

Appendix A: Conceptual Design Drawings, Alignment Alternatives

Appendix A: Refined Revised Rail Corridor Alignments

NOTES

KEY

APPROVED DTX ALIGNMENT

PENNSYLVANIA AVENUE ALIGNMENT

MISSION BAY ALIGNMENT

EXISTING RAIL INFRASTRUCTURE

DRAFT

CONCEPTUAL
DESIGN ONLY

ch2m



DRAWN	CHECKED	APPROVED
MJM	SDF	JS
04-22-16	04-29-16	04-29-16

CLIENT

CITY AND COUNTY OF SAN FRANCISCO,
PLANNING DEPARTMENT

PROJECT

SF RAILYARD ALTERNATIVES AND I-280
BOULEVARD FEASIBILITY STUDY

TITLE

KEY PLAN
CORRIDOR ALIGNMENTS

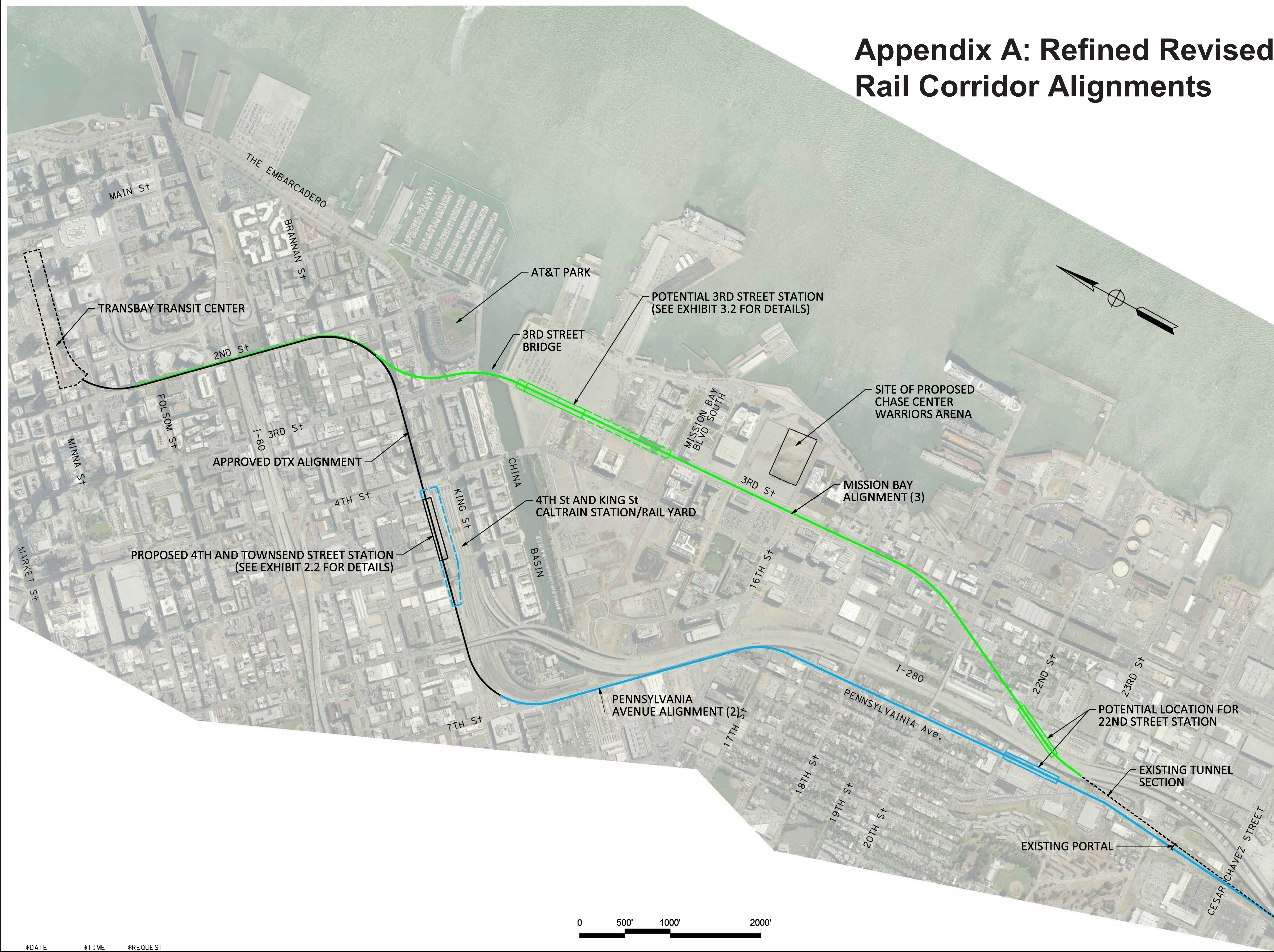
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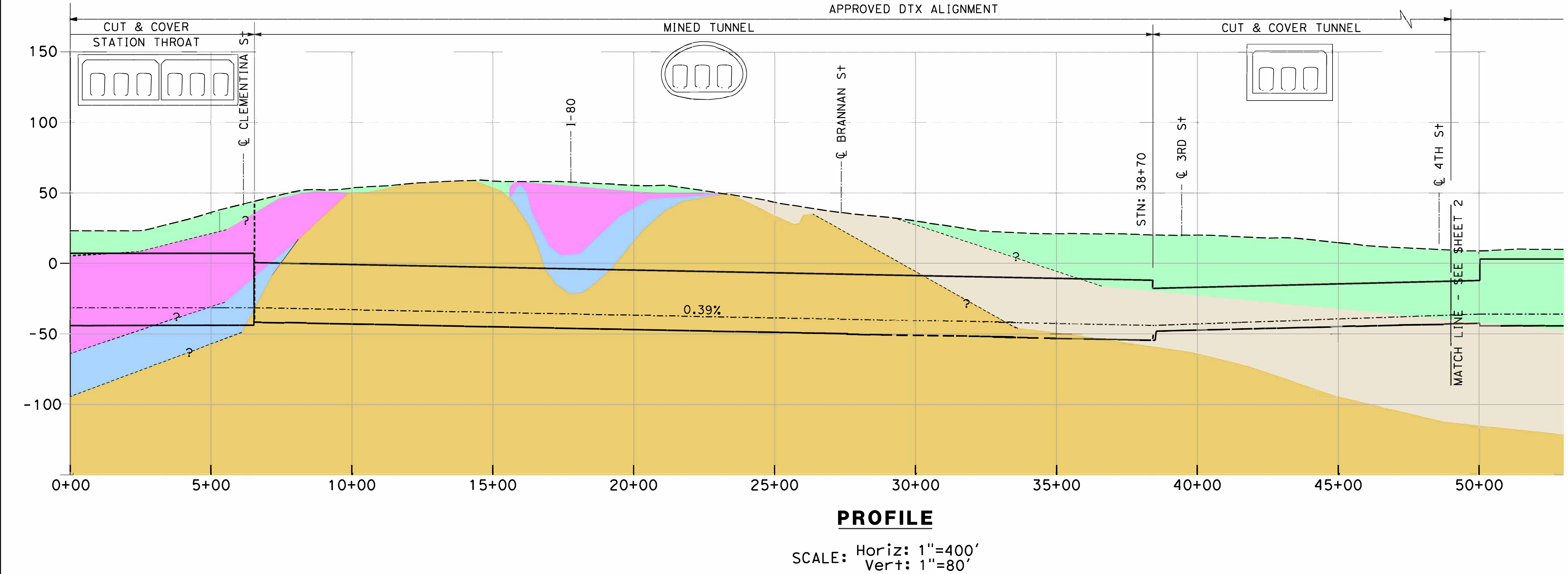
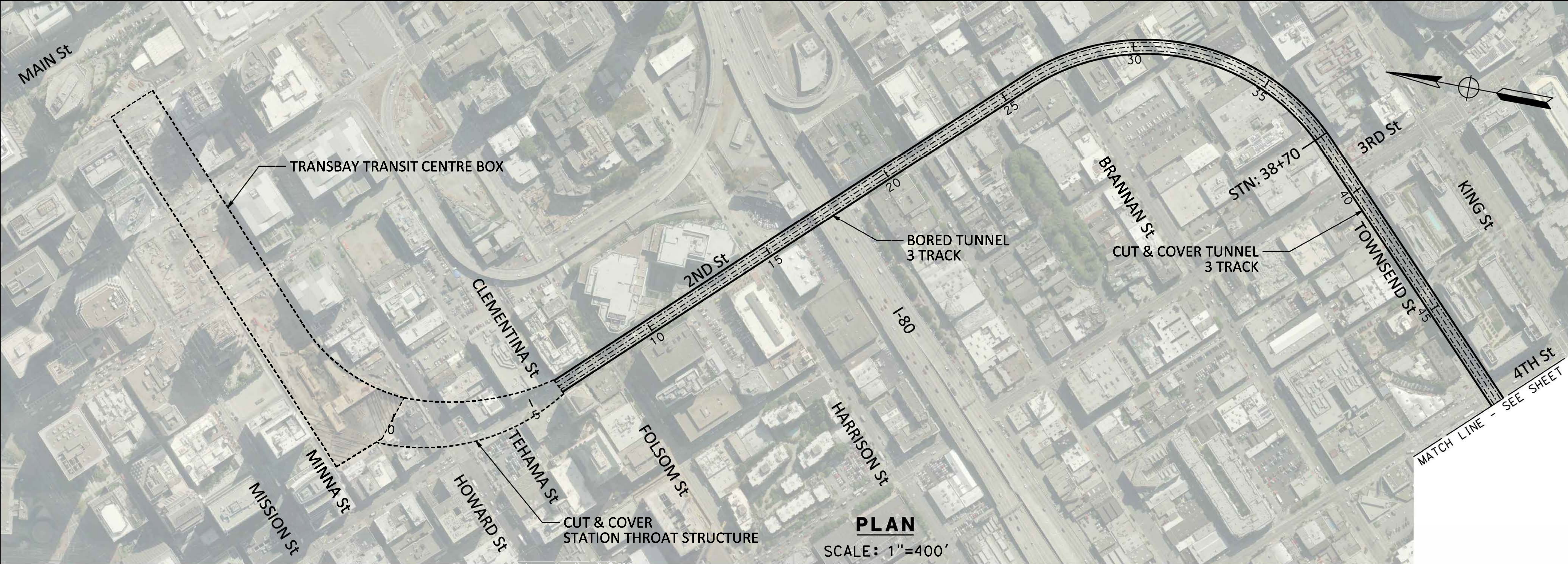
EXHIBIT 1.0

STATUS

IN PROCESS, FOR DISCUSSION ONLY

SCALE	REV
AS SHOWN AT 11" X 17"	A





NOTES
1. THE STRATIGRAPHY SHOWN IS BASED ON LIMITED INFORMATION AVAILABLE AT TIME OF STUDY AND MAY CHANGE WITH ACTUAL GROUND INVESTIGATION.
2. VENTILATION AND FIRE LIFE SAFETY REQUIREMENTS HAVE NOT BEEN CONSIDERED AS PART OF THIS STUDY.

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DESIGN ONLY

GEOLOGICAL KEY:
---?--- ASSUMED BOUNDARY
ARTIFICIAL FILL
YOUNGER BAY MUD
UPPER LAYERED SEDIMENTS
OLD BAY CLAY
LOWER LAYERED SEDIMENTS
SLOPE DEBRIS/RAVINE FILL
FRANCISCAN COMPLEX BEDROCK

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MJM	SDF	JS
06-03-16	06-03-16	06-09-16

