BROADWAY GRADE SEPARATION
Preliminary Project FAQ's

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1. Why is grade separation needed at Broadway?

The Broadway railroad crossing was identified as early as the 1970's as needing grade separation. Over 70,000 vehicles, pedestrians and bicyclists use Broadway on a daily basis. The average traffic during the weekday afternoon peak was recorded to be around 324 seconds (5.4 minutes). By 2040, and without any improvements, that delay would increase to 1,450 seconds (24.2 minutes). Vehicle vs. train, and train vs. pedestrian accidents are common at Broadway. In addition, with over 10,000 at-grade crossings in all of California, Broadway is currently ranked as #2 high priority project statewide, and #1 in Northern California, by the California Public Utilities Commission (CPUC) for grade separation priority.

2. How many alternative designs were studied, and what were they?

The Project Team analyzed six different alternative design options. They were:

- Alternative A – Roadway partially depressed and tracks partially elevated.
- Alternative B – Roadway partially elevated and tracks partially depressed.
- Alternative C – Roadway fully depressed and tracks at-grade.
- Alternative D – Roadway fully elevated and tracks at-grade.
- Alternative E – Roadway at-grade and tracks fully depressed.
- Alternative F – Roadway at-grade and tracks fully elevated.

3. Which alternative design(s) rose to the top for further consideration?

After the second public meeting in September 2015 and January 2016 Council meeting, based on the results of the analysis and public input, Alternatives A and B rose to the top for further consideration and detailed analysis.

Alternatives C through F were eliminated due to serious design hurdles that proved to have "fatal flaws" in one or more of the following areas of project impact.

1. Significant environmental issues
2. Significant unavoidable railroad operations to Caltrain/BART stations
3. Significant right-of-way issues
4. Significant negative impact to downtown properties and businesses

4. Other than cost, can you thoroughly explain the engineering challenges and risks associated with Alternative B (trenching the train, and running the cars above?) Most people can understand that the "water table" is an issue in a broader sense, but can you elaborate?

Below are some of the major challenges associated with Alternative B:

- Significant disruption to local traffic circulation and Caltrain operations.
- Extended duration of construction.
- Shoofly* construction to maintain Caltrain operations while excavating trench.
- Significant impacts to private properties due to right-of-way takes.
- Significant impacts to Broadway Commercial District and Auto Dealerships.
- Potential risk of flooding in the trench, and safety risk to Caltrain operations and the public.
- Construction of extensive storm water detention system and pumping plants to prevent flooding of upstream residential properties from the cut-off of natural drainage.
- Potential impact to trees

*Note: * shoofly is a temporary railroad track built to maintain train service operations while constructing new permanent railroad tracks.*

a. Would there be additional ongoing expensive maintenance? How costly would that likely be to the City on an annual basis?

Yes there would be additional long term maintenance costs associated with maintaining pump plants for drainage. These costs would have to be borne by the City. We do not have a definite number but with at least 5 pump stations/syphons, a ballpark estimate would be additional dedicated maintenance staff at $300K to $400K per year at a minimum. In addition, there will be ongoing costs associated with back-up power such as mobile generators for each location (see response to d below).

b. Would there be a high probability of leaks that could affect train service?

Leaks are to be expected with high ground water. This is one of BART's main issues with maintenance and causes many system failures due to water intrusion into electrical systems and corrosion of materials such as trackways and other metals. There is one stretch of tunnel in BART between Civic Center and 16th Street that has required track replacement within 2 years due to corrosion.

c. Is FEMA's flood zone an issue?

The project is within close proximity to the FEMA 100-year floodplain. Any change in drainage patterns would need to be modeled and submitted to FEMA to show that the project does not alter FEMA floodplains. This may require adding downstream capacity (i.e. expanding drainage facilities to the east).

d. What happens when major storms hit?

