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Georgia-Pacific LLC

Mill Pond Complex Restoration
DRAFT Conceptual Design

Former Georgia-Pacific Wood Products Facility

June 2011

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DRAFT Conceptual Design

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Jamie Tull
Principal Scientist

Alex Francisco, PWS
Principal Ecologist

Michael Fleischner, P.E.
Vice President

Prepared for:
Georgia-Pacific LLC

Prepared by:
ARCADIS
2033 North Main Street
Suite 340
Walnut Creek
California 94596
Tel 925.274.1100
Fax 7925.274.1103

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Acronyms and Abbreviations

ARCADIS	ARCADIS U.S., Inc.
CCA	California Coastal Act
CCC	California Coastal Commission
CCT	California Coastal Trail
CCZA	California Coastal Zone Act
CDFG	California Department of Fish and Game
CDP	Coastal Development Permit
CEQA	California Environmental Quality Act
City	City of Fort Bragg
CRAM	California Rapid Assessment Method for Wetlands
CWA 401	Clean Water Act Section 401
CZMA	Coastal Zone Management Act
DSOD	Division of Safety of Dams
DTSC	Department of Toxic Substances Control
DWR	Department of Water Resources
EIR	Environmental Impact Report
ESA	Endangered Species Act
ESHA	environmentally sensitive habitat area
ESHA Delineation Report	*Environmentally Sensitive Habitat Areas Delineation Report*
Georgia-Pacific	Georgia-Pacific LLC
LCP	Local Coastal Program
LSSA	Lake and Streambed Alteration Agreement
MSRA	Maple Street Riparian Area
MCRC	Maple Creek Riparian Corridor
MPC	Mill Pond Complex
NAVD	North American Vertical Datum

NMFS	National Marine Fisheries Service
NW	northwest
OU-A	Operable Unit A
OU-B	Operable Unit B
OU-C	Operable Unit C
OU-D	Operable Unit D
OU-E	Operable Unit E
OU-E lowland	low-lying portion of OU-E adjacent to Soldier Bay
O&M	operations and maintenance
RAP	Remedial Action Plan
RI	Remedial Investigation
RWQCB	North Coast Regional Water Quality Control Board
site	Georgia-Pacific former Wood Products Facility
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
USACE	United States Army Corps of Engineers
USFWS	United State Fish and Wildlife Service
waters/wetlands	federal or state jurisdictional waters and associated wetlands
WDR	Waste Discharge Requirement
WRA	WRA, Inc.
WWTP	waste water treatment plant

1. Introduction

ARCADIS U.S., Inc. (ARCADIS) has prepared this report on behalf of Georgia-Pacific LLC (Georgia-Pacific) to present the DRAFT Conceptual Design for the Mill Pond Complex (MPC) Restoration Project proposed as part of site closure process for the former Georgia-Pacific Wood Products Facility in Fort Bragg, California (site). Figure 1-1 presents a site location map. The site is approximately 415 acres in size and is divided into five general geographic areas: Operable Unit A (OU-A), Operable Unit B (OU-B), Operable Unit C (OU-C), Operable Unit D (OU-D), and Operable Unit E (OU-E). Georgia-Pacific no longer owns OU-A or OU-B. The portion of the site that Georgia-Pacific currently owns (i.e., OU-C, OU-D, and OU-E) is approximately 317 acres in size. Figure 1-2 presents the locations of these operable units and the historical buildings present in these operable units during active site operations.

1.1 Site Closure Overview

Georgia-Pacific ceased operations at the site in 2002 and has been engaged in a coordinated site closure process under the authority and oversight of the Department of Toxic Substances Control (DTSC) and the North Coast Regional Water Quality Control Board (RWQCB), and in coordination with the City of Fort Bragg (City). The site closure process will comply with investigations, feasibility studies, and remedial actions required by DTSC and the RWQCB to protect human health and the environment, actions necessary to remove the Mill Pond dam (i.e., the spillway, cribwall, and north wall) as required by Division of Safety of Dams (DSOD), and implement required compensatory mitigation for impacts to sensitive habitats affected during remediation and dam removal actions. Site closure activities will be implemented in a manner compatible with the goals, objectives, and policies of the Mill Site Specific Plan, which defines land use objectives and policies for future development of the site. The MPC Restoration Project involves dam removal, remedial actions associated with OU-E components in the central portion of the site, and habitat restoration. MPC Restoration Project habitat restoration will also provide compensatory mitigation for site remediation in a manner compatible with implementation of the Fort Bragg community vision for this area.

