CITY OF SAUSALITO

PROJECT SPECIFICATIONS-BID DOCUMENTS
FOR
North Street Steps Slope Repair

December 2023

CITY OF SAUSALITO
MARIN COUNTY

PUBLIC WORKS DEPARTMENT
420 Litho Street
Sausalito, California 94965
(415) 289-4106

Kevin McGowan, PE
DIRECTOR OF PUBLIC WORKS/CITY ENGINEER

Bid Opening: February 1, 2024

Pre-Bid Conference: Wednesday January 10, 1PM

Contract Performance Time: 84 Days
Liquidated Damages: $1,500 per Calendar Day

LOCATION MAP

North Street Step Slide Repair, City of Sausalito

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Notice Inviting Bids

1. **Bid Submission.** City of Sausalito ("City") will accept sealed bids for its North Street Steps Slide Repair Project ("Project"), by or before February 1, 2024 at 2:00pm, at City Hall (Administration Office), located at 420 Litho Street Sausalito, California, at which time the bids will be publicly opened and read aloud.

2. **Project Information.**

   2.1 **Location and Description.** The Project is located on the uphill side of the North Street Steps which connect North Street to Bridgeway Blvd. Work includes the installation of soil nails, grading, soil mesh to hold the hillside in place.

   2.2 **Time for Final Completion.** The Project must be fully completed within 84 calendar days from the start date set forth in the Notice to Proceed. While it is preferred that the contractor perform the work as soon as possible, the city will work closely with the contractor selected to identify the best time to start this work.

   2.3 **Estimated Cost.** The estimated construction cost is $480,000.

3. **License and Registration Requirements.**

   3.1 **License.** This Project requires a valid California contractor's license for the following classification(s): A-General Engineering Contractor.

   3.2 **DIR Registration.** City may not accept a Bid Proposal from or enter into the Contract with a bidder, without proof that the bidder is registered with the California Department of Industrial Relations ("DIR") to perform public work pursuant to Labor Code § 1725.5, subject to limited legal exceptions.

4. **Contract Documents.** The plans, specifications, bid forms and contract documents for the Project, and any addenda thereto ("Contract Documents") may be downloaded from City's website located at: https://www.sausalito.gov/departments/public-works/bid-notices. A printed copy of the Contract Documents are not available.

5. **Bid Security.** The Bid Proposal must be accompanied by bid security of ten percent of the maximum bid amount, in the form of a cashier's or certified check made payable to City, or a bid bond executed by a surety licensed to do business in the State of California on the Bid Bond form included with the Contract Documents. The bid security must guarantee that within ten days after City issues the Notice of Potential Award, the successful bidder will execute the Contract and submit the payment and performance bonds, insurance certificates and endorsements, and any other submittals required by the Contract Documents and as specified in the Notice of Potential Award.

6. **Prevailing Wage Requirements.**

   6.1 **General.** Pursuant to California Labor Code § 1720 et seq., this Project is subject to the prevailing wage requirements applicable to the locality in which the Work is to be performed for each craft, classification or type of worker needed to perform the Work, including employer payments for health and welfare, pension, vacation, apprenticeship and similar purposes.

   6.2 **Rates.** The prevailing rates are on file with the City and are available online at http://www.dir.ca.gov/DLSR. Each Contractor and Subcontractor must pay no less

than the specified rates to all workers employed to work on the Project. The schedule of per diem wages is based upon a working day of eight hours. The rate for holiday and overtime work must be at least time and one-half.

6.3 Compliance. The Contract will be subject to compliance monitoring and enforcement by the DIR, under Labor Code § 1771.4.

7. **Performance and Payment Bonds.** The successful bidder will be required to provide performance and payment bonds, each for 100% of the Contract Price, as further specified in the Contract Documents.

8. **Substitution of Securities.** Substitution of appropriate securities in lieu of retention amounts from progress payments is permitted under Public Contract Code § 22300.

9. **Subcontractor List.** Each Subcontractor must be registered with the DIR to perform work on public projects. Each bidder must submit a completed Subcontractor List form with its Bid Proposal, including the name, location of the place of business, California contractor license number, DIR registration number, and percentage of the Work to be performed (based on the base bid price) for each Subcontractor that will perform Work or service or fabricate or install Work for the prime contractor in excess of one-half of 1% of the bid price, using the Subcontractor List form included with the Contract Documents.

10. **Instructions to Bidders.** All bidders should carefully review the Instructions to Bidders for more detailed information before submitting a Bid Proposal. The definitions provided in Article 1 of the General Conditions apply to all of the Contract Documents, as defined therein, including this Notice Inviting Bids.

11. **Questions.** All bid questions must be in writing and can be emailed to Kevin McGowan at kmcgowan@sausalito.gov and Andrew Davidson at adavidson@sausalito.gov . The last day to submit questions prior to bid opening is Tuesday January 23, 2024.

12. **Bidders' Conference.** A bidders' conference is scheduled for Wednesday January 10, 2024 at 1PM at the Sausalito City Hall, 420 Litho St. Sausalito, CA 94965.

By: _____ Date: _____

Walfred Solorzano City Clerk

Publication Date: <_____>

END OF NOTICE INVITING BIDS

Instructions to Bidders

Each Bid Proposal submitted to City of Sausalito ("City") for its North Street Steps Slope Repair Project ("Project") must be submitted in accordance with the following instructions and requirements:

1. Bid Submission.

1.1 General. Each Bid Proposal must be signed, sealed and submitted to City, using the form provided in the Contract Documents, by or before the date and time set forth in Section 1 of the Notice Inviting Bids, or as amended by subsequent addendum. Faxed or emailed Bid Proposals will not be accepted, unless otherwise specified. Late submissions will be returned unopened. City reserves the right to postpone the date or time for receiving or opening bids. Each bidder is solely responsible for all of its costs to prepare and submit its bid and by submitting a bid waives any right to recover those costs from City. The bid price(s) must include all costs to perform the Work as specified, including all labor, material, supplies, and equipment and all other direct or indirect costs such as applicable taxes, insurance and overhead.

1.2 Bid Envelope. The envelope containing the sealed Bid Proposal and all required forms and attachments must be clearly labeled and addressed as follows:

BID PROPOSAL:
North Street Steps Slide Repair Project
Contract No. 07.01.013

City Clerk
420 Litho St.
Sausalito, CA 94965
Attn: Walfred Solorzano

The envelope must also be clearly labeled, as follows, with the bidder's name, address, and its registration number with the California Department of Industrial Relations ("DIR") for bidding on public works contracts (Labor Code §§ 1725.5 and 1771.1):

[Contractor company name]
[street address]
[city, state, zip code]
DIR Registration No: _____

1.3 DIR Registration. Subject to limited legal exceptions for joint venture bids and federally-funded projects, City may not accept a Bid Proposal from a bidder without proof that the bidder is registered with the DIR to perform public work under Labor Code § 1725.5. If City is unable to confirm that the bidder is currently registered with the DIR, City may disqualify the bidder and return its bid unopened. (Labor Code §§ 1725.5 and 1771.1(a).)

2. Bid Proposal Form and Enclosures. Each Bid Proposal must be completed in ink using the Bid Proposal form included with the Contract Documents. The Bid Proposal form must be fully completed without interlineations, alterations, or erasures. Any necessary corrections must be clear and legible, and must be initialed by the bidder's authorized representative. A Bid Proposal submitted with exceptions or terms such as "negotiable,"

"will negotiate," or similar, will be considered nonresponsive. Each Bid Proposal must be accompanied by bid security, as set forth in Section 4 below, and by a completed Subcontractor List and Non-Collusion Declaration using the forms included with the Contract Documents, and any other required enclosures, as applicable.

3. **Authorization and Execution.** Each Bid Proposal must be signed by the bidder's authorized representative. A Bid Proposal submitted by a partnership must be signed in the partnership name by a general partner with authority to bind the partnership. A Bid Proposal submitted by a corporation must be signed with the legal name of the corporation, followed by the signature and title of two officers of the corporation with full authority to bind the corporation to the terms of the Bid Proposal, under California Corporations Code § 313.

4. **Bid Security.** Each Bid Proposal must be accompanied by bid security of ten percent of the maximum bid amount, in the form of a cashier's check or certified check, made payable to the City, or bid bond using the form included in the Contract Documents and executed by a surety licensed to do business in the State of California. The bid security must guarantee that, within ten days after issuance of the Notice of Potential Award, the bidder will: execute and submit the enclosed Contract for the bid price; submit payment and performance bonds for 100% of the maximum Contract Price; and submit the insurance certificates and endorsements and any other submittals, if any, required by the Contract Documents or the Notice of Potential Award. A Bid Proposal may not be withdrawn for a period of 60 days after the bid opening without forfeiture of the bid security, except as authorized for material error under Public Contract Code § 5100 et seq.

5. **Requests for Information.** Questions or requests for clarifications regarding the Project, the bid procedures, or any of the Contract Documents must be submitted in writing to Kevin McGowan at kmcgowan@sausalito.gov and Andrew Davidson at adavidson@sausalito.gov. Oral responses are not authorized and are not binding on the City. The last day to submit questions prior to bid opening is Tuesday January 23, 2024. Questions received any later might not be addressed before the bid deadline. An interpretation or clarification by City in response to a written inquiry will be issued in an addendum.

6. **Pre-Bid Investigation.**

   6.1 General. Each bidder is solely responsible at its sole expense for diligent and thorough review of the Contract Documents, examination of the Project site, and reasonable and prudent inquiry concerning known and potential site and area conditions prior to submitting a Bid Proposal. Each bidder is responsible for knowledge of conditions and requirements which reasonable review and investigation would have disclosed. However, except for any areas that are open to the public at large, bidders may not enter property owned or leased by the City or the Project site without prior written authorization from City.

   6.2 Document Review. Each bidder is responsible for review of the Contract Documents and any informational documents provided "For Reference Only," e.g., as-builts, technical reports, test data, and the like. A bidder is responsible for notifying City of any errors, omissions, inconsistencies, or conflicts it discovers in the Contract Documents, acting solely in its capacity as a contractor and subject to the limitations of Public Contract Code § 1104. Notification of any such errors, omissions, inconsistencies, or conflicts must be submitted in writing to the City no later than five Working Days before the scheduled bid opening. (See Section 5, above.) City expressly disclaims responsibility for assumptions a bidder might draw from the presence or absence of information provided by City.

6.3 **Project Site.** Questions regarding the availability of soil test data, water table elevations, and the like should be submitted to the City in writing, as specified in Section 5, above. Any subsurface exploration at the Project site must be done at the bidder's expense, but only with prior written authorization from City. All soil data and analyses available for inspection or provided in the Contract Documents apply only to the test hole locations. Any water table elevation indicated by a soil test report existed on the date the test hole was drilled. The bidder is responsible for determining and allowing for any differing soil or water table conditions during construction. Because groundwater levels may fluctuate, difference(s) in elevation between ground water shown in soil boring logs and ground water actually encountered during Project construction will not be considered changed Project site conditions. Actual locations and depths must be determined by bidder's field investigation. The bidder may request access to underlying or background information on the Project site in City's possession that is necessary for the bidder to form its own conclusions, including, if available, record drawings or other documents indicating the location of subsurface lines, utilities, or other structures.

6.4 **Utility Company Standards.** The Project must be completed in a manner that satisfies the standards and requirements of any affected utility companies or agencies (collectively, "utility owners"). The successful bidder may be required by the third party utility owners to provide detailed plans prepared by a California registered civil engineer showing the necessary temporary support of the utilities during coordinated construction work. Bidders are directed to contact the affected third party utility owners about their requirements before submitting a Bid Proposal.

7. **Bidders Interested in More Than One Bid.** No person, firm, or corporation may submit or be a party to more than one Bid Proposal unless alternate bids are specifically called for. However, a person, firm, or corporation that has submitted a subcontract proposal or quote to a bidder may submit subcontract proposals or quotes to other bidders.

8. **Addenda.** Any addenda issued prior to the bid opening are part of the Contract Documents. Subject to the limitations of Public Contract Code § 4104.5, City reserves the right to issue addenda prior to bid time. Each bidder is solely responsible for ensuring it has received and reviewed all addenda prior to submitting its bid. Bidders should check City's website periodically for any addenda or updates on the Project at: https://www.sausalito.gov/departments/public-works/bid-notices.

9. **Brand Designations and "Or Equal" Substitutions.** Any specification designating a material, product, thing, or service by specific brand or trade name, followed by the words "or equal," is intended only to indicate quality and type of item desired, and bidders may request use of any equal material, product, thing, or service. All data substantiating the proposed substitute as an equal item must be submitted with the written request for substitution. A request for substitution must be submitted within 35 days after Notice of Potential Award unless otherwise provided in the Contract Documents. This provision does not apply to materials, products, things, or services that may lawfully be designated by a specific brand or trade name under Public Contract Code § 3400(c).

10. **Bid Protest.** Any bid protest against another bidder must be submitted in writing and received by City at 420 Litho, St., Sausalito, CA 94965 or sent via email at kmcgowan@sausalito.gov before 5:00 p.m. no later than two Working Days following bid opening ("Bid Protest Deadline") and must comply with the following requirements:

10.1 **General.** Only a bidder who has actually submitted a Bid Proposal is eligible to submit a bid protest against another bidder. Subcontractors are not eligible to submit bid protests. A bidder may not rely on the bid protest submitted by another

bidder, but must timely pursue its own protest. If required by City, the protesting bidder must submit a non-refundable fee in the amount specified by City, based upon City's reasonable costs to administer the bid protest. Any such fee must be submitted to City no later than the Bid Protest Deadline, unless otherwise specified. For purposes of this Section 10, a "Working Day" means a day that City is open for normal business, and excludes weekends and holidays observed by City. Pursuant to Public Contract Code § 4104, inadvertent omission of a Subcontractor's DIR registration number on the Subcontractor List form is not grounds for a bid protest, provided it is corrected within 24 hours of the bid opening or as otherwise provided under Labor Code § 1771.1(b).

10.2 Protest Contents. The bid protest must contain a complete statement of the basis for the protest and must include all supporting documentation. Material submitted after the Bid Protest Deadline will not be considered. The protest must refer to the *specific* portion or portions of the Contract Documents upon which the protest is based. The protest must include the name, address, email address, and telephone number of the protesting bidder and any person submitting the protest on behalf of or as an authorized representative of the protesting bidder.

10.3 Copy to Protested Bidder. Upon submission of its bid protest to City, the protesting bidder must also concurrently transmit the protest and all supporting documents to the protested bidder, and to any other bidder who has a reasonable prospect of receiving an award depending upon the outcome of the protest, by email or hand delivery to ensure delivery before the Bid Protest Deadline.

10.4 Response to Protest. The protested bidder may submit a written response to the protest, provided the response is received by City before 5:00 p.m., within two Working Days after the Bid Protest Deadline or after actual receipt of the bid protest, whichever is sooner (the "Response Deadline"). The response must attach all supporting documentation. Material submitted after the Response Deadline will not be considered. The response must include the name, address, email address, and telephone number of the person responding on behalf of or representing the protested bidder if different from the protested bidder.

10.5 Copy to Protesting Bidder. Upon submission of its response to the bid protest to the City, the protested bidder must also concurrently transmit by email or hand delivery, by or before the Response Deadline, a copy of its response and all supporting documents to the protesting bidder and to any other bidder who has a reasonable prospect of receiving an award depending upon the outcome of the protest.

10.6 Exclusive Remedy. The procedure and time limits set forth in this Section are mandatory and are the bidder's sole and exclusive remedy in the event of a bid protest. A bidder's failure to comply with these procedures will constitute a waiver of any right to further pursue a bid protest, including filing a Government Code Claim or initiation of legal proceedings.

10.7 Right to Award. City reserves the right, acting in its sole discretion, to reject any bid protest that it determines lacks merit, to award the Contract to the bidder it has determined to be the responsible bidder submitting the lowest responsive bid, and to issue a Notice to Proceed with the Work notwithstanding any pending or continuing challenge to its determination.

11. Reservation of Rights. City reserves the unfettered right, acting in its sole discretion, to waive or to decline to waive any immaterial bid irregularities; to accept or reject any or all

bids; to cancel or reschedule the bid; to postpone or abandon the Project entirely; or to perform all or part of the Work with its own forces. The Contract will be awarded, if at all, within 60 days after opening of bids or as otherwise specified in the Special Conditions, to the responsible bidder that submitted the lowest responsive bid. Any planned start date for the Project represents the City's expectations at the time the Notice Inviting Bids was first issued. City is not bound to issue a Notice to Proceed by or before such planned start date, and it reserves the right to issue the Notice to Proceed when the City determines, in its sole discretion, the appropriate time for commencing the Work. The City expressly disclaims responsibility for any assumptions a bidder might draw from the presence or absence of information provided by the City in any form. Each bidder is solely responsible for its costs to prepare and submit a bid, including site investigation costs.

12. Bonds. Within ten calendar days following City's issuance of the Notice of Potential Award to the apparent low bidder, the bidder must submit payment and performance bonds to City as specified in the Contract Documents using the bond forms included in the Contract Documents. All required bonds must be calculated on the maximum total Contract Price as awarded, including additive alternates, if applicable.

13. License(s). The successful bidder and its Subcontractor(s) must possess the California contractor's license(s) in the classification(s) required by law to perform the Work. The successful bidder must also obtain a City business license within ten days following City's issuance of the Notice of Potential Award. Subcontractors must also obtain a City business license before performing any Work.

14. Ineligible Subcontractor. Any Subcontractor who is ineligible to perform work on a public works project under Labor Code §§ 1777.1 or 1777.7 is prohibited from performing work on the Project.

15. Safety Orders. If the Project includes construction of a pipeline, sewer, sewage disposal system, boring and jacking pits, or similar trenches or open excavations, which are five feet or deeper, each bid must include a bid item for adequate sheeting, shoring, and bracing, or equivalent method, for the protection of life or limb, which comply with safety orders as required by Labor Code § 6707.

16. Bid Schedule. Each bidder must complete the Bid Schedule form with unit prices as indicated, and submit the completed Bid Schedule with its Bid Proposal.

16.1 Incorrect Totals. In the event a computational error for any bid item (base bid or alternate) results in an incorrect extended total for that item, the submitted base bid or bid alternate total will be adjusted to reflect the corrected amount as the product of the estimated quantity and the unit cost. In the event of a discrepancy between the actual total of the itemized or unit prices shown on the Bid Schedule for the base bid, and the amount entered as the base bid on the Bid Proposal form, the actual total of the itemized or unit prices shown on the Bid Schedule for the base bid will be deemed the base bid price. Likewise, in the event of a discrepancy between the actual total of the itemized or unit prices shown on the Bid Schedule for any bid alternate, and the amount entered for the alternate on the Bid Proposal form, the actual total of the itemized prices shown on the Bid Schedule for that alternate will be deemed the alternate price. Nothing in this provision is intended to prevent a bidder from requesting to withdraw its bid for material error under Public Contract Code § 5100 et seq.

16.2 Estimated Quantities. Unless identified as a "Final Pay Quantity," the quantities shown on the Bid Schedule are estimated and the actual quantities required to perform the Work may be greater or less than the estimated amount. The Contract

Price will be adjusted to reflect the actual quantities required for the Work based on the itemized or unit prices provided in the Bid Schedule, with no allowance for anticipated profit for quantities that are deleted or decreased, and no increase in the unit price, and without regard to the percentage increase or decrease of the estimated quantity and the actual quantity.

17. Bidder's Questionnaire. A completed, signed Bidder's Questionnaire using the form provided with the Contract Documents and including all required attachments must be submitted within 48 hours following a request by City. A bid that does not fully comply with this requirement may be rejected as nonresponsive. A bidder who submits a Bidder's Questionnaire which is subsequently determined to contain false or misleading information, or material omissions, may be disqualified as non-responsible.

18. For Reference Only. The following documents are provided "For Reference Only," as defined in Section 3.4 of the General Conditions:
None

END OF INSTRUCTIONS TO BIDDERS

Bid Proposal

North Street Steps Slide Repair Project

_____ ("Bidder") hereby submits this Bid Proposal to City of Sausalito ("City") for the above-referenced project ("Project") in response to the Notice Inviting Bids and in accordance with the Contract Documents referenced in the Notice.

1. Base Bid. Bidder proposes to perform and fully complete the Work for the Project as specified in the Contract Documents, within the time required for full completion of the Work, including all labor, materials, supplies, and equipment and all other direct or indirect costs including, but not limited to, taxes, insurance and all overhead for the following price ("Base Bid"):
$_____.

2. Addenda. Bidder agrees that it has confirmed receipt of or access to, and reviewed, all addenda issued for this bid. Bidder waives any claims it might have against the City based on its failure to receive, access, or review any addenda for any reason. Bidder specifically acknowledges receipt of the following addenda:

Addendum:	Date Received:	Addendum:	Date Received:
#01	_____	#05	_____
#02	_____	#06	_____
#03	_____	#07	_____
#04	_____	#08	_____

3. Bidder's Certifications and Warranties. By signing and submitting this Bid Proposal, Bidder certifies and warrants the following:

3.1 Examination of Contract Documents. Bidder has thoroughly examined the Contract Documents and represents that, to the best of Bidder's knowledge, there are no errors, omissions, or discrepancies in the Contract Documents, subject to the limitations of Public Contract Code § 1104.

3.2 Examination of Worksite. Bidder has had the opportunity to examine the Worksite and local conditions at the Project location.

3.3 Bidder Responsibility. Bidder is a responsible bidder, with the necessary ability, capacity, experience, skill, qualifications, workforce, equipment, and resources to perform or cause the Work to be performed in accordance with the Contract Documents and within the Contract Time.

3.4 Responsibility for Bid. Bidder has carefully reviewed this Bid Proposal and is solely responsible for any errors or omissions contained in its completed bid. All statements and information provided in this Bid Proposal and enclosures are true and correct to the best of Bidder's knowledge.

3.5 Nondiscrimination. In preparing this bid, the Bidder has not engaged in discrimination against any prospective or present employee or Subcontractor on grounds of race, color, ancestry, national origin, ethnicity, religion, sex, sexual orientation, age, disability, or marital status.

3.6 Iran Contracting Act. If the Contract Price exceeds $1,000,000, Bidder is not identified on a list created under the Iran Contracting Act, Public Contract Code § 2200 et seq. (the "Act"),

as a person engaging in investment activities in Iran, as defined in the Act, or is otherwise expressly exempt under the Act.

4. **Award of Contract**. By signing and submitting this Bid Proposal, Bidder agrees that if Bidder is awarded the Contract for the Project, within ten days following issuance of the Notice of Potential Award to Bidder, Bidder will do all of the following:

4.1 **Execute Contract.** Enter into the Contract with City in accordance with the terms of this Bid Proposal, by signing and submitting to City the Contract prepared by City using the form included with the Contract Documents;

4.2 **Submit Required Bonds.** Submit to City a payment bond and a performance bond, each for 100% of the Contract Price, using the bond forms provided and in accordance with the requirements of the Contract Documents; and

4.3 **Insurance Requirements.** Submit to City the insurance certificate(s) and endorsement(s) as required by the Contract Documents.

5. **Bid Security.** As a guarantee that, if awarded the Contract, Bidder will perform its obligations under Section 4 above, Bidder is enclosing bid security in the amount of ten percent of its maximum bid amount in one of the following forms (check one):

____ A cashier's check or certified check payable to City and issued by _____ [Bank name] in the amount of $_____.

____ A bid bond, using the Bid Bond form included with the Contract Documents, payable to City and executed by a surety licensed to do business in the State of California.

This Bid Proposal is hereby submitted on _____, 20__.

s/ _____	_____ Name and Title
s/ _____ *[See Section 3 of Instructions to Bidders]*	_____ Name and Title
_____ Company Name	_____ License #, Expiration Date, and Classification
_____ Address	_____ DIR Registration #
_____ City, State, Zip	_____ Phone
_____ Contact Name	_____ Contact Email

END OF BID PROPOSAL

Bid Schedule

This Bid Schedule must be completed in ink and included with the sealed Bid Proposal. Pricing must be provided for each Bid Item as indicated. Items marked "(SW)" are Specialty Work that must be performed by a qualified Subcontractor. The lump sum or unit cost for each item must be inclusive of all costs, whether direct or indirect, including profit and overhead. The sum of all amounts entered in the "Extended Total Amount" column must be identical to the Base Bid price entered in Section 1 of the Bid Proposal form.

AL = Allowance CF = Cubic Feet CY = Cubic Yard EA = Each LB = Pounds
LF = Linear Foot LS = Lump Sum SF = Square Feet TON = Ton (2000 lbs)

BID ITEM NO.	ITEM DESCRIPTION	EST. QTY.	UNIT	UNIT COST	EXTENDED TOTAL AMOUNT
1	**Mobilization and Demobilization**	**1**	**LS**	$	$
2	**Traffic Control System**	**1**	**LS**	$	$
3	**Erosion & Sediment Control**	**1**	**LS**	$	$
4	**Clearing & Grubbing**	**1**	**LS**	$	$
5	**Scaling and Excavation**	**25**	**CY**	$	$
6	**Production Ground Anchors**	**100**	**EA**	$	$
7	**Verification Ground Anchors**	**5**	**EA**	$	$
8	**Slope Mesh**	**4,500**	**SF**	$	$
9	**Erosion Control Mats**	**4,500**	**SF**	$	$
10	**Hydroseeding**	**4,500**	**SF**	$	$

TOTAL BASE BID: Items 1 through 10 inclusive: $_____

Note: The amount entered as the "Total Base Bid" should be identical to the Base Bid amount entered in Section 1 of the Bid Proposal form.

BIDDER NAME: _____

END OF BID SCHEDULE

Subcontractor List

For each Subcontractor that will perform a portion of the Work in an amount in excess of one-half of 1% of the Bidder's total Base Bid,[1] the bidder must list a description of the Work, the name of the Subcontractor, its California contractor license number, the location of its place of business, its DIR registration number, and the portion of the Work that the Subcontractor is performing based on a percentage of the Base Bid price.

DESCRIPTION OF WORK	SUBCONTRACTOR NAME	CALIFORNIA CONTRACTOR LICENSE NO.	LOCATION OF BUSINESS	DIR REG. NO.	PERCENT OF WORK

END OF SUBCONTRACTOR LIST

[1] For street or highway construction, this requirement applies to any subcontract of $10,000 or more.

Noncollusion Declaration

TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID

The undersigned declares:

I am the _____ [title] of _____ [business name], the party making the foregoing bid.

The bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation. The bid is genuine and not collusive or sham. The bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid. The bidder has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or to refrain from bidding. The bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder. All statements contained in the bid are true. The bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof, to effectuate a collusive or sham bid, and has not paid and will not pay, any person or entity for such purpose.

This declaration is intended to comply with California Public Contract Code § 7106 and Title 23 U.S.C § 112.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and that this declaration is executed on _____ [date], at _____ [city], _____ [state].

s/_____

_____
Name [print]

END OF NONCOLLUSION DECLARATION

Bid Bond

_____ ("Bidder") has submitted a bid, dated _____, 20_____ ("Bid"), to City of Sausalito ("City") for work on the North Street Steps Slope Repair Project ("Project"). Under this duly executed bid bond ("Bid Bond"), Bidder as Principal and _____, its surety ("Surety"), are bound to City as obligee in the penal sum of ten percent of the maximum amount of the Bid (the "Bond Sum"). Bidder and Surety bind themselves and their respective heirs, executors, administrators, successors and assigns, jointly and severally, as follows:

1. **General.** If Bidder is awarded the Contract for the Project, Bidder will enter into the Contract with City in accordance with the terms of the Bid.

2. **Submittals.** Within ten days following issuance of the Notice of Potential Award to Bidder, Bidder must submit to City the following:

2.1 **Contract.** The executed Contract, using the form provided by City in the Project contract documents ("Contract Documents");

2.2 **Payment Bond.** A payment bond for 100% of the maximum Contract Price, executed by a surety licensed to do business in the State of California using the Payment Bond form included with the Contract Documents;

2.3 **Performance Bond.** A performance bond for 100% of the maximum Contract Price, executed by a surety licensed to do business in the State of California using the Performance Bond form included with the Contract Documents; and

2.4 **Insurance.** The insurance certificate(s) and endorsement(s) required by the Contract Documents, and any other documents required by the Instructions to Bidders or Notice of Potential Award.

3. **Enforcement.** If Bidder fails to execute the Contract and to submit the bonds and insurance certificates as required by the Contract Documents, Surety guarantees that Bidder forfeits the Bond Sum to City. Any notice to Surety may be given in the manner specified in the Contract and delivered or transmitted to Surety as follows:

Attn: _____
Address: _____
City/State/Zip: _____
Phone: _____
Fax: _____
Email: _____

4. **Duration and Waiver.** If Bidder fulfills its obligations under Section 2, above, then this obligation will be null and void; otherwise, it will remain in full force and effect for 60 days following the bid opening or until this Bid Bond is returned to Bidder, whichever occurs first. Surety waives the provisions of Civil Code §§ 2819 and 2845.

[Signatures are on the following page.]

This Bid Bond is entered into and effective on _____, 20_____.

SURETY:

_____
Business Name

s/_____ _____
Date

_____
Name, Title

(Attach Acknowledgment with Notary Seal and Power of Attorney)

BIDDER:

_____
Business Name

s/_____ _____
Date

_____
Name, Title

END OF BID BOND

Bidder's Questionnaire

North Street Steps Slope Repair Project

Within 48 hours following a request by City, a bidder must submit to City a completed, signed Bidder's Questionnaire using this form and all required attachments, including clearly labeled additional sheets as needed. City may request the Questionnaire from one or more of the apparent low bidders following the bid opening, and may use the completed Questionnaire as part of its investigation to evaluate a bidder's qualifications for this Project. The Questionnaire must be filled out completely, accurately, and legibly. Any errors, omissions, or misrepresentations in completion of the Questionnaire may be grounds for rejection of the bid or termination of a Contract awarded pursuant to the bid.

Part A: General Information

Bidder Business Name: _____ ("Bidder")

Check One: ___ Corporation (State of incorporation: _____)
___ Partnership
___ Sole Proprietorship
___ Joint Venture of: _____
___ Other:_____

Main Office Address and Phone: _____

_____

Local Office Address and Phone: _____

_____

Website address: _____

Owner of Business: _____

Contact Name and Title:_____

Contact Phone and Email: _____

Bidder's California Contractor's License Number(s): _____

Bidder's DIR Registration Number: _____

Part B: Bidder Experience

1. How many years has Bidder been in business under its present business name? ____ years

2. Has Bidder completed projects similar in type and size to this Project as a general contractor?
_____ Yes _____ No

3. Has Bidder ever been disqualified from a bid on grounds that it is not responsible, or otherwise disqualified or disbarred from bidding under state or federal law?
_____ Yes _____ No

If yes, provide additional information on a separate sheet regarding the disqualification or disbarment, including the name and address of the agency or owner of the project, the type and size of the project, the reasons that Bidder was disqualified or disbarred, and the month and year in which the disqualification or disbarment occurred.

4. Has Bidder ever been terminated for cause, alleged default, or legal violation from a construction project, either as a general contractor or as a subcontractor?
_____ Yes _____ No

If yes, provide additional information on a separate sheet regarding the termination, including the name and address of the agency or owner of the subject project, the type and size of the project, whether Bidder was under contract as a general contractor or a subcontractor, the reasons that Bidder was terminated, and the month and year in which the termination occurred.

5. Provide information about Bidder's past projects performed as general contractor as follows:

5.1 Six most recently completed public works projects within the last three years;

5.2 Three largest completed projects within the last three years; and

5.3 Any project which is similar to this Project including scope and character of the work.

6. Use separate sheets to provide all of the following information for <u>each</u> project identified in response to the above three categories:

6.1 Project name, location, and description;
6.2 Owner (name, address, email, and phone number);
6.3 Prime contractor, if applicable (name, address, email, and phone number);
6.4 Architect or engineer (name, email, and phone number);
6.5 Project and/or construction manager (name, email, and phone number);
6.6 Scope of work performed (as general or as subcontractor);
6.7 Initial contract price and final contract price (including change orders);
6.8 Original scheduled completion date and actual date of completion;
6.9 Time extensions granted (number of days);
6.10 Number and amount of stop notices or mechanic's liens filed;
6.11 Amount of any liquidated damages assessed against Bidder; and
6.12 Nature and resolution of any project-related claim, lawsuit, mediation, or arbitration involving Bidder.

Part C: Safety

1. Provide Bidder's Experience Modification Rate (EMR) for the last three years:

Year	EMR

2. Complete the following, based on information provided in Bidder's CalOSHA Form 300 or Form 300A, Annual Summary of Work-Related Illnesses and Injuries, from the most recent past calendar year:

2.1 Number of lost workday cases: ____
2.2 Number of medical treatment cases: ____
2.3 Number of deaths: ____

3. Has Bidder ever been cited, fined, or prosecuted by any local, state, or federal agency, including OSHA, CalOSHA, or EPA, for violation of any law, regulation, or requirements pertaining to health and safety?

_____ Yes _____ No

If yes, provide additional information on a separate sheet regarding each such citation, fine, or prosecution, including the name and address of the agency or owner of the project, the type and size of the project, the reasons for and nature of the citation, fine, or prosecution, and the month and year in which the incident giving rise to the citation, fine, or prosecution occurred.

4. Name, title, and email for person responsible for Bidder's safety program:

_____ _____

Name Title Email

Part D: Verification

In signing this document, I, the undersigned, declare that I am duly authorized to sign and submit this Bidder's Questionnaire on behalf of the named Bidder, and that all responses and information set forth in this Bidder's Questionnaire and accompanying attachments are, to the best of my knowledge, true, accurate and complete as of the date of submission. **I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.**

Signature: _____ Date: _____

By: _____

Name and Title

END OF BIDDER'S QUESTIONNAIRE

Contract

This public works contract ("Contract") is entered into by and between City of Sausalito ("City") and _____ ("Contractor"), for work on the North Street Steps Slope Repair Project ("Project").

The parties agree as follows:

1. **Award of Contract.** In response to the Notice Inviting Bids, Contractor has submitted a Bid Proposal to perform the Work to construct the Project. On _____, 20___, City authorized award of this Contract to Contractor for the amount set forth in Section 4, below.

2. **Contract Documents.** The Contract Documents incorporated into this Contract include and are comprised of all of the documents listed below. The definitions provided in Article 1 of the General Conditions apply to all of the Contract Documents, including this Contract.

2.1 Notice Inviting Bids;
2.2 Instructions to Bidders;
2.3 Addenda, if any;
2.4 Bid Proposal and attachments thereto;
2.5 Contract;
2.6 Payment and Performance Bonds;
2.7 General Conditions;
2.8 Special Conditions;
2.9 Project Plans and Specifications;
2.10 Change Orders, if any;
2.11 Notice of Potential Award;
2.12 Notice to Proceed; and
2.13 The following: No other documents

3. **Contractor's Obligations.** Contractor will perform all of the Work required for the Project, as specified in the Contract Documents. Contractor must provide, furnish, and supply all things necessary and incidental for the timely performance and completion of the Work, including all necessary labor, materials, supplies, tools, equipment, transportation, onsite facilities, and utilities, unless otherwise specified in the Contract Documents. Contractor must use its best efforts to diligently prosecute and complete the Work in a professional and expeditious manner and to meet or exceed the performance standards required by the Contract Documents.

4. **Payment.** As full and complete compensation for Contractor's timely performance and completion of the Work in strict accordance with the terms and conditions of the Contract Documents, City will pay Contractor $_____ ("Contract Price") for all of Contractor's direct and indirect costs to perform the Work, including all labor, materials, supplies, equipment, taxes, insurance, bonds and all overhead costs, in accordance with the payment provisions in the General Conditions.

5. **Time for Completion.** Contractor will fully complete the Work for the Project, meeting all requirements for Final Completion, within 84 calendar days from the commencement date given in the Notice to Proceed ("Contract Time"). By signing below, Contractor expressly waives any claim for delayed early completion.

6. **Liquidated Damages.** As further specified in Section 5.4 of the General Conditions, if Contractor fails to complete the Work within the Contract Time, City will assess liquidated damages in the amount of $1,500 per day for each day of unexcused delay in achieving

Final Completion, and such liquidated damages may be deducted from City's payments due or to become due to Contractor under this Contract.

7. Labor Code Compliance.

7.1 General. This Contract is subject to all applicable requirements of Chapter 1 of Part 7 of Division 2 of the Labor Code, including requirements pertaining to wages, working hours and workers' compensation insurance, as further specified in Article 9 of the General Conditions.

7.2 Prevailing Wages. This Project is subject to the prevailing wage requirements applicable to the locality in which the Work is to be performed for each craft, classification or type of worker needed to perform the Work, including employer payments for health and welfare, pension, vacation, apprenticeship and similar purposes. Copies of these prevailing rates are available online at http://www.dir.ca.gov/DLSR.

7.3 DIR Registration. City may not enter into the Contract with a bidder without proof that the bidder and its Subcontractors are registered with the California Department of Industrial Relations to perform public work pursuant to Labor Code § 1725.5, subject to limited legal exceptions.

8. Workers' Compensation Certification. Pursuant to Labor Code § 1861, by signing this Contract, Contractor certifies as follows: "I am aware of the provisions of Labor Code § 3700 which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the Work on this Contract."

9. Conflicts of Interest. Contractor, its employees, Subcontractors and agents, may not have, maintain or acquire a conflict of interest in relation to this Contract in violation of any City ordinance or requirement, or in violation of any California law, including Government Code § 1090 et seq., or the Political Reform Act, as set forth in Government Code § 81000 et seq. and its accompanying regulations. Any violation of this Section constitutes a material breach of the Contract.

10. Independent Contractor. Contractor is an independent contractor under this Contract and will have control of the Work and the means and methods by which it is performed. Contractor and its Subcontractors are not employees of City and are not entitled to participate in any health, retirement, or any other employee benefits from City.

11. Notice. Any notice, billing, or payment required by or pursuant to the Contract Documents must be made in writing, signed, dated and sent to the other party by personal delivery, U.S. Mail, a reliable overnight delivery service, or by email as a PDF file. Notice is deemed effective upon delivery, except that service by U.S. Mail is deemed effective on the second working day after deposit for delivery. Notice for each party must be given as follows:

City:

Ali Iqbal
420 Litho St.
Sausalito, CA 94965
aiqbal@sausalito.gov

Copy to:
Kevin McGowan
Director of Public Works
kmcgowan@sausalito.gov

Contractor:

Name:_____
Address:_____
City/State/Zip:_____
Phone:_____
Attn:_____
Email:_____
Copy to:_____

12. General Provisions.

12.1 Assignment and Successors. Contractor may not assign its rights or obligations under this Contract, in part or in whole, without City's written consent. This Contract is binding on Contractor's and City's lawful heirs, successors and permitted assigns.

12.2 Third Party Beneficiaries. There are no intended third party beneficiaries to this Contract.

12.3 Governing Law and Venue. This Contract will be governed by California law and venue will be in the Marin County Superior Court, and no other place. Contractor waives any right it may have pursuant to Code of Civil Procedure § 394, to file a motion to transfer any action arising from or relating to this Contract to a venue outside of Marin County, California.

12.4 Amendment. No amendment or modification of this Contract will be binding unless it is in a writing duly authorized and signed by the parties to this Contract.

12.5 Integration. This Contract and the Contract Documents incorporated herein, including authorized amendments or Change Orders thereto, constitute the final, complete, and exclusive terms of the agreement between City and Contractor.

12.6 Severability. If any provision of the Contract Documents is determined to be illegal, invalid, or unenforceable, in whole or in part, the remaining provisions of the Contract Documents will remain in full force and effect.

12.7 Iran Contracting Act. If the Contract Price exceeds $1,000,000, Contractor certifies, by signing below, that it is not identified on a list created under the Iran Contracting Act, Public Contract Code § 2200 et seq. (the "Act"), as a person engaging in investment activities in Iran, as defined in the Act, or is otherwise expressly exempt under the Act.

12.8 Authorization. Each individual signing below warrants that he or she is authorized to do so by the party that he or she represents, and that this Contract is legally binding on that party. If Contractor is a corporation, signatures from two officers of the corporation are required pursuant to California Corporation Code § 313.

The parties agree to this Contract as witnessed by the signatures below:

CITY:

s/_____

_____
Name, Title

Date: _____

Approved as to form:

s/_____

_____
Name, Title

Date: _____

Attest:

s/_____

_____
Name, Title

Date: _____

CONTRACTOR: _____
Business Name

s/_____

Seal:

_____
Name, Title

Date: _____

Second Signature (See Section 12.8):

s/_____

_____
Name, Title

Date: _____

_____
Contractor's California License Number(s) and Expiration Date(s)

END OF CONTRACT

Payment Bond

City of Sausalito ("City") and _____ ("Contractor") have entered into a contract for work on the North Street Steps Slope Repair Project ("Project"). The Contract is incorporated by reference into this Payment Bond ("Bond").

1. **General.** Under this Bond, Contractor as principal and _____, its surety ("Surety"), are bound to City as obligee in an amount not less than $_____, under California Civil Code § 9550 et seq., to ensure payment to authorized claimants. This Bond is binding on the respective successors, assigns, owners, heirs, or executors of Surety and Contractor.

2. **Surety's Obligation.** If Contractor or any of its Subcontractors fails to pay a person authorized in California Civil Code § 9100 to assert a claim against a payment bond, any amounts due under the Unemployment Insurance Code with respect to work or labor performed under the Contract, or any amounts required to be deducted, withheld, and paid over to the Employment Development Department from the wages of employees of Contractor and its Subcontractors under California Unemployment Insurance Code § 13020 with respect to the work and labor, then Surety will pay the obligation.

3. **Beneficiaries.** This Bond inures to the benefit of any of the persons named in California Civil Code § 9100, so as to give a right of action to those persons or their assigns in any suit brought upon this Bond. Contractor must promptly provide a copy of this Bond upon request by any person with legal rights under this Bond.

4. **Duration.** If Contractor promptly makes payment of all sums for all labor, materials, and equipment furnished for use in the performance of the Work required by the Contract, in conformance with the time requirements set forth in the Contract and as required by California law, Surety's obligations under this Bond will be null and void. Otherwise, Surety's obligations will remain in full force and effect.

5. **Waivers.** Surety waives any requirement to be notified of alterations to the Contract or extensions of time for performance of the Work under the Contract. Surety waives the provisions of Civil Code §§ 2819 and 2845. City waives the requirement of a new bond for any supplemental contract under Civil Code § 9550. Any notice to Surety may be given in the manner specified in the Contract and delivered or transmitted to Surety as follows:

   Attn: _____
   Address: _____
   City/State/Zip: _____
   Phone: _____
   Email: _____

6. **Law and Venue.** This Bond will be governed by California law, and venue for any dispute pursuant to this Bond will be in the Marin County Superior Court, and no other place. Surety will be responsible for City's attorneys' fees and costs in any action to enforce the provisions of this Bond.

[Signatures are on the following page.]

7. Effective Date; Execution. This Bond is entered into and is effective on _____, 20__.

SURETY:

_____
Business Name

s/_____ _____
Date

_____
Name, Title

(Attach Acknowledgment with Notary Seal and Power of Attorney)

CONTRACTOR:

_____
Business Name

s/_____ _____
Date

_____
Name, Title

APPROVED BY CITY:

s/ _____ _____
Date

_____
Name, Title

END OF PAYMENT BOND

Performance Bond

City of Sausalito ("City") and _____ ("Contractor") have entered into a contract for work on the North Street Steps Slope Repair Project ("Project"). The Contract is incorporated by reference into this Performance Bond ("Bond").

1. **General.** Under this Bond, Contractor as principal and _____, its surety ("Surety"), are bound to City as obligee for an amount not less than $_____ to ensure Contractor's faithful performance of its obligations under the Contract. This Bond is binding on the respective successors, assigns, owners, heirs, or executors of Surety and Contractor.

2. **Surety's Obligations.** Surety's obligations are co-extensive with Contractor's obligations under the Contract. If Contractor fully performs its obligations under the Contract, including its warranty obligations under the Contract, Surety's obligations under this Bond will become null and void. Otherwise, Surety's obligations will remain in full force and effect.

3. **Waiver.** Surety waives any requirement to be notified of and further consents to any alterations to the Contract made under the applicable provisions of the Contract Documents, including changes to the scope of Work or extensions of time for performance of Work under the Contract. Surety waives the provisions of Civil Code §§ 2819 and 2845.

4. **Application of Contract Balance.** Upon making a demand on this Bond for completion of the Work prior to acceptance of the Project, City will make the Contract Balance available to Surety for completion of the Work under the Contract. For purposes of this provision, the Contract Balance is defined as the total amount payable by City to Contractor as the Contract Price minus amounts already paid to Contractor, and minus any liquidated damages, credits, or backcharges to which City is entitled under the terms of the Contract.

5. **Contractor Default.** Upon written notification from City of Contractor's termination for default under Article 13 of the Contract General Conditions, time being of the essence, Surety must act within the time specified in Article 13 to remedy the default through one of the following courses of action:

   5.1 Arrange for completion of the Work under the Contract by Contractor, with City's consent, but only if Contractor is in default solely due to its financial inability to complete the Work;

   5.2 Arrange for completion of the Work under the Contract by a qualified contractor acceptable to City, and secured by performance and payment bonds issued by an admitted surety as required by the Contract Documents, at Surety's expense; or

   5.3 Waive its right to complete the Work under the Contract and reimburse City the amount of City's costs to have the remaining Work completed.

6. **Surety Default.** If Surety defaults on its obligations under the Bond, City will be entitled to recover all costs it incurs due to Surety's default, including legal, design professional, or delay costs.

7. **Notice.** Any notice to Surety may be given in the manner specified in the Contract and sent to Surety as follows:

   Attn: _____
   Address: _____

City/State/Zip: _____
Phone: _____
Fax: _____
Email: _____

8. Law and Venue. This Bond will be governed by California law, and venue for any dispute pursuant to this Bond will be in the Marin County Superior Court, and no other place. Surety will be responsible for City's attorneys' fees and costs in any action to enforce the provisions of this Bond.

9. Effective Date; Execution. This Bond is entered into and effective on _____, 20___.

SURETY:

_____
Business Name

s/_____ _____
Date

_____
Name, Title

(Attach Acknowledgment with Notary Seal and Power of Attorney)

CONTRACTOR:

_____
Business Name

s/_____ _____
Date

_____
Name, Title

APPROVED BY CITY:

s/ _____ _____
Date

_____
Name, Title

END OF PERFORMANCE BOND

General Conditions

Article 1 - Definitions

Definitions. The following definitions apply to all of the Contract Documents unless otherwise indicated, e.g., additional definitions that apply solely to the Specifications or other technical documents. Defined terms and titles of documents are capitalized in the Contract Documents, with the exception of the following (in any tense or form): “day,” “furnish,” “including,” “install,” “work day” or “working day.”

Allowance means a specific amount that must be included in the Bid Proposal for a specified purpose.

Article, as used in these General Conditions, means a numbered Article of the General Conditions, unless otherwise indicated by the context.

Change Order means a written document duly approved and executed by City, which changes the scope of Work, the Contract Price, or the Contract Time.

City means the municipality which has entered into the Contract with Contractor for performance of the Work, acting through its City Council, officers, employees, City Engineer, and any other authorized representatives.

City Engineer means the City Engineer for City and his or her authorized delegee(s).

Claim means a separate demand by Contractor for a change in the Contract Time or Contract Price, that has previously been submitted to City in accordance with the requirements of the Contract Documents, and which has been rejected by City, in whole or in part; or a written demand by Contractor objecting to the amount of Final Payment.

Contract means the signed agreement between City and Contractor for performing the Work required for the Project, and all documents expressly incorporated therein.

Contract Documents means, collectively, all of the documents listed as such in Section 2 of the Contract, including the Notice Inviting Bids; the Instructions to Bidders; addenda, if any; the Bid Proposal, and attachments thereto; the Contract; the Notice of Potential Award and Notice to Proceed; the payment and performance bonds; the General Conditions; the Special Conditions; the Project Plans and Specifications; any Change Orders; and any other documents which are clearly and unambiguously made part of the Contract Documents. The Contract Documents do not include documents provided “For Reference Only,” or documents that are intended solely to provide information regarding existing conditions.

Contract Price means the total compensation to be paid to Contractor for performance of the Work, as set forth in the Contract and as may be amended by Change Order or adjusted for an Allowance. The Contract Price is not subject to adjustment due to inflation or due to the increased cost of labor, material, supplies or equipment following submission of the Bid Proposal.

Contract Time means the time specified for complete performance of the Work, as set forth in the Contract and as may be amended by Change Order.

Contractor means the individual, partnership, corporation, or joint-venture that has signed the Contract with City to perform the Work.

Day means a calendar day unless otherwise specified.

Design Professional means the licensed individual(s) or firm(s) retained by City to provide architectural, engineering, or electrical engineering design services for the Project. If no Design Professional has been retained for this Project, any reference to Design Professional is deemed to refer to the Engineer.

DIR means the California Department of Industrial Relations.

Drawings has the same meaning as Plans.

Engineer means the City Engineer for the City of Sausalito and his or her authorized delegees.

Excusable Delay is defined in Section 5.3(B), Excusable Delay.

Extra Work means new or unforeseen work added to the Project, as determined by the Engineer in his or her sole discretion, including Work that was not part of or incidental to the scope of the Work when the Contractor's bid was submitted; Work that is substantially different from the Work as described in the Contract Documents at bid time; or Work that results from a substantially differing and unforeseeable condition.

Final Completion means Contractor has fully completed all of the Work required by the Contract Documents to the City's satisfaction, including all punch list items and any required commissioning or training, and has provided the City with all required submittals, including the instructions and manuals, product warranties, and as-built drawings.

Final Payment means payment to Contractor of the unpaid Contract Price, including release of undisputed retention, less amounts withheld or deducted pursuant to the Contract Documents.

Furnish means to purchase and deliver for the Project.

Government Code Claim means a claim submitted pursuant to California Government Code § 900 et seq.

Hazardous Materials means any substance or material identified now or in the future as hazardous under any Laws, or any other substance or material that may be considered hazardous or otherwise subject to Laws governing handling, disposal, or cleanup.

Including, whether or not capitalized, means "including, but not limited to," unless the context clearly requires otherwise.

Inspector means the individual(s) or firm(s) retained or employed by City to inspect the workmanship, materials, and manner of construction of the Project and its components to ensure compliance with the Contract Documents and all Laws.

Install means to fix in place for materials, and to fix in place and connect for equipment.

Laws means all applicable local, state, and federal laws, regulations, rules, codes, ordinances, permits, orders, and the like enacted or imposed by or under the auspices of any governmental entity with jurisdiction over any of the Work or any performance of the Work, including health and safety requirements.

Non-Excusable Delay is defined in Section 5.3(D), Non-Excusable Delay.

Plans means the City-provided plans, drawings, details, or graphical depictions of the Project requirements, but does not include Shop Drawings.

Project means the public works project referenced in the Contract.

Project Manager means the individual designated by City to oversee and manage the Project on City's behalf and may include his or her authorized delegee(s) when the Project Manager is unavailable. If no Project Manager has been designated for this Project, any reference to Project Manager is deemed to refer to the Engineer.

Recoverable Costs is defined in Section 5.3(F), Recoverable Costs.

Request for Information or **RFI** means Contractor's written request for information about the Contract Documents, the Work or the Project, submitted to City in the manner and format specified by City.

Section, when capitalized in these General Conditions, means a numbered section or subsection of the General Conditions, unless the context clearly indicates otherwise.

Shop Drawings means drawings, plan details or other graphical depictions prepared by or on behalf of Contractor, and subject to City acceptance, which are intended to provide details for fabrication, installation, and the like, of items required by or shown in the Plans or Specifications.

Specialty Work means Work that must be performed by a specialized Subcontractor with the specified license or other special certification, and that the Contractor is not qualified to self-perform.

Specifications means the technical, text specifications describing the Project requirements, which are prepared for and incorporated into the Contract by or on behalf of City, and does not include the Contract, General Conditions or Special Conditions.

Subcontractor means an individual, partnership, corporation, or joint-venture retained by Contractor directly or indirectly through a subcontract to perform a specific portion of the Work. The term Subcontractor applies to subcontractors of all tiers, unless otherwise indicated by the context. A third party such as a utility performing related work on the Project is not a Subcontractor, even if Contractor must coordinate its Work with the third party.

Technical Specifications has the same meaning as Specifications.

Work means all of the construction and services necessary for or incidental to completing the Project in conformance with the requirements of the Contract Documents.

Work Day or **Working Day**, whether or not capitalized, means a weekday when the City is open for business, and does not include holidays observed by the City.

Worksite means the place or places where the Work is performed, which includes, but may extend beyond the Project site, including separate locations for staging, storage, or fabrication.

