



**ADDENDUM NO. 1  
POND DR05 RESTORATION PROJECT**

**To: Tour Attendees**  
**From: Julie Andersen, Project Manager**  
**Date: June 26, 2014**  
**Re: Ponds DR05 Pre-Bid Tour Supplemental Information**

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**NOTE: Contractors must acknowledge receipt of this Addendum No. 1 by signing below and including this page in their proposals.**

**The undersigned has carefully examined the attached Addendum No. 1:**

Contractor's Name	Company	Date
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Attachments to this addendum include the following from the Pre-Bid Site Tour conducted on Friday June 20, 2014:

- Questions received on June 20, 2014 at the Pre-bid tour and District Response.
- Revised Attachment A1\_Bid Proposal (Please note three additional add alternate line items – items 10, 11, and 12).
- Ditch Relief Culvert Specifications (to be used when preparing bid for add alternate line item 11).
- Attachment P. Staff Gage Plans and Specifications (to be used when preparing bid for add alternate line item 12).
- Pre-bid tour attendee list

Please bid the project according to the enclosed addendum attachments as well as the contents of the bid packet made available on the District's webpage ([http://www.openspace.org/news/request\\_for\\_bids.asp](http://www.openspace.org/news/request_for_bids.asp)) on June 11, 2014. **Final date for Questions is tomorrow, Friday June 27, 2014.**

As a reminder, bids are due to our office at 330 Distel Circle, Los Altos, CA 94022 by 10:00 AM on Friday, July 11, 2014 and will be opened publicly at that time.

Thank you for your time and consideration,

Julie Andersen, Project Manager

Project Name: Ponds DR05 Repair-  
10-80-830-8212

Date Visited: June 20, 2014

Pre-Bid Tour Questions(Q) & Answers(A)  
( in addition to Attachment O.)

**6 pages**



Q1.

Do the cattle belong to Midpeninsula Regional Open Space District (MROSD) and is the contractor responsible for dealing with the cattle while conducting work?

**A1)**

The cattle belong to the lessee not to MROSD. At this time, the lessee plans to remove the cattle from the pasture during construction; however they do have the right to access to the work area during construction. If cattle are in the area, they may come into the work area but tend to avoid the site when work is being conducted. If cattle are present, they may trample the bio-exclusion/perimeter silt fence. The selected contractor is responsible for repairing these fences (in conjunction with the biological consultant) prior to starting work each day. The selected contractor is also expected to protect any onsite equipment and/or materials from trampling. See bid package attachment S-3 "Memorandum for working near cattle on District Preserves" for reference. All gates into and out of the work site will need to remain in the position in which they are found (open or closed) when driven through. The contractor does not need to maintain the barb wire fencing along the top of the berm during pond construction.

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Q2.

Do contractors need to use water for dust control?

**A2)**

Dust control is required by CEQA and project permits; however due to drought conditions, any water used is expected to be primarily used to achieve desired compaction. Because construction related dust is expected to remain within the project footprint or within the surrounding Preserve lands, the District Representative will work with the selected contractor to minimize the amount of dust control activities required. See Bid Package Attachment N "Permit Conditions" for dust control requirements.

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Q3.

Is any associated road included in the bid package?

**A3)**

Any road improvements needed to access the site to complete the projects should be included in your base bid. However, long term road improvements (culvert replacements, or work on other ranch roads that do not feed into the pond site) is not to be included in your base bid. These are add alternate items that are not guaranteed, but may be added to the project upon successful completion of the pond project at the District's sole discretion.

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Q4.

If road work is added, does it need to be completed by September 30, 2014?

**A4)**

Only project components directly related to the pond project and its direct access road must be completed by this date (including installation of final erosion control measures). Any added road work must be completed by October 31, 2014 (as allowable by permit and weather conditions).

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Q5)

Will vegetation need to be removed from the dam face?

**A5)**

Yes. Vegetation is expected to be completely removed within the limit of grading shown on Page 2.0 of Attachment H "Project Engineering Plan Sheets and Specifications" as well as any needed access to install the rock energy dissipater/spillway outlet at the base of the berm and to access and remove any gully debris. In addition, the selected contractor will be expected to stump cut and clear any remaining vegetation on the dam face outside of these areas in order to view the entire dam face to check for slumping, old outlet pipes, cracks etc. that may be currently obscured by vegetation. All of these items should be included in your lump sum bid for base bid item 3 (Clearing and Grubbing).

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Q6.

Is there enough dirt volume located on-site, for the breach work that needs to be completed on the berm?

**A6)**

The pond re-countering as well as the drop in levee elevation will provide the material for the berm as well as excess fill that is to be placed on the dirt road accessing the pond site (See Attachment H "Project Engineering Plan Sheets and Specifications"). If this material is unsuitable for any reason, additional dirt may be borrowed onsite at a source approved by the project geotechnical engineer.

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Q7.

Since construction requires bio-monitoring prior to each work day, can the bio-monitor sweep an hour before the work is meant to begin, in order to avoid delays for the selected contractor?

**A7)**

Contractors must provide their proposed work days and hours using the calendar and schedule provided in their bid (Attachment G). The Contractors proposed schedule will be used to help determine the contracted hours (including start times) and dates available for the consulting biological monitors. For example, if the construction contractor proposes a scheduled start time of 8 a.m., 7 days a week, MROSD will endeavor to schedule the selected biological consultant to begin at 7 a.m. each of these days. However, if a 7 a.m. start time or 7 day work week is unavailable, the proposed start times and work days will need to be negotiated prior to starting work. MROSD will endeavor to provide biological monitors prior to the proposed start time each day in order

to maximize on the ground work during the hours proposed by the construction contractor.