1.2 Purpose and Objective

The purpose and objective of this DRAFT MPC Conceptual Design Report is to describe the required remedial and dam removal actions in general terms and the proposed restoration actions associated with the preferred restoration alternative identified through the community outreach process. This report:

- Identifies the required remedial and dam removal actions in general terms and the basic steps necessary for their implementation (e.g., rerouting surface water in the MPC area)

- Describes baseline conditions for the MPC area

- Describes the MPC restoration components, approximate locations and dimensions, enhanced ecological features and functions, and social values

- Characterizes the extent of sensitive habitat impacts associated with the required actions, and mitigation potential for the proposed restoration with respect to habitat area and enhanced ecological function

The MPC Restoration Project preferred alternative has been designed to be consistent with California Coastal Commission (CCC) objectives and policies for restoration of historical ecological features in the Coastal Zone. This design objective is compatible with the site closure and remedial objectives for the site, the Mill Site Specific Plan, and the Fort Bragg community vision for the MPC area. Feedback on this conceptual design will provide the basis for finalizing the concept and proceeding to engineering design.

1.3 Report Organization

- Section 2 presents the site description including the general environmental setting, a description of potential environmentally sensitive habitat areas (ESHAs), and an ecological functional assessment of potential ESHAs within the footprint of proposed activities described in this report.

- Section 3 provides the regulatory setting for remediation and closure activities ongoing or proposed on the site and the regulatory setting for associated mitigation activities for which the MPC Restoration Project is designed to fulfill.

- Section 4 describes existing conditions in the footprint of proposed activities, summarizes proposed final conditions of the final MPC Restoration Project, and reviews specific activities that will be undertaken to create the MPC habitats proposed.

- Section 5 presents a proposed framework for the MPC Restoration Project to meet compensatory mitigation requirements identified by the various regulatory agencies involved.

- Section 6 presents the proposed sequencing of construction activities that will occur to implement the MPC Restoration Project.

- Section 7 provides references used to develop this report.

2. Site Description

The following section describes general site characteristics. It also describes potential ESHAs identified on portions of the site affected by the MPC Restoration Project, and presents a functional assessment of the surface water and wetland features present on this portion of the site.

2.1 General Environmental Setting

Union Lumber Company began sawmill operations at the site in 1885, and Georgia-Pacific acquired the site from Boise Cascade in 1973. Lumber operations ceased in August 2002, and decommissioning activities were initiated at the site in 2003. Remediation activities are currently being conducted on site under the direction of the DTSC and the RWQCB. The site and surrounding topography is typically flat with little relief, except for coastal bluffs on the site's western edge and the lowland area of OU-E adjacent to Soldier Bay (OU-E lowland) in the central portion of the site. The site elevation is between approximately 40 and 110 feet above sea level (North American Vertical Datum [NAVD] 88). Topography of the OU-E lowland is between approximately 14 and 30 feet above sea level (NAVD 88).

Due to historical industrial uses, the site is dominated by impervious surfaces and ruderal habitats, with vegetation that is comprised primarily of non-native grass and herbaceous species, such as Italian ryegrass (*Lolium multiflorum*), velvetgrass (*Holcus lanatus*), and pampas grass (*Cortaderia jubata*). Small areas of relatively undisturbed habitat occur in a forested riparian area (Maple Street Riparian Area; MSRA) on the eastern edge of the site, composed of coastal riparian vegetation such as Bishop pine (*Pinus muricata)* and red alder (*Alnus rubra)*. Additional relatively undisturbed areas of vegetation are scattered along edges adjacent to the coastal bluffs in OU-A, comprising species such as rabbit's foot grass (*Polypogon maritima)* and sea-side daisy (*Erigeron glaucus)*.

Natural surface geologic units on and adjacent to the site contain deposits of beach and dune sands, alluvium, and marine terrace deposits. The most important of these units at the site are the marine terrace deposits of the Pleistocene age, which form much of the coastal bluff material overlying bedrock. The marine terrace deposits are massive, semi-consolidated clay, silt, sand, and gravel, ranging from 1 to 140 feet thick. The site is underlain by terrace sediments comprising poorly to moderately consolidated marine silts, sands, and gravels overlain by topsoil and in some areas by fill. Throughout the past 120 years, large portions of the site have been altered to accommodate sawmill operations. Currently, large areas of the site are covered with asphalt and concrete and most of the remaining areas are disturbed fill soils. Soil borings collected in the Pond 8 dam indicate that fill is up to 17 feet deep in some places (ARCADIS 2010). Evaluations of fill depth across the entire site have not been conducted.