Article 2 - Roles and Responsibilities

2.1 City.

(A) ***City Council.*** The City Council has final authority in all matters affecting the Project, except to the extent it has delegated authority to the Engineer.

(B) ***Engineer.*** The Engineer, acting within the authority conferred by the City Council, is responsible for administration of the Project on behalf of City, including authority to provide directions to the Design Professional and to Contractor to ensure proper and timely completion of the Project. The Engineer's decisions are final and

conclusive within the scope of his or her authority, including interpretation of the Contract Documents.

(C) ***Project Manager.*** The Project Manager assigned to the Project will be the primary point of contact for the Contractor and will serve as City's representative for daily administration of the Project on behalf of City. Unless otherwise specified, all of Contractor's communications to City (in any form) will go to or through the Project Manager. City reserves the right to reassign the Project Manager role at any time or to delegate duties to additional City representatives, without prior notice to or consent of Contractor.

(D) ***Design Professional.*** The Design Professional is responsible for the overall design of the Project and, to the extent authorized by City, may act on City's behalf to ensure performance of the Work in compliance with the Plans and Specifications, including any design changes authorized by Change Order. The Design Professional's duties may include review of Contractor's submittals, visits to any Worksite, inspecting the Work, evaluating test and inspection results, and participation in Project-related meetings, including any pre-construction conference, weekly meetings, and coordination meetings. The Design Professional's interpretation of the Plans or Specifications is final and conclusive.

2.2 Contractor.

(A) ***General.*** Contractor must provide all labor, materials, supplies, equipment, services, and incidentals necessary to perform and timely complete the Work in strict accordance with the Contract Documents, and in an economical and efficient manner in the best interests of City, and with minimal inconvenience to the public.

(B) ***Responsibility for the Work and Risk of Loss.*** Contractor is responsible for supervising and directing all aspects of the Work to facilitate the efficient and timely completion of the Work. Contractor is solely responsible for and required to exercise full control over the Work, including the construction means, methods, techniques, sequences, procedures, safety precautions and programs, and coordination of all portions of the Work with that of all other contractors and Subcontractors, except to the extent that the Contract Documents provide other specific instructions. Contractor's responsibilities extend to any plan, method or sequence suggested, but not required by City or specified in the Contract Documents. From the date of commencement of the Work until either the date on which City formally accepts the Project or the effective date of termination of the Contract, whichever is later, Contractor bears all risks of injury or damage to the Work and the materials and equipment delivered to any Worksite, by any cause including fire, earthquake, wind, weather, vandalism or theft.

(C) ***Project Administration.*** Contractor must provide sufficient and competent administration, staff, and skilled workforce necessary to perform and timely complete the Work in accordance with the Contract Documents. Before starting the Work, Contractor must designate in writing and provide complete contact information, including telephone numbers and email address, for the officer or employee in Contractor's organization who is to serve as Contractor's primary representative for the Project, and who has authority to act on Contractor's behalf. A Subcontractor may not serve as Contractor's primary representative.

(D) ***On-Site Superintendent.*** Contractor must, at all times during performance of the Work, provide a qualified and competent full-time superintendent acceptable to City, and assistants as necessary, who must be physically present at the Project site while any aspect of the Work is being performed. The superintendent must have full authority to act and communicate on behalf of Contractor, and Contractor will be bound by the

superintendent's communications to City. City's approval of the superintendent is required before the Work commences. If City is not satisfied with the superintendent's performance, City may request a qualified replacement of the superintendent. Failure to comply may result in temporary suspension of the Work, at Contractor's sole expense and with no extension of Contract Time, until an approved superintendent is physically present to supervise the Work. Contractor must provide written notice to City, as soon as practicable, before replacing the superintendent.

(E) ***Standards.*** Contractor must, at all times, ensure that the Work is performed in an efficient, skillful manner following best practices and in full compliance with the Contract Documents and Laws and applicable manufacturer's recommendations. Contractor has a material and ongoing obligation to provide true and complete information, to the best of its knowledge, with respect to all records, documents, or communications pertaining to the Project, including oral or written reports, statements, certifications, Change Order requests, or Claims.

(F) ***Meetings.*** Contractor, its project manager, superintendent and any primary Subcontractors requested by City, must attend a pre-construction conference, if requested by City, as well as weekly Project progress meetings scheduled with City. If applicable, Contractor may also be required to participate in coordination meetings with other parties relating to other work being performed on or near the Project site or in relation to the Project, including work or activities performed by City, other contractors, or other utility owners.

(G) ***Construction Records.*** Contractor will maintain up-to-date, thorough, legible, and dated daily job reports, which document all significant activity on the Project for each day that Work is performed on the Project. The daily report for each day must include the number of workers at the Project site; primary Work activities; major deliveries; problems encountered, including injuries, if any; weather and site conditions; and delays, if any. Contractor will take date and time-stamped photographs to document general progress of the Project, including site conditions prior to construction activities, before and after photographs at offset trench laterals, existing improvements and utilities, damage and restoration. Contractor will maintain copies of all subcontracts, Project-related correspondence with Subcontractors, and records of meetings with Subcontractors. Upon request by the City, Contractor will permit review of and/or provide copies of any of these construction records.

(H) ***Responsible Party.*** Contractor is solely responsible to City for the acts or omissions of any Subcontractors, or any other party or parties performing portions of the Work or providing equipment, materials or services for or on behalf of Contractor or the Subcontractors. Upon City's written request, Contractor must promptly and permanently remove from the Project, at no cost to City, any employee or Subcontractor or employee of a Subcontractor who the Engineer has determined to be incompetent, intemperate or disorderly, or who has failed or refused to perform the Work as required under the Contract Documents.

(I) ***Correction of Defects.*** Contractor must promptly correct, at Contractor's sole expense, any Work that is determined by City to be deficient or defective in any way, including workmanship, materials, parts or equipment. Workmanship, materials, parts or equipment that do not conform to the requirements under the Plans, Specifications and every other Contract Document, as determined by City, will be considered defective and subject to rejection. Contractor must also promptly correct, at Contractor's sole expense, any Work performed beyond the lines and grades shown on the Plans or established by City, and any Extra Work performed without City's prior written approval. If Contractor fails to correct or to take reasonable steps toward correcting defective Work within five days following notice from City, or within the time specified in City's notice to correct, City

may elect to have the defective Work corrected by its own forces or by a third party, in which case the cost of correction will be deducted from the Contract Price. If City elects to correct defective Work due to Contractor's failure or refusal to do so, City or its agents will have the right to take possession of and use any equipment, supplies, or materials available at the Project site or any Worksite on City property, in order to effectuate the correction, at no extra cost to City. Contractor's warranty obligations under Section 11.2, Warranty, will not be waived nor limited by City's actions to correct defective Work under these circumstances. Alternatively, City may elect to retain defective Work, and deduct the difference in value, as determined by the Engineer, from payments otherwise due to Contractor. This paragraph applies to any defective Work performed by Contractor during the one-year warranty period under Section 11.2.

(J) ***Contractor's Records.*** Contractor must maintain all of its records relating to the Project in any form, including paper documents, photos, videos, electronic records, approved samples, and the construction records required pursuant to paragraph (G), above. Project records subject to this provision include complete Project cost records and records relating to preparation of Contractor's bid, including estimates, take-offs, and price quotes or bids.

(1) Contractor's cost records must include all supporting documentation, including original receipts, invoices, and payroll records, evidencing its direct costs to perform the Work, including, but not limited to, costs for labor, materials and equipment. Each cost record should include, at a minimum, a description of the expenditure with references to the applicable requirements of the Contract Documents, the amount actually paid, the date of payment, and whether the expenditure is part of the original Contract Price, related to an executed Change Order, or otherwise categorized by Contractor as Extra Work. Contractor's failure to comply with this provision as to any claimed cost operates as a waiver of any rights to recover the claimed cost.

(2) Contractor must continue to maintain its Project-related records in an organized manner for a period of five years after City's acceptance of the Project or following Contract termination, whichever occurs first. Subject to prior notice to Contractor, City is entitled to inspect or audit any of Contractor's records relating to the Project during Contractor's normal business hours. The record-keeping requirements set forth in this subsection 2.2(J) will survive expiration or termination of the Contract.

(K) ***Copies of Project Documents.*** Contractor and its Subcontractors must keep copies, at the Project site, of all Work-related documents, including the Contract, permit(s), Plans, Specifications, Addenda, Contract amendments, Change Orders, RFIs and RFI responses, Shop Drawings, as-built drawings, schedules, daily records, testing and inspection reports or results, and any related written interpretations. These documents must be available to City for reference at all times during construction of the Project.

2.3 Subcontractors.

(A) ***General.*** All Work which is not performed by Contractor with its own forces must be performed by Subcontractors. City reserves the right to approve or reject any and all Subcontractors proposed to perform the Work, for reasons including the subcontractor's poor reputation, lack of relevant experience, financial instability, and lack of technical ability or adequate trained workforce. Each Subcontractor must obtain a City business license before performing any Work.

(B) ***Contractual Obligations.*** Contractor must require each Subcontractor to comply with the provisions of the Contract Documents as they apply to the Subcontractor's portion(s) of the Work, including the generally applicable terms of the Contract Documents, and to likewise bind their subcontractors. Contractor will provide that the rights that each Subcontractor may have against any manufacturer or supplier for breach of warranty or guarantee relating to items provided by the Subcontractor for the Project, will be assigned to City. Nothing in these Contract Documents creates a contractual relationship between a Subcontractor and City, but City is deemed to be a third-party beneficiary of the contract between Contractor and each Subcontractor.

(C) ***Termination.*** If the Contract is terminated, each Subcontractor's agreement must be assigned by Contractor to City, subject to the prior rights of any surety, but only if and to the extent that City accepts, in writing, the assignment by written notification, and assumes all rights and obligations of Contractor pursuant to each such subcontract agreement.

(D) ***Substitution of Subcontractor.*** If Contractor requests substitution of a listed Subcontractor under Public Contract Code § 4107, Contractor is solely responsible for all costs City incurs in responding to the request, including legal fees and costs to conduct a hearing, and any increased subcontract cost to perform the Work that was to be performed by the listed Subcontractor. If City determines that a Subcontractor is unacceptable to City based on the Subcontractor's failure to satisfactorily perform its Work, or for any of the grounds for substitution listed in Public Contract Code § 4107(a), City may request removal of the Subcontractor from the Project. Upon receipt of a written request from City to remove a Subcontractor pursuant to this paragraph, Contractor will immediately remove the Subcontractor from the Project and, at no further cost to City, will either (1) self-perform the remaining Work to the extent that Contractor is duly licensed and qualified to do so, or (2) substitute a Subcontractor that is acceptable to City, in compliance with Public Contract Code § 4107, as applicable.

2.4 Coordination of Work.

(A) ***Concurrent Work.*** City reserves the right to perform, have performed, or permit performance of other work on or adjacent to the Project site while the Work is being performed for the Project. Contractor is responsible for coordinating its Work with other work being performed on or adjacent to the Project site, including by any utility companies or agencies, and must avoid hindering, delaying, or interfering with the work of other contractors, individuals, or entities, and must ensure safe and reasonable site access and use as required or authorized by City. To the full extent permitted by law, Contractor must hold harmless and indemnify City against any and all claims arising from or related to Contractor's avoidable, negligent, or willful hindrance of, delay to, or interference with the work of any utility company or agency or another contractor or subcontractor.

(B) ***Coordination.*** If Contractor's Work will connect or interface with work performed by others, Contractor is responsible for independently measuring and visually inspecting such work to ensure a correct connection and interface. Contractor is responsible for any failure by Contractor or its Subcontractors to confirm measurements before proceeding with connecting Work. Before proceeding with any portion of the Work affected by the construction or operations of others, Contractor must give the Project Manager prompt written notification of any defects Contractor discovers which will prevent the proper execution of the Work. Failure to give notice of any known or reasonably discoverable defects will be deemed acknowledgement by Contractor that the work of others is not defective and will not prevent the proper execution of the Work. Contractor must also promptly notify City if work performed by others, including work or activities performed by City's own forces, is operating to hinder, delay, or interfere with Contractor's timely

performance of the Work. City reserves the right to backcharge Contractor for any additional costs incurred due to Contractor's failure to comply with the requirements in this Section 2.4.

2.5 Submittals. Unless otherwise specified, Contractor must submit to the Engineer for review and acceptance, all schedules, Shop Drawings, samples, product data, and similar submittals required by the Contract Documents, or upon request by the Engineer. Unless otherwise specified, all submittals, including Requests for Information, are subject to the general provisions of this Section, as well as specific submittal requirements that may be included elsewhere in the Contract Documents, including the Special Conditions or Specifications. The Engineer may require submission of a submittal schedule at or before a pre-construction conference, as may be specified in the Notice to Proceed.

(A) ***General.*** Contractor is responsible for ensuring that its submittals are accurate and conform to the Contract Documents.

(B) ***Time and Manner of Submission.*** Contractor must ensure that its submittals are prepared and delivered in a manner consistent with the current City-accepted schedule for the Work and within the applicable time specified in the Contract Documents, or if no time is specified, in such time and sequence so as not to delay the performance of the Work or completion of the Project.

(C) ***Required Contents.*** Each submittal must include the Project name and contract number, Contractor's name and address, the name and address of any Subcontractor or supplier involved with the submittal, the date, and references to applicable Specification section(s) and/or drawing and detail number(s).

(D) ***Required Corrections.*** If corrections are required, Contractor must promptly make and submit any required corrections as specified in full conformance with the requirements of this Section, or other requirements that apply to that submittal.

(E) ***Effect of Review and Acceptance.*** Review and acceptance of a submittal by City will not relieve Contractor from complying with the requirements of the Contract Documents. Contractor is responsible for any errors in any submittal, and review or acceptance of a submittal by City is not an assumption of risk or liability by City.

(F) ***Enforcement.*** Any Work performed or any material furnished, installed, fabricated or used without City's prior acceptance of a required submittal is performed or provided at Contractor's risk, and Contractor may be required to bear the costs incident thereto, including the cost of removing and replacing such Work, repairs to other affected portions of the Work or material, and the cost of additional time or services required of City, including costs for the Design Professional, Project Manager, or Inspector.

(G) ***Excessive RFIs.*** A RFI will be considered excessive or unnecessary if City determines that the explanation or response to the RFI is clearly and unambiguously discernable from the Contract Documents. City's costs to review and respond to excessive or unnecessary RFIs may be deducted from payments otherwise due to Contractor.

2.6 Shop Drawings. When Shop Drawings are required by the Specifications or requested by the Engineer, they must be prepared according to best practices at Contractor's expense. The Shop Drawings must be of a size and scale to clearly show all necessary details. Unless otherwise specified by City, Shop Drawings must be provided to the Engineer for review and acceptance at least 30 days before the Work will be performed. If City requires changes, the corrected Shop Drawings must be resubmitted to the Engineer for review within the time specified by the Engineer. For all Project components

requiring Shop Drawings, Contractor will not furnish materials or perform any Work until the Shop Drawings for those components are accepted by City. Contractor is responsible for any errors or omissions in the Shop Drawings, shop fits and field corrections; any deviations from the Contract Documents; and for the results obtained by the use of Shop Drawings. Acceptance of Shop Drawings by City does not relieve Contractor of Contractor's responsibility.

2.7 Access to Work. Contractor must afford prompt and safe access to any Worksite by City and its employees, agents, or consultants authorized by City; and upon request by City, Contractor must promptly arrange for City representatives to visit or inspect manufacturing sites or fabrication facilities for items to be incorporated into the Work.

2.8 Personnel. Contractor and its Subcontractors must employ only competent and skillful personnel to perform the Work. Contractor and its Subcontractor's supervisors, security or safety personnel, and employees who have unescorted access to the Project site must possess proficiency in English sufficient to read, understand, receive, and implement oral or written communications or instructions relating to their respective job functions, including safety and security requirements. Upon written notification from the Engineer, Contractor and its Subcontractors must immediately discharge any personnel who are incompetent, disorderly, disruptive, threatening, abusive, or profane, or otherwise refuse or fail to comply with the requirements of the Contract Documents or Laws, including Laws pertaining to health and safety. Any such discharged personnel may not be re-employed or permitted on the Project in any capacity without City's prior written consent.

Article 3 - Contract Documents

3.1 Interpretation of Contract Documents.

(A) ***Plans and Specifications.*** The Plans and Specifications included in the Contract Documents are complementary. If Work is shown on one but not on the other, Contractor must perform the Work as though fully described on both, consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results. The Plans and Specifications are deemed to include and require everything necessary and reasonably incidental to completion of the Work, whether or not particularly mentioned or shown. Contractor must perform all Work and services and supply all things reasonably related to and inferable from the Contract Documents. In the event of a conflict between the Plans and Specifications, the Specifications will control, unless the drawing(s) at issue are dated later than the Specification(s) at issue. Detailed drawings take precedence over general drawings, and large-scale drawings take precedence over smaller scale drawings. Any arrangement or division of the Plans and Specifications into sections is for convenience and is not intended to limit the Work required by separate trades. A conclusion presented in the Plans or Specifications is only a recommendation. Actual locations and depths must be determined by Contractor's field investigation. Contractor may request access to underlying or background information in City's possession that is necessary for Contractor to form its own conclusions.

(B) ***Duty to Notify and Seek Direction.*** If Contractor becomes aware of a changed condition in the Project, or of any ambiguity, conflict, inconsistency, discrepancy, omission, or error in the Contract Documents, including the Plans or Specifications, Contractor must promptly submit a Request for Information to the Engineer and wait for a response from City before proceeding further with the related Work. The RFI must notify City of the issue and request clarification, interpretation or direction. The Engineer's clarification, interpretation or direction will be final and binding on Contractor. If Contractor proceeds with the related Work before obtaining City's response, Contractor will be responsible for any resulting costs, including the cost of correcting any incorrect or

defective Work that results. Timely submission of a clear and complete RFI is essential to avoiding delay. Delay resulting from Contractor's failure to submit a timely and complete RFI to the Engineer is Non-Excusable Delay. If Contractor believes that City's response to an RFI justifies a change to the Contract Price or Contract Time, Contractor must perform the Work as directed, but may submit a timely Change Order request in accordance with the Contract Documents. (See Article 5 and 6.)

(C) ***Figures and Dimensions.*** Figures control over scaled dimensions.

(D) ***Technical or Trade Terms.*** Any terms that have well-known technical or trade meanings will be interpreted in accordance with those meanings, unless otherwise specifically defined in the Contract Documents.

(E) ***Measurements.*** Contractor must verify all relevant measurements in the Contract Documents and at the Project site before ordering any material or performing any Work, and will be responsible for the correctness of those measurements or for costs that could have been avoided by independently verifying measurements.

(F) ***Compliance with Laws.*** The Contract Documents are intended to comply with Laws and will be interpreted to comply with Laws.

3.2 Order of Precedence. Information included in one Contract Document but not in another will not be considered a conflict or inconsistency. Unless otherwise specified in the Special Conditions, in case of any conflict or inconsistency among the Contract Documents, the following order of precedence will apply, beginning from highest to lowest, with the most recent version taking precedent over an earlier version:

(A) Change Orders;
(B) Addenda;
(C) Contract;
(D) Notice to Proceed;
(E) Attachment B – Federal Contract Requirements (only if used);
(F) Special Conditions;
(G) General Conditions;
(H) Payment and Performance Bonds;
(I) Specifications;
(J) Plans;
(K) Notice of Potential Award;
(L) Notice Inviting Bids;
(M) Attachment A – Federal Bidding Requirements (only if used);
(N) Instructions to Bidders;
(O) Contractor's Bid Proposal and attachments;
(P) the City's standard specifications, as applicable; and
(Q) Any generic documents prepared by and on behalf of a third party, that were not prepared specifically for this Project, such as the Caltrans Standard Specifications or Caltrans Special Provisions.

3.3 Caltrans Standard Specifications. Any reference to or incorporation of the Standard Specifications of the State of California, Department of Transportation ("Caltrans"), including "Standard Specifications," "Caltrans Specifications," "State Specifications," or "CSS," means the most current edition of Caltrans' Standard Specifications, unless otherwise specified ("Caltrans Standard Specifications"), including the most current amendments as of the date that Contractor's bid was submitted for this Project. The following provisions apply to use of or reference to the Caltrans Standard Specifications or Special Provisions:

(A) ***Limitations.*** The "General Provisions" of the Caltrans Standard Specifications, i.e., sections 1 through 9, do not apply to these Contract Documents with the exception of any specific provisions, if any, which are expressly stated to apply to these Contract Documents.

(B) ***Conflicts or Inconsistencies.*** If there is a conflict or inconsistency between any provision in the Caltrans Standard Specifications or Special Provisions and a provision of these Contract Documents, as determined by City, the provision in the Contract Documents will govern.

(C) ***Meanings.*** Terms used in the Caltrans Standard Specifications or Special Provisions are to be interpreted as follows:

(1) Any reference to the "Engineer" is deemed to mean the City Engineer.

(2) Any reference to the "Special Provisions" is deemed to mean the Special Conditions, unless the Caltrans Special Provisions are expressly included in the Contract Documents listed in Section 2 of the Contract.

(3) Any reference to the "Department" or "State" is deemed to mean City.

3.4 For Reference Only. Contractor is responsible for the careful review of any document, study, or report provided by City or appended to the Contract Documents solely for informational purposes and identified as "For Reference Only." Nothing in any document, study, or report so appended and identified is intended to supplement, alter, or void any provision of the Contract Documents. Contractor is advised that City or its representatives may be guided by information or recommendations included in such reference documents, particularly when making determinations as to the acceptability of proposed materials, methods, or changes in the Work. Any record drawings or similar final or accepted drawings or maps that are not part of the Contract Documents are deemed to be For Reference Only. The provisions of the Contract Documents are not modified by any perceived or actual conflict with provisions in any document that is provided For Reference Only.

3.5 Current Versions. Unless otherwise specified by City, any reference to standard specifications, technical specifications, or any City or state codes or regulations means the latest specification, code or regulation in effect at the time the Contract is signed.

3.6 Conformed Copies. If City prepares a conformed set of the Contract Documents following award of the Contract, it will provide Contractor with two hard copy (paper) sets and one copy of the electronic file in PDF format. It is Contractor's responsibility to ensure that all Subcontractors, including fabricators, are provided with the conformed set of the Contract Documents at Contractor's sole expense.

3.7 Ownership. No portion of the Contract Documents may be used for any purpose other than construction of the Project, without prior written consent from City. Contractor is deemed to have conveyed the copyright in any designs, drawings, specifications, Shop Drawings, or other documents (in paper or electronic form) developed by Contractor for the Project, and City will retain all rights to such works, including the right to possession.

Article 4 - Bonds, Indemnity, and Insurance

4.1 Payment and Performance Bonds. Within ten days following issuance of the Notice of Potential Award, Contractor is required to provide a payment bond and a performance bond, each in the penal sum of not less than 100% of the Contract Price, and each

executed by Contractor and its surety using the bond forms included with the Contract Documents.

(A) ***Surety*.** Each bond must be issued and executed by a surety admitted in California. If an issuing surety cancels the bond or becomes insolvent, within seven days following written notice from City, Contractor must substitute a surety acceptable to City. If Contractor fails to substitute an acceptable surety within the specified time, City may, at its sole discretion, withhold payment from Contractor until the surety is replaced to City's satisfaction, or terminate the Contract for default.

(B) ***Supplemental Bonds for Increase in Contract Price*.** If the Contract Price increases during construction by five percent or more over the original Contract Price, Contractor must provide supplemental or replacement bonds within ten days of written notice from City pursuant to this Section, covering 100% of the increased Contract Price and using the bond forms included with the Contract Documents.

4.2 Indemnity. To the fullest extent permitted by law, Contractor must indemnify, defend, and hold harmless City, its Council, officers, officials, employees, agents, volunteers, and consultants (individually, an "Indemnitee," and collectively the "Indemnitees") from and against any and all liability, loss, damage, claims, causes of action, demands, charges, fines, costs, and expenses (including, without limitation, attorney fees, expert witness fees, paralegal fees, and fees and costs of litigation or arbitration) (collectively, "Liability") of every nature arising out of or in connection with the acts or omissions of Contractor, its employees, Subcontractors, representatives, or agents, in bidding or performing the Work or in failing to comply with any obligation of Contractor under the Contract, except such Liability caused by the active negligence, sole negligence, or willful misconduct of an Indemnitee. This indemnity requirement applies to any Liability arising from alleged defects in the content or manner of submission of Contractor's bid for the Contract. Contractor's failure or refusal to timely accept a tender of defense pursuant to this Contract will be deemed a material breach of the Contract. City will timely notify Contractor upon receipt of any third-party claim relating to the Contract, as required by Public Contract Code § 9201. Contractor waives any right to express or implied indemnity against any Indemnitee. Contractor's indemnity obligations under this Contract will survive the expiration or any early termination of the Contract.

4.3 Insurance. No later than ten days following issuance of the Notice of Potential Award, Contractor must procure and provide proof of the insurance coverage required by this Section in the form of certificates and endorsements acceptable to City. The required insurance must cover the activities of Contractor and its Subcontractors relating to or arising from the performance of the Work, and must remain in full force and effect at all times during the period covered by the Contract, through the date of City's acceptance of the Project. All required insurance must be issued by a company licensed to do business in the State of California, and each such insurer must have an A.M. Best's financial strength rating of "A" or better and a financial size rating of "VIII" or better. If Contractor fails to provide any of the required coverage in full compliance with the requirements of the Contract Documents, City may, at its sole discretion, purchase such coverage at Contractor's expense and deduct the cost from payments due to Contractor, or terminate the Contract for default. The procurement of the required insurance will not be construed to limit Contractor's liability under this Contract or to fulfill Contractor's indemnification obligations under this Contract.

(A) ***Policies and Limits.*** The following insurance policies and limits are required for this Contract, unless otherwise specified in the Special Conditions:

(1) *Commercial General Liability ("CGL") Insurance:* The CGL insurance policy must be issued on an occurrence basis, written on a comprehensive general

liability form, and must include coverage for liability arising from Contractor's or its Subcontractor's acts or omissions in the performance of the Work, including contractor's protected coverage, contractual liability, products and completed operations, and broad form property damage, with limits of at least $2,000,000 per occurrence and at least $4,000,000 general aggregate. The CGL insurance coverage may be arranged under a single policy for the full limits required or by a combination of underlying policies with the balance provided by excess or umbrella policies, provided each such policy complies with the requirements set forth in this Section, including required endorsements.

(2) *Automobile Liability Insurance:* The automobile liability insurance policy must provide coverage of at least $2,000,000 combined single-limit per accident for bodily injury, death, or property damage, including hired and non-owned auto liability.

(3) *Workers' Compensation Insurance and Employer's Liability:* The workers' compensation and employer's liability insurance policy must comply with the requirements of the California Labor Code, providing coverage of at least $1,000,000 or as otherwise required by the statute. If Contractor is self-insured, Contractor must provide its Certificate of Permission to Self-Insure, duly authorized by the DIR.

(4) *Pollution Liability Insurance:* The pollution liability insurance policy must be issued on an occurrence basis, providing coverage of at least $2,000,000 for all loss arising out of claims for bodily injury, death, property damage, or environmental damage caused by pollution conditions resulting from the Work.

(5) *Builder's Risk Insurance:* The builder's risk insurance policy must be issued on an occurrence basis, for all-risk or "all perils" coverage on a 100% completed value basis on the insurable portion of the Project for the benefit of City.

(B) ***Notice.*** Each certificate of insurance must state that the coverage afforded by the policy or policies will not be reduced, cancelled or allowed to expire without at least 30 days written notice to City, unless due to non-payment of premiums, in which case ten days written notice must be made to City.

(C) ***Waiver of Subrogation.*** Each required policy must include an endorsement providing that the carrier will waive any right of subrogation it may have against City.

(D) ***Required Endorsements.*** The CGL policy, automobile liability policy, pollution liability policy, and builder's risk policy must include the following specific endorsements:

(1) The City, including its Council, officials, officers, employees, agents, volunteers and consultants (collectively, "Additional Insured") must be named as an additional insured for all liability arising out of the operations by or on behalf of the named insured, and the policy must protect the Additional Insured against any and all liability for personal injury, death or property damage or destruction arising directly or indirectly in the performance of the Contract. The additional insured endorsement must be provided using ISO form CG 20 10 11 85 or an equivalent form approved by the City.

(2) The inclusion of more than one insured will not operate to impair the rights of one insured against another, and the coverages afforded will apply as though separate policies have been issued to each insured.

(3) The insurance provided by Contractor is primary and no insurance held or owned by any Additional Insured may be called upon to contribute to a loss.

(4) This policy does not exclude explosion, collapse, underground excavation hazard, or removal of lateral support.

(E) ***Contractor's Responsibilities.*** This Section 4.3 establishes the minimum requirements for Contractor's insurance coverage in relation to this Project, but is not intended to limit Contractor's ability to procure additional or greater coverage. Contractor is responsible for its own risk assessment and needs and is encouraged to consult its insurance provider to determine what coverage it may wish to carry beyond the minimum requirements of this Section. Contractor is solely responsible for the cost of its insurance coverage, including premium payments, deductibles, or self-insured retentions, and no Additional Insured will be responsible or liable for any of the cost of Contractor's insurance coverage.

(F) ***Deductibles and Self-Insured Retentions***. Any deductibles or self-insured retentions that apply to the required insurance (collectively, "deductibles") in excess of $100,000 are subject to approval by the City's Risk Manager, acting in his or her sole discretion, and must be declared by Contractor when it submits its certificates of insurance and endorsements pursuant to this Section 4.3. If the City's Risk Manager determines that the deductibles are unacceptably high, at City's option, Contractor must either reduce or eliminate the deductibles as they apply to City and all required Additional Insured; or must provide a financial guarantee, to City's satisfaction, guaranteeing payment of losses and related investigation, claim administration, and legal expenses.

(G) ***Subcontractors.*** Contractor must ensure that each Subcontractor is required to maintain the same insurance coverage required under this Section 4.3, with respect to its performance of Work on the Project, including those requirements related to the Additional Insureds and waiver of subrogation, but excluding pollution liability or builder's risk insurance unless otherwise specified in the Special Conditions. A Subcontractor may be eligible for reduced insurance coverage or limits, but only to the extent approved in writing in advance by the City's Risk Manager. Contractor must confirm that each Subcontractor has complied with these insurance requirements before the Subcontractor is permitted to begin Work on the Project. Upon request by the City, Contractor must provide certificates and endorsements submitted by each Subcontractor to prove compliance with this requirement. The insurance requirements for Subcontractors do not replace or limit the Contractor's insurance obligations.

Article 5 - Contract Time

5.1 Time is of the Essence. Time is of the essence in Contractor's performance and completion of the Work, and Contractor must diligently prosecute the Work and complete it within the Contract Time.

(A) ***General.*** Contractor must commence the Work on the date indicated in the Notice to Proceed and must fully complete the Work in strict compliance with all requirements of the Contract Documents and within the Contract Time. Contractor may not begin performing the Work before the date specified in the Notice to Proceed.

(B) ***Authorization.*** Contractor is not entitled to compensation or credit for any Work performed before the date specified in the Notice to Proceed, with the exception of any schedules, submittals, or other requirements, if any, that must be provided or performed before issuance of the Notice to Proceed.

(C) ***Rate of Progress.*** Contractor and its Subcontractors must, at all times, provide workers, materials, and equipment sufficient to maintain the rate of progress necessary to ensure full completion of the Work within the Contract Time. If City determines that Contractor is failing to prosecute the Work at a sufficient rate of progress, City may, in its sole discretion, direct Contractor to provide additional workers, materials, or equipment, or to work additional hours or days without additional cost to City, in order to achieve a rate of progress satisfactory to City. If Contractor fails to comply with City's directive in this regard, City may, at Contractor's expense, separately contract for additional workers, materials, or equipment or use City's own forces to achieve the necessary rate of progress. Alternatively, City may terminate the Contract based on Contractor's default.

5.2 Schedule Requirements. Contractor must prepare all schedules using standard, commercial scheduling software acceptable to the Engineer, and must provide the schedules in electronic and paper form as requested by the Engineer. In addition to the general scheduling requirements set forth below, Contractor must also comply with any scheduling requirements included in the Special Conditions or in the Technical Specifications.

(A) ***Baseline (As-Planned) Schedule.*** Within ten calendar days following City's issuance of the Notice to Proceed (or as otherwise specified in the Notice to Proceed), Contractor must submit to City for review and acceptance a baseline (as-planned) schedule using critical path methodology showing in detail how Contractor plans to perform and fully complete the Work within the Contract Time, including labor, equipment, materials and fabricated items. The baseline schedule must show the order of the major items of Work and the dates of start and completion of each item, including when the materials and equipment will be procured. The schedule must also include the work of all trades, reflecting anticipated labor or crew hours and equipment loading for the construction activities, and must be sufficiently comprehensive and detailed to enable progress to be monitored on a day-by-day basis. For each activity, the baseline schedule must be dated, provided in the format specified in the Contract Documents or as required by City, and must include, at a minimum, a description of the activity, the start and completion dates of the activity, and the duration of the activity.

(1) *Specialized Materials Ordering*. Within five calendar days following issuance of the Notice to Proceed, Contractor must order any specialized material or equipment for the Work that is not readily available from material suppliers. Contractor must also retain documentation of the purchase order date(s).

(B) ***City's Review of Schedules.*** City will review and may note exceptions to the baseline schedule, and to the progress schedules submitted as required below, to assure completion of the Work within the Contract Time. Contractor is solely responsible for resolving any exceptions noted in a schedule and, within seven days, must correct the schedule to address the exceptions. City's review or acceptance of Contractor's schedules will not operate to waive or limit Contractor's duty to complete the Project within the Contract Time, nor to waive or limit City's right to assess liquidated damages for Contractor's unexcused failure to do so.

(C) ***Progress Schedules.*** After City accepts the final baseline schedule with no exceptions, Contractor must submit an updated progress schedule and three-week look-ahead schedule, in the format specified by City, for review and acceptance with each application for a progress payment, or when otherwise specified by City, until completion of the Work. The updated progress schedule must: show how the actual progress of the Work as constructed to date compares to the baseline schedule; reflect any proposed changes in the construction schedule or method of operations, including to achieve Project milestones within the Contract Time; and identify any actual or potential impacts

to the critical path. Contractor must also submit periodic reports to City of any changes in the projected material or equipment delivery dates for the Project.

(1) *Float*. The progress schedule must show early and late completion dates for each task. The number of days between those dates will be designated as the "float." Any float belongs to the Project and may be allocated by the Engineer to best serve timely completion of the Project.

(2) *Failure to Submit Schedule*. Reliable, up-to-date schedules are essential to efficient and cost-effective administration of the Project and timely completion. If Contractor fails to submit a schedule within the time periods specified in this Section, or submits a schedule to which City has noted exceptions that are not corrected, City may withhold up to ten percent from payment(s) otherwise due to Contractor until the exceptions are resolved, the schedule is corrected and resubmitted, and City has accepted the schedule. In addition, Contractor's failure to comply with the schedule requirements in this Section 5.2 will be deemed a material default and a waiver of any claims for Excusable Delay or loss of productivity arising during any period when Contractor is out of compliance, subject only to the limits of Public Contract Code § 7102.

(D) ***Recovery Schedule.*** If City determines that the Work is more than one week behind schedule, within seven days following written notice of such determination, Contractor must submit a recovery schedule, showing how Contractor intends to perform and complete the Work within the Contract Time, based on actual progress to date.

(E) ***Effect of Acceptance.*** Contractor and its Subcontractors must perform the Work in accordance with the most current City-accepted schedule unless otherwise directed by City. City's acceptance of a schedule does not operate to extend the time for completion of the Work or any component of the Work, and will not affect City's right to assess liquidated damages for Contractor's unexcused delay in completing the Work within the Contract Time.

(F) ***Posting.*** Contractor must at all times prominently post a copy of the most current City-accepted progress or recovery schedule in its on-site office.

(G) ***Reservation of Rights.*** City reserves the right to direct the sequence in which the Work must be performed or to make changes in the sequence of the Work in order to facilitate the performance of work by City or others, or to facilitate City's use of its property. The Contract Time or Contract Price may be adjusted to the extent such changes in sequence actually increase or decrease Contractor's time or cost to perform the Work.

(H) ***Authorized Working Days and Times.*** Contractor is limited to working Monday through Friday, excluding holidays, during City's normal business hours, except as provided in the Special Conditions or as authorized in writing by City. City reserves the right to charge Contractor for additional costs incurred by City due to Work performed on days or during hours not expressly authorized in the Contract Documents, including reimbursement of costs incurred for inspection, testing, and construction management services.

5.3 Delay and Extensions of Contract Time.

(A) ***Notice of Delay.*** If Contractor becomes aware of any actual or potential delay affecting the critical path, Contractor must promptly notify the Engineer in writing, regardless of the nature or cause of the delay, so that City has a reasonable opportunity to mitigate or avoid the delay.

(B) ***Excusable Delay.*** The Contract Time may be extended if Contractor encounters "Excusable Delay," which is an unavoidable delay in completing the Work within the Contract Time due to causes completely beyond Contractor's control, and which Contractor could not have avoided or mitigated through reasonable care, planning, foresight, and diligence, provided that Contractor is otherwise fully performing its obligations under the Contract Documents. Grounds for Excusable Delay may include fire, natural disasters including earthquake or unusually severe weather, acts of terror or vandalism, epidemic, unforeseeable adverse government actions, unforeseeable actions of third parties, encountering unforeseeable hazardous materials, unforeseeable site conditions, or suspension for convenience under Article 13. The Contract Time will not be extended based on circumstances which will not unavoidably delay completing the Work within the Contract Time based on critical path analysis.

(C) ***Weather Delays.*** A "Weather Delay Day" is a Working Day during which Contractor and its forces, including Subcontractors, are unable to perform more than 40% of the critical path Work scheduled for that day due to adverse weather conditions which impair the ability to safely or effectively perform the scheduled critical path Work that day. Adverse weather conditions may include rain, saturated soil, and Project site clean-up required due to adverse weather. Determination of what constitutes critical path Work scheduled for that day will be based on the most current, City-approved schedule. Contractor will be entitled to a non-compensable extension of the Contract Time for each Weather Delay Day in excess of the normal Weather Delay Days within a given month as determined by reliable records, including monthly rainfall averages, for the preceding ten years (or as otherwise specified in the Special Conditions or Specifications).

(1) Contractor must fully comply with the applicable procedures in Articles 5 and 6 of the General Conditions regarding requests to modify the Contract Time.

(2) Contractor will not be entitled to an extension of time for a Weather Delay Day to the extent Contractor is responsible for concurrent delay on that day.

(3) Contractor must take reasonable steps to mitigate the consequences of Weather Delay Days, including prudent workforce management and protecting the Work, Project Site, materials, and equipment.

(D) ***Non-Excusable Delay.*** Delay which Contractor could have avoided or mitigated through reasonable care, planning, foresight and diligence is "Non-Excusable Delay." Contractor is not entitled to an extension of Contract Time or any compensation for Non-Excusable Delay, or for Excusable Delay that is concurrent with Non-Excusable Delay. Non-Excusable Delay includes delay caused by:

(1) weather conditions which are normal for the location of the Project, as determined by reliable records, including monthly rainfall averages, for the preceding ten years;

(2) Contractor's failure to order equipment and materials sufficiently in advance of the time needed for completion of the Work within the Contract Time;

(3) Contractor's failure to provide adequate notification to utility companies or agencies for connections or services necessary for completion of the Work within the Contract Time;

(4) foreseeable conditions which Contractor could have ascertained from reasonably diligent inspection of the Project site or review of the Contract Documents or other information provided or available to Contractor;

(5) Contractor's failure, refusal, or financial inability to perform the Work within the Contract Time, including insufficient funds to pay its Subcontractors or suppliers;

(6) performance or non-performance by Contractor's Subcontractors or suppliers;

(7) the time required to respond to excessive RFIs (see Section 2.5(G));

(8) delayed submission of required submittals, or the time required for correction and resubmission of defective submittals;

(9) time required for repair of, re-testing, or re-inspection of defective Work;

(10) enforcement of Laws by City, or outside agencies with jurisdiction over the Work; or

(11) City's exercise or enforcement of any of its rights or Contractor's duties pursuant to the Contract Documents, including correction of defective Work, extra inspections or testing due to non-compliance with Contract requirements, safety compliance, environmental compliance, or rejection and return of defective or deficient submittals.

(E) ***Compensable Delay.*** Pursuant to Public Contract Code § 7102, in addition to entitlement to an extension of Contract Time, Contractor is entitled to compensation for costs incurred due to delay caused solely by City, when that delay is unreasonable under the circumstances involved and not within the contemplation of the parties ("Compensable Delay"). Contractor is not entitled to an extension of Contract Time or recovery of costs for Compensable Delay that is concurrent with Non-Excusable Delay. Delay due to causes that are beyond the control of either City or Contractor, including Weather Delay Days, discovery of Historic or Archeological Items pursuant to Section 7.18, or the actions or inactions of third parties or other agencies, is not Compensable Delay, and will only entitle Contractor to an extension of time commensurate with the time lost due to such delay.

(F) ***Recoverable Costs.*** Contractor is not entitled to compensation for Excusable Delay unless it is Compensable Delay, as defined above. Contractor is entitled to recover only the actual, direct, reasonable, and substantiated costs ("Recoverable Costs") for each working day that the Compensable Delay prevents Contractor from proceeding with more than 50% of the critical path Work scheduled for that day, based on the most recent progress schedule accepted by City. Recoverable Costs will not include home office overhead or lost profit.

(G) ***Request for Extension of Contract Time or Recoverable Costs.*** A request for an extension of Contract Time or any associated Recoverable Costs must be submitted in writing to City within ten calendar days of the date the delay is first encountered, even if the duration of the delay is not yet known at that time, or any entitlement to the Contract Time extension or to the Recoverable Costs will be deemed waived. In addition to complying with the requirements of this Article 5, the request must be submitted in compliance with the Change Order request procedures in Article 6 below. Strict compliance with these requirements is necessary to ensure that any delay or consequences of delay may be mitigated as soon as possible, and to facilitate cost-

efficient administration of the Project and timely performance of the Work. Any request for an extension of Contract Time or Recoverable Costs that does not strictly comply with all of the requirements of Article 5 and Article 6 will be deemed waived.

(1) *Required Contents.* The request must include a detailed description of the cause(s) of the delay and must also describe the measures that Contractor has taken to mitigate the delay and/or its effects, including efforts to mitigate the cost impact of the delay, such as by workforce management or by a change in sequencing. If the delay is still ongoing at the time the request is submitted, the request should also include Contractor's plan for continued mitigation of the delay or its effects.

(2) *Delay Days and Costs.* The request must specify the number of days of Excusable Delay claimed or provide a realistic estimate if the duration of the delay is not yet known. If Contractor believes it is entitled to Recoverable Costs for Compensable Delay, the request must specify the amount and basis for the Recoverable Costs that are claimed or provide a realistic estimate if the amount is not yet known. Any estimate of delay duration or cost must be updated in writing and submitted with all required supporting documentation as soon as the actual time and cost is known. The maximum extension of Contract Time will be the number of days, if any, by which an Excusable Delay or a Compensable Delay exceeds any concurrent Non-Excusable Delay. Contractor is entitled to an extension of Contract Time, or compensation for Recoverable Costs, only if, and only to the extent that, such delay will unavoidably delay Final Completion.

(3) *Supporting Documentation.* The request must also include any and all supporting documentation necessary to evidence the delay and its actual impacts, including scheduling and cost impacts with a time impact analysis using critical path methodology and demonstrating the unavoidable delay to Final Completion. The time impact analysis must be submitted in a form or format acceptable to City.

(4) *Burden of Proof.* Contractor has the burden of proving that: the delay was an Excusable or Compensable Delay, as defined above; Contractor has fully complied with its scheduling obligations in Section 5.2, Schedule Requirements; Contractor has made reasonable efforts to mitigate the delay and its schedule and cost impacts; the delay will unavoidably result in delaying Final Completion; and any Recoverable Costs claimed by Contractor were actually incurred and were reasonable under the circumstances.

(5) *Legal Compliance.* Nothing in this Section 5.3 is intended to require the waiver, alteration, or limitation of the applicability of Public Contract Code § 7102.

(6) *No Waiver.* Any grant of an extension of Contract Time, or compensation for Recoverable Costs due to Compensable Delay, will not operate as a waiver of City's right to assess liquidated damages for Non-Excusable Delay.

(7) *Dispute Resolution.* In the event of a dispute over entitlement to an extension of Contract Time or compensation for Recoverable Costs, Contractor may not stop Work pending resolution of the dispute, but must continue to comply with its duty to diligently prosecute the performance and timely completion of the Work. Contractor's sole recourse for an unresolved dispute based on City's rejection of a Change Order request for an extension of Contract Time or compensation for Recoverable Costs is to comply with the dispute resolution provisions set forth in Article 12 below.

5.4 Liquidated Damages. It is expressly understood that if Final Completion is not achieved within the Contract Time, City will suffer damages from the delay that are difficult to determine and accurately specify. Pursuant to Public Contract Code § 7203, if Contractor fails to achieve Final Completion within the Contract Time due to Contractor's Non-Excusable Delay, City will charge Contractor in the amount specified in the Contract for each calendar day that Final Completion is delayed beyond the Contract Time, as liquidated damages and not as a penalty. Any waiver of accrued liquidated damages, in whole or in part, is subject to approval of the City Council or its authorized delegee.

(A) ***Liquidated Damages.*** Liquidated damages will not be assessed for any Excusable or Compensable Delay, as set forth above.

(B) ***Milestones.*** Liquidated damages may also be separately assessed for failure to meet milestones specified elsewhere in the Contract Documents.

(C) ***Setoff.*** City is entitled to deduct the amount of liquidated damages assessed against any payments otherwise due to Contractor, including progress payments, Final Payment, or unreleased retention. If there are insufficient Contract funds remaining to cover the full amount of liquidated damages assessed, City is entitled to recover the balance from Contractor or its performance bond surety.

(D) ***Occupancy or Use.*** Occupancy or use of the Project in whole or in part prior to Final Completion does not constitute City's acceptance of the Project and will not operate as a waiver of City's right to assess liquidated damages for Contractor's Non-Excusable Delay in achieving Final Completion.

(E) ***Other Remedies.*** City's right to liquidated damages under this Section applies only to damages arising from Contractor's Non-Excusable Delay or failure to complete the Work within the Contract Time. City retains its right to pursue all other remedies under the Contract for other types of damage, including damage to property or persons, costs or diminution in value from defective materials or workmanship, costs to repair or complete the Work, or other liability caused by Contractor.

Article 6 - Contract Modification

6.1 Contract Modification. Subject to the limited exception set forth in subsection (D) below, any change in the Work or the Contract Documents, including the Contract Price or Contract Time, will not be a valid and binding change to the Contract unless it is formalized in a Change Order, including a "no-cost" Change Order or a unilateral Change Order. Changes in the Work pursuant to this Article 6 will not operate to release, limit, or abridge Contractor's warranty obligations pursuant to Article 11 or any obligations of Contractor's bond sureties.

(A) ***City-Directed Changes.*** City may direct changes in the scope or sequence of Work or the requirements of the Contract Documents, without invalidating the Contract. Such changes may include Extra Work as set forth in subsection (C) below, or deletion or modification of portions of the Work. Contractor must promptly comply with City-directed changes in the Work in accordance with the original Contract Documents, even if Contractor and City have not yet reached agreement as to adjustments to the Contract Price or Contract Time for the change in the Work or for the Extra Work. Contractor is not entitled to extra compensation for cost savings resulting from "value engineering" pursuant to Public Contract Code § 7101, except to the extent authorized in advance by City in writing, and subject to any applicable procedural requirements for submitting a proposal for value engineering cost savings.

(B) ***Disputes.*** In the event of a dispute over entitlement to or the amount of a change in Contract Time or a change in Contract Price related to a City-directed change in the Work, Contractor must perform the Work as directed and may not delay its Work or cease Work pending resolution of the dispute, but must continue to comply with its duty to diligently prosecute the performance and timely completion of the Work, including the Work in dispute. Likewise, in the event that City and Contractor dispute whether a portion or portions of the Work are already required by the Contract Documents or constitute Extra Work, or otherwise dispute the interpretation of any portion(s) of the Contract Documents, Contractor must perform the Work as directed and may not delay its Work or cease Work pending resolution of the dispute, but must continue to comply with its duty to diligently prosecute the performance and timely completion of the Work, including the Work in dispute, as directed by City. If Contractor refuses to perform the Work in dispute, City may, acting in its sole discretion, elect to delete the Work from the Contract and reduce the Contract Price accordingly, and self-perform the Work or direct that the Work be performed by others. Alternatively, City may elect to terminate the Contract for convenience or for cause. Contractor's sole recourse for an unresolved dispute related to changes in the Work or performance of any Extra Work is to comply with the dispute resolution provisions set forth in Article 12, below.

(C) ***Extra Work.*** City may direct Contractor to perform Extra Work related to the Project. Contractor must promptly perform any Extra Work as directed or authorized by City in accordance with the original Contract Documents, even if Contractor and City have not yet reached agreement on adjustments to the Contract Price or Contract Time for such Extra Work. If Contractor believes it is necessary to perform Extra Work due to changed conditions, Contractor must promptly notify the Engineer in writing, specifically identifying the Extra Work and the reason(s) the Contractor believes it is Extra Work. This notification requirement does not constitute a Change Order request pursuant to Section 6.2, below. Contractor must maintain detailed daily records that itemize the cost of each element of Extra Work, and sufficiently distinguish the direct cost of the Extra Work from the cost of other Work performed. For each day that Contractor performs Extra Work, or Work that Contractor contends is Extra Work, Contractor must submit no later than the following Working Day, a daily report of the Extra Work performed that day and the related costs, together with copies of certified payroll, invoices, and other documentation substantiating the costs ("Extra Work Report"). The Engineer will make any adjustments to Contractor's Extra Work Report(s) based on the Engineer's records of the Work. When an Extra Work Report(s) is agreed on and signed by both City and Contractor, the Extra Work Report(s) will become the basis for payment under a duly authorized and signed Change Order. Failure to submit the required documentation by close of business on the next Working Day is deemed a full and complete waiver for any change in the Contract Price or Contract Time for any Extra Work performed that day.

(D) ***Minor Changes and RFIs.*** Minor field changes, including RFI replies from City, that do not affect the Contract Price or Contract Time and that are approved by the Engineer acting within his or her scope of authority, do not require a Change Order. By executing an RFI reply from City, Contractor agrees that it will perform the Work as clarified therein, with no change to the Contract Price or Contract Time.

(E) ***Remedy for Non-Compliance.*** Contractor's failure to promptly comply with a City-directed change is deemed a material breach of the Contract, and in addition to all other remedies available to it, City may, at its sole discretion, hire another contractor or use its own forces to complete the disputed Work at Contractor's sole expense, and may deduct the cost from the Contract Price.

6.2 Contractor Change Order Requests. Contractor must submit a request or proposal for a change in the Work, compensation for Extra Work, or a change in the Contract Price or Contract Time as a written Change Order request or proposal.

(A) ***Time for Submission.*** Any request for a change in the Contract Price or the Contract Time must be submitted in writing to the Engineer within ten calendar days of the date that Contractor first encounters the circumstances, information or conditions giving rise to the Change Order request, even if the total amount of the requested change in the Contract Price or impact on the Contract Time is not yet known at that time. If City requests that Contractor propose the terms of a Change Order, unless otherwise specified in City's request, Contractor must provide the Engineer with a written proposal for the change in the Contract Price or Contract Time within five working days of receiving City's request, in a form satisfactory to the Engineer.

(B) ***Required Contents.*** Any Change Order request or proposal submitted by Contractor must include a complete breakdown of actual or estimated costs and credits, and must itemize labor, materials, equipment, taxes, insurance, subcontract amounts, and, if applicable, Extra Work Reports. Any estimated cost must be updated in writing as soon as the actual amount is known.

(C) ***Required Documentation.*** All claimed costs must be fully documented, and any related request for an extension of time or delay-related costs must be included at that time and in compliance with the requirements of Article 5 of the General Conditions. Upon request, Contractor must permit City to inspect its original and unaltered bidding records, subcontract agreements, subcontract change orders, purchase orders, invoices, or receipts associated with the claimed costs.

(D) ***Required Form.*** Contractor must use City's form(s) for submitting all Change Order requests or proposals, unless otherwise specified by City.

(E) ***Certification.*** All Change Order requests must be signed by Contractor and must include the following certification:

> "The undersigned Contractor certifies under penalty of perjury that its statements and representations in this Change Order request are true and correct. Contractor warrants that this Change Order request is comprehensive and complete as to the Work or changes referenced herein, and agrees that any known or foreseeable costs, expenses, or time extension requests not included herein, are deemed waived."

