Feasibility Report

November 2019

Grangeville Boulevard at BNSF Grade Separation

Prepared For:

City of Hanford
900 South 10th Avenue
Hanford, California 93230

Prepared By:

TRC
575 E Locust Avenue, Suite 105
Fresno, California 93720

Prepared by: Mark Imbriani, Vice President
TRC Engineers, Inc.

Approved by: Lou Camara, Public Works Director
City of Hanford

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1. Executive Summary

The purpose of this report is to present the results of a feasibility study conducted for the grade separation of Grangeville Boulevard and the Burlington Northern and Santa Fe (BNSF) Railway Company tracks. Underpass and overpass alignment alternatives were developed in consultation with the City of Hanford Public Works Department and BNSF. The preliminary designs adhere to the Union Pacific Railroad - BNSF Railway Guidelines for Railroad Grade Separation Projects, as well as AASHTO's Policy on Geometric Design of Highways and Streets 2011 Green Book. A detailed description of the alternatives considered, as well as their impacts and estimated costs are provided herein. A summary of some of the important design elements of each alternative are provided below.

Underpass Alternative:

- Design Speed = 45 mph
- Approach grades = 4%
- Pedestrian profile grade follows roadway profile grade.
- Minimum vertical clearance underneath structure = 17'-9"
- Roadway cross section consists of a 28 ft. wide traveled way each direction with a 14 ft. wide raised center median. The traveled way consists of 12 ft. wide inside lanes and 11 ft. wide outside lanes with 5 ft. wide outside shoulders/bike lanes (includes 2 ft. wide gutter pan). There are 5 ft. wide sidewalks on each side. There is no barrier separation between pedestrians and vehicular traffic.
- Two-span bridge, 99'-10" long and 66'-0" wide (accommodates two existing tracks and future 3rd track).
- Tall, Secant-type abutments and retaining walls along the length of the project.
- Profile conforms to existing grade approximately 500 ft. east of University Avenue and 150 ft. east of Rodgers Road.
- Project length = 1,800 ft.
- New access to businesses at northwest corner of Grangeville/BNSF intersection via Claridge Lane extension.
- New 12 ft. wide railroad access roads parallel to Grangeville Blvd. west of the tracks.
- Mildred Street access closed to Grangeville Blvd.
- New access to Tara Mobile Estates via Malone Street.
- Minor lowering of Rodgers Road intersection.
- Requires significant railroad work (i.e. shoofly, relocation of control point, shoring)
- Construction duration = 18 months
- Construction Cost = $34 M current year cost, $37 M escalated cost.
- Total Project Cost = $39 M current year cost, $43 M escalated cost.

Overpass Alternative:

- Design Speed = 40 mph
- Approach grades = 8% and 7.75%
- Pedestrian traffic is separated from roadway traffic by a vehicular barrier. Vehicular barrier retains grade difference between pedestrian profile and roadway profile.
- Pedestrian profile includes level landings at every 2.5 ft. max rise in profile grade.
- Minimum vertical clearance over railroad right-of-way = 23'-6"
- Roadway cross section consists of a 28 ft. wide traveled way each direction with a 12 ft. wide raised center median. The traveled way consists of 12 ft. wide inside lanes and 11 ft. wide outside lanes with 5 ft. wide outside shoulders/bike lanes. There are 5 ft. wide sidewalks on each side, separated from the roadway by a Caltrans standard vehicular barrier.
- Single-span bridge, 149'-6" long and 83'-6" wide.
- Bridge spans railroad right-of-way. No railroad track work.
- Tall, MSE-type abutments and retaining walls along the length of the project.
- Profile conforms to existing grade 50 ft. east of University Avenue and 150 ft. east of Rodgers Road.
- Project length = 2,100 ft.
- New access to businesses at northwest corner of Grangeville/BNSF intersection via Claridge Lane extension.
- New 12 ft. wide railroad access roads parallel to Grangeville Blvd. west of the tracks.
- Mildred Street access closed to Grangeville Blvd.
- New access to Tara Mobile Estates via Malone Street.
- Minor raising of Rodgers Road intersection.
- Construction duration = 12 months
- Construction Cost = $23 M current year cost, $26 M escalated cost.
- Total Project Cost = $26 M current year cost, $29 M escalated cost.

The above alternatives were developed using existing documentation, as-built plans, information obtained through field surveys, and the results of coordination meetings held with City staff and BNSF personnel. Right-of-way and utility impacts as well as project costs were considered in the development of the geometric drawings and bridge planning studies.

Underpass and overpass alignment alternatives are both feasible. Advantages of the underpass alternative include less visual impact and shallower approach grades which may be more comfortable for drivers and pedestrians using the facility. Advantages to the overpass alternative include a significantly lower cost and quicker design and construction schedule. TRC has prepared this feasibility report so that the City may weigh the pros and cons of each alternative and decide which alternative to carry forward into design.

2. Introduction & Background

The City of Hanford (City) approved the preparation of a feasibility study for the preliminary layout of the future grade separated railroad crossing at Grangeville Boulevard and the BNSF tracks. The results of the feasibility study are presented in this report, the purpose of which is to provide the City with information to make a decision as to which type of grade crossing would best suit their needs, either underpass or overpass, and to assist them in securing funding in the future.

The City of Hanford is bifurcated by the BNSF Railway Company tracks, as illustrated in Figure 1, below. In fact, there are 15 existing at-grade crossings that are blocked by the approximately 42 freight and passenger (Amtrak) trains that pass through the center of the City on a daily basis. There are no grade separated crossings of BNSF tracks within the City limits other than the State Highway 198 grade separation. This results in frequent delays to traffic and prevents cross-City access.

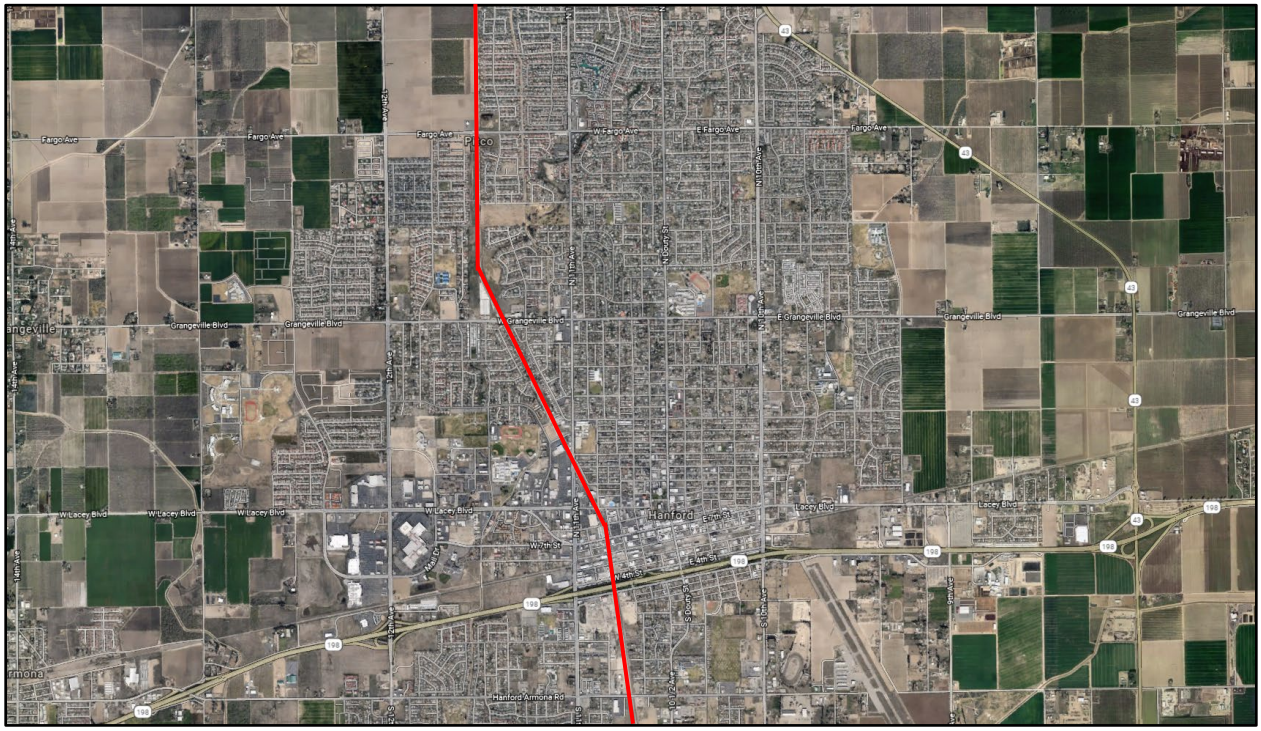


Figure 1: BNSF tracks crossing through Hanford

Most of the current City residential, commercial, and industrial areas are located east of the railroad tracks, along SR43 and SR198. Normal development pressure is occurring in the City, and much of that growth will, by necessity, be located west of the railroad tracks with an increase in traffic volumes, notably on Grangeville Boulevard as it is a principal arterial. The resultant traffic will require access across the track to SR43. Thus, the existing at-grade railroad crossings will experience much greater traffic volumes in upcoming years; significantly increasing total delay times in the near future.

Several locations were considered for the grade separated crossing including Flint Avenue, Fargo Avenue, Grangeville Boulevard, 11th Avenue, and Lacey Boulevard. Grangeville Boulevard was selected due to its central location and proximity to emergency services. Although its construction will cause more traffic disruptions than a more remote location like Flint Avenue, this location is still preferred due to the future benefits of the grade separated crossing being at a more centralized, highly trafficked area.

3. Purpose & Need

This grade separation project is needed because the cross-town traffic on east-west roadways in the City is significantly delayed at grade crossings with the BNSF tracks. In fact, with the exception of State Highway 198, there are 18 miles between grade separations in the City and Kings County. This problem will be exacerbated by the significant future projected growth. The significant delays due to at grade crossings have a detrimental impact on public safety and economic development in the community.

With the current distribution of residents and the planned growth, it will be important to maintain emergency access to the City's hospital which is located south of Grangeville Boulevard, along Mall Drive. The Grangeville Boulevard grade separated crossing will accomplish this important civic need, saving lives in the process. Additionally, response time by police and fire vehicles across the BNSF track will be improved, saving lives and property. Perhaps most importantly, automobiles have been struck by trains at the crossing. With the projected increase in traffic, safety can be expected to be further jeopardized at this crossing without a grade separation.

The primary purpose of the project is to provide a grade separated east-west arterial roadway in the City, eliminating delay and providing safer crossing of the BNSF track and access to State Highways 43 and 198. This project will greatly improve mobility in the central part of the City of Hanford. Without this project, significant traffic delays and congestion are anticipated on all east-west arterial streets in the City. This grade separation will relieve congestion, improve emergency response times, and increase safety on other arterial streets due to the expected shift in traffic to Grangeville Blvd. because of the grade separation.

Construction of the project will also facilitate development of property located west of the railroad tracks. This land has been identified by the City in their adopted General Plan as a future growth area to provide residential, commercial, and economic development in the north and west portions of the City (see Figure 2).

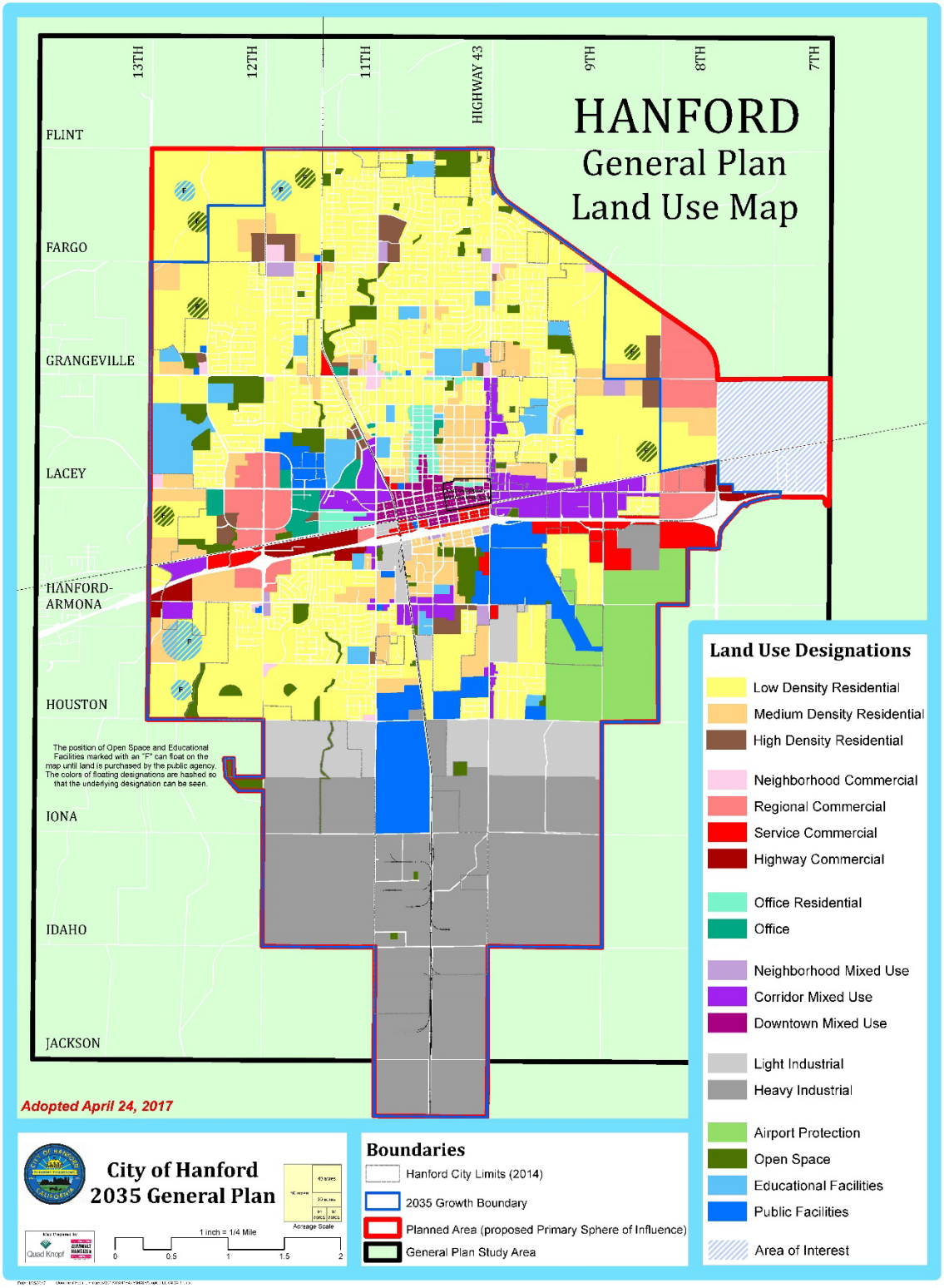


Figure 2: City of Hanford 2035 General Plan

4. Project Scope

To alleviate the above concerns, the City has decided to plan for the Grangeville Boulevard grade separation. The goals for this grade separation are:

1. Reduce accident potential and liability at this at-grade crossing
2. Improve emergency response times by providing this grade separation near the City center
3. Reduce traffic delays on this major east-west route through the City
4. Provide for efficient cross-town traffic
5. Provide infrastructure for the planned growth in traffic volumes
6. Eliminate traffic delays caused by train operations
7. Improved air quality by eliminating vehicle idling at train crossings

Although not a primary reason for constructing the grade separation, a great benefit it provides to residents and businesses nearby is a reduction in train noise. Because the train will no longer pass at-grade, the engineer will not need to sound the horn through the crossing. The elimination of the train horn noise will presumably have a positive impact on quality of life and property values in the area.

The grade separation will include the following features, as illustrated on the attached preliminary plan and profile sheets and bridge planning studies (see Appendix A):

1. Grade separation of BNSF track
2. Conveyance of rail traffic through the construction zone
3. Elimination of a grade crossing
4. Elimination of the T-intersection at Mildred Street
5. Extension of Claridge Lane to provide access to businesses
6. New access to Tara Bella Estates via Malone Street.
7. Addition of railroad access roads parallel to Grangeville Blvd. west of the tracks
8. Safer vehicular, pedestrian and bicycle lanes
9. Raised median along the length of the project
10. ADA compliant sidewalks
11. Profile touchdown to existing grade between University Avenue and Rodgers Road.

Two alignment alternatives were evaluated for the crossing. The alternatives studied were an underpass and overpass structure to separate the roadway grade from the railroad tracks. An overpass structure carries vehicular traffic over the railroad; whereas an underpass structure allows vehicular traffic to go under the railroad as the train uses the structure. Due to the proximity of residences and business to Grangeville Boulevard, retaining walls will be required along the length of the project for both alternatives in order to retain the excavation or fill. See Figures 3 and 4 for examples of underpass and overpass structures.

Figure 3: Underpass Structure; with retaining walls (above), with cut slope (below)

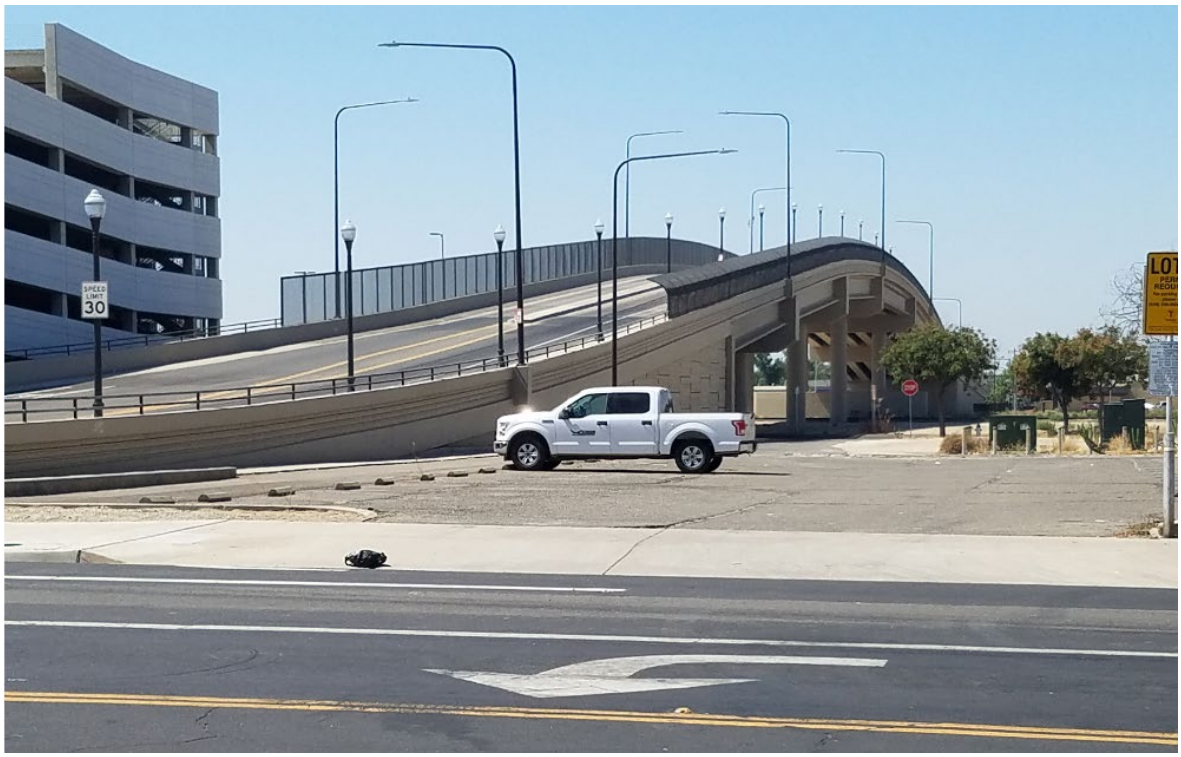


Figure 4: Overpass Structure; with retaining walls (above), with embankment fill (below)

In order to study the feasibility of each alternative, the preparation of plan and profile views of both an underpass and overpass were prepared. The City wished to study both an underpass and overpass alternative to determine the advantages and disadvantages of each and establish costs for future funding acquisition. The underpass alternative is significantly more expensive than the overpass alternative; however, it may be the more favorable option should sufficient funding become available.

Listed below are the comparative advantages and disadvantages of the underpass and overpass alternatives.

Underpass Alternative:

Advantages	Disadvantages
• Shorter project length • Flatter approach grades • No level landings required to make sidewalks ADA compliant • Design speed of 45 mph • Less visual impact	• More expensive • Requires significant railroad track work, including shoofly of two tracks and relocation of control point • Requires pump station for drainage • Complex construction including shoring of the railroad shoofly • Potential to expose hazardous materials • More expensive utility relocation

Overpass Alternative:

Advantages	Disadvantages
• Significantly less expensive • No railroad track work • Easier railroad approval • Easier railroad access (bridge spans over RR ROW) • No pump station required • Quicker design and construction schedule	• Longer project length (approx. 300 ft.) • Steep approach grades • Steep sidewalk grades, requires separate profile with introduction of level landings to meet ADA requirements • Design speed of 40 mph compared to Underpass Alt. design speed of 45 mph • Greater impact to Rodgers Road intersection. • Large walls behind homes and in front of businesses (visual impact) – bridge elevated 30 ft. above ground

5. Existing Condition

Grangeville Boulevard is currently a 4-lane arterial with a center two-way left turn lane within the project limits (see Figure 5 for Project Vicinity Map). The BNSF track intersects Grangeville Blvd. at an approximate 26 degree skew. Major intersections to Grangeville Blvd. occur at University Ave and Rodgers Road approximately 1,300 ft. west and 650 ft. east of the crossing, respectively. Mildred Street intersects Grangeville Blvd. only from the south approximately 500 ft. west of the crossing, and an entrance to Tara Mobile Estates intersects Grangeville Blvd. only from the south just west of Mildred Street.

The 2035 General Plan Land Use for property surrounding the crossing is as follows: Northwest corner to be service commercial, northeast corner to be offices, southeast corner to be medium density residential and southwest corner to be low density residential. The four corners at University Avenue are to be residential, and three of the four corners at Rodgers Road are to be residential, with the northwest corner being offices. The property south of Grangeville Blvd within the project limits has already been developed and is all residential. Immediately adjacent to the crossing, between Rodgers Road and Mildred Street, the homes back up to Grangeville Blvd. Some of the property north of Grangeville Blvd. within the project limits has been developed. There is a large self-storage facility with private offices in front facing Grangeville Blvd. located northwest of the crossing. There is a vacant lot between the storage facility and the tracks. East of the tracks on the north side is a former YMCA facility that was recently purchased.

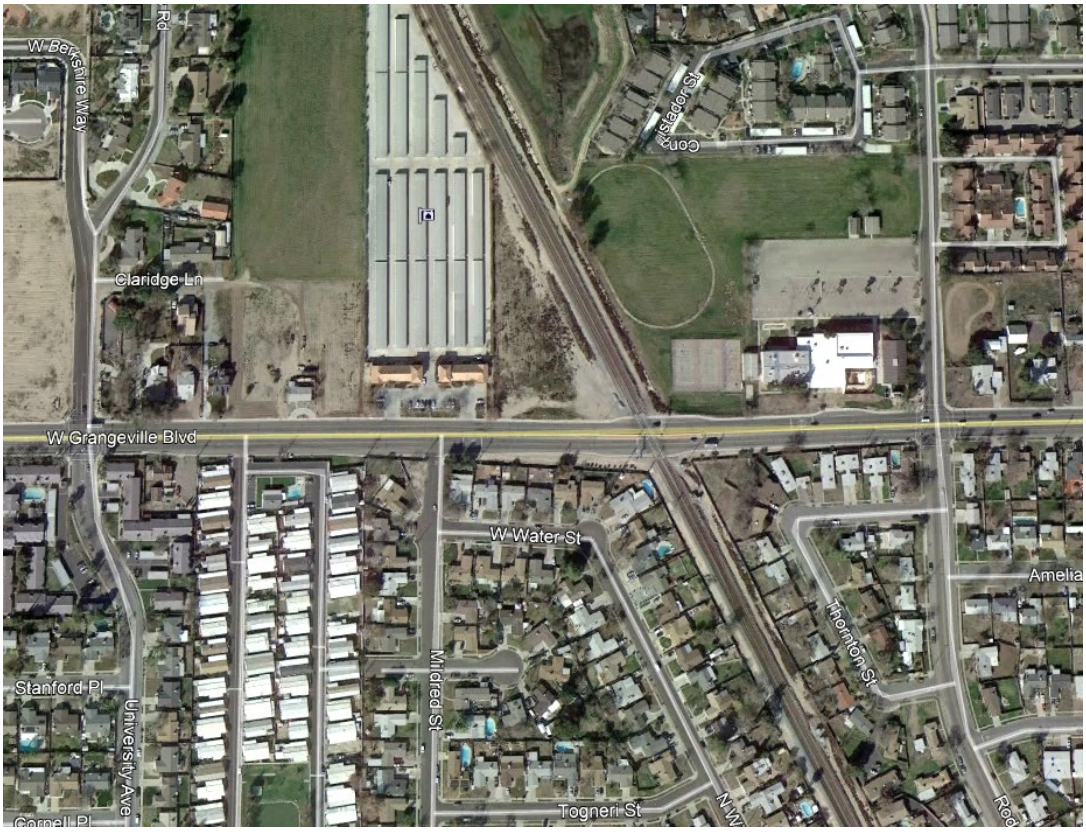


Figure 5: Project Vicinity Map

6. Underpass Study

Roadway

The proposed underpass roadway will maintain the existing horizontal alignment. The proposed vertical profile incorporates vertical curves and grades that meet AASHTO Greenbook standards for a 45 mph design speed. The vertical profile was set using 4% grades on the east and west approaches. The minimum vertical clearance criteria of 17'-6" at the railroad right-of-way to the bottom of the structure was used to create the vertical profile. The sidewalk will follow the roadway profile and will satisfy ADA requirements. The roadway design features four travel lanes, a 14 ft. wide raised median, 5 ft. wide outside shoulders/bike lanes (includes 2 ft. wide gutter pan), and 5 ft. wide sidewalks. For the underpass roadway layout, see Appendix A, Sheet L-1.

Mildred Street, which currently intersects Grangeville Blvd. only from the south, will be terminated with a cul-de-sac just south of Grangeville Blvd. An entrance to Tara Mobile Estates currently intersects Grangeville Blvd. only from the south, just west of Mildred Street. This access will be reconstructed to a right in, right out only driveway, with alternative access being created on Malone Street, located parallel to and south of Grangeville Blvd. This realignment will improve the traffic flow in this area by eliminating two T-intersections. Rodgers Road, which currently intersects Grangeville Blvd. east of the tracks will remain as is but be slightly lowered in elevation to accommodate the profile grade. See Appendix A, Sheet L-2 for existing and proposed grades at Rodgers Road and proposed driveway conforms. Finally, a new access road will be provided to parcels in the northwest quadrant of the project, including the Santa Fe Mini Storage facility, by extending and paving Claridge Lane from University Ave, thus eliminating the existing driveway access point near the grade crossing.

Right of Way

To reduce right of way impacts to nearby properties, retaining walls will be constructed parallel to the roadway along the length of the project. These walls will be constructed in a top-down fashion so that large temporary excavations to place retaining wall footings are not required. Utility easements will be required behind the retaining walls parallel to Grangeville Blvd. for railroad access roads and reconstructed utilities. Where possible, utilities running in Grangeville Blvd. will be relocated behind the retaining walls for ease of access, and to maintain gravity flow as is applicable. A pump station will be required to accommodate storm drainage. The proposed location for the pump station is in the vacant lot at the northwest corner of the crossing (APN 008-410-001-000). The City should consider taking steps to purchase this property now before commercial development of the lot occurs.

Temporary construction easements will be required at the northeast and southeast corners of the crossing to construct the railroad shoofly. Both tracks will need to be temporarily shifted about 50 ft. to the east so that train traffic can be maintained while the new underpass structure is being constructed. The limits of the temporary proposed right of way are shown on the underpass roadway layout sheet.

Traffic Control/Stage Construction

Railroad operations and local traffic can be significantly impacted by the construction of an underpass. Two general options are technically possible for handling traffic during construction. By far the quickest, most cost effective and safest way to construct the project is to close the road and build the entire project in one stage. Detours via Fargo Avenue to the north or Lacey Boulevard to the south are 4.0 miles in length. A detour via Elm Street is 2.2 miles in length. Peters Engineering performed a traffic study to determine the effects of closing the road during construction (see Appendix E for Traffic Study). The analysis assumed that 50 percent of the existing trips on Grangeville Blvd. will redistribute to Fargo Avenue, 25 percent will use Elm Street, and 25 percent will use Lacey Blvd. The traffic study determined that the nearest available detour routes are likely to experience severe congestion and delays during construction and recommended a public information campaign to alert motorists of the project, the alternate routes, and the potential for congestion. Alternate routes further from the project site, such as State Route 198 and Flint Avenue should be suggested.

The alternative option is to maintain two lanes of traffic through the construction site using complex traffic handling and stage construction plans. To do this, the following sequence, or some variant, would be required, assuming the railroad would approve it:

1. **Construct temporary railroad shoofly tracks, grade crossing, shoring, and temporary railroad trestle.**

   The road will need to be closed to traffic during this time. Construct a temporary grade crossing in the westbound lanes at the shoofly track location. Construct a sheet pile shoring wall parallel to and just north of the Grangeville Blvd. centerline. Construct a temporary railroad trestle across the eastbound lanes at the shoofly track location. Construct shoofly trackage for two mainlines. Install a temporary crossing protection system for the two-lane detour at the shoofly.
2. **Construct temporary two-lane detour.**

   Construct temporary two-lane traffic detour on the westbound lanes of Grangeville Blvd. Divert traffic to the temporary lanes.
3. **Divert trains to the shoofly.**
4. **Construct the southwest quadrant of the underpass structure.**
5. **Construct southern retaining walls and excavate and pave eastbound lanes.**
6. **Switch traffic to the eastbound lanes.**

   Divert traffic to the eastbound lanes. Vehicles will be down in the excavation, passing underneath the newly constructed southwest quadrant of the underpass structure and the temporary railroad trestle.
7. **Construct the northwest quadrant of the underpass structure.**
8. **Swing mainline railroad traffic to new underpass structure.**

   Construct mainline track segment on underpass. Swing mainline tracks back to original alignment. Remove shoofly trackage and temporary railroad trestle.
9. **Construct northern retaining walls, excavate westbound lanes and remove shoring.**
10. **Construct remaining portion of underpass structure.**

    Widen the bridge to the east to accommodate a future third track.

Underpass Structure and Retaining Wall Construction

We have chosen to show a precast, prestressed concrete wide flange girder superstructure on the underpass planning study sheet as we believe it to be the best choice for this situation (see Appendix A, Sheet B-1 Underpass Planning Study). This structure type has a lower depth-to-span ratio than other precast concrete structure types, meaning it has a shallower superstructure and requires less excavation to meet vertical clearance requirements. A concrete structure is recommended rather than steel construction due to reduced construction costs, better aesthetics, and reduced long-term maintenance costs. A cast-in-place superstructure was not considered because the railroad rarely allows cast-in-place concrete superstructures for underpass structures. In addition, cast-in-place construction has a longer duration than precast construction, and the shortest construction schedule is desired to minimize the disruption to traffic.

Secant pile abutments and retaining walls are proposed for this project. This type of wall can be constructed with minimal disruption to nearby properties since large temporary excavations are not required to place foundations. A secant wall consists of cast-in-drilled-hole (CIDH) piles overlapping each other in a single line. A line of concrete piles known as secant piles are constructed first by drilling holes and filling them with lean concrete. Then structural CIDH piles with rebar cages and structural concrete are constructed between the secant piles. See Figure 6 below for a plan view. After the piles are constructed, the contractor can then excavate down in front of the wall and place a cast-in-place concrete fascia for appearance (see Figure 7).

Figure 6: Secant Pile Wall Plan View

Figure 7: Example Secant Pile Wall without Fascia

Drainage

The underpass structure will require surface water drainage (and sometimes groundwater) to be pumped from the roadway sag up to the local storm water conveyance system. The estimated cost for this alternative includes the cost of providing a typical pump station within the project limits to store and facilitate the passage of stormwater to the local system. The proposed location for the pump station is in the vacant lot at the northwest corner of the crossing. Important information to obtain to size, price, and design the pump station includes: area draining to the low point, rainfall intensity, return period of the design storm, and limits (if any) of outflow rate into the local drainage system. The drainage may be pumped into the storm drain line located west of the crossing (at about station 19+00) which leads north to a storm drain basin.

Aesthetics

This underpass structure will be a landmark in the community and must be designed to be compatible with the surroundings. The underpass alternative will have minimal visual impact to the adjacent properties; however, approximately 15,000 travelers on Grangeville Blvd will pass through daily. Decorative form liners may be selected for the faces of retaining walls and center pier. Decorative steel railing may be placed on top of the retaining walls and across the underpass structure. See Figure 3 above for an example of these types of aesthetic treatments.

Environmental Clearance

The grade separation itself has a statutory exemption under CEQA, but additional environmental research may be required depending upon the other associated work and the level of controversy. The City may consider preparing an environmental document to address the concerns of the community. This report would review the effects on surrounding properties, businesses in particular, to facilitate discussions with property owners. Its purpose would be to reveal community concerns and mitigate them to the property owner(s) and community's satisfaction. This would maintain the CEQA exemption. If resolution cannot be reached, then a more extensive environmental process and document would be required. The most significant issues are expected to be visibility of and access to businesses, traffic detours due to road closure, and potential subsurface discoveries. Although noise will be greater during construction, the grade separation will eliminate use of the train horn at the crossing, which is a significant benefit to the surrounding community.

Railroad Construction and Coordination

BNSF will require that the railroad remain in service during construction of the underpass structure. This will require the construction of a shoofly to route the railroad traffic around the construction area. The shoofly for both tracks will have to be constructed prior to any excavation for the underpass. There is a railroad control point located approximatly 150 ft. south of the crossing which the railroad uses to switch trains between tracks. This control point is 1,200 ft. in length and will fall within the shoofly track limits. It will need to be temporarily relocated with the shoofly, and then placed back in its current position. According to BNSF, relocation of the control point could cost more than $5 million. Construction of the shoofly and relocation of the control point will require extensive coordination with BNSF. Appropriate approvals will need to be obtained from the railroad and the Public Utilities Commission (PUC). The total estimated cost of

railroad work for the underpass alternative is $8 million. This poses a significant challenge for this alternative.

