APPENDIX B-2

U.S. FISH AND WILDLIFE SERVICE AND NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION NATIONAL MARINE FISHERIES SERVICE SECTION 7 INFORMAL CONSULTATION AND CONCURRENCE FROM CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE (CDFW) UNDER SECTION 2081 OF THE CALIFORNIA ENDANGERED SPECIES ACT LETTER

January 24, 2014

Kyle Dahl
U.S Army Corps of Engineers
1455 Market Street
San Francisco, California
94103

Re: Chelsea Wetlands Restoration Project, Hercules, California

Dear Mr. Dahl:

The City of Hercules is submitting permit applications concurrent to this application to complete the restoration of tidal marsh habitat on the Chelsea Wetlands Project Site (Project Site) in Hercules, California (Figure 1). The primary goals of the proposed project are to restore tidal marsh habitat, improve flood storage on lower Pinole Creek, and provide additional recreational opportunities along the existing Bay Trail.

This letter report represents our request for informal consultation with the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) under Section 7 of the Endangered Species Act (ESA), and Concurrence from California Department of Fish and Wildlife (CDFW) under Section 2081 of the California Endangered Species Act. No prior consultation has been requested or initiated to date. Accordingly, this letter report describes the proposed project and analyzes potential effects on aquatic and terrestrial listed species that have the potential to be affected by the proposed project. Based on the analysis presented in this letter report, the proposed action may affect, but is not likely to adversely affect and will beneficially affect listed species, designated Critical Habitat, or Essential Fish Habitat (EFH).

The species addressed in this letter include: steelhead (*Oncorhynchus mykiss;* central California Coast Distinct Population Segment, DPS, Federal Threatened), green sturgeon (*Acipsenser medirostris*; Federal Threatened), longfin smelt (*Spirinchus thaleichthys*; Candidate), California red-legged frog (*Rana draytonii*; Federal Threatened), salt marsh harvest mouse (*Reithrodontomys raviventris*; Federal Endangered), and California clapper rail (*Rallus longirostris obsoletus*; Federal Endangered).

Spring-run and winter-run Chinook salmon (*Oncorhynchus tshawytscha*) Evolutionarily Significant Units (ESUs) are not documented within Pinole Creek, and are thus not anticipated to occur in Pinole Creek at the Project site or beyond the tide gate that connects the interior portion of the site to Pinole Creek (Leidy 2007). Delta smelt (*Hypomesus transpacificus*) may occur seasonally in San Pablo Bay; however, have not been documented to occur within Pinole Creek and are not anticipated to be supported by the Project Site habitat (Leidy 2007). The Project Site does not contain critical habitat for either Chinook salmon ESU or Delta smelt. No additional discussion of these species is included with this letter.

The only federally listed species of fish known to currently occur in Pinole Creek is steelhead (HES 2009, Leidy 2007). Pinole Creek is not designated Critical Habitat for the species; however, steelhead has been documented using available aquatic habitat in tidally influenced portion of Pinole Creek (HES 2009). Additionally, Pinole Creek is designated EFH for Pacific salmon. The designation of a water body as EFH does not imply the presence of all the species covered by the EFH in that area.

In addition to steelhead; green sturgeon and longfin smelt (a Candidate species) have the potential to occur in Pinole Creek near the confluence with San Pablo Bay. The tidally influenced portion of Pinole Creek falls within Critical Habitat for green sturgeon. Based on available habitat and the proximity to San Francisco Bay, along with life history requirements and documented distribution; juvenile green sturgeon along with juvenile and adult longfin smelt may occur in the downstream, tidally influenced, portion of the creek. Within the Project Site, a drainage channel located east of Pinole Creek is controlled by a flap gate which likely prevents fish from accessing the channel within the Project Site. Because of the barrier, and the altered habitat state found upstream of the flap gate, no special status fish occur within the Project Site east of Pinole Creek. A discussion of steelhead, juvenile green sturgeon, and longfin smelt and how they potentially utilize the existing habitat within the Project Site is presented below. With the implementation of the proposed Chelsea Wetlands Restoration Project described herein, barriers between Pinole Creek and the Project Site would be removed and a tidal channel would be constructed on the Project Site, resulting in a substantial increase in the quality and quantity of aquatic and marsh habitat for native fish and other species.

1.0 PROPOSED PROJECT DESCRIPTION

The City of Hercules is proposing to restore tidal marsh habitat on the Project Site, which consists of an undeveloped 12.28-acre parcel adjacent to Pinole Creek in the City of Hercules. Historically, the project site was a tidal marsh, but over the years became degraded by the dumping of soil from surrounding construction projects. The site currently supports annual grasslands, a small brackish/salt marsh drainage channel with adjacent pockets of brackish/salt marsh, and a few small, scattered freshwater seasonal wetlands totaling approximately 1.90 acres of wetland habitat. The site is subject to flooding during 100-year storm events. The primary goals of this project are to:

- Restore tidal marsh habitat;
- Improve flood storage on lower Pinole Creek; and
- Provide additional recreational opportunities along the existing Bay Trail.

The tidal marsh restoration will be accomplished through the excavation of fill previously deposited on the site and the construction of a tidal channel that will connect to Pinole Creek through a con-span. In addition, an adjacent 2-acre marsh-upland transitional area owned by the Chelsea-by-the-Bay Homeowners Association (HOA) will be incorporated into the design.

Restoration will include grading of the site to the appropriate elevations for establishing tidal marsh habitat, and realigning of the existing on-site drainage channel to meander along an approximately 1,200-foot section that will tie back into the upstream historic channel near the south east corner of the project. The new tidal channel will connect to Pinole Creek by creating 65 feet of new channel through the existing marsh area adjacent to Pinole Creek. The meandering realigned channel will be deeper and wider to increase tidal exchange capacity and stormwater runoff conveyance. Site plans for the Proposed Project are shown in Appendix B.

Much of the perimeter of the project site (except where it borders the existing marsh-upland transitional area) is bordered by steep berms. The upland margins surrounding the tidal marsh will be graded to allow a gentle transition between these habitats which will require the removal of approximately 36

existing ornamental trees along the berm. The upland margins of the restoration area will be planted with native vegetation while the marsh plain and channel will be predominantly allowed to self-colonize.

Infrastructure improvements will include the removal of an existing 36-inch culvert at the southwest corner of the site, and the embankment will be rebuilt. A con-span will be installed below the existing Contra Costa County Flood Control and Water Conservation District (FCWCD) maintenance road and levee between Pinole Creek and the project site. In addition, approximately 140 linear feet of the existing 8-inch sewer line which crosses the Project Site will be lowered approximately 10 feet in order to accommodate the placement of the new tidal channel. Flood walls will be installed along Santa Fe Avenue and along eight of Chelsea-By-the Bay houses located on the southeastern side of the project site to protect the homes from flood waters. The flood walls will be constructed of vinyl sheeting and will be installed to ensure that the minimum elevation of 14.0 feet will be achieved around the basin or as directed by the FCWCD and the U.S. Army Corps of Engineers (Corps).

Approximately 1,200 linear feet of the San Francisco Bay Trail forms the northwest boundary of the project site. As tidal marsh is not prevalent along the Bay Trail in this area of Contra Costa County, the restored Chelsea Wetlands will offer nature and wildlife viewing opportunities to Bay Trail users. To enhance passive recreation opportunities on the Bay Trail, up to two viewing areas will be located around the tidal marsh area on the northwest side of the Project Site. Interpretive signs will be installed in the turnout as well as on the south and north ends of the restored marsh area.

1.1 Description of the Action Area

Location

The Project Site is located in the City of Hercules (Figure 1), Contra Costa County, California on the northeast side of Pinole creek near the shores of San Pablo Bay. A levee containing a portion of the Bay Trail borders the Project Site to the north, Pinole Creek borders it to the west, and properties to the south and east of the Project Site are occupied by single-family dwellings. The Project Site is comprised of four land parcels owned by different entities, totaling approximately 12.28 acres (Figure 2). The four entities include Chelsea by the Bay HOA, City of Hercules, City of Pinole, and PG&E.

Historic Land Use

The Project Site was at one time part of a large complex of tidal marshes and mudflats that fringed San Pablo Bay and provided essential habitat for a wide range of animals, birds, and plants. Beginning in the mid-19th century, many of these low-lying areas around the Bay were diked, drained, and filled to support agriculture and urban development, resulting in the loss of approximately 82% of the North Bay's historic tidal wetlands (Goals report 1999). The loss of habitat directly translated into reductions in native wildlife populations. Without the habitats they need to sustain themselves, many birds, animals, and plants have become threatened or endangered.

Current Land Use and Habitats

A large portion of the site was filled approximately 100 years ago during the rapid urbanization of the Hercules/Pinole area. With historic topography and tidal influence gone, the site was largely converted into uplands with a narrow, vegetated drainage channel along the southern boundary. The Chelsea parcel is zoned as open space and currently supports annual grasslands and small, scattered seasonal wetlands. The adjacent HOA parcel currently supports salt marsh, seasonal wetlands, and annual grasslands. The wetland fringe along Pinole Creek within Project Site is tidally influenced brackish marsh.

The Project Site as a whole is dominated by annual grassland, which occurs east of the levee that separates the diked parcels from Pinole Creek. The grassland along the northern and eastern site boundaries appear to be mowed regularly. The diked area within the Chelsea and PG&E parcels also support scattered wetlands which are seasonal in nature and composed primarily of pickleweed (*Salicornia pacifica*), saltgrass (*Distichlis spicata*), and common reed (*Phragmites australis*), among other wetland species. These wetlands are particularly prevalent in the eastern portion of the Project Site. Trees and shrubs are also present within the site, though they occupy a much smaller area than the grasslands or seasonal wetlands. Species include coyote brush (*Baccharis pilularis*), Himalayan blackberry (*Rubus armeniacus*), non-native palm trees (*Phoenix* sp.), Aleppo pine (*Pinus halepensis*), *Eucalyptus* sp., and Northern California walnut (*Juglans hindsii* [*J. californica* var. *h*.]).

The portion of Pinole Creek bordering the Project Site is within tidal influence of San Pablo Bay, approximately 800 feet upstream of the creek mouth. The banks of the creek support tidal wetlands, which average approximately 40 feet wide on the eastern bank. Dominant species include pickleweed, saltgrass, marsh gumplant (*Grindelia stricta*), and cordgrass (*Spartina* sp.). As noted above, a small "vegetated waters" channel connected to Pinole Creek runs along the southern project boundary, carrying surface water from the Project Site through a tide gate and into Pinole Creek. Cordgrass and alkali bulrush (*Bolboschoenus maritimus*) occur within lower portions of the channel, transitioning into a matrix of pickleweed, saltgrass, and marsh gumplant. Plant species bordering the channel include Harding grass (*Phalaris aquatic)*, wild radish (*Raphanus raphanistrum*), and various non-native annual grasses. The channel is approximately 1 foot wide and contained several inches of stagnant or slow-moving water during the site visits.

Surrounding Land Uses and Habitats

The areas surrounding the project site were slowly developed over time and the site is now bordered by housing developments to the south and east, the Amtrak/Union Pacific Railroad to the north, and the Pinole Creek flood control channel to the west (Figure 1). The Chelsea by the Bay subdivision, which borders the project site to the south, was constructed in the late 1980s. The residential area to the east of the project site, on the east side of Santa Fe Avenue has been slowly developed over the past 100 years.

Pinole Creek runs west of the project site and is separated from the site by a narrow, paved and gravel walkway/access road. The portion of Pinole Creek bordering the project site is located approximately 800 feet upstream from San Pablo Bay, making it tidally influenced. Several beds of California cordgrass (*Spartina foliosa*) occur near the mouth of Pinole Creek, while other portions of the creek are dominated by Alkali bulrush (*Bolboschoenus maritimus*). Both vegetation types are classified as coastal brackish marsh.

A large tidal marsh, which is a part of the East Bay Regional Park District's San Pablo Bay Regional Shoreline Park, occurs approximately 140 feet to the northwest of the project site. The tidal marsh is separated from the site by a constructed berm (containing the San Francisco Bay Trail), a row of planted eucalyptus trees, Railroad Avenue (now closed to vehicles), and the Amtrak railroad right-of way (containing an active railroad line and areas of compacted dirt and gravel). The tidal marsh is dominated by pickleweed (*Salicornia pacifica*), but contains other tidal marsh species including fleshy jaumea (*Jaumea carnosa*) and marsh gumplant (*Grindelia stricta* var. *angustifolia*).

A freshwater marsh is located to the southeast of the project site. The marsh is generally choked with cattails (*Typha* spp.) with few open water areas visible. Willows (*Salix* spp.) occur in locations throughout the marsh, as well as dense stands of Himalayan blackberry (*Rubus armeniacus*). The

drainage channel traversing the southern project site boundary continues into and terminates within the freshwater marsh. Upon entering the marsh, vegetation within the channel (primarily cattails) becomes dense and open water areas are limited. A small drainage channel and additional freshwater marsh habitat occur east and upslope of the freshwater marsh and connect to the marsh via a culvert under Santa Fe Avenue. This channel is completely choked with cattails and willows whereas the ponds contain open aquatic habitat and are generally surrounded by cattails.

1.2 Measures to Avoid Potential Effects to Listed Species

Fish Species Avoidance Measures

The following avoidance and minimization measures are intended to prevent take of steelhead, green sturgeon, and longfin smelt which may occur within the Action Area vicinity. The incorporation of these measures will also reduce the extent of temporary effect to Critical Habitat and EFH. No permanent loss of habitat or habitat function is anticipated as the project will be wholly beneficial. Existing diked uplands would be restored to fully tidal marsh habitat, resulting in a substantial increase in available habitat for marsh-associated species in the area.

