

SUBDIVISION REGULATIONS

for

Treasure Island and Yerba Buena Island

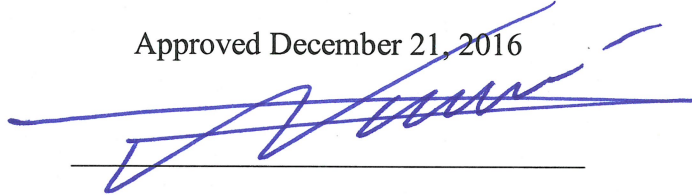
2016

DEPARTMENT OF PUBLIC WORKS

CITY AND COUNTY OF SAN FRANCISCO

Adopted by Department of Public Works Order No. 185,562

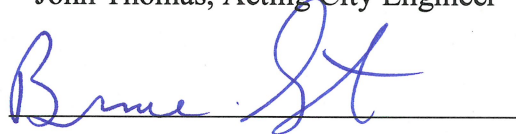
Approved December 21, 2016



Mohammed Nuru, Director of Public Works



John Thomas, Acting City Engineer



Bruce Storrs, City and County Surveyor



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I. PURPOSE

These regulations for Treasure Island and Yerba Buena Island (“Subdivision Regulations”) are established pursuant to the San Francisco Subdivision Code Section 1711, together with San Francisco Public Works Code Section 147.2(b)(2) Section 1204(b)(2) and other applicable San Francisco Municipal Codes and City regulations to serve as general guidelines for the planning, development, design and improvement of subdivisions in the City and County of San Francisco, and also to supplement said Code.¹

II. APPLICABLE LAWS

Subdivision maps and all procedures in connection with the subdivision of land within the City and County of San Francisco shall conform to all applicable laws of the State of California and ordinances of the City and County of San Francisco, and all amendments thereto. The principal laws and ordinances in effect governing subdivisions and related public improvements are as follows:

Subdivision Map Act (State of California), Government Code Sections 66410 et. seq.

San Francisco Subdivision Code

San Francisco Public Works Code

San Francisco Administrative Code

¹ Department of Public Works Order No. 171,379 adopted separate Subdivision Regulations on November 18, 1998 that apply to the development of property in Mission Bay North and South Redevelopment Areas pursuant to Subdivision Code Section 1411; Department of Public Works Order No. 182,651 adopted separate Subdivision Regulations on June 5, 2014 that apply to the development of property in Candlestick Point and Hunters Point Shipyard pursuant to Subdivision Code Section 1611. Department of Public Works Order No. 183,447, pursuant to Subdivision Code Section 1311, adopted separate Subdivision Regulations on March 24, 2015 that superseded the former 1982 Subdivision Regulations.

The Board of Supervisors adopted the applicable provisions of the Subdivision Code in connection with approval of the Treasure Island and Yerba Buena Island development project (the “Project”) and of the Disposition and Development Agreement (Treasure Island/Yerba Buena Island) (the “DDA”). This Code applies to the Project site as defined in the DDA (the “Subdivision Area”). The Department of Public Works (the “Department”) intends these Regulations to supplement the Code, however there are several other documents that serve as reference documents for any subdivision work within the Subdivision Area.

The Treasure Island Development Authority (“TIDA”) and the Planning Department of the City and County of San Francisco rely upon the Treasure Island / Yerba Buena Island Design for Development (the “TI/YBI D4D”) as the planning document for the Subdivision Area. Other documents approved or adopted in connection with approval of the Project include the Infrastructure Plan and supporting Technical Memoranda, Development Agreement by and between Treasure Island Community Development, LLC and the City and County of San Francisco, a public body, corporate and politic, of the State of California (the “City”), and the Interagency Cooperation Agreement by and between TIDA and the City (the “ICA”).

Other Documents that may be referenced in Appendix D include: the Streetscape Master Plan, Major Phase Applications and Sub-Phase Applications. For purposes of Appendix D, the terms “Developer” and “Subdivider” shall have the same meaning.

III. DEFINITIONS

Terms used shall have the meanings defined herein except where an alternate definition already exists in the applicable Subdivision Code, Treasure Island

Subdivision Code or State Law, in which case such Code or State Law definition shall prevail.²

A. EXCEPTIONS

Exceptions as that term is used within these Regulations shall refer to Subdivision Code Section 1712. Exceptions, inclusive, as defined in the San Francisco Subdivision Code. An Exception may include an exception, waiver, or deferral of any of the requirements set forth in the Subdivision Code or Subdivision Regulations. The Director of Public Works (the “Director”) shall make the findings specified in Subdivision Code Section 1712 and any conditions that the Director designates as associated with the Exception in writing prior to granting the Exception.

B. DESIGN MODIFICATION

Design Modification shall refer to the process under which the Director, in consultation with any affected City departments, may review a Subdivider’s proposed alternative design, and for good cause and as consistent with customary engineering practices, issue written approval of such alternative design. The Subdivider may request a Design Modification at any time prior to the Director’s decision to approve, conditionally approve, or deny a tentative map application. A Design Modification does not rise to the level of an Exception as specified in Subdivision Code Section 1712 and cannot be used for the purposes reserved for Exceptions.

² See Subdivision Code Sec. 1707 for related definitions such as “Development Agreement” and “Plan Documents.”

C. VARIATION

Variation shall refer generally to a process distinct from “Exceptions” and “Design Modifications”, where the Director, in consultation with any affected City department, may review and issue written approval of any Subdivider proposed technical engineering variation, deviation, or alternative as applicable to Appendix D, Technical Specifications related to Engineering Documents after the Director’s approval or conditional approval of the associated tentative map. A Variation does not rise to the level of an Exception as specified in Subdivision Code Section 1712 and cannot be used for the purposes reserved for Exceptions.

D. SUBDIVISION CODE

Subdivision Code shall refer to the applicable Code referenced in Section I. Purpose, of these Regulations.

E. DIRECTOR OF PUBLIC WORKS

Director of Public Works or Director shall mean the Director of Public Works, City and County Surveyor or City Engineer where these Regulations refer to the processes governed under the Subdivision Map Act and as further promulgated under these Regulations; provided however, that where these Regulations specify the City and County Surveyor or the City Engineer, only such individual is authorized to take the action identified.

F. SURVEYOR

Surveyor shall mean a Professional Land Surveyor or Civil Engineer authorized to practice land surveying, and who is currently licensed by the California Board for Professional Engineers, Land Surveyors and Geologists.

G. CITY

City as used herein shall mean the City and County of San Francisco.

H. GLOBAL NAVIGATION SATELLITE SYSTEM

Global Navigation Satellite System (GNSS), including the Global Positioning System (GPS), shall refer to the satellite surveying methods employed by and under the supervision of Surveyors as consistent with the applicable Public Resources Code.

I. RECORD MAP

Record Map shall refer to any map prepared by a Surveyor and required to be recorded pursuant to the Professional Land Surveyors Act Section 8762 or the Subdivision Map Act.

J. IMPROVEMENT, PUBLIC IMPROVEMENT, AND SUBDIVISION IMPROVEMENT AGREEMENTS

Improvement Agreement, Public Improvement Agreement, and Subdivision Improvement Agreement shall be synonymous for the purposes of these regulations and refer to the agreements entered into pursuant to the Subdivision Map Act (SMA) and applicable City Code for completion of public improvements pursuant to a condition of approval of a tentative subdivision map.

K. DPW WEBSITE

DPW Website shall refer to the internet page maintained by the Department of Public Works for dissemination of information regarding the subdivision and mapping process. The site address is <http://www.sfpublishworks.org/services/subdivisions-and-mapping>. Or, <http://www.sfpublishworks.org>, then select “Services”, and select

“Subdivisions and Mapping”. The DPW Bureau of Street Use and Mapping is physically located at 1155 Market Street, 3rd Floor, San Francisco, CA 94103.

L. TI/YBI PROJECT HORIZONTAL DATUM & REFERENCE SYSTEM

The Horizontal Datum is the North American Datum of 1983: NAD 83 (2011) 2010.00 epoch referenced by the City and County of San Francisco, CCSF-2013 High Precision Network (CCSF-2013 HPN). The plane coordinates are based on a local grid coordinate system known as the City & County of San Francisco 2013 Coordinate System (SFCS13). The SFCS13 is a low distortion (near ground) Transverse Mercator Projection. Within the City, the combined grid factor is generally less than 1/100,000 with the origin and central meridian located near the center of the City. See Record of Survey #8080 recorded in Book EE of Survey Maps, Page 147-157, S.F.C.R. and the CCSF PW Web Site (<http://sfpublicworks.org/ccsf-geodetic-network>) for projection parameters.

M. TI/YBI PROJECT VERTICAL DATUM & REFERENCE SYSTEM

The Vertical Datum is the City and County of San Francisco CCSF-2013 NAVD88 Vertical Datum (SFVD13). (NAVD88 as recovered in 2013 by CCSF) and referenced by the CCSF 2013 High Precision Leveling Network (includes the CCSF-HPN) plus 100.000-feet (added to avoid the use of negative elevations on the improvement plans).

IV. GENERAL PROCEDURES

The procedures described herein conform with State and local laws and with such additional procedures that the Director has found necessary and desirable for the expeditious handling of Subdivision Maps. These Regulations supersede the 1982 Regulations and amendments thereto. The Department's Standard Plans and Specifications, Project Manual and Reference Documents, and Departmental Procedures Manual, shall be viewed as supplemental to these Regulations; provided, however, if there is a conflict between these Regulations and the Standard Plans and Specifications in regard to subdivision specific requirements, these Regulations shall prevail. In addition, these regulations shall apply to all street or public improvement construction projects that occur independent of or in advance of a subdivision map.

A. SUBMISSION OF TENTATIVE MAP

The initial official act to obtain the approval of a subdivision is the formal submission of a Tentative Map and other application materials to the City and County Surveyor. Either a Registered Civil Engineer or a Licensed Land Surveyor may prepare and submit an application. This application shall include all of the documents that the Subdivision Code and the Application Packet require. The "Application Packet" is available at the Department's offices or on the Department website. The Subdivider shall collate and submit the required number of copies specified within the Application Packet³. The City and County Surveyor shall then submit a copy of the

³ The Department of Public Works anticipates acceptance of electronic application submittals. Applicants should check the Department website for the most current application instructions.

map and application materials to the Planning Department and other appropriate governmental agencies for review and recommendations.

1. Vesting Tentative Maps

The Subdivider may submit a Tentative Map or Vesting Tentative Map. Because a Vesting Tentative Map vests the Subdivider with rights to proceed with development, subject to the laws, ordinances, and standards in effect at the time of application submittal, the requirements of an application for Vesting Tentative Map are more extensive as set forth in the applicable Subdivision Codes. Of chief concern is the necessity of a Site Plan that a Surveyor prepares. Such Site Plan need not constitute a final boundary survey, but it must show actual property boundary lines and any title gaps or physical encroachments that would necessarily impact the subdivision process.

2. Required Tentative Maps

A Tentative Map is required for all Final Maps (consisting of five or more units or lots), and all Parcel Maps (consisting of four or less units or lots) except as provided for otherwise in the applicable Subdivision Code. In cases where the Subdivision Code permits submittal of an application without a Tentative Map, the content requirements of such application shall be consistent with the content requirements of the applicable Parcel Map Application to the extent consistent with, and as set forth in the applicable Subdivision Code.

3. Multiple Phased Final Maps must be requested in Application

- a. A Subdivider may request to submit multiple phased Final Maps when permitted by the applicable Subdivision Code or with prior authorization to do

so from the Director. Such a request shall be made at the time of application and affirmed in the conditions of approval for the Tentative Map.⁴

- b. Where authorized by the Subdivision Code, and because multiple phased final maps typically record over the span of several years, it is not uncommon that the Subdivider may request a deferral of certain required items when such information will necessarily change, be refined, or become outdated during the time before the submittal of phased Final Maps or associated Improvement Plans. Any such request for deferral shall be in writing and identify each item being requested for deferral. In such case, the Director, in his or her sole discretion, may defer such items, in accordance with the Subdivision Code, and condition the deferral in a manner that he or she deems appropriate. The Subdivider shall include all deferred information as part of the submission of a Deferred Materials Submittal.
- c. The Subdivider may request in writing, waivers of items required in a Tentative Map application only in accordance with the applicable provisions of the Subdivision Code. The Director, in his or her sole discretion, may grant such waivers in writing and condition the waivers in a manner that he or she deems appropriate.

4. Transfer Maps

Where authorized by the Subdivision Code, a Subdivider may submit a Tentative Transfer Map. Transfer Maps are meant to create legal parcels for the purpose of financing and conveyancing only, but do not grant any development rights. Because

⁴ Gov. Code Sec. 66452.6 requires DPW to determine the number of phased final maps in conditions of approval when a Tentative Map application is pursuant to a development agreement with the City.

no development rights are granted, a Subdivider may request in writing the waiver or deferral of many items generally required in a Tentative Map Application Packet in accordance with the applicable provisions of the Subdivision Code for Conveyancing or Finance Maps. The Director, in his or her sole discretion, may grant such deferrals and/or waivers in writing and condition the deferrals and/or waivers in a manner that he or she deems appropriate.

B. CITY AGENCY REVIEW

As required by the State Subdivision Map Act, the Subdivision Code, and other applicable local laws, all proposed subdivisions shall be reviewed by the Planning Department for consistency with the General Plan and any applicable Area Plan.⁵ The Planning Department also shall review the application to determine consistency with the priority policies of Planning Code Section 101.1, in accordance with the applicable environmental laws including the California Environmental Quality Act, Administrative Code Chapter 31, and report its determination to the Department. In order to be informed of the various policies applicable to a particular subdivision, the Department recommends that the Subdivider consult with the Planning Department prior to submittal of a Tentative Map application.

All proposed subdivisions shall be reviewed by the TIDA for consistency with the Development Agreement and other Project Approvals. Any Tentative Map shall be sent to TIDA and TIDA shall respond within 30 days with a consistency determination (stating whether the proposed subdivision is consistent with the Project Approvals). Any subsequent Final Map Checkprint shall also be sent to TIDA for a

⁵ Subdivision Map Act (“SMA”) Sec. 66473.5

finding of consistency before submittal of such Checkprint to the Department for review. The Subdivider shall provide a copy of TIDA's determination of consistency to Public Works whenever any Final Map Checkprint is submitted to the Department for review.

Other City departments and interested persons may also review and comment on the Tentative Map as provided for in the applicable State law and Subdivision Code.

C. NOTICE OF PUBLIC HEARINGS AND NOTICE OF TENTATIVE MAP DECISION

The Subdivider shall submit the following materials with the Application Packet.

1. 300-Foot Radius Map

A map drawn to scale showing the property that is the subject of the application and all other properties within a radius of 300 feet of the exterior boundaries of the subject property, the Assessor's Parcel Number, and the names of all streets shown. The drafting scale shall be sufficiently sized to show and identify individual properties. The Subdivider shall show the 300' Radius line in a bold dashed linetype and shall annotate in several places with leaders from the offset perimeter to the subject development boundary.

2. Address List

The Subdivider shall submit a printed and electronic list, showing in numerical order by Assessor's Parcel Number, the names and mailing addresses of the last known owners of all properties touching or within the 300-foot radius of the subdivision shown on the map. These names and addresses are available at the Tax Collector's Office and are shown on the latest city-wide assessment roll. The list also shall include the names of the residents within the subdivision itself. In addition, the

Subdivider shall include on the list names and addresses of the persons, organizations, or any other agencies that have made a formal request to the Department to receive notification concerning the subdivision. The electronic copy of the list shall be in *.xls or *.txt format or other format acceptable to the Director.

3. Mailing Envelopes

The Subdivider shall submit one set of #10 regular envelopes with rounded gummed flap, stamped, and addressed to the parties in the Address List and printed with the Department's return address. Envelopes are available upon request from the City and County Surveyor's office.

4. Mailing Envelopes for a Public Hearing on the Tentative Subdivision

In the case of vesting tentative maps or multiple phased final maps or when the Director elects to hold a public hearing, the applicant shall submit an additional set of mailing envelopes.

D. ACTIONS ON TENTATIVE MAP

1. Approval, Conditional Approval, or Denial of Map

After the determination that a Tentative Map application is deemed complete and the Planning Department issues its determination under the California Environmental Quality Act (CEQA), the Director shall approve, conditionally approve, or deny the application within 50 days (or other time period as specified in the Subdivision Code) unless such time shall have been extended by mutual agreement.

2. Director's Hearing

In advance of the Tentative Map decision, the Department may hold a Director's Hearing, as determined in accordance with the provisions of the applicable

Subdivision Code. The Department and the Subdivider may hold a Subdivision Conference, as determined in accordance with the applicable Subdivision Code or at the request of the Subdivider.

3. Notification in Writing

The Director shall notify the Subdivider in writing of his or her findings and decision with regard to said Tentative Map. The Director also shall mail notice of the decision to all parties listed on the 300' Radius Map.

E. CONDITIONS OF APPROVAL

Conditions of Approval (“COA”) on a Tentative Map allow for the Director to approve and record a Final Map subject to the satisfactory completion of necessary and important tasks related to the subdivision and construction of improvements for the subdivision. Compliance with the COA is an important link in a long chain of tasks that culminate in a complete and successful development. COA typically include the requirement for the submission of materials or the completion of tasks by specified deadlines, various improvement plans, and construction permits⁶. If the Subdivider may not complete required public infrastructure at the time of Final Map Approval, the COA also shall address the following:

- i. Improvement Agreements
- ii. Submission to the City of Irrevocable Offers of Real Property in Fee and/or Improvements (or rarely, Offers of Easements and Easement Agreements)

⁶ See Section V. Tentative Map Requirements, (D) Engineering Plans and Documents.

- iii. Bonds to guarantee completion of and payment to contractors for future public improvements

2. Availability of Sufficient Water Supply

- i. Water Supply - Unless a statutory exception applies or the Subdivider has previously satisfied this requirement as part of environmental review, subdivisions involving a proposed residential development of more than 500 dwelling units shall require proof to the satisfaction of the Director that a sufficient water supply shall be available.⁷ The Subdivider shall request proof from the San Francisco Public Utilities Commission (“SFPUC”) and submit to the Department written verification from the SFPUC within 90 days of the request.
- ii. Wastewater Treatment Service – The Infrastructure Plan provided that: “Subject to future negotiation and agreement between the TIDA and the SFPUC on the provisions and terms upon which the SFPUC will provide such services it is intended that the SFPUC may finance, design, build, own and operate a new Wastewater Treatment Facility (“WWTF”) on Treasure Island or provide for other improvements and/or agreements as necessary to provide wastewater treatment services to the Project.” (Infrastructure Plan Section 10.3) In Resolution 11-0068, adopted May 10, 2011, the SFPUC gave conditioned approval of the Interagency Cooperation Agreement and the acceptance, operation and maintenance of SFPUC related infrastructure, “provided the SFPUC retains full

⁷ SMA Sec. 66473.7; see also subsection (i), excluding certain urbanized areas.

discretion to negotiate the elements of the wastewater/recycled project.” All Tentative or Vesting Tentative Maps will include a condition identifying the terms of an agreement between the TIDA and SFPUC as to the provision of wastewater/recycled water services, or in the absence of such agreement, stating the conditions under which the TIDA will provide wastewater/recycled water utility service at the time of such subdivision map approval, and reserving unto the City the ability to add restrictions on subsequent approval of maps or permits consistent with the terms of such service.

3. Public Easements

To the extent that the design or improvements of a subdivision will conflict with easements acquired by the public at large, the Department shall condition approval to provide for alternate easements substantially equivalent to the ones previously acquired by the public along with any associated City actions necessary to accomplish this.⁸

4. Substantial Compliance with Tentative Map

Final Maps shall be in substantial compliance with an approved Tentative Map and any conditions of approval issued thereto.⁹

To assist the Department in confirming this requirement, the Subdivider shall submit to the Department a tracking document in spreadsheet form as pre-approved by the City and County Surveyor. The spreadsheet shall address how each COA has been or will be satisfied. The spreadsheet shall be submitted with the Final Map Checkprint.

⁸ SMA Sec. 66474.

⁹ SMA Sec. 66474.1.

In the case of Phased Final Maps, where deferral of certain application materials has been requested by the Subdivider and approved by the Director, the Subdivider also shall submit a tracking spreadsheet with any Deferred Materials Submittal, if and when such a Submittal is required.

5. Vesting Tentative Map

A condition for Vesting Tentative Maps shall be that the Subdivider provides a date-stamped copy of the Subdivision Regulations in effect on the date of approval of the Vesting Tentative Map. The Department shall maintain a copy of this document in its files on the Subdivision.

6. Timing of Submittals for Multiple Phased Final Maps

Where a Subdivider has requested and obtained approval to submit multiple phased Final Maps, the Director shall condition and address the timing of interim submittals such as Deferred Materials Submittals and Improvement Plans, to provide for efficient review by the various City departments.

7. Condition Precedent to Dedication of Public Improvements

The Director shall require as a condition of approval of any tentative map that no Public Improvement Agreement be executed, and no Final Map or Parcel Map be recorded, where a dedication of public improvements is required, without prior execution of a Jurisdictional Memorandum of Agreement¹⁰ to the satisfaction of the Director.

¹⁰ See Sec. V(A)(2) for more information.

8. Other Conditions

The Subdivider shall address other City concerns associated with the proposed subdivision through additional conditions as the Director deems necessary. The City Engineer or the City and County Surveyor shall review conditions related to engineering or land surveying, as appropriate, to determine compliance with generally accepted engineering or surveying practices.

F. DEFERRED MATERIALS SUBMITTAL

Where the Subdivision Code allows Phased Final Maps and the Subdivider has requested deferral of certain application materials and the Director approves or conditionally approves the deferral, the Subdivider shall submit to the Director a Deferred Materials Submittal at the same time as and concurrent with each application for phase approval in accordance with local laws and rules related to phased approvals. The Deferred Materials Submittal shall update the Tentative Map with all items previously deferred and an explanation of any materially changed site conditions that would affect the Conditions of Approval.

The Subdivider shall prepare and submit a tracking spreadsheet addressing each condition of approval, the estimated date and method of satisfaction, and what if any conditions are being satisfied, through the submittal of the Deferred Materials Submittal.

The Director shall review the Deferred Materials Submittal and if the previously deferred information affects the prior COA, the Director reserves the right to impose reasonable conditions necessary for the development and to refine, adjust,

supplement, modify, and/or delete the COA to the extent consistent with the earlier approval.¹¹

If the Subdivider fails to timely submit any deferred item in the Deferred Materials Submittal, the Director shall return the Submittal to the Subdivider with a statement that identifies what materials are absent. As consistent with the applicable Subdivision Code, the Subdivider may request in writing the continued deferral of these materials. The Director, in his or her sole discretion, may grant such additional deferral in writing and condition the deferral in a manner that he or she deems appropriate.

G. SUBMISSION OF FINAL MAP

Within the time accorded under the Development Agreement, after the approval or conditional approval of the Tentative Map or maps, and as consistent with the applicable provisions of the Subdivision Map Act¹², the Subdivider shall prepare a Final Map in accordance with the Tentative Map as approved, and submit it to the Director in the form of a Final Map Checkprint. The Subdivider's failure to submit a Final Map within the applicable time limits shall result in the Tentative Map being automatically denied.

H. ACTION ON FINAL MAP

The Director shall forward all Final Maps or Parcel Maps associated with a Public Improvement Agreement to the Board of Supervisors for approval. After all required

¹¹ See also SMA Sec. 66474.3(f) which provides that, “[a]n approved or conditionally approved tentative map or vesting tentative map shall not limit a legislative body from imposing reasonable conditions on subsequent required approvals or permits necessary for the development...”

¹² See Development Agreement Sec. 3.9.1 regarding the extensions of various categories of subdivision maps.

City approvals are completed, the Department shall record the Final Map in the County Recorder's Office for San Francisco ("Recorder").

I. PUBLIC IMPROVEMENTS, IMPROVEMENT AGREEMENTS, AND SECURITY

1. Form of Dedications

The process and forms for dedication and acceptance of public improvements shall be completed by the Subdivider to the satisfaction of the Director and as specified within these regulations and accompany any Public Improvement Agreement as separate exhibits.

2. Security

- a. The requirements of this Section apply to all Public Improvement Agreements.
- b. The Director shall not sign or record a Final Map or Parcel Map until the Department has received and approved all improvement securities required herein in the form prescribed by the City pursuant to Government Code Section 66499 et seq.
- c. The Department shall require a performance bond or other acceptable security as provided in Government Code Section 66499 in the amount of 100 percent of the estimated cost of completion of the construction of the unfinished public improvements or installation of all public improvements, as determined by the City Engineer, for all subdivisions to secure satisfactory performance of those obligations. As a guarantee of payment for the labor, materials, equipment and services required, the Department shall require a payment bond or other acceptable security for 50 percent of the estimated cost of

completion of unfinished public improvements or installation of all public improvements, as the City Engineer determines. For purposes of the preceding sentences, the “estimated cost of completion” shall include all costs of remediating any hazardous materials as necessary to permit completion of the required public improvements.

- d. The Department shall release or reduce security upon completion of construction as follows:
 - i. The Department shall reduce security to no less than 10 percent of the original amount for the purpose of guaranteeing repair of any defect in the improvements which occurs within one year of when:
 - 1) the Subdivider has completed the public improvements to the satisfaction of the Director; and
 - 2) the Clerk of the Board of Supervisors certifies that no claims by any contractor, subcontractor or person furnishing labor, materials or equipment for the required public improvements have been filed against the City prior to or within a 100-day period following completion of the public improvements.
 - ii. If any claims by any contractor, subcontractor or person furnishing labor, materials or equipment to the Subdivider have been filed against the City, then the Department shall reduce the performance security only to an amount equal to the amount of all such claims filed or to 10 percent of the original amount whichever is greater.

- iii. The Department may reduce security in conjunction with completion of a portion of the public improvements to the satisfaction of the Director, to an amount that the Director determines; however, in no event shall the Department reduce the amount of the security below the greater of:
 - 1) the amount required to guarantee the completion of the remaining portion of public improvements and any other obligation imposed by the Subdivision Map Act, this Code or the Public Improvement Agreement; or
 - 2) 10 percent of the original amount of the security.
- iv. The Department shall release security when all of the following have occurred:
 - 1) One year has passed since the date of acceptance by the Board of Supervisors, or one year has passed since the date that all deficiencies that the Director identifies in the required public improvements have been corrected or waived in writing; and
 - 2) If any claims identified in Subsection (d)(i)(2) have been filed against the City, all such claims have been satisfied or withdrawn, or otherwise secured.

V. TENTATIVE MAP REQUIREMENTS

A. GENERAL

1. Dedications of Private Property or Property Not Owned by TIDA

Because no private property exists within the area proposed to be developed under these Subdivision Regulations on the initial effective date of these Regulations, the Subdivider shall refer to the City-wide Subdivision Regulations for any future circumstances where privately owned property may be needed for public dedications unless these Regulations identify the specific situation and method(s) to address it. Should there be any dedication of fee interest in private property, such dedications shall be to TIDA acting in its independent authority, not the City.

2. Dedications of Improvements on TIDA-Owned Property

For property that TIDA owns, including lands subject to the public trust for commerce, fisheries, and navigation (the “Public Trust”), but not under the jurisdiction of the Department for street and roadway purposes, the Subdivider shall clearly label the status of such lands on the tentative map. Subject to Board of Supervisors approval, the Director may accept jurisdiction and regulatory control of such lands subject to an interdepartmental transfer of jurisdiction as set forth in a Jurisdictional Memorandum of Agreement (“Jurisdictional Memorandum”) between TIDA and affected City departments. The Jurisdictional Memorandum shall address at a minimum, the issues associated with permitting authority, standard processes for offers, construction, dedication, acceptance, maintenance, excavation, moratorium streets and street vacations, and associated uses for public streets such as public

utilities or private improvements permitted by license in a franchise agreement or encroachment permit.

Where property underlying proposed right-of-way will be dedicated to TIDA for public use and public street and roadway purposes, the Subdivider shall clearly label such locations on the Tentative Map as “PROPERTY TO BE DEDICATED TO TIDA FOR PUBLIC STREET AND ROADWAY PURPOSES SUBJECT TO MEMORANDUM.” If Subdivider will dedicate the property to TIDA for public use as park or open space, the Subdivider shall clearly label such locations on the Tentative Map as “PROPERTY TO BE DEDICATED TO TIDA FOR PUBLIC PARK AND OPEN SPACE PURPOSES SUBJECT TO MEMORANDUM.” In addition to the aforementioned requirements, where public improvements will be constructed on land (whether within existing public right-of-way or on property subject to future dedication of public right-of-way) that is or will be under TIDA ownership, the Subdivider shall clearly label such locations on the Tentative Map as “PUBLIC IMPROVEMENT(S) TO BE DEDICATED TO TIDA OR THE CITY SUBJECT TO MEMORANDUM.” In any location that public utilities are located on lands subject to the Public Trust or within existing or future dedicated public right-of-way that is or will be under TIDA ownership, the Subdivider shall label such locations on the Tentative Map “LANDS SUBJECT TO A PERPETUAL EASEMENT RESERVED FOR PUBLIC UTILITIES.”

3. Other Considerations

Where the property underlying improvements will remain privately owned but used for public purposes, the Department and any affected City department shall determine

whether they will allow a Subdivider to dedicate an easement solely on the face of the map or require an additional easement agreement with the City. If the City requires an easement agreement, such easement shall be subject to Board of Supervisors approval unless local law provides for an alternate form of approval.

Privately owned improvements and other encroachments are generally precluded from occupying the public right-of-way. When such private occupation of public right-of-way is required, the Subdivider shall obtain a separate approval or permit from the appropriate City agency, board, or commission in accordance with local law. If required public improvements are not complete at the time of parcel map or final map approval, the Subdivider shall enter into a Public Improvement Agreement with the City in accordance with the applicable procedures of Subdivision Code Section 1651.

