Subject:	**Logistics Strategy (Final Draft)**
Project feature:	Site Development / Logistics
Prepared for:	California Department of Water Resources (DWR) / Delta Conveyance Office (DCO)
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1. Introduction

Logistics touches almost every element of the proposed Delta Conveyance Project (Project), including people, procurement, commercial, construction, and design. At the earliest stage, logistics can help to shape design and procurement, ensuring the best solutions are developed based on a consultative approach between all disciplines. By being part of the early-stage planning, the Logistics Strategy is well placed to help influence the definition and development of the required Project features.

A construction logistics strategy is more than simply identifying how materials are to be moved to and from the work sites. It is intended to identify how logistics management can be used to address key constraints and opportunities to ensure that the Project is delivered in a timely, cost effective way while minimizing impacts to the environment and residents of the Delta. Because construction of major infrastructure, such as required under the Project, is highly complex, the logistics strategy needs to show how the aims and aspirations at the planning stage of the project can be delivered during construction, leaving a lasting, positive, legacy.

Techniques of construction logistics management have developed rapidly over the last decade, leading to opportunities to both improve efficiency and reduce impacts. These developments include technological advances in the design of vehicles and equipment as well as advances in the way construction logistics can be managed, to allow for more centralized control of logistics flows, such as logistics hubs, which have the ability to optimize the supply chain by offering common products and services to numerous contractors. This approach will be developed as part of future submittals and as contracting strategies are developed. This TM will focus on the materials and manpower access opportunities needed for developing the environmental documents.

This section of the technical memorandum (TM) provides the Project background and the purpose and organization of the TM.

1.1 Background

There is clear evidence of the vulnerabilities in the Sacramento-San Joaquin Delta (Delta) posed by climate change and earthquake risk. As sea levels continue to rise, the Delta could be faced with increasing water levels and salinity, which would dramatically alter and harm water quality and supply locally and for 27 million Californians across the state. Immediate action is needed to upgrade Delta infrastructure, ensuring the State’s largest supply of clean water is climate resilient and able to respond to these risks.

The California Department of Water Resources (DWR) is performing an environmental review and planning process for a single-tunnel solution to modernize Delta conveyance. Modernizing Delta conveyance, paired with complementary projects that improve water recycling, recharge depleted groundwater reserves, strengthen existing levee protections, and improve Delta water quality is critical to building a resilient water supply for California's communities and economy.

The Project would use intake structures at up to three sites located on the Sacramento River, each capable of conveying 1,500-3,000 cubic feet per second (cfs). Several project design capacities were considered for the total Project diversion flows of 3,000, 4,500, 6,000, and 7,500 cfs. A large-diameter tunnel would convey flows from the intake structures to the South Delta Pumping Plant and the Southern Forebay approximately 40 miles downstream, prior to delivering the flows into the California Aqueduct. Construction of this single-tunnel conveyance project would require the movement of labor, equipment, and material resources within the Delta, potentially using a combination of land-based and waterborne transportation systems.

1.2 Purpose

The purpose of this document is to summarize general access studies related to the overall Project area, to identify the logistics-related issues that could prevent or complicate serving each specific planned work site, and to resolve these challenges at a strategic level. It therefore provides a framework for the development of more detailed logistics strategies for each site as design development evolves.

This logistics strategy is primarily intended to accommodate the forecasted movement of bulk materials, such as spoils, borrow material, concrete (either raw materials or ready-mix), tunnel lining segments, etc., equipment, and workers during construction. Additionally, one of the goals of this strategy is to determine the best possible transport solution for these items, considering many factors, and looking at barge, rail, and road systems.

1.3 Organization

This TM includes the following sections:

- Introduction
- General Access, Project Alignment and Road Access
- Material Requirements
- Construction Support Facilities
- Common Project Feature Preliminary Logistic Strategy
- Central Alignment Project Features Preliminary Logistics Strategy
- Eastern Alignment Project Feature Preliminary Logistics Strategy
- References
- Document History and Quality Assurance
- Appendices

2. General Access, Project Alignment and Road Access

The Delta Conveyance Design and Construction Authority (DCA) engineering team has conducted numerous studies and evaluations associated with identifying general means of access by road, rail, and barge to the Central and Eastern corridors included in the DWR *Notice of Preparation* (DWR, 2020). Drawing on these general access studies, the team has additionally conducted siting studies to define potential work sites and a conveyance alignment for each of these corridors. The results of these investigations are summarized below.

2.1 General Access

The general means of access to the various tracts and islands along both corridors under study were investigated by the DCA and include road, rail, and barge (DCA, 2021a; 2021b; 2021c). The results of these general access studies are shown on the figures presented in Appendix A. These general access assessments were subsequently used to inform the more detailed work site location studies.

2.2 Project Alignment

To establish a proposed conveyance system alignment for each corridor, the DCA engineering team performed a thorough shaft siting analysis (refer to *Shaft Siting Study TM* [DCA 2021d]). The analysis initially focused on locations for the launch shafts followed by a similar analysis to site the reception and maintenance shafts. The process utilized in this analysis included:

- Methodology was broken out into criteria and sub-criteria
- Sub-criteria were assigned an Importance Factor to reflect their weighting
- Criteria were based generally on design and construction considerations, including existing land uses
- Smaller overall footprint for maintenance/reception shafts, as compared to launch shafts, provided more flexibility in siting

The criteria/sub-criteria considered in the analysis included the following:

- Construction Considerations:
  - Access Suitability
  - Quality of Adjacent Road(s)
  - Access Constraints
  - Concrete Source
  - Condition of Existing Levees
- Geotechnical/Geological:
  - Geologic Unit
  - Peat Thickness
- Property and Land Use:
  - Conservation Land, Refuges, Preserves, and Vernal Pool Critical Habitat
  - Number of Land Owners
  - Public or Private Land Ownership
  - Future Development
  - Farmland Designation
- Existing Infrastructure:
  - Existing Houses, Schools, Hospitals
  - Existing Linear Infrastructure
  - Existing Water Supply Wells
  - Existing Structures
  - Gas Wells or Gas/Oil Production Fields

The results of this analysis are the proposed alignments presented in Figure 1.

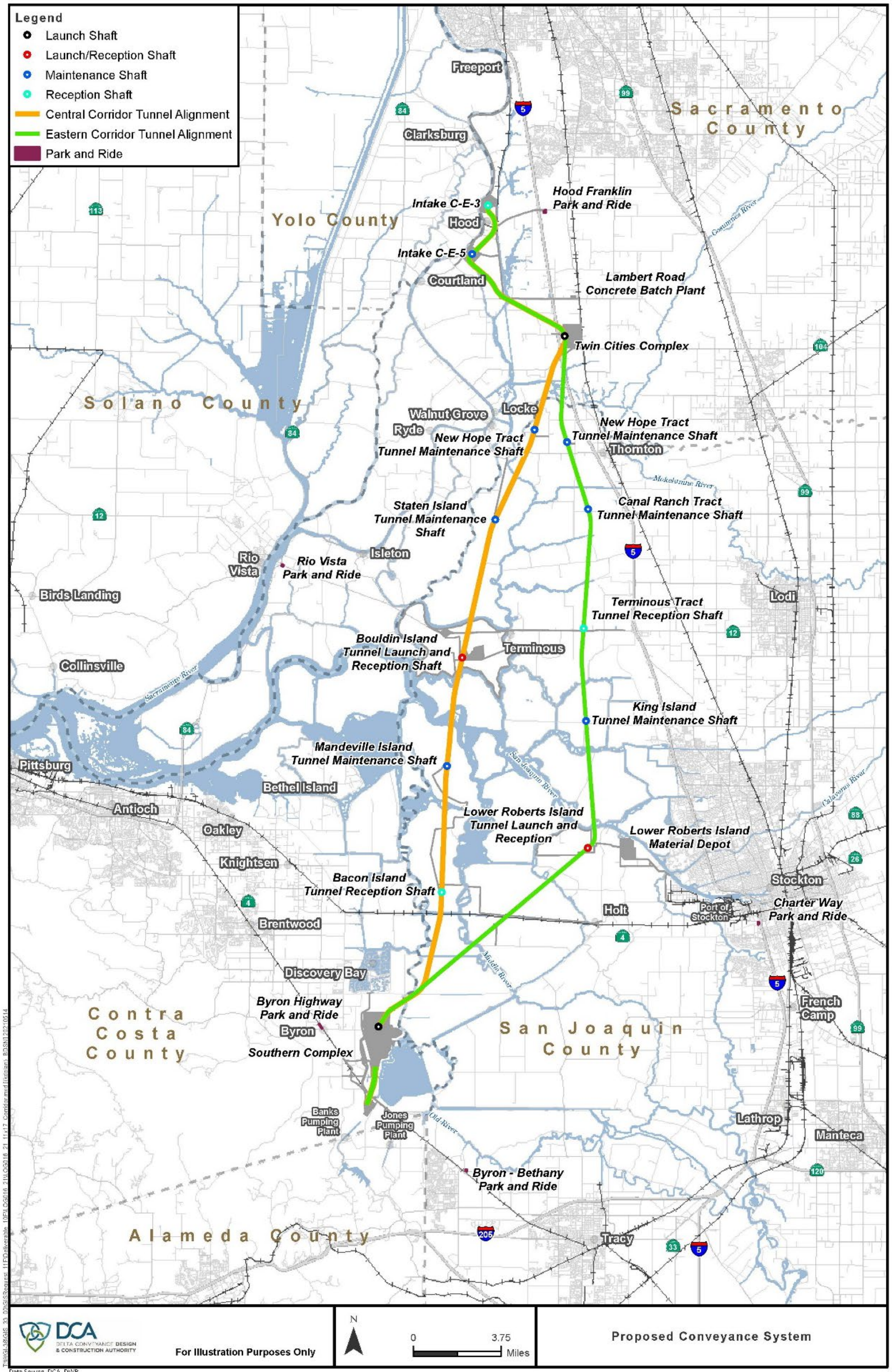


Figure 1. Proposed Conveyance System

2.3 Road Access Considerations

Access by road would be required to all work sites. The following general guiding principles were followed in determining the best access to the various work sites:

- No construction traffic would be allowed in Yolo County except for Interstate 80, or for individuals or trucks traveling from homes or businesses in Yolo County
- No construction traffic would be allowed within Solano County except for Interstate 80 and State Route 12 in Solano County (between Interstate 80 and Sacramento River) or for individuals or trucks traveling from homes or businesses in Solano County.
- Maximize use of existing public roads and farm roads for haul roads to minimize changes to agricultural land.
- Prevent construction traffic on levee roads, including SR 160, except when the highway is re-aligned during intake construction.
- No construction traffic would be allowed on State Route 160 between State Route 12 and Cosumnes River Boulevard except for re-alignment of this highway at the intake locations or for individuals or trucks traveling from homes or businesses along the affected routes
- No construction trucks with three or more axles would be allowed on SR 4 across Victoria Island between the Old River and Middle River bridges.
- All truck routes on public roads would be at least two-lane roads with paved shoulders to park trucks in case of breakdowns, unless the widened road would be located within sensitive habitat areas.
- Store construction vehicles on-site to minimize truck traffic.
- Pave access roads and intake haul road to minimize dust generation and noise.

As described in *Potential Road Access Routes TM* (DCA 2021a), design criteria for proposed new access roads would generally follow the applicable County design requirements. Conceptual drawings of the proposed roads are also presented in *Engineering Project Report | Central & Eastern Options, Volume 2 of 3 – Engineering Concept Drawings* (DCA 2021e).

To facilitate selection of suitable road access, a Traffic Impact Analysis (TIA) was initially completed for the Central and Eastern Corridors. The outcome of this analysis is report in the *Traffic Impact Analysis TM* (DCA 2021f).

3. Material Requirements

Construction of the Project would require movement of large volumes of various materials. The higher volume materials would include:

- Tunnel lining segments
- Spoil material (unsuitable or excess excavated material)
- Borrow material (needed to raise land, construct levees and forebays, etc.)
- Raw materials associated with concrete/grout (coarse aggregates, fine aggregates, and cement) and/or ready-mix concrete depending on the location of the batch plants
- Potentially reusable tunnel material (RTM) if moved from or between worksites

The sources of raw materials would be selected by the contractors that ultimately build the project features. The various materials could be sourced from the region around the Delta or come from much further away as maritime cargo shipments to one of the regional ports or by rail or road. Specialty and manufactured materials could be sourced from further afield and moved to the Delta by one or more of the potential transportation networks, including barge, rail and road.

Based on the conceptual designs for the planned project features, estimates of the quantities of these bulk materials have been developed, as well as to reflect facility sizing for the multiple design capacity options under consideration. In addition, information on soil and reusable tunnel material (RTM) are presented in the *Soil Balance TM* (DCA 2021g) *and Reusable Tunnel Material TM* (DCA 2021h), respectively.

4. Construction Support Facilities

To support construction of the Delta Conveyance Project, several ancillary construction support facilities would be developed along the alignment. The primary purpose of these construction support facilities would be to reduce traffic going into the Delta on roadways that are not well suited to handle the additional traffic volume. The planned construction support facilities include (refer to Figure 1 for location of each facility):

- Material depots
- Park & ride facilities

These facilities are further described below.

Additionally, the project considered several options for precast concrete plants to manufacture the pre-cast concrete segments of the interior liner of the tunnel system. Refer to the *Preliminary Precast Yard Study TM* (DCA 2021i) for details associated with these construction support facilities.

4.1 Material Depots

Material Depots would allow materials and equipment to be transported to the construction work sites in bulk quantities and then distributed to the work sites by other means to reduce traffic within the Delta. They could also be used to consolidate smaller loads from several trucks to one larger clean fuel truck to transport items to construction sites and minimize truck trips beyond the influence of major State Routes (SRs) and freeways.

Material Depots could contain various construction support facilities including:

- Concrete batch plants
- Rail siding and loading and unloading facilities (if appropriate)
- Barge loading and unloading facilities (if appropriate)
- Other consolidation center facilities to combine small loads into larger ones for movement into the work sites

The Material Depots would be located on relatively flat sites near major highways, rail lines and/or waterways for rail/barge access. Four Material Depots have been identified as potential locations to support construction of the Project:

- Lambert Road Concrete Batch Plant
- Twin Cities Complex Material Depot

- Lower Roberts Island Material Depot
- Southern Complex Material Depot

Each of these is further described below in Section 5 with their associated Project feature.

4.2 Park & Ride Facilities

In addition to parking facilities included within work sites, several separate potential Park & Ride facilities have been identified to consolidate worker vehicles and allow for conveying workers to some of the construction work sites on clean fuel buses or vans or in carpools. These facilities could include:

- Designated parking areas
- Shuttle vehicle loading/unloading zones and parking area
- Electric vehicle recharge stations (recharged by on-site solar panels, when possible)

Five separate Park & Ride facilities have been identified to support construction of the Project:

- Hood Franklin Park & Ride
- Rio Vista Park & Ride (for Central only)
- Charter Way Park & Ride
- Byron Park & Ride
- Byron-Bethany Park & Ride

The basis for these, along with the selection of locations for these Park & Ride facilities, is further discussed under Section 5 as related to their associated Project feature work sites.

5. Preliminary Logistics Strategy

The following subsections describe the preliminary logistics strategy associated with serving each of the planned work locations. They are grouped into three categories:

- Common Project features
- Central alignment Project features
- Eastern alignment Project features

5.1 Common Project Features

There are several Project features that are common to both optional conveyance alignments. These include:

- Northern Facilities:
  - North Delta Intakes
  - Twin Cities Complex (launch shafts, and associated tunnel reaches and Twin Cities Complex Material Depot)
- Southern Complex:
  - Southern Forebay North A and North B Launch Shafts (and associated tunnel reaches)
  - South Delta Pumping Plant
  - Southern Forebay
  - Southern Forebay South Launch Shafts (and associated tunnel reaches)

– South Delta Conveyance Facilities (Southern Forebay Outlet, South Delta Outlet and Control and CA Aqueduct Control)

– Southern Complex Material Depot

Following is the proposed preliminary logistics strategy for each of these Project features.

5.1.1 Northern Facilities

The Northern Facilities includes:

- North Delta Intakes
- Twin Cities Complex

Multiple approaches to provide access and logistic support to these Project features was evaluated. These include (refer to Figure 2):

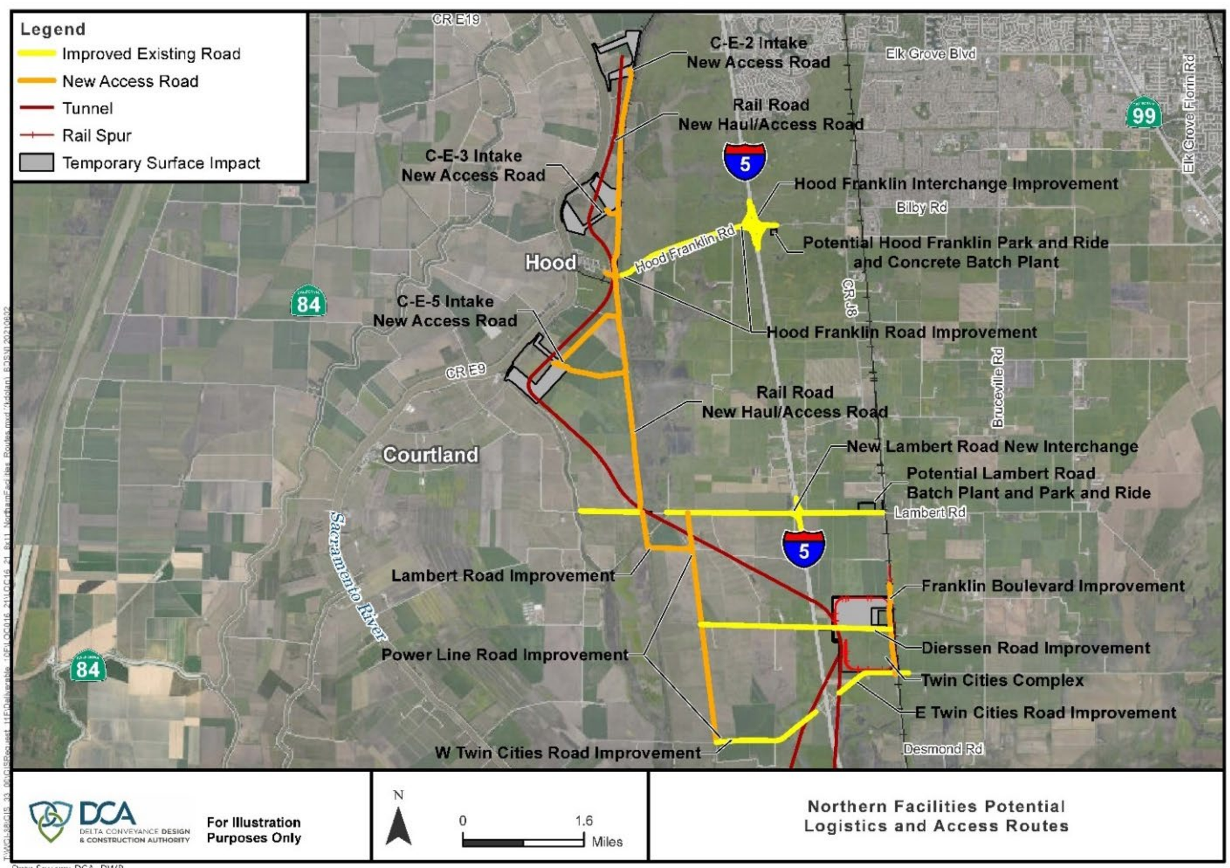


Figure 2. Northern Facilities Potential Logistics and Access Approaches

- Improving Interstate 5 (I-5) and Hood Franklin Road interchange and Hood Franklin Road into Hood
- Constructing new interchange at I-5 and Lambert Road
- Improving Lambert Road
- Constructing a new interchange and improving Dierssen Road
- Improving Twin Cities Road

- Improving/realigning Franklin Road between Twin Cities Road and north of Dierssen Road
- Constructing new dedicated haul/access road parallel to and west of old railroad track from Lambert Road north to Intake C-E-2
- Constructing new dedicated haul/access road parallel to and west of powerline corridor from Twin Cities Road to Lambert Road
- Constructing Park & Ride facility at either Hood Franklin Road and I-5, the Lambert Road and Franklin Boulevard intersection or within the Twin Cities Complex
- Constructing a concrete batch plant at either Hood Franklin Road and I-5, lambert Road and Franklin Boulevard intersection or within the Twin Cities Complex

Following is a discussed related to the approach selected to serve each of these Northern Facilities features.