Please note that per District standard contract language: *“No work or equipment shall be started on a workday before 9 a.m. nor continue beyond 5 p.m. except when permitted by the Contract Documents, or agreed upon at the pre-construction meeting or approved by the District Representative. The Contractor may request permission to work on a Saturday, Sunday, on a District recognized holiday, or past normal working hours by notifying the District Representative at least two (2) working days in advance. Contractor shall only be permitted to work outside normal working hours at such times and on such days as are authorized by the District Representative in writing.”* **Any proposed deviations should be noted on Attachment G with your bid.**

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Q8.

What happens if there is rain?

**A8)**

Per permit conditions, if rain occurs, no work will occur during a dry out period of 24 hours after there has been ¼ inch or more of precipitation. Please see Attachment N “Permit Conditions” which details work restrictions in the event rain is in the forecast or during periods of low rainfall. In the past, early rain storms have brought ¼ to ½ inch water at the Preserve, and work was halted for a 1-2 days.

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Q9.

Is the selected contractor responsible for dewatering of the pond?

**A9)**

This item was previously covered in Attachment O: “Frequently Asked Questions”, the response is provided again below:

*“Per permit conditions, dewatering of the pond may not begin until August 15, 2014. The District at its sole discretion may award the task of pumping and/or diversion of water to the selected Biological Consultant for the project. However, dewatering has also been included as an add alternate item and may be negotiated with the selected construction contractor upon award of contract.”*

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Q10.

How much lowering of the actual pond interior will need to be done?

**A10)**

Please see Attachment H “Project Engineering Plan Sheets and Specifications”

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Q11.

How much muck and silt is in the pond interior?

**A11)**

There has not been a detailed test conducted to determine these amounts. The estimates used in the plans were obtained by using a float tube and stadia rod.

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Q12.

Will the cattle fence need to be salvaged or recycled?

**A12)**

The onsite grazing tenant will remove and salvage T-posts prior to construction. Any remaining barbed wire, wooden posts, or unusable T-posts will need to be removed by the construction contractor and disposed of along with other project related construction debris (tires, bailing wire etc.).

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Q13.

Where will the vegetation that is removed be stock-piled?

**A13)**

Any large willows will be salvaged and the root balls can be stored next to the other willows at the back of the pond for shade. Vegetation from the face of the berm (coyote brush, small oaks etc.) may be scattered on the hillside near the south end of the berm. This material may also be used as slash pack in the gullies once tires and other debris is removed.

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Q14.

Is there a way to access the large willow without going on the berm?

**A14)**

As the water level drops, you may be able to go around the breach in the embankment on the inside face of the berm. Alternatively, willows are very hardy and the tree(s) may be cut back, left in place and the root ball(s) removed and placed in the back of the pond once the pond basin is dry. There is also a way to go up and over the ridge above the pond, but that route should be avoided if possible as it is not an official road. Any use of the overland route would need to be approved by MROSD.

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Q15.

What are the expectations and quantities for re-vegetation?

**A15)**

The large willow cluster on the south side of the pond (shown on plans) needs to be preserved and replanted by the contractor. The branches can be cut and the plant broken up into a number of root balls that can be set aside and may go dormant. The willow root balls will then be placed within the pond basin or moved into the gullies once debris is removed. The contractor is also responsible to spread native seed mix (identified on sheet 5.0 of the plan set) on disturbed areas such as the berm face and surrounding areas. No re-vegetation within the pond basin is expected as this area will become filled with water.

The contractor will be asked to salvage any large chunks of native wetland plants that are disturbed during construction. These chunks can then be placed back into the pond area when construction is complete. No ongoing watering or maintenance of these plants is required as they will be inundated by water once the pond re-fills. Additional wetland

plants are being grown in the Acterra nursery and will be planted by MROSD volunteers once construction is complete.

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Q16.

How many tires are located at the inlets and is the contractor responsible for re-vegetation after their removal?

**A16)**

It is unknown the total number of tires present. The location of the tires and the anticipated extent was pointed out to contractors during the site tour. Many of the tires are visible on the surface, although the contractor should expect additional tires are located subsurface. Willow root balls or vegetative slash may be used to stabilize these areas once tires are removed.

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Q17.

What is the contractor responsible for in the area uphill of the pond?

**A17)**

See Attachment H “Project Engineering Plan Sheets and Specifications”. Debris is to be removed from gullies, any vegetation that needs to be removed to access debris will need to be cleared and re-vegetation of the gullies once debris is removed. As discussed previously, willow roots balls or slash from the face of the berm may be used to stabilize the gullies and re-seeding/erosion control shall follow the specification identified on sheet 5.0 of the plan set. An add alternate of installing the cattle exclusion fence may be awarded to prevent cattle from accessing the restored gullies.

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Q18.

What area does the fence encompass?

**A18)**

See Attachment H “Project Engineering Plan Sheets and Specifications” for location of the new fence.

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Q19.

Has the entire fill eroded at the breach or does more excavation need to occur?

**A19)**

There is still excavation that needs to be completed at the bottom. From the top of the berm to the bottom of the cut is currently 11 feet. See Attachment H “Project Engineering Plan Sheets and Specifications” and Attachment J “Geotechnical Report” (specifically the cross sections) to review and determine the additional width/depth of excavation that will be required to complete the project.

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Q20.

What are the fire requirements for an on-site pumper truck?

**A20)**

Please see attachment N “Permit requirements” for all fire requirements. Requirements for an on-site pumper truck are as follows:

*“The contractor shall furnish a water tank truck or trailer to be located on or immediately adjacent to the contract area and meet the following minimum specifications: Contain at least 300 gallons of water; a combination straight stream-fog nozzle with 300 feet of one inch fire hose with no segment longer than 50 feet; fire hose with nozzle closed shall be capable of withstanding 200 psi pump pressure without leaking, slipping of couplings, distortions, or other failures; have a nozzle discharge rating of six to 20 gallons per minute; have a pump capable of delivering 23 gallons per minute at 175 pounds psi at sea level; the power unit for pump shall have fuel for at least two hours of operation, have an ample vehicle available at all times to transport the trailer immediately and safely over roads serving the contract area and the pump outlet shall be equipped with 1-1/2 inch National Standard Fire Hose thread.”*

This truck or trailer is expected to be present at the staging area indicated during the site tour, and closer to the pond once the work site is cleared of vegetation if an adequate parking area can be made available.

