

Welcome

Broadway Grade Separation Study
City Council Meeting
January 19, 2016

Broadway Grade Separation Study



Purpose of the Project

- ❖ Improve Traffic Circulation/Mobility
 - ✓ Reducing Traffic Delays
 - ✓ Alleviate Traffic Congestion (Existing and Projected Peak Hour)
 - ✓ Improve Traffic Flow across Railroad Crossing

- ❖ Increase Public Safety (vehicular, bicycle, and pedestrian)
 - ✓ Improve Pedestrian and Bicycle Access

- ❖ Offer an Opportunity for a Gateway treatment to Broadway

- ❖ Obtain Council Feedback on Alternatives

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Community Meeting No. 1

March 11, 2015



Approximately 100 people attended

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Community Meeting No. 2

September 16, 2015



Approximately 20 people attended

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Project Area



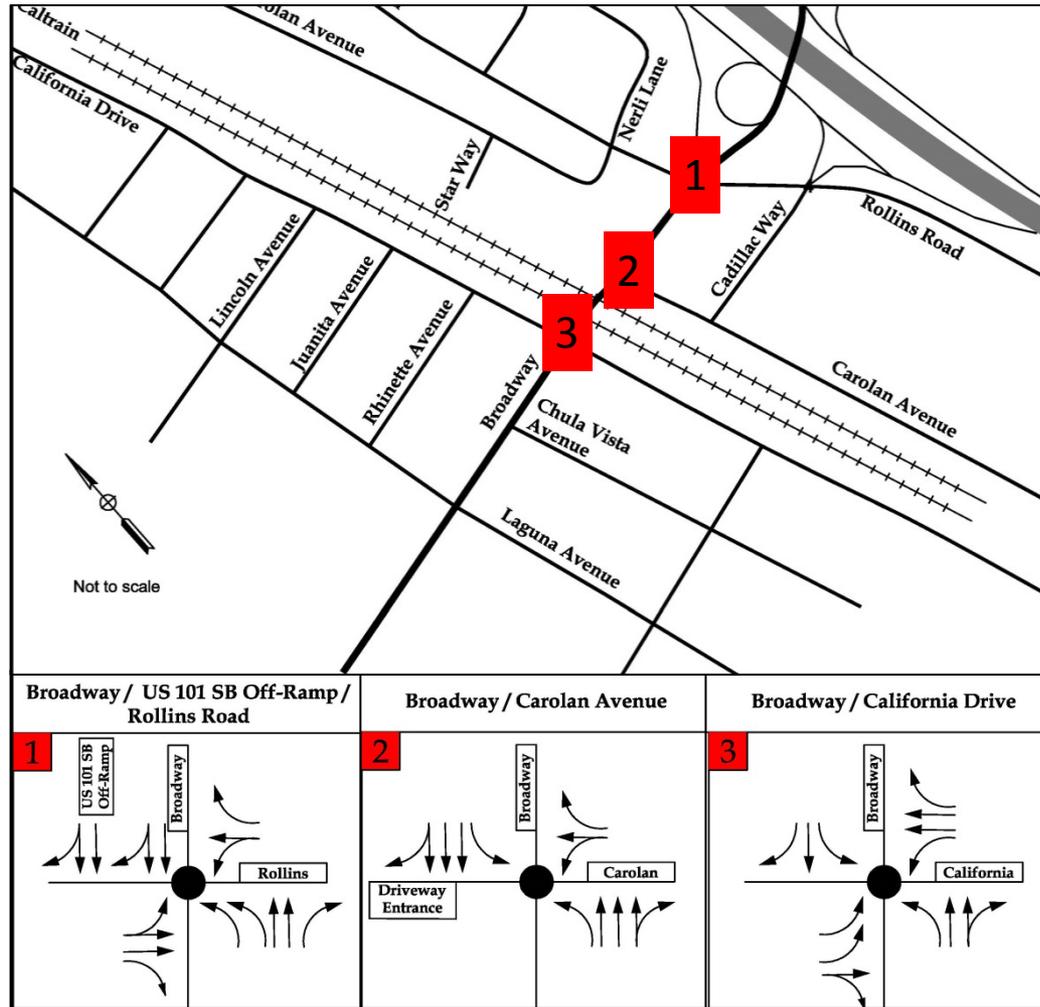
Major Constraints

- Millbrae Station to the north
- Burlingame Station to the south
- Highway 101 to the east
- Downtown Broadway Commercial District to the west
- Caltrain Operational Constraint

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Grade Separation Improvements



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Existing Condition - Traffic Delays