5.1.1.1 North Delta Intakes

As noted in Section 1.1, the Central Corridor would include North Delta intake structures at potentially multiple sites located on the Sacramento River, each with a capacity of 1,500-3,000 cfs, to divert water into the conveyance system. The Project would convey a range of flow rates between 3,000 cfs to 7,500 cfs. Three potential intake locations were identified along SR 160 and the Sacramento River East Levee south of Freeport and north of Courtland. These locations, as shown generally in Figure 1 have been identified as C-E-2, C-E-3 and C-E-5.

Depending on the selected project design capacity, one, two, or all three of the intakes could be included in the Project. The range of Project design capacities of 3,000 to 7,500 cfs could be achieved through a combination of intakes sized at 1,500 and 3,000 cfs. The following array of intakes sites for each project design capacity was selected:

- Project design capacity of 3,000 cfs – Intake C-E-5 only with a capacity of 3,000 cfs
- Project design capacity of 4,500 cfs – Intake C-E-3 with a capacity of 3,000 cfs and Intake C-E-5 with a capacity of 1,500 cfs
- Project design capacity of 6,000 cfs – Intakes C-E-3 and C-E-5 with a capacity of 3,000 cfs at each site
- Project design capacity of 7,500 cfs – Intakes C-E-3 and C-E-5 with capacity of 3,000 cfs at each site along with Intake C-E-2 with a capacity of 1,500 cfs

There would be multiple North Tunnel options to connect these intakes to the Main Tunnel, which begins at the Twin Cities Complex site for the Central and Eastern corridors.

Multiple modes of transporting bulk materials to and from the intake sites were considered. Rail access to these locations using the old historic Union Pacific Railroad (UP) line running south from Sacramento along the west side of Stone Lake National Wildlife Reserve (NWR) was considered but dismissed early as being infeasible due to potential effects on nearby wildlife habitat and portions of this abandoned railroad within Sacramento city limits have been removed for a bike trail.

Barge access along the Sacramento River was evaluated related to intake construction. However, except for minor activities at the beginning and end of the construction period for each intake, this mode of access was eventually eliminated for the following reasons:

- Frequent raising of several of the bridges crossing the Sacramento River was deemed unacceptable due to the age of these bridges and disruption to surface traffic that would result.
- There could be significant restrictions on barge traffic timing in this area of the Sacramento River, which could result in disruptions to the delivery of materials and increase the construction footprint at the intakes sites to provide for additional short-term material storage on-site.
- All materials delivered or removed from the sites would need to need to be moved across SR 160, which could result in significant traffic delays and increased risk of vehicular accidents.

It should be noted that limited barging would be utilized to perform the geotechnical field investigation related to test pile activity and to install the final riprap bank protection towards the end of construction.

Therefore, all construction materials would be trucked to the intake work sites, with the exception of riprap and limited geotechnical exploration materials that would be brought to the sites by barge as noted above. To minimize traffic on the local Delta roadways and specifically on SR 160, and to minimize the land requirements and footprint of materials storage areas at the individual intake sites, dedicated construction support facilities would be incorporated into the Project as discussed in Section 4. As it was determined that ready-mix concrete truck could not be delivered from commercial batch plants and poured within an acceptable time after loading the ready-mix truck, a dedicated batch plant was recommended. Given the potential quantities of concrete to be placed for the Northern Facilities, two plants were recommended. The criteria used to site the concrete batch plants included:

- Ready access off I-5 for transport of the raw materials to avoid excessive travel on the local roads within the Delta.
- Availability of a sufficient water supply.
- Comply with DWR guidelines that require a maximum of 90 minutes from the time a concrete ready-mix truck is filled to the time the concrete is poured.

Several locations in the northern area of the Project met these requirements and were evaluated:

- Hood Franklin Road just east of the I-5 interchange.
- Intersection of Lambert Road and Franklin Boulevard.
- Within the Twin Cities Complex.

The Lambert Road location was selected for the following reasons (refer to Figure B1):

- All options have similar water supply issues.
- Based on the Traffic Impact Analysis (TIA) performed (refer to *Traffic Impact Analysis TM* [DCA 2021f]), the level of service (LOS) of Hood Franklin Road would remain at acceptable levels even with ready-mix concrete truck traffic. However, avoidance of further traffic through the Stone Lakes NWR was a high priority. As a result, use of Hood-Franklin Road as a major construction route was eliminated to avoid ready-mix concrete truck traffic along Hood Franklin Road.
- Lambert Road has a lighter traffic load as there is no existing interchange with I-5. Therefore, this would be a preferred east-west route to the intakes. Siting the concrete batch plants at the Lambert Road and Franklin Boulevard intersection provides ready access for raw material delivery via either a Hood Franklin Road-Franklin Boulevard route or a Twin Cities Road-Franklin Boulevard route.

- With the Hood Franklin Road location eliminated as a major construction route, results in the shortest haul distance to the intakes.
- The Twin Cities Complex offers good access for raw material delivery via a Twin Cities Road-Franklin Boulevard route. However, a more extensive network of new dedicated haul/access roads would be required using either Twin Cities Road or Dierssen Road from the complex (refer to Figure 2). Additionally, there most likely will not be sufficient space at the Twin Cities Complex for the dual concrete batch plant. Therefore, the Twin Cities Complex location was deemed less desirable than a Lambert Road location for the concrete batch plant.

In addition to off-site concrete batch plants, an off-site park & ride facility was recommended for construction employees at the intake sites. An electric shuttle van would transport employees to the intake sites which would also reduce the need for parking areas at the intakes. The criteria used to select an acceptable location included:

- Easy on and off access to I-5.
- Direct access to an east-west route to the intake sites, supplemented with new dedicated north-south haul/access roads.

Three locations met these requirements and were evaluated:

- Hood Franklin Road just east of the I-5 interchange
- Intersection of Lambert Road and Franklin Boulevard
- At the Twin Cities Complex

Of these options, the Hood Franklin Road location was selected for the Park & Ride facility for the following reasons (refer to Figure B2):

- Results in the shortest shuttle distance from the Park & Ride facility to the intake work sites and least impacts associated with road improvements.
- Separates the traffic of the intake construction workers for the intakes from the workers and deliveries of materials and equipment at Twin Cities Complex, and thus further diluting the impact on traffic.
- Based on the TIA performed, a LOS C or better would be maintained on Hood Franklin Road even with the additional shuttle traffic. This would result in a minimal increase in traffic through the Stone Lakes NWR.
- For a Park & Ride facility at the intersection of Lambert Road and Franklin Boulevard, a new interchange would be required at the intersection of I-5 and Lambert Road, which would result in additional construction impacts and be challenging to permit given the existing nearby interchanges at Hood Franklin Road and Twin Cities Road. Therefore, this location was deemed less desirable than the Hood Franklin Road location.
- The Twin Cities Complex offers good access on and off I-5 via a Twin Cities Road-Franklin Boulevard. However, a more extensive network of new dedicated haul/access roads would be required using either Twin Cities Road or Dierssen Road from the complex to the intake sites (refer to Figure 2). This would result in greater construction disruption and travel time to serve the intake works sites. Additionally, while there is sufficient space at the Twin Cities Complex for parking to build the facilities at the complex, there is not enough space for the park & ride facility to serve the intake construction worker parking. Therefore, the Twin Cities Complex location was deemed less desirable than the Hood Franklin Road location.

With the location of the potential intakes established, along with the associated construction support facilities for these Project features, the following road access options were considered to get to the intake work sites:

- Option 1 – exit I-5 at Hood Franklin Road:
  - Hood Franklin Road west to new dedicated Rail Road haul/access road located at the western toe of the abandoned railroad embankment (not on the embankment)
  - North on new dedicated haul/access road to Intakes C-E-3 and C-E-2
  - South on new dedicated haul/access road to Intakes C-E-5
- Option 2 – exit I-5 at new Lambert Road interchange:
  - Construct new interchange at I-5 and Lambert Road
  - West on Lambert Road to new dedicated Rail Road haul/access road located at the western toe of the abandoned railroad embankment (not on the embankment)
  - North on new dedicated haul/access road to all intake sites
- Option 3 – exit I-5 at Twin Cities Road:
  - Twin Cities Road east to Franklin Road
  - North on Franklin Boulevard to Lambert Road
  - West on Lambert Road to new dedicated Rail Road haul/access road located at the western toe of the abandoned railroad embankment (not on the embankment)
  - North on new dedicated haul/access road to all intake sites
- Option 4 – exit I-5 at Twin Cities Road:
  - Twin Cities Road west to new dedicated Power Line Corridor Road haul/access road (located along an existing power line corridor that crosses agricultural land)
  - North on new dedicated Power Line Corridor Road haul/access road to Lambert Road
  - West on Lambert Road to new dedicated Rail Road haul/access road located at the western toe of the abandoned railroad embankment (not on the embankment)
  - North on new dedicated haul/access road to all intake sites

Based on an evaluation of these options, the Option 3 access strategy was selected for all intake options with a few minor adjustments to the strategy noted below. This access option made best use of the planned construction support facilities while minimizing construction of new dedicated haul/access roads. Following are the proposed road improvements associated with the selected strategy, depending on which intake(s) are selected for inclusion in the Project (refer to Figure 3). Further details on the proposed road improvements are presented in the engineering concept drawings.

Intake C-E-5 Only

If only Intake C-E-5 is included in the Project, the general Option 3 road improvements to facilitate access to this site from the construction support facilities discussed above include the following:

- Widening (24-foot-wide pavement plus 4-foot-wide shoulders on both sides) approximately 3.2 miles of Lambert Road from Franklin Boulevard to the beginning of the new intake haul/access road just west of the Stone Lakes NWR. Initial plans included widening bridge on Lambert Road over Snodgrass Slough but it was determined that the existing bridge would be adequate since:

- Existing bridge is approximately 28 feet wide
- Widening would require work in wetlands, which we wanted to avoid
- Bridge includes a flood control structure that helps with the routing of flood flows in the area
- Widening beyond the existing width would primarily be done to facilitate vehicles on the shoulder and ability to simultaneously route traffic through in both directions, which is not necessary for this small distance

- Construction of approximately 3.1 miles of the new intake haul/access road (24-foot-wide pavement plus 4-foot-wide shoulders on both sides) northward along the west side of the reserve and old UP right-of-way (for the abandoned railroad embankment) and Snodgrass Slough to the selected intake site and on to Hood Franklin Road.
- Construction of approximately 1.0-mile access road (24-foot-wide pavement plus 4-foot-wide shoulders on both sides) into Intake C-E-5 from new intake haul/access road.
- Improved intersection at Hood Franklin Road and new intake haul/access road to facilitate this crossing.
- Widening the Hood Franklin Road Bridge over Snodgrass Slough.
- Asphalt overlay of approximately 2.25 miles of Hood Franklin Road between the new Hood Franklin Park & Ride facility and the new intake haul/access road.

Note that planned improvements to the Twin Cities Road and Franklin Boulevard components of this option are described below under the Twin Cities Complex subsection.

Intakes C-E-3 and C-E-5

If Intakes C-E-3 and C-E-5 are included in the Project, access would be the same as described above for Intake C-E-5 with the exception that the new intake haul/access road would be extended another approximately 0.7 miles north past Hood Franklin Road to a new 0.25 access road connecting to the Intake C-E-3 site.

Intakes C-E-2, C-E-3 and C-E-5

If all three intakes are included in the Project, access would be the same as described above for Intake C-E-3 and C-E-5, except that the intake haul/access road would be further extend north another approximately 2.2 miles to Intake C-E-2.

5.1.1.2 Twin Cities Complex

The Twin Cities Complex would be one of the Project’s main work sites, as it would be used for two main tunnel drives and the Twin Cities Complex Material Depot. It would be located to the south of Dierssen Road and east of I-5 (refer to Figure D2) and would be used as a launch shaft site for the tunnel reach heading north to connect the new intakes. A second adjacent shaft would be used as a launch shaft for either the Central Corridor tunnel to the Bouldin Island Launch/Reception Shaft or the Eastern Corridor tunnel to the Terminous Tract Reception Shaft.

To support construction activities at this large construction site, the Twin Cities Complex Material Depot would be developed and utilized (refer to Figure B4). The depot would contain the following:

- Rail siding and loading and unloading facilities:
  - Tunnel liner segment unloading system
  - Covered conveyor system to load RTM on rail cars
- Tunnel liner segment storage areas
- Covered conveyor system to transport bulk materials around site and RTM from the Twin Cities Launch Shafts
- RTM processing areas:
  - Material testing areas
  - Wet material storage
  - Material drying area
  - Excess RTM storage area
- Other ancillary facilities

Materials would be transferred between the depot and shaft work site with conveyors or vehicles. Given the proximity of this complex to I-5, the depot would include parking for workers associated with the construction contracts serviced from the Twin Cities Complex.

The Twin Cities Complex site would have two modes of access:

- Road access via I-5 and a series of improved roads using Dierssen Road, Lambert Road, Franklin Boulevard and Twin Cities Road.
- Rail access by constructing a new rail siding off the UP rail line running between Sacramento and Stockton along the east side of I-5.

The mode of transportation used for the bulk materials would be as follows:

- Tunnel liner segments – would be moved by rail (primary)/road (back-up), transferred with vehicles on-site.
- RTM – would be moved on-site conveyor to RTM storage location at Twin Cities Complex Material Depot, with excess moved by conveyor to rail depot loading facility and hauled from site via rail to the Southern Complex for construction of the Southern Forebay embankment.

As noted above, construction materials would either be trucked to this work site via I-5 coupled with a series of improved roads or hauled via UP to a constructed rail siding at the Twin Cities Complex Material Depot. Road improvements to facilitate site access include the following (refer to Figure B4):

- Widening (24-foot-wide pavement plus 4-foot-wide shoulders on both sides) approximately 1.4 miles of Twin Cities Road from Franklin Boulevard east of I-5 to I-5.
- Widening Dierssen Road (24-foot-wide pavement plus 4-foot-wide shoulders on both sides) approximately 1.0 miles from Franklin Boulevard to I-5.
- Relocation and widening (24-foot-wide pavement plus 4-foot-wide shoulders on both sides) approximately 0.6 miles of Franklin Boulevard between Twin Cities and just north of Dierssen Roads.

Further details on the proposed road improvements are presented in the engineering concept drawings.

5.1.2 Southern Complex

The Southern Complex is a large work area that includes the following Project features:

- Byron Tract Working Shaft and Southern Forebay Inlet Structure Launch Shaft
- South Delta Pumping Plant
- Southern Forebay
- South Delta Conveyance Facilities
- Southern Complex Material Depot
- Park & Ride Facilities (Byron and Byron-Bethany)

The potential exists for four major contractors to be working at the site at one time.

Multiple modes of transporting bulk materials to and from the overall Southern Complex were considered. The primary drivers affecting transport modes decisions were:

- From the TIA conducted, the existing Byron Highway and SR 4 already have very heavy traffic resulting in poor levels of service. These are the two main local road access points to this work area and the increased construction traffic will only make the existing situation worse. In fact, the Byron Highway is already operating at mainly LOS D during positions of the day. Project traffic would result in LOS F, which is an unacceptable situation for materials transport to the Project. To reduce the traffic impact, the TIA tested several improvement options to primarily Byron Highway along with the use of several potential park & ride facilities to reduce peak early morning and late afternoon traffic.
- There is a need to transport large quantities of RTM under both the Central and Eastern alignment options from the Twin Cities Complex to the Southern Complex for construction of the Southern Forebay.
- There is the need to transport large quantities of tunnel liner segments to build the southernmost reach of the Main Tunnel and the dual Southern Tunnel reach.
- There is the need to transport large quantities of materials, especially concrete, for construction of all the various features at the site.

Rail access using the inactive UP line along Byron Highway was deemed feasible following some improvements to the existing rail line and construction of a dedicated siding to the new complex. Barge access to the northern end of the complex along the San Joaquin River and then Old River is possible; however, this mode of access was eventually eliminated for the following reasons:

- It would be an extremely slow trek down the Old River, including coordinated openings of the BNSF bridge.
- Rail access was more feasible and providing both modes of access to the complex is not necessary.

Therefore, the Southern Complex would be provided two modes of access (refer to Figure B5):

- Rail access by constructing a new rail siding off the UP rail line running along Byron Highway. Details on the proposed rail siding, which are part of the Southern Complex Material Depot, are described below under the depot description. Use of rail delivery for major materials deliveries would reduce the dependence on the Byron Highway and which could increase traffic to reach LOS F.
- Road access from Byron Highway for smaller loads and vehicles, especially during off-peak hours.

Based on the results of the TIA, the following road improvements to facilitate access to the Southern Complex were developed:

- Extend Discovery Bay Boulevard (24-foot-wide pavement plus 4-foot-wide shoulders on both sides) south approximately 0.8 miles from SR 4 to internal site roads. The dedicated secondary access road would be used for primarily for small vehicle and emergency response.
- Relocate approximately 2.0 miles of Byron Highway from just west of Western Farm Ranch Road to just east of North Bruns Way, including constructing a traffic circle with an extended Armstrong Road. The relocated Byron Highway would be a 24-foot-wide pavement plus 8-foot-wide shoulders on both sides. This improvement takes into consideration the potential future Contra Costa County Transit Authority improvements in this area.
- Allow one-way access from the east to the Southern Complex site along the old Byron Highway alignment.
- Construct/reconstruct (24-foot-wide pavement plus 8-foot-wide shoulders on both sides) approximately 0.6 miles of Clifton Court Road between the new Byron Highway traffic circle and the new Byron Highway Truck Bypass.
- Reconstruct approximately 0.8 miles of Western Farms Ranch Road (24-foot-wide pavement plus 8-foot-wide shoulders on both sides) from Byron Highway eastward to internal site roads.
- Reconstruct and widen approximately 0.7 miles of North Bruns Way (24-foot-wide pavement plus 4-foot-wide shoulders on both sides) and constructing a new 0.6 mile Byron Highway Truck Bypass with overcrossing (24 foot wide pavement plus 4 foot wide shoulders on both sides) at Byron Highway to provide improved access to the South Delta Conveyance Facilities from the main Southern Complex. Materials would be trucked for the South Delta Control Structure work sites utilizing the new overcrossing.

Further details on the proposed road improvements are presented in the conceptual engineering drawings.

Following is a further discussion of each of the Project features within the Southern Complex.

5.1.2.1 Byron Tract Working Shaft and Southern Forebay Inlet Structure Launch Shafts

The Byron Tract Working Shaft and Southern Forebay Inlet Structure Launch Shafts would be located at the far north end of the Southern Complex adjacent to the South Delta Pumping Plant. There would be two shafts to either drive northward to Bacon Island on the Central alignment or to Lower Roberts Island on the Eastern alignment. The reason there are two shafts is that initially the tunnel boring machine (TBM) would be launched from the Southern Forebay Inlet Structure shaft and once it passes the Byron Tract Working Shaft the tunnel excavation process would be serviced from Byron Tract Working Shaft so that Southern Forebay Inlet Structure would be repurposed as part of the South Delta Pumping Plant. This process is to improve the schedule.