2.2 Hydrologic Conditions

The site is located within the Noyo River Watershed (Coastal Watershed Program 2011) and receives hydrologic inputs from precipitation, emergent groundwater flow, and surface water flow from adjacent areas. Natural water bodies near the site include Soldier Bay, Pacific Ocean, Noyo Bay, Noyo River, and Pudding Creek. Historically, the site hydrology was dominated by local precipitation and surface water flow through creeks that crossed the site and discharged to Soldier Bay or discharged to the Pacific Ocean along the coastal bluffs (Figure 2-1). Industrial development on the site diverted the two primary creeks, Alder and Maple Creeks, into the site mill pond for industrial use. Upgradient of the site, Alder and Maple Creeks receive urban runoff. Residential and commercial development in the City placed the creeks in culverts throughout their respective watersheds. Depending on the soil type (i.e., ability for soil to drain), groundwater and shallow subsurface flow play an important hydrologic role within the MPC Restoration Project area, because the water table is near or at the ground surface at some times of the year (ARCADIS 2011a). Areas known to exhibit emergent groundwater include portions of the OU-E lowland, wetlands, and the stream channel within the MSRA (i.e., wetlands L, J, and D-2), and wetlands O and P in the South Ponds area. Figure 2-1 presents an 1873 map showing historical features on the site prior to development overlain by the current surface water and wetland features. Table 2-1 summarizes characteristics of current surface water and wetland features that will be affected by the MPC Restoration Project preferred alternative.

Site surface runoff is collected via swales, ditches, and underground vaults that discharge to Pond 8 or to the Pacific Ocean via the coastal bluff. On-site sub-catchments and approximate surface runoff flow paths are depicted on Figure 2-2. The majority of site surface runoff is discharged to Pond 8, the former mill pond, from which water discharges to Soldier Bay, and eventually the Pacific Ocean, via a spillway on the west end of Pond 8. Site surface flow comprises approximately 45 percent of the Pond 8 flow; the remaining 55 percent is composed of City stormwater and dry season base flow originating from the Alder and Maple Creek watersheds (ARCADIS 2011b). The primary hydrologic features contributing to the MPC Restoration Project area, and/or contributing water to the restored habitats, are briefly described below:

- Alder Creek, Maple Creek, and Pond 8 are all designated as waters of the state by the RWQCB. City drainage basins C (124 acres) and D (103 acres) comprising the watersheds for historic Maple and Alder Creeks, respectively, provide baseline surface flow throughout the year and higher flows during storm events. Storm event monitoring conducted by Georgia-Pacific in 2011 indicates that both watersheds contribute high peak flows of short duration during storm events and are the dominant hydrologic influence on Pond 8 (ARCADIS, in preparation).

- Sub-catchment O-1 is approximately 74.6 acres and consists of a mix of impervious asphalt and concrete surfaces and ruderal vegetated areas. Surface runoff from sub-catchment O-1 occurs only during and immediately following rainfall events and is all conveyed to Pond 8 as overland flow is capture in storm drains that route flow to Pond 8 (Figure 2-2). A small portion of the runoff in O-1 is

captured by Pond 5 located immediately east of Pond 8. Pond 5 has no natural outlet, so excess water is currently pumped to Pond 8 as needed.

- The MSRA consists of three sub-catchments E, F, and J that contribute to the Maple Creek drainage pipe flowing in to Pond 8. Catchment F conveys surface runoff during rainfall events. Sub-catchments E and J convey baseline flow resulting from perennial emergent groundwater and ponded precipitation, as well as surface runoff during storm events to the Maple Creek drainage pipeline and Pond 8. The 30-acre MSRA has extensive vegetative cover in sub-catchments E and J resulting in modest flows during storm events.

- Basin S is approximately 68 acres in size and captures surface run and emergent groundwater from the southern portion of the site. The southern two-thirds of Basin S, south of the South Ponds, consist of bare soil and ruderal vegetation in the former log deck area. The northern one-third of Basin S consists of impervious asphalt and concrete surfaces associated with former lumber processing areas. Surface runoff from these areas is captured in the South Ponds or enters the South Pond pipeline that discharges to the southwest corner of Pond 8 (Figure 2-2). Pond 3 captures emergent groundwater and is located in an area consistent with a historic wetland feature (Figure 2-1).

- Sub-catchment O-2 is approximately 6.6 acres in size and is located west of Basin S. It captures surface runoff from a small portion of the former log deck area in a drainage ditch that runs adjacent to the City WWTP and then discharges to the southwest corner of Pond 8 via small culvert.

ARCADIS conducted hydrologic modeling using the United States Environmental Protection Agency Storm Water Management Model (SWMM) to characterize the runoff associated with typical 2.5-year and 100-year return interval 24-hour precipitation events in the contributing watersheds. The results indicate that peak flows associated with a 100-year 24-hour rainfall event will route flows of approximately 450 cubic feet per second through the Pond 8 spillway.