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Q21.

What will be required for erosion control on the berm face?

**A21)**

See Attachment H “Project Engineering Plan Sheets and Specifications” for erosion control specifications.

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Q22.

What fish are in the pond?

**A22)**

Non-native species including but not limited to: mosquito fish, & bass are present.

**ATTACHMENT 1 (A-1)**  
**BID PROPOSAL**

**Project:** Pond DR05 Repair  
**Budget:** \$95,000

**Refer to Bid Documents for complete details. The bullet list below represents an overview of work items. Proposed line items include the cost of labor, equipment, all materials and delivery of all equipment and placement of materials at the project site.**

**Project scope/description for BASE BID items:**

- Install biological exclusionary fencing (silt fence) prior to move in of equipment and before beginning project construction. Fencing type and installation shall be in accordance with Attachment J Silt fence site plan and specifications. Any deviations will need to be approved by the Districts Representative.
- The work site must be cleared daily by the Project biologist or their designee prior to construction. The project Biologist or their designee may halt construction at any time to protect sensitive wildlife species and their habitat.
- Implement Best Management Practices to protect worksite from erosion and downstream sedimentation, including pre and post construction installation of all erosion control devices as indicated on the attached plan sheets. Locations requiring erosion control devices are indicated on the attached plan sheets. Only certified weed free straw may be utilized.
- Clearing and Grubbing is expected to occur in the area shown as the limits of grading as indicated on the Engineering Plan Sheets, on the berm face, in the gully debris area, and any needed access areas.
- Install an exploratory trench through inside face of berm to look for bedrock, former outlet pipes, tree roots, or other debris. Re-compact the trench as a clay cutoff wall having a compaction of 93% and assumes onsite clay available and soil mixing required.
- Remove existing (failed) outlet pipe and replace with compacted soils as identified on the attached plan sheets.
- Install new outlet pipes through the berm (including trash racks, energy dissipater, seepage collars etc.) as indicated on the attached plan sheets.
- Reconstruct failed earthen berm by placing compacted native soils to match the existing berm slope gradient according to attached plan sheets.
- Grade top of earthen berm to ensure a uniform width across the top according to attached plan sheets.
- Remove, store onsite, and replant/replace willow and other wetland vegetation as shown on the attached plan sheets and as directed in the field.
- Improve pond margin and interior basin through excavation, grading, reshaping, and re-compacting as indicated on attached plan sheets.



- Restore access road by placing and compacting excess fill material along access road as indicated on the attached plan sheets.
- Remove tires and other debris in upper gullies and re-vegetate as indicated on the attached plan sheets.
- Re-vegetate and place erosion control on all disturbed soils throughout the project area according to the erosion control plan on the attached plan sheets. Only approved seed mix and certified weed free straw may be utilized.
- Arrange necessary inspections for each phase of construction with San Mateo County Planning Department and the Project Engineer and Geotechnical consultant.
- Transport and place all materials at local staging areas. Haul away construction debris and dispose of properly at an appropriate facility.
- Refueling of vehicles shall be conducted offsite on paved surfaces when possible. However, when field fueling is required onsite it must be done at least 150 feet away from riparian habitat or water bodies. Heavy gauge tarps of chemically resistant polypropylene, small basins, or other impervious material must be used to prevent spills and to prevent soil contamination. Adequate absorbent materials must be present on site at all times in case of accidental spills. The contractor shall provide the District with a list of materials and measures for spill prevention and response prior to construction, as required by the permitting agencies.
- Onsite water may be available for dust control, fire suppression, and soil conditioning purposes.
- Contractor shall maintain equipment with appropriate spark arrester, and have on site at all time adequate firefighting tools as required by the California Public Resources Code.
- All work sites shall be kept clean. No loose trash, particularly food related trash, is allowed.

**Project scope/description for ADD ALTERNATE items:**

- Dewatering (diverting or pumping) of water may not occur until August 15 or after as determined by the Project Biologist. Inlet hose requires ¼ mesh screening to prevent suction of aquatic organisms. Rate of dewatering will be under the direct supervision of the Project Biologist to protect aquatic organisms and to allow adequate time to relocate any sensitive wildlife.
- Additional grading and or placement of engineered fill to address any unforeseen site conditions
- Installation of a toe drain as directed by the engineer if site conditions warrant
- Remove and replace 2 culverts on the access road into the pond site
- Install cattle exclusion fencing as indicated on the attached engineering plan sheets.
- Install reverse grade dips on road into pond site after construction to improve water drainage across the restored road.

Julie K. Andersen, Project Manager  
330 Distel Circle, Los Altos, CA 94022  
(650) 691-1200

The undersigned has carefully examined the Work site conditions, the Drawings, Plans and Specifications, and the complete Agreement, including the following Addenda:

No. \_\_\_\_\_, dated \_\_\_\_\_, 2014,

No. \_\_\_\_\_, dated \_\_\_\_\_, 2014,

No. \_\_\_\_\_, dated \_\_\_\_\_, 2014.

