

**Memorandum of Agreement**

among the

**Federal Transit Administration, and  
California State Historic Preservation Officer**

for the

**Transbay Terminal/Caltrain Downtown Extension/Redevelopment Project  
in San Francisco County, California**

WHEREAS, the Federal Transit Administration (FTA) has under consideration construction of a new multi-modal Terminal on the site of the present Transbay Transit Terminal, extension of the Peninsula Corridor Service (Caltrain) from its current San Francisco terminus at Fourth and Townsend Streets to a new underground terminus beneath the new Terminal, and establishment of a Redevelopment Area Plan with related development projects, including transit-oriented development on publicly-owned land in the vicinity of the new multi-modal Terminal (Undertaking) as proposed by the Transbay Joint Powers Authority (TJPA), the City and County of San Francisco (CCSF), the Peninsula Corridor Joint Powers Board (JPB), and the San Francisco Redevelopment Agency (SFRA); and

WHEREAS, on March 28, 2003, the TJPA selected a Locally Preferred Alternative (LPA) for this Undertaking that includes the West Ramp Transbay Terminal Alternative, Full Build Redevelopment Alternative; and Second-to-Main Tunneling Alternative; and

WHEREAS, FTA is the lead federal agency for this Undertaking, pursuant to the National Environmental Policy Act (NEPA) and the co-lead agencies are the CCSF, JPB, and the SFRA;

WHEREAS, the TJPA, as a Responsible Agency, intends to become the project sponsor, a grantee for federal grant receipt purposes, and the recipient to FTA assistance; and

WHEREAS, the California Department of Transportation (Department) has indicated that it will transfer title to the historic property known as the Transbay Transit Terminal, which is a component of the San Francisco – Oakland Bay Bridge (Bay Bridge), a multi-component structure that is listed on the National Register of Historic Places (NRHP), to TJPA, after receipt of satisfactory proof that FTA has issued a Record of Decision pursuant to NEPA for construction of the Undertaking, and

WHEREAS, this Undertaking will adversely affect historic properties listed or eligible for listing on the NRHP, including components of the Bay Bridge and the Second and Howard Streets Historic District, and may have effects on archaeological properties that have not yet been identified; and

WHEREAS, the Bay Bridge East Span Seismic Safety Project in San Francisco and Alameda counties is a separate undertaking from the subject Undertaking; and

WHEREAS, FTA has consulted with the California State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation (ACHP) pursuant to 36 CFR Part 800, regulations implementing Section 106 of the National Historic Preservation Act (16 U.S.C. 470f); and

1 WHEREAS, FTA, TJPA, CCSF, JPB, SFRA have consulted with Department; the City of Oakland,  
2 the San Francisco Architectural Heritage; the San Francisco Planning & Urban Research Association  
3 (SPUR); the National Park Service (Western Regional Office); the National Trust for Historic Preservation;  
4 the American Institute of Architects Preservation Committee; San Francisco Beautiful; Transbay Citizens'  
5 Advisory Committee; the Oakland Heritage Alliance; the San Francisco Landmarks Preservation Advisory  
6 Board; and San Francisco Tomorrow, about the Undertaking and its effects on historic properties, and  
7 have taken all comments received from these parties into account; and  
8

9 WHEREAS, the California Legislature has considered the importance of proceeding with the  
10 Transbay Transit Terminal project and has granted a specific exemption to State Law prohibiting the  
11 demolition of historic structures with the following language: "the Legislature hereby approves demolition  
12 of the Transbay Terminal building at First and Mission Streets in the City and County of San Francisco,  
13 including its associated ramps, for construction of a new terminal at the same location, designed to serve  
14 Caltrain in addition to local, regional, and intercity bus lines, and designed to accommodate high-speed  
15 passenger rail service." (AB 812, 2003);  
16

17 NOW, THEREFORE, FTA and SHPO agree that the Undertaking will be implemented in accordance  
18 with the following stipulations in order to take into account the effect of the Undertaking on historic  
19 properties.  
20

