall be held confidential and shall not be used for any purpose not provided for in agreements with the Burlington Northern Santa Fe Railway

DESIGNED BY: A. CRAFT  
DRAWN BY: A. COSS  
CHECKED BY: M. CANAS  
APPROVED BY: M. CANAS  
DATE: SEPTEMBER 09, 2011



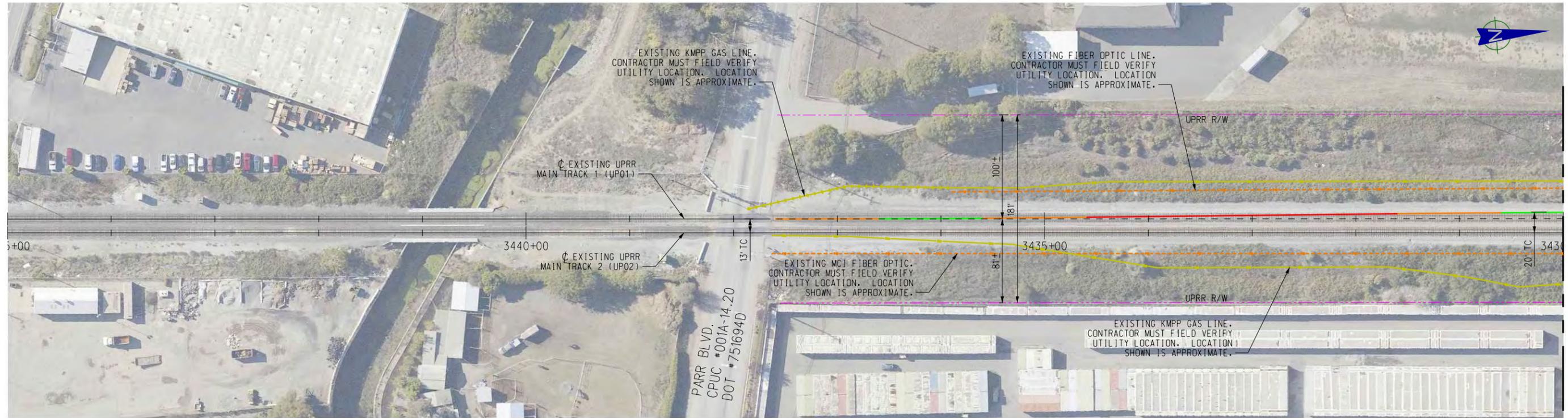
BNSF RAILWAY  
RICHMOND RAIL CONNECTION  
UTILITY PLAN - SHEET 4 OF 5  
UP01 20+00 TO UP01 8+00  
MP 17.36 TO MP 17.62 (UPRR)