## **BASE BID ITEMS**

Based upon that review, the undersigned proposes to furnish all labor, materials, services and equipment required to complete the Work for the following amount:

### **1. BASE BID**

**Units are as follows: LS=Lump Sum; LF=Foot; CY=Cubic yard;**

<i>Item No.</i>	<i>Description of Item</i>	<i>Unit</i>	<i>Unit Price</i>
1.	Move In	LS	
2.	Labor and Materials- Install Silt Fence according to Silt Fence Site Plan and Specifications (Attachment J).	LS	
3.	Labor and Materials- Clearing and Grubbing berm face, area of grading limits (shown on plan sheets), gully debris area, and any needed access routes.	LS	
4.	Labor and Materials- Excavate exploratory trench through inside face of berm. Assume 160ft trench having an average depth of 7ft. Re-compact the trench as a clay cutoff wall having a compaction of 93% (assumes onsite clay available and soil mixing required for adequate clay content and moisture percent).	LS	
5.	Labor and Materials- Grading, Excavation, and Fill Placement: The selected contractor is responsible to perform <b>all</b> earthwork according to Engineering Plan Sheets and Specifications (see Attachment G).	LS	
6.	Labor and Materials- Remove and dispose of existing outlet pipe and re-compact with engineered fill according to the Engineering Plan Sheets and Specifications.	LS	
7.	Labor and Materials- Install new outlet pipes (includes all materials: pipes, anchors, trash racks, energy dissipater, seepage collars etc.).	LS	
8.	Labor and Materials- remove and store onsite willow tree (indicated on Engineering Plan Sheets) and associated pond vegetation at direction of project	LS	

	biologist and replace in pond after reconstruction.	
9.	Labor and Materials- repair breach and rebuild embankment according to Engineering Plan Sheets.	LS
10.	Labor and Materials- Pond re-contouring according to Engineering Plan Sheets.	LS
11.	Place excess fill along pond access road according to Engineering Plan Sheets	LS
12.	Labor and Materials- Remove and dispose of tires and other debris in upper gullies and re-vegetate according to Engineering Plan Sheets.	LS
13.	Labor and Materials- Place erosion control and revegetate disturbed areas according to Engineering Plan Sheets.	LS
14.	Move out	LS

(Sum of items 1-14) **TOTAL BID** \$

Proposed Duration of Scope of Work  working days

**ADD ALTERNATE ITEMS:**

**2. UNIT PRICES**

Unit Prices shall be used for adding or deleting work at the sole discretion of the District Representative, and may be exercised at any time during the execution of the Work. Unit pricing shall be utilized to complete additional grading, restoration, and erosion control work.

Units are as follows: CY=Cubic yard, LS= Lump sum, LF= Linear Foot

<i>Item No.</i>	<i>Description of Item</i>	<i>Unit</i>	<i>Unit Price</i>
<b><u>EARTHWORK- GENERAL</u></b>			
1.	Labor and Materials- General earthwork (non engineered fill at 85% compaction)	CY	
2.	Labor and Materials- over excavation and re-compaction of engineered fill at 93% compaction (for areas within dam prism) Assumes onsite soil mixing required	CY	
3.	Labor and Materials- over excavation and re-compaction of engineered fill at 90% compaction (for all other areas) Assumes onsite soil mixing required	CY	
<b><u>EARTHWORK- CLAY LINER</u></b>			
4.	Labor and Materials- Install and compact imported clay soils within dam prism and/or pond basin (assumes imported clay which contains a minimum of 80 percent fines, with the fines fraction having a minimum plasticity index of 35).	CY	
<b><u>OTHER:</u></b>			
5.	Labor and Materials- Dewatering of pond and install any necessary water diversion.	LS	
6.	Labor and Materials- Install new toe drain in existing embankment (includes trenching to a 6ft depth, installation of 6" perforated drain pipe, drain rock, and filter fabric. See Attachment L, As Built Plans for Pond DR08, for example specifications).	LF	

7.	Labor and Materials- Install cattle exclusion fencing (See Engineering Plans and Specifications Sheet 2.0)	LF
8.	Labor and Materials- Remove and replace culverts on access road (assume 18" diameter 30' length pipe and rock placement) according to the attached culvert and energy dissipater specifications	LS
9.	Labor and Materials- Install reverse grade dips on access road according to attached reverse grade specification	LS
10.	Labor and Materials- Remove and replace culverts on rural ranch roads (assume 24" diameter 30' length pipe and rock placement) according to the attached culvert and energy dissipater specifications	LS
11.	Labor and Materials- Install new ditch relief culvert (DRC) (assume 18" diameter by 20' length pipe and rock placement) according to the attached ditch relief culvert specification.	LS
12.	Install staff gage according to Attachment P. "Staff Gage Plans and Specifications" Actual location within the pond is flexible and is to be determined in the field.	LS
13.	Hand labor	hour

### 3. DISCLOSURE

The names of all persons financially interested in this Bid Proposal as principals are as follows:

An authorized person for the bidder must sign this Bid Proposal. If the bidder is a partnership, a general partner must sign. If the bidder is a corporation, an authorized officer of the corporation must sign and a corporate resolution conferring such authority must be provided. If bidder, or any partner of bidder, is a corporation, provide the legal name of the corporation, the state of its incorporation and the name and address of the President and of the Secretary. If bidder is a partnership, provide name of the firm and names and addresses of all individual co-partners. Use additional sheets as necessary. If bidder is an individual, provide the first and last name and address.

Name of Corporation: \_\_\_\_\_

State of Incorporation: \_\_\_\_\_

Name of Officer/Shareholder

Title

Address

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#### **4. WITHDRAWAL OF BIDS**

Bids may be withdrawn prior to the opening of bids only by a signed, written notice received by the District Representative prior to the commencement of the bid opening. In consideration of District's reliance on and consideration of this Bid Proposal, the undersigned agrees that such Bid Proposal shall be irrevocable upon opening and shall not be withdrawn for forty-five (45) calendar days following the bid opening even though award may be made to another bidder. Thereafter, such bid shall be automatically relieved.

#### **5. SCHEDULE**

Please provide an anticipated project schedule (Attachment F).

#### **6. EXPERIENCE**

Please provide information regarding your firm's experience performing pond repair or similar restoration, especially those involving the presence of California red-legged frog. Include any additional information as may be required to describe the work.