6.3 Adjustments to Contract Price. The amount of any increase or decrease in the Contract Price will be determined based on one of the following methods listed below, in the order listed with unit pricing taking precedence over the other methods. Markup applies only to City-authorized time and material Work, and does not apply to any other payments to Contractor. For Work items or components that are deleted in their entirety, Contractor will only be entitled to compensation for those direct, actual, and documented costs (including restocking fees), reasonably incurred before Contractor was notified of the City's intent to delete the Work, with no markup for overhead, profit, or other indirect costs.

(A) ***Unit Pricing.*** Amounts previously provided by Contractor in the form of unit prices, either in a bid schedule or in a post-award schedule of values pursuant to Section 8.1, Schedule of Values, will apply to determine the price for the affected Work, to the extent applicable unit prices have been provided for that type of Work. No additional markup for overhead, profit, or other indirect costs will be added to the calculation.

(B) ***Lump Sum.*** A mutually agreed upon, all-inclusive lump sum price for the affected Work with no additional markup for overhead, profit, or other indirect costs.

(C) ***Time and Materials.*** On a time and materials basis, if and only to the extent compensation on a time and materials basis is expressly authorized by City in advance of Contractor's performance of the Work and subject to any not-to-exceed limit. Time and materials compensation for increased costs or Extra Work (but not decreased costs or deleted Work), will include allowed markup for overhead, profit, and other indirect costs, calculated as the total of the following sums, the cumulative total of which may not exceed the maximum markup rate of 15%:

(1) All direct labor costs provided by the Contractor, excluding superintendence, project management, or administrative costs, plus 15% markup;

(2) All direct material costs provided by the Contractor, including sales tax, plus 15% markup;

(3) All direct plant and equipment rental costs provided by the Contractor, plus 15% markup;

(4) All direct additional subcontract costs plus 10% markup for Work performed by Subcontractors; and

(5) Increased bond or insurance premium costs computed at 1.5% of total of the previous four sums.

6.4 Unilateral Change Order. If the parties dispute the terms of a proposed Change Order, including disputes over the amount of compensation or extension of time that Contractor has requested, the value of deleted or changed Work, what constitutes Extra Work, or quantities used, City may elect to issue a unilateral Change Order, directing performance of the Work, and authorizing a change in the Contract Price or Contract Time for the adjustment to compensation or time that the City believes is merited. Contractor's sole recourse to dispute the terms of a unilateral Change Order is to submit a timely Claim pursuant to Article 12, below.

6.5 Non-Compliance Deemed Waiver. Contractor waives its entitlement to any increase in the Contract Price or Contract Time if Contractor fails to fully comply with the provisions of this Article. Contractor will not be paid for unauthorized Extra Work.

Article 7 - General Construction Provisions

7.1 Permits, Fees, Business License, and Taxes.

(A) ***Permits, Fees, and City Business License.*** Contractor must obtain and pay for all permits, fees, or licenses required to perform the Work, including a City business license. Contractor must cooperate with and provide notifications to all government agencies with jurisdiction over the Project, as may be required. Contractor must provide City with copies of all records of permits and permit applications, payment of required fees, and any licenses required for the Work.

(B) ***Taxes.*** Contractor must pay for all taxes on labor, material and equipment, except Federal Excise Tax to the extent that City is exempt from Federal Excise Tax.

7.2 Temporary Facilities. Contractor must provide, at Contractor's sole expense, any and all temporary facilities for the Project, including an onsite staging area for materials and equipment, a field office, sanitary facilities, utilities, storage, scaffolds, barricades, walkways, and any other temporary structure required to safely perform the Work along with any incidental utility services. The location of all temporary facilities must be

approved by the City prior to installation. Temporary facilities must be safe and adequate for the intended use and installed and maintained in accordance with Laws and the Contract Documents. Contractor must fence and screen the Project site and, if applicable, any separate Worksites, including the staging area, and its operation must minimize inconvenience to neighboring properties. Additional provisions pertaining to temporary facilities may be included in the Specifications or Special Conditions.

(A) ***Utilities.*** Contractor must install and maintain the power, water, sewer and all other utilities required for the Project site, including the piping, wiring, internet and wifi connections, and any related equipment necessary to maintain the temporary facilities.

(B) ***Removal and Repair.*** Contractor must promptly remove all such temporary facilities when they are no longer needed or upon completion of the Work, whichever comes first. Contractor must promptly repair any damage to City's property or to other property caused by the installation, use, or removal of the temporary facilities, and must promptly restore the property to its original or intended condition.

7.3 Noninterference and Site Management. Contractor must avoid interfering with City's use of its property at or adjacent to the Project site, including use of roadways, entrances, parking areas, walkways, and structures. Contractor must also minimize disruption of access to private property in the Project vicinity. Contractor must coordinate with affected property owners, tenants, and businesses, and maintain some vehicle and pedestrian access to their residences or properties at all times. Temporary access ramps, fencing or other measures must be provided as needed. Before blocking access to a private driveway or parking lot, Contractor must provide effective notice to the affected parties at least 48 hours in advance of the pending closure and allow them to remove vehicles. Private driveways, residences and parking lots must have access to a roadway during non-Work hours.

(A) ***Offsite Acquisition.*** Unless otherwise provided by City, Contractor must acquire, use and dispose of, at its sole expense, any Worksites, licenses, easements, and temporary facilities necessary to access and perform the Work.

(B) ***Offsite Staging Area and Field Office*****.** If additional space beyond the Project site is needed, such as for the staging area or the field office, Contractor may need to make arrangements with the nearby property owner(s) to secure the space. Before using or occupying any property owned by a third party, Contractor must provide City with a copy of the necessary license agreement, easement, or other written authorization from the property owner, together with a written release from the property owner holding City harmless from any related liability, in a form acceptable to the City Attorney.

(C) ***Traffic Management.*** Contractor must provide traffic management and traffic controls as specified in the Contract Documents, as required by Laws, and as otherwise required to ensure public and worker safety, and to avoid interference with public or private operations or the normal flow of vehicular, bicycle, or pedestrian traffic.

7.4 Signs. No signs may be displayed on or about City's property, except signage which is required by Laws or by the Contract Documents, without City's prior written approval as to size, design, and location.

7.5 Project Site and Nearby Property Protections.

(A) ***General.*** Contractor is responsible at all times, on a 24-hour basis and at its sole cost, for protecting the Work, the Project site, and the materials and equipment to be incorporated into the Work, until the City has accepted the Project, excluding any exceptions to acceptance, if any. Except as specifically authorized by City, Contractor

must confine its operations to the area of the Project site indicated in the Plans and Specifications. Contractor is liable for any damage caused by Contractor or its Subcontractors to the Work, City's property, the property of adjacent or nearby property owners and the work or personal property of other contractors working for City, including damage related to Contractor's failure to adequately secure the Work or any Worksite.

(1) Subject to City's approval, Contractor will provide and install safeguards to protect the Work; any Worksite, including the Project site; City's real or personal property and the real or personal property of adjacent or nearby property owners, including plant and tree protections.

(2) City wastewater systems may not be interrupted. If the Work disrupts existing sewer facilities, Contractor must immediately notify City and establish a plan, subject to City's approval, to convey the sewage in closed conduits back into the sanitary sewer system. Sewage must not be permitted to flow in trenches or be covered by backfill.

(3) Contractor must remove with due care, and store at City's request, any objects or material from the Project site that City will salvage or reuse at another location.

(4) If directed by Engineer, Contractor must promptly repair or replace any property damage, as specified by the Engineer. However, acting in its sole discretion, City may elect to have the property damage remedied otherwise, and may deduct the cost to repair or replace the damaged property from payment otherwise due to Contractor.

(5) Contractor will not permit any structure or infrastructure to be loaded in a manner that will damage or endanger the integrity of the structure or infrastructure.

(B) ***Securing Project Site.*** After completion of Work each day, Contractor must secure the Project site and, to the extent feasible, make the area reasonably accessible to the public unless City approves otherwise. All excess materials and equipment not protected by approved traffic control devices must be relocated to the staging area or demobilized. Trench spoils must be hauled off the Project site daily and open excavations must be protected with steel plates. Contractor and Subcontractor personnel may not occupy or use the Project site for any purpose during non-Work hours, except as may be provided in the Contract Documents or pursuant to prior written authorization from City.

(C) ***Unforeseen Conditions.*** If Contractor encounters facilities, utilities, or other unknown conditions not shown on or reasonably inferable from the Plans or apparent from inspection of the Project site, Contractor must immediately notify the City and promptly submit a Request for Information to obtain further directions from the Engineer. Contractor must avoid taking any action which could cause damage to the facilities or utilities pending further direction from the Engineer. The Engineer's written response will be final and binding on Contractor. If the Engineer's subsequent direction to Contractor affects Contractor's cost or time to perform the Work, Contractor may submit a Change Order request as set forth in Article 6 above.

(D) ***Support; Adjacent Properties.*** Contractor must provide, install, and maintain all shoring, bracing, and underpinning necessary to provide support to City's property and adjacent properties and improvements thereon. Contractor must provide notifications to adjacent property owners as may be required by Laws. See also, Section 7.15, Trenching of Five Feet or More.

(E) ***Notification of Property Damage.*** Contractor must immediately notify the City of damage to any real or personal property resulting from Work on the Project. Contractor must immediately provide a written report to City of any such property damage in excess of $500 (based on estimated cost to repair or replace) within 24 hours of the occurrence. The written report must include: (1) the location and nature of the damage, and the owner of the property, if known; (2) the name and address of each employee of Contractor or any Subcontractor involved in the damage; (3) a detailed description of the incident, including precise location, time, and names and contact information for known witnesses; and (4) a police or first responder report, if applicable. If Contractor is required to file an accident report with another government agency, Contractor will provide a copy of the report to City.

7.6 Materials and Equipment.

(A) ***General.*** Unless otherwise specified, all materials and equipment required for the Work must be new, free from defects, and of the best grade for the intended purpose, and furnished in sufficient quantities to ensure the proper and expeditious performance of the Work. Contractor must employ measures to preserve the specified quality and fitness of the materials and equipment. Unless otherwise specified, all materials and equipment required for the Work are deemed to include all components required for complete installation and intended operation and must be installed in accordance with the manufacturer's recommendations or instructions. Contractor is responsible for all shipping, handling, and storage costs associated with the materials and equipment required for the Work. Contractor is responsible for providing security and protecting the Work and all of the required materials, supplies, tools and equipment at Contractor's sole cost until City has formally accepted the Project as set forth in Section 11.1, Final Completion. Contractor will not assign, sell, mortgage, or hypothecate any materials or equipment for the Project, or remove any materials or equipment that have been installed or delivered.

(B) ***City-Provided.*** If the Work includes installation of materials or equipment to be provided by City, Contractor is solely responsible for the proper examination, handling, storage, and installation in accordance with the Contract Documents. Contractor must notify City of any defects discovered in City-provided materials or equipment, sufficiently in advance of scheduled use or installation to afford adequate time to procure replacement materials or equipment as needed. Contractor is solely responsible for any loss of or damage to such items which occurs while the items are in Contractor's custody and control, the cost of which may be offset from the Contract Price and deducted from any payment(s) due to Contractor.

(C) ***Intellectual Property Rights.*** Contractor must, at its sole expense, obtain any authorization or license required for use of patented or copyright-protected materials, equipment, devices or processes that are incorporated into the Work. Contractor's indemnity obligations in Article 4 apply to any claimed violation of intellectual property rights in violation of this provision.

7.7 Substitutions.

(A) ***"Or Equal."*** Any Specification designating a material, product, or thing (collectively, "item") or service by specific brand or trade name, followed by the words "or equal," is intended only to indicate the quality and type of item or service desired, and Contractor may request use of any equal item or service. Unless otherwise stated in the Specifications, any reference to a specific brand or trade name for an item or service that is used solely for the purpose of describing the type of item or service desired, will be deemed to be followed by the words "or equal." A substitution will only be approved if it is a true "equal" item or service in every aspect of design, function, and quality, as

determined by City, including dimensions, weight, maintenance requirements, durability, fit with other elements, and schedule impacts.

(B) ***Request for Substitution.*** A post-award request for substitution of an item or service must be submitted in writing to the Engineer for approval in advance, within the applicable time period provided in the Contract Documents. If no time period is specified, the substitution request may be submitted any time within 35 days after the date of award of the Contract, or sufficiently in advance of the time needed to avoid delay of the Work, whichever is earlier.

(C) ***Substantiation.*** Any available data substantiating the proposed substitute as an equal item or service must be submitted with the written request for substitution. Contractor's failure to timely provide all necessary substantiation, including any required test results as soon as they are available, is grounds for rejection of the proposed substitution, without further review.

(D) ***Burden of Proving Equality.*** Contractor has the burden of proving the equality of the proposed substitution at Contractor's sole cost. City has sole discretion to determine whether a proposed substitution is equal, and City's determination is final.

(E) ***Approval or Rejection.*** If the proposed substitution is approved, Contractor is solely responsible for any additional costs or time associated with the substituted item or service. If the proposed substitution is rejected, Contractor must, without delay, install the item or use the service as specified by City.

(F) ***Contractor's Obligations.*** City's approval of a proposed substitution will not relieve Contractor from any of its obligations under the Contract Documents. In the event Contractor makes an unauthorized substitution, Contractor will be solely responsible for all resulting cost impacts, including the cost of removal and replacement and the impact to other design elements.

7.8 Testing and Inspection.

(A) ***General.*** All materials, equipment, and workmanship used in the Work are subject to inspection and testing by City at all times and locations during construction and/or fabrication and at any Worksite, including at shops and yards as well as at the Project site. All manufacturers' application or installation instructions must be provided to the Inspector at least ten days prior to the first such application or installation. Contractor must, at all times, make the Work available for testing or inspection. Neither City's inspection or testing of Work, nor its failure to do so, operate to waive or limit Contractor's duty to complete the Work in accordance with the Contract Documents.

(B) ***Scheduling and Notification.*** Contractor must cooperate with City in coordinating the inspections and testing. Contractor must submit samples of materials, at Contractor's expense, and schedule all tests required by the Contract Documents in time to avoid any delay to the progress of the Work. Contractor must notify the Engineer no later than noon of the Working Day before any inspection or testing and must provide timely notice to the other necessary parties as specified in the Contract Documents. If Contractor schedules an inspection or test beyond regular Work hours, or on a Saturday, Sunday, or recognized City holiday, Contractor must notify the Engineer at least two Working Days in advance for approval. If approved, Contractor must reimburse City for the cost of the overtime inspection or testing. Such costs, including the City's hourly costs for required personnel, may be deducted from payments otherwise due to Contractor.

(C) ***Responsibility for Costs.*** City will bear the initial cost of inspection and testing to be performed by independent testing consultants retained by City, subject to the following exceptions:

(1) Contractor will be responsible for the costs of any subsequent tests which are required to substantiate compliance with the Contract Documents, and any associated remediation costs.

(2) Contractor will be responsible for inspection costs, at City's hourly rates, for inspection time lost because the Work is not ready or Contractor fails to appear for a scheduled inspection.

(3) If any portion of the Work that is subject to inspection or testing is covered or concealed by Contractor prior to the inspection or testing, Contractor will bear the cost of making that portion of the Work available for the inspection or testing required by the Contract Documents, and any associated repair or remediation costs.

(4) Contractor is responsible for properly shoring all compaction test sites deeper than five feet below grade, as required under Section 7.15 below.

(5) Any Work or material that is defective or fails to comply with the requirements of the Contract Documents must be promptly repaired, removed, replaced, or corrected by Contractor, at Contractor's sole expense, even if that Work or material was previously inspected or included in a progress payment.

(D) ***Contractor's Obligations.*** Contractor is solely responsible for any delay occasioned by remediation of defective or noncompliant Work or material. Inspection of the Work does not in any way relieve Contractor of its obligations to perform the Work as specified. Any Work done without the required inspection(s) will also be subject to rejection by City.

(E) ***Distant Locations.*** If required off-site testing or inspection must be conducted at a location more than 100 miles from the Project site, Contractor is solely responsible for the additional travel costs required for testing and/or inspection at such locations.

(F) ***Final Inspection.*** The provisions of this Section 7.8 also apply to final inspection under Article 11, Completion and Warranty Provisions.

7.9 Project Site Conditions and Maintenance. Contractor must at all times, on a 24-hour basis and at its sole cost, maintain the Project site and staging and storage areas in clean, neat, and sanitary condition and in compliance with all Laws pertaining to safety, air quality, and dust control. Adequate toilets must be provided, and properly maintained and serviced for all workers on the Project site, located in a suitably secluded area, subject to City's prior approval. Contractor must also, on a daily basis and at its sole cost, remove and properly dispose of the debris and waste materials from the Project site.

(A) ***Air Emissions Control*****.** Contractor must not discharge smoke or other air contaminants into the atmosphere in violation of any Laws.

(B) ***Dust and Debris*****.** Contractor must minimize and confine dust and debris resulting from the Work. Contractor must abate dust nuisance by cleaning, sweeping, and immediately sprinkling with water excavated areas of dirt or other materials prone to cause dust, and within one hour after the Engineer notifies Contractor that an airborne nuisance exists. The Engineer may direct that Contractor provide an approved water-spraying truck for this purpose. If water is used for dust control, Contractor will only use

the minimum necessary. Contractor must take all necessary steps to keep waste water out of streets, gutters, or storm drains. See Section 7.19, Environmental Control. If City determines that the dust control is not adequate, City may have the work done by others and deduct the cost from the Contract Price. Contractor will immediately remove any excess excavated material from the Project site and any dirt deposited on public streets.

(C) ***Clean up.*** Before discontinuing Work in an area, Contractor must clean the area and remove all debris and waste along with the construction equipment, tools, machinery, and surplus materials.

(1) Except as otherwise specified, all excess Project materials, and the materials removed from existing improvements on the Project site with no salvage value or intended reuse by City, will be Contractor's property.

(2) Hauling trucks and other vehicles leaving the Project site must be cleaned of exterior mud or dirt before traveling on City streets. Materials and loose debris must be delivered and loaded to prevent dropping materials or debris. Contractor must immediately remove spillage from hauling on any publicly traveled way. Streets affected by Work on the Project must be kept clean by street sweeping.

(D) ***Disposal.*** Contractor must dispose of all Project debris and waste materials in a safe and legal manner. Contractor may not burn or bury waste materials on the Project site. Contractor will not allow any dirt, refuse, excavated material, surplus concrete or mortar, or any associated washings, to be disposed of onto streets, into manholes or into the storm drain system.

(E) ***Completion.*** At the completion of the Work, Contractor must remove from the Project site all of its equipment, tools, surplus materials, waste materials and debris, presenting a clean and neat appearance. Before demobilizing from the Project site, Contractor must ensure that all surfaces are cleaned, sealed, waxed, or finished as applicable, and that all marks, stains, paint splatters, and the like have been properly removed from the completed Work and the surrounding areas. Contractor must ensure that all parts of the construction are properly joined with the previously existing and adjacent improvements and conditions. Contractor must provide all cutting, fitting and patching needed to accomplish that requirement. Contractor must also repair or replace all existing improvements that are damaged or removed during the Work, both on and off the Project site, including curbs, sidewalks, driveways, fences, signs, utilities, street surfaces and structures. Repairs and replacements must be at least equal to the previously existing improvements, and the condition, finish and dimensions must match the previously existing improvements. Contractor must restore to original condition all property or items that are not designated for alteration under the Contract Documents and leave each Worksite clean and ready for occupancy or use by City.

(F) ***Non-Compliance.*** If Contractor fails to comply with its maintenance and cleanup obligations or any City clean up order, City may, acting in its sole discretion, elect to suspend the Work until the condition(s) is corrected with no increase in the Contract Time or Contract Price, or undertake appropriate cleanup measures without further notice and deduct the cost from any amounts due or to become due to Contractor.

7.10 Instructions and Manuals. Contractor must provide to City three copies each of all instructions and manuals required by the Contract Documents, unless otherwise specified. These must be complete as to drawings, details, parts lists, performance data, and other information that may be required for City to easily maintain and service the materials and equipment installed for this Project.

(A) ***Submittal Requirements.*** All manufacturers' application or installation instructions must be provided to City at least ten days prior to the first such application. The instructions and manuals, along with any required guarantees, must be delivered to City for review.

(B) ***Training.*** Contractor or its Subcontractors must train City's personnel in the operation and maintenance of any complex equipment or systems as a condition precedent to Final Completion, if required in the Contract Documents.

7.11 As-built Drawings. Contractor and its Subcontractors must prepare and maintain at the Project site a detailed, complete and accurate as-built set of the Plans which will be used solely for the purpose of recording changes made in any portion of the original Plans in order to create accurate record drawings at the end of the Project.

(A) ***Duty to Update.*** The as-built drawings must be updated as changes occur, on a daily basis if necessary. City may withhold the estimated cost for City to have the as-built drawings prepared from payments otherwise due to Contractor, until the as-built drawings are brought up to date to the satisfaction of City. Actual locations to scale must be identified on the as-built drawings for all runs of mechanical and electrical work, including all site utilities installed underground, in walls, floors, or otherwise concealed. Deviations from the original Plans must be shown in detail. The exact location of all main runs, whether piping, conduit, ductwork or drain lines, must be shown by dimension and elevation. The location of all buried pipelines, appurtenances, or other improvements must be represented by coordinates and by the horizontal distance from visible above-ground improvements.

(B) ***Final Completion.*** Contractor must verify that all changes in the Work are depicted in the as-built drawings and must deliver the complete set of as-built drawings to the Engineer for review and acceptance as a condition precedent to Final Completion and Final Payment.

7.12 Existing Utilities.

(A) ***General.*** The Work may be performed in developed, urban areas with existing utilities, both above and below ground, including utilities identified in the Contract Documents or in other informational documents or records. Contractor must take due care to locate identified or reasonably identifiable utilities before proceeding with trenching, excavation, or any other activity that could damage or disrupt existing utilities. This may include excavation with small equipment, potholing, or hand excavation, and, if practical, using white paint or other suitable markings to delineate the area to be excavated. Except as otherwise provided herein, Contractor will be responsible for costs resulting from damage to identified or reasonably identifiable utilities due to Contractor's negligence or failure to comply with the Contract Documents, including the requirements in this Article 7.

(B) ***Unidentified Utilities.*** Pursuant to Government Code § 4215, if, during the performance of the Work, Contractor discovers utility facilities not identified by City in the Contract Documents, Contractor must immediately provide written notice to City and the utility. City assumes responsibility for the timely removal, relocation, or protection of existing main or trunkline utility facilities located on the Project site if those utilities are not identified in the Contract Documents. Contractor will be compensated in accordance with the provisions of the Contract Documents for the costs of locating, repairing damage not due to Contractor's failure to exercise reasonable care, and removing or relocating utility facilities not indicated in the Plans or Specifications with reasonable accuracy, and for equipment on the Project necessarily idled during such work. Contractor will not be

assessed liquidated damages for delay in completion of the Work, to the extent the delay was caused by City's failure to provide for removal or relocation of the utility facilities.

7.13 Notice of Excavation. Contractor must comply with all applicable requirements in Government Code §§ 4216 through 4216.5, which are incorporated by reference herein. Government Code § 4216.2 requires that, except in an emergency, Contractor must contact the appropriate regional notification center, or Underground Services Alert, at least two working days, but not more than 14 calendar days, before starting any excavation if the excavation will be conducted in an area that is known, or reasonably should be known, to contain subsurface installations. Contractor may not begin excavation until it has obtained and submitted to Engineer an inquiry identification number from Underground Services Alert.

7.14 Trenching and Excavations of Four Feet or More. As required by Public Contract Code § 7104, if the Work includes digging trenches or other excavations that extend deeper than four feet below the surface, the provisions in this Section apply to the Work and the Project.

(A) ***Duty to Notify.*** Contractor must promptly, and before the following conditions are disturbed, provide written notice to City if Contractor finds any of the following conditions:

(1) Material that Contractor believes may be a hazardous waste, as defined in § 25117 of the Health and Safety Code, that is required to be removed to a Class I, Class II, or Class III disposal site in accordance with the provisions of existing Laws;

(2) Subsurface or latent physical conditions at the Project site differing from those indicated by information about the Project site made available to bidders prior to the deadline for submitting bids; or

(3) Unknown physical conditions at the Project site of any unusual nature, materially different from those ordinarily encountered and generally recognized as inherent in work of the character required by the Contract Documents.

(B) ***City Investigation.*** City will promptly investigate the conditions and if City finds that the conditions materially differ from those indicated, apparent, or reasonably inferred from information about the Project site made available to bidders, or involve hazardous waste, and cause a decrease or increase in Contractor's cost of, or the time required for, performance of any part of the Work, City will issue a Change Order.

(C) ***Disputes.*** In the event that a dispute arises between City and Contractor regarding any of the conditions specified in subsection (B) above, or the terms of a Change Order issued by City, Contractor will not be excused from completing the Work within the Contract Time, but must proceed with all Work to be performed under the Contract. Contractor will retain any and all rights provided either by the Contract or by Laws which pertain to the resolution of disputes between Contractor and City.

7.15 Trenching of Five Feet or More. As required by Labor Code § 6705, if the Contract Price exceeds $25,000 and the Work includes the excavation of any trench or trenches of five feet or more in depth, a detailed plan must be submitted to City for acceptance in advance of the excavation. The detailed plan must show the design of shoring, bracing, sloping, or other provisions to be made for worker protection from the hazard of caving ground during the excavation. If the plan varies from the shoring system standards, it must be prepared by a California registered civil or structural engineer. Use of a shoring,

sloping, or protective system less effective than that required by the Construction Safety Orders is prohibited.

7.16 New Utility Connections. Except as otherwise specified, City will pay connection charges and meter costs for new permanent utilities required by the Contract Documents, if any. Contractor must notify City sufficiently in advance of the time needed to request service from each utility provider so that connections and services are initiated in accordance with the Project schedule.

7.17 Lines and Grades. Contractor is required to use any benchmark provided by the Engineer. Unless otherwise specified in the Contract Documents, Contractor must provide all lines and grades required to execute the Work. Contractor must also provide, preserve, and replace if necessary, all construction stakes required for the Project. All stakes or marks must be set by a California licensed surveyor or a California registered civil engineer. Contractor must notify the Engineer of any discrepancies found between Contractor's staking and grading and information provided by the Contract Documents. Upon completion, all Work must conform to the lines, elevations, and grades shown in the Plans, including any changes directed by a Change Order.

7.18 Historic or Archeological Items.

(A) ***Contractor's Obligations.*** Contractor must ensure that all persons performing Work at the Project site are required to immediately notify the Project Manager, upon discovery of any potential historic or archeological items, including historic or prehistoric ruins, a burial ground, archaeological or vertebrate paleontological site, including fossilized footprints or other archeological, paleontological or historical feature on the Project site (collectively, "Historic or Archeological Items").

(B) ***Discovery; Cessation of Work.*** Upon discovery of any potential Historic or Archeological Items, Work must be stopped within an 85-foot radius of the find and may not resume until authorized in writing by City. If required by City, Contractor must assist in protecting or recovering the Historic or Archeological Items, with any such assistance to be compensated as Extra Work on a time and materials basis under Article 6, Contract Modification. At City's discretion, a suspension of Work required due to discovery of Historic or Archeological Items may be treated as Excusable Delay pursuant to Article 5, or as a suspension for convenience under Article 13.

7.19 Environmental Control. Contractor must not pollute any drainage course or its tributary inlets with fuels, oils, bitumens, acids, insecticides, herbicides or other harmful materials. Contractor must prevent the release of any hazardous material or hazardous waste into the soil or groundwater, and prevent the unlawful discharge of pollutants into City's storm drain system and watercourses as required below. Contractor and its Subcontractors must at all times in the performance of the Work comply with all Laws concerning pollution of waterways.

(A) ***Stormwater Permit.*** Contractor must comply with all applicable conditions of the State Water Resources Control Board National Pollutant Discharge Elimination System General Permit for Waste Discharge Requirements for Discharges of Stormwater Runoff Associated with Construction Activity ("Stormwater Permit").

(B) ***Contractor's Obligations.*** If required for the Work, a copy of the Stormwater Permit is on file in City's principal administrative offices, and Contractor must comply with it without adjustment of the Contract Price or the Contract Time. Contractor must timely and completely submit required reports and monitoring information required by the conditions of the Stormwater Permit. Contractor also must comply with all other Laws

governing discharge of stormwater, including applicable municipal stormwater management programs.

7.20 Noise Control. Contractor must comply with all applicable noise control Laws. Noise control requirements apply to all equipment used for the Work or related to the Work, including trucks, transit mixers or transient equipment that may or may not be owned by Contractor.

7.21 Mined Materials. Pursuant to the Surface Mining and Reclamation Act of 1975, Public Resources Code § 2710 et seq., any purchase of mined materials, such as construction aggregate, sand, gravel, crushed stone, road base, fill materials, and any other mineral materials must originate from a surface mining operation included on the AB 3098 List, which is available online at: ftp://ftp.consrv.ca.gov/pub/omr/AB3098%20List/AB3908List.pdf.

Article 8 - Payment

8.1 Schedule of Values. Prior to submitting its first application for payment, Contractor must prepare and submit to the Project Manager a schedule of values apportioned to the various divisions and phases of the Work, including mobilization and demobilization. If a Bid Schedule was submitted with Contractor's bid, the amounts in the schedule of values must be consistent with the Bid Schedule. Each line item contained in the schedule of values must be assigned a value such that the total of all items equals the Contract Price. The items must be sufficiently detailed to enable accurate evaluation of the percentage of completion claimed in each application for payment, and the assigned value consistent with any itemized or unit pricing submitted with Contractor's bid.

(A) ***Measurements for Unit Price Work.*** Materials and items of Work to be paid for on the basis of unit pricing will be measured according to the methods specified in the Contract Documents.

(B) ***Deleted or Reduced Work.*** Contractor will not be compensated for Work that City has deleted or reduced in scope, except for any labor, material or equipment costs for such Work that Contractor reasonably incurred before Contractor learned that the Work could be deleted or reduced. Contractor will only be compensated for those actual, direct and documented costs incurred, and will not be entitled to any mark up for overhead or lost profits.

8.2 Progress Payments. Following the last day of each month, or as otherwise required by the Special Conditions or Specifications, Contractor will submit to the Project Manager a monthly application for payment for Work performed during the preceding month based on the estimated value of the Work performed during that preceding month.

(A) ***Application for Payment.*** Each application for payment must be itemized to include labor, materials, and equipment incorporated into the Work, and materials and equipment delivered to the Project site, as well as authorized and approved Change Orders. Each payment application must be supported by the unit prices submitted with Contractor's Bid Schedule and/or schedule of values and any other substantiating data required by the Contract Documents.

(B) ***Payment of Undisputed Amounts.*** City will pay the undisputed amount due within 30 days after Contractor has submitted a complete and accurate payment application, subject to Public Contract Code § 20104.50. City will deduct a percentage from each progress payment as retention, as set forth in Section 8.5, below, and may withhold additional amounts as set forth in Section 8.3, below.

8.3 Adjustment of Payment Application. City may adjust or reject the amount requested in a payment application, including application for Final Payment, in whole or in part, if the amount requested is disputed or unsubstantiated. Contractor will be notified in writing of the basis for the modification to the amount requested. City may also deduct or withhold from payment otherwise due based upon any of the circumstances and amounts listed below. Sums withheld from payment otherwise due will be released when the basis for that withholding has been remedied and no longer exists.

(A) For Contractor's unexcused failure to perform the Work as required by the Contract Documents, including correction or completion of punch list items, City may withhold or deduct an amount based on the City's estimated cost to correct or complete the Work.

(B) For loss or damage caused by Contractor or its Subcontractors arising out of or relating to performance of the Work or any failure to protect the Project site, City may deduct an amount based on the estimated cost to repair or replace.

(C) For Contractor's failure to pay its Subcontractors and suppliers when payment is due, City may withhold an amount equal to the total of past due payments and may opt to pay that amount separately via joint check pursuant to Section 8.6(B), Joint Checks.

(D) For Contractor's failure to timely correct rejected, nonconforming, or defective Work, City may withhold or deduct an amount based on the City's estimated cost to correct or complete the Work.

(E) For any unreleased stop notice, City may withhold 125% of the amount claimed.

(F) For Contractor's failure to submit any required schedule or schedule update in the manner and within the time specified in the Contract Documents, City may withhold an amount equal to five percent of the total amount requested until Contractor complies with its schedule submittal obligations.

(G) For Contractor's failure to maintain or submit as-built documents in the manner and within the time specified in the Contract Documents, City may withhold or deduct an amount based on the City's cost to prepare the as-builts.

(H) For Work performed without Shop Drawings that have been accepted by City, when accepted Shop Drawings are required before proceeding with the Work, City may deduct an amount based on the estimated cost to correct unsatisfactory Work or diminution in value.

(I) For fines, payments, or penalties assessed under the Labor Code, City may deduct from payments due to Contractor as required by Laws and as directed by the Division of Labor Standards Enforcement.

(J) For any other costs or charges that may be withheld or deducted from payments to Contractor, as provided in the Contract Documents, including liquidated damages, City may withhold or deduct such amounts from payment otherwise due to Contractor.

8.4 Early Occupancy. Neither City's payment of progress payments nor its partial or full use or occupancy of the Project constitutes acceptance of any part of the Work.

8.5 Retention. City will retain five percent of the full amount due on each progress payment (i.e., the amount due before any withholding or deductions pursuant to Section 8.3, Adjustment of Payment Application), or the percentage stated in the Notice Inviting Bids, whichever is greater, as retention to ensure full and satisfactory performance of the Work.

Contractor is not entitled to any reduction in the rate of withholding at any time, nor to release of any retention before 35 days following City's acceptance of the Project.

(A) ***Substitution of Securities.*** As provided by Public Contract Code § 22300, Contractor may request in writing that it be allowed, at its sole expense, to substitute securities for the retention withheld by City. Any escrow agreement entered into pursuant to this provision must fully comply with Public Contract Code § 22300 and will be subject to approval as to form by City's legal counsel. If City exercises its right to draw upon such securities in the event of default pursuant to section (7) of the statutory Escrow Agreement for Security Deposits in Lieu of Retention, pursuant to subdivision (f) of Public Contract Code § 22300 ("Escrow Agreement"), and if Contractor disputes that it is in default, its sole remedy is to comply with the dispute resolution procedures in Article 12 and the provisions therein. It is agreed that for purposes of this paragraph, an event of default includes City's rights pursuant to these Contract Documents to withhold or deduct sums from retention, including withholding or deduction for liquidated damages, incomplete or defective Work, stop payment notices, or backcharges. It is further agreed that if any individual authorized to give or receive written notice on behalf of a party pursuant to section (10) of the Escrow Agreement are unavailable to give or receive notice on behalf of that party due to separation from employment, retirement, death, or other circumstances, the successor or delegee of the named individual is deemed to be the individual authorized to give or receive notice pursuant to section (10) of the Escrow Agreement.

(B) ***Release of Undisputed Retention.*** All undisputed retention, less any amounts that may be assessed as liquidated damages, retained for stop notices, or otherwise withheld pursuant to Section 8.3, Adjustment of Payment Application, will be released as Final Payment to Contractor no sooner than 35 days following recordation of the notice of completion, and no later than 60 days following acceptance of the Project by City's governing body or authorized designee pursuant to Section 11.1(C), Acceptance, or, if the Project has not been accepted, no later than 60 days after the Project is otherwise considered complete pursuant to Public Contract Code § 7107(c).

8.6 Payment to Subcontractors and Suppliers. Each month, Contractor must promptly pay each Subcontractor and supplier the value of the portion of labor, materials, and equipment incorporated into the Work or delivered to the Project site by the Subcontractor or supplier during the preceding month. Such payments must be made in accordance with the requirements of Laws pertaining to such payments, and those of the Contract Documents and applicable subcontract or supplier contract.

(A) ***Withholding for Stop Notice.*** Pursuant to Civil Code § 9358, City will withhold 125% of the amount claimed by an unreleased stop notice, a portion of which may be retained by City for the costs incurred in handling the stop notice claim, including attorneys' fees and costs, as authorized by law.

(B) ***Joint Checks.*** City reserves the right, acting in its sole discretion, to issue joint checks made payable to Contractor and a Subcontractor or supplier, if City determines this is necessary to ensure fair and timely payment for a Subcontractor or supplier who has provided services or goods for the Project. As a condition to release of payment by a joint check, the joint check payees may be required to execute a joint check agreement in a form provided or approved by the City Attorney's Office. The joint check payees will be jointly and severally responsible for the allocation and disbursement of funds paid by joint check. Payment by joint check will not be construed to create a contractual relationship between City and a Subcontractor or supplier of any tier beyond the scope of the joint check agreement.

8.7 Final Payment. Contractor's application for Final Payment must comply with the requirements for submitting an application for a progress payment as stated in Section 8.2, above. Corrections to previous progress payments, including adjustments to estimated quantities for unit priced items, may be included in the Final Payment. If Contractor fails to submit a timely application for Final Payment, City reserves the right to unilaterally process and issue Final Payment without an application from Contractor in order to close out the Project. For the purposes of determining the deadline for Claim submission pursuant to Article 12, the date of Final Payment is deemed to be the date that City acts to release undisputed retention as final payment to Contractor, or otherwise provides written notice to Contractor of Final Payment or that no undisputed funds remain available for Final Payment due to offsetting withholdings or deductions pursuant to Section 8.3, Adjustment of Payment Application. If the amount due from Contractor to City exceeds the amount of Final Payment, City retains the right to recover the balance from Contractor or its sureties.

8.8 Release of Claims. City may, at any time, require that payment of the undisputed portion of any progress payment or Final Payment be contingent upon Contractor furnishing City with a written waiver and release of all claims against City arising from or related to the portion of Work covered by those undisputed amounts subject to the limitations of Public Contract Code § 7100. Any disputed amounts may be specifically excluded from the release.

8.9 Warranty of Title. Contractor warrants that title to all work, materials, or equipment incorporated into the Work and included in a request for payment will pass over to City free of any claims, liens, or encumbrances upon payment to Contractor.

Article 9 - Labor Provisions

9.1 Discrimination Prohibited. Discrimination against any prospective or present employee engaged in the Work on grounds of race, color, ancestry, national origin, ethnicity, religion, sex, sexual orientation, age, disability, or marital status is strictly prohibited. Contractor and its Subcontractors are required to comply with all applicable Laws prohibiting discrimination, including the California Fair Employment and Housing Act (Govt. Code § 12900 et seq.), Government Code § 11135, and Labor Code §§ 1735, 1777.5, 1777.6, and 3077.5.

9.2 Labor Code Requirements.

(A) ***Eight Hour Day.*** Pursuant to Labor Code § 1810, eight hours of labor constitute a legal day's work under this Contract.

(B) ***Penalty.*** Pursuant to Labor Code § 1813, Contractor will forfeit to City as a penalty, the sum of $25.00 for each day during which a worker employed by Contractor or any Subcontractor is required or permitted to work more than eight hours in any one calendar day or more than 40 hours per calendar week, except if such workers are paid overtime under Labor Code § 1815.

(C) ***Apprentices.*** Contractor is responsible for compliance with the requirements governing employment and payment of apprentices, as set forth in Labor Code § 1777.5, which is fully incorporated by reference.

(D) ***Notices.*** Pursuant to Labor Code § 1771.4, Contractor is required to post all job site notices prescribed by Laws.

9.3 Prevailing Wages. Each worker performing Work under this Contract that is covered under Labor Code §§ 1720 or 1720.9, including cleanup at the Project site, must be paid at a rate not less than the prevailing wage as defined in §§ 1771 and 1774 of the Labor Code. The prevailing wage rates are on file with the City and available online at http://www.dir.ca.gov/dlsr. Contractor must post a copy of the applicable prevailing rates at the Project site.

(A) ***Penalties.*** Pursuant to Labor Code § 1775, Contractor and any Subcontractor will forfeit to City as a penalty up to $200.00 for each calendar day, or portion thereof, for each worker paid less than the applicable prevailing wage rate. Contractor must also pay each worker the difference between the applicable prevailing wage rate and the amount actually paid to that worker.

(B) ***Federal Requirements.*** If this Project is subject to federal prevailing wage requirements in addition to California prevailing wage requirements, Contractor and its Subcontractors are required to pay the higher of the currently applicable state or federal prevailing wage rates.

9.4 Payroll Records. Contractor must comply with the provisions of Labor Code §§ 1771.4, 1776, and 1812 and all implementing regulations, which are fully incorporated by this reference, including requirements for monthly electronic submission of payroll records to the DIR.

(A) ***Contractor and Subcontractor Obligations***. Contractor and each Subcontractor must keep accurate payroll records, showing the name, address, social security number, work classification, straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed in connection with the Work. Each payroll record must contain or be verified by a written declaration that it is made under penalty of perjury, stating both of the following:

(1) The information contained in the payroll record is true and correct; and

(2) Contractor or the Subcontractor has complied with the requirements of Labor Code §§ 1771, 1811, and 1815 for any Work performed by its employees on the Project.

(B) ***Certified Record.*** A certified copy of an employee's payroll record must be made available for inspection or furnished to the employee or his or her authorized representative on request, to City, to the Division of Labor Standards Enforcement, to the Division of Apprenticeship Standards of the DIR, and as further required by the Labor Code.

(C) ***Enforcement.*** Upon notice of noncompliance with Labor Code § 1776, Contractor or Subcontractor has ten days in which to comply with the requirements of this section. If Contractor or Subcontractor fails to do so within the ten-day period, Contractor or Subcontractor will forfeit a penalty of $100.00 per day, or portion thereof, for each worker for whom compliance is required, until strict compliance is achieved. Upon request by the Division of Apprenticeship Standards, or the Division of Labor Standards Enforcement, these penalties will be withheld from payments then due to Contractor.

9.5 Labor Compliance. Pursuant to Labor Code § 1771.4, the Contract for this Project is subject to compliance monitoring and enforcement by the DIR.

Article 10 - Safety Provisions

10.1 Safety Precautions and Programs. Contractor and its Subcontractors are fully responsible for safety precautions and programs, and for the safety of persons and property in the performance of the Work. Contractor and its Subcontractors must at all times comply with all applicable health and safety Laws and seek to avoid injury, loss, or damage to persons or property by taking reasonable steps to protect its employees and other persons at any Worksite, materials and equipment stored on or off site, and property at or adjacent to any Worksite.

(A) ***Reporting Requirements.*** Contractor must immediately notify the City of any death, serious injury or illness resulting from Work on the Project. Contractor must immediately provide a written report to City of each recordable accident or injury occurring at any Worksite within 24 hours of the occurrence. The written report must include: (1) the name and address of the injured or deceased person; (2) the name and address of each employee of Contractor or of any Subcontractor involved in the incident; (3) a detailed description of the incident, including precise location, time, and names and contact information for known witnesses; and (4) a police or first responder report, if applicable. If Contractor is required to file an accident report with a government agency, Contractor will provide a copy of the report to City.

(B) ***Legal Compliance.*** Contractor's safety program must comply with the applicable legal and regulatory requirements. Contractor must provide City with copies of all notices required by Laws.

(C) ***Contractor's Obligations.*** Any damage or loss caused by Contractor arising from the Work which is not insured under property insurance must be promptly remedied by Contractor.

(D) ***Remedies.*** If City determines, in its sole discretion, that any part of the Work or Project site is unsafe, City may, without assuming responsibility for Contractor's safety program, require Contractor or its Subcontractor to cease performance of the Work or to take corrective measures to City's satisfaction. If Contractor fails to promptly take the required corrective measures, City may perform them and deduct the cost from the Contract Price. Contractor agrees it is not entitled to submit a Claim for damages, for an increase in Contract Price, or for a change in Contract Time based on Contractor's compliance with City's request for corrective measures pursuant to this provision.

10.2 Hazardous Materials. Unless otherwise specified in the Contract Documents, this Contract does not include the removal, handling, or disturbance of any asbestos or other Hazardous Materials. If Contractor encounters materials on the Project site that Contractor reasonably believes to be asbestos or other Hazardous Materials, and the asbestos or other Hazardous Materials have not been rendered harmless, Contractor may continue Work in unaffected areas reasonably believed to be safe, but must immediately cease work on the area affected and report the condition to City. No asbestos, asbestos-containing products or other Hazardous Materials may be used in performance of the Work.

10.3 Material Safety. Contractor is solely responsible for complying with § 5194 of Title 8 of the California Code of Regulations, including by providing information to Contractor's employees about any hazardous chemicals to which they may be exposed in the course of the Work. A hazard communication program and other forms of warning and training about such exposure must be used. Contractor must also maintain Safety Data Sheets ("SDS") at the Project site, as required by Laws, for materials or substances used or consumed in the performance of the Work. The SDS will be accessible and available to Contractor's employees, Subcontractors, and City.

(A) ***Contractor Obligations.*** Contractor is solely responsible for the proper delivery, handling, use, storage, removal, and disposal of all materials brought to the Project site and/or used in the performance of the Work. Contractor must notify the Engineer if a specified product or material cannot be used safely.

(B) ***Labeling.*** Contractor must ensure proper labeling on any material brought onto the Project site so that any persons working with or in the vicinity of the material may be informed as to the identity of the material, any potential hazards, and requirements for proper handling, protections, and disposal.

10.4 Hazardous Condition. Contractor is solely responsible for determining whether a hazardous condition exists or is created during the course of the Work, involving a risk of bodily harm to any person or risk of damage to any property. If a hazardous condition exists or is created, Contractor must take all precautions necessary to address the condition and ensure that the Work progresses safely under the circumstances. Hazardous conditions may result from, but are not limited to, use of specified materials or equipment, the Work location, the Project site condition, the method of construction, or the way any Work must be performed.

10.5 Emergencies. In an emergency affecting the safety or protection of persons, Work, or property at or adjacent to any Worksite, Contractor must take reasonable and prompt actions to prevent damage, injury, or loss, without prior authorization from the City if, under the circumstances, there is inadequate time to seek prior authorization from the City.

Article 11 - Completion and Warranty Provisions

11.1 Final Completion.

(A) ***Final Inspection and Punch List.*** When the Work required by this Contract is fully performed, Contractor must provide written notification to City requesting final inspection. The Engineer will schedule the date and time for final inspection, which must include Contractor's primary representative for this Project and its superintendent. Based on that inspection, City will prepare a punch list of any items that are incomplete, missing, defective, incorrectly installed, or otherwise not compliant with the Contract Documents. The punch list to Contractor will specify the time by which all of the punch list items must be completed or corrected. The punch list may include City's estimated cost to complete each punch list item if Contractor fails to do so within the specified time. The omission of any non-compliant item from a punch list will not relieve Contractor from fulfilling all requirements of the Contract Documents. Contractor's failure to complete any punch list item within the time specified in the punch list will not waive or abridge its warranty obligations for any such items that must be completed by the City or by a third party retained by the City due to Contractor's failure to timely complete any such outstanding item.

(B) ***Requirements for Final Completion.*** Final Completion will be achieved upon completion or correction of all punch list items, as verified by City's further inspection, and upon satisfaction of all other Contract requirements, including any commissioning required under the Contract Documents and submission of all final submittals, including instructions and manuals as required under Section 7.10, and complete, final as-built drawings as required under Section 7.11, all to City's satisfaction.

(C) ***Acceptance.*** The Project will be considered accepted upon City Council action during a public meeting to accept the Project, unless the Engineer is authorized to accept

the Project, in which case the Project will be considered accepted upon the date of the Engineer's issuance of a written notice of acceptance. In order to avoid delay of Project close out, the City may elect, acting in its sole discretion, to accept the Project as complete subject to exceptions for punch list items that are not completed within the time specified in the punch list.

(D) ***Final Payment and Release of Retention.*** Final Payment and release of retention, less any sums withheld pursuant to the provisions of the Contract Documents, will not be made sooner than 35 days after recordation of the notice of completion. If Contractor fails to complete all of the punch list items within the specified time, City may withhold up to 150% of City's estimated cost to complete each of the remaining items from Final Payment and may use the withheld retention to pay for the costs to self-perform the outstanding items or to retain a third party to complete any such outstanding punch list item.

11.2 Warranty.

(A) ***General.*** Contractor warrants that all materials and equipment will be new unless otherwise specified, of good quality, in conformance with the Contract Documents, and free from defective workmanship and materials. Contractor further warrants that the Work will be free from material defects not intrinsic in the design or materials required in the Contract Documents. Contractor warrants that materials or items incorporated into the Work comply with the requirements and standards in the Contract Documents, including compliance with Laws, and that any Hazardous Materials encountered or used were handled as required by Laws. At City's request, Contractor must furnish satisfactory evidence of the quality and type of materials and equipment furnished. Contractor's warranty does not extend to damage caused by normal wear and tear, or improper use or maintenance.

(B) ***Warranty Period.*** Contractor's warranty must guarantee its Work for a period of one year from the date of Project acceptance (the "Warranty Period"), except when a longer guarantee is provided by a supplier or manufacturer or is required by the Specifications or Special Conditions. Contractor must obtain from its Subcontractors, suppliers and manufacturers any special or extended warranties required by the Contract Documents.

(C) ***Warranty Documents.*** As a condition precedent to Final Completion, Contractor must supply City with all warranty and guarantee documents relevant to equipment and materials incorporated into the Work and guaranteed by their suppliers or manufacturers.

(D) ***Subcontractors.*** The warranty obligations in the Contract Documents apply to Work performed by Contractor and its Subcontractors, and Contractor agrees to be co-guarantor of such Work.

(E) ***Contractor's Obligations.*** Upon written notice from City to Contractor of any defect in the Work discovered during the Warranty Period, Contractor or its responsible Subcontractor must promptly correct the defective Work at its own cost. Contractor's obligation to correct defects discovered during the Warranty Period will continue past the expiration of the Warranty Period as to any defects in Work for which Contractor was notified prior to expiration of the Warranty Period. Work performed during the Warranty Period ("Warranty Work") will be subject to the warranty provisions in this Section 11.2 for a one-year period that begins upon completion of such Warranty Work to City's satisfaction.

(F) ***City's Remedies.*** If Contractor or its responsible Subcontractor fails to correct defective Work within ten days following notice by City, or sooner if required by the circumstances, City may correct the defects to conform with the Contract Documents at Contractor's sole expense. Contractor must reimburse City for its costs in accordance with subsection (H), below.

(G) ***Emergency Repairs.*** In cases of emergency where any delay in correcting defective Work could cause harm, loss or damage, City may immediately correct the defects to conform with the Contract Documents at Contractor's sole expense. Contractor or its surety must reimburse City for its costs in accordance with subsection (H), below.

(H) ***Reimbursement.*** Contractor must reimburse City for its costs to repair under subsections (F) or (G), above, within 30 days following City's submission of a demand for payment pursuant to this provision. If City is required to initiate legal action to compel Contractor's compliance with this provision, and City is the prevailing party in such action, Contractor and its surety are solely responsible for all of City's attorney's fees and legal costs expended to enforce Contractor's warranty obligations herein, in addition to any and all costs City incurs to correct the defective Work.

11.3 Use Prior to Final Completion. City reserves the right to occupy or make use of the Project, or any portions of the Project, prior to Final Completion if City has determined that the Project or portion of it is in a condition suitable for the proposed occupation or use, and that it is in its best interest to occupy or make use of the Project, or any portions of it, prior to Final Completion.

(A) ***Non-Waiver.*** Occupation or use of the Project, in whole or in part, prior to Final Completion will not operate as acceptance of the Work or any portion of it, nor will it operate as a waiver of any of City's rights or Contractor's duties pursuant to these Contract Documents, and will not affect nor bear on the determination of the time of substantial completion with respect to any statute of repose pertaining to the time for filing an action for construction defect.

(B) ***City's Responsibility.*** City will be responsible for the cost of maintenance and repairs due to normal wear and tear with respect to those portions of the Project that are being occupied or used before Final Completion. The Contract Price or the Contract Time may be adjusted pursuant to the applicable provisions of these Contract Documents if, and only to the extent that, any occupation or use under this Section actually adds to Contractor's cost or time to complete the Work within the Contract Time.

11.4 Substantial Completion. For purposes of determining "substantial completion" with respect to any statute of repose pertaining to the time for filing an action for construction defect, "substantial completion" is deemed to mean the last date that Contractor or any Subcontractor performs Work on the Project prior to City acceptance of the Project, except for warranty work performed under this Article.

Article 12 - Dispute Resolution

12.1 Claims. This Article applies to and provides the exclusive procedures for any Claim arising from or related to the Contract or performance of the Work.

(A) ***Definition.*** "Claim" means a separate demand by Contractor, submitted in writing by registered or certified mail with return receipt requested, for a change in the Contract Time, including a time extension or relief from liquidated damages, or a change in the Contract Price, when the demand has previously been submitted to City in accordance with the requirements of the Contract Documents, and which has been

rejected or disputed by City, in whole or in part. A Claim may also include that portion of a unilateral Change Order that is disputed by the Contractor.