CONTRACT NO.	
DRAWING NO.	UA-04
REVISION	0 SHEET NO. 023
SCALE AS SHOWN	

REV	DATE	DESCRIPTION	BY	SUB	APP

TO RICHMOND, CA  
← RR SOUTH

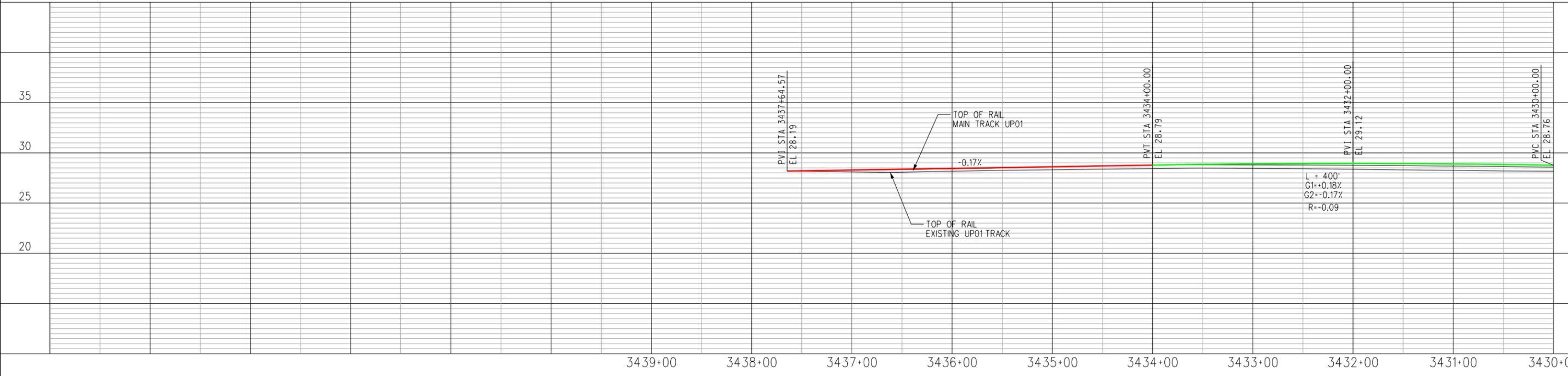
TO CALWA, CA  
→ RR NORTH



MATCH LINE - UP01 3430+00  
SEE DRAWING NO. RP-02

- TRACK LEGEND**
- PROPOSED TRACK SHIFT (CURVE)
  - PROPOSED TRACK SHIFT (TANGENT)
  - PROPOSED TRACK SHIFT (SPIRAL)
  - EXISTING TRACK (TO REMAIN)
  - - - EXISTING TRACK (TO BE SHIFTED)

PLAN



J:\Projects\BNSF\48\_Rheem\Drawings\17048UA05.sht  
10/31/10 AM  
10/18/2011

PROJECT NUMBER	LINE ITEM	CONTRACT DESIGNATOR	PHYSICAL ENTITY	WORK ELEMENT

**NOT FOR CONSTRUCTION**  
**60% SUBMITTAL**

Information confidential all plans, drawings, specifications, and/or information furnished herewith shall remain the property of the Burlington Northern Santa Fe Railway and shall be held confidential and shall not be used for any purpose not provided for in agreements with the Burlington Northern Santa Fe Railway.

DESIGNED BY	A. CRAFT
DRAWN BY	A. COSS
CHECKED BY	M. CANAS
APPROVED BY	M. CANAS
DATE	SEPTEMBER 09, 2011

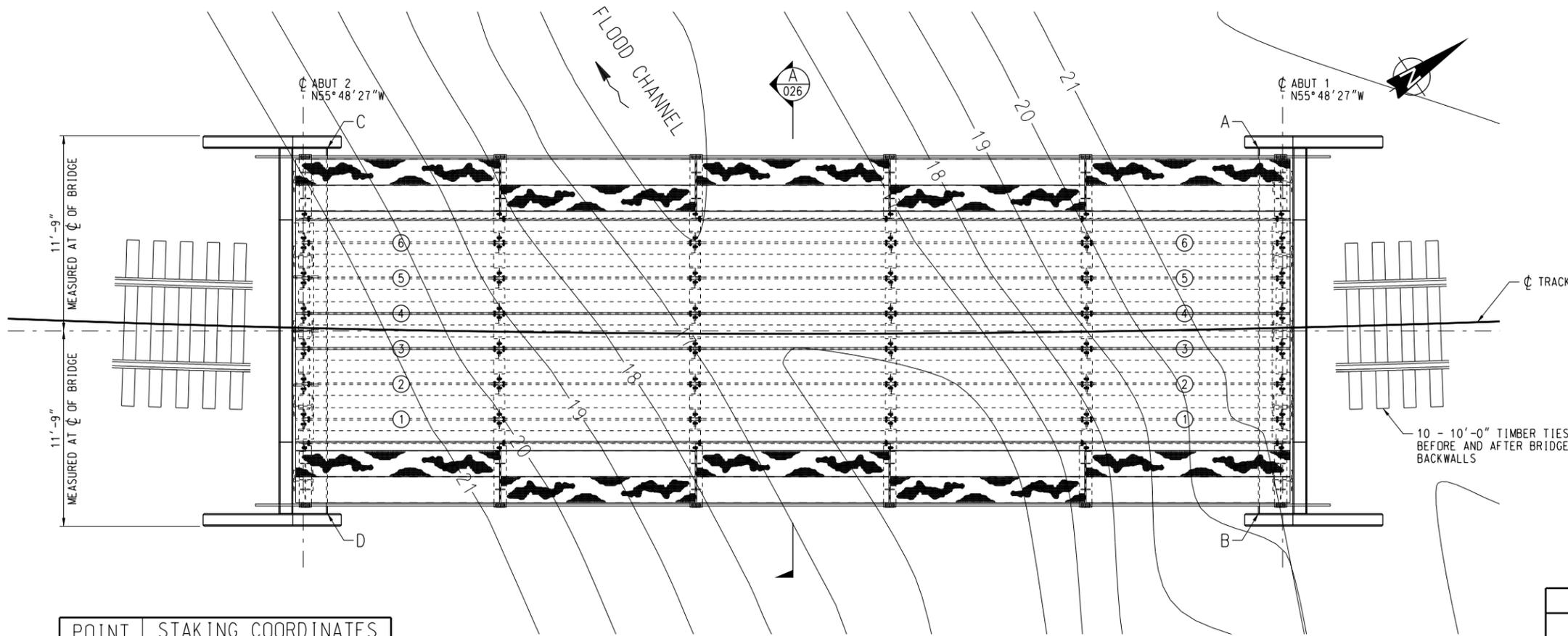


BNSF RAILWAY  
RICHMOND RAIL CONNECTION  
UTILITY PLAN - SHEET 5 OF 5  
UP01 3445+00 TO UP01 3430+00  
MP 17.20 TO MP 17.36