## 21 **STIPULATIONS**

### 23 **I. Applicability of Stipulations**

24  
25 If FTA provides funding assistance or a loan guarantee for the Undertaking, FTA will ensure that the TJPA  
26 implements the following stipulations, which are applicable to the Locally Preferred Alternative (LPA).  
27

### 28 **II. Professional Standards**

29  
30 All activities regarding history, historic preservation, historical archaeology and prehistoric archaeology  
31 that are carried out pursuant to this Agreement will be carried out by or under the direct supervision of  
32 persons meeting, at a minimum, the Secretary of the Interior's professional qualifications standards  
33 (48 FR 44738-9) in these disciplines.  
34

### 35 **III. Mitigation of Effects on Components of the San Francisco-Oakland Bay Bridge** 36 **(Bay Bridge)**

#### 37 **A. Permanent Interpretive Exhibit at the Terminal**

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39  
40 TJPA will direct the design and engineering team for the Undertaking to integrate into the design  
41 of the new terminal a dedicated space for a permanent interpretive exhibit. The interpretive  
42 exhibit will include at a minimum, but is not necessarily limited to: plaques or markers, a mural  
43 or other depiction of the historic terminal, and Key System, or other interpretive material.  
44

45 TJPA will consult with Department regarding the availability of historical documentary materials  
46 and the potential use of salvaged items from the existing Transbay Transit Terminal for the  
47 creation of the permanent interpretive display of the history of the original Transbay Transit  
48 Terminal building and its association with the San Francisco-Oakland Bay Bridge and the potential  
49 salvaged items from the existing Terminal.  
50

1 Department will assist TJPA in planning the scope and content of the proposed interpretive  
2 exhibit. In addition, TJPA will also invite the Oakland Heritage Alliance, the San Francisco  
3 Architectural Heritage, the California State Railroad Museum, and the Western Railway Museum  
4 to participate. TJPA, while retaining responsibility for the development of the exhibit, will  
5 consider, jointly with Department, the participating invitees' recommendations when finalizing the  
6 exhibit design. TJPA will produce, install, and maintain the exhibit.  
7

8 TJPA will also consult with the City of Oakland about its interest in having a similar interpretive  
9 exhibit in the East Bay. If agreement is reached prior to completion of final design of the  
10 Terminal, TJPA will provide and deliver exhibit materials to a venue provided by the City of  
11 Oakland.  
12

13 **B. Salvage**

14  
15 TJPA, in consultation with Department, will identify elements of the existing Transbay Transit  
16 Terminal that are suitable for salvage and interpretive use in the exhibit in the new Terminal or in  
17 museums. Within two years of signing of this agreement, TJPA will offer these items to  
18 San Francisco Architectural Heritage, the California State Railroad Museum, Sacramento, the  
19 Western Railway Museum, the Oakland Museum, and any other interested parties. Acceptance of  
20 items by interested parties must be completed at least 90 days prior to demolition of the  
21 Transbay Transit Terminal. TJPA will remove the items selected in a manner that minimizes  
22 damage and will deliver them with legal title to the recipient. Items not accepted for salvage or  
23 interpretive use will receive no further consideration under this agreement.  
24

25 **C. Oakland Museum of California Exhibit**

26  
27 TJPA will consult with Department and the Oakland Museum about contributing to Department's  
28 exhibit at the Oakland Museum relating to the history and engineering of the major historic state  
29 bridges of the San Francisco Bay Area. TJPA will propose contributions to such an exhibit that  
30 may include an interpretive video including the history of the Transbay Transit Terminal and the  
31 Key System. Components to such an exhibit may include photographs, drawings, videotape,  
32 models, oral histories, and salvaged components from the terminal. In addition, TJPA will assist  
33 the Museum by contributing to the cost of preparing and presenting the exhibit, interpretive  
34 video, as well as the costs of an exhibit catalog or related museum publication in conjunction  
35 with the exhibit, in a manner and to the extent agreed upon by TJPA, Department, and the  
36 Oakland Museum of California if consultation results in agreement between TJPA and Oakland  
37 Museum prior to demolition of the existing Transbay Transit Terminal. TJPA has established a  
38 maximum budget of \$50,000.00 for the Oakland Museum of California exhibit and the  
39 interpretive video.  
40