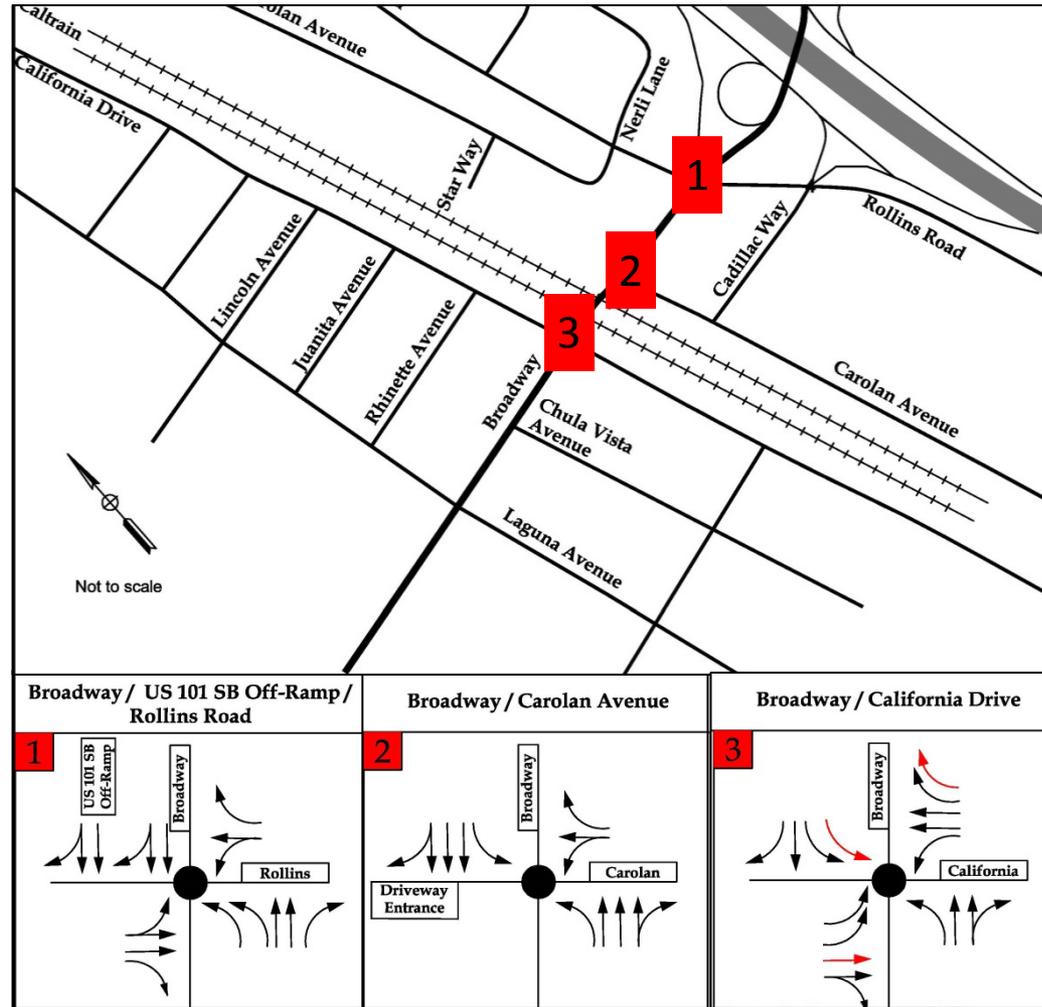
		Existing [2015] Delay		Future 2040 Delay	
Intersection	Weekday AM	Weekday PM		Weekend (Midday)	
	Delay* (sec)	Delay* (sec)		Delay* (sec)	
Broadway/US 101 Off-Ramp/ Rollins Road	65 249	243	744	153	381
Broadway/ Carolan Avenue	26 207	21	37	23	38
Broadway/ California Drive	68 550	60	452	69	431

* Average delay per vehicle

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Grade Separation Improvements



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2040 Traffic Delays

Future [2040] Delay without Grade Separation		Future 2040 with Grade Separation		
Intersection	Weekday AM	Weekday PM	Weekend (Midday)	
	Delay* (sec)	Delay* (sec)	Delay* (sec)	
Broadway/US 101 Off-Ramp/ Rollins Road	249 37	744 48	381	24
Broadway/ Carolan Avenue	207 43	37 22	38	15
Broadway/ California Drive	550 38	452 41	431	33

* Average delay per vehicle

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Travel Time Savings

- Future Caltrain Service increase weekday trains from 92 to 114 trains
- Future High Speed Rail to increase trains
- Users save 680,000 hours in annual delays

Description	Average Annual Impact	Average Annual Benefit
Travel Time Savings	680,000 hrs.	\$7,730,000

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Fuel Savings & Air Quality Benefits

- Reduction of 395,000 ga/yr of idling fuel use
- \$805,000/yr cost savings for drivers
- Greenhouse gas emissions and criteria air pollutants emission reductions valued at \$116,000

Description	Average Annual Impact	Average Annual Benefit
Fuel Use Savings	395,000 gal	\$805,000
GHG Emission Reduction	4,736,000 lbs	\$85,000
CAP Emission Reduction	22,000 lbs	\$31,000
EMMISSIONS BENEFITS		\$116,000

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Safety Benefits

Accidents

- Average of 23 accidents per year at the adjacent Broadway intersections – 7 with injuries.
- Total accident cost estimated to be \$970,000