(B) ***Limitations.*** A Claim may only include the portion of a previously rejected demand that remains in dispute between Contractor and City. With the exception of any dispute regarding the amount of money actually paid to Contractor as Final Payment, Contractor is not entitled to submit a Claim demanding a change in the Contract Time or the Contract Price, which has not previously been submitted to City in full compliance with Article 5 and Article 6, and subsequently rejected in whole or in part by City.

(C) ***Scope of Article.*** This Article is intended to provide the exclusive procedures for submission and resolution of Claims of any amount and applies in addition to the provisions of Public Contract Code § 9204 and § 20104 et seq., which are incorporated by reference herein.

(D) ***No Work Delay.*** Notwithstanding the submission of a Claim or any other dispute between the parties related to the Project or the Contract Documents, Contractor must perform the Work and may not delay or cease Work pending resolution of a Claim or other dispute, but must continue to diligently prosecute the performance and timely completion of the Work, including the Work pertaining to the Claim or other dispute.

(E) ***Informal Resolution.*** Contractor will make a good faith effort to informally resolve a dispute before initiating a Claim, preferably by face-to-face meeting between authorized representatives of Contractor and City.

12.2 Claims Submission. The following requirements apply to any Claim subject to this Article:

(A) ***Substantiation.*** The Claim must be submitted to City in writing, clearly identified as a "Claim" submitted pursuant to this Article 12 and must include all of the documents necessary to substantiate the Claim including the Change Order request that was rejected in whole or in part, and a copy of City's written rejection that is in dispute. The Claim must clearly identify and describe the dispute, including relevant references to applicable portions of the Contract Documents, and a chronology of relevant events. Any Claim for additional payment must include a complete, itemized breakdown of all known or estimated labor, materials, taxes, insurance, and subcontract, or other costs. Substantiating documentation such as payroll records, receipts, invoices, or the like, must be submitted in support of each component of claimed cost. Any Claim for an extension of time or delay costs must be substantiated with a schedule analysis and narrative depicting and explaining claimed time impacts.

(B) ***Claim Format and Content.*** A Claim must be submitted in the following format:

(1) Provide a cover letter, specifically identifying the submission as a "Claim" submitted under this Article 12 and specifying the requested remedy (e.g., amount of proposed change to Contract Price and/or change to Contract Time).

(2) Provide a summary of each Claim, including underlying facts and the basis for entitlement, and identify each specific demand at issue, including the specific Change Order request (by number and submittal date), and the date of City's rejection of that demand, in whole or in part.

(3) Provide a detailed explanation of each issue in dispute. For multiple issues included within a single Claim or for multiple Claims submitted concurrently, separately number and identify each individual issue or Claim, and include the following for <u>each</u> separate issue or Claim:

a. A succinct statement of the matter in dispute, including Contractor's position and the basis for that position;

b. Identify and attach all documents that substantiate the Claim, including relevant provisions of the Contract Documents, RFIs, calculations, and schedule analysis (see subsection (A), Substantiation, above);

c. A chronology of relevant events; and

d. Analysis and basis for claimed changes to Contract Price, Contract Time, or any other remedy requested.

(4) Provide a summary of issues and corresponding claimed damages. If, by the time of the Claim submission deadline (below), the precise amount of the requested change in the Contract Price or Contract Time is not yet known, Contractor must provide a good faith estimate, including the basis for that estimate, and must identify the date by which it is anticipated that the Claim will be updated to provide final amounts.

(5) Include the following certification, executed by Contractor's authorized representative:

"The undersigned Contractor certifies under penalty of perjury that its statements and representations in this Claim submittal are true and correct. Contractor warrants that this Claim submittal is comprehensive and complete as to the matters in dispute, and agrees that any costs, expenses, or delay not included herein are deemed waived."

(C) ***Submission Deadlines.***

(1) A Claim disputing rejection of a request for a change in the Contract Time or Contract Price must be submitted within 15 days following the date that City notified Contractor in writing that a request for a change in the Contract Time or Contract Price, duly submitted in compliance with Article 5 and Article 6, has been rejected in whole or in part. A Claim disputing the terms of a unilateral Change Order must be submitted within 15 days following the date of issuance of the unilateral Change Order. These Claim deadlines apply even if Contractor cannot yet quantify the total amount of any requested change in the Contract Time or Contract Price. If the Contractor cannot quantify those amounts, it must submit an estimate of the amounts claimed pending final determination of the requested remedy by Contractor.

(2) With the exception of any dispute regarding the amount of Final Payment, any Claim must be filed on or before the date of Final Payment or will be deemed waived.

(3) A Claim disputing the amount of Final Payment must be submitted within 15 days of the effective date of Final Payment, under Section 8.7, Final Payment.

(4) Strict compliance with these Claim submission deadlines is necessary to ensure that any dispute may be mitigated as soon as possible, and to facilitate cost-efficient administration of the Project. ***Any Claim that is not submitted within the specified deadlines will be deemed waived by Contractor.***

12.3 City's Response. City will respond within 45 days of receipt of the Claim with a written statement identifying which portion(s) of the Claim are disputed, unless the 45-day period is extended by mutual agreement of City and Contractor or as otherwise allowed under Public Contract Code § 9204. However, if City determines that the Claim is not adequately substantiated pursuant to Section 12.2(A), Substantiation, City may first request in writing, within 30 days of receipt of the Claim, any additional documentation supporting the Claim or relating to defenses to the Claim that City may have against the Claim.

(A) ***Additional Information.*** If additional information is thereafter required, it may be requested and provided upon mutual agreement of City and Contractor. If Contractor's Claim is based on estimated amounts, Contractor has a continuing duty to update its Claim as soon as possible with information on actual amounts in order to facilitate prompt and fair resolution of the Claim.

(B) ***Non-Waiver.*** Any failure by City to respond within the times specified above will not be construed as acceptance of the Claim, in whole or in part, or as a waiver of any provision of these Contract Documents.

12.4 Meet and Confer. If Contractor disputes City's written response, or City fails to respond within the specified time, within 15 days of receipt of City's response or within 15 days of City's failure to respond within the applicable 45-day time period under Section 12.3, respectively, Contractor may notify City of the dispute in writing sent by registered or certified mail, return receipt requested, and demand an informal conference to meet and confer for settlement of the issues in dispute. If Contractor fails to notify City of the dispute and demand an informal conference to meet and confer in writing within the specified time, Contractor's Claim will be deemed waived.

(A) ***Schedule Meet and Confer.*** Upon receipt of the demand to meet and confer, City will schedule the meet and confer conference to be held within 30 days, or later if needed to ensure the mutual availability of each of the individuals that each party requires to represent its interests at the meet and confer conference.

(B) ***Location for Meet and Confer.*** The meet and confer conference will be scheduled at a location at or near City's principal office.

(C) ***Written Statement After Meet and Confer.*** Within ten working days after the meet and confer has concluded, City will issue a written statement identifying which portion(s) of the Claim remain in dispute, if any.

(D) ***Submission to Mediation.*** If the Claim or any portion remains in dispute following the meet and confer conference, within ten working days after the City issues the written statement identifying any portion(s) of the Claim remaining in dispute, the Contractor may identify in writing disputed portion(s) of the Claim, which will be submitted for mediation, as set forth below.

12.5 Mediation and Government Code Claims.

(A) ***Mediation.*** Within ten working days after the City issues the written statement identifying any portion(s) of the Claim remaining in dispute following the meet and confer, City and Contractor will mutually agree to a mediator, as provided under Public Contract Code § 9204. Mediation will be scheduled to ensure the mutual availability of the selected mediator and all of the individuals that each party requires to represent its interests. If there are multiple Claims in dispute, the parties may agree to schedule the mediation to address all outstanding Claims at the same time. The parties will share the costs of the mediator and mediation fees equally, but each party is otherwise solely and separately

responsible for its own costs to prepare for and participate in the mediation, including costs for its legal counsel or any other consultants.

(B) ***Government Code Claims*.**

(1) Timely presentation of a Government Code Claim is a condition precedent to filing any legal action based on or arising from the Contract. Compliance with the Claim submission requirements in this Article 12 is a condition precedent to filing a Government Code Claim.

(2) The time for filing a Government Code Claim will be tolled from the time Contractor submits its written Claim pursuant to Section 12.2, above, until the time that Claim is denied in whole or in part at the conclusion of the meet and confer process, including any period of time used by the meet and confer process. However, if the Claim is submitted to mediation, the time for filing a Government Code Claim will be tolled until conclusion of the mediation, including any continuations, if the Claim is not fully resolved by mutual agreement of the parties during the mediation or any continuation of the mediation.

12.6 Tort Claims. This Article does not apply to tort claims and nothing in this Article is intended nor will be construed to change the time periods for filing tort-based Government Code Claims.

12.7 Arbitration. It is expressly agreed, under Code of Civil Procedure § 1296, that in any arbitration to resolve a dispute relating to this Contract, the arbitrator's award must be supported by law and substantial evidence.

12.8 Burden of Proof and Limitations. Contractor bears the burden of proving entitlement to and the amount of any claimed damages. Contractor is not entitled to damages calculated on a total cost basis, but must prove actual damages. Contractor is not entitled to speculative, special, or consequential damages, including home office overhead or any form of overhead not directly incurred at the Project site or any other Worksite; lost profits; loss of productivity; lost opportunity to work on other projects; diminished bonding capacity; increased cost of financing for the Project; extended capital costs; non-availability of labor, material or equipment due to delays; or any other indirect loss arising from the Contract. The Eichleay Formula or similar formula will not be used for any recovery under the Contract. The City will not be directly liable to any Subcontractor or supplier.

12.9 Legal Proceedings. In any legal proceeding that involves enforcement of any requirements of the Contract Documents, the finder of fact will receive detailed instructions on the meaning and operation of the Contract Documents, including conditions, limitations of liability, remedies, claim procedures, and other provisions bearing on the defenses and theories of liability. Detailed findings of fact will be requested to verify enforcement of the Contract Documents. All of the City's remedies under the Contract Documents will be construed as cumulative, and not exclusive, and the City reserves all rights to all remedies available under law or equity as to any dispute arising from or relating to the Contract Documents or performance of the Work.

12.10 Other Disputes. The procedures in this Article 12 will apply to any and all disputes or legal actions, in addition to Claims, arising from or related to this Contract, including disputes regarding suspension or early termination of the Contract, unless and only to the extent that compliance with a procedural requirement is expressly and specifically waived by City. Nothing in this Article is intended to delay suspension or termination under Article 13.

Article 13 - Suspension and Termination

13.1 Suspension for Cause. In addition to all other remedies available to City, if Contractor fails to perform or correct Work in accordance with the Contract Documents, including non-compliance with applicable environmental or health and safety Laws, City may immediately order the Work, or any portion of it, suspended until the circumstances giving rise to the suspension have been eliminated to City's satisfaction.

(A) ***Notice of Suspension.*** Upon receipt of City's written notice to suspend the Work, in whole or in part, except as otherwise specified in the notice of suspension, Contractor and its Subcontractors must promptly stop Work as specified in the notice of suspension; comply with directions for cleaning and securing the Worksite; and protect the completed and in-progress Work and materials. Contractor is solely responsible for any damages or loss resulting from its failure to adequately secure and protect the Project.

(B) ***Resumption of Work.*** Upon receipt of the City's written notice to resume the suspended Work, in whole or in part, except as otherwise specified in the notice to resume, Contractor and its Subcontractors must promptly re-mobilize and resume the Work as specified; and within ten days from the date of the notice to resume, Contractor must submit a recovery schedule, prepared in accordance with the Contract Documents, showing how Contractor will complete the Work within the Contract Time.

(C) ***Failure to Comply.*** Contractor will not be entitled to an increase in the Contract Time or Contract Price for a suspension occasioned by Contractor's failure to comply with the Contract Documents.

(D) ***No Duty to Suspend.*** City's right to suspend the Work will not give rise to a duty to suspend the Work, and City's failure to suspend the Work will not constitute a defense to Contractor's failure to comply with the requirements of the Contract Documents.

13.2 Suspension for Convenience. City reserves the right to suspend, delay, or interrupt the performance of the Work in whole or in part, for a period of time determined to be appropriate for City's convenience. Upon notice by City pursuant to this provision, Contractor must immediately suspend, delay, or interrupt the Work and secure the Project site as directed by City except for taking measures to protect completed or in-progress Work as directed in the suspension notice, and subject to the provisions of Section 13.1(A) and (B), above. If Contractor submits a timely request for a Change Order in compliance with Articles 5 and 6, the Contract Price and the Contract Time will be equitably adjusted by Change Order pursuant to the terms of Articles 5 and 6 to reflect the cost and delay impact occasioned by such suspension for convenience, except to the extent that any such impacts were caused by Contractor's failure to comply with the Contract Documents or the terms of the suspension notice or notice to resume. However, the Contract Time will only be extended if the suspension causes or will cause unavoidable delay in Final Completion. If Contractor disputes the terms of a Change Order issued for such equitable adjustment due to suspension for convenience, its sole recourse is to comply with the Claim procedures in Article 12.

13.3 Termination for Default. City may declare that Contractor is in default of the Contract for a material breach of or inability to fully, promptly, or satisfactorily perform its obligations under the Contract.

(A) ***Default.*** Events giving rise to a declaration of default include Contractor's refusal or failure to supply sufficient skilled workers, proper materials, or equipment to perform the Work within the Contract Time; Contractor's refusal or failure to make prompt

payment to its employees, Subcontractors, or suppliers or to correct defective Work or damage; Contractor's failure to comply with Laws, or orders of any public agency with jurisdiction over the Project; evidence of Contractor's bankruptcy, insolvency, or lack of financial capacity to complete the Work as required within the Contract Time; suspension, revocation, or expiration and nonrenewal of Contractor's license or DIR registration; dissolution, liquidation, reorganization, or other major change in Contractor's organization, ownership, structure, or existence as a business entity; unauthorized assignment of Contractor's rights or duties under the Contract; or any material breach of the Contract requirements.

(B) ***Notice of Default and Opportunity to Cure.*** Upon City's declaration that Contractor is in default due to a material breach of the Contract Documents, if City determines that the default is curable, City will afford Contractor the opportunity to cure the default within ten days of City's notice of default, or within a period of time reasonably necessary for such cure, including a shorter period of time if applicable.

(C) ***Termination.*** If Contractor fails to cure the default or fails to expediently take steps reasonably calculated to cure the default within the time period specified in the notice of default, City may issue written notice to Contractor and its performance bond surety of City's termination of the Contract for default.

(D) ***Waiver.*** Time being of the essence in the performance of the Work, if Contractor's surety fails to arrange for completion of the Work in accordance with the Performance Bond within seven calendar days from the date of the notice of termination pursuant to paragraph (C), City may immediately make arrangements for the completion of the Work through use of its own forces, by hiring a replacement contractor, or by any other means that City determines advisable under the circumstances. Contractor and its surety will be jointly and severally liable for any additional cost incurred by City to complete the Work following termination, where "additional cost" means all cost in excess of the cost City would have incurred if Contactor had timely completed Work without the default and termination. In addition, City will have the right to immediate possession and use of any materials, supplies, and equipment procured for the Project and located at the Project site or any Worksite on City property for the purposes of completing the remaining Work.

(E) ***Compensation*****.** Within 30 days of receipt of updated as-builts, all warranties, manuals, instructions, or other required documents for Work installed to date, and delivery to City of all equipment and materials for the Project for which Contractor has already been compensated, Contractor will be compensated for the Work satisfactorily performed in compliance with the Contract Documents up to the effective date of the termination pursuant to the terms of Article 8, Payment, subject to City's rights to withhold or deduct sums from payment otherwise due pursuant to Section 8.3, and excluding any costs Contractor incurs as a result of the termination, including any cancellation or restocking charges or fees due to third parties. If Contractor disputes the amount of compensation determined by City, its sole recourse is to comply with the Claim Procedures in Article 12, by submitting a Claim no later than 30 days following notice from City of the total compensation to be paid by City.

(F) ***Wrongful Termination.*** If Contractor disputes the termination, its sole recourse is to comply with the Claim procedures in Article 12. If a court of competent jurisdiction or an arbitrator later determines that the termination for default was wrongful, the termination will be deemed to be a termination for convenience, and Contractor's damages will be strictly limited to the compensation provided for termination for convenience under Section 13.4, below. Contractor waives any claim for any other damages for wrongful termination including special or consequential damages, lost

opportunity costs, or lost profits, and any award of damages is subject to Section 12.8, Burden of Proof and Limitations.

13.4 Termination for Convenience. City reserves the right, acting in its sole discretion, to terminate all or part of the Contract for convenience upon written notice to Contractor.

(A) ***Compensation to Contractor.*** In the event of City's termination for convenience, Contractor waives any claim for damages, including for loss of anticipated profits from the Project. The following will constitute full and fair compensation to Contractor, and Contractor will not be entitled to any additional claim or compensation:

(1) *Completed Work.* The value of its Work satisfactorily performed as of the date notice of termination is received, based on Contractor's schedule of values and unpaid costs for items delivered to the Project site that were fabricated for incorporation in the Work;

(2) *Demobilization.* Demobilization costs specified in the schedule of values, or if demobilization costs were not provided in a schedule of values pursuant to Section 8.1, then based on actual, reasonable, and fully documented demobilization costs; and

(3) *Termination Markup.* Five percent of the total value of the Work performed as of the date of notice of termination, including reasonable, actual, and documented costs to comply with the direction in the notice of termination for convenience, and demobilization costs, which is deemed to cover all overhead and profit to date.

(B) ***Disputes.*** If Contractor disputes the amount of compensation determined by City pursuant to paragraph (A), above, its sole recourse is to comply with the Claim procedures in Article 12, by submitting a Claim no later than 30 days following notice from City of total compensation to be paid by City.

13.5 Actions Upon Termination for Default or Convenience. The following provisions apply to any termination under this Article, whether for default or convenience, and whether in whole or in part.

(A) ***General.*** Upon termination, City may immediately enter upon and take possession of the Project and the Work and all tools, equipment, appliances, materials, and supplies procured or fabricated for the Project. Contractor will transfer title to and deliver all completed Work and all Work in progress to City.

(B) ***Submittals.*** Unless otherwise specified in the notice of termination, Contractor must immediately submit to City all designs, drawings, as-built drawings, Project records, contracts with vendors and Subcontractors, manufacturer warranties, manuals, and other such submittals or Work-related documents required under the terms of the Contract Documents, including incomplete documents or drafts.

(C) ***Close Out Requirements.*** Except as otherwise specified in the notice of termination, Contractor must comply with all of the following:

(1) Immediately stop the Work, except for any Work that must be completed pursuant to the notice of termination and comply with City's instructions for cessation of labor and securing the Project and any other Worksite(s).

(2) Comply with City's instructions to protect the completed Work and materials, using best efforts to minimize further costs.

(3) Contractor must not place further orders or enter into new subcontracts for materials, equipment, services or facilities, except as may be necessary to complete any portion of the Work that is not terminated.

(4) As directed in the notice, Contractor must assign to City or cancel existing subcontracts that relate to performance of the terminated Work, subject to any prior rights, if any, of the surety for Contractor's performance bond, and settle all outstanding liabilities and claims, subject to City's approval.

(5) As directed in the notice, Contractor must use its best efforts to sell any materials, supplies, or equipment intended solely for the terminated Work in a manner and at market rate prices acceptable to City.

(D) ***Payment Upon Termination.*** Upon completion of all termination obligations, as specified herein and in the notice of termination, Contractor will submit its request for Final Payment, including any amounts due following termination pursuant to this Article 13. Payment will be made in accordance with the provisions of Article 8, based on the portion of the Work satisfactorily completed, including the close out requirements, and consistent with the previously submitted schedule of values and unit pricing, including demobilization costs. Adjustments to Final Payment may include deductions for the cost of materials, supplies, or equipment retained by Contractor; payments received for sale of any such materials, supplies, or equipment, less re-stocking fees charged; and as otherwise specified in Section 8.3, Adjustment of Payment Application.

(E) ***Continuing Obligations.*** Regardless of any Contract termination, Contractor's obligations for portions of the Work already performed will continue and the provisions of the Contract Documents will remain in effect as to any claim, indemnity obligation, warranties, guarantees, submittals of as-built drawings, instructions, or manuals, record maintenance, or other such rights and obligations arising prior to the termination date.

Article 14 - Miscellaneous Provisions

14.1 Assignment of Unfair Business Practice Claims. Under Public Contract Code § 7103.5, Contractor and its Subcontractors agree to assign to City all rights, title, and interest in and to all causes of action it may have under section 4 of the Clayton Act (15 U.S.C. § 15) or under the Cartwright Act (Chapter 2 (commencing with § 16700) of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, services, or materials pursuant to the Contract or any subcontract. This assignment will be effective at the time City tenders Final Payment to Contractor, without further acknowledgement by the parties.

14.2 Provisions Deemed Inserted. Every provision of law required to be inserted in the Contract Documents is deemed to be inserted, and the Contract Documents will be construed and enforced as though such provision has been included. If it is discovered that through mistake or otherwise that any required provision was not inserted, or not correctly inserted, the Contract Documents will be deemed amended accordingly.

14.3 Waiver. City's waiver of a breach, failure of any condition, or any right or remedy contained in or granted by the provisions of the Contract Documents will not be effective unless it is in writing and signed by City. City's waiver of any breach, failure, right, or remedy will not be deemed a waiver of any other breach, failure, right, or remedy, whether or not similar, nor will any waiver constitute a continuing waiver unless specified in writing by City.

14.4 Titles, Headings, and Groupings. The titles and headings used and the groupings of provisions in the Contract Documents are for convenience only and may not be used in the construction or interpretation of the Contract Documents or relied upon for any other purpose.

14.5 Statutory and Regulatory References. With respect to any amendments to any statutes or regulations referenced in these Contract Documents, the reference is deemed to be the version in effect on the date that bids were due.

14.6 Survival. The provisions that survive termination or expiration of this Contract include Contract Section 11, Notice, and subsections 12.1, 12.2, 12.3, 12.4, 12.5, and 12.6, of Section 12, General Provisions; and the following provisions in these General Conditions: Section 2.2(J), Contractor's Records, Section 2.3(C), Termination, Section 3.7, Ownership, Section 4.2, Indemnity, Article 12, Dispute Resolution, and Section 11.2, Warranty.

END OF GENERAL CONDITIONS

Special Conditions

1. Authorized Work Days and Hours.

1.1 Authorized Work Days. Except as expressly authorized in writing by City, Contractor is limited to performing Work on the Project on the following days of the week, excluding holidays observed by City:
Monday through Friday.

1.2 Authorized Work Hours. Except as expressly authorized in writing by City, Contractor is limited to performing Work on the Project during the following hours: Monday through Friday 8:00 a.m. to 6:00 p.m. A schedule of work shall be submitted to the City for review and approval prior to mobilization to the site work.

2. ***Pre-Construction Conference.*** City will designate a date and time for a pre-construction conference with Contractor following Contract execution. Project administration procedures and coordination between City and Contractor will be discussed, and Contractor must present City with the following information or documents at the meeting for City's review and acceptance before the Work commences:

2.1 Name, 24-hour contact information, and qualifications of the proposed on-site superintendent;

2.2 List of all key Project personnel and their complete contact information, including email addresses and telephone numbers during regular hours and after hours;

2.3 Staging plans that identify the sequence of the Work, including any phases and alternative sequences or phases, with the goal of minimizing the impacts on residents, businesses and other operations in the Project vicinity;

2.4 If required, traffic control plans associated with the staging plans that are signed and stamped by a licensed traffic engineer;

2.5 Draft baseline schedule for the Work as required under Section 5.2, to be finalized within ten days after City issues the Notice to Proceed;

2.6 Breakdown of lump sum bid items, to be used for determining the value of Work completed for future progress payments to Contractor;

2.7 Schedule with list of Project submittals that require City review, and list of the proposed material suppliers;

2.8 Plan for coordination with affected utility owner(s) and compliance with any related permit requirements;

2.9 Videotape and photographs recording the conditions throughout the pre-construction Project site, showing the existing improvements and current condition of the curbs, gutters, sidewalks, signs, landscaping, streetlights, structures near the Project such as building faces, canopies, shades and fences, and any other features within the Project area limits;

2.10 If requested by City, Contractor's cash flow projections; and

2.11 Any other documents specified in the Special Conditions or Notice of Potential Award.

3. ***Insurance Requirements.*** The insurance requirements under Section 4.3 of the General Conditions are modified for this Contract, as set forth below. Except as expressly stated below, all other provisions in Section 4.3 are unchanged and remain in full force and effect.

3.1 **Builders Risk Insurance Waived.** The builder's risk insurance policy requirement set forth in subsection 4.3(A)(5) of the General Conditions is hereby waived and does not apply to this Contract.

4. **Normal Weather Delay Days**. This provision is intended to supplement the requirements of General Conditions Section 5.2 on Schedule Requirements and Section 5.3 on Delays and Extensions of Contract Time. Based on historic records for the Project location, Contractor's schedule should assume the following number of normal Weather Delay Days for each month:

Month	**# Normal Weather Delay Days**
January	6
February	5
March	2
April	2
May	0
June	0
July	0
August	0
September	0
October	1
November	1
December	5

Weather Delay Days which do not occur during a given month based on the number of days allocated for that month (above) do not carry over to another month.

5. **Public Notification.**

5.1 At least seventy-two (72) hours prior to the start of work that will affect property access, wastewater flow, parking, or traffic circulation, the Contractor shall provide notice to affected homeowners of the impending construction activity.

5.2 The contractor shall designate a representative to address questions and comments from the general public in the area and make an effort to reach out to the adjacent residents before and during the construction. The cost of this outreach shall be included in various items necessary to complete the work as stated in the contract and no additional compensation will be made for this coordination effort.

6. **Alterations** The City reserves the right to increase or decrease the quantity of any item or portion of the Work or omit portions of the Work as may be deemed necessary or advisable by the City Engineer; also, to make such alterations or deviations, additions to, or omissions from the Plans and Special Provisions, as may be determined during the progress of the Work to be

necessary and advisable for the proper completion thereof. Upon written order of the Engineer, the Contractor shall proceed with the Work as increased, decreased or altered.

Increases or Decreases in the Quantity of Work: The contractor is not entitled to adjustments of the unit price if the total bid item quantity exceeds 125 percent shown on the bid item list. The contractor is not entitled to adjustments of the unit price if the total bid item quantity is less than 75 percent shown on the bid item list.

7. Close Out Requirements. Contractor's close out requirements include the following, if applicable:

7.1 Contractor must replace, with thermoplastic, any existing striping adjacent to the Project site that is damaged during the Work. Partially damaged striping must be replaced in its entirety.

7.2 Contractor must replace any survey monuments that are damaged or removed during the Work, with a Record of Survey filed by a licensed land surveyor as required by California law.

8. Value Engineering. The Contractor may be entitled to additional compensation for cost reduction changes made pursuant to a value engineering proposal submitted by the Contractor, subject to the limitations of Public Contract Code § 7107, and in strict compliance with this Section 8. Contractor will not be entitled to any such additional compensation unless all of the following requirements have been met:

8.1 The Contractor must submit a written proposal for changes to the Plans or Specifications for the Project, in which it:

(A) Identifies the written proposal as a proposal for cost reduction changes with reference to this section;

(B) Clearly and specifically identifies the proposed cost reduction changes by describing in detail each of the changes proposed with specific references to each of the Specifications and Plans involved in the proposed changes, and providing proposed revised Specifications and Plans as applicable; and

(C) Estimates the net amount of the cost reduction and provides the basis for that estimate.

8.2 The proposed changes have been identified and developed solely by the Contractor, and not, in whole or in part, by the City.

8.3 The City accepts the proposed changes in whole or in part in a writing signed by the Engineer. The Contractor will only be entitled to additional compensation for those changes specifically accepted by the City. The Engineer will determine the net savings in construction costs from any such changes that are both accepted and implemented by the City. Contractor will not be entitled to more than 50% of the net savings as determined by the Engineer, acting in his or her sole discretion.

END OF SPECIAL CONDITIONS

TECHNICAL SPECIFICATIONS

10-1 MOBILIZATION AND DEMOBILIZATION (BID ITEM 1)

1. This bid item shall be lump sum. Payment shall be made at seventy five (75%) percent of the bid item amount on the first progress payment following completion of mobilization and the remaining amount on the final progress payment, with retention withheld as allowed by the Contract Documents. The Contractor may apply for the remaining twenty-five (25%) percent of the bid item amount upon completion of the project final punch list items provided by the Construction Manager.

2. This bid item shall include payment for obtaining all bonds, all Contractor acquired permits, licenses, agreements, certifications, notices of intent, and temporary easements; moving onto the site of all equipment, materials, and staff including obtaining and set up of Contractor's staging area/yard; preparing Storm Water Pollution Prevention Plan; furnishing and erecting all needed construction facilities; fencing; preparing traffic control plans; project signage; project security; demobilization; preconstruction photographs; video recording of surface features; progress schedules and reports; contract meetings; and record drawings.

3. The contractor shall obtain permission from the Engineer to use any portion of the public right of way for a staging area.

4. Final payment for mobilization and demobilization, or any part thereof, will be approved for payment under the Contract when all applicable mobilization and demobilization items listed above have been completed, including: punch list items, cleaning all portions of the project area, street sweeping, power washing and removal of all temporary facilities and equipment from the project site.

5. **Measurement and Payment**
The lump sum price paid for Mobilization and Demobilization (**Bid Item 1**) shall include full compensation for furnishing all personnel, equipment, material and supplies and no additional payment will be made therefor. The Lump Sum Price shall not exceed 10 percent (10%) of the total bid price for the Work.

10-2 CONSTRUCTION STAKING

1. GENERAL

This work consists of furnishing and setting construction stakes and marks by the Contractor to establish the lines and grades required for the completion of the improvements as shown on the plans, and as specified in these specifications.

2. CONSTRUCTION

Construction staking shall be performed as necessary to control the work. Construction stakes and marks shall be furnished and set by the Contractor with accuracy adequate to assure that the completed work conforms to the lines, grades, and notes on the plans.

Prior to the commencement of demolition and clearing and grubbing, the contractor shall field verify and mark limits of work. Before work commences, the contractor shall review the location of the proposed limits of work with the engineer and make any changes as deemed necessary to the line and grade or construction staking, at no extra charge.

All computations necessary to establish the exact position of the work shall be made by the Contractor.

3. MEASUREMENT AND PAYMENT

Full compensation for all labor, materials, tools, equipment and doing all work involved as described for Construction Staking shall be considered included in the contract prices paid for various other items of work and no additional compensation will be allowed therefor.

10-3 LAYDOWN AREA

1. GENERAL

The Contractor shall not maintain staging, equipment parking, or materials within the project limits. The Contractor shall obtain a site for use as a Construction Staging Area near the project. This area should be of sufficient size to store the contractor's equipment, materials and other items necessary for completing the project. The City has made no provision for a Construction Staging Area.

2. MEASUREMENT AND PAYMENT

Full compensation for conforming to the provisions in this section, not otherwise provided for, shall be considered as included in prices paid for the various contract items of work involved and no additional compensation will be allowed therefor.

10-4 TRAFFIC CONTROL SYSTEM (BID ITEM 2)

1. GENERAL

The Contractor shall not implement a traffic control system until public noticing described in these Special Provisions is complete, has obtained an encroachment permit from the City of Sausalito and obtained approval of the traffic control plans from the Engineer. For the purpose of this section, traffic pertains to truck and motor vehicles, pedestrians, bicyclists, and public transit operations.

The Contractor shall implement the traffic control system as approved by the Engineer. If warranted by field conditions, the Contractor shall adjust the system as directed by the Engineer. The Contractor shall provide and implement all traffic handling devices and equipment as described in Sections 12-3 and 12-4 of the Standard Specifications. If any component in the traffic control system is displaced, or ceases to operate or function as specified, from any cause, during the progress of the work, the Contractor shall immediately repair the component to its original condition or replace the component, and shall restore the component to its original location.

The Contractor shall provide advanced warning signs and changeable message boards as part of the traffic Control plan.

The Contractor shall provide flaggers to control traffic. Section 12-1.03 of the Standard Specifications is deleted; the cost for flaggers is the Contractor's responsibility.

"Traffic Control System" shall conform to Sections 7-1.03 "Public Convenience," 7-1.04 "Public Safety" and Section 12 "Temporary Traffic Control" of the current State of California Department of Transportation Standard Specifications (Standard Specifications), insofar as they may apply, and the following special provisions.

The Contractor shall be held solely responsible for complying with the listed reference documents and these Special Provisions for the complete duration of project. The Traffic Control Plans shall be prepared by a licensed engineer or otherwise certified individual.

The Standard Specifications Sections 7-1.03, 7-1.04 and Section 12 regarding signs and other traffic control devices are hereby revised to provide that all signs and other warning devices (including construction and warning signs placed beyond the limits of work) shall be provided and maintained by the Contractor at his or her expense, and shall remain his property after the completion of the contract. The applicable sections of Section 7-1.03 "Public Convenience" and Section 12-1.03 "Flagging Costs" are further revised to provide that all flaggers shall be provided by the Contractor at his or her expense. Flaggers shall be properly equipped and trained in accordance with "Instructions to Flaggers," published by the Department of Transportation.
The Contractor shall not implement a traffic control system until public noticing is complete, obtain an encroachment permit from the City of Sausalito, and obtained approval of the traffic control plans from the Engineer. For the purpose of this section, traffic pertains to truck and motor vehicles, pedestrians, bicyclists, and public transit operations.

Traffic Control shall be implemented only during the Working Hours as defined in these Special Provisions.

However, traffic control devices shall remain in place at all times during construction to warn the public of the work zone. The Engineer will make no exceptions to this requirement.

2. TRAFFIC CONTROL PLAN SUBMITTAL

The Contractor shall submit a detailed plan describing how you propose to manage traffic while performing the work within the City of Sausalito. This Plan shall be coordinated and approved by the City of Sausalito.
The Plan shall detail:

1. Your sequence of work to be performed.
2. Your proposed traffic handling through the work zone.
3. Accessible pedestrian detour plan.
4. Bicycle detour plan

The traffic control plans shall not be general, but specific to the project and of sufficient detail for the Engineer to understand your method of traffic management. Your plans shall be consistent with the current California edition of the Manual of Uniform Traffic Control Devices.

The Engineer will NOT issue the Notice to Proceed until the traffic control plan is approved.

LANE OR STREET CLOSURE

All lane or street closures proposed by the Contractor shall be defined in the Traffic Control Plans described previously in this section. All street closures shall be approved in advance by the Engineer at least five (5) working days in advance of requested closure.

If approved by the Engineer, the Contractor shall:

1. At least 72 hours prior to any lane or street closures, detours or any other alterations that can impact traffic, the Contractor shall place electronic message boards at each end of the project to inform the public of the planned alterations to the normal flow of traffic. The location of the message boards shall be approved by the Engineer prior to their installation.

No work may begin under contract until City Engineer's representative has approved Progress Schedule, General Project Notice, Street Construction Notice, Encroachment Permit and Traffic Control Plan.

Time required for review and approval of these items shall not constitute a basis for time extension.

City of Sausalito Community Wide Email System shall be used, in a cooperative effort with the City Public Works Department, to inform the public of pending work scheduled. Traffic Control shall be implemented only during the Working Hours as defined in these Specifications. The Engineer will make no exceptions to this requirement.

On the day of lane or street closure, the Contractor shall notify the Police Department (415) 289-4170, Fire Department 415-289-4155, and notify County Dispatch (415)479-5302.

3. CONSTRUCTION AREA SIGNS

Once construction starts, the Contractor shall furnish and install construction area signs to inform motorists, pedestrians, and bicyclists of work in the streets and sidewalks. These signs may include, but are not limited to, "Road Construction Ahead", "Detour Ahead", "Road Closed". Construction area signs shall be furnished, installed, maintained, and removed when no longer required in accordance with the provisions in Section 12, "Temporary Traffic Control Devices" of the State Standard Specifications and these Special Provisions. Construction area signs shall be metal, with reflective coating, black on orange, and securely mounted. Signs shall be kept clean and in good repair. The Contractor's control plan shall show the location of the signs.

The Contractor shall be responsible for providing, placing, and installing all construction area signs. The signs shall not be installed on trees, utility poles, private property, traffic signals, or any other appurtenance, unless approved by the Engineer.

CHANGEABLE MESSAGE SIGNS

At least two (2) changeable message signs shall be made available during the project, as requested by the City and shall remain in service for as long as construction is in effect. The changeable message sign shall be a pull-type, solar-powered LED sign.

PROJECT INFORMATION SIGN

The Contractor shall furnish and install one (1) Project Signs, with a minimum dimension of 4' x 4' - 3/4" plywood and bolted to 4" x 4" redwood posts at a location to be designated by the Engineer. The sign shall be made by a professional sign company, approved in advance by the Engineer. The sign information shall be provided by the City of Sausalito as shown below. The sign shall be installed prior to construction and maintained in place for the duration of the project by the Contractor. Sign shall be repaired or replaced at no cost to the City of Sausalito, if damaged or stolen.

CITY OF SAUSALITO
NORTH STREET STEPS SLOPE REPAIR PROJECT
PROJECT

CONTRACTOR
"Contractor's Name"
"Contractor's
Phone Number"
CITY CONTACT
xxxxxxxxxxx

The Contractor shall remove the project sign at the end of the contract and dispose in a legal manner.

4. TRAFFIC CONTROL SYSTEM MAINTENANCE

It shall be the responsibility of the Contractor to maintain signs and barricades overnight and on weekends. It shall be the responsibility of the Contractor to make sure that the signs remain posted until no longer required and are protected from vandalism or removal.

5. MEASUREMENT AND PAYMENT

The lump sum price paid for **"Traffic Control System"** (**Bid Item 2**) shall include furnishing all labor (including flaggers and detours), materials, equipment and incidentals necessary to provide for the convenience and safety of the public and to facilitate the performance of the contract work as shown on the Plans and specified herein.

Compensation for providing the traffic control, pedestrian path of travel, Traffic Control Plan, Pedestrian Detour Plan, construction area signs, electronic changeable message signs, and any other requirements of this section shall be considered as included in the contract price paid under “Traffic Control System,” in these Special Provisions and no additional compensation will be allowed.

Payments for the lump sum item for Traffic Control shall be determined based on the Contractor’s baseline schedule. Thus, if the Contractor completed 25% of the work as defined in the schedule, the Engineer will pay 25% of the traffic control item.

10-5 EROSION & SEDIMENT CONTROL (BID ITEM 3 & BID ITEM 10)

1. GENERAL

The Contractor shall provide all materials, equipment, and labor necessary to furnish, place, and maintain all water pollution control systems, including construction, maintenance, and inspection of said systems, as required to perform the work in accordance with Section 13, “Water Pollution Control,” Section 5-1.36, “Property and Facility Preservation,” of the Standard Specifications.

The Contractor shall submit an Erosion and Sedimentation Control Plan (ECP) to the Engineer for review and must be accepted prior to beginning of work and submitted through the City of Sausalito Encroachment Permit Process. The Contractor shall be fully responsible for implementing, maintaining, and repairing all storm water pollution controls as described in his approved ECP for the duration of the construction contract. The Contractor shall make any repairs to the storm water pollution controls and amend the ECP if, in the opinion of the Engineer, the Contractor is not in compliance with the ECP.

The Contractor shall be responsible for any fines imposed by the Regional Water Quality Control Board or other agency as a result of noncompliance, negligence, or violation of permit conditions.

Construction vehicles and equipment entering existing paved areas shall be free of mud, silt and other debris during all phases of work. No mud, silt and other debris shall be tracked on paved surfaces. If such materials are tracked on the streets or other paved areas both public and private, the Contractor shall immediately remove these materials prior to these materials entering into the storm drain system.

Stockpiling of materials on the street will not be allowed unless otherwise approved by the Engineer. The Contractor shall cover with plastic any construction or excavated materials which may possibly erode and enter the storm drain system of paved streets or other paved areas both public and private. Stockpiling of dirt on paved areas will not be allowed.

The Contractor shall sweep the work area and clean up the work site daily before leaving the site or more frequently as may be directed by the Engineer.

The Contractor shall be responsible throughout the duration of the project for installing, constructing, inspecting and maintaining the control measures included in the ECP and any amendments thereto and for removing and disposing of temporary control measures.

To ensure the proper implementation and functioning of temporary erosion control measures, the Contractor shall regularly inspect and maintain the construction site for the control measures identified in the ECP. The Contractor shall identify corrective actions and time frames to address any damaged measures or reinitiate any measures that have been discontinued.

During the length of the project, inspections of the construction site shall be conducted by the Contractor to identify deficient measures. The inspections shall be, but not limited to as follows:

1. Prior to a predicted storm;
2. After all precipitation which causes runoff capable of carrying sediment from the construction site;
3. At 24 hours intervals during extended precipitation events; and
4. Routinely, on a minimum daily basis.
5. If the Contractor identifies a deficiency in the deployment or functioning of an identified control measure, the deficiency shall be corrected in a timely manner.
6. If the Engineer identifies a deficiency in the deployment or functioning of an identified control measure, the Contractor will be notified and the deficiencies shall be corrected by the Contractor in a timely manner.
7. Failure to make the necessary repairs or other necessary maintenance when directed by the Engineer shall result in the necessary repair work being done by City forces the Contractor will be billed at double the rate of all City expenses.

Records of all inspections and compliance reporting must be retained as part of the ECP for review at any time by the Engineer. Upon completion of the project construction records shall be retained by the City/operator with a copy of the final ECP.

Refer to Plan Sheet 2, Erosion & Sediment Control Notes. Installation of Erosion Control Mats shall be per the manufacturer's recommendations. Fixed aperture netting shall not be allowed.

2. HYDROSEED

Work under this section shall comply with Section 21-2 Erosion Control Work of the Standard Specifications. Seed must comply with Section 21-2.01C(3) of the Standard Specifications, but that contractor must submit proof that ordered seed has been placed at least 30 days before seed application.

Work includes an establishment period of 30 calendar days, commencing immediately after completion and acceptance of the initial hydroseeding application. If during the establishment period, areas are lacking in sufficient seeding to assure adequate growth, such areas shall be recultivated and reseeded within 24 hours after written notification from the Engineer.

3. MEASUREMENT AND PAYMENT

The contract lump sum price paid for Erosion & Sediment Control (**Bid Item 3**) and the contract square foot unit price for Hydroseeding (**Bid Item 10**) shall include full compensation for furnishing all labor, materials, tools, equipment, incidentals, and maintenance, complete in place as specified in these Special Provisions, as shown on the Plans and as directed by the Engineer and no additional compensation will be allowed therefore.

10-6 EXPLORATORY EXCAVATION

1. GENERAL

The Contractor shall perform exploratory excavations (potholes) to determine the location and depth of existing utility lines to support the installation of facilities, and all other tasks required for the successful completion of this project. Exploratory excavation shall conform to Section 7-1.11, "Preservation of Property" and Section 8-1.10, "Utility and Non-highway Facilities" of the Standard Specifications.

The Contractor shall contact Underground Service Alert to assist in determining the extent of potholing required. Exploratory excavation (potholing) shall be at the Contractor's expense.

The Contractor shall cut neatly the asphalt or concrete and use a vacuum type excavation device to remove soil to the depth of the utility. The Contractor shall coordinate with the City and outside utility agencies prior to exploratory excavation.

The Contractor shall provide backfill and surface restoration. Backfill shall be per the County of Marin standard drawings. The Contractor shall replace pavement or surfacing material in kind so that no discontinuity between the new and existing surface results. The minimum thickness of asphalt shall be four inches.

The Contractor shall provide the Engineer a description (material, diameter, etc.) of existing utility exposed by the exploratory excavation prior to commencing construction. The exploratory excavation log shall be a neatly redlined plan that shows the horizontal and vertical location (the depth) of each exploratory excavation. The Contractor shall immediately notify the Engineer of any conflicts that prevent the satisfactory completion of the work.

The Contractor shall take care not to damage any existing facilities during exploratory excavation. Existing facilities damaged by the Contractor's operations, as determined by the Engineer, shall be repaired or replaced to the satisfaction of the Engineer and the City of the utility if the City is different from the City, all at the Contractor's expense.

2 . MEASUREMENT AND PAYMENT

Full compensation for conforming to the provisions in this section, not otherwise provided for, shall be considered as included in prices paid for the various contract items of work involved and no additional compensation will be allowed therefor.

10-7 **CLEARING & GRUBBING (BID ITEM 4)**

PART 1- GENERAL

1.01 SECTION INCLUDES

A. Removal of bushes, shrubs, grass, weeds and other vegetation within the construction area, either on the slope to be stabilized or along the crest of the slope.

B. Limits of clearing and grubbing and existing trees that are to be protected are shown on the Drawings.

PART 2 – PRODUCTS Not Used.

PART 3 – EXECUTION

3.01 CLEARING

A. Clearing operations shall be conducted in a manner which will prevent damage to vegetation outside the clearing limits.

1. Removal: Remove bushes, shrubs, weeds and other vegetation that would otherwise interfere with installation of new wire mesh and/or ground anchors, including within a one-foot perimeter adjacent to the limits of the wire mesh. Clearing shall also include removal of the existing wood wall at the toe of the slope along Bridgeway, as shown on the Plans.

3.02 GRUBBING

A. General: Includes removal of g bushes, shrubs, weeds and other vegetation below ground level within the limits of the work area after clearing.

B. Stumps: Cut existing stump flush with ground surface as shown on the plans.

3.03 PROTECTION

A. The Contractor shall protect all irrigation facilities, hardscape trees, shrubs, and other plants beyond the areas to be cleared and grubbed and shall not trespass beyond the construction limits. Damaged or removed facilities and planting shall be replaced in-kind at the Contractor's sole expense.

B. The edges of clearings and cuts through trees shall be irregularly shaped to soften the visual impact of straight lines.

3.04 DISPOSAL OF CLEARED AND GRUBBED MATERIALS

A. All material removed as a result of clearing and grubbing shall be disposed of legally off-site.

3.05 MEASUREMENT AND PAYMENT

The Lump Sum price paid for Clearing and Grubbing (**Bid Item 4**) shall include full compensation for furnishing all labor, materials and equipment and incidentals necessary to perform the removal and disposal of materials, including but not limited to physical obstructions to the work, vegetation and structures and removal and replacement of handrails as shown or noted on the Plans and specified here in, or directed by the Engineer and no additional compensation will be allowed therefor.

END OF SECTION

10-8 SCALING & EXCAVATION (BID ITEM 5)

1.01 DESCRIPTION

A. The Work covered by this section consists of furnishing all labor, equipment, and materials for the following tasks:

1. Removing loosened blocks of bedrock from the repair area of slope.

2. Excavating and removing loose soil and up to boulder-sized material (talus and colluvium) that has been formed and/or deposited on the bedrock surface by natural weathering processes.

3. Scaling loosened blocks of rock from the exposed bedrock surface following excavation and removal of the talus and colluvium.

4. Excavating and removing material that has been scaled from the slope.

5. Protecting all existing infrastructure on or at the toe of the slope during all scaling and excavation activities.

6. Transportation and disposal of excavated soil and rock.

7. All supplementary Work incidental to the services outlined above, whether or not specifically indicated in the Contract Documents.

B. Scaling is expected to include both mechanical scaling and hand scaling.

C. Inflatable bladders may be used to remove large blocks of rock that are too large to remove with hand scaling bars.

D. The use of explosives is prohibited.

1.03 SUBMITTALS

A. Submit the plan and schedule for scaling and excavation 14 days prior to starting the Work. The plan shall include descriptions of the methods and equipment for scaling and excavation, survey equipment, methods of stockpiling, loading, hauling, and disposal of waste material, and the proposed disposal location.

1.04 DEFINITIONS

A. Mechanical Scaling: The removal of loosened or unstable slabs or blocks of rock from the bedrock surface using mechanical means, such as dragging scaling equipment across the face.

B. Hand Scaling: Removal of loosened or unstable slabs or blocks of rock from the bedrock surface by personnel using rock climbing techniques to rappel down the slope. Hand scaling equipment typically includes hand-operated pry bars, pneumatic bladders placed in cracks within the rock to be scaled, and similar tools.

C. Unclassified Excavation: Removal of any combination of topsoil, earth, weathered rock, intact rock, cobbles, boulders or other subsurface material.

PART 2 – PRODUCTS NOT USED

PART 3 – EXECUTION

3.01 GENERAL

A. The Contractor shall notify the Engineer at least 48 hours in advance of the commencement of any phase of scaling or excavation and/or of any delays or work stoppages.

B. Scaling and excavation shall be accomplished with equipment, methods, and workmanship that will minimize disturbance or damage to sound, intact bedrock.

C. All excavation shall be performed in a safe manner. Loose material shall be scaled from the cliff face prior to excavation of the talus wedge. Appropriate measures shall be taken to protect personnel and equipment from falling material.

D. The Contractor's excavation and scaling methods shall be such that after completion of excavation all peripheral surfaces are sound and not cracked or loosened.

E. Contractor shall protect the Powerhouse, other nearby structures, pipelines, and utilities from damage during scaling operations.

F. Contractor shall coordinate with the Owner to identify the locations(s) of buried utilities or other critical infrastructure within the work area and take all reasonable measures to protect such infrastructure from damage during scaling and excavation activities.

G. All scaling and excavation shall be performed in accordance with applicable OSHA regulations. Safety shall at all times remain the sole responsibility of the Contractor.

3.02 MECHANICAL SCALING

A. Contractor shall mechanically scale work area of the slope before permitting hand scaling crews to rappel down the slope and before clearing and grubbing below the cliff and excavating the talus wedge. The purpose of mechanical scaling is to remove smaller-sized material.

B. Mechanical scaling equipment may consist of an unhinged “caterpillar” track, heavy marine anchor chain, tugboat chain, dragline chain, or other Engineer-approved device that can be hung over the crest and dragged across the slope face to effectively remove loosened material from the slope.

C. Contractor shall protect all infrastructure from impact or other damage caused by material scaled from the cliff face during mechanical scaling operations.

3.03 HAND SCALING

A. Contractor shall hand-scale loose or unstable blocks of rock from the slope that cannot be removed by mechanical scaling.

B. Contractor shall all infrastructure from impact or other damage caused by material scaled from the cliff face during hand scaling operations.

C. Hand scaling of the cliff shall be performed only after mechanical scaling is complete. Hand scaling of the remainder of the slope shall be performed following excavation of the talus wedge.

D. Hand scaling may consist of rope access crews on slope using pry bars, pneumatic bladders (“air bags”), or other approved means and methods.

E. Contractor is responsible for providing suitable anchorages for climbing ropes.

3.04 EXCAVATION

A. Excavate/scale slope as required to remove loose material and abrupt elevation changes and to provide a relatively uniform surface for installation of the anchors and mesh.

B. Contractor shall protect all infrastructure from damage during excavation and removal of spoil.

C. Removal of excavated spoil is expected to require hoisting or conveying material to the crest or toe of the slope.

D. All excavations are the responsibility of the Contractor and shall conform to all Federal, State, and/or local safety requirements.

3.05 DISPOSAL OF SCALED AND/OR EXCAVATED MATERIALS

A. Excavated and scaled material shall be removed from the site and legally disposed of off site.

B. The Contractor shall prevent debris from polluting soil, groundwater, or surficial runoff until disposal in accordance with the requirements of the current County Best Management Practices.

3.06 MEASUREMENT AND PAYMENT

The contract paid per cubic yard for Scaling and Excavation (**Bid Item 5**) shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals necessary to complete the work and removal and disposal of materails as shown on the plans and specified herein, or as directed by the Engineer and no additional compensation will be allowed therefor.

10-9. GROUND ANCHORS & STEEL MESH (BID ITEM 6, BID ITEM 7, BID ITEM 8, BID ITEM 9)

PART 1 – GENERAL

1.01 DESCRIPTION

A. This item consists of the furnishing of all labor, materials, and equipment to install cement-grouted ground anchors, erosion control mat, and steel wire slope mesh with boundary ropes on the slope.

1. Anchor geometry and spacing and locations for installation of slope mesh and boundary ropes are shown on the Drawings.

2. Additional anchors may be required based on actual conditions encountered and as directed by the Engineer.

3. Ground anchor, slope mesh, and erosion control mat requirements are described on the Plans and in these Specifications.