41 **D. Documentation**

42  
43 Prior to the start of any work that would have an adverse effect on historic properties, TJPA will  
44 consult with the California SHPO, to ensure that the Transbay Transit Terminal has been  
45 adequately recorded by past efforts. Collectively, these past studies, which include Department's  
46 past recordation of a series of remodeling and seismic retrofit projects that have occurred since  
47 1993, may adequately document the building, making Historic American Buildings Survey/Historic  
48 American Engineering Record (HABS/HAER) documentation unnecessary. In addition, TJPA,  
49 assisted by Department, will seek to obtain the original drawings of the Transbay Transit  
50 Terminal by the architect Timothy Pflueger. If the drawings cannot be copied and included in the  
51 documentation, then TJPA will consult with SHPO regarding recordation level and specifications  
52 for completing additional documentation. When the SHPO finds the documentation to be  
53 adequate, then TJPA will compile this documentation into a comprehensive record. All

1 documentation will be submitted to SHPO and Department Headquarters Library with a  
2 xerographic copy to the Department District 4 Office. TJPA will contact the following repositories  
3 to inquire if they would like to receive a xerographic copy of the documentation: History Center  
4 at the San Francisco Public Library, San Francisco Architectural Heritage, the Oakland History  
5 Room of the Oakland Public Library, the Oakland Museum of California, and the Western Railway  
6 Museum. TJPA will ensure that these records are accepted by SHPO prior to demolition of the  
7 Transbay Transit Terminal.  
8

9 **E. Reevaluation of the Bay Bridge**

10  
11 Within 180 days after FTA determines that the Undertaking has been completed, TJPA, in  
12 consultation with FTA and SHPO, will re-evaluate the Bay Bridge, a property listed on the NRHP,  
13 and determine whether the National Register nomination should be amended or whether the  
14 bridge no longer qualifies for listing and should be removed from the National Register. As  
15 appropriate, TJPA will prepare and submit to the FTA and SHPO either an amended nomination  
16 or petition for removal, to be processed according to the procedures set forth in 36 CFR  
17 Part 60(60.14 and 60.15).  
18

19 **IV. Mitigation of Effects on Second and Howard Streets Historic District and Protective**  
20 **Measures for Rincon Point/South Beach Historic Warehouse Industrial District**

21  
22 **A. Protective Measures**

23  
24 TJPA, in consultation with the owners of historic properties immediately adjoining the  
25 construction sites, will develop and implement measures to protect the contributing elements of  
26 the Second and Howard Streets Historic District and the Rincon Point/South Beach Historic  
27 Warehouse Industrial District from damage by any aspect of the Undertaking. Such measures  
28 will include, but are not necessarily limited to those identified in Appendix A to this Agreement.  
29

30 **B. HABS/HAER Documentation**

31  
32 Prior to the start of any work that would have an adverse effect on historic properties, TJPA will  
33 ensure that the three historic properties that will be demolished are recorded in accordance with  
34 HABS/HAER standards, as appropriate. These buildings are:

- 35  
36
  - 191 2nd Street, (APN: 3721-022),
  - 580-586 Howard Street, (APN: 3721-092 through 3721-106), and
  - 165-173 2nd Street, (APN: 3721-025).

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40 TJPA will contact the HABS/HAER branch of the NPS to obtain guidance regarding the level of  
41 recordation and specifications for completing the documentation. All documentation will be  
42 submitted to SHPO, with xerographic copies to the History Center at the San Francisco Public  
43 Library, San Francisco Architectural Heritage, and the Oakland History Room of the Oakland  
44 Public Library. TJPA will ensure that these HABS/HAER records are accepted by NPS prior to  
45 carrying out any other treatment.  
46