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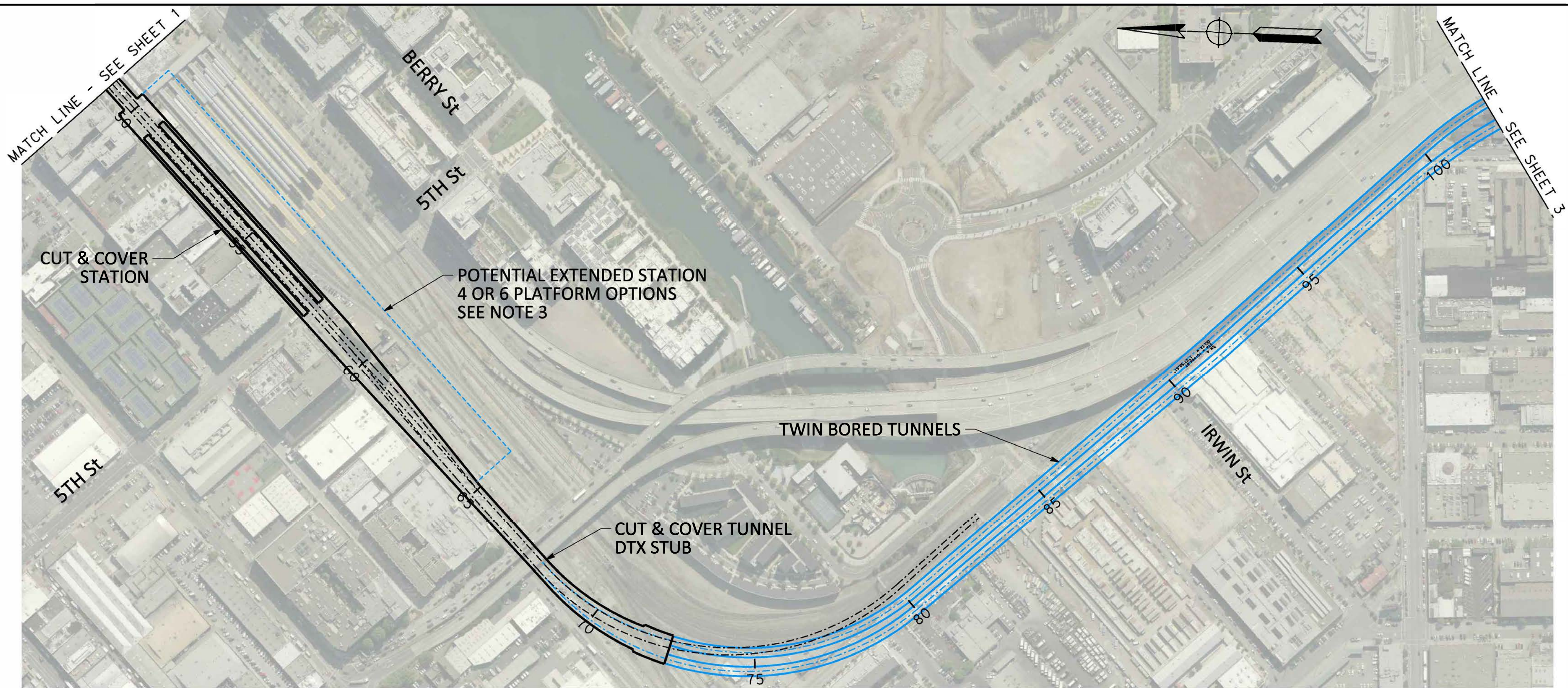
PROJECT
SF RAILYARD ALTERNATIVES AND I-280
BOULEVARD FEASIBILITY STUDY

TITLE
ALIGNMENT 2: PENNSYLVANIA AVENUE
PLAN AND PROFILE

DRAWING NUMBER
EXHIBIT 2.1

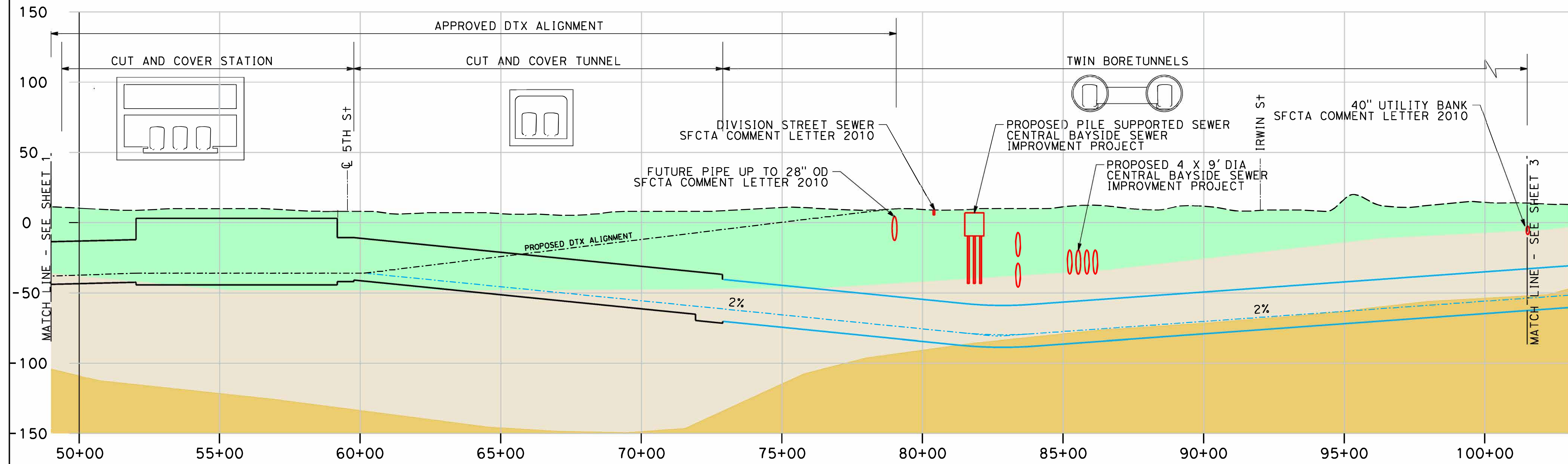
STATUS
IN PROCESS, FOR DISCUSSION ONLY

SCALE	REV
AS SHOWN AT 11" X 17"	A



PLAN

SCALE: 1"=400'



PROFILE

SCALE: Horiz: 1"=400'
Ver+: 1"=80'

NOTES

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- 2. VENTILATION AND FIRE LIFE SAFETY REQUIREMENTS HAVE NOT BEEN CONSIDERED AS PART OF THIS STUDY.
- 3. ASSUMES RELOCATION OF EXISTING RAILYARD. REFER TO EXHIBITS 4.1 & 4.2 FOR STATION ARRANGEMENT WITH 4 AND 6 PLATFORMS. REFER TO PROJECT REPORT FOR RAILYARD RELOCATION PROPOSALS.

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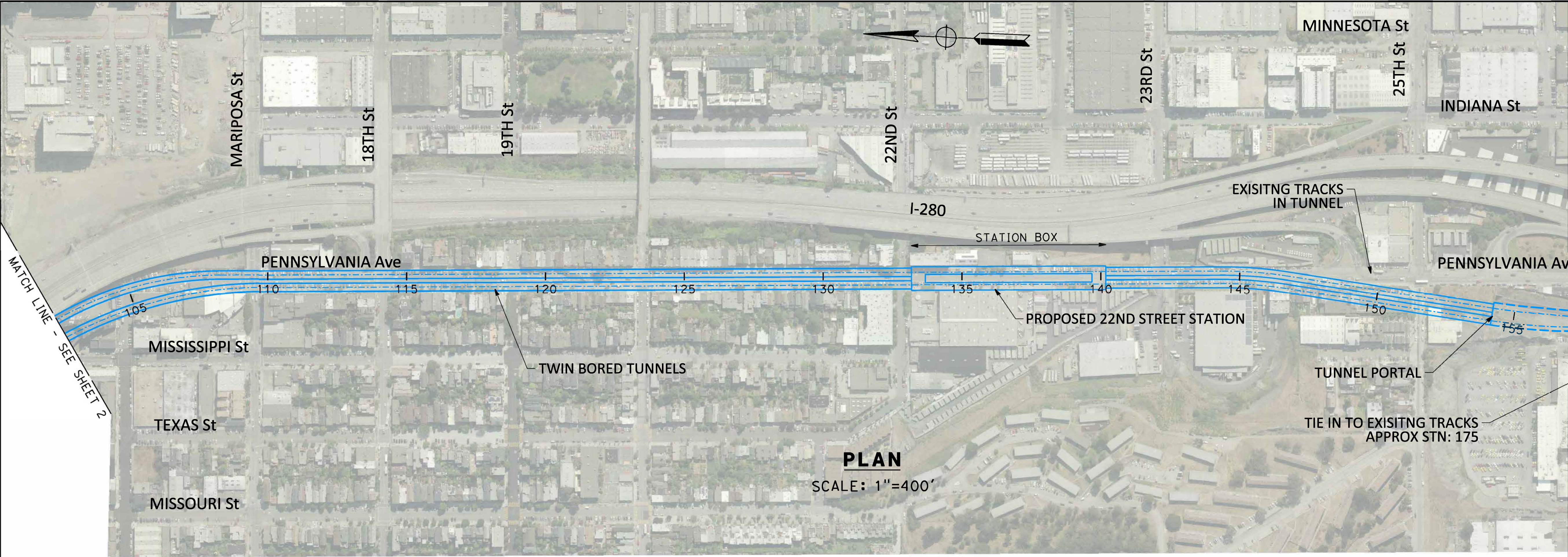
GEOLOGICAL KEY:

- ?--- ASSUMED BOUNDARY
- ARTIFICIAL FILL
- YOUNGER BAY MUD
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- OLD BAY CLAY
- LOWER LAYERED SEDIMENTS
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- FRANCISCAN COMPLEX BEDROCK

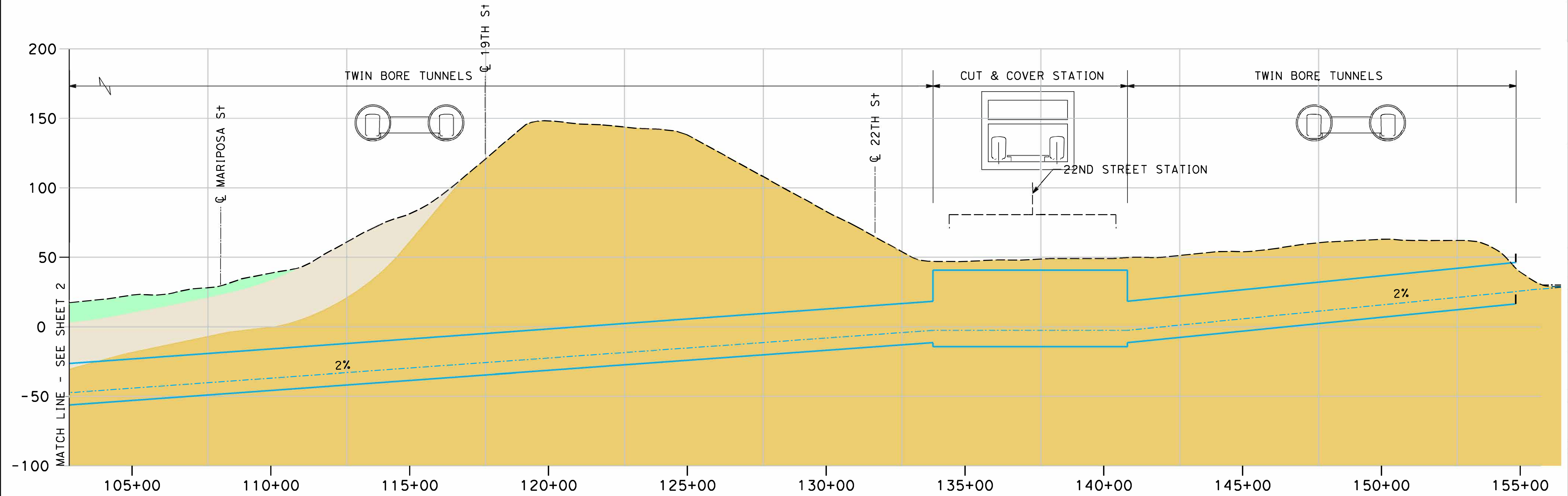
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MJM	SDF	JS
06-03-16	06-03-16	06-09-16
CLIENT		
CITY AND COUNTY OF SAN FRANCISCO, PLANNING DEPARTMENT		
PROJECT		
SF RAILYARD ALTERNATIVES AND I-280 BOULEVARD FEASIBILITY STUDY		
TITLE		
ALIGNMENT 2: PENNSYLVANIA AVENUE PLAN AND PROFILE		
DRAWING NUMBER		
EXHIBIT 2.2		
STATUS		
IN PROCESS, FOR DISCUSSION ONLY		
SCALE	REV	
AS SHOWN AT 11" X 17"	A	



PLAN
SCALE: 1"=400'



PROFILE
SCALE: Horiz: 1"=400'
Vert: 1"=80'

NOTES

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2. VENTILATION AND FIRE LIFE SAFETY REQUIREMENTS HAVE NOT BEEN CONSIDERED AS PART OF THIS STUDY.
3. 22ND STREET STATION LOCATION AND DEPTH ARE INDICATIVE ONLY. REQUIRES FURTHER INVESTIGATION.