Job/Project Name \_\_\_\_\_

Landowner \_\_\_\_\_ Year \_\_\_\_\_ Contract Amt \$ \_\_\_\_\_

Contract Officer \_\_\_\_\_ Phone \_\_\_\_\_

Project Description \_\_\_\_\_

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Job/Project Name \_\_\_\_\_

Landowner \_\_\_\_\_ Year \_\_\_\_\_ Contract Amt \$ \_\_\_\_\_

Contract Officer \_\_\_\_\_ Phone \_\_\_\_\_

Project Description \_\_\_\_\_

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Job/Project Name \_\_\_\_\_

Landowner \_\_\_\_\_ Year \_\_\_\_\_ Contract Amt \$ \_\_\_\_\_

Contract Officer \_\_\_\_\_ Phone \_\_\_\_\_

Project Description \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



I make the above Bid and declare under penalty of perjury that the statements made in this Bid Proposal are true and correct.

FULLY EXECUTED at \_\_\_\_\_, \_\_\_\_\_  
City State

on \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_  
Month Day Year

Signature \_\_\_\_\_ Title \_\_\_\_\_

Name (please type or print) \_\_\_\_\_

Federal Employer I.D. Number \_\_\_\_\_

License Type \_\_\_\_\_

License Number \_\_\_\_\_ Expiration Date \_\_\_\_\_

License Type \_\_\_\_\_

License Number \_\_\_\_\_ Expiration Date \_\_\_\_\_

Name of Firm \_\_\_\_\_

Mailing Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Phone (Bus) \_\_\_\_\_ Phone (Cell) \_\_\_\_\_

Email \_\_\_\_\_

Other Contact Info (please describe) \_\_\_\_\_

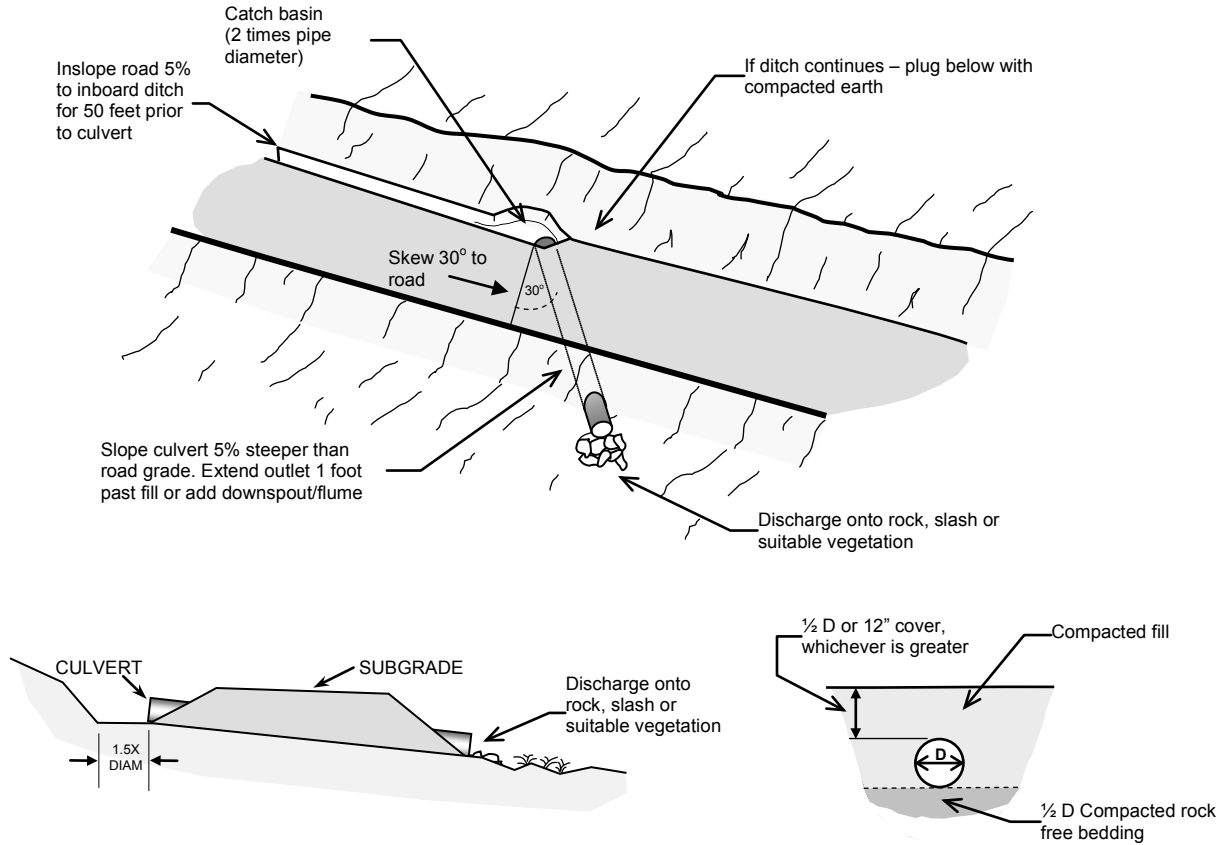
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**NOTES**

- Ditch relief culverts shall be installed flagged locations or as identified on plans. The maximum spacing of culverts shall be 150 feet unless otherwise specified or directed.
- Culverts shall be 12-inch diameter smooth bore, double wall HDPE (ASTM D3350 and AASHTO M294, Type S) unless otherwise specified
- The culverts shall be placed at a 30 degree skew angle down grade (where allowable) with a gradient 5% steeper than that of the road. Culverts should extend a minimum of 1' beyond base of road fill.
- Where necessary, outlet ditch shall be constructed at a steeper gradient than the culvert, at least one pipe diameter in width, and with bank tapered back to a 1:1 slope.
- The culvert bed shall ½ diameter of the culvert and be clean and free of large woody debris and large rocks. Trench shall be adequate width to facilitate compaction.
- Select approved mineral soil shall be used for culvert back fill. The back fill shall have no rocks greater than 3 inches in any dimensions placed closer than 1 foot to the culvert. Backfill shall be adequately compacted throughout the entire process to 95 percent ASTM 1557 unless otherwise specified. During placement and compaction of fill, the moisture content of the materials being placed shall be maintained.
- Compacted fill coverage shall be minimum ½ pipe diameter or 12 inches, whichever is greater
- Rock, slash or suitable vegetation should be used at discharge point as directed or specified
- A ditch block shall be placed immediately downslope of the culvert intake to prevent ditch flow from bypassing the pipe inlet.
- Specifications are indented only as guideline, modifications may be made in the field by geotechnical consultant or designee



**6D DITCH RELIEF CULVERT (Typical)**

NTS



**TIMOTHY C. BEST, CEG**  
 ENGINEERING GEOLOGY AND HYDROLOGY  
 1002 Columbia Street, Santa Cruz, CA 95060  
 (831) 425-5832 (831) 425 5830 fax.