The following measures will be included in the Project implementation:

- Work will be conducted in isolation from flowing or tidal water. Prior to the start of culvert replacement or channel disturbance activities, the Project Site will be isolated by sheet piling, and flowing water will be diverted around the isolated area.

- Sheet pile installation will begin during a zero tide or lower when Pinole Creek downstream of the existing culvert or proposed new connector location have only a minimal amount of water.

- If work is to be conducted within standing or flowing water, a qualified fisheries biologist will be onsite during sheet pile installation to ensure no listed fish are trapped in the tidal slough. If a listed fish species is observed within the tidal slough during this inspection, sheet pile installation will cease for one full tidal cycle to allow the fish to leave of its own accord.

- The appropriate Corps, CDFW, and Regional Water Quality Control Board (RWQCB) permits will be obtained to conduct culvert replacement within the Project Site. Additional avoidance and minimization measures recommended in these permits will be followed to reduce the potential to affect downstream fish habitat.

California Red-legged Frog Avoidance Measures

- All project personnel will receive an environmental training from a qualified biologist (approved by the USFWS) prior to the initiation of any on-site construction work. At a minimum, the training will cover: 1) the natural history, identification and distribution of the California red-legged frog (CRLF); 2) the legal protections of this species and the ramifications for take; 3) circumstances under which this species may be encountered in the course of project work; and, 4) avoidance and conservation measures to ensure that no take of this species occurs.

- All grading activity within suitable aquatic and associated upland and dispersal habitat for CRLF will be conducted prior to the onset of the rainy season or during the dry season (May 1 through October 31), unless exclusion fencing is utilized. If grading and earth work will occur during the rainy season (November 1 through April 30), temporary exclusion fencing will be placed

between the Project Site and the freshwater marsh to the east to prevent CRLF from moving through the Project Site during construction. The exclusion fence (if used) will consist of silt fencing (or similar material) and will be buried to a minimum depth of two inches so that frogs cannot crawl under the fence. Fence height will be at least one foot higher than the highest adjacent vegetation, with a minimum height of three feet. All supports for the exclusion fencing will be placed on the inside of the work area. The fencing will be immediately removed upon project completion.

- A qualified biologist will be present on-site during exclusion fence installation and removal, and will conduct a pre-construction survey immediately prior to the initiation of vegetation removal and ground disturbance activities. The biologist will document compliance with the project permit conditions and all take avoidance and minimization measures. The biologist will also train a designated onsite monitor to ensure compliance with all permit conditions throughout the remainder of restoration work.

- If a CRLF enters or is found within the work area(s), the biologist or onsite monitor will suspend all construction activities in the immediate construction zone that may result in harassment or other forms of take. The animal will be closely monitored and allowed to leave the work area voluntarily. A qualified biologist may relocate CRLF from the construction zone to suitable habitat outside the Project Site.

- Prior to the start of daily construction activities, the biologist or onsite monitor will inspect the exclusion fencing to ensure that it is functional (e.g., has no rips or tears, and remains buried in the ground). The fenced area(s) will also be inspected to ensure that no frogs are trapped there. Any CRLF that are found along and outside the fence will be closely monitored until they move away from the construction area.

- No plastic monofilament netting (erosion control wattles or matting) will be used within 300 feet of potentially suitable aquatic habitat for CRLF.

- USFWS shall be notified within one working day of the discovery of the death or injury of a listed species.

2.0 DESCRIPTION OF LISTED SPECIES THAT MAY BE AFFECTED BY THE PROPOSED PROJECT

The Project Site was traversed on foot by WRA biologists on September 30, October 2, and December 28, 2013. The latter was conducted by a fisheries biologist during a 5.59-foot high tide to evaluate the extent and quality of aquatic habitat present and determine the potential for occurrence of listed fish and adjacent terrestrial species known to occur in similar habitats. The site visit was conducted during the dry period, when aquatic habitat and physiological constraints are most limiting for juvenile anadromous species. Observations of aquatic species and notes on riparian vegetation were recorded. Aquatic habitat features that are important to fish including substrate type, cover, water depth, pool composition, and riparian vegetation were also assessed.

No special status fish or aquatic species were encountered during the site visit. Based on existing culvert flap gate, and the reduced habitat quality in the drainage channel along the southern Project Site boundary, sensitive fish species are not anticipated to utilize this channel east of Pinole Creek.

In addition, uplands, seasonal wetlands and tidal marsh within the Project Site were assessed for the potential to support CRLF, CCR and SMHM. The surrounding area for 700 feet in all directions was also evaluated for the potential to support these species to determine whether they were in range of potential construction-related disturbance, or if they could potentially move into the Project Site from suitable habitat outside the site.

The following section details the ecology of listed species and their potential to occur in the Project Site.

Steelhead; Central California Coast DPS, Federal Threatened

The life history patterns for steelhead are highly variable and flexible, and are limited to juvenile rearing and migration habitat, as the Project Site does not support spawning for the species (Moyle 2002). While similar in their anadromy to most Pacific salmonids (*Oncorhynchus* sp.), steelhead exhibit a greater variation in timing for each component of their life history (NMFS 2007). Steelhead typically migrate to marine waters after spending two years in freshwater, though they may stay in freshwater up to seven. They then reside in marine waters for two or three years prior to returning to their natal stream to spawn generally as four or five year-olds. Spawning typically occurs between December and June, and unlike other Pacific salmonids, steelhead are iteoparous, meaning adults do not always die after spawning (NMFS 2007). In addition to the anadromous life history, an alternate resident freshwater life history, known as rainbow trout, exists for the species. Both of these life histories often occur within the same populations, and are genetically indistinct from each other; resident rainbow trout are capable of producing steelhead and steelhead progeny sometimes becoming resident rainbow trout (Moyle 2002).

Juvenile steelhead prefer to rear in eddies and along velocity breaks within a stream where they can exert minimal energy while being able to easily take advantage of terrestrial and aquatic invertebrates washed downstream. Instream cover, such as large woody debris and undercut banks, along with moderate to dense riparian cover are important characteristics in steelhead rearing habitat (USFWS 1986). Growth rate varies based on temperature; however optimal growth is thought to occur between 15° and 19° C (59 to 66° F) (Hayes et al. 2008). Ephemeral floodplains have been shown to be particularly important foraging and refuge habitat for juvenile salmonids (Jeffres et al. 2008). Sommer (2001) found significantly higher growth rates for salmonids rearing in floodplain habitat then with those rearing in adjacent stream habitat. Juvenile survival rates are positively correlated with the size of an individual, demonstrating the importance of high quality juvenile rearing habitat for the survival of the species (USFWS 1986).

Smolting occurs when juvenile steelhead out-migrate to the ocean. A process of morphological, behavioral, and biochemical changes occur that prepares the individual for life in the ocean (USFW 1986). Once in the ocean, a rapid growth phase occurs caused by the benefit of the nutrient rich marine ecosystem and allows individuals to become much larger than resident rainbow trout.

Potential to Occur within the Project Site

Habitat within the Pinole Creek portion of Project Site is capable of providing a migration corridor for steelhead, along with seasonal rearing habitat. Steelhead are documented to occur within Pinole Creek; however, an existing fish passage barrier approximately 1.5 miles upstream of San Pablo Bay prevents returning adults from reaching more suitable spawning habitat (HES 2009). Because of this, steelhead are anticipated to only infrequently occur within the Action Area, and in relatively low numbers. For the Project Site east of Pinole Creek, steelhead are not supported within the existing habitat. A culvert flap gate restricts access and degrades the habitat quality within the existing channel,

which is limited to a narrow, shallow channel. Spawning habitat is not supported in any portion of the Project Site or immediate vicinity. Steelhead do not occur east of the flap gate, and are only anticipated to infrequently occur within the tidally influenced portion of Pinole Creek. The Project Site does not contain critical habitat for this species.

With the implementation of the proposed Project, steelhead would have access to the Project Site, which currently does not support suitable habitat. The restoration of the Chelsea Wetlands site would create suitable aquatic habitat within the Project Site, and following the completion of the Project, the site would have potential to support this species.

Green sturgeon; Federal Threatened

Green sturgeon is widely distributed throughout the Sacramento/San Joaquin Delta and San Francisco Bay Estuary. Adults typically migrate upstream on the western edge of the Delta, returning to the ocean when river temperatures decrease and flows increase during the fall and early winter. Green sturgeon may hold in low gradient or off-channel sloughs or coves where temperatures are within acceptable thresholds. Larval sturgeon prefer open waters for foraging, but utilize areas with in-water structure during the day. Juvenile green sturgeon are strong swimmers and have the ability to select or avoid habitats. Juvenile rearing habitat includes areas suitable for spawning and downstream migration corridors. Utilization of rearing habitat varies based on seasonal flow and temperatures. Juvenile sturgeon are found in the Delta throughout the year for migration, foraging, and rearing. Juveniles may reside in fresh water for up to two years (Moyle 2002) before out-migrating to more marine waters during the summer and fall (Emmett et al. 1991).

Potential to Occur within the Project Site

Because the downstream portion of the Project Site is subject to tidal influence, there is a potential for juvenile sturgeon to enter the lower portion of Pinole Creek to forage. Unfortunately, not enough is known about juvenile green sturgeon movement or distribution to determine with more certainty if the species would utilize the tidally connected portion of the Project Site. Pinole Creek does not support adult green sturgeon spawning or foraging. The existing culvert flap gate restricts access to the Project Site east of Pinole Creek. As a result, juvenile green sturgeon do not occur east of the flap gate, and are only anticipated to infrequently occur within the tidally influenced portion of Pinole Creek. The tidally influenced portion of Pinole Creek, as defined by the elevation of mean higher high water, is included in critical habitat for green sturgeon. Tidally influenced portions of the Project Site are thereby included in green sturgeon critical habitat.

With the implementation of the proposed Project, green sturgeon would have access to the Project Site, which currently does not support suitable aquatic habitat. The restoration of the Chelsea Wetlands site would create suitable aquatic habitat within the Project Site, and following the completion of the Project, the site would have potential to support this species.

Longfin Smelt; Federal Candidate

Longfin Smelt is a pelagic, estuarine fish that ranges from Monterey Bay northward to Hinchinbrook Island, Prince William Sound Alaska. As this species matures in the fall, adults found throughout the San Francisco Bay, migrate to brackish or freshwater in Suisun Bay, Montezuma Slough, and the lower reaches of the Sacramento and San Joaquin Rivers. Spawning is believed to take place in freshwater. In April and May, juveniles are believed to migrate downstream to San Pablo Bay. Juveniles tend to inhabit the middle and lower portions of the water column. This species tends to be abundant near

freshwater outflow, where higher-quality nursery habitat occurs and potential feeding opportunities are greater.

Potential to Occur within the Project Site

Longfin smelt are not documented to occur within Pinole Creek; however, the tidal portion of Pinole Creek may seasonally support longfin smelt (Leidy 2007). While adults can be found throughout San Francisco Bay, this species is not strongly associated with any structural habitat, and relies on greater depths with slower velocities than are typically present in tidally influenced portions of the Project Site. Because of this, longfin smelt are anticipated to only infrequently occur within the tidally influenced portion of Pinole Creek. For the Project Site east of Pinole Creek, longfin are not supported within the existing habitat. A culvert flap gate restricts access and degrades the habitat quality within the existing channel, which is limited to a narrow, shallow channel. Spawning habitat is not supported within the Project Site. Longfin smelt do not occur east of the flap gate, and are only anticipated to infrequently occur within the tidally influenced portion of Pinole Creek. Critical habitat has not been designated for this species.

With the implementation of the proposed Project, longfin smelt would have access to the Project Site, which currently does not support suitable aquatic habitat. The restoration of the Chelsea Wetlands site would create suitable aquatic habitat within the Project Site, and following the completion of the Project, the site would have potential to support this species.

<u>California Red-legged Frog; Federal Threatened</u>

The California red-legged frog (CRLF) was listed as Federally Threatened May 23, 1996 (61 FR 25813-25833) and is a candidate for listing under CESA. Critical Habitat for the CRLF was designated on April 13, 2006 (71 FR 19243-19346), and the revised designation was finalized March 17, 2010 (75 FR 12815-12959). A Recovery Plan for the CRLF was published by the USFWS on May 28, 2002.

The historical range of the CRLF extended along the coast from the vicinity of Point Reyes National Seashore, Marin County, California and inland from Redding, Shasta County southward to northwestern Baja California, Mexico (Jennings and Hayes 1985, Hayes and Krempels 1986). The current distribution of this species includes only isolated localities in the Sierra Nevada, Northern Coast and Northern Traverse Ranges. It is still common in the San Francisco Bay area and along the central coast. It is now believed to be extirpated from the southern Transverse and Peninsular Ranges (USFWS 2002).

There are four primary constituent elements (PCEs) that are considered to be essential for the conservation or survival of a species. The PCEs for the CRLF include: aquatic breeding habitat; non-breeding aquatic habitat; upland habitat; and dispersal habitat (USFWS 2010).

Aquatic breeding habitat consists of low-gradient fresh water bodies, including natural and manmade (e.g., stock) ponds, backwaters within streams and creeks, marshes, lagoons, and dune ponds. It does not include deep water habitat, such as lakes and reservoirs. Aquatic breeding habitat must hold water for a minimum of 20 weeks in most years. This is the average amount of time needed for egg, larvae, and tadpole development and metamorphosis so that juveniles can become capable of surviving in upland habitats. During this period, salinity levels in the water must remain at or below 4.5 parts per thousand (ppt) for CRLF eggs and 7 ppt for tadpoles; higher levels have proven to be lethal (USFWS 2010).