The mode of transportation used for the bulk materials would be as follows:

- Excavated material from shafts – covered conveyor to on-site temporary storage areas for ultimate reuse
- Concrete – from Southern Complex concrete batch plant (see Southern Complex Material Depot)
- Tunnel liner segments – would be delivered by rail (primary)/road (back-up) and transferred on the site with vehicles

- RTM – on-site conveyor would move RTM from launch shaft sites to RTM temporary storage locations (material would be used to construct Southern Forebay embankments)

5.1.2.2 South Delta Pumping Plant

The South Delta Pumping Plant would be constructed within the northern embankment of the Southern Forebay and adjacent to the Southern Forebay Inlet Structure Launch Shaft. A concrete batch plant would be set up on this work site. The mode of transportation used for bulk materials would be as follows:

- Excavated material from structure footprint would be moved on a covered conveyor to on-site temporary storage areas for ultimate reuse or storage
- Concrete – would be moved by on-site vehicles from the Southern Complex concrete batch plant (see Southern Complex Material Depot):

5.1.2.3 Southern Forebay

The new Southern Forebay would take up a large footprint on the Southern Complex site. The forebay embankment would be constructed to the extent possible using RTM generated at the Byron Tract Working Shaft and Southern Forebay Inlet Structure Launch Shafts and Southern Forebay South Launch Shafts. To supplement that material, imported RTM from the Twin Cities Launch Shaft or the Lower Roberts Launch Shaft sites would be transported from the Twin Cities Material Depot plus excess material from the South Delta Conveyance Facilities. The mode of transportation used for bulk materials would be as follows:

- Excavated material from forebay footprint – would be moved on covered conveyor to on-site temporary storage areas for ultimate reuse or storage Borrow Material:
  - Would be moved by covered conveyor to on-site areas
  - Would be moved by truck from South Delta Conveyance Facilities
- Imported RTM – would be moved by rail from the Twin Cities Complex Material Depot
- Ready-mix concrete – would be moved on-site from Southern Complex concrete batch plant (see Southern Complex Material Depot
- Cement/Flyash– would be moved rail(primary) or on road(back-up)
- Bentonite – would be moved rail (primary) or on road (back-up)

5.1.2.4 South Delta Conveyance Facilities

The South Delta Conveyance facilities include the following components:

- Southern Forebay South Launch Shafts
- South Tunnels
- South Delta Structures

The Southern Forebay South Launch Shafts would be located at the far south end of the Southern Forebay. The shafts would be used to drive dual tunnels between the forebay and the connection to the Banks Pumping Plant inlet channel. The western South Tunnel would be constructed first and then the TBM would be turned around at the South Delta Structures site or dis-assembled and moved back to the Southern Forebay South Launch Shaft and excavation of the eastern South Tunnel segment continued. The TBM would always be serviced from the Southern Forebay South Launch Shafts.

The mode of transportation used for bulk materials would be as follows:

- Spoils – would be moved by truck to temporary storage area near Southern Forebay (material would be used to construct Southern Forebay embankments)
- Concrete – would be moved by ready-mix trucks from Southern Complex concrete batch plant (see Southern Complex Material Depot
- Tunnel liner segments – would be moved by rail (primary)/road (back-up) and transferred with vehicles on-site
- RTM – would be moved on-site in covered conveyor to RTM temporary storage location (material would be used to construct Southern Forebay embankments)

5.1.2.5 Southern Complex Material Depot

To support construction activities of the entire Southern Complex, the Southern Complex Material Depot would be developed and utilized. The depot would be constructed northeast of Byron Road and generally along the west and north sides of the Southern Forebay facilities. The depot would contain:

- Since it was determined that ready-mix concrete trucks could not be delivered from commercial batch plants and poured within an acceptable time after loading the truck, two dedicated batch plants, located at northwest corner of Southern Complex site, would be included
- Rail sidings and loading and unloading facilities serving multiple contractor's operations to deliver:
  - Tunnel liner segment unloading system
  - Bulk material (RTM, aggregate, sand, etc.) unloading system
  - Bulk powdered material (cement, flyash, bentonite) unloading systems
  - Covered conveyor system to move RTM unloaded from rail cars
- Tunnel liner segment storage areas
- Covered conveyor system to transport bulk materials on-site
- Covered conveyor system to transport RTM from the shaft work site to RTM processing areas and rail siding
- Other ancillary facilities

Bulk materials and ready-mix concrete from the batch plants would be transferred between the work site and the depot to the extent possible with covered conveyors or vehicles.

5.1.2.6 Park & Ride Facilities

As noted above, the TIA conducted showed that the existing Byron Highway and SR 4 have very heavy traffic resulting in poor levels of service. To reduce traffic impact on these roadways, the TIA evaluated the use of several Park & Ride facilities to reduce peak early morning and late afternoon traffic primarily on Byron Highway, the primary road access point to the Southern Complex. Based on a model to forecast Project worker trips to the various work sites, it was projected that approximately half the workers going to the Southern Complex would travel from the east or south and the other half from primarily the west with some from the northeast.

Park & Ride facilities would be located to intercept the majority of workers at strategy locations. Buses, vans or carpools would then be used to transfer to the individual Project feature work sites within the Southern Complex. Two strategy locations were selected for this purpose:

- Byron Park & Ride (refer to Figure B6) – would be located just south of SR 4 at the intersection of Byron Highway and Camino Diablo, this facility would intercept over 30 percent or the projected workers coming from the west/northwest on SR 4 to Byron Highway.
- Byron-Bethany Park & Ride (refer to Figure B7) – would be located at the intersection of Byron Highway and Bethany Road, this facility would intercept a small percentage of workers traveling northward on Byron Highway and a projected over 40 percent of the workers traveling on I-580 or I-205 and then northward on Mountain House Road to Byron Highway.

Further details on these Park & Ride facilities are discussed under Section 4.1.2.

5.2 Central Corridor Project Features

The Central Corridor has the following unique Project features:

- New Hope Tract (Central) Maintenance Shaft
- Staten Island Maintenance Shaft
- Bouldin Island Launch/Reception Shaft (and associated tunnel reaches)
- Mandeville Island Maintenance Shaft
- Bacon Island Reception Shaft

Following is the proposed logistics strategy for each of these Project features.

5.2.1 New Hope Tract (Central) Maintenance Shaft

The New Hope Tract (Central) Maintenance Shaft would be located on the western side of New Hope Tract near the Mokelumne River north of Walnut Grove Road (refer to Figure B8). All construction materials would be trucked to this work site from I-5, west on Walnut Grove Road, north on Vail road, then west on West Lauffer Road and then finally to the site on a dedicated haul road off West Lauffer Road. This is the most direct and logical access to the work site. Workers would come directly to the site along this same route.

Road improvements to facilitate site access would include the following:

- Asphalt overlay of approximately 3.9 miles of Walnut Grove Road from I-5 west to Staten Island Road (portion of work related to Staten Island Maintenance Shaft).
- Asphalt Overlay of approximately 0.7 miles of Vail Road between Walnut Grove Road and Lauffer Road.
- Improving approximately 0.8 miles of West Lauffer Road (24-foot-wide gravel roadway plus 4-foot-wide shoulders on each side) between Vail Road and new haul road.

5.2.2 Staten Island Maintenance Shaft

The Staten Island Maintenance Shaft would be located on the north central portion of Staten Island adjacent to Staten Island Road (refer to Figure B9). All construction materials would be trucked to this work site from I-5, west on Walnut Grove Road and then south on Staten Island Road to the work site, which is the most direct and logical access to the work site. Workers would come directly to the site along this same route.

Road improvements to facilitate site access would include the following:

- Asphalt overlay of Walnut Grove Road from I-5 west to Staten Island Road (refer to New Hope Tract (Central) Maintenance Shaft above).
- Asphalt overlay of the approximately 2.1 miles paved portion of Staten Island Road. Maintenance and addition of gravel on the approximately 0.6 miles of non-paved portion of Staten Island Road to the work site.
- Construction of approximately 300-foot gravel access road into work site.

5.2.3 Bouldin Island Launch/Reception Shaft

The Bouldin Island Launch/Reception Shaft would be located in the central portion of Bouldin Island (refer to Figure B10) and used as a launch shaft for the tunnel heading south to the Bacon Island reception shaft. The same shaft would be used as a reception shaft for the tunnel launched from Twin Cities Complex.

Construction from this work site would require deliveries of equipment, tunnel liner segments, raw materials for the on-site grout batch plant, and other building materials. A concrete batch plant was not included at Bouldin Island because it was determined that ready-mix concrete truck could be delivered and poured within 90 minutes of loading the truck.

Since there is no potential for rail access to the site, there are potentially two modes of access:

- Road access via SR 12 from I-5.
- Barge access along a barge route on the San Joaquin River Deep Water Ship Channel and Potato Slough.

The TIA showed that the existing SR 12 already has very heavy traffic resulting in poor levels of service (LOS E). Added construction traffic would make the situation worse reaching a LOS F during portions of the day. To reduce the traffic impact, the TIA tested several improvement options to SR 12 along with the use of several potential Park & Ride facilities to reduce peak early morning and late afternoon traffic. Based on this analysis, the improvements would include:

- Widen SR 12 to four 12-foot lanes (2 lanes in each direction) with variable median and 8-foot shoulders from the existing four lane section near I-5 to past the shaft location (approximately 8 miles).
- Widen the Potato Slough Bridge (four 12-foot lanes, a 12-foot median, 8-foot shoulders on both sides and an 8-foot sidewalk on one side of the bridge).
- Construct median turn pockets at Guard Road, N. Peatland Road and Correia Road,
- Construct an interchange at the turnoff to the shaft site to allow for left-turn movements without interfering with opposing traffic.
- Construct a new approximately 2.1-mile haul road (24-foot-wide paved roadway plus 4-foot-wide shoulders on both sides) between the new interchange on SR 12 and the Bouldin Island work site.
- Include a Rio Vista Park & Ride lot (refer to Figure B11) located along SR 12 just east of SR 160 to intercept the projected workers coming from the west/southwest on SR 160 and SR 12. Workers coming from the north or south on I-5 or from the east on SR 12 would go directly to the site on the improved SR 12.

Further details on the proposed road improvements are presented in the conceptual design drawings.

The second access option to the Bouldin Island work site would be a barge landing, which would be constructed to reduce the number of truck trips on SR 12. This barge landing was considered to transfer RTM from Bouldin Island to other locations within the Delta for reuse. The barge route would extend along the San Joaquin River Deep Water Ship Channel and Potato Slough. On Bouldin Island, the western and southwestern shorelines are located near the Stockton Deep Water Ship Channel. However, the landside of those areas is characterized by extensive peat soils and would require ground improvement to provide adequate foundations for the barge landing facilities. Therefore, a potential barge landing site would be more effective along Potato Slough in an area with adequate water depths and land-side geotechnical conditions to support the barge landing (refer to Figure B10). The barge landing could include the following facilities (refer to Figure 3):

- Docking area for up to three small barges
- Two covered conveyor systems to allow loading and/or unloading bulk materials such as sand, aggregate and RTM
- Work pad for mobile crane to load and/or unload equipment and liner segments

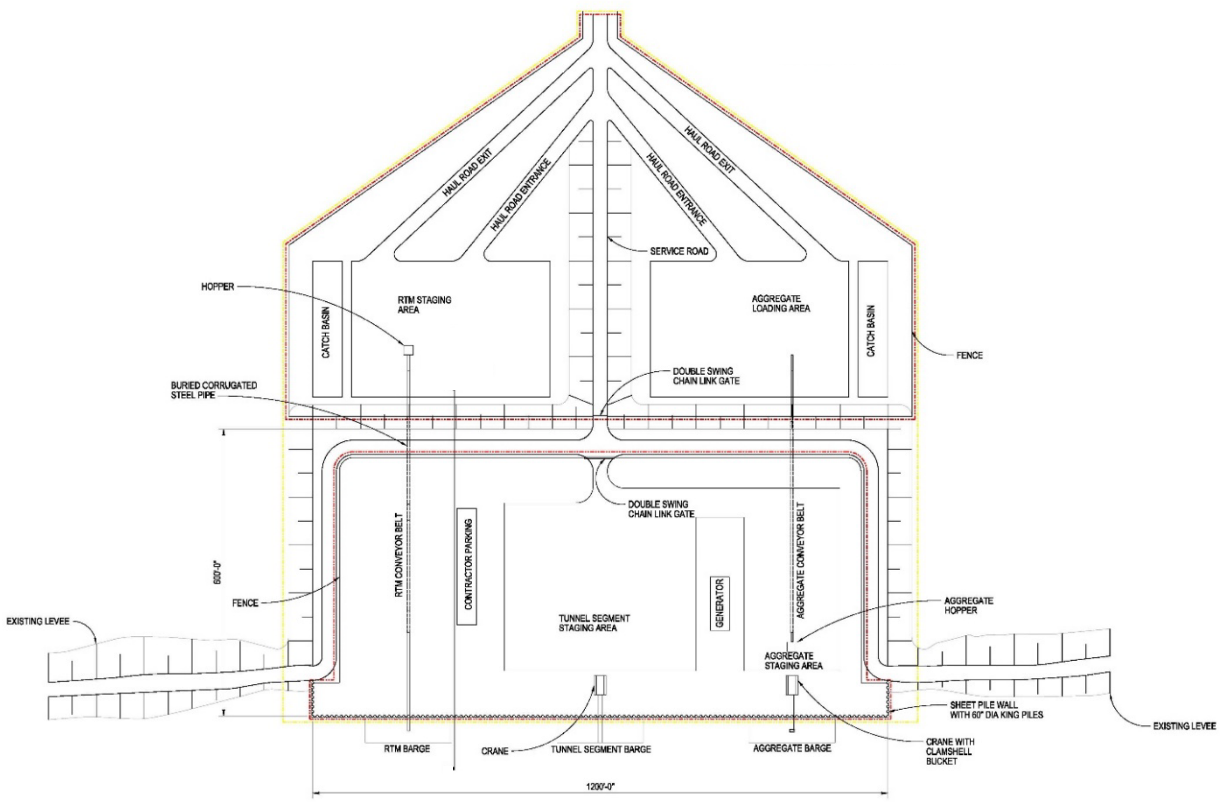


Figure 3. Potential Bouldin Island Barge Landing Facility

In evaluating the modes of access to the Bouldin Island work site, the barge landing option was eliminated for the following reasons:

- Barging could not efficiently haul all the necessary commodities, and therefore improvements to SR 12 would still be necessary.

- As demonstrated by the TIA, the proposed improvements to SR 12 would provide sufficient capacity to move all materials by road and improve the level of service of SR 12 to LOS C or better in the sections of SR 12 to be improved.
- Barge routes to this barge landing would require navigation of San Joaquin River to Potato Slough that would require passing under several operable bridges which could lead to traffic congestion on the roads along those bridges.
- The barge landing site would not be an ideal location due to geotechnical challenges (which occur across much of Bouldin Island) and would require a substantial amount of ground improvement.
- The barge landing would be located along a portion of Potato Slough used frequently for recreational navigation and short-term moorings. Opposition to use of such a barge landing was opposed by boating stakeholders.
- Providing both access modes would result in additional unwarranted disruption with no limited added benefit.

5.2.4 Mandeville Island Maintenance Shaft

The Mandeville Island Maintenance Shaft would be in the central portion of Mandeville Island. There is extremely limited road access to this island. Therefore, the proposed access to Bacon Island would be extended on a new dedicated haul road from the adjacent Bacon Island work area to the Mandeville Island work site (refer to Figure B12). All construction materials would be trucked to this work site on this new dedicated haul road from the Bacon Island work site. Refer to the Bacon Island logistics strategy description below for the plan for access to the Bacon Island site. Workers would come directly to the site along this same route.

Road improvements to facilitate site access would include the following:

- Construction of a new 24-foot-wide moveable bridge between Bacon Island and Mandeville Island crossing Connection Slough.
- Demolition of existing bridge between Bacon Island and Mandeville Island crossing Connection Slough.
- Construction of a new approximately 7.3 mile long haul road (24- foot wide gravel roadway plus 4-foot wide shoulders on both sides) between the Bacon Island work site and the Mandeville Island work site.

5.2.5 Bacon Island Reception Shaft

The Bacon Island Maintenance Shaft would be located in the southern portion of Bacon Island. The single shaft would serve as a reception shaft for two separate tunnel contractors. As there is limited road access to this island, consideration was given to constructing a rail spur off the Burlington Northern Santa Fe (BNSF) rail line that crosses the island and developing a construction materials depot to service this site. However, this was determined to be difficult because portions of the rail are constructed on an elevated trestle and there is a high volume of rail traffic on this BNSF line. Access via the adjacent waterways would also be challenging due to the navigability of these sloughs and rivers. As a result, road access would be provided by developing a dedicated haul road from SR 4 to the Bacon Island work area.

Two options were explored for the haul road to Bacon Island (refer to Figure 4). The first would follow the existing Bacon Island Road from SR 4 and improvements to this roadway along with improved crossings of the BNSF line and the Mokelumne Aqueduct. Option 2 would use SR 4 to S. Whiskey Slough, then be extended north on Holt Road to a new access point to West Lower Jones Road off Holt Road with a bridge over the BNSF line and the Mokelumne Aqueducts. The new access road would be constructed to West Lower Jones Road. Improvements to improve West Lower Jones Road would be constructed to a point where a new access road would be constructed to the existing bridge crossing into Bacon Island from Bacon Island Road. The second option was selected for the following reasons:

- Option 2 would result in the shortest distance and therefore less disruption the two routes.
- Option 2 would avoid construction traffic on most levee roads on the Bacon Island Road route.
- Option 2 would result in a less challenging crossing of the BNSF line and the Mokelumne Aqueducts.

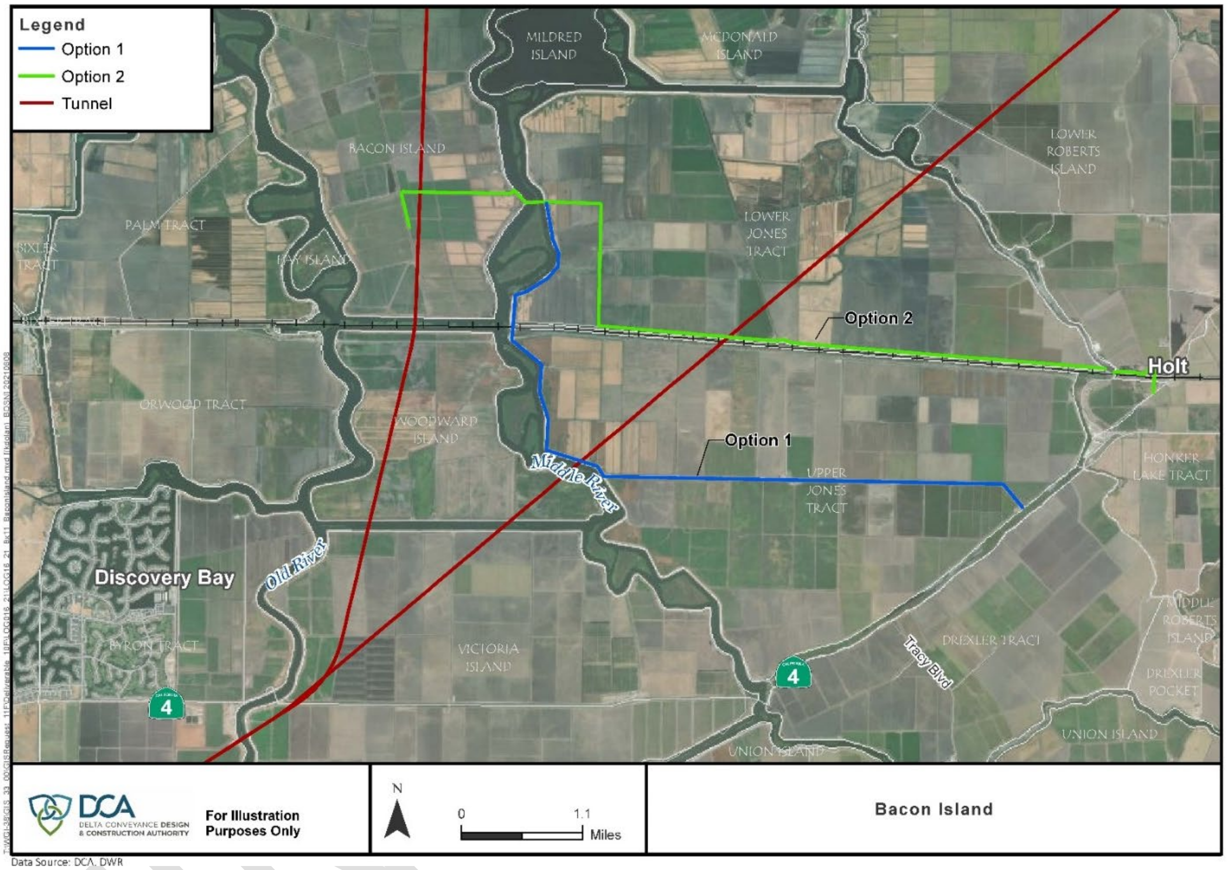


Figure 4. Potential Road Access Options to Bacon Island

Road improvements to facilitate site access under Option 2 would include the following (refer to Figure B12):

- Construction of a new approximately 300-foot 24-foot-wide concrete bridge crossing the BNSF line and the Mokelumne Aqueduct.
- Construction of a new approximately 0.8 miles West Lower Jones Road Extension (24-foot-wide paved roadway with 4-foot-wide shoulders on both sides) from the new bridge to existing West Lower Jones Road.
- Construction of improvements along West Lower Jones Road (24-foot-wide paved roadway plus 4-foot-wide shoulders on both sides) approximately 4.3 miles to location of new dedicated haul road on Lower Jones Tract.