1.02 REFERENCES

A. ASTM International

1. ASTM A 180: Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished

2. ASTM A 123: Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

3. ASTM A 153: Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

4. ASTM A 536: Standard Specification for Ductile Iron Castings

5. ASTM A 615: Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement

6. ASTM A 767: Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement

7. ASTM A 780: Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings

8. ASTM C 109: Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50 mm] Cube Specimens)

9. ASTM C 150: Standard Specification for Portland Cement

10. ASTM F 432: Standard Specification for Roof and Rock Bolts and Accessories

11. ASTM F 436: Standard Specification for Hardened Steel

B. U.S. Military Specification (MILSPEC)

1. MIL-P-21035B: Paint, High Zinc Dust Content, Galvanizing Repair

C. U.S. Army Corps of Engineers (USACE)

1. CRD-C 400: Requirements for Water for Use for Mixing or Curing Concrete

2. EM-385-1-1: Safety and Health Requirements

D. Post Tensioning Institute (PTI)

1. Recommendations for Prestressed Rock and Soil Anchors, Fourth Edition

2. PTI Manual, Sixth Edition

E. American Concrete Institute (ACI)

1. ACI 305R-10: Guide to Hot Weather Concreting

2. ACI 306R-10: Guide to Cold Weather Concreting

F. Geobrugg AG

1. Tecco® Slope Stabilization System Product Manual, latest version

2. Tecco® Slope Stabilization with New Connection Clip T3, April 2009 (unless a superseding document is available from Geobrugg AG).

G. Deutsches Institut für Normung [German Institute for Standardization] (DIN)

1. DIN EN 13411-5 Terminations for Steel Wire Ropes

1.03 DEFINITIONS

A. Alignment Load: A nominal load maintained on the ground anchor to keep the testing equipment in position.

B. Design Load: The minimum load required for each ground anchor based on the bonded length shown on the Plans.

C. Ground Anchor: Anchors comprised of a deformed steel bar grouted into a near horizontal drilled hole, together with anchorage hardware, for the purpose of reinforcing a slope by transferring tensile loads into the soil and/or rock formation.

D. Anchorage Hardware: Includes anchor plates, washers, and hex nuts.

1.04 SUBMITTALS

A. General

1. Submittals shall be made a minimum of 14 days prior to commencing installation of ground anchors and slope mesh.

2. Safety-related submittals are for information only. Review by the Engineer shall in no way relieve Contractor from their sole responsibility for site safety.

B. Preconstruction

1. Shop drawings, a detailed description of ground anchor and steel mesh assemblies, and installation procedures and sequence, including:

a. Catalog cuts, brochures, or other descriptive literature describing the equipment to be used for drilling, handling, installing, and grouting the ground anchors. Description of drilling equipment shall include rod sizes and bit diameter. Also include method and

equipment to be used for checking angle and alignment of ground anchor holes.

b. Details of how ground anchors will be installed on the slope, including a description of work platform(s), crane/hoist, and other equipment.

i. If a crane will be used, submittal shall describe operating procedures, including communication procedures if work platform is not visible to crane operator and verification that crane capacity and boom angle are compatible with supporting the work platform at all locations where ground anchors are to be installed.

c. Ground anchor details, including threadbar, couplings, plate, nut, washers, grout tubes, grout socks, centralizers, and the geometry of the fully assembled anchor.

d. Cement grout mixture proportions, including test reports demonstrating that the proposed grout mixture will meet the specified requirements and a description of how the proportions of grout ingredients will be measured in the field.

e. Cement grouting procedures, including procedures to dry-pack "birds beak" voids after cement grout has set.

2. Details of storage facilities that will be used to protect ground anchors and ground anchor components against damage and maintain the ground anchors and components at proper temperatures during extreme weather conditions.

3. Qualifications, experience record, and at least two references for installer and foreman in charge of ground anchor and steel mesh installations.

4. Descriptions of stressing jacks, gages, load cells, or other devices for measuring testing load, certified calibration records for each set of jacking equipment, and current testing curves for stress measurement gages which show that gages have been calibrated for the jacks for which they are used. Equipment shall have been calibrated within the 180 calendar days prior to the start of ground anchor testing at the site.

5. Installation procedures for installing erosion control mat.

6. Procedures for installing slope mesh and boundary ropes and methods for fastening the ropes and mesh to the ground anchors.

C. Test Reports and Certificates for Ground Anchor Materials

1. Submit the following at least 14 days before commencing ground anchor installation:

a. Mill reports and a certificate from the manufacturer stating chemical properties, ultimate strength, yield strength, modulus of elasticity, for each heat or lot of steel delivered to the site. This requirement applies to the ground anchor bars, anchorage hardware, and couplers.

D. Test Reports and Certificates for Erosion Control Mat and Slope Mesh

1. Submit the following at least 14 days before installing erosion control mat and slope mesh:

a. Certificates of compliance from the manufacturer that the erosion control mat, steel wire slope mesh, and connection clips meet the specified requirements.

E. Daily Reports

1. Submit records of the quantity and locations of installed ground anchors, results of proof and performance tests completed, and any difficulties encountered in drilling or installing ground anchors at the end of each work shift, or prior to commencing the next shift.

1.05 QUALITY ASSURANCE

A. Installation of ground anchors and slope mesh shall be in accordance with the recommendations of the respective manufacturers. When such recommendations differ from the requirements of this section, request clarification from the Engineer before proceeding.

1. Technical representatives from the ground anchor and slope mesh manufacturers shall be available to answer questions and assist with solving problems related to installation.

1.06 QUALIFICATIONS

A. Ground anchor installer shall be experienced in the Work of this section with a minimum of 2 years of experience installing cement-grouted ground anchors.

B. Foreman shall have a minimum of 5 years of experience supervising and installing cement-grouted ground anchors.

C. Foreman shall have completed at least 3 other projects within the past 5 years where similar slope mesh was installed as slope/ground support. Alternatively, Contractor may arrange to have a representative of the slope mesh manufacturer on site at all times when steel mesh is installed to provide supervision and guidance.

1.07 DELIVERY, STORAGE AND HANDLING

A. Materials shall be suitably wrapped, packaged or covered at the factory or shop to prevent being affected by dirt, water, oil, grease, and rust.

B. Materials shall be protected against abrasion or damage during shipment and handling.

C. Materials stored at the site shall be protected from adjacent construction operations.

D. Steel damaged by abrasion, cuts, nicks, heavy corrosions, pitting, welds or weld spatter shall be rejected and removed from the site.

E. The steel threadbar and cement grout shall be stored and installed at a temperature ranging between 40 and 70 degrees Fahrenheit. The steel threadbar and cement shall be at the same temperature at the time of installation.

G. Heated storage facilities shall be provided at the work site to meet these criteria during cold weather conditions.

PART 2 – PRODUCTS

2.01 GROUND ANCHORS

A. Ground anchors shall be ASTM A615, Grade 75 Threadbar as manufactured by Dywidag or approved equal. Bar size shall be as shown on the Drawings. Anchors shall be hot-dip galvanized in accordance with ASTM A153.

B. Slope Mesh Anchor Plates

1. Slope mesh anchor plates shall be TECCO® system spike plates P33/40 N with caped claws (for rock surfaces) or approved equal. Plates shall be hot-dip galvanized in accordance with EN ISO 1461.

C. Washers

1. Spherical washers shall ensure that there is continuous load transfer between the tightened hex nut and the anchor plate. Spherical washers shall be steel or malleable iron and shall be hot-dip galvanized in accordance with ASTM A123.

2. Flat washers shall be hardened steel and shall be hot-dip galvanized in accordance with ASTM A123.

D. Hex Nuts

1. Spherical Hex nuts used on threaded portions of ground anchors shall be of the heavy-duty type, with hexagonal heads. Nuts shall develop an ultimate strength of not less than 125 percent of the minimum yield strength of the threadbar.

2. Hex nuts shall be hot-dip galvanized in accordance with ASTM A123.

G. Centralizers

1. Centralizers shall be plastic or other approved material.

2. Centralizers shall permit grout to freely flow up the drill hole.

3. Each ground anchor shall include at least three centralizers placed no more than 5 feet apart.

2.02 CEMENT GROUT, MORTAR, AND APPURTENANCES

A. Cement grout mixture proportions shall be the responsibility of the Contractor. Grout shall consist of a homogenous, pumpable, stable mixture of Portland cement and water. The water content shall be the minimum necessary for proper placement but the water-cement ratio and shall be between 0.4 and 0.5 by weight. Final proportions of materials shall be based on results of tests made on sample mixtures of grout.

B. The minimum compressive strength of two-inch cubes, molded, cured, and tested in accordance with ASTM C 109 shall be 2,500 psi at 7 days and 4,000 psi at 28 days. The Contractor shall be responsible for sampling, curing, and breaking of grout test cubes for determining mix design, and all testing shall be done by an independent laboratory approved by the Engineer.

C. Portland cement shall be ASTM C150, Type II or V.

D. Water for mixing cement grout shall meet the requirements of CRD-C 400.

2. Water temperature prior to mixing shall be between 50 and 70 degrees Fahrenheit. During periods of cold or hot temperatures, water shall be heated or cooled before mixing grout.

E. Admixtures

1. Admixtures, which control bleed, improve flowability, reduce water content and retard set, may be used in the grout subject to the approval of the Engineer. Any admixtures used shall be compatible with the ASTM A615, Grade 75 steel and shall be mixed in accordance with the manufacturer's recommendations.

F. Grout Tubes

1. Grout tubes shall be polyethylene tubing or as recommended by the ground anchor manufacturer/supplier. Inside diameter of grout tubes shall be adequate for the proposed grout mix. Tubes shall be able to withstand the expected grouting pressure.

G. Grout Socks

1. Grout socks shall consist of Williams Form Engineering grout socks S5Z-01 or approved equivalent.

H. Dry-Pack Mortar

1. Dry-pack mortar shall consist of one part cement, 2-½ parts sand that will pass the No. 16 (1.18 millimeter) sieve, and sufficient water to produce a mixture that will just stick together while being molded into a ball with the hands. Mortar should not exude water but leave the hands damp when handled.

2.03 SLOPE MESH AND APPURTENANCES

A. Slope mesh shall be high tensile strength steel wire TECCO® G65/3 mesh of brown or green color manufactured by Geobrugg AG or approved equal.

B. Slope mesh shall be corrosion protected with Geobrugg Supercoating® A or approved equal.

C. Mesh connectors shall be Geobrugg TECCO® T2 and T3 connection clips as shown on the drawings. Corrosion protection shall consist of Geobrugg Ultracoating® or approved equal.

2.04 BOUNDARY ROPES

A. Boundary ropes shall be the heavy type as described in the Geobrugg Tecco® Slope Stabilization System Product Manual (12 mm diameter steel wire rope with a minimum breaking force of 91 kilonewtons) or approved qual.

B. Boundary ropes shall be corrosion protected with Geobrugg Supercoating® or approved equal.

C. Wire rope clips shall conform to DIN EN 13411-5, or as recommended by Geobrugg or approved equal. Wire rope clips shall be galvanized.

D. Wire rope thimbles shall be heavy-duty, hot-dip galvanized, with eye dimensions sized to fit over galvanized threadbar of the dimensions shown on the plans and a saddle dimension appropriate for the boundary rope.

2.05 EROSION CONTROL MAT

A. Erosion control mats shall be North American Green SC150BN or approved equal.

2.06 EQUIPMENT

A. Drilling Equipment

1. Holes may be advanced by rotary, percussion, rotary/percussion, down-hole hammer, or using other drilling method suitable for advancing the drill tools to the depths and at the alignment specified.

B. Grouting Equipment

1. Grout Mixer: The grout mixer shall be a high-speed, high-shear, colloidal type grout mixer capable of continuous mechanical mixing that will produce uniform and thoroughly mixed grout which is free of lumps and undispersed cement.

2. Measuring Devices: Contractor shall provide devices capable of measuring the relative proportions of grout ingredients such that each batch of grout is consistent with the approved mix design.

3. Grout Pump: The grout pump shall be of the positive displacement type. It shall be capable of pumping at all flow rates below 20 gallons per minute and shall be capable of pumping at a pressure of at least 50 psi at zero flow rate. The pumping equipment shall have a pressure gage capable of measuring pressures of at least 150 psi.

C. Testing Equipment

1. Testing equipment shall consist of a hydraulic jack with calibrated pressure gage for applying the load and a dial gage or vernier scale to measure ground anchor movement. The ram travel of the stressing equipment shall be not less than 6 inches. The pressure gage shall be graduated in 100 psi increments. The movement measuring device shall be capable of measuring to 0.001-inch and be capable of measuring the theoretical elastic elongation of the total ground anchor length at the maximum Test Load without resetting the device.

2. The stressing equipment and pressure gage must have been calibrated as a unit by an independent firm no more than 180 calendar days prior to commencing Work under this contract and at six-month intervals throughout the period of use. Calibrations shall be performed at least every three months, after rough handling of the test equipment, after damage and repair of any test equipment component, or as requested by the Engineer.

PART 3 – EXECUTION

3.01 GENERAL

A. All the equipment used in handling and placing the ground anchors shall be such that it does not damage the Grade 75 steel or galvanized coating.

B. Each ground anchor shall be inspected prior to insertion into the hole. Any damage to ground anchors or ground anchor heads shall be repaired prior to insertion, or, if determined by the Engineer to be not repairable, shall be

replaced. Minor damage to the galvanized coatings shall be repaired by applying a compound meeting the requirements of MIL-P-21035B.

3.02 SEQUENCE OF INSTALLATION

A. Ground anchors shall be installed and tested in accordance with the provisions of this Section before installing slope mesh, boundary ropes, and erosion control mat.

3.03 DRILLING

A. Just prior to drilling holes for ground anchors the area shall be inspected and scaled as required to assure safety and to provide adequate faces to seat the mesh anchor plate.

B. The Contractor shall layout the ground anchors using the approximate locations shown on the Plans. Prior to beginning drilling, the proposed ground anchor layout shall be reviewed and approved by the Engineer prior to starting drilling.

C. Care shall be taken while drilling to avoid damage to existing structures and further disturbance to the slope.

D. Drilled holes shall be blown clear with compressed air introduced at the back of the hole to remove all drill cuttings, sludge, and debris immediately before installation of the ground anchor assembly.

E. The Contractor shall be responsible for maintaining stability of each drilled hole until the ground anchor has been installed, grouted, and accepted.

3.04 INSTALLATION OF GROUND ANCHORS

A. Ground anchors shall be installed in accordance with the recommendations of the manufacturer.

B. Ground anchors shall be installed and grouted on the same day in which the hole is drilled unless otherwise approved by the Engineer.

3.05 CEMENT GROUTING

A. All ground anchors shall be fully grouted. For anchors which will be load tested, the unbonded portion of the drilled hole shall be left ungrouted, or the anchor sleeved, until after testing is complete.

B. ACI Recommendations for hot weather concreting shall be followed when the ambient air temperature is 75 degrees Fahrenheit or above.

C. ACI Recommendations for cold weather concreting shall be followed when the ambient air temperature is 40 degrees Fahrenheit or below.

D. The “birds beak” void shall be completely filled with dry-pack mortar. Dry pack mortar should be placed in 6-inch lifts beginning at the back of the hole, with each lift compacted by rodding. Use care not to damage the ground anchor or galvanized coating when rodding.

1. Dry pack mortar shall not be placed until all testing has been completed as described in Section 3.06.

3.06 ANCHORAGE TESTING

A. Provision shall be made by the Contractor for conducting proof and verification load tests as indicated on the Plans. Anchors to be tested will be selected and observed by the Engineer.

B. Cement grouted ground anchors shall be tested following a period of time not less than seven days after the installation has been completed. Minimum compressive strength of the cement grout at time of testing shall be 4,000 psi.

C. The minimum bonded length shall be as shown on the plans.

D. Ground anchors shall be load tested to confirm that they will resist the design load. Load tests shall be made by incrementally loading the ground anchor. The loads shall be applied with a hydraulic jack equipped with a pressure gage that has been calibrated within the prior 180 calendar days as evidenced by a written certificate. The hydraulic pump shall be capable of applying each load increment within 60 seconds and maintaining the load increment within 5 percent of the intended load during the test period.

1. The Verification Load Tests shall be performed on sacrificial anchors. The testing sequence shall be as a ratio of the design load (DL) as follows.

   AL (0.05 DL), 0.25 DL, 0.50 DL, 0.75 DL, 1.00 DL, 1.25 DL, 1.50 DL (Creep Test Load), 1.75 DL, 2.00 DL

   The alignment load (AL) should be applied and held until no displacement occurs. Dial gauges should be set to “zero” after application of the alignment load. The load at each increment thereafter shall be held for a minimum of 10 minutes or until displacement ceases. The final displacement shall be recorded at each load interval. The creep test load (CTL = 1.50 DL) shall be held for a minimum of 60 minutes, displacement measurements shall be taken at 1, 2, 3, 4, 5, 6, 10, 20, 30, 45 and 60 minutes. The total movement within the period of 6 to 60 minutes shall not exceed 0.080 inches (2mm).

2. The Proof Load Test sequence shall be as a ratio of the design load (DL) as follows.

   AL (.05 DL), 0.25 DL, 0.50 DL, 0.75 DL, 1.00 DL (CTL), 1.33 DL

The alignment load (AL) should be applied and held until no displacement occurs. Dial gauges should be set to "zero" after application of the alignment load. The load at each increment thereafter shall be held for a minimum of one minute or until displacement ceases. The final displacement shall be recorded at each load interval. The creep test load (CTL = 1.33 DL) shall be held for 10 minutes, displacement measurements shall be taken at 1, 2, 3, 4, 5, 6, and 10 minutes. If the total movement between one minute and 10 minutes exceeds 0.04 inches (1mm), the test load shall be held for an additional 50 minutes with further displacement measurements made at 15, 20, 25, 30, 45, and 60 minutes. The total movement within the period of 6 to 60 minutes shall not exceed 0.080 inches (2mm).

3. For all tests, the maximum test load shall not exceed 90 percent of the yield strength of the threadbar.

4. For each load test failure, two (2) additional anchors shall be tested. For example, if 8 anchors are tested and two fail, four additional anchors shall be tested (12 anchors total).

5. Ground anchors which do not pass the anchorage test shall be cut off flush with the ground surface and the hole shall be sealed with a minimum 3-inch-thick mortar patch. Failed ground anchors shall be replaced at no additional cost to the owner.

3.07 INSTALLATION OF SLOPE MESH, BOUNDARY ROPES, & EROSION CONTROL MAT

A. General

1. Slope mesh and erosion control mat shall not be installed until the cement grout has attained a minimum compressive strength of 4,000 psi.

2. Contractor shall use care in handling and installing erosion control mat, slope mesh, boundary ropes, and appurtenances. Materials damaged by the Contractor's operations shall be replaced at the Contractor's sole expense.

B. Erosion Control Mat

1. Slope shall be covered in hydroseed by a licensed erosion control contractor prior to placement of the erosion control mats.

2. Install erosion control mat in accordance with the manufacturer's recommendations as described in the Product Manual, or as directed by the Engineer and/or the manufacturer's on- site representative. The erosion control mat should be fastened to the ground anchors until the slope mesh is installed.

C. Slope Mesh

1. Install slope mesh in accordance with the manufacturer's recommendations (Installation Option Variant A) as described in the Tecco® Slope Stabilization System Product Manual and this Section, or as directed by the Engineer and/or the manufacturer's on-site representative.

2. Cutting or trimming of slope mesh rolls shall be in accordance with the manufacturer's recommended procedure.

3. Overlap of adjacent panels of slope mesh shall be in accordance with the Drawings and the manufacturer's recommendations.

4. Connect adjacent mesh panels using mesh connectors. Use one clip for each diamond-shaped mesh opening, horizontally and vertically.

D. Boundary Ropes

1. Boundary ropes shall be installed in accordance with the manufacturer's recommendations, the Drawings, this Section, and/or as directed by the Engineer and/or the manufacturer's on-site representative.

2. All boundary ropes shall be fastened to the slope mesh using boundary rope connectors. Boundary rope connectors shall be fastened to every other diamond-shaped mesh opening.

3. Boundary rope segments shall be terminated with eye splices, consisting of a wire rope thimble and at least three wire rope clips. Eye splices shall be as shown on the Drawings and as recommend by the manufacturer.

4. Eye splices shall be fastened to ground anchors and held in place with a flat washer and hex nut. One terminal eye splice shall be made when the boundary rope is slack, and the second eye splice shall be completed once the boundary rope has been tensioned.

E. Spike Plates and Anchorage Hardware

1. Install spike plate with the long axis oriented horizontally. Spike plate claws shall be positioned such that they penetrate a complete diamond-shaped mesh opening (i.e., spike plate claws may not be located outside a half diamond at the edge of the mesh).

2. Install spherical washer, flat washer, and hex nut on thread bar.

3. Using calibrated torque wrench, tighten hex nuts onto spike plates to a torque of 250 foot-pounds, plus or minus 10 foot-pounds.

4. Using calibrated torque wrench, tighten hex nuts onto boundary rope eye splices to a torque of 100 foot-pounds, plus or minus 10 foot-pounds.

F. Penetrations

1. Penetrations through the slope mesh (such as to accommodate trees, utility poles, etc) will generally follow the “Holes for Trees” procedure described in the Tecco® Slope Stabilization System Product Manual or per Manufacturer’s recommendations if alternative system is used. This procedure may be modified by the Engineer and/or the Manufacturer’s on-site representative.

PART 4 MEASUREMENT AND PAYMENT

The contract paid per each Production Ground Anchor (**Bid Item 6**), per each Verification Ground Anchor (**Bid Item 7**), per square foot of Slope Mesh, (**Bid Item 8**) and per square foot Erosion Control Mats (**Bid Item 9**) shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals necessary to complete the work in place as shown on the plans and specified herein, or as directed by the Engineer and no additional compensation will be allowed therefor.

END OF SECTION

10-10. SITE CLEAN-UP

1. GENERAL.

On completion of the work, the Contractor shall clean all portions of the project area. This work includes removing all debris, street sweeping, power washing, and removing paint marks within the work zone.

2. MEASUREMENT AND PAYMENT

Full compensation for conforming to the provisions in this section, not otherwise provided for, shall be considered as included in prices paid for the various contract items of work involved and no additional compensation will be allowed therefor.

10-12. AS-BUILT DRAWINGS

1. GENERAL The Contractor shall be responsible for maintaining a set of as built improvement plans with any field changes or deviations made by the contractor or his/her subcontractors. The Contractor shall make annotations with erasable colored pencil conforming to the following color code:

- Additions: Red
- Deletions: Green
- Comments: Blue
- Dimensions: Graphite

This set of as built drawings shall be submitted to the Engineer at the conclusion of construction. Each sheet in the plan set shall be no less than 24 inches tall by 36 inches wide. All markings shall be legible and the plan set shall be clean and free from tears or other damage.

2. MEASUREMENT AND PAYMENT

Full compensation for conforming to the provisions in this section, not otherwise provided for, shall be considered as included in prices paid for the various contract items of work involved and no additional compensation will be allowed therefor.

END TECHNICAL SPECIFICATIONS

Attachment A
Tecco® Slope Stabilization System Manual

GEOBRUGG
BRUGG
Safety is our nature

Manual

TECCO® SYSTEM

Slope Stabilization System

Date: 09.03.2023
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Subject to change without notice.

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CE

Purpose and organization of the manual

The TECCO® slope stabilization system is a mitigation system consisting of a high-tensile steel wire mesh. It is used in combination with soil and/or rock nails to stabilize steep slopes in unconsolidated material and rock liable to slip and break out.

This product manual is the basis for proper planning and execution of the TECCO® slope stabilization system describes the individual construction elements, connections and fastening devices/methods and ensures that

- the range of applications is defined,
- it is manufactured free from defects in accordance with the latest technical expertise,
- complete planning documentation is available,
- the planning of all relevant requirements is sufficient,
- the important boundary conditions are taken into consideration,
- the proofs of bearing safety are verified,
- the installation is carried out professionally and checked correctly.

The product manual is divided into the following sections:

- proof of quality assurance / verification of conformity
- planning fundamentals
- installation instructions
- technical leaflets for the installation
- ISO 9001:2015 certificate

No claims are made that this document is complete. The manual describes standard applications and does not take into account project-specific parameters. Geobrugg cannot be held liable for any extra costs that may be incurred for special cases. In case of uncertainties, please contact the manufacturer. The General Sales Conditions of Geobrugg AG are applicable.

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Romanshorn, March 2023

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(stamp / authorized signatures)

1. Range of application

The TECCO® SYSTEM serves to stabilize steep slopes of unconsolidated material and rocks, and to prevent stones and blocks in disintegrated, loose or weathered rocky slopes from breaking out.

Hereby the surface to be protected is first cleaned, levelled and shaped, and then covered by the TECCO® steel wire mesh. The mesh is fastened by ground or rock nails and pretensioned with a defined force against these nails by means of system spike plates.

Reacting to this, the mesh presses against the slope surface and in this way limits deformations, slips and breaking out from occurring. This external pretensioning increases the safety and efficiency of the system decisively.

The nails to which the TECCO® SYSTEM are fastened are arranged in a pattern. They can also be used to stabilize deeper-reaching slips or slides. Prerequisite for this is the appropriate knowledge of existing or potential slipping or creeping surfaces or zones, and supplementary to the proofs of surface protection, proofs of safety against rupture of the terrain must be submitted.

While the open structure of the TECCO® SYSTEM lends itself to surface greening, it is also suitable for planting domestic shrubs adapted to the location. In exceptional cases it is also possible to plant smaller trees.

It is generally recommended to reinforce the edge areas of the mesh with boundary ropes. These are secured to spiral rope anchors arranged on the side and tensioned against them. In case of an uneven surface and along edges there may be a need for short or driven nails in order to tension the mesh as tightly as possible to the ground everywhere and to fasten the edges auxiliary.

2. Quality of the individual parts of the system

Geobrugg AG, the former Geobrugg Protection Systems Divison of Fatzer AG, Romanshorn has been certified since August 22nd 1995 under the registration no. CH-S34372 in accordance with the Quality Management Systems Requirements (ISO 9001:2015). The certifying body is the Swiss Association for Quality and Management Systems (SQS), which belongs to IQNet. The quality manual completely specifies how to test the system components (raw material, commercial as well as end products) comprehensively in order to exclude deficiencies in quality. The relevant certificates are attached in the appendix.

3. Suitability for the purpose

Proper functioning of the system is based on proofs of the stability of the individual elements including the fastening devices by means of general and system-specific earth-static and rock-static models. For the soil / rock nails, proof of the inner (nail) and of the outer (transmission of force into the subsoil) stability must be established.

Prerequisite for the proofs is an adequate knowledge not only of the topographic and geological circumstances, but also of the existing shear strength parameters of the subsoil.

4. Planning fundamentals and implementation

Chapter 1 - 6 of this product manual describe the planning tasks and the knowledge and fundamentals required.

5. Installation of the system

Chapter 7 - 18 of this product manual describe the individual steps in detail, how the TECCO® SYSTEM is to be installed by appropriately qualified building contractors and which points need to be observed in particular.

6. Product Liability Clause

Rockfall, landslides, debris flows or avalanches are sporadic and unpredictable. Causes can be human (construction, etc.) or environmental (weather, earthquakes, etc.). Due to the multitude of factors affecting such events it is not and cannot be an exact science that guarantees the safety of individuals and property.

However, by the application of sound engineering principles to a predictable range of parameters and by the implementation of correctly designed protection measures in identified risk areas the risks of injury and loss of property can be reduced substantially.

Inspection and maintenance of such systems are an absolute requirement to ensure the desired protection level. The system safety can also be impaired by events such as natural disasters, inadequate dimensioning parameters or failure to use the prescribed standard components, systems and original parts; and/or corrosion (caused by pollution of the environment or other man-made factors as well as other external influences).

GEOBRUGG BRUGG Safety is our nature

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Enclosures

- Technical leaflets for the installation
- System drawing TECCO® G45/2
- System drawing TECCO® G65/3
- System drawing TECCO® G65/4
- Installation options Interception Apron
- CE Certificate TECCO® G45/2
- CE Certificate TECCO® G65/3
- CE Certificate TECCO® G65/4
- Certificates ISO 9001:2015

1 Introduction

The TECCO® SYSTEM is an engineered slope protection and stabilization system which is used to stabilize steep slopes of unconsolidated and rocky material and to prevent stones and blocks in disintegrated, loose or weathered rock faces from breaking out.

Together with the nails to which the mesh is fastened and against which the mesh is pretensioned, the TECCO® SYSTEM must satisfy all requirements of a soil- and rock-static nature.

The TECCO® SYSTEM consists of the high-tensile steel wire mesh and associated, suitably adapted spike plates. The nails are commercially available products (e.g. GEWI, TITAN, etc.). The anchor type, diameter, load bearing resistance in respect of strain and pressure, as well as their length depend on the project-specific requirements.

In general, the corrosion protection must be in accordance with the project-specific requirements. Thereby, if there is an increased risk of corrosion (e.g. with aggressive hillside water, in a coastal area, an acidic environment, in case of stray current or the possibility of generating of macro elements, etc.), this has to be taken into account.

2 Planning Sequence

The proper planning of a TECCO® slope stabilization system requires the following planning sequence to be carried out right. The sequence must include a summary of masses and details of particular measures (e.g. drainage) to guarantee the suitability for the intended purpose:

Planning steps	
1. Problem	Define the problem
2. Slope Stabilization System TECCO®	General possible applications as per scope of application
3. Function	• Slope stabilization • Protection against slides breaking out • Rockfall protection • Erosion protection
4. Planning fundamentals as per TECCO® check list	• General project information • Topography • Terrain profiles • General Geology • Subsoil conditions • Stratification • Surface layers • Soil and rock characteristic values • Deep sliding surfaces • Water • Special aspects
5. Dimensioning by means of the RUVOLUM® dimensioning concept	• Proofs of bearing safety • Measures to ensure the suitability for the intended purpose From the above follows: • Maximum distances between nails • Nail types and lengths • Pretensioning forces • Object-specific measures
6. Project	• Dimensions of the safety measures • Nails plan • Preparation of the terrain • Scope, material requirement • Ordering of special measures • Erosion protection • Drainage • Greening, planting • Call for tenders

3 Planning Fundamentals

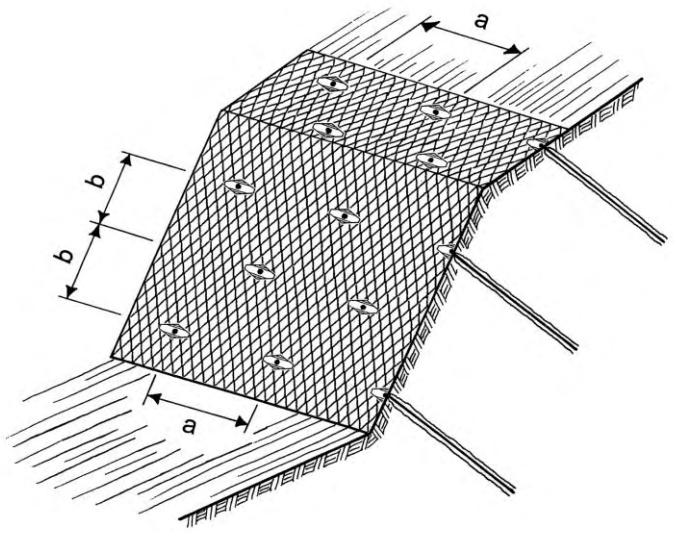
To enable proper planning of a TECCO® slope stabilization system, the most important boundary conditions must be known.

The recommended basis for this is the TECCO® check list which permits recording of all relevant basic data and boundary conditions required for dimensioning and for project work. Total completion of the check list is a prerequisite before processing of the project can be continued.

Various data and information must be procured from site plans, geology, characteristic values of the ground, etc. Hereby it is important to state the sources of documents and data so that the responsibilities can be made clear. If, for example, a geologist or geotechnician provides the important information on the subsoil and the critical characteristic values, this person is also responsible for these details which serve to dimension the system and to establish proof of the bearing safety. The supplier of the system cannot be held liable for damages originating from misjudgements in this respect. Unless also entrusted with the geological-geotechnical clarifications and surveying, the system supplier is only liable for damages which can be traced to faulty materials or dimensioning (provided that dimensioning was in the supplier's care).

3.1 The TECCO® Slope Stabilization System

The TECCO® SYSTEM serves to stabilize steep soil and rock slopes. Hereby the surface to be protected is first cleaned, levelled and trimmed before it is covered with the TECCO® high-tensile steel wire mesh. The mesh is attached to ground and rock nails by means of system spike plates. By tightening of the nuts, the slope stabilization system is pretensioned to a defined force.



The nails are normally offset from row to row by half the horizontal distance between them.

The three most important elements of the TECCO® SYSTEM are:

- the TECCO® steel wire mesh
- the TECCO® system spike plate
- the soil or rock nail

The three high-tensile steel wire meshes and the associated three corresponding spike plates are specific elements of the TECCO® SYSTEM. The bearing resistances against shearing-off and against selective, slope parallel tensile stress with the meshes and the corresponding system spike plates are important to establish the proof of bearing safety. The bearing resistances have been determined in comprehensive tests which served to optimize the system at the same time.

It is general recommended to reinforce the edge areas of the mesh with boundary ropes. These are fastened to spiral rope anchors arranged on the side and tensioned against them. Additional short or driven nails may be required in case of an uneven surface and along edges in order to tension the mesh as tightly as possible against the ground (cf. chapter 11).

3.2 Variables of the TECCO® SYSTEM

The following variables exist with the TECCO® SYSTEM:

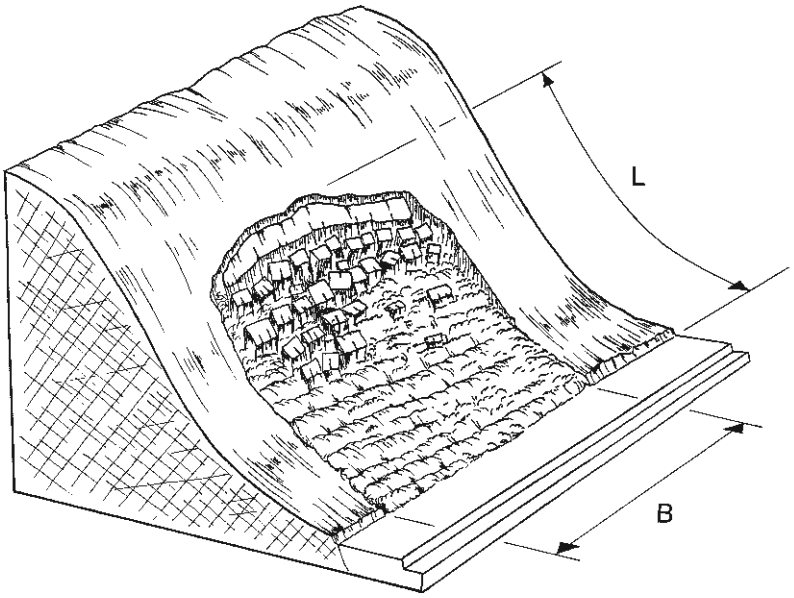
- Distance between nails a = horizontal distance from nail head to nail head
- Distance between nails b = distance between the rows of nails measured in the line of slope
- Nail type (with specific tensile strength and shear resistance)
- Nail length
- Nail inclination

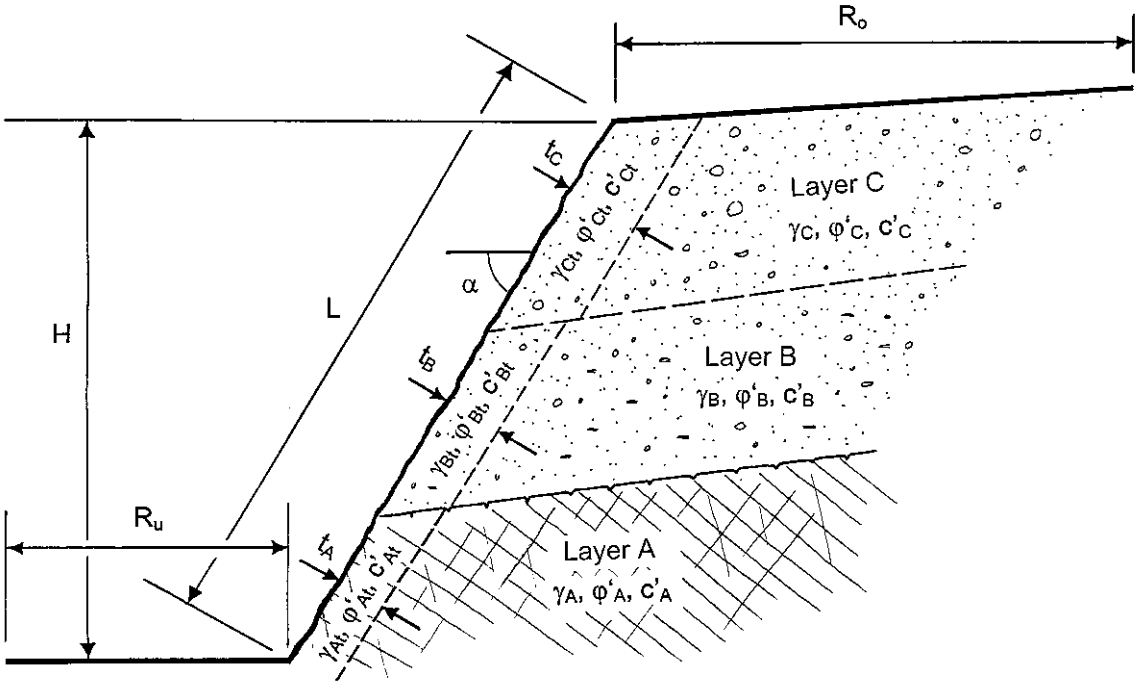
These variables are determined by the dimensioning of the slope stabilization system.

3.3 General boundary conditions

General site conditions must be known for each project to determine the variables by proofs of the bearing safety and stability.

Boundary conditions		
1. Terrain profile	• Height of slope (measured vertically)	H
	• Length of slope (measured parallel to slope)	L
	• Width of slope (measured horizontally)	B
	• Sufficient bottom boundary section	$R_u > H/2$
	• Sufficient top boundary section	$R_o > H$
	• Average slope inclination	α
2. Layer structure in the subsoil	Description of the subsoil (Classification for uncons. material or rock) Stratigraphy from bottom to top	A, B, C, ...
3. Surface layer	Thickness of the surface layer to be secured, measured at right angle to the surface, with classification relative to the subsoil layers A, B, C, ...	t_A, t_B, t_C, ...
4. Ground characteristic values	Differentiation between decisive subsoil layers associated surface layers	
	Subsoil layer A, B, C, ...	
	• unit weight	$\gamma_{A,B,C,...}$
	• friction angle	$\varphi_{A,B,C,...}$
	• cohesion	$c_{A,B,C,...}$
	Surface layer pertaining to A, B, C ... of thickness t_A, t_B, t_C, ...	
	• unit weight	$\gamma_{At,Bt,Ct,...}$
	• friction angle	$\varphi_{At,Bt,Ct,...}$
	• cohesion	$c_{At,Bt,Ct,...}$
5. Global stability	A separate global stability analysis should be performed to evaluate deeper existing / potential sliding surfaces. Deeper soil / rock nails can then be used in conjunctive with the TECCO® System.	





3.4 Special boundary conditions

- Hillside or ground water, hillside springs
- Difficulties due to obstacles (trees, buildings, etc.)
- Assessment for greening, planting
  (altitude, exposure, climate, natural vegetation)
- Requirements applying to greening, planting
- Additional erosion protection in case of fine-grained subsoil
- Additional rockfall protection in case of special hazards

3.5 Special specifications

- Nail type
- Nail length, e.g. for securing deep sliding surfaces
- Drilling process to suit the subsoil

3.6 Terrain surveying

In the **preliminary project** phase, simple surveying by means of measuring tape and angle meter is generally sufficient. Current documents such as site plans or cross-sections may be used if available.

Final terrain surveys are best carried out **after** the preparatory tasks (see chapter 7), otherwise only preliminary information will be available for the arrangement of the meshes.

- Trigonometric surveys with the theodolite and electronic distance measurement or also via cross-sections.

- Preparation of a topographic map and cross-sections. Distinct shapes of the slope (dells, humps, overhangs) must be evident from the planning documents to enable correct detail planning and to avoid problems during the execution.

- With these planning documents, finally, it should be possible to verify the arrangement of the meshes (mesh sheets) and of the nails. Hereby the position of the nails is determined according to the specifications from the stability proofs (maximum horizontal and vertical distances), with **adaptations to the prevailing local terrain (dells, low points)**.

4 Dimensioning

The dimensioning concept RUVOLUM® permits consideration of the pretensioning of the system. This makes it suitable to establish the proofs of bearing capacity.

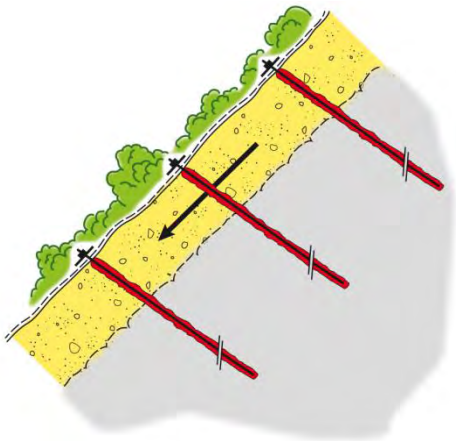
Dimensioning of the flexible TECCO® surface stabilization system according to the RUVOLUM® concept two investigations (see the technical documentation on the TECCO® SYSTEM and in particular the fundamentals for dimensioning according to the RUVOLUM® concept):

➢ **Investigation of superficial instabilities parallel to the slope**

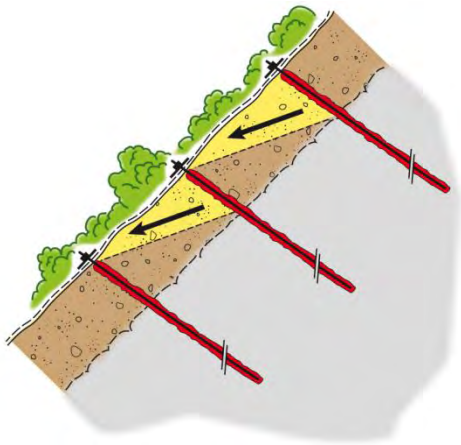
The cover layer liable to slide off a firm subsoil must be retained by the nailing. Each nail must be able to hold back a body of width a, length b and thickness t with a certain safety.

➢ **Investigation of local instabilities between single nails**

It must be further investigated whether or not local instabilities can occur, i.e. between the individual nails. These possible local bodies liable to slide out are to be retained with a certain safety by the use of the slope stabilization system with nailing and TECCO® mesh covers.



Superficial instabilities parallel to the slope



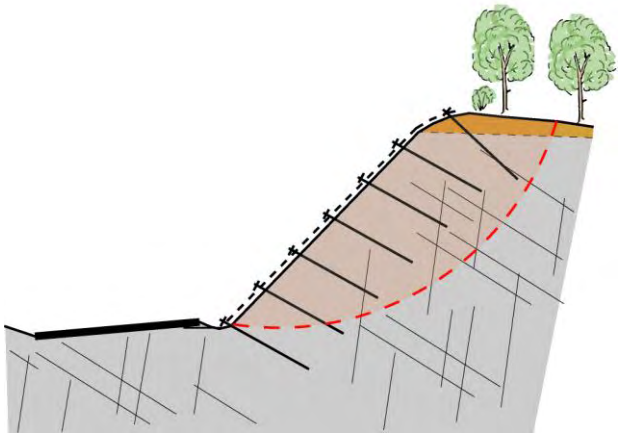
Local instabilities between single nails

To be able to establish the proofs of bearing capacity it is necessary to know the following:
a) the load bearing resistance of the mesh at the system spike plate around the nail for selective tensile stress parallel to the slope as well as puncturing, and b) the nail's load bearing resistance for the combined strains from tension and shear.

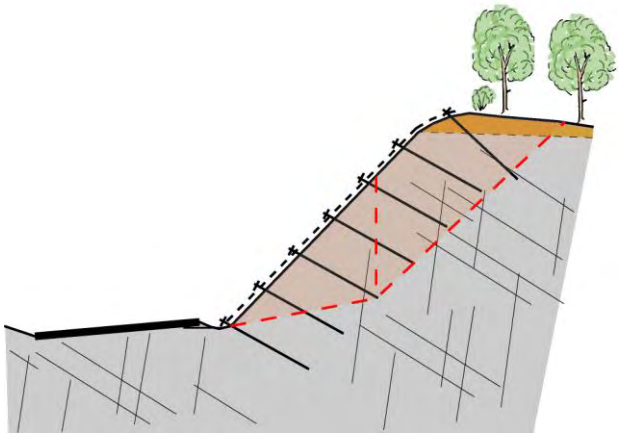
While the nail's load bearing capacity can be determined by calculation from the nail material's characteristic values, the load bearing resistance of the meshes with nail fastening for slope-parallel shearing-off and for puncturing has to be determined by system-specific model tests. Additionally, the bearing resistance of the system has been tested and verified under realistic conditions in 1:1 large scale field tests (see picture on the front page).

The load bearing capacities determined for the TECCO® slope stabilization system are not applicable to other systems and materials. For comparison purposes the relevant values would have to be established by means of appropriate tests. This is important to assess the equality of possible competitive products.

Proof of the terrain's resistance against sliding (deep sliding surfaces)
Dimensioning of the TECCO® slope stabilization system (TECCO® mesh cover in combination with nailing) includes, in dependence of the prevailing geological circumstances, not only the investigation of instabilities close to the surface according to the RUVOLUM® concept, but in principle also proof of the terrain's resistance against sliding with deep sliding surfaces. Topographically and geologically adapted sliding surfaces are hereby taken into account. In most cases the nails are included in the calculation as tensile members with a stabilizing effect and less frequently as shear members.



Curved sliding surfaces



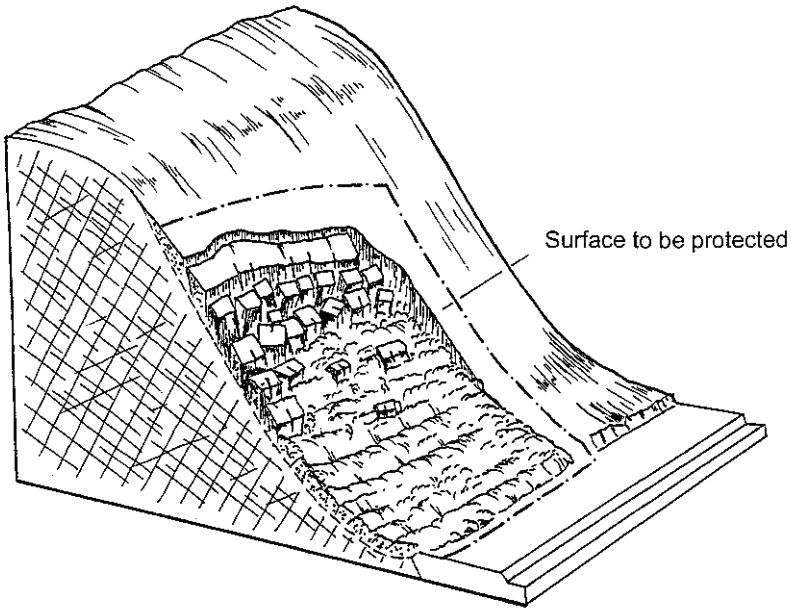
Straight-lined sliding surfaces (block sliding method)

5 Project details

5.1 General

Required for the project are the planning fundamentals (topography, geometry of the terrain, profiles, etc.) plus the dimensioning results with the proofs of bearing capacity which define the maximum admissible distances between nails, the nail types and lengths as well as the minimum pretensioning forces.

In determining the area to be protected it is important to extend this sufficiently (generally by at least 2 m) beyond the existing or potential unstable zones and terrain edges.



The boundary terminations (with/without boundary wire rope) must be specified in the project plans.

Levelling and shaping of the terrain must be stated where existing slopes are to be protected.

Where existing slopes with vegetation are concerned, moreover, the clearing, cutting of shrubs and trees to the rootstock, mowing of grass slopes (areas, number, dimensions, etc.) must be shown.

5.2 Special aspects

The following circumstances, furthermore, must be considered in the project and presented in the plans and / or described specifically to the extent possible (the list below is not complete):

- Large hollows
- Projecting blocks which must be circumvented or specially secured
- Existing trees to be kept alive
- Springs, water pressure areas and corresponding drainage measures
- Special measures such as shotecrete fillings
- Structural parts such as post foundations, etc., to be circumvented
- Need for erosion protection measures
- Greening, planting

5.3 Call for tenders

The invitation for tenders for the TECCO® SYSTEM work must contain all major material supplies and tasks to be carried out. Properties and requirements applying to the TECCO® SYSTEM materials must be specified so that other systems must provide/meet these requirements for proper system performance also.

Included for this purpose for the mesh are:

- Maximum mesh size
- Bearing resistance of the mesh against shearing-off at the upslope edge of the spike plate P_R
- Bearing resistance of the mesh against slope-parallel tensile stress Z_R
- Minimum tensile strength and the corresponding maximum elongation
- Minimum tensile strength of connection of the mesh rolls

To be specified for the nails:

- Nail type
- Minimum internal/external load bearing resistance
- Corrosion protection requirements
- Minimum drilling diameter
- Length of nails
- Drilling method: dry (air flushing), if appropriate grout flushing in case of self-drilling nails
- Number and type of test nails (if necessary preliminary pull-out tests to determine the external load bearing resistance)
- Number of pull tests up to the dimensioning resistance (random sample testing of the system nails)

Sample tender text for TECCO® slope stabilization systems is available.

6 Elements of the system and auxiliary equipment

6.1 Elements of the system

The TECCO® slope stabilization system consists of the following elements:

Surface material

- TECCO® steel wire meshes G45/2, G65/3 and G65/4
- TECCO® connection clips T3

Soil / rock nails

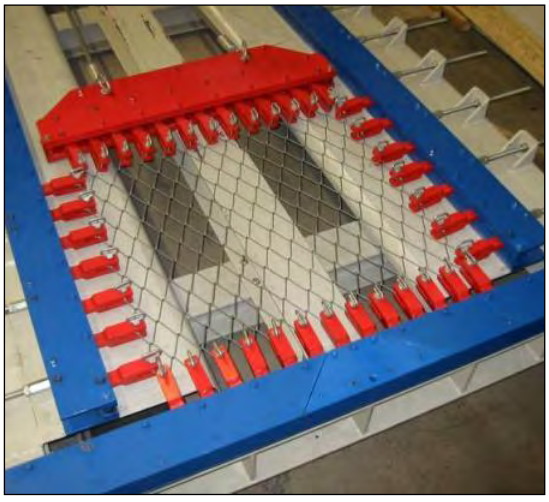
- Main nail (with nut)
- TECCO® spike plates P25, P33 and P66

Optional individual parts

- Short nails
- Driven nails
- Boundary wire ropes
- Spiral wire rope anchors

6.1.1 High-tensile steel wire mesh TECCO®

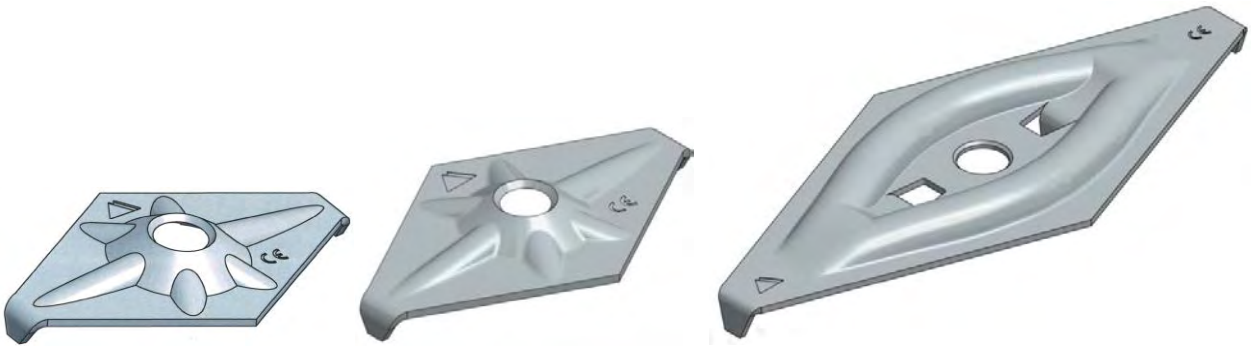
Technical Data	TECCO® G45/2	TECCO® G65/3	TECCO® G65/4
Wire diameter	2 mm	3 mm	4 mm
Tensile strength of steel wire	≥ 1‘770 N/mm²	≥ 1‘770 N/mm²	≥ 1‘770 N/mm²
Tensile strength of steel wire mesh	≥ 85 kN/m	≥ 150 kN/m	≥ 250 kN/m
Diagonal	62 x 95 mm	83 x 143 mm	83 x 138 mm
Mesh width	48 mm	65 mm	63 mm
Number of meshes transversal	16.1 pcs./m	12 pcs./m	12 pcs./m
Number of meshes longitudinal	10.5 pcs./m	7 pcs./m	7.2 pcs./m
Weight per m²	1.15 kg/m²	1.65 kg/m²	3.3 kg/m²
Corrosion protection	GEOBRUGG SUPERCOATING®		
Compound of corrosion protection	95% Zn / 5% Al		
Bearing resistances	Spike plate P25 / P33	Spike plate P33 / P66	Spike plate P33 / P66
Bearing resistance of the mesh against puncturing D_R	80 / 110 kN	180 / 240 kN	280 / 370 kN
Bearing resistance of the mesh against shearing-off at the upslope edge of the spike plate P_R	40 / 55 kN	90 / 120 kN	140 / 185 kN
Bearing resistance of the mesh against slope-parallel tensile stress Z_R	10 / 10 kN	30 / 45 kN	50 / 75 kN



TECCO® mesh made from high-tensile steel wire with knotted ends.