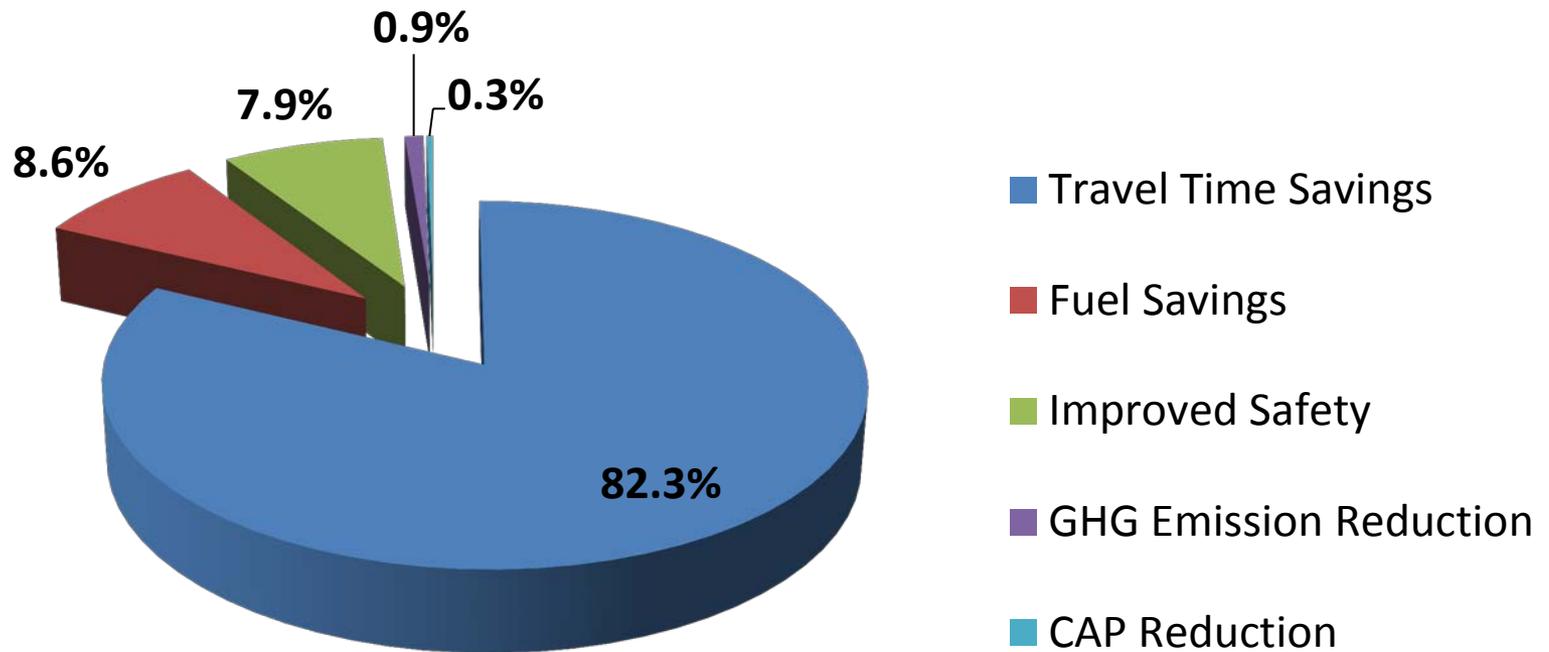
Emergency Response

- Reduced response times for police
- Reduced response times for emergency services

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Distribution of Quantified Benefits



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Alternative Analysis

- 6 Alternatives Evaluated
- Preliminary Costs Range from \$235M to \$705M

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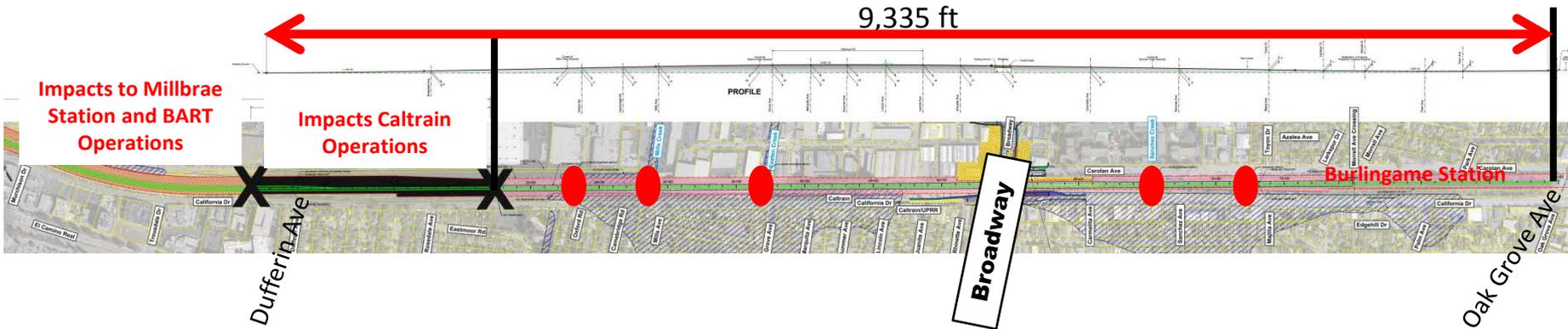
Alternative F

Order of Magnitude Cost
\$510M



Rail Fully Elevated and Roadway At-Grade

Maximum Fill Height = 29 ft



Impacts to Millbrae Station and BART Operations

Impacts Caltrain Operations

Burlingame Station

Major Constraints and Cons:

- Impacts to Caltrain Operations
- Impacts to Millbrae Station and BART Operations
- Requires significant Caltrain track closure for construction
- Significant Visual Impact

Major Constraints and Cons:

- Complex construction
- Significant impact to Caltrain operations
- Ripple-effect on railroad likely to cause impacts to Millbrae Station and BART operations
- Temporary Closure of Broadway
- Eliminates Broadway Parking Lot
- Impacts to existing utilities