When a major storm hits, the reliability of pumps to pump water is an issue as well as power to run the pumps. If either of these fails, then the water will start to fill the trench and there could be service disruption. At a minimum, a maintenance engineer would need to be on call during these events to manage and assess the situation. Back-up power sources such as mobile generators would be required to be on call for all 5 locations.

e. Is there a safety risk in operating an electrified train in a potentially flooded trench?

Yes, there is a potential safety risk in operating electrified trains in a flooded trench. This also affects reliability of train operations.

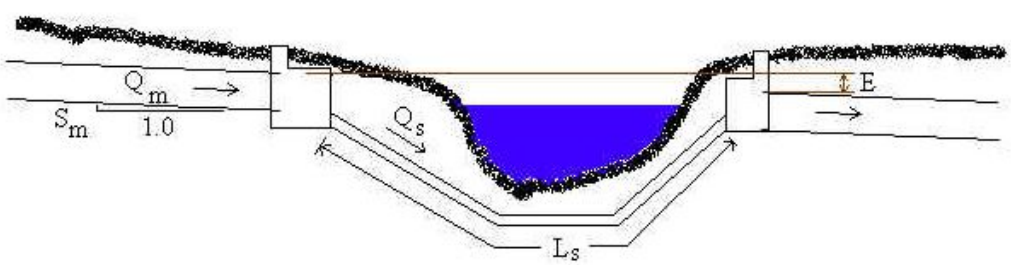
f. Is sea level rise a long-term concern?

Yes it is a concern. Sea level rise numbers for the bay area are projected to be around +3 feet. This may further exacerbate the risk of operating trains in a trench.

g. How do sewers and creeks play into the Alternative B scenario? (Beyond the initial engineering costs and time.)

Sewers, creeks and drainage facilities would require a syphon to pump water/sewer down and under the trench (see below sketch) with lift stations at either side of the trench. These types of systems are expensive to maintain and have reliability issues as well. Many flood control agencies discourage the use of these systems because of long term maintenance and reliability.

Overall Diagram:



5. If trenching is so challenging from an engineering point of view, how does BART do it?

Trenching is a challenging engineering issue especially in developed areas that add constraints on how construction is implemented. In the 1960's, BART used cut-and-cover excavation to construct in Downtown Oakland and San Francisco. This construction lasted many years and disrupted City streets for years – impacting businesses and local circulation. Currently, SFMTA is building the Central Subway, which is a drilled shaft below BART from South of Market to Chinatown. Many streets nearby are disrupted, and there have been several street closures for long periods of time. The cost is in the billions. Also there are long-term maintenance issues for these underground facilities such as groundwater infiltration that affects services and reliability.

6. Has Caltrain trenched anywhere else along their railroad corridor line?

Caltrain tracks are not trenched anywhere along their corridor.

7. What does Burlingame propose to do with the other Burlingame train crossings when electrification comes? Would some likely be eliminated? Would we likely advocate for grade separation at other crossings too?

The Caltrain Electrification Project does not propose any grade separation in Burlingame. Except for the Broadway crossing, there currently is no identified need for grade separation for other crossings in Burlingame. Broadway is the only crossing identified in the statewide priority list; no other Burlingame grade crossing is on the grade separation list. The other at-grade crossings in Burlingame include: Oak Grove Avenue, North Lane, Bayswater Avenue, Howard Avenue and Peninsula Avenue.

Implementing a grade separation at Broadway does not preclude grade separating these other crossings in the future. The issues and costs would be comparable for these streets, but the distances between Oak Grove Avenue, North Lane, Howard Avenue, Bayswater Avenue, and Peninsula Avenue may require that these be all grade separated or a combination of grade separation and closure. Further circulation studies would be needed to assess these sites.

8. The January presentation suggests Alternatives A and B minimize right-of-way takes / eminent domain. Which one would require more land? Can you elaborate?

Alternative B would require significantly more right-of-way takes especially in the Broadway Commercial Area. The elevation difference in roadway on Broadway and nearby streets, would take the first block of the downtown area due to access impacts to those buildings and businesses. In addition, the temporary shoofly for the railroad tracks would impact several buildings that are built up to Caltrain ROW (about 15+ commercial buildings).