Utilities

The construction of an underpass structure will require the relocation of underground and overhead utilities. The underground utilities that will have to be relocated or deepened to pass underneath the roadway are:

1. Southern California Gas Company gas line
2. City Sewer, Water and Storm Drain

Portions of the overhead utilities running on the south side of the project may need to be relocated prior to construction. These utilities are:

1. Southern California Edison electric lines
2. Comcast Cable TV
3. AT&T telephone lines

The utilities within the BNSF right of way are unknown at this time, although grade crossing alteration plans from 2001 indicate a buried communication line running parallel to the tracks. All of the utilities located within the limits of construction for this project will require review and approval by the relevant agencies prior to construction of the underpass. Where possible, utility relocation should be implemented prior to construction of the underpass. Utility and railroad relocation construction would require significant coordination to ensure that the underpass excavation is not delayed due to waiting for utility relocation. During construction of the underpass it will be required to have representatives of all utilities present during any construction located close to their respective facilities.

The City sewer is proposed to be relocated on the north side of Grangeville Blvd, behind the retaining wall. The SoCal gas line is proposed to be relocated on the south side of Grangeville Blvd, behind the retaining wall. Parallel gas facilities may be required on the north and south side to make lateral connections. The storm drain will be lowered with the roadway, and a storm drain pump station will be constructed. See discussion under “Drainage” above. There may not be sufficient room behind the retaining wall at the southeast quadrant to relocate the City water due to the proximity of homes to Grangeville Blvd, therefore the City water may need to be lowered with the roadway and placed in the outside travel lane. The best option for each utility facility will have to be studied during the design phase of the project.

Funding/Estimate

The City submitted an application for nomination to the Grade Separation Fund Priority List maintained by the California Public Utilities Commission (CPUC) in 2017 and ranked 13th on the state-wide list. It is necessary to reapply every two years to remain on this list, and the City recently reapplied in October 2019. Being on this list means that the project could receive $5 to $15 million dollars in funding towards construction of the underpass. The estimated escalated cost for this project built in one stage is:

Right of Way	$2,650,000
Engineering/Administration	$5,580,000
Total Construction	$34,670,000
Total Probable Estimated Cost*	$42,900,000

*See Appendix B for the Total Probable Estimated Cost Breakdown. Values shown here have been rounded to the nearest ten thousand.

The funding for this project will likely come from three sources; City, BNSF, and CPUC Grade Separation Fund administered by Caltrans. The proposed contribution breakdown is as follows:

City of Hanford	$33,610,000
Railroad Contribution (10%)	$4,290,000
Grade Separation Fund	$5,000,000

The City may wish to implement a regional transportation sales tax in order to reserve funds for this project.

7. Overpass Study

Roadway

The proposed overpass roadway will maintain the existing horizontal alignment. The proposed vertical profile incorporates vertical curves and grades that meet AASHTO Greenbook standards for a 40 mph design speed. A somewhat reduced design speed of 40 mph is required as opposed to 45 mph in order to reduce impacts to the Rodgers Road intersection. The vertical profile was set using a 7.75% grade on the east approach and an 8% grade on the west approach. The minimum vertical clearance criteria of 23'-6" at the railroad right-of-way to the bottom of the structure was used to create the vertical profile. For the overpass roadway layout, see Appendix A, Sheet L-3. A separate sidewalk profile was developed for the project to satisfy ADA requirements (see Appendix A, Sheet L-4 to L-6). The sidewalk incorporates 5 ft. wide level landings at every 2.5 ft. max rise in profile grade. The difference in grade between the roadway and sidewalk is retained by a vehicle barrier at the edge of traveled way. The roadway design features four travel lanes, a 12 ft. wide raised median, 5 ft. wide outside shoulders/bike lanes, and 5 ft. wide sidewalks. A vehicle barrier separates pedestrians from traffic and a pedestrian handrailing is included at each edge of deck of the overpass structure.

Mildred Street, which currently intersects Grangeville Blvd. only from the south, will be terminated. A gate and access will be provided at the Mildred St. terminus. An entrance to Tara Mobile Estates currently intersects Grangeville Blvd. only from the south, just west of Mildred Street. This access will be reconstructed to a right in, right out only driveway, with alternative access being created on Malone Street, located parallel to and south of Grangeville Blvd. This realignment will improve the traffic flow in this area by eliminating two T-intersections. Rodgers Road, which currently intersects Grangeville Blvd. east of the tracks will remain as is but be slightly raised in elevation to accommodate the profile grade. See Appendix A, Sheet L-7 for existing and proposed grades at Rodgers Road and proposed driveway conforms. Finally, a new access road will be provided to parcels in the northwest quadrant of the project, including the Santa Fe Mini Storage facility, by extending and paving Claridge Lane from University Ave, thus eliminating the existing driveway access point near the grade crossing.

Right of Way

To reduce right of way impacts to nearby properties, retaining walls will be constructed parallel to the roadway along the length of the project. Mechanically stabilized embankment (MSE) walls will be utilized so that large temporary excavations or expensive shoring is not required to place cantilever-type retaining wall footings. Utility easements will be required in front of the retaining walls parallel to Grangeville Blvd. for railroad access roads and reconstructed utilities. Where possible, utilities running in Grangeville Blvd. will be relocated in front of the retaining walls for ease of access, and to maintain gravity flow as is applicable.

Traffic Control/Stage Construction

For an overpass structure, railroad operations remain largely unaffected, but vehicular traffic is impacted. Two general options are technically possible for handling traffic during construction. By far the quickest, most cost effective and safest way to construct the project is to close the road and build the entire project in one stage. For detour routes and impacts to traffic as a result of

closing Grangeville Boulevard during construction, see discussion under “Underpass Study” above.

The alternative option is to maintain two lanes of traffic through the construction site using complex traffic handling and stage construction plans. To do this, the following sequence would be required, assuming the railroad would approve it:

1. **Construct temporary two-lane detour.**

   Construct temporary two-lane traffic detour on the westbound lanes of Grangeville Blvd. Divert traffic to the temporary lanes.
2. **Construct temporary shoring wall adjacent to two-lane detour.**

   Construct sheet pile or soldier pile shoring wall parallel to and just north of the Grangeville Blvd. centerline.
3. **Construct southern portion of overpass.**

   Construct southern retaining walls, southern half of embankment, southern half of structure, and southern roadway approaches.
4. **Switch traffic to the eastbound lanes and construct remaining portion of overpass.**

   Divert traffic to the eastbound lanes and newly constructed southern half of the overpass structure. Construct remaining portion of structure. Place northern retaining walls and embankment for northern half of structure, remove shoring wall, and construct remaining portion of roadway approaches.

Overpass Structure and Retaining Wall Construction

We have chosen to show a precast, prestressed concrete wide flange girder superstructure on the overpass planning study sheet as we believe it to be the best choice for this situation (see Appendix A, Sheet B-2 Overpass Planning Study). This structure type can span long distances and has a relatively low depth-to-span ratio. A concrete structure is recommended rather than steel construction due to reduced construction costs, better aesthetics, and reduced long-term maintenance costs. TRC prepared a Structure Type Selection Memorandum for the overpass alternative which evaluated cast-in-place and precast superstructure types and configurations, as well as abutment and retaining wall types (see Appendix C). Precast was selected as the preferred structure type because it has a shorter construction duration than cast-in-place and does not require the use of falsework within the railroad right-of-way. A shorter, single-span bridge with tall abutments placed close to the railroad right of way is preferred over a longer, multi-span bridge with short abutments for cost reasons, and to limit the amount of vacant space underneath the structure that may allow homeless people to congregate.

The overpass structure will be approximately 149 ft. long and will accommodate the roadway cross section on Grangeville Boulevard consisting of four travel lanes, a 12 ft. median, 5 ft. outside shoulders, and 5 ft. sidewalks. A vehicle barrier will be placed between the travel way and the sidewalk to provide protection for pedestrians and to retain the grade difference between the sidewalk and roadway off the bridge. An 8 ft-3 in tall protective fence meeting railroad requirements will be placed at each edge of deck. Off the bridge, a decorative pedestrian railing is proposed.

MSE abutments and retaining walls are proposed for this project. MSE walls must be set back a minimum of 50 ft. from the railroad track centerline per the BNSF guidelines, or one must get approval to place them closer and incorporate abutment protections. This type of wall can be constructed with minimal disruption to nearby properties since only a small leveling pad is required and not a large foundation requiring large temporary excavations to construct. An MSE wall consists of precast concrete panels with soil reinforcing strips extending back into the embankment at even intervals along the length and height of the wall. See Figure 8 below for a cross section of the wall. A reinforced concrete barrier slab sits on top of the wall and allows for attachment of the vehicle barrier and pedestrian railing.

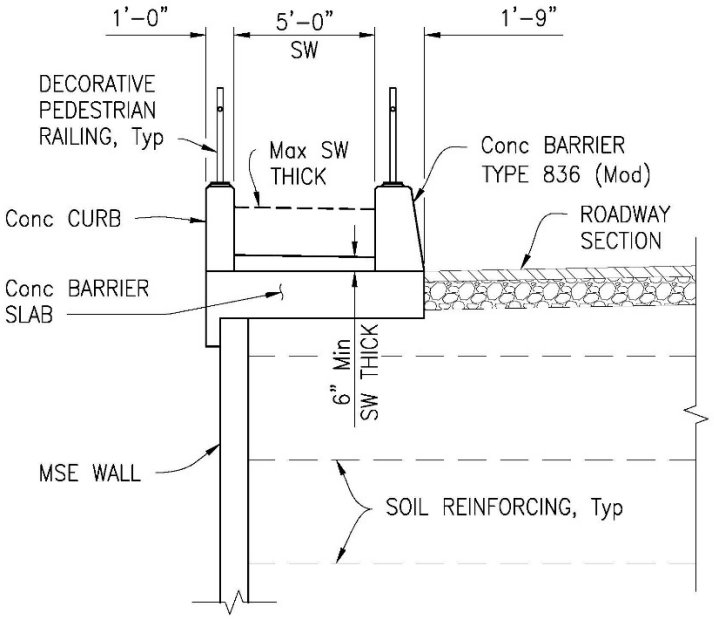


Figure 8: MSE Wall Cross Section

Drainage

An overpass alternative has little effect on the current drainage of the site compared to an underpass alternative where the road is placed in a cut section. Rain falling on the bridge deck will flow along the barrier curbs and be collected in a series of deck drains discharging into a storm drain system along Grangeville Boulevard.

Aesthetics

This overpass structure will be a landmark in the community and must be designed to be compatible with the surroundings. The overpass alternative will have a significant visual impact to the adjacent properties since it will be elevated approximately 30 ft. above existing ground at the highest point. See Appendix D for exhibit showing visual impact to properties at the southeast quadrant of the crossing, on Water Street. These homes back up to the overpass. Additionally, approximately 15,000 travelers on Grangeville Blvd will pass over the bridge daily. Architectural textured surfaces and/or vegetation may be selected for the faces of retaining walls. Decorative steel railing may be placed on top of the retaining walls and across the overpass structure.

Environmental Clearance

The grade separation itself has a statutory exemption under CEQA, but additional environmental research may be required depending upon the other associated work and the level of controversy. The City may consider preparing an environmental document to address the concerns of the community. This report would review the effects on surrounding properties, businesses in particular, to facilitate discussions with property owners. Its purpose would be to reveal community concerns and mitigate them to the property owner(s) and community's satisfaction. This would maintain the CEQA exemption. If resolution cannot be reached, then a more extensive environmental process and document would be required. The most significant issues are expected to be visibility of and access to businesses, visual impact, and traffic detours due to road closure. Although noise will be greater during construction, the grade separation will eliminate use of the train horn at the crossing, which is a significant benefit to the surrounding community.

Railroad Construction and Coordination

Construction of an overpass will not require significant modification of railroad facilities or impact rail operations. The bridge abutments will be constructed outside of the railroad right-of-way, and the bridge superstructure will span over the right-of-way. The existing crossing protection system will be removed prior to construction of the overpass but not until after the closure of the road and through traffic along Grangeville Boulevard is diverted to another route(s). Appropriate approvals will need to be obtained from the railroad and PUC.

Utilities

The construction of an overpass structure will require the relocation of underground and overhead utilities. The underground utilities that will have to be relocated or raised to facilitate access are:

3. Southern California Gas Company gas line
4. City Sewer, Water and Storm Drain

Portions of the overhead utilities running on the south side of the project and service poles on the north side of the project will need to be relocated prior to construction. These utilities are:

4. Southern California Edison electric lines
5. Comcast Cable TV
6. AT&T telephone lines

Utilities running within BNSF right of way will not be affected by the overpass construction; however, undergrounding of utilities crossing the railroad could affect the railroad utilities. It is recommended to pothole all the utilities in the design phase so that all conflicts can be resolved prior to construction. All of the utilities located within the limits of construction for this project will require review and approval by the relevant agencies prior to construction of the overpass. Where possible, utility relocation should be implemented prior to construction of the overpass.

The City sewer and storm drain are proposed to be relocated on the north side of Grangeville Blvd, in front of the retaining wall. The City water and SoCal gas line are proposed to be relocated on the south side of Grangeville Blvd, in front of the retaining wall. Parallel gas facilities may be required on the north and south side to make lateral connections. There may not be sufficient room in front of the retaining wall at the southeast quadrant to relocate the City water due to the proximity of homes to Grangeville Blvd, therefore the City waterline may need to be raised with the roadway and carried over the bridge. Utilities that are to be raised within the roadway will have to be reconstructed near the center of the roadway so that they are not in conflict with the MSE wall soil reinforcing. The best option for each utility facility will have to be studied during the design phase of the project.

Funding/Estimate

The City submitted an application for nomination to the Grade Separation Fund Priority List maintained by the California Public Utilities Commission (CPUC) in 2017 and ranked 13th on the state-wide list. It is necessary to reapply every two years to remain on this list, and the City recently reapplied in October 2019. Being on this list means that the project could receive $5 to $15 million dollars in funding towards construction of the overpass. The estimated escalated cost for this project built in one stage is:

Right of Way	$1,400,000
Engineering/Administration	$3,740,000
Total Construction	$24,310,000
Total Probable Estimated Cost*	$29,450,000

*See Appendix B for the Total Probable Estimated Cost Breakdown. Values shown here have been rounded to the nearest ten thousand.

The funding for this project will likely come from three sources; City, BNSF, and CPUC Grade Separation Fund administered by Caltrans. The proposed contribution breakdown is as follows:

City of Hanford	$21,505,000
Railroad Contribution (10%)	$2,945,000
Grade Separation Fund	$5,000,000

The City may wish to implement a regional transportation sales tax in order to reserve funds for this project.

8. Conclusions

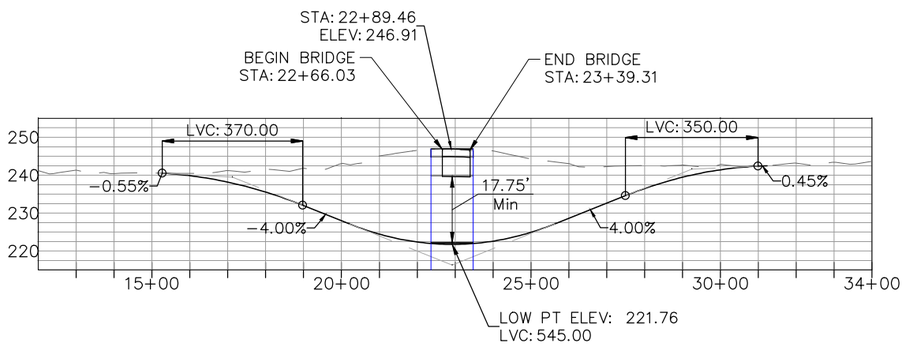
A railroad grade separation is needed in the City of Hanford to improve public safety, alleviate traffic congestion due to train blockages, and spur economic growth. Grangeville Boulevard is the ideal location for this grade separation due to its central location and proximity to emergency services. Underpass and overpass alignment alternatives were studied and are both feasible. Advantages of the underpass alternative include less visual impact and shallower approach grades which may be more comfortable for drivers and pedestrians using the facility. Advantages to the overpass alternative include a significantly lower cost and quicker design and construction schedule. TRC has prepared this feasibility report so that the City may weigh the pros and cons of each alternative and decide which alternative to carry forward into design.

9. References

Union Pacific Railroad – BNSF Railway. 2016. Guideline for Railroad Grade Separation Projects.

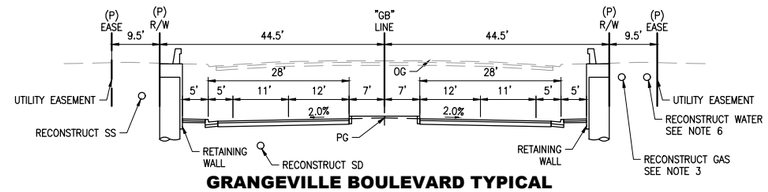
AASHTO. 2011. A Policy on Geometric Design of Highways and Streets.

Appendix A: Grade Separation Layouts

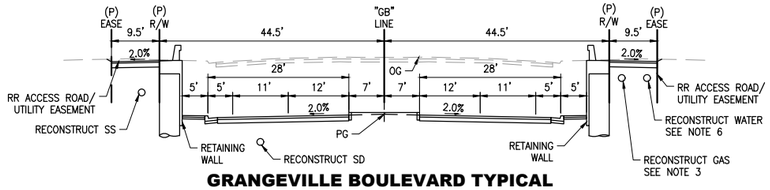


"GB" LINE PROFILE

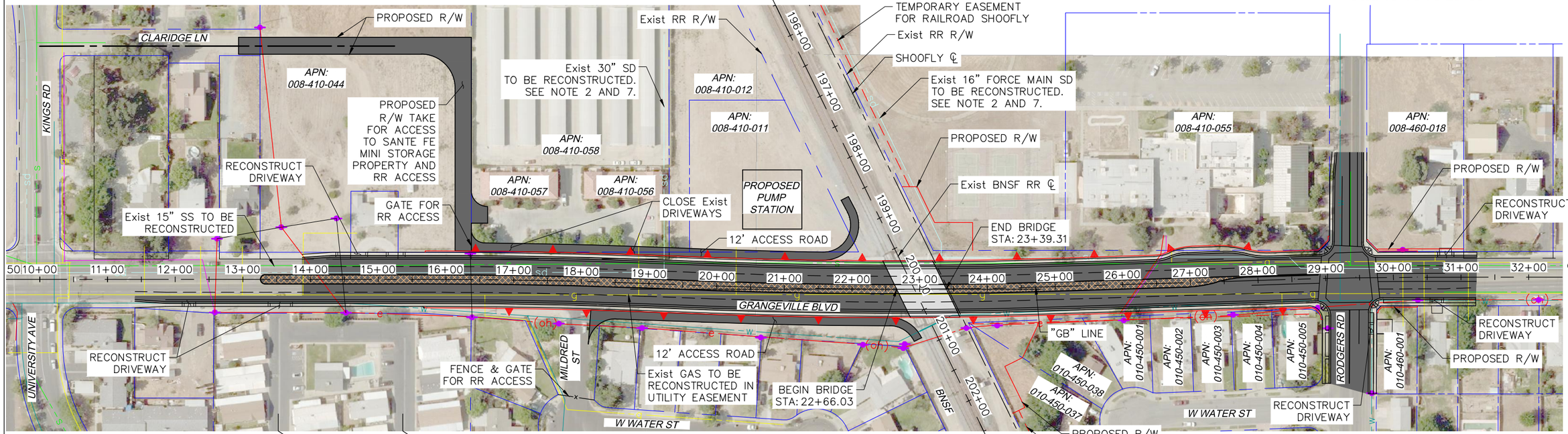
NE QUADRANT
RR ACCESS ALTERNATIVE

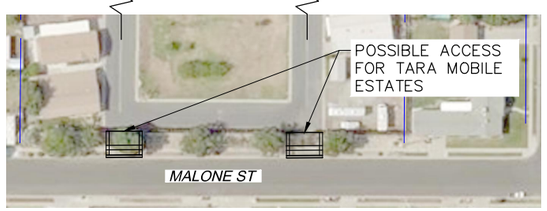


GRANGEVILLE BOULEVARD TYPICAL
STA. 23+00 TO 29+00



GRANGEVILLE BOULEVARD TYPICAL
STA. 13+75 TO 23+00





SE QUADRANT
RR ACCESS

LEGEND

- RETAINING WALL
- Exist R/W
- Exist PROPERTY LINE
- PROPOSED R/W
- EXISTING UTILITY POLE
- PROPOSED UNDERPASS STRUCTURE
- PROPOSED PAVEMENT
- PROPOSED RAISED MEDIAN

UTILITY NOTES:

1. UTILITIES ON NORTH SIDE WILL BE RECONSTRUCTED IN ACCESS ROAD AND WILL CONTINUE THROUGH A 15' PUE ACROSS PROPERTIES UNTIL END OF WALL.
2. NEED 10' SEPARATION BETWEEN STORM DRAIN AND SEWER.
3. HIGH PRESSURE GAS MAIN TO BE LOWERED. MAY NEED TO BE RELOCATED BEHIND RETAINING WALL.
4. RECONSTRUCT SEWER (GRAVITY) ON NORTH SIDE OF GRANGEVILLE BLVD.
5. RELOCATION REQUIRED FOR OVERHEAD UTILITIES.
6. WATER LINE INFORMATION UNKNOWN. WATER MAIN ASSUMED TO BE ADJACENT TO EXISTING GRANGEVILLE BOULEVARD. RECONSTRUCT TO AVOID CONFLICTS WITH RETAINING WALL.
7. RECONSTRUCT 30" GRAVITY AND 16" FORCE MAIN STORM DRAIN ON NORTH SIDE. TIE IN PROPOSED ROAD DRAINAGE SYSTEM.

DESIGN DESIGNATION

GRANGEVILLE BLVD DESIGN SPEED = 45 MPH

DR. BY:	NAH
CH. BY:	JLC
DATE:	11/13/19
SCALE:	1" = 150'

UNDERPASS ROADWAY LAYOUT

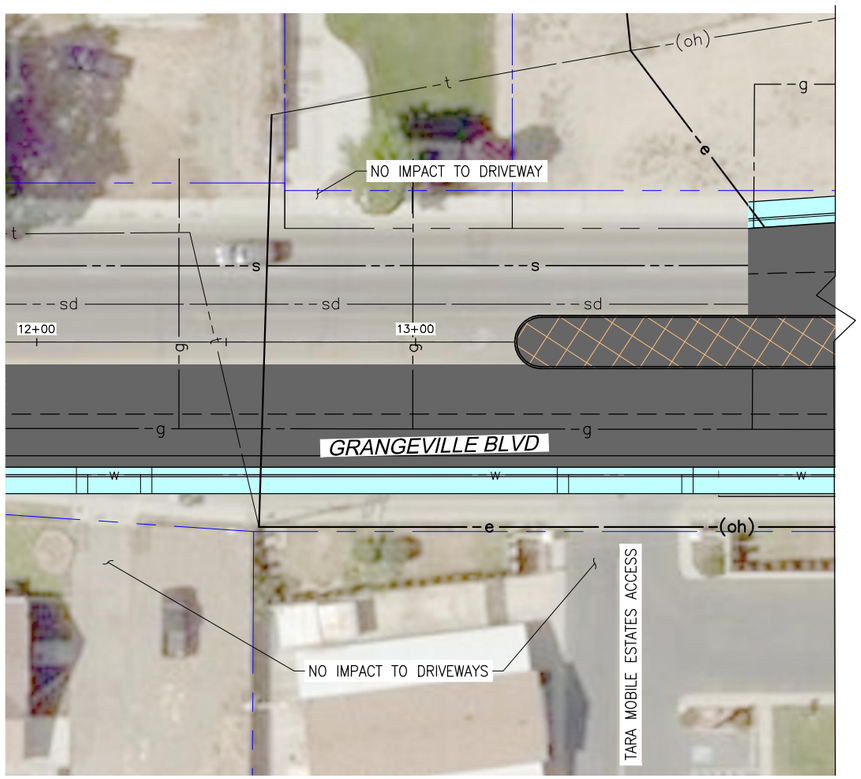
GRANGEVILLE GRADE SEPARATION

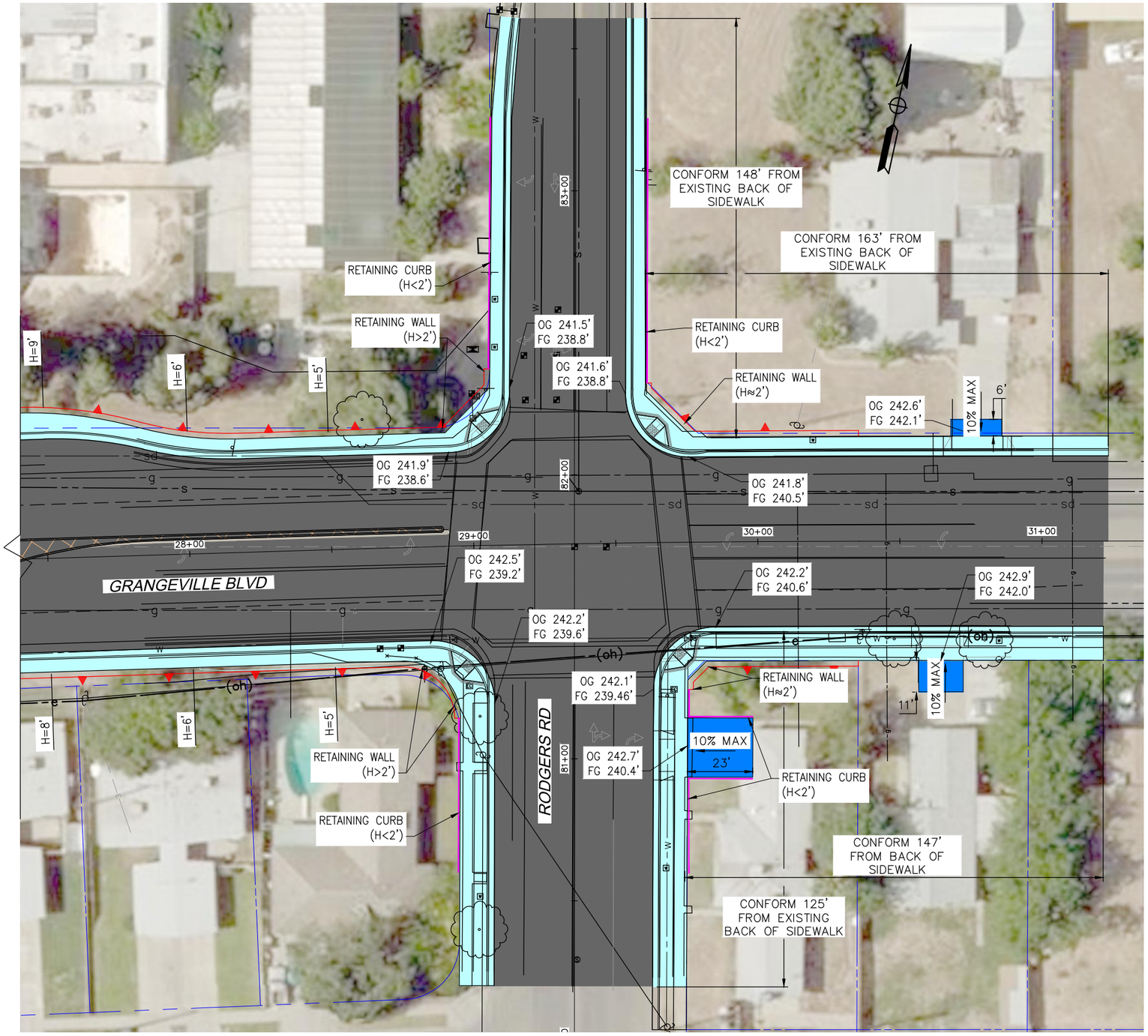
CITY PROJECT NO.:
TRC PROJ NO.: 251911-1
EXHIBIT NO.:

SHEET L-1

LEGEND:

- RETAINING WALL
- Exist R/W
- Exist PROPERTY LINE
- PROPOSED PAVEMENT
- PROPOSED RAISED MEDIAN
- PROPOSED CURB, GUTTER, AND SIDEWALK
- PROPOSED DRIVEWAY CONFORM
- H=X' RETAINING WALL HEIGHT BELOW OG
- RETAINING CURB





TRC	DR. BY: DSL CH. BY: JLC DATE: 11/13/2019 SCALE: 1" = 20'	**UNDERPASS DRIVEWAY EXHIBIT** *GRANGEVILLE GRADE SEPARATION*	CITY PROJECT NO.: TRC PROJ NO.: 251911-1 EXHIBIT NO.:	**SHEET L-2**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT
06	Kin	-	-

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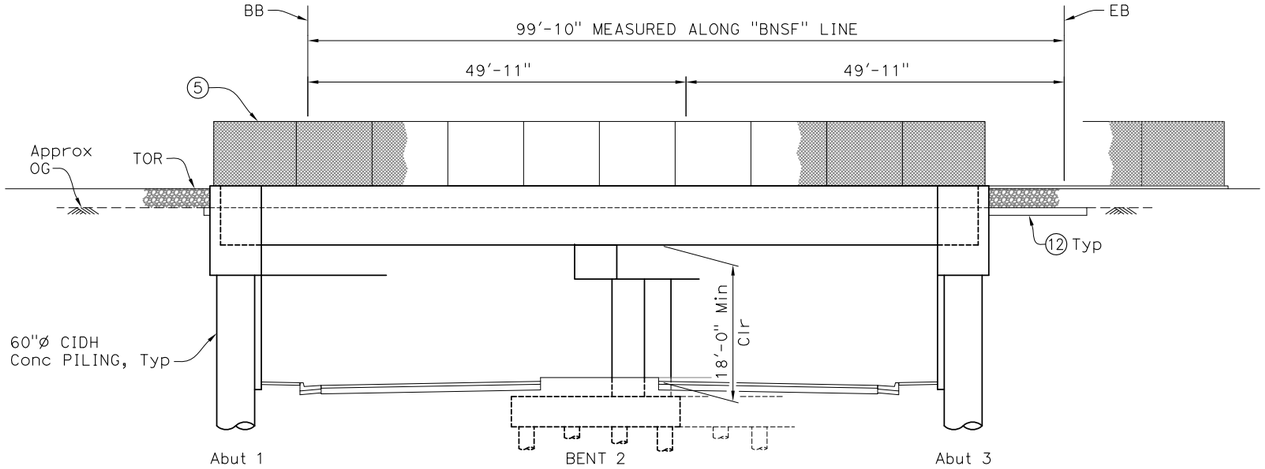
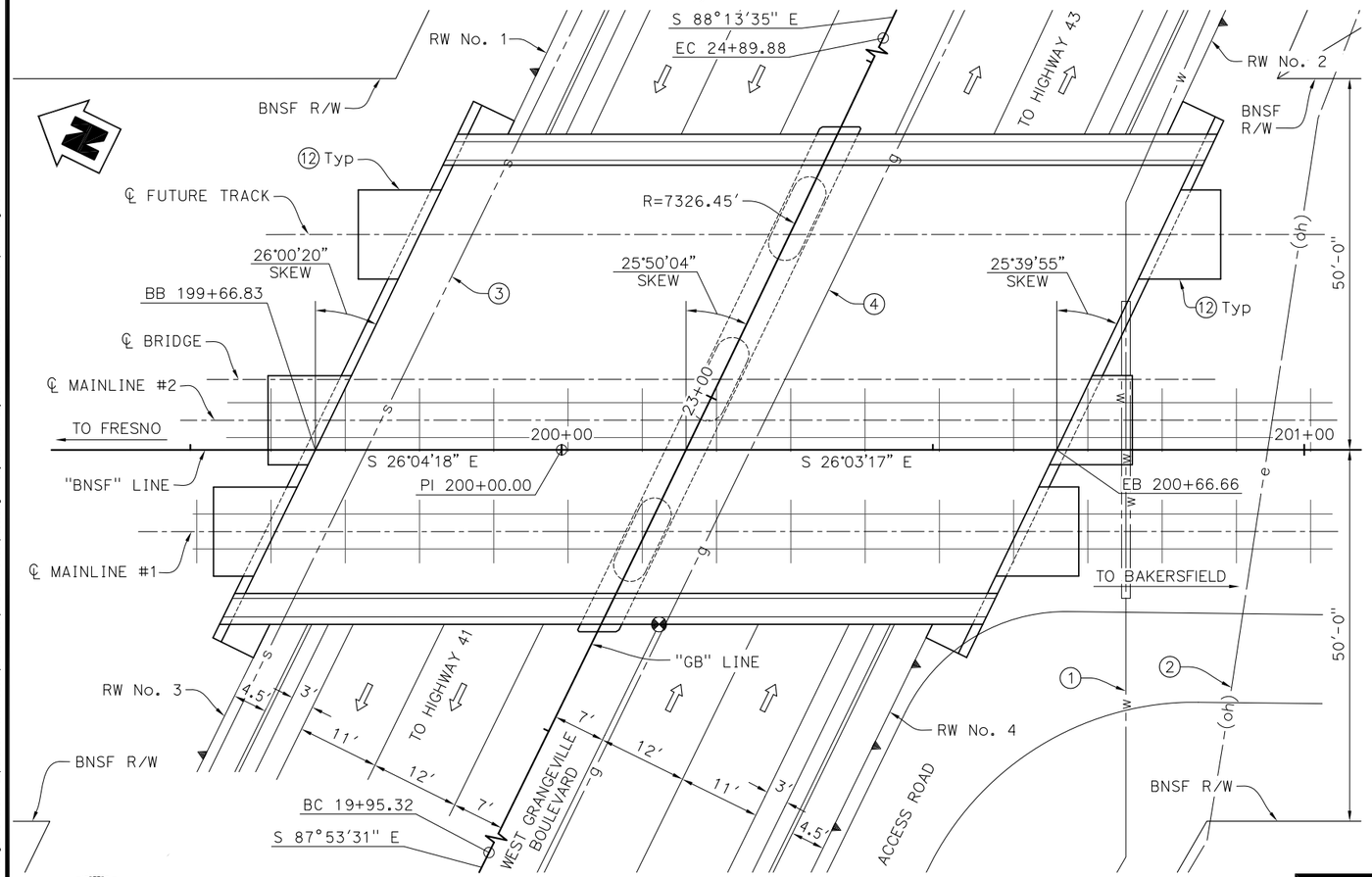
575 E LOCUST AVE.
SUITE 105
FRESNO, CA 93720