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Alternative E

Order of Magnitude Cost
\$705M



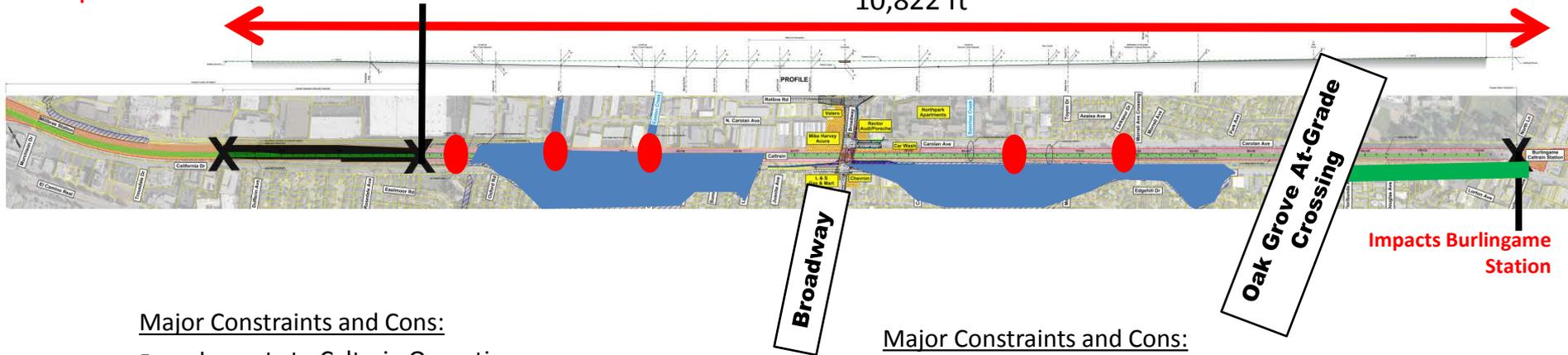
Maximum Excavation Depth = 33 ft

Rail Fully Depressed and Roadway At-Grade

Impacts to Millbrae Station and BART Operations

Impacts Caltrain Operations

10,822 ft



Major Constraints and Cons:

- Impacts to Caltrain Operations
- Impacts to Millbrae Station and BART Operations
- Impacts to Burlingame Station
- Caltrans closure required for construction
- Major flooding issues
- Tree removal
- Impacts Oak Grove At-Grade Crossing

Major Constraints and Cons:

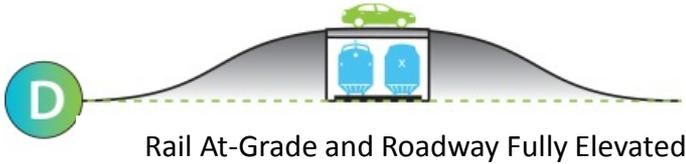
- Impacts to historic Burlingame Station
- Impacts to existing utilities and infrastructure
- Difficult construction
- Significant impact to Caltrain operations
- Ripple-effect on railroad likely to cause impacts to Millbrae Station and BART operations
- Extremely high long-term maintenance costs