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CONCEPTUAL
DESIGN ONLY

GEOLOGICAL KEY:

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CLIENT
CITY AND COUNTY OF SAN FRANCISCO,
PLANNING DEPARTMENT

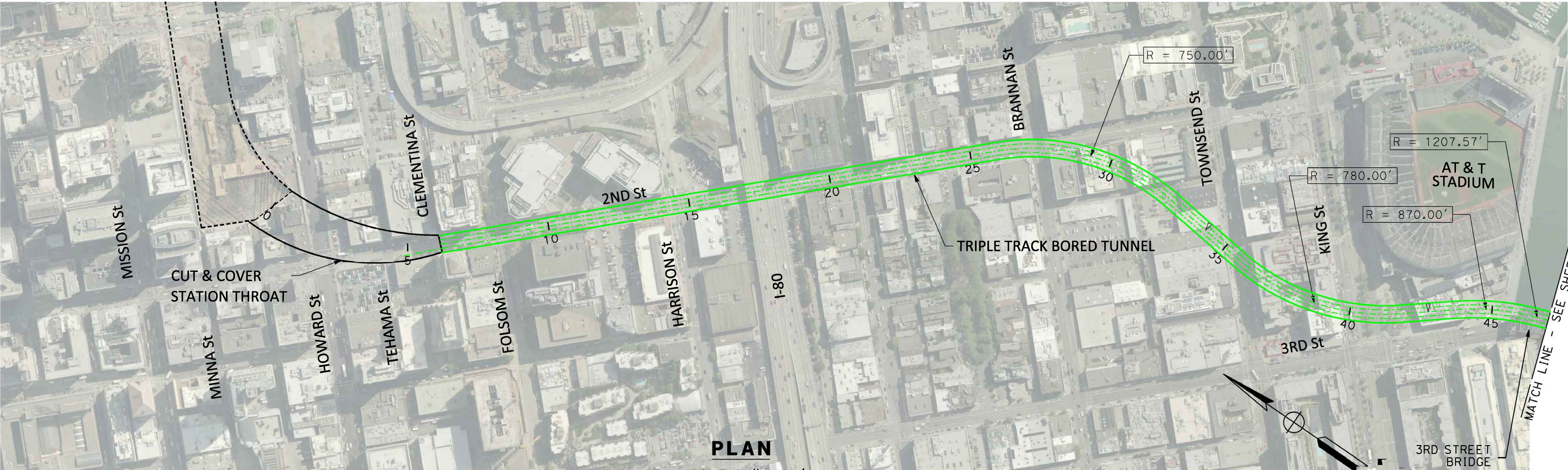
PROJECT
SF RAILYARD ALTERNATIVES AND I-280
BOULEVARD FEASIBILITY STUDY

TITLE
ALIGNMENT 2: PENNSYLVANIA AVENUE
PLAN AND PROFILE

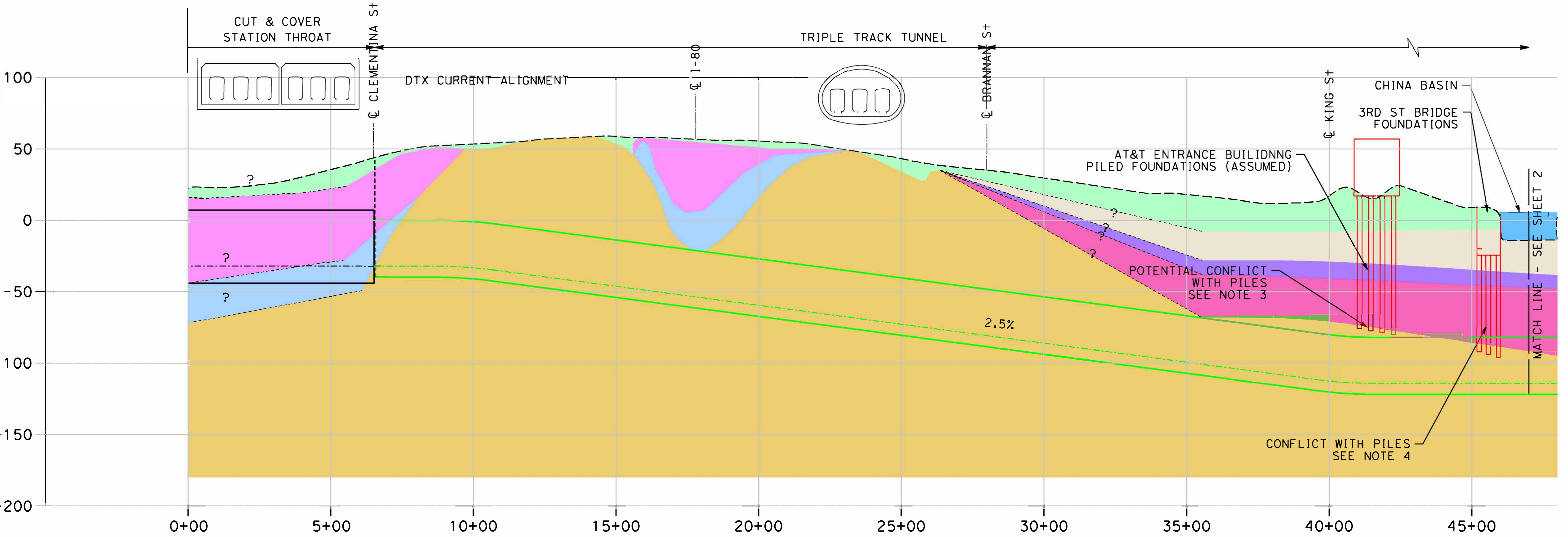
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STATUS
IN PROCESS, FOR DISCUSSION ONLY

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AS SHOWN AT 11" X 17"	A



PLAN
SCALE: 1"=400'



PROFILE
SCALE: Horiz: 1"=400'
Vert: 1"=80'

NOTES

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3. POTENTIAL CONFLICT WITH PILES TO AT&T ENTRANCE BUILDING MAY BE AVOIDED BY LOWERING ALIGNMENT ALTHOUGH BUILDING PROTECTION MEASURES WOULD BE REQUIRED.
4. CLASH WITH BRIDGE FOUNDATIONS WILL REQUIRE MAJOR PROTECTION WORKS OR COMPLETE RECONSTRUCTION.

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CONCEPTUAL
DESIGN ONLY

GEOLOGICAL KEY:

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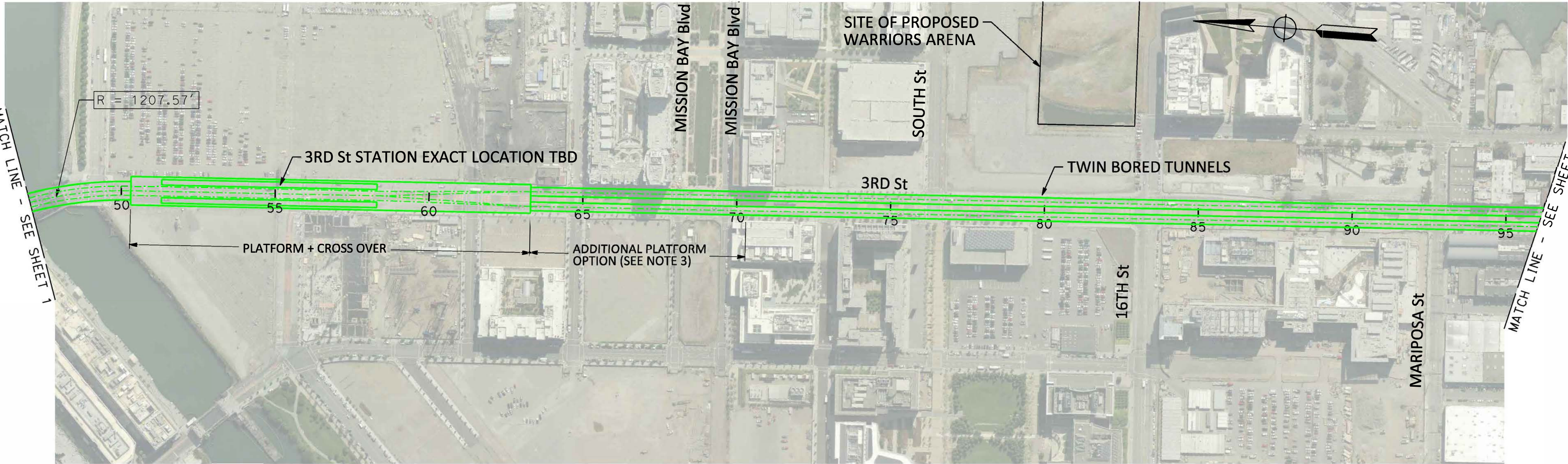
PROJECT
SF RAILYARD ALTERNATIVES AND I-280
BOULEVARD FEASIBILITY STUDY

TITLE
ALIGNMENT 3: MISSION BAY
PLAN AND PROFILE

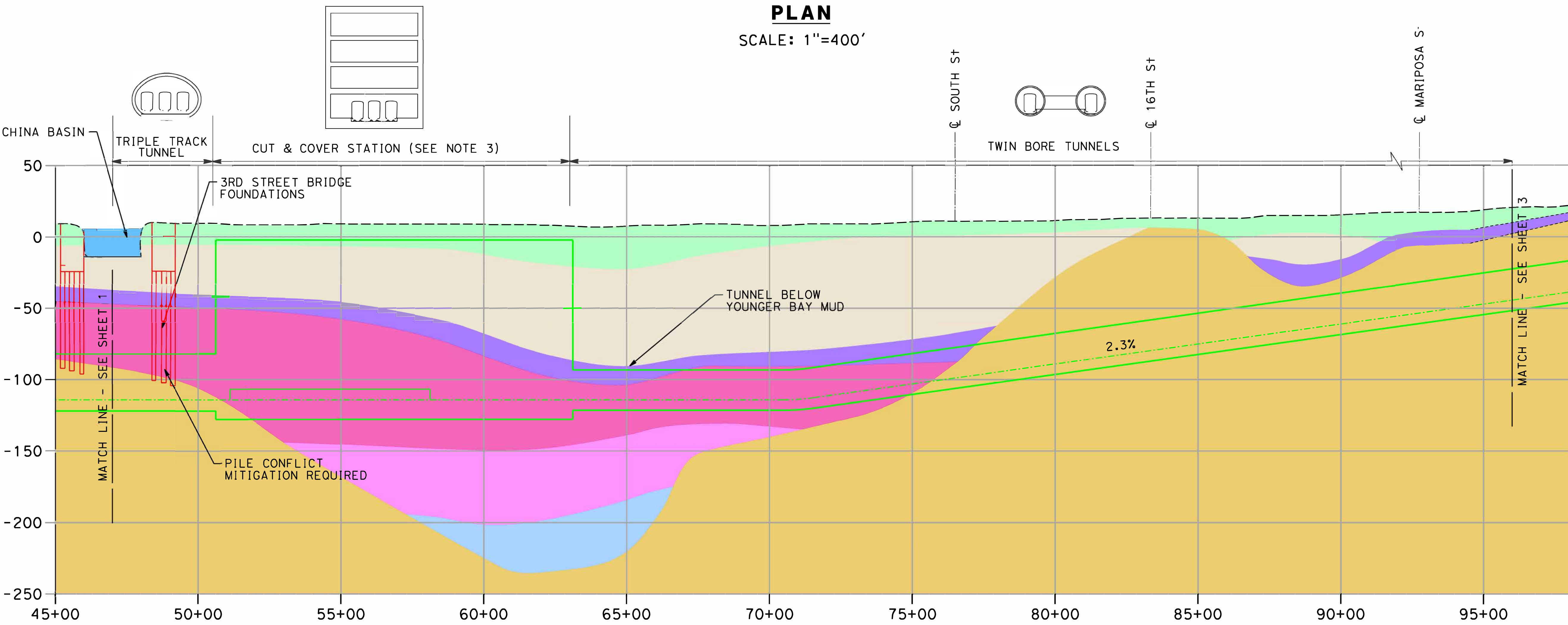
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EXHIBIT 3.1

STATUS
IN PROCESS, FOR DISCUSSION ONLY

SCALE	REV
AS SHOWN AT 11" X 17"	A



PLAN
SCALE: 1"=400'



PROFILE
SCALE: Horiz: 1"=400'
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- 3. FOR STATION DETAIL SEE EXHIBIT 5.1 AND FOR ALTERNATIVE BORED TUNNEL STATION SEE EXHIBIT 5.2. ADDITIONAL PLATFORM OPTIONS SHOWN FOR BOTH

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CONCEPTUAL
DESIGN ONLY

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MJM	SDF	JS
06-03-16	06-03-16	06-09-16