CONTRACT NO.	
DRAWING NO.	UA-05
REVISION	SHEET NO. 024
0	
SCALE AS SHOWN	

REV	DATE	DESCRIPTION	BY	SUB	APP

J:\Projects\BNSF\48\_Rheem\Drawings\17048sc01.sht  
 10/18/2011 10:59:41 AM  
 Acraft



LIST OF DRAWINGS	
PLAN NO.	ABUT 1
XXXX-1186.3-01	GENERAL PLAN
XXXX-1186.3-02	PILING PLAN AND TYPICAL SECTION
XXXX-1186.3-03	ABUTMENT PLAN AND ELEVATION
XXXX-1186.3-04	PRECAST CONCRETE DETAILS (1 OF 2)
XXXX-1186.3-05	PRECAST CONCRETE DETAILS (2 OF 2)
XXXX-1186.3-06	BEAM SPAN - FRAMING PLAN
XXXX-1186.3-07	BEAM SPAN - DECK DETAILS
XXXX-1186.3-08	BEAM SPAN - DETAILS
XXXX-1186.3-09	HANDRAIL PANEL DETAILS
XXXX-1186.3-10	BEARING AND MISCELLANEOUS DETAILS
XXXX-1186.3-11	GENERAL NOTES AND BILL OF MATERIAL

TABLE OF ELEVATIONS		
LOCATION	ABUT 1	ABUT 2
TOP OF TIE	26.11*	25.91*
TOP OF CAP	21.09*	20.88*
PILE CUT-OFF	19.10*	18.89*

\* ELEVATIONS TAKEN ALONG CENTERLINE OF BEARING

POINT NO.	STAKING COORDINATES	
	X	Y
A	6027271.357	2183633.569
B	6027289.555	2183621.206
C	6027239.795	2183587.113
D	6027257.992	2183574.750

PLAN

SLOPE = -0.35%

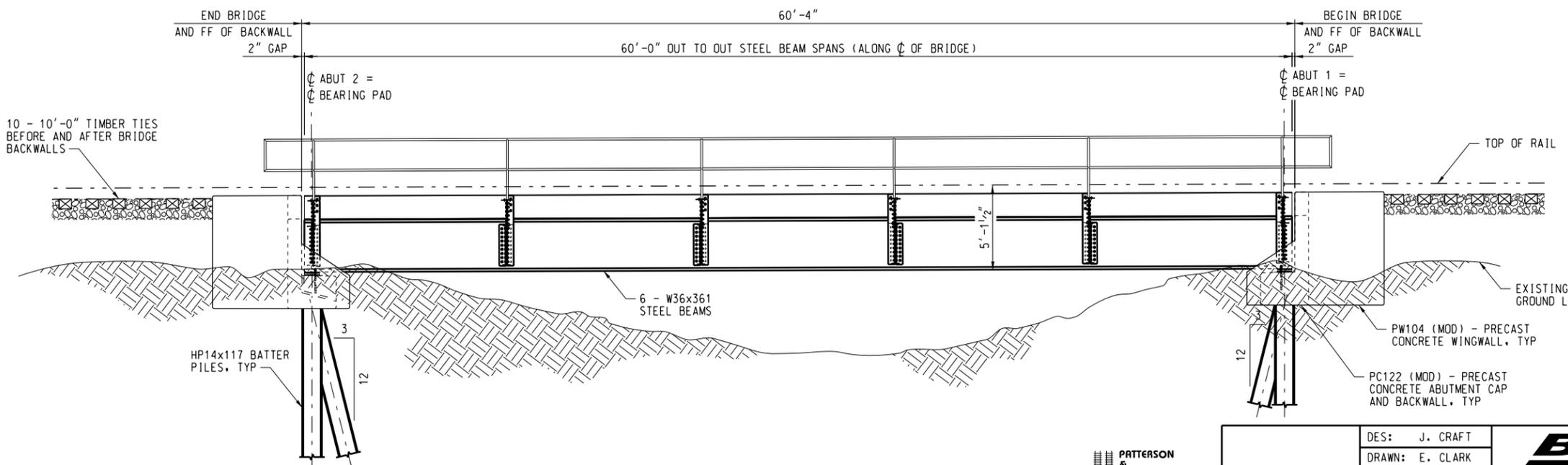
TABLE OF LIFTING WEIGHTS		
DESCRIPTION	MARK NO.	EST. WEIGHT (LBS)
W36x361 x 60'-0" STEEL BEAMS (6 TOTAL)	--	21,000
PRECAST CONCRETE ABUTMENT CAP AND BACKWALL	PC122 (MOD)	30,500 (EA)
PRECAST CONCRETE WINGWALL (4 TOTAL)	PW104 (MOD)	5,150