2.3 Environmentally Sensitive Habitat Areas

The *Environmentally Sensitive Habitat Areas Delineation Report* (ESHA Delineation Report; ARCADIS 2011a) identifies potential ESHAs (including potential federal and state jurisdictional waters, and associated wetlands [waters/wetlands]) located on site. The potential ESHA features identified in the ESHA Delineation Report were delineated by WRA, Inc. (WRA), based on 2009 field investigations, and by ARCADIS, based on 2010 field investigations. These delineated features are shown on Figures 2-3, 2-3a, 2-3b, and 2-3c. The boundaries of the WRA delineated features were initially presented in the *Delineation of Potential Section 404 Jurisdictional Wetlands and Waters. Former Georgia-Pacific Fort Bragg Wood Products Facility* (WRA 2009) and approved by the United States Army Corps of Engineers (USACE) on March 15, 2010 (File # 2009-00372N).

WRA (2009) delineated 20 waters/wetlands totaling 13.31 acres in OU-C, OU-D, and OU-E (i.e., excluding Wetland S, which lies in OU-A outside of the portion of the site that Georgia-Pacific owns). Of these delineated areas, USACE jurisdictional waters/wetlands total 8.89 acres. Approximately 308 acres of the 317 acres that Georgia-Pacific owns were considered non-jurisdictional for USACE purposes. To identify the features potentially subject to jurisdiction of the State Water Resource Control Board and the CCC, ARCADIS supplemented the federal jurisdictional delineation conducted by WRA with a delineation of state waters/wetlands and coastal ESHAs. Decommissioning activities on the site altered hydraulic conditions, which resulted in the natural development of hydric conditions in additional areas of the site. ARCADIS evaluated these areas and identified and delineated the following features as potential ESHAs: 17 waters/wetlands totaling approximately 3.64 acres, approximately 2.21 acres of riparian area, and approximately 375 linear feet of bedrock supporting numerous small groundwater seeps. ARCADIS also delineated coastal waters associated with Soldier Bay. In total, there are 48 potential ESHA areas totaling approximately 19.16 acres of the approximately 317 acres comprising OU-D, OU-D, and OU-E. Delineated coastal waters and the 375 linear feet of bedrock groundwater seep on the coastal bluff face are not included in this acreage estimate (ARCADIS 2011a). Status of the features delineated by WRA (2009) and ARCADIS (2011a) regarding jurisdictional waters of the state and coastal ESHAs have not been formalized.

2.4 Ecological Functional Assessment

ARCADIS ecologists conducted a functional assessment of the delineated potential waters/wetlands that fall within the MPC Restoration Project footprint (see Section 4). ARCADIS followed guidance provided in *California Rapid Assessment Method (CRAM) for Wetlands* (Collins et al. 2008) to assess the ecological function of the potential waters/wetlands. The goal of CRAM is to:

> "*provide rapid, scientifically defensible, standardized, cost-effective assessments of the status and trends in the condition of wetlands and the performance of related policies, programs and projects throughout California."*

Appendix A presents details of the CRAM evaluation; the evaluation is summarized below. ARCADIS ecologists evaluated several assessment areas on site; these assessment areas are shown on Figure 2-4. Figures 2-5a and 2-5b present results for CRAM attributes scaled to 100 percent of their total possible scores and presents the overall CRAM score for each potential waters/wetlands scaled to 100 percent of their total possible scores.

Overall, CRAM scores indicate that existing waters/wetlands that have developed in the former industrial ponds and in the OU-E lowland provide between 33 and 58 percent of the total functional capacity that a reference wetland system could attain. These CRAM scores indicate the generally degraded character of the site waters/wetlands in their current condition. Industrial ponds on the site (i.e., Ponds 5 through 8) scored lowest in the CRAM evaluation (i.e., between 33 and 45 percent of total functional capacity).

Seasonal and seep wetlands that have developed in the OU-E lowland since demolition of the building foundations in this area scored the highest in the CRAM evaluation (i.e., 57 to 58 percent of total functional capacity). CRAM scores for Drainage D-1 (a surface component of the Maple Creek drainage in the northern end of the MSRA) indicate that this feature has 50 percent of the total functional capacity of a reference riparian wetland system.

Generally, CRAM results suggest that the depressional wetlands (i.e., industrial ponds and seep and seasonal wetlands) are most limited by physical structure (i.e., an average score of 31 percent of total). These isolated aquatic features are typically small and lack topographical complexity and physical structural diversity, which limit development of microhabitats that would support increased biological diversity. The higher CRAM scores for seep and seasonal wetlands in the OU-E lowland (i.e., E-1, E-2, and E-5/E-6) result from higher scores for the Hydrology attribute. The seep and seasonal wetlands have a more natural hydrologic regime with less anthropogenic influence resulting in a more consistent source of hydrology. In contrast, the industrial ponds are fed by primarily by flashy flows associated with runoff from developed areas (i.e., the site and/or the City) or are artificially impounded to prevent natural drawdown.