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Alternative D

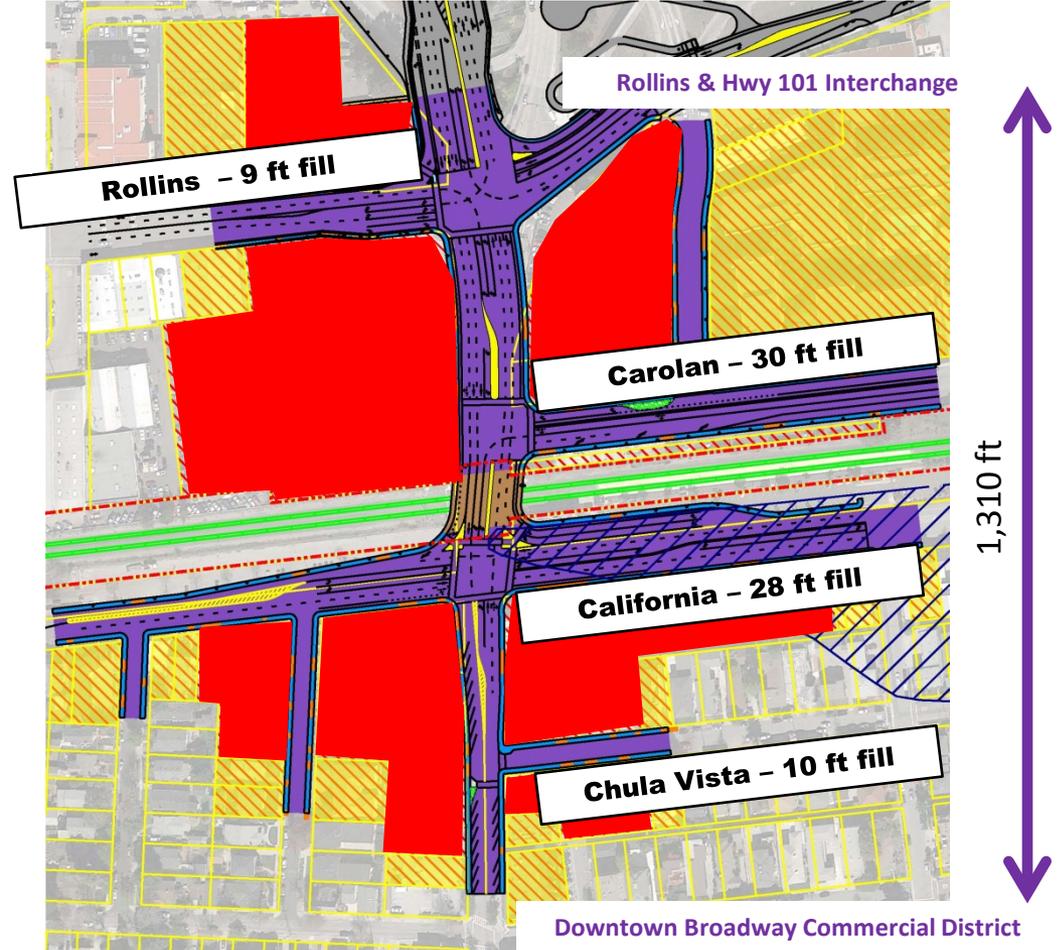
Order of Magnitude Cost
\$275M



Maximum Fill Height = 32 ft

Major Constraints & Cons

- Significant profile modification to Broadway, California, Carolan and Rollins
- Significant property takes
- Severe impact to adjacent business and residences
- Visual Impacts
- Significantly impacts to Broadway Station Access
- Eliminates Broadway Station Parking
- Significant impact to existing utilities
- Complex construction staging

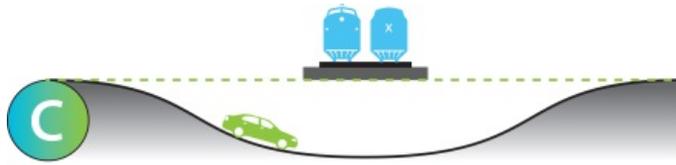


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Alternative C

Order of Magnitude Cost
\$240M



Rail At-Grade and Roadway Fully Depressed

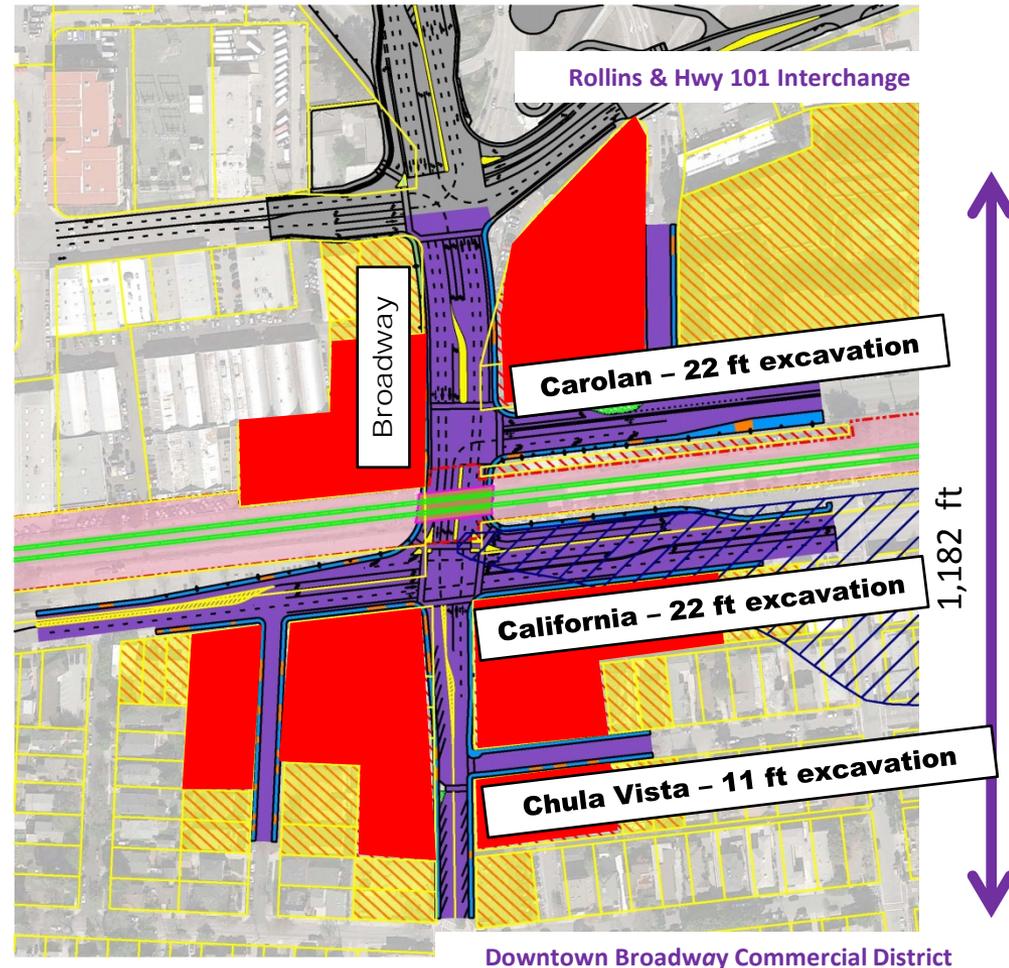
Maximum Excavation Depth = 28 ft

Pro

- Reduced visual impact

Major Constraints & Cons

- Significant profile modification to Broadway, California, Carolan and Rollins
- Significant property takes
- Severe impact to adjacent business and residences
- Significantly impacts Broadway Station Access
- Eliminates Broadway Station Parking
- Significant impact to existing utilities
- Construction staging will require lane closures
- RR structure will require temporary RR service outage



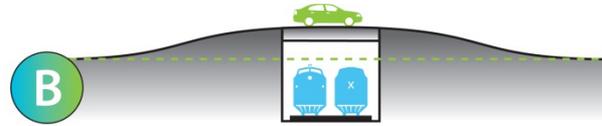
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Alternative B