- Construction of new haul road (24-foot-wide paved roadway plus 4-foot-wide shoulders on both sides) approximately 1.6 miles on Lower Jones Tract to the existing bridge to Bacon Island.
- Rehabilitation of the bridge between Lower Jones Tract and Bacon Island crossing the Middle River.
- Construction of a new haul road (24-foot-wide gravel roadway plus 4-foot-wide shoulders on both sides) approximately 1.5 miles on Bacon Island from the bridge to the work site.

Given the travel distance from commercial ready-mix plants in Stockton, a concrete batch plant would be set up on at the Bacon Island shaft site to serve both the Bacon Island Reception Shaft and the Mandeville Island Maintenance Shaft. As noted above, all construction materials would be trucked to this work site by road from SR 4. Workers would come directly to the site along this same route.

5.3 Eastern Corridor Project Features

The Eastern Corridor would have the following unique Project Features:

- New Hope Tract (Eastern) Maintenance Shaft
- Canal Ranch Tract Maintenance Shaft
- Terminous Tract Reception Shaft (and associated tunnel reaches)
- King Island Maintenance Shaft
- Lower Roberts Island Launch/Reception Shaft (and associated tunnel reaches)
- Upper Jones Tract Maintenance Shaft

Following is the proposed logistics strategy for each of these Project features.

5.3.1 New Hope Tract (Eastern) Maintenance Shaft

The New Hope Tract (Eastern) Maintenance Shaft would be located in the central portion of New Hope Tract north of Walnut Grove Road (refer to Figure B13). All construction materials would be trucked to this work site from I-5, west on Walnut Grove Road and then north to the site on Blossom Road and then to the site from a dedicated haul road off Blossom Road. This is the most direct and logical access to the work site. Workers would come directly to the site along this same.

Road improvements to facilitate site access would include the following:

- Overlay approximately 1.3 miles of Walnut Grove Road and Blossom Road.
- Construction of approximately 0.3 miles of a new haul road (24-foot-wide gravel roadway plus 4-foot-wide shoulders on both sides) between Blossom Road and work site.
- Construction of approximately 330-foot gravel access road into work site.

5.3.2 Canal Ranch Tract Maintenance Shaft

The Canal Ranch Tract Maintenance Shaft would be located on Canal Ranch Tract adjacent to West Peltier Road (refer to Figure B14). All construction materials would be trucked to this work site from I-5, West Peltier Road and then to the site, which is the most direct route to the work site. Workers would come directly to the site along this same route. Road improvements to facilitate site access include the following:

- Overlays of approximately 1.8 miles of Peltier Road between I-5 and the work site.
- Construction of approximately 300-foot gravel access road into work site.

5.3.3 Terminous Tract Reception Shaft

The Terminous Tract Reception Shaft would be located in the central portion of Terminous Tract just north of SR 12 (refer to Figure B15). The single shaft would serve as a reception shaft for two separate tunnel contractors. All major construction materials would be trucked to this work site from I-5 and then west on SR 12 and then to the site off SR 12. Workers would come directly to the site along SR 12. Road improvements to facilitate site access include the following:

- Improving approximately 2.3 miles of SR 12 from I-5 to work site, including turn pockets and acceleration lanes.
- Construction of approximately 470-foot gravel access road into work site.

5.3.4 King Island Maintenance Shaft

The King Island Maintenance Shaft would be located in the central portion of King Island just north of Eight Mile Road west of White Slough (refer to Figure B16). All construction materials would be trucked to this work site from I-5 and then west on Eight Mile Road to the site, which is the most direct route to the work site. Workers would come directly to the site along this same route. Road improvements to facilitate site access include the following:

- Overlaying approximately 3.4 miles of Eight Mile Road from I-5 west to new haul road.
- Construction of approximately 420-foot gravel access road into work site.

5.3.5 Lower Roberts Island Work Site

5.3.5.1 Launch/Reception Shaft

The Lower Roberts Island Launch/Reception Shaft would be located in the north central portion of Lower Roberts Island (refer to Figure B17) and would serve a dual purpose for the eastern tunnel alignment. It would be used as a launch shaft for a tunnel to the north to the Terminous Tract Reception Shaft and as a reception shaft for the tunnel from the Southern Complex Launch Shafts.

The site would potentially have multiple modes of access (refer to Figure 5):

- Road access via several optional routes:
  - Option 1 - a new haul road would be extended from West Fyffe Street in the Port of Stockton and use portions of House Road
  - Option 2 – upgrade N. Island Road from SR 4 to House Road
  - Option 3 – upgrade S. Whiskey Slough Road/Holt Road from SR 4 to new haul road west of House Road
- Rail access by would be extended from existing rail lines from the Port of Stockton to area just south of Vulcan Island.
- Barge access would be considered from a new landing, similar to Figure 3, along the south side of San Joaquin River Deep Water Ship Channel just east of Vulcan Island.

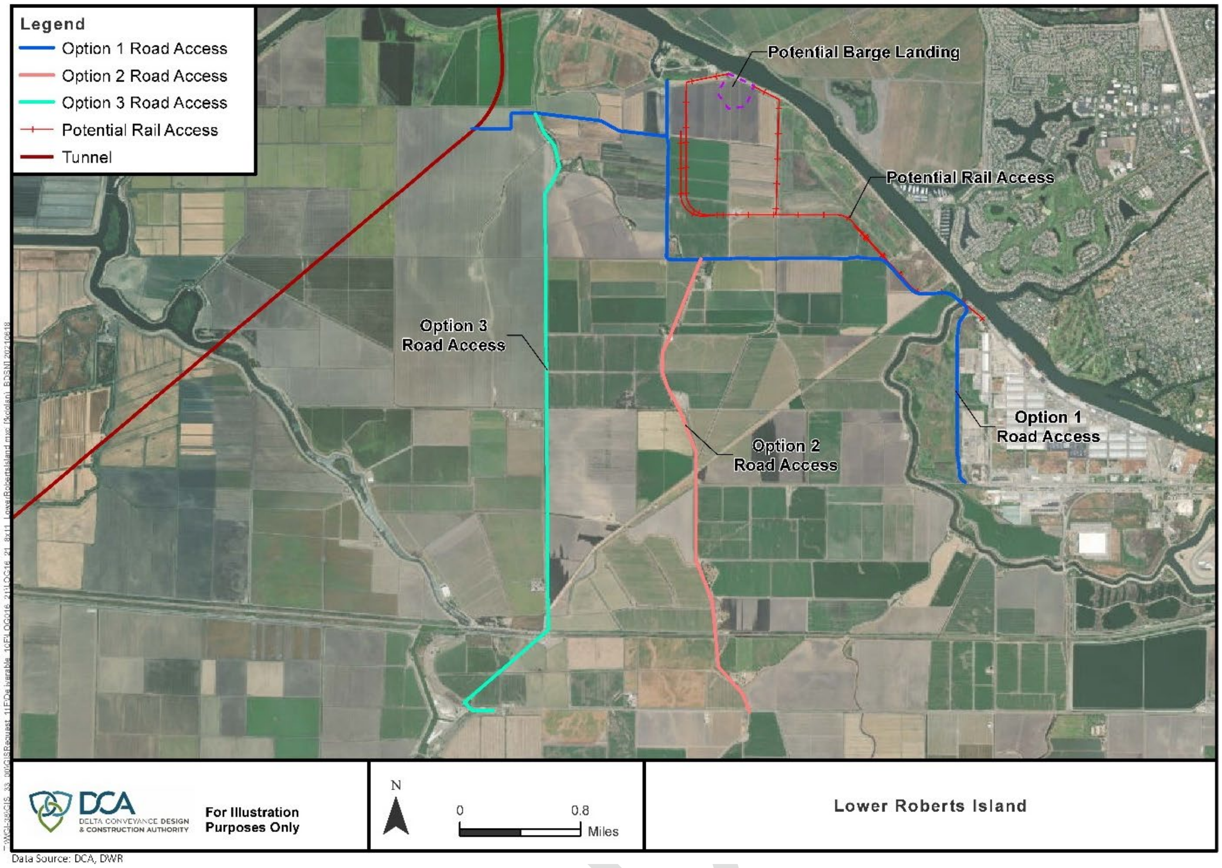


Figure 5. Potential Modes of Access to Lower Roberts Island

The planned mode of transportation used for the bulk materials would be as follows:

- Spoils – would be transported in a covered conveyor to on-site disposal area
- Borrow – would be transported in a covered conveyor from an on-site borrow area
- Ready-mix concrete – a concrete batch plant was not included because it was determined that ready-mix concrete truck could be delivered from a commercial plant and poured within 90 minutes of loading the truck
- Bulk powdered material (cement, flyash, bentonite) – would be transported by roads
- Tunnel liner segments – would be transported by rail or barge (primary) or road (back-up), and transferred with vehicles on-site
- RTM – would be transported on-site in covered conveyor to RTM storage location

As the rail or barge modes would only be used to transport tunnel liner segments to the work site, implementing only one of the two modes was selected. In looking at the two modes, rail was deemed more appropriate than barge for the following reasons:

- Rail would have lower air quality emissions than barges
- The potential exists for the tunnel segments to be manufactured in the Port of Stockton and it would be efficient to move the segments via rail to the work site
- The rail access would be more flexible than the barge access option

- The barge landing would be located near routes used by commercial and recreational navigation
- The barge landing would be located near or within habitat areas or areas designated as potential habitat areas
- The barge landing would be located along San Joaquin River near Windmill Cove which includes residential and marina facilities. Stakeholders provided feedback over concerns about conflicts with recreational navigation opportunities.
- Relative to road access and based on an evaluation of the three potential options, Option 1 was selected as the preferred rod access route for the following reasons: Options 2 and 3 would require traveling substantially further distance on SR 4 than Option 1 with Option 3 being the longest. The TIA showed that SR 4 is currently at LOS D so adding further traffic to this route would increase traffic
- Option 1 is the shortest route and will therefore result in the least disruption
- Option 1 routes the construction traffic through an industrial area Instead of residential, recreational, or habitat areas

Road improvements to facilitate site access include the following (refer to Figure B17):

- Construction of approximately 1.2 miles of new access road (24- foot wide paved roadway plus 4-foot wide shoulders on both sides) from end of West Fyffe Street in Port of Stockton to new rail and road bridge at the northwestern corner of Rough and Ready Island.
- Construction of new road and rail bridge crossing Burns Cut (approximately 67.5-feet wide) connecting Rough and Ready and Lower Roberts Islands.
- Construction of approximately 3.2 miles of new access road (24- foot wide paved roadway plus 4-foot wide shoulders on both sides) and rail lines along West House Road from new bridge to the Material Depot.
- Construction of approximately 1.6 miles of new access road (24- foot wide paved roadway plus 4-foot wide shoulders on both sides) from depot to shaft work site.

As noted above, construction materials would either be trucked to this work site via new haul roads extended west from the Port of Stockton, or by rail from a new rail construction materials depot constructed on the work site. Details on the Lower Roberts Island Material Depot are described below. On-site, bulk materials would be transferred to the extent possible with conveyors.

Based on the TIA, benefits would be achieved by bussing workers to the site from a park & ride facility located off I-5 and SR 4 in Stockton (refer to description below). Workers would use the extended West Fyffe Street access road through the Port of Stockton or utilize South Holt Road or Inland Drive off of SR 4.

5.3.5.2 Lower Roberts Island Material Depot

To support construction activities at the Lower Roberts Island Launch/Reception Shaft site, a Lower Roberts Island Material Depot would be developed and utilized (refer to Figure B17). The depot would be constructed west of the Port of Stockton and along the San Joaquin River Deep Water Ship Channel just east of Windmill Cove. The depot would contain:

- Rail siding and loading and unloading facilities:
  - Tunnel liner segment unloading system
  - Covered conveyor system to load RTM on rail cars (for some design capacity options)

- Tunnel liner segment storage areas
- Covered conveyor system to transport bulk materials around site and RTM from the shaft work site
- RTM processing areas:
  - Material testing areas
  - Wet material storage
  - Material drying area
  - Excess RTM storage area
- Other ancillary facilities

Bulk materials would be transferred between the shaft work site and the depot to the extent possible with covered conveyors or vehicles.

5.3.5.3 Charter Way Park & Ride

As recommended by the TIA, a Park & Ride lot would be located along Charter Way just west of the I-5 interchange (refer to Figure B18). This facility would intercept the projected workers coming from the north and south on I-5 and from the east on SR 4. This location would provide for transport the workers to the Lower Roberts Island work site westward along SR 4, then northward on the Port of Stockton Expressway, then west on West Fyffe Street to the new work site access road network since this route would bypass secure portions of the Port of Stockton.

5.3.6 Upper Jones Tract Maintenance Shaft

The Upper Jones Maintenance Shaft would be located in the central portion of Upper Jones Tract just north of Bacon Island Road (refer to Figure B19). All construction materials would be trucked to this work site on a new dedicated haul road from Bacon Island Road, which is the most direct route to the work site. Workers would come directly to the site along this same route. Road improvements to facilitate site access include the following:

- Asphalt overlay of approximately 2.5 miles of Bacon Island Road between SR 4 and the work site access road.
- Construction of a short approximately 420-foot new haul road on between Bacon Island Road and work site.

6. References

The following publications, documents, or other information sources have been cited in this TM:

California Department of Water Resources (DWR). 2020. Notice of Preparation of Environmental Impact Report for the Delta Conveyance Project.

Delta Conveyance Design and Construction Authority (DCA). 2021a. Potential Road Access Routes Technical Memorandum. Final Draft.

Delta Conveyance Design and Construction Authority (DCA). 2021b. Preliminary Rail Feasibility Study Technical Memorandum. Final Draft.

Delta Conveyance Design and Construction Authority (DCA). 2021c. Barge Transport Study Technical Memorandum. Final Draft.

Delta Conveyance Design and Construction Authority (DCA). 2021d. Shaft Siting Study Technical Memorandum. Final Draft.

Delta Conveyance Design and Construction Authority (DCA). 2021e. Engineering Project Report | Central & Eastern Options, Volume 2 of 3 – Engineering Concept Drawings. Final Draft.

Delta Conveyance Design and Construction Authority (DCA). 2021f. Traffic Impact Analysis Technical Memorandum. Final Draft.

Delta Conveyance Design and Construction Authority (DCA). 2021g. Soil Balance Technical Memorandum. Final Draft.

Delta Conveyance Design and Construction Authority (DCA). 2021h. Reusable Tunnel Material Technical Memorandum. Final Draft.

Delta Conveyance Design and Construction Authority (DCA). 2021i. Preliminary Precast Yard Study Technical Memorandum. Final Draft.

7. Document History and Quality Assurance

Reviewers listed have completed an internal quality review check and approval process for deliverable documents that is consistent with procedures and directives identified by the Engineering Design Manager (EDM) and the DCA.

Approval Names and Roles			
Prepared by	**Internal Quality Control review by**	**Consistency review by**	**Approved for submission by**
Terry Krause / EDM Project Manager	Bob Cermak / EDM QC Reviewer	Gwen Buchholz / DCA Environmental Consultant Phil Ryan / EDM Design Manager	Graham Bradner / DCA Executive Director
This interim document is considered preliminary and was prepared under the responsible charge of Bob Cermak, California Professional Engineering License C31524.			