Aquatic non-breeding habitat may or may not hold water long enough for this species to hatch and complete its aquatic life cycle, but it provides shelter, foraging, predator avoidance, and aquatic dispersal for juvenile and adult CRLF. These waterbodies include plunge pools within intermittent creeks; seeps; quiet water refugia during high water flows; and springs of sufficient flow to withstand the summer dry period (USFWS 2010). CRLF is sensitive to salinity and requires fresh water habitats. The maximum salinity tolerance for adult frogs is 9 ppt (Jennings and Hayes 1990). CRLF can also use large cracks in the bottom of dried ponds as refugia to maintain moisture and avoid heat and solar exposure (Alvarez 2004). Non-breeding aquatic features enable CRLF to survive drought periods, and disperse to other aquatic breeding habitat (USFWS 2010).

Upland habitats include areas within 300 feet of aquatic and riparian habitat and are comprised of grasslands, woodlands, and/or vegetation that provide shelter, forage, and predator avoidance. These upland features provide breeding, non-breeding, feeding, and sheltering habitat for juvenile and adult frogs (e.g., shelter, shade, moisture, cooler temperatures, a prey base, foraging opportunities, and areas for predator avoidance). Upland habitat can include structural features such as boulders, rocks and organic debris (e.g. downed trees, logs), as well as small mammal burrows and moist leaf litter (USFWS 2010).

Dispersal Habitat includes accessible upland or riparian habitats between occupied locations within 0.7 mi of each other that allow for movement between these sites. Dispersal habitat includes various natural and altered habitats such as agricultural fields, which do not contain barriers to dispersal. Moderate to high density urban or industrial developments, large reservoirs and heavily traveled roads without bridges or culverts are considered barriers to dispersal (USFWS 2006).

Breeding takes place from November through April (Storer 1925, USFWS 2002). Males usually appear at the breeding sites 2 to 4 weeks before females who are attracted to calling males. Females lay egg masses containing about 2,000 to 5,000 eggs, which hatch in 6 to 14 days, depending on water temperatures (USFWS 2002). Larvae metamorphose in 3.5 to 7 months, typically between July and September (Storer 1925, Wright and Wright 1949, USFWS 2002).

Due to habitat loss and urbanization, isolated populations are now more vulnerable to extinction through stochastic environmental events (i.e. drought, floods) and human-caused impacts (i.e., grazing disturbance, contaminant spills) (Soulé 1998). Isolated populations suffer from increased predation by nonnative predators, changes in hydroperiod due to variable wastewater outflows, and increased potential for toxic runoff.

Potential to Occur within the Project Site

The nearest documented occurrence of CRLF to the Project Site is located approximately 1.4 miles to the east. Dense residential development and a major transportation corridor (Highway 4) separate the Project Site from this documented occurrence (CDFW 2013). The three other occurrences of this species within 5 miles of the Project Site are located beyond the dense, urban coastal development to the east and south. There are no documented occurrences within 5 miles to west or north of the Project Site. Additionally, the Project Site is not within designated Critical Habitat for the species.

Pinole Creek is tidally influenced where it meets the Project Site, and based on the proximity of the Project Site to San Pablo Bay, this portion of the creek is likely to saline throughout most or all of the year to support CRLF. On December 28, 2013, a WRA biologist took salinity readings where the Project Site meets the creek, and the creek measured 20 ppt, which is beyond the maximum salinity level that adult CRLF can tolerate (9 ppt) (Jennings and Hayes 1990). Salinity levels are likely to decrease during the rainy season, though the proximity of the site to tidal waters in the Bay suggests

that the site will maintain unsuitable salinity levels throughout this period as well. Pinole Creek also has steep banks in the vicinity of the Project Site, and this would make it difficult for CRLF to move from open water into vegetative cover. Overall, Pinole Creek in the vicinity of the western Project Site is not likely to provide suitable habitat for CRLF, and it is not likely to act as a dispersal corridor between the Project Site and potentially suitable habitat to the south.

The aquatic habitat with the greatest potential to support CRLF occurs in the off-site freshwater marsh southeast of the Project Site; which is almost entirely surrounded by the Chelsea by the Bay subdivision (Figure 3). Limited areas of open water with substantial floating vegetation were visible through thick willows and cattails, and the feature was inundated during all three site visits prior to the onset of the rainy season, suggesting that it is perennially flooded. The site is fairly isolated, though it appears to connect to other potential aquatic habitat to the east through several culverts. The condition of this feature indicates that it may be suitable for use as aquatic breeding or aquatic non-breeding CRLF habitat.

Because protocol level surveys have not been conducted and therefore absence of the species cannot be definitively established, CRLF are assumed present in the off-site freshwater marsh. A portion of the drainage channel within the southeast corner of the Project Site, flows out of the freshwater marsh, and would be considered aquatic non-breeding habitat for the species. The drainage channel is relatively narrow (1 to 3 feet with width) and typically less than a foot in depth. Salinity measurements taken within the drainage channel indicated the majority of water within the Project Site is above 9 ppt (reaching 25 ppt in some portions), and therefore unsuitable for CRLF. With this limitation, potential aquatic non-breeding habitat for this species would be restricted to the southeast corner of the Project Site (Figure 3).

Upland habitat for CRLF is typically within 300 feet of potential suitable aquatic habitat. The eastern portion of the Project Site supports cattail, pickleweed, saltgrass and associates, as well as palm trees, and limited ruderal vegetation along Santa Fe Avenue. With the exception of the ruderal community, the vegetation in this area is not typical CRLF upland vegetation and is likely dense enough to discourage movement and foraging. CRLF upland habitat surrounding aquatic features is generally most important where aquatic features dry up seasonally and force frogs to seek cover in soil cracks, animal burrows or plant debris. Where suitable perennial water sources occur, as appears to be the case with the drainage channel and off-site freshwater marsh, frogs are not forced to seek dry season refuge; they are more likely to remain in aquatic habitat and less likely to occur in upland refugia surrounding the aquatic feature. Thus, assuming CRLF are present in the freshwater marsh, it would be unlikely that any would occur in upland refugia within the Project Site.

The Project Site appears generally isolated from known CRLF occurrences by large expanses of urban development; corridors leading to and from the site are extremely limited. The potential aquatic non-breeding habitat in the Project Site is also degraded and would provide only poor to marginal quality CRLF habitat. Additionally, if CRLF was present within non-breeding aquatic habitat in the Project Site or freshwater marsh to the southeast, they would face high rates of mortality due to urban environmental impacts, such as road traffic, domestic and non-native predators, high rates of predation due to lack of suitable cover along dispersal routes, and desiccation if they become trapped, are unable to move beyond a barrier, or simply due to the long travel distance over paved surfaces which lack sufficient moisture. Only extremely limited corridors exist that would allow frogs to move into and out of the freshwater marsh and Project site, meaning that this species would likely have to support a self-sustaining population to persist here; high mortality rates would not likely be compensated by inflow from a source population outside the site.

Salt marsh harvest mouse (*Reithrodontomys raviventris*); Federal Endangered, State Endangered, CDFW Fully Protected

The salt marsh harvest mouse (SMHM) is endemic to tidal and brackish marshes of the San Francisco Bay Estuary. It was listed as endangered under the ESA in 1970 (35 Fed Reg. 1604) and under CESA in 1971. SMHM is also a CDFW Fully Protected Species. No critical habitat has been proposed or designated for this species. There are two SMHM subspecies, the southern subspecies (*Reithrodontomys raviventris raviventris*) found in the marshes of Corte Madera, Richmond, and South San Francisco Bay, and the northern subspecies (*R. r. halicoetes*) found in the marshes of the northern San Pablo Bay and throughout the Suisun Bay. The Project Site is located near the southern shore of San Pablo Bay along a stretch of coastline which is not known to support SMHM and which is located between the known distributions of the two subspecies (CDFW 2013, SFEI 2009, USFWS 2010).

SMHM females are reproductively active from March to November, and males from April through September (Fisler 1965). SMHM typically nests in a loose ball of grasses on the ground's surface; it does not burrow (USFWS 1984). The primary food sources for SMHM are seeds and pickleweed, and this species is also accustomed to drinking moderately saline water.

The SMHM is critically dependent on dense vegetative cover. The original SMHM Recovery Plan (USFWS 1984) characterizes the best SMHM habitat as having 100 percent cover, a cover depth of approximately 12 to 20 inches at summer maximum, greater than 60 percent cover by pickleweed, and habitat complexity (which includes other halophytes). However, studies have documented SMHM use of habitats traditionally regarded as poor, including brackish marsh (Shellhammer et al. 2010), cattail-tule dominated marsh (Zetterquist 1977), and diked areas when pickleweed is present (Shellhammer et al. 1982, Geissel and Harvey 1988). The Draft Recovery Plan for Tidal Marsh Ecosystems of Northern and Central California (USFWS 2009), which covers SMHM and effectively replaces USFWS (1984), summarizes these findings and broadens the characterization of suitable habitat (at least for the northern subspecies) to include salt and brackish wetland vegetation in both tidal and diked wetlands, as well as annual grasslands adjacent to occupied wetlands, though grasslands are thought to provide only seasonal habitat (USFWS 2009). Wetland vegetation suitable for SMHM may include pickleweed (*Salicornia virginica)*, saltgrass (*Distichlis spicata*), alkali heath (*Frankenia salina)*, common bulrush (*Schoenoplectus americanus*), gumplant, cattail (*Typha* spp.), and rushes (*Juncus* spp.).

Another key habitat requirement for this species is upland or tidal refuge habitat, which is used to escape high tides and storm events that flood portions of its habitat. Tall stands of pickleweed that remain unsubmerged during high tides or floods, as well as gumplant, common bulrush, natural and artificial dikes and levees, floating debris, and grasslands adjacent to the marsh edge are all potential sources of refuge.

Potential to Occur within the Project Site

The Project Site does not occur within or adjacent to known SMHM habitat. The USFWS (2009, 2010) has excluded the San Pablo Bay shore between Point Pinole and Martinez from their map of the current distribution of SMHM. This stretch of shoreline, which includes Hercules, supports only small, isolated patches of salt or brackish marsh; the remainder of the shoreline in this area is dominated by rip-rap lined Bay shore adjacent to the Amtrak/Union Pacific Railroad line. Historical maps of the region also indicate that only small, isolated patches of marsh present pre-European settlement (SFEI 2001). Currently, the largest patch of salt marsh between Point Pinole and Martinez is the marsh north of the Project Site, which covers approximately 10 acres and is located approximately 2 miles from the nearest large expanse of marsh (in Bayview-Montalvin). The minimum acreage thought to sustain a

healthy SMHM population is 150 acres (Shellhammer, pers. comm. 2005), well above the amount of available habitat in the vicinity of the Project Site.

Additionally, the SMHM is critically dependent on suitable vegetative cover, which is lacking between the Project Site and potential habitat to the east and west, and the 2-mile distance between the Project Site and the nearest potential habitat is greater than the known dispersal distance for this species (Bias and Morrison 1999). Based on the historical distribution of marsh communities, and the lack of connectivity historically and currently between the Project Site and suitable marsh habitat, it is unlikely that SMHM occur within the Project Site or could move into the Hercules area from established population centers.

California clapper rail (*Rallus longirostris obsoletus*); Federal Endangered, State Endangered, CDFW Fully Protected

The California clapper rail (CCR) is the resident clapper rail subspecies of northern and central California. Although formerly more widespread, it is currently restricted to the San Francisco Bay Estuary, with the largest populations occurring in remnant salt marshes of southern San Francisco Bay. It was listed as endangered under the ESA in 1970 (35 Fed. Reg. 16,047 [Oct. 13, 1970]), and also under CESA in 1971. CCR is also a CDFW Fully Protected Species. No critical habitat has been proposed or designated for this subspecies.

The CCR occurs only within salt and brackish marshes. According to Harvey (1988), Shuford (1993) and Eddleman and Conway (1998), important CCR habitat components are: 1) well-developed tidal sloughs and secondary channels; 2) beds of cordgrasss (*Spartina* spp.) in the lower marsh zone; 3) dense salt marsh vegetation for cover, nest sites, and brooding areas; 4) intertidal mudflats, gradually sloping banks of tidal channels, and cordgrass beds for foraging; 5) abundant invertebrate food resources; and 6) transitional vegetation at the marsh edge to serve as a refuge during high tides. In south and central San Francisco Bay and along the perimeter of San Pablo Bay, CCR typically inhabits salt marshes dominated by pickleweed and cordgrasss, with other halophytes (e.g., marsh gum-plant [*Grindelia stricta*], saltgrass, jaumea [*Jaumea carnosa*]) typically present. Brackish marshes supporting CCR occur along major sloughs and rivers of San Pablo Bay and along tidal sloughs of Suisun Marsh.

Breeding begins in mid-March and extends into July, with peak activity in late April to late May (DeGroot 1927, Harvey 1980, Harvey 1988). CCR nests, constructed of wetland vegetation and platform-shaped, are placed near the ground in clumps off dense vegetation, usually in the lower marsh zone near small tidal channels (DeGroot 1927, Evens and Page 1983, Harvey 1988). Existing marsh vegetation or drift material is used as a canopy over the nest platform. Although CCR is considered non-migratory, numerous accounts exist of juveniles dispersing widely between habitat areas (USFWS et al. 1984).