47 **C. Repair of Inadvertent Damage**

48  
49 TJPA will ensure that any damage to contributing elements of the Second and Howard Streets  
50 Historic District and the Rincon Point/South Beach Historic Warehouse Industrial District resulting  
51 from the Undertaking will be repaired in accordance with the Secretary of the Interior's Standards  
52 for Rehabilitation. The condition of the contributing properties will be photographed prior to the

1 start of the Undertaking to establish the baseline condition for assessing damage. To record  
2 these existing conditions, TJPA will consult with property owner(s) about the appropriate level of  
3 photographic documentation of building interiors and exteriors. A copy of this photographic  
4 documentation will be provided to the property owner(s), and will be retained on file by TJPA. If  
5 repair of inadvertent damage is necessary, TJPA will submit plans to the SHPO for review and  
6 comment to ensure conformance with the Secretary of the Interior’s Standards for Rehabilitation.  
7

8 **D. Reevaluation of the Second and Howard Streets Historic District**  
9

10 Within 180 days after FTA determines that the Undertaking has been completed, TJPA, in  
11 consultation with FTA and SHPO, will re-evaluate the Second and Howard Streets Historic  
12 District and determine whether the National Register nomination should be amended or whether  
13 the district no longer qualifies for listing and should be removed from the National Register. As  
14 appropriate, TJPA will prepare and submit to the FTA and SHPO either an amended nomination  
15 or petition for removal, to be processed according to the procedures set forth in 36 CFR  
16 Part 60(60.14 and 60.15).  
17

18 **V. Mitigation of Effects on Archaeological Properties and Development and**  
19 **Implementation of a Treatment Plan for Archaeological Resources**  
20

21 TJPA or its consultants will carry out, in consultation with the JPB and CCSF, the following activities  
22 regarding mitigation of potential archaeological resource impacts.  
23

24 **A. Research Design/Treatment plan development**  
25

26 The TJPA will have a comprehensive Research Design/Treatment Plan for archeological resources  
27 prepared by a qualified consultant. The Research Design/Treatment Plan will be consistent with  
28 the Secretary of the Interior’s Standards and Guidelines for Archaeological Documentation  
29 (48 FR 44734-37) and take into account the ACHP publication, Treatment of Archaeological  
30 Properties: A Handbook (ACHP 1980), and SHPO guidelines.  
31

32 **B. Research Design/Treatment Plan Specifics**  
33

34 The Research Design/Treatment Plan will include, at a minimum:  
35

- 36 i An Historical Context for the Area of Potential Effects for Archaeological Resources  
37 (APEAR). The Historical Context will present prehistoric and historic-era overviews of  
38 the project area. The Historical Context should incorporate data developed in the  
39 Archaeological Research Design and Treatment Plan for SF-480 Terminal Separation  
40 Rebuild (Praetzellis and Praetzellis, 1993) and the San Francisco-Oakland Bay Bridge,  
41 West Approach Replacement: Archaeological Research Design and Treatment Plan  
42 (Ziesing, 2000) for the portions of the APEAR within the scope of these documents.  
43
- 44 ii A Research Context for the APEAR. The Research Context will identify expected  
45 archeological property types and develop research themes, questions, and data  
46 needs. To the extent applicable to expected property types, the Research Context  
47 will incorporate the research framework developed in the Revised Historical  
48 Archaeology Research Design for the Central Freeway Replacement Project (Thad M.  
49 Van Bueren, Mary Praetzellis, Adrian Praetzellis, Frank Lortie, Brian Ramos, Meg  
50 Scantlebury and Judy D. Tordoff). )  
51  
52

1           iii     Testing/Data Recovery Plan that will specify, at minimum:  
2