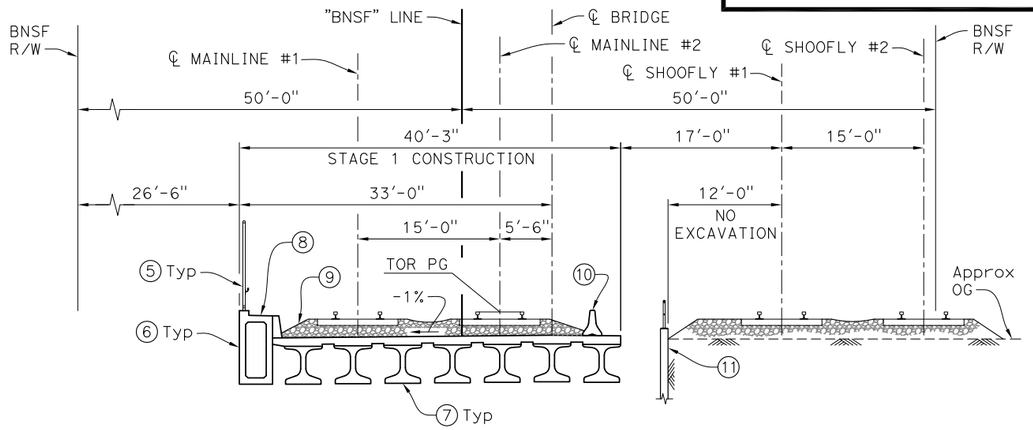
ELEVATION
1"=10'



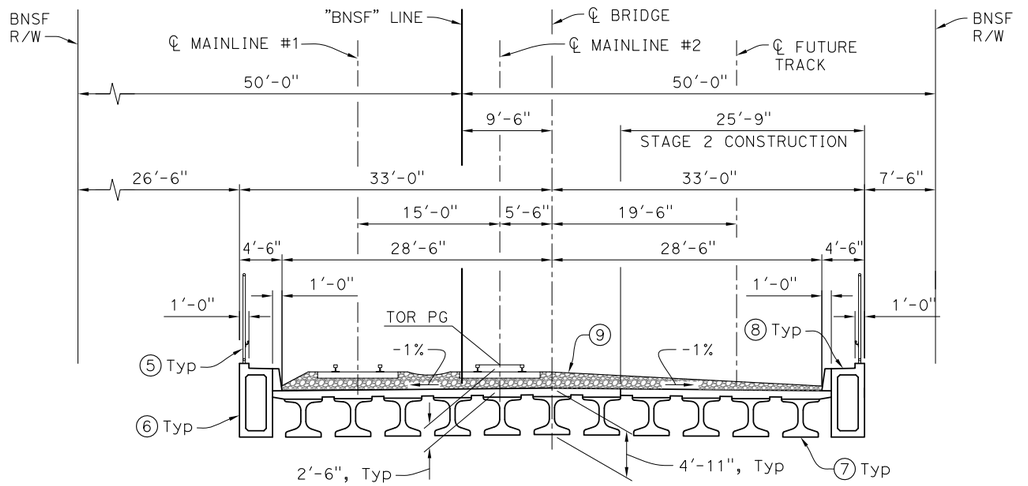
PLAN
1"=10'

CURVE DATA
R=7326.45'
Δ=3°52'03"
T=247.37'
L=494.56'

LEGEND:
- ⇦ INDICATES DIRECTION OF TRAFFIC
- ⊗ INDICATES MINIMUM VERTICAL CLEARANCE



STAGE 1



STAGE 2 / FINAL

TYPICAL SECTIONS
1/8"=1'-0"

NOTES:

1. RELOCATE Exist WATER LINE
2. Exist OVERHEAD ELECTRICAL LINE
3. RELOCATE Exist GAS LINE
4. RELOCATE Exist SEWER LINE
5. CHAIN LINK RAILING TYPE 7
6. PC/PS BOX BEAM
7. PC/PS CONCRETE WIDE-FLANGE GIRDER
8. WALKWAY
9. BALLAST
10. TEMPORARY K RAIL
11. TEMPORARY SHORING
12. APPROACH SLAB

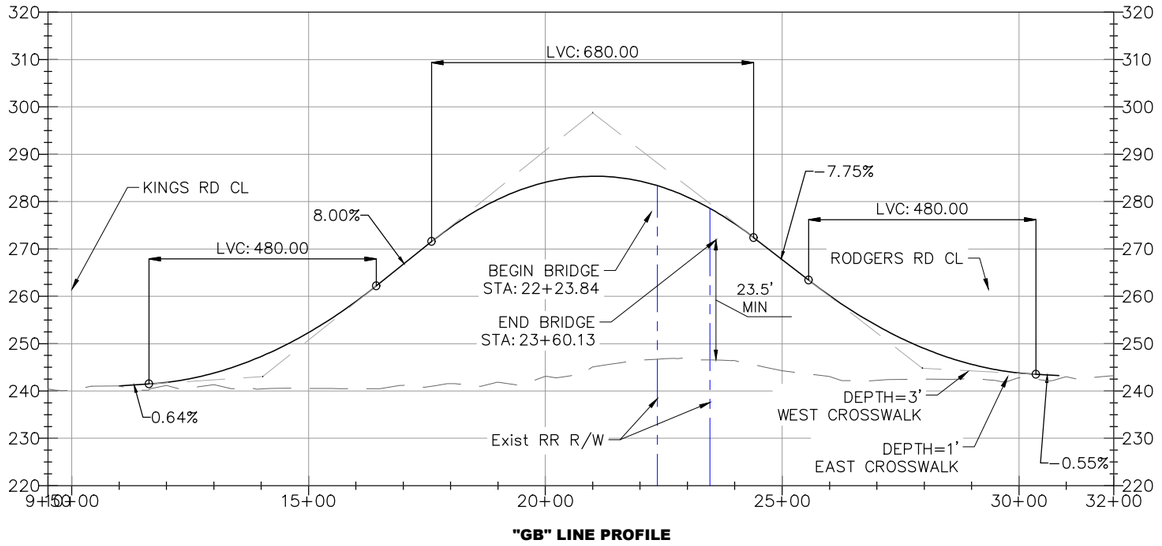
B-1

DESIGNED BY	R. YATES	DATE	10-04-17
DRAWN BY	A. CARDOZA	DATE	10-04-17
CHECKED BY	M. IMBRIANI	DATE	10-04-17
APPROVED BY		DATE	

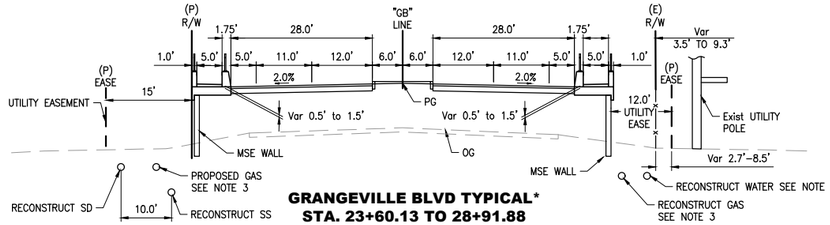
M. IMBRIANI
PROJECT ENGINEER

UNDERPASS PLANNING STUDY
GRANGEVILLE GRADE SEPARATION

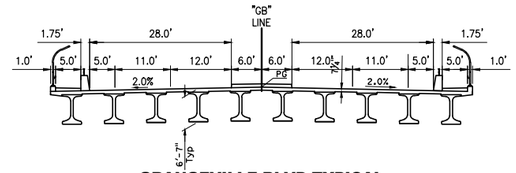
BRIDGE NO. TBD	CU RR MP 969.10
SCALE: AS SHOWN	EA



"GB" LINE PROFILE



GRANGEVILLE BLVD TYPICAL*
STA. 23+60.13 TO 28+91.88



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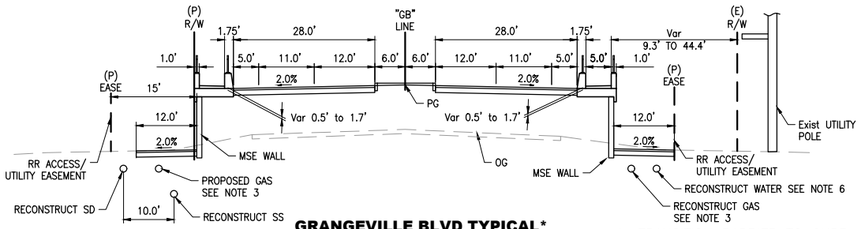
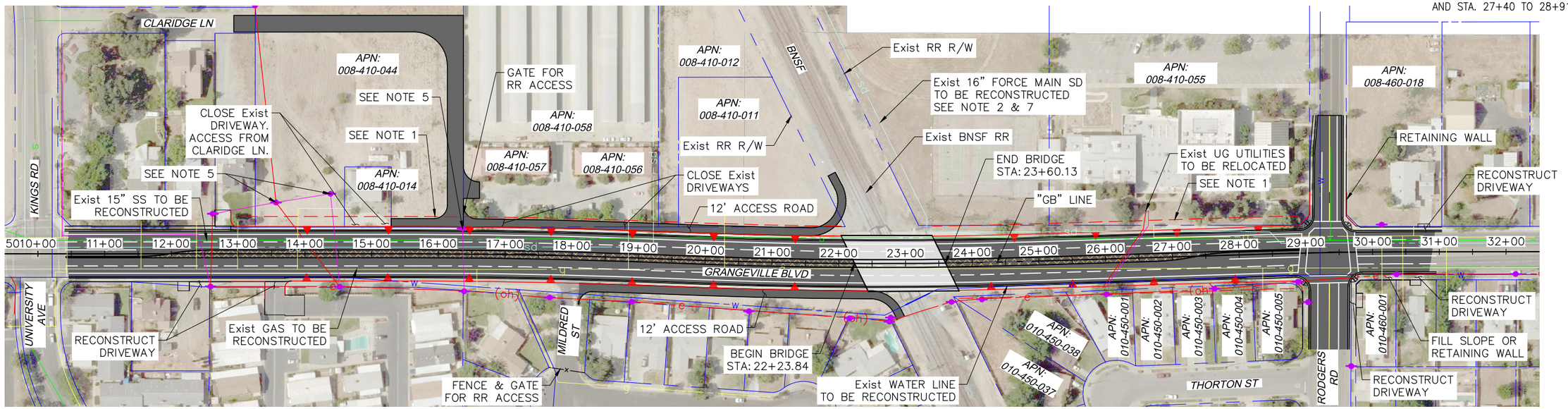
STA. 22+23.84 TO 23+60.13



GRANGEVILLE BLVD TYPICAL*
STA. 10+46.33 TO 22+23.84

* TRANSITION BARRIER TO CURB, GUTTER, AND SIDEWALK FOR STA. 10+46.33 TO 12+99.08 AND STA. 27+40 TO 28+91.88



LEGEND:

- RETAINING WALL
- Exist R/W
- Exist PROPERTY LINE
- PROPOSED EASEMENT
- EXISTING UTILITY POLE
- PROPOSED OVERPASS STRUCTURE
- PROPOSED PAVEMENT
- PROPOSED RAISED MEDIAN

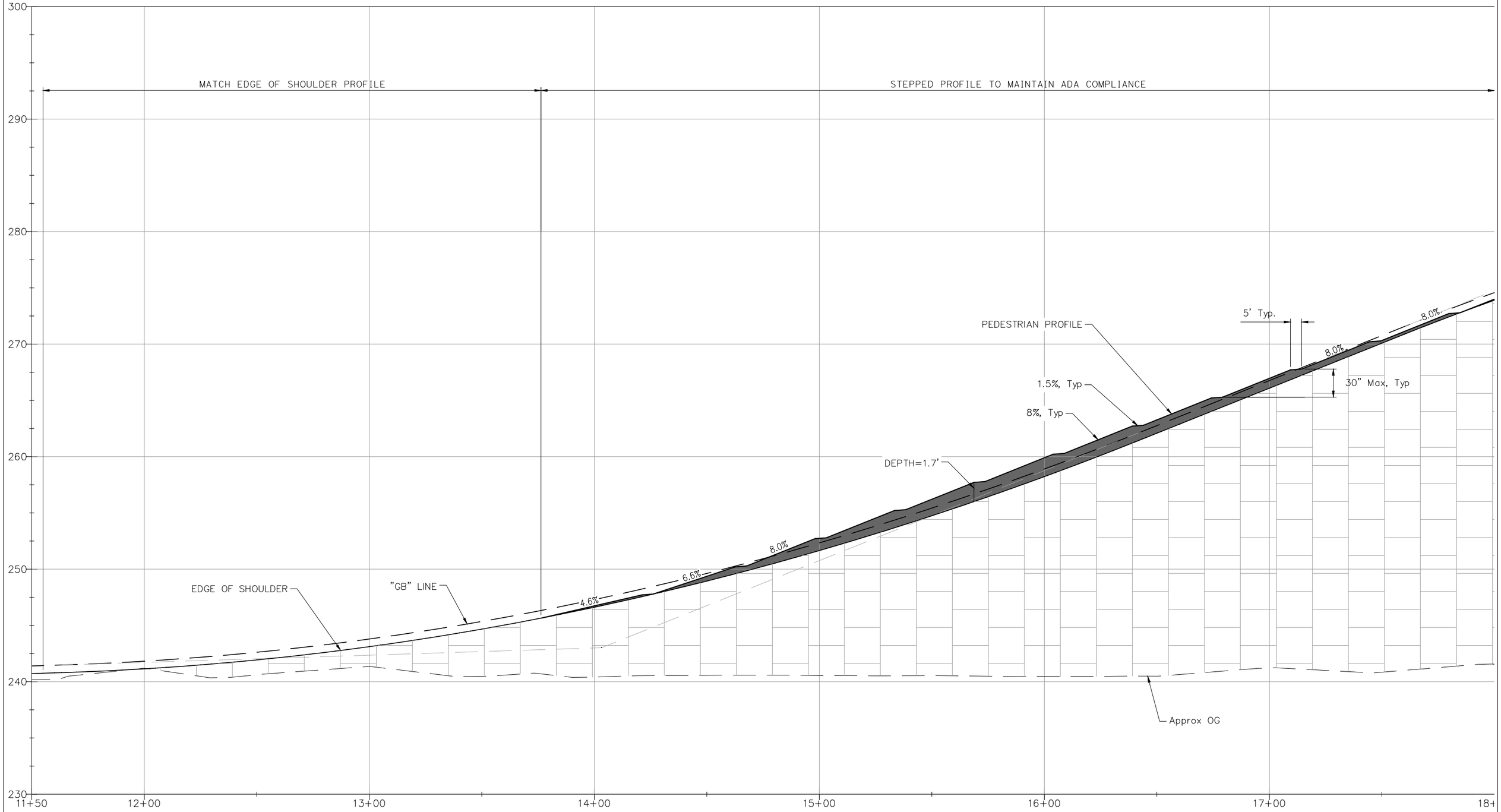
UTILITY NOTES:

1. UTILITIES ON NORTH SIDE WILL BE RECONSTRUCTED IN ACCESS ROAD AND WILL CONTINUE THROUGH A 15' PUE ACROSS PROPERTIES UNTIL END OF WALL.
2. NEED 10' SEPARATION BETWEEN STORM DRAIN AND SEWER.
3. HIGH PRESSURE GAS MAIN TO BE RELOCATED IN FRONT OF MSE WALL. MAY REQUIRE PARALLEL GAS FACILITIES ON BOTH NORTH AND SOUTH FOR LATERAL CONNECTIONS.
4. RECONSTRUCT SEWER (GRAVITY) ON NORTH SIDE OF GRANGEVILLE BLVD.
5. RELOCATION REQUIRED FOR OVERHEAD UTILITIES.
6. WATER LINE INFORMATION UNKNOWN. WATER MAIN ASSUMED TO BE ADJACENT TO EXISTING GRANGEVILLE BOULEVARD. RELOCATE OUTSIDE OF WALL ON EITHER NORTH OR SOUTH SIDE TO AVOID CONFLICTS WITH MSE WALL.
7. RECONSTRUCT 30" GRAVITY AND 16" FORCE MAIN STORM DRAIN ON NORTH SIDE. TIE IN PROPOSED ROAD DRAINAGE SYSTEM.

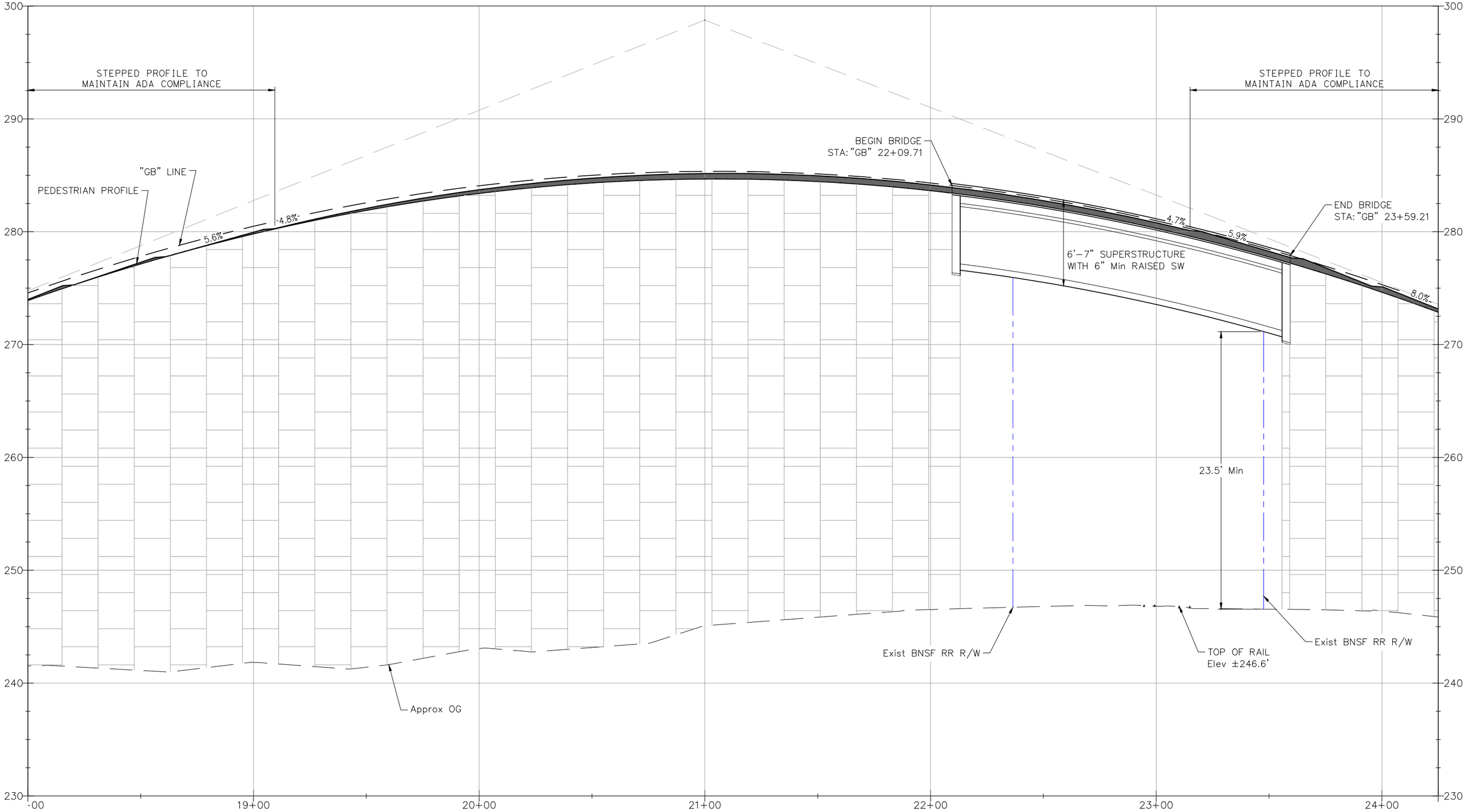
DESIGN DESIGNATION

GRANGEVILLE BLVD DESIGN SPEED = 40 MPH

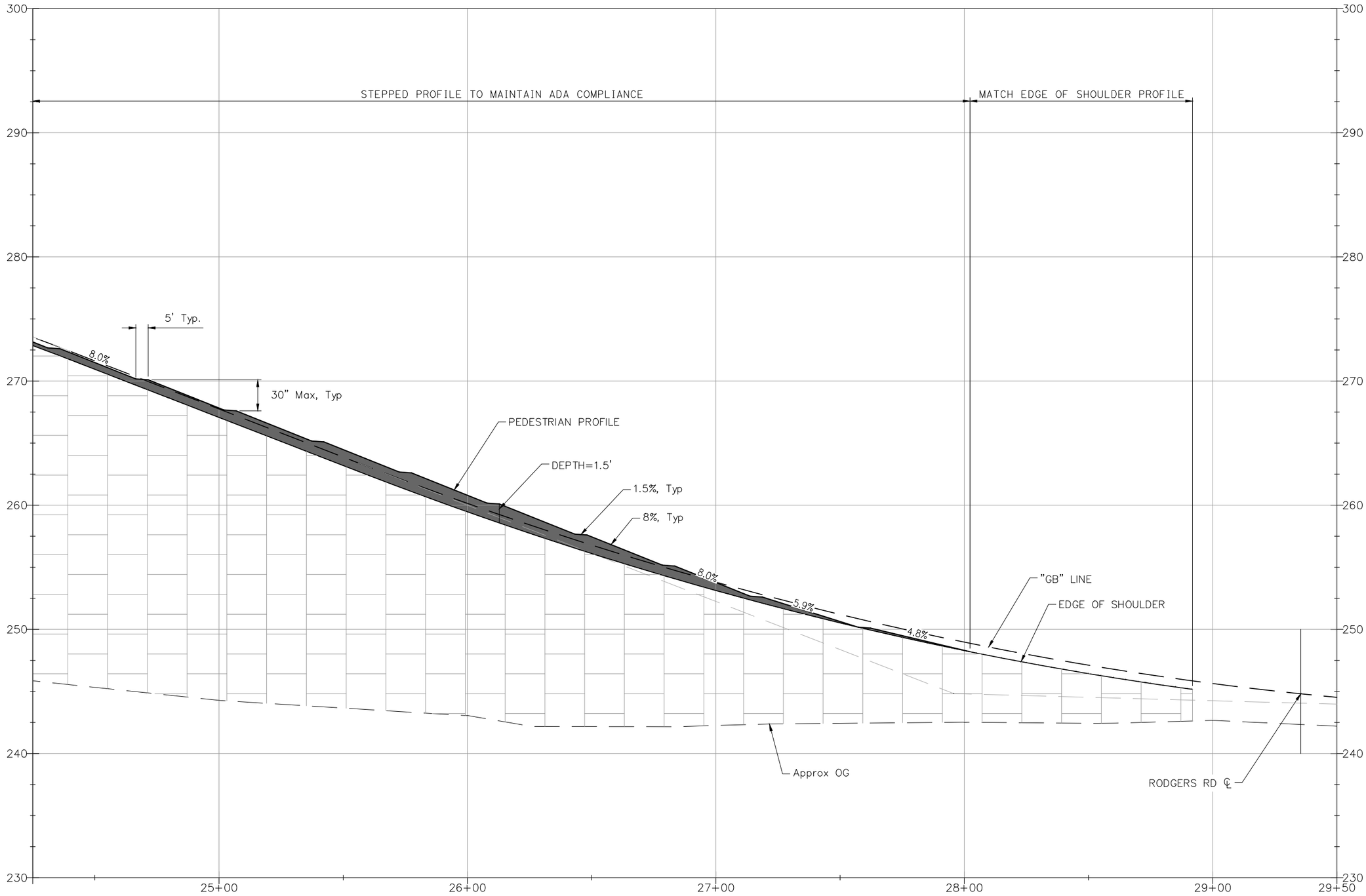
TRC	DR. BY: NAH CH. BY: JLC DATE: 11/13/19 SCALE: 1" = 160'	**OVERPASS ROADWAY LAYOUT** *GRANGEVILLE GRADE SEPARATION*	CITY PROJECT NO.: TRC PROJ NO.: 251911-1 EXHIBIT NO.:	**SHEET L-3**



TRC	DR. BY: NAH CH. BY: JLC DATE: 11/13/19 SCALE: 1" = 20'	**OVERPASS PEDESTRIAN PROFILE** *GRANGEVILLE GRADE SEPARATION*	CITY PROJECT NO.: TRC PROJ NO.: 251911-1 EXHIBIT NO.:	**SHEET L-4** 1 of 3



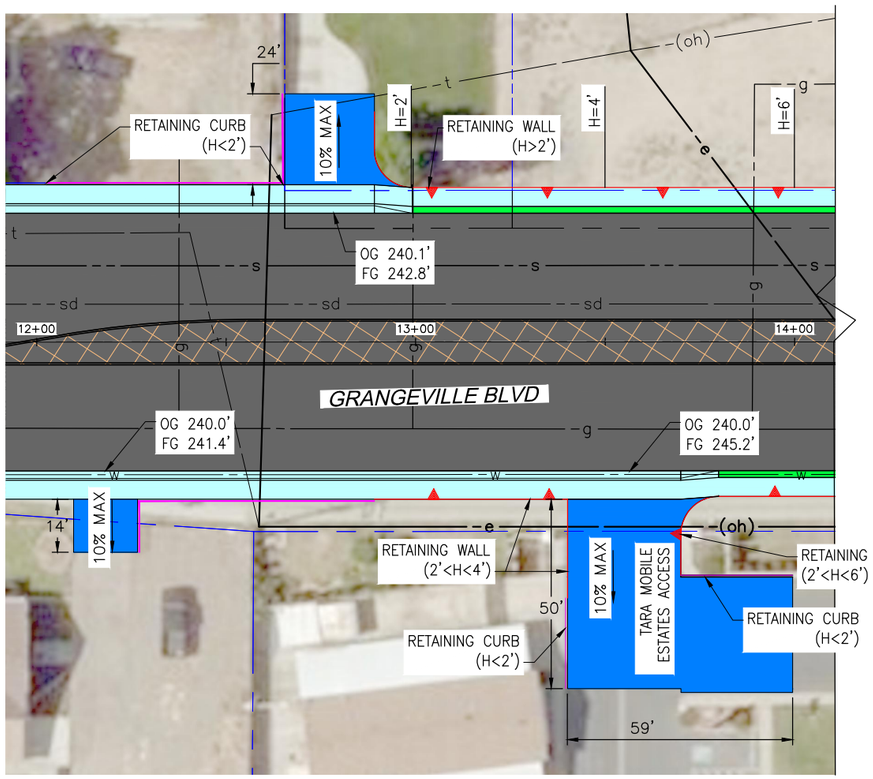
DR. BY: NAH CH. BY: JLC DATE: 11/13/19 SCALE: 1" = 20'	**OVERPASS PEDESTRIAN PROFILE** *GRANGEVILLE GRADE SEPARATION*	CITY PROJECT NO.: TRC PROJ NO.: 251911-1 EXHIBIT NO.:	**SHEET L-5** 2 of 3

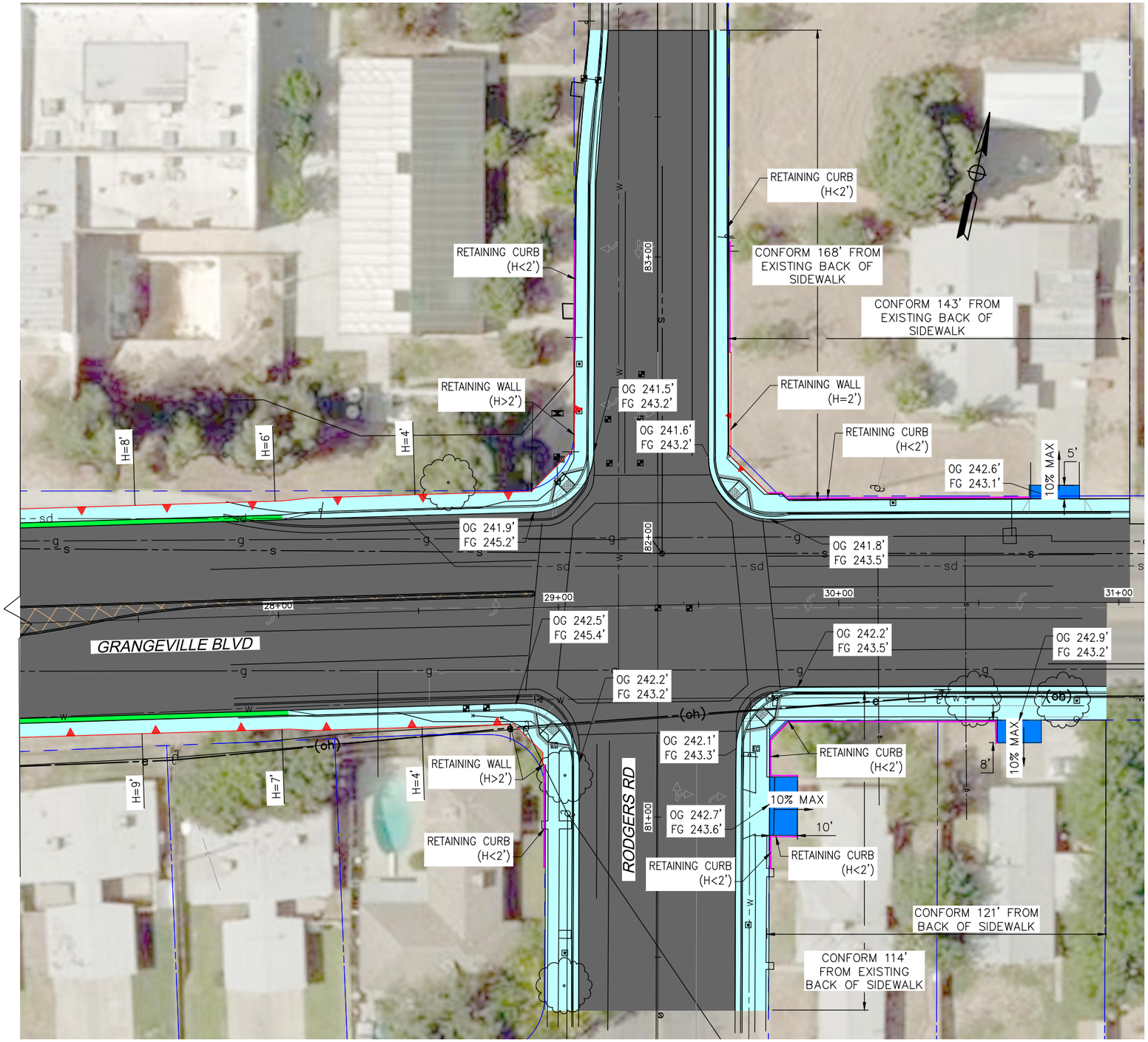


TRC	DR. BY: NAH CH. BY: JLC DATE: 11/13/19 SCALE: 1" = 20'	**OVERPASS PEDESTRIAN PROFILE** *GRANGEVILLE GRADE SEPARATION*	CITY PROJECT NO.: TRC PROJ NO.: 251911-1 EXHIBIT NO.:	**SHEET L-6** 3 of 3

LEGEND:

- RETAINING WALL
- Exist R/W
- Exist PROPERTY LINE
- PROPOSED PAVEMENT
- PROPOSED RAISED MEDIAN
- PROPOSED CURB, GUTTER, AND SIDEWALK
- PROPOSED BARRIER
- PROPOSED DRIVEWAY CONFORM
- H=X' RETAINING WALL HEIGHT ABOVE OG
- RETAINING CURB





TRC	DR. BY: DSL CH. BY: JLC DATE: 11/13/2019 SCALE: 1" = 20'	**OVERPASS DRIVEWAY EXHIBIT** *GRANGEVILLE GRADE SEPARATION*	CITY PROJECT NO.: TRC PROJ NO.: 251911-1 EXHIBIT NO.:	**SHEET L-7**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT
06	Kin	-	-