B. APPLICATION PACKET

The Application Packet containing detailed instructions, checklists and requirements for each particular type of subdivision of land is available in the most current and updated form at the Department's offices or on the Department website.

C. CONTENTS OF TENTATIVE MAP

The following items are arranged in a checklist format for sheets in a typical Vesting Tentative Map submittal.

Refer to the applicable Subdivision Code for additional items such as architectural plans that the Department may require for Vesting Tentative Maps or other requirements listed below that the Subdivider may omit from a Tentative Map that is not a "vesting" tentative map.

The contents of the Tentative Map application do not substitute for any required engineering documents such as grading plans, improvement plans or utility plans, but should be consistent with the design criteria for such documents as set forth in greater detail in the applicable engineering-specific Appendix attached hereto.

The Tentative Map shall be neatly drawn at a scale sufficiently large to present the required information clearly and accurately. All lettering and numerals on the drawings shall be legible from the bottom or right-hand side. In general, a tentative map shall contain the following information.

1. Cover Sheet

- a. Title stating: “Tentative Subdivision Map” or “Vesting Tentative Subdivision Map” or “Tentative Parcel Map” or “Vesting Tentative Parcel Map” or other title as authorized by the applicable Subdivision Code¹³.
- b. Title stating the location, “San Francisco, California.”
- c. Include “condominium purposes” in Title if applicable and include the number of residential and/or commercial units proposed.
- d. Vicinity Map showing the project location within the region.
- e. Location Map showing the project extents.
- f. Project Data including:
 - i. Street address of project
 - ii. Assessor’s block and lot numbers
 - iii. Owner/Subdivider’s name and contact information
 - iv. Existing and proposed land use zoning

¹³ A “Vesting” Tentative Map is subject to the requirements of the San Francisco Subdivision Code Section 1333.2 and California Government Code Section 66452.

- v. Project area in acres to the nearest hundredth acre
- vi. Existing and proposed utility providers and contact information
- g. Legend showing abbreviations, symbology, and linetypes
- h. Name, address, “wet” seal and signature of the Surveyor (wet seal required on printed copy – electronic seal and signature acceptable for pdf copies - 16 CCR 411).
- i. Surveyor’s and/or Engineer’s Statement.
- j. Note: Actual boundary survey only required for “vesting” maps. If the tentative map contains the work of more than one licensed professional, the map should indicate their respective responsibilities and portions of the map completed under their supervision.
- k. A notation superimposed over the Surveyor’s seal stating “preliminary” or “for examination only.”
- l. Sheet numbers: “Sheet ___ of ___” in the lower right corner of each sheet.
- m. Sheet size: 24” x 36” or 30” x 42” with a marginal line drawn 1” from all borders.
- n. Index containing a description of each sheet in the plan set.
- o. Basis of bearings, units of measurement, vertical, and horizontal datum.
- p. Statements regarding existing use of property, proposed development, proposed improvements, design modifications and exceptions, retention of ownership in common areas, and whether use of multiple phased final maps is planned.

- q. A reference to environmental evaluation data on the appropriate Planning Department forms.

2. Existing Site Conditions

- a. The names of the adjacent subdivisions, or the record vesting information of adjacent parcels of land, and the Assessor's block and lot numbers of adjacent parcels.
- b. Location, dimensions, and approximate size of existing lots.
- c. The location of all existing buildings within the subdivision and on adjacent land which may be affected by the proposed subdivision.
- d. The location and names of all existing streets within or adjacent to the proposed subdivision, together with overall widths of roadways.
- e. The locations and widths of existing railroad right-of-way, San Francisco Municipal Railway ("MUNI") right-of-way, sewer and other easements within or affecting the proposed subdivision.
- f. Location and dripline of large trees, 8" or larger diameter at breast height, within the proposed subdivision.
- g. Location of all existing visible surface utilities present at the proposed subdivision. Include: drain inlets, manholes, clean-outs, water valves, fire hydrants, gas valves, electrical and telephone vaults, utility poles, MUNI poles, street lights, traffic lights, and all other surface utilities fronting or within 25 feet of the subject property.

- h. Location of all existing features of sub-surface utilities present at the proposed subdivision. Include material, diameter, and direction of flow (can be based on record information).
- i. Topography with contours delineated at 1' intervals; spot elevations may be added for flat sites as necessary to depict slope.
- j. Location of existing improvements including, building envelopes, sidewalks, top face of curb and flowline, driveways, and other improvements fronting public areas. Note the source (e.g. GIS records, aerial survey, field survey, etc.) and date of the above information and whether any significant changes occurred between then and the time of application.
- k. Note whether buildings or other improvements are to be demolished or preserved in the proposed subdivision development.
- l. North arrow (usually pointing to left or top of sheet), graphic scale, date of drafting, and a submission number, i.e. first submission, second submission, etc.

3. Proposed Parcelization (Lots, Parcels, or Units)

- a. Proposed streets within or adjacent to the proposed subdivision; indicate if proposed streets are to be public or private. If the Department has not selected and approved street names, the Subdivider may use identifying letters.
- b. Location, dimensions and approximate size of proposed lots.
- c. All parcels of land that the Subdivider proposes to dedicate for public use such as parks, open space, right-of-way, etc., together with the purposes, conditions, and limitations, if any. Note the party who will be the beneficiary

of the offer of dedication if it is an entity other than TIDA or the City, e.g., non-City governmental agency, Private Utility, Non-Profit, Homeowner's Association, etc.

4. Proposed Street Improvements

- a. Proposed streets within or adjacent to the proposed subdivision, together with overall widths of roadways and sidewalks. Indicate curb return radius. Indicate if proposed streets are to be public or private. If the Department has not selected and approved street names, the Subdivider may use identifying letters.
- b. Typical cross-sections of proposed and existing streets showing the full width of existing right-of-way and any proposed addition to or reduction in right-of-way.

5. Proposed Underground Utilities

- a. Layout of drainage and sanitary facilities and utilities, including alignments and grades thereof. Show manhole covers and other underground structures together with distance between them and direction of flow. Label separation distances between water mains and other sanitary facilities.
- b. Layout of all other existing and planned utility facilities which would serve the proposed subdivision such as electric, gas, potable water, reclaimed water, SFWS, telephone, cable TV, solar, etc.
- c. Layout of the street lighting and facilities for the fire alarm and police communications system.

- d. Show proposed connections between existing and proposed utilities, between interim sub-phases of proposed development, and proposed lateral service connections to future lots. Show any temporary interim facilities that will function prior to completion of proposed final improvements.
- e. Show location and size of all required easements and right-of-ways needed to serve the public or private utilities.
- f. Note any infrastructure improvements necessary to be constructed together to make the utility facilities operable, whether on-site or off-site.
- g. Note the party responsible for ownership and maintenance of the actual infrastructure if that party differs from the proposed owner in fee.

6. Proposed Grading Plan

Note: A separate grading plan is required for planned cut/fill involving more than 1,000 C.Y. of earth. Such grading plan should be consistent with the design criteria for such plan as described in greater detail in the applicable engineering specific Appendix attached hereto.

- a. Label proposed pad grades, streets, and other proposed hard surfaces. Label areas of cut/fill.
- b. Note the location, height, and type of proposed structural retaining walls.
- c. Include a statement on whether the site grading is impacted by any applicable environmental mitigation measures.

D. ENGINEERING PLANS AND DOCUMENTS

Improvement plans, utility plans, and other required engineering plans and documents shall comply with the requirements of the applicable engineering specific Appendices attached hereto.

1. Appendix A

Technical Specifications Related to Surveys Performed in San Francisco.

2. Appendix D

Technical Specifications Related to Engineering Documents for Treasure Island and Yerba Buena Island.

3. Other Appendices

Appendix B: Technical Specifications Related to Engineering Documents Applicable City-Wide Unless Specified Otherwise in Subsequent Appendices.

Appendix C: Technical Specifications for Candlestick Point/Hunters Point Phase II Development.

Or, such other appendices the Department subsequently adopts or amends hereto from time to time.

If the engineering plans and specifications related to the proposed public improvements are not addressed in the Appendices, the Subdivider shall rely on the requirements set forth in the Department's Standard Plans and Specifications and the other officially adopted regulatory standards of other City departments.

VI. DEFERRED MATERIALS SUBMITTAL

When a Subdivider requests both phased Final Maps and the deferral of application materials, and the Director has approved such a request, the Department shall require

the Subdivider to submit Deferred Materials Submittals prior to submittal of a Final Map Checkprint in accordance with Section IV. Subsection F. In such Deferred Materials Submittal, Subdivider shall graphically present the areas included within the proposed Final Map and include an overlay of all items that the Department previously deferred as part of its tentative map approval. Public Works may address additional information on the content and timing of Deferred Materials Submittals in the tentative map conditions of approval.

VII. FINAL MAP

A. Conditions Satisfied

Subdivider shall satisfy all applicable conditions of approval prior to the recording of a Final Map. If Subdivider does not satisfy all public improvement requirements prior to recording the Final Map, Subdivider shall address and secure any outstanding requirements through a Public Improvement Agreement in accordance with the provisions of the applicable Subdivision Code and these Regulations. City approved Improvement Plans are a prerequisite to Department approval of any Public Improvement Agreement.

B. Satisfaction of Conditions Documented

When submitting a Final Map Checkprint, the Subdivider shall prepare a tracking spreadsheet addressing each condition of approval, the date each was satisfied, and the method of satisfaction (actual compliance or future compliance by separate agreement and security).

C. Checkprint Submittal

Subdivider shall submit to the Department Final Map Checkprints for City review comments and redline corrections. Upon receipt of the City's requested revisions, the Subdivider shall revise and re-submit another Final Map Checkprint conforming with all requested changes.

Upon satisfactory review of the Final Map Checkprint, the Director shall issue instructions for submittal of mylar copies of the Final Map for recording.

The content of Final Maps and Final Map Checkprints shall conform to the technical specifications described in Appendix A.

D. Map Certificates

The Final Map shall bear the following certificates or acknowledgments:

- a. A certificate, signed and acknowledged by all parties having any record title interest in the land subdivided, consenting to the preparation and recordation of the Final Map and an irrevocable offer of dedication for public use of the streets and easements shown.
- b. Notary's acknowledgment of signatures.
- c. Approval of the Director and City Engineer.
- d. Approval as to form by the San Francisco City Attorney ("City Attorney").
- e. Certificate of the City and County Surveyor.
- f. Certificate of the Surveyor.
- g. Certificate(s) of the Clerk of the Board of Supervisors as to liens or taxes.
- h. Certificate of the Clerk of the Board of Supervisors approving the map and accepting and/or rejecting the offers of dedication.

- i. The Recorder's Certificate.
- j. Certificate of Compliance.

VIII. PARCEL MAP

The Department review and approval process for Parcel Maps shall be the same as for Final Maps indicated in the previous section. Parcel Maps shall include the same information specified for a Final Map with the exception that required certificates may vary as listed below.

A Parcel Map shall bear the following:

- a. Certificate of the Surveyor.
- b. Certificate of the City and County Surveyor.
- c. A certificate signed and acknowledged by all parties having any record title interest in the real property subdivided, consenting to the preparation and recordation of the parcel map. Note that when no offers of dedication are being made, then signature blocks for Trustees or Beneficiaries are not required to be shown.
- d. Notary's acknowledgment of signatures.
- e. The Recorder's Certificate.

Recommended standard forms of the above certificates and acknowledgments are available at the Department's offices or on the Department website.

IX. RECORD OF SURVEY MAP

A Record of Survey ("ROS") map may be filed for any purpose specified under applicable State law. All recorded maps shall comply with the technical requirements specified in Appendix A,

A Record of Survey Map shall bear the following:

- a. Certificate of the Surveyor.
- b. Certificate of the City and County Surveyor.
- c. The Recorder's Certificate.

Recommended standard forms of the above certificates and acknowledgments are available at the Department's offices or on the Department website.

X. ADDITIONAL REQUIREMENTS

Subdivider's Tentative Map application shall include the then current application fees as published and available at the Department's offices or on the Department website.

A Parcel Map or Final Map shall be accompanied by the following:

- a. A recording fee. Refer to the Office of the Assessor-Recorder for the current fee schedule.
- b. Title report or reports updated to within 45 days of recording.
- c. A tax certificate dated within 30 days of date of submittal.
- d. Any other item(s) requested by the mylar approval transmittal.
- e. A tracking spreadsheet document, signed by the Subdivider or Applicant, indicating how and when each COA was satisfied.

Subdivider's Parcel Map or Final Map, when applicable, also shall include the following unless other provisions as applicable to TIDA or City owned lands apply pursuant to a Jurisdictional Memorandum:

- f. Grant Deed of Fee Interest: A deed(s) to the street areas, pedestrian ways, and other property that the Subdivider shall dedicate to public use transferring the title in fee to TIDA or the City as described in the Jurisdictional

Memorandum. Subdivider shall furnish a title report covering the parcels to be dedicated showing the parcels to be free and clear of all encumbrances. Subdivider also shall accompany the deed with an irrevocable offer of the property and a separate irrevocable offer of the proposed improvements referencing approved improvement plans.

- g. Grant Deed of Easement Interest: If the Director authorizes a public easement in lieu of a grant deed, the Subdivider shall submit the grant deed of easement at this time unless the easement can be shown and dedicated solely on the face of the map. The easement to the City shall contain the regular conditions and restrictions shown in the City's standard form for easements. (The form and process of granting and accepting any lesser real property interest, at the discretion of the Department, shall follow the same form and process as that of granting and accepting a fee simple interest.)
- h. Improvement Agreements: Subdivider shall submit a draft version of the Improvement Agreements applicable to the Final Map with a Final Map Checkprint. Subdivider shall provide the final form of the Improvement Agreements at least three weeks before any applicable Board of Supervisors hearing date and the fully executed Improvement Agreements at least one week prior to recordation of a Final Map.
- i. Monument Bond: A bond in an amount that the City and County Surveyor determines is necessary to cover the cost of setting monuments if the Subdivider will set monuments after the City records the Final Map.

- j. Temporary Construction Easement: Subdivider also shall provide an easement or license agreement (by separate instrument or as contained within the terms of a permit) at the same time as the final form of the Improvement Agreement, such that the City can step into the shoes of the Subdivider in the event of a failure to complete construction of public improvements prior to the City's final acceptance of the dedication.

XI. SETTING MONUMENTS

The Surveyor shall set permanent survey monuments prior to the recordation of any map in such positions that another surveyor may readily retrace the lines of the survey or subdivision. The City and County Surveyor shall review and approve the proposed number of monuments and their locations.¹⁴

XII. REVISIONS AND CERTIFICATES OF CORRECTION

Upon written request of the Surveyor who prepared the map, the City and County Surveyor may allow a Final Map or Parcel Map, once submitted for recordation, to be recalled prior to recordation. The request for a recall shall state the reason for the recall and the nature and extent of the revisions to be made.

No recorded Final Map or Parcel Map may be repeatedly amended with certificates of corrections. Where the extent and occurrence of such corrections are excessive in the opinion of the City and County Surveyor, he or she shall require a new map to be

¹⁴ Refer to Appendix A. for additional details and requirements.

filed and approved. The Department shall charge a fee, based on actual cost, for checking and processing each certificate of correction.

XIII. SEVERABILITY

If any section, subsection, sentence or provision of these Subdivision Regulations is ruled inconsistent with the provisions of other existing State or local statutes and declared void, such said section, subsection, sentence or provision shall not in any way invalidate or change any other portion or portions of these Subdivision Regulations.

XIV. EFFECTIVE DATE

The provisions of these Subdivision Regulations, as amended, shall become operative upon approval and adoption by the Director.

APPENDIX A – TECHNICAL SPECIFICATIONS RELATED TO SURVEYS PERFORMED IN SAN FRANCISCO

I. GENERAL

Suggested guidelines for subdivision maps in San Francisco.

Although it is understood the County Surveyor is limited as to what can be required for a Record of Survey, following these Guidelines will be a substantial benefit in future years to the public and to the surveyors who may one day follow in our footsteps. This document does not provide an exhaustive discussion of the many unique situations that act to create these procedures. However, the City and County Surveyor is available to assist fellow Land Surveyor's or members of the public who wish to have a dialogue regarding these policies or who have any questions regarding their application.

Boundary surveys completed in San Francisco are subject to procedures unique to this City. The historical and physical realities of the City yield many unique situations that a surveyor can positively mitigate with the formalization of certain customs and consistent practices to promote and maintain reliable land records.

II. RETRACEMENT SURVEY POLICY

A. SURVEYS PRESUMED TO REFLECT DEED

When a surveyor submits a survey to the City for review and the survey is a retracement of lands described by metes and bounds, the survey must clearly depict relationship to the deed of record.

B. EXCEPTIONS

The City and County Surveyor, on a case by case basis, may request evidence extrinsic to the record deed to support a boundary resolution. The following guidelines are found consistent with the historical practice of surveying in this community, but are not conclusive or meant to preclude any private property rights or any other rights of the City and County of San Francisco or the State of California.

1. Deed Calls at Variance from Long Occupation

If the physical occupation on the subject property is discrepant with the written deed and the Surveyor proposes a resolution based upon the physical occupation, the survey shall show the relationship (by dimensions on the survey map) between the resolved boundary location and the record deed location as required to comply with Professional Land Surveyor's Act ("PLS Act") Section 8764. At a minimum, the following should be addressed and included in the proposed resolution¹⁵:

- a. Title research that includes McEnerney deeds¹⁶ for the subject parcel and all adjoiners.
- b. Field measurements documenting the location of the physical occupation of subject property, its adjoiners, and present location of improvements along the

¹⁵ Professional Land Surveyor's (PLS) Act Sec. 8764(d) and (g), requires the submittal of specific requested information where surveys have been previously performed by others.

¹⁶ Research should extend back in time to a point of common ownership of the parent tract. Because land records prior to the 1906 fire were largely destroyed, the McEnerney decrees to establish title are often the earliest surviving documents of record in the City.

full width of the block together with a comparison of those locations shown on historical surveys as required by PLS Act Section 8764.¹⁷

- c. Evidence demonstrating that current occupation supports the historical evidence of occupation dating back to the era of the original McEnerney judgments. In such cases, the Surveyor may, consistent with his or her professional opinion, monument and hold as the property boundary either the record deed line or the occupation line. However, in doing so, the survey shall clearly state which of the two lines is purported to be the property boundary (deed or occupation).

Land Surveyors are not authorized to determine title or whether physical occupation has ripened into actual transfer of title. Land Surveyors are authorized to weigh all applicable evidence and opine on the location of the property boundary based on that evidence. If there exists physical evidence that is in contradiction to the title boundary, then the Surveyor must also show that additional information in an effort to memorialize all relevant survey evidence needed to conclude their opinion. In such a case, the use of extrinsic evidence may support the conclusion not that title changed, but rather that the reliably documented historical occupation is consistent with the actual intent of the parties as expressed in light of the circumstances¹⁸ of the 1906 earthquake and fire that necessitated the McEnerney deeds.¹⁹

¹⁷ This would include but not be limited to the Block Diagrams on file with the City. Original City field notes dating from the era of the 1906 fire have been found to support the information portrayed on many of the Block Diagrams.

¹⁸ Fire destroyed most of the public records existing in 1906. However anecdotal evidence and fragments of surviving documents show that substantial portions of the City had been surveyed, platted, developed and occupied since the time of statehood.

¹⁹ See Civ. Proc. Sec. 2077 establishing principles for construing doubtful or uncertain descriptions of real property.

2. Unwritten Rights

These cases are not correctable by the surveyor. They are characterized by relatively shorter (5+ years) occupation. An actual transfer of title may have occurred, but the City shall recognize such transfer only after formal judicial action (quiet title) or agreement between the concerned parties (lot line adjustment, grant of fee ownership, easement, etc.).

3. Defective Deeds

A deed is presumed to have a defect in cases where the discrepancy between the deed and occupation is explained from evidence other than historical occupation alone. Such cases include among others, problems created through the chronology of McEnerney judgments and subdivisions of property containing some deficiency. Such defects may be, but are not necessarily, correctable by the Surveyor. Such retracements shall be based on substantial record evidence that clearly explains why the evidence invariably supports the Surveyor's conclusion. The explanation may incorporate graphic and/or narrative formats and needs to reach a logical conclusion.

III. SURVEYS AND COMPUTATIONS

- a. As a basis for a recorded map, a Surveyor shall complete a final survey of the land to be subdivided. If the schedule of construction of pertinent improvements potentially conflicts with an anticipated boundary location, the Surveyor is encouraged to consult early with the City and County Surveyor's office to help resolve any boundary questions. To help mitigate delays in the development schedule, the Surveyor may submit a complete boundary survey

for review and comments at the time of tentative map submittal or as early thereafter as possible.

- b. The Surveyor shall furnish closure calculations, in a form that the City and County Surveyor approves, that give bearings, distances, and coordinates, and shows the mathematical closure of lots. For calls to a remote point of commencement or ties to distant controlling monuments, the Surveyor shall provide a similar closure report that allows the ties shown on the map to be confirmed. Alternatively, the Surveyor may submit a least squares adjustment report, in a form that the City and County Surveyor approves, that is based on redundant observations.
- c. The Surveyor shall ensure that the exterior boundary and control ties for each block of the subdivision close.
- d. The Surveyor shall tie to all monuments, property lines, street and alley lines, and all easements or right-of-ways associated with a survey and that serve to perpetuate and preserve existing survey control.
- e. Surveys that show bearings shall tie to and have as a basis of bearings the CCSF-CS13²⁰, another prior map of record that is referenced on the map, or as otherwise approved by the City and County Surveyor.

IV. DETAILS OF RECORD MAPS

- a. All Record Maps shall be clearly and legibly printed using permanent black ink on mylar film. All affidavits, certificates and acknowledgments shall be

²⁰ City and County of San Francisco 2013 Coordinate System (CCSF-CS13), as established by that Certain Record of Survey 8080, recorded April 4, 2014 in Book EE of Survey Maps 147.

signed using a permanent black ink that dries without tracking or sticking onto adjacent sheets. The Subdivider or Applicant shall submit the Record Map to the City and County Surveyor for recording.

- b. All characters shall have a minimum text height of 1/10th of an inch at the plotted scale of the map. No lines or symbols shall cross through or obscure the printed characters and any such lines or symbols shall be trimmed or masked to preserve map legibility.
- c. The size of each sheet shall be 18 inches by 26 inches overall, with a marginal line drawn completely around each sheet leaving a blank margin one inch in width.
- d. A printed and graphic scale shall be shown on the map. The map must be sufficient to show all details clearly. Additional sheets may be employed to accomplish this purpose. Each sheet shall include a north arrow, the number of the sheet and the total number of sheets comprising the set, its relation to the adjoining sheets, and the basis of the bearings used.
- e. All survey and mathematical information and data necessary to locate all monuments and to locate and easily retrace any and all interior or exterior boundaries, including angles or bearings and distances for all straight lines shall be shown on the map. The map shall show radius, length and central angle of all curves. Non-tangent curves shall include additional curve elements such as chord length and chord bearing.
- f. Each block and lot shall be numbered. Lots on Final Maps shall use “lot” followed by Arabic numerals, i.e., “Lot 1”. Any lots on Final Maps dedicated

to the public shall be designated with alphabetic letters, i.e., “Lot A”. Lots on Parcel Maps shall use “Parcel” followed by alphabetic letters, i.e., “Parcel A”. Contact the City and County Surveyor for naming conventions on Parcel Maps that will dedicate parcels to the public. The record map shall show angles or bearings and distances of each lot, block, and boundary line, except when bearings or distances of lot lines in any series of lots are the same. The map may omit such bearings or lengths from each interior parallel lot line of such series. The map shall show each required bearing and distance in full. Angular measurements shall be shown to the nearest arc second and distances shall be shown to the nearest hundredth of a foot using U.S. Survey Feet as the unit of measurement, unless otherwise approved by the City and County Surveyor. Where needed to simplify or compare measurements to earlier record documents (deeds calling to fractions of an inch), distances may be converted and shown to the nearest thousandth of a foot. In such case, the Surveyor shall place a cautionary note explaining why the increased precision is shown and that it is not intended to imply a more accurate measurement.

- g. The record map shall designate each street by the name that the Director has authorized.
- h. The map shall show locations of all new monuments and shall describe them with sufficient detail so that they can be easily identified. Monuments not set at the time of the Final Map shall be labeled “To Be Set.” A map amendment shall be subsequently filed after monuments are installed and as a condition of the release of associated security.

- i. The record map shall indicate exterior boundary of land to be subdivided by means of a bold border of such a character that it will not obliterate any figures or other data.

V. MONUMENTATION

Subdivider shall not place monuments located in pavement areas until construction of pavement is complete. If a Record Map is filed before pavements have been constructed, the City and County Surveyor shall require the Subdivider to post a bond with the Department in an amount the City and County Surveyor determines shall guarantee that the monuments will be set. The Subdivider is required to set all monuments within two years of the City Engineer's determination that the construction of pavement has been completed. The PLS or RCE number shall be affixed to monuments set during the survey per Section 8772 of the PLS Act.

Monuments shall consist of the following alternatives as approved by the City and County Surveyor:

- a. A granite or concrete monument, 5 x 5 inches at the top, 9 x 9 inches at the bottom and 30 inches long. Subdivider shall place a lead plug, one inch in diameter and two inches long, in the center of the top face and the exact monument point marked with a brass nail. The Subdivider shall cap the monument with a cast-iron frame and cover, the design of which shall be approved by the City and County Surveyor.
- b. A surface metal disk countersunk and set flush in the surface of a concrete or rock structure of such a nature as to provide a permanent fixed and

immoveable reference point. The disk shall be composed of brass, bronze, or other comparable durable metal.

- c. Other sufficiently durable and identifiable monument as approved by the City and County Surveyor. Where feasible, the Subdivider shall place a 1/2" x 1/4" ceramic magnet below any monument to aid in future recovery and perpetuation of the monument.

VI. MONUMENT DESTRUCTION AND PROCEDURES FOR PRESERVATION

Survey monuments in the City are a valuable public resource that Subdividers and applicable governmental agencies shall preserve and perpetuate. Monuments form the tangible substance of land boundaries and perpetuate the horizontal and vertical location of land-related rights and responsibilities. The improper disturbance of survey monuments is illegal²¹ and may amount to a crime.²²

A. LOCATING MONUMENTS BEFORE CONSTRUCTION

Prior to performing any construction within any public street, public easement, or other City owned property, a Surveyor shall locate and reference all survey monuments on a Corner Record form or Record of Survey. The construction zone within which a survey monument is presumed to be disturbed shall include any work

²¹ Bus. and Prof. Code Sec. 8771(b) requires that survey monuments in the public way be referenced before construction, their positions recorded, and if disturbed or destroyed, be reset and perpetuated – all under the supervision of a Surveyor and in cooperation with DPW. See also The Greenbook – Standard Specifications for Public Works Construction Sec. 2-9.1, reiterating the above and explaining that a contractor is to provide notice before disturbing a survey monument and bears the expense of replacing a disturbed monument.

²²Penal Code Sec. 605 makes the malicious intentional destruction of survey marks a misdemeanor.

done within 10 feet of a survey monument. If the proposed work will disturb any survey monument the City owns or sets, the Subdivider shall contact the City and County Surveyor at least two weeks prior to construction and submit a Monument Reference Request form and the appropriate fee. The form, instructions and amount of the fees are available on the Department website.

Examples of City monuments and additional identifying information for City-owned monuments are available from the Department upon request.

B. REPLACING MONUMENTS AFTER CONSTRUCTION

When construction is substantially complete, but before certificate of final completion, the Applicant shall schedule an inspection of any monuments that existed prior to construction and within the construction zone. The Applicant shall reset and perpetuate any monuments that were disturbed or destroyed under the supervision of a Surveyor and file this information with the City and County Surveyor on a Corner Record form or Record of Survey. If the monument was a survey monument that the City owns or set, the Applicant shall contact the City and County Surveyor at least two weeks prior to completion, finalize the Monument Reference Request, and submit the appropriate fee per replaced monument. The form, instructions and amount of the fees are available on the Department website.

VII. STANDARD FORMS AND AGREEMENTS FOR EASEMENTS AND FEE DEDICATIONS

Subdivider shall base all offers of dedication, grant deeds, and agreements to benefit the public on the standard forms available upon request from the Department. The

TIDA, the City Attorney, and if required, the Director of the Division of Real Estate and the Board of Supervisors shall review and approve the content and form of all final offers, deeds, and agreements prior to any City acceptance or recordation. The following presupposes that Subdivider is dedicating privately owned land to public use. Where TIDA already owns or will own the land and the City and TIDA have entered into an easement or the Memorandum, the below subsections (A) through (C) are inapplicable and the provisions of the easement or Memorandum shall control.

A. PRIVATE EASEMENTS BETWEEN PRIVATE PARTIES

A Surveyor shall locate private easements on all record maps and identify them on the face of the map in a note describing the use of the easement and listing the easement recording information. Note that the map notation of the easement and the corresponding information in the title report should match. A Subdivider may not use a subdivision map to purport to create an easement benefiting a private party.

B. QUASI PUBLIC EASEMENTS

A Surveyor shall locate private easements intended to benefit a public entity in its proprietary capacity on the face of all record maps and label them “Private Easement for Public Utilities” or as appropriate. These easements and agreements shall be in the form that the public entity, and if necessary, the City Attorney approves. The Subdivider shall submit a copy of the approved easement and if applicable, the approved easement agreement, with a Checkprint prior to recording the map. The Subdivider shall include a note describing the use of the easement and listing the easement’s separate recording information on the face of the map. In the case of an

easement not separately recorded, then the Subdivider shall provide a copy of the public entity's official written interim acceptance of easement to the Department at the time of submittal of a Checkprint.