Potential to Occur within the Project Site

The vast majority of the Project Site provides no suitable habitat for CCR, consisting primarily of uplands with small, isolated wetland patches. Tidal influence is restricted by a tide gate along Pinole Creek that irregularly inundates a very narrow channel directly adjacent to residential development. The small section of marsh vegetation along Pinole Creek at the western end of the Project Site provides only very poor-quality CCR habitat, as described below.

The USFWS typically assesses potential incidental impacts to CCR (e.g., nest abandonment due to noise) within 700 feet of project activities, and thus an assessment of the potential for CCR occurrence in surrounding areas is warranted. Wetland areas bordering the Project Site are unlikely to support

CCR. The pickleweed-dominated wetland to the north is effectively diked, with tidal influence restricted to a culvert along the creek. Although there are beds of cordgrass along the bay shoreline on the outboard of this wetland area, these beds are hydrologically isolated from the adjacent wetland basin and the two vegetation types do not form a continuous, zoned marsh plain of the type that supports CCR. Lower Pinole Creek provides tidal-influenced wetlands, although they are confined to relatively narrow strips along the creek banks. In the vicinity of the Project Site (within 700 feet), the marsh plain along the creek appears to be widest directly west of the Project Site, where it extends for approximately 60 feet; in other areas, the plain varies in extent from approximately 15 to 35 feet. Although cordgrass is present in scattered and limited amounts along portions of the creek, its banks are relatively steep (lacking a gradual slope), and denditric tidal channels are absent, indicating only very poor-quality habitat that lacks most typical characteristics and is very unlikely to support breeding.

Available information about the current distribution of CCR along the southern portion of San Pablo Bay also suggests that it is unlikely to occur near the Project Site. A current distribution map by the USFWS (2013) shows no occurrences along southern San Pablo Bay east of Point Pinole, approximately 2.2 miles west of the Project Site. This distribution pattern is also shown by an examination of documented CCR occurrences in CDFW's Natural Diversity Database (CDFW 2013). East of Point Pinole, tidal wetlands along San Pablo Bay east of Point Pinole currently occur only in very small, scattered fragments that are likely too small in area, marginal in quality, and distant from occupied areas to support CCR, most especially for breeding.

3.0 MANNER IN WHICH ACTION MAY AFFECT LISTED SPECIES

The Project will involve the creation of new tidal channels and additional salt marsh vegetation, as well as the replacement of an existing flap gate culvert to increase tidal inundation within an unnamed tidal slough in lower Pinole Creek. Project activities will also include grading throughout the Chelsea, PG&E, and HOA parcels, which contain uplands and seasonal wetlands. The manner in which these Project activities may affect listed species is described below.

Fish Species

As described above, the Project will involve work along the eastern bank of lower Pinole Creek and in the drainage channel which runs along the southern Project Site boundary. Excavating substrate from the channel has the potential to mobilize sediment and temporarily increase turbidity levels resulting in temporary indirect effects to suitable downstream fish rearing habitat of Pinole Creek and its confluence with San Pablo Bay. Substrate removal can also result in the mortality of fish that are not protected by the ESA or CESA, but can serve as prey species for special-status fish such as steelhead that may utilize downstream habitat.

Potential direct effects to steelhead, green sturgeon, and longfin smelt include injury or mortality of individuals due to construction activities if construction occurs within wetted areas. Specifically, if it is necessary to excavate the new tidal channel in Pinole Creek or backfill the existing culvert while standing water is present, these activities could result in trapping or burying juvenile listed fish. Adult fish are anticipated to be more mobile and less likely to utilize the shallow waters west of the flap gate. With the implementation of the prescribed impact avoidance and minimization measures, which include isolating the work area from Pinole Creek using sheet piling installation at low tide to exclude fish, the Project is not likely to adversely affect listed fish species.

The main channel of Pinole Creek will not be impacted directly by the project; all excavation activity will occur along the eastern bank of the creek. Additionally, the majority of earth work and disturbance will

occur east of the existing levee along Pinole Creek and east of the flap gate, within habitat currently not accessible to listed fish. As a result, potential direct effects to listed fish due to Project activities east of the existing levee are likely to be insignificant or discountable. Overall, the Project is anticipated to have a wholly beneficial effect on aquatic listed species, enhancing the quality and extent of tidal channels and wetland vegetation that is present and accessible to fish in Pinole Creek. The avoidance and minimization measures are designed to prevent any take of listed fish species.

California Red-legged Frog

This species is assumed present within the Project Site; however, use of the Project Site by CRLF would be limited due to the presence of dispersal barriers between the site and potential CRLF habitat in the vicinity. Additionally, perennial aquatic habitat is located within and adjacent to the Project Site, and the presence of these features would reduce or eliminate the need for frogs to seek refuge during the dry season in the Project Site's uplands. Dispersing or foraging individuals may rarely enter the Project Site, if they are present in the off-site freshwater marsh or upstream in Pinole Creek. Pinole Creek adjacent to the Project Site is not likely to provide suitable habitat for CRLF.

Potential impact areas for CRLF are limited to individuals in the eastern drainage channel and associated uplands, particularly near the southeastern area adjacent to the freshwater marsh. It is unlikely that CRLF would be present in underground refugia in the Project Site's uplands, and thus no impacts to refuging CRLF are anticipated. Project activities which may directly affect this species include vegetation clearing and grading. Work in the drainage channel downstream of the freshwater wetland is not anticipated to affect water quality for frogs in the wetland, and avoidance measures will be implemented to avoid impacts to CRLF in the western portion of the channel, if present. After the proposed Project is completed, movement corridors to and from the site would still be present, and the uplands surrounding the freshwater marsh would be more likely to support CRLF foraging and dispersal than under existing conditions. The avoidance and minimization measures described above are designed to prevent any take of CRLF, and with the implementation of these measures, the Project is not likely to adversely affect this species.

Salt Marsh Harvest Mouse

Salt marsh harvest mouse is not likely to be present within the Project Site, and thus no direct or indirect effects to this species are anticipated. They have not been documented to occur within 3.5 miles of the Project Site (CDFW 2013, SFEI 2009), and the amount of potential habitat present in the vicinity is considered too small to support a healthy mouse population (Shellhammer, pers. comm. 2005). Although it is unlikely that SMHM occupied marsh in the Hercules area prior to European settlement and subsequent habitat degradation, any mice that could have been there would face substantial predation pressure from domestic and non-native animals associated with developed and residential areas, as well as substantial disturbance and likely high levels of mortality resulting from filling, diking and modifying their habitat. Furthermore, the Project Site and adjoining marsh community are geographically isolated from other potential SMHM populations by large expanses of unsuitable coastline (i.e., lack of suitable marsh) and development, effectively eliminating any chance for this species to colonize the Project Site or vicinity. Thus, the Project is not likely to adversely affect SMHM.

California Clapper Rail

The Project Site provides very poor-quality habitat and thus there is extremely limited potential for direct injury or mortality due to construction activities. If this species were breeding in close proximity to the Project Site, there would likely be some potential for abandonment of an active nest (with eggs and/or dependent young) due to construction activities, and this would be considered a direct effect. However, tidal marsh areas in and within 700 feet of the Project Site are very poor-quality for CCR, and are not

likely to support breeding. In addition, the Project Site and adjoining marsh are isolated from suitable habitat areas by large expanses of unsuitable shoreline (i.e., lack of suitable marsh) and development, which further reduces the potential for this species to move into and use marsh in the vicinity of the Project Site. Therefore, the direct effects of construction activities on breeding CCR are likely to be insignificant or discountable. Overall, the Project is anticipated to beneficially affect CCR by creating tidal marsh which may be used as breeding and/or foraging habitat for this species.

Interrelated and Interdependent Actions

Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions have no independent utility apart from the action under consideration {50 CFR §402.02}. No interrelated or interdependent effects are expected as a result of the Project. This Project provides benefits to habitat in Pinole Creek independently of any other actions and will be implemented as a stand-alone project.

Cumulative effects

Cumulative effects are those effects of future state or private activities, not involving federal activities, that are reasonably certain to occur within the Action Area of the federal action subject to consultation {50 CFR §402.02}. No cumulative negative effects are foreseen as a result of the Project.

4.0 DETERMINATION OF EFFECT

With implementation of all the avoidance and minimization measures described in Section 1.2, the proposed Project may affect, but is not likely to adversely affect aquatic or terrestrial listed species, critical habitat, or EFH that may be present in the Action Area. In addition, the proposed Project may beneficially affect CCR and listed fish species.

If you require any additional information regarding the proposed project, please feel free to contact me at (415) 454-8868 or Pat Britton at (916) 852-2000.

Thank you for your assistance.

Sincerely,

Matt Richmond
WRA

REFERENCES

Alvarez, JA. 2004. *Rana aurora draytonii* (California red-legged frog) Microhabitat. Herpetological Review 35:162-163.

Bias, MA and ML Morrison. 1999. Movements and Home Range of Salt Marsh Harvest Mice. Southwestern Naturalist 44(3): 348-353.

[CDFW] California Department of Fish and Wildlife. 2013. Natural Diversity Database, Wildlife and Habitat Data Analysis Branch, Habitat Conservation Division. Sacramento, CA.

DeGroot, DS. 1927. The California clapper rail: its nesting habits, enemies and habitat. Condor 29(6): 259-270.

Eddleman, WR and CJ Conway. 1998. Clapper Rail (*Rallus longirostris*). In: The Birds of North America, No. 340. A. Poole and F. Gill, eds. The Academy of Natural Sciences, Philadelphia, and the American Ornithologists' Union, Washington, D.C.

Emmett, RL, SL Stone, SA Hinton, and ME Monaco. 1991. Distribution and abundance of fishes and invertebrates in West Coast estuaries, volume II. Species life history summaries. NOAA-NOS Strategic Environmental Assessments Division, ELMR Report Number 8, Rockville, Maryland.

Evens, J and G Page. 1983. The ecology of rail populations at Corte Madera Ecological Preserve with recommendations for management. Report prepared for the Marin Audubon Society. 62 pp.

Fisler, GF. 1965. Adaptations and speciation in harvest mice of the marshes of San Francisco Bay. Univ. of Calif. Publ. in Zoology 77:1-108.

Geissel, W, H Shellhammer, and HT Harvey. 1988. The ecology of the Salt Marsh Harvest Mouse (Reithrodontomys raviventris) in a Diked Salt Marsh. Journal of Mammalogy. Vol: 69(4). pp: 696-703.

Google Earth version 7.1.2.2041. 2012. Chelsea wetlands project area. Lat: 38.013366, Long: -122.293356. Accessed: December 11, 2013.

[HES] Hagar Environmental Science. 2009. Lower Pinole Creek Steelhead Habitat Assessment. Prepared for: Contra Costa Resource Conservation District.

Harvey, TE. 1988. Breeding biology of the California clapper rail in South San Francisco Bay. Transactions of the Western Section of the Wildlife Society 24: 98-104.

Harvey, TE. 1980. A breeding season survey of the California clapper rail (*Rallus longirostns obsoletus*) in South San Francisco Bay. San Francisco Bay National Wildlife Refuge, Newark, California.

Hayes, S, M Bond, C Hanson, E Freund, J Smith, E Anderson, A Ammann, and R MacFarlane. 2008. Steelhead Growth in a Small Central California Watershed: Upstream and Estuarine Rearing Patterns. *Transactions of the American Fisheries Society* 137:114-128.

Hayes, MP and DM Krempels. 1986. Vocal sac variation among frogs of thegenus Rana from western North America. Copeia 1986(4):927-936.

Hayes, MP and MR Tennant. 1985. Diet and feeding behavior of the California red-legged frog Rana aurora draytonii (Ranidae). The Southwestern Naturalist 30(4):601-605.

Jeffres C, J Opperman, and P Moyle. 2008. Ephemeral floodplain habitats provide best growth conditions for juvenile Chinook salmon in a California river. Environmental Biology of Fishes (2008) 83:449–458.

Jennings, MR and MP Hayes. 1990. Status of the California red-legged frog *Rana aurora draytonii* in the Pescadero Marsh Natural Preserve. Sacramento: California Department of Parks and Recreation, Resource Division, Natural Heritage Section. 30pp.

Jennings, MR and MP Hayes. 1985. Pre- 1900 overharvest of California red-legged frogs (Rana aurora draytonii): The inducement for bullfrog (Rana catesbeiana) introduction. Herpetological Review 32(1):94-103.

Leidy, R. 2007. Ecology, Assemblage Structure, Distribution, and Status of Fishes in Streams Tributary to the San Francisco Estuary, California. San Francisco Estuary Institute.

Moyle, P. 2002. Inland Fishes of California Revised and Expanded. University of California Press. Berkeley, California.

[NMFS] National Marine Fisheries Service. 2007. Federal Recovery Outline for the Distinct Population Segment of Central California Coast Steelhead. Prepared by NMFS Southwest Regional Office. Long Beach, California.

[SFEI] San Francisco Estuary Institute. 2009. Salt marsh harvest mouse database and maps. San Francisco Estuary Institute, Richmond, California. http://www.sfei.org/content/salt- marsh-harvest-mouse-database-and-maps. Accessed 12 November 2013.

[SFEI]. 2001. Bay Area EcoAtlas: Historical Baylands. http://www.sfei.org/content/ecoatlas_habitats. Accessed 13 November 2013.

Shellhammer, H, R Duke, and MC Orland. 2010. Use of brackish marshes in the south San Francisco Bay by salt marsh harvest mice. California Department of Fish and Game 96.4 (2010): 256-259.