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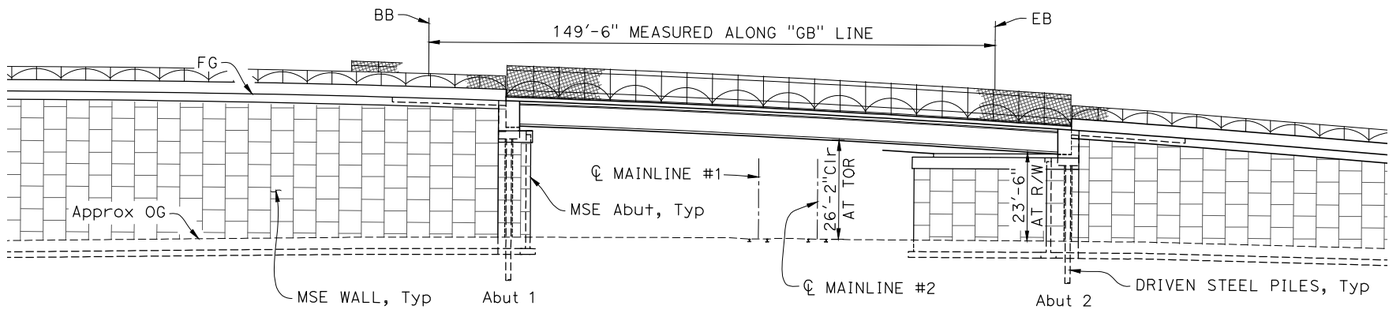
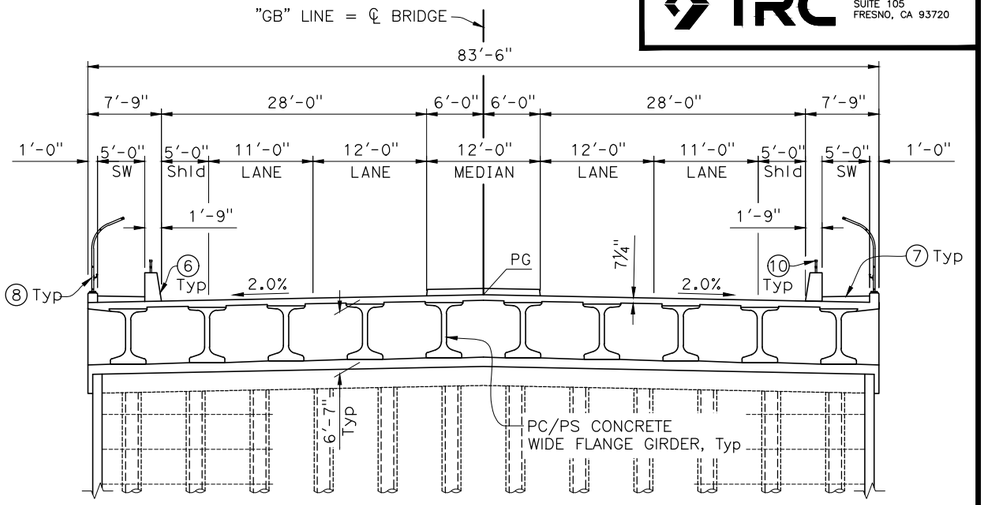
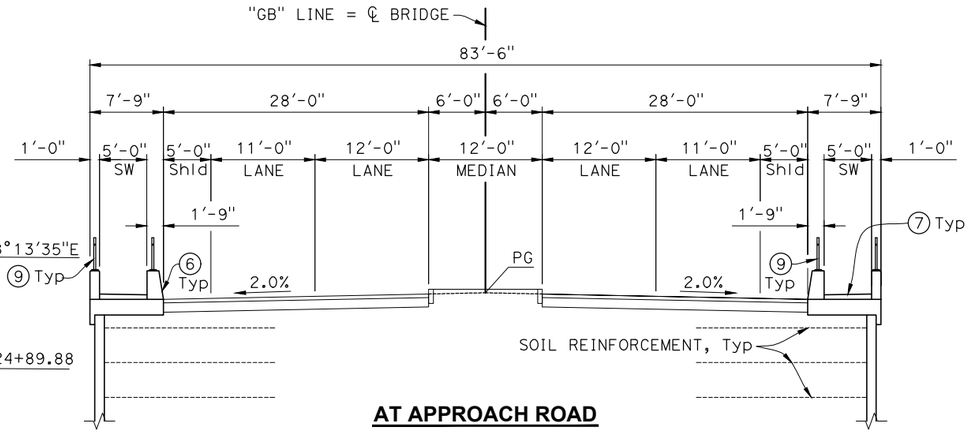
575 E LOCUST AVE.
SUITE 105
FRESNO, CA 93720



ELEVATION
1"=20'

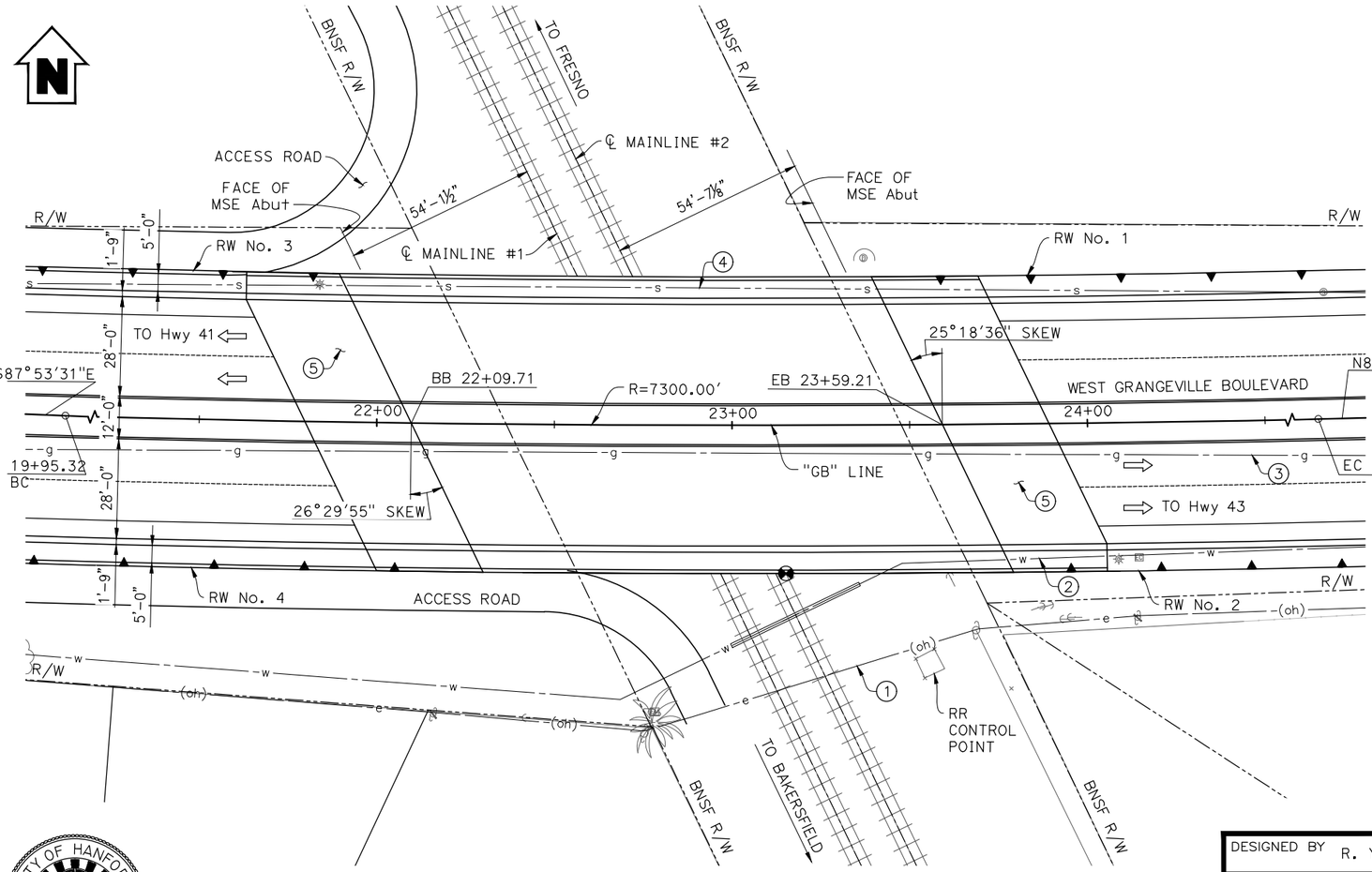


AT ABUTMENTS



AT APPROACH ROAD

TYPICAL SECTIONS
1/8"=1'-0"



CURVE DATA
R=7300.00'
Δ=3°52'54"
T=247.37'
L=494.56'

PLAN
1"=20'

LEGEND:
⇦ INDICATES DIRECTION OF TRAFFIC
INDICATES MINIMUM VERTICAL CLEARANCE OVER RAILROAD TRACKS

NOTES:

①	Exist OVERHEAD ELECTRICAL LINE	⑥	CONCRETE BARRIER TYPE 836 (MOD)
②	RECONSTRUCT WATER LINE	⑦	RAISED SIDEWALK
③	RECONSTRUCT GAS LINE	⑧	CHAIN LINK RAILING TYPE 3
④	RECONSTRUCT SEWER LINE	⑨	CHAIN LINK RAILING TYPE 7 (MOD)
⑤	STRUCTURE APPROACH TYPE N (30S)	⑩	TUBULAR HANDRAILING

B-2

DESIGNED BY	R. YATES	DATE	11/04/19
DRAWN BY	K. NEGORO	DATE	11/04/19
CHECKED BY	M. IMBRIANI	DATE	11/04/19
APPROVED BY		DATE	

M. IMBRIANI
PROJECT ENGINEER

OVERPASS PLANNING STUDY
GRANGEVILLE GRADE SEPARATION

BRIDGE NO. TBD	CU RR MP 969.10
SCALE: AS SHOWN	EA

Appendix B: Opinion of Probable Cost

GRANGEVILLE BOULEVARD GRADE SEPARATION - UNDERPASS ALTERNATIVE

PLANNING COST ESTIMATE

TRC Project No. 251911-1

District-County-Route: 06-KIN-0-HAN

RR PM: 969.10

Type of Estimate : Advance Planning Estimate

Project Limits : Grangeville Boulevard between University Avenue and Rodgers Road

Project Description: Grangeville Boulevard Grade Separation at BNSF Railway

Alternative : Underpass

SUMMARY OF PROJECT COST ESTIMATE

	Current Year Cost	Escalated Cost
TOTAL ROADWAY COST	$ 6,718,800	$ 7,686,514
TOTAL STRUCTURES COST	$ 15,972,805	$ 18,273,381
TOTAL RAILROAD WORK COST	$ 8,448,015	$ 8,693,007
SUBTOTAL CONSTRUCTION COST	$ 31,139,620	$ 34,652,903
TOTAL RIGHT OF WAY COST	$ 2,639,333	$ 2,639,333
TOTAL CAPITAL OUTLAY COSTS	$ 33,779,000	$ 37,293,000
PRELIMINARY ENGINEERING	$ 3,040,110	$ 3,040,110
CONSTRUCTION ENGINEERING	$ 2,533,425	$ 2,533,425
TOTAL ENGINEERING COST	$ 5,573,535	$ 5,573,535
TOTAL PROJECT COST	$ 39,400,000	$ 42,900,000

Allocated Share from State Fund: **$ 5,000,000**

Contributions

City	$ 33,610,000
County	$ -
Railroad	$ 4,290,000
Other (specify)	$ -

	Month	/	Year
Date of Estimate (Month/Year)	11	/	2019
Estimated Construction Start (Month/Year)	1	/	2025
Number of Working Days =	375		
Estimated Mid-Point of Construction (Month/Year)	10	/	2025
Estimated Construction End (Month/Year)	6	/	2026
Number of Plant Establishment Days	261		

GRANGEVILLE BOULEVARD GRADE SEPARATION - UNDERPASS ALTERNATIVE

TRC Project No. 251911-1

I. ROADWAY ITEMS SUMMARY

	Section		Cost
Grangeville Boulevard Grade Separation at BNSF Railway			
1	**Earthwork**	$	1,316,400
2	**Pavement Structural Section**	$	987,800
3	**Drainage**	$	1,149,600
4	**Specialty Items**	$	24,900
5	**Environmental**	$	95,600
6	**Traffic Items**	$	450,000
7	**Detours**	$	50,000
8	**Minor Items**	$	407,500
9	**Roadway Mobilization**	$	448,200
10	**Supplemental Work**	$	185,300
11	**State Furnished**	$	179,300
12	**Time-Related Overhead**	$	572,000
13	**Roadway Contingency**	$	852,200
	TOTAL ROADWAY ITEMS	**$**	**6,718,800**

Estimate Prepared By : Daniel Lockett — Name and Title — 11/27/2019 — Date

Estimate Reviewed By : Justina Conklin — Name and Title — 11/12/2019 — Date

GRANGEVILLE BOULEVARD GRADE SEPARATION - UNDERPASS ALTERNATIVE

TRC Project No. 251911-1

SECTION 1: EARTHWORK

Item code		Unit	Quantity		Unit Price ($)			Cost
190101	Roadway Excavation	CY	62,068	x	20.00	=	$	1,241,360
19010X	Roadway Excavation (Type X) ADL	CY		x		=	$	-
194001	Ditch Excavation	CY		x		=	$	-
198010	Imported Borrow	Grade Separation at BN		x		=	$	-
16010X	Clearing & Grubbing	LS	1	x	25,000.00	=	$	25,000
170101	Develop Water Supply	LS	1	x	50,000.00	=	$	50,000
210130	Duff	ACRE		x		=	$	-
XXXXXX	Some Item	Unit						

TOTAL EARTHWORK SECTION ITEMS	**$**	**1,316,400**

SECTION 2: PAVEMENT STRUCTURAL SECTION

Item code		Unit	Quantity		Unit Price ($)			Cost
401050	Jointed Plain Concrete Pavement	CY		x		=	$	-
400050	Continuously Reinforced Concrete Pavement	CY		x		=	$	-
404092	Seal Pavement Joint	LF		x		=	$	-
404093	Seal Isolation Joint	LF		x		=	$	-
413117	Seal Concrete Pavement Joint (Silicone)	LF		x		=	$	-
413118	Seal Pavement Joint (Asphalt Rubber)	LF		x		=	$	-
280010	Rapid Strength Concrete Base	CY		x		=	$	-
410095	Dowel Bar (Drill and Bond)	EA		x		=	$	-
XXXXXX	Hot Mix Asphalt (Type B)	TON	6,029	x	100.00	=	$	602,900
390137	Rubberized Hot Mix Asphalt (Gap Graded)	TON		x		=	$	-
39300X	Geosynthetic Pavement Interlayer (Type X)	SQYD		x		=	$	-
260203	Class 2 Aggregate Base	CY	4,811	x	80.00	=	$	384,880
290201	Asphalt Treated Permeable Base	CY		x		=	$	-
250401	Class 4 Aggregate Subbase	CY		x		=	$	-
374002	Asphaltic Emulsion (Fog Seal Coat)	TON		x		=	$	-
397005	Tack Coat	TON		x		=	$	-
377501	Slurry Seal	TON		x		=	$	-
3750XX	Screenings (Type XX)	TON		x		=	$	-
374492	Asphaltic Emulsion (Polymer Modified)	TON		x		=	$	-
370001	Sand Cover (Seal)	TON		x		=	$	-
731530	Minor Concrete (Textured Paving)	CY		x		=	$	-
731502	Minor Concrete (Miscellaneous Construction)	CY		x		=	$	-
39407X	Place Hot Mix Asphalt Dike (Type X)	LF		x		=	$	-
150771	Remove Asphalt Concrete Dike	LF		x		=	$	-
420201	Grind Existing Concrete Pavement	SQYD		x		=	$	-
150860	Remove Base and Surfacing	CY		x		=	$	-
390095	Replace Asphalt Concrete Surfacing	CY		x		=	$	-
15312X	Remove Concrete	LF/CY/LS		x		=	$	-
394090	Place Hot Mix Asphalt (Miscellaneous Area)	SQYD		x		=	$	-
153103	Cold Plane Asphalt Concrete Pavement	SQYD		x		=	$	-
39405X	Shoulder Rumble Strip (HMA, X-In Indentations)	STA		x		=	$	-
413113	Repair Spalled Joints, Polyester Grout	SQYD		x		=	$	-
420102	Groove Existing Concrete Pavement	SQYD		x		=	$	-
390136	Minor Hot Mix Asphalt	TON		x		=	$	-
394095	Roadside Paving (Miscellaneous Areas)	SQYD		x		=	$	-
XXXXXX	Some Item	Unit		x		=	$	-

TOTAL PAVEMENT STRUCTURAL SECTION ITEMS	**$**	**987,800**

GRANGEVILLE BOULEVARD GRADE SEPARATION - UNDERPASS ALTERNATIVE

TRC Project No. 251911-1

SECTION 3: DRAINAGE

Item code		Unit	Quantity		Unit Price ($)			Cost
15080X	Remove Culvert	EA/LF		x		=	$	-
150820	Modify Inlet	EA		x		=	$	-
155232	Sand Backfill	CY		x		=	$	-
15020X	Abandon Culvert	EA		x		=	$	-
152430	Adjust Inlet	LF		x		=	$	-
155003	Cap Inlet	EA		x		=	$	-
731510	Minor Concrete (Curb, Gutter, Sidewalk and Drive	CY	598	x	600.00	=	$	358,800
731623	Minor Concrete (Curb Ramp)	EA	4	x	3,000.00	=	$	12,000
731511	Minor Concrete (Island Paving)	CY	228	x	600.00	=	$	136,800
620XXX	XX" Alternative Pipe Culvert (Type X)	LF		x		=	$	-
6411XX	XX" Plastic Pipe	LF		x		=	$	-
65XXXX	XX" Reinforced Concrete Pipe (Type X)	LF		x		=	$	-
6650XX	XX" Corrugated Steel Pipe (0.XXX" Thick)	LF		x		=	$	-
68XXXX	XX" Plastic Pipe (Edge Drain)	LF		x		=	$	-
69011X	XX" Corrugated Steel Pipe Downdrain (0.XXX" Th	LF		x		=	$	-
70321X	XX" Corrugated Steel Pipe Inlet (0.XXX" Thick)	LF		x		=	$	-
70XXXX	XX" Corrugated Steel Pipe Riser (0.XXX" Thick)	LF		x		=	$	-
7050XX	XX" Steel Flared End Section	EA		x		=	$	-
703233	Grated Line Drain	LF		x		=	$	-
72XXXX	Rock Slope Protection (Type and Method)	CY/TON		x		=	$	-
72901X	Rock Slope Protection Fabric (Class X)	SQYD		x		=	$	-
721420	Concrete (Ditch Lining)	CY		x		=	$	-
721430	Concrete (Channel Lining)	CY		x		=	$	-
XXXXXX	Storm Drain Pump Plant & Appurtenances	LS	1	x	642,000.00	=	$	642,000

TOTAL DRAINAGE ITEMS $ 1,149,600

SECTION 4: SPECIALTY ITEMS

Item code		Unit	Quantity		Unit Price ($)			Cost
080050	Progress Schedule (Critical Path Method)	LS	1	x	10,000.00	=	$	10,000
582001	Sound Wall (Masonry Block)	SQFT		x		=	$	-
510530	Retaining Walls	LS		x		=	$	-
15325X	Remove Sound Wall	LF/LS		x		=	$	-
070030	Lead Compliance Plan	LS	1	x	5,000.00	=	$	5,000
141120	Treated Wood Waste	LB		x		=	$	-
153221	Remove Concrete Barrier	LF		x		=	$	-
150662	Remove Metal Beam Guard Railing	LF		x		=	$	-
150668	Remove Flared End Section	EA		x		=	$	-
8000XX	Chain Link Fence (Type XX)	LF		x		=	$	-
80XXXX	12' Chain Link Gate (Type CL-6)	EA	3	x	2,500.00	=	$	7,500
832001	Metal Beam Guard Railing	LF		x		=	$	-
839301	Single Thrie Beam Barrier	LF		x		=	$	-
839521	Cable Railing	LF		x		=	$	-
730070	Detectable Warning Surface	SQFT	48	x	50.00	=	$	2,400
839585	Alternative Flared Terminal System	EA		x		=	$	-
839584	Alternative In-line Terminal System	EA		x		=	$	-
4906XX	CIDH Concrete Piling (Insert Diameter)	LF		x		=	$	-
839591	Crash Cushion, Sand Filled	EA		x		=	$	-
520103	Bar Reinforced Steel (Retaining Wall)	LB		x		=	$	-
510060	Structural Concrete, Retaining Wall	CY		x		=	$	-
513553	Retaining Wall (Masonry Wall)	SQFT		x		=	$	-
XXXXXX	Some Item	Unit		x		=	$	-

TOTAL SPECIALTY ITEMS $ 24,900

GRANGEVILLE BOULEVARD GRADE SEPARATION - UNDERPASS ALTERNATIVE

TRC Project No. 251911-1

SECTION 5: ENVIRONMENTAL

5A - ENVIRONMENTAL MITIGATION

Item code		Unit	Quantity		Unit Price ($)			Cost
	Biological Mitigation	LS		x		=	$	-
130670	Temporary Reinforced Silt Fence	LF		x		=	$	-
141000	Temporary Fence (Type ESA)	LF		x		=	$	-
						Subtotal Environmental Mitigation	*$*	*-*

5B - LANDSCAPE AND IRRIGATION

Item code		Unit	Quantity		Unit Price ($)			Cost
20XXXX	Highway Planting	LS	1	x	20,000.00	=	$	20,000
20XXXX	Irrigation System	LS		x		=	$	-
204099	Plant Establishment Work	LS		x		=	$	-
204101	Extend Plant Establishment Work	LS		x		=	$	-
20XXXX	Follow-up Landscape Project	LS		x		=	$	-
150685	Remove Irrigation Facility	LS		x		=	$	-
20XXXX	Maintain Existing (Irrigation or Planted Areas)	LS		x		=	$	-
206400	Check and Test Existing Irrigation Facilities	LS		x		=	$	-
21011X	Imported Topsoil (X)	CY/TON		x		=	$	-
20XXXX	Rock Blanket, Rock Mulch, DG, Gravel Mulch	SQFT/SQYD		x		=	$	-
200122	Weed Germination	SQYD		x		=	$	-
208304	Water Meter	EA		x		=	$	-
2087XX	XX" Conduit (Use for Irrigation x-overs)	LF		x		=	$	-
20890X	Extend X" Conduit (Use for Extension of Irrigation x-overs)	LF		x		=	$	-
						Subtotal Landscape and Irrigation	*$*	*20,000*

5C - EROSION CONTROL

Item code		Unit	Quantity		Unit Price ($)			Cost
210010	Move In/Move Out (Erosion Control)	EA		x		=	$	-
210350	Fiber Rolls	LF		x		=	$	-
210360	Compost Sock	LF		x		=	$	-
2102XX	Rolled Erosion Control Product (X)	SQFT		x		=	$	-
21025X	Bonded Fiber Matrix	SQFT/ACRE		x		=	$	-
210300	Hydromulch	SQFT		x		=	$	-
210420	Straw	SQFT		x		=	$	-
210430	Hydroseed	SQFT		x		=	$	-
210600	Compost	SQFT		x		=	$	-
210630	Incorporate Materials	SQFT		x		=	$	-
						Subtotal Erosion Control	*$*	*-*

5D - NPDES

Item code		Unit	Quantity		Unit Price ($)			Cost
130300	Prepare SWPPP	LS	1	x	10,000.00	=	$	10,000
130200	Prepare WPCP	LS		x		=	$	-
130100	Job Site Management	LS	1	x	50,000.00	=	$	50,000
130330	Storm Water Annual Report	EA	1	x	2,000.00	=	$	2,000
130310	Rain Event Action Plan (REAP)	EA		x		=	$	-
130320	Storm Water Sampling and Analysis Day	EA		x		=	$	-
130520	Temporary Hydraulic Mulch	SQYD		x		=	$	-
130550	Temporary Hydroseed	SQYD		x		=	$	-
130505	Move-In/Move-Out (Temporary Erosion Control)	EA		x		=	$	-
130640	Temporary Fiber Roll	LF		x		=	$	-
130900	Temporary Concrete Washout	LS	2	x	3,000.00	=	$	6,000
130710	Temporary Construction Entrance	EA	2	x	2,500.00	=	$	5,000
130610	Temporary Check Dam	LF		x		=	$	-
130620	Temporary Drainage Inlet Protection	EA	4	x	650.00	=	$	2,600
130730	Street Sweeping	LS		x		=	$	-
						Subtotal NPDES	*$*	*75,600*

	TOTAL ENVIRONMENTAL	**$**	**95,600**

Supplemental Work for NPDES

066595	Water Pollution Control Maintenance Sharing*	LS	1	x	2,000.00	=	$	2,000
066596	Additional Water Pollution Control**	LS	1	x	2,000.00	=	$	2,000
066597	Storm Water Sampling and Analysis***	LS	1	x	2,000.00	=	$	2,000
XXXXXX	Some Item	LS		x		=	$	-
						Subtotal Supplemental Work for NDPS	*$*	*6,000*

*Applies to all SWPPPs and those WPCPs with sediment control or soil stabilization BMPs.

**Applies to both SWPPPs and WPCP projects.

*** Applies only to project with SWPPPs.

GRANGEVILLE BOULEVARD GRADE SEPARATION - UNDERPASS ALTERNATIVE

TRC Project No. 251911-1

SECTION 6: TRAFFIC ITEMS

6A - Traffic Electrical

Item code		Unit	Quantity		Unit Price ($)			Cost
860460	Lighting and Sign Illumination	LS	1	x	50,000.00	=	$	50,000
860201	Modify Traffic Signal	LS	1	x	300,000.00	=	$	300,000
860990	Closed Circuit Television System	EA		x		=	$	-
86110X	Ramp Metering System (Location X)	LS		x		=	$	-
86070X	Interconnection Conduit and Cable	LF/LS		x		=	$	-
5602XX	Furnish Sign Structure (Type X)	LB		x		=	$	-
5602XX	Install Sign Structure (Type X)	LB		x		=	$	-
498040	XX" CIDHC Pile (Sign Foundation)	LF		x		=	$	-
86080X	Inductive Loop Detectors	EA/LS		x		=	$	-
8609XX	Traffic Monitoring Station (Type X)	LS		x		=	$	-
15075X	Remove Sign Structure	EA/LS		x		=	$	-
151581	Reconstruct Sign Structure	EA		x		=	$	-
152641	Modify Sign Structure	EA		x		=	$	-
860090	Maintain Existing Traffic Management System Elements During Construction	LS		x		=	$	-
86XXXX	Fiber Optic Conduit System	LS		x		=	$	-
XXXXX	Some Item	LS		x		=	$	-

Subtotal Traffic Electrical $ *350,000*

6B - Traffic Signing and Striping

Item code		Unit	Quantity		Unit Price ($)			Cost
566011	Roadside Sign - One Post	EA		x		=	$	-
566012	Roadside Sign - Two Post	EA		x		=	$	-
5602XX	Furnish Sign	SQFT		x		=	$	-
568016	Install Sign Panel on Existing Frame	SQFT		x		=	$	-
150711	Remove Painted Traffic Stripe	LF		x		=	$	-
141101	Remove Yellow Painted Traffic Stripe (Hazardous Waste)	LF		x		=	$	-
150712	Remove Painted Pavement Marking	SQFT		x		=	$	-
150742	Remove Roadside Sign	EA		x		=	$	-
152320	Reset Roadside Sign	EA		x		=	$	-
152390	Relocate Roadside Sign	EA		x		=	$	-
84XXXX	Signing and Striping	LS	1	x	10,000.00	=	$	10,000
840502	Thermoplastic Traffic Stripe (Enhanced Wet Night Visibility)	LF		x		=	$	-
846012	Thermoplastic Crosswalk and Pavement Marking (Enhanced Wet Night Visibility)	SQFT		x		=	$	-
120090	Construction Area Signs	LS	1	x	40,000.00	=	$	40,000
84XXXX	Permanent Pavement Delineation	LS		x		=	$	-

Subtotal Traffic Signing and Striping $ *50,000*

6C - Traffic Management Plan

Item code		Unit	Quantity		Unit Price ($)			Cost
12865X	Portable Changeable Message Signs	EA/LS		x		=	$	-

Subtotal Traffic Management Plan $ -

6C - Stage Construction and Traffic Handling

Item code		Unit	Quantity		Unit Price ($)			Cost
120199	Traffic Plastic Drum	EA		x		=	$	-
12016X	Channelizer (Type X)	EA		x		=	$	-
120120	Type III Barricade	EA		x		=	$	-
129100	Temporary Crash Cushion Module	EA		x		=	$	-
120100	Traffic Control System	LS	1	x	50,000.00	=	$	50,000
129110	Temporary Crash Cushion	EA		x		=	$	-
129000	Temporary Railing (Type K)	LF		x		=	$	-
120149	Temporary Pavement Marking (Paint)	SQFT		x		=	$	-
82010X	Delineator (Class X)	EA		x		=	$	-
XXXXXX	Stage Construction	LS		x		=	$	-

Subtotal Stage Construction and Traffic Handling $ *50,000*

TOTAL TRAFFIC ITEMS $ **450,000**

GRANGEVILLE BOULEVARD GRADE SEPARATION - UNDERPASS ALTERNATIVE

TRC Project No. 251911-1

SECTION 7: DETOURS

Includes constructing, maintaining, and removal

Item code		Unit	Quantity		Unit Price ($)		Cost
190101	Roadway Excavation	CY		x		= $	-
19801X	Imported Borrow	CY/TON		x		= $	-
390132	Hot Mix Asphalt (Type A)	CY		x		= $	-
26020X	Class 2 Aggregate Base	TON/CY		x		= $	-
250401	Class 4 Aggregate Subbase	CY		x		= $	-
130620	Temporary Drainage Inlet Protection	EA		x		= $	-
129000	Temporary Railing (Type K)	LF		x		= $	-
128601	Temporary Signal System	LS		x		= $	-
120149	Temporary Pavement Marking (Paint)	SQFT		x		= $	-
80010X	Temporary Fence (Type X)	LF		x		= $	-
XXXXXX	Road Repair (Detour)	LS	1	x	50,000.00	= $	50,000

TOTAL DETOURS	**$**	**50,000**
SUBTOTAL SECTIONS 1 through 7	$	4,074,300

SECTION 8: MINOR ITEMS

8A - Americans with Disabilities Act Items						
ADA Items				1.0%	$	40,743
8B - Bike Path Items						
Bike Path Items				1.0%	$	40,743
8C - Other Minor Items						
Other Minor Items				8.0%	$	325,944
Total of Section 1-7	$	4,074,300	x	10.0%	= $	407,430

TOTAL MINOR ITEMS	**$**	**407,500**

SECTIONS 9: MOBILIZATION

Item code							
999990	Total Section 1-8	$	4,481,800	x	10%	= $	448,180

TOTAL MOBILIZATION	**$**	**448,200**

SECTION 10: SUPPLEMENTAL WORK

Item code		Unit	Quantity		Unit Price ($)		Cost
066670	Payment Adjustments For Price Index Fluctuations	LS		x		= $	-
066094	Value Analysis	LS		x		= $	-
066070	Maintain Traffic	LS		x		= $	-
066919	Dispute Resolution Board	LS		x		= $	-
066921	Dispute Resolution Advisor	LS		x		= $	-
066015	Federal Trainee Program	LS		x		= $	-
066610	Partnering	LS		x		= $	-
066204	Remove Rock and Debris	LS		x		= $	-
066222	Locate Existing Crossover	LS		x		= $	-
XXXXXX	Some Item	Unit		x		= $	-
	*Cost of **NPDES** Supplemental Work specified in Section 5D*					= $	6,000
	Total Section 1-8	$	4,481,800		4%	= $	179,272

TOTAL SUPPLEMENTAL WORK	**$**	**185,300**

GRANGEVILLE BOULEVARD GRADE SEPARATION - UNDERPASS ALTERNATIVE

TRC Project No. 251911-1

SECTION 11: STATE FURNISHED MATERIALS AND EXPENSES

Item code		Unit	Quantity		Unit Price ($)		Cost
066105	Resident Engineers Office	LS		x		=	$0
066063	Traffic Management Plan - Public Information	LS		x		=	$0
066901	Water Expenses	LS		x		=	$0
8609XX	Traffic Monitoring Station (X)	LS		x		=	$0
066841	Traffic Controller Assembly	LS		x		=	$0
066840	Traffic Signal Controller Assembly	LS		x		=	$0
066062	COZEEP Contract	LS		x		=	$0
066838	Reflective Numbers and Edge Sealer	LS		x		=	$0
066065	Tow Truck Service Patrol	LS		x		=	$0
066916	Annual Construction General Permit Fee	LS		x		=	$0
XXXXXX	Some Item	Unit		x		=	$0
	Total Section 1-8		$ 4,481,800		4%	= $	179,272

TOTAL STATE FURNISHED **$179,300**

SECTION 12: TIME-RELATED OVERHEAD

Total of Roadway and Structures Contract Items excluding Mobilization $19,065,665 (used to calculate TRO)

Total Construction Cost (excluding TRO and Contingency) $21,267,405 (used to check if project is greater than $5 million excluding contingency)

Estimated Time-Releated Overhead (TRO) Percentage (0% to 10%) = **3%**

Item code		Unit	Quantity		Unit Price ($)		Cost
070018	Time-Related Overhead	WD	375	X	$1,525	=	$572,000

TOTAL TIME-RELATED OVERHEAD **$572,000**

Note: If the building portion of the project is greater than 50% of the total project cost, then TRO is not included.

SECTION 13: ROADWAY CONTINGENCY

Recommended Contingency: (Pre-PSR 30%-50%, PSR 25%, Draft PR 20%, PR 15%, after PR approval 10%, Final PS&E 5%)

Total Section 1-11	$	5,681,300	x	**15%**	=	$852,195

TOTAL CONTINGENCY **$852,200**

II. STRUCTURE ITEMS

Grangeville Boulevard Grade Separation at BNSF Railway

	Bridge		Retaining Walls		
DATE OF ESTIMATE	11/13/19		11/13/19		00/00/00
Bridge Name	Underpass Structure		xxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxx
Bridge Number	45C-XXX		45C-XXX		45C-XXX
Structure Type	Precast/Prestressed Wide Flange Girder		Secant and Type 1 Retaining Walls		xxxxxxxxxxxxxxxxxx
Width (Feet) [out to out]	66.00 LF		0 LF		0 LF
Total Bridge Length (Feet)	99.83 LF		0 LF		0 LF
Total Area (Square Feet)	6,589 SQFT		30,552 SQFT		0 SQFT
Structure Depth (Feet)	4.92 LF		0 LF		0 LF
Footing Type (pile or spread)	Pile		Pile/Spread		xxxxxxxxxxxxxxxxxx
Cost Per Square Foot	$823		$232		$0
COST OF EACH STRUCTURE	**$5,423,256**		**$7,077,200**		**$0**

DATE OF ESTIMATE	00/00/00		00/00/00		00/00/00
Name	xxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxx
Bridge Number	45C-XXX		45C-XXX		45C-XXX
Structure Type	xxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxx
Width (Feet) [out to out]	0 LF		0 LF		0 LF
Total Length (Feet)	0 LF		0 LF		0 LF
Total Area (Square Feet)	0 SQFT		0 SQFT		0 SQFT
Structure Depth (Feet)	0 LF		0 LF		0 LF
Footing Type (pile or spread)	xxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxx
Cost Per Square Foot	$100		$0		$0
COST OF EACH STRUCTURE	**$0**		**$0**		**$0**

Note: See attached itemized structure costs

TOTAL COST OF BRIDGES		**$5,423,256**
TOTAL COST OF RETAINING WALLS		**$7,077,200**
Structures Mobilization Percentage	10%	**$1,388,940**

Recommended Contingency: (Pre-PSR 30%-50%, PSR 25%, Draft PR 20%, PR 15%, after PR approval 10%, Final PS&E 5%)

Structures Contingency Percentage	15%	**$2,083,409**
TOTAL COST OF STRUCTURES		**$15,972,805**

Estimate Prepared By: Robin Yates

11/13/2019
Date

III. RAILROAD ITEMS

Item code		Unit	Quantity		Unit Price ($)		Cost
XXXXXX	Removal of Existing Crossing	LS	1	x	14,200.00	=	$ 14,200
XXXXXX	Subballast - Class 2 Agg Base*	CY	3,444	x	38.00	=	$ 130,872
XXXXXX	Ballast**	CY	5,167	x	43.00	=	$ 222,181
XXXXXX	Shoofly Tracks Work	Grade Sepa	9,000	x	65.00	=	$ 585,000
XXXXXX	Shoofly Tracks Cutover	LS	1	x	375,000.00	=	$ 375,000
XXXXXX	Remove/Reconstruct Track Work	LF	250	x	75.00	=	$ 18,750
XXXXXX	Relocate Control Point	LS	1	x	6,000,000.00	=	$ 6,000,000

TOTAL RAILROAD ITEMS		**$ 7,346,100**
Railroad Work Contingency Percentage	15%	**$1,101,915**
TOTAL COST OF RAILROAD WORK		**$8,448,015**

IV. RIGHT OF WAY

Fill in all of the available information from the Right of Way data sheet.