C. PUBLIC EASEMENTS

With prior approval and when permitted by the TIDA Executive Director and the Director²³, the Subdivider shall irrevocably offer easements in perpetuity for public access to TIDA when the easement will not be a dedicated public right-of-way for street and roadway purposes. The Subdivider shall offer such easements for dedication to TIDA, but TIDA will not accept such easements until the City Engineer deems construction of associated improvements complete and the Board of Supervisors acts to accept the dedication²⁴. These easements shall be in the form acceptable to TIDA, the Department and the City Attorney. The Subdivider shall submit a copy of the easement and easement agreement that the burdened property owner has executed with a Checkprint prior to recording the map. The Subdivider shall include a note making an irrevocable offer of the easement to TIDA, describing the use of the easement, and listing the easement recording information on the face of the map. Examples of such public access easements are available from the Department upon request.

²³Subdivision Regulations Sec. V(A), note the City's policy to require fee dedications. See also Sec. E, Conditions of Approval.

²⁴This section shall be inapplicable to easements dedicated for public utility purposes. The PUC requires separate consent and approval including approval by the PUC Commission for any easement for public utilities and may have additional and different requirements for depth of cover, minimum width and surface treatments not addressed in these Regulations. See Sec. VII(E), Dedication of Facilities for the PUC.

D. PUBLIC DEDICATIONS IN FEE

The City generally requires dedications in fee for new public right-of-way associated with land development projects; however, for purposes of these Regulations, the Department shall require dedication in fee to TIDA and subject to the Jurisdictional Memorandum, See Sec. V(A) Tentative Map Requirements. In all cases of privately-owned property, the Director shall require public right-of-way dedications for street and roadway purposes or parks and open space purposes in fee for real property to TIDA. In all cases where Subdivider will construct public improvements on existing or future dedicated public right-of-way for street and roadway purposes or parks and open space purposes without regard to whether the land is subject to the Public Trust, Director shall require dedication of such public improvements in fee to TIDA and/or the City, pursuant to the Jurisdictional Memorandum.

1. Completeness of Public Infrastructure

The City shall accept only full, complete, and functional public streets for purposes of City maintenance and liability and subject to the terms of the Jurisdictional Memorandum, and subject to exceptions for sidewalks, private encroachments, and other improvements that the City deems to be private responsibility. Full, complete, and functional streets include all the aerial, surface, and subsurface public improvements necessary for, and the full width of the public right-of-way from property line to property line and full length of the public right-of-way from intersection to intersection necessary to safely operate the public street and all other components as designed in perpetuity. The Subdivider shall not offer public improvements to TIDA or the City for purposes of City maintenance and liability

unless the improvements include the full, complete, and functional public street. The City shall not accept temporary streets or other temporary public improvements. Where proposed public streets or other public improvements connect to or rely upon private, temporary, or non-functional streets or street improvements, the Subdivider shall not offer such public improvements to the City and the City shall not accept such public streets or street improvements for City maintenance and liability purposes unless the Director, after consultation with other affected City departments, approves or conditionally approves the proposed connections and further subject to Board of Supervisors approval. The Director, with the consent of affected City departments and on a case by case basis, may grant an exception to these requirements.

2. Exception for Temporary Sanitary Sewer Force Main

The Director hereby authorizes an exception to the complete public infrastructure requirement of Subsection (1) above for the temporary sanitary sewer force main that Subdivider proposes to construct on the east side of Treasure Island subject to the future written consent of the SFPUC General Manager and after additional information provided by the Subdivider and after additional conditions the City may impose in response to such information. The SFPUC General Manager shall retain discretion on a sub-phase by sub-phase or permit by permit basis to consent to accept such public improvements that rely on the temporary force main. Upon written consent of the SFPUC General Manager, the Director, subject to Board of Supervisors approval, may accept such streets and other public improvements that rely upon the temporary sanitary sewer force main in the same manner as any other typical public street or improvement. The temporary force main itself shall not be

offered or accepted by the City, but Subdivider shall enter into such agreements as may be reasonably required by the City to operate, maintain or replace the temporary force main in the event of default by Subdivider.

Subdivider shall at a minimum comply with the following:

- a. Subdivider shall prepare a utility acceptance plan as part of any street improvement plan and demonstrate the necessity of connecting the temporary sanitary sewer force main for the initial sub-phases of the development to the Wastewater Treatment Plant. The utility acceptance plan shall show how such temporary force main will operate and be maintained and how and when the Subdivider plans to construct and complete an operational permanent sanitary sewer line. The utility acceptance plan shall show how the temporary sanitary sewer force main conforms with the corresponding force main design criteria and has capacity to support the proposed phase of development in addition to the prior phases of development.
- b. Subdivider shall be solely responsible for ownership, operation, maintenance, and liability of the temporary sanitary sewer force main; provided, however, that as part of the City's approval of the utility acceptance plan, the SFPUC General Manager may require that the SFPUC perform certain activities in relation to the temporary sanitary sewer force main and that the Subdivider reimburse the SFPUC for such activities. The City's approval of the utility acceptance plan also shall address the terms of and reimbursement for any SFPUC actions in relation to the temporary sanitary sewer force main. The Subdivider shall indemnify TIDA and the City against any and all claims,

losses and damages directly or indirectly caused by or resulting from the use, operation, or failure of the temporary sanitary sewer force main.

- c. The City may place requirements or conditions for additional testing of post-acceptance infrastructure where replacement of the temporary sanitary sewer force main could impact or damage such infrastructure. The Subdivider shall bear the cost of such testing and complete such testing to the satisfaction of the Director in consultation with the SFPUC General Manager as set forth in a written agreement that the Director, SFPUC General Manager, and Subdivider execute. The City also may require additional Security for removal and/or replacement of the temporary sanitary sewer force main and repair of any existing accepted public infrastructure that may be impacted or damaged.

3. Exception to Allow Deferral of Construction for Certain Public Improvements

- a. Requirements for Acceptance

The City requires that Subdivider construct and complete all Public Improvements necessary for new street segments at the same time prior to acceptance.

- i. In certain situations (for example, where lateral location or sizing cannot reasonably be determined due to the configuration of the subdivision or the anticipated phasing of development), Subdivider may request the Director's approval to allow Subdivider to defer installation of utility laterals serving adjacent lots after acceptance and opening of a new

street segment.²⁵ In instances where there is insufficient evidence to the SFPUC for it to confirm lateral size(s) and location(s) such as that described below in Subsection 3(a)(iv), the City, may prohibit Subdivider from installing water laterals until such time as the Subdivider provides the evidence required above to the SFPUC and the adjacent lot(s) is prepared to connect to the associated utility service. In the event these deferrals for construction of utility laterals occur, the following requirements shall apply.

- 1) Sanitary Sewer: Subdivider shall concurrently install sanitary sewer laterals together with the construction of the sanitary sewer main. Future excavations to modify, add, or replace sewer laterals after Subdivider has completed initial construction of the sewer main may necessitate that Subdivider also replace portions of the sewer main. The SFPUC shall determine the extent of main replacement required on a case-by-case basis.
- 2) Storm or Combined Sewer: Subdivider shall concurrently install storm drain/combined sewer laterals with the construction of the sewer main. Future excavations to modify, add, or replace sewer laterals after Subdivider has completed initial construction of the sewer main may necessitate that Subdivider also replace portions of the sewer main. The SFPUC shall determine the extent of main

²⁵For general information, a request to defer a sanitary lateral or storm or a combined sewer lateral may be requested by the Subdivider and reviewed by the Director (in his or her discretion) as a Variation under Sec. III(C) of these Regulations.

replacement required on a case-by-case basis. Subdivider shall not install storm drain connections to the Best Management Practices structures (BMPs) until the SFPUC approved the Final Stormwater Control Plan and Green Stormwater Infrastructure Staging Plan.

- 3) Water: Subdivider shall defer and not install laterals for low pressure water, recycled non-potable water, irrigation or fire suppression until such time that the SFPUC approves the location and size of each lateral and can schedule and perform the necessary City work to connect laterals to the water main. Subdivider shall show the design location of all foreseeable laterals serving future lots on the improvement plans in their approximate positions, but shall not size the laterals. Locations of laterals must not conflict with other required street improvements or necessary clearances. Subdivider shall place the following note on the improvement plans, “Water lateral shown in approximate location but not sized until Subdivider submits additional building details to the SFPUC and the SFPUC approves plans for the laterals based on such details.”
 - ii. Whenever laterals are deferred, Subdivider, as a condition precedent to City’s approval of the improvement plans that include a deferral, shall record a notice of restrictions against all property with a deferred laterals stating that the property is subject to future public right-of-way restoration, repair, and replacement obligations and costs related to the installation of the deferred laterals. The Director of Public Works and

the General Manager of the SFPUC shall approve the terms of the restriction prior to its recordation.

- iii. Neither Subdivider nor any other party shall be entitled to reimbursement for the costs of deferred laterals and any associated restoration, repair, or replacement of the public right-of-way.
- iv. When Subdivider intends to construct water lateral(s) concurrently with new streets the Subdivider must submit sufficient evidence to the SFPUC for it to confirm lateral size(s) and location(s). Minimum documentation shall include:
 - 1) Obtain Fire Sprinkler Service-Meter and Supply Size Approval from San Francisco Fire Department (“SFFD”) specifying fire service lateral size and street of connection based on the City Distribution Division’s (“CDD”) theoretical available flow and pressure in the water distribution main at the proposed point of connection.
 - 2) Provide preliminary fixture counts and proposed standard and recycled lateral sizes and locations calculated using the SFPUC Fixture Count Worksheet.
 - 3) Submit maximum flow (gpm) required for irrigation system and the proposed lateral locations.
 - 4) Backflow preventers proposed locations (must be 25’ from the point of connection).

5) Updated Street improvement plans or modifying permit documents such as informational bulletins from the Department, if applicable and available at the time of the request.

b. Trenching and Public Right-of-Way Restoration and Acceptance of Street
When Lateral Installations Deferred

When the Subdivider elects or City requires deferred installation of any utility lateral until after construction of the concrete street base and the Director has approved such deferral, the following requirements shall govern trenching and public right-of-way restoration and street acceptance:

- i. No new construction joints shall be allowed for the concrete base and concrete surface of streets. Trenching lines shall follow existing construction joints. Trenching restoration requires the replacement of the each affected concrete panel(s). A “panel” is defined as the section of concrete street base from construction joint to construction joint in both the transverse and longitudinal direction.
- ii. If a utility lateral trench is located within 3-feet of a construction joint, the Subdivider shall replace both the concrete panel that is cut and the adjacent panel closest to the cut.
- iii. If an adjoining concrete panel is undermined or should voids be identified under an adjacent panel, the Subdivider shall remove the adjacent panel, re-compact the sub-grade under the adjacent panel and install a new concrete panel.

- iv. Subdivider shall replace the asphalt concrete wearing surface to extend a minimum of 6 feet beyond the construction joint along the path of vehicular travel and to the nearest traffic lane line and as required by Article 2.4 of the Public Works Code as supplemented by Director's Order No. 178,940 and subsequent revisions thereto.
- v. Subdivider also shall replace, repair, restore, and/or install all required public improvements from the front of the curb to the property line.
- vi. Subdivider shall place construction joints in the concrete base in alignment with the construction joints in the curb & gutter to facilitate identification and placement of future utility laterals. As-built drawings shall show the location of the construction joints for concrete base streets to facilitate identification and placement of future utility laterals within the right-of-way.
- vii. Subdivider shall design and install all new laterals a minimum of 5 feet from outside edge to the center of any tree in the approved Streetscape Plan.
- viii. The City will accept completed street segments where Subdivider deferred lateral installation when:
 - 1) The Director approved the deferral as consistent with these Subdivision Regulations, and
 - 2) Subdivider has shown the lateral design and location on the applicable Improvement Plans, and

3) Subdivider has provided adequate security and other associated information necessary for future installation in the Public Improvement Agreement. At the time Subdivider requests a notice of completion for streets where there are deferred laterals, City may require Subdivider to amend the amount of posted Security to adequately address all work associated with installation of the deferred laterals.

ix. City shall retain Security for construction of deferred items until Subdivider has completed all public improvements.

4. Form and Process of Dedications of Land to TIDA and Public Improvements to TIDA and the City

Dedications in fee for real property shall be irrevocably offered to TIDA. Dedications in fee for public improvements shall be irrevocably offered to TIDA and/or City; TIDA and the City shall determine which entity shall accept such dedication pursuant to the Jurisdictional Memorandum. In addition, the Subdivider shall include an irrevocable offer of interim easement for areas under private ownership to TIDA and/or City such that TIDA or the City can complete the Subdivider's public improvement obligation in the event of default at any time prior to the TIDA's final acceptance of the fee dedication. TIDA and City also may agree to accept other property interests in lieu of an easement for the purposes described above. In most instances, prior to or after Board of Supervisors approval but prior to recordation of the map, the TIDA Board shall reject or conditionally accept the offer of real property or the offer of public improvement dedication until the Subdivider completes the required public improvements. In most instances, after Board of

Supervisors approval and prior to recordation of the map, the Clerk of the Board of Supervisors shall accept the offer of easement if shown only on the map and reject or conditionally accept the offer of public improvement dedication until the Subdivider completes the required public improvements. The Board of Supervisors may accept easements that include an easement agreement at any time after the offer of such easements is made based on recommendation from the Director and any affected City department. The City also may accept easements through other procedures available under local law. All offers and dedications shall be in the form acceptable to TIDA, the Department, the City Attorney, and any other affected City department, and the Subdivider shall execute such offers and dedications prior to TIDA and City approval. A copy of the approved offers and dedications shall be submitted with a Checkprint prior to recording the map. The Subdivider shall include a statement making the irrevocable offers of dedication in fee for real property to TIDA and for public improvements to TIDA and the City and describe the purposes of the dedications on the face of the map. Example documents of past dedications are available from the Department upon request.

E. Dedication of Property Rights for SFPUC Facilities

1. PUC Facilities within TIDA owned Public Streets

Any PUC utility proposed to be located within the existing or future public right of way owned in fee by TIDA must be located within an easement reserved in perpetuity in favor of the City and dedicated or granted on terms acceptable to the PUC. The PUC also may require a memorandum of agreement between TIDA and the PUC for this purpose.

2. Fee Dedications for PUC Facilities Outside of a Public Right-of-Way

The City generally requires dedications in fee for new major utility facilities (e.g. pump stations, treatment facilities, and storage tanks) located outside of the public right-of-way associated with land development projects. Fee conveyances of lands impressed with Public Trust will require the approval of the State Lands Commission.²⁶ The SFPUC, in its discretion, may accept an easement for placement of its facilities outside of the public right-of-way.

3. Approval of PUC Facilities Outside of a Public Right-of-Way

PUC utility facilities to be offered for dedication to the City must be located within the public right-of-way unless otherwise approved in advance by the PUC as part of the associated tentative map. All proposed fee and easement dedications require an irrevocable offer to be recorded upon the earlier of: (1) issuance of an Improvement Agreement or (2) approval of a final map. Subdivider shall make all irrevocable offers in a form acceptable to the SFPUC and the City Attorney.

a. PUC Facilities on Private or TIDA Property.

- i. Any PUC utility that Subdivider proposes to locate outside of the public right-of-way on private or TIDA property must be located within an easement reserved in perpetuity in favor of the City and dedicated on terms acceptable to the PUC.

²⁶Such approval could take either of two forms: Removal of trust obligations entirely such as has occurred in prior “trust land exchanges”, or recognition of another governmental entity such as the PUC as a Trustee by the State.

- ii. All easements for PUC facilities require a separate agreement, in a form and substance acceptable to the PUC, and may not be dedicated solely on the face of a Final Map.
- iii. Any such easement dedication shall provide for the exclusive use of the sanitary sewer, storm drain, low pressure water, recycled water, Supplemental Fire Water System, municipal power or street lighting facilities.
- iv. Subdivider shall offer easements and/or improvements for dedication to the City (including any offsite easements and fee dedications required for offsite utility facilities that are necessary for the functioning of the facilities within the phase), but the City will not accept such easements until the SFPUC approves the form of dedication, such as an irrevocable offer with accompanying plans or permits and/or real estate documents. These terms of dedication shall be in the form acceptable to SFPUC, the Division of Real Estate, any other affected City department, and the City Attorney.
- v. The Subdivider shall submit a copy of the easement agreement upon the earlier of: (a) submission of the Final Map Checkprint for the development sub-phase, or (b) application for a street improvement permit where proposed improvements rely on or connect to the proposed easement. The Subdivider shall include on any applicable final or parcel map, a note describing the terms, a graphic depiction of its location and the recording information providing constructive notice of such terms.

- vi. All easements granted to the City for PUC facilities, including but not limited to sanitary sewer, storm drain, low pressure water, recycled water, SFWS, municipal power and street lighting, require SFPUC approval prior to Board of Supervisors approval; provided however, that the City may accept easements through other procedures available under local law.
- vii. The PUC will not accept any infrastructure located in an easement if the City does not accept that easement prior to or concurrently with the relevant infrastructure.
- viii. The SFPUC will not accept an easement for any facility that is a dead end or is not part of a utility network.

4. Width of Easement Area

- a. Unless otherwise approved in writing by the SFPUC, all utility easements for sanitary sewer, storm drain, low pressure water, recycled water, and SFWS shall have a minimum twenty-five-foot (25') width. The SFPUC may increase the minimum easement width based on any issue related to utility location, layout, or facility access, including but not limited to the size or depth of the facility.
- b. The PUC shall determine the minimum width for any stormwater overland flow easement on a case-by-case basis using calculations demonstrating the flow and other design factors.
- c. PUC power facility easements shall extend a minimum of five feet (5') beyond the outermost edge of the conduit or conduits. The maximum invert

elevation (depth) of the bottom conduit should be five feet (5'). California Public Utilities Commission General Order 128 requires a minimum twelve-inch (12") separation between the electrical conduits and all other facilities.

- d. If multiple PUC utilities are to be located within the same easement area, the minimum easement width may increase at SFPUC's discretion.

5. Configuration of Easement Area

- a. SFPUC, at its discretion, may require alterations to proposed infrastructure within proposed easements to enable improved access for operation, maintenance, repair and replacement activities.
- b. SFPUC may require that an easement area connect to public right-of-way at both ends to provide for necessary access by SFPUC maintenance vehicles.

6. Non-PUC Uses of Easement Area

- a. TIDA, the City, and any private property owner shall not allow the use of an easement area for any purpose that will damage or interfere with the proper use, function, maintenance, repair, replacement of, or access to, the SFPUC facilities therein.
- b. Subdivider shall design easement area surface improvements for H-20 traffic loading to accommodate maintenance vehicles.
- c. Neither Subdivider nor subsequent successor(s) in interest shall use an easement area for the erection of any structure, or for any other purpose that will damage, interfere with or endanger the proper use, function, maintenance, repair, or replacement of the utility facilities without prior written authorization from the Director and the SFPUC General Manager. Further,

the City may remove any improvement that may damage or interfere with public facilities or impede access thereto without any notice, liability, or obligations to replace the same.

- d. Subdivider may construct and maintain fences on the easement area, but Subdivider (or TIDA) shall provide easement rights to the City that provide for the right of immediate access without any requirement for notification, clearance, or permission. The fence design, location and construction method for any fence that Subdivider locates on or over SFPUC facilities shall require SFPUC's prior written consent from the SFPUC General Manager.
- e. Low shrubs may be planted in an easement area, provided that their roots or underground growth shall not have the potential to damage the sanitary sewer, storm drain, low pressure water, recycled water, SFWS, municipal power or street lighting facilities. No tree, tall plant, or plant with invasive roots shall be planted in a corridor area except in movable planters.
- f. The SFPUC requires that Department standard paving be installed above public utility facilities, but the SFPUC, in its discretion, may approve non-standard paving on a case-by-case basis.
- g. Outside of a dedicated public right of way, the Subdivider shall not locate any PUC easement in an area that the public uses as the sole accessible path of travel. Depending on the proposed land uses in the vicinity, SFPUC may, at its sole discretion, require the Subdivider to provide options for alternative access to be included as an exhibit to the applicable terms of dedication or other agreement(s).

7. PUC Use of Easement Area and PUC Restoration

The City shall not be held liable for any damage to the surface improvements or trees or vegetation in the easement area or the restriction of access to the easement area which may occur as a result of City activity pursuant to the purpose of the utility corridor. The City shall restore only to base conditions of paved and unpaved easements. The base condition of a paved easement is defined as three-inch (3") thick asphalt concrete over eight-inch (8") thick Portland cement concrete. The base condition of an unpaved easement is defined as native backfill.

VIII. EXEMPT CONVEYANCES

The Subdivision Map Act does not require that a parcel map or final map be filed for certain conveyances to or from a governmental agency, public entity, or public utility²⁷. However, the Subdivision Map Act still applies to the division and it is the City and County Surveyor's longstanding policy to require that such conveyances be adequately memorialized. For each such exempt conveyance where parcel boundaries are newly created and not shown on any existing map of record, the authorized entity shall request a certificate of compliance from the City and County Surveyor for review and filing. Upon City and County Surveyor approval, which shall be issued on a case by case basis, the applicant shall prepare and simultaneously file a Record of Survey to memorialize the newly established boundaries and provide evidence of their physical locations.

²⁷SMA Sec. 66426.5 and Sec. 66428

APPENDIX D – TECHNICAL SPECIFICATIONS RELATED TO ENGINEERING DOCUMENTS

APPLICABLE TO TREASURE ISLAND AND YERBA BUENA ISLAND

Note: These specifications continue those portions of the 1982 Subdivision Regulations related to engineering. The section numbering here commences with Section I in contrast with the corresponding Section XII of the 1982 Regulations. Users should be aware of and familiarize themselves with more updated policies and procedures contained in official design manuals, plans and specifications, rules, and other official policies adopted by the Department, the SFFD, the Public Utilities Commission, and other City agencies and departments.

I. GENERAL MATTERS

A. EXCEPTIONS, DESIGN MODIFICATIONS AND OTHER REQUESTS FOR VARIATIONS

Appendix D is established as part of these Subdivision Regulations to regulate the detailed design of public infrastructure within the Project and act as standards for the preparation and review of Street Improvement Plans and supporting documents.

When during the lifetime of the Project it may become practical or necessary to vary, deviate from, or otherwise alter the standards established by these Technical Specifications, the Subdivider may request such change in writing from the Director. The Director, in consultation with affected City departments, will consider changes to these Technical Specifications. The following process shall guide the review and decision making process used to evaluate any request for such changes to these Technical Specifications.

1. Exceptions

Any deviation or change triggering Subdivision Code Section 1712 that either (1) affects the implementation of these Code or Regulations island-wide; or (2) requires a deviation or change from the express requirements of the Code, shall require an “Exception” as defined in Sec. III(A) of these Subdivision Regulations and the Subdivision Code. A Design Modification or Variation as described below do not rise to the level of an Exception as specified in Subdivision Code Section 1712 and cannot be used for the purposes reserved for Exceptions.

2. Design Modifications

Any deviation or change of a technical nature requested prior to approval, conditional approval, or denial of an associated Tentative Subdivision Map, shall be processed as a Design Modification, as defined in Sec. III(B) of these Subdivision Regulations.

3. Other requests for approval of Variations

After Tentative Subdivision approval or conditional approval, a Subdivider may no longer request a design modification. Instead, Subdivider may request a Variation as defined in Sec. III(C) of these Subdivision Regulations if occurring after Tentative Subdivision Map approval and not in the nature of an “Exception”. The Director, with the consent of affected City departments, may approve, conditionally approve, or deny such Variation as the Director deems appropriate including but not limited to, issuance of conditions on a Permit; authorized amendments and/or contract change orders to a Permit; or other form of written agreement that the Director finds acceptable.

B. SUBMITTAL OF MASTER SPECIFICATIONS

Prior to, or concurrently with, the submittal to the Department of the first set of Improvement Plans (as defined in the Subdivision Code) within the Subdivision Area, the Subdivider shall submit Master Specifications for Treasure Island and Yerba Buena Island (“TI/YBI Master Specifications”) that establish the standard construction and maintenance specifications and construction details for all proposed and future City facilities and structures within the Subdivision Area. The Department shall review and approve these TI/YBI Master Specifications prior to City’s approval of the 100% (final) version of the first set of Improvement Plans within the Subdivision Area.

C. SUBMITTAL REQUIREMENTS WITH SUB-PHASE APPLICATIONS

The Subdivider shall submit specific interim information and technical engineering reports when the City requires public improvements as condition of approving a division of land.

Subdivider shall submit the following documents with each applicable Sub-Phase Application (which includes 50% Improvement Plans) for City review and approval. Subdivider shall not submit 95% Improvement Plans until this City review is complete and the Subdivider has addressed any City comments or requests for clarification on the earlier set of Improvement Plans.

1. Major Phase Utility Exhibits

- a. A figure or series of figures and a narrative description of the Utility Infrastructure Improvements (“Improvements”) for the entire development at

full build-out, clearly depicting the boundary of the Major Phase and Sub-Phases clearly including and differentiating between (as applicable):

- i. Accepted Improvements from previously constructed phases (if applicable)
 - ii. Unaccepted Improvements from previously constructed phases, either temporary or permanent (if applicable)
 - iii. Improvements proposed in the Major Phase
 - iv. The most accurate layout of Improvements that Subdivider will propose in future Major Phases.
- b. A figure or series of figures and a narrative description of the Improvements for the Major Phase, clearly depicting the boundary of the current Major Phase, the sub-phases within the Major Phase and clearly including and differentiating between (as applicable):
- i. Existing Utility Infrastructure
 - ii. Permanent Improvements proposed in the Major Phase
 - iii. Location and extent of all proposed easements in the Major Phase
 - iv. Temporary Improvements proposed in the Major Phase
 - v. Temporary Improvements necessary to serve the Major Phase proposed outside of the Major Phase boundary
 - vi. The narrative should also include a proposal for geotechnical stabilization of proposed improvements outside of the Major Phase boundary

- c. Improvements that Subdivider will propose for City acceptance following completion of the Major Phase. The SFPUC shall not accept storm or sanitary sewer piping or treatment facilities proposed within a private parcel or within easements that the SFPUC has not previously authorized in the Tentative Map or piping and facilities that service only private parcels (e.g., Job Corps or Coast Guard).

2. Sub-Phase Preliminary Stormwater Control Plan (“Sub-Phase PSCP”) and/or Regional Centralized Preliminary Stormwater Control Plan(s)

- a. A Stormwater Control Plan that follows the requirements outlined in the Multi-Parcel Stormwater Control Plan (SCP) Instruction and Project Information Form.
- b. A demonstration that the SFPUC’s stormwater management requirements for the sub-phase have been met.
- c. Plan view and diagrammatic sections consistent with the Improvement Plans showing the location and configuration of Stormwater Management Controls located in the public parks including sections, planting plans, grading information, soil depth, etc. (as applicable).
- d. Plan view and diagrammatic sections consistent with the Improvement Plans showing the location and configuration of Stormwater Management Controls located within the right-of-way (as applicable).
- e. Sub-Phase Best Management Practices hydrologic modeling (e.g. rational method):

- i. Demonstration that the Subdivider sized Best Management Practices structures (BMPs) to comply with the applicable design storms for Stormwater Design Guidelines for:
 - 1) Runoff that the Major Phase creates to prove that the BMPs Subdivider proposed for the Major Phase will provide an adequate level of stormwater treatment, even if Subdivider completes no further phases.
 - 2) Runoff that the proposed upstream development creates at full build-out to show that prior to full build-out, upstream stormwater flows will not exceed the capacity of the proposed downstream BMPs.
- ii. Description of the modeling approach and assumptions.
- f. Subdivider shall propose a method to simplify future SFPUC review of the 2 different, interconnected systems to facilitate future review and help the SFPUC ensure that both systems are fully functional up to the 16" SLR for review and approval. Ensure that the two different project tailwater datums (BFE vs. MHHW) are clearly reported to simplify future review of the BMPs and the SD system.
- g. A description of the proposed sequencing for implementation of the BMPs relative to the occupancy of buildings in the contributing tributary area and other milestones within the Sub-Phase.
- h. A description of the period of time required for plant establishment. Note that Vegetated Stormwater Management Controls, like the systems that Subdivider proposed for Treasure Island and Yerba Buena Island, may need a period for

plant establishment before the City and Subdivider can rely on such system to treat and convey storm flows.

- i. An assessment of the activities that Subdivider will undertake to appropriately maintain the proposed Stormwater Management Controls along with an analysis of whether the funding mechanisms that Subdivider established to carry out that maintenance will be sufficient to defray the Subdivider's maintenance obligations.
 - i. Subdivider shall base such assessment and analysis on achieving appropriate levels of ongoing functionality, including both the experience of operating and maintaining previously implemented elements of the Stormwater Management Controls and the generally accepted practices for operating and maintaining the Stormwater Management Controls in good and workmanlike condition.
 - ii. If the SFPUC, in its discretion, determines that the maintenance funding source is not sufficient for the appropriate maintenance activities required under alphabetic clause "i" above, the parties shall meet and confer on how best to address such shortfall. These measures could include reconfiguring the system to reduce the anticipated maintenance costs or identifying additional funding sources that will defray the anticipated expenses in excess of the existing funding mechanism. The SFPUC shall not be required to approve the Sub-Phase PSCP until the parties agree on such measures.

- j. Subdivider shall submit to SFPUC recommendations for appropriate upgrades to planned or newly constructed systems that an increase in projected demands may trigger due to unanticipated changes to the land use.

3. TI/YBI Master Specifications

The City may require Subdivider to submit any proposed amendments/special provisions to the TI/YBI Master Specifications with future Sub-Phase Applications as necessary.