- 3           • The properties or portion of properties where evaluation and/or data recovery are  
4           to be carried out;
- 5           • The properties, if any, that will be affected by the Undertaking but for which no  
6           data recovery will be carried out;
- 7           • The manner in which inadvertent discoveries will be treated;
- 8           • The methods to be used for data recovery, with an explanation of their relevance  
9           to the research questions/themes;
- 10          • The methods to be used in cataloguing, analysis, data management, and  
11          dissemination of data;
- 12          • The proposed disposition of recovered materials and records, including discard  
13          and deaccession;
- 14          • The manner in which any human remains and associated/unassociated funerary  
15          objects, including those of Native American or Native Hawaiian origin, will be  
16          treated;
- 17          • The security procedures to be undertaken to protect the archeological  
18          testing/data recovery site from vandalism, theft, or unintended damage;
- 19          • The final report summarizing, describing and interpreting the results of  
20          testing/data recovery;
- 21          • The measures to be undertaken to ensure curation of recovered data determined  
22          to have appropriate research potential.
- 23          • Research Design/Treatment Plan Review

24  
25           TJPA will submit the Research Design/Treatment Plan to all parties to this Agreement for a thirty  
26           (30) calendar day review following receipt of the Plan. If any party fails to submit their  
27           comments within thirty (30) days, TJPA may assume that party's concurrence with the Research  
28           Design/Treatment Plan. TJPA will take any review comments into account, revise the Research  
29           Design/Treatment Plan accordingly, and will notify any party whose comments were not  
30           incorporated into the Plan.

31  
32           **C. Notification**

33  
34           TJPA will promptly notify the SHPO, FTA, and Department as appropriate, if any properties are  
35           found that meet the conditions for eligibility for inclusion in the NRHP.

36  
37           **D. Report Standards and Dissemination**

38  
39           TJPA will ensure that all reports from implementation of the Research Design/Treatment Plan  
40           meet contemporary professional standards and the Secretary of the Interior's Standards and  
41           Guidelines for Archaeological Documentation (48 FR 44734-37). Copies of all final reports will be  
42           provided to the SHPO, the Northwest Information Center at Sonoma State University, the Federal  
43           Transit Administration, Department, and the Environmental Review Officer of the CCSF.

44  
45           **E. Confidentiality**

46  
47           The signatories to this Agreement acknowledge that historic properties covered by this  
48           Agreement are subject to the provisions of § 304 of the National Historic Preservation Act of  
49           1966 and § 6254.10 of the California Government Code (Public Records Act), relating to the  
50           disclosure of archeological site information and, having so acknowledged, will ensure that all  
51           actions and documentation prescribed by this Agreement are consistent with § 304 of the  
52           National Historic Preservation Act of 1966 and § 6254.10 of the California Government Code.  
53

1 **VI. Annual Report**  
2

3 TJPA will prepare an annual report describing the status of its efforts to comply with the mitigation  
4 measures set forth in Stipulations III through V of this Agreement. The annual report will be prepared  
5 following the end of the each fiscal year (July 1 to June 30) and will be distributed by TJPA to all of the  
6 signatories to this Agreement by July 30 of each year, until TJPA determines that the applicable  
7 mitigation measures set forth in Stipulations III through V inclusive, of this Agreement have been  
8 completed.  
9

10 **VII. Amendments, Legal Compliance, Termination, and New Agreement**  
11

12 **A. Amendments**  
13

14 If any signatory to this Agreement determines that an amendment to its terms should be made,  
15 the signatory will immediately consult with the other signatories to this Agreement pursuant to  
16 36 CFR 800.6 (c)(7). This Agreement may be amended only upon written concurrence of all  
17 signatory parties.  
18

19 **B. Legal Compliance**  
20

21 All signatories to this agreement shall comply with all applicable laws and regulations of the State  
22 of California and the United States.  
23

24 **C. Termination**  
25

26 If the signatory parties to this Agreement do not reach consensus on amendment(s) as provided  
27 for in this stipulation, FTA and SHPO may terminate it. The party terminating the Agreement will  
28 in writing provide all other signatories with an explanation of the reasons for termination. If the  
29 Agreement is not amended or terminated, the Agreement will remain in effect as originally  
30 executed, and FTA will notify the other signatories that the attempt to reach consensus on  
31 amendment(s) was unsuccessful.  
32

33 **D. Action Following Termination**  
34

35 If this Agreement is terminated by FTA or SHPO for any reason, and FTA determines that the  
36 Undertaking will proceed, FTA will execute a new Memorandum of Agreement with the  
37 signatories under 36 CFR 800.6.  
38