Order of Magnitude Cost
\$360M

No Impact to Caltrain Operational Constraint, Millbrae Station or BART Operations

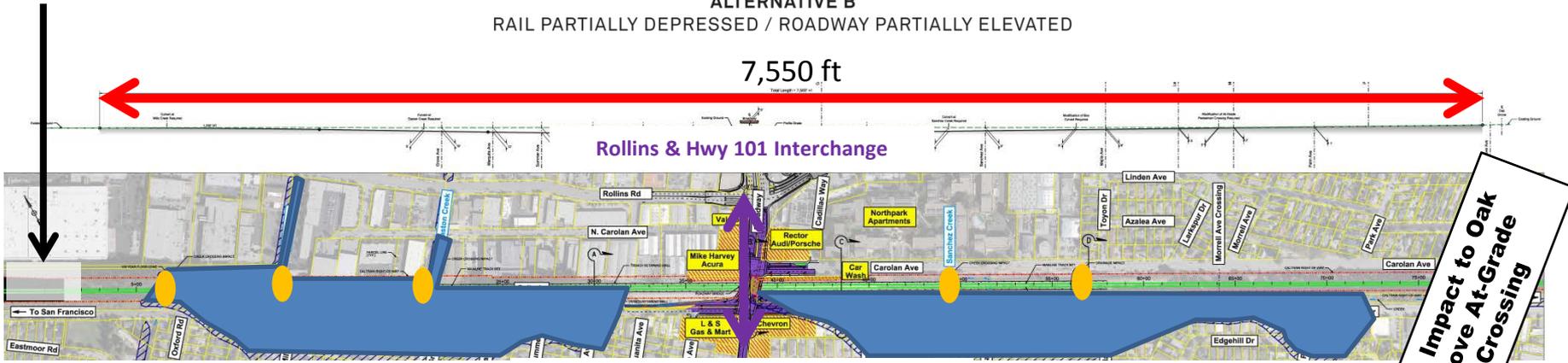


Maximum Rail Excavation Depth = 17 ft
Maximum Roadway Fill Height = 18 ft

ALTERNATIVE B
RAIL PARTIALLY DEPRESSED / ROADWAY PARTIALLY ELEVATED

7,550 ft

Rollins & Hwy 101 Interchange



Downtown Broadway Commercial District

Pros:

- No Impacts Caltrain Operational Constraint
- No impacts to Millbrae Station or BART Operations
- Minimized impacts to Downtown Broadway Commercial District and Rollins / Hwy 101 Interchange
- Minimizes Right-of-Way Takes
- Minimal Visual Impact
- Maintains existing Oak Grove Crossing

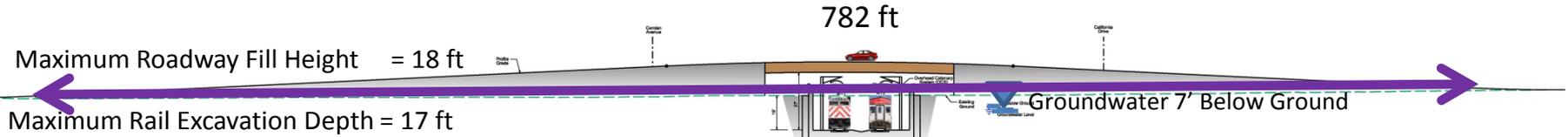
Cons:

- High groundwater will require cutoff wall construction required along railroad corridor – significant impact to natural creeks and drainage facilities – potential flooding issues
- Complex construction staging
- Impacts to existing utilities and infrastructure

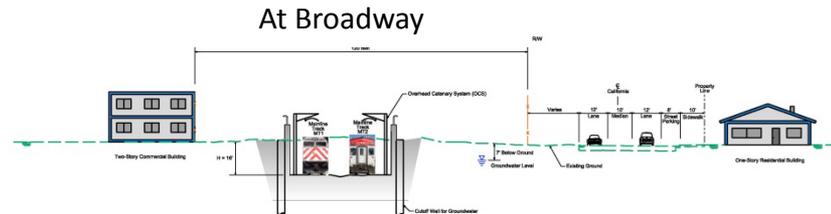
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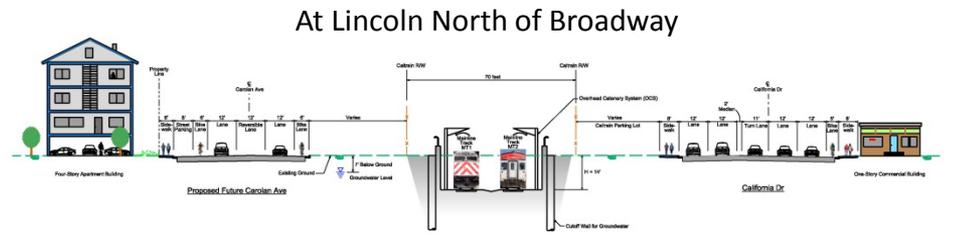
Alternative B – Sectional Views