4. Geotechnical Report

Subdivider shall submit a Geotechnical Report that covers, at a minimum, site subsurface soil conditions, estimated settlement, proposed pavement sections, remedial earthwork, compaction, soil corrosivity, utility trench over- excavation requirements, clay seals, soil bearing pressures and soils infiltration tests in the vicinity of any stormwater management facility that the Subdivider proposes to infiltrate.

D. SUBMITTAL REQUIREMENTS BETWEEN SUB-PHASE APPLICATION AND FINAL PLANS

Subdivider shall submit the following documents prior to or concurrent with the submittal of 95% Improvement Plans. The following items shall require City review and approval prior to approval of the 100% Complete Final Improvement Plans:

1. Sub-Phase Hydrology and Hydraulics Plan (“H&H Plan”)

- a. 5-year Conveyance System: The Sub-Phase H&H Plan shall utilize dynamic hydrologic modeling (e.g. SWMM or equivalent) for the 5-year design storm to demonstrate that the proposed stormwater conveyance system for the sub-

phase is adequately sized to convey the runoff from the sub-phase for current conditions and each applicable Sea Level Rise milestone as well as from the best estimate of a 5-year design storm runoff from the proposed upstream development at full build-out. The dynamic hydrologic modeling (e.g. SWMM or equivalent) also shall demonstrate that the 2 feet per second velocity can be achieved for current conditions and at each applicable Sea Level Rise milestone.

- b. 100-year overland flow conveyance: The Sub-Phase H&H Plan shall utilize dynamic hydrologic modeling (e.g. SWMM or equivalent) for the 100-year design storm, (1) at the 100-year tide overland flows for current conditions and (2) at each Sea Level Rise milestone as outlined in the Infrastructure Plan to demonstrate that the overland flow path is adequately sized to safely convey the runoff from the Sub-Phase as well as from the best estimate of a 100-year design storm runoff from the proposed upstream development at full build-out within the street curbs (top-of-curb to top-of-curb). Safe conveyance requires that the sidewalks (or in the case of curbless streets, the pedestrian accessibility routes, or PARs) be accessible during the 100-year storm event. The modeling shall also determine if any off-site improvements are reasonably necessary to protect publicly- and privately-owned property downstream (e.g. the Job Corps Site). Additionally, modeling shall determine the anticipated depth and horizontal extent of any open space ponding.

- i. The modeling shall utilize previous as-built conditions (as applicable) as well as the proposed design for the current sub-phase and the best known schematic design conditions for all future phases.
- ii. The Sub-Phase H&H Plan shall include a narrative description of all modeling assumptions, including inflow/infiltration assumptions, for SFPUC review and approval. The Subdivider also shall submit to the City a complete hydrologic model as part of the Sub-Phase H&H Plan.
- c. If there are unanticipated changes to approved entitlements prior to full Project build-out, Subdivider shall prepare recommendations for appropriate upgrades to planned or newly constructed systems triggered by an increase in projected demands.

2. Sub-Phase Sanitary Sewer Analysis

- a. A figure or series of figures and a narrative description of the Sanitary Sewer Improvements that demonstrate that the sub-phase is designed to convey anticipated peak flows and meet self-cleaning velocity for anticipated average daily flow for the proposed upstream development at full build-out.
- b. Sanitary sewage projections, including permanent dewatering, for each parcel of the sub-phase as well as the best estimate for the development at full build-out including a description of the assumptions and calculation methods that Subdivider used to project sewage generation.
- c. Proof that prior to full build-out of the Project and completion of the new sanitary sewer system, sanitary flows shall not exceed the capacity of the remaining, existing downstream sanitary system.

- d. Recommendations for appropriate upgrades to planned or newly constructed systems triggered by an increase in projected demands due to unanticipated changes to the land use.
- e. Subdivider shall coordinate with the SFPUC and the Department on the contents of Subdivider's comprehensive Settlement, Vibration, and Horizontal Movement Monitoring Plan.

3. Improvement Plans

Improvement plans shall clearly identify procedures for the installation, O&M, and deactivation of temporary utilities that Subdivider develops for purposes of phasing construction. In future Improvement plans Subdivider shall demonstrate to the SFPUC's satisfaction how such plans coordinate with the design of all off-site infrastructure necessary to serve the infrastructure shown in the improvement plans, including utility corridors.

E. SEPARATION REQUIREMENTS

1. Utility Main to Utility Main Separation

- a. Horizontal Separation. Subdivider shall design the horizontal utility main to utility main separation as described in Appendix D, Sec. I(E) Separation Requirements.
- b. Vertical Separation.
 - i. Subdivider shall locate potable water mains one foot (1') minimum clear (measured from the outside diameter to outside diameter) above non-potable water mains in conformance with City and California

Department of Public Health requirements and California Code of Regulations Title 22, Section 64572.

- ii. Potable water utility to potable water utility crossings shall be one foot (1') minimum clear (measured from the outside diameter to outside diameter).
 - iii. Non-potable water utility to non-potable water utility crossings shall be one foot (1') minimum clear (measured from the outside diameter to outside diameter).
 - iv. Subdivider shall locate the storm drain main pipe invert at a street section equal to or higher than the combined sewer main pipe invert and the separated sanitary sewer main pipe invert.
- c. Trenching. Subdivider and/or utility providers shall not locate different utilities in the same utility trench.

2. Utility Laterals and Appurtenances to Utility Main Separation

Utility laterals shall have one foot (1') minimum vertical separation from other utility mains where they cross. Utility laterals shall not cross below any other utility structures. Utility laterals with approval for less than one foot (1') minimum vertical separation from other utility mains or that the Subdivider and/or utilities install below other utility structures shall be in casings that the PUC approves.

3. Utility to Surface Improvements Separation

- a. Utility Structure Surface Appurtenances to Surface Improvements Separation:
In general, Subdivider and/or utilities shall locate utility structure surface appurtenances such as manhole rims, valve covers, valve boxes, etc. clear of

the gutter. Subdivider and/or utilities shall locate utility structure surface appurtenances one foot (1') minimum beyond the crosswalk edge.

- b. Utilities to Surface Improvements Separation: Subdivider shall locate PUC utility mains except for joint trench in the street with the clearances shown in the table below. The City shall allow utility service laterals to cross below surface improvements such as bulb-outs, medians, lanes, landscaped areas, and other similar improvements as necessary to provide service to each lot or parcel of land. The City shall allow storm drain and sanitary sewer laterals to cross below surface improvements if the Subdivider places lateral vent per City requirements.

4. Utility to Best Management Practice Separation

- a. Horizontal Separation: Subdivider and/or utility shall locate utility service laterals and structure appurtenances one foot (1') minimum clear from the outside edge of Best Management Practice (BMP) measures, and utility mains 4.5 feet minimum clear from the outside edge of BMP area.
- b. Vertical Separatio: Utility mains and service laterals shall not cross through or below BMPs.

5. Table - Horizontal Utility Main Separation

All distances are minimums from outside diameter of pipe to outside edge of structures^{1, 2 & 6}

Utility Separations	Sanitary Sewer (gravity and force main) *footnotes 3 & 4	Storm Drain Sewer *footnotes 3 & 4	Potable Water	Recycled Water (Tertiary)	Supplemental Fire Water System	Joint Trench	Face of Curb (including bulb-outs)
Sanitary Sewer (gravity and force main) *footnotes 3 & 4	3.5' *footnote 5	3.5'	10.0' (per DPH requirements and CCR Title 22, Section 64572)	3.5'	3.5'	3.5'	4.0'
Storm Drain Sewer *footnotes 3 & 4	----	3.5' *footnote 5	4.0' (per DPH requirements and CCR Title 22, Section 64572)	3.5'	3.5'	3.5'	4.0'
Potable Water	----	----	3.5' *footnote 5	4.0' (per DPH requirements and CCR Title 22, Section 64572)	4.0' (per DPH requirements and CCR Title 22, Section 64572)	4.0'	4.5'
Recycled Water (Tertiary)	----	----	----	3.5' *footnote 5	3.0'	3.0'	4.0'
Supplemental Fire Water System	----	----	----	----	3.5' *footnote 5	3.0'	4.0'
Joint Trench	----	----	----	----	----	----	----
Face of Curb (including bulb-outs)	----	----	----	----	----	----	----

*Footnotes:

1. For the initial Sub-phase of construction, alternative separation distances, if any, shall be identified on the Street Improvement Plans. In such cases, Variations or Exceptions shall be processed according to the applicable provisions of Sec. III of these Regulations.
2. "Outside edge of structure" shall be the edge of the structure that is closest to the affected utility.
3. To allow maintenance, repair, and replacement of sanitary manholes and storm sewer manholes and catch basins, these assets require horizontal separation from the utility structures identified in this table. Horizontal separation values subject to revision where required for safe work conditions in deep excavations. At a minimum, sanitary and storm sewer manhole barrels (outside edge) shall be separated from (i) the face of curb by a horizontal distance of 4.0'; and (ii) other sewer mains by 2.0'. Similarly, stormwater catch basins shall be separated from sanitary sewer mains by 4.0'. To increase feasibility of repair and replacement work, including provision of safety structures needed for deep excavations (e.g., shoring), separation distances for deeper utilities, such as sewer mains, will be maximized in detailed design.
4. To allow access for maintenance and excavation equipment, the above-ground roadway area shall have a minimum 8.0' clearance above sewer and storm drain mains and an adjacent minimum 10.0' clearance (total 18' clearance, the approximated clearance for an excavator and dump truck).
5. This separation applies where parallel mains may be present (e.g., separation of gravity sewer and force main).
6. "----" = Separation value identified elsewhere in table.

F. PHASING OF CONSTRUCTION

TIDA establishes the phasing of development within the Subdivision Area through the Major Phase Approval and Sub-Phase Approval process set forth in the DDA.

As a refinement of the above development approvals, Subdivider shall prepare with each Public Improvement Agreement a phasing plan of construction that accommodates the orderly provision of services, protects existing infrastructure, and provides for other health, safety, and welfare considerations. This requirement shall become a condition of approval of any Tentative Subdivision Map requiring the construction of associated public improvements.

G. REPORTING REQUIREMENT FOR ADJACENT EXISTING UTILITIES

Prior to geotechnical mitigation activities, the Subdivider shall provide an existing conditions report for the adjacent existing utilities that Subdivider constructed in previous phases of the project that Subdivider intends to remain in service. The Subdivider shall coordinate the geographic extents to be covered by the report and the ways that the conditions of the systems are determined with the SFPUC for each phase of construction. The Subdivider shall update the report at the conclusion of any geotechnical mitigation activity and again at the end of each phase of construction as the PUC deems appropriate. See Appendix D, Sec. XX Utility Monitoring Program for additional details on survey monitoring requirements.

The Subdivider shall be responsible for damage to existing utilities including adjacent utilities constructed in previous phases due to geotechnical mitigation activity and/or construction of the proposed improvements. The Subdivider shall make any repairs

that City requires and shall be responsible for any permit violations due to the damage.

II. RECOMMENDED DESIGN OF STREETS, BLOCKS, AND LOTS

A. GENERAL

The following Department standards of design govern the layout of streets, blocks, and lots in the Treasure Island and Yerba Buena Island. All tentative and Final Maps shall conform thereto except where unusual circumstances warrant Department issued Exceptions, Design Modifications, or Variations.

In accordance with Administrative Code Chapter 98, the Department is guided by the following principles in the review and approval of street designs:

- a. Design of City streets shall be in keeping with the Urban Design Element of the City's General Plan;
- b. The City's Transit-First Policy;
- c. The Better-Streets Policy;
- d. Engineering best practices in environmental planning and pedestrian-oriented, multi-modal street designs as adopted within the profession;
- e. Incorporation of sustainable water management, hydraulic engineering, and landscape architecture techniques to promote safe and livable public improvements.

These principles are intended to ensure continued quality of life, economic well-being, and environmental health in San Francisco. To support these guiding

principles, the Department incorporates by reference Administrative Code Chapter 98 and the concepts of the Better Streets Plan into these Subdivision Regulations. The Department also recognizes the City's General Plan, Transportation Element, Urban Design Element, various Neighborhood Plans, and Neighborhood Streetscape Plans as additional objectives and policies that will guide development and assist City departments when reviewing and approving street designs so that streets are safe and compatible for all users and modes of travel in specific areas of the City.

The Department notes the importance of the following excerpt from the Better Streets Plan:

“The pedestrian character and quality of place for a given street is determined as much by the design of the roadway between the curbs as by what happens on the sidewalk. Factors such as numbers of lanes, lane widths, design and posted speeds, number of directions (one-way or two-way), and how the roadway is split among different travel modes (transit, bicycles, vehicles) exert a great influence on pedestrian safety and quality.”

Recognizing the need to apply sound engineering principles for street design in light of these broad policy goals, the Department encourages all designers and developers to consider the totality of these factors in the resulting proposed street designs.

Practical considerations also should include but are not limited to the relationships of intersecting and adjacent streets; roadway access for emergency vehicles; length of street segments; adjacent proposed development, occupant density, and residential or commercial nature of the occupation; type of building construction, height, and building access points for emergency service provisions; driveway cuts and location

and type of private ingress and egress, inclusion of parks, mews, and pedestrian-only corridors, curb turning radii at public streets for various types of vehicles; crosswalk and curb location and design; sidewalk widths, sight lines for both pedestrians and vehicles; lane width and direction, parking lane locations and width; bicycle access and accommodations; pedestrian safety and disabled access and accommodations; accommodation of fixed street encroachments, such as trees and street furniture; stormwater management, flood analysis and hydraulic design; grading, soils analysis, liquefaction susceptibility; geotechnical suitability, soil permeability, slope stability, and ground water influences, etc.

Additionally, the Treasure Island and Yerba Buena Island Streetscape Master Plan that the Treasure Island Development Authority adopted on February 10, 2015, in conjunction with other Plan Documents, as applicable, shall serve as a guiding document for the design of streets, lots, and blocks, and to complement these Regulations. In the event of conflict between these various guiding documents, the Director in consultation with other affected City departments shall review the evidence, weigh the competing interests and reconcile the differences in accordance with accepted engineering practices.

In light of these factors and considerations, the Department establishes the following street design standards. The Department with the input of other reviewing City departments may consider modifying these standards on a case-by-case basis if the Subdivider or sponsoring City Agency presents adequate technical information that supports the Department issuance of an exception to the standards, a design modification, or a Variation.

B. PUBLIC STREETS

The following design criteria governing the dimensions and grades of City streets is the result of the findings of a multi-department technical engineering review. The Department advises the Subdivider to consult with all affected City departments to verify that adequate safety and separation factors are properly addressed in any proposed new street design. PW intends these guidelines to be consistent with the San Francisco Street Design Manual that the City anticipates drafting and adopting in the future. The Department also intends these guidelines to be consistent with the National Association of City Transportation Officials' ("NACTO") *Urban Street Design Guide*, and the NACTO *Urban Bikeway Design Guide*. Where topography, conservation of land use, or other public benefit overrides other factors, the Director may grant an exception to these requirements. Prior to or concurrent with a tentative map application submittal, the Subdivider may request such an exception or design modification.

1. Definitions

- a. Street. The area between property lines dedicated to public right-of-way purposes, including Sidewalks, Curbs, Gutters and Roadway. All public streets require a minimum width of 40 feet.²⁸There is no maximum width.
- i. Sidewalk. The area between property line and face of curb or edge of Roadway as depicted on the official grade and dedication maps maintained by the Department. The Sidewalk is composed of three general zones:

²⁸Street and Highways Code Sec. 1805; see also Sec. 160

- 1) **Frontage Zone.** The frontage zone is the portion of the sidewalk located immediately adjacent to the property line, and provides shy distance from buildings, walls, fences, or property lines. It sometimes includes space for building-related features such as entryways and accessible ramps. It also may include landscaping as well as awnings, signs, news racks, benches, and outdoor café seating.
- 2) **Pedestrian Zone.** The pedestrian zone²⁹, situated between the frontage zone and the furniture zone, is the area dedicated to pedestrian movement and should be kept clear of all fixtures and obstructions. Within the pedestrian zone, the Pedestrian Access Route (“PAR”) is the path that provides continuous connections from the public right-of-way to building and property entry points, parking areas, and public transportation. The Department requires this pathway to comply with American Disabilities Act (“ADA”) guidelines and is intended to be a seamless pathway for persons with disabilities. As such, this route should be a firm, stable, and slip-resistant pavement. The PAR should be a minimum of 4 feet, but preferably at least 5 feet in width to provide adequate space for two pedestrians to comfortably pass or walk side by side and accommodate pedestrian traffic load. All transitions (e.g., from street to accessible ramp or accessible ramp to landing) must be flush

²⁹The Pedestrian Zone is also identified in other design documents for Treasure Island and Yerba Buena Island as the “Throughway Zone.”

and in accordance with ADA guidelines. The design engineer shall propose a pedestrian zone width sufficient to accommodate the projected volume of users, subject to the approval of the City Engineer. In no case shall this zone be less than the width of the PAR.

- 3) Furniture Zone. The furniture zone is located between the curb and the pedestrian zone. To keep the pedestrian zone free of obstructions, the furniture zone should contain all fixtures, such as street trees, bus stops and shelters, parking meters, lamp posts, signs, bike racks, benches, waste receptacles, drinking fountains, and other street furniture.
- ii. Roadway. The roadbed, the curb to curb area marking the travel way, is the area of the roadway typically reserved for the curb, curbside parking, and vehicular travel. In a Shared Street, it is that portion demarcated for use by vehicles. The type, quantity, and size of lanes shall be consistent with the requirements of Section B Constituent Parts, below.
- iii. Alley. A Street with a Roadway not exceeding 25 feet in width. The overall right-of-way for an alley shall not exceed 40 feet in width or be less than 20 feet in width.³⁰ A standard alley shall have sidewalks on both sides of the roadway that are a minimum of 4 feet in width. These sidewalks shall be designed in accordance with ADA guidelines. The Department shall review and approve other types of alleys (such as

³⁰California Vehicle Code Sec. 110; Street and Highways Code Sec. 1805.

Shared Streets) on a case by case basis after consultation with other affected City departments. The Department may approve an alley with a sidewalk on only one side on a case by case basis and after issuing an exception.

C. CONSTITUENT PARTS

The Department shall require the Subdivider to dedicate to the City a public street of sufficient width to accommodate the sum of the individual components listed below. Subdivider shall demonstrate that streets have all necessary constituent parts and functionality prior to offering such streets for dedication. The following shall apply to public or private streets:

1. Traffic Lane

The standard automobile traffic lane shall be 10 feet wide. Recommended traffic lane on a truck, commercial or transit routes is 11 to 12 feet wide, depending on the number of lanes and their location.³¹ The design of lane widths shall be a function of adjacency to oncoming lanes, parking lane or bicycle lane, and other special conditions such as design speed, curves, and traffic volumes. Streets shall have a minimum of two lanes of opposing traffic. The Director may approve a design modification to allow one-way streets on a case by case basis after consultation with affected City department. Subdivider shall consult with the appropriate City

³¹San Francisco currently lacks “designated truck routes”; see MTA Memorandum from the City Traffic Engineer dated June 19, 2013 for additional information related to lane widths for streets with SFMTA vehicles and bicycle facilities.

departments for additional specifications and requirements for streets that the City may classify and/or design as arterials or collector streets.³²

2. Sidewalks

Streets shall include sidewalk improvements on both sides of the roadway. Street sidewalk widths shall conform to the following or as the Better Streets Plan may be updated in the future.

Primary Land Use	Street Type	Sidewalk Minimum Width
COMMERCIAL	Downtown commercial	Per Downtown Plan
	Commercial throughway	15'
	Neighborhood	15'
RESIDENTIAL	Downtown residential	15'
	Residential throughway	15'
	Neighborhood residential	12'
OTHER	Industrial	10'
	Mixed-use	15'
SPECIAL	Parkway	17'
	Park edge	24'
	Multi-way boulevard	15'
	Ceremonial	Varies
	Alley	9'
	Shared public way	NA
	Paseo	Varies

³²See California Highway Design Manual Chapter 40 – Federal Aid, and Chapter 60 – Nomenclature for additional information on funding and classification of state and federal highway systems.

Note that additional accessibility requirements exist with technical specifications beyond the scope of these Regulations. The Department advises Subdivider to contact the Department Disabilities Coordinator for specific provisions related to pavement materials, passenger loading zones, and path of travel for disabled persons.³³

3. Fire Department Operations

- a. All streets shall provide a minimum clear width of 20 feet of travel way between obstructions. Obstructions may include parked vehicles, certain curbs greater than 6 inches in height³⁴ or any other fixed object that prevents emergency vehicular travel.
- b. For purposes of calculating the clear width of the travel way, such width may include any combination of the following:
 - i. That portion of any adjacent curbside parking space having a width greater than 7 feet,
 - ii. A bike lane or any other adjacent pavement capable of supporting emergency vehicles where such lane or pavement is separated from the vehicular lanes by paint striping (Class II) or a mountable curb being no more than 2 inches in height (Class I), or other forms of pavement separation that may vary in material type, color, and texture.
- c. Where adjacent buildings are greater than 40 feet in height and not of Type 1 (fire resistive) building construction, and the building entrance locations are

³³See also Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way as published by the United States Access Board.

³⁴See San Francisco Fire Code Sec. 503.4, providing additional guidance on what may be considered an obstruction; see also Board of Supervisors Ordinance No. 116-13.

not yet specified, the Director may require an operational width of at least 26 feet to accommodate SFFD operational requirements along each street fronting such a building.

- i. “Operational width” shall be the combined total of the clear width of the travel way together with those unobstructed portions of adjacent pavement or sidewalks (if capable of supporting emergency vehicles). Reservation of portions of curbside parking for fire-only access or use of alternative mountable curb designs that allow for safe fire vehicle access to the sidewalk may accomplish this goal. The SFFD, in consultation with other affected City departments, may approve other proposals developed in the future.
- ii. In such cases, the Subdivider shall provide sufficient right-of-way width on all abutting sides of a proposed development block to accommodate the foreseeable street design alternatives.
- iii. Where the Department requires the portion of the block to have additional operational width (greater than 20 feet clear), the design engineer shall locate this in segments along the building frontages with a maximum length of 200 feet for any one segment. Segments may have a minimum length of as little as 100 feet. The Subdivider shall ensure the existence of adequate space for emergency vehicles to pass each other and set up operations at the front entrance of the building. In addition, the design shall provide for meaningful traffic calming measures to ensure safe vehicle speeds along the street, including returning to the

standard 20-foot travel way between widened segments. This provision shall not apply to blocks less than 200 feet in length.

- iv. Subdividers are encouraged to consult with the SFFD early in the subdivision process in advance of when the Subdivider anticipates the construction of such buildings. Information such as building access points, size of building and type of building construction are essential elements needed for constructive agency review.
- v. The Director may approve a street width having greater than 20 feet of travel way only after consultation with and approval by an interagency working group composed of the SFFD, SFMTA, the Planning Department and any other affected City agency. When discussing the most appropriate widths of the travel way, the interagency working group shall consider such factors as the role and intended character of the street in the overall street network, the width of adjacent streets, the length of the street(s) in question, the anticipated traffic volume, and emergency and medical response.

4. Bicycle Lanes

All bicycle facilities shall meet or exceed the minimum lane widths provided in the *California Highway Design Manual*, the *California Manual on Uniform Traffic Control Devices*. Subdivider's shall design bicycle facilities in accordance with the *NACTO Urban Bikeway Design Guide*.

5. Parking Lane

The width of a curbside parallel parking lane shall be 8 feet. SFMTA may approve on a case by case basis angled curbside parking designs.

6. Curb Intersection Radii and Turning Movements

Subdividers shall design intersections for and accommodate turning vehicles in accordance with the Better Streets Plan.³⁵

7. Sidewalk Extensions or Bulbs

Sidewalk extensions or bulbs into the roadway at intersection or midblock adjacent to parallel parking shall be 6 feet wide. The Director, on a case-by-case basis, may vary sidewalk extension or bulb width.

8. Median

Any uncontrolled pedestrian crossing of four or more traffic lanes shall have a median or island not less than 6 feet wide in-between opposing traffic directions. The Director shall review on a case by case basis continuous medians that extend more than 400 feet in length or continue beyond a city block

9. Dead End Streets

In addition to all other applicable requirements, Subdivider shall ensure that all requirements of the San Francisco Fire Code are met.

10. Utility Separation

Utilities shall conform to the requirements of state law and the policies of the Department and the SFPUC.³⁶ Refer to Appendix D, Sec. I(E) Separation Requirements for additional information.

³⁵<http://www.sfbetterstreets.org/find-project-types/pedestrian-safety-and-traffic-calming/traffic-calming-overview/curb-radius-changes/>

D. STREET GUIDELINES

1. Alignment

All streets shall, as far as practicable, align with existing streets. The Subdivider shall justify any deviations based on written environmental and design objectives.

2. Intersecting Streets

Intersecting streets shall meet at right angles or as nearly so as practicable.

3. Naming

Streets of a proposed subdivision that are in alignment with existing streets shall bear the names of street names, but also show existing street names if the Department requires both names. The Board of Supervisors, TIDA, and the Department shall approve names for all new streets.

4. Street Grades

DPW shall not approve street grades in excess of 17% except as an exception and under unusual conditions.

Streets having grades in excess of 14% shall require separate consultation with the SFFD prior to use for fire access purposes.

No gutter grade shall be less than 0.5%. The Subdivider shall provide concrete on any pavement grade less than 1.0%.

The Subdivider shall connect all changes in street grades, the algebraic sum of which exceeds 1.5%, with vertical curves of the Department approved length sufficient to provide safe stopping sight distances and good riding quality. All changes in street

³⁶Subdividers shall consult separately with Pacific Gas and Electric Company to determine separation requirements of natural gas or as appropriate for other utilities not addressed herein.

grades shall have an absolute value of the algebraic difference in grades which does not exceed fifteen percent (15%), regardless of any vertical curves.

The Director with the consent of the SFFD may approve of any design modification to this standard on a case-by-case basis.

5. Surface Drainage

- a. Subdivider shall grade streets to provide a continuous downhill path that facilitates adequate overland release to open space areas.
- b. At low end cul-de-sacs and sumps, in addition to sewer drainage facilities, Subdivider shall provide surface drainage channels in dedicated easements as relief of overflow to prevent flooding of adjoining property.
- c. Subdivider shall design street and drainage channel cross-sections to provide a transport channel for overland or surface flow in excess of the 5-years storm capacity of the sewer system. The channel capacity shall be the difference between the sewer capacity and the quantity of runoff generated by a 100-year storm as defined by the NOAA National Weather Service or by City-furnished data, applied over the tributary area involved.
- d. Subdivider shall round street curb intersections by a curve generally having a radius equivalent to the width of the sidewalk and the design shall be in accordance with the Better Streets Plan. While allowing vehicle movements for emergency vehicles, the Subdivider shall use the smallest possible radius.

E. PRIVATE STREETS

Private streets shall have a minimum right-of-way width of 40 feet for through streets.

Dead-end private streets shall have a minimum right-of-way width of 60 feet. The

Subdivider shall consult with the SFFD and Department of Building Inspection for all designs that might result in less than the minimum width.

F. SHARED PUBLIC WAYS

For those public streets that the Subdivider proposes to build entirely or primarily to non-standard conditions or with non-standard materials, the Subdivider shall clearly designate on plans as “shared public ways” (“SPW”) or as otherwise applicable and shall clearly note what lands and improvements Subdivider proposes to be offered for public dedication and/or acceptance.

The Department shall review SPW on a case by case basis and such SPW are subject to approval at the sole discretion of the Director with consent of other affected City departments. SPW also are likely to require multiple Exceptions, Design Modifications, and/or Variations to these Regulations depending to the types of alterations sought and the procedural steps for City authorization of such alterations.

If the Department approves a SPW, the Subdivider shall obtain a Major Encroachment Permit for the SPW that addresses the following concerns:

- a. Subdivider shall offer to TIDA the entire right of way width of the lands underlying the SPW for dedication.
- b. Subdivider shall offer to TIDA and City the traveled way improvements of the SPW that are designed for vehicular traffic for dedication and City acceptance, but such area shall be subject to separate maintenance and replacement costs in perpetuity.

- c. Subdivider shall offer to TIDA and City the sidewalk improvements of the SPW that Subdivider designed solely for pedestrian traffic for dedication subject to the terms of Public Works Code Sec. 706.³⁷
- d. The Subdivider's Major Encroachment Agreement shall include sources of funding in perpetuity that are acceptable to the Director. The Department suggests the following sources in the order of preference:
 - i. Subdivider, together with one or more of,
 - ii. Community Facilities District or equivalent bonding and taxing entity,
 - iii. Homeowners Association or equivalent,
 - iv. Other security acceptable to the Director.
- e. The Subdivider's Major Encroachment Agreement shall include provisions regarding the prevention of flooding private property, to City's satisfaction.

G. BLOCKS

1. Length

Blocks shall not exceed 600 feet in length except under unusual conditions. If a Block is greater than 300 feet in length, the Subdivider shall attempt to incorporate a mid-block access generally near the mid-point of each block in accordance with the applicable provisions of the Planning Code.

2. Mid-Block Pedestrian Way

Where a City department or commission requires a mid-block pedestrian way for longer blocks, such pedestrian way shall have a minimum width of 10 feet and be

³⁷Maintenance and liability of sidewalks shall be the responsibility of fronting property owners in accordance with Public Works Code Section 706. Subject to Public Works approval, the Subdivider's Major Encroachment Agreement for a SPW may provide for an alternative means and responsible party(ies) for sidewalk maintenance and liability.

located near the mid-point of each block. The grade of such pedestrian ways shall not exceed 15% unless the Subdivider provides steps that the Department approves as part of the design. The Subdivider should consult all latest laws and regulations, which may be in effect, governing accessibility and the design of pedestrian ways for the disabled.