Appendix A
General Access Figures

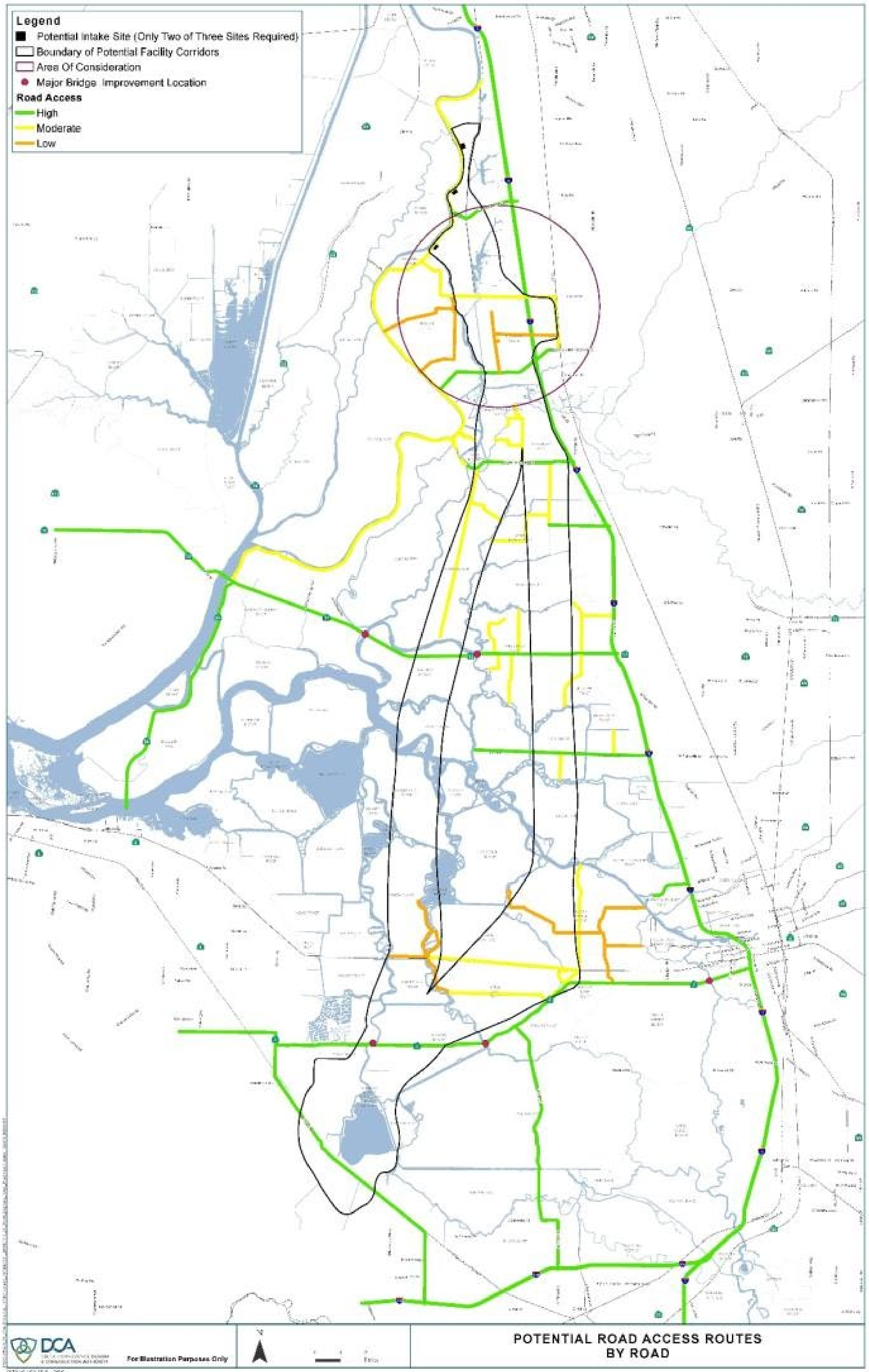


Figure A1. Proposed Road Access Routes

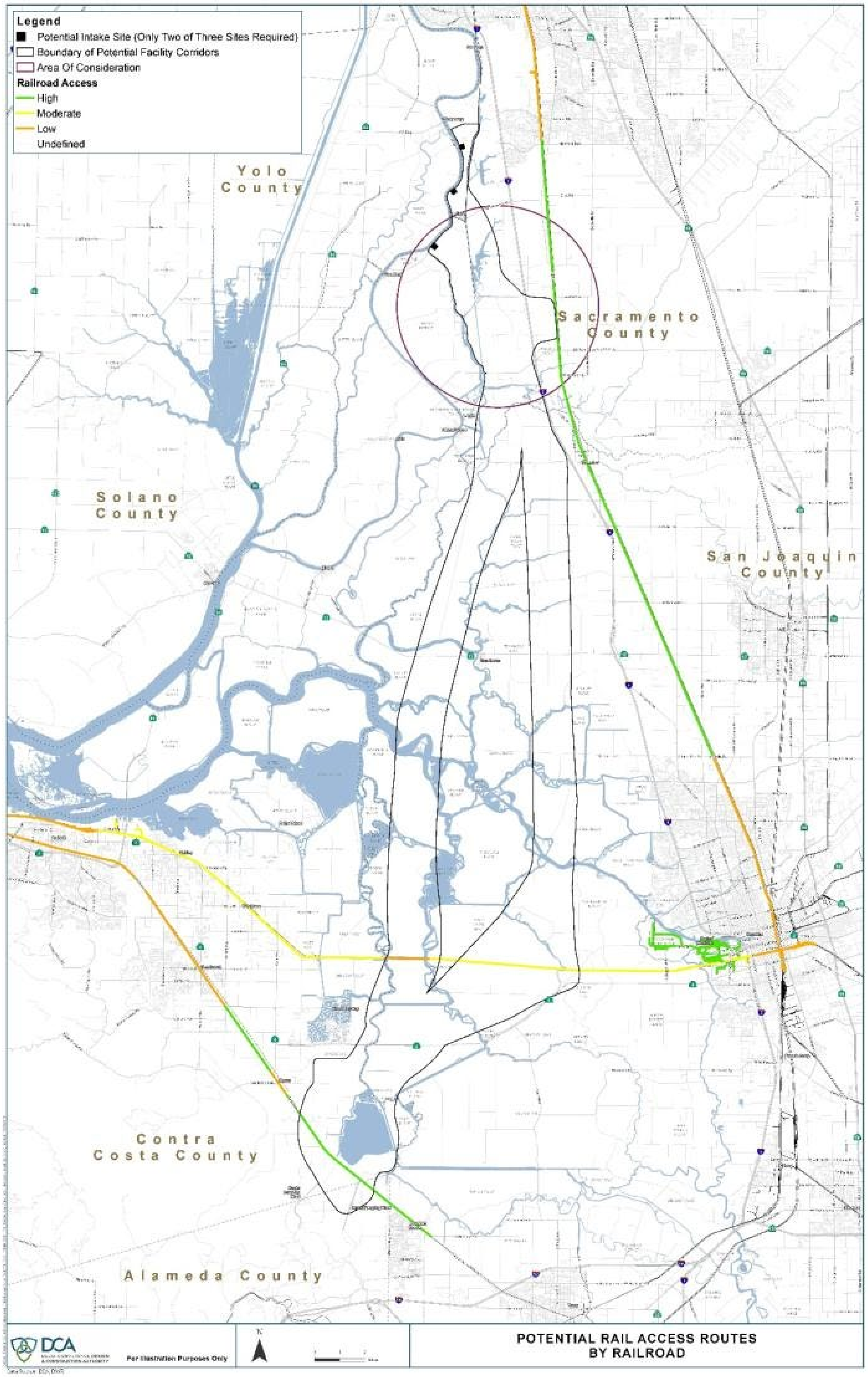


Figure A2. Proposed Rail Access Routes

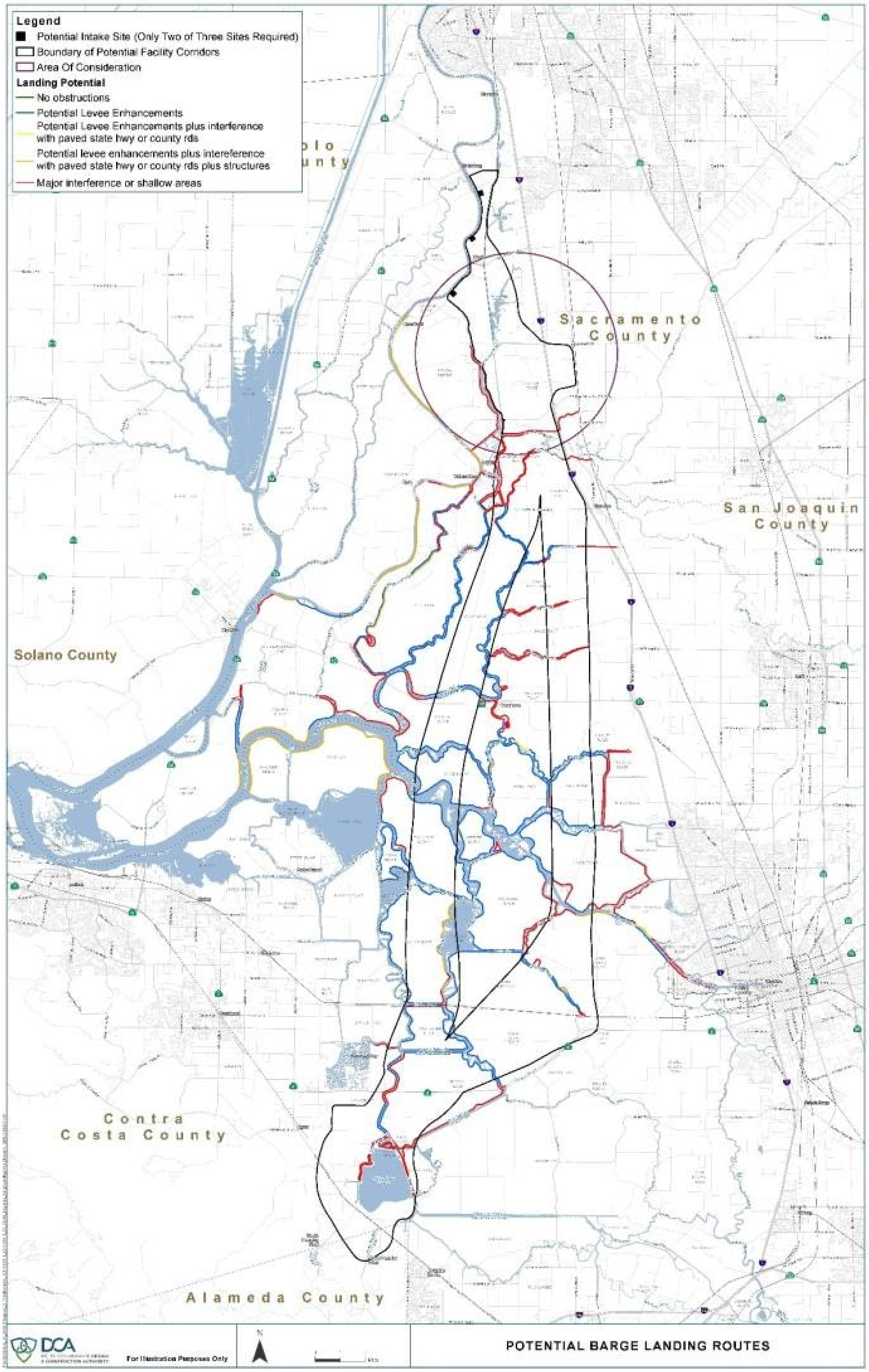


Figure A3. Potential Barge Access Routes Considered

Appendix B
Work Site Access and Logistics Concepts

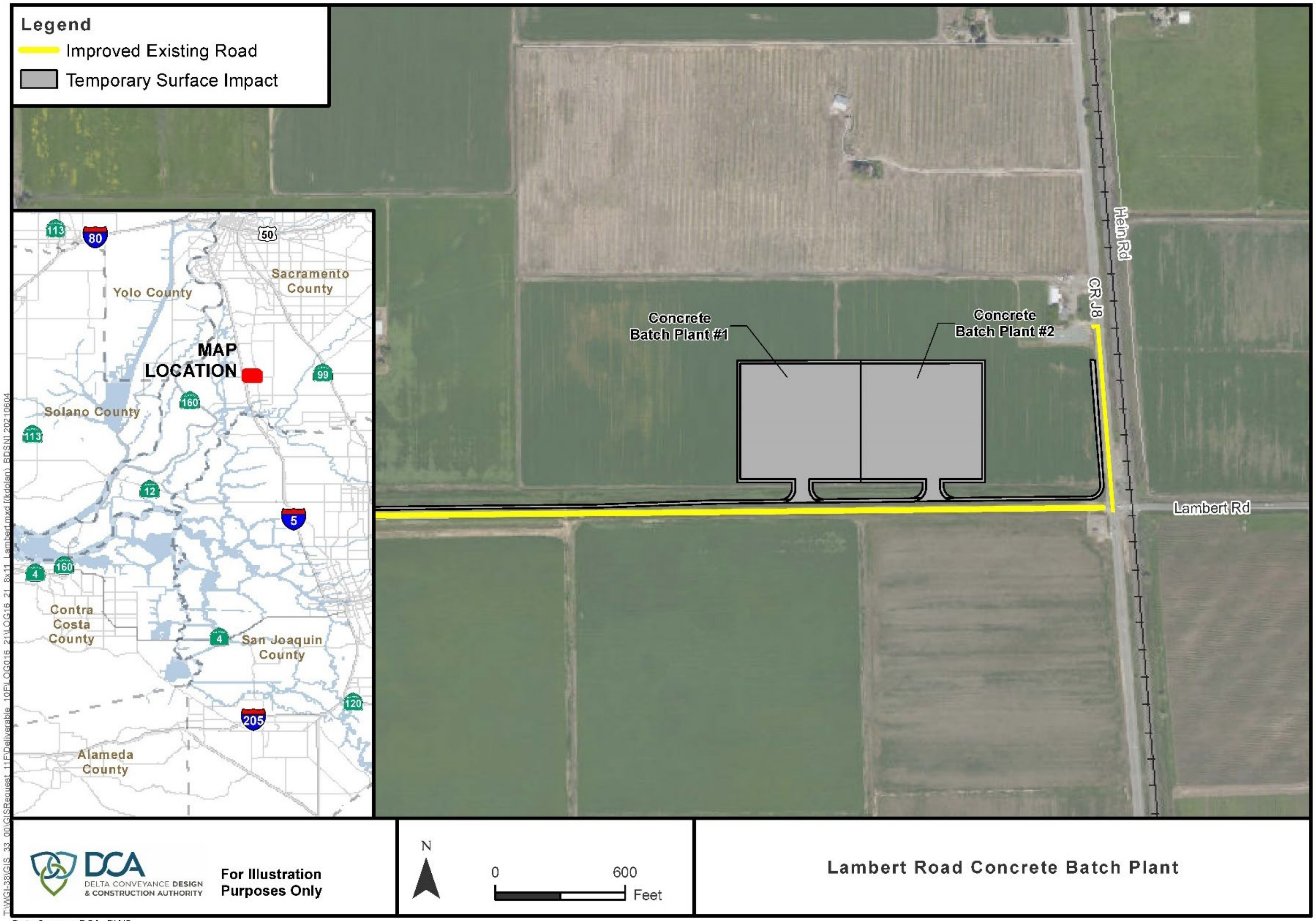
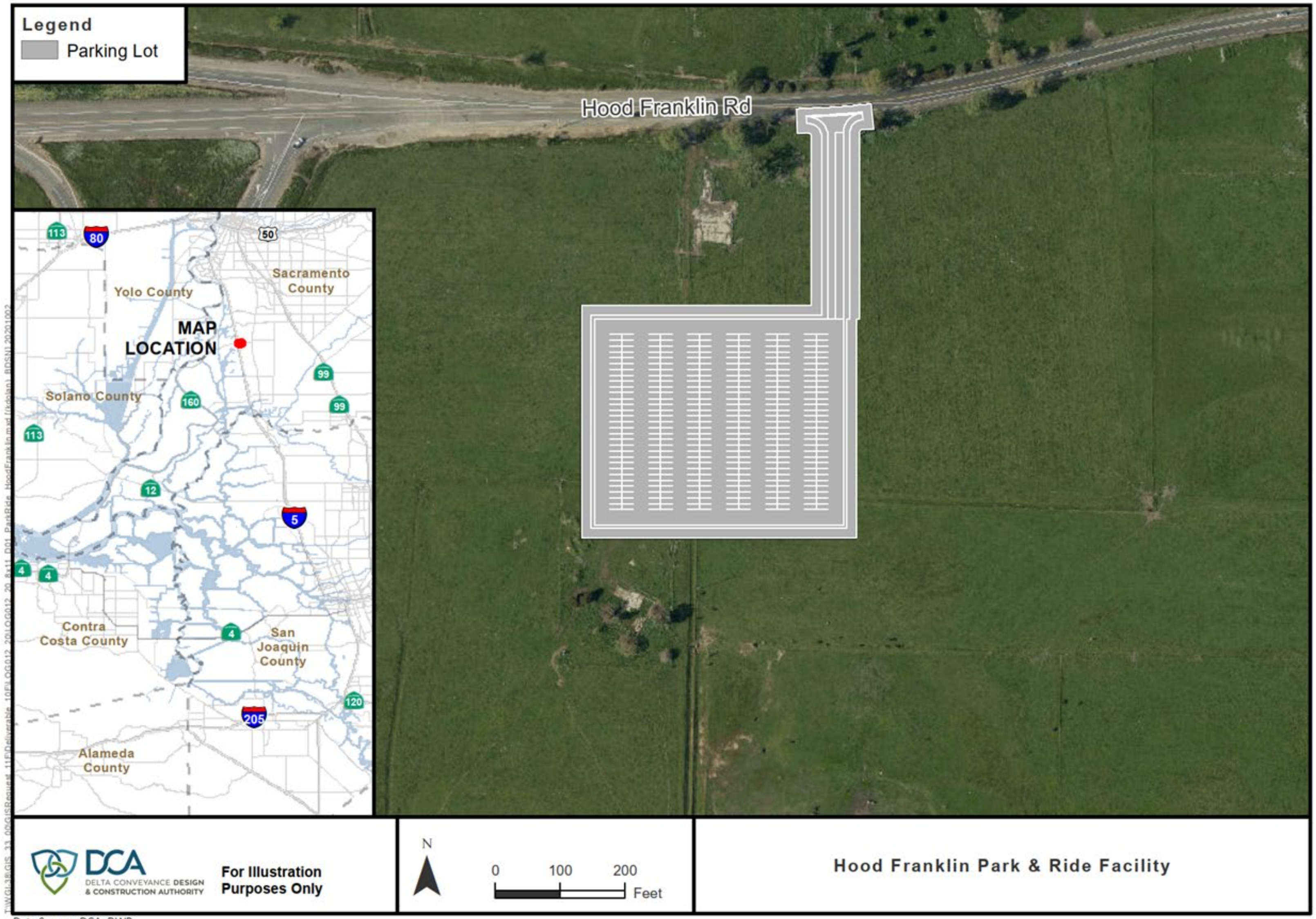
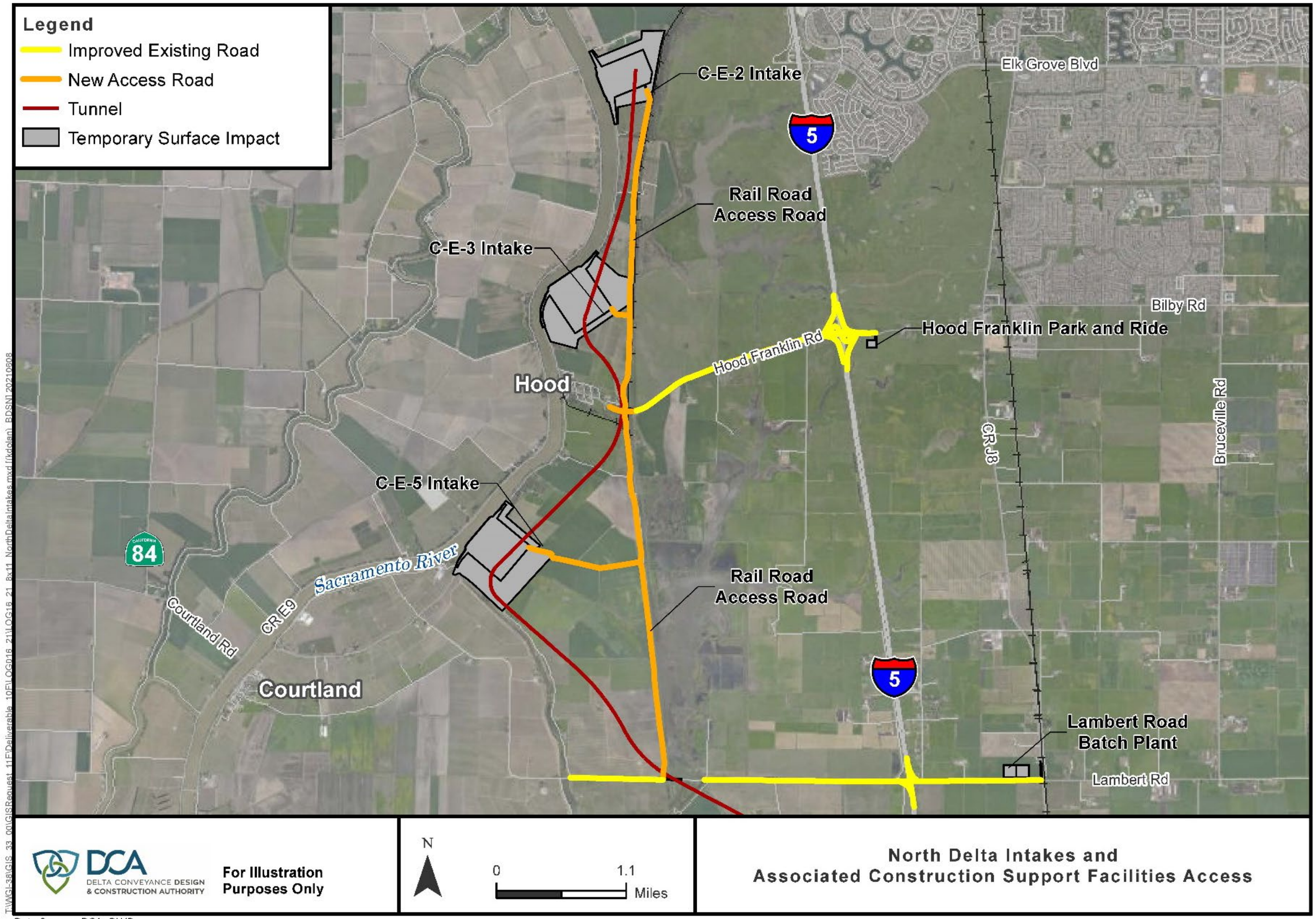


Figure B1. Lambert Road Concrete Batch Plant



Data Source: DCA, DWR

Figure B2. Hood Franklin Park & Ride Facility



Data Source: DCA, DWR

Figure B3. North Delta Intakes and Associated Construction Support Facilities Access