**DITCH RELIEF CULVERT  
 TYPICAL SPECIFICATIONS**

**Standard Detail 6D**

Date: May 3, 2009

The selected contractor is requested to bid on installation of a staff gage according to the following directions/specifications, or equivalent, as approved by project engineer.

### Installing a Reservoir Staff Gage

The gage is basically a vertical ruler graduated in feet and fractions thereof. Attached is a generic plan we have prepared for staff gage construction that uses Stevens Water Company gage plates, Style C (catalog cut attached), mounted on aluminum posts in stair-step fashion down the reservoir slope. The top of the uppermost gage assembly must be at or above the spillway crest elevation. The bottom of the uppermost gage assembly is level with the top of the next one down and so forth. Note that this particular design requires that the reservoir be drained for complete installation. Attached is a photo showing installed gages.

Below is a web link for Stevens Water Company that takes you directly to their staff gage page.

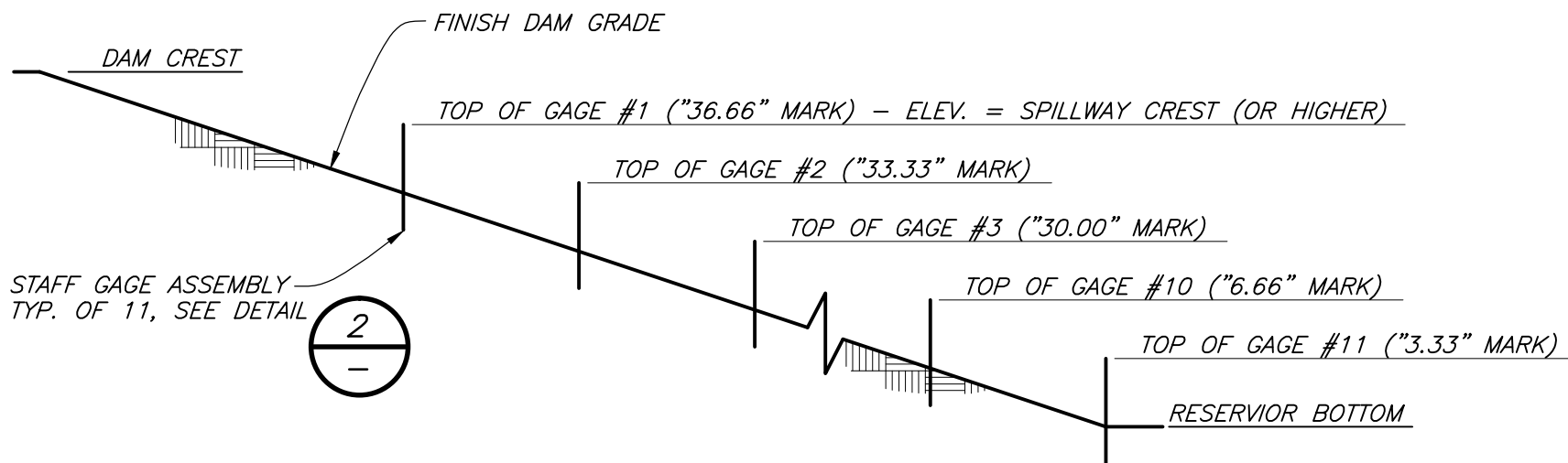
[http://www.stevenswater.com/water\\_level\\_sensors/staff\\_gages.aspx](http://www.stevenswater.com/water_level_sensors/staff_gages.aspx)

The gage comes in sections and you will need to order the number of gage sections depending on how deep the pond is.

For example;