3. Corners

Where block corners having an interior angle of 60 degrees or less are necessary, the Subdivider, subject to Director approval, shall round such corners with a curve having a radius of not less than ten feet. When this curb radius is added to the sidewalk width, the aggregate shall not be less than 25 feet. In a business district, the Subdivider may chamfer the block corner in an angular fashion.

4. Block Numbers

The San Francisco Assessor's Office ("Assessor's Office") shall approve all Block numbers.

H. LOTS

1. Dimensions

Lot dimensions shall conform with the City Planning Code.

2. Side Lines

The side lines of all lots shall be at right angles or radial to the street right-of-way line, to the extent practicable.

3. Setback Lines

Setback lines shall be consistent with the provisions of the General Plan or other Planning Code Special Use District requirement as applicable.

4. Lot Numbers

The Assessor's Office shall approve all lot numbers.

I. STREET NETWORK DESIGN

In any planned unit development as defined in Planning Code Section 304 or other type of master plan area of equal or greater size, the Department shall prohibit more than one half of the total street network to include 26' minimum clear or larger street width, as counted by the number of block faces fronting on such streets. The Subdivider shall arrange and align such larger streets in these development areas to create a continuous network of emergency vehicle access streets and shall ensure that at least one side of each block fronts on such a street. The Director, only after consultation and agreement with the SFFD, the SFMTA, the Planning Department and any other affected city agency, may allow more than two faces of any block to front on such larger streets.

III. STREET IMPROVEMENT REQUIRED

The Subdivider shall improve, or agree to improve, all streets, highways, or public ways that are a part of or adjacent to the subdivision. Such improvement shall include the necessary paving, curbs, sidewalks, catchbasins, manholes, sewers, side sewers, culverts, storm drains, sanitary sewers and various utilities such as gas, electric, telephone, water, fire protection and alarm, and lighting.³⁸ All street improvements shall be in accordance with the requirements of the Department and all

³⁸See also Sec. VII(D)(1) Completeness of Public Infrastructure

other affected City departments with jurisdiction over public improvements as consistent with the Development Agreement and Plan Documents.

The SFFD shall approve all water supplies for fire protection and alarm facilities. The SFPUC Bureau of Light, Heat and Power shall approve all street lighting facilities. All potable water supply mains, catch basins, manholes, sewers, side sewers, culverts, storm drains, and sanitary sewers shall be in accordance with rules and regulations of the SFPUC. The Subdivider shall bear the difference in cost between a normal size main and that of any larger size main that the City may require because of the City's fire service needs. The City shall not refund any part of such additional cost. The Subdivider shall satisfy the SFPUC that such oversizing of the main will not be detrimental to water quality.

The Subdivider may obtain information regarding street lighting requirements from the Bureau of Light, Heat and Power of the SFPUC.

The Subdivider may obtain information regarding requirements for fire alarm facilities and Police Communication system from the Department of Technology. If Subdivider has not satisfactorily completed such improvements at the time the Final Map Checkprint is filed, the Subdivider shall, prior to the approval of such map, enter into a Public Improvement Agreement with the Director in accordance with the provisions set forth in these Subdivision Regulations.

IV. RECOMMENDED TYPES OF PAVEMENTS

The Subdivider shall construct pavements and curbs to the Standard Specifications of the Bureau of Engineering, Department of Public Works if not specified otherwise as set forth below.

A. FOR LIGHT TRAFFIC

1. Grades over 17% (when approved)

An 8-inch concrete pavement.

2. Grades 17% to 0.5%

A pavement consisting of a 8-inch concrete base and a 2-inch asphalt concrete wearing surface, or;

3. Also on grades 1.0% - 0.5%

The Subdivider shall construct a concrete gutter at least 1 foot wide and of the same thickness as adjoining pavement.

B. FOR HEAVY TRAFFIC

On streets likely to carry heavy loads or large volumes of traffic, the Subdivider shall design pavements according to and in compliance with Department requirements.

C. COMMERCIAL AREAS

The Subdivider shall construct a concrete parking strip 8 inches thick and at least 8 feet wide adjacent to the curbs in all areas zoned for commercial purposes.

D. CURBS

The Subdivider shall construct standard concrete curbs adjacent to all pavements.

V. STREET IMPROVEMENT PLANS

Where the Subdivider will construct new streets within a subdivision for dedication to the City for public use, the Subdivider shall provide Improvement Plans in accordance with Sec. VII of these Regulations (Final Map). The Improvement Plans shall conform to the construction standards applying to work that the City performs

and to the design standards described hereinafter consistent with the Plans and Plan Documents. These Improvement Plans shall include the following:

- a. Grading and street improvement plans, showing pavement design, proposed location of street lights (connection thereto and any appurtenances), street trees, street furniture, bus shelters, fire hydrants, traffic signals, and police and fire alarms, if any.
- b. Official or proposed street grades and anticipated settlement.
- c. Contours shall be at intervals of five feet or less, depending on the topography. Contours shall be referenced to TI/YBI Datum (NGVD 88 + 100 feet). The Subdivider shall show the benchmarks used and elevations thereof.
- d. On all streets within or adjacent to the subdivision, the Subdivider shall designate curb grades in the manner indicated on Bureau of Engineering drawing L-7215.2. The Subdivider shall show distances between such grade points and the rate of grade on curb lines. The Subdivider shall show the lengths of vertical curves in the same way.
- e. Sanitary sewer, combined sewer and storm drain facilities.
 - i. The location (with reference to street lines), size, and rate of grade of all existing and proposed sanitary sewers, storm drains or combined sewers, manholes, catch basins, laterals, and other drainage appurtenances.
 - ii. Elevations at catch basins and the elevations of manhole inverts and rims of manhole covers in plan and profile views.
 - iii. Approximate location of sewer laterals and storm laterals with reference to lot lines and proposed sizes. With the approval of the Director and

the consent of the SFPUC, the Subdivider may defer certain provisions of this Appendix.

iv. Profiles of all main sewers and storm drain lines shall be submitted showing:

- 1) Existing and proposed lines, with inside diameter noted thereon, together with manholes, and such structures as overflows and diversion weirs.
- 2) Invert elevations of all existing and proposed lines at manholes and at grade changes.
- 3) Rim elevations of all manholes.
- 4) Pavement surface line or ground line on the centerline of lines.
- 5) Stationing along street centerline, including intersecting street lines.
- 6) Lift stations and pump stations and connection thereto.
- 7) Abbreviations where used shall be as follows:

VCP – Vitrified Clay Pipe

RCP – Reinforced Concrete Pipe

CIP– Cast Iron Pipe

DIP – Ductile Iron Pipe

CMP – Corrugated Metal Pipe

MH – Manhole

DMH – Drop Manhole

CB – Catch basin

OG – Original Grade (See drawing L-7215.2)

Inv – Invert (Flow Line)

DI – Drainage Inlet

HDPE – High Density Polyethylene

- f. Except as otherwise provided in the Improvement Plans or Plan Documents, the Subdivider shall construct all sewers, storm drains, and appurtenances shall, to the extent consistent with Applicable City Regulations, in accordance with approved “Standard Sewer Plans,” copies of which the Subdivider can obtain through application to the Department of Public Works, Bureau of Engineering. Improvement Plans for special structures or systems not covered by any Standard Sewer Plans shall require the approval of the Director with the consent of the SFPUC unless included in the Improvement Plans or Plan Documents.
- g. Low pressure water, recycled water and auxiliary water supply system facilities.
 - i. Show all water infrastructure that is proposed and existing, including pipe sizes.
 - ii. Water meter boxes and vaults shown to scale in sidewalk.
 - iii. Valve covers shown to scale.
- h. Profiles of streets showing existing ground along the center line (See drawing L- 7215.2). At the discretion of the Director, the profiles may be required to show existing ground along both property lines and the center line in areas with significant topographic relief. The horizontal scale of profiles shall be at least four times the vertical scale. The Subdivider shall plot the center line

profile of a curved street in a continuous manner. Profiles shall show proposed grade line of curbs.

- i. Typical cross-sections of each street, showing the width of the street, the width of official sidewalk area, width of concrete sidewalk that will be actually constructed and utilities to ensure that vertical and horizontal separation requirements outlined in Appendix D, Sec. I(E) Separation Requirements have been met.
- j. The Subdivider shall show the location of monuments on the plans. Public Works shall approve the number of monuments and their location.
- k. Temporary Utilities. Subdivider's Improvement Plans shall clearly show temporary utilities that Subdivider proposes to develop for phasing purposes. Subdivider shall include or submit Improvement Plans with the design of all off-site infrastructure necessary to serve the infrastructure shown in the Improvement Plans, including utility corridors.
- l. Improvement Specifications. The Subdivider shall describe in the Improvement Specifications for the construction of utilities, formatted to print on 8 1/2" x 11" paper, or other format that the City and Subdivider mutually accept, all requirements as to material and workmanship. These requirements shall conform, to the extent consistent with the Subdivision Regulations, to the TI/YBI Master Specifications, or pertinent provisions thereof. For convenience, the Subdivider should reference any project-specific Improvement Specifications against the TI/YBI Master Specifications as a

base document, and show only proposed or City approved Exceptions, Design Modifications and/or Variations from such Specifications.

- m. Submittal. The Subdivider shall coordinate with the City to determine the number of copies for each of the Improvement Plans and Improvement Specifications that Subdivider shall deliver to the Director for review with the applicable Final Map.
- n. Improvement Plans and Specifications Review, Approval, and Schedule. Upon the Director's approval, permitting of the Improvement Plans, and written notice to the Subdivider that the Street Improvement Permit is ready to issue, the Subdivider shall have 12 months to obtain the Department's Street Improvement Permit and shall have 24 months following issuance of the permit to commence construction. In the event the Subdivider does not achieve these timeframes, the Department and/or the SFPUC may require the Subdivider to resubmit the Improvement Plans for review; provided, however, that the TIDA Director, in consultation with the Director and SFPUC General Manager, may extend each of the timeframes described in this paragraph by up to 12 months.
- o. Expeditious Review. Department, PUC, and other City departments shall process, as expeditiously as reasonably feasible, the review and approval of the Improvement Plans, Improvement Specifications, or any other submittals in support of a Street Improvement Permit or other permit applications.

VI. SEA LEVEL RISE

A. GENERAL

1. Major Areas That Sea Level Rise Impacts

The Subdivision Area has five major areas that Sea Level Rise (“SLR”) impacts as follows:

- a. Perimeter Protection – Consists of the perimeter shoreline that protects the interior of Treasure Island from wave run-up.
- b. Development Areas – Consists of new development areas that the Subdivider will elevate above the adopted SLR elevations.
- c. Parks and Open Space Areas – Consists of the public land located between the shoreline and the edge of the development areas.
- d. Existing Structures to Remain – Consists of several existing historic buildings, existing Job Corps buildings and existing school buildings that will remain on Treasure Island.
- e. New Roads – Consists of the new public rights-of-way

2. 100-Year Return Period

- a. The 100-year return period water elevation is the water elevation that is exceeded on average once every 100 years. Stated another way, the 100-year return period water elevation is the water elevation with a 1% annual chance of occurrence. The 100-year return period water elevation is different for the open space/development areas and for the shoreline areas.
- b. The 100-year return period water elevation for the design of the open space and development areas (Base Flood Elevation or 100-year high tide) is 109.2

feet. The 100-year return period water elevation for the open space and development areas includes the effects of tides, storm surges, and tsunamis.

- c. The 100-year return period water elevation for the design of the shoreline varies by wave exposure. The 100-year return period water elevation for the shoreline includes the effects of tides, storm surges, tsunamis, and wind-driven waves.

3. SEA LEVEL RISE DESIGN CRITERIA

AREA TYPE	MINIMUM DESIGN CRITERIA
Shoreline	The minimum shoreline elevation shall accommodate 16 inches of SLR above the 1% annual chance of occurrence water elevation with minimal overtopping. Elevations and types of perimeter protection shall take into account shoreline orientation and the proposed adjacent land plan.
Parks and Open Space Adjacent to the Shoreline	Provide a minimum elevation of 109.2 feet (100-year high tide elevation) over parks and open space while allowing ponding during combined large rain and high tide events.
Development Areas Perimeter—Streets	The street elevation shall accommodate 32 inches of freeboard between the 5-year storm drain system hydraulic grade line and the street gutter flow line. The starting hydraulic grade line design elevation for the storm drain system shall be 109.2 feet. This allows for 16-inches of SLR before an adaptive management strategy needs to be implemented (per Sec. B below)
Development Areas Perimeter—Structures	Provide a minimum finished floor elevation of 112.7 feet (109.2 feet 100-year high tide elevation + 36 inches of SLR + 6 inches of freeboard) for occupied facilities.
Development Area Perimeter—Storm Drain System 5-Year Storm Event	The starting hydraulic grade line design elevation for the storm drain system shall be 110.53 feet (109.2 feet 100-year high tide + 16 inches of SLR). Provide a minimum 16 inches of freeboard between the storm drain system hydraulic grade line and the street gutter flow line.

AREA TYPE	MINIMUM DESIGN CRITERIA
Development Area Perimeter—Storm Drain System 5 to 100-Year Storm Event	<p>Provide a starting hydraulic grade line design elevation for the overland flow of 110.5 feet (109.2 feet 100-year high tide elevation + 16-inches of SLR).</p> <p>Subdivider shall not convey overland flow in easements across private property.</p> <p>Subdivider may convey overland flow in easements across public property.</p> <p>Subdivider shall convey overland flow either within the City right-of-way, between the face of curb to face of curb, or within public property in channels.</p> <p>Subdivider shall contain overland flow within the City right-of-way between the face of curb to face of curb with no freeboard unless the Director with the consent of the SFPUC approves otherwise on a case-by-case basis. The City shall allow curb overtopping for the overland flow at the edge of the Project to flow into San Francisco Bay. When the overland flow overtops the curb at the edge of the Project and flows into San Francisco Bay, the overland flow water level shall be below the top of curb on the side of the street adjacent to structures such as buildings.</p> <p>Overland flow within channels shall have 1 foot of freeboard measured from the highest point between the channel and the edge of easement except where the depth of flow is less than 1 foot. For cases where the depth of flow is less than 1 foot, the freeboard shall be equal to the depth of flow.</p>

B. ADAPTIVE MANAGEMENT PLAN (“AMP”)

1. Monitoring and Adaptive Management Plan

TIDA shall establish a Special Assessment District (“District”) as referenced in the Mitigation Measures. This District shall be responsible for developing a detailed Monitoring and Adaptive Management Plan (“Plan”) within 5 years of the establishment of the District. The City departments shall review and approve the Plan and updates to the Plan. The Plan shall include the following, but is not limited to:

- a. Clearly defined roles and responsibilities,
- b. A decision making framework,
- c. A projected spending plan for the planning, design, construction, implementation and maintenance of all adaptive management strategies.
- d. Detailed strategies to address 16”, 24” and 36” of SLR, based on the dynamic hydrologic modeling performed as part of the Hydrology and Hydraulics Plan

- e. Detailed strategies to ensure SLR design criteria as outlined in the above table are met.

2. Monitoring Report

TIDA shall compile updates to the Plan in a monitoring report (“Report”) that TIDA prepares at least once every five years or more frequently if new regulations require this or an increase in public health hazards or safety associated with flooding. The Report shall include, but is not limited to:

- a. Publication and analysis of SLR and local rainfall data.
- b. Determination of accepted SLR that has occurred and establishment of updated baseline data and criteria for ongoing analysis and planning.
- c. Changes and anticipated changes in Local, State or Federal regulations related to SLR and climate change and a discussion of how the Project complies with or will comply with any applicable new regulatory requirements as needed.
- d. A report of the funds that the special assessment district collects and expends for implementation of the Adaptive Management Strategy.
- e. A summary of flooding issues that occur on a regular basis and the associated risk and potential impacts.
- f. A description of any necessary changes to the Adaptive Management Strategy as outlined in the Plan that are necessary as a result of the new SLR and climate change information analyzed above.

When data that TIDA collects in the Report shows that SLR has exceeded or is projected to exceed the limits designed for in the initial improvements within the next 5 years or if flooding issues are documented to occur on a regular basis or impact

public health and safety, TIDA shall update the Plan and activate the adaptive management strategies, including the development of work plans and schedules, and the determination of the process to implement the necessary improvements.

VII. SEPARATED SANITARY SEWER (GRAVITY)

All sanitary sewer system designs shall follow the applicable Federal, State and Local Regulations, including the Sanitary Sewer Systems Waste Discharge Requirements (“SSS WDRs”) consistent with the provisions for use of new regulations as described in the Treasure Island/Yerba Buena Island Disposition and Development Agreement.

A. REQUIRED CAPACITY OF SEPARATED GRAVITY SANITARY SEWER SYSTEM

1. Design Basis

Subdivider shall base sewer demand, Average Dry Weather Flow (“ADWF”) on 95% of the indoor low pressure water demand and 100% of the indoor recycled water demands of the Subdivision Area.

2. Minimum Pipe Size

Sanitary sewer mains shall be 8” inside diameter.

The Director, with the consent of the SFPUC General Manager, may approve a conditional exception to allow smaller internal diameter separated sanitary sewers subject to Subdivider providing acceptable inspection and maintenance equipment that the SFPUC can use to verify the proper operation of the smaller sanitary sewer line.

3. Velocity

- a. Minimum Velocity: 2 feet per second (fps) under ADWF conditions. Subdivider shall coordinate the final pipe velocities with the SFPUC prior to approval of the Sub-Phase Improvement Plans.
- b. Development of individual parcels may require the Vertical Developers to review upstream conditions and demonstrate to the SFPUC that a minimum velocity of 2 fps shall be achieved in the sewer mains to which they are connecting. If the Vertical Developer cannot demonstrate that it can achieve the minimum required velocity in aggregate with other development parcels contributing to the same main by gravity at project build out, then the Vertical Developer shall install a privately owned and maintained ejector pump sized to provide the minimum required velocity in the main when the pump is running.
- c. Subdivider shall record a SFPUC approved notice of special restriction, declaration, or similar document against any such properties notifying the vertical developer that the subject property is responsible for maintaining the minimum velocity identified in the Sanitary Sewer Master Plan in the ultimate build-out condition. This may require the Vertical Developer to install and maintain a private sewer ejector pump on private property at no cost to the City. The restriction shall include the City as a third party beneficiary for purposes of enforcing the ejector pump requirement.
- d. Subdivider shall design separated gravity sanitary sewers for a maximum velocity of ten (10) feet per second under Peak Wet Weather Flow conditions.

4. Pipe Roughness Coefficient

The pipe roughness coefficient “n” for HDPE pipe shall be 0.010.

5. Peaking Factor

Peak Dry Weather Flow (“PDWF”) = 3.0 x ADWF

Peak Wet Weather Flow (“PWWF”) = PDWF + Inflow/Infiltration

Design Inflow/Infiltration rate shall be 0.003 cfs per acre of the development area.

6. Pipe Flow Depth

- a. Subdivider shall set sanitary sewer pipe capacity by the proportional depth of flow, d/D . d/D is defined to be the ratio of the depth of flow (d) to the pipe inside diameter (D).
- b. Sewers shall have sufficient capacity to carry ADWF when running half full based on depth ($d/D=0.50$).
- c. Sewers shall have sufficient capacity to carry PWWF when running 0.75 full based on depth ($d/D=0.75$).

B. RECOMMENDED STANDARDS OF DESIGN FOR SEPARATED GRAVITY SANITARY SEWER SYSTEM

1. General

Subdivider shall make provision for the removal of sewage from each lot or parcel of land.

2. Separated Sanitary Sewer Main

- a. Location
 - i. Subdivider shall locate separated sanitary sewer mains and structure appurtenances either within the public right-of-way or within a dedicated

easement in accordance with Appendix A, Sec. I(E) of these Subdivision Regulations. Subdivider shall locate separated sanitary sewer mains and structure appurtenances so that the excavation and repair of mains or structure appurtenances shall not encroach on private property without dedicated easements.

- ii. Subdivider shall locate separated sanitary sewer mains as close as possible to the center of streets and alleys to adequately serve both sides of the right-of-way, except where separated storm drain mains are located near the center of the improvements or where physical constraints dictate, and meet utility pipe and structure appurtenance separation requirements. The City Engineer with the consent of the SFPUC may approve an alternate design on a case-by-case basis.
- iii. Where the Subdivider locates separated storm drain mains near the center of the improvements, the Subdivider shall locate the separated sanitary sewer main as close as practical to the separated storm drain main. The SFPUC prefers, where possible, to have the Subdivider locate the separated sanitary sewer main as close to the center of lanes nearest the center of streets and alleys as possible with consideration of the placement of other utility pipes and structure appurtenances.

b. Separation between sanitary sewer and other utilities

See Appendix D, Sec. I(E) Separation Requirements for the approximate location and/or separation requirements between the separated sanitary sewer and the other utilities and improvements.

- c. Depth and Cover. The minimum depth of cover of separated sanitary sewers shall be six (6) feet.
- d. Material and Sizes
 - i. Sewer pipes 6” to 24” inside diameter shall be HDPE SDR 17 Iron Pipe Size (IPS) conforming to ASTM D3035.
 - ii. The Director, with the consent of the SFPUC General Manager, may approve a conditional exception to allow smaller internal diameter separated sanitary sewers subject to Subdivider providing acceptable inspection and maintenance equipment that the SFPUC can use to verify the proper operation of the smaller sanitary sewer line.
 - iii. Subdivider shall coordinate pipe materials for separated sanitary sewer mains larger than 24” inside diameter with the City Engineer and the SFPUC during design. Sewer pipes larger than 24” inside diameter may be HDPE SDR 17 Iron Pipe Sizing (IPS) conforming to ASTM D3035 subject to the approval of the City Engineer with the consent of the SFPUC on a case-by-case basis.
- e. Joints
 - i. Subdivider shall make connections of HDPE pipe to HDPE pipe by butt (heat) fusion process. When the Subdivider joins sections of pipe, the Subdivider shall immediately remove the bead formed on the interior of the pipe per the manufacturer’s recommendation.
 - ii. The City Engineer with the consent of the PUC may approve on a case-by-case basis a variation for connections of HDPE pipe to HDPE pipe

using electrofusion couplings. Subdivider shall make connections of different pipe materials by manholes.

- f. Alignment. Subdivider shall lay all pipes on straight lines and grades between manholes.
- g. Encasement and Bedding. Subdivider shall encase all sewers on grades of 30% or greater in reinforced concrete in accordance with City Standard Plans and place concrete against undisturbed ground.
- h. Clay Seals. The City Engineer and SFPUC shall determine the requirement for clay seals based on a soil or environmental report.
- i. Settlement. Subdivider shall design pipes to comply with the criteria herein both at the time of construction and after 100% of the predicted 50-year settlement.

3. MANHOLES AND MANHOLE COVERS

- a. Subdivider shall locate manholes preferably at intervals of three hundred (300) feet but not more than three hundred fifty (350) feet. Subdivider shall provide manholes at every change in pipe size, grade, material, shape, or alignment, at all junctions of sewers, and at ends of sewers.
- b. Subdivider shall locate manholes outside the crosswalks and a minimum of one (1) foot beyond the outside edge of crosswalk striping.
- c. Unless the City Engineer with the consent of the SFPUC approves an alternate design on a case-by-case basis, Subdivider shall construct manholes in accordance with the Standard Plans.

- d. The Director with the consent of the SFPUC shall approve all manhole covers and the Subdivider shall show them in the Improvement Plans or TI/YBI Master Specifications.
- e. The separated sanitary sewer manhole shall differ from the combined sewer manhole. Separated sanitary sewer manhole covers shall not have holes and shall seal to prevent stormwater flowing into the separated sanitary sewer to the maximum extent practical. The size of separated sanitary sewer manhole covers shall be standardized and differ in size from the storm drain manhole covers.
- f. Sanitary sewer manhole covers shall include a “SANITARY SEWER” stamp.
- g. Subdivider shall provide one additional non-standard manhole cover or 10% of the total number of manhole covers in each sub-phase, whichever is greater, to the PUC upon completion of each sub-phase. Subdivider shall provide one corresponding casting mold to the SFPUC for the entire Project.

4. SANITARY SEWER SERVICE LATERAL CONNECTIONS

- a. Y-and T-Branches
 - i. Subdivider shall install Y- and T- fittings on the sanitary sewer main for sanitary sewer lateral connections 8” inside diameter and smaller.
 - ii. Subdivider shall connect sanitary sewer service laterals to the side of the main. Sanitary sewer service laterals shall be perpendicular to the main and shall connect either between the 9 o’clock and 11 o’clock position or the 1 o’clock and 3 o’clock position of the main.

- iii. Subdivider shall make the openings for connections to existing sanitary sewer mains with a sharp cutting tool.
 - iv. Subdivider shall saddle fuse an approved saddle of appropriate size to HDPE sanitary sewer mains.
 - v. Tapped laterals on existing mains will only be allowed when existing main line is twice the diameter of the lateral being added to the existing main.
- b. Manholes
- i. Subdivider shall install manholes on the sanitary sewer main for sanitary sewer lateral connections 9.4" inside diameter and larger.
 - ii. Subdivider shall cast-in sanitary sewer lateral connections to new manholes with the construction of new manholes.
 - iii. Subdivider shall provide a proposed detail for connecting sanitary sewer laterals to existing manholes to SFPUC for approval prior to construction.

5. SANITARY SEWER SERVICE LATERALS

- a. General
 - i. Subdivider shall design sanitary sewer laterals and install them in accordance with the San Francisco Plumbing Code, Standard Plans, City Sanitary Sewer Lateral Standard Details, latest revision, and Standard Specifications.
 - ii. The San Francisco Plumbing Code shall apply to the building lateral and upper sanitary sewer lateral (the section of sanitary sewer lateral from

the face of curb to the property line). The Standard Plans and Standard Specifications shall apply to the section of sanitary sewer lateral from the face of curb to the sewer main.

b. Layout. Unless the City Engineer with the consent of the SFPUC approves an alternate design on a case-by-case basis, Subdivider shall design sanitary sewer laterals and install them perpendicular to the sanitary sewer main. The perpendicular alignment of the sanitary sewer laterals shall take precedence over locating other utilities when the City Engineer with the consent of the SFPUC has authorized an adjacent sanitary sewer main to have less than six (6) feet depth of cover.

c. Sizes

i. Sanitary sewer laterals for residential lots shall be 6” inside diameter minimum and sanitary sewer laterals for industrial or commercial lots shall be 8” inside diameter minimum.

ii. The Director, with the consent of the SFPUC General Manager, may approve a conditional exception to allow smaller internal diameter separated sanitary sewers subject to Subdivider providing acceptable inspection and maintenance equipment that the SFPUC can use to verify the proper operation of the smaller sanitary sewer line.

d. Installation

i. Subdivider shall provide the location of laterals to serve the development parcels in Street Improvement Plans. The Subdivider shall include design lateral locations with the Street Improvement Plans based

- on anticipated parcel layouts consistent with the Design for Development document.
- ii. Subdivider shall install sanitary sewer laterals concurrently with the construction of the sanitary sewer unless otherwise identified by Developer at time of Permit and approved by the City Engineer with consent of the SFPUC. Laterals shall extend one (1) foot beyond the property line. Subdivider shall lay sanitary sewer laterals on a uniform grade upward from the sanitary sewer main and, in no case, shall the grade shall be less than 2%.
 - iii. Subdivider shall cap the upper end of each sanitary sewer lateral not in service when Subdivider backfills the work. Subdivider shall mark these with a redwood post and with the letter “S” on the curb as specified in the Standard Specifications.
- e. Material. Sanitary sewer lateral pipe shall be HDPE SDR 17 conforming to ASTM D3035.
 - f. Depth. The sanitary sewer laterals shall be of sufficient depth to provide adequate drainage for the property served and in no case shall the pipe centerline at the face of curb be less than four (4) feet below the top of curb.
 - g. Connection
 - i. Separated sewer mains may flow to downstream combined sewer mains. Combined sewers are designed to flow under surcharged conditions, and in the event of extreme storms, the surcharge may rise to the street for

overland flow transport. Upstream separated sewer mains flowing to surcharged combined sewer mains may also surcharge.

- ii. In order to prevent backflow into improvements below street grade from service laterals connected to the separated sewer main, Subdivider shall not make gravity sewer connections from basements to sewer mains that may surcharge without backflow preventers.
- h. Backflow Preventers. Subdivider shall install backflow preventers for all properties below street grade. All backflow preventers must be outside of the right-of-way, on private property. The property owner(s) shall privately own and maintain these backflow preventers. The SFPUC may require that Subdivider record a SFPUC approved notice of special restriction, declaration, or other similar document against all property subject to the backflow preventer requirement that notifies successor property owners of such requirement.

VIII. SANITARY SEWER FORCE MAIN

A. MATERIALS AND JOINTS

Sanitary sewer force main materials may be the following:

1. High Density Polyethylene

- a. High Density Polyethylene (“HDPE”) pipes and fittings 24” inside diameter and smaller shall be PE 4710 (125 psi) SDR 17 Iron Pipe Sizing (IPS) conforming to ASTM D3035.
- b. Subdivider shall make connections of HDPE pipe to HDPE pipe by the butt (heat) fusion process. When Subdivider joins sections of pipe, the Subdivider

shall immediately remove the bead formed on the interior of the pipe per the Manufacturer's recommendation.

- c. The City Engineer with the consent of the SFPUC may approve on a case-by-case basis a variation of connections of HDPE pipe to HDPE pipe using electrofusion couplings.

2. Other Materials

The City Engineer with the consent of the PUC may approve on a case-by-case basis an Exception, Design Modification, and/or Variation in accordance with the procedures for approving such alternations for sanitary sewer force main materials that the Subdivider may propose during design.

B. VELOCITY

Minimum flow velocity shall be 2 feet per second.

Maximum flow velocity shall be 8 feet per second.

C. DESIGN METHOD

Subdivider shall size force mains using the Hazen-Williams formula.