CLIENT
CITY AND COUNTY OF SAN FRANCISCO,
PLANNING DEPARTMENT

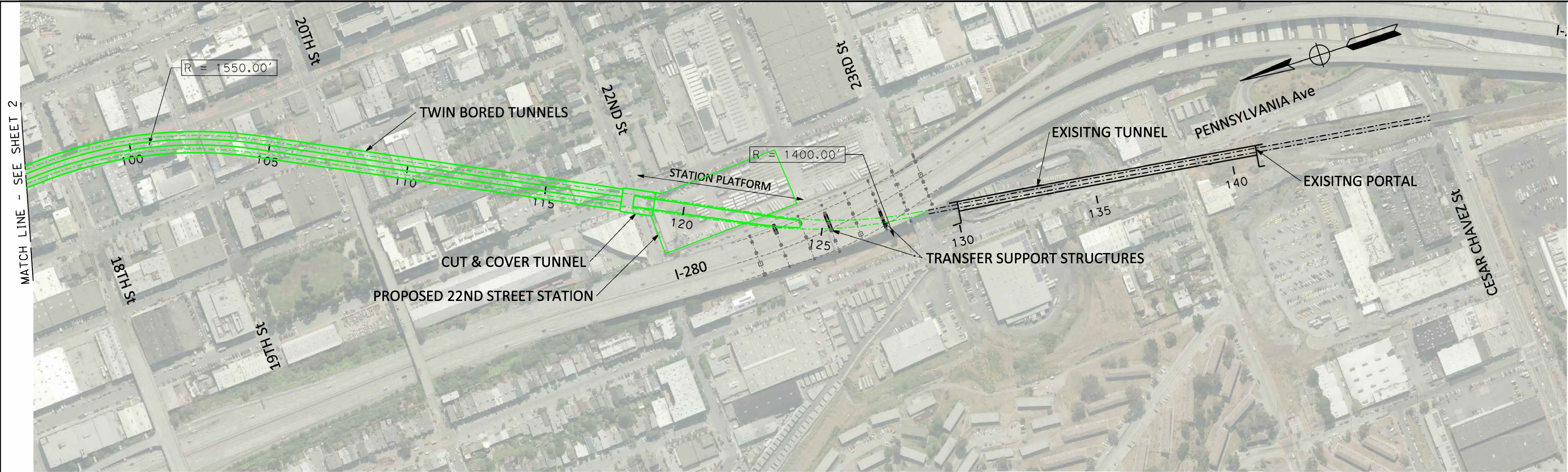
PROJECT
SF RAILYARD ALTERNATIVES AND I-280
BOULEVARD FEASIBILITY STUDY

TITLE
ALIGNMENT 3: MISSION BAY
PLAN AND PROFILE

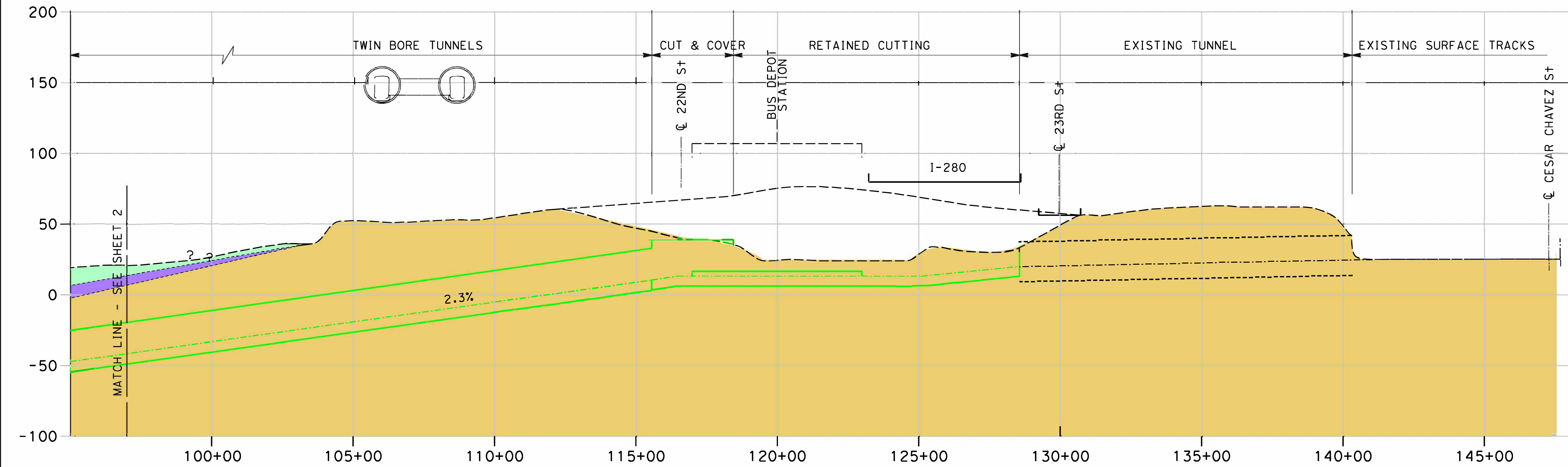
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EXHIBIT 3.2

STATUS
IN PROCESS, FOR DISCUSSION ONLY

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AS SHOWN AT 11" X 17"	A



PLAN
SCALE: 1"=400'



PROFILE
SCALE: Horiz: 1"=400'
Vert: 1"=80'

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MJM	SDF	JS
06-03-16	06-03-16	06-09-16

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PLANNING DEPARTMENT

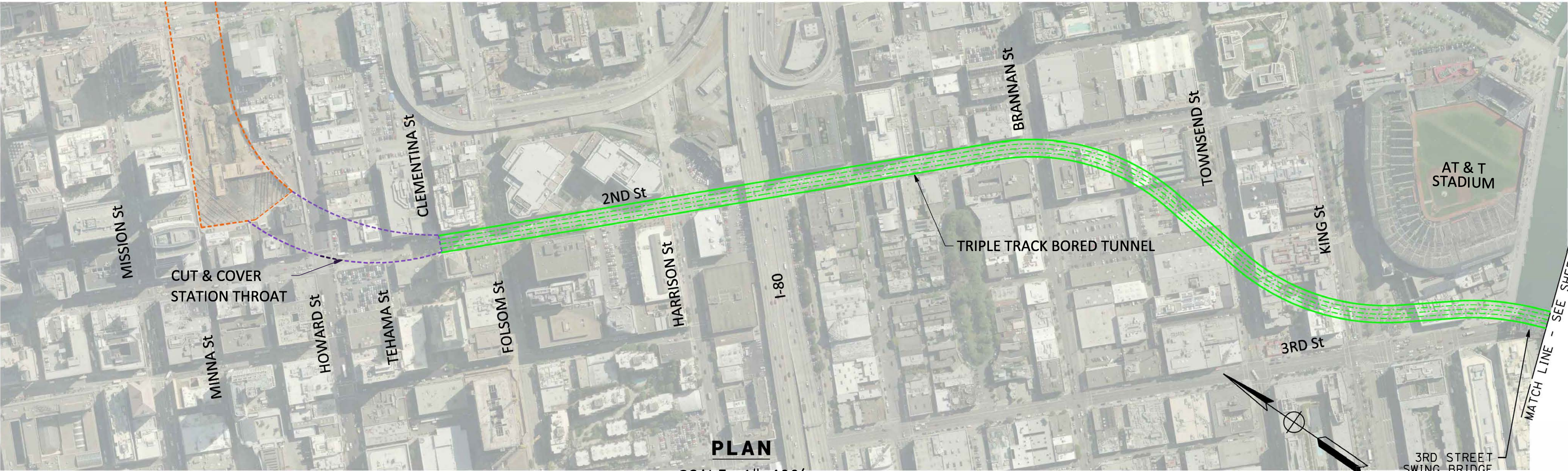
PROJECT
SF RAILYARD ALTERNATIVES AND I-280
BOULEVARD FEASIBILITY STUDY

TITLE
ALIGNMENT 3: MISSION BAY
PLAN AND PROFILE

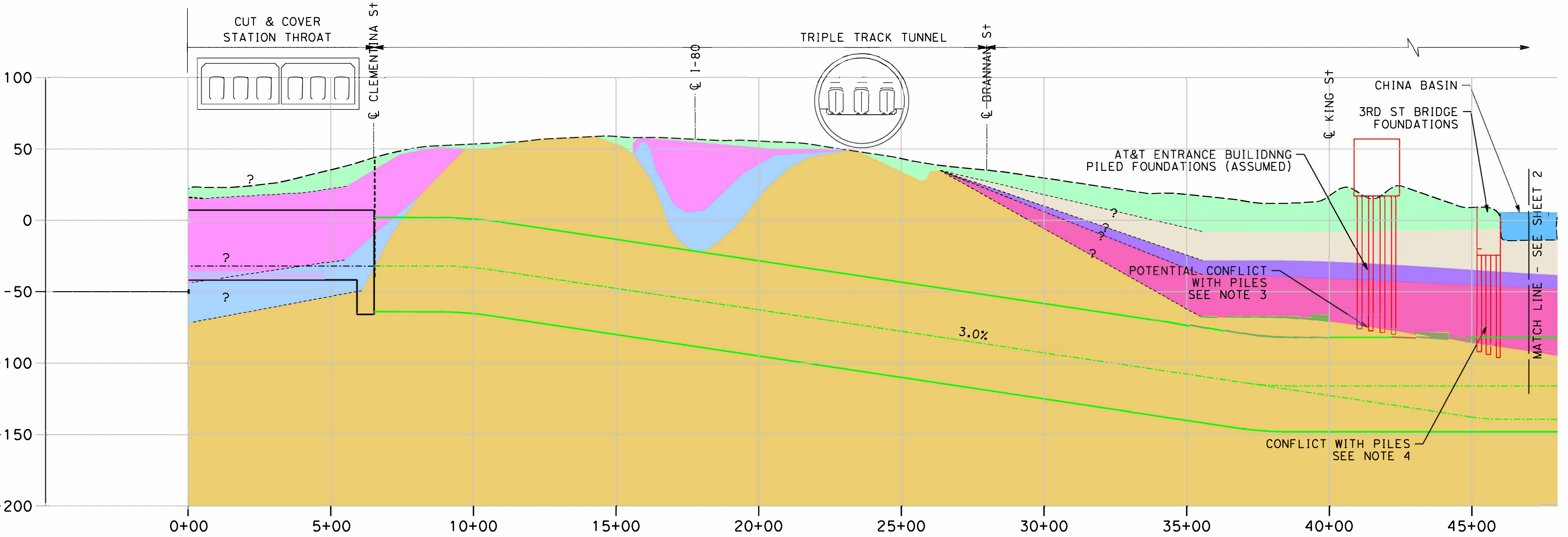
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EXHIBIT 3.3

STATUS
IN PROCESS, FOR DISCUSSION ONLY

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AS SHOWN AT 11" X 17"	A



PLAN
SCALE: 1"=400'





PROFILE
SCALE: Horiz: 1"=400'
Vert: 1"=80'

- NOTES**
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DRAWN	CHECKED	APPROVED
MJM	SDF	JS
06-03-16	06-03-16	06-09-16

CLIENT

CITY AND COUNTY OF SAN FRANCISCO,
PLANNING DEPARTMENT

PROJECT

SF RAILYARD ALTERNATIVES AND I-280
BOULEVARD FEASIBILITY STUDY

TITLE

ALIGNMENT 3: MISSION BAY
PLAN AND PROFILE

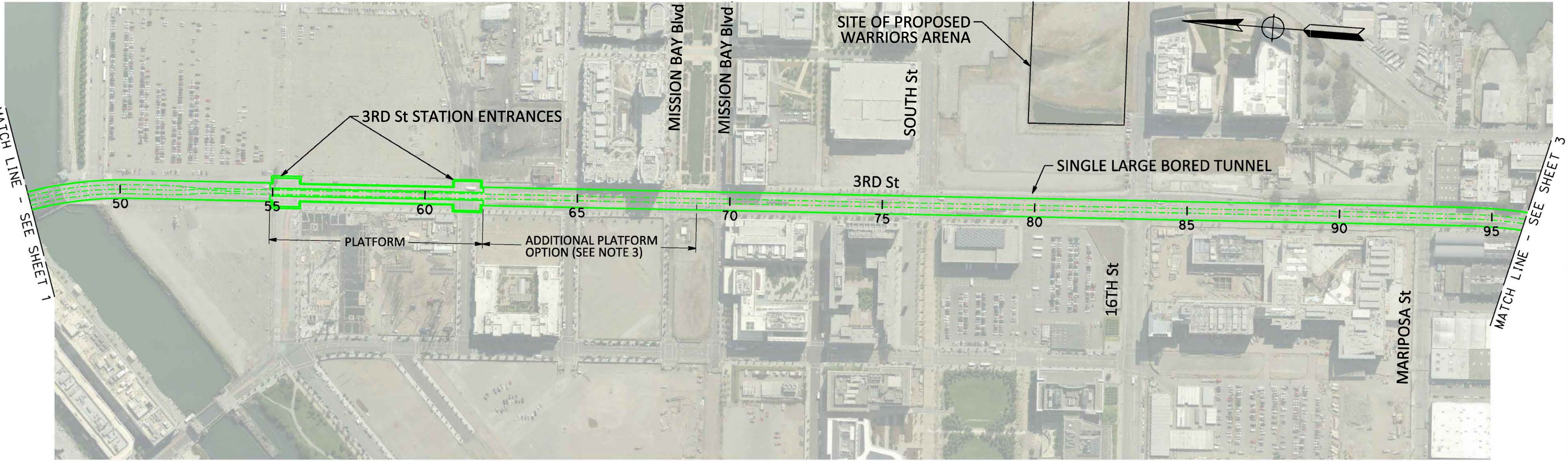
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EXHIBIT 3.1B