BNSF - BRIDGE STANDARD PLANS (REFERENCES)

PLAN NO.	DESCRIPTION	SHEET NO.
0000-10802-039 (MOD)	MISCELLANEOUS DETAILS	4 OF 20
0000-10802-040 (MOD)	SINGLE BENT - "H" PILES	5 OF 20
0000-10802-049	MISCELLANEOUS DETAILS	14 OF 20
0000-10802-052 (MOD)	PRECAST CONCRETE MEMBERS	17 OF 20
0000-10802-053 (MOD)	PRECAST CONCRETE MEMBERS	18 OF 20
0000-10802-054	STEEL DETAILS	19 OF 20
0000-10802-055	GENERAL NOTES	20 OF 20
0000-17000-001B	HANDRAIL PANEL DETAILS FOR MULTIPLE LENGTH BEAMS	1 OF 1

GENERAL NOTES:

- DESIGN LOADING: COOPER E80 WITH DIESEL IMPACT
- BRIDGE STATIONING AND ELEVATIONS ARE BASED ON SURVEY CONDUCTED BY WESTLAND GROUP, INC DATED MARCH 2010
- BRIDGE ERECTION SUBJECT TO APPLICABLE DETAILS AS SHOWN ON THE PLANS AND/OR REFERENCES AND AS DIRECTED BY THE ENGINEER
- CONTRACTOR SHALL SUBMIT BRIDGE LIFTING PLAN TO ENGINEER FOR APPROVAL PRIOR TO CONSTRUCTION BEGIN
- DETAIL DESIGN MAY VARY PENDING SURVEY INFORMATION



ELEVATION ALONG  $\phi$  OF BRIDGE  
WALKWAY NOT SHOWN FOR CLARITY

**60% IN-PROGRESS**

**PATTERSON & ASSOCIATES, INC.**  
 CIVIL STRUCTURES ENGINEERING  
 725 TOWN & COUNTRY RD  
 SUITE 300  
 ORANGE, CA 92868

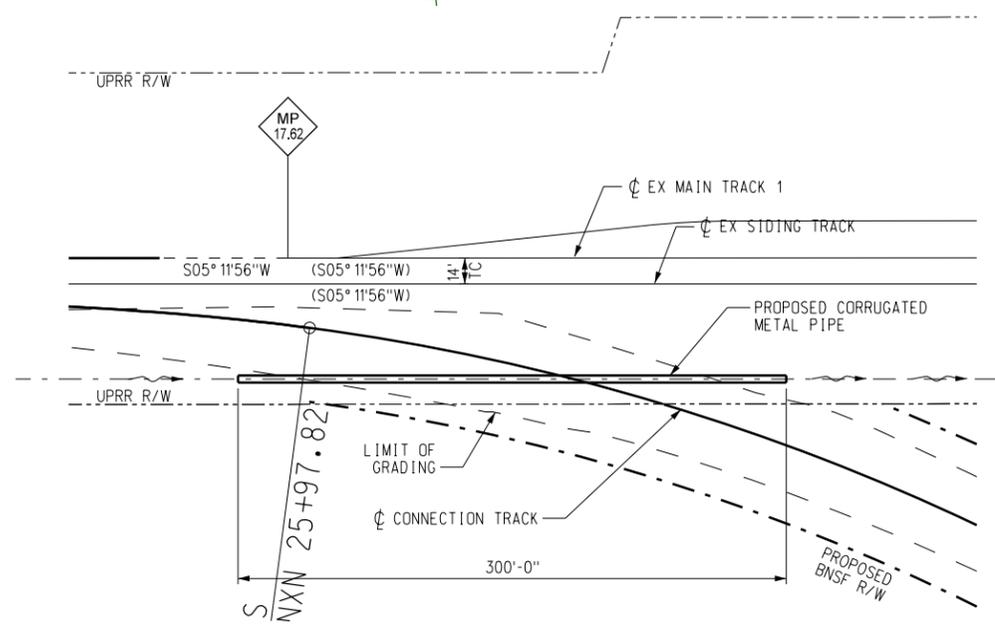
DES: J. CRAFT  
 DRAWN: E. CLARK  
 CHECK: H. SOLARTE  
 DATE: 10/10/2011  
 AUTH: XXX  
 LINE SEG: 7200