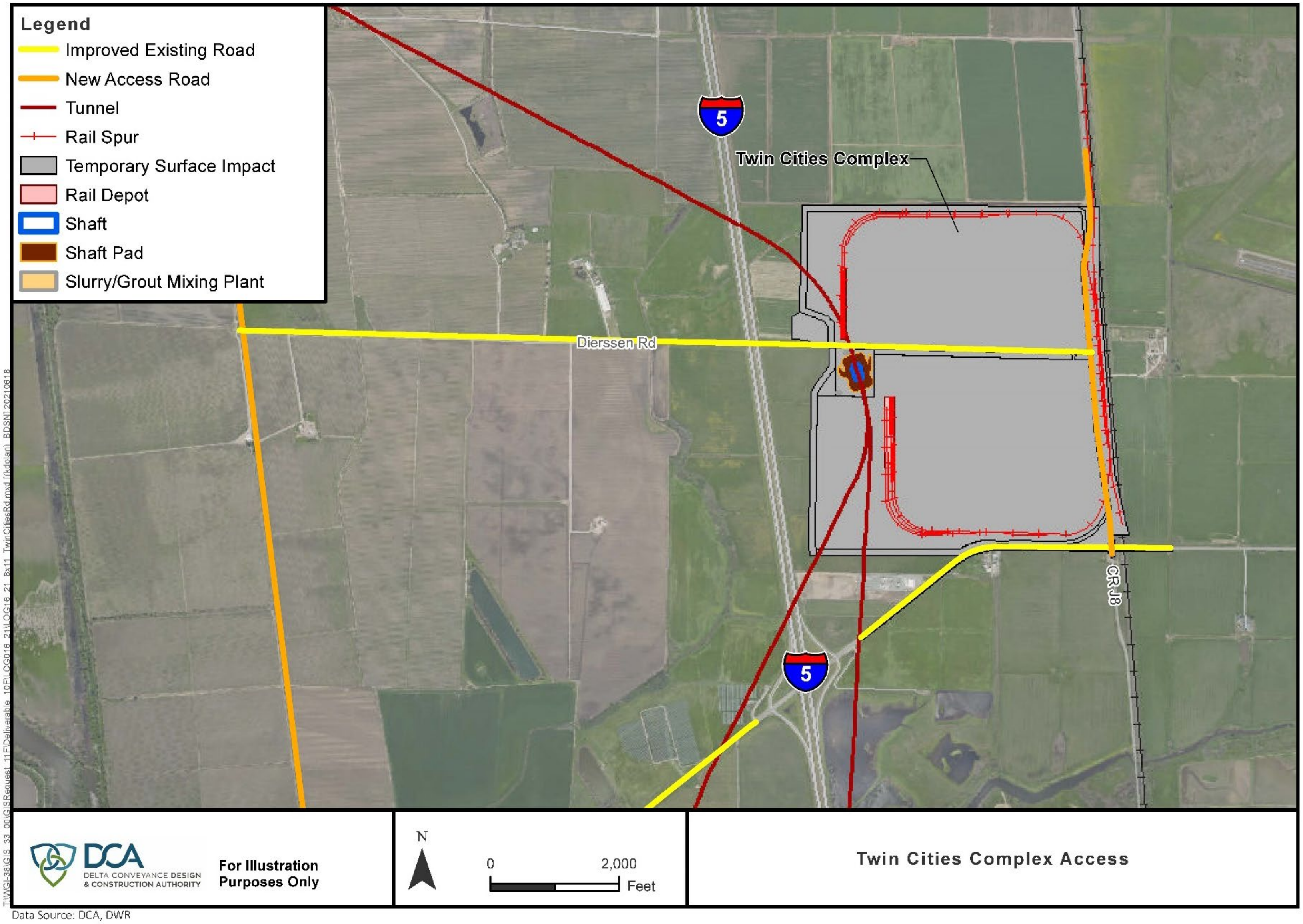


Figure B4. Twin Cities Complex Access

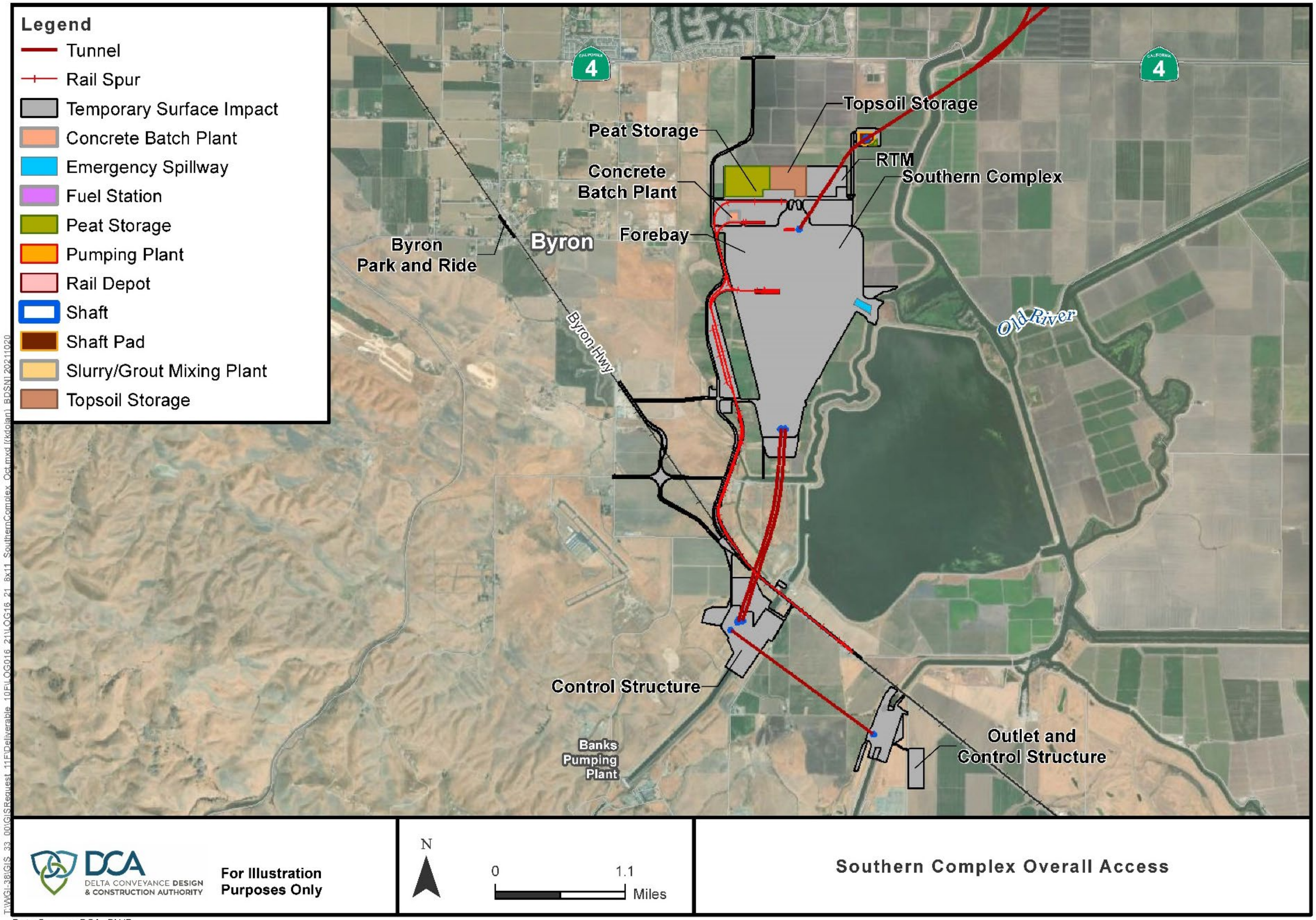


Figure B5. Southern Complex Overall Access

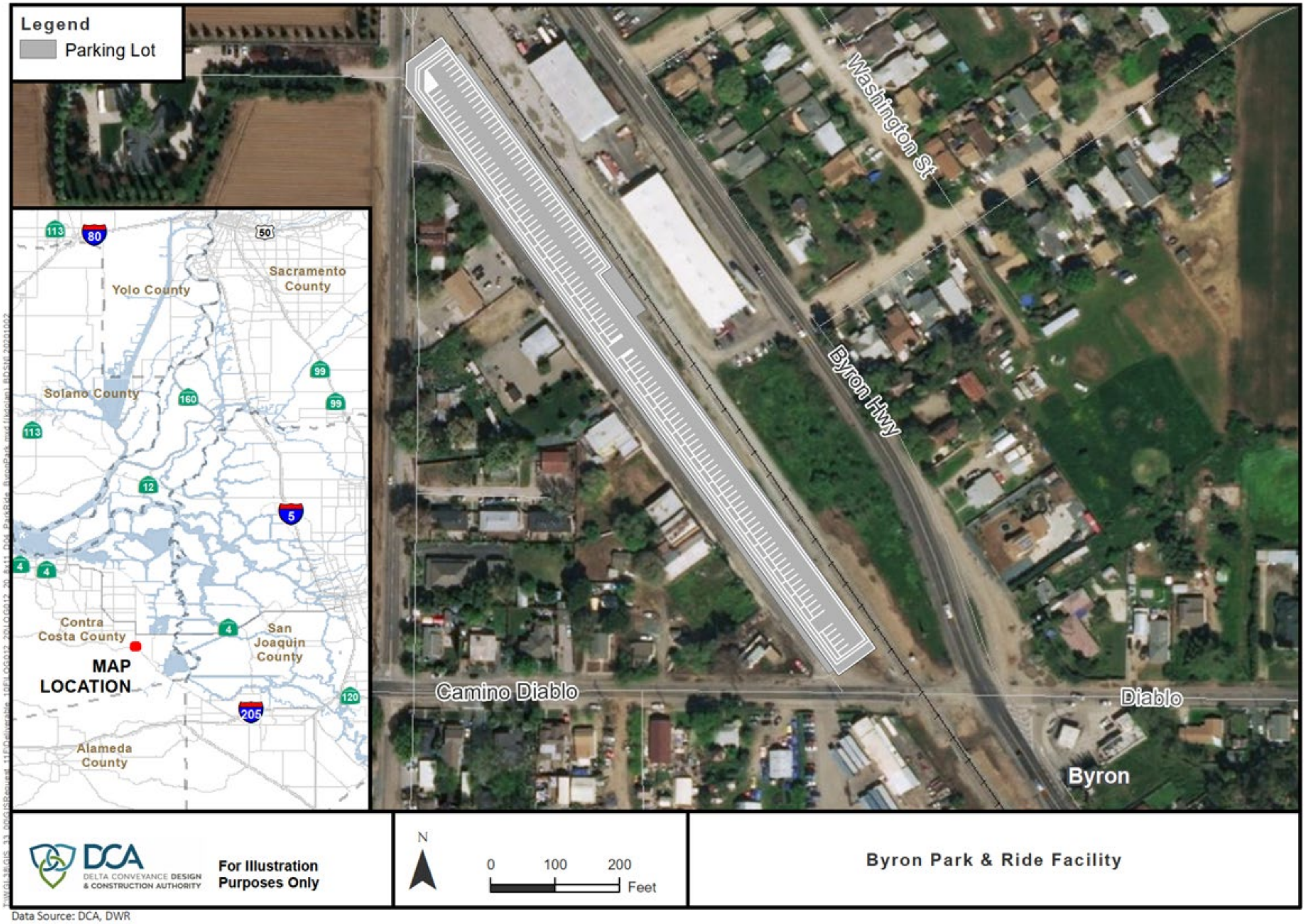


Figure B6. Byron Park & Ride Facility

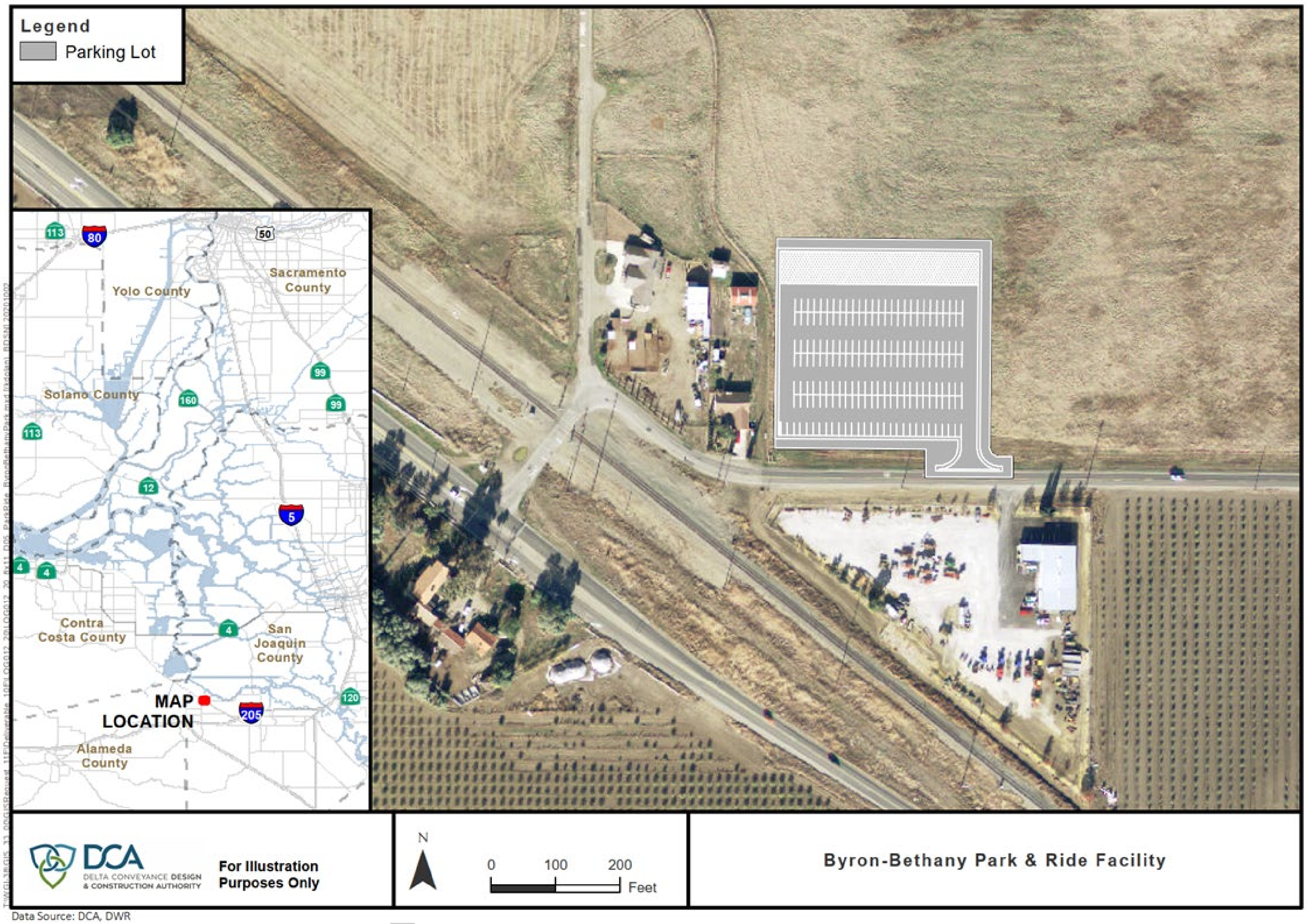


Figure B7. Byron-Bethany Park & Ride Facility

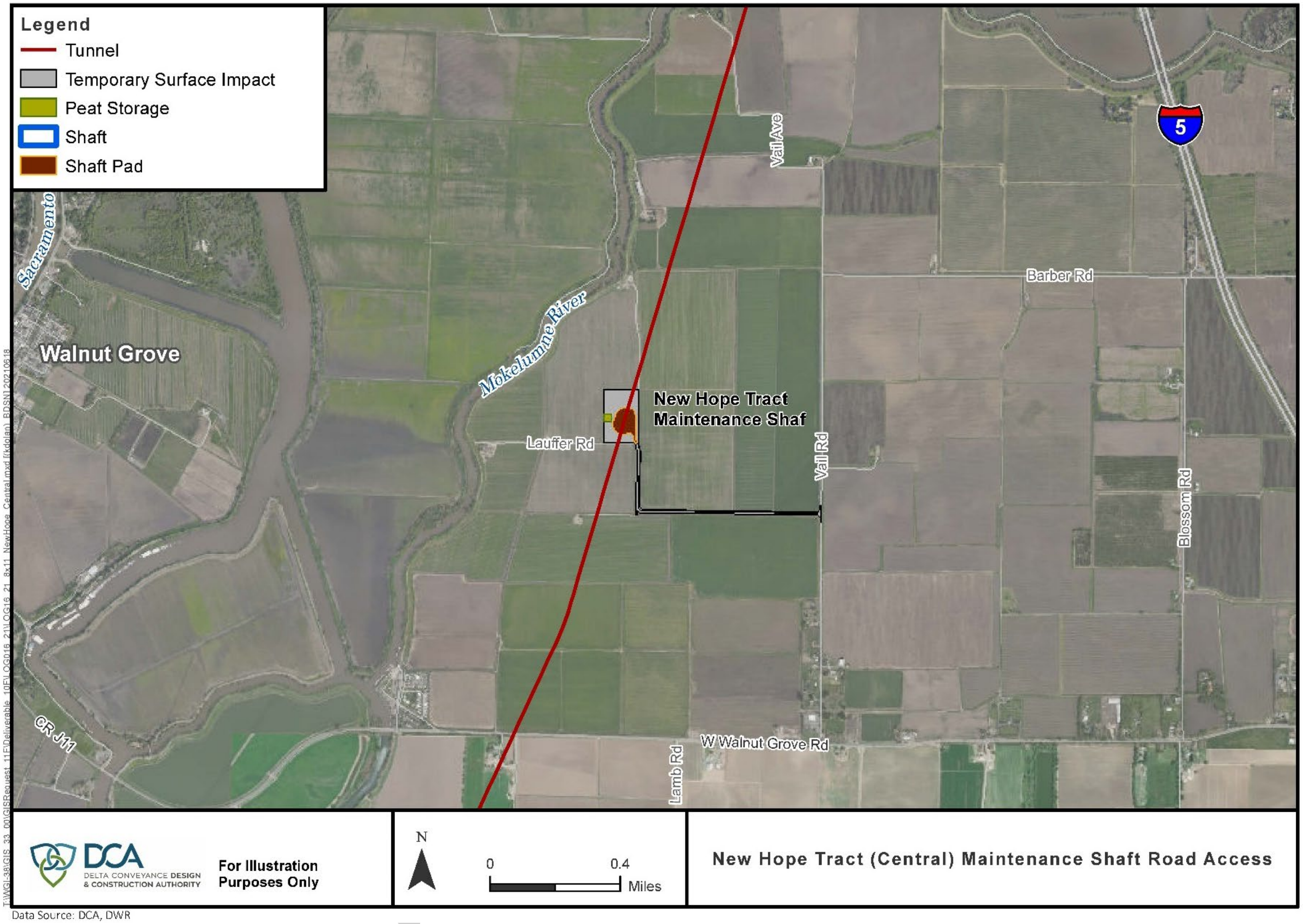
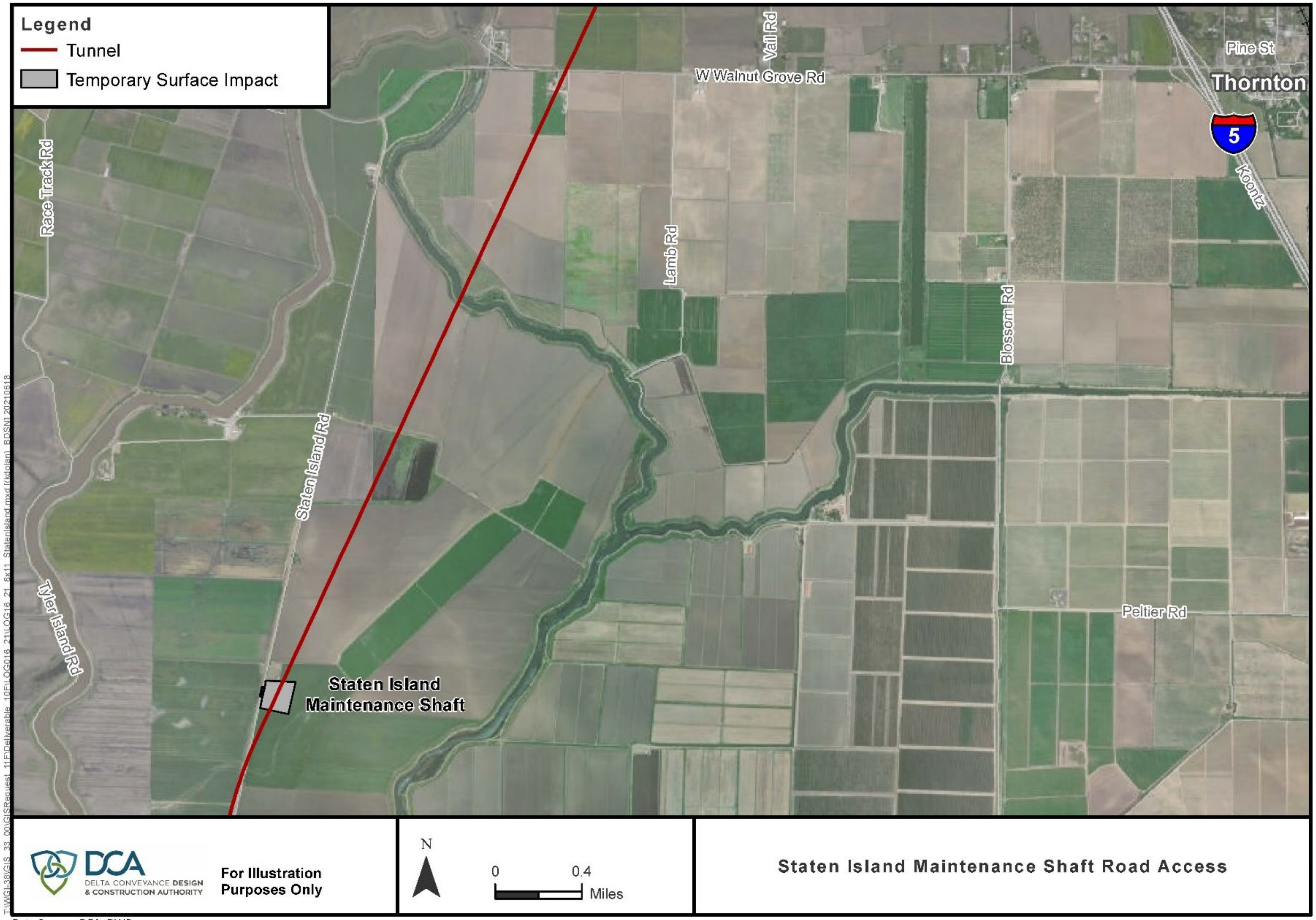