HAZEN-WILLIAMS COEFFICIENT

For HDPE pipe, Subdivider shall use a Hazen-Williams coefficient $C=110$ with bend losses accounted for separately.

If the Subdivider proposes alternative materials, the City Engineer with the consent of SFPUC may approve such materials on a case-by-case basis. Under such circumstances, the City Engineer with the consent of the SFPUC shall approve of the Hazen-Williams coefficient for the alternative materials.

D. SEPARATION

Subdivider shall provide for necessary separation between the sanitary sewer force main and the other utilities and improvements in accordance with Appendix D, Sec. I(E) Separation Requirements.

IX. SANITARY SEWER PUMP STATION

A. GENERAL

The Subdivider's pump station systems shall be designed for safe, efficient, and reliable operation in order to achieve key performance goals and minimize life-cycle costs.

The Subdivider's pump station systems shall comply with these Regulations as well as the following:

- a. Draft Pump Station Design Guide, dated August 31, 2007, or latest revision, prepared by the SFPUC Wastewater Enterprise
- b. The latest revision of the Safe Design Guidelines, prepared by the SFPUC Health and Safety Program and the Department.
- c. The latest revision of the ANSI/HI Pump Standards, published by the American National Standards Institute/Hydraulic Institute.
- d. The latest revision of the NFPA 70E: Standard for electrical safety in the workplace, published by the National Fire Protection Association.

B. BASIS OF DESIGN

1. Key Performance Goal

Each sanitary pump and lift station capacity shall be the Peak Wet Weather Flow at full build-out.

2. Narrative

The Subdivider shall provide a written Basis of Design Summary for each pump station demonstrating how the pump station design achieves the key performance goal. The Basis of Design Summary must be reviewed and approved the SFPUC.

C. STANDARDS

1. Operations and Maintenance

- a. Subdivider shall design pump and lift stations to minimize frequency and intensity of maintenance.
- b. Pump and lift stations shall be designed to maximize operational flexibility.
- c. Pump and lift stations shall have redundancy on all critical systems to achieve key performance goals. This includes, but is not limited to:
 - i. Installation of an extra pump per pump or lift station.
 - ii. Provision, by Subdivider, of one spare sanitary pump for every ten sanitary pump types or fraction thereof. Storm drain pumps shall not be interchangeable with sanitary pumps.
- d. Lift stations shall be designed to allow gravity overflow to the next lift station in the event of a lift station failure.
- e. Lift stations shall include a means for a generator to supply power to the lift station. Pump stations shall include standby generator.

- f. Pump or lift stations with large sumps shall have continuous level reading available to the SFPUC Distributed Control System (“DCS”) even during power failure. SFPUC shall determine which sumps require continuous level reading on a case-by-case basis.
- g. Subdivider shall provide a Pump Station Operation and Maintenance Manual that outlines the critical items for operators to ensure the pump or lift station achieves the key performance goal.
- h. Subdivider shall design frequently adjusted equipment for both manual and automated control. Subdivider shall identify gates, valves, or pumps that are not automated in the Pump Station Operation and Maintenance Manual.
- i. Pump and lift stations shall have electrical isolation for all equipment.
- j. Pump and lift stations shall include an area and means for cleaning equipment.
This requires:
 - i. A spigot designated for SFPUC-only use with adequate contamination protections for the potable water lines and the ability to retrofit with an eyewash shower; and
 - ii. An area drain that drains only to the sanitary system and not to the storm drain system.
- k. Eyewash showers shall be installed, per “Safe Design Guidelines” (SFPUC Health and Safety Program and the Department of Public Works), if chemical application is used at the pump or lift station.

2. Site Accessibility

- a. Pump and lift stations shall allow for adequate access for typical operation and maintenance by staff, vehicles, out-rigging, and equipment. Access requirements shall be determined by SFPUC on a case-by-case basis.
- b. The Subdivider shall provide an Operation and Maintenance Accessibility Plan for each pump or lift station during design review to demonstrate that adequate access can be achieved by staff, vehicles, out-rigging, and equipment. All access shall be available via the public ROW and in land dedicated to SFPUC in accordance with Section VII of Appendix A of these Regulations.
- c. Subdivider shall design pump and lift stations such that confined space entry or fall protection is not required for routine operation and maintenance tasks within, or on, pump and lift stations.

3. Monitoring

- a. Pump stations and lift stations shall include a means to monitor or analyze the complete range of flows. Flow meters or other measuring equipment shall be installed and located as efficiently as possible to minimize number of meters while still obtaining complete flow data.
- b. Pump and lift stations shall include a means to monitor flows, such as a flow meter.
- c. Pump and lift stations shall include a port or other means to sample sewer flows.

- d. The pump status for pump and lift stations shall connect to the SFPUC DCS prior to operation of the pump or lift station.
- e. The controls for pump stations shall connect to the SFPUC DCS prior to operation of the pump station.

4. Pump Size

Subdivider shall select and size pumps to operate within the optimal pump efficiency rating, per the latest revision of the American National Standards Institute/Hydraulic Institute (“ANSI/HI Pump Standards”), while achieving key performance goals.

5. Equipment Protection

- a. Subdivider shall locate pump and lift station controls and electrical equipment outside of flood areas or rated for immersion per the National Electrical Manufacturer Association (“NEMA”) Enclosure Standards Type 6p.
- b. Pump and lift station capacity criteria shall include inflow/infiltration for a conservative design; however acceptance of pump or lift station will be based on zero inflow/infiltration when tested.

6. Nuisance

- a. Pump and lift station designs shall minimize odors to achieve below 5 Detection Threshold (“DT”).
- b. Pump and lift station designs shall minimize nuisance noises.
- c. Subdivider shall design pump and lift stations to be fully secure.
- d. Pump stations shall include remote video surveillance available to the live SFPUC-WWE security network.

7. Future Improvements

- a. The Subdivider shall coordinate with the SFPUC to identify appropriate upgrades to the planned or newly constructed sewer and stormwater systems if in the future, over the course of the development, the projected demands increase due to currently unanticipated changes to the land use plan.
- b. The Subdivider shall identify the equipment's necessary components to allow successful future replacement or updating of that equipment. This list shall be included in the design drawings.
- c. Pump and lift stations shall have two empty electrical conduits within the joint utility trench that are each a minimum of three inches in diameter. Of the two conduits, Subdivider shall connect one conduit to a two inch drop between the joint utility to the control station.

8. Land

Subdivider shall dedicate property rights for all SFPUC-owned pump and lift stations to TIDA in accordance with Section VII of Appendix A of these Regulations.

X. STORMWATER MANAGEMENT

A. GENERAL

1. San Francisco Stormwater Design Guidelines

- a. New or redevelopment projects built in San Francisco can increase stormwater flows that affect San Francisco's wet weather infrastructure capacity and permit compliance. The Subdivider's design for stormwater management of development within the Subdivision Area that disturbs 2,500 square feet or more of ground surface shall comply with the San Francisco Stormwater

Design Guidelines (“Guidelines”). Subdivider shall comply with the Stormwater Management Ordinance that requires the development and maintenance of stormwater management controls outlined in the Guidelines that were effective on May 22, 2010.

- b. The SFPUC conducts project reviews to ensure that new development and redevelopment projects comply with the Guidelines. The Subdivider for any project disturbing 5,000 square feet or more of ground surface shall submit to the SFPUC for review and approval a project Stormwater Control Plan (SCP) demonstrating compliance with the Guidelines.

2. Public Streets

- a. Public streets shall incorporate stormwater BMP measures that comply with the Guidelines in the public right-of-way or in the public open space parks. The Subdivider shall show typical concepts and locations of stormwater BMP measures consistent with the Master Utility Plan.
- b. Subdivider shall show the final placement and design of the stormwater BMP measures in the Stormwater Control Plans. The SFPUC shall review and approve all design of stormwater BMP measures.

3. Development Parcels

Subdivider may incorporate stormwater BMP measures that comply with the *Guidelines* either on-site or regionally (in public open space parks) as part of a master-planned or multi-parcel development. Subdivider shall show the final placement and design of the stormwater BMP measures in the Stormwater Control

Plans. The SFPUC shall review and approve all design of stormwater BMP measures.

B. BEST MANAGEMENT PRACTICES

Subdivider shall design stormwater treatment BMPs to meet the Stormwater Design Guidelines such that the system hydraulic grade line during the treatment storm, at Mean Higher High Water (“MHHW”), with 16-inches of SLR³⁹ shall have a 6-inch clearance below the bottom of the treatment and/or storage zones, unless the SFPUC approves otherwise on a case-by-case basis.

See Appendix D, Sec. II(E) Separation Requirements for the approximate location of and separation requirements between the BMPs and the other improvements.

XI. SEPARATED STORM DRAIN SEWER (GRAVITY)

All separated gravity storm drain system designs shall follow the applicable Federal, State and Local Regulations, including the Phase II Small Municipal Separate Storm Sewer System (“MS4”) Permit consistent with the provisions for use of new regulations as described in the Treasure Island/Yerba Buena Island Disposition and Development Agreement.

³⁹Note MHHW is presently known to be 106.22 feet elevation in the island datum for this tidal epoch. For purposes of design this elevation is considered static and will not change unless SLR Adaptive Management Strategies are implemented at a future time by TIDA.

A. REQUIRED CAPACITY OF SEPARATED GRAVITY STORM DRAIN SYSTEM

1. Design Basis

Separated storm drains shall have sufficient capacity, when flowing full or surcharged, to carry the computed stormwater runoff, based on the ultimate development of the area including the natural drainage from upstream areas. Subdivider shall include upstream stormwater runoff from watersheds adjacent to the development area in the stormwater flow analysis.

2. Minimum Pipe Size

Storm drain mains shall have a minimum 11.1” inside diameter.

3. Velocity

- a. Subdivider shall design storm drains for a minimum velocity of two (2) feet per second when flowing full with a tide elevation equal to the Mean Lower Low Water plus 2 feet at the outfalls.
- b. Subdivider shall design gravity storm drains for a maximum velocity of ten (10) feet per second when flowing full.

4. Design Criteria

Subdivider shall design the stormwater system to convey the 5-year storm event within the piped system and the 100-year storm event within the street curblines. For curbless streets, the 100-year storm event must be conveyed in the travel way, not in the pedestrian accessibility routes. The system will discharge to the San Francisco Bay through multiple outfalls. Subdivider shall use the tailwater elevation at the

outfall for the stormwater design so that it is equal to the design tide elevation (defined below).

5. Design Tide Elevation

Moffatt & Nichol completed an Extreme High Water Level Analysis to determine the current 100-year tide elevation as part of their April 2009 “Coastal Flooding Study for Treasure Island” (Appendix D). Based on its review of the historical tide and storm data for the San Francisco Bay, the current 100-year tide elevation for Treasure Island is estimated to be 109.2 feet (island datum).

B. FUTURE SEA LEVEL RISE

In the future, SLR could raise the design tide elevation. The State of California’s 2009 Draft Climate Adaptation Strategy Report includes guidance to State agencies addressing climate change adaptation. The anticipated SLR for mid-century is 16 inches and end of this century is 55 inches. Subdivider shall design the stormwater system to accommodate 16 inches of SLR with an adaptive management strategy.

A description of Sea Level Rise and the Adaptive Management Strategy proposed for Treasure Island are included in the Coastal Flooding Study referenced above.

The design year, SLR, and freeboard are summarized below.

1. SLR Design Criteria Table

Initial Infrastructure Design	Tide/SLR Condition	Minimum Design Criteria for Stormwater System	
		5-year storm	5 to 100-year storm
Infrastructure Adjustments for Future SLR	Current Tide Condition Mean sea level: 103.29 feet (Determined in 2009 Coastal Flooding Study)	<u>Flow in Pipes</u> Design Storm: 5-year event Design Tide: Current 100-year high tide Minimum Freeboard (Streets): 2.67 feet to street gutter flow line Minimum Freeboard (parks/open space): ponding allowed	<u>Overland Flow</u> Design Storm: 5 to 100-year event Design Tide: Current 100-year high tide Minimum Freeboard (Streets): Allowed to flow in street, 6 inches of ponding depth Minimum Freeboard (parks/open space): Ponding allowed
	SLR Conditions: up to 16 inches Mean sea level: 103.29 feet + 16 inches = 104.62 feet (Estimated to occur by 2050)	<i>Adaptive Management Strategy: reduce freeboard allowance</i>	<i>Adaptive Management Strategy: reduce freeboard allowance</i>
		<u>Flow in Pipes</u> Design Storm: 5-year event Design Tide: Current 100-year high tide + SLR (16 inches) = 110.53 feet Minimum Freeboard (Streets): 16 inches to street gutter flow line Minimum Freeboard (parks/open space): Ponding allowed	<u>Overland Flow</u> Design Storm: 5 to 100-year event Design Tide: Current 100-year high tide + SLR (16 inches) = 110.53 feet Minimum Freeboard (Streets): Allowed to flow in street, 6 inches of ponding depth Minimum Freeboard (parks/open space): Ponding allowed
	SLR Condition: 16 inches to 36 inches Mean sea level: 103.29 feet + 36 inches = 106.29 feet (Estimated to occur between 2050 and 2100.)	<i>Adaptive Management Strategy: When SLR Monitoring Report (Section 5.5.2) determines 16 inches of SLR has occurred implement modifications to storm drainage system.</i>	<i>Adaptive Management Strategy: When SLR Monitoring Report (Section 5.5.2) determines 16 inches of SLR has occurred implement modifications to storm drainage system.</i>
		<u>Flow in Pipes</u> Design Storm: 5-year event Design Tide: 100-year high tide at that time + SLR (guidance at that time) Minimum Freeboard (streets): 2.67 feet to street gutter flow line Minimum Freeboard (parks/open space): Ponding allowed	<u>Overland Flow</u> Design Storm: 5 to 100-year event Design Tide: 100-year high tide at that time + SLR (guidance at that time) Minimum Freeboard (streets): Allowed to flow in street, 6 inches of ponding depth Minimum Freeboard (parks/open space): Ponding allowed
	SLR Condition: greater than 36 inches Mean sea level: 103.29 feet + 36 inches = 106.29 feet (NAVD 88 + 100 feet) (Estimated to occur after 2100.)	<i>Adaptive Management Strategy: When SLR Monitoring Report (Section 5.5.2) determines greater than 36 inches of SLR has occurred implement modifications to storm drainage system.</i>	<i>Adaptive Management Strategy: when freeboard violates minimum allowance 8 inches, implement modifications to storm drainage system.</i>
		<u>Flow in Pipes</u> Design Storm: 5-year event Design Tide: 100-year high tide at that time + SLR (guidance at that time) Minimum Freeboard (streets): 2.67 feet to street gutter flowline Minimum Freeboard (parks/open space): Ponding allowed	<u>Overland Flow</u> Design Storm: 5 to 100-year event Design Tide: 100-year high tide at that time + SLR (guidance at that time) Minimum Freeboard (streets): Allowed to flow in street, 6 inches of ponding depth Minimum Freeboard (parks/open space): Ponding allowed

2. Run-Off

Subdivider shall compute stormwater run-off by the Rational Formula, as herein described, or other such methods that the City Engineer with the consent of the SFPUC determines to be City practice.

Rational Formula: $Q = CIA$, where

Q = Quantity of Run-off in cubic feet per second, which is equal to the cubic feet per second per acre for the duration of rainfall corresponding to the time of concentration

C = Coefficient of Run-off = Ratio of Run-off to Rainfall.

I = Rate or Intensity of Rainfall in inches per hour.

A = Drainage Area, tributary to the point under consideration, in acres.

Coefficient of Run-off (C) for any area depends upon the type of development, character of the soil, slope and general topography, and the proportion of the area occupied by improvements. The coefficient that the Subdivider uses in design shall be in accordance with the values shown in Table 2.1 below and shall be subject to the approval of the City Engineer with the consent of the SFPUC.

Rainfall Intensity (I), or rate, that the Subdivider uses in design shall be from the tabulation entitled "San Francisco Rainfall Rate Table 1941," Plan L-3903.4 dated February 1941, or subsequent revisions thereof, and is defined as a 5-year storm. See Table 2.1 below. The intensity, or rate, that the Subdivider uses at any point along the storm drain line shall be the intensity corresponding to the total time of concentration at that point.

Table 2.1		
Rainfall Intensity/Duration/Frequency Table		
Duration (min)	Intensity (in/hr)	
	5-yr	100-yr
5	3.126	4.92
7	2.742	4.464
10	2.316	3.78
15	1.84	3.24
22	1.428	2.69
30	1.137	2.06
45	0.856	1.675
60	0.723	1.29

The 100-year Intensity-Duration-Frequency (“IDF”) curve equation for overland flow shall be the following:

$$I = \frac{11.802}{t_c^{0.54}}$$

The 100-year IDF curve equation is the best fit log-linear line of the Rainfall Depth-Duration-Frequency table for the San Francisco City Station E70 7772 00 published by the California Department of Water Resources. See Table 2.1.

Area (A) – The Subdivider shall use the total area tributary to the point under consideration in design.

Time of Concentration and Inlet Time – Time of concentration at any given point is the time required for the run-off from the most remote point in the drainage area to

reach that point and is equal to the inlet time plus the time of flow in the storm drain to the point under consideration.

Inlet time is the time required for the water from the most remote point of the drainage area to reach the uppermost inlet of the storm drain system. The inlet times that the Subdivider uses in design shall be in accordance with the values shown in Table 2.3 or as demonstrated by calculation. The minimum inlet time of concentration shall be five minutes or as demonstrated by calculation.

Coefficients of run-off and inlet times for various types of districts are shown in Table 2.3. For those districts that do not fit into any of the categories below, Subdivider shall submit proposed coefficients with rationale to the City Engineer and SFPUC for review and approval.

The time of concentration for overland flow shall be the inlet time adjusted for travel time in the streets.

TABLE 2.3
COEFFICIENTS OF RUN-OFF AND INLET TIMES

Type of District	Range of Values Run-Off Coefficient "C"	Inlet Time in Minutes	
		Slope 3% & Over	Slope Under 3%
Commercial	0.80 to 0.95	3	5
Industrial	0.60 to 0.90	3-5	5
Apts. & Flats	0.60 to 0.80	3	5
Residential (Attached Homes)	0.45 to 0.70	4	6
Residential (Detached Homes)	0.40 to 0.65	--	--
Suburban	0.25 to 0.35	6	10
Open Space	0.30	22	22
Undefined Undeveloped Space Within Parcel	0.70	5	5
Developed Space Within Parcel	0.90	5	5
Streets and Paved Areas	0.95	5	5

3. Selection of Storm Drain Sizes, Street Sections, and Channels

- a. Subdivider's design shall carry flow up to and including the 5-year storm in the pipes. Subdivider shall compute stormwater flow rates using the Rational Method.

- b. Subdivider’s design shall carry flow in excess of the 5-year storm up to and including the 100-year storm in the pipes and/or the City right-of-way or in the channels as overland flow. Subdivider shall compute overland flow within the City right-of-way or channels using the Rational Method.
- c. Subdivider shall contain overland flow up to the 100-year storm within the City right-of-way between the face of curb to face of curb with no freeboard. The City will allow curb overtopping for the overland flow at the edge of the Project to flow into San Francisco Bay subject to the approval of regulatory agencies. When the overland flow overtops the curb at the edge of the Project and flows into San Francisco Bay, the overland flow water level shall be below the top of curb on the side of the street adjacent to structures such as buildings.
- d. Overland flow within channels shall have 1 foot of freeboard measured from the highest point between the channel and the edge of easement except where the depth of flow is less than 1 foot. For cases where the depth of flow is less than 1 foot, the freeboard shall be equal to the depth of flow.
- e. Subdivider shall use the values of the coefficient of roughness “n” for different materials of storm drain pipes and the street as shown below in Table 3.1.

Table 3.1	
Coefficient of Roughness “n”	
Type of Sewer	Coefficient “n”
HDPE	0.010
Monolithic Concrete	0.013
Centrifugally Spun or Vertically Cast Concrete Pipe	0.012-0.013
Street and Gutter Flow	0.015-0.016

C. RECOMMENDED STANDARDS OF DESIGN FOR SEPARATED GRAVITY STORM DRAIN SYSTEM

1. General

Subdivider's Improvement Plans shall include designs that provide for the removal of stormwater from each lot or parcel of land and the stormwater from all roads, streets, and sidewalks.

2. Separated Storm Drain Main

a. Location

- i. Subdivider shall locate storm drain mains and structure appurtenances either within the public right-of-way or within a dedicated easement in accordance with Appendix A, Sec. E of these Subdivision Regulations. Subdivider shall locate storm drain mains and structure appurtenances so that the excavation and repair of mains or structure appurtenances will not encroach on private property without dedicated easements.
- ii. Subdivider shall locate storm drain mains as close as possible to the center of streets and alleys to adequately serve both sides of the right-of-way, except where physical constraints dictate otherwise.
- iii. Location of separated storm drain mains near the center of the improvements takes precedence over locating other utilities.
- iv. The City prefers that the Subdivider, where possible, locate the storm drain main as close to the center of lanes nearest the center of streets and alleys as possible with consideration of the placement of other utility pipes and structure appurtenances.

- b. Separation. See Appendix D, Sec. I(E) Separation Requirements for the approximate location and separation of the separated storm drain and the other utilities and improvements.
- c. Depth and Cover
 - i. The minimum depth of cover for separated storm drains shall be five (5) feet.
 - ii. For storm drains located in easements in landscape area, the minimum depth of cover shall be three (3) feet. Subdivider shall design surface drainage in these areas so that natural soil erosion does not result in a build-up of soil covering the manhole castings. Subdivider may accomplish this by designing the casting to rise slightly above the surrounding surface. Castings that the Subdivider installs above the surrounding surface shall have an 18” minimum reinforced concrete ring installed.
- d. Material and Sizes
 - i. Storm drain pipes 11.1” to 24” inside diameter shall be HDPE SDR 17 Iron Pipe Sizing (IPS) conforming to ASTM D3035 or Class IV reinforced concrete pipe conforming to ASTM C76.
 - ii. Storm drain pipes larger than 24” inside diameter shall be Class IV reinforced concrete pipe conforming to ASTM C76. The City Engineer with the consent of the SFPUC may approve on a case-by-case basis the use of HDPE SDR 17 conforming to ASTM D3035 for storm drain pipes larger than 24” inside diameter.

- e. Joints
 - i. Subdivider shall make connections of HDPE pipe to HDPE pipe by the butt (heat) fusion process. When Subdivider joins sections of pipe, the Subdivider shall immediately remove the bead formed on the interior of the pipe per the Manufacturer's recommendation.
 - ii. The City Engineer with the consent of the SFPUC may approve on a case-by-case basis connections of HDPE pipe to HDPE pipe using electrofusion couplings.
 - iii. Reinforced concrete pipe ("RCP") shall have bell and spigot or other approved joints. Subdivider shall make connections of different pipe materials using manholes.
- f. Alignment. Subdivider shall lay all pipes on straight lines and grades between manholes.
- g. Encasement and Bedding. Subdivider shall place all storm drain pipes on a crushed rock foundation.
- h. Subdivider shall not place pipes at slopes greater than 30%.
- i. Clay Seals. The City shall require clay seals except where a Geotechnical Report or Environmental Report determines that they are not necessary for a specific area. Under such circumstances, the City Engineer with the consent of the SFPUC may approve an alternative design on a case-by-case basis.
- j. Settlement. Subdivider shall design pipes to comply with the criteria herein both at the time of construction and after 100% of the predicted 50-year settlement.

3. Manholes and Manhole Covers

- a. Subdivider shall locate manholes preferably at intervals of three hundred (300) feet but not more than three hundred fifty (350) feet. Subdivider shall provide manholes at every change in pipe size, grade, material, shape, or alignment, at all junctions of storm drains, at ends of storm drains, and where catch basin laterals join storm drain mains.
- b. Unless the City Engineer with the consent of the SFPUC approves an alternative design on a case-by-case basis, Subdivider shall locate manholes outside the crosswalks and a minimum of one (1) foot beyond the outside edge of crosswalk striping.
- c. Subdivider shall construct manholes in accordance with the Standard Plans. The City Engineer with the consent of the SFPUC may approve on a case-by-case basis an alternative manhole design.
- d. The City Engineer with the consent of the SFPUC shall approve the manhole covers and the Subdivider shall show them in the Improvement Plans.
- e. The size of storm drain manhole covers shall be standardized and differ in size from the separated sanitary sewer manhole covers.
- f. Stormdrain manhole covers will include "STORMDRAIN" stamp.
- g. The Subdivider shall provide one additional non-standard manhole cover or 10% of the total number of manhole covers in each sub-phase, whichever is greater, to the SFPUC upon completion of each sub-phase. The Subdivider shall provide one corresponding casting mold to the SFPUC for the entire Project.

4. Catch Basin Laterals

- a. Catch basin laterals shall be 9.4-inch inside diameter HDPE SDR 17 Iron Pipe Sizing (“IPS”) pipe conforming to ASTM D3035. When the Subdivider joins sections of pipe, the Subdivider shall immediately remove the bead formed on the interior of the pipe per the Manufacturer’s recommendation.
- b. The Subdivider shall make connections to storm drain mains at manholes and in accordance with the Standard Plans.
- c. The Subdivider shall cast-in catch basin lateral connections to new manholes with the construction of new manholes.
- d. Subdivider shall provide a proposed detail for catch basin lateral connections to existing manholes to SFPUC for approval prior to construction.
- e. Subdivider shall generally lay laterals with a depth of cover of approximately two (2) feet below pavement grade at the catch basin, with a fall towards the manhole or storm drain main of approximately twelve (12) inches, but in no case at a grade of less than two percent (2%). The City Engineer with the consent of the SFPUC may approve variations to these standards on a case-by-case basis.

5. Catch Basins and Catch Basin Grates

- a. Subdivider shall locate catch basins in the gutter to most effectively serve the adjacent drainage areas. The Subdivider shall not locate catch basins within crosswalks or in the curb return area. Subdivider shall place catch basins 12” minimum away from the footprint of curb ramps, including flares, and curb

returns. Subdivider shall typically locate catch basins outside the crosswalk, on the far side of the curb return from the intersection.

- b. Subdivider shall provide catch basins at all low points and shall not space them more than six hundred (600) feet apart. The City Engineer and the SFPUC may require closer spacing and additional catch basins to effectively drain the pavement. The Director with the consent of the SFPUC shall determine where the Subdivider shall install multiple inlets on a case-by-case basis.
- c. The Subdivider shall label catch basins draining to the separated storm drain system with “No Dumping Only Rain Down the Drain Report Pollution” decals per the SFPUC template.
- d. The Subdivider shall construct catch basins draining to the separated storm drain system in conformance with City Standard Plan 87,188, including but not limited to the provision for a cast iron trap. However, the structure should be rectangular, rather than round, similar to the State of California Department of Transportation Standard Plan D73, Drainage Inlet Type G3.
- e. Catch basin grates shall be State of California Department of Transportation Standard Type 24-12X Bicycle Proof Grate.
- f. Prior to, or concurrently with, the first improvement plan submittal for this project area, the Subdivider shall submit a standard detail for a separated storm drain system catch basin and grate, to the City for approval. The Subdivider shall incorporate the approved design into the Treasure Island and Yerba Buena Island Master Details.

6. Storm Drain Service Lateral Connections

a. Y- and T-Branches

- i. Subdivider shall install Y- and T-fittings on the storm drain main for storm drain lateral connections 8" inside diameter and smaller.
- ii. Storm drain service laterals shall connect to the side of the main that the storm drain service lateral is on and shall connect either between the 9 o'clock and 11 o'clock position or the 1 o'clock and 3 o'clock position of the main.
- iii. Subdivider shall make the openings for connections to existing storm drain mains or existing combined sewer mains with a sharp cutting tool.
- iv. Subdivider shall epoxy or strap an approved saddle of appropriate size to non-HDPE mains. Subdivider shall provide reinforced concrete collars for lateral connections to non-HDPE mains.
- v. Subdivider shall saddle fuse an approved saddle of appropriate size to HDPE mains.

b. Manholes

- i. Subdivider shall install manholes on the storm drain main for storm drain lateral connections 10" inside diameter and larger.
- ii. Subdivider shall cast-in storm drain lateral connections to new manholes with the construction of new manholes.
- iii. Subdivider shall provide a proposed detail for storm drain lateral connections to existing manholes to SFPUC for approval prior to construction.

7. STORM DRAIN SERVICE LATERALS

- a. Layout. Subdivider shall design storm drain laterals and install them perpendicular to the storm drain main. The City Engineer with the consent of the SFPUC may approve an alternate design standard on a case-by-case basis. The perpendicular alignment of the storm sewer laterals shall take precedence over locating other utilities when the City Engineer with the consent of the SFPUC approves an adjacent storm drain main with less than six (6) feet depth of cover.
- b. Sizes
 - i. Storm drain laterals for residential lots shall be 6” inside diameter minimum and storm drain laterals for industrial or commercial lots shall be 8” inside diameter minimum.
 - ii. The Director, with the consent of the SFPUC General Manager, may approve a conditional exception to allow smaller internal diameter separated sanitary sewers subject to Subdivider providing acceptable inspection and maintenance equipment that the SFPUC can use to verify the proper operation of the smaller sanitary sewer line.
- c. Installation
 - i. Subdivider shall install storm drain laterals concurrently with the construction of the separated storm drain main unless otherwise identified by Developer at time of permit and approved by the City Engineer with consent of SFPUC. Laterals shall extend one foot (1’) beyond the property line.