6.1.2 TECCO® SYSTEM spike plates type P25, P33 and P66

Technical Data	Spike plate P25/34 N	Spike plate P33/40 N and P33/50 N	Spike Plate P66/50 N
Size	250 x 155 mm	330 x 205 mm	667 x 300 mm
Thickness	5 mm	7 mm	7 mm
Hole diameter	34 mm	40 and 50 mm	50 mm
Length of the spikes	min. 16 mm	min. 20 mm	min. 30 mm
Weight	0.9 kg	2.2 kg	6.7 kg
Geometry	diamond		
Steel quality	S355J		
Longitudinal bending resistance	≥ 1.25 kNm	≥ 2.5 kNm	≥ 8.0 kNm
Corrosion protection	hot-dip galvanized based on EN ISO 1461, layer thickness in average 55 µm		



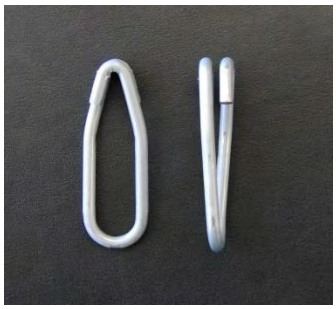
System spike plate type P25, P33 and type P66

6.1.3 Main nail (soil and rock nails)

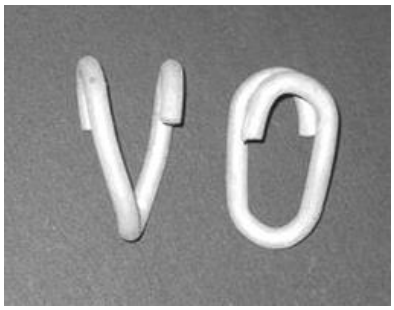
Technical data	
Common nail types	e.g. GEWI D = 25, 28, 32 or 40 mm or self-drilling nails of type TITAN 30/11 or 40/16 as well as IBO R32 S/N or similar. Other nail types may be used if the relevant proofs can be fulfilled.
Common nail pattern	Distances between nails a = 2.0 - 4.0 meters (in horizontal direction) b = 2.0 - 4.0 meters (in line of slope) or to suit local requirements.
Length	as required, generally more than L ≥ 2.0 m
Corrosion protection	Normally the nails are installed raw *). It is customary to take into account either a corrosion of 4 mm based on the diameter or to calculate with reduced steel strains. In exceptional cases (partially)-galvanized nails or even nails with double corrosion protection can be utilized. It is reasonable depending on project requirements to paint the head area of the nail with zinc after setting and cutting to length. * In general, the nail is several times over dimensioned in the head section because its resistance against tension and shear to protect from sliding parallel to the slope is decisive for dimensioning purposes.
Nuts	Generally hexagonal nuts with spherical bearing faces or spherical nuts should be used. If nails with diameter < 28 mm are going to be installed, the installation of corresponding washers is generally recommended.

6.1.4 TECCO® connection clips / press claws

Technical data	Connection clips T3	Press claws type 2
Application purpose	connection elements to interlink the individual mesh sheets	connection elements to fasten the TECCO® mesh at the boundary rope
Execution	open eyelet for installation on site by hand	open eyelet for compression after installation on site
Material quality	ø 4 mm high-tensile steel wire, tensile strength ≥ 1'770 N/mm^2	ø 6 mm steel wire, tensile strength 530 – 680 N/mm^2
Corrosion protection	GEOBRUGG ULTRACOATING®	Zn/Al coating min. 290 g/m^2



Connection clips T3



Press claws type 2

6.1.5 Auxiliary nails, short nails (optional individual parts)

Technical data	
Standard nail types	e.g., GEWI D = 20 or 25 mm The utilization of other nail types is allowable if they are adapted to the project-specific requirements.
Application area	As auxiliary reinforcement in spots in the border areas, in low points, etc. Diameter according to need, as a rule D = 20, 25 mm
Length	Usually predetermined: L = 1.5 m
Corrosion protection	Normally the nails are installed raw. In exceptional cases (partially)-hot dip galvanized nails are used. It is reasonable depending on project requirement to paint the head area of the nail with zinc after setting and cutting to length.

6.1.6 Driven nails, short nails (optional individual parts)

Technical data	
Application area	for possible required intermediate fastening and boundary fastening of the mesh
Execution	e.g. ribbed TOR-steel D = 16 mm with bracket welded to top, L = 0.6 meter or 1.0 meter
Corrosion protection	hot-dip galvanized, layer thickness 85 µm

Driven nail

6.1.7 Boundary ropes

Technical data		
Application area	for fastening and reinforce the edge areas	
Light type	Steel wire rope minimum breaking force	D = 10 mm 63 kN
Heavy type	Steel wire rope minimum breaking force	D =12 mm 91 kN
Corrosion protection	zinc coating according to DIN EN 10244-2	

Boundary ropes

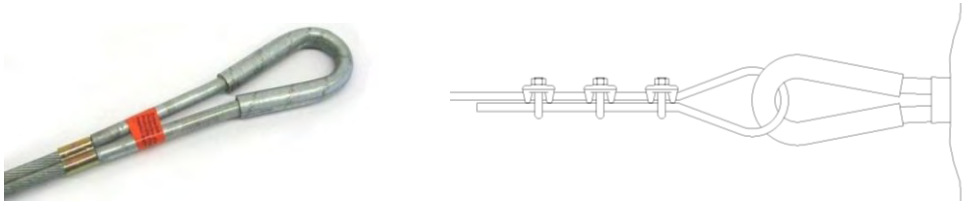
6.1.8 Wire rope clips

Technical data	
Application area	Care must absolutely be taken that the right number of wire rope clips with the specified torques (greased) are utilized. If the wire rope clips should be made theft proof, the threads can be secured with Loctite.
Type	For wire ropes with diameter D = 10 mm 3/8“ (NG10) wire rope clips respectively for D = 12 mm 7/16“ (NG12) should be used in accordance with FF-C-450 Type 1 Class 1 (similar to EN 13411-5 Type 2).
Number	For wire ropes with diameter D = 10 and 12 mm minimum 3 wire rope clips should be used.
Corrosion protection	Hot dip galvanized

Wire rope clips

6.1.9 Spiral wire rope anchors

Technical data	
Application area	The border ropes should be fastened laterally onto spiral rope anchors. In order to be able to tension the border ropes sufficiently by sections, the spiral rope anchors should not as a rule lie further than 20 – 25 m apart from each other.
Specification	Spiral rope, 2-stranded, with two hot dip galvanized steel tubes in the loop area
Corrosion protection rope	Heavy galvanized in accordance with DIN EN 10244-2 (DIN 2078), minimum coating weight 230 g/m^2 (D 10.5 mm), 255 g/m^2 (D 14.5 mm)
Corrosion protection tubes	Hot dip galvanized in accordance with EN 10240, minimum layer thickness 55 µm
Light type	D = 10.5 mm, breaking load 180 kN, length depending on subsoil: L = 2 - 3 m
Heavy type	D = 14.5 mm, breaking load 350 kN, length depending on subsoil: L = 2 - 4 m



Spiral rope anchor and installation of the border ropes

Flexhead	
Optional, to replace spiral rope anchor	The flexhead can also be used instead of the spiral rope anchor. It attaches to the nail by hand-screwing it directly onto the nail. The flexhead has the same technical data as the spiral rope anchor.

Flexhead

6.2 Connecting elements

In rare cases it is possible to use further connection elements specific to the project. This is the case in particular if holes have to be provided for planting. Subject to agreement by the manufacturer one can use aluminium press sleeves (EN 13411-3) or wire rope clips (FF-C-450 Type 1 Class 1, similar to EN 13411-5 type 2) as connection elements (see also chapter 11.4.1).

6.3 Auxiliary equipment and tools

- Drill rig (mounted drilling devices, possibly a portable hand drill),
  minimum bore diameter = 1.5 times nail diameter
  or depending on project requirements = nail diameter + 2 x 20 mm grout cover
- Injection pump for mortar-stabilization of the nails, e.g. SIG-Jet 2000, (Lumesa SA), MAI - Mungg (GD-Anker AG) or a device of Morath GmbH
- Rope shears with cutting force for minimum ø 12 mm (e.g. type Felco)
- Tool box with set of wrenches, M10 - M32
- Torque wrench for pretensioning of the system, range 0.3 - 0.6 kNm depending on the nail (cf. chapter 11.7)
- Pliers for compressing (closing) of the press claws by the boundary ropes
- Pliers for compressing aluminium press sleeves (if used, cf. chapter 6.2)
- Lightweight rope pulling devices (come-along, pully) if needed (e.g. LUGAL)

7 Preparation of the terrain

The terrain must be suitably prepared before the TECCO® SYSTEM is put in place:

- Clearing of the slope
- Cleaning of the slope
- Levelling of the slope
- Trimming of the slope (as required and in case of new cuttings)
- Drainage measures (if required)

Remarks on the terrain preparation measures
Fracture zones are often characterized by vertical or even overhanging parts of the terrain. **Levelling or evening-out of the terrain** is frequently required. This work consists of the cutting of terrain edges, the removal of loose blocks and the filling of dells in the terrain.

A part of this is also the specific removal of individual trees which are of no particular value. Tree stumps must be cut off as near to the ground as possible so that the mesh remains tensioned over it after the rotting of the tree stumps. Certain trees may also be left in place, whereby these fixed points must be taken into account determination of the stabilization. Shrubs are cut back completely to the rootstock.

DURING
Slope preparation measures (clearing, levelling, partial cutting, etc.)

AFTER
Slope preparation measures (clearing, levelling, partial cutting, etc.)

8 Stake out

Good staking and marking of all points of importance for the operation facilitates the execution and provides a good overview at all times.

The stake-out should mark the items listed below with pegs, nails or dots of paint in accordance with project specifications, and local adaptations to terrain shapes, obstacles, etc.

- Boundaries
- Corner points
- Sheets (mesh) delineation
- Nails, numbered for subsequent protocolling
- Rope anchors (in combination with boundary ropes)

During stake-out, care must be taken that the distances between nails as stated in the project are adhered to and generally not exceeded. The distances between nails are based on the dimensioning and stability proofs for the system, taking into account the prevailing subsoil circumstances and slope gradients.

For the position of the individual nails, a maximum deviation of +/- 10 % from the nail distance specified by the project, measured in the horizontal and the line of slope, are generally admissible. A reduction of the distances between nails or the arrangement of extra nails for adaptation to local circumstances (e.g. securing in low spots) is always admissible.

In slopes to be protected, adaptations to the actual site conditions are often required. The project specifications must not and cannot simply be translated. However, if major adaptations become necessary or if the profiles (gradients) or the subsoil do not correspond with the assumptions on which the project is based, the project management and if appropriate the responsible designer of the project must be contacted immediately.

9 Installation options

We differentiate basically between two laying variants:

- Option A) Laying of the meshes **after** installation of the nails
- Option B) Laying of the meshes **before** installation of the nails (for TECCO® G65)

The option to be selected depends on e.g. the type of nails, the drilling method and in some cases also on the installation instructions.

9.1 Option A: Laying of the meshes after setting of the nails

This installation variant is necessary if drilling diameters of more than 65 mm (respectively more than 90 mm using the drilling device) are specified or required. This may be the case if:

- the bond strength of the nails requires an accordingly large drilling diameter (specified by test nail or the designer of the project)
- infiltration tubes have to be installed because of a poor stability of the bore holes
- drill bits, in-the-hole hammers of dia. > 65 mm (respectively > 90 mm) can be used
- piped (cased) bore holes are required

Installation option A, therefore, is usually envisaged for:

- protection features in loose, unconsolidated rock of a medium deposition density requiring a bore-hole diameter of more than 65 mm (respectively more than 90 mm).
- in severely weathered, disintegrated rock with bigger fissures which, under certain circumstances, require the use of fabric hoses to limit the mortar consumption.
- generally unstable bore holes
- a potential requirement to provide piped (cased) bore holes
- situations with major quantities of hillside water possibly requiring drainage bores with filter installation

Installation sequence for option A:

- stake-out of the starting points for drilling with nail pattern as by project specification taking into account low spots
- excavation of the dell (for pretensioning), preferably before drilling
- drilling of the nails (nail head should not project over the terrain line) and if appropriate of the rope anchors holes
- setting and mortar-stabilizing of the nails (and if appropriate of the rope anchors)

- laying bare of the nail heads (dells)
- laying of the wire meshes
- connecting the mesh sheets to each other
- fitting of the boundary ropes
- installation of the spike plates and pretensioning with torque wrench or hydraulic press to the specified forces

Advantages of installation option A:

- no limitation for the drilling process and the bore-hole diameter
- mortar-stabilizing before laying of the meshes, e.g. no danger of contaminating the mesh with anchor mortar
- subsequent work on the nail heads (removal of mortar) and in the environment of the nail heads (recess for spike plate) is possible
- no obstacles to drilling operations (especially also in case of major hollows, dells, etc.)
- possibilities of intervening for drainage measures, etc. are available right to the last moment

Disadvantages of installation option A:

- excessively projecting nails are a hindrance when laying the meshes; if appropriate they should be shortened beforehand
- optimal nail positions for tensioning of the mesh are not as easily visible as in subsequent drilling according to variant B
- no rockfall protection (during drilling and setting) by the mesh as in option B, i.e. there might be a need for provisional protective measures

9.2 Option B: Laying of the meshes before setting of the nails

This installation variant is possible if bore-hole diameters below 65 mm (respectively below 90 mm using the drilling device) are admissible and if:

- the substrate circumstances allow the use of a small drill diameter and the outer bearing capacity is guaranteed uniform (test nails may be required)
- stability of the bore holes can be expected and no installation of infiltration tubes is required for support
- no locally larger bore-hole diameter is required for the installation of pipes (casing), drainage pipes and fabric hoses, either

Installation option B can be envisaged for:

- protection features in densely deposited, firm unconsolidated material in which the bore holes are stable without problems right to the specified end depth
- rock that is weathered and disintegrated to a slight to medium degree only and in the absence of major fissures which would require the use of fabric hoses to limit the mortar consumption
- sites with little or no hillside water requiring special drainage measures

Installation sequence for option B:

- stake-out, drilling, setting and mortar-stabilizing of the top boundary nails
- stake-out of the drilling points for the nails taking into account low spots within the tolerance range of the nail pattern according to static requirements
- excavation of the dells in the area of the nails
- securing of the meshes to the boundary nails
- unrolling/laying of the meshes

- connecting the mesh sheets to each other with connection clips
- optimization of the drilling points for the nails considering low spots within the tolerance range of the nail pattern according to static requirements
- drilling of the nails through the mesh using the special TECCO® drilling device
- setting and mortar-stabilizing of the nails
- installation of the spike plates and pretensioning with torque wrench or hydraulic press to the specified forces

Advantages of installation option B:

- easier laying of the meshes without obstacles in the form of projecting nail heads
- easier determination of the optimal nail positions for tensioning of the mesh than with prior drilling according to variant A
- protection by the mesh (against rockfall) is already available while work is in progress
- walking (climbing) and belaying in steep terrain can be facilitated (use of crampons with front spikes, karabiners can be clipped to mesh)

Disadvantages of option B:

- drilling diameter is generally limited to 90 mm using the TECCO® drilling device
- subsequent work on the nail heads (removal of mortar) and in the environment of the nail heads (recess for spike plate) is encumbered by the mesh
- contamination of the mesh with mortar, i.e. need for cleaning
- once the meshes are laid, interventions for drainage measures, etc., are no longer possible

9.3 Remark on the stability of the slope

Where new slope cuts are concerned, the size of the possible execution stages to be carried out in one step (drilling, setting of the nails, mesh cover) depend on the slope's stability in each smaller area.

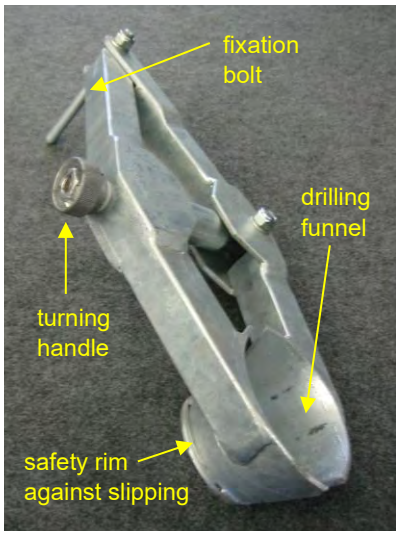
The stability is determined primarily by the existing actual or apparent cohesion of the subsoil and the water. Water in the form of emerging hillside, layer or fissure water, but also rainfalls, can influence the stability substantially.

9.4 Drilling device for TECCO® G65

The incircle diameter of the TECCO® G65 mesh is 65 mm. The TECCO® drilling device is designed to allow a drilling diameter of up to **maximum 90 mm** without damaging the mesh and its corrosion protection. It is placed in the mesh above the drilling position. The safety rim of the drilling funnel is placed completely through the mesh. The fixation bolt is put into a mesh to avoid turning of the drilling device while drilling. The drilling funnel is opened by turning the handle. Use a ratchet wrench to open the drilling device up to 90 mm. Easy drilling through the mesh is now possible without damaging the mesh and its corrosion protection.

Technical Information:

- Weight: approx. 5 kg
- Material: galvanized steel
- Turning handle: with nut for ratchet wrench (22 mm)
- Size: 480 x 220 mm
- Fixation bolt: Length 160 mm
- Drilling funnel with rim for slip safety: opening up to maximum 90 mm



10 Drilling and installation of the nails

10.1 Drilling work

Drilling and nailing work must be coordinated with slope cutting (job planning, planning for safety at work, etc.).

Stake-out of the drilling points must comply with the project specifications (maximum nail distances a, b).

Hereby mean deviations of +/- 10 % from the nominal distances *a* and *b* are admissible for adaptation to the local circumstances (low spots, niches in the rock, etc.). It is always admissible for smaller distances or extra nails if the terrain properties require this so that the mesh lies optimally on the slope.

The nails should be installed in deeper locations if possible.

The use of portable drilling equipment is only rarely necessary. Mounted drilling devices are used in most cases.

Generally speaking, one starts at the top and works down towards the bottom.

The suitable drilling method is primarily determined by the subsoil (unconsolidated material, rock). Depending on the circumstances it is also possible to apply different drilling methods, in which case the most suitable one is determined by the available devices and their capacity.

Because of static reason the nails should be installed flat to horizontal but at maximum 15° from perpendicular to the slope surface.

Dry drilling processes operating with air flushing are to be preferred. Water or direct grout flushing are the exceptions and should be approved by the designer and owner.

It is important that the required nail bond strength is achieved and verified by testing.

The bond strength is primarily determined by the bond between mortar and subsoil. The effective skin friction is critical for this in substrates of soft to rigid consistency and deposits of loose to medium density. The bond capacity, therefore, may control the minimum drilling diameter.

Large drilling diameters (more than 65 mm) result in better nail embedment in the grout and thus corrosion protection. In unstable bore holes, large drilling diameters enable the installation of protective tubes, fabric hoses or other measures to avoid loss of mortar in fissured rock or coarse scree.

Generally, the following minimum drilling diameters D_{min} should be observed for main nails:

- in fine-grained unconsolidated material D_{min} = 90 mm
- in mixed-grain, unconsolidated material of low stability D_{min} = 90 mm
- in mixed-grain, unconsolidated material of good stability D_{min} = 65 mm
- in fine-grained rock (clay/siltstone) D_{min} = 65 mm
- in rock without major fissures, stable boreholes D_{min} = 50 mm

A drilling diameter of D_{min} = 50 mm is generally sufficient for secondary nails to hold down the meshes, for boundary stabilizations, drill to a depth of a maximum 1.5 m.

Bores in stable material may be made without casing. In unstable material it is necessary to change to a method with casing (requires appropriate drilling equipment) or, depending on dimensioning requirements, self-drilling anchors may also be suitable.

As an option, a perforated protection or stabilization tube can be inserted in the hole (immediately after drilling), so that the bore cannot collapse until the insertion and mortar-stabilizing of the nail.

Stabilization tubes must be set to a height of approx. 20 cm **below** the surface of the terrain, so that subsequent pretensioning is possible (see also chapter 10.3 in this context).

Example: Drilling work using a crawler-mounted drilling device.

Example: Depending on terrain conditions, drilling work can also be carried out from a small crane platform or lifting platform.

10.2 Installation and grout (infiltration) of the nails

For centering purposes, main nails must be provided with centralizers in the borehole.

If fissures are to be expected (resulting in loss of mortar), the nails must be lined with a suitable textile bag.

For the grout, use a suitable, tested and frost resistant, non-shrink, injection-type grout.

The grout is prepared with a grout pump with mixing container. For proper filling of the borehole, a grout tube (lance) is inserted along the nail to the bottom of the borehole. The grout is pumped through this tube so that the borehole is filled from the bottom outwards. The lance is steadily withdrawn as the hole is filled.

For main nails: Filling from the bottom of the borehole with infiltration hose

For short nails: Pre-filling of the hole is acceptable

Mean mortar consumption (assumption for calculation):

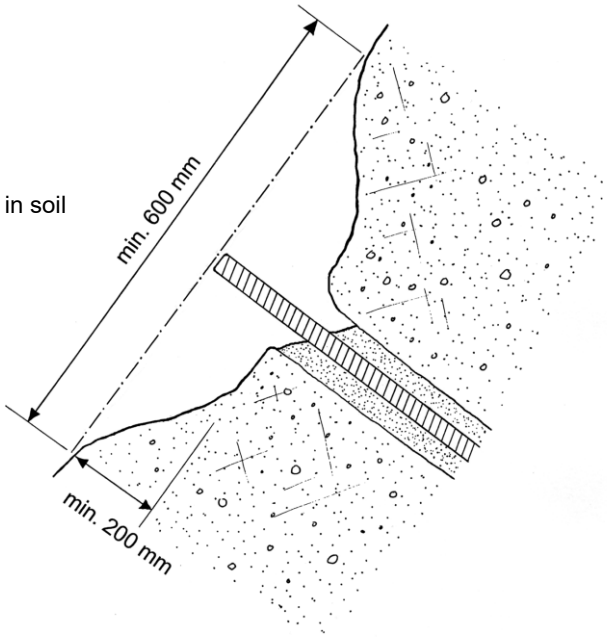
Borehole diameter	D = 50 mm	approx. 8 kg / m’
	D = 65 mm	approx. 12 kg / m’
	D = 90 mm	approx. 20 kg / m’

The above values are an assumption for calculation purposes. In principle the mortar consumption always depends also on the permeability of the subsoil and the degree to which it is fissured.

10.3 Recessing of the nail heads in soil

In soil slopes, the nail heads must be recessed in a dell (approx. 20 - 30 cm). The nail's thread must be laid bare from soil and grout and cleaned. By tightening the nut or by means of a hydraulic press it is possible to press the spike plate and thereby the mesh tightly onto or slightly into the ground. The objective of pretensioning the slope stabilization system is to press the mesh as tightly as possible onto the substrate to be stabilized. At the location of the boundary nails the dells does not have to be excavated so that the installation of the boundary ropes is more favourable.

Nail head section:
Dell for optimal pretensioning of the mesh in soil applications.
This is not required in rock slopes.



10.4 Test nails

On testing of test nails we differentiate between pull-out test (A) and pull test (B):

A) Pull-out test: Test nails for preliminary tests to determine the load bearing capacity, the required nail length, drilling diameter, etc.

The test nails are subjected to strain until failure.

General rule: In case of bigger objects and in the absence of reliable experience values, at least 3 test nails per soil layer should be arranged in preferably different areas of the slope to be protected.

B) Pull test: Test nails in the system itself. They are only strained up to a defined testing force.

The testing force should correspond at least to the force for which the nail is dimensioned.

Number of test nails per decisive, characteristic ground layer in dependence of the object size and the total number of nails to be installed:

- 0 – 100 nails: 3 test nails (minimum)
- 100 – 200 nails: 5 test nails
- more than 200 nails: 2.5% of the number of nails to be installed = number of test nails

10.5 Particular aspects

The nail heads for the TECCO® SYSTEM must be laid out so that, with sufficient free thread length, the mesh can be pretensioned with the spike plate to the specified value by applying a controlled force with the torque wrench or a hydraulic press.

Depending on the installation option (see chapter 9), the rod nails are set and stabilized with mortar before or after laying of the mesh.

Before installing the TECCO® mesh, the nails have to be cut back on approximately the level of the slope surface to enable an appropriate and tight installation of the mesh. Thereby, a proper installation of the system spike plates still has to be guaranteed. The nail head needs to be excavated according to 10.3 if possible.

In case of a loose installation of the mesh not being sufficiently tensioned against the subsoil to be stabilized according to this product manual, corresponding deformations in the subsoil cannot be excluded. This can cause a failure of a part of the system or the system itself!

11 Mounting of the mesh

11.1 Cutting the TECCO® mesh to size

The standard roll dimensions are for the TECCO® **G45/2 and G65/3 3.9 x 30 m** and for the **G65/4 3.5 x 20 m**. The roll weight is 135 kg for G45/2, 193 kg for G65/3 and 231 kg for G65/4.

Cutting the mesh sheets to size is done by the separation of meshes on the two lateral edges (cutting of the wire next to the knot, using a pair of suitable cutting pliers). One wire spiral can then be turned out and the mesh is separated.

It is recommended to cut the mesh sheets to size before assembly, in a suitable area at the installation site. The advantage of this is that there is no need to transport complete rolls to the actual place of installation, since all tasks on the actual slope take up much more time.

11.2 Unrolling of the TECCO® mesh

Laying of the meshes is usually done from top to bottom. Hereby it must be ensured that the mesh is secured to the top edge of the slope before it is unrolled. In principle, however, it is also possible to lay the mesh from the bottom to the top.

11.2.1 Unrolling of the mesh in case of prior setting of the nails (installation option A)

In option A (cf. chapter 9) the meshes are laid after setting of the nails.

Care must be taken that the mesh sheets are suspended from the nails in such a manner that, after pretensioning, they rest on the slope surface as tightly as possible. Hereby the uppermost nails can serve directly for fastening of the rolls for laying.

It is not allowed to cut off the TECCO® mesh e.g. in the nail head area to enable a correspondingly tight installation of the mesh.

In general, with the exception of holes for planting or of bypassing stumps or parts of civil engineering structures, it is not allowed to cut-off the mesh without noteworthy reasons!

11.2.2 Unrolling of the mesh before installing the nails (installation option B)

With option B the meshes are laid out first and only afterwards are the nails drilled. This variant offers advantages regarding laying and an optimal adaptation of the nail positions but is not possible with the smaller openings of the G45/2.

The mesh sheets (rolls) are first fastened above the edge of the slope to be protected. This can be done either to previously drilled main nails for protection purposes or to auxiliary nails. In principle, however, it is also possible to lay the mesh from the bottom to the top. Care must be taken that the mesh rests as fully as possible on the slope surface.

Setting of the nails is done afterwards through the mesh. The procedure in principle is as explained in chapter 10 (setting and mortar-stabilizing of the nails). However, the bore-hole diameter is limited to maximum 65 mm (incircle diameter of one mesh = 65 mm).

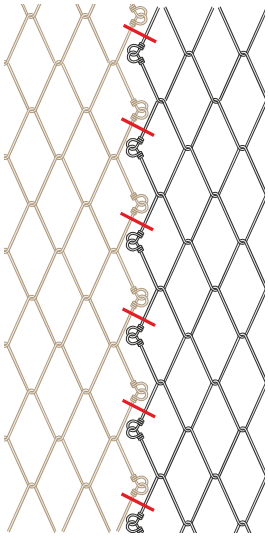
11.3 Vertical mesh connection

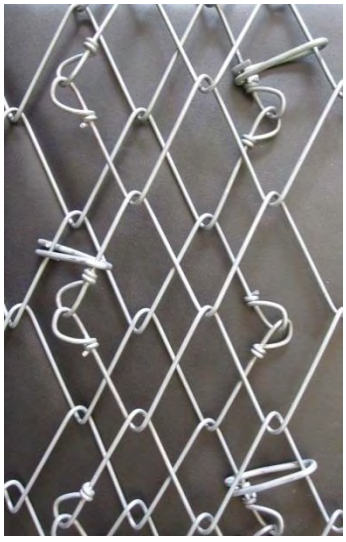
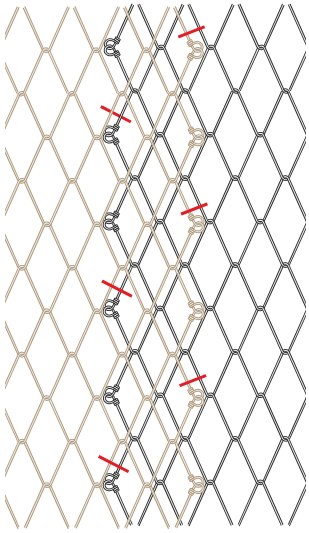
The mesh sheets can be laid out without overlap at the side.

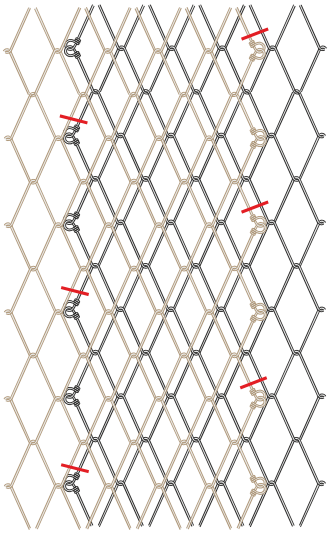
The mesh sheets must be connected lengthwise (normally in the line of the slope) by means of connection clips T3 illustrated below.

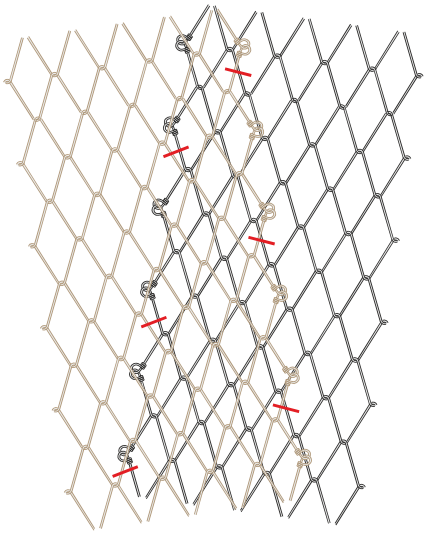
TECCO® G45/2 and TECCO® G65/3:
Hereby each individual edge-mesh must be secured with a single connection clip T3 to the neighbouring mesh. Therefore, there are 7 clips T3 per meter needed for the G65/3 and 10.5 clips T3 per meter for the G45/2.

By this arrangement it is guaranteed that the lateral connection of the mesh sheets provides the transverse tensile strength of the mesh, and that the deformations under load are limited.

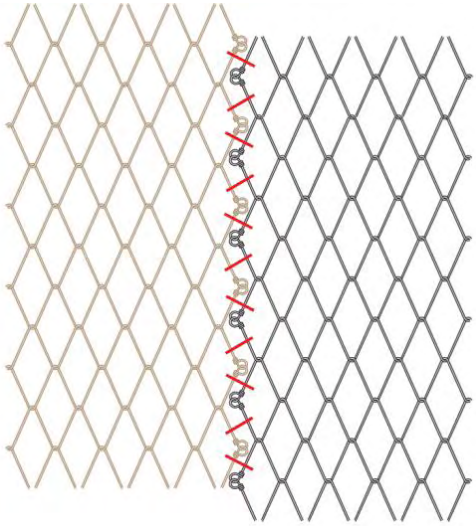


without overlap



overlap = 2 diamond mesh units


overlap > 2 diamond mesh units



TECCO® G65/4:
Hereby each individual edge-mesh must be secured with two single connection clips T3 to the neighbouring mesh. Therefore, there are 14 clips T3 per meter needed.



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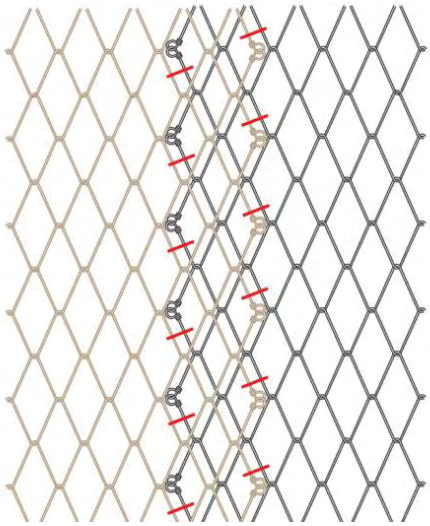


overlap = 2 diamond mesh units

11.4 Horizontal mesh connection

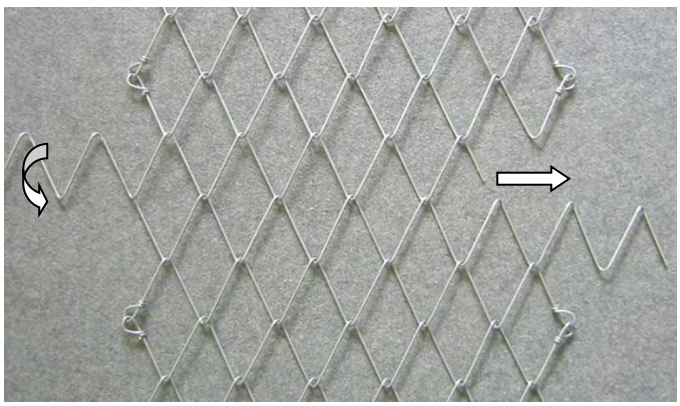
In principle there are two possibilities:

- Standard case: connection by turning-in of a wire spiral
- Alternative: connection by means of connection clips (TECCO® G45/2 and G65/3) or shackles (TECCO® G65/4)

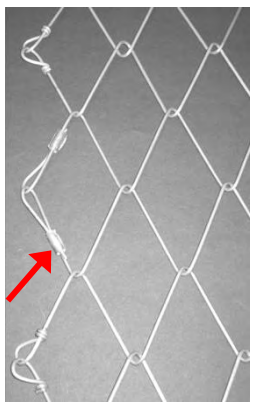
11.4.1 Horizontal connection with spiral

The standard length of the TECCO® mesh roll is 30 m for G45/2 and G65/3 respectively 20 m with the G65/4. By suitable division of the mesh sheets before laying on the slope surface it is possible to largely avoid horizontal connections.

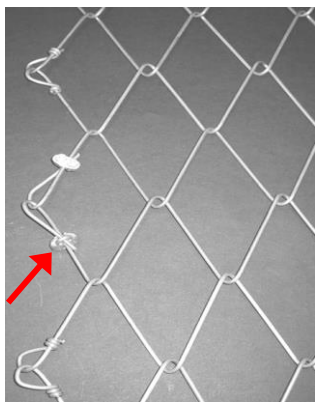
Two mesh sheets can be connected to each other horizontally by turning-in of wire spirals, whereby the outer wire ends must be secured with aluminium ferrules EN 13411-3 (see below picture on the left). For a frictional connection the clips are to be compressed by means of suitable compression pliers. As an alternative to the compression clips it is also possible to use wire rope clips according to FF-C-450 Type 1 Class 1, similar EN 13411-5 Type 2, (see below picture on the right).



Connection by turning-in of wire spirals



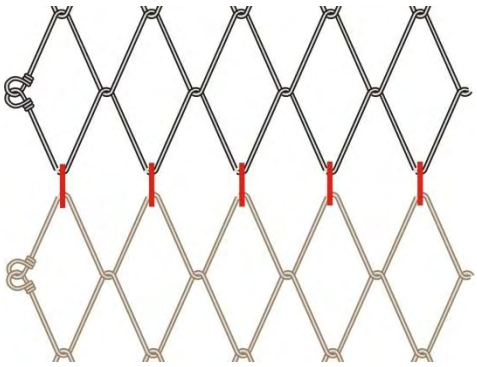
aluminium ferrules

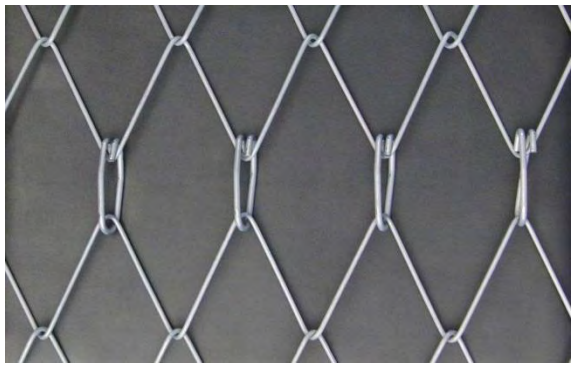


wire rope clips

11.4.2 Horizontal connection with connection clips for G45/2 and G65/3

The horizontal connection of two mesh rolls TECCO® G45/2 and G65/3 can be made by fitting **one connection clip per individual mesh** (see picture below). The clips need to be installed in such a way that both hooks can carry the load.





Connection with 16 clips (T3) per meter possible for TECCO® G45/2 and 12 clips/m for the G65/3

11.4.3 Horizontal connection using shackles for G65/4

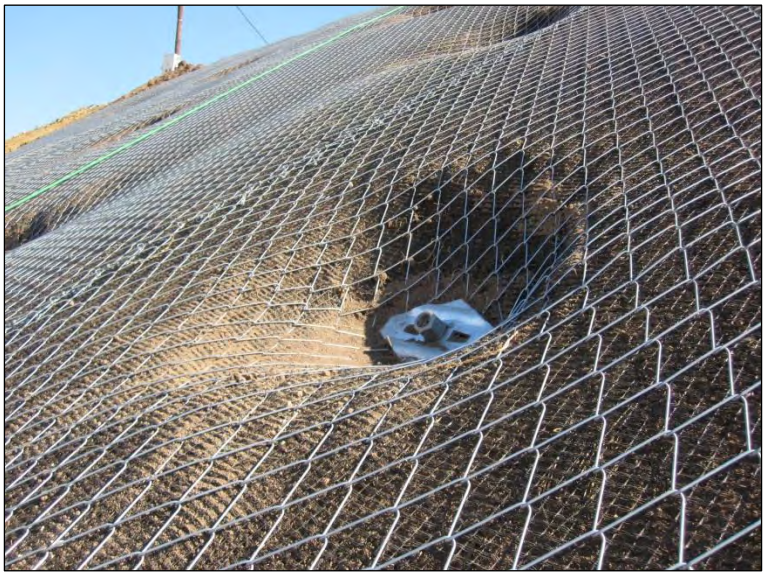
Connection by turning-in of a wire spiral as in chapter 11.4.1 or using one **3/8" shackles in every opening**.

11.5 Positioning of the spike plates

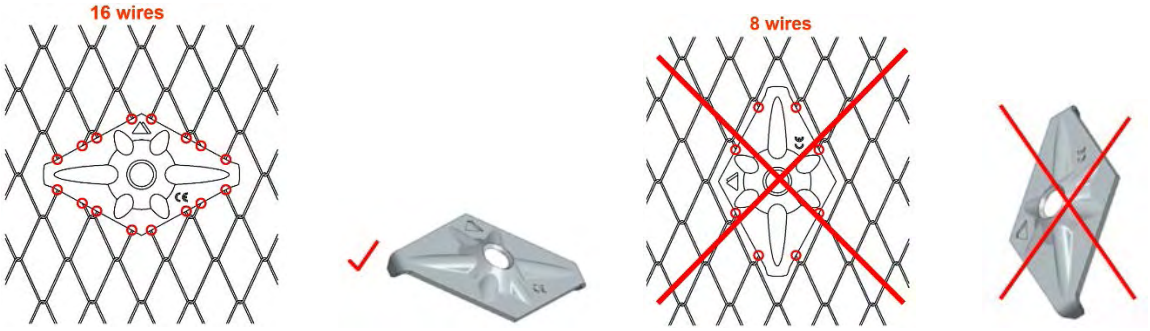
On positioning of the spike plates, care must be taken that the spike plates fit well between the individual meshes and that they are firmly pressed into the ground. This ensures that both mesh and plate are optimally pressed to or against the ground to enable a correct transmission of the forces.

Thereby, the neighbouring mesh panels needs to be laterally attached to each other and installed in a tight manner at first before the spike plates are going to be installed and actively pressed against the surface. If necessary, the mortar column in the nail head area needs to be removed accordingly to enable a proper tensioning of the system.

Tightening the nut, individual wires could get stuck in the thread of the nail. In this case, the nut has to be loosened again trying to push the wire further against the subsoil.



It is important that the system spike plates are applied correctly. This means the plates need to be positioned horizontally that a maximum of high tensile steel wires of the mesh can be covered. The next pictures explain the great importance of the correct positioning on the example with the P33.



11.6 Positioning of the spike plates in areas of hollows in the terrain

If a spike plate is positioned in the area of a hollow in the terrain, care must be taken again that the spikes of the plates engage in the individual meshes evenly and in the best possible way.
If due to the local topography as shown in the picture below, the mesh cannot be pressed firmly onto the ground, the nails should be set as far as possible at a right angle to the mesh surface, so that the spike plates are more or less parallel to the mesh without provoking a one-sided strain on the mesh.

In such cases the pretensioning force must be limited to **maximum 30 kN**.

11.7 Pretensioning of the slope stabilization system

By tightening the nut or with the aid of a hydraulic press, the spike plate and thereby the mesh are firmly pressed onto the ground and the mesh is tensioned. The load table below shows a summary of the required torques for three different nails of type GEWI for the application of a pretensioning force of at maximum V = 30 kN in soil and maximum V = 50 kN in rock, respectively. For the TECCO® G45/2 the maximum pretensioning force should be reduced to maximum 20 kN.

Load table (1 kNm = 224.81 lbs · 3.281 ft = 737.6 ft-lbs)

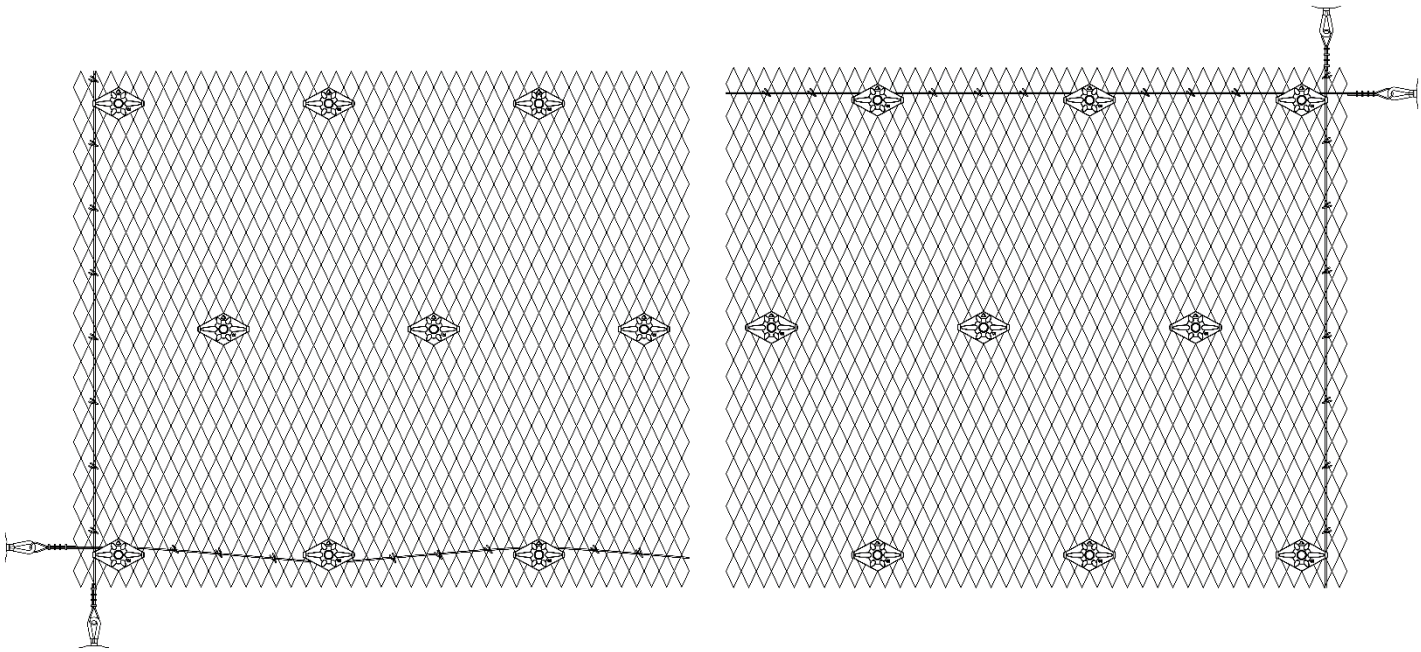
Nail type	Pretensioning force V	Required torque	
GEWI D = 25 mm and TITAN 30/11	20 kN	0.20 kNm	148 ft-lbs
	30 kN	0.30 kNm	221 ft-lbs
	50 kN	0.50 kNm	369 ft-lbs
GEWI D = 28 mm	20 kN	0.25 kNm	184 ft-lbs
	30 kN	0.35 kNm	258 ft-lbs
	50 kN	0.55 kNm	406 ft-lbs
GEWI D = 32 mm and TITAN 40/16	20 kN	0.30 kNm	221 ft-lbs
	30 kN	0.40 kNm	295 ft-lbs
	50 kN	0.60 kNm	443 ft-lbs

Tightening of the nut to the required torque using a torque wrench.

11.8 Mesh edges

It is generally recommended to reinforce the edge areas of the mesh with boundary ropes. The boundary ropes are secured and tensioned to wire rope anchors located at the corners.

In case of irregular edges there may be a need under certain circumstances for short or driven nails. These serve to tension the mesh to the ground as tightly as possible and to secure the edges in the best possible way.



The above two schematic drawings show the arrangement of the top, side and bottom boundary ropes and the rope anchor. Hereby the minimum distances of the boundary nails to the edge of the mesh are maintained correctly.

Generally, the horizontal boundary wire ropes at the bottom should be installed alternating once above and once below the nails. Thus, a slipping out of the boundary wire rope underneath the spike plate can be avoided. Especially if the boundary nails are not continuing straight on or if the slope geometry is very irregular this is important as well.

11.8.1 Top edge

With boundary rope

The boundary rope is fastened to the mesh by means of press claws (type 2, cf. chapter 6.1.4) and tensioned against the lateral rope anchors (corner points or intermediate anchorages). Hereby care must be taken that the boundary rope runs above the top row of nails and that it is held in position by the spike plates on the uppermost nails.

Provided the edge rope is sufficiently far enough from the critical area to fasten the boundary rope, a **press claw (type 2**) is normally placed in **every third individual mesh (G65) or in every fourth mesh (G45/2).**

In principle the boundary rope needs to be fixed with the main nails or with driven or auxiliary nails and should not be used as bottom support ropes for rockfall barriers.

If boundary ropes are used with boundaries more than approx. 30 meters long, intermediate rope anchors must be set approx. every 20 - 25 meters.

Option

If possible, the top edge should be executed in such a manner that the mesh is slightly buried and covered with approx. 0.3 meter of excavated material.

11.8.2 Side edge of the mesh

With lateral boundary rope

The lateral boundary ropes are secured to the mesh with press claws (type 2). Hereby **every second mesh (G65) or third mesh (G45/2)** must be held. The boundary ropes are to be tensioned against wire rope anchors.

The boundary rope needs to be fixed with the main nails or with driven or auxiliary nails.

If possible, the edge should be slightly buried.

The position of the boundary nails must be selected so that the spike plates can press the mesh onto the ground with their entire surface.

The picture on the right shows an extreme situation: if the nail was set one mesh further to the left, the left spike of the spike plate would be outside the mesh and therefore unable to secure a complete individual mesh. This must be avoided under all circumstances.

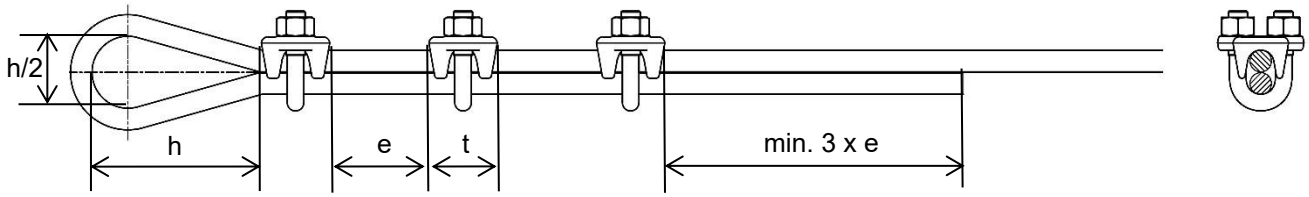
11.8.3 Bottom edge of the mesh

With bottom boundary rope

The horizontal bottom boundary rope should run alternating once above and once below the lowermost row of nails as a best practice. The rope must be connected to the mesh by means of press claws, whereby **every third individual mesh (G65) or in every fourth mesh (G45/2)** must be held. Moreover, the bottom boundary rope must be arranged so that it can be held punctually by the system's spike plates at the lowermost nails.
Irregular rock slopes in which the boundary rope is not tight on the surface **every second mesh** must be held with press claws.

11.9 Fastening of boundary ropes onto spiral rope anchors by means of wire rope clips

Instructions below apply to all wire rope clips according to FF-C-450 type 1 class 1 (similar EN 13411-5 type 2) delivered by Geobrugg AG.
The distance **e** between the wire rope clips should be at least **1 x t** but not exceed **2 x t**, where **t** is the width of the clamping jaws. The loose rope end has to be **3 x e** at a minimum. Geobrugg recommends looping up the remaining free section and fixing it directly behind the last wire rope clip on the tightened rope.
If you are using a thimble in the loop structure, the first wire rope clip must be attached directly next to the thimble. For loops without a thimble the length **h** between the first wire rope clip and the point of load incidence must minimally be 15-time the nominal diameter of the rope. In unloaded condition the length **h** of the loop should be not less than the double of the loop width **h/2.**
The clamping brackets (U-brackets) must always be fitted to the unstressed end of the rope, the clamping jaws (saddle) must always be fitted to the strained rope („never saddle a dead horse“).



The required tightening torques with lubrication apply to wire rope clips whose bearing surfaces and the threads of the nuts have been greased with Panolin CL 60 multipurpose lubricant spray (or an equivalent lubricant).
During tightening the nuts have to be tensioned equally (alternately) until the required tightening torque is reached.

Wire rope clip diameter [mm]	Nominal size wire rope clip	Required number of wire rope clips	Required torque **with** greasing [Nm]	Required torque **without** greasing [Nm]	Wrench size [mm]
8 (1)	5/16“	3	20	50	18
9 - 10	3/8“	3	30	75	19
11 - 12	7/16“	3	40	110	22

(1) Only used for the holes for trees, see chapter 14.5.1.

After the first load application the tightening torque has to be checked and if not fulfilled adjusted to the required value.
A visible contusion of the wire ropes positively indicates that the wire rope clips have been tightened to the required tightening torque.

Wire rope clips always have to be installed and used with the required tensioning torque. It is not allowed to reuse clips once they have been detached.

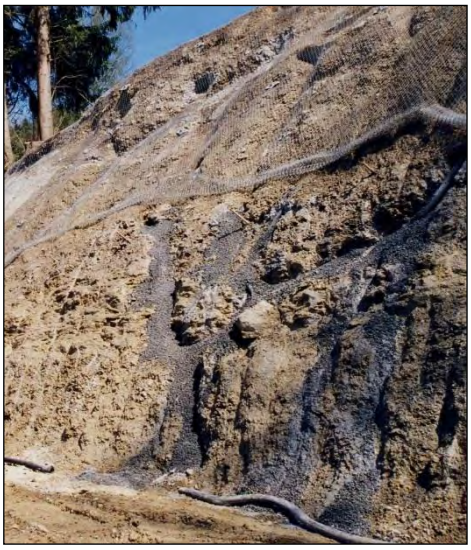
12 Water, Drainages

Outflows of water must be caught and the water must be drained outside or below the slope area to be protected.