39 **VIII. Dispute Resolution**  
40

41 Should any signatory to this Agreement object to the manner in which the terms of this Agreement are  
42 implemented, or to any documentation prepared in accordance with and subject to the terms of this  
43 Agreement, FTA will consult further with the objecting party to resolve the objection. If FTA determines  
44 within fourteen (14) days of receipt that such objection cannot be resolved, FTA will forward all  
45 documentation relevant to the dispute to the ACHP, including FTA's proposed response to the objection.  
46 Within thirty (30) days after receipt of all pertinent documentation, the ACHP will:

- 47
- 48 • Advise FTA that it concurs in FTA's proposed response, whereupon FTA will respond to the objection  
49 accordingly; or
- 50
- 51 • Provide FTA with recommendations which FTA will take into account in reaching a final decision  
52 regarding the dispute.

1  
2 Any ACHP comment provided in response to FTA’s request will be taken into account by FTA with  
3 reference only to the subject of the dispute. The signatories’ responsibilities to carry out all actions under  
4 this Agreement that are not the subject of the dispute will remain unchanged. FTA may authorize TJPA  
5 to implement that portion of the Agreement which is subject to dispute after receiving and taking into  
6 account, any ACHP comments issued in accordance with this stipulation. FTA’s decision regarding  
7 resolution of the dispute will be final.  
8

9 If the ACHP fails to comment within the time period specified in this stipulation, FTA may authorize TJPA  
10 to implement that portion of the Agreement which is subject to dispute in accordance with FTA’s  
11 proposed response to the objection as submitted to the ACHP, and after taking into account any SHPO or  
12 ACHP comments. FTA’s decision regarding resolution of the dispute will be final.  
13

14 **IX. Public Objections**

15  
16 If any member of the public objects to the manner in which the provisions of this Agreement are  
17 implemented, FTA shall immediately notify the other parties in writing of the objection and take the  
18 objection into account. FTA shall consult with the objecting party and, if the objecting party so requests,  
19 with any or all of the other signatories, for no more than thirty (30) calendar days. Within fourteen (14)  
20 calendar days following closure of the consultation period, FTA will render a decision regarding the  
21 objection and notify all parties of this decision in writing. In reaching a decision, FTA will take comments  
22 from all parties into account. No provision of this stipulation will preclude FTA from continuing to  
23 implement any provision of the Agreement that is subject to public objection.  
24

25 **X. Duration**

26 **A. Reconsideration**

27  
28  
29 If FTA determines that construction of the Undertaking has not been initiated within ten years  
30 following execution of this Agreement, the signatories shall consult to reconsider its terms.  
31 Reconsideration may include continuation of the Agreement as originally executed, amendment,  
32 or termination in accordance with Stipulation VII.  
33

34 **B. Terms Fulfilled**

35  
36 This Agreement will be in effect through FTA’s implementation of the Undertaking, and will  
37 terminate and have no further force or effect when FTA, in consultation with the other  
38 signatories, determines that the terms of this Agreement have been fulfilled in a satisfactory  
39 manner. FTA will provide that other signatories with written notice of its determination and of  
40 termination of this Agreement.  
41

42 Execution and implementation of this Agreement is evidence that FTA has afforded the ACHP a  
43 reasonable opportunity to comment on the Undertaking and the effect of the Undertaking on  
44 historic properties, and have themselves taken into account the effect of the Undertaking on  
45 historic properties.