- ii. Subdivider shall install storm drain laterals in accordance with the San Francisco Plumbing Code. Subdivider shall lay storm drain laterals on a uniform grade upward from the storm drain main and the grade shall in no case be less than 2%.
 - iii. The Subdivider shall cap the upper end of each storm drain lateral not in service when the Subdivider backfills the work. The Subdivider shall mark the laterals with a redwood post and with the letter “D” on the curb as similarly specified in the Standard Specifications for side sewers.
- d. Material. Storm drain lateral pipe shall be HDPE SDR 17 conforming to ASTM D3035.
 - e. Depth. The storm drain laterals shall be of sufficient depth to provide adequate drainage for the property served and in no case shall the pipe centerline at the face of curb be less than three feet (3’) below the top of curb.
 - f. Connection. Separated storm drains are designed to flow under surcharged conditions, and in the event of extreme storms, the surcharge may rise to the street for overland flow transport. In order to prevent backflow into improvements below street grade from service laterals connected to the storm drain main, the Subdivider shall not make gravity storm drain connections from sites lower than street grade to storm drain mains without backflow provisions.
 - g. Backflow Preventers. Subdivider shall install backflow preventers for all properties below street grade. All backflow preventers must be outside of the right-of-way, on private property. The property owner(s) shall privately own

and maintain the backflow preventers. The SFPUC may require Subdivider to record a SFPUC approved notice of special restriction, declaration, or similar document against all property subject to this requirement to provide notice to successor owners of this requirement.

- h. Shared Public Ways. Subdivider shall provide mechanisms for the private ownership and maintenance of laterals in Shared Public Ways up to the connection to main to the City's satisfaction prior to Department approval of a Public Improvement Agreement.

XII. STORM DRAIN FORCE MAIN

A. MATERIALS AND JOINTS

Storm drain force main materials may be the following:

1. High Density Polyethylene

- a. HDPE pipes and fittings 24" inside diameter and smaller shall be PE 4710 (125 psi) SDR 17 Iron Pipe Sizing (IPS) conforming to ASTM D3035.
- b. Subdivider shall make connections of HDPE pipe to HDPE pipe by the butt (heat) fusion process. When Subdivider joins sections of pipe, the Subdivider shall immediately remove the bead formed on the interior of the pipe per the manufacturer's recommendation.
- c. The City Engineer with the consent of the SFPUC may approve on a case-by-case basis connections of HDPE pipe to HDPE pipe using electrofusion couplings.

2. Other Materials

The Director with the consent of the SFPUC may approve an alternative storm drain force main material on a case-by-case basis.

B. VELOCITY

Minimum flow velocity shall be 2 feet per second.

Maximum flow velocity shall be 8 feet per second.

C. DESIGN METHOD

Subdivider shall size force mains using the Hazen-Williams formula.

D. HAZEN-WILLIAMS COEFFICIENT

For HDPE pipe, use a Hazen-Williams coefficient $C=110$ with bend losses accounted for separately.

In the event that the City Engineer with the consent of the SFPUC approves alternate materials on a case-by-case basis, the City Engineer with the consent of the SFPUC shall approve of the Hazen-Williams coefficient for such materials.

E. SEPARATION

Subdivider shall provide for necessary separation between the storm drain force main and the other utilities and improvements in accordance with Appendix D, Sec. I(E) Separation Requirements.

XIII. STORM DRAIN PUMP STATION

A. GENERAL

The Subdivider shall design the pump or lift station systems for safe, efficient, and reliable operation in order to achieve key performance goals and minimize life-cycle costs.

The Subdivider's pump station systems shall comply with criteria described in this Appendix. Additionally, pump station systems shall comply with the following documents:

- a. Draft Pump Station Design Guide, dated August 31, 2007, or latest revision, that the SFPUC Wastewater Enterprise prepares.
- b. The latest revision of the Safe Design Guidelines, prepared by the SFPUC Health and Safety Program and the Department.
- c. The latest revision of the ANSI/HI Pump Standards, published by the American National Standards Institute/Hydraulic Institute.
- d. The latest revision of the NFPA 70E: Standard for electrical safety in the workplace, published by the National Fire Protection Association.

B. BASIS OF DESIGN

1. Key Performance Goals

- a. Subdivider shall size the capacity of pump stations and conveyance lift stations, at a minimum, for the 5-year storm for the conveyance of stormwater.
- b. The capacity of treatment lift stations that send flows toward a stormwater treatment facility shall be sized for the required treatment storm flow rate per

the SFPUC stormwater management requirements based on the associated contributing tributary area.

2. Narrative

The Subdivider shall provide a written Basis of Design Summary for each pump or lift station demonstrating how the pump or lift station design achieves the key performance goals. The Basis of Design Summary must be approved the SFPUC.

C. STANDARDS

1. Operations and Maintenance

- a. Subdivider shall design pump and lift stations to minimize frequency and intensity of maintenance.
- b. Subdivider shall design pump and lift stations to maximize operational flexibility.
- c. Pump and lift stations shall have redundancy on all critical systems to achieve key performance goals. This includes, but is not limited to:
 - i. Installation of an extra pump per pump or lift station.
 - ii. Provision, by Subdivider, of 1 spare storm drain pump for every 10 storm drain pump types or fraction thereof. Storm drain pumps shall not be interchangeable with sanitary pumps.
 - iii. Subdivider shall design conveyance lift stations to allow a gravity overflow to the next lift station in the event of a lift station failure.
 - iv. Pump stations shall include a means for a generator to supply power to the pump station.

- d. Pump or lift stations at outfalls shall provide the ability to connect to the sanitary sewer system. Details for the connection will be determined during the design.
- e. Subdivider shall provide a Pump Station Operation and Maintenance Manual that outlines the critical items for operators to ensure the pump or lift station achieves key performance goals.
- f. Subdivider shall identify the make, model, size, and function of all valves, fitting, equipment, or pumps in the Pump Station Operation and Maintenance Manual. State if manual or automated.
- g. Subdivider shall design pump station and conveyance lift station equipment that requires frequent operation and/or adjustment for both manual and automated control.
- h. Pump and lift stations shall have electrical isolation for all equipment.
- i. Subdivider shall design pump stations and conveyance lift stations with a bypass recirculation system to allow for wet testing of the pump station pumps without discharging to the San Francisco Bay.
- j. Pump stations shall include an area and means for cleaning equipment. This requires a source of water supply within 100 yards of the pump or lift station.

2. Site Accessibility

- a. Pump and lift stations shall allow for adequate access for typical operation and maintenance by staff, vehicles, out-rigging, and equipment. Access requirements shall be determined by SFPUC on a case by case basis.

- b. The Subdivider shall provide an Operation and Maintenance Accessibility Plan for each pump or lift station during design review to demonstrate that adequate access can be achieved by staff, vehicles, out-rigging, and equipment. All access shall be available via the public ROW and in land dedicated to SFPUC in accordance with Section VII of Appendix A of these Regulations.
- c. Subdivider shall design pump and lift stations such that confined space entry or fall protection is not required for routine operation and maintenance tasks within, or on, pump and lift stations.

3. Monitoring

- a. Subdivider shall design pump and lift stations to provide long-term recordation and storage of status and process data until downloaded.
- b. Pump stations and lift stations shall include a means to monitor or analyze the complete range of flows. Subdivider shall install and locate flow meters or other measuring equipment as efficiently as possible to minimize number of meters while still obtaining complete flow data.
- c. Pump and lift stations shall include a port or other means to sample storm water flows.
- d. Pump and lift stations' pump status must connect to SFPUC DCS prior to operation of the pump or lift station.
- e. Pump and lift stations' controls shall connect to the SFPUC DCS prior to operation of the pump station.

4. Pump Size

Pumps shall be selected and sized to operate within the optimal pump efficiency rating, per the latest revision of the ANSI/HI Pump Standards, while achieving key performance goals.

5. Equipment Protection

Subdivider shall located pump and lift station controls and electrical equipment outside of flood areas or rated for immersion per the NEMA Enclosure Standards Type 6p.

6. Nuisance

- a. Pump and lift station designs shall minimize odors.
- b. Pump and lift station designs shall minimize nuisance noises.
- c. Subdivider shall design pump and lift stations to be fully secure.
- d. Pump stations shall include remote video surveillance available to the live SFPUC-WWE security network.

7. Future Improvements

- a. The Subdivider shall coordinate with the SFPUC to identify appropriate upgrades to the planned or newly constructed sewer and stormwater systems if in the future, over the course of the development, the projected demands increase due to currently unanticipated changes to the land use plan.
- b. The Subdivider shall identify the equipment's necessary components to allow successful future replacement or updating of that equipment. Subdivider shall include this list in the design drawings.

- c. Pump and conveyance lift stations shall have two empty electrical conduits within the joint utility trench that are each a minimum of three inches in diameter. Of the two conduits, Subdivider shall connect one conduit to a two inch drop between the joint utility to the control station.

8. Land

Subdivider shall dedicate property rights for all SFPUC-owned pump and lift stations to TIDA in accordance with Section VII of Appendix A of these Regulations.

XIV. LOW PRESSURE WATER SYSTEM

A. WATER DEMAND AND DISTRIBUTION DESIGN CRITERIA

1. General

Subdivider shall design the low pressure water system to serve the potable water, fire flow, and temporary recycled water demands for the Subdivision Area.

2. Water Demand

Water demands shall include recycled water demands until an independent recycled water supply system is developed by the City. The Subdivider shall design fire flow demands for each structure and construction type based on the San Francisco Fire Code, National Fire Protection Act, SFFD administrative bulletins, and applicable industry, City, State, and federal codes and standards. The SFFD and SFPUC shall review and approve fire flow demands.

3. Isolation Configuration

The CDD requires low pressure water mains to achieve isolation during emergency shutdowns by using gate valves. Subdivider shall install gate valves in the water mains so that the City can isolate the length of the pipe within each City block.

4. Hydraulics

In addition to conforming to pertinent SFPUC and SFFD standards, the City shall require a hydraulic analysis to confirm adequacy of the water supply for both potable, non-potable and fire use. If current distribution system pressures and flows are inadequate, the Subdivider shall be responsible for any capital improvements required to meet the water demands. The Subdivider shall complete the hydraulic analysis and provide to SFPUC for approval. Depending upon the size and complexity of the subdivision, the City may require that the Subdivider pay for the hydraulic analysis that CDD performs. Additionally, the City shall assess a capacity fee on an individual building basis.

a. Peaking Factor

Maximum Day Demand = 1.2 x Average Day Demand

Peak Hour Demand = 2.65 x Average Day Demand

b. Maximum Velocity

Peak Hour Demand: 8 feet per second

Maximum Day Demand + Fire Flow: 14 feet per second

c. Residual Pressure

Peak Hour Demand: 40 psi

Maximum Day Demand + Fire Flow: 20 psi

5. Hazen-Williams Coefficient

For new ductile iron pipe, use a Hazen Williams coefficient $C=130$.

For existing pipe, use a Hazen Williams coefficient $C=100$.

Subdivider may need to adjust existing condition Hazen Williams coefficient depending on water model calibrations and actual fire hydrant flow tests.

B. STANDARDS OF DESIGN FOR LOW PRESSURE WATER

1. Water System Review

The City Engineer with the consent of the SFPUC shall approve the water system layout.

2. Codes and Standards

Subdivider shall design and construct the low pressure water system in accordance with all applicable City, State, and federal codes and standards. Applicable codes and standards include, but are not limited to:

- a. California Code of Regulations, Title 22, California DPH
- b. California Waterworks Standards, R-14-03, California DPH
- c. American Water Works Association (“AWWA”) Standards
- d. City and County of San Francisco Department of Public Works – Bureau of Engineering Standard Plans and Standard Specifications
- e. San Francisco Water Department Standard Plans and Standard Specifications
- f. San Francisco Water Department – Design Criteria for Potable Domestic Water

3. Transmission and Distribution Mains

- a. Size. Subdivider shall use pipe diameters of 8, 12 and 16 inches for all distribution and feeder mains.
- b. Material
 - i. The water transmission and distribution main material shall be Class 53 ductile iron conforming to ANSI/AWWA C151/A21.51 and shall conform to CCR Title 22, Section 64570.
 - ii. The ductile iron pipe shall be cement-mortar lined conforming to ANSI/ASTM C104/A21.4 and shall be asphaltic outside coated conforming to ANSI/AWWA C151/A21.51. The cement-mortar lining shall be double the standard thickness.
 - iii. The pipe fittings shall be ductile iron conforming to ANSI/AWWA C110/A21.10 or ANSI/AWA C153/A21.53. Except for caps, 8” and smaller fittings shall have Tyton joints with U.S. Pipe “Field-Lok” gaskets. 12” and 16” fittings shall have TR Flex joints with Tyton gaskets, American Ductile Iron Flex-Ring Joints with Fastite gaskets, or approved equivalent. Subdivider shall fasten caps to the pipe by use of tie rods and lugs or restrainers. The ductile iron fittings shall be cement-mortar lined conforming to ANSI/ASTM C104/A21 and shall be double the standard thickness.
 - iv. The ductile iron pipe joints shall be:
 - 1) For 8” and smaller mains: Tyton joint with U.S. Pipe “Field-Lok” gaskets.

- 2) For mains larger than 8": TR Flex or American Ductile Iron Flex-Ring joint pipe and fittings, or approved equivalent.
 - 3) For water mains spanning across the causeway (portion of Treasure Island Road): Earthquake Resistant Ductile Iron pipe shall be Kubota, US Pipe TR-Xtreme, or American Earthquake Joint System.
- c. Certification. Water main materials, linings, and coatings shall be National Sanitary Foundation ("NSF") certified.

4. Service Laterals

- a. Size. Service lateral diameters shall be 1, 2, 4, 6, 8, and 12 inches. The Subdivider shall not use service lateral diameters of 3 inches or less than 1 inch.
- b. Material
 - i. 1 and 2-inch service laterals. Service lateral diameters 1 and 2 inches shall be copper tubing type K and shall conform to CCR Title 22, Section 64570. Soft or hard type K copper tubing shall be per service size as shown in PUC-CDD Standard Drawings.

Subdivider shall use service lateral valves and fittings of bronze or brass conforming to AWWA C800.
 - ii. 4 inch and larger service laterals. Service lateral diameters 4 inches and larger shall be Class 53 ductile iron conforming to ANSI/AWWA C151/A21.51 and shall conform to CCR Title 22, Section 64570. Refer to "Section B.3, Subparagraph b, Material", for ductile iron pipe and fittings.

- iii. Joints. Subdivider shall restrain joints on all laterals to the main per SFPUC-CDD Standard Drawings. Subdivider shall restrain all joints and gate valves on 4-inch or larger service laterals per the SFPUC-CDD Standard Drawings.
- iv. Certification. Water service lateral materials, linings, and coatings shall be NSF certified.
- c. Installation. Subdivider shall install low pressure water laterals concurrently with the construction of the low pressure water main and as further specified in Appendix A, Sec. VII.(D)(3)(a). Laterals shall extend one (1) foot behind the curb line of the public sidewalk and Subdivider shall not install laterals within five (5) feet of an existing tree or any future trees. Subdivider shall show the lateral locations and sizes on plans, which must be consistent with the lotting pattern and unit counts proposed. Prior to installation of laterals, meters, meter boxes and meter vaults, the Subdivider must confirm the size and location with SFPUC-CDD.

5. Fire Laterals

The Subdivider shall install separate fire service connections to residential and commercial customers for the purpose of providing private fire protection and as further specified in Appendix A, Sec. D(3)(a)(iii). SFPUC-CDD Engineering shall review and approve the required fire flow, type and size of the fire protection through a hydraulic analysis that the Subdivider completes. Subdivider shall not connect this fire protection system to any other water distribution system on the premises. The

Subdivider's design shall preclude the use of water dedicated to the fire protection services except for purposes of extinguishing fires.

- a. Size. Fire Service lateral diameters shall be 1, 2, 4, 6, 8, and 12 inches. The Subdivider shall not use Fire Service lateral diameters of 3 inches or less than 1 inch.
- b. Material
 - i. 1 and 2 inch fire service laterals. Fire Service lateral diameters 1 and 2 inches shall be copper tubing type K and shall conform to CCR Title 22, Section 64570. Soft or hard type K copper tubing shall be per service size as shown in PUC-CDD Standard Drawings.
 - ii. The Subdivider shall use fire Service lateral valves and fittings of bronze or brass conforming to AWWA C800.
 - iii. 4 inch and larger fire service laterals. Fire Service lateral diameters 4 inches and larger shall be Class 53 ductile iron conforming to ANSI/AWWA C151/A21.51 and shall conform to CCR Title 22, Section 64570. Refer to "Section B.3, Subparagraph b, Material", for ductile iron pipe and fittings.
 - iv. Joints. Subdivider shall restrain joints on all laterals to the main per SFPUC-CDD Standard Drawings. Subdivider shall restrain all joints and gate valves on 4-inch or larger service laterals per the PUC-CDD Standard Drawings.
 - v. Certification. Fire service lateral materials, linings, and coatings shall be National Sanitation Foundation certified.

- c. Pressure and Supply. SFPUC-CDD assumes no responsibility for loss or damage due to lack of water or pressure, either high or low, and merely agrees to furnish such quantities and pressures as are available in its distribution system. The fire service is subject to shutdowns and fluctuations from time to time, as City operations of the system may require.
- d. Meter. The private fire service and all equipment up to and including the meter shall belong to the SFPUC. The Subdivider shall equip each fire service with a meter, and if water is used through the fire service connection for any purpose other than extinguishing fires, the SFPUC shall have the right to charge the customer an applicable fire service penalty and the SFPUC may assess any other pertinent fees. The SFPUC shall not charge for water that the City uses through a fire service for fighting accidental fires.
- e. Installation. Subdivider shall install fire service laterals concurrently with the construction of the low pressure water main and as further specified in Appendix A, Sec. VII(D)(3)(a). Laterals shall extend one (1) foot behind the curb line of the public sidewalk and shall not be installed within five (5) feet of an existing tree or any future trees. Subdivider shall show the lateral locations and sizes on plans, which must be consistent with the lotting pattern and unit counts proposed. Prior to installation of laterals and meters, the Subdivider must confirm the size and location with SFPUC-CDD.

6. Installation of Water Mains

- a. Location. Subdivider shall locate low pressure water mains and structure appurtenances within the public right-of-way unless the SFPUC agrees to

accept an easement in accordance with Appendix A, Sec. VII(E) of these Subdivision Regulations. Subdivider shall locate low pressure water mains and structure appurtenances so that the excavation and repair of the main or appurtenances will not encroach on private property without dedicated easements.

b. Separation. Subdivider shall provide for necessary separation between water mains and the other utilities and improvements in accordance with Appendix D, Sec. I(E) Separation Requirements.

c. Layout. Subdivider shall lay out water mains in segmented grids and loops. The Subdivider may install dead-end water mains only if:

- i. CDD Engineering acknowledges looping or gridding is impractical due to topography, geology, pressure zone boundaries, unavailability of easements, or location of users;
- ii. The Subdivider plans to extend the main within the next five (5) years and the planned extensions would eliminate the dead-end conditions; or
- iii. The City Engineer with the consent of the SFPUC approves this design on a case-by-case basis.

d. Cover. Low pressure water mains that the Subdivider installs below ground shall have the following minimum and maximum cover:

<u>Pipe Size</u>	<u>Minimum Cover</u>	<u>Maximum Cover*</u>
8-inch or less	30 inches	36 inches
12-inch	32 inches	38 inches

16-inch

36-inches

42 inches

*Variances in maximum cover shall be permitted and approved by the City Engineer with consent of SFPUC

The City requires that low pressure water mains with less than the minimum cover have a protecting slab or other structural protective measures. In addition, such alternate design shall require approval, on a case-by-case basis, of the City Engineer with the consent of the SFPUC.

e. Trench Width

Minimum pipe trench widths shall be as follows:

<u>Pipe Size</u>	<u>Minimum Trench Width</u>
4, 6, and 8-inch	18 inches
12-inch	24 inches
16-inch	30 inches

f. Thrust Blocks

- i. Subdivider shall install thrust blocks on pipes larger than 12” diameter at all fittings or angular bends of 11-1/4 degrees or larger. The City does not require thrust blocks for lines 12” in diameter and smaller, except at fire hydrant laterals, where the City does require thrust blocks per the SFPUC-CDD Standard Drawings.
- ii. Subdivider shall design thrust blocks to resist the thrust reaction forces at the bends or fittings whose magnitude will depend on the pipe diameter, internal pressures, and allowance for water hammer.

Subdivider shall design thrust blocks to transfer and distribute the thrust forces to the undisturbed soil surface. The City Engineer and the SFPUC shall determine the surface bearing capacity of soil based on a soil investigation or report that the Subdivider completes. The Subdivider shall design the thrust block with a minimum factor of safety of 1.25.

- g. V-Bio Polyethylene Encasement. Subdivider shall encase the entire pipe system, including service laterals, in an 8 mil, low density polyethylene casing in accordance with ANSI/AWWA C105/A21.5. The tape to secure polyethylene encasement over pipe barrels shall be blue polyethylene adhesive tape.

7. Bypass Configuration

SFPUC-CDD requires the connection between perpendicular crossing low pressure water mains (one on top of the other) to be achieved using a bypass pipe with a gate valve. Subdivider shall locate gate valves in the water mains so that the City can isolate the length of pipe within each City block.

8. Cathodic Protection

Subdivider shall design and install cathodic protection in conjunction with ductile iron pipe low pressure water mains and ductile iron and copper low pressure water laterals. Subdivider shall include cathodic protection testing stations with the design at locations in the sidewalk that SFPUC-CDD approves. Subdivider shall be responsible for providing SFPUC-CDD with the initial test results after completion of

construction and additional testing required prior to SFPUC-CDD acceptance of the low pressure water line.

9. Joint Restraint Devices

Joint restraint devices shall be per the SFPUC-CDD Standard Drawings, except that bolts, nuts, and tie-rods shall be stainless steel TP304.

10. Backflow Preventer

- a. The SFPUC-Water Quality Bureau shall determine the required type of backflow preventer. Subdivider shall design and install the backflow preventer in accordance with CCR Title 17, Sections 7601, 7602, 7603, and 7604, and City Ordinance 356-84, Article 12A.
- b. The location of all backflow preventers shall be outside of the City right-of-way, within 25' of the water meter or from the point of connection for fire services located one (1) foot behind the curb line of public sidewalk.
- c. Where the recycled water system connects to the low pressure water system on a temporary basis, the City shall require a backflow preventer. The location of this backflow preventer shall be outside of the City right-of-way, within a public utility easement in accordance with Appendix A, Sec. VII(E) of the Subdivision Regulations.

11. Fire Hydrants and Fire Hydrant Laterals

- a. Fire hydrant laterals shall have gate valves in conformance with CCR Title 22, Section 64577.
- b. The SFFD and City Engineer shall approve the location of fire hydrants. To the extent practicable, the Subdivider shall locate hydrants near street

intersections. The City may change the proposed locations, layout and quantity of low pressure water hydrants during vertical design depending upon both fire flow requirements and proximity to building fire department connections. All building fire department connections shall be within 100 feet of a fire hydrant.

- c. Subdivider shall install fire hydrants near the street curb where they are accessible to fire trucks and protected from traffic. Subdivider shall locate hydrants at a distance of 24” minimum and 27” maximum from the fire hydrant centerline to the face of curb and five (5) feet minimum from a utility pole, traffic control box, or fixed object or structure. Subdivider shall not install fire hydrants within curb return areas or in sidewalk areas serving crosswalks.
- d. In addition to “Field-Lok” gaskets, Subdivider shall restrain all joints on hydrant laterals as shown on SFPUC-CDD Standard Drawings.
- e. SFPUC-CDD shall furnish and install the fire hydrant laterals, valves, fire hydrant buries, risers, breakaways and fire hydrants for existing water main connections.
- f. The Subdivider shall furnish and install fire hydrant laterals, valves, fire hydrant buries, and risers for new water main connections. SFPUC-CDD shall furnish and install breakaways and fire hydrants for new water main connections at the cost of the Subdivider.

12. Valves

- a. Location. Subdivider shall locate valves per CCR Title 22, Section 64577 and as specified herein.
 - i. Center to center spacing between the air release valve and blow-off valve to the gate valves shall be 3 feet.
 - ii. The first air release valve/blow-off valve shall not be more than 3 feet behind the property line (typically in line with the crosswalk striping at the intersection).
 - iii. The air release valve/blow-off valve and gate valve shall not be under sidewalks, reinforced concrete bus pads, bulb-outs or concrete gutters.
 - iv. Subdivider shall provide all taps to existing mains with valves. Subdivider shall locate valves on all branches of the main, all service pipes, and on all fire hydrant branches.
 - v. Subdivider shall install valves on mains in commercial areas at a minimum interval of 500 feet. Valves shall be installed on mains in non-commercial areas no more than one block apart or within an interval of 800 feet.
 - vi. Subdivider shall not locate valves within the crosswalks.
 - vii. Subdivider shall provide dead ends for future expansion with a valve and a blow-off valve.
- b. Corporation Stops. Subdivider shall use corporation stops for service laterals 2" diameter and smaller. Subdivider shall tap corporation stops into the main as shown in the SFPUC-CDD Standard Drawings.

c. Gate Valves

- i. Subdivider shall use gate valves for pipe sizes 4” diameter and larger. 4”, 6”, 8” and 12” gate valves shall conform to ANSI/AWWA C509, 16” gate valves shall conform to ANSI/AWAA C515 and be NSF 61 certified.
- ii. 8” and smaller gate valves shall have push-on by push-on (Tyton by Tyton) ends that the Subdivider designs to accommodate U.S. Pipe “Field-Lok” gaskets. 12” and 16” gate valves shall have mechanical joint ends restrained with Megalug glands.
- iii. All gate valves shall have a non-rising stem and be resilient seated, right turn open, nut operated, and fusion-bonded epoxy coated.
- iv. Subdivider shall install City approved gate valves make and model per the latest City Purchasing Contract for gate valves.

13. Air Release and Blow-Off Valves

- a. Subdivider shall design and install air release and blow-off valves to conform DPH requirements and to CCR Title 22, Section 64575 and Section 64576.
- b. Air release valves and blow-off valves shall be manual type and the assembly shall be as shown in the PUC-CDD Standard Drawings.
- c. Subdivider shall design the low pressure water distribution system to minimize high points where air can accumulate. Subdivider shall provide all high points in the distribution system with air release valves. Subdivider shall install air release valves next to a shut-off valve, at the high end of the segment isolated by two gate valves.

- d. Subdivider shall install blow-offs at low points and dead ends. Subdivider also shall install blow-offs next to a shut-off valve, at the low end of the segment isolated by two gate valves.

14. Valve Boxes and Covers

Valve boxes and covers shall be per SFPUC-CDD Standard Drawings.

15. Service Laterals, Valves, Meters, Meter Boxes, Meter Vaults and Covers

- a. Service Laterals. Each type of low pressure water service shall have a separate service lateral and valve.
- b. New service to existing main connection. Subdivider shall coordinate the new service to existing main with the SFPUC-CDD prior to the service lateral installation.
- c. New service to new main connection. The Subdivider shall install the new service lateral connection to new mains and as further specified in Appendix A, Sec. VII.(D)(3)(a).
- d. Meter covers. Meter covers shall meet accessibility requirements when the Subdivider locates them in pedestrian areas such as the sidewalks.
- e. Meter boxes and meter vaults. Subdivider shall not locate meter boxes or meter vaults within the pedestrian throughway zone of the sidewalks.
- f. Installation of New Service Laterals, Meters, Meter Boxes, Meter Vaults, and Covers.
 - i. For new service laterals from new mains, the Subdivider shall furnish and install the service lateral, valve, and fittings to a point inside the meter box, up to and excluding the meter and meter box, and thence

from the meter to one (1) foot behind the curb line of public sidewalk. SFPUC-CDD shall furnish and install the meter, meter box, and meter vaults at the cost of the Subdivider.

ii. For new service laterals from existing mains, SFPUC-CDD shall furnish and install the service lateral, meter, and meter box at the cost of the Subdivider. The Subdivider shall be responsible for shoring, excavation, backfill, and pavement restoration.

g. Location of Service. In general, Subdivider shall design for the installation of the meter at the principal frontage of the premises, in the area between the curb line and the customer's premises. The Subdivider shall not locate the meter in the traveled way of City streets, private roads or driveways. The SFPUC-CDD shall furnish and install the meter in the approved location at the cost of the Subdivider.

XV. RECYCLED WATER SYSTEM

A. RECYCLED WATER DEMAND AND DISTRIBUTION DESIGN CRITERIA

1. General

The City currently does not have an independent recycled water supply to serve the recycled water system in the Subdivision Area. The recycled water system in the Subdivision Area shall be temporarily served by the low pressure water system until the City develops an independent recycled water supply. The Subdivider shall design the recycled water system in the Subdivision Area to serve the recycled water demands using the temporary cross connection(s) to the low pressure water system.

The recycled water system design for the Subdivision Area shall assume that the future recycled water system will be able to provide connection boundary conditions meeting or exceeding the boundary conditions provided by the temporary connection to the low pressure water system.

2. Recycled Water Demand

- a. Recycled water demand shall simulate recycled water usage patterns for the Subdivision Area.
- b. Subdivider shall include recycled water demands with the low pressure water demands in the low pressure water system analysis to reflect the temporary connection of the recycled water system to the low pressure water system.
- c. Peaking Factor

Maximum Day Demand = 1.4 x Average Day Demand

Peak Hour = 3.0 x Average Day Demand

- d. Maximum Velocity

Peak Hour Demand: 8 feet per second

- e. Residual Pressure

Peak Hour Demand: 40 psi

Maximum Day Demand + Fire Flow: 20 psi

- f. Hazen-Williams Coefficient

New ductile iron pipe, use a Hazen Williams coefficient C=130.

B. RECOMMENDED STANDARDS OF DESIGN FOR RECYCLED WATER

1. Recycled Water System Review

The City Engineer with the consent of the SFPUC shall approve the recycled water system layout.