Figure B8. New Hope Tract (Central) Maintenance Shaft Road Access



Data Source: DCA, DWR

Figure B9. Staten Island Maintenance Shaft Road Access

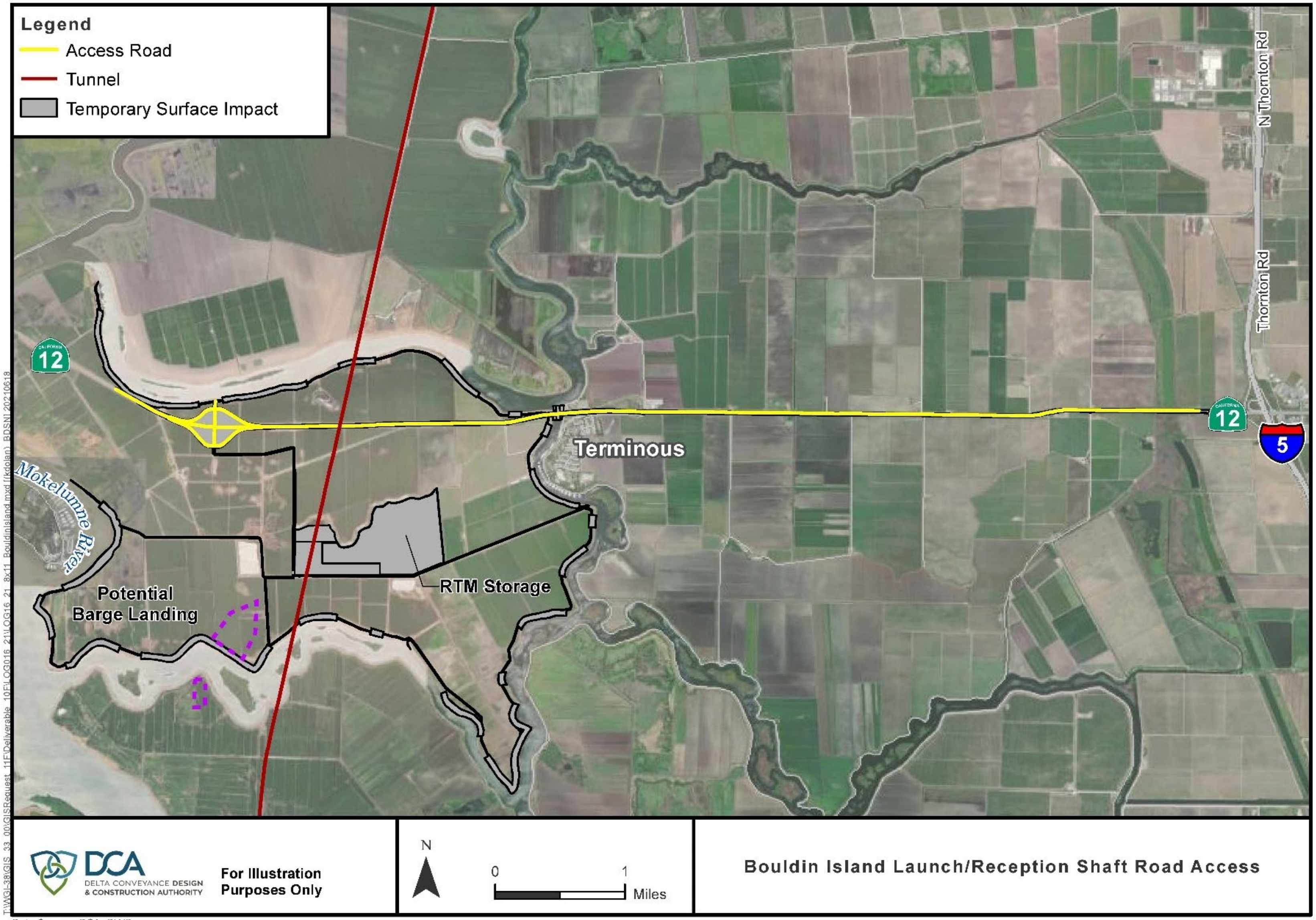
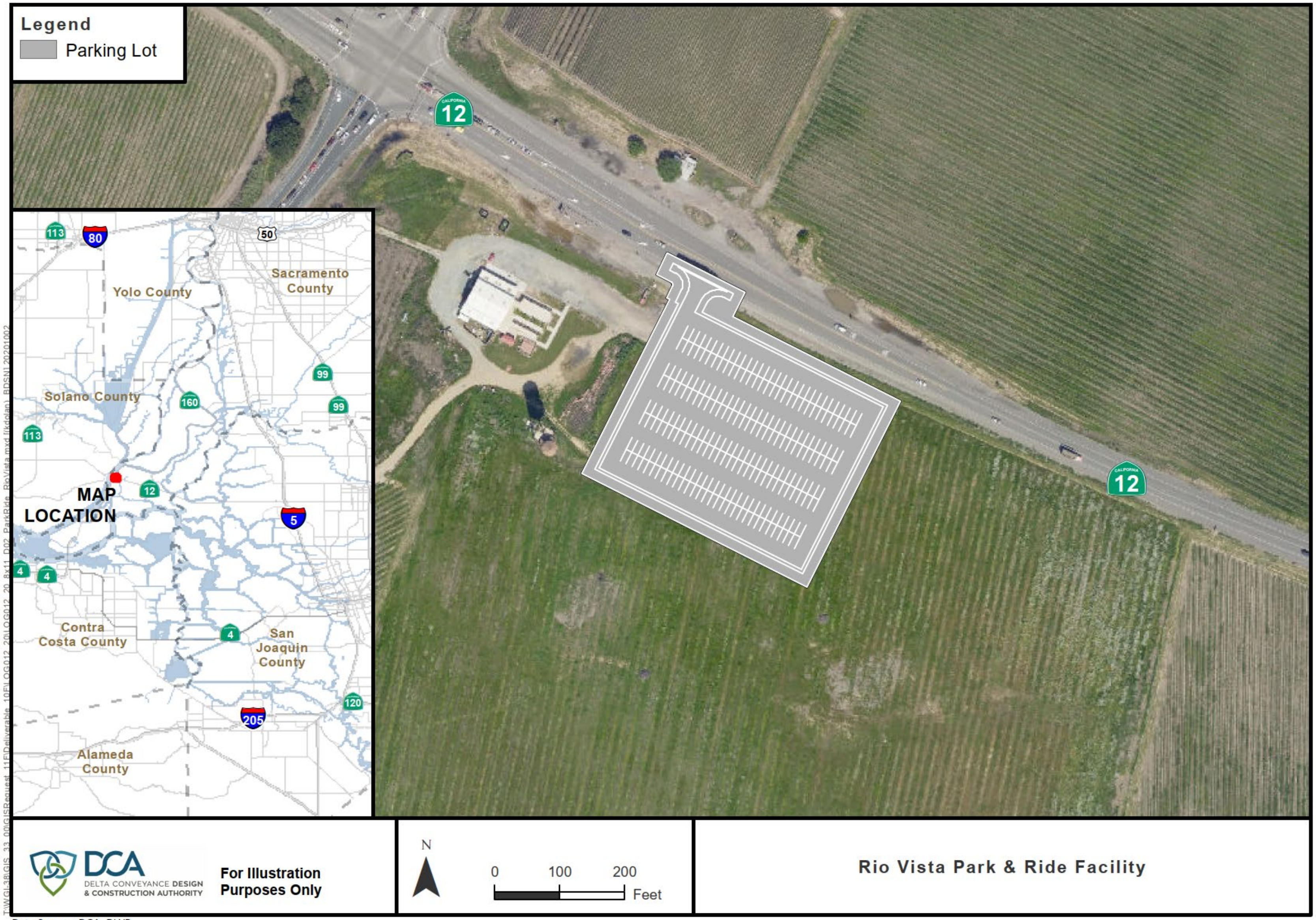


Figure B10. Bouldin Island Launch - Reception Shaft Road Access



Data Source: DCA, DWR

Figure B11. Rio Vista Park & Ride Facility

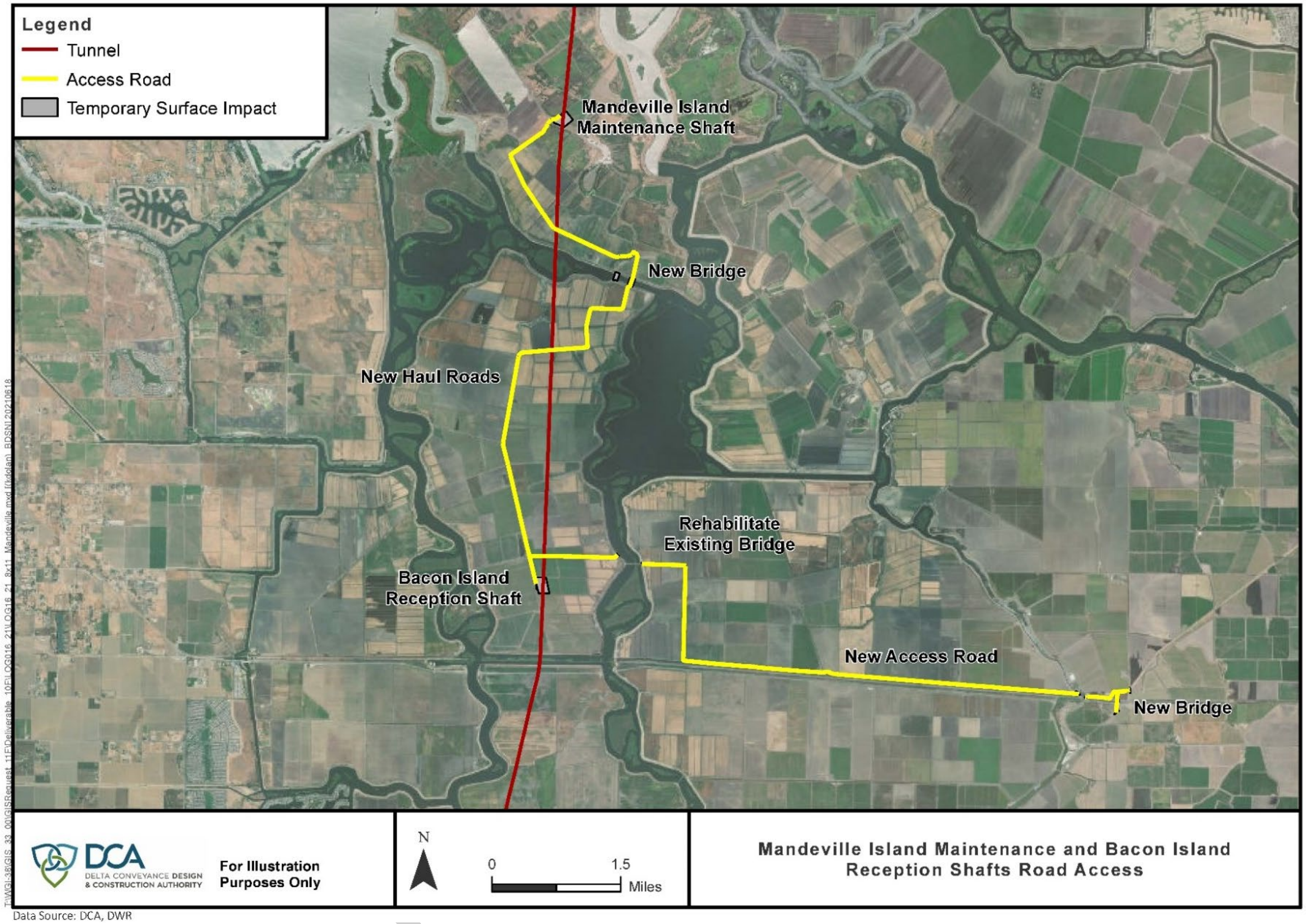
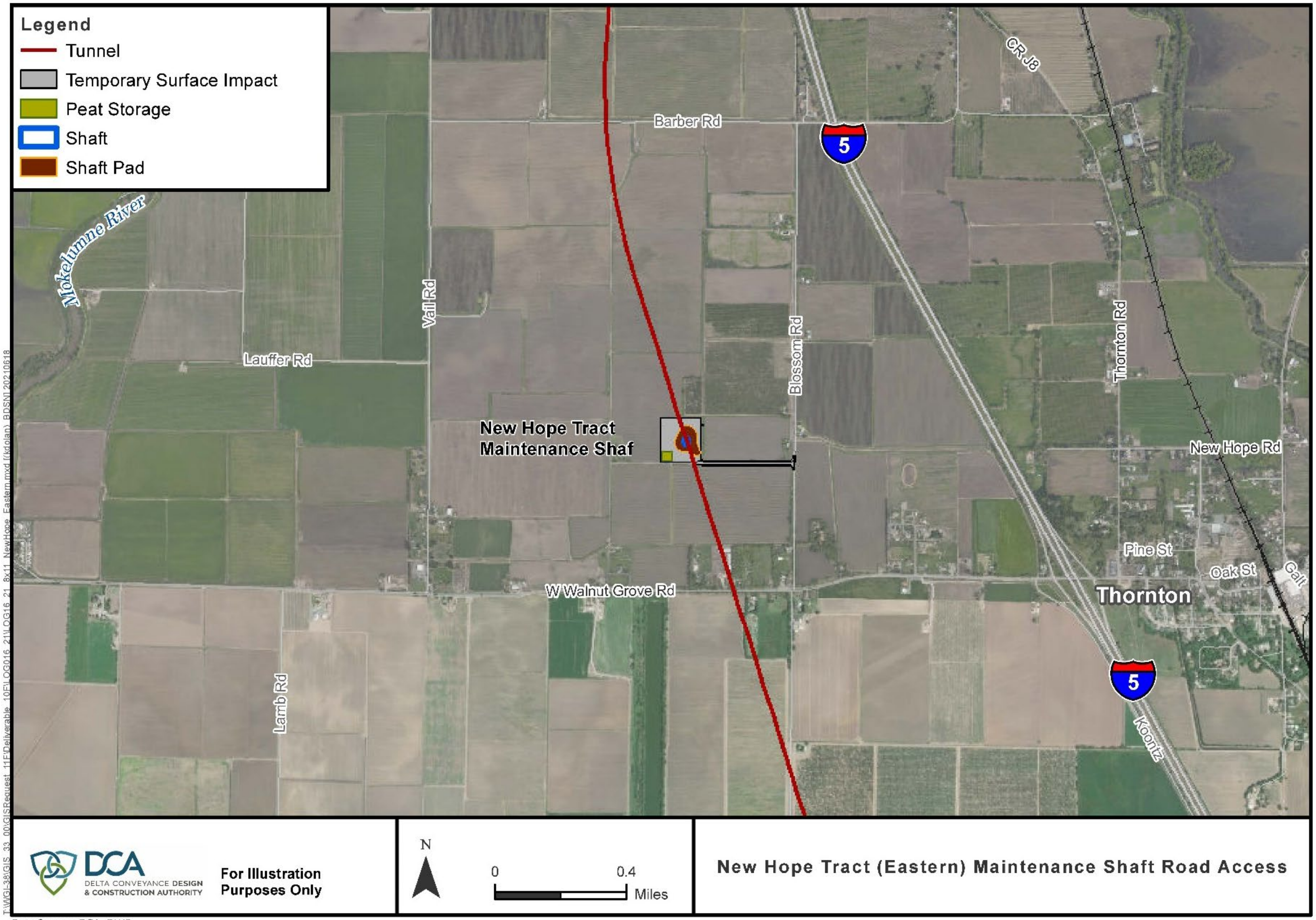
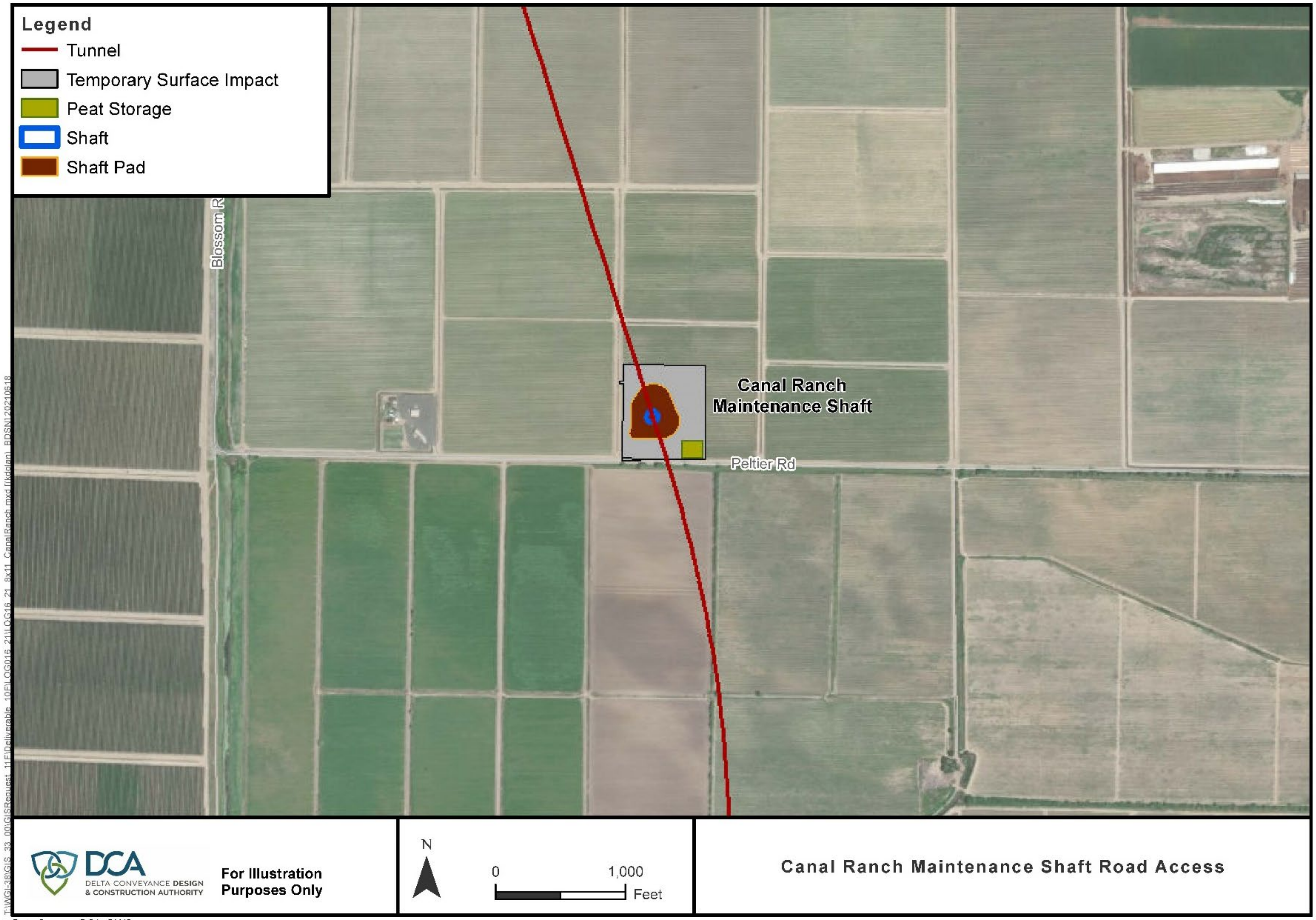