CRAM scores for Drainage D-1 attribute scores suggest that the riverine wetland is most limited by hydrology. Field indicators that caused the reductions in the Hydrology attribute included urban stormwater runoff being the primary hydrologic source and the presence of significant erosion of the stream bed and bank.

The results of the CRAM evaluation demonstrate the limited ecological function that the evaluated waters/wetlands on the site provide compared to a typical reference system. The results also provide an evaluation of the reasons why ecological function may be limited (i.e., small isolated nature of depressional wetlands limiting structural complexity and erosion and degradation of stream channel and banks resulting from flashy stormwater flows coming into Maple Creek).

3. Regulatory Setting

Local, state, and federal regulatory and trustee agencies participating in the MPC Restoration Project and the broader Mill Site Specific Plan development and approval are identified and their roles are briefly described with respect to the permits that will be required and the California Environmental Quality Act (CEQA) process.

3.1 City of Fort Bragg

The City will play a key role in the MPC Restoration Project from a planning and regulatory standpoint, as a participant in the Mill Site Specific Planning process with Georgia-Pacific, and as a steward of the Fort Bragg community vision for the site. In these roles, the City will:

- Serve as lead agency for the CEQA process and will prepare the environmental impact report (EIR) to address the project specific assessment of the MPC Restoration Project and the programmatic assessment of the Mill Site Specific Plan

- Evaluate and approve the Project with respect to compliance with the Local Coastal Plan as authorized by the California Coastal Commission, and will be responsible for issuing the necessary Coastal Development Permit (CDP) for the MPC Restoration Project

- Issue the necessary grading permits for the MPC Restoration Project and will ensure that the MPC Restoration Project conforms to the goals and objectives set forth for the site

- Participate directly in the conceptual design of the MPC Restoration Project and facilitate the community planning and outreach process

- Coordinate with the responsible agencies during the preparation of the EIR

3.2 Department of Toxic Substances Control

The DTSC is authorized by the California Health and Safety Code to investigate, remove, and remedy conditions associated with a release of a hazardous substance at the site and correct conditions that threaten the release of a hazardous substance. DTSC is the lead agency for investigation and remedial action at the site under Docket No. HAS-RAO 06-07-150. In this regulatory role, the DTSC:

- Has lead authority for the remedial investigation, risk assessment and remediation process, and approval of all remedial action plans and related studies

- Will serve as a responsible agency in the review of the EIR

3.3 Division of Safety of Dams

The Department of Water Resources (DWR), DSOD has oversight of state jurisdictional dams. DSOD has jurisdiction over the removal, upgrade or maintenance of all dams within their jurisdiction. DSOD established in their letter to Georgia-Pacific dated August 11, 2010, that the Mill Pond dam (i.e., the spillway, cribwall, and north wall) was no longer seismically stable and should be removed by the close of 2015. Under this authority, the DSOD will:

- Oversee the removal of the Mill Pond Dam to ensure removal is done safely
- Review and approve all dam removal plans and specifications
- Act as a responsible agency in the CEQA process

3.4 Regional Water Quality Control Board

The RWQCB regulates waters of the State and is responsible for the identified beneficial uses of water resources within the north coast region and will serve as both permitting and Responsible Agency for the Project. The RWQCB is responsible for administering Clean Water Act Section 401 (CWA 401) within California and must certify that any permits issued by the USACE under Section 404 of the CWA meet state water quality objectives. The RWQCB also has jurisdiction overwaters of the State as defined in the Porter-Cologne Act and could issue Waste Discharge Requirements (WDRs) for activities that impact waters of the State. For the MPC Restoration Project, the RWQCB will also act as a responsible agency under CEQA. Acting as a Responsible Agency, the RWQCB will coordinate closely with the City to ensure that any mitigation measures developed in the EIR are consistent with CWA 401 and Porter-Cologne and with the designated beneficial uses in the Basin Plan.

The RWQCB, on behalf of the State Water Resources Control Board (SWRCB), will also over oversee the stormwater permits and implementation for construction of the Project. The SWRCB oversees the stormwater program and the Construction General Permit and the RWQCB enforces individual construction sites. The RWQCB will have authority over the stormwater plan prepared for the Project and will oversee how stormwater is discharged into waters of the state. The RWQCB will ensure that stormwater within the site does not contribute to the degradation of surface waters and wetlands.