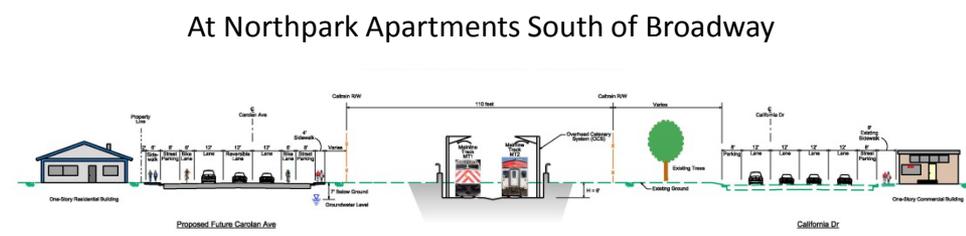
Excavation Depth = 16 ft



Excavation Depth = 13 ft



Excavation Depth = 6 ft



At Toyon Drive South of Broadway

Broadway Grade Separation Study



Alternative A

Order of Magnitude Cost
\$235M



A

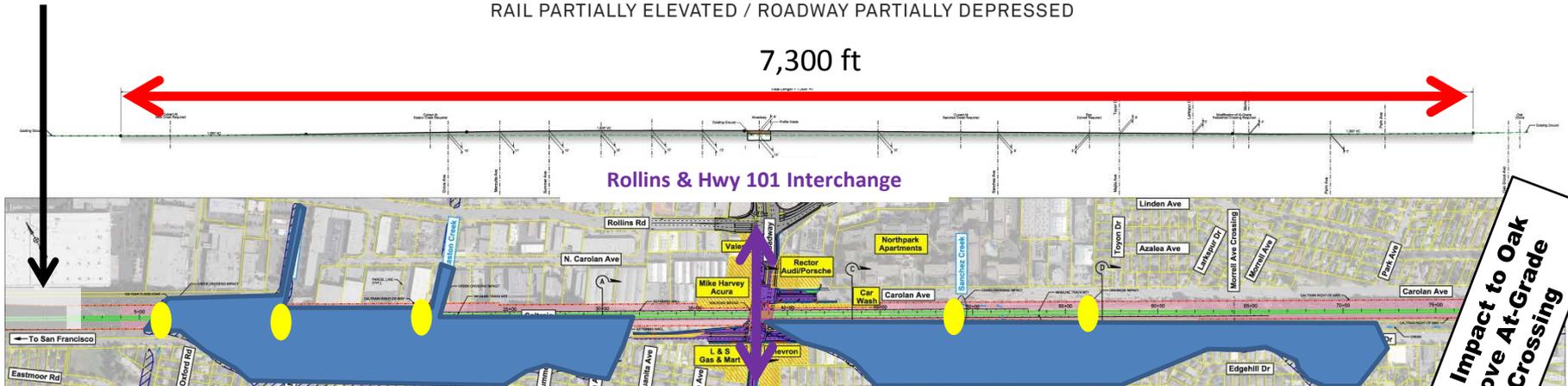
ALTERNATIVE A
RAIL PARTIALLY ELEVATED / ROADWAY PARTIALLY DEPRESSED

7,300 ft

Maximum Rail Fill Height = 13 ft

Maximum Roadway Excavation Depth = 13 ft

No Impacts to Caltrain
Operational Constraint, Millbrae
Station or BART Operations



Downtown Broadway Commercial District

No Impact to Oak
Grove At-Grade
Crossing

Pros:

- No Impacts to Caltrain Operational Constraint
- No Impacts to Millbrae Station and BART Operations
- Minimized impacts to Downtown Broadway Commercial District
- Minimizes Right-of-Way Takes
- Reduced Visual Impact
- No Impacts to Oak Grove At-grade Crossing

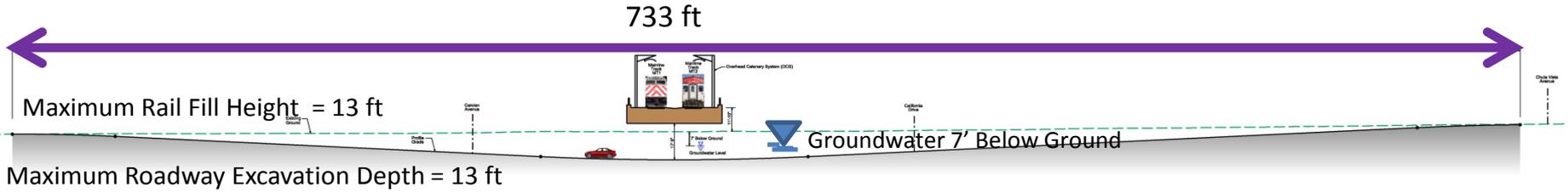
Cons:

- High groundwater will require cutoff wall construction – only required around Broadway area
- Complex construction staging
- Impacts to existing utilities and infrastructure

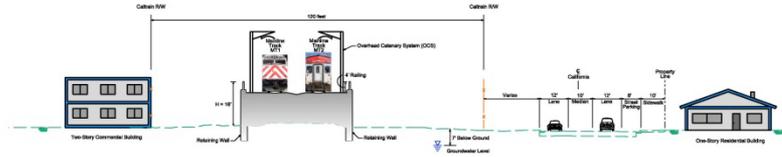
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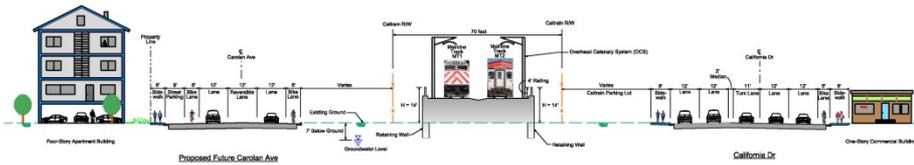
Alternative A – Sectional View