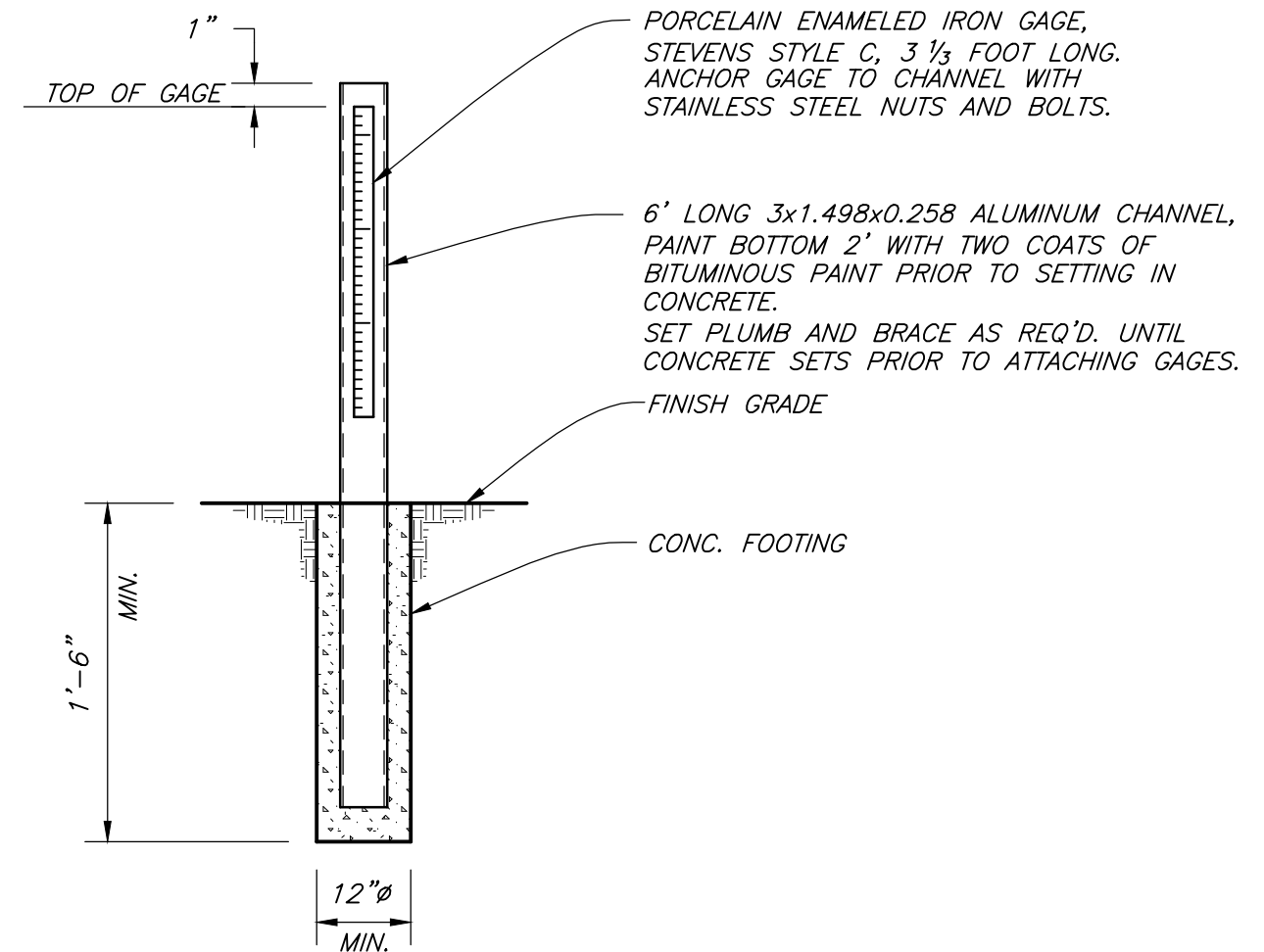
- if your pond is about 10' deep you would need to order 4 sections (item numbers 15405 – 15407) of gage
- if your pond is about 20' deep you would need to order 6 sections (item numbers 15405 – 15410) of gage
- if your pond is about 42' deep you would need to order 13 sections (item numbers 15405 – 15414 and 14509 - 14511) of gage

<u>Item #</u>	<u>Style</u>	<u>Length</u>
15405	Style C	0 - 3.33 feet
15406	Style C	3.33 - 6.66 feet
15407	Style C	6.66 - 10.0 feet
15408	Style C	10.0 - 13.33 feet
15409	Style C	13.33 - 16.66 feet
15410	Style C	16.66 - 20.0 feet
15411	Style C	20.0 - 23.33 feet
15412	Style C	23.33 - 26.66 feet
15413	Style C	26.66 - 30.00 feet
15414	Style C	30.00 - 33.33 feet
14509	Style C	33.33 - 36.66 feet
14510	Style C	36.66 - 40.00 feet
14511	Style C	40.00 - 43.33 feet



**STAFF GAGE INSTALLATION DETAIL** (1)  
SCALE: 1" = 10'

**NOTES:**  
THIS PLAN IS FOR A RESERVOIR DEPTH OF ABOUT 36 FEET. SHALLOWER RESERVOIRS WILL REQUIRE FEWER GAGE ASSEMBLIES.  
TOP OF GAGES SHALL BE LEVEL WITH THE BOTTOM OF NEXT UP-SLOPE GAGE.

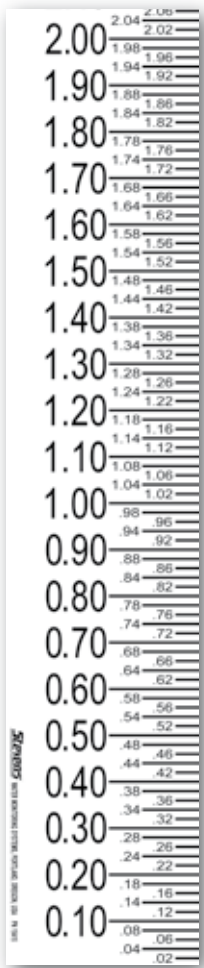


**STAFF GAGE ASSEMBLY DETAIL** (2)  
NOT TO SCALE

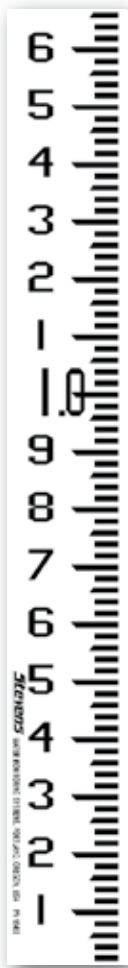
TYPICAL STAFF GAGE DESIGN

**Wagner & Bonsignore**  
Consulting Civil Engineers, A Corporation

# Porcelain Enamelled Staff Gages



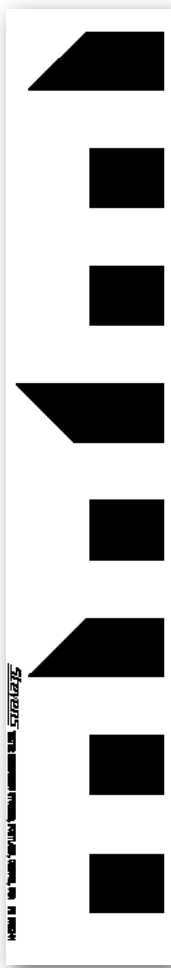
Style A



Style C



Style I



Style E



Style M

## Description

The Staff Gage has a long history of visually providing a direct indicator for determining water level. The gages are designed with heavy metal grommets with a 0.2 inch opening for easy mounting to a wall or pier.