Within its role as permitting and responsible agency, the RWQCB will:

- Coordinate with DTSC to protect groundwater and surface water resources during the remedial process

- Issue the CWA 401 Water Quality Certification and possibly Waste Discharge Requirements (WDRs) for the restoration work involving waters of the U.S. and waters of the state

- Review and comment on the conceptual and final restoration plans, ensuring no net loss of waters of the state and establishing compensatory mitigation requirements, where applicable

- As responsible agency, provide formal review and comment on the EIR and coordinate with the City to ensure that the EIR appropriately addresses potential impacts on waters of the State and designated beneficial uses and ensure consistency between the EIR and all permits issued by the RWQCB

- Review the Stormwater Pollution Prevention Plan (SWPPP) and any associated stormwater plans to ensure no impacts to beneficial uses of waters of the State

- Review annual monitoring reports

3.5 California Department of Fish and Game

The California Department of Fish and Game (CDFG) will serve in a regulatory, responsible, and trustee agency role over the Project. All lakes, streams, and rivers, as habitat for fish and wildlife species, are under the jurisdiction of the CDFG under Fish and Game Code 1600-1616. Any activities that disturb the bed or banks within jurisdictional streams or lakes would require obtaining a Lake and Streambed Alteration Agreement from CDFG. Construction of drainages, including any daylighting of drainages associated with the MPC Restoration Project, would require authorization from CDFG for work within these features. In addition, any activities within riparian zones or habitat for nesting birds and raptors would fall within CDFG's jurisdiction. CDFG will review and comment on the conceptual restoration plan and on the final plan in addition to issuing Lake and Streambed Alteration Agreement(s) for implementation of the remediation and restoration activities within CDFG jurisdiction. CDFG will provide review and comment on the plan and will specify annual monitoring requirements to document fulfillment of the restoration objectives.

In its role as responsible and trustee agency, CDFG has jurisdiction over the natural resources within California and will provide formal review and comment on the EIR document during the public review period and would also have discretionary approval over the Project. In these roles, CDFG will:

- As responsible agency, provide formal review and comment on the EIR and will ensure that mitigation measures for biological resources impacts are reduced to a less than significant level

- As trustee agency, provide expertise on issues related to plants, fish, and wildlife during preparation of the EIR and ensure protection measures for California species of special concern that may be present in the project area

- Issue 1602 Lake and Streambed Alteration Agreement(s) for restoration and remediation activities within jurisdictional streams, and establish compensatory mitigation requirements, where applicable

- Provide review and comment on conceptual and final restoration plans

- Review annual monitoring reports

3.6 California Coastal Commission

The CCC oversees the California Coastal Act (CCA) and the federal Coastal Zone Management Act (CZMA). The CCC, in partnership with coastal cities and counties, plans and regulates land and water resources within the coastal zone. For the MPC Restoration Project, the CCC has appeal authority under the City's LCP in the event that an appeal on the City's decision is made.

The CCC will serve as responsible agency during the preparation of the EIR. In this role, the CCC would have a discretionary approval over the Project and would be available to the City for early coordination to ensure that the Project activities are consistent with the CCA and CZMA. In these roles CCC will:

- Provide formal review and comment on the EIR to ensure it addresses activities within the Coastal Zone

- As responsible agency, provide review and comment on conceptual and final restoration plan for consistency with CCA and CZMA policies, and will establish compensatory mitigation requirements where applicable

- Review annual and post restoration monitoring reports

- Serve as appeal body under the CCA in the event the CDP decision by the City is appealed

3.7 United States Army Corps of Engineers

Several wetlands and surface waters within the MPC Restoration Project area fall under the jurisdiction of the USACE. Any discharge or placement of dredge or fill material within a water of the U.S., including any remediation action, is subject to USACE approval under Section 404 of the federal Clean Water Act. The USACE will also serve as the federal lead agency for consultation under Section 7 of the federal Endangered Species Act should a federally listed threatened or endangered species be located in the project area. In its regulatory role, the USACE will:

- Review and comment on the conceptual and final restoration design plan

- Issue Clean Water Act Section 404 permits for activities within jurisdictional waters of the U.S.
- Consult with United States Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) for impacts to federally listed threatened or endangered species, if appropriate
- Review annual monitoring reports following implementation of the restoration plan

3.8 United States Fish and Wildlife Service

The USFWS is charged with regulatory oversight under the federal Endangered Species Act (ESA) for federally listed threatened and endangered plant, terrestrial wildlife species, and certain fish species. Federally listed animal species are not present on the site. Several special status plants occur or have the potential to occur near the MPC Restoration Project footprint. However, plant surveys conducted to date have not found any rare plants in the MPC Restoration Project area. Federally listed threatened and endangered animal species are not located in the project area. Consequently, Section 7 consultation between the USACE and USFWS is not anticipated to be necessary because no federal actions are expected to affect federally listed threatened and endangered species. The USFWS has participated throughout the site closure process and is expected to continue to provide their expertise regarding the protection, enhancement, and restoration of ecological resources associated with the MPC Restoration Project.