Shellhammer, Howard. 2005. San Jose State University, San Jose, California. Telephone conversations with USFWS.

Shellhammer, HS, R Jackson, W Davilla, AM Gilroy, HT Harvey, and L Simons. 1982. Habitat Preferences of Salt Marsh Harvest Mice (*Reithrodontomys raviventris*). The Wasmann Journal of Biology. Vol: 40(1-2). pp. 102-144.

Sommer, T, M Nobriga, W Harrell, W Batham, and W Kimmerer. 2001. Floodplain rearing of juvenile Chinook salmon: evidence of enhanced growth and survival. Canadian Journal of Fisheries and Aquatic Sciences 58: 325-333.

Soulé, M. 1998. Viable Populations for Conservation. Cambridge University Press, Great Britain.

Storer, TI. 1925. A synopsis of the amphibia of California. University of California Publications in Zoology 27:1-342.

[USFWS] United States Fish and Wildlife Service. 2010. Salt marsh harvest mouse (*Reithrodontomys raviventris*) 5-Year Review: Summary and Evaluation. Sacramento, California. 49 pp. February.

[USFWS]. 2010. Endangered and Threatened Wildlife and Plants: Revised Designation of Critical Habitat for California Red-legged Frog; Final Rule. Federal Register, Vol. 75, No. 51. 12815-12959.

[USFWS]. 2009. Draft Recovery Plan for Tidal Marsh Ecosystems of Northern and Central California. Sacramento, California. xviii + 636 pp.

[USFWS]. 2006. Designation of Critical Habitat for the California Red-Legged Frog, and Special Rule Exemption Associated With Final Listing for Existing Routine Ranching Activities; Final Rule. Federal Register 71(71): 19243-19346. April 13.

[USFWS]. 2002. Recovery plan for the California red-legged frog (Rana aurora draytonii). U.S. Fish and Wildlife Service, Portland, OR.

[USFWS]. 1996. Endangered and threatened wildlife and plants: determination of threatened status for the California red-legged frog. Federal Register 61(101):25813-25833. May 23.

[USFWS]. 1986. Species Profile: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (Pacific Northwest) Steelhead Trout. Biological Report 82 (11.82).

[USFWS]. 1984. Salt Marsh Harvest Mouse and California Clapper Rail Recovery Plan. Portland, Oregon. 141 pp.

[USFWS]. 1978. Concept plan for waterfowl wintering habitat preservation, Central Valley, California. Region 1, Portland, OR.

Wright, AH, and AA Wright. 1949. Handbook of frogs and toads of the United States and Canada. Comstock Publishing Company, Ithaca, N.Y.

Zetterquist, DK. 1977. The salt marsh harvest mouse (*Reithrodontomys raviventris*) in marginal habitats. The Wasmann Journal of Biology. Vol: 35(1). pp. 68-76.

Appendix A

Figures

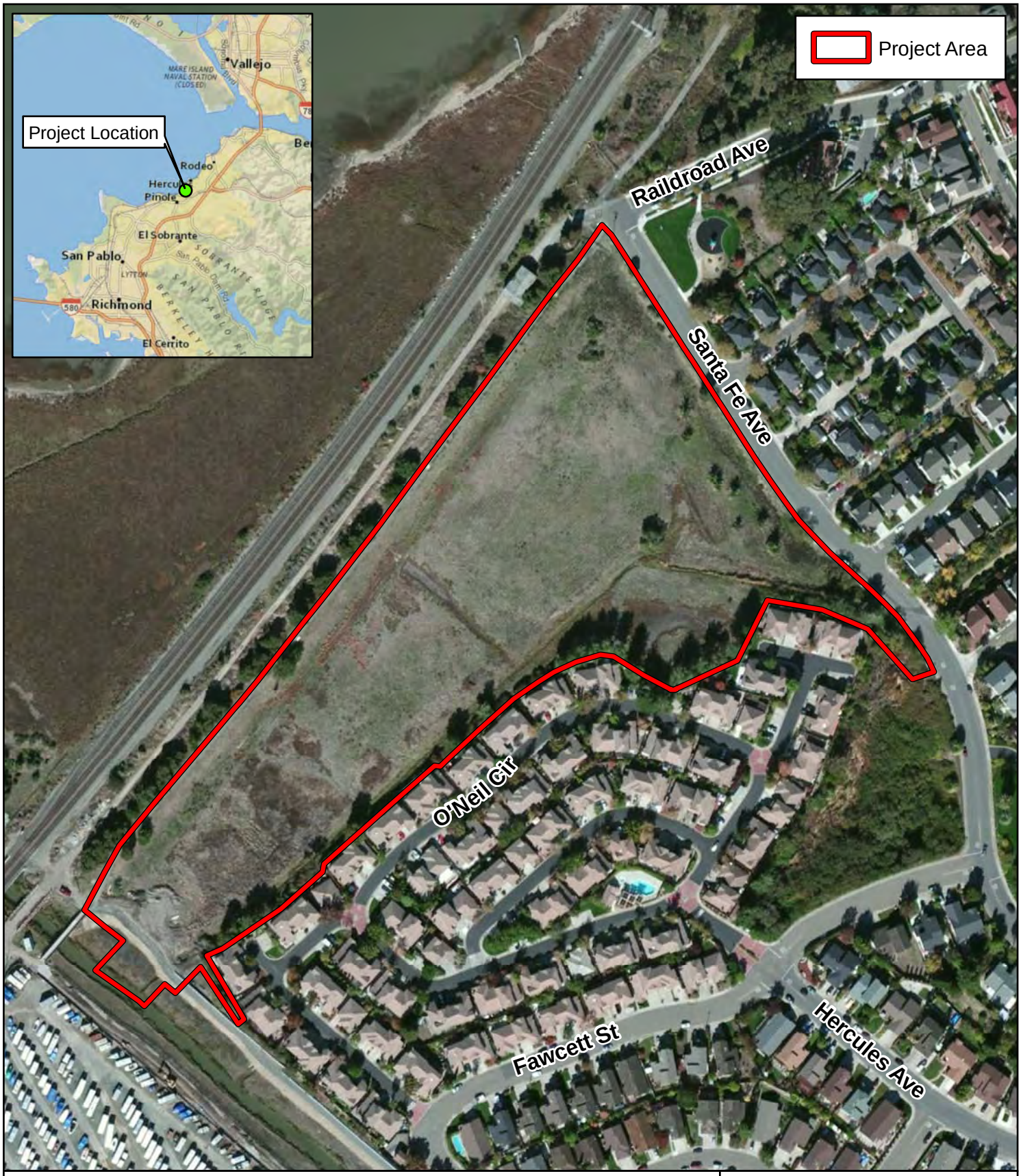


Figure 1. Project Site

Chelsea Wetlands
Contra Costa County, California

N
W E
S

0 100 200 400
Feet

wra
ENVIRONMENTAL CONSULTANTS

Date: January 2014
Map By: Michael Rochelle
Aerial: 2010 Microsoft

Path: L:\Acad 2000 Files\22000\22038-3\GIS\ArcMap\Permit Package\Location.mxd

Figure 2. Land Ownership

N
W E
S

0 100 200 400
Feet

Chelsea Wetlands
Contra Costa County, California

wra
ENVIRONMENTAL CONSULTANTS

Date: January 2014
Map By: Michael Rochelle
Aerial: 2010 Microsoft

Path: L:\Acad 2000 Files\22000\22038-3\GIS\ArcMap\Permit Package\Ownership.mxd

Figure 3. Potential CRLF Aquatic Habitat

N
W E
S

0 100 200 400
Feet

Chelsea Wetlands
Contra Costa County, California

wra
ENVIRONMENTAL CONSULTANTS

Date: Jan 2014
Map By: DC
Aerial: 2010 Microsoft

Path: L:\Acad 2000 Files\22000\22038-3\GIS\ArcMap\Fig2_CRLF.mxd

Appendix B

Site Plans for the Proposed Project

US-CA-517-1
CHELSEA WETLAND
RESTORATION PROJECT

DUCKS UNLIMITED, INC.
WESTERN REGIONAL OFFICE
3074 GOLD CANAL DRIVE
RANCHO CORDOVA, CA. 95670-6116
PH. (916) 852-2000

LOCATION MAP

NOT TO SCALE

VICINITY MAP

SHEET INDEX

PRELIMINARY
NOT FOR CONSTRUCTION

SITE MAP

NOT TO SCALE

Utility Notification Center
CALL BEFORE YOU DIG

UNAUTHORIZED CHANGES & USES
THE ENGINEER PREPARING THESE PLANS WILL NOT BE RESPONSIBLE FOR, OR LIABLE FOR, UNAUTHORIZED CHANGES TO OR USES OF THESE PLANS. ALL CHANGES MUST BE IN WRITING AND MUST BE APPROVED BY THE PREPARER OF THESE PLANS.

SURVEY DATUM

The horizontal datum for this survey is the California Coordinate System of 1983, Zone 3 (0403), NAD 83 (2011), Epoch Date 2010.00 in U.S. Survey Feet. The vertical datum for this survey is the North American Vertical Datum of 1988 (NAVD88) computed using GEOID12. Both datums were derived from Static GPS observations corrected using the National Geodetic Survey (NGS) Online Positioning User Service (OPUS) program. Static GPS observations were collected on May 7, 2013. The NGS OPUS Solution Report is on file at the WRO engineering department in Rancho Cordova, California.

CONTOUR INTERVAL: 1 FOOT

REVISIONS

REV. NO.	DESCRIPTION	DATE	APPROVED
5			
4			
3			
2			
1			

DUCKS UNLIMITED INC.
WESTERN REGIONAL OFFICE

PROJECT NO. US-CA-517-1
CHELSEA WETLAND RESTORATION PROJECT
COVER SHEET

DESIGNED BY:
DRAWN BY:
SURVEYED BY:
CHECKED BY:
APPROVED BY:
APPROVED BY:
DATE: 12/18/2013
SHEET NO. 1 of 8

PRELIMINARY

GENERAL NOTES:

1. DUCKS UNLIMITED MAKES NO REPRESENTATIONS AS TO THE EXISTENCE OR NONEXISTENCE OF UTILITIES. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO COMPLY WITH THE PROVISIONS OF ALL APPLICABLE UTILITY NOTIFICATION REGULATIONS. THE CONTRACTOR IS RESPONSIBLE FOR LOCATING UTILITIES PRIOR TO THE START OF CONSTRUCTION. THE CONTRACTOR WILL BE LIABLE FOR ANY DAMAGE TO UTILITIES CAUSED BY CONSTRUCTION ACTIVITIES.

2. IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES THE CONTRACTOR WILL BE SOLELY AND COMPLETELY RESPONSIBLE FOR THE CONDITIONS OF THE JOB SITE INCLUDING SAFETY OF ALL PERSONS AND PROPERTY DURING PERFORMANCE OF THE WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN AND CONSTRUCTION OF PROPER SHORING OF TRENCHES IN ACCORDANCE WITH OCCUPATIONAL SAFETY LAWS. THE DUTIES OF THE PROJECT ENGINEER DO NOT INCLUDE REVIEW OF THE ADEQUACY OF THE CONTRACTORS SAFETY IN, ON, OR NEAR THE JOB SITE.

3. SHOULD THE CONTRACTOR FIND ANY DISCREPANCIES BETWEEN THE CONDITIONS EXISTING IN THE FIELD AND THE INFORMATION SHOWN ON THE DRAWINGS, HE SHALL NOTIFY THE ENGINEER BEFORE PROCEEDING WITH CONSTRUCTION.

4. SHOULD IT APPEAR THAT THE WORK TO BE DONE, OR ANY MATTER RELATIVE THERETO, IS NOT SUFFICIENTLY DETAILED OR EXPLAINED ON THESE PLANS OR IN THE SPECIFICATIONS, THE CONTRACTOR SHALL CONTACT THE PROJECT ENGINEER FOR SUCH FURTHER EXPLANATIONS AS MAY BE NECESSARY.