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**Federal Transit Administration**

By: \_\_\_\_\_ Date: \_\_\_\_\_  
Title:

**California State Historic Preservation Officer**

By: \_\_\_\_\_ Date: \_\_\_\_\_  
Title:

**Invited Concurring Parties:**

**Transbay Joint Powers Authority**

By: \_\_\_\_\_ Date: \_\_\_\_\_  
Title:

**City and County of San Francisco**

By: \_\_\_\_\_ Date: \_\_\_\_\_  
Title:

**Peninsula Corridor Joint Powers Board**

By: \_\_\_\_\_ Date: \_\_\_\_\_  
Title:

**California Department of Transportation**

By: \_\_\_\_\_ Date: \_\_\_\_\_  
Title:

**Appendix A: Protective Measures:**

Following are mitigation measures to be implemented to protect properties eligible for on in the National Register of Historic Places. The measures described would be implemented by a combination of construction contract specifications, drawings, and provisions, as well as public affairs programs. TJPA and JPB staff would be assigned to work directly with the public to provide project information and to resolve construction-related problems. The TJPA and JPB will work with community residents, elected officials, local businesses, and community organizations to tailor the mitigation program to best meet community needs. Contractors will be monitored to assure that mitigation measures are met.

**I. Preconstruction Activities**

- **Undertake building data survey.** A pre-construction structural survey would be completed to determine the integrity of existing buildings adjacent to and over the proposed extension. This survey would be used to finalize detailed construction techniques along the alignment and as the baseline for monitoring construction impacts during and following construction. During construction, the TJPA and JPB would monitor adjacent buildings for movement and, if movement is detected, take immediate action to control the movement.
- **Complete detailed geotechnical investigation.** During final design, additional sampling (drilling and core samples) and analyses of subsurface soil/rock conditions would be used to detail and finalize the excavation and its support system to be used in the retained cut, cut-and-cover and tunnel portions of the extension. Current data, including subsurface sampling conducted in 1995 and 1996 for the 1997 Caltrain DEIS/DEIR have been used to identify the proposed construction techniques presented in the following sections, which form the basis for the impact analysis that follows in Section 5.21.

**II. General Construction Measures**

- **Provide signage.** The TJPA and JPB would work with establishments affected by construction activities. Appropriate signage would be developed and displayed to direct both pedestrian and vehicular traffic to businesses via alternate routes.
- **Install level deck.** Decking at the under-street cut-and-cover sections would be installed flush with the existing street or sidewalk levels.
- **Provide for efficient sidewalk design and maintenance.** Wherever feasible, sidewalks would be maintained at the existing width during construction. Where a sidewalk must be temporarily narrowed during construction (e.g., deck installation), it would be restored to its original width during the majority of construction period. In some places this may require placing the temporary sidewalk actually on the deck. Each sidewalk design should be of good quality and approved by the Resident Engineer prior to construction. Handicapped access would be maintained during construction where feasible.

**III. Soils/Geology**

- **Underpin existing buildings, where deemed necessary, to protect existing structures from potential damage that could result from excessive ground movements during construction.** The design of the tunneling and the excavation procedures (and construction sequence), and the design of the temporary support system will be developed with the objective of controlling ground deformations within small enough levels to avoid damage to adjacent structures.

1 Where the risk of damage to adjacent structures is too great, special measures may be implemented  
2 such as: (1) underpinning, (2) ground improvement, and/or (3) strengthening of existing structures  
3 to mitigate the risks.  
4

5 The cut-and-cover alignment passes near settlement-sensitive structures in the vicinity of the  
6 intersection of Second and Townsend streets, including buildings in the Rincon Point / South Beach  
7 Historic Warehouse – Industrial District (i.e., 166-178, 180, , and 350-360 Townsend Street).  
8

9 The tunnel alignment passes under a number of old and settlement-sensitive structures in the  
10 vicinity of the intersection of Second and Townsend streets, including buildings in the Rincon Point /  
11 South Beach Historic Warehouse – Industrial District (i.e., 130, 136, 144-146, 148-154, and 162-164  
12 “Townsend Street; 634, 640, 650, and 670-680 Second Street; and 301-321 Brannan Street).  
13

14 Even though the tunnel will be excavated using the stacked drift method, and even though the  
15 tunnel will be excavated in the Franciscan Rock formation, the risk of potential adverse impacts of  
16 tunneling on the existing buildings must be assessed, because the rock cover over the tunnel is  
17 rather shallow.  
18