**BNSF**  
 RAILWAY  
 BRIDGE ENGINEERING  
 KANSAS CITY, KS  
 APPROVED: \_\_\_\_\_  
 ASST. DIRECTOR STRUCTURES DESIGN

**RICHMOND RAIL CONNECTOR**  
 BRIDGE NUMBER 1186.3  
 OVER FLOOD CONTROL CHANNEL EASEMENT  
 GENERAL PLAN  
 PLAN NO: \_\_\_\_\_ SHEET NO. 025

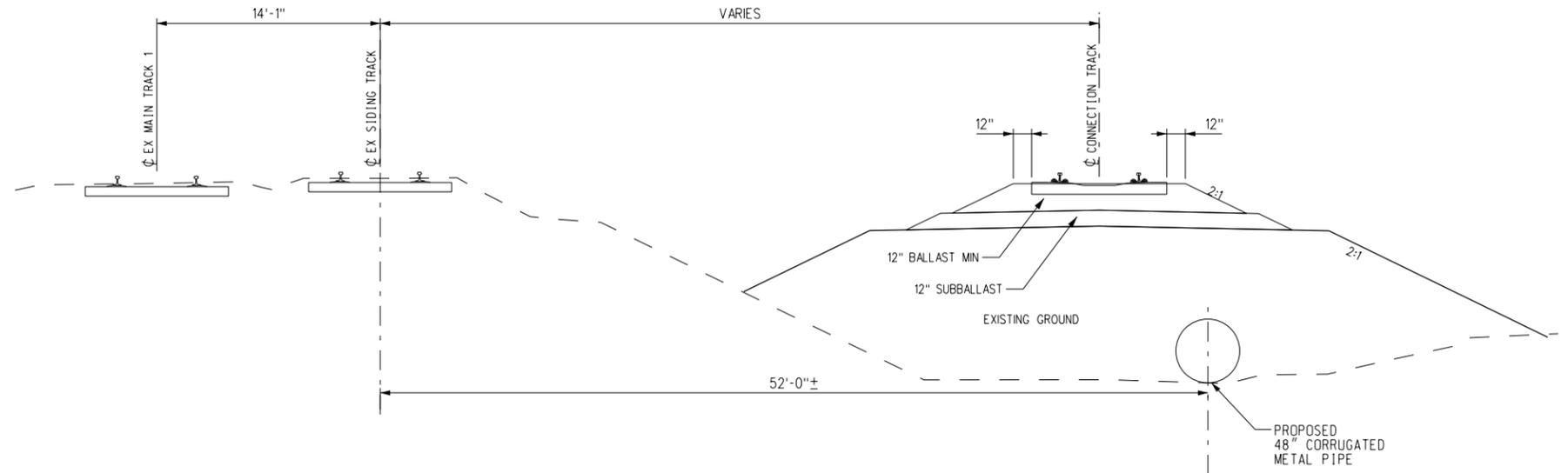
TO RICHMOND, CA  
RR WEST

TO EAST ROSEVILLE  
RR EAST



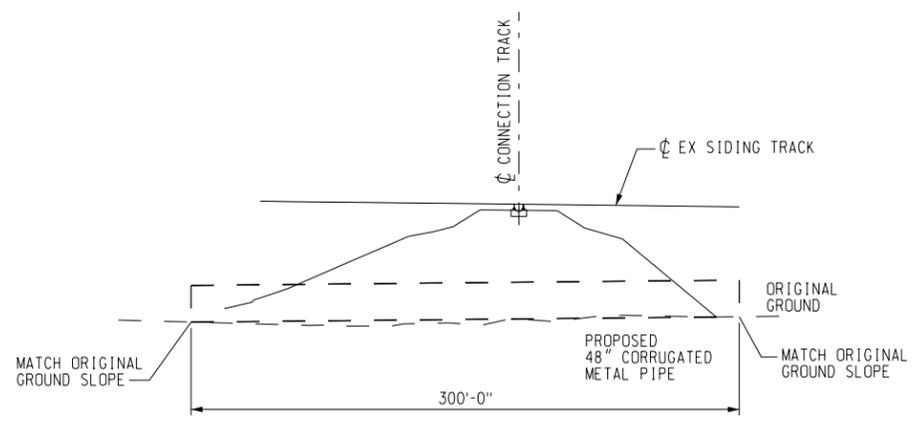
PLAN VIEW

SCALE: 1"=50'