9. Is the cost to build Broadway station included in the estimates for grade separation A & B scenarios?

There is a place holder for the cost of the station in the estimates for both. There is a building shown in both alternatives that represents the station as a place holder.

10. Alternative A = tracks will be 13' higher than street level. But how high will the entire train and wires be above ground at the highest point?

The overhead wires are about 22 feet above the track level. This is a safer design as people cannot inadvertently touch the wires. In Alternative B, the high-voltage wires will be at a level that someone could touch them, which will require high fencing and armoring to prevent people from touching or damaging the wires.

11. Are you concerned about graffiti along a large berm or elevated tracks?

The best type of anti-graffiti is to use plantings (such as ivy) as was done on Holly Street in San Carlos. Where possible, we would look to use berms in lieu of wall if there is enough ROW for grading.

12. Will train noise be quieter with Alternative B or Alternative A?

In the trench option the concrete wall tends to reflect the train noise and this can lead to properties that don't currently hear trains getting more noise than they currently experience. Also, there may be slightly more noise along and adjacent to the tracks in Alternative A. Noise can be mitigated in both Alternatives A and B with the installation of acoustical panels at the train wheel level and other methods to attenuate noise will mitigate this issue.

13. If Council OK's the elevated train Alternative A, some community members are concerned it would be against Council's letter to California High Speed Rail Authority (CHSRA) from 2010 opposing any kind of elevated alignment—prior to blended system compromise.

The City Council letter in 2010 was in response to the Elevated Viaduct Alignment of High Speed Rail throughout the entire corridor in Burlingame at that time. Based on the best information available at this time, the CHSRA is not proposing to elevate the tracks in Burlingame along the Caltrain corridor like they did in their previous attempt. They plan to run High Speed Trains at existing grade without making changes to the existing alignment. The Alternative A for Broadway Grade Separation partially raises the railroad tracks and partially depresses the roadway to minimize visual impacts, and significantly limits the raised portion tracks, which is completely different than what was proposed in 2010 by CHSRA. If the City were to choose to not grade separate Broadway, and leave the situation as it is, the projected increase in the overall number of trains from currently at 92 per day to 220 per day by 2030 (information per PCJPB and CHSRA), will result in a significant traffic circulation failure and increase safety problems. This is particularly significant because Broadway is the gateway to Burlingame from US 101, and is the only direct access to it. Additionally, this will affect the entire Broadway corridor, including the commercial district and the Bayfront hotels' patrons and businesses that use Broadway to visit the downtown areas.

14. Some community members are concerned that the City is rushing this proposal decision in order to get a shovel-ready project in the pipeline, and we may not be researching all the options carefully enough.

The City issued a Request For Proposals and hired URS/AECOM, a well-qualified engineering consulting firm, to identify and evaluate all options available to address the Broadway grade crossing problem. URS/AECOM comprehensively studied the issues, performed engineering analysis, and identified six potential alternatives, of which four were discarded because of severe flaws, and narrowed their focus on to two alternatives with extensive details including 3D animation of potential buildout-concepts. The amount of work done to provide details of renderings on this project is beyond the original scope and is unusual at this stage per industry standards. Staff and the project team believe that all feasible options have been successfully studied and presented at this time. Staff welcomes hearing from anyone with a better idea of a feasible alternative that hasn't been studied as of yet, which would solve the Broadway grade crossing problem in a more effective and efficient manner, with fewer challenges and issues.

15. How are the trees impacted in Alternative A and B?

While an actual tree survey will be needed, and performed in the next phase of the grade separation project development, initial analysis shows that in Alternative A, there will be minimal impacts to the existing eucalyptus grove adjacent to the tracks and just north of Oak Grove Avenue. There would be significant impacts to the trees in Alternative B. Based on the

current analysis, the trees would be removed to accommodate the depressed railroad as well as the electrified catenary cables and poles for Caltrain.