Depending on the type of water pressure and the quantities, drainage can be accomplished by means of drainage hoses (e.g. slotted, perforated corrugated tubes) or special drainage-geotextiles in combination with hoses. Concrete ribs for filtering purposes may also be suitable and provide a supporting function in critical areas.

For slope stabilizations, where aggressive, sour or otherwise corrosive slope water is to be expected, it is necessary to perform regular inspections, so that the hillside-water is drained away well. At such an environment the application of TECCO® STAINLESS is possible.

Example: Drainage hose to drain arising hillside water



Example: filter drain filled with concrete

13 Erosion control

In the case of fine-grained substrates with a strong tendency to erode, it is normally necessary to install a mat protecting against erosion underneath the mesh so that protection is already provided from the moment the slope stabilization is installed. Usually, some time elapses before greening can be carried out because it is uneconomical to do this work in smaller stages.

Erosion control measures are required if soil material can be flushed away in fine-grained, non- or insufficiently cohesive substrates. This erosion control may need to be of a temporary (in case of subsequent greening) or permanent nature (without greening).

General assessment of the need for erosion control measures

- Mandatory in cases of fine-grained, non-cohesive unconsolidated materials (e.g. silt, sand).
- Normally required in cases of mixed-grain, unconsolidated rolling materials (e.g. sand, gravel).
- Recommended in cases of relatively fine-grained soils if there is a risk of water flowing over the surface from areas above the TECCO® slope stabilization.
- In general not required in cases of rocky slopes without loose rock or soil cover.

For protection against erosion, finer-meshed geogrids or structural mats must be installed below the mesh. In general, slopes with a risk of erosion, need to be greened. The mats must be matched to the intended greening process. Weather-resistant mats of plastic (preferably UV-stabilized PP, PE or PET) are generally used. From our testing of decomposing

mats (jute, sisal, coco fibre) we experienced some revegetation problems. The TECMAT® Erosion Control Mat, consisting of Polypropylene, is specially designed and tested for the use with the TECCO® Slope Stabilization System (see chapter 14.3). The mats should only be opened in the area where the nails are passing through. Along the edges they should overlap by approx. 0.1 - 0.2 m. Bigger overlaps should be avoided. The mats must be placed on the slope before the mesh is laid and can be secured by short driven nails or pins.

Alternatively, the in chapter 14.4 described TECCO® G65/3 GREEN can be used where the erosions control mat is already integrated in the steel wire mesh.

14 Revegetation and planting

It can be desirable, recommended or mandatory to green / plant a slope on where a TECCO® slope stabilization system is installed.

Greening is always compulsory if the substrate is relatively fine-grained and endangered by erosion, and if flushing away of material (formation of erosion gullies) is expected during rainfalls / snow melting periods. In such cases greening is an integral part of the entire mitigation measure.

14.1 General assessment of the need for greening from a technical point-of-view

- Mandatory in cases of fine-grained, non-cohesive unconsolidated materials (e.g. silt, sand).
- Normally required in cases of all remaining substrates of unconsolidated material and rocky slopes highly prone to weathering, particular in case of marl, siltstone, and sandstone.
- Recommended in cases of rocky slopes of medium proneness to weathering, with distinct layers and fissures.
- Not required in general for rocky slopes whose individual components (stones, blocks) are resistant to weathering and which the slope stabilization system simply has to stop from sliding off and/or breaking out.

In fine-grained soils with a high risk of erosion, an erosion control mat must usually be installed to ensure there is erosion control immediately after the installation of the slope stabilization system. Sometime usually elapses before greening can be carried out because it is uneconomical to do this work in smaller stages.

Erosion control mats may not be necessary if the stability can be guaranteed by the planned greening method, the type of vegetation layer and taking into account the point in time when greening becomes effective after the installation of the slope stabilization system.

Greening / planting may also be required for reasons of landscape preservation, for example if major new slope cuts must be recultivated.

Special remark:
Modern greening processes with special vegetation layers allow greening on substrates that are less suitable for vegetation and/or under difficult climatic conditions. Such vegetation layers are accordingly more expensive. Normally greening is possible until a slope inclination up to approximately 60°. For steeper slopes all the factors as water content, date of seeding etc. are important and specialist should be contacted.

14.2 Vegetation face

Greening of steep slopes as enabled by the TECCO® slope stabilization system is recommended to be performed by experienced specialists which already should be contacted in the planning stage. It is important that these experts are aware of the local circumstances (climate, exposition, natural plant population, subsoil, etc.) and that they can match the vegetation face to these circumstances.

A prerequisite for successful greening is often the application of a minimum vegetation layer after the system installation to permit the plants to begin growing. This layer must be matched to the subsoil, the need for nutrients and possibly other factors. It must be possible to apply this layer with full-surface contact to the ground. The layer must be able to resist erosion a few hours after the application so that it cannot be flushed away by sudden heavy rainfalls. If erosion protection mats are used, it is important to match the vegetation layer material to the mat in such a way that penetration and filling of the mat is guaranteed.

Dense mats of natural fibres, seed mats (with pre-greening) are normally not suitable for these purposes unless the slope can be shaped very evenly so that the mats lie tightly on the entire surface and are pressed against the slope by the TECCO® mesh.

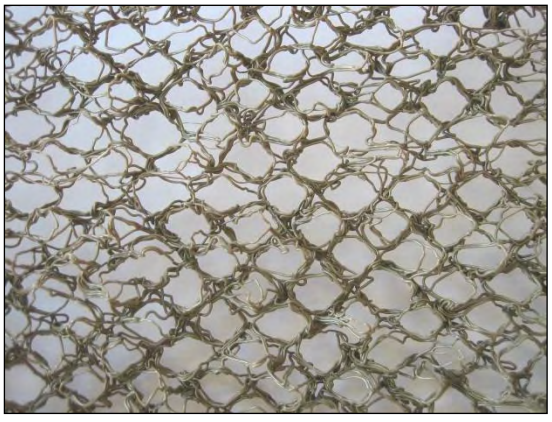
The TECMAT® Erosion Control Mat and the TECCO® G65/3 GREEN are tested in detailed field studies for permeability of hydro and dry seed. Thus, the TECMAT® or TECCO® G65/3 GREEN is the ideal solution for irregular slopes.

14.3 Revegetation with erosion control mat: TECMAT®

Slopes consisting of loose rock are well protected against erosion with the TECMAT® Erosion Control Mat and support the revegetation after installation.

14.3.1 TECMAT® Erosion Control Mat

TECMAT® Erosion Control Mat	
Fibers	extruded monofilaments
Material	Polypropylene (PP)
Structure	irregular loopy structure
Thickness	18 mm
Weight	approx. 600 g/m^2
Void space	> 95%
Colour	Curry green

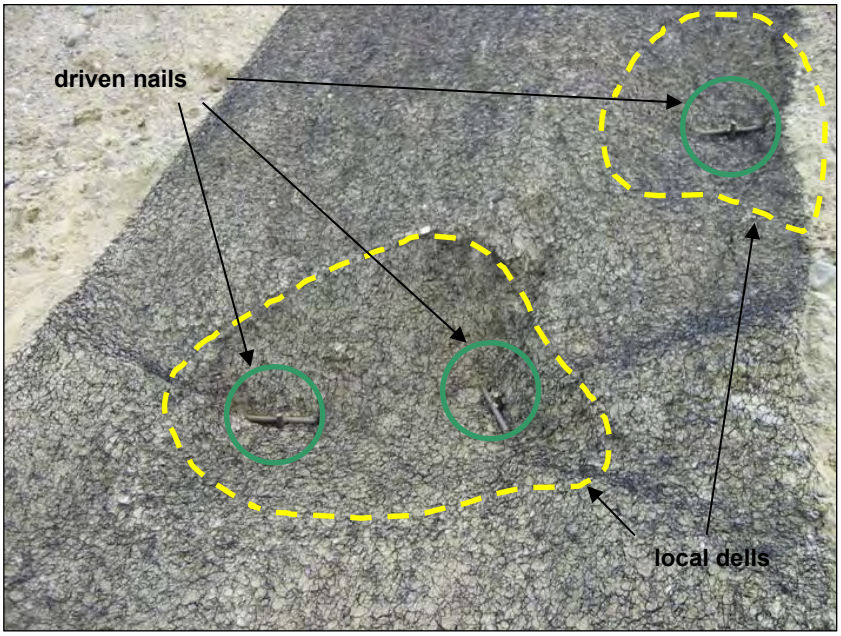


TECMAT® erosion control mat

14.3.2 Installation

The standard length of the TECMAT® erosion control mat is **40 m**. The standard width is **2.0 m**.

The erosion control mat will be placed on top of the soil and fixed before installation of the TECCO® mesh. For irregular slopes it is required to fix the mat with driven nails to local dells. This ensures an improved erosion control. The fixation is carried out with driven nails of different length, depending on the thickness of the subsoil layer. Based on experience, it is recommended to install one nail every 3 – 6 m^2. Along the edges the mats should overlap by approximately 0.1 - 0.2 m and if required fixed with plastic ties.



After laying of the erosion control mat, the TECCO® mesh is to install according to Chapter 9.
For the installation option B (laying of the meshes before setting of the nails) it is required to cut a hole with scissors in the TECMAT® Erosion Control Mat to avoid snarl of the mat while drilling.

14.3.3 Auxiliary equipment and tools

- Long scissors for cutting of the mat panels to the appropriate length. Alternatively, it is possible to use a universal scissor with rechargeable battery (e.g. “Bosch”, GUS 9.6 V).
- Universal scissors to cut holes in the mat for drilling through.
- Sledge hammer (e.g. 4 kg) to drive in the soil nails

14.3.4 Seeding methods

The TECMAT® Erosion Control Mat is specially designed for greening with hydraulic or dry seeding respectively.

The components of the hydro seeding are:

- seeds adapted to the soil and the climatic conditions,
- biodegradable soil covering mulch (max. fibre length 3 mm),
- organic adhesive glue,
- purified, clean water,
- if required, an organic-mineral fertilizer.

The materials will be mixed in the tank of a seeding machine to ensure homogeneity of the mixture. After mixing, the material is sprayed in liquid form over the surfaces to be treated. For slopes with bad access or economically small areas, there is the option to do dry seeding with a so called “greening backpack”. The components are seeds adapted to the soil and the climatic conditions, organic adhesive glue, if required, an organic-mineral fertilizer.

Example for hydraulic seeding machine


Greening „backpack“ (hand machine) for dry seeding

In any case it is recommended to contact a local greening specialist for successful revegetation.

14.4 Revegetation with integrated erosion control mat: TECCO® G65/3 GREEN

Alternatively to the TECMAT® Erosion Control Mat the TECCO® G65/3 GREEN can be used where the erosion control mat is already integrated in the mesh.

TECCO® G65/3 GREEN	
Fibers	extruded monofilaments
Material	Polypropylene (PP)
Structure	irregular loopy structure
Thickness	14 mm
Weight	approx. 400 g/m^2
Void space	> 90%
Colour	Curry green
Size per roll	3.9 x 25 m
Weight per roll	200 kg

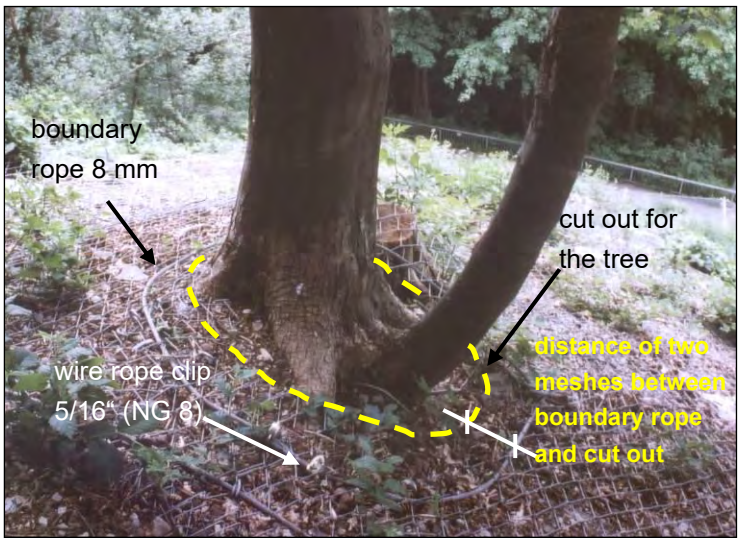
14.5 Planting

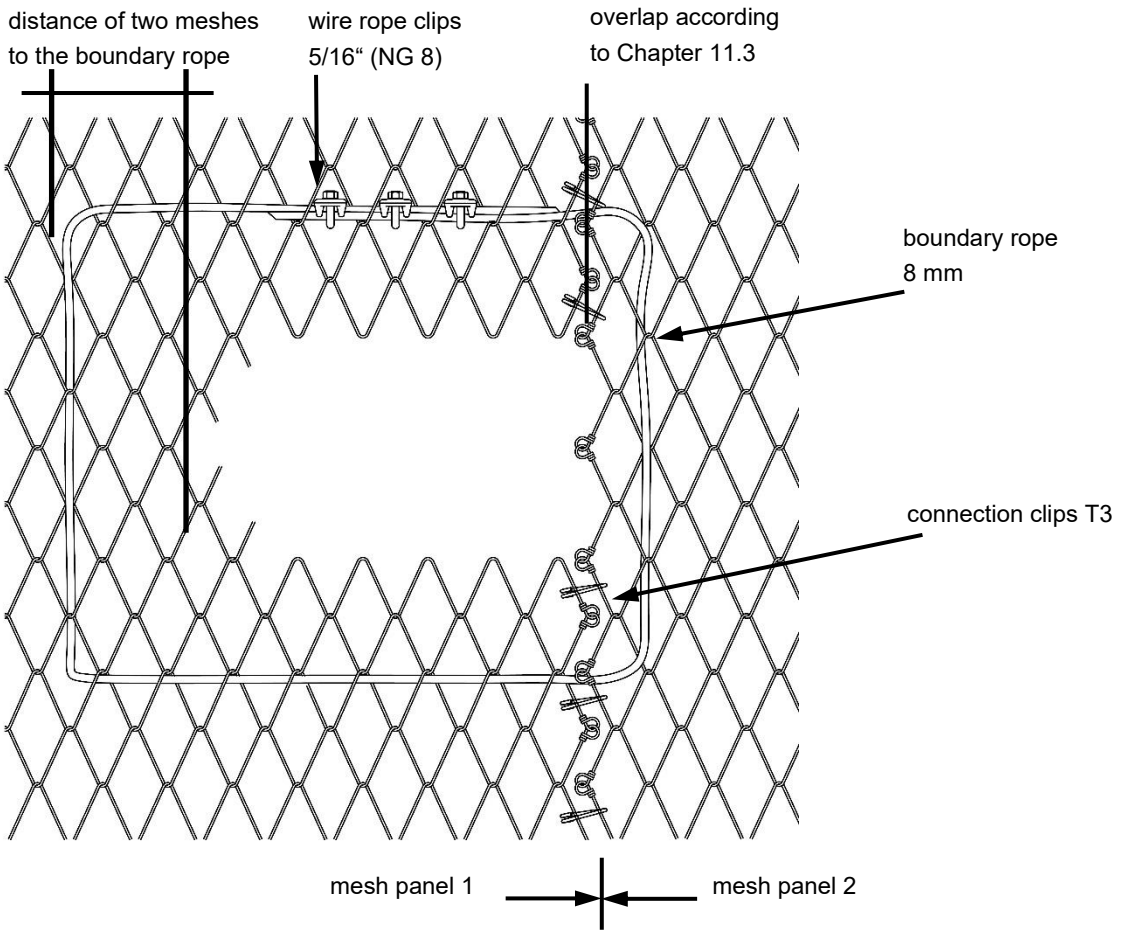
In principle, the additional planting of shrubs (trees in exceptional cases only) is possible. This must be planned carefully and suit the particular location. There are various possibilities, ranging from seeding, cuttings of vegetatively multiplying shrubs and trees (e.g. types of willows), to the planting of grown plants with roots.

14.5.1 Holes for trees

It is possible to integrate trees and other plants in exceptional cases into the slope stabilization system. A cut out of the mat panel is sized accordingly to the crops. The cut out is carried out after laying of the mesh panels (see below picture). Thus, the panel is open to the side and it is possible to lay it around the tree. The two mesh panels are connected

according to Chapter 11.3 with connection clips. Approximately two meshes from the cut edge, a boundary rope (diam. 8 mm) is seamed into the mesh. The boundary rope is connected at the end with 3 pcs. 5/16” (NG 8) wire rope clips.





14.5.2 Holes for planting

The planting of plants with roots (e.g. so-called container plants) is possible with adaptations to the mesh (after consultation with the mesh manufacturer). It is recommended to obtain the service of an experienced specialist for both planning and execution.

The plant holes will be carried out after laying of the mesh and before the final tensioning of the claw plates. The mesh is cut according to the size of the required opening. Fixation and installation are according to the description of tree holes (see Chapter 14.5.1).

14.6 Maintenance

Please note that every "green" solution in the form of greening / planting requires a minimal amount of maintenance. This is usually most intensive in the first two years and then decreases, particularly in the case of planted slopes.

14.6.1 First cut

Indispensable for successful greening is a first nursing cut after the first full growth. This should be done under all circumstances, otherwise there is a danger of the grass and herbs drying and covering the slope in a manner restricting regrowth. The dry material can also result in rot setting in underneath and encouraging moss to grow all over the slope.

This 1st cut must be made after a growth to a height of approx. 20 - 30 cm, and a cut level of 10 cm should be maintained. Too short a cut can lead to drying up in droughts.

Cutting should generally not be done in hot weather or after long dry periods, as the generally thin grass sod can easily dry out. A good time for cutting is in early autumn, after the end of the vegetation period.

14.6.2 Follow-up maintenance

In the first two years one cut per vegetation period is generally enough and this preferably also in early autumn.

After two vegetation periods the long-term fertilizer is used up and extensive vegetation adapted to the locally prevailing conditions forms. There is no strong growth anymore, so that there is generally no need for further maintenance with nursing cuts. Cuts may only be required in parts of the slope from now on if subsequent inspections indicate a need for them.

14.6.3 Slopes with shrubs

Where shrubs are planted on slopes, maintenance in the first two vegetation periods is the same as on slopes with grass.

Depending on the selected types, shrubs require a nursing cut at intervals of approx. 3 - 5 years or whenever the periodic inspections show that it is necessary.

A nursing cut is also appropriate to guarantee a minimum incidence of light in the slope so that the remaining greening (grass and herbs) does not disappear completely together with the erosion protection and the stabilization by the roots.

If tall trees grow in the course of time, they must be felled since they might be blown over by strong winds. Dead wood must be removed.

14.6.4 General remarks regarding maintenance

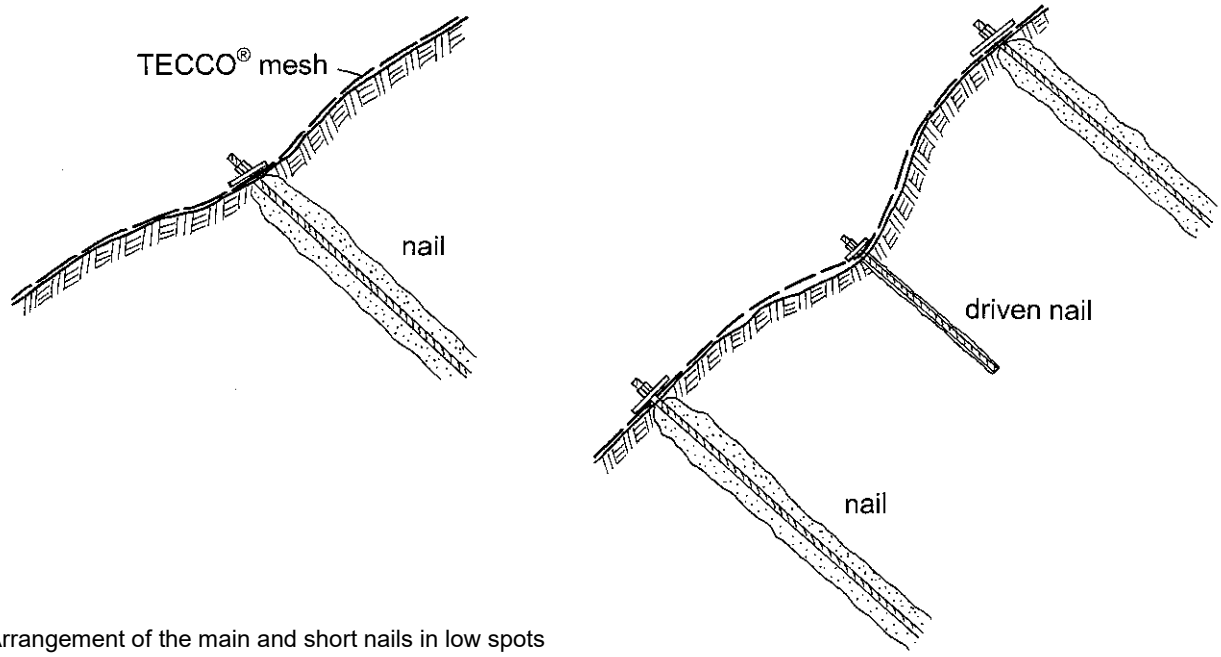
More intensive maintenance in the first vegetation period encourages an optimal function of the vegetation and reduces the need for subsequent maintenance.

It makes sense to include maintenance with the 1st nursing cut and follow-up maintenance during two vegetation periods in the project and to have it offered as part of the scope of performance.
In this way it is possible to agree on a formal acceptance of the greening of the construction after expiry of these two vegetation periods and the company doing the work can be held responsible. Thereby one can practically exclude a low-cost offer of an inadequate greening quality, since the supplier is aware of the pending assessment after two vegetation periods. Furthermore, experience shows, that well-developed vegetation will continue to hold and grow also after the two years.

15 Hollows (dells, recesses)

15.1 Dells and recesses up to approx. 0.5 m

Whenever possible the nails should be set in low spots, so that the pretensioning pulls the mesh cover into the recesses. Major hollow spaces are thus avoided and in case of greening there is no need to spray on an excessive quantity of vegetation layer material or filler material. If the nail pattern does not permit setting nails in low spots, it may be necessary to set additional short nails.



Arrangement of the main and short nails in low spots

15.2 Hollows, dells and recesses deeper than 0.5 m

If the hollow spaces are too deep, prefilling with a special mixture to which concrete may be admixed is possible before a vegetation layer is sprayed on. In this case the mesh does not need to be pressed or pulled right into the low spot.

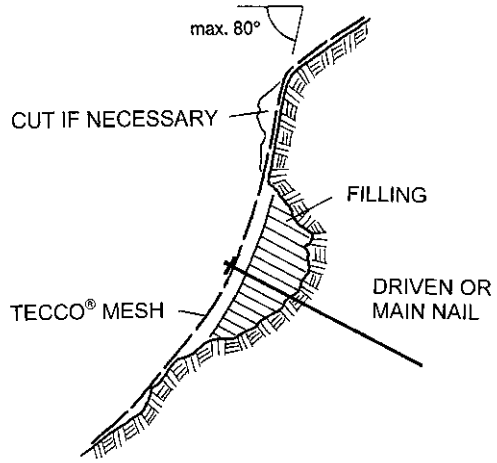
Hereby care must be taken to ensure that the mesh upslope of the nail is tensioned so that a gradient of no more than 75° results, otherwise correct greening is no longer possible.

15.3 Filling of hollows with a static support function

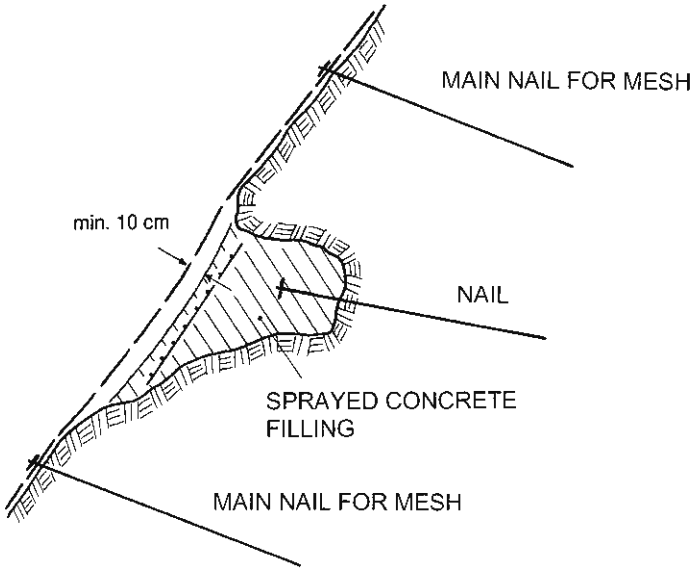
If overhangs in rock, projecting blocks, etc. need to be secured statically, this can be achieved with sprayed concrete fillings secured as required with nails and if appropriate reinforced additionally with welded wire fabric.

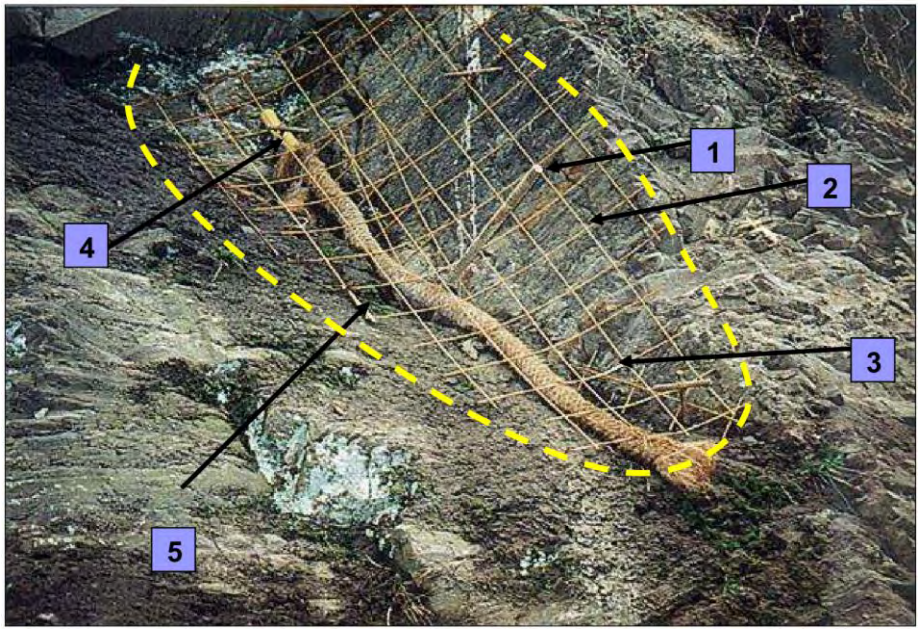
If these fillings are to be greened, the sprayed concrete surface should be at a level so that the TECCO® steel wire mesh is tensioned at a distance of at least 10 cm above it. This will allow the subsequent application of a sufficiently thick vegetation layer.

15.3.1 Detail arrangement in case of deep hollows with prefilling



15.3.2 Sprayed concrete fillings





Legend:

1 Main anchor (nail)
2 Reinforcing fabric
3 Drainage
4 Short nail to secure the reinforcement additionally
5 Filling edge (marked by yellow broken line)

The picture above clarifies the arrangement of a shotecrete filling with reinforcing steel. The area of the dell marked by the broken line is filled with shotecrete. In this variant the main nail (1) is in the area of the shotecrete filling.

16 Interception apron using TECCO® G65/3

As explained hereafter, an intercepting apron can be erected as an economically efficient solution, depending on the local circumstances and the hazards that exist. This apron serves to catch rocks of a max. diameter of approx. 30 cm and moving at a maximum velocity of 20 – 25 m/s.

The TECCO® mesh serves primarily to protect the connecting area below. However, instead of just pulling the mesh over the endangered surface and terminating it flat on the ground with the aid of a boundary rope, the mesh panels can be run up along the protruding boundary nails, secured to the top bearing rope and thereby shaped into an intercepting apron. In combination with an active slope stabilization, the transition from the mesh cover to the intercepting apron generally requires the installation of a bottom bearing rope so that the apron can be tensioned optimally. This bottom bearing rope must be positioned as close as possible to the ground so that falling rocks are prevented from sliding beneath the mesh where they can otherwise cause undesirable pouches. If a curtain is installed on the downslope side to provide controlled falling, it may be appropriate to design the intercepting apron without bottom bearing rope so that falling rocks are collected by the apron and guided downwards in a controlled manner underneath the mesh.

The following conditions must be taken into account for the installation of an intercepting apron:

- In principle the area above the intercepting apron must be stable, i.e. there is no or only a negligible danger from instabilities near the surface or slips with deeper-seated sliding surfaces.
- The area below the intercepting apron is actively stabilized with the aid of the TECCO® SYSTEM based on nailing or protected against rockfall by means of a TECCO® curtain.
- The area immediately at the intercepting apron is suitably stabilized or in itself stable, so that no danger from any instabilities exists here.
- Only individual rocks of a maximum diameter of 30 cm can work loose in the area above the intercepting apron.
- The bounce height of the rocks in the area of the intercepting apron is maximum 1.5 – 1.8 m.
- The intercepting apron requires regular checking and appropriate maintenance, i.e. the area above and below the apron should be suitable to walk on.
- The intercepting apron is not laid out for the load case „snow“ or „ice“. Measures appropriate to the situation must be taken if there is a danger of snow slides, unfavourable accumulations of snow or ice.
- If any outflow of water or water accumulations exist in the area of the intercepting apron and below it, the arising water must be captured with suitable measures and drained in a controlled manner. Particular caution is called for if a sink or a lengthwise trench is located immediately upslope of the apron, in which water can collect and subsequently seep away. The seepage may lead to a soaking of the surface layer to be stabilized, with very unfavourable effects.

The implementation of an intercepting apron must be avoided in principle if rocks of a diameter of more than 30 cm can become loose in the area above or if there is a danger of instabilities close to the surface or even slips, representing a hazard to the area below. Measures adapted to the particular situation must be taken in such cases. After an in-depth clarification a suitable passive measure might be a correctly designed and dimensioned rockfall protection fence, or an active measure might be taken by installing a TECCO® mesh cover.

To fasten the top bearing rope and the retaining ropes, a suitable eyebolt can be provided in the head section of the post. The mesh sheet can be secured to the top bearing rope by folding around the bearing rope as shown in the photos above fixed with connection clips T3 or optionally with a seam rope of diameter D = 6 mm.




The bottom bearing rope must be laid upslope of the posts as a matter of principle. Existing spike plates are used for fixing the rope to the nails. **Each individual mesh must be secured** to the bottom bearing rope, as in the case of the top bearing rope.

The specification for corrosion protection of the nails acting as posts must be laid down by the project engineers.

The following must be observed if an intercepting apron is erected (see drawing in the appendix):

- Maximum admissible height: 2.0 m
- Max. distance between posts: 2.5 – 3.0 m
- Recommended nail types: TITAN 30/11 or 40/16; GEWI D = 28 or 32 mm
- Top bearing rope: D = 12 mm (laterally tensioned against wire rope anchor Ø 10.5 mm)
- Bottom bearing rope: D = 12 mm (laterally tensioned against wire rope anchor Ø 10.5 mm)
- Retaining ropes: D = 12 mm, whereby each post must be back hung against wire rope anchor Ø 10.5 mm

17 Acceptance of the construction

17.1 Acceptance inspection

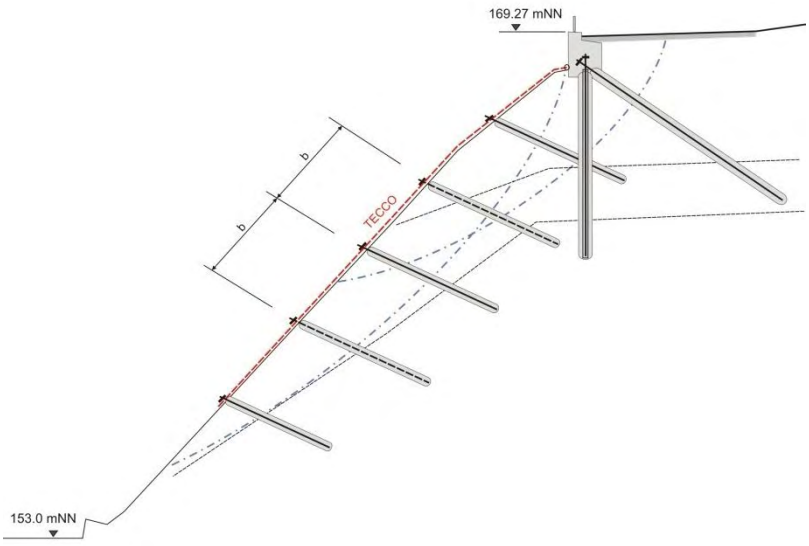
A general acceptance inspection must be carried out on completion of the work and before the possible application of a vegetation face. Hereby the following must be checked:

Construction components

- The nails are correctly placed and grouted.
- The positions of the nails are adapted to the local topography in the best possible manner and the maximum admissible distances between nails are complied with the design.
- Nails must be placed in low spots whenever possible.
- Auxiliary nails are placed where necessary in order to tension the mesh as much as possible onto the surface.
- The nails are allowed to protrude by maximum approx. 20 - 25 cm.
- The system's spike plates are installed correctly (horizontal alignment).
- The system's spike plates are actively pressed onto the mesh and the substrate without bottoming on the nail itself due to e.g. a thread cut too short.
- The mesh is tensioned onto the surface to the best possible extent.
- The mesh sheets are fully connected without interruptions with the connection clips.
- Openings in the mesh e.g. for trees, adaptations to components, etc. are correctly closed.
- The boundary terminations are of a neat execution and the mesh is correctly fastened to the boundary ropes.
- The boundary ropes are installed tightly and laterally tensioned against rope anchors whenever possible.
- There is no evidence of unconformities (damaged/defective system).

Slope in general

- The system covers the critical area of the slope adequately in principle.
- Any drainage measures immediately above the protected slope and in the slope itself are of correct execution. Any observed outflows of water must be recorded in a protocol. If indicated, suitable supplementary work must be carried out to collect the arising water and to drain it away in a controlled manner.
- If any signs of erosion are already evident, they must be recorded.
- Any more substantial movements in the fields between the nails must be recorded.
- Any fracture lines above the top boundary must be recorded.



Remark:
If any sort of construction sensitive to deformation (e.g. a road) is located above the flexible slope stabilization, it is recommended as a matter of principle to provide a stiffening measure in the form of e.g. a deep-anchored concrete partition in addition to the mesh cover in combination with nailing. If no such measure has been taken, the current condition must be recorded and the possibility of damage resulting from possibly inadequate protection measures in the boundary area must be pointed out.

17.2 Acceptance protocol

Deficiencies detected during acceptance inspection must be eliminated by the executing contractor and a formal final **acceptance protocol** must be issued and signed by the involved parties (client, project editor, site manager and contractor).

Potential problem areas in the slope must be recorded in this acceptance protocol and documented with photographs, so that any changes can be detected during subsequent inspections.

If required or desired, a vegetation face can be applied by means of a suitable process after acceptance is completed. The acceptance inspection must be made beforehand because constructive deficiencies within the system itself might otherwise be hidden by the sprayed on vegetation or greening layer.

18 Maintenance and periodic inspections of the system

18.1 Maintenance of the system

No maintenance as such is required if the slope stabilization system was correctly laid out and put in place and if suitable measures were taken against the problems of water outflows and erosion.

The TECCO® SYSTEM elements themselves require generally no maintenance thanks to their high-grade coating against corrosion.

Certain weathering and loosening processes are possible, however, since a protected slope is also exposed to the influences of the environment (cycles of rain, frost, dew, etc.). Such effects cannot be prevented by the open TECCO® system, which is why it may become necessary to remove any fine material which has been washed to the foot of the slope or rippled there.

Maintenance is actually only called for if inspections reveal mechanical damage to the mesh or its fastening devices due to external influences. Such defects must be corrected.

If the mesh or a fastening feature has become loose, the problem can normally be solved by further tightening (tensioning). In extreme cases additional nails may have to be put in place.

If, in the extreme case, weathering, loosening and the influence of water have caused intolerable material washout or movements with resulting hollows behind and pouches in the meshes, the need for comprehensive maintenance including detaching of the meshes, emptying and re-installing must be considered. If appropriate, local hollows must be filled and stabilized with shotecrete.

18.2 Periodic inspections of the system

The periodic inspections must be specified within the framework of a maintenance schedule.

In the first two years an annual inspection should be carried out, preferably in spring. If two consecutive inspections reveal no major changes with a negative influence on the safety and function of the protective construction, the intervals between the periodic checks can be extended to 2 years.

Additional inspections may have to be made after special events (e.g. after extreme rainfalls, falling of material over the protected slope and more severe seismic influences) in order to detect damage to the system or major erosion and movements.

The periodic inspections comprise in the main:

- General condition
- Condition of problem spots according to the acceptance protocol
- Damage to the system itself (construction components)
- Damage due to erosion / movements in the context of the substrate
- Condition of the greening / vegetation (general / local)
- Documentation of defective areas / changes in relation to the previous inspections

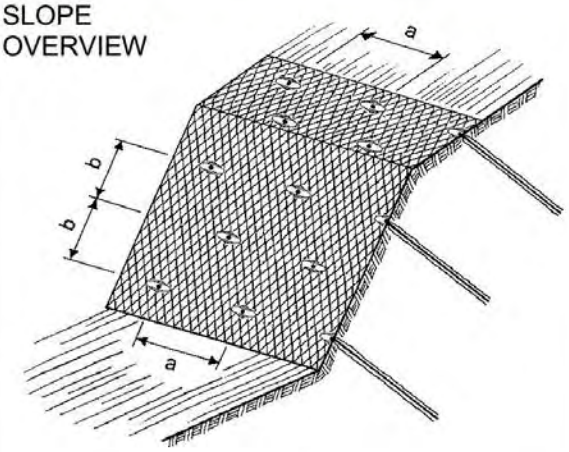
The findings must be detailed in a protocol and documented by photographs so that changes from the condition at the time of the acceptance inspection and preceding inspections are recorded.

Observing the weathering and erosion processes is important in slopes without greening or vegetation. In cases of local loosening or material erosion it must be checked whether the situation can be improved by retensioning alone or additional measures such as securing of hollows with shotecrete, greening, emptying of material deposits are called for. The critical areas must be documented with photographs.

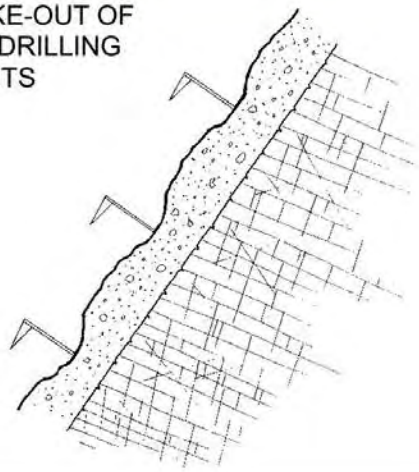
In slopes with greening or vegetation it must be checked how the plant life develops. Is the surface covered completely, bare spots require re-greening. The need for maintenance (mowing, cutting back to the rootstock) must be determined.

THE TECCO® SYSTEM^3
TECHNICAL LEAFLET FOR THE INSTALLATION 1

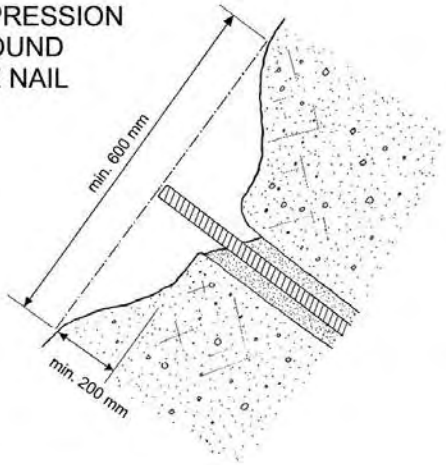
SLOPE OVERVIEW



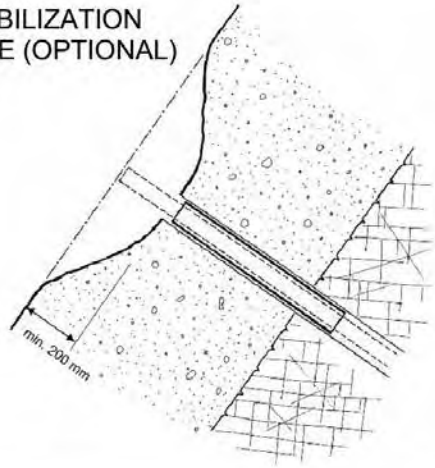
STAKE-OUT OF THE DRILLING POINTS



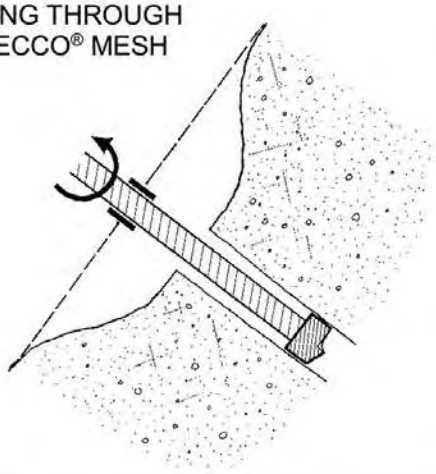
DEPRESSION AROUND THE NAIL



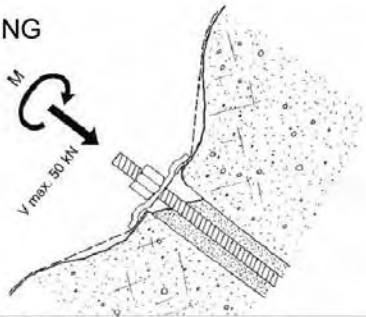
STABILIZATION TUBE (OPTIONAL)



DRILLING THROUGH THE TECCO® MESH



PRETENSIONING OF THE TECCO® SYSTEM



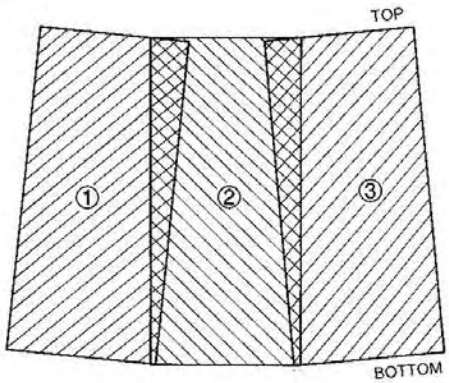
LOAD TABLE

Nail type	Pretensioning force V	Required torque	
GEWI D = 25 mm and TITAN 30/11	20 kN	0.20 kNm	148 ft-lbs
	30 kN	0.30 kNm	221 ft-lbs
	50 kN	0.50 kNm	369 ft-lbs
GEWI D = 28 mm	20 kN	0.25 kNm	184 ft-lbs
	30 kN	0.35 kNm	258 ft-lbs
	50 kN	0.55 kNm	406 ft-lbs
GEWI D = 32 mm and TITAN 40/16	20 kN	0.30 kNm	221 ft-lbs
	30 kN	0.40 kNm	295 ft-lbs
	50 kN	0.60 kNm	443 ft-lbs

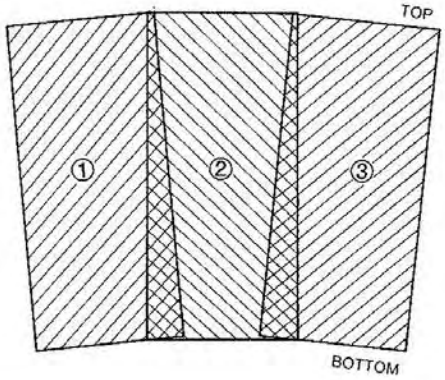
12.07.2017

THE TECCO® SYSTEM^3
TECHNICAL LEAFLET FOR THE INSTALLATION 2

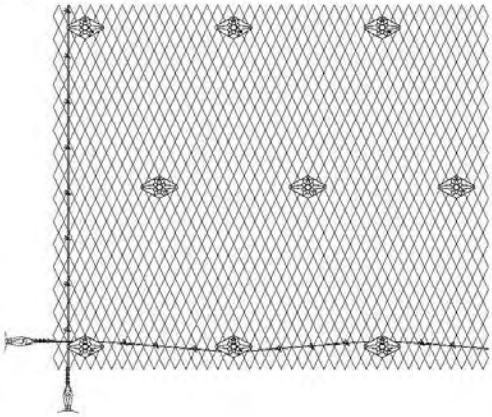
CONVEX SLOPE



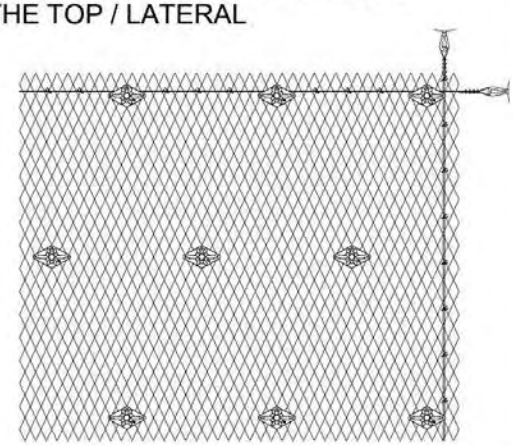
CONCAVE SLOPE



RECOMMENDED BOUNDARY ROPE AT THE BOTTOM / LATERAL



RECOMMENDED BOUNDARY ROPE AT THE TOP / LATERAL



VERTICAL CONNECTION OF THE MESH SHEETS

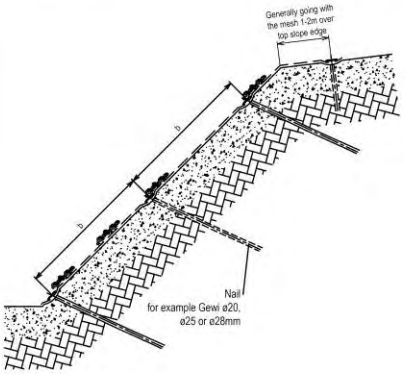
TECCO® G45/2+G65/3

TECCO® G65/4

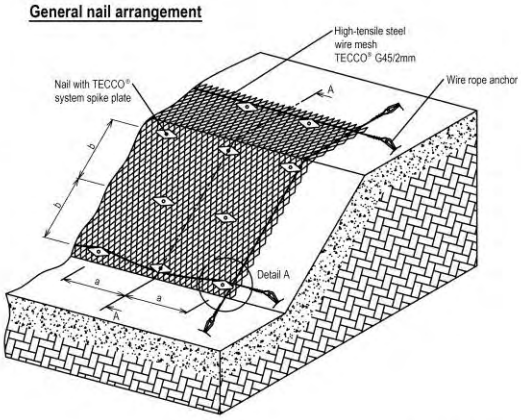
THE FINISHED TECCO® SYSTEM LAYED AND TENSIONED

12.07.2017

Cross section A-A



General nail arrangement

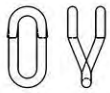


TECCO® System spike plate P25

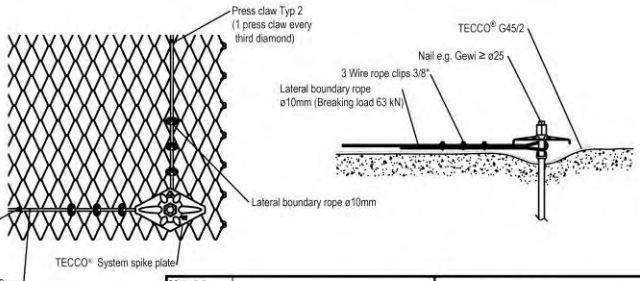
TECCO® System spike plate P33, P33/40N, P33/50N,

Connection clip T3

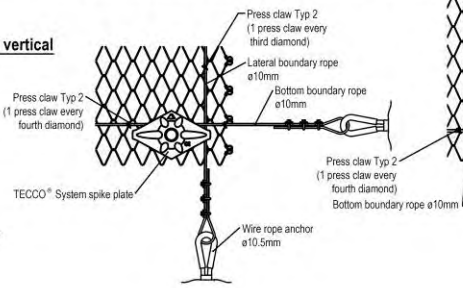
Press claw Typ 2



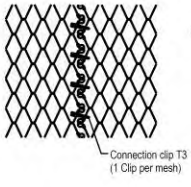
Detail A, Option shear force on the nail



Detail A, Standard, tension force on the wire rope anchor



TECCO® mesh connection vertical normally without overlap



Material:			
Surface:			
Weight [kg]:			
Drawn by:	RIM	Date:	22.02.23
Edited by:	RIM	Date:	23.02.23
Freigegeben	ROA1	Date:	23.02.23

TECCO G45/2
System drawing

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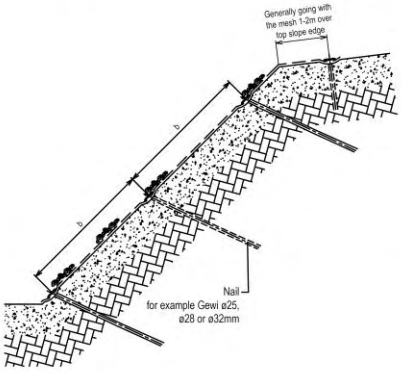
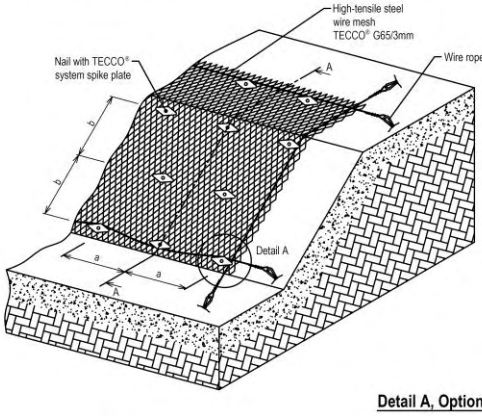
Cross section A-A



General nail arrangement

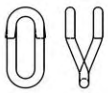


TECCO® System spike plate P33

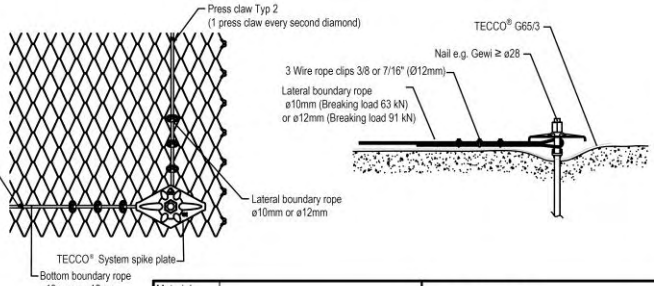
TECCO® System spike plate P66

Connection clip T3

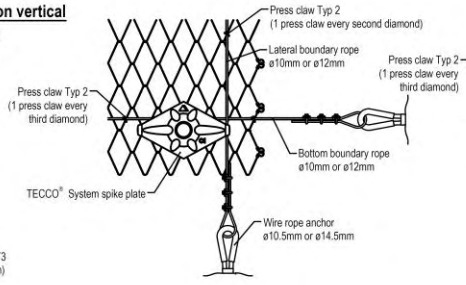
Press claw Typ 2



Detail A, Option shear force on the nail



Detail A, Standard, tension force on the wire rope anchor



TECCO® mesh connection vertical normally without overlap

Material:			
Surface:			
Weight [kg]:			
Drawn by:	RIM	Date:	22.02.23
Edited by:	RIM	Date:	23.02.23
Freigegeben	RIM	Date:	27.02.23

TECCO G65/3
System drawing

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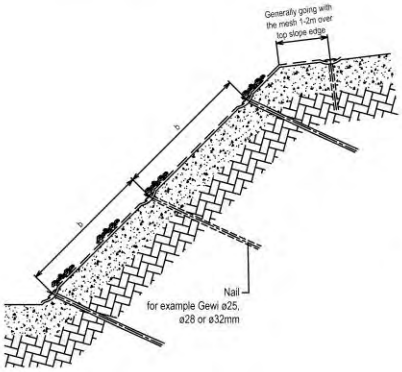
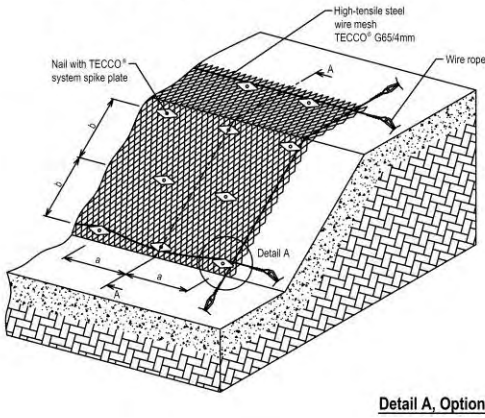
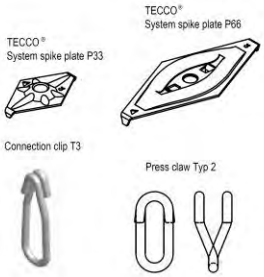
Cross section A-A

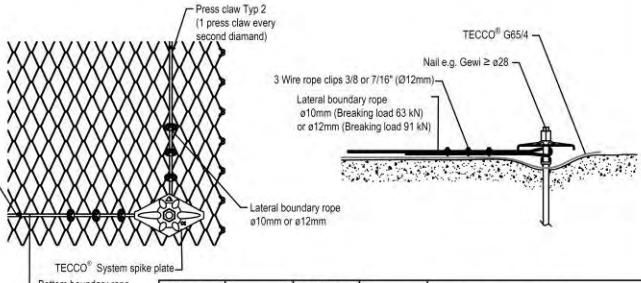


General nail arrangement

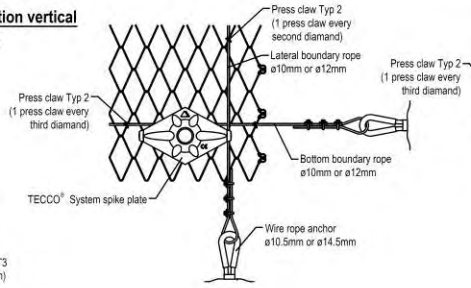




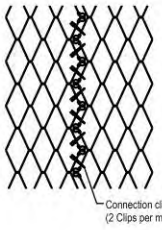
Detail A, Option shear force on the nail



Detail A, Standard, tension force on the wire rope anchor



TECCO® mesh connection vertical normally without overlap



ChM-No:		Weight [kg]:	
Replacement for:	GE-1006e 20.06.19		
Replaced by:			
Drawn by:	RIM	Date:	13.10.2022
Checked by:	ROA1	Date:	13.10.2022
Released by:	ROA1	Date:	13.10.2022

TECCO G65/4
System drawing

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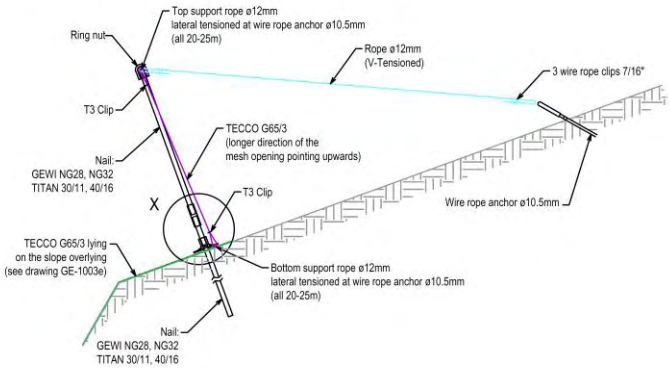
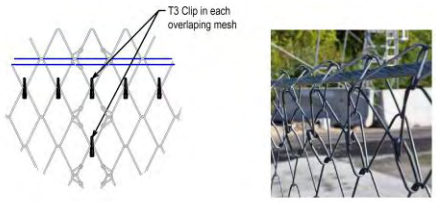
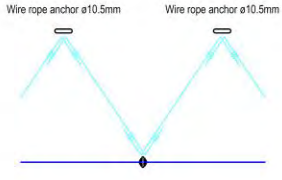
Option 1 (for uneven barrier line: attach additional mesh)



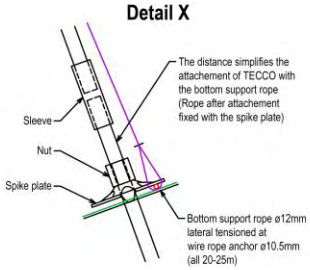
Detail fixation T3 Clip



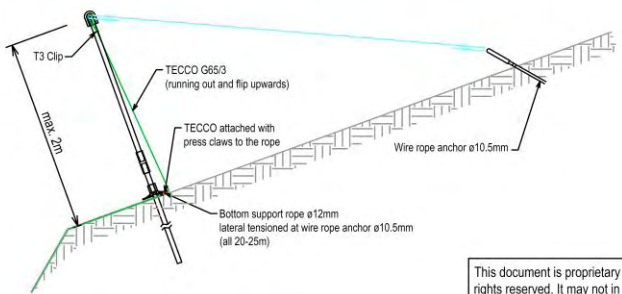
V-Tensioned



Detail X



Option 2 (for even barrier line: mesh directly fold upwards)



modification: -	M:%	substitute for: GE-1014e ed. 29.07.16 replaced by:

Interception apron
TECCO G65/3
Installations options

drawn	19.04.18	BIH
checked	19.04.18	
approved	19.04.18	

GEOBRUGG BRUGG Safety is our nature | **GE-1014e**

Notifikovaná osoba č. 1301

TECHNICKÝ A SKÚŠOBNÝ ÚSTAV STAVEBNÝ, n. o.
BUILDING TESTING AND RESEARCH INSTITUTE
Studená 3, 821 04 Bratislava, Slovenská republika

Certificate of constancy of performance

1301 – CPR – 1271

In compliance with Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011 (the Construction Products Regulation or CPR), this certificate applies to the construction product

High-Tensile Steel Wire Mesh System TECCO®G45/2

is intended to be used for:
- stabilization of steep slopes of unconsolidated soil and rocky material and for prevention of stones and blocks in disintegrated, loose or weathered rock faces from breaking out (Slope Stabilization System);
- securing of rock slopes, spurs, overhangs or individual section of loose rock (Rock Protection System);
- protection system for safety application like not sudden impact of objects.