TYPICAL SECTION

SCALE: NONE



ELEVATION

SCALE: HORZ. = 1"=50'  
VERT. = 1"=10'

J:\Projects\BNSF\48\_Rheem\Drawings\CULVERT.dgn  
10:31:24 AM  
10/18/2011

PROJECT NUMBER	LINE ITEM	CONTRACT DESIGNATOR	PHYSICAL ENTITY	WORK ELEMENT

REV	DATE	DESCRIPTION	BY	SUB	APP

**NOT FOR CONSTRUCTION**  
**60% SUBMITTAL**

Information confidential  
all plans, drawings, specifications and/or information furnished herewith shall remain the property of the Burlington Northern Santa Fe Railway and shall be held confidential and shall not be used for any purpose not provided for in agreements with the Burlington Northern Santa Fe Railway

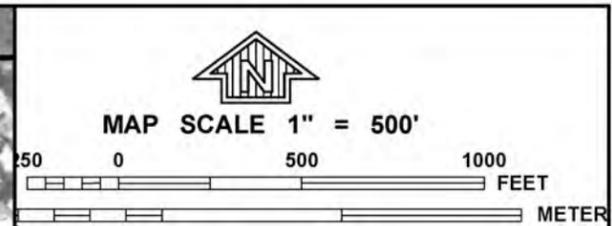
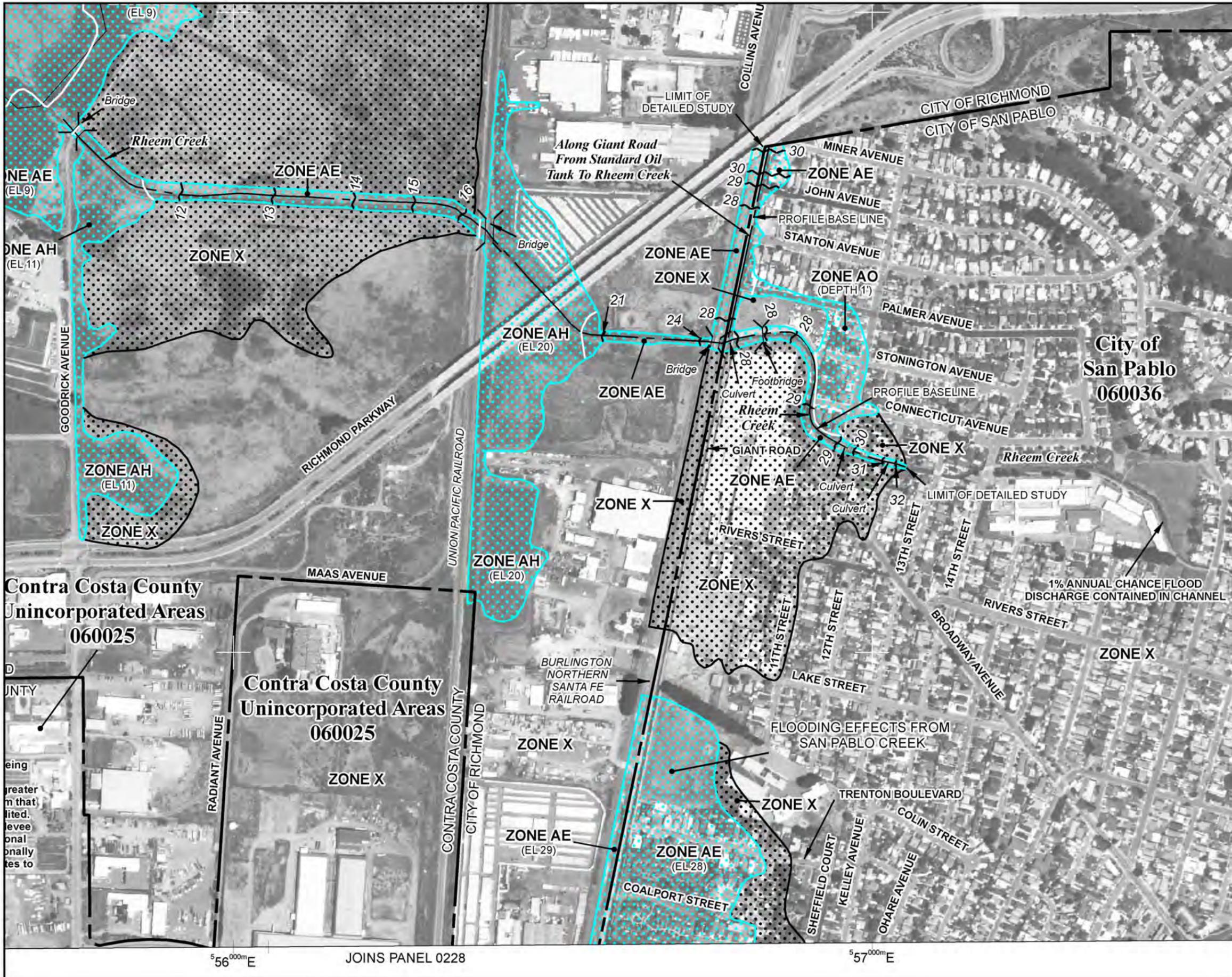
DESIGNED BY PM  
DRAWN BY PZ  
CHECKED BY TT  
APPROVED BY MG  
DATE SEPTEMBER 09, 2011