3.9 National Marine Fisheries Service

The NMFS is charged with regulatory oversight under Section 7 of the federal ESA for listed threatened and endangered marine fish and mammal species. Potential habitat for protected marine mammal occurs offshore of the site. Although Section 7 consultation with the USACE is not anticipated, coordination with NMFS may be necessary to confirm the MPC Restoration Project will not result in adverse effects to listed fish species or marine mammals.

4. Mill Pond Complex Restoration Concept

Georgia-Pacific and the City have initiated a community planning process to identify and evaluate projects that effectively encompass the regulatory requirements for site remediation and dam safety compliance, protection of environmental resources and their beneficial uses (e.g., jurisdictional waters/wetlands and ESHAs), and the long-term plan the City and community of Fort Bragg have for the MPC area. Central to this complex collaborative process is a strategic framework that established some basic concepts and understandings central to a successful planning effort. Key concepts embraced in this process are outlined below:

- The MPC Project will be accomplished in at least two phases of work. The actions in the first phase, which are necessary to address the dam safety issues, must be complete by 2015. This phase of work will encompass the rerouting of storm water; remediation of OU-E (including management of the sediment in Ponds 6, 7 and 8); removal of the Mill Pond dam, spillway, cribwall, and north wall; and associated mitigation and revegetation activities. Subsequent phases of work are anticipated to consist of actions necessary to implement the remainder of the City's long-term plan for the MPC. The later phase project(s) will be addressed at a programmatic level in the Mill Site Specific Plan EIR, whereas the first phase projects will be addressed at a project-specific level of design.

- Georgia-Pacific and City staff implemented a planning process to identify a preferred conceptual alternative for the MPC Restoration Project and at least one feasible alternative to be evaluated in the Mill Site Specific Plan EIR. The preferred alternative described herein is designed to create a platform on which subsequent phase project(s) related to the City's long-term MPC plan can be based. A key objective of the planning process was to define the City's long-term vision for the MPC at a programmatic level to facilitate a first phase project design that will result in site conditions that facilitate subsequent phases and do not preclude or impede future actions to achieve the long-term vision.

- OU-E, which encompasses the majority of the MPC Restoration Project area, contains areas that are potentially considered ESHAs under the CCA. Many of these areas will be disturbed during the project implementation, resulting in the need to evaluate possible mitigation measures. Regulatory policies of state and federal agencies generally require that mitigation be provided in-kind, preferably on-site, and within one year of project implementation. On a multiple-year project, piecemeal in-kind mitigation may lead to a disjointed and dysfunctional suite of restoration and mitigation projects that fail to achieve the MPC Restoration Project objectives and the community vision. To avoid this potential outcome, ecological areas within OU-E are considered as a complex of related ESHAs. One of the MPC Restoration Project goals is the development of an integrated restoration and mitigation plan based on a holistic view of the MPC that allows flexibility in the timing, kind, location, and extent of restoration and mitigation.

- Investigation and remediation of site soil, sediment, and groundwater is necessary to achieve site closure under the oversight of DTSC, with input from the RWQCB, other regulatory agencies, and the City. Remediation objectives and actions necessary to complete the first phase scope of work could differ from remedial actions that may be necessary under the subsequent phases of work to implement the long-term vision for the MPC.

- The planning process has considered and qualitatively evaluated a range of MPC project alternatives with respect to the following factors for both: 1) the time period between the conclusion of the 2015 scope of work and implementation of the long-term vision; and 2) implementation of the long-term vision for:

  - Surface water and stormwater management
  - Regulatory complexity and feasibility
  - Remedial requirements
  - Restoration
  - Mitigation requirements
  - Long term operations and maintenance (O&M)
  - Ecological function
  - Implementation costs
  - Aesthetics
  - Public access

- The MPC Restoration Project alternative selected is required to be consistent with the policies for coastal resources management specified in the CZMA, as administered by the CCC and the City through the LCP. As such, the MPC Restoration Project preferred alternative has been designed to be consistent with CCC objectives and policies for restoration of historical ecological features in the Coastal Zone. This design objective is compatible with the site closure and remedial objectives for the site, the Mill Site Specific Plan, and the Fort Bragg community vision for the MPC area.

4.1 Overview

The MPC Restoration Project consists of the following three primary components:

- Creation of a single wetland system in the OU-E lowland composed of low marsh, high marsh, and adjacent coastal shrub and grassland habitats

- Restoration of Maple Creek through daylighting the historical Maple Creek channel, enhancing the existing Maple Creek channel by correcting stream incision and controlling invasive plants, and daylighting the open channel connection between the MSRA and Maple Creek between Wetlands L and J

- Restoration of the western end of the historical South Ponds stream channel to allow for flow from the South Ponds and portions of the southern areas of the site to drain into the Pacific Ocean off of the coastal bluff in the historical location.