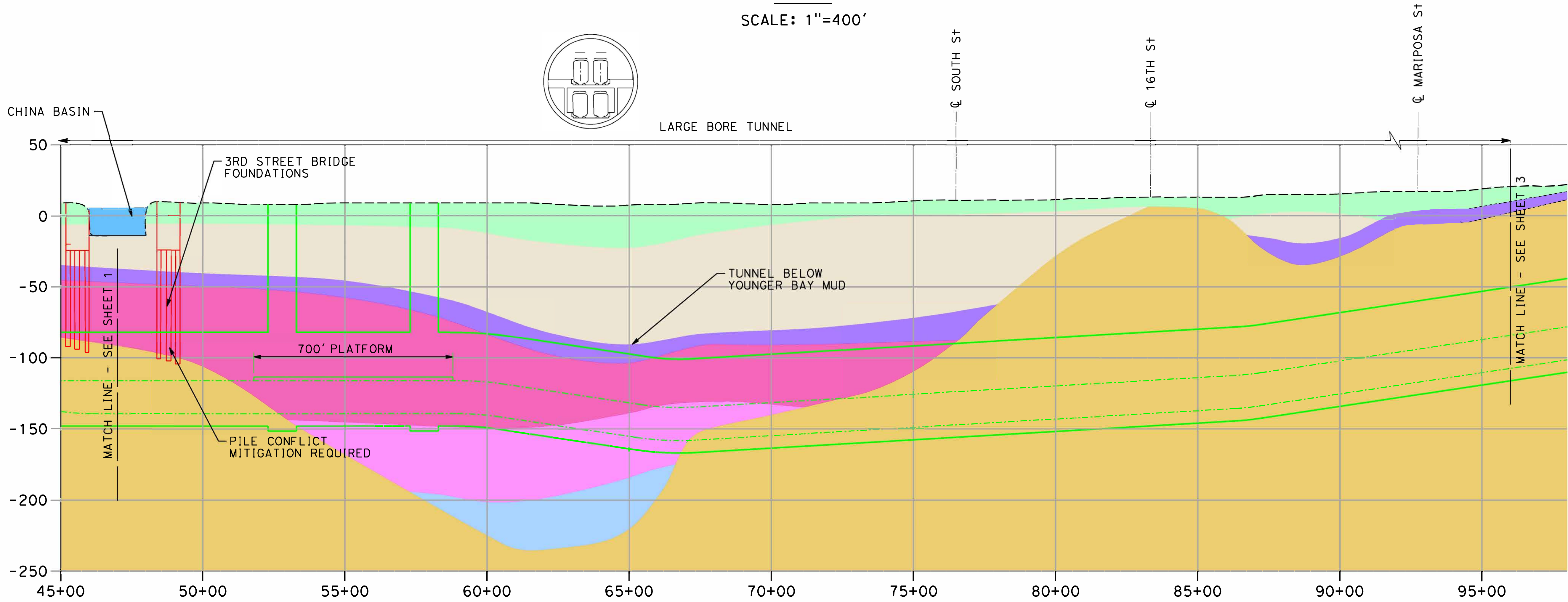
STATUS

IN PROCESS, FOR DISCUSSION ONLY

SCALE	REV
AS SHOWN AT 11" X 17"	B



PLAN
SCALE: 1"=400'



PROFILE
SCALE: Horiz: 1"=400'
Vert: 1"=80'

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3. FOR STATION DETAIL SEE EXHIBIT 5.2 AND FOR ALTERNATIVE BOX STATION SEE EXHIBIT 5.1. ADDITIONAL PLATFORM OPTIONS SHOWN FOR BOTH

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CONCEPTUAL
DESIGN ONLY

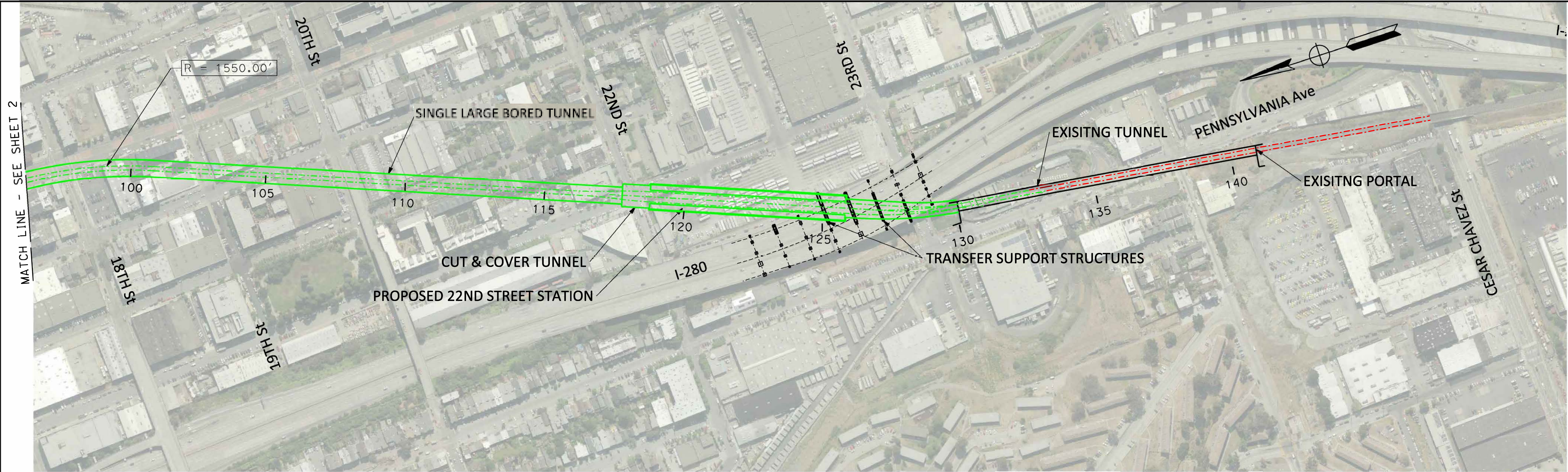
GEOLOGICAL KEY:

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ch2m

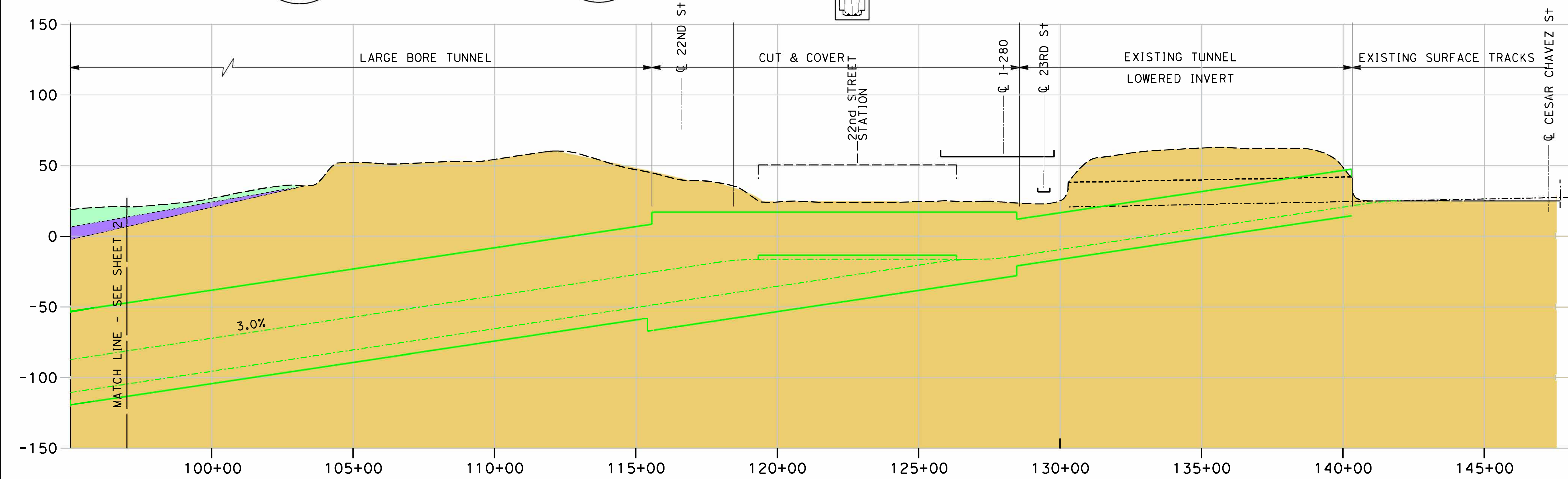
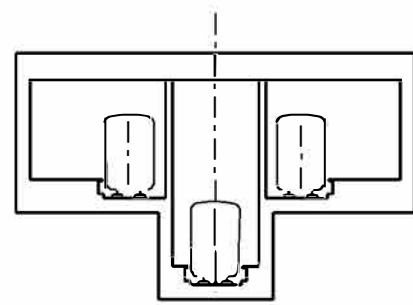
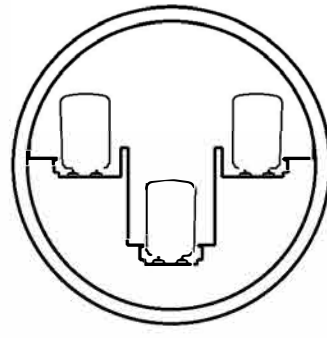
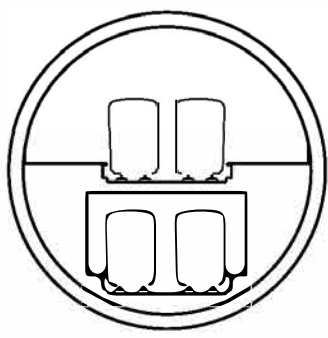


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MJM	SDF	JS
06-03-16	06-03-16	06-09-16
CLIENT		
CITY AND COUNTY OF SAN FRANCISCO, PLANNING DEPARTMENT		
PROJECT		
SF RAILYARD ALTERNATIVES AND I-280 BOULEVARD FEASIBILITY STUDY		
TITLE		
ALIGNMENT 3: MISSION BAY PLAN AND PROFILE		
DRAWING NUMBER		
EXHIBIT 3.2B		
STATUS		
IN PROCESS, FOR DISCUSSION ONLY		
SCALE	REV	
AS SHOWN AT 11" X 17"	B	



PLAN

SCALE: 1"=400'



PROFILE

SCALE: Horiz: 1"=400'
Vert: 1"=80'

NOTES

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DRAFT

CONCEPTUAL
DESIGN ONLY

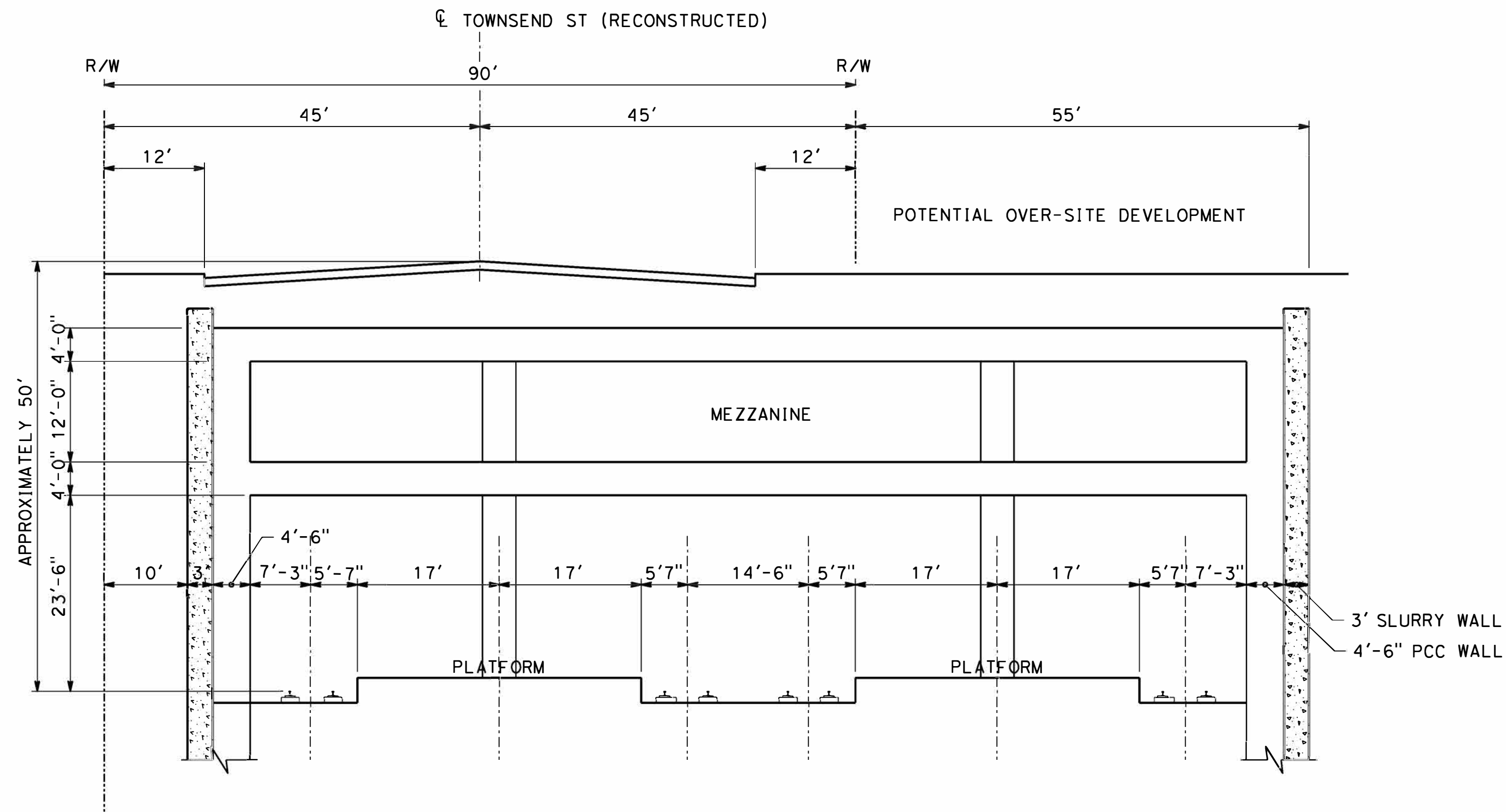
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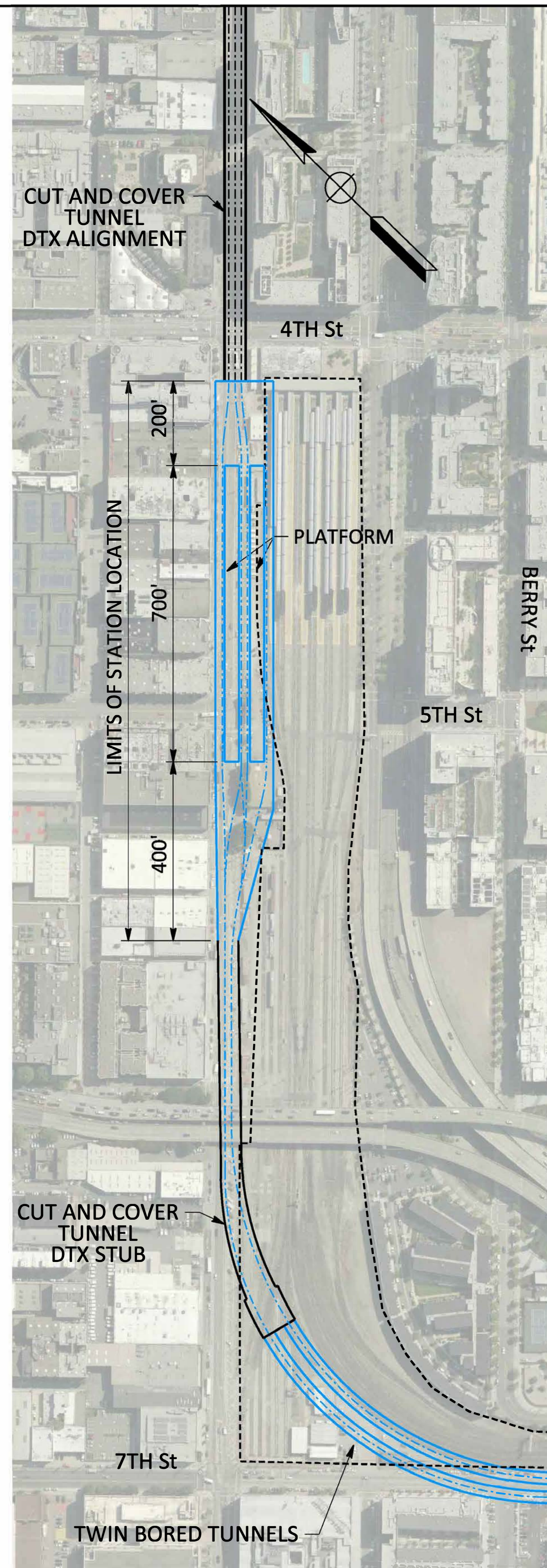
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09-08-16	09-16-16	09-16-16
CLIENT		
CITY AND COUNTY OF SAN FRANCISCO, PLANNING DEPARTMENT		
PROJECT		
SF RAILYARD ALTERNATIVES AND I-280 BOULEVARD FEASIBILITY STUDY		
TITLE		
ALIGNMENT 3: MISSION BAY PLAN AND PROFILE		
DRAWING NUMBER		
EXHIBIT 3.3B		
STATUS		
IN PROCESS, FOR DISCUSSION ONLY		
SCALE		REV
AS SHOWN AT 11" X 17"		B