BNSF RAILWAY  
RICHMOND RAIL CONNECTION  
CORRUGATED PIPE CULVERT  
GENERAL ARRANGEMENT  
SHEET 1 OF 1

CONTRACT NO.  
DRAWING NO. S-02  
REVISION 0 SHEET NO. 026  
SCALE AS SHOWN

**APPENDIX 2**  
**FEMA FIRM Panels**



**NFIP** PANEL 0226F

**FIRM**  
 FLOOD INSURANCE RATE MAP  
 CONTRA COSTA COUNTY,  
 CALIFORNIA  
 AND INCORPORATED AREAS

PANEL 226 OF 602  
 (SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CONTRA COSTA COUNTY	060025	0226	F
RICHMOND, CITY OF	060035	0226	F
SAN PABLO, CITY OF	060036	0226	F

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

**MAP NUMBER**  
06013C0226F

**EFFECTIVE DATE**  
JUNE 16, 2009

Federal Emergency Management Agency

Contra Costa County  
 Unincorporated Areas  
 060025

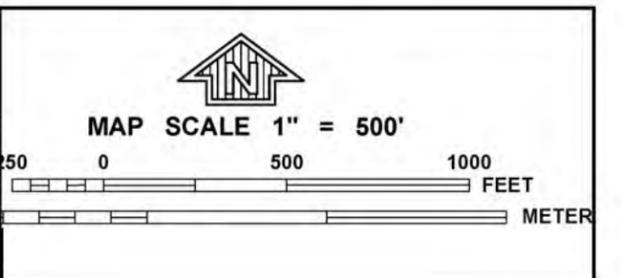
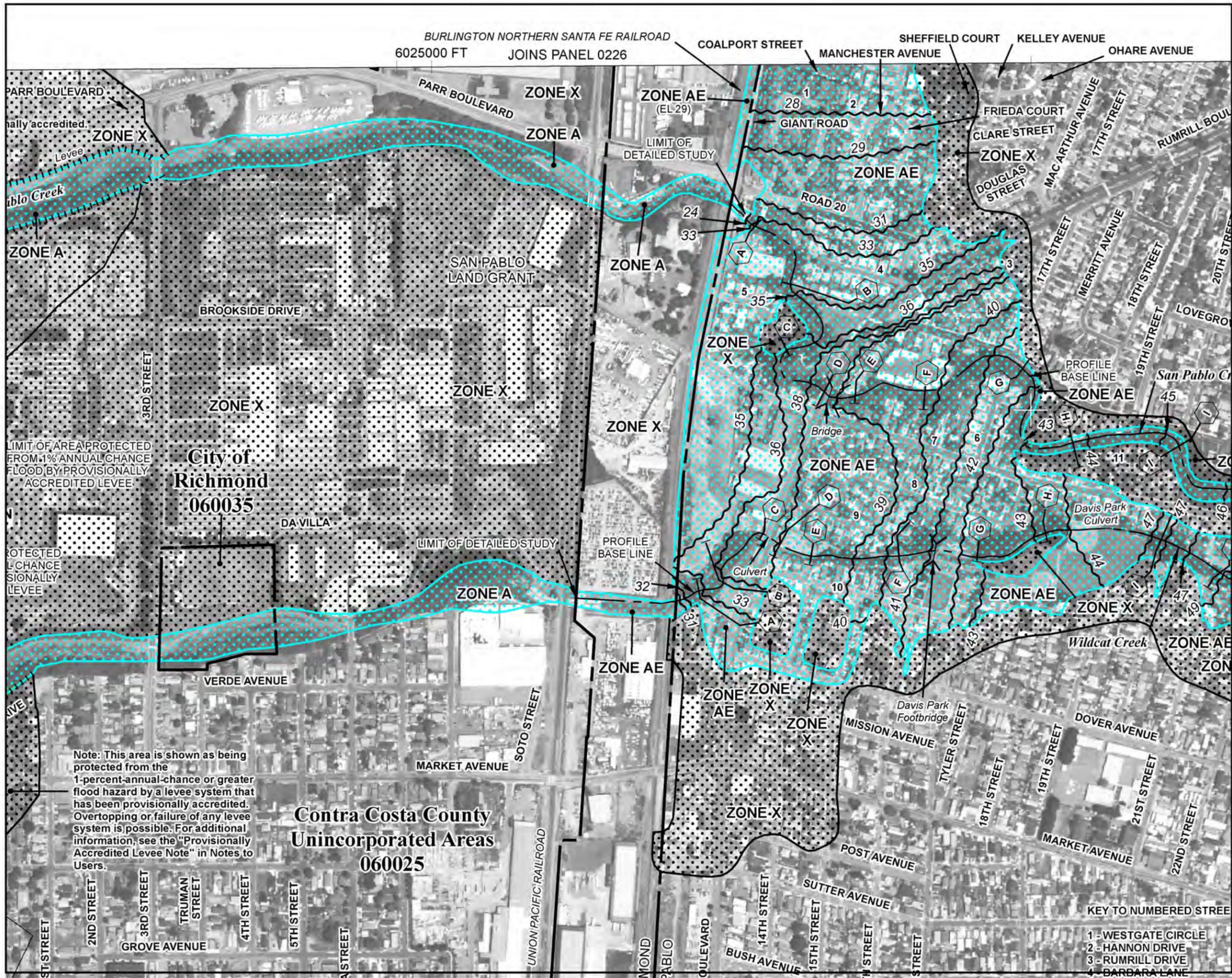
Contra Costa County  
 Unincorporated Areas  
 060025