Figure B12. Mandeville Island Maintenance and Bacon Island Reception Shafts Road Access



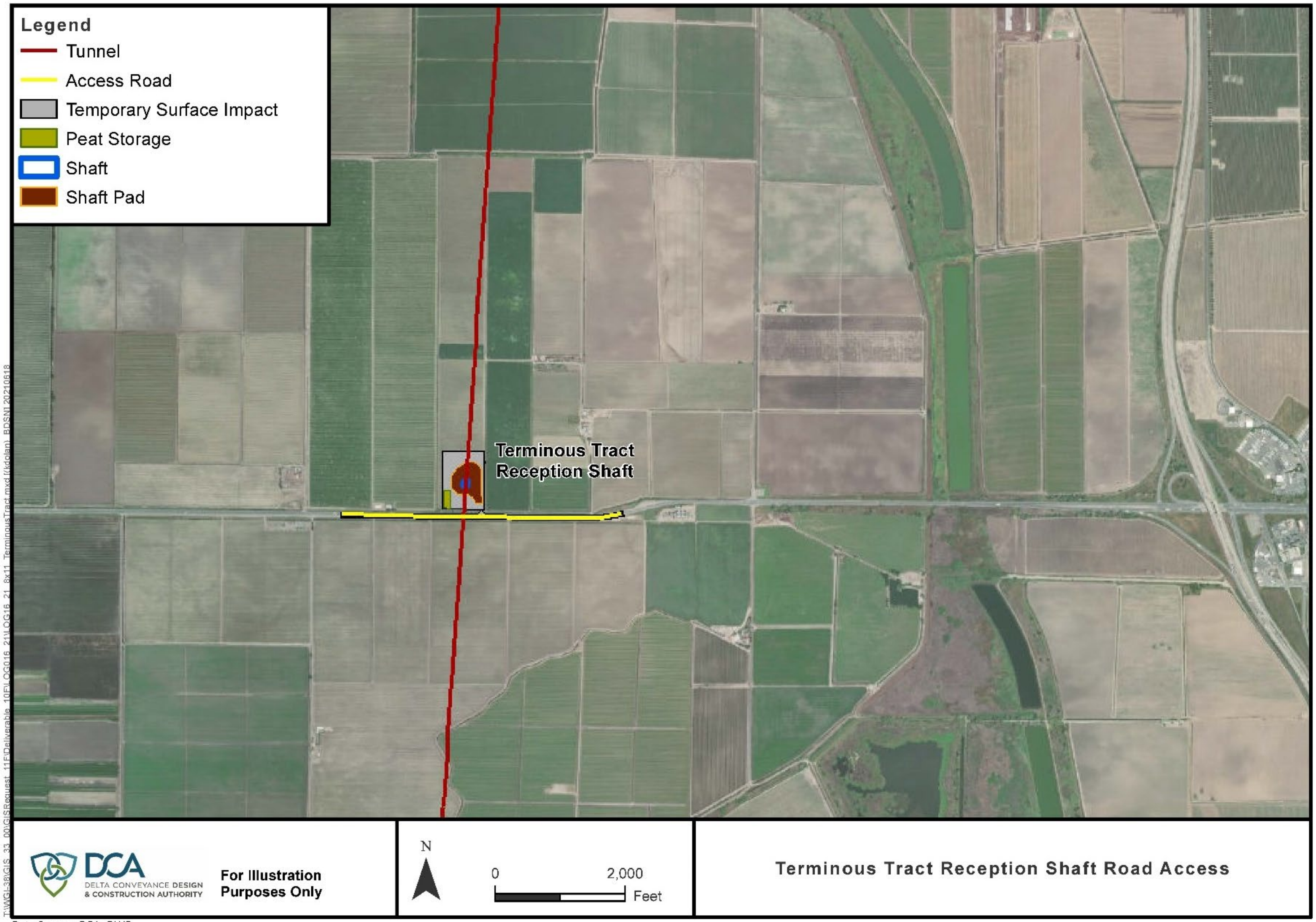
Data Source: DCA, DWR

Figure B13. New Hope Tract (Eastern) Maintenance Shaft Road Access



Data Source: DCA, DWR

Figure B14. Canal Ranch Tract Maintenance Shaft Road Access



Data Source: DCA, DWR

Figure B15. Terminous Tract Reception Shaft Road Access

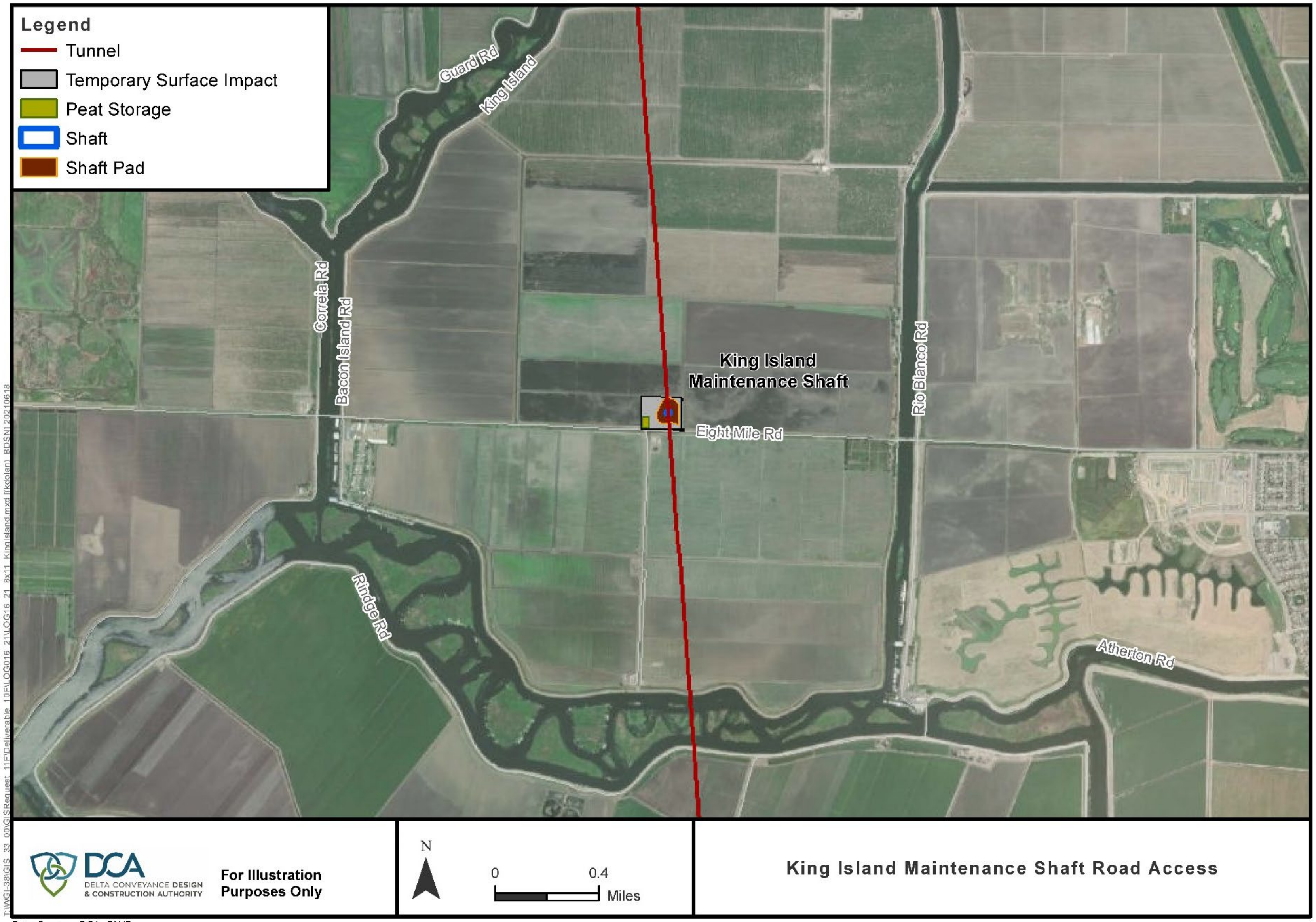
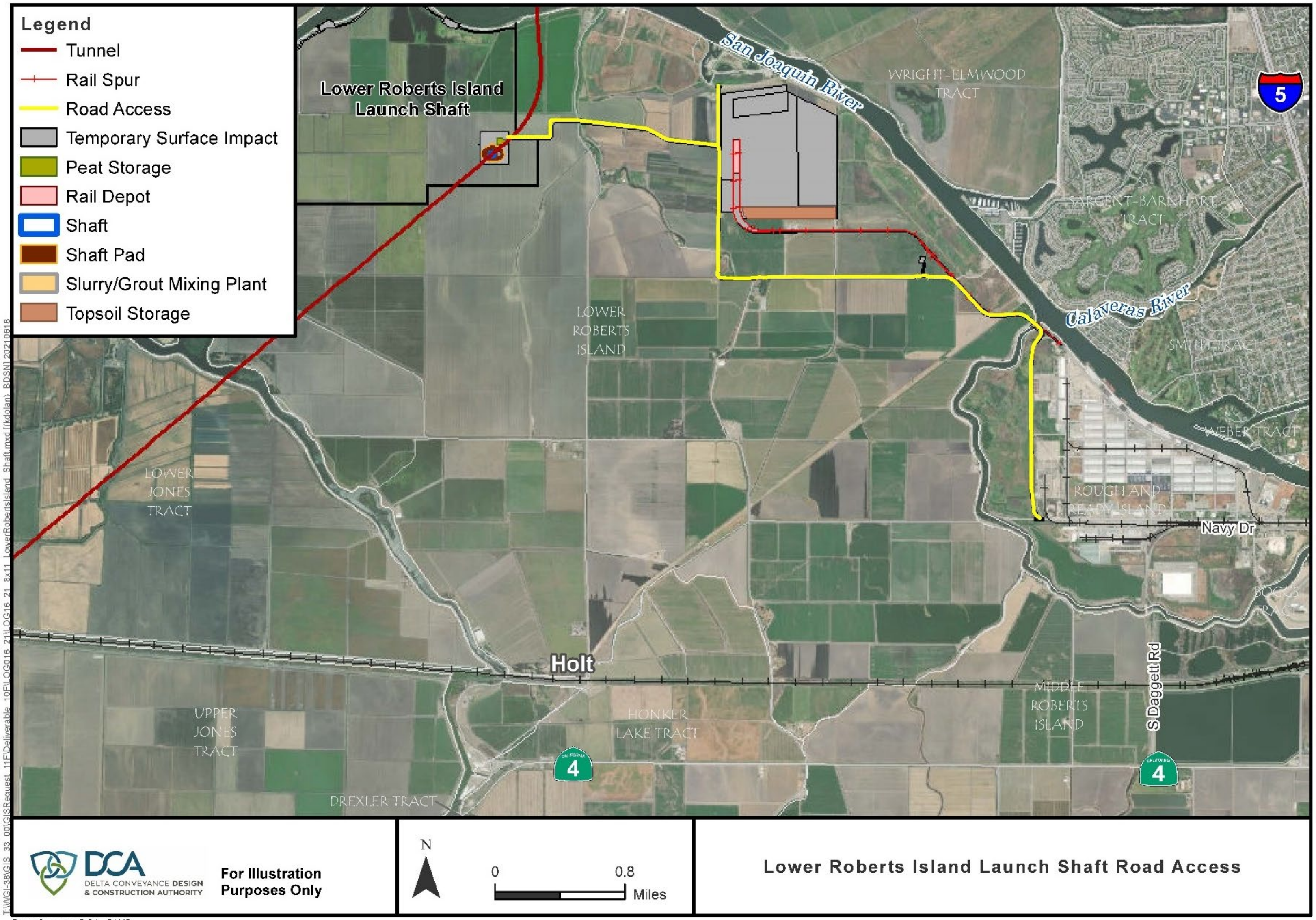


Figure B16. King Island Maintenance Shaft Road Access



Data Source: DCA, DWR

Figure B17. Lower Roberts Island Launch Shaft Road Access

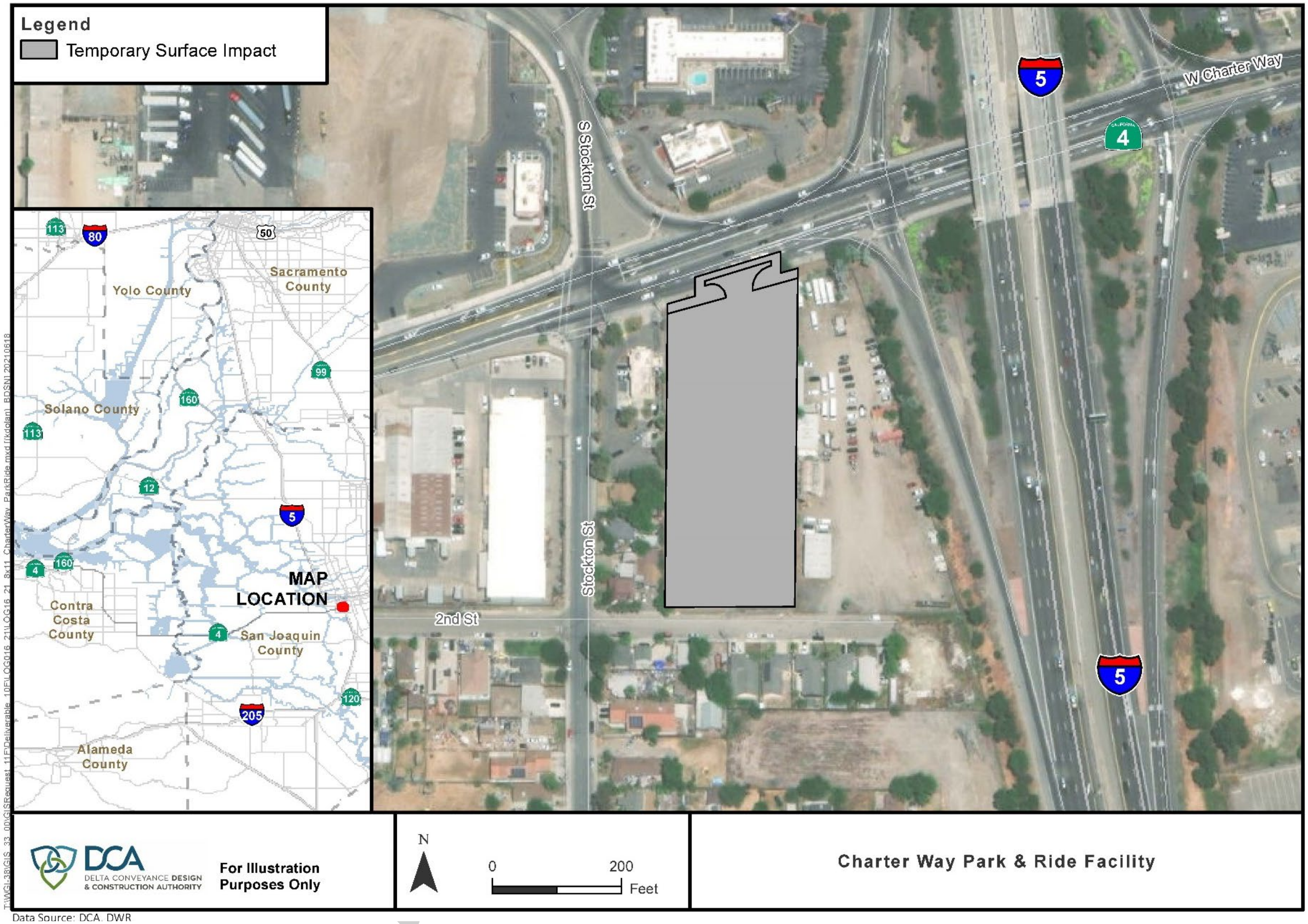


Figure B18. Charter Way Park & Ride Facility

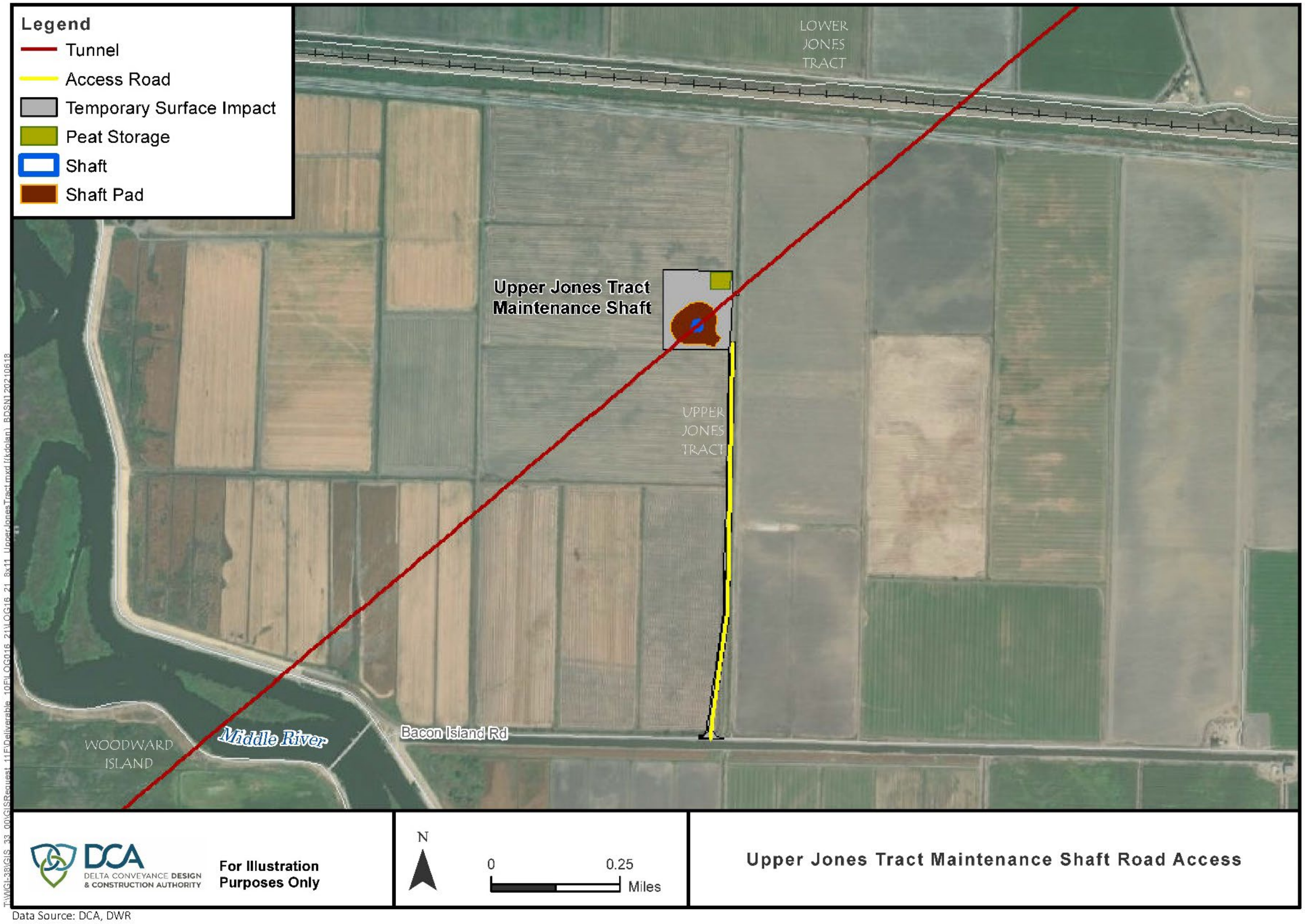


Figure B19. Upper Jones Tract Maintenance Shaft Road Access