19 As part of the initial studies performed in 1996, preliminary plans were developed to  
20 protect/strengthen existing structures to mitigate the risk of adverse impacts of tunneling on existing  
21 structures. Underpinning, if it is deemed necessary, is one of the options for mitigating adverse  
22 effects of tunneling on the existing buildings. Underpinning involves modification of the foundations  
23 of the building so that the superstructure loads can be transferred beyond the zone of influence of  
24 tunneling. Underpinning may include internal strengthening of the superstructure, bracing,  
25 reinforcing the existing foundations, or replacing the existing foundations with deep foundations that  
26 are embedded outside the zone of influence of tunneling.  
27

28 Other alternatives, in lieu of underpinning, involve strengthening of the rock between the building  
29 and the crown of the tunnel. Grouting in combination with inclined pin piles can be used not only to  
30 strengthen the rock but to make the rock mass over the tunnel act as a rigid beam, which would  
31 allow construction of the tunnels with no adverse effects on the buildings that are supported on  
32 shallow foundations over the tunnel.  
33

34 Preliminary plans for underpinning have been developed that allow cost estimates to be made for  
35 underpinning. During the detailed design phase of the Project, underpinning plans will be developed  
36 specific to each of the buildings that may require it. It is not necessary at this stage of the Project  
37 to develop detailed underpinning plans.  
38

39 These issues will be addressed on a case by case basis, along the alignment, during the detailed  
40 design phase of the Project. The methodology that is proposed for the Caltrain Downtown  
41 Extension, i.e. to design the support system to control ground deformations within tolerances, and  
42 selectivity strengthen structures that may be too weak to resist even small deformations, was  
43 successfully used for the Muni Metro Turnback project, and should be effective for the Caltrain  
44 Downtown Extension Project as well.  
45

- 46 • Assure proper design and construction of pile supported foundations for structures to control  
47 potential settlement of the surface. Stability of excavations resultant impacts on adjacent structures  
48 can be controlled within tolerable limits by proper design and implementation of the excavation  
49 shoring systems.  
50

1 **IV. Air Emissions**

- 2
- 3 • Upon completion of the construction phase, buildings with visible signs of dirt and debris from the
- 4 construction site shall be power washed and/or painted (given that permission is obtained from the
- 5 property owner to gain access to and wash the property with no fee charged by the owner).
- 6

7 **V. Vibration**

- 8
- 9 • **Limit or prohibit use of construction techniques that create high vibration levels.** At a
- 10 minimum, processes such as pile driving would be prohibited at distances less than 250 feet from
- 11 residences.
- 12
- 13 • **Restrict procedures that contractors can use in vibration sensitive areas.** It is often
- 14 possible to employ alternative techniques that create lower vibration levels. For example,
- 15 unrestricted pile driving is one activity that has considerable potential for causing annoying vibration.
- 16 Using the cast-in-drilled-hole piling method instead will eliminate most potential for vibration impact
- 17 from the piling.
- 18
- 19 • Require vibration monitoring during vibration intensive activities.
- 20
- 21 • Restrict the hours of vibration intensive activities such as pile driving to weekdays during daytime
- 22 hours.
- 23
- 24 • Investigate alternative construction methods and practices to reduce the impacts in coordination
- 25 with the construction contractor if resident annoyance from vibration becomes a problem.
- 26
- 27 • Include specific limits, practices and monitoring and reporting procedures for the use of controlled
- 28 detonation. Controlled detonation may be required during tunnel construction through rock for both
- 29 the cut-and-cover and stacked-drift construction methods, subject to additional geotechnical
- 30 investigations and other considerations that would be determined during the final design and
- 31 construction phases of the project. Any use of controlled detonation would be closely controlled and
- 32 monitored to avoid damage to existing structures. Specific limits, practices, and monitoring and
- 33 reporting procedures would be included within the contract documents to ensure that such
- 34 construction methods, if used, would not exceed safety criteria.
- 35
- 36 • **Use high-resilience track fasteners or a resiliently supported tie system** for the Caltrain
- 37 downtown extension for areas projected to exceed vibration criteria.
- 38
- 39