A)	A1)	Acquisition, including Excess Land Purchases, Damages & Goodwill, Fees	$	585,000
	A2)	SB-1210	$	0
B)	Acquisition	Grangeville Boulevard Grade Separation at BNSF Railway	$	0
C)	C1)	Utility Relocation (State Share)	$	0
	C2)	Potholing (Design Phase)		0
D)	Railroad Acquisition		$	0
E)	Clearance / Demolition		$	0
F)	Relocation Assistance (RAP and/or Last Resort Housing Costs)		$	0
G)	Title and Escrow		$	91,000
H)	Environmental Review		$	0
I)	Condemnation Settlements	0%	$	0
J)	Design Appreciation Factor	0%	$	0
K)	Utility Relocation (Construction Cost)		$	1,963,333

L)	**TOTAL RIGHT OF WAY ESTIMATE**	**$2,639,333**

BRIDGE ESTIMATE - UNDERPASS ALT

PROJECT NO. 251911-1

__ Advance Planning Estimate
x General Plan Estimate
__ Marginal Estimate

Est. By RY 11/25/2019
Chk. By

TRC
575 East Locust Avenue, Suite 105
Fresno, CA 93720
Phone (559) 439-2576

3.0% Forecasted Annual Cost Inflation Rate

Date for mid-point of construction period

BRIDGE: Grangeville Ave Grade Separation
TYPE: Precast, Prestressed Wide Flange Girder
CALTRANS BR NO.:
COUNTY BR NO.:
DISTRICT: 06
COUNTY: KIN
ROUTE: Grangeville Ave
PM:

CU:
EA:

DEPTH: 4.92 ft
LENGTH: 99.83 ft
WIDTH: 66.00 ft
= AREA: 6,589 sq ft

ITEM NO.		CONTRACT ITEMS	UNIT	QUANTITY	UNIT COST	ADJ	PRICE	AMOUNT
1	19XXXX	Temporary Shoring	LS	1	$750,000.00	1.00	$750,000.00	$750,000
2	192003	Structure Excavation (Bridge)	CY	790	$85.00	1.25	$106.25	$83,938
3	193003	Structure Backfill (Bridge)	CY	265	$175.00	1.25	$218.75	$57,969
4	490603	24" Cast-In-Drilled-Hole Concrete Piling	LF	1,500	$225.00	1.25	$281.25	$421,875
5	490609	60" Cast-In-Drilled-Hole Concrete Piling	LF	1,800	$750.00	1.25	$937.50	$1,687,500
6	49XXXX	18" Lean Concrete Secant Pile	LF	400	$170.00	1.25	$212.50	$85,000
7	510051	Structural Concrete, Bridge Footing	CY	220	$650.00	1.25	$812.50	$178,750
8	510053	Structural Concrete, Bridge	CY	560	$1,500.00	1.25	$1,875.00	$1,050,000
9	510080	Structural Concrete, Approach Slab	CY	20	$850.00	1.25	$1,062.50	$21,250
10	512203	Furnish PC/PS Concrete Girder (40'-50')	EA	22	$26,800.00	1.00	$26,800.00	$589,600
11	512221	Furnish PC/PS Concrete Box Girder (40'-50')	EA	4	$32,100.00	1.00	$32,100.00	$128,400
12	512500	Erect PC/PS Concrete Girder	EA	22	$3,750.00	1.25	$4,687.50	$103,125
13	512502	Erect PC/PS Concrete Box Girder	EA	4	$6,420.00	1.25	$8,025.00	$32,100
14	520102	Bar Reinforcing Steel (Bridge)	LB	100,000	$1.70	1.25	$2.13	$212,500
15	833032	Chain Link Railing (Type 7)	LF	200	$85.00	1.25	$106.25	$21,250

NOTES:

1. Some unit costs have been increased by 25% to account for staged construction.

SUBTOTAL		$5,423,256
MOBILIZATION	(@ 10%)	$602,584
SUBTOTAL BRIDGE ITEMS		**$6,025,840**
CONTINGENCIES	(@ 15%)	$903,876
TOTAL BRIDGE COST		$6,929,716
COST PER SQ. FT. (w/o contingencies)		$915
FOR PRESENT DAY COST - USE	11/25/2019	**$6,930,000**

RETAINING WALL ESTIMATE - UNDERPASS ALT

	Advance Planning Estimate
x	General Plan Estimate
	Marginal Estimate

PROJECT NO. 251911-1

Est. By RY 11/25/2019

Chk. By

575 East Locust Avenue, Suite 105
Fresno, CA 93720
Phone (559) 439-2576

3.0% Forecasted Annual Cost Inflation Rate

Date for mid-point of construction period

BRIDGE: Grangeville Ave Grade Separation
TYPE: Secant & Type 1 Retaining Walls
CALTRANS BR NO.:
COUNTY BR NO.:
DISTRICT: 06
COUNTY: KIN
ROUTE: Grangeville Ave
PM:

CU:
EA:
AVG HT: 12.00 ft
LENGTH: 2546.00 ft
= AREA: 30,552 sq ft

ITEM NO.		CONTRACT ITEMS	UNIT	QUANTITY	UNIT COST	ADJ	PRICE	AMOUNT
1	490607	48" Cast-In-Drilled-Hole Concrete Piling	LF	15,700	$580.00	0.50	$290.00	$4,553,000
2	49XXXX	18" Lean Concrete Secant Pile	LF	4,100	$170.00	0.50	$85.00	$348,500
3	510060	Structural Concrete, Retaining Wall	CY	1,900	$660.00	1.00	$660.00	$1,254,000
4	520103	Bar Reinforcing Steel (Retaining Wall)	LB	203,000	$1.30	1.00	$1.30	$263,900
5	839727A	Concrete Barrier (Type 836)	LF	2,530	$175.00	1.00	$175.00	$442,750
6	833032	Chain Link Railing (Type 7)	LF	2,530	$85.00	1.00	$85.00	$215,050

NOTES:

SUBTOTAL		$7,077,200
MOBILIZATION	(@ 10%)	$786,356
SUBTOTAL RW ITEMS		**$7,863,556**
CONTINGENCIES	(@ 15%)	$1,179,533
TOTAL RW COST		$9,043,089
COST PER SQ. FT. (w/o contingencies)		$257
FOR PRESENT DAY COST - USE	11/25/2019	**$9,050,000**

GRANGEVILLE BOULEVARD GRADE SEPARATION - OVERPASS ALTERNATIVE

PLANNING COST ESTIMATE

TRC Project No. 251911-1

District-County-Route: 06-KIN-0-HAN

RR PM: 969.10

Type of Estimate : Advance Planning Estimate

Project Limits : Grangeville Boulevard between University Avenue and Rodgers Road

Project Description: Grangeville Boulevard Grade Separation at BNSF Railway

Alternative : Overpass

SUMMARY OF PROJECT COST ESTIMATE

	Current Year Cost	Escalated Cost
TOTAL ROADWAY COST	$ 7,716,800	$ 8,828,257
TOTAL STRUCTURES COST	$ 13,510,226	$ 15,456,114
TOTAL RAILROAD WORK COST	$ 16,330	$ 18,682
SUBTOTAL CONSTRUCTION COST	$ 21,243,356	$ 24,303,053
TOTAL RIGHT OF WAY COST	$ 1,388,333	$ 1,388,333
TOTAL CAPITAL OUTLAY COSTS	$ 22,632,000	$ 25,692,000
PRELIMINARY ENGINEERING	$ 2,036,880	$ 2,036,880
CONSTRUCTION ENGINEERING	$ 1,697,400	$ 1,697,400
TOTAL ENGINEERING COST	$ 3,734,280	$ 3,734,280
TOTAL PROJECT COST	$ 26,400,000	$ 29,450,000

Allocated Share from State Fund: **$ 5,000,000**

Contributions

City	$ 21,505,000
County	$ -
Railroad	$ 2,945,000
Other (specify)	$ -

	Month	/	Year
Date of Estimate (Month/Year)	11	/	2019
Estimated Construction Start (Month/Year)	1	/	2025
Number of Working Days =	250		
Estimated Mid-Point of Construction (Month/Year)	7	/	2025
Estimated Construction End (Month/Year)	1	/	2026
Number of Plant Establishment Days	261		

GRANGEVILLE BOULEVARD GRADE SEPARATION - OVERPASS ALTERNATIVE

TRC Project No. 251911-1

I. ROADWAY ITEMS SUMMARY

	Section		Cost
1	**Earthwork**	$	2,479,800
2	**Pavement Structural Section**	$	1,042,600
3	**Drainage**	$	691,700
4	**Specialty Items**	$	36,900
5	**Environmental**	$	95,600
6	**Traffic Items**	$	450,000
7	**Detours**	$	50,000
8	**Minor Items**	$	484,700
9	**Roadway Mobilization**	$	533,200
10	**Supplemental Work**	$	219,300
11	**State Furnished**	$	213,300
12	**Time-Related Overhead**	$	441,700
13	**Roadway Contingency**	$	978,000
	TOTAL ROADWAY ITEMS	**$**	**7,716,800**

Estimate Prepared By : Daniel Lockett — Name and Title — 11/27/2019 — Date

Estimate Reviewed By : Justina Conklin — Name and Title — 9/11/2019 — Date

GRANGEVILLE BOULEVARD GRADE SEPARATION - OVERPASS ALTERNATIVE

TRC Project No. 251911-1

SECTION 1: EARTHWORK

Item code		Unit	Quantity		Unit Price ($)			Cost
190101	Roadway Excavation	CY	2,874	x	100.00	=	$	287,400
19010X	Roadway Excavation (Type X) ADL	CY		x		=	$	-
194001	Ditch Excavation	CY		x		=	$	-
198010	Imported Borrow	CY	107,870	x	20.00	=	$	2,157,400
192037	Structure Excavation (Retaining Wall)	CY		x		=	$	-
193013	Structure Backfill (Retaining Wall)	CY		x		=	$	-
193031	Pervious Backfill Material (Retaining Wall)	CY		x		=	$	-
16010X	Clearing & Grubbing	LS	1	x	25,000.00	=	$	25,000
170101	Develop Water Supply	LS	1	x	10,000.00	=	$	10,000
210130	Duff	ACRE		x		=	$	-
XXXXXX	Some Item	Unit						

TOTAL EARTHWORK SECTION ITEMS $ 2,479,800

SECTION 2: PAVEMENT STRUCTURAL SECTION

Item code		Unit	Quantity		Unit Price ($)			Cost
401050	Jointed Plain Concrete Pavement	CY		x		=	$	-
400050	Continuously Reinforced Concrete Pavement	CY		x		=	$	-
404092	Seal Pavement Joint	LF		x		=	$	-
404093	Seal Isolation Joint	LF		x		=	$	-
413117	Seal Concrete Pavement Joint (Silicone)	LF		x		=	$	-
413118	Seal Pavement Joint (Asphalt Rubber)	LF		x		=	$	-
280010	Rapid Strength Concrete Base	CY		x		=	$	-
410095	Dowel Bar (Drill and Bond)	EA		x		=	$	-
XXXXXX	Hot Mix Asphalt (Type B)	TON	6,464	x	100.00	=	$	646,400
390137	Rubberized Hot Mix Asphalt (Gap Graded)	TON		x		=	$	-
39300X	Geosynthetic Pavement Interlayer (Type X)	SQYD		x		=	$	-
260203	Class 2 Aggregate Base	CY	4,952	x	80.00	=	$	396,160
290201	Asphalt Treated Permeable Base	CY		x		=	$	-
250401	Class 4 Aggregate Subbase	CY		x		=	$	-
374002	Asphaltic Emulsion (Fog Seal Coat)	TON		x		=	$	-
397005	Tack Coat	TON		x		=	$	-
377501	Slurry Seal	TON		x		=	$	-
3750XX	Screenings (Type XX)	TON		x		=	$	-
374492	Asphaltic Emulsion (Polymer Modified)	TON		x		=	$	-
370001	Sand Cover (Seal)	TON		x		=	$	-
731530	Minor Concrete (Textured Paving)	CY		x		=	$	-
731502	Minor Concrete (Miscellaneous Construction)	CY		x		=	$	-
39407X	Place Hot Mix Asphalt Dike (Type X)	LF		x		=	$	-
150771	Remove Asphalt Concrete Dike	LF		x		=	$	-
420201	Grind Existing Concrete Pavement	SQYD		x		=	$	-
150860	Remove Base and Surfacing	CY		x		=	$	-
390095	Replace Asphalt Concrete Surfacing	CY		x		=	$	-
15312X	Remove Concrete	LF/CY/LS		x		=	$	-
394090	Place Hot Mix Asphalt (Miscellaneous Area)	SQYD		x		=	$	-
153103	Cold Plane Asphalt Concrete Pavement	SQYD		x		=	$	-
39405X	Shoulder Rumble Strip (HMA, X-In Indentations)	STA		x		=	$	-
413113	Repair Spalled Joints, Polyester Grout	SQYD		x		=	$	-
420102	Groove Existing Concrete Pavement	SQYD		x		=	$	-
390136	Minor Hot Mix Asphalt	TON		x		=	$	-
394095	Roadside Paving (Miscellaneous Areas)	SQYD		x		=	$	-
XXXXXX	Some Item	Unit		x		=	$	-

TOTAL PAVEMENT STRUCTURAL SECTION ITEMS $ 1,042,600

GRANGEVILLE BOULEVARD GRADE SEPARATION - OVERPASS ALTERNATIVE

TRC Project No. 251911-1

SECTION 3: DRAINAGE

Item code		Unit	Quantity		Unit Price ($)			Cost
15080X	Remove Culvert	EA/LF		x		=	$	-
150820	Modify Inlet	EA		x		=	$	-
155232	Sand Backfill	CY		x		=	$	-
15020X	Abandon Culvert	EA/LF		x		=	$	-
152430	Adjust Inlet	LF		x		=	$	-
155003	Cap Inlet	EA		x		=	$	-
731510	Minor Concrete (Curb, Gutter, Sidewalk and Driveway)	CY	505	x	500.00	=	$	252,500
731623	Minor Concrete (Curb Ramp)	EA	4	x	3,000.00	=	$	12,000
731511	Minor Concrete (Island Paving)	CY	212	x	600.00	=	$	127,200
620XXX	XX" Alternative Pipe Culvert (Type X)	LF		x		=	$	-
6411XX	XX" Plastic Pipe	LF		x		=	$	-
65XXXX	XX" Reinforced Concrete Pipe (Type X)	LF		x		=	$	-
6650XX	XX" Corrugated Steel Pipe (0.XXX" Thick)	LF		x		=	$	-
68XXXX	XX" Plastic Pipe (Edge Drain)	LF		x		=	$	-
69011X	XX" Corrugated Steel Pipe Downdrain (0.XXX" Thick)	LF		x		=	$	-
70321X	XX" Corrugated Steel Pipe Inlet (0.XXX" Thick)	LF		x		=	$	-
70XXXX	XX" Corrugated Steel Pipe Riser (0.XXX" Thick)	LF		x		=	$	-
7050XX	XX" Steel Flared End Section	EA		x		=	$	-
703233	Grated Line Drain	LF		x		=	$	-
72XXXX	Rock Slope Protection (Type and Method)	CY/TON		x		=	$	-
72901X	Rock Slope Protection Fabric (Class X)	SQYD		x		=	$	-
721420	Concrete (Ditch Lining)	CY		x		=	$	-
721430	Concrete (Channel Lining)	CY		x		=	$	-
750001	Miscellaneous Iron and Steel	LB		x		=	$	-
XXXXXX	Additional Drainage	LS	1	x	300,000.00	=	$	300,000

TOTAL DRAINAGE ITEMS $ 691,700

SECTION 4: SPECIALTY ITEMS

Item code		Unit	Quantity		Unit Price ($)			Cost
080050	Progress Schedule (Critical Path Method)	LS	1	x	10,000.00	=	$	10,000
582001	Sound Wall (Masonry Block)	SQFT		x		=	$	-
510530	Minor Concrete (Wall)	CY		x		=	$	-
15325X	Remove Sound Wall	LF/LS		x		=	$	-
070030	Lead Compliance Plan	LS	1	x	5,000.00	=	$	5,000
141120	Treated Wood Waste	LB		x		=	$	-
153221	Remove Concrete Barrier	LF		x		=	$	-
150662	Remove Metal Beam Guard Railing	LF		x		=	$	-
150668	Remove Flared End Section	EA		x		=	$	-
8000XX	Chain Link Fence (Type XX)	LF		x		=	$	-
80XXXX	12' Chain Link Gate (Type CL-6)	EA	3	x	2,500.00	=	$	7,500
832001	Metal Beam Guard Railing	LF		x		=	$	-
839301	Single Thrie Beam Barrier	LF		x		=	$	-
839310	Double Thrie Beam Barrier	LF		x		=	$	-
730070	Detectable Warning Surface	SQFT	48	x	50.00	=	$	2,400
839521	Cable Railing	LF		x		=	$	-
8395XX	Terminal System (Type CAT)	EA		x		=	$	-
839585	Alternative Flared Terminal System	EA		x		=	$	-
839584	Alternative In-line Terminal System	EA		x		=	$	-
4906XX	CIDH Concrete Piling (Insert Diameter)	LF		x		=	$	-
839591	Crash Cushion, Sand Filled	EA	2	x	6,000.00	=	$	12,000
83XXXX	Concrete Barrier (Insert Type)	LF		x		=	$	-
520103	Bar Reinforced Steel (Retaining Wall)	LB		x		=	$	-
510060	Structural Concrete, Retaining Wall	CY		x		=	$	-
513553	Retaining Wall (Masonry Wall)	SQFT		x		=	$	-
511035	Architectural Treatment	SQFT		x		=	$	-
598001	Anti-Graffiti Coating	SQFT		x		=	$	-
203070	Rock Stain	SQFT		x		=	$	-
5136XX	Reinforced Concrete Crib Wall (Type X)	SQFT		x		=	$	-
83954X	Transition Railing (Type X)	EA		x		=	$	-
597601	Prepare and Stain Concrete	SQFT		x		=	$	-
839561	Rail Tensioning Assembly	EA		x		=	$	-
83958X	End Anchor Assembly (Type X)	EA		x		=	$	-
XXXXXX	Some Item	Unit		x		=	$	-

TOTAL SPECIALTY ITEMS $ 36,900

GRANGEVILLE BOULEVARD GRADE SEPARATION - OVERPASS ALTERNATIVE

TRC Project No. 251911-1

SECTION 5: ENVIRONMENTAL

5A - ENVIRONMENTAL MITIGATION

Item code		Unit	Quantity		Unit Price ($)			Cost
	Biological Mitigation	LS		x		=	$	-
130670	Temporary Reinforced Silt Fence	LF		x		=	$	-
141000	Temporary Fence (Type ESA)	LF		x		=	$	-
						Subtotal Environmental Mitigation	*$*	*-*

5B - LANDSCAPE AND IRRIGATION

Item code		Unit	Quantity		Unit Price ($)			Cost
20XXXX	Highway Planting	LS	1	x	20,000.00	=	$	20,000
20XXXX	Irrigation System	LS		x		=	$	-
204099	Plant Establishment Work	LS		x		=	$	-
204101	Extend Plant Establishment Work	LS		x		=	$	-
20XXXX	Follow-up Landscape Project	LS		x		=	$	-
150685	Remove Irrigation Facility	LS		x		=	$	-
20XXXX	Maintain Existing (Irrigation or Planted Areas)	LS		x		=	$	-
206400	Check and Test Existing Irrigation Facilities	LS		x		=	$	-
21011X	Imported Topsoil (X)	CY/TON		x		=	$	-
20XXXX	Rock Blanket, Rock Mulch, DG, Gravel Mulch	SQFT/SQYD		x		=	$	-
200122	Weed Germination	SQYD		x		=	$	-
208304	Water Meter	EA		x		=	$	-
2087XX	XX" Conduit (Use for Irrigation x-overs)	LF		x		=	$	-
20890X	Extend X" Conduit (Use for Extension of Irrigation x-overs)	LF		x		=	$	-
						Subtotal Landscape and Irrigation	*$*	*20,000*

5C - EROSION CONTROL

Item code		Unit	Quantity		Unit Price ($)			Cost
210010	Move In/Move Out (Erosion Control)	EA		x		=	$	-
210350	Fiber Rolls	LF		x		=	$	-
210360	Compost Sock	LF		x		=	$	-
2102XX	Rolled Erosion Control Product (X)	SQFT		x		=	$	-
21025X	Bonded Fiber Matrix	SQFT/ACRE		x		=	$	-
210300	Hydromulch	SQFT		x		=	$	-
210420	Straw	SQFT		x		=	$	-
210430	Hydroseed	SQFT		x		=	$	-
210600	Compost	SQFT		x		=	$	-
210630	Incorporate Materials	SQFT		x		=	$	-
						Subtotal Erosion Control	*$*	*-*

5D - NPDES

Item code		Unit	Quantity		Unit Price ($)			Cost
130300	Prepare SWPPP	LS	1	x	10,000.00	=	$	10,000
130200	Prepare WPCP	LS		x		=	$	-
130100	Job Site Management	LS	1	x	50,000.00	=	$	50,000
130330	Storm Water Annual Report	EA	1	x	2,000.00	=	$	2,000
130310	Rain Event Action Plan (REAP)	EA		x		=	$	-
130320	Storm Water Sampling and Analysis Day	EA		x		=	$	-
130520	Temporary Hydraulic Mulch	SQYD		x		=	$	-
130550	Temporary Hydroseed	SQYD		x		=	$	-
130505	Move-In/Move-Out (Temporary Erosion Control)	EA		x		=	$	-
130640	Temporary Fiber Roll	LF		x		=	$	-
130900	Temporary Concrete Washout	LS	2	x	3,000.00	=	$	6,000
130710	Temporary Construction Entrance	EA	2	x	2,500.00	=	$	5,000
130610	Temporary Check Dam	LF		x		=	$	-
130620	Temporary Drainage Inlet Protection	EA	4	x	650.00	=	$	2,600
130730	Street Sweeping	LS		x		=	$	-
							Subtotal NPDES	*$*	*75,600*

						TOTAL ENVIRONMENTAL	**$**	**95,600**

Supplemental Work for NPDES

066595	Water Pollution Control Maintenance Sharing*	LS	1	x	2,000.00	=	$	2,000
066596	Additional Water Pollution Control**	LS	1	x	2,000.00	=	$	2,000
066597	Storm Water Sampling and Analysis***	LS	1	x	2,000.00	=	$	2,000
XXXXXX	Some Item	LS		x		=	$	-
						Subtotal Supplemental Work for NDPS	*$*	*6,000*

*Applies to all SWPPPs and those WPCPs with sediment control or soil stabilization BMPs.

**Applies to both SWPPPs and WPCP projects.

*** Applies only to project with SWPPPs.

GRANGEVILLE BOULEVARD GRADE SEPARATION - OVERPASS ALTERNATIVE

TRC Project No. 251911-1

SECTION 6: TRAFFIC ITEMS

6A - Traffic Electrical

Item code		Unit	Quantity		Unit Price ($)			Cost
860460	Lighting and Sign Illumination	LS	1	x	50,000.00	=	$	50,000
xxxxxx	Modify Traffic Signal	LS	1	x	300,000.00	=	$	300,000
860990	Closed Circuit Television System	LS		x		=	$	-
86110X	Ramp Metering System (Location X)	LS		x		=	$	-
86070X	Interconnection Conduit and Cable	LF/LS		x		=	$	-
5602XX	Furnish Sign Structure (Type X)	LB		x		=	$	-
5602XX	Install Sign Structure (Type X)	LB		x		=	$	-
498040	XX" CIDHC Pile (Sign Foundation)	LF		x		=	$	-
86080X	Inductive Loop Detectors	EA/LS		x		=	$	-
8609XX	Traffic Monitoring Station (Type X)	LS		x		=	$	-
15075X	Remove Sign Structure	EA/LS		x		=	$	-
151581	Reconstruct Sign Structure	EA		x		=	$	-
152641	Modify Sign Structure	EA		x		=	$	-
860090	Maintain Existing Traffic Management System Elements During Construction	LS		x		=	$	-
86XXXX	Fiber Optic Conduit System	LS		x		=	$	-
XXXXX	Some Item	LS		x		=	$	-

Subtotal Traffic Electrical $ *350,000*

6B - Traffic Signing and Striping

Item code		Unit	Quantity		Unit Price ($)			Cost
566011	Roadside Sign - One Post	EA		x		=	$	-
566012	Roadside Sign - Two Post	EA		x		=	$	-
5602XX	Furnish Sign	SQFT		x		=	$	-
568016	Install Sign Panel on Existing Frame	SQFT		x		=	$	-
150711	Remove Painted Traffic Stripe	LF		x		=	$	-
141101	Remove Yellow Painted Traffic Stripe (Hazardous Waste)	LF		x		=	$	-
150712	Remove Painted Pavement Marking	SQFT		x		=	$	-
150742	Remove Roadside Sign	EA		x		=	$	-
152320	Reset Roadside Sign	EA		x		=	$	-
152390	Relocate Roadside Sign	EA		x		=	$	-
84XXXX	Signing and Striping	LS	1	x	10,000.00	=	$	10,000
840502	Thermoplastic Traffic Stripe (Enhanced Wet Night Visibility)	LF		x		=	$	-
846012	Thermoplastic Crosswalk and Pavement Marking (Enhanced Wet Night Visibility)	SQFT		x		=	$	-
120090	Construction Area Signs	LS	1	x	40,000.00	=	$	40,000
84XXXX	Permanent Pavement Delineation	LS		x		=	$	-

Subtotal Traffic Signing and Striping $ *50,000*

6C - Traffic Management Plan

Item code		Unit	Quantity		Unit Price ($)			Cost
12865X	Portable Changeable Message Signs	EA/LS		x		=	$	-

Subtotal Traffic Management Plan $ -

6C - Stage Construction and Traffic Handling

Item code		Unit	Quantity		Unit Price ($)			Cost
120199	Traffic Plastic Drum	EA		x		=	$	-
12016X	Channelizer (Type X)	EA		x		=	$	-
120120	Type III Barricade	EA		x		=	$	-
129100	Temporary Crash Cushion Module	EA		x		=	$	-
120100	Traffic Control System	LS	1	x	50,000.00	=	$	50,000
129110	Temporary Crash Cushion	EA		x		=	$	-
129000	Temporary Railing (Type K)	LF		x		=	$	-
120149	Temporary Pavement Marking (Paint)	SQFT		x		=	$	-
82010X	Delineator (Class X)	EA		x		=	$	-
XXXXXX	Stage Construction	LS		x		=	$	-

Subtotal Stage Construction and Traffic Handling $ *50,000*

TOTAL TRAFFIC ITEMS $ **450,000**

GRANGEVILLE BOULEVARD GRADE SEPARATION - OVERPASS ALTERNATIVE

TRC Project No. 251911-1

SECTION 7: DETOURS

Includes constructing, maintaining, and removal

Item code		Unit	Quantity		Unit Price ($)		Cost
190101	Roadway Excavation	CY		x		= $	-
19801X	Imported Borrow	CY/TON		x		= $	-
390132	Hot Mix Asphalt (Type A)	TON		x		= $	-
26020X	Class 2 Aggregate Base	TON/CY		x		= $	-
250401	Class 4 Aggregate Subbase	CY		x		= $	-
130620	Temporary Drainage Inlet Protection	EA		x		= $	-
129000	Temporary Railing (Type K)	LF		x		= $	-
128601	Temporary Signal System	LS		x		= $	-
120149	Temporary Pavement Marking (Paint)	SQFT		x		= $	-
80010X	Temporary Fence (Type X)	LF		x		= $	-
XXXXXX	Road Repair (Detour)	LS	1	x	50,000.00	= $	50,000

TOTAL DETOURS	**$**	**50,000**
SUBTOTAL SECTIONS 1 through 7	$	4,846,600

SECTION 8: MINOR ITEMS

8A - Americans with Disabilities Act Items					
ADA Items			1.0%	$	48,466
8B - Bike Path Items					
Bike Path Items			1.0%	$	48,466
8C - Other Minor Items					
Other Minor Items			8.0%	$	387,728
Total of Section 1-7	$	4,846,600	10.0%	$	484,660

TOTAL MINOR ITEMS	**$**	**484,700**

SECTIONS 9: MOBILIZATION

Item code							
999990	Total Section 1-8	$	5,331,300	x	10%	= $	533,130

TOTAL MOBILIZATION	**$**	**533,200**

SECTION 10: SUPPLEMENTAL WORK

Item code		Unit	Quantity		Unit Price ($)		Cost
066670	Payment Adjustments For Price Index Fluctuations	LS		x		= $	-
066094	Value Analysis	LS		x		= $	-
066070	Maintain Traffic	LS		x		= $	-
066919	Dispute Resolution Board	LS		x		= $	-
066921	Dispute Resolution Advisor	LS		x		= $	-
066015	Federal Trainee Program	LS		x		= $	-
066610	Partnering	LS		x		= $	-
066204	Remove Rock and Debris	LS		x		= $	-
066222	Locate Existing Crossover	LS		x		= $	-
XXXXXX	Some Item	Unit		x		= $	-
	*Cost of **NPDES** Supplemental Work specified in Section 5D*					= $	6,000
	Total Section 1-8	$	5,331,300		4%	= $	213,252

TOTAL SUPPLEMENTAL WORK	**$**	**219,300**

GRANGEVILLE BOULEVARD GRADE SEPARATION - OVERPASS ALTERNATIVE

TRC Project No. 251911-1

SECTION 11: STATE FURNISHED MATERIALS AND EXPENSES

Item code		Unit	Quantity		Unit Price ($)		Cost
066105	Resident Engineers Office	LS		x		=	$0
066063	Traffic Management Plan - Public Information	LS		x		=	$0
066901	Water Expenses	LS		x		=	$0
8609XX	Traffic Monitoring Station (X)	LS		x		=	$0
066841	Traffic Controller Assembly	LS		x		=	$0
066840	Traffic Signal Controller Assembly	LS		x		=	$0
066062	COZEEP Contract	LS		x		=	$0
066838	Reflective Numbers and Edge Sealer	LS		x		=	$0
066065	Tow Truck Service Patrol	LS		x		=	$0
066916	Annual Construction General Permit Fee	LS		x		=	$0
XXXXXX	Some Item	Unit		x		=	$0
	Total Section 1-8		$ 5,331,300		4%	= $	213,252

TOTAL STATE FURNISHED **$213,300**

SECTION 12: TIME-RELATED OVERHEAD

Total of Roadway and Structures Contract Items excluding Mobilization $17,666,723 (used to calculate TRO)

Total Construction Cost (excluding TRO and Contingency) $19,807,326 (used to check if project is greater than $5 million excluding contingency)

Estiamted Time-Releated Overhead (TRO) Percentage (0% to 10%) = **3%**

Item code		Unit	Quantity		Unit Price ($)		Cost
070018	Time-Related Overhead	WD	250	X	$1,767	=	$441,700

TOTAL TIME-RELATED OVERHEAD **$441,700**

Note: If the building portion of the project is greater than 50% of the total project cost, then TRO is not included.

SECTION 13: ROADWAY CONTINGENCY

Recommended Contingency: (Pre-PSR 30%-50%, PSR 25%, Draft PR 20%, PR 15%, after PR approval 10%, Final PS&E 5%)

Total Section 1-11	$	6,519,500	x	**15%**	=	$977,925

TOTAL CONTINGENCY **$978,000**

TRC Project No. 251911-1

II. STRUCTURE ITEMS

	Bridge		Retaining Wall		Bridge (Alt 2)
DATE OF ESTIMATE	11/13/19		11/13/19		11/13/19
Bridge Name	Overpass Structure		xxxxxxxxxxxxxxxxxx		Overpass Structure (Alt 2)
Bridge Number	45C-XXX		45C-XXX		45C-XXX
Structure Type	Precast/Prestressed Wide Flange Girder		MSE Retaining Walls		CIP Box Girder
Width (Feet) [out to out]	83.50 LF		0 LF		83.50 LF
Total Bridge Length (Feet)	149.50 LF		0 LF		149.50 LF
Total Area (Square Feet)	12483 SQFT		82100 SQFT		12483 SQFT
Structure Depth (Feet)	6.58 LF		0 LF		6.58 LF
Footing Type (pile or spread)	Pile		xxxxxxxxxxxxxxxxxx		Pile
Cost Per Square Foot	$254		$90		$241
					$3,012,820
COST OF EACH STRUCTURE	**$3,165,360**		**$7,407,860**		**$0**

DATE OF ESTIMATE	00/00/00		00/00/00		00/00/00
Name	xxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxx
Bridge Number	45C-XXX		45C-XXX		45C-XXX
Structure Type	xxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxx
Width (Feet) [out to out]	0 LF		0 LF		0 LF
Total Length (Feet)	0 LF		0 LF		0 LF
Total Area (Square Feet)	0 SQFT		0 SQFT		0 SQFT
Structure Depth (Feet)	0 LF		0 LF		0 LF
Footing Type (pile or spread)	xxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxxx
Cost Per Square Foot	$100		$0		$0
COST OF EACH STRUCTURE	**$0**		**$0**		**$0**

For Estimate - See 251911-Structure Costs Overpass

TOTAL COST OF BRIDGES		**$3,165,360**
TOTAL COST OF BUILDINGS		**$7,407,860**
Structures Mobilization Percentage	10%	**$1,174,802**

Recommended Contingency: (Pre-PSR 30%-50%, PSR 25%, Draft PR 20%, PR 15%, after PR approval 10%, Final PS&E 5%)

Structures Contingency Percentage	15%	**$1,762,203**
TOTAL COST OF STRUCTURES		**$13,510,226**

Estimate Prepared By: Kiana Negoro

11/13/2019
Date

TRC Project No. 251911-1

III. RAILROAD ITEMS

Item code		Unit	Quantity		Unit Price ($)			Cost
XXXXXX	Removal of Existing Crossing	LS	1	x	14,200.00	=	$	14,200

TOTAL RAILROAD ITEMS		**$ 14,200**
Railroad Work Contingency Percentage	15%	**$2,130**
TOTAL COST OF RAILROAD WORK		**$16,330**

IV. RIGHT OF WAY

Fill in all of the available information from the Right of Way data sheet.