5. CONTRACTOR TO CONTACT UNDERGROUND SERVICE ALERT (U.S.A.) 48 HOURS MINIMUM PRIOR COMMENCING ONSITE ACTIVITIES FOR UTILITY SERVICE LOCATIONS PHONE = 1-800-227-2600 -OR- 1-800-642-2444

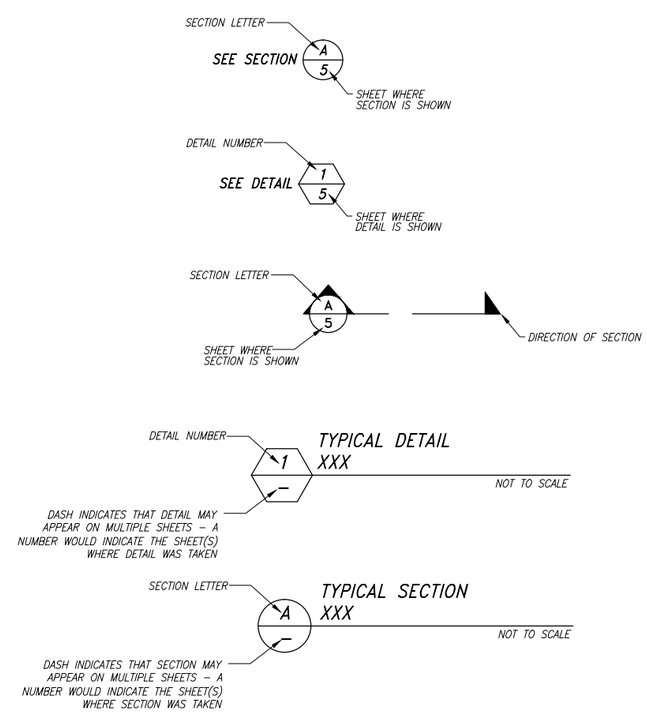
SURVEY POINT DESCRIPTORS

CTBM	Bench Mark (permanent)
CTBT	Bench Mark (temporary)
CTCP	Survey Control Point (permanent)
CTCT	Survey Control Point (temporary)
DIFL	Ditch Flowline
DIGB	Ditch Grade Break
DITO	Ditch Toe
DITP	Ditch Top
SWFL	Swale Flowline
SWGB	Swale Grade Break
SWTO	Swale Toe
SWTP	Swale Top
IRCO	Irrigation Concrete Pad
IRCP	Irrigation Control Panel
IRPI	Irrigation Pipe Invert
IRPM	Irrigation Pump
IRPT	Irrigation Pipe Top
IRVL	Irrigation Valve
IRWL	Irrigation Well
FNAP	Fence Angle Point
FNCR	Fence Corner
FNGT	Fence Gate
FNLN	Fence Line
LVCL	Levee Centerline
LVGB	Levee Grade Break
LVTO	Levee Toe of Slope
LVTP	Levee Top of Slope
RDCL	Road, Centerline
RDED	Road, Edge of Dirt Road
RDEG	Road, Edge of Gravel Road
RDEP	Road, Edge of Paved Road
RDFC	Road, Face of Curb
RDFL	Road, Gutter Flowline
RDGB	Road Grade Break
RDSH	Road Shoulder
RDSN	Road Sign
RDST	Road, Painted Stripe
RDTC	Road, Top Back of Curb
RDTO	Road, Toe of Slope
RDTP	Road, Top of Slope
RDTW	Road, Top Back of Walk
TFBL	Building
TFBR	Brush
TFCO	Concrete (pad, slab, etc.)
TFGB	Grade Break
TFGS	Ground Shot
TFRK	Rock Or Rocky Area Boundary
TFTO	Grade Break at Toe
TFTP	Grade Break at Top
TFTL	Tree line
TFTR	Tree
TFVP	Vernal Pool Edge
ELBX	Electric, Box or Pullbox
ELGY	Electric, Guy Wire to Pole
ELOH	Electric, Overhead
ELMT	Electric, Meter
ELPP	Electric, Power Pole
ELSN	Electric, Warning Sign
ELTR	Electric, Transformer
ELTW	Electric, Tower
ELUG	Electric, Underground
ELVT	Electric, Vault
NGMT	Natural Gas, Meter
NGPI	Natural Gas, Pipe
NGSN	Natural Gas, Warning Sign
NGVL	Natural Gas, Valve
SDMH	Storm Drain, Manhole
SDPI	Storm Drain, Pipe Invert
SDPT	Storm Drain, Pipe Top
SSCO	Sanitary Sewer, Cleanout
SSMH	Sanitary Sewer, Manhole
SSPI	Sanitary Sewer, Pipe Invert
SSSV	Sanitary Sewer, Service
TEGY	Telephone, Guy Wire to Pole
TEOH	Telephone, Overhead
TERI	Telephone, Riser
TESN	Telephone, Warning Sign
TETP	Telephone, Pole
TEUG	Telephone, Underground
WTFH	Water Fire Hydrant
WTHW	Water High Water
WTMT	Water Meter
WTPI	Water Pipe
WTPM	Water Pump
WTVL	Water Valve
WTWL	Water Well
WAEW	Edge of Water
WAHW	High Water Mark
WAUW	Under Water Ground Shot
WAWS	Water Surface
WCFL	Water Control Structure, Flowline/Invert at Structure
WCHW	Water Control Structure, Headwall
WCPI	Water Control Structure, Pipe Invert at Outlet
WCPT	Water Control Structure, Pipe Top at Outlet
WCST	Water Control Structure, Top of Structure
WCWW	Water Control Structure, Wing Wall

ABBREVIATIONS

A.B.	AGGREGATE BASE
AC	ACRE
CAP	CORRUGATED ALUMINUM PIPE
CC	CENTER TO CENTER
CL	CENTERLINE
CMP	CORRUGATED METAL PIPE
CMPA	CORRUGATED METAL ARCH PIPE
CONC	CONCRETE
DIA	DIAMETER
Dp	PIPE DIAMETER
Dr	RISER DIAMETER
DU	DUCKS UNLIMITED, INC.
E	EAST
EG	EXISTING GROUND
EL	ELEVATION
EX	EXISTING
FB	FLASHBOARD
FG	FINISH GRADE
FL	FLOWLINE
FT	FOOT, FEET
FTG	FITTING, FOOTING
GA	GAUGE
H	HEIGHT
HDPE	HIGH-DENSITY POLYETHYLENE
ID	INSIDE DIAMETER
IE	INVERT ELEVATION
IN	INCH, INCHES
L	LENGTH, LEFT
LBF	POUNDS-FORCE
LF	LINEAR FEET
MAX	MAXIMUM
MIN	MINIMUM
MISC	MISCELLANEOUS
N	NORTH
NTS	NOT TO SCALE
OC	ON CENTER
OD	OUTSIDE DIAMETER
PP	POWER POLE
PSI	POUNDS PER SQUARE INCH
PVC	POLYVINYL CHLORIDE
R	RIGHT
RCB	REINFORCED CONCRETE BOX
RD	ROAD
REF	REFERENCE DIMENSION
REQD	REQUIRED
S	SOUTH
SCH	SCHEDULE
SF	SQUARE FEET
SP	SPECIAL
SY	SQUARE YARD
STA	STATION
TBD	TO BE DETERMINED BY ENGINEER
TE	TOP ELEVATION
TOL	TOP OF LEVEE
TOB	TOP OF BERM
TYP	TYPICAL
USA	UNDERGROUND SERVICE ALERT
VLV	VALVE
W	WIDTH
W	WEST (WHERE APPLICABLE)
W/	WITH
WCS	WATER CONTROL STRUCTURE
WS	WATER SURFACE
WSEL	WATER SURFACE ELEVATION
WWF	WELDED WIRE FABRIC

DETAILING CONVENTIONS



LEGEND & STANDARD SYMBOLS

	TULES	BLIND	EX BLIND
	NEW SLOPE SYMBOL		EX SLOPE SYMBOL
	NEW LEVEE SECTION OR ELEVATION CHANGE POINT		EX LEVEE SECTION OR ELEVATION CHANGE POINT
	NEW ELECTRIC SIGN		EX ELECTRIC SIGN
	NEW ELECTRIC GUY WIRE		EX ELECTRIC GUY WIRE
EM	NEW ELECTRIC METER	EM	EX ELECTRIC METER
	NEW ELECTRIC/TELEPHONE POLE		EX ELECTRIC/TELEPHONE POLE
	NEW ELECTRIC TRANSFORMER	TRANS	EX ELECTRIC TRANSFORMER
	NEW ELECTRIC TOWER		EX ELECTRIC TOWER
VAULT	NEW ELECTRIC VAULT	VAULT	EX ELECTRIC VAULT
	NEW GATE VALVE		EX GATE VALVE
	NEW PRESSURE REDUCTION VALVE		EX PRESSURE REDUCTION VALVE
	NEW AIR RELIEF VALVE		EX AIR RELIEF VALVE
	NEW BACKFLOW PREVENTER		EX BACKFLOW PREVENTER
	NEW IRRIGATION WELL		EX IRRIGATION WELL
	NEW IRRIGATION PUMP		EX IRRIGATION PUMP
WM		WM	EX WATER METER
			EX FIRE HYDRANT
			EX MANHOLE
			EX DRAIN INLET
			EX SEWER CLEANOUT
	NEW PIPE WITH CANAL GATE		EX PIPE WITH CANAL GATE
	NEW FULL ROUND RISER		EX FULL ROUND RISER
	NEW HALF ROUND RISER		EX HALF ROUND RISER
	NEW PRECAST CONCRETE RISER		EX PRECAST CONCRETE RISER
	NEW WATER CONTROL FLARED END SECTION		EX WATER CONTROL FLARED END SECTION
	NEW WATER CONTROL OUTLET STRUCTURE		EX WATER CONTROL OUTLET STRUCTURE
	NEW NATURAL GAS VALVE		EX NATURAL GAS VALVE
GM		GM	EX NATURAL GAS METER
			EX NATURAL GAS SIGN
	NEW BENCHMARK		EX BENCHMARK
	NEW TEMPORARY BENCHMARK		EX TEMPORARY BENCHMARK
	NEW CONTROL POINT		EX CONTROL POINT
	NEW CONTROL POINT		EX CONTROL POINT
	NEW SECTION CORNER		EX SECTION CORNER

X	EX FENCE LINE
DH	POWER/TELEPHONE OVERHEAD LINES
G	UNDERGROUND GAS LINE
SS	EXISTING SEWER MAIN
SD	EXISTING STORM DRAIN
FM	EXISTING SEWER FORCE MAIN
TOP / TOE	DITCH TOP / TOE
	EX DITCH FLOWLINE
TOP / TOE	DITCH TOP / TOE
TOE / TOP / TOP / TOE	LEVEE TOP / TOE
	EX LEVEE CENTERLINE
TOP / TOE	LEVEE TOP / TOE
EDGE / EDGE / EDGE	ROAD EDGE
	EX ROAD CENTERLINE
	ROAD EDGE
	EX SWALE FLOWLINE
	NEW SWALE
	NEW LEVEE
	IMPROVED LEVEE
	REMOVE EX LEVEE
	NEW VINYL SHEETPILE FLOODWALL

1	REVISION NUMBER IDENTIFIER
	EX TREES TO BE REMOVED

PRELIMINARY

UNAUTHORIZED CHANGES & USES
THE ENGINEER PREPARING THESE PLANS WILL NOT BE RESPONSIBLE FOR, OR LIABLE FOR, UNAUTHORIZED CHANGES TO OR USES OF THESE PLANS. ALL CHANGES MUST BE IN WRITING AND MUST BE APPROVED BY THE PREPARER OF THESE PLANS.

SURVEY DATUM

The horizontal datum for this survey is the California Coordinate System of 1983, Zone 3 (0403), NAD 83 (2011), Epoch Date 2010.00 in U.S. Survey Feet. The vertical datum for this survey is the North American Vertical Datum of 1988 (NAVD88) computed using GEOID12. Both datums were derived from Static GPS observations corrected using the National Geodetic Survey (NGS) Online Positioning User Service (OPUS) program. Static GPS observations were collected on May 7, 2013. The NGS OPUS Solution Report is on file at the WRO engineering department in Rancho Cordova, California.

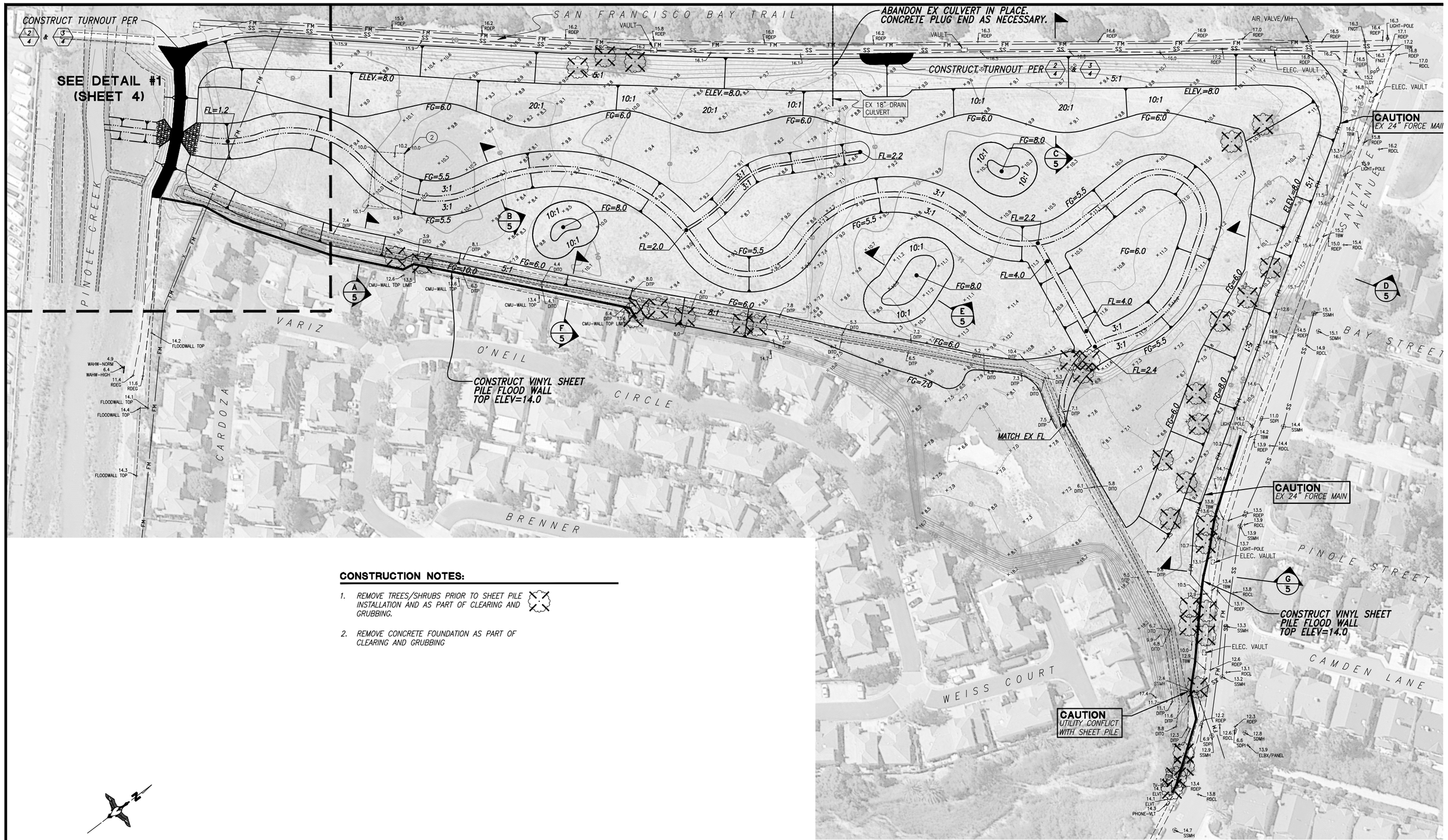
CONTOUR INTERVAL: 1 FOOT

REVISIONS			
REV. NO.	DESCRIPTION	DATE	APPROVED
5			
4			
3			
2			
1			

DUCKS UNLIMITED INC.
WESTERN REGIONAL OFFICE
DATE: 12/18/2013

PROJECT NO. US-CA-517-1
CHELSEA WETLAND RESTORATION PROJECT
DEFINITIONS, ABBREVIATIONS & LEGEND

DESIGNED BY:
DRAWN BY:
SURVEYED BY:
CHECKED BY:
SHEET NO. 2 of



CONSTRUCTION NOTES:

1. REMOVE TREES/SHRUBS PRIOR TO SHEET PILE INSTALLATION AND AS PART OF CLEARING AND GRUBBING.
2. REMOVE CONCRETE FOUNDATION AS PART OF CLEARING AND GRUBBING

BAR SCALE

0 50 100 150

PRELIMINARY

SURVEY DATUM

The horizontal datum for this survey is the California Coordinate System of 1983, Zone 3 (0403), NAD 83 (2011), Epoch Date 2010.00 in U.S. Survey Feet. The vertical datum for this survey is the North American Vertical Datum of 1988 (NAVD88) computed using GEOID12. Both datums were derived from Static GPS observations corrected using the National Geodetic Survey (NGS) Online Positioning User Service (OPUS) program. Static GPS observations were collected on May 7, 2013. The NGS OPUS Solution Report is on file at the WRO engineering department in Rancho Cordova, California.

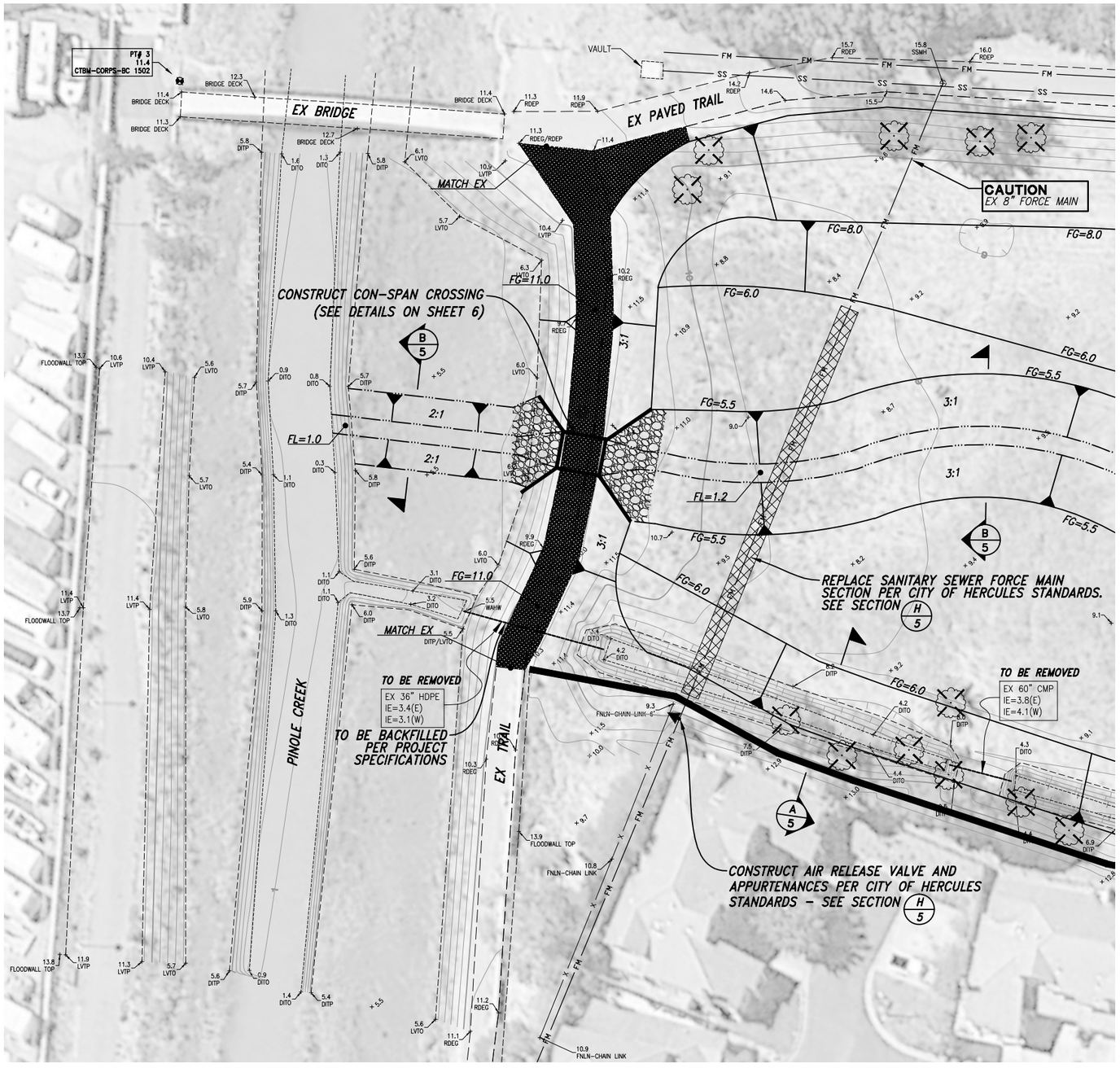
CONTOUR INTERVAL: 1 FOOT

REVISIONS			
REV. NO.	DESCRIPTION	DATE	APPROVED
5			
4			
3			
2			
1			

DUCKS UNLIMITED INC.
WESTERN REGIONAL OFFICE
DATE: 12/18/2013

PROJECT NO. US-CA-517-1
CHELSEA WETLAND RESTORATION PROJECT
PLAN SHEET

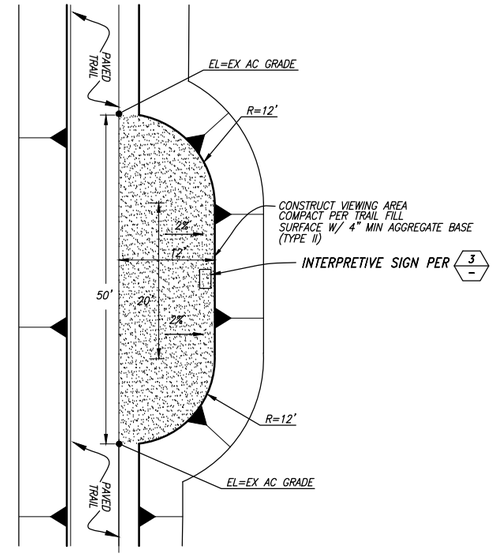
DESIGNED BY:
DRAWN BY:
SURVEYED BY:
CHECKED BY:
SHEET NO. 3 of



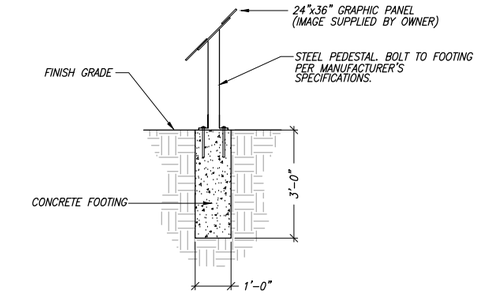
1 – DETAIL – GRADING & CON-SPAN CULVERT

CONSTRUCTION NOTES:

1. REMOVE TREES/SHRUBS PRIOR TO SHEET PILE INSTALLATION AND AS PART OF CLEARING AND GRUBBING.
2. REMOVE CONCRETE FOUNDATION AS PART OF CLEARING AND GRUBBING



2 – TYPICAL DETAIL – BAY TRAIL TURNOUT
NOT TO SCALE



1. DISPLAY PANEL SHALL BE ½" DIGITAL HIGH PRESSURE LAMINATE, PANNIER GRAPHICS, 1-800-544-8428 OR APPROVED EQUAL.
2. STEEL PEDESTAL SHALL BE A3 PEDESTAL, AS MANUFACTURED BY HOPEWELL MANUFACTURING INC., 301-582-2342 OR APPROVED EQUAL.
3. DISPLAY PANEL SHALL BE MOUNTED TO THE PEDESTAL WITH STAINLESS STEEL THREADED INSERTS AND VANDAL RESISTANT SCREWS INSTALLED IN THE BACK OF THE PANELS

3 – TYPICAL DETAIL – INTERPRETIVE SIGN
NOT TO SCALE

BAR SCALE
0 20 40 60

PRELIMINARY

SURVEY DATUM

The horizontal datum for this survey is the California Coordinate System of 1983, Zone 3 (0403), NAD 83 (2011), Epoch Date 2010.00 in U.S. Survey Feet. The vertical datum for this survey is the North American Vertical Datum of 1988 (NAVD88) computed using GEOID12. Both datums were derived from Static GPS observations corrected using the National Geodetic Survey (NGS) Online Positioning User Service (OPUS) program. Static GPS observations were collected on May 7, 2013. The NGS OPUS Solution Report is on file at the WRO engineering department in Rancho Cordova, California.

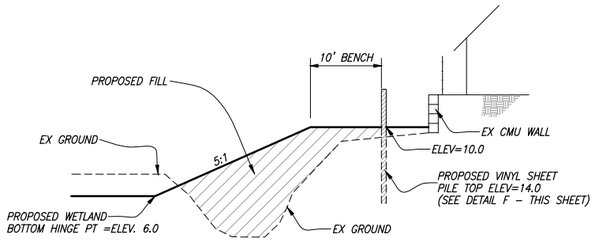
CONTOUR INTERVAL: 1 FOOT

REVISIONS			
REV. NO.	DESCRIPTION	DATE	APPROVED
5			
4			
3			
2			
1			

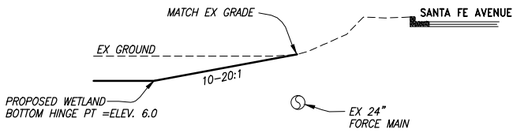
DUCKS UNLIMITED INC.
WESTERN REGIONAL OFFICE
DATE: 12/18/2013

PROJECT NO. US-CA-517-1
CHELSEA WETLAND RESTORATION PROJECT
DETAILS

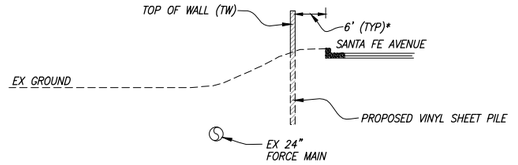
DESIGNED BY:
DRAWN BY:
SURVEYED BY:
CHECKED BY:
SHEET NO. 4 of 8



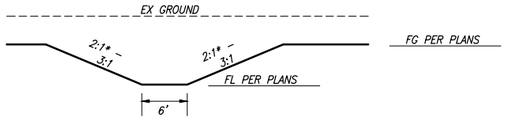
A – TYPICAL SECTION – DITCH GRADING
NOT TO SCALE



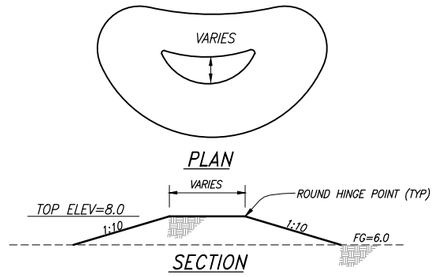
D – SANTA FE ROAD SECTION
NOT TO SCALE



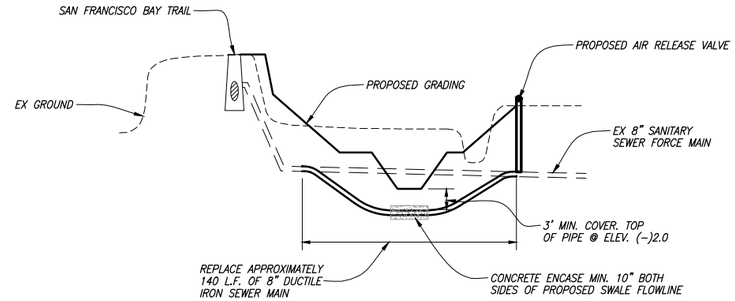
G – SANTA FE ROAD SECTION WITH SHEET PILE
NOT TO SCALE
*DISTANCE VARIES DUE TO CONFLICTS WITH UTILITIES



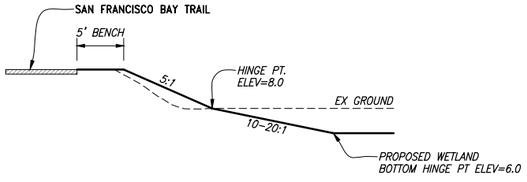
B – TYPICAL SECTION – SWALE
NOT TO SCALE
*SIDE SLOPES AS SHOWN ON PLANS



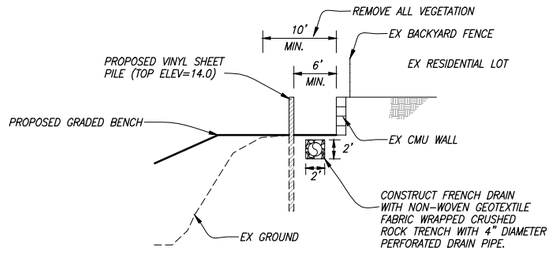
E – WETLAND MOUND DETAIL
NOT TO SCALE



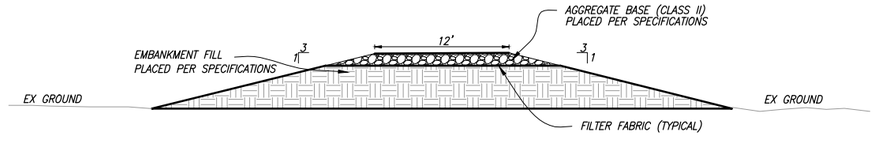
H – REPLACEMENT OF FORCE MAIN
NOT TO SCALE



C – SAN FRANCISCO BAY TRAIL SECTION
NOT TO SCALE



F – TYPICAL SECTION – FRENCH DRAIN
NOT TO SCALE



I – PINOLE CREEK LEVEE ACCESS
NOT TO SCALE

UNAUTHORIZED CHANGES & USES
THE ENGINEER PREPARING THESE PLANS WILL NOT BE RESPONSIBLE FOR, OR LIABLE FOR, UNAUTHORIZED CHANGES TO OR USES OF THESE PLANS. ALL CHANGES MUST BE IN WRITING AND MUST BE APPROVED BY THE PREPARER OF THESE PLANS.