The gage consists of a metal plate with accurately positioned markings. The metal plates are heavy 16 gage (0.075 in / 1.9 mm) enameled iron or steel, which is completely covered with a baked-on porcelain enamel finish to resist rust or discoloration. Different colors of enamel are used to provide the markings; typically black numbers on a white background.

Stevens designs and provides custom staff gages for applications requiring larger displays, unique mounting angles, slopes or visual flow measurements.

[www.stevenswater.com](http://www.stevenswater.com)

1.800.452.5272

## Features

- Time-proven basic visual reference of water level measurement
- Easy to see and read
- Available in many standard sizes (english or metric)
- Custom scales, sizes and colors available
- Pre-numbered or “build your own” options
- Rugged and durable weather resistant design

## Applications

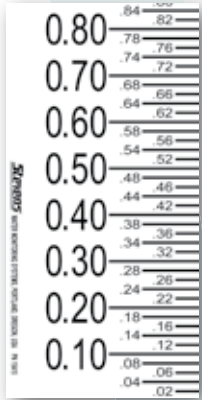
- Rivers, lakes, streams, dams and reservoirs
- Wastewater treatment plants
- Flumes and weirs
- Visual flow measurement

**Stevens**<sup>®</sup>  
Water Monitoring Systems, Inc.

# Porcelain Enameled Staff Gage Styles

## Style A

The Style A staff gage is 4 inches wide and comes in 3.33 ft. sections. The standard maximum height is 13.33 feet. The Style A has graduated marks every ft., 1/10th ft., and 0.02 ft. with total elevations.



Part Number	Range
15415	0 to 3.33 feet
15395	3.33 to 6.66 feet
15396	6.66 to 10.0 feet
15397	10.0 to 13.33 feet

## Style C

The Style C staff gage is 2.5 inches wide and is available in separate lengths of 0 - 1.06 feet., 0 - 1.56 feet, 0 - 1.56 feet, 0 - 2.06 feet, 0 - 3.06 feet, 0 - 4.06 feet, and 3.06 - 5.06 feet. Style C also comes in standard 3.33 ft. sections for a maximum height of of 20 feet. Style C has graduations every 100th of a foot with numerical marks every ft. and every tenth of a ft.



Part Number	Range	Part Number	Range
15402	0 to 1.06 ft.	15405	0 to 3.33 ft.
15403	0 to 1.56 ft.	15406	3.33 to 6.66 ft.
15404	0 2.06 ft.	15407	6.66 to 10.00 ft.
15418	0 to 3.06 ft.	15408	10.00 to 13.33 ft.
15419	3.06 to 5.06 ft.	15409	13.33 to 16.66 ft.
43082	0 to 4.06 ft.	15410	16.66 to 20.0 ft.

## Style I

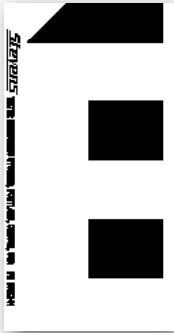
The Style I staff gage is 2.5 inches wide and has graduation every 0.25 inches with numerical marks every inch. Style I is available in any length ranging from 0 to 48 inches.



Part Number	Range
90223	0 to 14.0 inches
44405	0 to 18.0 inches
44406	0 to 24.0 inches
45637	0 to 36.0 inches
45480	0 to 48.0 inches

## Style E

The Style E is an English measurement staff gage that is 3.5 inches wide and is available in 1, 2 or 5 ft. sections. Style E is graduated in feet every tenth of a ft. Separate figure plates (see below) can be fastened on a pier, wall or other surface next to the Style E staff gage to number any desired elevation.



Part Number	Range
15420	1 foot section
15421	2 foot section
15422	5 foot section

## Style M

The Style M is a metric measurement staff gage that is 65 mm wide and is available in 1 meter sections. The Style M is divided into centimeters with each decimeter numbered. Separate figure plates (see below) can be fastened on a pier, wall or other surface next to the Style M staff gage to number any desired elevation.



Part Number	Range
15423	1 meter section

## Figure Plates

Separate numerical figure plates are available in 2" x 3", 3" x 4" and 4" x 6" sizes. Figure plates are commonly used with Style E or Style M staff gages and are fastened to a pier or wall to mark custom elevations.



Figure Plate Number	Figure Plate Dimensions 2" x 3"	Figure Plate Dimensions 3" x 4"	Figure Plate Dimensions 4" x 6"
#0	15424	90980	28134
#1	15425	90981	28135
#2	15426	90982	28136
#3	15427	90983	28137
#4	15428	90984	28138
#5	15429	90985	28139
#6	15430	90986	28140
#7	15431	90987	28141
#8	15432	90988	28142
#9	15430	90986	28140
Minus figure (-)	24187	-	-

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Since 1911, Stevens Water Monitoring Systems, Inc. has been a leading manufacturer of:

- Water Level Sensors
- Water Quality Sensors
- Soil Moisture Sensors
- Chart Recorders
- Staff Gages
- Telemetry Systems
- Data Collection Platforms

# Porcelain Enameled Staff Gage DATA SHEET

## Custom Gages

Stevens is one of the leading providers of custom staff gages. Staff gages can be designed for applications requiring large displays, slopes, or other unique mounting angles that a site may need for easy visual measurements. Numbers and graduated markings on the gage can also be customized to present a clear, visual measurement of water flow.



Custom Stevens staff gage mounted on a sloped pier on the Willamette River in Portland, Oregon. The submarine pictured is the USS Blueback.





Project Name:  
PONDS DR05 REPAIR -  
10-80-830-8212

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