2. Standards

The Subdivider shall design and construct the recycled water system similar to the low pressure water system and in accordance with all applicable City, State, and federal codes and standards. Applicable codes and standards include:

- a. California Code of Regulations, Title 22, CA DPH
- b. California Waterworks Standards, R-14-03, CA DPH
- c. American Water Works Association (AWWA) Standards
- d. City and County of San Francisco Department of Public Works – Bureau of Engineering Standard Plans and Standard Specifications
- e. San Francisco Water Department Standard Plans and Standard Specifications
- f. San Francisco Water Department – Design Criteria for Recycled Water

3. Transmission and Distribution Mains

- a. Size. Subdivider shall use pipe diameters of 6, 8, 12 and 16 inches for all distribution and feeder mains.
- b. Material
 - i. The recycled water transmission and distribution main material shall be Class 53 ductile iron conforming to ANSI/AWWA C151/A21.51 and shall conform to CCR Title 22, Section 64570.

- ii. The ductile iron pipe shall be cement-mortar lined conforming to ANSI/ASTM C104/A21.4 and shall be asphaltic outside coated conforming to ANSI/AWWA C151/A21.51. The cement-mortar lining shall be double the standard thickness.
- iii. The pipe fittings shall be ductile iron conforming to ANSI/AWWA C110/A21.10 or ANSI/AWA C153/A21.53. Except for caps, 8” and smaller fittings shall have Tyton joints with U.S. Pipe “Field-Lok” gaskets. 12” and 16” fittings shall have TR Flex joints with Tyton gaskets, American Ductile Iron Flex-Ring Joints with Fastite gaskets, or approved equivalent. Subdivider shall fasten caps to the pipe by use of tie rods and lugs or restrainers. The ductile iron fittings shall be cement-mortar lined conforming to ANSI/ASTM C104/A21 and shall be double the standard thickness. The ductile iron pipe joints shall be:
 - 1) For 8” and smaller mains: Tyton joint with U.S. Pipe “Field-Lok” gaskets.
 - 2) For mains larger than 8”: TR Flex or American Ductile Iron Flex-Ring joint pipe and fittings, or approved equivalent.
- c. Certification. Recycled water main materials, linings, and coatings shall be National Sanitary Foundation certified.

4. SERVICE LATERALS

- a. Size. Service lateral diameters shall be 1, 2, 4, 6, 8, and 12 inches. Subdivider shall not use service lateral diameters of 3 inches or less than 1 inch.

- b. Material
 - i. Subdivider shall use service lateral valves and fittings of bronze or brass conforming to AWWA C800.
 - ii. 1 and 2 inch service laterals. Service lateral diameters 1 and 2 inches shall be copper tubing type K and shall conform to CCR Title 22, Section 64570. Soft or hard type K copper tubing shall be per service size as shown in SFPUC-CDD Standard Drawings.
 - iii. 4 inch and larger service laterals. Service lateral diameters 4 inches and larger shall be Class 53 ductile iron conforming to ANSI/AWWA C151/A21.51 and shall conform to CCR Title 22, Section 64570. Refer to “Section B.3, Subparagraph b, Material”, for ductile iron pipe and fittings.
- c. Joints. Subdivider shall restrain joints on all laterals to the main per PUC-CDD Standard Drawings. Subdivider shall restrain all joints and gate valves on 4 inch or larger service laterals per the SFPUC-CDD Standard Drawings.
- d. Certification. Recycled water service lateral materials, linings, and coatings shall be certified by the National Sanitary Foundation.
- e. Installation. Subdivider shall install recycled water laterals concurrently with the construction of the recycled water main and as further specified in Appendix A, Sec. D(3)(a)(iii). Laterals shall extend one (1) foot behind the curb line of public sidewalk and shall not be installed within five (5) feet of an existing tree or any future trees. Subdivider shall show the lateral locations and sizes on plans, which must be consistent with the lotting pattern and unit

counts proposed. Prior to installation of laterals, meters, meter boxes and meter vaults, the Subdivider must confirm the size and location with SFPUC-CDD.

5. Installation of Recycled Water Mains

The installation criteria for recycled water are similar to the low pressure water.

- a. Location
 - i. Subdivider shall locate recycled water mains and structure appurtenances within the public right-of-way unless the SFPUC agrees to accept an easement in accordance with Appendix A, Sec. VII(E) of these Subdivision Regulations. Subdivider shall locate recycled water mains and appurtenances so that the excavation and repair of the main or structure appurtenances will not encroach on private property without dedicated easements.
- b. Separation. See Appendix D, Sec. I(E) Separation Requirements for the approximate location of and separation between recycled water mains and the other utilities and improvements.
- c. Layout. Subdivider shall lay out recycled water mains in segmented grids and loops. Subdivider may install dead-end recycled water mains only if:
 - i. Looping or gridding is impractical due to topography, geology, pressure zone boundaries, unavailability of easements, or location of users, as acknowledged by CDD Engineering;

- ii. The main that the Subdivider proposes to extend within the next five (5) years and the planned extensions would eliminate the dead-end conditions; or
 - iii. The City Engineer with the consent of SFPUC approves such alternate design on a case-by-case basis.
- d. Cover. Subdivider shall install recycled water mains below ground shall have the following minimum and maximum cover:

<u>Pipe Size</u>	<u>Minimum Cover</u>	<u>Maximum Cover*</u>
8-inch or less	30 inches	36 inches
12-inch	32 inches	38 inches
16-inch	36 inches	42 inches

*Variances in maximum cover shall be permitted and approved by the City Engineer with consent of SFPUC

Recycled water mains with less than the minimum cover shall have a protecting slab or other structural protective measures, if the City Engineer with the consent of the SFPUC approves an alternate design to distribute surface loads on a case-by-case basis.

- e. Trench Width. Minimum pipe trench widths shall be as follows:

<u>Pipe</u>	<u>Size</u>	<u>Minimum Trench Width</u>
4, 6, and 8-inch		18 inches
12-	inch	24 inches
16-	inch	30 inches

f. Thrust Blocks

i. Subdivider shall install thrust blocks on pipes larger than 12” diameter at all fittings or angular bends of 11-1/4 degrees or larger. The City does not require thrust blocks for lines 12” in diameter and smaller.

ii. Subdivider shall design thrust blocks to resist the thrust reaction forces at the bends or fittings whose magnitude will depend on the pipe diameter, internal pressures, and allowance for water hammer. Subdivider shall design thrust blocks to transfer and distribute the thrust forces to the undisturbed soil surface. The City Engineer and the SFPUC shall determine surface bearing capacity of soil based on by a soil investigation or report. Subdivider shall design thrust block with a minimum factor of safety of 1.25.

g. V-Bio Polyethylene Encasement. Subdivider shall encase the entire ductile iron pipe system, including service laterals, in an 8 mil, low density, and polyethylene casing in accordance with ANSI/AWWA C105/A21.5. The tape to secure polyethylene encasement over pipe barrels shall be purple polyethylene adhesive tape.

6. Cathodic Protection

Subdivider shall design and install cathodic protection in conjunction with ductile iron pipe recycled water mains and ductile iron and copper recycled water laterals. Cathodic protection testing stations will be included with the design at locations in the sidewalk to be approved by the SFPUC. Subdivider shall be responsible for

providing the SFPUC with the initial test results after completion of construction and additional testing required prior to the SFPUC acceptance of the recycled water line.

7. Bypass Configuration

SFPUC-CDD requires the connection between perpendicular crossing recycled water mains (one on top of the other to be achieved using a bypass pipe with a gate valve. Subdivider shall locate gate valve in the water mains so that the City can isolate the length of pipe within each City block.

8. Joint Restraint Devices

For ductile iron pipe, joint restraint devices shall be per the SFPUC-CDD Standard Drawings, except that bolts, nuts, and tie-rods shall be stainless steel TP304.

9. Backflow Preventer

SFPUC shall not require Subdivider to install reduced pressure principle assembly on service lines that are connected to recycled water mains temporarily supplied by the potable distribution system provided the following conditions have been met:

- a. Subdivider protect the potable distribution system from backflow/backsiphonage by a reduced pressure principle assembly installed at the point of connection to the recycled water distribution system. The reduced pressure principle assembly must be on the USC List of Approved Assemblies and approved by the Water Quality Bureau (“WQB”) and Subdivider shall install it in accordance with CCR Title 17, Sections 7601, 7602, 7603, and 7604, and City Ordinance 356-84, Article 12A. The location of this backflow preventer shall be outside of the City right-of-way, within a public utility

easement, unless the City Engineer with the consent of the SFPUC approves of an alternative location, on a case-by-case basis.

- b. The recycled water distribution system shall be operated at 5 psi lower than the supplying potable distribution system.
- c. The recycled water distribution system shall not be supplied from any other source of water while it is connected to the potable distribution system.
- d. The reduced pressure principle assembly must be on the USC List of Approved Assemblies and Subdivider shall install it in accordance with Title 17, California Code of Regulations.
- e. Once Subdivider has installed the reduced pressure principle assembly, Water Quality Division shall perform final inspection and sign off on the job.
- f. The Subdivider and/or successor owner shall inspect and test the reduced pressure principle assembly before it is put into service and every year thereafter.
- g. The Subdivider and/or successor owner shall submit the test report to SFPUC-CDD within five (5) calendar days of said test.

Once the recycled water supply is available to be delivered by the PUC, all dual-plumbed connections between the potable water systems and recycled water system shall be protected by air-gap separation in compliance with Sections 7602(a) and 7603 (a) of Title 17, California Code of Regulations.

10. Valves

- a. Location. Subdivider shall locate valves per CCR Title 22, Section 64577 and as specified herein.

- i. Center to center spacing between the air release valve and blow-off valve to the gate valves shall be 3 feet.
 - ii. The first air release valve/blow-off valve shall not be more than 3 feet behind the property line (typically in line with the crosswalk striping at the intersection).
 - iii. The air release valve/blow off and gate valve shall not be under the sidewalk, reinforced concrete bus pads, bulb-out or concrete gutter.
 - iv. Subdivider shall provide all taps to existing mains with valves. Subdivider shall locate valves on all branches of the main and all service laterals.
 - v. Subdivider shall install valves on mains in commercial areas at a minimum interval of 500 feet. Subdivider shall install valves on mains in non-commercial areas no more than one block apart or within an interval of 800 feet.
 - vi. Subdivider shall locate valves outside of all crosswalks with a 1-foot minimum clearance.
 - vii. Subdivider shall provide dead ends for future expansion with a valve and a blow off valve.
- b. Corporation Stops
- i. Subdivider shall use corporation stops for service laterals 2” diameter and smaller.
 - ii. Subdivider shall tap corporation stops into the main as shown in the SFPUC-CDD Standard Drawings.

- iii. Subdivider shall identify corporation stops with a stamped brass or engraved plastic disc not less than 1.5 inches in diameter that is permanently affixed to the corporation stop with the inscription: “RECYCLED WATER” with a universal icon for non-potable water.
- c. Gate Valves. Subdivider shall use gate valves for pipe sizes 4” diameter and larger.
 - i. 4”, 6”, 8” and 12” Gate valves shall conform to ANSI/AWWA C509, 16” gate valves shall conform to ANSI/AWWA C515 and be NSF 61 certified.
 - ii. 8” and smaller gate valves shall have push-on by push-on (Tyton by Tyton) ends that the Subdivider designs to accommodate U.S. Pipe “Field-Lok” gaskets.
 - iii. 12” and 16” gate valves shall have mechanical joint ends restrained with Megalug glands. All gate valves shall have a non-rising stem and be resilient seated, right turn open, nut operated, and fusion-bonded epoxy coated.
 - iv. Subdivider shall identify gate valves with a stamped brass or engraved plastic disc not less than 1.5 inches in diameter that is permanently affixed to the gate valve with the inscription: “RECYCLED WATER” with a universal icon for non-potable water.
 - v. Gate valves shall be the make and model that the City approved in the latest City Purchasing Contract for gate valves.

11. Air Release and Blow-Off Valves

- a. Subdivider shall design and install air release and blow-off valves to conform to DPH requirements and to CCR Title 22, Section 64575 and Section 64576.
- b. Air release valves and blow-off valves shall be manual type and the Subdivider shall show the assembly in accordance with the SFPUC-CDD Standard Drawings.
- c. Subdivider shall identify air release valves and blow-off valves with a stamped brass or engraved plastic disc not less than 1.5 inches in diameter that is permanently affixed to the valve with the inscription: “RECYCLED WATER” with a universal icon for non-potable water.
- d. Subdivider shall design the recycled water distribution system to minimize high points where air can accumulate. Subdivider shall provide all high points in the distribution system with air release valves. Subdivider also shall install air valves next to a shut-off valve, at the high end of the segment isolated by two gate valves.
- e. Subdivider shall install blow-offs at low points and dead ends. Subdivider also shall install blow-offs next to a shut-off valve, at the low end of the segment isolated by two gate valves.

12. Valve Boxes and Covers

The valve box assembly shall consist of a ductile iron frame and valve box similar to the auxiliary water supply system (“AWSS”) hydrant valve box in the Standard Plans. The valve cover shall be triangular shape with the following inscription cast on the top:

“SFWD - RECYCLED WATER” with a universal icon for non-potable water.

13. Service Laterals, Valves, Meters, Meter Boxes, Meter Vaults and Covers

- a. Service Laterals. Each type of recycled water service shall have a separate service lateral and valve.
- b. New Service to Existing Main Connection. Subdivider shall coordinate the new service to existing main connection with the PUC-CDD prior to the service lateral installation.
- c. New Service to New Main Connection. The Subdivider shall install the new service lateral connection to new mains and as further specified in Appendix A, Sec. D(3)(a)(iii).
- d. Meters. The recycled water meters shall be purple in color. Subdivider shall identify meters with a stamped brass or engraved plastic disc not less than 1.5 inches in diameter that is permanently affixed to the meter with the inscription:

“RECYCLED WATER” with a universal icon for non-potable water.

- e. Meter Covers. Meter covers shall meet accessibility requirements when the Subdivider locates them in pedestrian areas such as the sidewalks.
- f. Meter Boxes and Meter Vaults. Subdivider shall not locate meter boxes or meter vaults within the pedestrian throughway zone of the sidewalks.
- g. Installation of New Service Lateral, Meter, Meter Box, Meter Vaults and Cover.
 - i. For new service laterals from new mains, the Subdivider shall furnish and install the service lateral, valve, and fittings to a point inside the

meter box, up to and excluding the meter and meter box, and thence from the meter to one (1) foot beyond the back of public sidewalk. SFPUC-CDD shall furnish and install the meter, meter box, and meter vaults at Subdivider's cost.

ii. For new service laterals from existing mains, SFPUC-CDD shall furnish and install the service lateral, meter, and meter box at Subdivider's cost. The Subdivider shall be responsible for shoring, excavation, backfill, and pavement restoration.

h. Location of Service. In general, Subdivider shall design for the installation of the meter at the principal frontage of the premises, in the area between the curb line and the customer's premises. The Subdivider shall not locate the meter in the traveled way of City streets, private roads or driveways. The SFPUC-CDD shall furnish and install the meter in the approved location at Subdivider's cost.

XVI. AUXILIARY WATER SUPPLY SYSTEM

Treasure Island's domestic water supply will serve as the primary source of water for fire suppression. This system will incorporate the use of three water storage tanks on Yerba Buena Island, and fire hydrants spaced throughout Treasure Island and Yerba Buena Island as required by the California Fire Code and SFFD standards.

The Project shall incorporate a Supplemental Fire Water System ("SFWS") for Treasure Island as described in a memorandum to be agreed at a future date and executed by the SFFD, SFPUC, and TIDA (the "Fire Memorandum"). The Fire Memorandum builds on the DDA's Infrastructure Plan and the June 29, 2010

memorandum titled “Treasure Island and Yerba Buena Island Fire Protection” signed by the SFFD and TIDA (2010 Fire Memorandum). Specific details for the SFWS, including but not limited to, the supplemental bay water supply source, pump connection manifolds and design standards, will be described in the Fire Memorandum. The 2010 Fire Memorandum and the Fire Memorandum are incorporated into these Regulations by reference, and shall establish the requirements for the design and installation of SFWS.

XVII. STREET LIGHTS AND LIGHTING SYSTEMS

A. GENERAL

1. Service Points, Connection and Energization

The Subdivider or its authorized representative shall make arrangements with the serving utility for service points. Subdivider shall show service points on the improvement plans. The Subdivider shall be responsible for all costs associated with connecting the street lights. Subdivider shall pay these costs directly to the serving utility. The Subdivider shall verify the street light service point location(s) with the serving utility and the serving utility shall approve service point locations prior to installation. The Subdivider shall coordinate with the SFPUC Bureau of Light, Heat, and Power (“BLHP”) to request energization from the serving utility.

2. Design

Subdivider shall design street lighting systems utilizing street light lamps up to, and including, 150 watts for 120-volt service unless connecting to an existing system. When connecting to an existing system, the Subdivider’s design shall conform to the

system to which it is connected. The SFPUC BLHP may approve a Design Modification or Variation to this standard on a case-by-case basis. Street lighting systems that utilizes street light lamps above 150 watts shall require 240-volt service.

3. Materials and Installations

Street lighting materials and installations shall conform to the National Electrical Code (“N.E.C.”) and applicable sections of the Standard Plans and Standard Specifications.

4. SFPUC BHLHP Review and Approval

SFPUC BLHP shall review, approve, and inspect all street lighting projects. The SFPUC BLHP may approve any variations to these design standards on a case-by-case basis.

B. ROADWAY ILLUMINATION REQUIREMENTS

1. Area Classifications

Subdivider shall base area classifications on the American National Standard Practice for Roadway Lighting (Illuminating Engineering Society (“IES RP-8”).

2. Average Maintained Foot-Candle Requirements

Subdivider shall base average maintained foot-candle requirement on the IES RP-8. For calculation, use a Light Loss Factor equal to 0.75 for Light Emitting Diode (“LED”) per the SFPUC Project Procedures and Lighting Calculation Criteria.

C. STREET LIGHTS

SFPUC BLHP shall approve the street light poles and fixtures that the Subdivider proposes to use.

1. Street Light Identification

- a. Identification Numbers. Each street light shall have a number for identification. The SFPUC BLHP shall assign and provide the identification number.
- b. Street Light Decals. The Subdivider shall provide and apply the decals to the poles as shown on SFPUC BLHP standard drawing 1277A, revision 1. The decals shall be pressure sensitive and have a reflectorized yellow-colored number that is 2-1/2" high on a black background. The overall decal dimension shall be 1-3/4" wide x 2-7/8" high. Subdivider shall use Panduit-manufactured decals, part number PRL250YB, unless SFPUC BLHP approves an alternate equivalent decal. Subdivider shall not install the decals during threatening or inclement weather.
- c. Lighting and Fixtures.
 - i. Subdivider shall design new projects with LED Luminaires including the pedestrian scale lighting. LED Street light spacing shall be 80-100 feet maximum.
 - ii. LED fixtures shall be in compliance with the San Francisco Better Streets Plan and selected from the Street Light Catalogue: <http://sfwater.org/index.aspx?page=925>.
 - iii. The concrete footing requirement shall conform to the requirements of the Department Standard Plan 87,212 for steel street light standards and the Department Standard Plan 87,208 for concrete street light standards.

The class of concrete foundation shall be Class 7-4000-1 ½ with 4-inches maximum slump.

- d. Clearance. Clearance between the streetlight and tree* shall be in accordance with Department Order No. 178631:

Small tree – No closer than 9 feet

Medium tree – No closer than 15 feet

Large tree – No closer than 21 feet

*Mature size of tree determined by the Department Street Tree Planting Guide.

D. PHOTOCELLS

For street lights that the Subdivider equips with photoelectric control, the photocell shall be Type IV consisting of a photoelectric unit which plugs into an EEI-NEMA twist lock receptacle integral with the luminaire.

The photoelectric controls shall be operable within a minimum voltage range between 105 and 305 volts.

Subdivider shall orient the photoelectric controls to the north.

Photoelectric controls for luminaires shall be Dark to Light Model #D124-1.5-SM or an alternate equivalent model that the SFPUC BLHP approves that has an instantaneous turn on at 1.5 + 0.3 foot-candles and having a turn off/on ratio of 1.5:1.

Photoelectric controls for LED luminaries shall be Dark to Light Model No. DLL-127 with 7 pin or approved equal.

E. WIRING

Unless otherwise noted, all wiring methods and equipment construction shall conform to the N.E.C. and applicable sections of the Standard Specifications, Bureau of

Engineering, Department of Public Works, City and County of San Francisco dated November 2001 and Standard Plans dated April 2007.

Subdivider shall make all splices in accordance with the Department Standard Plan 87,204.

The wiring for the street light shall conform to the requirements of the Department Standard Plan 87,203.

SFPUC BLHP prohibits the use of insulating boot on each fuse holder for service connection. Subdivider shall wrap installed connectors with a minimum of four half-lapped layers of rubber or rubber mastic tape. For this overlap Subdivider shall use at least two half-lapped layers of Scotch 33+ vinyl or an alternate premium tape that the SFPUC BLHP approves. After taping splices, Subdivider shall apply Scotchkote electrical coating evenly over splices or as the manufacturer recommends.

Unless SFPUC BLHP authorizes otherwise, Subdivider shall use No. 10 AWG wiring that is solid copper for street lights and No. 8 AWG or larger that is stranded copper for street lights. Subdivider shall insulate street light wiring for 600 volts with Type THW insulation.

Wiring shall be of the following sizes:

Field wiring: #8 minimum (N.E.C.)

Pull box to street light: #10 minimum (N.E.C.)

Wire in pole: #10 minimum (N.E.C.)

F. CONDUIT

Conduit shall be 1 1/2-inch, hot-dip galvanized rigid steel as indicated in Section 601 of the Standard Specifications.

Subdivider shall hot-dip galvanize all steel conduit and other metal parts, including bonding bushing, and list these for the use. The Subdivider shall bond and ground conduit in a continuous manner in accordance with NEC requirements. All threads shall either have factory installed hot dip galvanizing or a listed thread protection compound.

Subdivider shall make all bends and offsets with listed conduit benders or use of listed factory-made bends. The total of bends in one run of conduit shall not exceed 360 degrees.

All empty conduits shall have a one-quarter inch polypropylene pull rope provided inside and sealed with a dual seal, on both ends of the conduit. The SFPUC BLHP shall approve in advance the dual seal that the Subdivider uses.

Subdivider shall seal with a duct seal the ends of all conduits that the Subdivider installs. Subdivider shall cap conduits that Subdivider stubs for future extension. PUC BLHP shall approve the duct seal that the Subdivider uses.

G. PULL BOXES AND PULL BOX COVERS

Subdivider shall install all pull boxes per Standard Plan 87,201 with a crushed rock pad as shown in the referenced Standard Plan and Subdivider shall install these within five feet of the base of all street light poles.

Subdivider shall not place pull boxes where they will be subject to vehicular traffic.

Subdivider shall not install pull boxes within curb ramps including the grooved borders as defined in Standard Plan CR-1.

Subdivider shall not install pull boxes more than 250 feet apart on long runs.

Subdivider shall inscribe pull box covers with the first line, "STREET LIGHTING", and the second line, "120/240 VOLT". The letters shall be 1-inch high and shall be made with 1/4-inch wide strokes. The letters inscribed in concrete lids covers shall be made with 1/8-inch minimum deep imprints. Subdivider shall make legends in steel covers with weld bead letters.

XVIII. ELECTRICAL SYSTEMS

A. GENERAL

SFPUC BLHP intends these Regulations to serve as a guide in the preparation of design plans and specifications for the electrical power supply and distribution system within the Subdivision Area. Subdivider shall use the recommendations to indicate desirable procedures or methods and serve as guidelines for designers.

1. Design Considerations

Subdivider's design of the electrical system shall provide for, but not be limited to:

- a. Personnel and public safety
- b. Environment impacts, including electric and magnetic fields, insulation, and clearances
- c. Reliable service
- d. Flexibility for the addition of future loads
- e. Ease of maintenance
- f. Convenience of operation
- g. Interchangeability of equipment
- h. Aesthetics
- i. Cost

2. Design Standards

- a. The design shall conform to Pacific Gas and Electric's ("PG&E") Electric and Gas Service Requirements ("Greenbook") and PG&E construction standards, with exceptions noted by the serving utility before design efforts commence.
- b. Subdivider also shall prepare the design of the electrical systems and components in accordance with the laws and regulations of the Federal government, State of California, and industry standards. If there are conflicts between the cited documents, the more conservative requirement shall apply. The following codes, standards, and design considerations shall apply to the electrical aspects of the power facility:
 - i. American National Standards Institute (ANSI)
 - ii. American Society for Testing and Materials (ASTM)
 - iii. California State General Order 95 (GO 95)
 - iv. California State General Order 128 (GO 128)
 - v. Edison Electrical Institute (EEI)
 - vi. Insulated Cable Engineers Association (ICEA)
 - vii. Institute of Electrical and Electronics Engineers (IEEE)
 - viii. Illuminating Engineering Society (IES)
 - ix. National Association of Corrosion Engineers (NACE)
 - x. National Electrical Code (NEC)
 - xi. National Electrical Manufacturers Association (NEMA)
 - xii. National Electrical Safety Code (NESC)
 - xiii. National Fire Protection Association (NFPA)

- xiv. Occupational Safety and Health Act (OSHA)
- xv. Underwriters' Laboratories (UL)
- c. Subdivider shall provide design drawings and provide support documentation including but not limited to:
 - i. Joint trench/pole intent drawings
 - ii. Gas layout drawings
 - iii. Single line drawings, key sketch
 - iv. Base Maps
 - v. Construction detail drawings
 - vi. Street light design-coordinate with applicable government agency
 - vii. Engineering calculations (e.g., voltage drop, flicker, pulling tension, pole sizing, guying, etc.)
 - viii. Substructure information
 - ix. Stub/full/branch service locations (that a utility pre-approves)
 - x. Main locations
 - xi. Meter locations (pre-approved by utility)
 - xii. Identify permits
 - xiii. Identify right-of-ways that utilities may require
 - xiv. Trench cost allocation estimate
 - xv. Coordination with other utilities if joint trench or joint pole
 - xvi. Tentative design and construction scheduling
 - xvii. Gas handling procedures
 - xviii. Leak test requirements

xix. Conflict checks

xx. Material list

Note that above items shall be Stamped by a Registered Professional Engineer (PE).

B. SEPARATION

See Appendix D, Sec. I(E) Separation Requirements, for the approximate location of and separation between the joint trench and the other utilities and improvements.

XIX. POST-CONSTRUCTION DRAWINGS

A. AS-BUILTS

The City requires that the Contractor and Construction Manager sign and certify as-built. The Contractor and/or Construction Manager shall provide scanned copies of the original redlines to the City.

B. RECORD DRAWINGS

Upon completion of improvements shown on a set of Improvement Plans, the Subdivider, prior to requesting City acceptance of any public improvements, shall update the Improvement Plans with changes made during construction and provide the City with electronic files of the final record drawings and any reports that the Improvement Plans, Standard Plans, or Standard Specifications require. The record drawings shall be a separate document and shall not contain references to construction submittals, instructional bulletins, or requests for information. The electronic files shall be in AutoCAD (.dwg), ESRI (.shp, personal or file geodatabase) and/or some other form acceptable to the City and the Subdivider shall deliver these to the City for a permanent record. Example electronic files in the City's approved layering and labeling system are available upon request. Pipe attributes shall include

material, type and diameter information from the Department look up tables as Object Data or .shp or geodatabase as applicable. Node attributes shall include Rim, Invert, Node Type from the Department look-up tables as Object Data or .shp or geodatabase as applicable. Structures shall include Type attribute (e.g., Diversion, Junction, Weir, Pump Station, etc.) from the Department look-up table as Object Data or .shp or Geodatabase as applicable.

XX. UTILITY MONITORING PROGRAM

The Developer shall be responsible for implementation of a survey monitoring program to measure performance of utility infrastructure within and adjacent to the geotechnical stabilization activities to ensure that the stabilization does not negatively impact newly constructed infrastructure or existing infrastructure to remain.

A. New Infrastructure

For newly constructed infrastructure, a professionally licensed surveyor shall perform the survey program. Each survey shall consist of Baseline survey monitoring with elevation, immediately after construction and verified with construction documents. The surveyor and the City shall determine and agree upon the survey monument locations prior to setting them. The surveyor shall tie each survey to at least one existing City Survey Monument outside of the development area. The Department strongly recommends that the surveyor check into at least one other City Survey Monument and verify accuracy requirements. Prior to construction, the surveyor and the City shall determine and agree upon the period between monitoring observations. The Developer shall mitigate any movement beyond predicted settlement indicated in

final geotechnical report at no additional cost to the City. The City prohibits any other deviation.

B. Existing Infrastructure

For existing infrastructure, including infrastructure that the Developer constructed in previous phases of development and existing infrastructure to remain, a professional licensed surveyor shall perform all surveys. Each survey shall consist of a Baseline survey monitoring with checks on both elevation and horizontal alignment, immediately before adjacent construction, including initiation of the surcharging program adjacent to a sewer. The surveyor and the City shall determine and agree upon the survey monument locations prior to setting them. The surveyor shall tie each survey to at least one existing City Survey Monument outside of the development area. The Department strongly recommends that the surveyor check into at least one other City Survey Monument and verify accuracy requirements. Prior to construction, the surveyor and the City shall determine and agree upon the period between monitoring observations. If Subdivider determines at any time that existing utilities constructed in previous phases of development have moved in any direction due to construction activities, the Subdivider shall submit a condition assessment of the utility per SFPUC requirements. The SFPUC shall review the condition assessment and determine the mitigations that it requires to repair any damage. If the City requires monitoring for the Navy and/or TIDA controlled utilities, the SFPUC may or may not perform this service, depending on the terms of the current Utility Service MOU between TIDA and the SFPUC. The Subdivider

shall be responsible for reimbursement of City services for such activities and mitigation at no additional cost to the City.