City of  
 San Pablo  
 060036

56°00'00"E JOINS PANEL 0228

57°00'00"E

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at [www.msc.fema.gov](http://www.msc.fema.gov)



PANEL 0228F

**FIRM**  
FLOOD INSURANCE RATE MAP  
CONTRA COSTA COUNTY,  
CALIFORNIA  
AND INCORPORATED AREAS

PANEL 228 OF 602  
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CONTRA COSTA COUNTY	060025	0228	F
RICHMOND, CITY OF	060035	0228	F
SAN PABLO, CITY OF	060036	0228	F

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

**MAP NUMBER**  
06013C0228F

**EFFECTIVE DATE**  
JUNE 16, 2009

Federal Emergency Management Agency

Note: This area is shown as being protected from the 1-percent-annual-chance or greater flood hazard by a levee system that has been provisionally accredited. Overtopping or failure of any levee system is possible. For additional information, see the "Provisionally Accredited Levee Note" in Notes to Users.

**Contra Costa County**  
**Unincorporated Areas**  
**060025**

KEY TO NUMBERED STREET

- 1 - WESTGATE CIRCLE
- 2 - HANNON DRIVE
- 3 - RUMRILL DRIVE
- 4 - BARBARA LANE

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at [www.msc.fema.gov](http://www.msc.fema.gov)

**APPENDIX 3**

**California Department of Transportation's  
Title VI Policy Statement**

**DEPARTMENT OF TRANSPORTATION**

OFFICE OF THE DIRECTOR  
P.O. BOX 942873, MS-49  
SACRAMENTO, CA 94273-0001  
PHONE (916) 654-5266  
FAX (916) 654-6608  
TTY 711  
www.dot.ca.gov



*Flex your power!  
Be energy efficient!*

March 16, 2012

**NON-DISCRIMINATION  
POLICY STATEMENT**

The California Department of Transportation, under Title VI of the Civil Rights Act of 1964 and related statutes, ensures that no person in the State of California shall, on the grounds of race, color, national origin, sex, disability, religion, sexual orientation, or age, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity it administers.

For information or guidance on how to file a complaint based on the grounds of race, color, national origin, sex, disability, religion, sexual orientation, or age, please visit the following web page: [http://www.dot.ca.gov/hq/bep/title\\_vi/t6\\_violated.htm](http://www.dot.ca.gov/hq/bep/title_vi/t6_violated.htm).

Additionally, if you need this information in an alternate format, such as in Braille or in a language other than English, please contact Mario Solis, Manager, Title VI and Americans with Disabilities Act Program, California Department of Transportation, 1823 14<sup>th</sup> Street, MS-79, Sacramento, CA 95811. Phone: (916) 324-1353, TTY 711, fax (916) 324-1869, or via email: [mario\\_solis@dot.ca.gov](mailto:mario_solis@dot.ca.gov).

A handwritten signature in blue ink, appearing to read "Malcolm Dougherty".

MALCOLM DOUGHERTY  
Acting Director