SECTION



PLAN



CONSTRUCTION ASSUMPTIONS:

- STATIONS BUILT USING ASSUMED CUT AND COVER METHOD WITH SLURRY WALL (APPROX. 3' THICK) AND A STRUCTURAL CONCRETE WALL (APPROX. 4'-6" THICK).
- DEPTH OF SLURRY WALLS AND OTHER GROUND TREATMENT REQUIREMENTS TO BE DETERMINED.
- ASSUMED MINIMUM CONSTRUCTION EASEMENT OF 10' WIDTH SHOWN BEYOND LIMIT OF SLURRY WALL.
- TRACK AND PLATFORM DIMENSIONS ARE BASED ON CURRENT DTX PROPOSAL.
- A MEZZANINE LEVEL IS PROVIDED AS AN ACCESS POINT TO PLATFORMS AND STREET LEVEL.
- STREET LEVEL ENTRANCE STRUCTURES ARE NOT SHOWN. LOCATIONS TO BE DETERMINED.
- STATION OPERATION AND PLANT ROOMS ARE ASSUMED TO BE SAME LEVEL AS MEZZANINE.
- STATION STRUCTURE OUTSIDE RIGHTS OF WAY CAN BE DESIGNED FOR OVERSITE DEVELOPMENT.

OPERATION ASSUMPTIONS:

- FOUR TRACKS AND FOUR PLATFORM EDGES.
- FOUR STOPPING TRACKS AT SINGLE LENGTH PLATFORMS.
- ONE TRACK TERMINATES AT CURRENT RAILYARD LOCATION, ALL OTHER TRACKS PASS THROUGH FROM THE SOUTH.

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CONCEPTUAL
DESIGN ONLY

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MJM	SDF	JS
06-03-16	06-03-16	06-09-16

CLIENT
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PLANNING DEPARTMENT

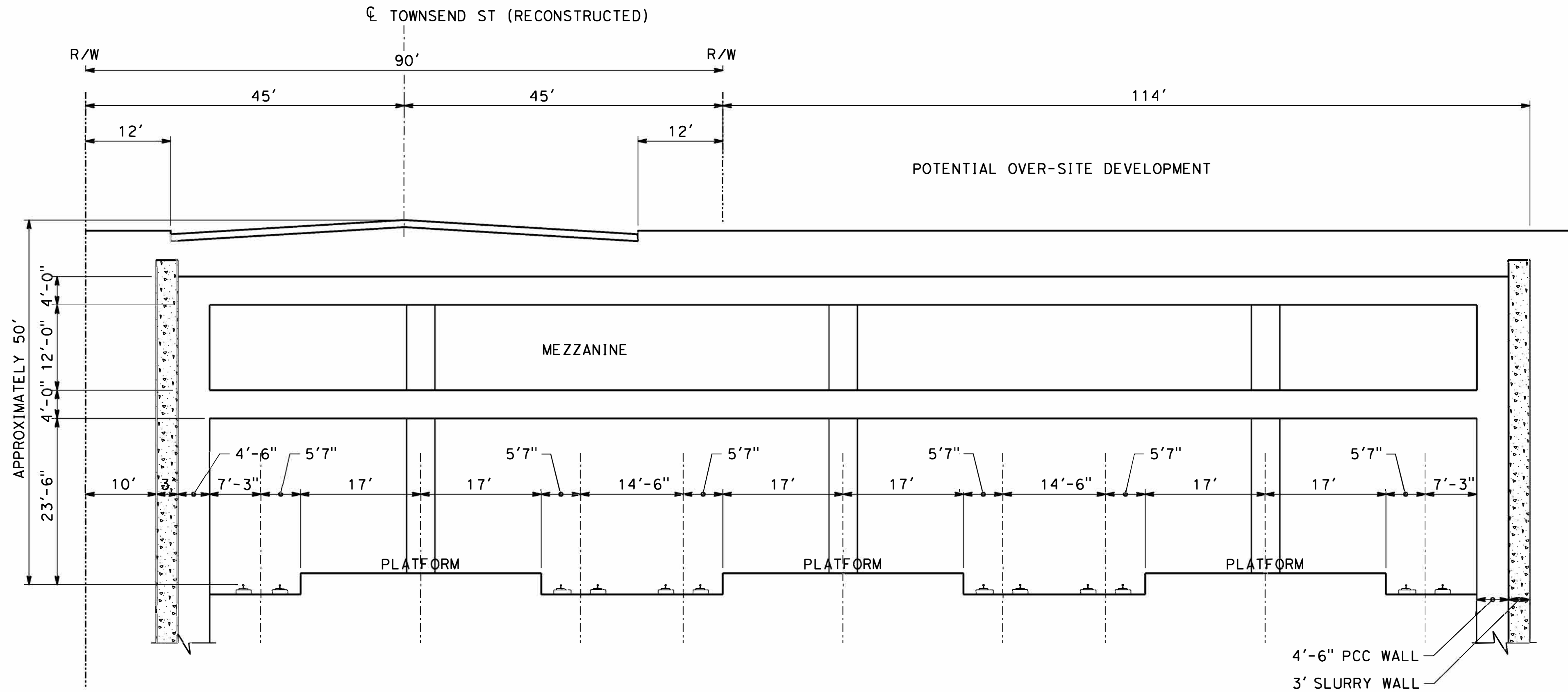
PROJECT
SF RAILYARD ALTERNATIVES AND I-280
BOULEVARD FEASIBILITY STUDY

TITLE
ALIGNMENT 2: PENNSYLVANIA AVENUE
STATION CONFIGURATION OPTION C

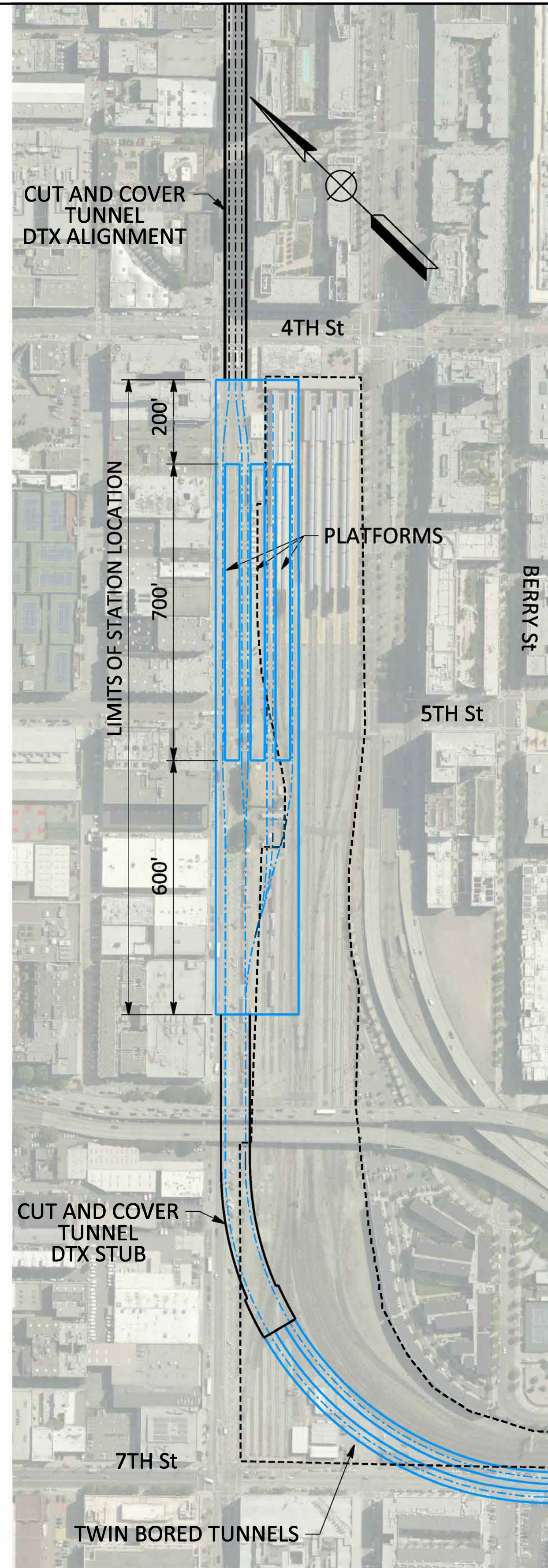
DRAWING NUMBER
EXHIBIT 4.1

STATUS
IN PROCESS, FOR DISCUSSION ONLY

SCALE	REV
AS SHOWN AT 11" X 17"	A



SECTION



PLAN

CONSTRUCTION ASSUMPTIONS:

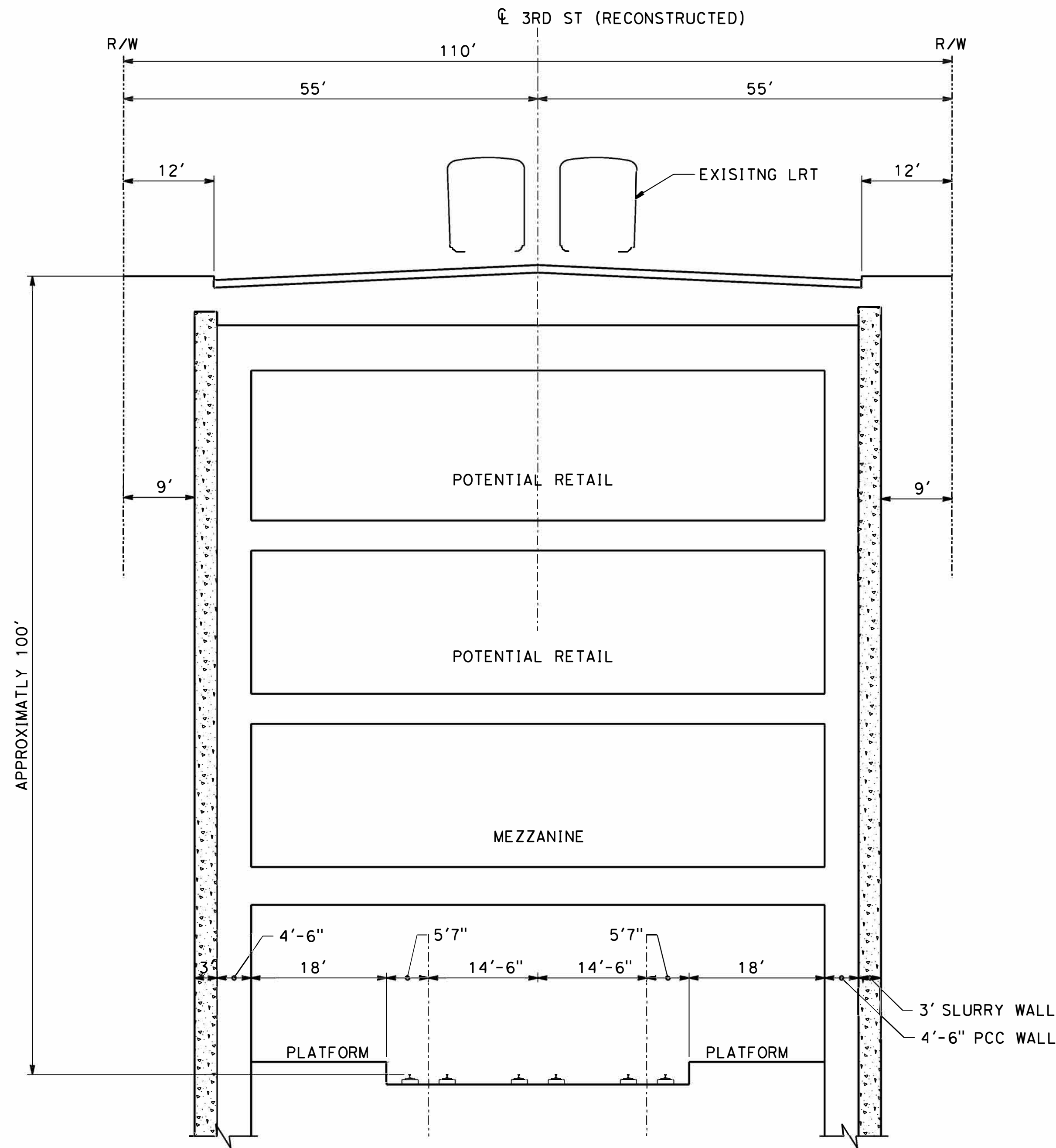
1. STATIONS BUILT USING ASSUMED CUT AND COVER METHOD WITH SLURRY WALL (APPROX. 3' THICK) AND A STRUCTURAL CONCRETE WALL (APPROX. 4'-6" THICK).
2. DEPTH OF SLURRY WALLS AND OTHER GROUND TREATMENT REQUIREMENTS TO BE DETERMINED.
3. ASSUMED MINIMUM CONSTRUCTION EASEMENT OF 10' WIDTH SHOWN BEYOND LIMIT OF SLURRY WALL.
4. TRACK AND PLATFORM DIMENSIONS ARE BASED ON CURRENT DTX PROPOSAL.
5. A MEZZANINE LEVEL IS PROVIDED AS AN ACCESS POINT TO PLATFORMS AND STREET LEVEL.
6. STREET LEVEL ENTRANCE STRUCTURES ARE NOT SHOWN. LOCATIONS TO BE DETERMINED.
7. STATION OPERATION AND PLANT ROOMS ARE ASSUMED TO BE SAME LEVEL AS MEZZANINE.
8. STATION STRUCTURE OUTSIDE RIGHTS OF WAY CAN BE DESIGNED FOR OVERSITE DEVELOPMENT.

OPERATION ASSUMPTIONS:

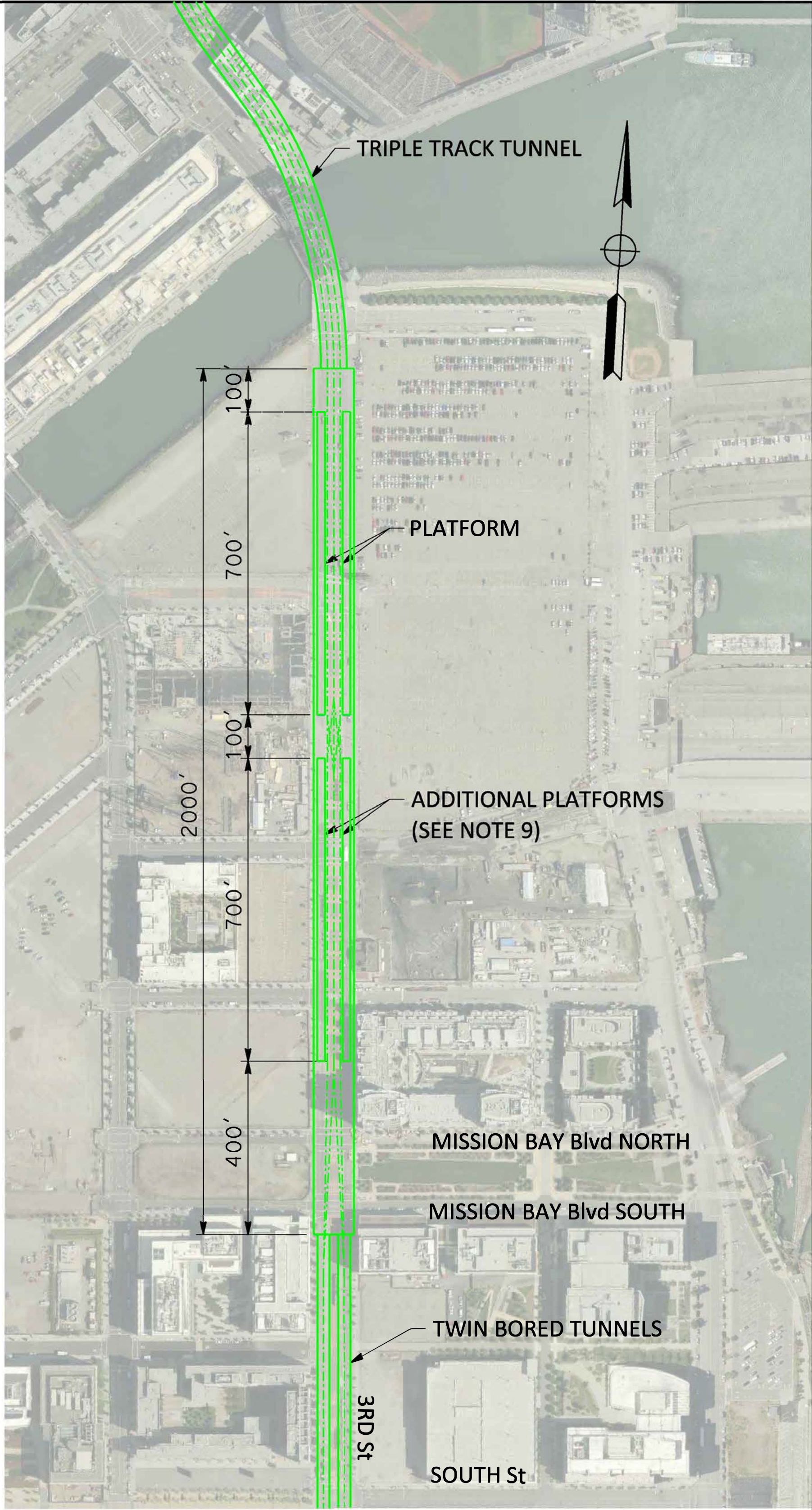
1. SIX TRACKS AND SIX PLATFORM EDGES.
2. SIX STOPPING TRACKS AT SINGLE LENGTH PLATFORMS.
3. THREE TRACKS TERMINATE AT CURRENT RAILYARD LOCATION, ALL OTHER TRACKS PASS THROUGH FROM THE SOUTH TO NORTH.

DRAFT
CONCEPTUAL
DESIGN ONLY

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TITLE		
ALIGNMENT 2: PENNSYLVANIA AVENUE STATION CONFIGURATION OPTION D		
DRAWING NUMBER		
EXHIBIT 4.2		
STATUS		
IN PROCESS, FOR DISCUSSION ONLY		
SCALE		REV
AS SHOWN AT 11" X 17"		A



SECTION



PLAN

CONSTRUCTION ASSUMPTIONS:

1. STATIONS BUILT USING ASSUMED CUT AND COVER METHOD WITH SLURRY WALL (APPROX. 3' THICK) AND A STRUCTURAL CONCRETE WALL (APPROX. 4'-6" THICK).
2. DEPTH OF SLURRY WALLS AND OTHER GROUND TREATMENT REQUIREMENTS TO BE DETERMINED.
3. ASSUMED MINIMUM CONSTRUCTION EASEMENT OF 9' WIDTH SHOWN BEYOND LIMIT OF SLURRY WALL.
4. TRACK AND PLATFORM DIMENSIONS ARE BASED ON CURRENT DTX PROPOSAL
5. A MEZZANINE LEVEL IS PROVIDED AS AN ACCESS POINT TO PLATFORMS AND STREET LEVEL.
6. STREET LEVEL ENTRANCE STRUCTURES ARE NOT SHOWN. LOCATIONS TO BE DETERMINED.
7. STATION OPERATION AND PLANT ROOMS ARE ASSUMED TO BE SAME LEVEL AS MEZZANINE.
8. EXISTING LRT WOULD BE DIVERTED OR SUSPENDED DURING CONSTRUCTION OF ROOF SLAB. TOP DOWN METHOD COULD BE USED TO REINSTATE FOR EXCAVATION OF LOWER LEVELS
9. ADDITIONAL PLATFORMS OPTION SHOWN WOULD GIVE ADDITIONAL CAPACITY DURING EVENTS AT AT&T PARK AND CHASE CENTER

OPERATION ASSUMPTIONS:

1. THREE TRACKS AND TWO PLATFORM EDGES.
2. TWO STOPPING TRACKS AT DOUBLE LENGTH PLATFORMS.
3. ONE BYPASS TRACK.
4. ALL THREE TRACKS PASS THROUGH FROM THE SOUTH TO THE NORTH
5. CROSSOVER LENGTH IS FOR SWITCHING TO BYPASS TRACK ONLY