Placed on the market under the name of

Geobrugg AG
Geohazard Solutions
Aachstrasse 11, CH-8590 Romanshorn
Switzerland

and produced in the manufacturing plant

Geobrugg AG
Geohazard Solutions
Aachstrasse 11, CH-8590 Romanshorn
Switzerland

This certificate attests that all provisions concerning the assessment and verification of constancy of performance described in the

ETA 17/0119 – version 03, issued on 09/05/2022

and

EAD 230025-00-0106

under system 1 for the performance set out in the ETA are applied and that the factory production control conducted by the manufacturer is assessed to ensure the

constancy of performance of the construction product.

This certificate was first issued on 24 April 2017 and will remain valid as long as neither the ETA, the EAD, the construction product, the AVCP methods nor the manufacturing conditions in the plant are modified significantly, unless suspended or withdrawn by the notified product certification body.

Bratislava, 17 May 2022

Technický a skúšobný ústav stavebný, n. o. TSUS -1- Notifikovaná osoba 1301

Dipl. Ing. Daša Kozáková
Head of Notified Body 1301

143974

Notifikovaná osoba č. 1301

TECHNICKÝ A SKÚŠOBNÝ ÚSTAV STAVEBNÝ, n. o.
BUILDING TESTING AND RESEARCH INSTITUTE
Studená 3, 821 04 Bratislava, Slovenská republika

Certificate of constancy of performance

1301 – CPR – 1274

In compliance with Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011 (the Construction Products Regulation or CPR), this certificate applies to the construction product

High-Tensile Steel Wire Mesh System TECCO®G65/3

is intended to be used for:
- stabilization of steep slopes of unconsolidated soil and rocky material and for prevention of stones and blocks in disintegrated, loose or weathered rock faces from breaking out (Slope Stabilization System);
- securing of rock slopes, spurs, overhangs or individual section of loose rock (Rock Protection System);
- protection system for safety application like not sudden impact of objects.

Placed on the market under the name of

Geobrugg AG
Geohazard Solutions
Aachstrasse 11, CH-8590 Romanshorn
Switzerland

and produced in the manufacturing plant

Geobrugg **AG**
Geohazard Solutions
Aachstrasse 11, CH-8590 Romanshorn
Switzerland

This certificate attests that all provisions concerning the assessment and verification of constancy of performance described in the

ETA 17/0118 – version 04, issued on 03/03/2023

and

EAD 230025-00-0106

under system 1 for the performance set out in the ETA are applied and that the factory production control conducted by the manufacturer is assessed to ensure the

constancy of performance of the construction product.

This certificate was first issued on 26 April 2017 and will remain valid as long as neither the ETA, the EAD, the construction product, the AVCP methods nor the manufacturing conditions in the plant are modified significantly, unless suspended or withdrawn by the notified product certification body.

Bratislava, 9 March 2023

Technický a skúšobný ústav stavebný, n. o. -1- Notifikovaná osoba 1301

Dipl. Ing. Daša Kozáková
Head of Notified Body 1301

151981

Notifikovaná osoba č. 1301

TECHNICKÝ A SKÚŠOBNÝ ÚSTAV STAVEBNÝ, n. o.
BUILDING TESTING AND RESEARCH INSTITUTE
Studená 3, 821 04 Bratislava, Slovenská republika

Certificate of constancy of performance

1301 – CPR – 1273

In compliance with Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011 (the Construction Products Regulation or CPR), this certificate applies to the construction product

High-Tensile Steel Wire Mesh System TECCO®G65/4

is intended to be used for:
- stabilization of steep slopes of unconsolidated soil and rocky material and for prevention of stones and blocks in disintegrated, loose or weathered rock faces from breaking out (Slope Stabilization System);
- securing of rock slopes, spurs, overhangs or individual section of loose rock (Rock Protection System);
- protection system for safety application like not sudden impact of objects.

Placed on the market under the name of

Geobrugg AG
Geohazard Solutions
Aachstrasse 11, CH-8590 Romanshorn
Switzerland

and produced in the manufacturing plant

Geobrugg AG
Geohazard Solutions
Aachstrasse 11, CH-8590 Romanshorn
Switzerland

This certificate attests that all provisions concerning the assessment and verification of constancy of performance described in the

ETA 17/0117 – version 03, issued on 09/05/2022

and

EAD 230025-00-0106

under system 1 for the performance set out in the ETA are applied and that the factory production control conducted by the manufacturer is assessed to ensure the

constancy of performance of the construction product.

This certificate was first issued on 26 April 2017 and will remain valid as long as neither the ETA, the EAD, the construction product, the AVCP methods nor the manufacturing conditions in the plant are modified significantly, unless suspended or withdrawn by the notified product certification body.

Bratislava, 17 May 2022

Technický a skúšobný ústav stavebný, n. o. TSUS -1- Notifikovaná osoba 1301

Dipl. Ing. Daša Kozáková
Head of Notified Body 1301

143975

Certificate

Site certificate of main certificate Reg. no. H30393

The SQS herewith attests that the organisation named below has a management system that meets the requirements of the normative base mentioned.

GEOBRUGG BRUGG
Safety is our nature

Geobrugg AG
Aachstrasse 11
8590 Romanshorn
Switzerland

Scope

Development, manufacturing, sales and services of Netting Systems for protection against natural hazards and Safety Solutions in mining and motorsports

Normative base

ISO 9001:2015 Quality Management System

Reg. no. S34372

Validity 15. 12. 2020 – 14. 12. 2023
Issue 15. 12. 2020

A. Grisard, President SQS

F. Müller, CEO SQS

Swiss Association for Quality
and Management Systems (SQS)
Bernstrasse 103, 3052 Zollikofen, Switzerland

Swiss Made

Partner of IQNet

sqs.ch

4041_2/June 2019/Version 2.0

THE INTERNATIONAL CERTIFICATION NETWORK

CERTIFICATE

SQS has issued an IQNet recognized certificate that the organization:

Geobrugg AG
Aachstrasse 11
8590 Romanshorn
Switzerland

has implemented and maintains a

Management System

for the following scope:

Development, manufacturing, sales and services of Netting Systems for protection against natural hazards and Safety Solutions in mining and motorsports

which fulfills the requirements of the following standard(s):

ISO 9001:2015

Issued on: 2020-12-15
Expires on: 2023-12-14

This attestation is directly linked to the IQNet Partner's original certificate and shall not be used as a stand-alone document

Registration Number: CH-S34372

Alex Stoichitoiu
President of IQNet

Felix Müller
CEO SQS

IQNet Partners*:
AENOR Spain AFNOR Certification France APCER Portugal CCC Cyprus CISQ Italy
CQC China CQM China CQS Czech Republic Cro Cert Croatia DQS Holding GmbH Germany EAGLE Certification Group USA
FCAV Brazil FONDONORMA Venezuela ICONTEC Colombia Inspecta Sertifiointi Oy Finland INTECO Costa Rica
IRAM Argentina JQA Japan KFQ Korea MIRTEC Greece MSZT Hungary Nemko AS Norway NSAI Ireland
NYCE-SIGE México PCBC Poland Quality Austria Austria RR Russia SII Israel SIQ Slovenia
SIRIM QAS International Malaysia SQS Switzerland SRAC Romania TEST St Petersburg Russia TSE Turkey YUQS Serbia

* The list of IQNet partners is valid at the time of issue of this certificate. Updated information is available under www.iqnet-certification.com

Attachment B
Draft Encroachment Permit

☐ **City of Belvedere**
☐ **City of Larkspur**
☐ **City of Mill Valley**
☐ **City of Novato**
☐ **City of San Rafael ***
☐ **City of Sausalito**

☐ **Town of Ross**
☐ **Town of Fairfax**
☐ **Town of Corte Madera**
☐ **Town of San Anselmo**
☐ **Town of Tiburon**
☐ **County of Marin**

EP No: _____
A / B

UNIFIED APPLICATION FOR ENCROACHMENT PERMIT

APPLICATION DATE: _____ APN: _____ - _____ - _____

LOCATION OF WORK OR ENCROACHMENT: North Street Steps
No. Street City/Township

CROSS STREET: Bridgeway ESTIMATED COST: $ _____

STARTING DATE: _____ COMPLETION DATE: _____

PROPERTY OWNER'S NAME AND ADDRESS (If Different from Applicant):
City of Sausalito

THE UNDERSIGNED HEREBY APPLIES FOR PERMISSION TO PERFORM THE FOLLOWING DESCRIBED WORK AND/OR OTHERWISE ENCROACH ON A LOCAL AGENCY RIGHT-OF-WAY (ROW):

DESCRIPTION OF WORK OR ENCROACHMENT (Include plans or sketch):

Check all that apply to the project and provide a written description:

☐ Driveway Approach	☐ Sidewalk	☐ Accessible Ramp	☐ Debris Box
☐ Curb & Gutter	☐ Water Service	☐ New Utilities	☐ Special Event
☐ Sewer Improvement	☐ Excavation	☐ Landscaping	☑ Other (Describe)

Describe: The Project is located on the uphill side of the North Street Steps which connect North Street to Bridgeway Blvd. Work includes the installation of soil nails, grading, soil mesh to hold the hillside in place

Road Surface Type: ☐ Asphalt ☐ Concrete ☐ Other: _____

Trenching Work: ☐ Yes ☐ No Linear Feet: _____ Surface Thickness: _____

Traffic Control Plan: ☑ Yes ☐ No

Applicant agrees that all work will be performed in accordance with the rules, regulations and standards of the Local Agency Department of Public Works and any Local Municipal Code. All work shall be subject to inspection and approval by the Department of Public Works. Applicant shall indemnify, defend and hold the Local Agency, its officers, agents and employees harmless from any and all claims, suits or liability, including, but not limited to, litigation costs and attorney's fees which the Local Agency may incur as the result of any and all claims and suits for personal injury, property damage or inverse condemnation by reason of applicants placement of/or maintenance of encroachments authorized by this permit. No work shall commence until permit is issued.

APPLICANT'S NAME / COMPANY (PLEASE PRINT): _____

CONTRACTOR'S NAME: _____ Contractor License No: _____

APPLICANT'S MAILING ADDRESS: _____

AGENCY: _____

CONTACT NUMBERS: _____
Daytime Phone Fax Email

APPLICANT'S SIGNATURE: _____

For Agency Use Only

Accepted By: _____

Insurance on file? ☐ Yes ☐ No Final Insp. Cleared: ☐

Road Moratorium? ☐ Yes ☐ No Receipt #: _____

Fees:
Application: _____
Plan Review & Inspection: _____
Total: _____

*** Contact City of San Rafael Public Works for Specific Encroachment Permit Application**

Revised May 20

Encroachment Permit Conditions

- ❒ Construction Standard(s): _____
- ☒ Hard copy of the approved permit shall be on site at all times during work
- ❒ Comprehensive General Liability insurance in amounts not less than $1,000,000 combined single limit applying to bodily injury, personal injury and property damage are required.
- ☒ Additional Insured Endorsement: The local agency must be named as an additionally insured on a separate endorsement sheet that modifies the general liability policy.
- ❒ Contact local Police Department, Fire Department, and Parking Services prior to start of work.
- ☒ The Contractor shall ~~maintain local access and~~ provide emergency vehicle access at all times.
- ❒ Compaction test is required and shall be submitted to local Public Works Department.
- ☒ Provide a traffic control plan per the Manual on Uniform Traffic Control Devices (MUTCD).
- ❒ Provide safe pedestrian and wheelchair access, per ADA and State requirements, during construction.
- ☒ All work shall be performed between the hours of 8am & 6pm.
- ❒ Please contact _____ prior to start of work and for final inspection.
- ❒ Planning review required: YES / NO
- ❒ Special Conditions: _____

Encroachment Permit Approval

Approved By: _____ Date: _____

Inspected By: _____ Date: _____

CITY OF SAUSALITO

STANDARD CONDITIONS FOR ENCROACHMENT PERMIT NO. _____

DESCRIPTION:_____

Condition Marked ☑Apply to this Project

THIS ENCROACHMENT PERMIT IS GOOD FOR ☐ 6 MONTHS __ ☐ONE YEAR __ ☐ 18 MONTHS__ ☒ AS NOTED ON THE E.P.APPLICATION____

☒ 1. This permit, or a complete copy, shall be kept at the work site at all times while work is being performed.

☒ 2. Notify Engineering Division staff at least 24 hours in advance of beginning work. X Engineer at (415) 289-4106 ext. 111 and/or _____Sewer Systems Coordinator at (415) 289-4192.

☒ 3. Contractor is to comply with all requirement of Ordinance No. 1048 (Noise Ordinance) including limiting hours of work in residential areas between 8:00AM and ~~7:00~~6pm, Monday through Friday, between 9:00AM and 5:00PM, Saturdays, ~~and between 9:00AM and 7:00PM, on City Holidays~~ or City Holidays. No work is permitted on Sunday, except by owner occupant between 9:00AM and 7:00PM.

☒ 4. Permittee shall comply with all Federal State and local laws regulation and statutes applicable to the work being performed under this permit. This also includes compliance with the requirements and permit conditions of the State of California Division of Industrial Safety.

* ☒ 5. The Permittee shall repair or replace at the discretion of the City Engineer, any and all public facilities damaged as a result of Permittee's actions in connection with this permit, and shall guarantee repairs or replacements to all work done under this permit, as deemed necessary by the City Engineer for a period of one year after completion of said work.

☒ 6. All traffic control shall be performed in accordance with the requirements of the current edition of Caltrans publication, "California Manual on Uniform Traffic Devices, Part 6- Temporary Traffic Control" including all specified advance construction signs and channelization devices. Construction warning signs and channelization devices are to be sufficient to adequately inform and protect vehicles, bicycle and pedestrian traffic. Permittee shall have available a copy of the Manual for workers at the construction site at all times during the progress of the work.

☐ 7. Where excavations have been permitted in paved streets, Permittee shall place temporary informational signs at each end of the work in addition to those signs required by the "California Manual on Uniform Traffic Devices, Part 6- Temporary Traffic Control." Such informational signs shall be a minimum of 18 x 24 inches, clearly identify the owner of the facility for which the work is being done, and shall show a telephone number of the owner where the public may obtain information relative to the work being done.

☐ 8. Traffic shall be permitted to pass through the work area at all times unless otherwise permitted in writing by the City Engineer. Any street closures shall be approved in advance by the City Engineer.

☒ 9. If the City Engineer determines that public convenience or safety is being jeopardized by Permittee's actions or inactions, the City Engineer may order the condition remedied by either verbal or written communication to the Permittee. If Permittee fails to remedy the condition within eight hours of such notice, the City Engineer may, at his or her discretion, either remedy the condition or contract to remedy the condition, and the cost thereof, including administrative expenses shall be charged to the Permittee.

☒ 10. If any work is performed in the location of an existing pedestrian path of travel, the Contractor shall restore the path of travel compliant with all ADA accessibility standards.

☒ 11. Any pavement marking and/or legends which are damaged or removed shall be replaced in kind by the Contractor at his/her expense. The repainting of any street markings or legends shall be performed using City stencils:

☒ 12. Wherever new work crosses any existing ~~City~~ utilities, the Contractor shall pothole the existing ~~City~~ utilities and determine their actual depth so as to avoid hitting these facilities during excavation.

☐ 13. All AC or PCC to be removed is to be sawcut at the edges.

☐ 14. All new AC street trench resurfacing is to be placed in maximum lifts of 3 inches and the final surface is to be fog sealed (unless a sand or slurry seal is called for on. the plans).

*

Per contract documents

CITY OF SAUSALITO

STANDARD CONDITIONS FOR ENCROACHMENT PERMIT NO. _____

☐ 15. All sections of curb, gutter and sidewalk to be replaced, shall have 12 inch long dowels (#4 reinforcing bars) inserted 6" into the existing concrete. A minimum of 2 dowels shall be placed into the curb and gutter. A minimum of 2 dowels shall be placed into sidewalk. Sidewalk dowel spacing shall be 24 inches on center.

☐ 16. Portions of existing sidewalk or curb and gutter to be removed shall be removed to the nearest expansion joint or sawcut at an existing score mark. Sawcuts must be at least 1-1/2 inches deep.

☐ 17. Concrete curbs, gutters and sidewalk shall consist of five sacks of cement per cubic yard with 3/8" maximum aggregate. ~~Two pounds of lampblack shall be added per cubic yard~~. Slump shall not exceed 4 inches.

☐ 18. Special care shall be taken to match the existing finish, color, texture and score joining during replacement of the sidewalk.

☐ 19. Curb, gutter and sidewalk surfaces shall be broom finished unless otherwise approved by the City Engineer.

☐ 20. New sidewalk thickness shall be 4 inches minimum and driveway thickness shall be 6'" minimum.

☐ 21. All excavations shall be backfilled and paved either temporarily or permanently at the end of each work day or covered with steel traffic plates held securely in place.

☐ 22. All backfill placement shall be approved by the City Engineer prior to permanent pavement replacement.

☐ 23. Tree roots shall not be cut or in any way damaged by Permittee.

☐ 24. Trench backfill shall be ~~either concrete slurry containing one sack of cement per cubic yard with ¾ inch Maximum aggregate size~~, or Class 2 Aggregate Base compacted to 95% relative compaction as determined by California Test Method No. 216. All other trench details shall conform with Uniform Standard Drawing No. 330, 340 and 350 except as modified herein.

* ☒ 25. Permittee shall bear the entire cost of restoring the street or other property of the City, to the satisfaction of the City Engineer.

☒ 26. Excavated materials, equipment, construction materials or other debris shall not be stored or stockpiled on public streets

☐ 27. The top six inches of subgrade shall be compacted to at least 95% relative Compaction in accordance with California Test Method No. 236 and shall be dampened before placing concrete.

☐ 28. Where unsuitable subgrade material is encountered, the City Engineer may require remedial work to be done, including, but not limited to, placing a layer of crushed rock under the concrete 'section.

☐ 29. Undercut subgrade for gutter or sidewalk shall be filled with Class 2 Aggregate Base.

☐ 30. Where trench excavation is longitudinal with the traffic lane and extends 100 feet or more, a 2" minimum thickness of asphalt concrete paving with pavement reinforcing fabric shall be placed across the entire width of the affected traffic lane upon completion of trench work. Existing surfacing shall be removed as necessary to maintain satisfactory cross slopes.

☐ 31. One-half inch thick expansion joints shall be placed on both sides of driveway approaches, curb and sidewalk return points and at 4 feet on center. Weakened plane joints in sidewalk shall be at least 1-1/2 inch deep and placed at 16 feet on center.

☒ 32. All work shall be performed in accordance with the codes and ordinances of the City of Sausalito and the Uniform Construction Standards, Specifications of the Cities of Marin and County of Marin.

☐ 33. The Contractor is to provide a Storm Water Pollution Prevention Plan to the City for review and approval. City Approval must be obtained prior to commencing any work.

☒ 34. Underground Service Alert (USA) shall be notified at tel. (800) 642-2444, no later than 48 hours prior to excavation near utilities.

☐ 35. No new utility boxes or poles will be permitted in the sidewalk area without the written approval of the City Engineer.

* Per Contract Documents

Special Conditions 2023-0

1 The Encroachment Permit is only applicable to the public right of way; Contractor shall be responsible for ensuring that they have obtained permission from property owners prior to the use of their land.

2 No non-stormwater discharge shall enter the public storm drainage system or the Waters of The State. All Porta-Potties in the public Right of Way shall be equipped with a functional Secondary Containment Systems. The porta-potties shall be cleaned and maintained regularly throughout the project. The secondary containment shall be kept clear of trash, debris, and sewage. the secondary containment shall be properly cleaned or covered prior to any wet weather.

3 The public right of way shall be kept clean at all times. Spilled debris shall be cleaned promptly. No visible accumulation of sediment is permitted. No washing of sediment into drainage inlets is permitted. No materials associated with the work shall enter the waters of the State.

4 Prevent construction equipment/materials from entering stormdrains, sanitary sewers, ditches, creeks, or the bay.

5 Sweep streets and other paved areas daily. Never wash down streets or work areas with water.

6 Store any stockpiles of dirt, sand, asphalt, concrete, grout, or mortar under cover and away from drainage areas. These materials must never reach a storm drain, or other watercourse.

7 Contractor shall provide constant dust control.

8 Open structure/excavation(s) shall not be left unattended.

9 Contractor shall save and protect existing monuments. Any damaged monuments shall be reestablished along with the filing of all required documents including but not limited to Corner Record with Marin County Department of Public Works. Refer to Business & Professions code section 8771.

10 Maintain access to adjacent driveways and property entrances.

11 No parking signs shall be obtained from City of Sausalito Department of Public Works one week in advance, mlockett@sausalito.gov. Vehicles shall be parked legally in the parking spaces. No parking signs shall be posted and verified by the County Dispatch 72 hours prior to becoming effective for enforcement. To verify the no parking signs, call County Dispatch 415-479-5302.

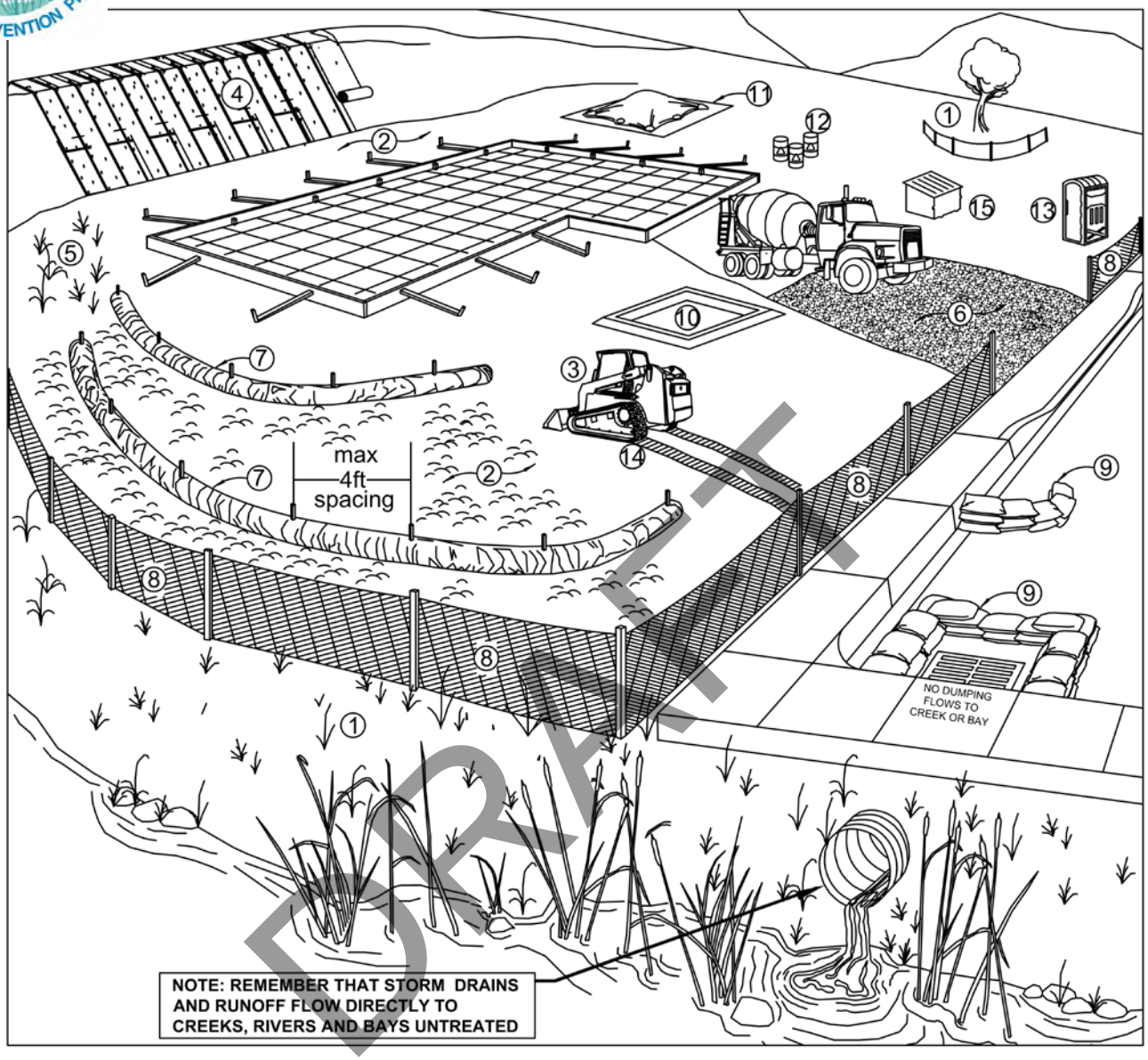
12 Project shall not increase emergency response time and shall allow emergency vehicles to pass without delay.

13 The pedestrian barricade shall be 34 to 38 inches high. Pedestrian barricade rail supports shall not extend into the pedestrian walkway more than 4 inches. The top edge of the bottom portion of the barricade shall be a minimum of 8 inches above the walkway. The bottom edge of the barricade may only be a maximum of 2 inches above the surface of the walkway. Joints between barricades shall interlock or be closed flush, so that small wheels and canes cannot get caught on edges.

14 If a subcontractor is to be used to perform any part of the work, subcontractor shall name the City of Sausalito as an additionally insured on a separate endorsement sheet that modifies the general liability policy prior to start of work, a copy of which shall be provided to the City of Sausalito. The description in the certificate shall include the following language: "The City of Sausalito, its agents, officers, officials, employees and volunteers as required by the permit are included as additionally insured.”

Marin County Stormwater Pollution Prevention Program

Minimum Control Measures
For Small Construction Projects



Erosion Controls	Sediment Controls	Good Housekeeping
NS Scheduling	6. Tracking Controls	10. Concrete Washout
1. Preserve Vegetation & Creek Set Backs	7. Fiber Rolls	11. Stockpile Management
2. Soil Cover	8. Silt Fence	12. Hazardous Material Management
3. Soil Preparation/ Roughening	9. Drain Inlet Protection	13. Sanitary Waste Management
4. Erosion Control Blankets	NS Trench Dewatering	14. Equipment and Vehicle Maintenance
5. Revegetation		15. Litter and Waste Management

NS=not shown on graphic

Note: Select an **effective combination of control measures from each category**, Erosion Control, Sediment Control, and Good Housekeeping. Control measures shall be **continually implemented and maintained throughout the project** until activities are complete, disturbed areas are stabilized with permanent erosion controls, and the local agency has signed off on permits that may have been required for the project. **Inspect and maintain the control measures** before and after rain events, and as required by the local agency or state permit.

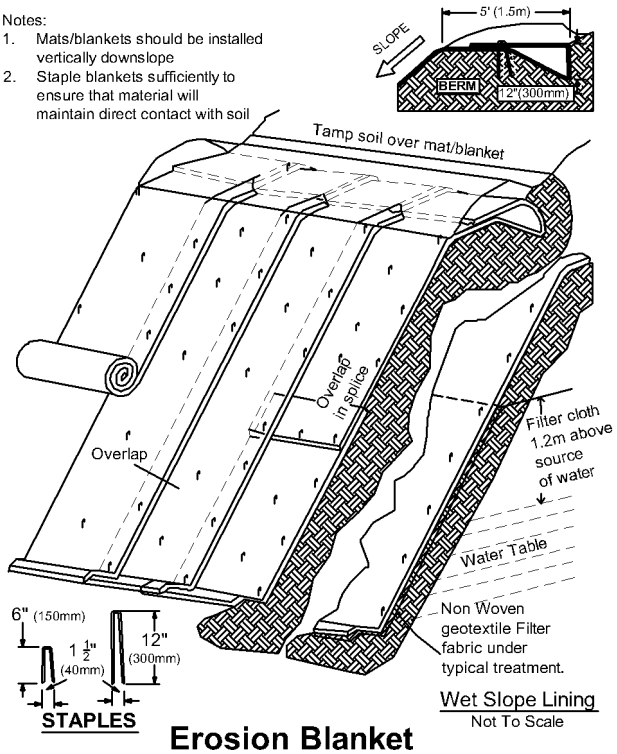
More detailed information on the BMPs can be found in the related California Stormwater Quality Association (CASQA) and California Department of Transportation (Caltrans) BMP Factsheets. CASQA factsheets are available by subscription in the *California Best Management Practices Handbook Portal: Construction* at http://www.casqa.org. Caltrans factsheets are available in the *Construction Site BMP Manual March 2003* at http://www.dot.ca.gov/hq/construc/stormwater/manuals.htm.

Visit www.mcstoppp.org for more information on construction site management and Erosion and Sediment Control Plans.

If you require materials in alternative formats, please contact:
415-473-4381 voice/TTY or disabilityaccess@co.marin.ca.us

Control Measure		General Description
Erosion Control Best Management Practices		
N/A	Scheduling	Plan the project and develop a schedule showing each phase of construction. Schedule construction activities to reduce erosion potential, such as scheduling ground disturbing activities during the summer and phasing projects to minimize the amount of area disturbed. *For more info see the following factsheets: CASQA: EC-1; or Caltrans: SS-1*.
1	Preserve Existing Vegetation and Creek Setbacks	Preserve existing vegetation to the extent possible, especially along creek buffers. Show creek buffers on maps and identify areas to be preserved in the field with temporary fencing. Check with the local Planning and Public Works Departments for specific creek set back requirements. *For more info see the following factsheets: CASQA: EC-2; or Caltrans: SS-2.*
2	Soil Cover	Cover exposed soil with straw mulch and tackifier (or equivalent). *For more info see the following factsheets: CASQA: EC-3, EC-5, EC-6, EC-7, EC-8, EC-14, EC-16; or Caltrans: SS-2, SS-4, SS-5, SS-6, SS-7, SS-8.*
3	Soil Preparation/ Roughening	Soil preparation is essential to vegetation establishment and BMP installation. It includes soil testing and amendments to promote vegetation growth as well as roughening surface soils by mechanical methods (decompacting, scarifying, stair stepping, etc.). *For more info see the following factsheets: CASQA: EC-15.*
4	Erosion Control Blankets	Install erosion control blankets (or equivalent) on disturbed sites with 3:1 slopes or steeper. Use wildlife-friendly blankets made of biodegradable natural materials. Avoid using blankets made with plastic netting or fixed aperture netting. See: http://www.coastal.ca.gov/nps/Wildlife-Friendly_Products.pdf. *For more info see the following factsheets: CASQA: EC-7; or Caltrans: SS-7.*
5	Revegetation	Re-vegetate areas of disturbed soil or vegetation as soon as practical. *For more info see the following factsheets: CASQA: EC-4; or Caltrans: SS-4.*
Sediment Control Best Management Practices		
6	Tracking Controls	Stabilize site entrance to prevent tracking soil offsite. Inspect streets daily and sweep street as needed. Require vehicles and workers to use stabilized entrance. Place crushed rock 12-inches deep over a geotextile, using angular rock between 4 and 6-in. Make the entrance as long as can be accommodated on the site, ideally long enough for 2 revolutions of the maximum tire size (16-20 feet long for most light trucks). Make the entrance wide enough to accommodate the largest vehicle that will access the site, ideally 10 feet wide with sufficient radii for turning in and out of the site. Rumble pads or rumble racks can be used in lieu of or in conjunction with rock entrances. Wheel washes may be needed where space is limited or where the site entrance and sweeping is not effective. *For more info see the following factsheets: CASQA: TC-1; TC-3; or Caltrans: TC-1; TC-3.*
7	Fiber Rolls	Use fiber rolls as a perimeter control measure, along contours of slopes, and around soil stockpiles. On slopes space rolls 10 to 20 feet apart (using closer spacing on steeper slopes). Install parallel to contour. If more than one roll is used in a row overlap roll do not abut. J-hook end of roll upslope. Install rolls per either Type 1 (stake rolls into shallow trenches) or Type 2 (stake in front and behind roll and lash with rope). Use wildlife-friendly fiber rolls made of biodegradable natural materials. Avoid using fiber rolls made with plastic netting or fixed aperture netting. See: http://www.coastal.ca.gov/nps/Wildlife-Friendly_Products.pdf. Manufactured linear sediment control or compost socks can be used in lieu of fiber rolls. *For more info see the following factsheets: CASQA: SE-5 (Type 1); SE-12, SE-13; or Caltrans: SC-5 (Type 1 and Type 2).*
8	Silt Fence	Use silt fence as a perimeter control measure, and around soil stockpiles. Install silt fence along contours. Key silt fence into the soil and stake. Do not use silt fence for concentrated water flows. Install fence at least 3 feet back from the slope to allow for sediment storage. Wire backed fence can be used for extra strength. Avoid installing silt fence on slopes because they are hard to maintain. Manufactured linear sediment control can be used in lieu of silt fences. *For more info see the following factsheets: CASQA: SE-1; SE-12; or Caltrans: SC-1.*
9	Drain Inlet Protection	Use gravel bags, (or similar product) around drain inlets located both onsite and in gutter as a last line of defense. Bags should be made of a woven fabric resistant to photo-degradation filled with 0.5-1-in washed crushed rock. Do not use sand bags or silt fence fabric for drain inlet protection. *For more info see the following factsheets: CASQA: SE-10; or. Caltrans: SC-10.*
N/A	Trench Dewatering	Follow MCSTOPPP BMPs for trench dewatering. http://www.marincounty.org/depts/pw/divisions/mcstoppp/development/~/media/Files/Departments/PW/mcstoppp/development/TrenchingSWReqMCSTOPPPFinal6_09.pdf. *For more info see the following factsheets: CASQA: NS-2; or Caltrans: NS-2.*
Good Housekeeping Best Management Practices		
10	Concrete Washout	Construct a lined concrete washout site away from storm drains, waterbodies, or other drainages. Ideally, place adjacent to stabilized entrance. Clean as needed and remove at end of project. *For more info see the following factsheets: CASQA: WM-8; or .Caltrans: WM-8.*
11	Stockpile Management	Cover all stockpiles and landscape material and berm properly with fiber rolls or sand bags. Keep behind the site perimeter control and away from waterbodies. *For more info see the following factsheets: CASQA: WM-3 or Caltrans: WM-3.*
12	Hazardous Material Management	Hazardous materials must be kept in closed containers that are covered and within secondary containment; do not place containers directly on soil. *For more info see the following factsheets: CASQA: WM-6; or Caltrans: WM-6.*
13	Sanitary Waste Management	Place portable toilets near stabilized site entrance, behind the curb and away from gutters, storm drain inlets, and waterbodies. Tie or stake portable toilets to prevent tipping and equip units with overflow pan/tray (most vendors provide these). *For more info see the following factsheets: CASQA: WM-9; or Caltrans: WM-9.*
14	Equipment and Vehicle Maintenance	Prevent equipment fluid leaks onto ground by placing drip pans or plastic tarps under equipment. Immediately clean up any spills or drips. *For more info see the following factsheets: CASQA: NS-8, NS-9, and NS-10; or Caltrans: NS-8, NS-9, and NS-10.*
15	Litter and Waste Management	Designate waste collection areas on site. Use watertight dumpsters and trash cans; inspect for leaks. Cover at the end of each work day and when it is raining or windy. Arrange for regular waste collection. Pick up site litter daily. *For more info see the following factsheets: CASQA: WM-5; or Caltrans: WM-5.*

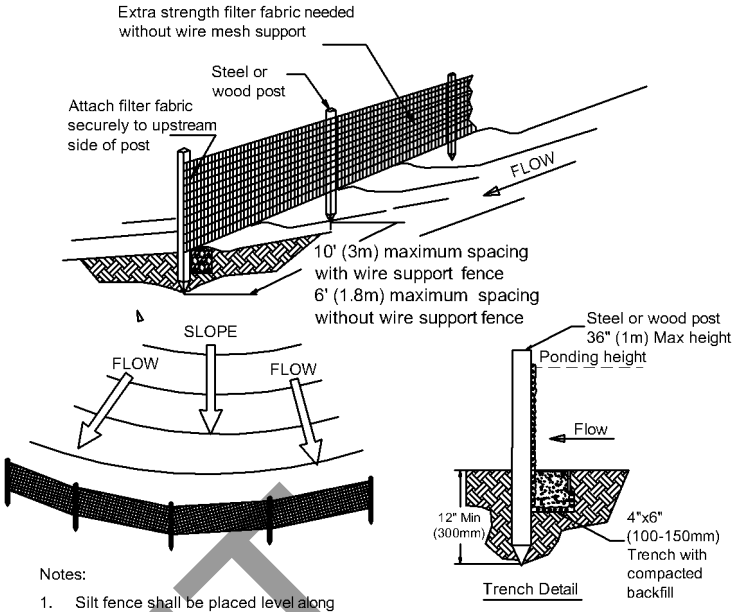
Notes:
1. Mats/blankets should be installed vertically downslope
2. Staple blankets sufficiently to ensure that material will maintain direct contact with soil



Wet Slope Lining
Not To Scale

Erosion Blanket

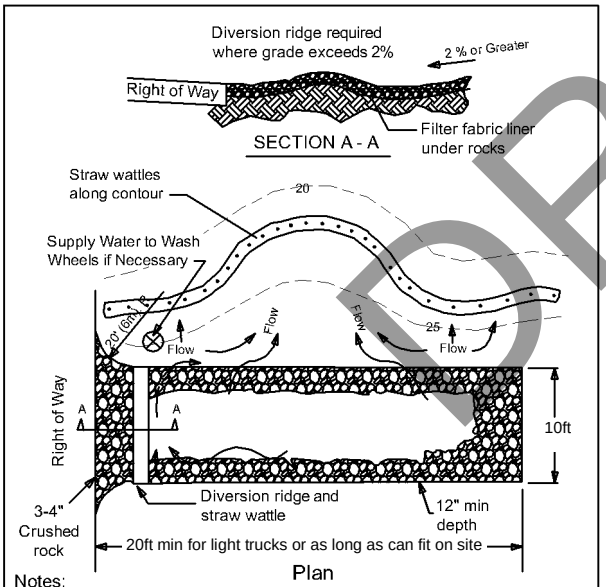
Note: Actual layout determined in the field.



Notes:
1. Silt fence shall be placed level along slope contours to maximize ponding efficiency with the ends curved uphill to improve ability to retain water.
2. Inspect and repair fence after each storm event and remove sediment when accumulation reaches 1/3 of the barrier height.
3. Removed sediment shall be deposited to an area that will not contribute sediment off-site and can be permanently stabilized

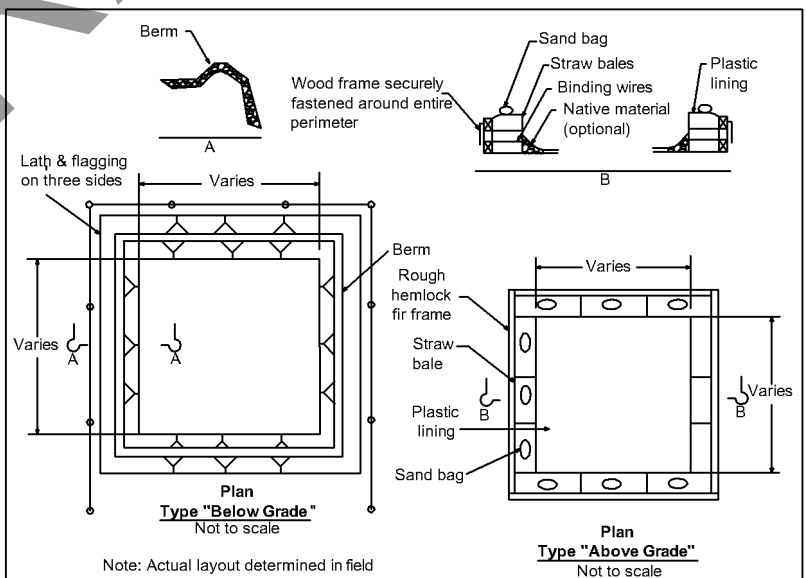
Silt Fence

NOT TO SCALE



Notes:
1. The entrance shall be maintained to prevent sediment tracking or flowing onto public right-of-ways. This may require top dressing, repair and/or cleanout or other measures that trap sediment.
2. When necessary, wheels shall be cleaned prior to entering public right-of-way.
3. When washing is required, it shall be done on an area stabilized with crushed stone that drains into an approved sediment trap or sediment basin. Rumble plates or tire wash can be added.

Site Entrance



Note: Actual layout determined in field

Concrete Washout

Catch Basins with Gravel Bags

(Do not use sand bags near inlets)

In Marin, all storm drains go directly to local waterways!

POLLUTION PREVENTION

IT'S PART OF THE PLAN

MAKE SURE YOUR CREWS AND SUBS DO THE JOB RIGHT!

Runoff from streets and other paved areas is a major source of pollution in San Francisco Bay. Construction activities can directly affect the health of the Bay unless contractors and crews plan ahead to keep dirt, debris, and other construction waste away from storm drains and local creeks. Following these guidelines will ensure your compliance with local ordinance requirements. Contact your local stormwater coordinator (see reverse). Storm drain polluters may be liable for fines!

EARTHWORK & CONTAMINATED SOILS

- Avoid scheduling earth disturbing activities during the rainy season if possible. If grading activities during wet weather are allowed in your permit, be sure to implement all measures necessary to prevent erosion.
- Mature vegetation is the best form of erosion control. Minimize disturbance to existing vegetation whenever possible.
- If you disturb a slope during construction, prevent erosion by securing the soil with erosion control fabric, or seed with fast-growing grasses as soon as possible. Place a silt barrier downslope until soil is secure.
- Keep excavated soil on the site where it is least likely to collect in the street. Transfer to dump trucks should occur on the site, not in the street.
- Use sand bags, silt fences, hay bales, straw logs or other control measures to prevent the flow of silt off the site and into storm drains or creeks.

PAVING/ASPHALT WORK

- Do not pave during wet weather or when rain is forecast.
- Always cover storm drain inlets and manholes when paving or applying seal coat, tack coat, slurry seal, or fog seal.
- Do not sweep or wash down excess materials into storm drains, ditches or creeks. Collect these materials and return them to stockpiles, or dispose of as trash.
- Do not use water to wash down fresh asphalt or concrete pavement.

DEWATERING OPERATIONS

- Reuse water for dust control, irrigation, or another on-site purpose to the greatest extent possible.
- Be sure to call the local Stormwater Coordinator before discharging water to a street, storm drain, or creek. Filtration or diversion through a basin, tank, or sediment trap may be required.

MATERIALS STORAGE & WASTE DISPOSAL

- Sweep streets and other paved areas daily. Never wash down streets or work areas with water!
- Be sure to store any stockpiles of dirt, sand, asphalt, concrete, grout, or mortar under cover and away from drainage areas. These materials must never reach a storm drain, or other watercourse.
- Wash out concrete equipment trucks off-site, or designate an on-site area for washing where water will flow into a temporary pit in a dirt area. Let the water seep into the soil and dispose of hardened concrete with trash.
- Divert water from washing exposed aggregate concrete to a dirt area where it will not run into a gutter, street, or storm drain.
- If a suitable dirt area is not available, collect the wash water and remove it for appropriate disposal off site.

HAZARDOUS MATERIALS MANAGEMENT

- Label all hazardous materials/wastes (such as pesticides, paints, thinners, solvents, fuel, oil, and antifreeze) in accordance with city, state, and federal regulations.
- Store hazardous materials and wastes in secondary containment and cover them during wet weather.
- Follow manufacturer's application instructions for hazardous materials. Be careful not to use more than necessary.
- Do not apply chemicals outdoors when rain is forecast within 24 hours.
- Dispose of hazardous materials/waste at the Hazardous Waste Collection Facility. For more information:

  Novato businesses call 892-6395

  All other businesses in Marin call 485-5648

CONTINUED ON BACK

PAINTING

- Never rinse paint brushes or materials into a storm drain or on the street!
- Paint out excess water-based paint before rinsing brushes, rollers, or containers in a sink. If you can't use a sink, direct wash water to a dirt area, and spade it into the dirt with a shovel.
- Paint out excess oil-based paint before cleaning brushes in paint thinner.
- Filter paint thinners and solvents for reuse whenever possible. Dispose of oil-based paint sludge and unusable thinner at the hazardous waste collection facility. (See reverse for Hazardous Materials Management.)

LANDSCAPING

- Schedule grading and excavation projects for dry weather.
- Protect stockpiles and landscaping materials from wind and rain by storing them under tarps and secured plastic sheeting.
- Store pesticides, fertilizers, and other chemicals indoors or in a locked shed or storage cabinet.
- Make sure products are properly labeled and check inventory before buying additional products.
- Rinse containers and use rinse water as products before tossing out empty containers (5 gallons or less) in the trash.
- Get rid of unwanted products through the hazardous waste facility. (See reverse for Hazardous Materials Management.)
- Use temporary check dams or ditches to divert runoff away from storm drains.
- Protect storm drain inlets with berms, filter mats or other inlet protection measures.
- Revegetate the area. It's an excellent form of erosion control for any site.
- Collect lawn and garden clippings, pruning waste and tree trimmings. Chip, if necessary, and compost.
- Do not place yard waste in gutters. In communities with curbside yard waste recycling, leave clippings and pruning waste for pick-up in approved bags or containers or, take to a landfill that composts yard waste.
- Do not blow or rake leaves into the street.
- Call the County Stormwater Program at 499-6528 and ask for a copy of Bay- Friendly Landscape Guidelines for the Landscape Professional or visit www.bayfriendly.org

POOL/FOUNTAIN/SPA MAINTENANCE

- Never discharge pool or spa water (and/or backwash water) to a street or storm drain. Call the County at 499-6528 for a copy of "Here's What To Do with the Water" or look in "other businesses" under www.mcstoppp.org

VEHICLE & EQUIPMENT MAINTENANCE

- Frequently, inspect vehicles and equipment for leaks. Use drip pans to catch leaks until repairs are made; repair leaks promptly.
- Fuel and maintain vehicles on site only in a bermed area or over a drip pan that is big enough to prevent runoff.
- If you must clean vehicles or equipment on site, clean with water only - and in a bermed area that will not allow rinsewater to run into streets, stormdrains, ditches, or creeks.
- Do not clean vehicles or equipment on site using soaps, solvents, degreasers, steam cleaning equipment, etc.

SAW CUTTING

- Always completely cover or barricade storm drain inlets when saw cutting. Use filter fabric, sand bags, or fine gravel dams to keep slurry out of the storm drain system.If saw-cut slurry enters a stormdrain, clean up immediately.
- Shovel, absorb, or vaccuum saw-cut slurry and pick up all waste as soon as you are finished in one location and by the end of each work day.

STORMWATER COORDINATORS

(During Normal Business Hours)

Town of San Anselmo
Rabi Elias/Dave Craig
258-4616

City of Sausalito
Engineering
289-4191

Town of Corte Madera
Kevin Kramer
927-5057

City of San Rafael
Richard Landis
485-3355

City of Belvedere
Scott Derdenger
435-3838

County of Marin
Howard Bunce
499-3748

Town of Ross
Rob Maccario
453-8287 ext. 163

Town of Tiburon
Matt Swalberg
435-7354

Town of Fairfax
Kathy Wilkie
453-0291

City of Larkspur
Mike Myers
927-5017

City of Novato
Dave Harlan
899-8246

City of Mill Valley
Jill Barnes
388-4033 ext. 116

To report illegal discharges to local waterways occurring after normal business hours, call 911; or, the County Sheriff's non-emergency line at 499-7233.

To report oil and chemical spills occurring in "open waters" or "on land" call 1-800-OILS911.

To report fish kills or poaching, call the California Department of Fish and Game at 1-888-334-2258.