A)	A1)	Acquisition, including Excess Land Purchases, Damages & Goodwill, Fees		$	404,000
	A2)	SB-1210		$	0
B)	Acquisition of Offsite Mitigation			$	0
C)	C1)	Utility Relocation (State Share)		$	0
	C2)	Potholing (Design Phase)		$	0
D)	Railroad Acquisition			$	0
E)	Clearance / Demolition			$	0
F)	Relocation Assistance (RAP and/or Last Resort Housing Costs)			$	0
G)	Title and Escrow			$	91,000
H)	Environmental Review			$	0
I)	Condemnation Settlements		0%	$	0
J)	Design Appreciation Factor		0%	$	0
K)	Utility Relocation (Construction Cost)			$	893,333

L)	**TOTAL RIGHT OF WAY ESTIMATE**	**$1,388,333**

PRECAST BRIDGE ESTIMATE - OVERPASS ALT

PROJECT NO. 251911-1

	Advance Planning Estimate	Est. By	KN	11/25/2019
x	General Plan Estimate			
	Marginal Estimate	Chk. By		

3.0% Forecasted Annual Cost Inflation Rate

Date for mid-point of construction period

BRIDGE: Grangeville Ave Grade Separation
TYPE: Precast, Prestressed Wide Flange Girder
CALTRANS BR NO.:
COUNTY BR NO.:
DISTRICT: 06
COUNTY: KIN
ROUTE: Grangeville Ave
PM:

CU:
EA:

DEPTH:	LENGTH:	WIDTH:		AREA:
6.58 ft	149.50 ft	83.50 ft	=	12,483 sq ft

ITEM NO.		CONTRACT ITEMS	UNIT	QUANTITY	UNIT COST	ADJ	PRICE	AMOUNT
1	477020	Mechanically Stabilized Embankment	SQFT	6,700	$90.00	1.00	$90.00	$603,000
2	490782	Furnish Piling (Class 200) (Alternative W)	LF	1,170	$61.00	1.00	$61.00	$71,370
3	490783	Drive Pile (Class 200) (Alternative W)	EA	24	$3,000.00	1.00	$3,000.00	$72,000
4	510053	Structural Concrete, Bridge	CY	570	$1,500.00	1.00	$1,500.00	$855,000
5	510086	Structural Concrete, Approach Slab (Type N)	CY	240	$850.00	1.00	$850.00	$204,000
6	512200A	Furnish Precast Prestressed Concrete Girder (140'-150')	EA	10	$70,000.00	1.00	$70,000.00	$700,000
7	512500	Erect PC/PS Concrete Girder	EA	10	$20,000.00	1.00	$20,000.00	$200,000
8	519100	Joint Seal (MR 2")	LF	190	$120.00	1.00	$120.00	$22,800
9	520102	Bar Reinforcing Steel (Bridge)	LB	111,700	$1.70	1.00	$1.70	$189,890
10	665023	24" Corrugated Steel Pipe (.079" Thick)	LF	560	$140.00	1.00	$140.00	$78,400
11	833033	Chain Link Railing (Type 7 Modified)	LF	120	$85.00	1.00	$85.00	$10,200
12	833023A	Chain Link Railing (Type 3)	LF	300	$130.00	1.00	$130.00	$39,000
13	833088	Tubular Handrailing	LF	420	$110.00	1.00	$110.00	$46,200
14	839727A	Concrete Barrier (Type 836 Modified)	LF	420	$175.00	1.00	$175.00	$73,500

NOTES:

SUBTOTAL			$3,165,360
MOBILIZATION	(@ 10%)		$351,707
SUBTOTAL BRIDGE ITEMS			$3,517,067
CONTINGENCIES	(@ 15%)		$527,560
TOTAL BRIDGE COST			$4,044,627
COST PER SQ. FT. (w/o contingencies)			$282
FOR PRESENT DAY COST - USE		11/25/2019	**$4,050,000**

RETAINING WALL ESTIMATE - OVERPASS ALT

PROJECT NO. 251911-1

Est. By KN 11/25/2019

Chk. By

__ Advance Planning Estimate

x General Plan Estimate

__ Marginal Estimate

3.0% Forecasted Annual Cost Inflation Rate

__ Date for mid-point of construction period

BRIDGE: Grangeville Ave Grade Separation CALTRANS BR NO.: DISTRICT: 06 ROUTE: Grangeville Ave

TYPE: MSE Retaining Walls COUNTY BR NO.: COUNTY: KIN PM:

CU: EA:

DEPTH: LENGTH: WIDTH: = AREA: 82,100 sq ft

ITEM NO.		CONTRACT ITEMS	UNIT	QUANTITY	UNIT COST	ADJ	PRICE	AMOUNT
1	477020	Mechanically Stabilized Embankment	SQFT	82,100	$90.00	0.50	$45.00	$3,694,500
2	510053	Structural Concrete, Bridge	CY	2,970	$1,200.00	0.50	$600.00	$1,782,000
3	520102	Bar Reinforcing Steel (Bridge)	LB	425,800	$1.70	1.00	$1.70	$723,860
4	833033	Chain Link Railing (Type 7 Modified)	LF	7,000	$85.00	1.00	$85.00	$595,000
5	839727A	Concrete Barrier (Type 836 Modified)	LF	3,500	$175.00	1.00	$175.00	$612,500

NOTES:

SUBTOTAL		$7,407,860
MOBILIZATION	(@ 10%)	$823,096
SUBTOTAL RW ITEMS		$8,230,956
CONTINGENCIES	(@ 15%)	$1,234,643
TOTAL RW COST		$9,465,599
COST PER SQ. FT. (w/o contingencies)		$100
FOR PRESENT DAY COST - USE	11/25/2019	**$9,470,000**

Appendix C: Overpass Structure Type Selection Memorandum

STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION

STRUCTURE TYPE SELECTION

PROJECT IDENTIFICATION	LATITUDE	LONGITUDE	DATE
Grangeville Boulevard Grade Separation	36.3426	-119.6617	11/25/2019

DIST	CO	RTE	PM	CD	EA	DESIGN GROUP
06	Kings	Grangeville Blvd	-	-	-	TRC

STRUCTURE NAME(S)	PRESENT DAY CONSTRUCTION COST	
Grangeville Boulevard Overpass	Bridge	$4,050,000
	Wall	$9,470,000
	Total	$13,520,000

TYPES CONSIDERED:

- Alternative 1: Precast Prestressed Wide Flange Girder Bridge
- Alternative 2: Cast-in-Place Prestressed Box Girder Bridge

BRIEF PROJECT DESCRIPTION:

Grangeville Boulevard will be grade separated from the BNSF railroad tracks to reduce accident potential and liability, improve emergency response times, reduce traffic delays, provide for efficient cross-town traffic, provide infrastructure for the planned growth in traffic volumes, and improve air quality by eliminating vehicle idling at the train crossing. This document compares two alternatives for overpass superstructure types to span over the existing railroad tracks. Due to the proximity of residences and businesses to the roadway, retaining walls will be required at each corner of the bridge, running parallel with Grangeville Blvd along the length of the project to retain the embankment fill. Further discussion is included under "Span Configurations". The bridge span and depth and retaining wall lengths are the same for both alternatives.

Span Configurations

Due to the large raise in profile to meet railroad clearances, two span configurations were considered: a single span bridge with tall abutments (39 ft. tall) or a 10-span bridge with shorter abutments (14 ft. tall). Although the longer bridge will provide less visual obstruction than the shorter bridge, it is more expensive to construct a longer bridge than it is to construct retaining walls and embankment fill. Additionally, the longer bridge provides a large vacant space underneath it that will act as a sheltered area for homeless people to congregate. The abutment types are discussed further below.

Alternative 1: Precast Prestressed Wide Flange Girder Bridge

A precast prestressed wide flange girder superstructure has many advantages including falsework not being required over the railroad, quicker construction, shorter traffic impact, and less risk to contractor and public safety due to shorter project duration. Disadvantages for this superstructure type include somewhat higher costs.

Alternative 2: Cast-in-Place Prestressed Box Girder Bridge

A cast-in-place prestressed box girder superstructure has a somewhat lower construction cost; however, it requires the construction of falsework over the railroad tracks and has a longer construction time with increased impact to traffic and more risk to contractor and public safety due to a longer project duration. Cast-in-place construction typically requires a higher roadway profile in order to meet falsework clearances over the tracks, and therefore could result in longer roadway approaches. The BNSF guidelines discourages the use of cast-in-place superstructures; however, they are not prohibited.

Falsework

For the cast-in-place option, falsework will be required to construct the superstructure over the railroad. According to the UPRR BNSF Grade Separation Guidelines, the minimum construction clearance envelope is 15 feet horizontally from the centerline of each track and 21.5 feet above the top of rail. To satisfy the construction clearance envelope for this project, the falsework will need to span a minimum of 44 feet, requiring a falsework depth of 3.25 feet per Caltrans Bridge Design Aids Table 10-2. The minimum clearance at the edge of the construction clearance envelope is 25.45 feet, which will accommodate the 21.5 feet minimum clearance with the 3.25 feet of falsework. Thus, the same vertical profile can be used for both the cast-in-place and precast options. The vertical profile for the project was set to meet the permanent vertical clearance criteria of 23.5 ft. over the entire railroad right of way. However, the guidelines state that the extent of the permanent vertical clearance shall be a minimum of 9 ft. to the field side of the outer most existing or future tracks. Depending on BNSF's future track needs, the proposed profile may be able to be lowered for the precast alternative.

Abutment Types

The maximum retained soil height behind the abutment for the single span option is approximately 39 ft., which is very tall. Two abutment types were considered for the single span option: MSE abutments and tall cantilever abutments. Tall cantilever abutments consist of a cast-in-place reinforced concrete stem wall with a seat at the top to support the bridge and a large footing with four or more rows of piles. Due to the large retained height, soil nail anchors may be required near the top of the stem wall to help prevent overturning. MSE abutments are preferred over tall cantilever abutments for cost reasons. MSE abutments are like MSE walls, consisting of precast concrete panels with soil reinforcing extending back into the embankment. A short, pile-supported seat-type abutment is constructed directly behind the MSE abutment. The piles allow the vertical loads from the bridge to transfer down below the wall so that there is no surcharge on the wall. The BNSF guidelines say that if MSE walls are used to retain abutment fill the abutment must be supported by deep foundations. Additionally, the MSE walls must be at least 50 ft. from the centerline of existing or future tracks. MSE walls placed within 50 ft. must be approved by the railroad and abutment protection consisting of a thickened wall for a minimum of 12 ft. above the top of rail must be incorporated. We have set the abutments so that they are 50 ft. from the centerline of existing track. If a future track is needed, railroad approval and abutment protection will be required to use this abutment type.

Retaining Wall Types

Similar to the abutment types considered, the two retaining wall types considered were MSE walls and tall cantilever walls. MSE retaining walls were chosen because they are expected to be less expensive than tall cantilever walls, and they do not require large excavations or expensive temporary shoring to construct the foundations. MSE walls are constructed on a small concrete leveling pad, which is ideal for constructing close to residences and businesses.

Approximate Construction Costs

Advance planning bridge estimates were created for both superstructure alternatives, and a separate estimate was created for the retaining walls. Both bridge alternatives utilize the MSE abutment type. Approximate costs provided herein will be in present day dollars and include 15% contingencies. Alternative 1: Precast Prestressed Wide Flange Girder Bridge will cost approximately $4,050,000. Alternative 2: Cast-in-Place Prestressed Box Girder Bridge will cost approximately $3,850,000. The retaining walls will cost approximately $9,470,000.

Recommendation

Based on the above information, we recommend Alternative 1: Precast Prestressed Wide Flange Girder Bridge with MSE abutments and MSE retaining walls.

(1) DESIGN ENGR _____ (2) BR DES SUPV _____ (3) SR BR ARCHIT _____ (4) CHIEF STR DES _____ (5) PROJECT ENGR _____	**PROJECT MANAGER** Mark A. Imbriani, P.E.	**PROJECT ENGINEER** Robin Yates, P.E.
	PROJECT AESTHETICS CONSULTANT	

Copy to File
Attachments: Advanced Planning Estimates

PRECAST BRIDGE ESTIMATE - OVERPASS ALT

PROJECT NO. 251911-1

Est. By KN 11/25/2019

Chk. By

__ Advance Planning Estimate
x General Plan Estimate
__ Marginal Estimate

3.0% Forecasted Annual Cost Inflation Rate

__ Date for mid-point of construction period

BRIDGE: Grangeville Ave Grade Separation
TYPE: Precast, Prestressed Wide Flange Girder
CALTRANS BR NO.:
COUNTY BR NO.:
DISTRICT: 06
COUNTY: KIN
ROUTE: Grangeville Ave
PM:

CU:
EA:

DEPTH: 6.58 ft
LENGTH: 149.50 ft
WIDTH: 83.50 ft
= AREA: 12,483 sq ft

ITEM NO.		CONTRACT ITEMS	UNIT	QUANTITY	UNIT COST	ADJ	PRICE	AMOUNT
1	477020	Mechanically Stabilized Embankment	SQFT	6,700	$90.00	1.00	$90.00	$603,000
2	490782	Furnish Piling (Class 200) (Alternative W)	LF	1,170	$61.00	1.00	$61.00	$71,370
3	490783	Drive Pile (Class 200) (Alternative W)	EA	24	$3,000.00	1.00	$3,000.00	$72,000
4	510053	Structural Concrete, Bridge	CY	570	$1,500.00	1.00	$1,500.00	$855,000
5	510086	Structural Concrete, Approach Slab (Type N)	CY	240	$850.00	1.00	$850.00	$204,000
6	512200A	Furnish Precast Prestressed Concrete Girder (140'-150')	EA	10	$70,000.00	1.00	$70,000.00	$700,000
7	512500	Erect PC/PS Concrete Girder	EA	10	$20,000.00	1.00	$20,000.00	$200,000
8	519100	Joint Seal (MR 2")	LF	190	$120.00	1.00	$120.00	$22,800
9	520102	Bar Reinforcing Steel (Bridge)	LB	111,700	$1.70	1.00	$1.70	$189,890
10	665023	24" Corrugated Steel Pipe (.079" Thick)	LF	560	$140.00	1.00	$140.00	$78,400
11	833033	Chain Link Railing (Type 7 Modified)	LF	120	$85.00	1.00	$85.00	$10,200
12	833023A	Chain Link Railing (Type 3)	LF	300	$130.00	1.00	$130.00	$39,000
13	833088	Tubular Handrailing	LF	420	$110.00	1.00	$110.00	$46,200
14	839727A	Concrete Barrier (Type 836 Modified)	LF	420	$175.00	1.00	$175.00	$73,500

NOTES:

SUBTOTAL		$3,165,360
MOBILIZATION	(@ 10%)	$351,707
SUBTOTAL BRIDGE ITEMS		$3,517,067
CONTINGENCIES	(@ 15%)	$527,560
TOTAL BRIDGE COST		$4,044,627
COST PER SQ. FT. (w/o contingencies)		$282
FOR PRESENT DAY COST - USE	11/25/2019	**$4,050,000**

RETAINING WALL ESTIMATE - OVERPASS ALT

PROJECT NO. 251911-1

Est. By KN 11/25/2019

Chk. By

__ Advance Planning Estimate

x General Plan Estimate

__ Marginal Estimate

3.0% Forecasted Annual Cost Inflation Rate

__ Date for mid-point of construction period

BRIDGE: Grangeville Ave Grade Separation CALTRANS BR NO.: DISTRICT: 06 ROUTE: Grangeville Ave

TYPE: MSE Retaining Walls COUNTY BR NO.: COUNTY: KIN PM:

CU: EA:

DEPTH: LENGTH: WIDTH: = AREA: 82,100 sq ft

ITEM NO.		CONTRACT ITEMS	UNIT	QUANTITY	UNIT COST	ADJ	PRICE	AMOUNT
1	477020	Mechanically Stabilized Embankment	SQFT	82,100	$90.00	0.50	$45.00	$3,694,500
2	510053	Structural Concrete, Bridge	CY	2,970	$1,200.00	0.50	$600.00	$1,782,000
3	520102	Bar Reinforcing Steel (Bridge)	LB	425,800	$1.70	1.00	$1.70	$723,860
4	833033	Chain Link Railing (Type 7 Modified)	LF	7,000	$85.00	1.00	$85.00	$595,000
5	839727A	Concrete Barrier (Type 836 Modified)	LF	3,500	$175.00	1.00	$175.00	$612,500

NOTES:

SUBTOTAL		$7,407,860
MOBILIZATION	(@ 10%)	$823,096
SUBTOTAL RW ITEMS		$8,230,956
CONTINGENCIES	(@ 15%)	$1,234,643
TOTAL RW COST		$9,465,599
COST PER SQ. FT. (w/o contingencies)		$100
FOR PRESENT DAY COST - USE	11/25/2019	**$9,470,000**

CIP BRIDGE ESTIMATE - OVERPASS ALT

PROJECT NO. 251911-1

Est. By KN 11/25/2019

Chk. By

__ Advance Planning Estimate

x General Plan Estimate

__ Marginal Estimate

3.0% Forecasted Annual Cost Inflation Rate

__ Date for mid-point of construction period

BRIDGE: Grangeville Ave Grade Separation CALTRANS BR NO.: DISTRICT: 06 ROUTE: Grangeville Ave

TYPE: Cast-in-Place Prestressed Box Girder COUNTY BR NO.: COUNTY: KIN PM:

CU:

EA:

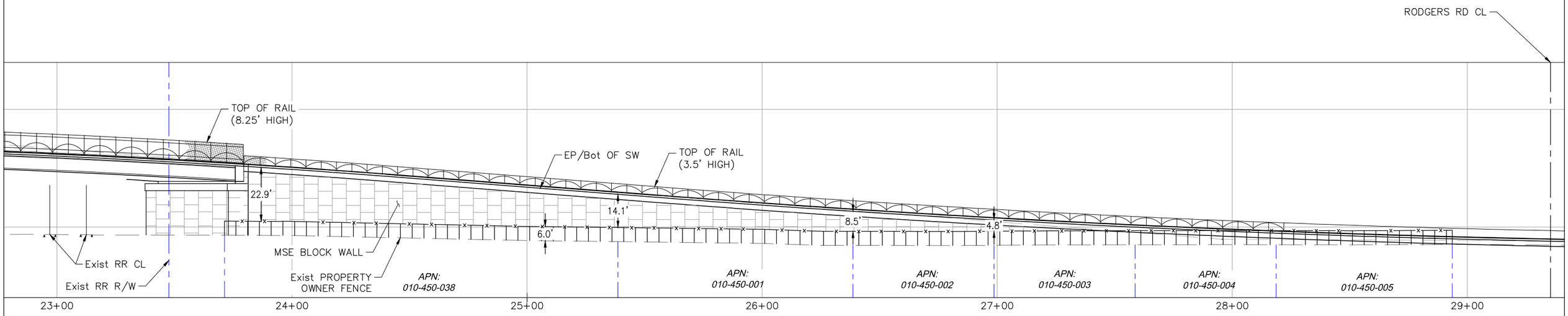
DEPTH:	LENGTH:	WIDTH:		AREA:
6.58 ft	149.50 ft	83.50 ft	=	12,483 sq ft

ITEM NO.		CONTRACT ITEMS	UNIT	QUANTITY	UNIT COST	ADJ	PRICE	AMOUNT
1	477020	Mechanically Stabilized Embankment	SQFT	6,700	$90.00	1.00	$90.00	$603,000
2	490782	Furnish Piling (Class 200) (Alternative W)	LF	1,170	$61.00	1.00	$61.00	$71,370
3	490783	Drive Pile (Class 200) (Alternative W)	EA	24	$3,000.00	1.00	$3,000.00	$72,000
4	500001	Prestressing Cast-In-Place Concrete	LS	1	$140,000.00	1.00	$140,000.00	$140,000
5	510053	Structural Concrete, Bridge	CY	1,100	$1,500.00	0.80	$1,200.00	$1,320,000
6	510086	Structural Concrete, Approach Slab (Type N)	CY	240	$850.00	1.00	$850.00	$204,000
7	519100	Joint Seal (MR 2")	LF	190	$120.00	1.00	$120.00	$22,800
8	520102	Bar Reinforcing Steel (Bridge)	LB	195,500	$1.70	1.00	$1.70	$332,350
9	665023	24" Corrugated Steel Pipe (.079" Thick)	LF	560	$140.00	1.00	$140.00	$78,400
10	833033	Chain Link Railing (Type 7 Modified)	LF	120	$85.00	1.00	$85.00	$10,200
11	833023A	Chain Link Railing (Type 3)	LF	300	$130.00	1.00	$130.00	$39,000
12	833088	Tubular Handrailing	LF	420	$110.00	1.00	$110.00	$46,200
13	839727A	Concrete Barrier (Type 836 Modified)	LF	420	$175.00	1.00	$175.00	$73,500

NOTES:

SUBTOTAL			$3,012,820
MOBILIZATION	(@ 10%)		$334,758
SUBTOTAL BRIDGE ITEMS			$3,347,578
CONTINGENCIES	(@ 15%)		$502,137
TOTAL BRIDGE COST			$3,849,714
COST PER SQ. FT. (w/o contingencies)			$268
FOR PRESENT DAY COST - USE		11/25/2019	**$3,850,000**

Appendix D: Overpass Visual Impact Exhibit



"GB" LINE
40 MPH PROFILE

DR. BY: NAH CH. BY: JLC DATE: 11/13/19 SCALE: 1" = 100'	**VIEW OF OVERPASS FROM THORTON STREET** *GRANGEVILLE GRADE SEPARATION*	CITY PROJECT NO.: TRC PROJ NO.: 251911-1 EXHIBIT NO.:	**SHEET L-8**

Appendix E: Traffic Study

Traffic Analysis

Proposed Grangeville Avenue / BNSF Railroad Grade Separation

Hanford, California

Prepared For:

TRC Companies, Inc.
10680 White Rock Road, Suite 100
Rancho Cordova, California 95670

Date:

April 30, 2019

Job No.:

18-066.01

PETERS ENGINEERING GROUP
A CALIFORNIA CORPORATION

PETERS ENGINEERING GROUP
A CALIFORNIA CORPORATION

Mr. Mark Imbriani
TRC Companies, Inc.
10680 White Rock Road, Suite 100
Rancho Cordova, California 95670

April 30, 2019

Subject: Traffic Analysis
Proposed Grangeville Avenue / BNSF Railroad Grade Separation
Hanford, California

Dear Mr. Imbriani:

INTRODUCTION

This report presents the results of traffic counts and analyses related to construction of the Grangeville Avenue / BNSF Railroad grade separation in Hanford, California. This limited analysis focuses on the traffic volumes that will be diverted by the project and the anticipated conditions after completion of the project.

PROJECT DESCRIPTION

The proposed Grangeville Avenue / BNSF Railroad Grade Separation will be an underpass below the railroad tracks that will likely affect at least 850 feet in each direction along Grangeville Avenue.

Grangeville Boulevard is an arterial street that will be closed during construction, likely between University Avenue and Rodgers Road. It is anticipated that the intersection of Rodgers Road and Grangeville Boulevard will require full closure during at least a portion of the construction schedule. The following locations will be closed during construction and the connections will likely be permanently eliminated:

- Mildred Street at Grangeville Boulevard;
- Santa Fe Mini Storage Driveway;
- Tara Mobile Estates Driveway.

The project may include improvements on Claridge Lane to provide access to the existing mini storage facility and a new driveway on Malone Street to provide access to the mobile estates.

A vicinity map is presented in the attached Figure 1, Site Vicinity Map.

EXISTING TRAFFIC VOLUMES

Intersection turning movement traffic counts were performed on a weekday between 7:00 and 9:00 a.m. and between 4:00 and 6:00 p.m. at the following intersections:

- University Avenue / Grangeville Avenue

- Tara Mobile Homes / Grangeville Avenue
- Mildred Street / Santa Fe Central & Mini Storage / Grangeville Avenue
- Rodgers Road / Grangeville Avenue

The intersection counts included bicycles, pedestrians, and heavy vehicles. The traffic count data sheets are attached and include the dates the counts were performed. The existing peak-hour turning movement volumes are presented in Figure 2, Existing Peak Hour Traffic Volumes.

A 24-hour vehicle classification count was performed on Grangeville Avenue near the BNSF crossing on Tuesday, December 18, 2018. The count revealed a total 24-hour traffic volume (eastbound and westbound combined) of 14,166 vehicles with a peak-hour volume of 1,336 vehicles between 4:30 and 5:30 p.m. Approximately five percent of the vehicles are trucks (heavy vehicles) of two or more axles.

LANE CONFIGURATIONS AND INTERSECTION CONTROL

The existing lane configurations and intersection control at the study intersections are illustrated in Figure 3, Existing Lane Configurations.

TRAFFIC VOLUMES AT ALTERNATE CROSSINGS

The nearest alternate locations to cross the BNSF railroad exist on Fargo Avenue to the north and Elm Street to the south. 11th Avenue also provides an alternative north-south crossing south of Elm Street, and Lacey Boulevard is the next major east-west street to the south. It is assumed that the detour established for the closure will include 12th Avenue, Fargo Avenue, and 11th Avenue. Traffic is also likely to redistribute to Greenfield Avenue and Elm Street to cross the tracks, or to 11th Avenue south of Elm Street. The following is a description of the alternate crossings:

Fargo Avenue at the BNSF Railroad is a two-lane at-grade crossing (one lane in each direction) with active traffic control devices, post-mounted and cantilevered flashing lights, signage, pavement markings, raised medians, and two automatic gates on each approach. The crossing is approximately one mile north of Grangeville Avenue. Fargo Avenue is designated as an arterial street in the City of Hanford General Plan with a current traffic volume on the order of 10,500 vehicles per day (both directions combined) based on traffic count data provided by the City of Hanford.

Elm Street at the BNSF Railroad is a four-lane at-grade crossing (two lanes in each direction) with active traffic control devices, post-mounted and cantilevered flashing lights, signage, pavement markings, and one automatic gate on each approach. There are no raised medians at the crossing. The crossing is approximately 0.7 mile south of Grangeville Avenue. Elm Street is a local road with an existing traffic volume on the order of 6,800 vehicles per day (both directions combined) based on traffic count data provided by the City of Hanford. The stop-controlled intersection of Elm Street and Greenfield Avenue is located approximately 350 feet west of the at-grade crossing. The signalized intersection of Elm Street and 11th Avenue is located less than 300 feet east of the at-grade crossing.

Lacey Boulevard at the BNSF Railroad is a four-lane at-grade crossing (two lanes in each direction) with active traffic control devices, post-mounted flashing lights, signage, pavement markings, raised medians, and two automatic gates on each approach. The crossing is approximately one mile south and half a mile east of the Grangeville Avenue crossing. Lacey Boulevard is designated as a collector street east of 11th Avenue in the City of Hanford General Plan with a current traffic volume on the order of 11,400 vehicles per day (both directions combined) based on traffic count data provided by the City of Hanford.

ROAD SEGMENT ANALYSES

The Transportation Research Board *Highway Capacity Manual,* 2000, (HCM) defines level of service (LOS) as a qualitative measure describing operational characteristics within a traffic stream, based on service measures such as speed and travel time, freedom to maneuver, traffic interruptions, comfort, and convenience. Level-of-service characteristics for road segments are presented in Table 1.

Table 1
Level of Service Characteristics for Roadways

Level of Service	Description
A	Primarily free flow operations
B	Reasonably unimpeded operations, ability to maneuver only slightly restricted
C	Stable operations, ability to maneuver and select operating speed affected
D	Unstable flow, speeds and ability to maneuver restricted
E	Significant delays, flow quite unstable
F	Extremely slow speeds

Reference: 1998 *Highway Capacity Manual*, Transportation Research Board

For general planning purposes, road segment levels of service were determined based on procedures outlined in the HCM2010 utilizing the 2012 Florida Department of Transportation (FDOT) Quality/Level of Service Handbook Tables (Florida tables). The Florida tables present generalized correlations between traffic volumes and LOS based on the nationally-utilized and accepted HCM2010; the Florida tables are frequently utilized throughout California for road segment analyses. The Florida tables present LOS criteria based on the type of roadway being analyzed and the regional setting (i.e., urban areas or transitioning areas). The applicable Florida table is attached.

It should be noted that the actual operations of the roadways will likely be governed by the operations at intersections near the crossings. The analyses presented herein should be utilized only for the discussion of the order of magnitude of the effects of the Grangeville Avenue closure.

Table 2 presents the specific volume thresholds used in the analyses. It should be noted that reference to "signalized" roadways in the Florida tables includes stop-controlled intersections.

Table 2
Volume Thresholds for Non-State Signalized Roadway Levels of Service

Lanes	Configuration	A	B	C	D	E/F
2	Divided, ≥40 MPH (Fargo Avenue)	*	*	≤15,876	15,877 – 16,726	>16,726
4	Undivided, ≤35 MPH (Elm Street)	*	*	≤9,787	9,788 – 21,870	>21,870
4	Divided, ≤35 MPH (Lacey Boulevard)	*	*	≤13,050	13,050 – 30,420	>30,420

Reference: Florida Department of Transportation Table 1, Generalized Annual Average Daily Volumes for Florida's Urbanized Areas (utilizing Non-State Signalized Roadway Adjustments) dated December 18, 2012

Table 3 presents the results of the road segment analyses. The analyses are based on an assumption that 50 percent of the existing trips on Grangeville Avenue will redistribute to Fargo Avenue, 25 percent will use Elm Street, and 25 percent will use Lacey Boulevard.

Table 3
Summary of Estimated LOS

Road Segment	Existing Volume	Existing LOS	Detour Volume	Detour LOS
Fargo Avenue	10,500	C or better	17,583	E/F
Elm Street	6,800	C or better	10,342	D
Lacey Boulevard	11,400	C or better	14,942	D

DISCUSSION OF ANALYSES

The results of the road segment analyses suggest that congestion and delays are likely on Fargo Avenue and on Elm Street during construction. The conditions on Elm Street are expected to be worse than suggested by the road segment analyses because of the short length of the road segment and the proximity of intersections to the crossing. Congested conditions at intersections along the detour route should be anticipated.

A public information campaign is recommended to alert motorists of the project, the alternate routes, and the potential for congestion. It is recommended that alternate routes farther from the project site, such as State Route 198 and Flint Avenue, be suggested as alternate routes.

CONCLUSIONS

Standard traffic engineering principles and methods were employed to study the existing conditions and to estimate conditions that may occur during construction.

The conclusion of this study is that the nearest potential detour routes available during construction of the Grangeville Avenue / BNSF grade separation are likely to experience severe congestion and delays during construction.

A public information campaign is recommended to alert motorists of the project, the alternate routes, and the potential for congestion. It is recommended that alternate routes farther from the project site, such as State Route 198 and Flint Avenue, be suggested as alternate routes.

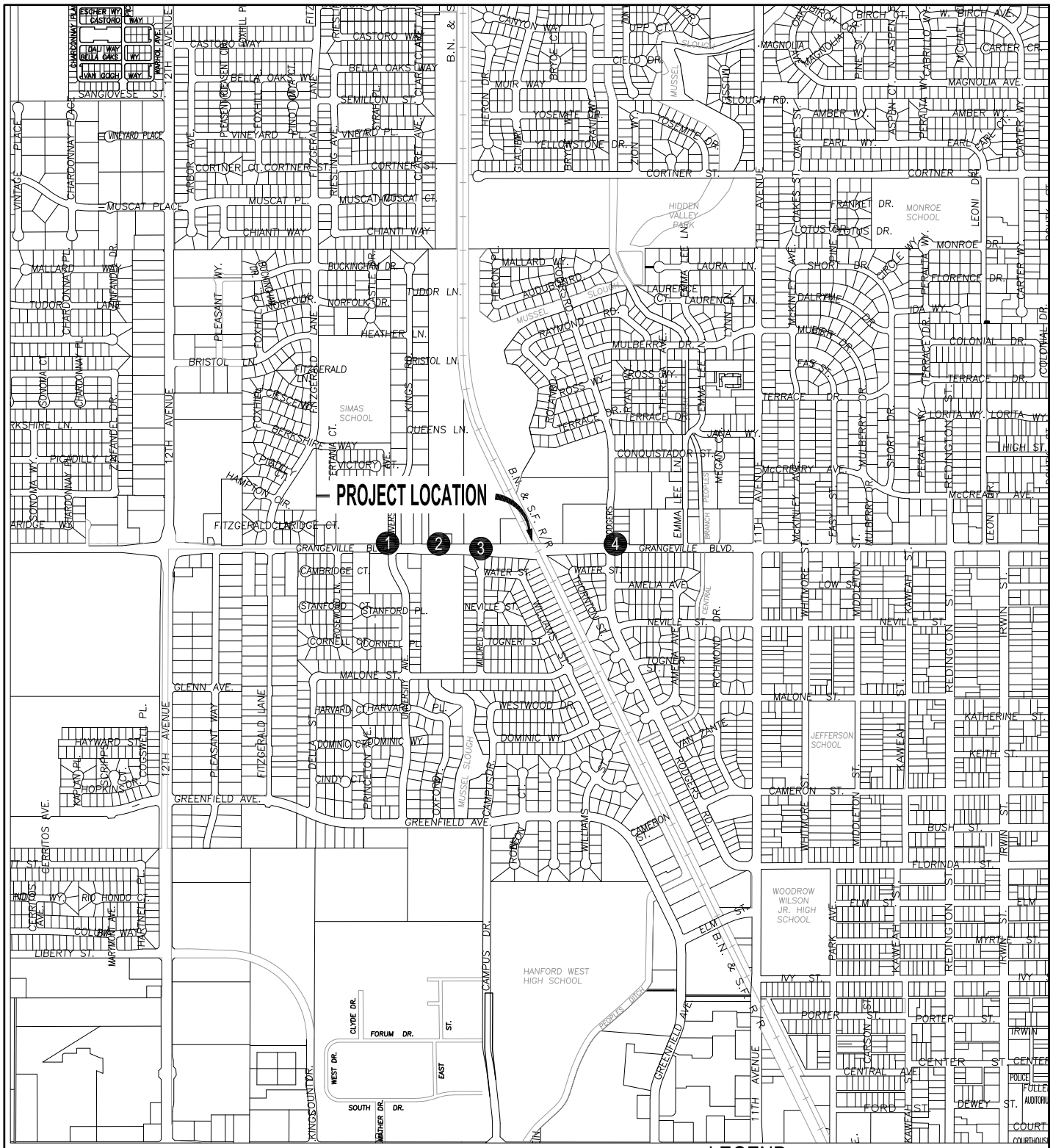
Thank you for the opportunity to perform this traffic analysis. Please feel free to call our office if you have any questions.