DRAFT
CONCEPTUAL
DESIGN ONLY



DRAWN	CHECKED	APPROVED
MJM	SDF	JS
06-03-16	06-03-16	06-09-16

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CITY AND COUNTY OF SAN FRANCISCO,
PLANNING DEPARTMENT

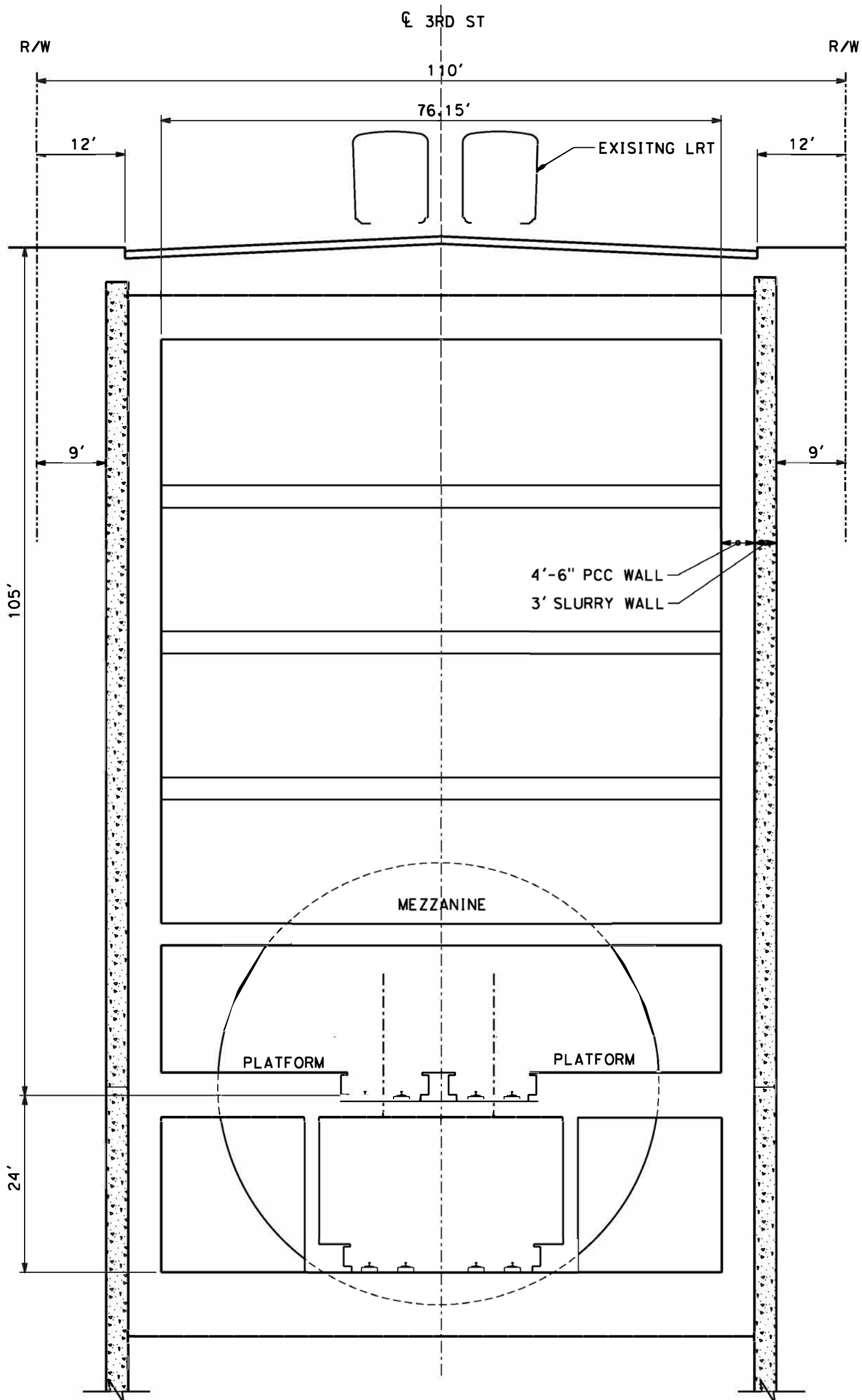
PROJECT
SF RAILYARD ALTERNATIVES AND I-280
BOULEVARD FEASIBILITY STUDY

TITLE
ALIGNMENT 3: MISSION BAY
STATION CONFIGURATION OPTION A

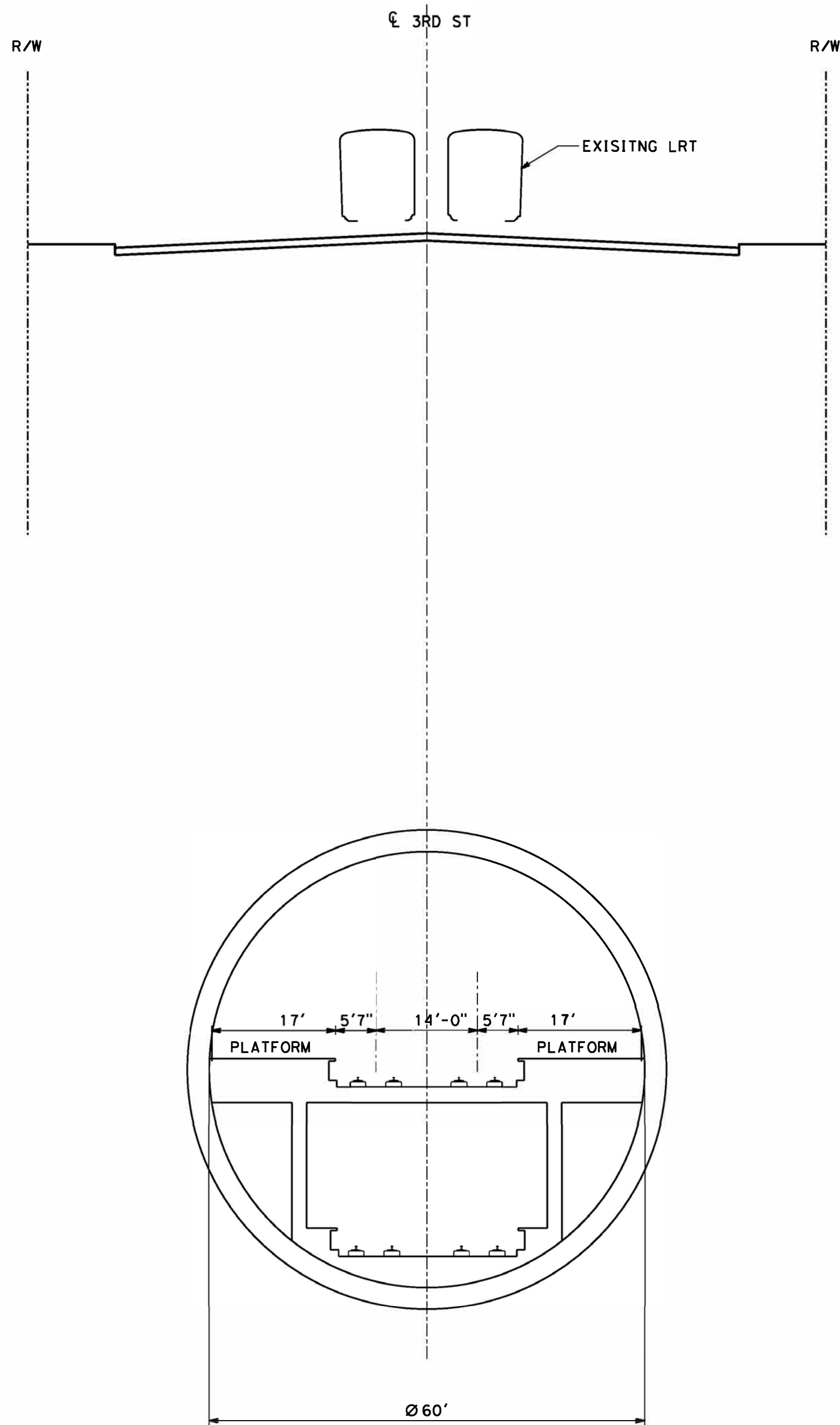
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EXHIBIT 5.1

STATUS
IN PROCESS, FOR DISCUSSION ONLY

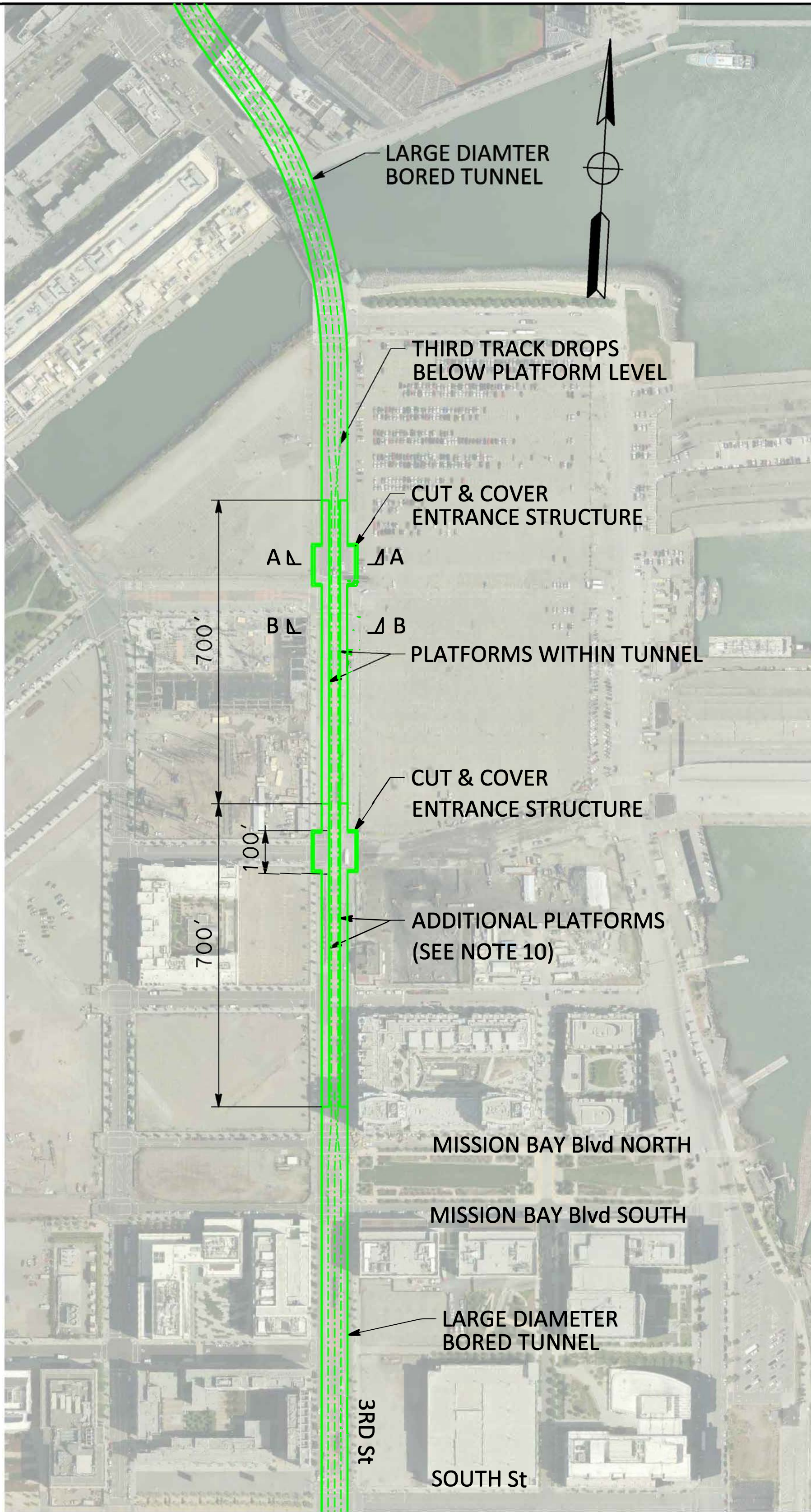
SCALE	REV
AS SHOWN AT 11" X 17"	A



SECTION A-A



SECTION B-B



PLAN

CONSTRUCTION ASSUMPTIONS:

1. LARGE DIAMETER BORED TUNNEL IS CONSTRUCTED USING A SINGLE TBM FOR THE FULL LENGTH.
2. ENTRANCE STRUCTURES ARE CONSTRUCTED IN ADVANCE OF TBM
3. ENTRANCE STRUCTURES BUILT USING CUT AND COVER METHOD WITH SLURRY WALL (APPROX. 3' THICK) AND A STRUCTURAL CONCRETE WALL (APPROX. 4'-6" THICK).
4. DEPTH OF SLURRY WALLS AND OTHER GROUND TREATMENT REQUIREMENTS TO BE DETERMINED.
5. ASSUMED MINIMUM CONSTRUCTION EASEMENT OF 9' WIDTH SHOWN BEYOND LIMIT OF SLURRY WALL.
6. TRACK AND PLATFORM DIMENSIONS ARE BASED ON CURRENT DTX PROPOSALS.
7. STREET LEVEL ENTRANCE STRUCTURES ARE NOT SHOWN. LOCATIONS TO BE DETERMINED.
8. STATION OPERATION AND PLANT ROOMS ARE ASSUMED TO BE WITHIN ENTRANCE STRUCTURES.
9. EXISTING LRT WOULD BE TEMPORARILY SUPPORTED DURING CONSTRUCTION OF ENTRANCE STRUCTURE.
10. ADDITIONAL PLATFORMS OPTION SHOWN WOULD PROVIDE ADDITIONAL CAPACITY DURING EVENTS AT AT&T PARK AND CHASE CENTER

OPERATION ASSUMPTIONS:

1. THREE TRACKS AND TWO PLATFORM EDGES.
2. TWO STOPPING TRACKS AT DOUBLE LENGTH PLATFORMS.
3. ONE BYPASS TRACK AND ONE STOPPING TRACK BELOW PLATFORM.
4. THREE TRACKS PASS THROUGH FROM THE SOUTH TO THE NORTH.
5. 3RD AND 4TH TRACKS COULD BE EXTENDED END OF TUNNEL FOR TRAIN STORAGE.

DRAFT
CONCEPTUAL
DESIGN ONLY

ch2m



DRAWN	CHECKED	APPROVED
MJM	SDF	JS
06-03-16	06-03-16	06-09-16

CLIENT
CITY AND COUNTY OF SAN FRANCISCO,
PLANNING DEPARTMENT

PROJECT
SF RAILYARD ALTERNATIVES AND I-280
BOULEVARD FEASIBILITY STUDY

TITLE
ALIGNMENT 3: MISSION BAY
STATION CONFIGURATION OPTION C

DRAWING NUMBER
EXHIBIT 5.2

STATUS
IN PROCESS, FOR DISCUSSION ONLY

SCALE	REV
AS SHOWN AT 11" X 17"	A

CONCEPTUAL VISUALIZATIONS OF 16TH & 7TH STREETS

DTX AS ENVIRONMENTALLY APPROVED IN TIPA SEIS/EIR



16th & 7th Streets - looking east (from 1010 Potrero)

OPTION 1 FUTURE WITH SURFACE RAIL: DTX + TRENCHED STREETS



16th & 7th Streets - looking east (from 1010 Potrero)

OPTION 2: PENNSYLVANIA AVENUE: DTX + EXTENDED TUNNEL

OPTION 3: MISSION BAY: MODIFIED DTX + 3RD ST TUNNEL



16th & 7th Streets - looking east (from 1010 Potrero)



16th & 7th Street - looking east, pedestrian perspective