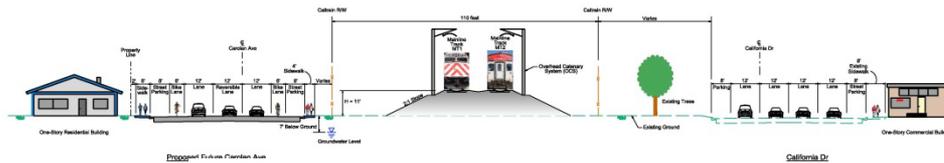
At Broadway



At Lincoln North of Broadway



At Northpark Apartments South of Broadway



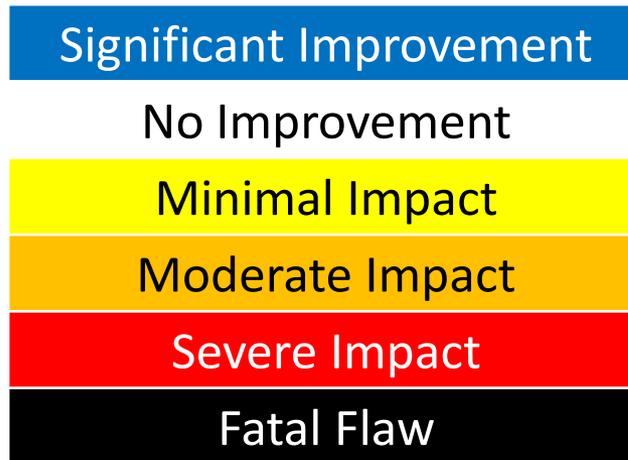
At Toyon Drive South of Broadway

Broadway Grade Separation Study



Impact Matrices

- Color coded rating system
- Ratings based on qualitative assessment and quantitative assessment



Broadway Grade Separation Study



Impact Matrices

- Impacts grouped by category:
 - Environmental
 - Railroad Operations
 - Users
 - Local Issues and Right-of-Way

Environmental

	F	E	D	C	B	A
Alternatives F → A						
Greenhouse Gas Emissions	Blue	Blue	Blue	Blue	Blue	Blue
Criteria Air Pollutants	Blue	Blue	Blue	Blue	Blue	Blue
Noise	Red	Yellow	Yellow	White	Yellow	Orange
Groundwater	Orange	Red	White	Orange	Red	Orange
Eucalyptus Tree Removal	Red	Red	White	White	White	White
Historic Structures	Orange	Red	Yellow	Yellow	White	White
Aesthetics	Red	Yellow	Red	White	Yellow	Yellow

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Railroad Operations

	F	E	D	C	B	A
Alternatives F → A						
Service Outage During Construction	Red	Red	Yellow	Yellow	Yellow	Yellow
Burlingame Station Closure	Red	Orange	Yellow	Yellow	Yellow	Yellow
Caltrain Operational Impacts	Black	Black	Yellow	Yellow	Yellow	Yellow
Long Term Maintenance	Yellow	Red	Yellow	Yellow	Orange	Orange
Accommodates Broadway Station	Black	Black	Yellow	Yellow	Orange	Orange
Caltrain Electrification	Red	Red	Yellow	Yellow	Orange	Orange
Accommodates HSR	Red	Red	Yellow	Yellow	Orange	Orange
Existing Pedestrian Xing at Morrell	Red	Red	Yellow	Yellow	Orange	Orange
Potential for Other Pedestrian Xings	Red	Red	Yellow	Yellow	Orange	Orange

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Users

	F	E	D	C	B	A
Alternatives F → A						
Safety	Blue	Blue	Blue	Blue	Teal	Teal
Community Connectivity	Blue	Blue	Blue	Blue	Teal	Teal
Pedestrian & Bike Access	Blue	Blue	Blue	Blue	Teal	Teal
Fuel Use	Blue	Blue	Blue	Blue	Teal	Teal
Reliability	Blue	Blue	Blue	Blue	Teal	Teal
Traffic Delays (During Construction)	Yellow	Orange	Black	Black	Yellow	Yellow
Traffic Delays (After Construction)	Blue	Blue	Blue	Blue	Teal	Teal

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Local Issues & Right-of-Way

Alternatives F → A	F	E	D	C	B	A
						
Parcels with Potential R/W Issues	1	1	23	21	19	15
Parcels with R/W Takes	7	7	39	32	0	0
Traffic in Local Neighborhoods						
Business Disruption (During Construction)						
Resident Disruption (During Construction)						
Existing Utility Infrastructure						
Flooding & Groundwater Issues						

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Impact Matrix Summary

	F	E	D	C	B	A
Alternatives F → A						
Environmental	Red	Red	Yellow	Yellow	Yellow	Yellow
Railroad Operations	Black	Black	Yellow	Yellow	Orange	Orange
Users	Blue	Blue	Red	Red	Blue	Blue
Local & Right-of-Way Issues	Yellow	Yellow	Black	Black	Yellow	Yellow
Order of Magnitude Cost	\$510M	\$705M	\$275M	\$240M	\$360M	\$235M



Only Alternatives without Fatal Flaws

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3D Animation of Alternative A

BROADWAY GRADE SEPARATION STUDY

Broadway Grade Separation Study



Next Steps

- 3rd Public Outreach Meeting in February/March 2016
- Complete Project Study Report (PSR) in March 2016
- Follow-up City Council Presentation in April 2016

For More Information:

Visit Us at: www.burlingame.org/broadwaygradesep

Email Us at: broadwaygradesep@burlingame.org

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