PETERS ENGINEERING GROUP

John Rowland, PE, TE

Attachments: Figures 1 through 3
Traffic Count Data Sheets
Florida Table

FIGURES



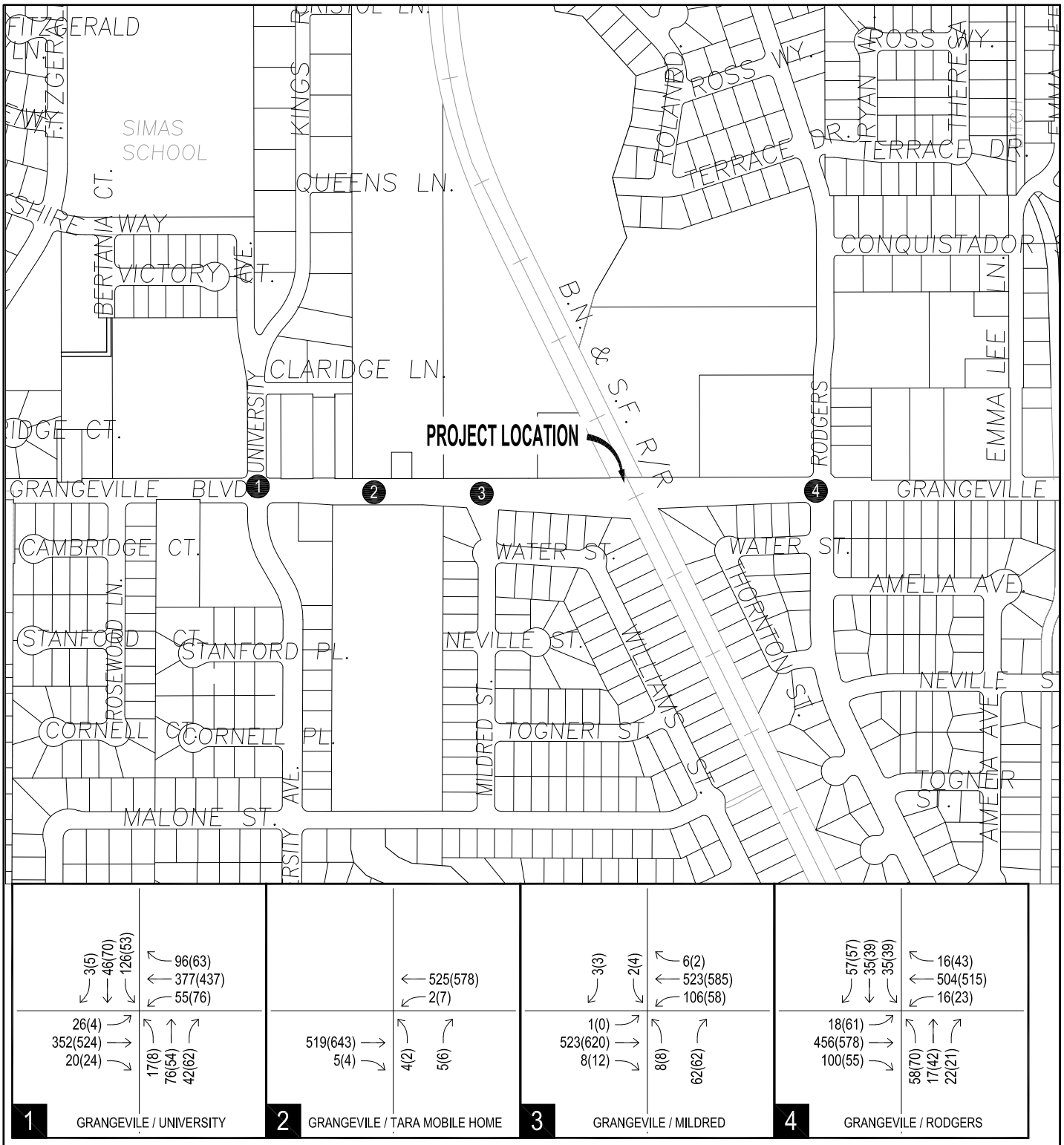
Proposed Grangeville Avenue / BNSF Railroad Grade Separation
Hanford, California

LEGEND

- (X) STUDY AREA INTERSECTIONS
- PROJECT SITE

SITE VICINITY MAP

Not to Scale



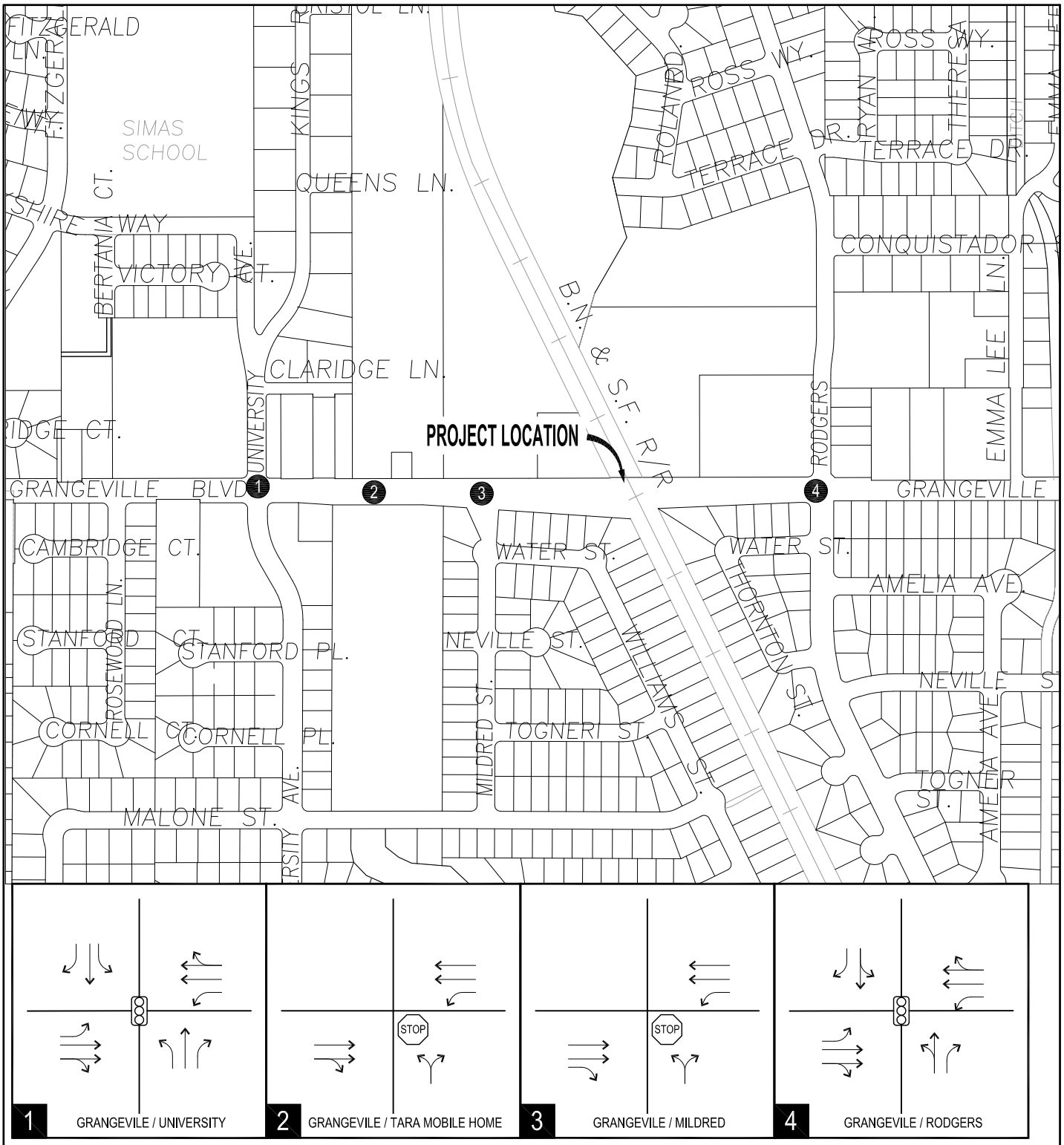
Proposed Grangeville Avenue / BNSF Railroad Grade Separation
Hanford, California

LEGEND

(X)	STUDY AREA INTERSECTIONS
XX (YY)	AM (PM) PEAK HOUR VOLUMES
	PROJECT SITE

EXISTING PEAK HOUR TRAFFIC VOLUMES

Not to Scale



Proposed Grangeville Avenue / BNSF Railroad Grade Separation
Hanford, California

LEGEND

- XX STUDY AREA INTERSECTIONS
- PROJECT SITE
- SIGNALIZED INTERSECTION
- STOP STOP SIGN
- DIRECTION OF TRAVEL

EXISTING LANE CONFIGURATIONS AND STOP CONTROL

Not to Scale

TRAFFIC COUNT DATA SHEETS

Metro Traffic Data Inc.
310 N. Irwin Street - Suite 20
Hanford, CA 93230

800-975-6938 Phone/Fax
www.metrotrafficdata.com

Turning Movement Report

Prepared For:

Peters Engineering Group
952 Pollasky Avenue
Clovis, CA 93612

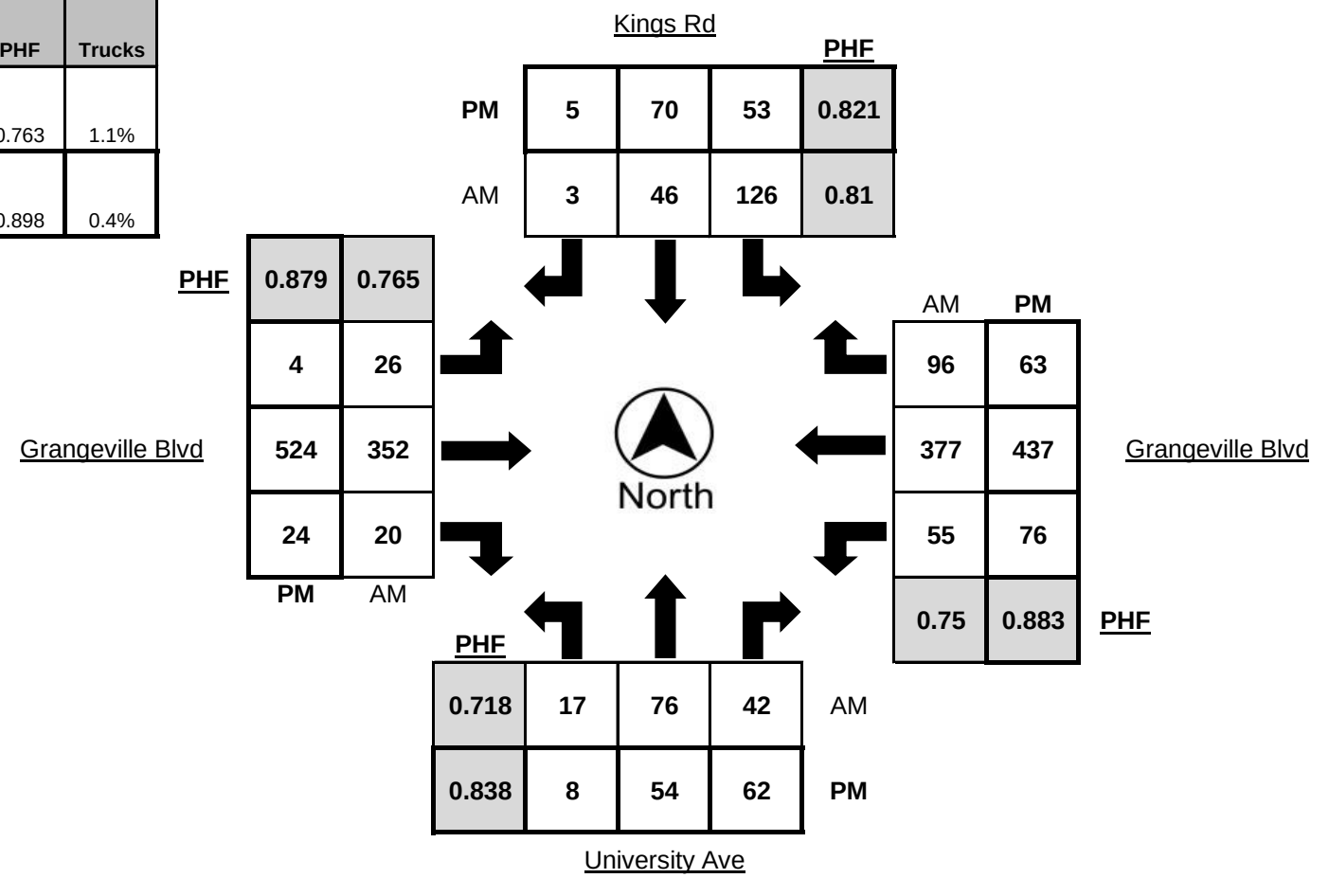
LOCATION Grangeville Blvd @ University Ave
LATITUDE 36.3426
COUNTY Kings
LONGITUDE -119.6661
COLLECTION DATE Tuesday, December 18, 2018
WEATHER AM Fog / PM Clear

	Northbound				Southbound				Eastbound				Westbound			
Time	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
7:00 AM - 7:15 AM	0	7	3	1	10	12	0	1	1	34	2	0	4	50	6	4
7:15 AM - 7:30 AM	3	11	9	0	25	6	0	1	4	59	4	0	10	63	11	4
7:30 AM - 7:45 AM	7	26	14	0	38	13	2	1	11	100	5	0	12	88	27	0
7:45 AM - 8:00 AM	3	32	10	1	42	11	1	0	10	113	7	1	18	110	48	0
8:00 AM - 8:15 AM	4	7	9	0	21	16	0	0	1	80	4	1	15	116	10	4
8:15 AM - 8:30 AM	1	2	6	1	13	14	2	0	1	78	5	0	3	57	11	2
8:30 AM - 8:45 AM	2	3	3	0	7	17	1	0	0	67	3	1	11	55	7	1
8:45 AM - 9:00 AM	3	5	3	0	9	11	0	0	0	64	2	2	10	73	6	4
TOTAL	**23**	**93**	**57**	**3**	**165**	**100**	**6**	**3**	**28**	**595**	**32**	**5**	**83**	**612**	**126**	**19**

	Northbound				Southbound				Eastbound				Westbound			
Time	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
4:00 PM - 4:15 PM	3	12	8	0	12	13	2	0	1	105	1	0	11	110	5	2
4:15 PM - 4:30 PM	3	6	6	0	18	10	1	0	0	125	7	1	8	104	12	1
4:30 PM - 4:45 PM	2	13	22	0	13	17	1	0	1	119	4	2	14	103	9	0
4:45 PM - 5:00 PM	2	11	12	0	14	12	2	0	3	105	8	0	18	93	15	1
5:00 PM - 5:15 PM	1	16	19	0	12	17	1	0	0	148	7	0	27	114	22	0
5:15 PM - 5:30 PM	3	14	9	0	14	24	1	0	0	152	5	0	17	127	17	2
5:30 PM - 5:45 PM	1	17	10	0	7	8	2	0	2	107	5	0	12	110	12	0
5:45 PM - 6:00 PM	1	11	8	0	14	7	1	0	0	111	3	0	4	84	17	0
TOTAL	**16**	**100**	**94**	**0**	**104**	**108**	**11**	**0**	**7**	**972**	**40**	**3**	**111**	**845**	**109**	**6**

	Northbound				Southbound				Eastbound				Westbound			
PEAK HOUR	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
7:15 AM - 8:15 AM	17	76	42	1	126	46	3	2	26	352	20	2	55	377	96	8
4:30 PM - 5:30 PM	8	54	62	0	53	70	5	0	4	524	24	2	76	437	63	3

	PHF	Trucks
AM	0.763	1.1%
PM	0.898	0.4%



Metro Traffic Data Inc.
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Hanford, CA 93230

800-975-6938 Phone/Fax
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Turning Movement Report

Prepared For:

Peters Engineering Group
952 Pollasky Avenue
Clovis, CA 93612

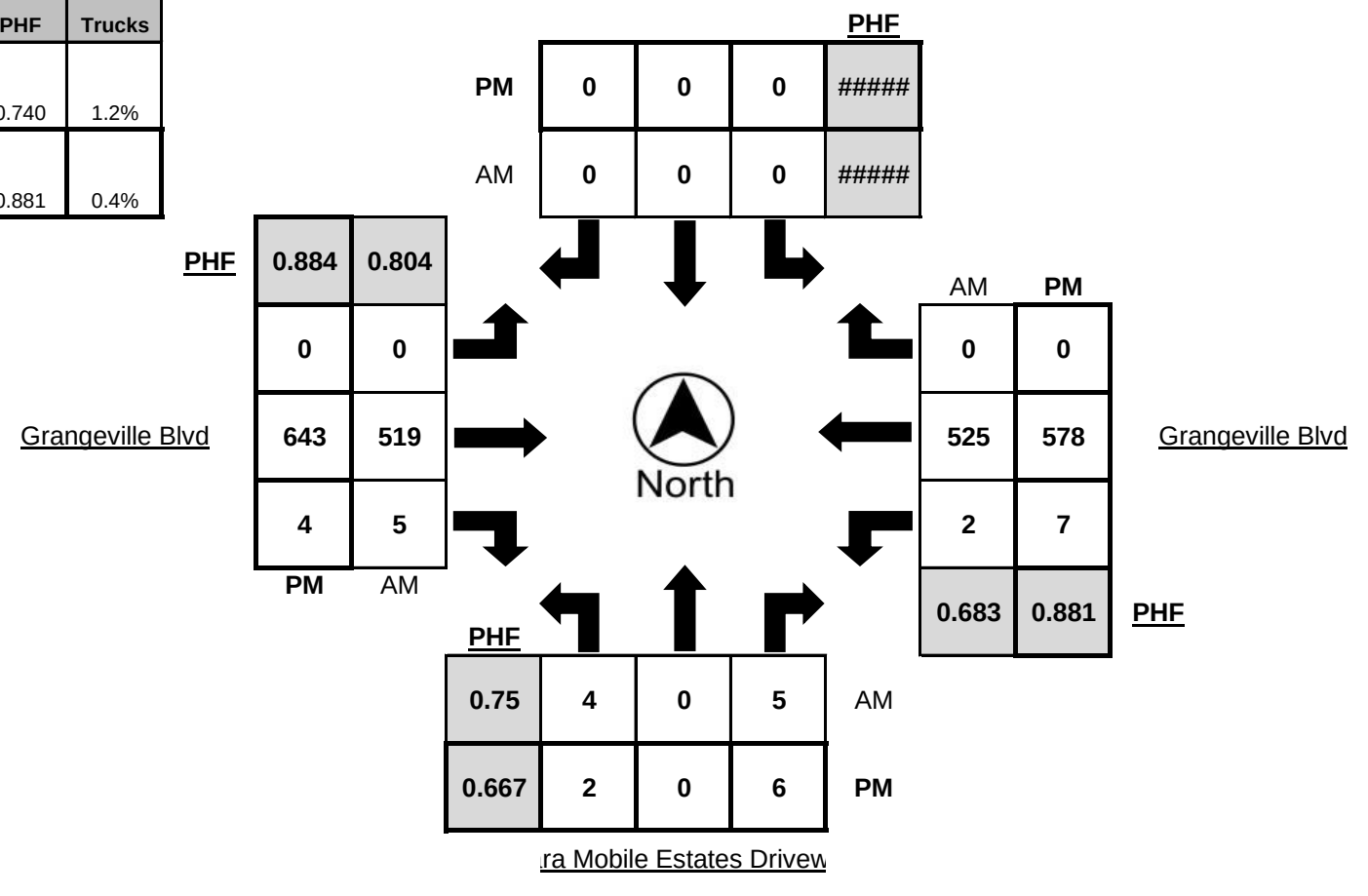
LOCATION Grangeville Blvd @ Tara Mobile Estates Driveway
LATITUDE 36.3426
COUNTY Kings
LONGITUDE -119.6649
COLLECTION DATE Tuesday, December 18, 2018
WEATHER AM Fog / PM Clear

	Northbound				Southbound				Eastbound				Westbound			
Time	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
7:00 AM - 7:15 AM	1	0	1	0	0	0	0	0	0	45	0	2	0	56	0	3
7:15 AM - 7:30 AM	1	0	2	0	0	0	0	0	0	95	0	1	0	88	0	4
7:30 AM - 7:45 AM	2	0	0	0	0	0	0	0	0	150	2	1	0	121	0	0
7:45 AM - 8:00 AM	0	0	2	0	0	0	0	0	0	160	3	2	1	192	0	2
8:00 AM - 8:15 AM	1	0	1	0	0	0	0	0	0	114	0	1	1	124	0	2
8:15 AM - 8:30 AM	1	0	0	0	0	0	0	0	0	92	0	1	1	69	0	2
8:30 AM - 8:45 AM	1	0	1	0	0	0	0	0	0	78	2	1	0	77	0	1
8:45 AM - 9:00 AM	6	0	0	0	0	0	0	0	0	74	0	1	0	83	0	4
TOTAL	**13**	**0**	**7**	**0**	**0**	**0**	**0**	**0**	**0**	**808**	**7**	**10**	**3**	**810**	**0**	**18**

	Northbound				Southbound				Eastbound				Westbound			
Time	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
4:00 PM - 4:15 PM	0	0	2	0	0	0	0	0	0	121	1	0	3	125	0	2
4:15 PM - 4:30 PM	0	0	2	0	0	0	0	0	0	147	1	1	1	124	0	1
4:30 PM - 4:45 PM	1	0	0	0	0	0	0	0	0	157	2	0	2	126	0	1
4:45 PM - 5:00 PM	0	0	2	1	0	0	0	0	0	129	1	0	1	126	0	2
5:00 PM - 5:15 PM	1	0	2	0	0	0	0	0	0	183	0	0	2	164	0	0
5:15 PM - 5:30 PM	0	0	2	0	0	0	0	0	0	174	1	0	2	162	0	1
5:30 PM - 5:45 PM	2	0	0	0	0	0	0	0	0	118	0	0	6	131	0	0
5:45 PM - 6:00 PM	0	0	1	0	0	0	0	0	0	135	2	0	1	103	0	1
TOTAL	**4**	**0**	**11**	**1**	**0**	**0**	**0**	**0**	**0**	**1164**	**8**	**1**	**18**	**1061**	**0**	**8**

	Northbound				Southbound				Eastbound				Westbound			
PEAK HOUR	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
7:15 AM - 8:15 AM	4	0	5	0	0	0	0	0	0	519	5	5	2	525	0	8
4:30 PM - 5:30 PM	2	0	6	1	0	0	0	0	0	643	4	0	7	578	0	4

	PHF	Trucks
AM	0.740	1.2%
PM	0.881	0.4%



Metro Traffic Data Inc.
310 N. Irwin Street - Suite 20
Hanford, CA 93230

800-975-6938 Phone/Fax
www.metrotrafficdata.com

Turning Movement Report

Prepared For:

Peters Engineering Group
952 Pollasky Avenue
Clovis, CA 93612

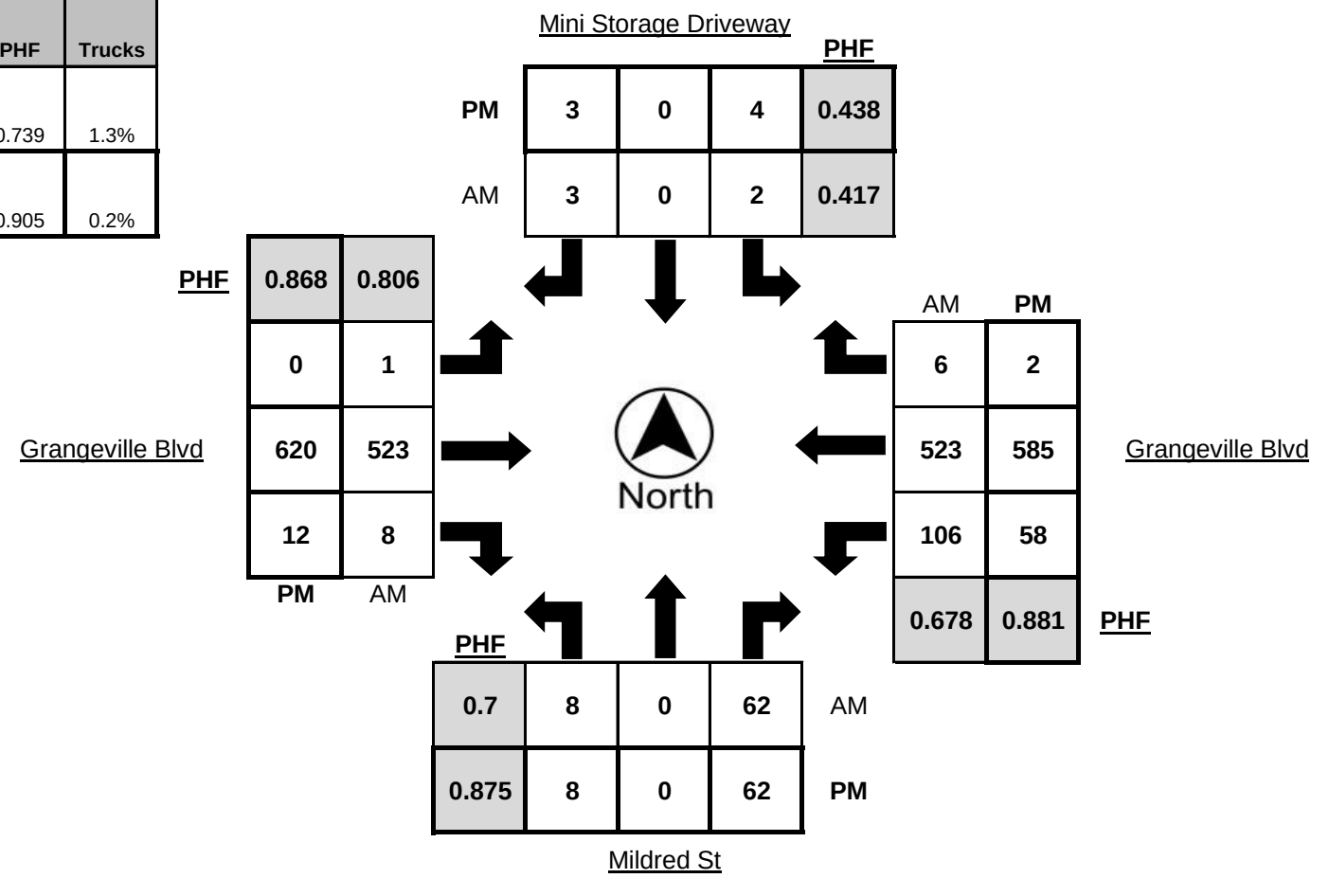
LOCATION Grangeville Blvd @ Mildred St
LATITUDE 36.3426
COUNTY Kings
LONGITUDE -119.6636
COLLECTION DATE Tuesday, December 18, 2018
WEATHER AM Fog / PM Clear

	Northbound				Southbound				Eastbound				Westbound			
Time	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
7:00 AM - 7:15 AM	2	0	10	1	0	0	1	0	0	48	1	2	3	56	3	4
7:15 AM - 7:30 AM	2	0	17	1	0	0	1	0	0	95	0	1	11	83	1	4
7:30 AM - 7:45 AM	1	0	24	1	0	0	1	0	0	148	3	1	41	131	1	0
7:45 AM - 8:00 AM	4	0	17	0	0	0	0	0	0	162	3	2	36	197	1	3
8:00 AM - 8:15 AM	1	0	4	0	2	0	1	1	1	118	2	1	18	112	3	1
8:15 AM - 8:30 AM	2	0	8	0	1	0	0	0	0	94	1	1	9	68	1	3
8:30 AM - 8:45 AM	0	0	6	0	1	0	0	0	1	78	1	1	5	76	0	1
8:45 AM - 9:00 AM	2	0	4	0	0	0	0	0	0	71	2	1	3	85	3	4
TOTAL	**14**	**0**	**90**	**3**	**4**	**0**	**4**	**1**	**2**	**814**	**13**	**10**	**126**	**808**	**13**	**20**

	Northbound				Southbound				Eastbound				Westbound			
Time	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
4:00 PM - 4:15 PM	2	0	12	0	2	0	1	0	0	120	3	0	12	124	3	2
4:15 PM - 4:30 PM	2	0	11	0	1	0	0	0	0	144	2	0	10	122	0	1
4:30 PM - 4:45 PM	2	0	16	0	1	0	1	0	0	150	1	0	16	127	1	1
4:45 PM - 5:00 PM	2	0	13	0	0	0	0	0	0	124	3	0	13	136	1	1
5:00 PM - 5:15 PM	2	0	18	0	3	0	1	0	0	180	2	0	12	156	0	1
5:15 PM - 5:30 PM	2	0	15	0	0	0	1	0	0	166	6	0	17	166	0	0
5:30 PM - 5:45 PM	2	0	10	0	0	0	0	0	0	123	1	0	13	137	0	0
5:45 PM - 6:00 PM	1	0	11	0	1	0	0	0	2	132	2	0	10	104	0	1
TOTAL	**15**	**0**	**106**	**0**	**8**	**0**	**4**	**0**	**2**	**1139**	**20**	**0**	**103**	**1072**	**5**	**7**

	Northbound				Southbound				Eastbound				Westbound			
PEAK HOUR	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
7:15 AM - 8:15 AM	8	0	62	2	2	0	3	1	1	523	8	5	106	523	6	8
4:30 PM - 5:30 PM	8	0	62	0	4	0	3	0	0	620	12	0	58	585	2	3

	PHF	Trucks
AM	0.739	1.3%
PM	0.905	0.2%



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Turning Movement Report

Prepared For:

Peters Engineering Group
952 Pollasky Avenue
Clovis, CA 93612

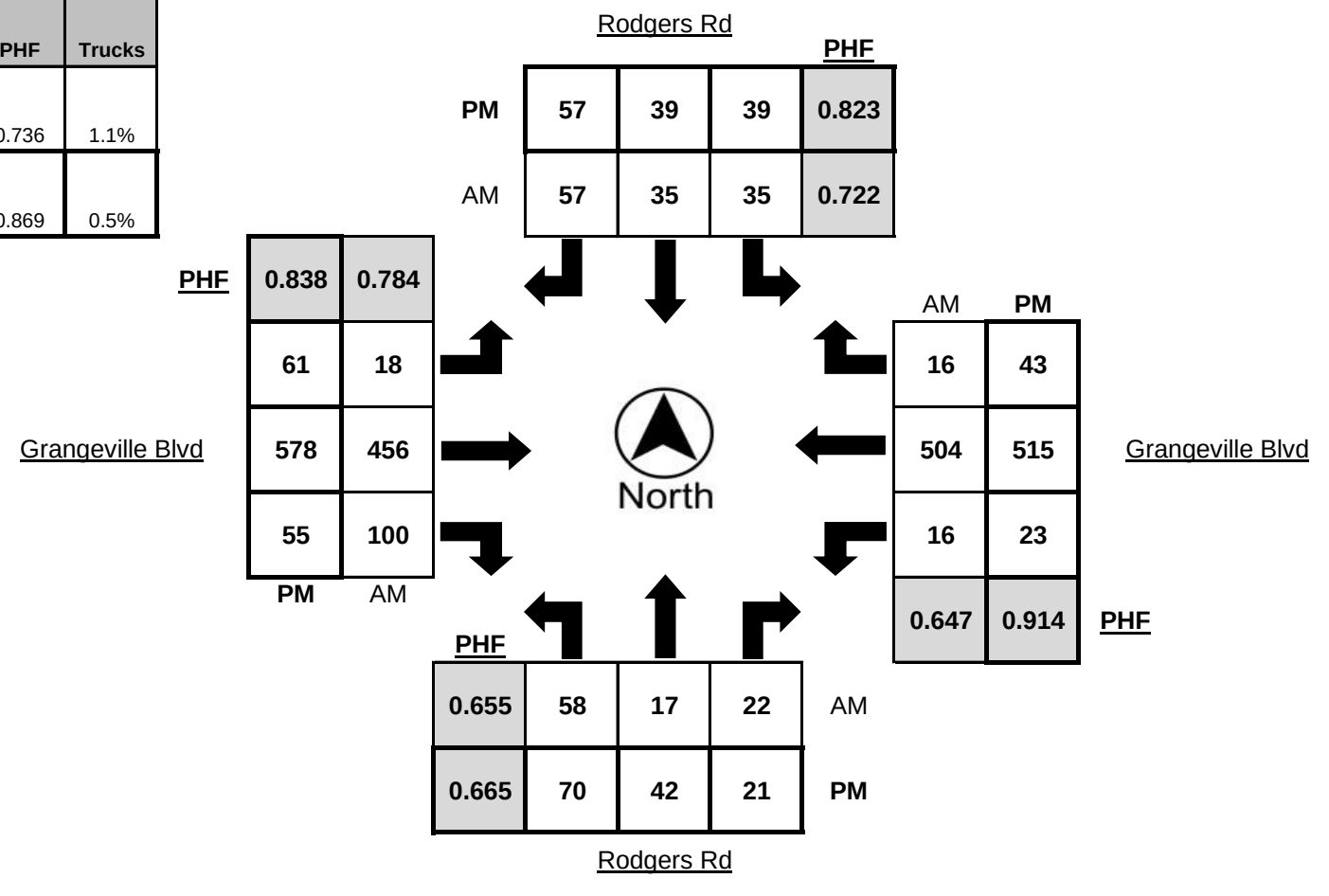
LOCATION Grangeville Blvd @ Rodgers Rd
LATITUDE 36.3427
COUNTY Kings
LONGITUDE -119.6596
COLLECTION DATE Tuesday, December 18, 2018
WEATHER AM Fog / PM Clear