PRELIMINARY

SURVEY DATUM

The horizontal datum for this survey is the California Coordinate System of 1983, Zone 3 (0403), NAD 83 (2011), Epoch Date 2010.00 in U.S. Survey Feet. The vertical datum for this survey is the North American Vertical Datum of 1988 (NAVD88) computed using GEOID12. Both datums were derived from Static GPS observations corrected using the National Geodetic Survey (NGS) Online Positioning User Service (OPUS) program. Static GPS observations were collected on May 7, 2013. The NGS OPUS Solution Report is on file at the WRO engineering department in Rancho Cordova, California.

CONTOUR INTERVAL: 1 FOOT

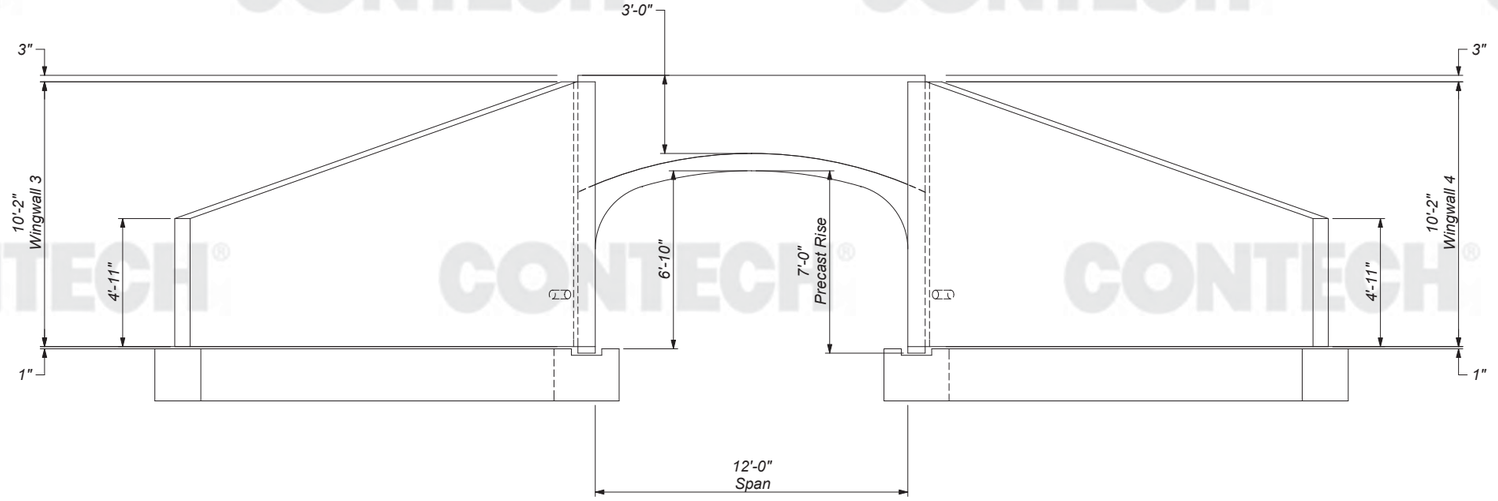
REVISIONS			
REV. NO.	DESCRIPTION	DATE	APPROVED
5			
4			
3			
2			
1			

DUCKS UNLIMITED INC.
WESTERN REGIONAL OFFICE

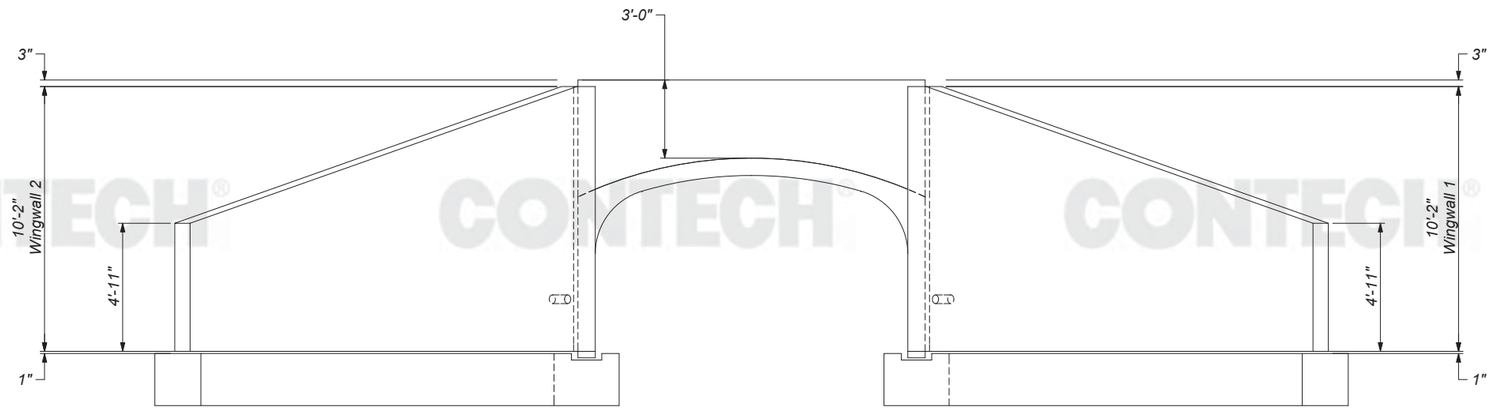
DATE: 12/18/2013

PROJECT NO. US–CA–517–1
CHELSEA WETLAND RESTORATION PROJECT
DETAIL SHEET

DESIGNED BY:
DRAWN BY:
SURVEYED BY:
CHECKED BY:
SHEET NO. 5 of



DOWNSTREAM END ELEVATION



UPSTREAM END ELEVATION

CONTECH® CONSTRUCTION PRODUCTS INC.
www.contech-cpi.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

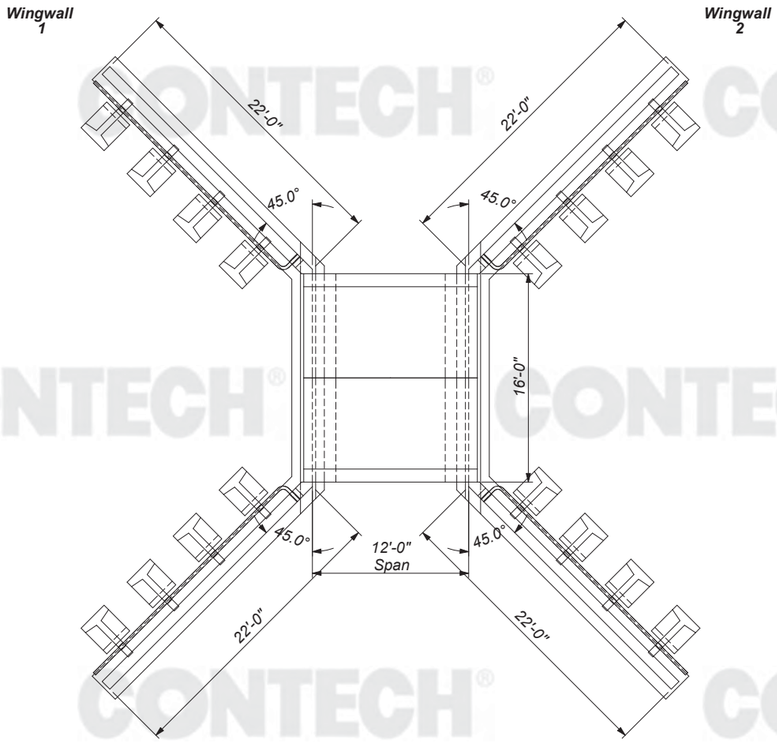
CONTECH DYOB DRAWING

Chelsea Wetlands

Herculies, CA

PROJECT NUMBER:	DATE:
139137	11/04/13
DESIGNED: DYOB	DRAWN: DYOB
CHECKED:	APPROVED:
SHEET NO.: 3 OF 3	

Upstream



Downstream

BRIDGE PLAN

CONTECH® CONSTRUCTION PRODUCTS INC.
www.contech-cpi.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CONSPAN® BRIDGE SYSTEMS
CONTECH DYOB DRAWING

Chelsea Wetlands

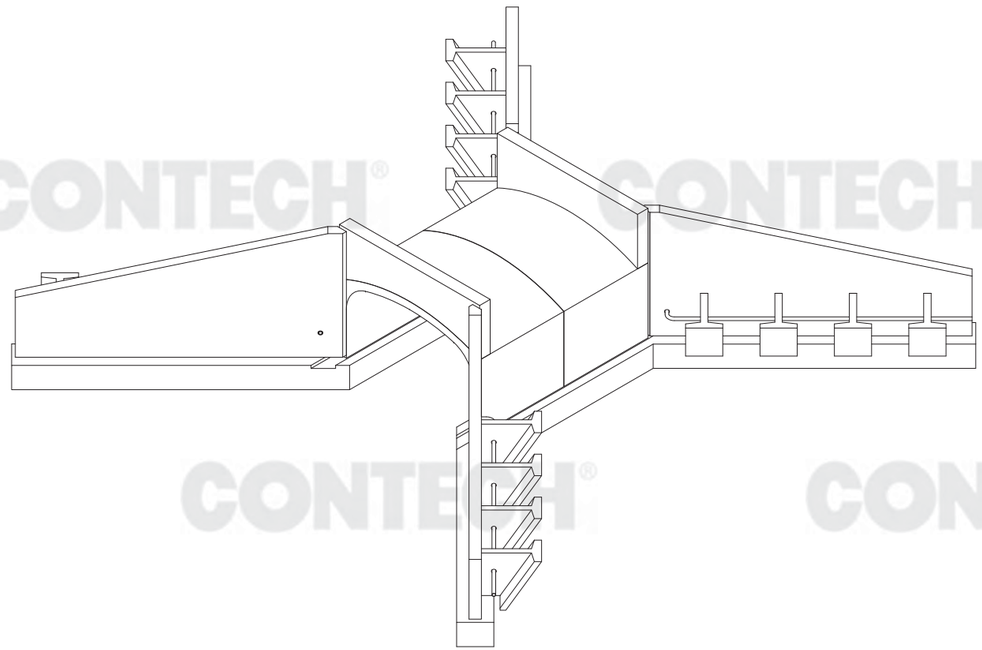
Herculies, CA

PROJECT NUMBER:	DATE:
139137	11/04/13
DESIGNED: DYOB	DRAWN: DYOB
CHECKED:	APPROVED:
SHEET NO.: 2 OF 3	

BRIDGE SUMMARY

1 cell of CON/SPAN® Bridge System 12' Span x 6'-10" Rise
Length: 16'
Downstream Headwall: Height= 3' from arch crown.
Upstream Headwall: Height= 3' from arch crown.
Wingwall 1: Length= 22' - Angle= 45° - End Height= 4'-11"
Wingwall 2: Length= 22' - Angle= 45° - End Height= 4'-11"
Wingwall 3: Length= 22' - Angle= 45° - End Height= 4'-11"
Wingwall 4: Length= 22' - Angle= 45° - End Height= 4'-11"

Upstream



Downstream

ISOMETRIC VIEW

This DYOB® has been provided as a service for the exclusive use of CONTECH project partners and customers only. For a version of this document without watermarking, please contact your local CONTECH representative.

CONTECH® CONSTRUCTION PRODUCTS INC.
www.contech-cpi.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CON/SPAN® BRIDGE SYSTEMS
CONTECH
DYOB
DRAWING

Chelsea Wetlands

Herculies, CA

PROJECT NUMBER:	DATE:
139137	11/04/13
DESIGNED: DYOB	DRAWN: DYOB
CHECKED:	APPROVED:
SHEET NO.: 1 OF 3	