	Northbound				Southbound				Eastbound				Westbound			
Time	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
7:00 AM - 7:15 AM	3	0	4	1	6	8	7	1	2	48	5	2	3	49	3	3
7:15 AM - 7:30 AM	8	2	4	0	7	7	16	0	1	97	13	1	2	72	4	4
7:30 AM - 7:45 AM	15	5	4	0	13	14	17	0	5	135	28	2	3	130	2	0
7:45 AM - 8:00 AM	23	3	11	2	7	8	11	0	4	142	37	2	6	196	5	3
8:00 AM - 8:15 AM	12	7	3	0	8	6	13	0	8	82	22	0	5	106	5	1
8:15 AM - 8:30 AM	9	1	3	0	6	3	6	0	5	90	12	1	0	58	5	3
8:30 AM - 8:45 AM	8	1	2	0	4	8	3	0	4	73	7	1	1	70	2	1
8:45 AM - 9:00 AM	8	5	2	0	4	9	7	0	5	65	6	2	1	76	2	4
TOTAL	**86**	**24**	**33**	**3**	**55**	**63**	**80**	**1**	**34**	**732**	**130**	**11**	**21**	**757**	**28**	**19**

	Northbound				Southbound				Eastbound				Westbound			
Time	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
4:00 PM - 4:15 PM	9	9	5	0	5	9	8	0	8	116	13	0	2	126	9	2
4:15 PM - 4:30 PM	11	6	6	0	5	8	5	1	10	128	14	1	5	118	4	1
4:30 PM - 4:45 PM	13	7	4	1	11	16	14	1	10	132	16	1	4	120	10	0
4:45 PM - 5:00 PM	11	13	0	0	5	7	12	0	20	119	12	1	5	124	8	1
5:00 PM - 5:15 PM	27	12	11	0	12	11	13	0	19	176	12	0	10	129	12	2
5:15 PM - 5:30 PM	19	10	6	0	11	5	18	0	12	151	15	0	4	142	13	0
5:30 PM - 5:45 PM	17	9	5	0	4	6	7	0	17	107	5	0	5	120	12	0
5:45 PM - 6:00 PM	17	10	4	0	7	8	9	0	12	118	8	0	5	90	5	0
TOTAL	**124**	**76**	**41**	**1**	**60**	**70**	**86**	**2**	**108**	**1047**	**95**	**3**	**40**	**969**	**73**	**6**

	Northbound				Southbound				Eastbound				Westbound			
PEAK HOUR	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
7:15 AM - 8:15 AM	58	17	22	2	35	35	57	0	18	456	100	5	16	504	16	8
4:30 PM - 5:30 PM	70	42	21	1	39	39	57	1	61	578	55	2	23	515	43	3

	PHF	Trucks
AM	0.736	1.1%
PM	0.869	0.5%



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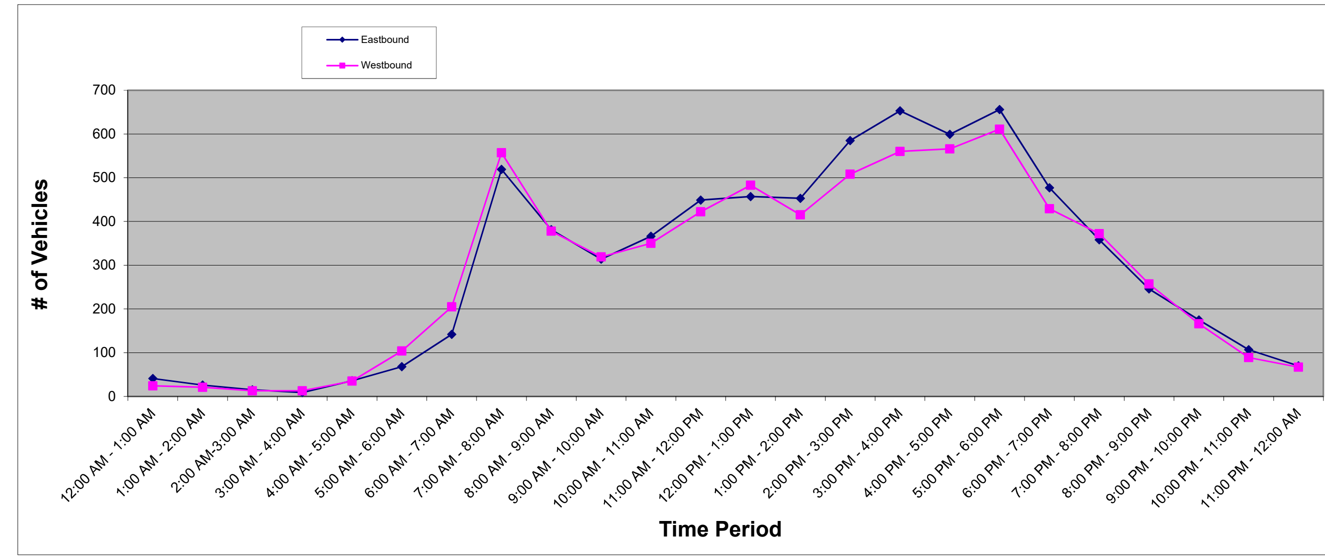
Prepared For:

Peters Engineering Group
952 Pollasky Avenue
Clovis, CA 93612

Description	Grangeville Blvd @ BNSF Railroad
Survey Date	Tuesday, December 18, 2018
Latitude	36.342575
Longitude	-119.6609998
Number of Lanes	4
Total Volume	14166
HV Percentage	5.2%
AM Peak Period	7:15am-8:15am
AM Peak Volume	1206
AM PHF	0.73
PM Peak Period	4:30pm-5:30pm
PM Peak Volume	1336
PM PHF	0.90

Class 1 - Motorcycles, 2 axles
Class 2 - Passenger cars, 2 axles
Class 3 - Pickup trucks, vans, 2 axles
Class 4 - Busses
Class 5 - Single unit, 2 axle, 6 tires
Class 6 - Single unit truck, 3 axles
Class 7 - Single unit, 4 axles
Class 8 - Double unit, < 5 axles
Class 9 - Double unit, 5 axles
Class 10 - Double unit, > 5 axles
Class 11 - Multi unit, 5 axles
Class 12 - Multi unit, 6 axles
Class 13 - Multi unit, > 6 axles
Class 14 - Unclassifiable

1st First 15 minute interval
2nd Second 15 minute interval
3rd Third 15 minute interval
4th Fourth 15 minute interval
T Hourly Total



Eastbound

Hour	Class 1					Class 2					Class 3					Class 4					Class 5				
	1st	2nd	3rd	4th	T	1st	2nd	3rd	4th	T	1st	2nd	3rd	4th	T	1st	2nd	3rd	4th	T	1st	2nd	3rd	4th	T
12:00 AM - 1:00 AM	0	0	0	1	**1**	11	10	6	6	**33**	1	1	2	2	**6**	0	0	0	0	**0**	0	1	0	0	**1**
1:00 AM - 2:00 AM	0	0	0	0	**0**	6	4	10	4	**24**	1	0	0	0	**1**	0	0	0	0	**0**	0	1	0	0	**1**
2:00 AM-3:00 AM	0	0	0	0	**0**	4	5	0	4	**13**	1	1	0	0	**2**	0	0	0	0	**0**	0	0	0	0	**0**
3:00 AM - 4:00 AM	0	0	0	0	**0**	2	0	4	1	**7**	1	0	0	1	**2**	0	0	0	0	**0**	0	0	0	0	**0**
4:00 AM - 5:00 AM	0	0	0	0	**0**	5	4	11	10	**30**	2	0	1	1	**4**	1	0	0	0	**1**	0	0	0	1	**1**
5:00 AM - 6:00 AM	0	0	0	0	**0**	8	13	13	19	**53**	2	1	2	7	**12**	0	0	0	0	**0**	0	0	3	0	**3**
6:00 AM - 7:00 AM	0	0	0	0	**0**	17	19	28	34	**98**	5	8	11	7	**31**	0	1	0	0	**1**	2	0	1	6	**9**
7:00 AM - 8:00 AM	3	0	0	2	**5**	47	86	142	138	**413**	4	19	23	27	**73**	1	1	1	0	**3**	1	5	2	5	**13**
8:00 AM - 9:00 AM	3	1	0	4	**8**	93	78	65	51	**287**	18	18	15	14	**65**	0	0	0	1	**1**	3	4	3	5	**15**
9:00 AM - 10:00 AM	0	2	2	0	**4**	49	59	61	66	**235**	12	18	10	17	**57**	0	0	0	0	**0**	1	6	2	2	**11**
10:00 AM - 11:00 AM	0	0	0	0	**0**	68	65	67	70	**270**	9	19	21	21	**70**	0	0	0	0	**0**	2	4	6	6	**18**
11:00 AM - 12:00 PM	0	2	0	0	**2**	75	72	96	103	**346**	19	19	10	26	**74**	0	0	0	0	**0**	8	5	5	3	**21**
12:00 PM - 1:00 PM	5	0	0	0	**5**	96	78	85	92	**351**	24	23	13	20	**80**	0	0	0	0	**0**	5	4	3	4	**16**
1:00 PM - 2:00 PM	1	0	0	1	**2**	76	106	93	84	**359**	12	13	22	16	**63**	0	0	0	1	**1**	4	6	3	5	**18**
2:00 PM - 3:00 PM	0	2	3	2	**7**	77	113	128	120	**438**	17	21	36	26	**100**	0	0	0	0	**0**	5	8	7	7	**27**
3:00 PM - 4:00 PM	2	0	0	2	**4**	126	122	116	124	**488**	34	34	23	26	**117**	1	1	0	0	**2**	6	8	4	4	**22**
4:00 PM - 5:00 PM	4	3	1	4	**12**	104	116	130	108	**458**	22	23	30	23	**98**	0	1	0	0	**1**	3	5	3	7	**18**
5:00 PM - 6:00 PM	2	4	1	2	**9**	163	146	109	111	**529**	29	21	16	20	**86**	0	0	0	2	**2**	8	4	1	3	**16**
6:00 PM - 7:00 PM	1	3	0	2	**6**	94	86	91	104	**375**	15	23	17	18	**73**	0	0	0	0	**0**	5	6	2	4	**17**
7:00 PM - 8:00 PM	0	0	0	1	**1**	83	71	66	76	**296**	11	12	13	12	**48**	0	0	0	0	**0**	4	2	4	1	**11**
8:00 PM - 9:00 PM	0	0	0	0	**0**	49	50	48	56	**203**	15	8	7	9	**39**	0	0	0	0	**0**	1	0	0	2	**3**
9:00 PM - 10:00 PM	0	0	0	0	**0**	42	36	41	24	**143**	11	8	4	7	**30**	0	0	0	0	**0**	0	1	0	0	**1**
10:00 PM - 11:00 PM	0	0	0	0	**0**	25	22	24	24	**95**	4	2	3	2	**11**	0	0	0	0	**0**	0	0	0	0	**0**
11:00 PM - 12:00 AM	0	0	0	0	**0**	16	25	11	7	**59**	3	1	0	3	**7**	0	0	0	0	**0**	1	1	0	1	**3**
Total	**66**					**5603**					**1149**					**12**					**245**				
Percentage	**0.9%**					**77.8%**					**16.0%**					**0.2%**					**3.4%**				

Hour	Class 6					Class 7					Class 8					Class 9					Class 10				
	1st	2nd	3rd	4th	T	1st	2nd	3rd	4th	T	1st	2nd	3rd	4th	T	1st	2nd	3rd	4th	T	1st	2nd	3rd	4th	T
12:00 AM - 1:00 AM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**
1:00 AM - 2:00 AM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**
2:00 AM-3:00 AM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**
3:00 AM - 4:00 AM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**
4:00 AM - 5:00 AM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**
5:00 AM - 6:00 AM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**
6:00 AM - 7:00 AM	0	0	0	1	**1**	0	0	0	0	**0**	0	0	1	0	**1**	0	0	0	1	**1**	0	0	0	0	**0**
7:00 AM - 8:00 AM	0	0	1	5	**6**	1	0	0	0	**1**	0	0	0	0	**0**	0	0	0	2	**2**	0	0	0	0	**0**
8:00 AM - 9:00 AM	1	3	1	0	**5**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**
9:00 AM - 10:00 AM	0	0	2	2	**4**	0	0	1	0	**1**	0	0	0	1	**1**	0	0	0	0	**0**	0	0	0	0	**0**
10:00 AM - 11:00 AM	3	0	0	3	**6**	0	1	0	0	**1**	0	0	0	0	**0**	1	0	0	0	**1**	0	0	0	0	**0**
11:00 AM - 12:00 PM	0	4	0	1	**5**	0	0	0	0	**0**	0	0	0	0	**0**	0	1	0	0	**1**	0	0	0	0	**0**
12:00 PM - 1:00 PM	1	0	2	0	**3**	0	1	0	0	**1**	0	0	0	0	**0**	1	0	0	0	**1**	0	0	0	0	**0**
1:00 PM - 2:00 PM	2	2	2	1	**7**	1	0	0	0	**1**	0	0	0	0	**0**	0	0	1	0	**1**	0	0	0	0	**0**
2:00 PM - 3:00 PM	2	2	1	4	**9**	0	0	0	1	**1**	0	1	0	0	**1**	0	1	0	0	**1**	0	0	0	0	**0**
3:00 PM - 4:00 PM	4	3	3	2	**12**	0	0	0	1	**1**	0	0	0	1	**1**	0	0	1	0	**1**	0	1	0	0	**1**
4:00 PM - 5:00 PM	1	4	1	1	**7**	0	1	0	0	**1**	0	1	0	1	**2**	1	0	0	0	**1**	0	0	0	1	**1**
5:00 PM - 6:00 PM	2	4	1	0	**7**	0	0	0	1	**1**	0	0	1	1	**2**	0	0	0	0	**0**	0	0	1	0	**1**
6:00 PM - 7:00 PM	2	0	0	3	**5**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**
7:00 PM - 8:00 PM	0	2	0	0	**2**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**
8:00 PM - 9:00 PM	0	0	0	1	**1**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**
9:00 PM - 10:00 PM	1	0	0	0	**1**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**
10:00 PM - 11:00 PM	0	0	0	1	**1**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**
11:00 PM - 12:00 AM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	1	**1**	0	0	0	0	**0**
Total	**82**					**9**					**8**					**11**					**3**				
Percentage	**1.1%**					**0.1%**					**0.1%**					**0.2%**					**0.0%**				

Hour	Class 11					Class 12					Class 13					Class 14					Total
	1st	2nd	3rd	4th	T	1st	2nd	3rd	4th	T	1st	2nd	3rd	4th	T	1st	2nd	3rd	4th	T	
12:00 AM - 1:00 AM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**41**
1:00 AM - 2:00 AM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**26**
2:00 AM-3:00 AM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**15**
3:00 AM - 4:00 AM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**9**
4:00 AM - 5:00 AM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**36**
5:00 AM - 6:00 AM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**68**
6:00 AM - 7:00 AM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**142**
7:00 AM - 8:00 AM	0	1	0	0	**1**	0	0	1	0	**1**	0	0	0	1	**1**	0	0	0	0	**0**	**519**
8:00 AM - 9:00 AM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**381**
9:00 AM - 10:00 AM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	1	0	**1**	0	0	0	0	**0**	**314**
10:00 AM - 11:00 AM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**366**
11:00 AM - 12:00 PM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**449**
12:00 PM - 1:00 PM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**457**
1:00 PM - 2:00 PM	0	0	0	0	**0**	0	1	0	0	**1**	0	0	0	0	**0**	0	0	0	0	**0**	**453**
2:00 PM - 3:00 PM	0	0	0	0	**0**	0	0	0	0	**0**	0	1	0	0	**1**	0	0	0	0	**0**	**585**
3:00 PM - 4:00 PM	0	0	0	1	**1**	0	0	0	1	**1**	0	1	1	0	**2**	0	0	0	0	**0**	**653**
4:00 PM - 5:00 PM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**599**
5:00 PM - 6:00 PM	0	0	0	0	**0**	0	1	0	1	**2**	0	0	0	1	**1**	0	0	0	0	**0**	**656**
6:00 PM - 7:00 PM	0	0	0	0	**0**	0	0	1	0	**1**	0	0	0	0	**0**	0	0	0	0	**0**	**477**
7:00 PM - 8:00 PM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**358**
8:00 PM - 9:00 PM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**246**
9:00 PM - 10:00 PM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**175**
10:00 PM - 11:00 PM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**107**
11:00 PM - 12:00 AM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**70**
Total	**2**					**6**					**6**					**0**					**7202**
Percentage	**0.0%**					**0.1%**					**0.1%**					**0.0%**					**100.0%**

7:15am-8:15am AM PK 580 AM PHF 0.81 4:30pm-5:30pm PM PK 694 PM PHF 0.85 HV Percent 5.3%

Westbound

Hour	Class 1					Class 2					Class 3					Class 4					Class 5				
	1st	2nd	3rd	4th	T	1st	2nd	3rd	4th	T	1st	2nd	3rd	4th	T	1st	2nd	3rd	4th	T	1st	2nd	3rd	4th	T
12:00 AM - 1:00 AM	0	0	0	0	**0**	7	5	7	3	**22**	2	0	0	0	**2**	0	0	0	0	**0**	0	0	0	0	**0**
1:00 AM - 2:00 AM	0	0	0	0	**0**	7	2	5	4	**18**	0	0	0	1	**1**	0	0	0	0	**0**	0	0	1	0	**1**
2:00 AM-3:00 AM	0	0	0	0	**0**	4	6	0	2	**12**	0	0	1	0	**1**	0	0	0	0	**0**	0	0	0	0	**0**
3:00 AM - 4:00 AM	0	0	0	0	**0**	3	1	2	4	**10**	1	0	0	1	**2**	0	0	0	0	**0**	0	0	0	0	**0**
4:00 AM - 5:00 AM	0	0	0	0	**0**	2	6	10	12	**30**	0	2	0	0	**2**	0	0	0	0	**0**	0	0	0	2	**2**
5:00 AM - 6:00 AM	0	0	0	0	**0**	14	16	28	28	**86**	2	0	3	5	**10**	0	0	0	1	**1**	1	0	2	3	**6**
6:00 AM - 7:00 AM	0	1	1	0	**2**	27	33	50	54	**164**	5	8	8	9	**30**	2	0	0	0	**2**	1	1	1	3	**6**
7:00 AM - 8:00 AM	0	0	0	4	**4**	48	82	144	196	**470**	7	6	18	23	**54**	0	2	0	1	**3**	6	3	5	4	**18**
8:00 AM - 9:00 AM	2	0	0	0	**2**	105	61	67	75	**308**	17	7	11	10	**45**	0	0	0	0	**0**	5	2	4	2	**13**
9:00 AM - 10:00 AM	1	0	2	0	**3**	61	57	76	68	**262**	13	8	9	4	**34**	1	0	0	0	**1**	3	3	2	6	**14**
10:00 AM - 11:00 AM	0	0	3	0	**3**	54	67	74	82	**277**	9	15	12	11	**47**	0	0	0	0	**0**	2	5	4	5	**16**
11:00 AM - 12:00 PM	0	1	0	0	**1**	78	86	75	98	**337**	18	15	10	21	**64**	1	0	0	1	**2**	5	4	2	3	**14**
12:00 PM - 1:00 PM	0	0	2	2	**4**	129	96	82	88	**395**	13	18	18	14	**63**	0	1	0	0	**1**	5	5	2	2	**14**
1:00 PM - 2:00 PM	2	1	0	0	**3**	85	94	75	91	**345**	6	12	9	17	**44**	0	0	0	0	**0**	3	3	2	5	**13**
2:00 PM - 3:00 PM	0	0	1	0	**1**	92	111	95	120	**418**	13	18	16	10	**57**	1	0	1	1	**3**	5	6	7	2	**20**
3:00 PM - 4:00 PM	0	0	0	1	**1**	147	125	98	99	**469**	14	13	19	9	**55**	0	1	0	0	**1**	6	11	4	5	**26**
4:00 PM - 5:00 PM	2	2	1	2	**7**	117	115	122	121	**475**	14	12	16	14	**56**	0	0	0	0	**0**	6	2	4	3	**15**
5:00 PM - 6:00 PM	0	1	1	0	**2**	145	157	117	102	**521**	13	13	21	9	**56**	0	0	0	0	**0**	9	6	5	2	**22**
6:00 PM - 7:00 PM	0	0	1	0	**1**	117	83	79	80	**359**	16	14	13	10	**53**	0	0	0	0	**0**	4	2	3	3	**12**
7:00 PM - 8:00 PM	0	0	0	0	**0**	79	94	77	72	**322**	11	3	15	3	**32**	0	0	0	0	**0**	6	4	2	3	**15**
8:00 PM - 9:00 PM	0	0	0	0	**0**	54	47	62	59	**222**	8	7	6	3	**24**	0	0	0	0	**0**	3	3	1	1	**8**
9:00 PM - 10:00 PM	0	0	0	0	**0**	41	42	29	36	**148**	9	2	2	1	**14**	0	0	0	0	**0**	2	2	0	0	**4**
10:00 PM - 11:00 PM	0	0	0	0	**0**	25	26	12	21	**84**	2	2	0	0	**4**	0	1	0	0	**1**	0	0	0	0	**0**
11:00 PM - 12:00 AM	0	0	0	0	**0**	20	15	17	8	**60**	1	2	2	2	**7**	0	0	0	0	**0**	0	0	0	0	**0**
Total	**34**					**5814**					**757**					**15**					**239**				
Percentage	**0.5%**					**83.5%**					**10.9%**					**0.2%**					**3.4%**				

Hour	Class 6					Class 7					Class 8					Class 9					Class 10				
	1st	2nd	3rd	4th	T	1st	2nd	3rd	4th	T	1st	2nd	3rd	4th	T	1st	2nd	3rd	4th	T	1st	2nd	3rd	4th	T
12:00 AM - 1:00 AM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**
1:00 AM - 2:00 AM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	1	0	0	**1**	0	0	0	0	**0**
2:00 AM-3:00 AM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**
3:00 AM - 4:00 AM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	1	0	0	**1**	0	0	0	0	**0**
4:00 AM - 5:00 AM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	1	0	**1**	0	0	0	0	**0**
5:00 AM - 6:00 AM	0	0	1	0	**1**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**
6:00 AM - 7:00 AM	0	0	0	0	**0**	0	0	1	0	**1**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**
7:00 AM - 8:00 AM	1	1	1	4	**7**	0	0	0	0	**0**	0	1	0	0	**1**	0	0	0	0	**0**	0	0	0	0	**0**
8:00 AM - 9:00 AM	1	4	0	1	**6**	1	0	0	0	**1**	0	1	0	0	**1**	0	0	0	1	**1**	0	0	0	0	**0**
9:00 AM - 10:00 AM	0	2	2	0	**4**	0	0	0	0	**0**	0	0	1	0	**1**	0	0	0	0	**0**	0	0	0	0	**0**
10:00 AM - 11:00 AM	0	2	0	1	**3**	0	0	0	0	**0**	0	0	1	0	**1**	0	0	1	2	**3**	0	0	0	0	**0**
11:00 AM - 12:00 PM	0	3	0	0	**3**	0	0	1	0	**1**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**
12:00 PM - 1:00 PM	2	1	0	1	**4**	1	0	0	0	**1**	0	0	0	0	**0**	0	1	0	0	**1**	0	0	0	0	**0**
1:00 PM - 2:00 PM	1	2	2	2	**7**	0	0	0	0	**0**	2	0	0	0	**2**	0	0	1	0	**1**	0	0	0	0	**0**
2:00 PM - 3:00 PM	1	1	0	1	**3**	0	0	0	1	**1**	0	0	0	2	**2**	0	1	0	0	**1**	1	0	0	0	**1**
3:00 PM - 4:00 PM	1	2	1	2	**6**	0	1	0	0	**1**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**
4:00 PM - 5:00 PM	1	2	2	3	**8**	0	0	0	2	**2**	0	0	0	2	**2**	0	0	0	1	**1**	0	0	0	0	**0**
5:00 PM - 6:00 PM	1	2	2	2	**7**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	1	0	**1**
6:00 PM - 7:00 PM	1	1	1	1	**4**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**
7:00 PM - 8:00 PM	0	0	0	3	**3**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**
8:00 PM - 9:00 PM	0	1	1	1	**3**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**
9:00 PM - 10:00 PM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**
10:00 PM - 11:00 PM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**
11:00 PM - 12:00 AM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**
Total	**69**					**8**					**10**					**11**					**2**				
Percentage	**1.0%**					**0.1%**					**0.1%**					**0.2%**					**0.0%**				

Hour	Class 11					Class 12					Class 13					Class 14					Total
	1st	2nd	3rd	4th	T	1st	2nd	3rd	4th	T	1st	2nd	3rd	4th	T	1st	2nd	3rd	4th	T	
12:00 AM - 1:00 AM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**24**
1:00 AM - 2:00 AM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**21**
2:00 AM-3:00 AM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**13**
3:00 AM - 4:00 AM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**13**
4:00 AM - 5:00 AM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**35**
5:00 AM - 6:00 AM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**104**
6:00 AM - 7:00 AM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**205**
7:00 AM - 8:00 AM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**557**
8:00 AM - 9:00 AM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	1	**1**	0	0	0	0	**0**	**378**
9:00 AM - 10:00 AM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**319**
10:00 AM - 11:00 AM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**350**
11:00 AM - 12:00 PM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**422**
12:00 PM - 1:00 PM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**483**
1:00 PM - 2:00 PM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**415**
2:00 PM - 3:00 PM	0	0	1	0	**1**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**508**
3:00 PM - 4:00 PM	0	0	0	0	**0**	0	0	0	0	**0**	1	0	0	0	**1**	0	0	0	0	**0**	**560**
4:00 PM - 5:00 PM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**566**
5:00 PM - 6:00 PM	1	0	0	0	**1**	0	1	0	0	**1**	0	0	0	0	**0**	0	0	0	0	**0**	**611**
6:00 PM - 7:00 PM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**429**
7:00 PM - 8:00 PM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**372**
8:00 PM - 9:00 PM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**257**
9:00 PM - 10:00 PM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**166**
10:00 PM - 11:00 PM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**89**
11:00 PM - 12:00 AM	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**67**
Total	**2**					**1**					**2**					**0**					**6964**
Percentage	**0.0%**					**0.0%**					**0.0%**					**0.0%**					**100.0%**

7:15am-8:15am AM PK 626 AM PHF 0.67 4:45pm-5:45pm PM PK 644 PM PHF 0.89 HV Percent 5.2%

Traffic Counts

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CITY OF HANFORD

(update counts every 3 years)

Street	Location	Station	2012 Traffic Count	2013 Traffic Count	2014 Traffic Count	2015 Traffic Count	2016 Traffic Count	2017 Traffic Count	2018 Traffic Count
Douty St.	south of Lang	**109**			2,766			2,828	
Elm St.	west of 11th	**65**						6,831	
Fargo Ave.	west of 12th	**155**		3,381			3,587		3,708
	east of 12th	**35**		7,868			8,977		9,249
	west of Fountain Plaza	**12**	9,459			10,502			10,451
	east of Aspen	**13**			9,314			9,961	
	east of Kensington	**14**		8,216			8,187		8,651
	west of Encore	**15**		4,732			4,661		4,972
	west of 9 1/4	**16**			2,743			3,068	
Fifth St.	east of Brown	**104**	765				977		
Fitzgerald Ln	south of Castoro	**163**	2,334				1,980		
	south of Bristol	**30**		3,713			3,204		
Flint Ave	west of 11th	**28**		1,968			3,138		
	west of Douty	**3**	3,770				4,568		
	west of Hwy 43	**11**		3,889			5,020		5,165
Florinda St.	west of Kaweah	**61**			4,922			5,282	
	east of Brown	**62**			4,768			5,115	
	west of Gladys	**63**	3,199				4,684		

Traffic Counts

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CITY OF HANFORD

(update counts every 3 years)

Street	Location	Station	2012 Traffic Count	2013 Traffic Count	2014 Traffic Count	2015 Traffic Count	2016 Traffic Count	2017 Traffic Count	2018 Traffic Count
Hume Ave.	west of Dawn	**131**	2,651				3,083		
	east of Santa Rosa	**147**	2,270				1,072		
Idaho Ave.	east of 11th	**143**	512				658		
Iona Ave.	east of 11th	**139**	723				1,041		
Irwin St.	north of Katherine	**52**	2,038			1,865			1,994
	north of Myrtle	**75**	3,789			3,249			3,274
	north of Seventh	**93**		2,886			2,885		
	south of Han/Arm	**129**		1,402			949		
Ivy St.	west of Kaweah	**67**		2,333			2,605		NEED
	east of Brown	**68**		1,843			1,853		NEED
Kings Co. Dr	south of Forum	**82**			3,370			3,373	
Lacey Blvd.	west of 13th	**98**			7,221			7,634	
	east of Magna Carta	**77**			12,246			11,535	
	west of 12th	**78**			13,105			11,772	
	east of Mall	**79**			15,829			15,648	
	west of Greenfield	**80**			16,211			17,448	
	west of Phillips	**81**			9,075			11,391	
	west of 9 1/2	**84**	4,753		7,003			6,982	

FLORIDA TABLE

TABLE 1

Generalized **Annual Average Daily** Volumes for Florida's **Urbanized Areas**

12/18/12

INTERRUPTED FLOW FACILITIES

STATE SIGNALIZED ARTERIALS

Class I (40 mph or higher posted speed limit)

Lanes	Median	B	C	D	E
2	Undivided	*	16,800	17,700	**
4	Divided	*	37,900	39,800	**
6	Divided	*	58,400	59,900	**
8	Divided	*	78,800	80,100	**

Class II (35 mph or slower posted speed limit)

Lanes	Median	B	C	D	E
2	Undivided	*	7,300	14,800	15,600
4	Divided	*	14,500	32,400	33,800
6	Divided	*	23,300	50,000	50,900
8	Divided	*	32,000	67,300	68,100

Non-State Signalized Roadway Adjustments

(Alter corresponding state volumes by the indicated percent.)

Non-State Signalized Roadways - 10%

Median & Turn Lane Adjustments

Lanes	Median	Exclusive Left Lanes	Exclusive Right Lanes	Adjustment Factors
2	Divided	Yes	No	+5%
2	Undivided	No	No	-20%
Multi	Undivided	Yes	No	-5%
Multi	Undivided	No	No	-25%
–	–	–	Yes	+ 5%

One-Way Facility Adjustment

Multiply the corresponding two-directional volumes in this table by 0.6

BICYCLE MODE[2]

(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Paved Shoulder/Bicycle Lane Coverage	B	C	D	E
0-49%	*	2,900	7,600	19,700
50-84%	2,100	6,700	19,700	>19,700
85-100%	9,300	19,700	>19,700	**

PEDESTRIAN MODE[2]

(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Sidewalk Coverage	B	C	D	E
0-49%	*	*	2,800	9,500
50-84%	*	1,600	8,700	15,800
85-100%	3,800	10,700	17,400	>19,700

BUS MODE (Scheduled Fixed Route)[3]

(Buses in peak hour in peak direction)

Sidewalk Coverage	B	C	D	E
0-84%	> 5	≥ 4	≥ 3	≥ 2
85-100%	> 4	≥ 3	≥ 2	≥ 1

UNINTERRUPTED FLOW FACILITIES

FREEWAYS

Core Urbanized

Lanes	B	C	D	E
4	47,400	64,000	77,900	84,600
6	69,900	95,200	116,600	130,600
8	92,500	126,400	154,300	176,600
10	115,100	159,700	194,500	222,700
12	162,400	216,700	256,600	268,900

Urbanized

Lanes	B	C	D	E
4	45,800	61,500	74,400	79,900
6	68,100	93,000	111,800	123,300
8	91,500	123,500	148,700	166,800
10	114,800	156,000	187,100	210,300

Freeway Adjustments

Auxiliary Lanes Present in Both Directions	Ramp Metering
+ 20,000	+ 5%

UNINTERRUPTED FLOW HIGHWAYS

Lanes	Median	B	C	D	E
2	Undivided	8,600	17,000	24,200	33,300
4	Divided	36,700	51,800	65,600	72,600
6	Divided	55,000	77,700	98,300	108,800

Uninterrupted Flow Highway Adjustments

Lanes	Median	Exclusive left lanes	Adjustment factors
2	Divided	Yes	+5%
Multi	Undivided	Yes	-5%
Multi	Undivided	No	-25%

[1]Values shown are presented as two-way annual average daily volumes for levels of service and are for the automobile/truck modes unless specifically stated. This table does not constitute a standard and should be used only for general planning applications. The computer models from which this table is derived should be used for more specific planning applications. The table and deriving computer models should not be used for corridor or intersection design, where more refined techniques exist. Calculations are based on planning applications of the Highway Capacity Manual and the Transit Capacity and Quality of Service Manual.

[2] Level of service for the bicycle and pedestrian modes in this table is based on number of motorized vehicles, not number of bicyclists or pedestrians using the facility.

[3] Buses per hour shown are only for the peak hour in the single direction of the higher traffic flow.

* Cannot be achieved using table input value defaults.

** Not applicable for that level of service letter grade. For the automobile mode, volumes greater than level of service D become F because intersection capacities have been reached. For the bicycle mode, the level of service letter grade (including F) is not achievable because there is no maximum vehicle volume threshold using table input value defaults.

Source:
Florida Department of Transportation
Systems Planning Office
www.dot.state.fl.us/planning/systems/sm/los/default.shtm