The three primary MPC Restoration Project components will create an ecologically connected system that contains habitats currently rare on the site (e.g., stream channel, riparian corridor, and perennial marsh) and will improve the overall ecological function of the system compared to the current wetland and surface water features. The MPC Restoration Project will provide 50-foot buffers around each of these components.

4.2 Operable Unit E Lowland

The OU-E lowland area is slated for various remediation activities to address soil and sediment impacts, and closure activities to remove the Pond 8 spillway cribwall and north wall. As a part of the remediation and closure activities, the preferred alternative will restore those areas impacted to create new wetland areas in the OU-E lowland, and enhance wetland areas on the hillsides of the OU-E lowland by creating surrounding coastal shrub habitat and controlling growth of invasive plants. The OU-E lowland wetland and associated terrestrial habitats will form the central component of an ecologically functional public open space providing a broad range of beneficial services including: coastal access, recreation, ecological habitat and species diversity, and a wildlife migration corridor. The following section presents current conditions in the OU-E lowland, a description of the restoration proposed in the preferred alternative for this area, and the specific activities necessary to complete the restoration.

4.2.1 Current Conditions

The OU-E lowland area is an approximately 6.22-acre area located in the center of the site adjacent to Soldier Bay. This area formerly housed the Mill Site Powerhouse and related infrastructure. The OU-E lowland is a naturally low area bounded by a man made earthen berm (the beach berm) adjacent to Pond 6, which separates the OU-E lowland from Soldier Bay, the Pond 8 dam north wall on the south, and the upland terrace for the site on the north and east (Figure 1-2). Most of the industrial features and buildings in the OU-E lowland have been removed, although some foundations still exist in this area.

The basic characteristics of the aquatic habitat features associated with the OU-E lowland are presented in Table 2-1. Most waters/wetlands features in the OU-E lowland do not have a direct hydrologic surface connection to Soldier Bay. However, Pond 6 has a surface flow connection to Soldier Bay via a corrugated

high density polyethylene culvert that discharges through the beach berm onto the riprap on the outboard face of the beach berm. Seasonal wetlands (i.e., the western portion of Wetland E-1and Wetlands E-2, E-5/E-6 and E-7) and most industrial ponds (i.e., Ponds 6 and 7 and North Pond) in the OU-E lowland area are fed by direct precipitation and surface water runoff. Wetland E-4, an unvegetated ponded feature created by a remaining building foundation, and seep wetlands (i.e., the eastern portion of Wetland E-1and Wetlands E-3 and E-8) in the OU-E lowland are fed primarily by emergent groundwater. Runoff into the OU-E lowland also occurs from impervious surfaces (i.e., asphalt and concrete) in the upland terrace to the north and east.

Based on the CRAM results (Section 2.3), ARCADIS concluded that the components of the OU-E lowland (i.e., industrial Ponds 6, 7, North Pond, and Wetland E-4; seep and seasonal Wetlands E-1, E-2, and E-5/E-6) possessed between 43 and 58 percent of the ecological function present in a typical reference system. Seep and seasonal wetlands in the OU-E lowland received higher CRAM scores than the industrial ponds due to a more natural hydrologic regime, which resulted in a more consistent source of surface water. Hydrology in the industrial ponds is dominated by flashy stormwater inputs or stormwater surface flow from adjacent ruderal and paved areas. The most limiting factor of the OU-E lowland waters/wetlands is their small isolated nature, which limits the structural diversity that can develop in these areas.

Vegetation in the delineated boundaries of the OU-E lowland potential waters/wetlands is a mix of native and invasive hydrophytes. The potential waters/wetlands that have the furthest spread of invasive species are Pond 5 and Wetlands E-1, E-2, and E-5/E-6. Upland areas directly adjacent to the waters/wetlands in the OU-E lowland, including the adjacent hillsides, are dominated by non-native annual grasses and weeds. Pampas grass is a common invasive species growing in the upland areas of the OU-E lowland.

Historically, the OU-E lowland area contained the confluence of Alder and Maple Creeks and supported a wetland that discharged to Soldier Bay. The approximate locations of the historical aquatic features are shown on Figures 2-1 and 4-1. Current seeps in the OU-E lowland area indicate that the subsurface hydrology associated with these historical features remains.

4.2.2 Related Site Closure and Site Development Activities and Objectives

The following activities associated with the remediation and demolition will occur or influence restoration activities in the OU-E lowland:

- Pond 6 and Pond 7 sediment will be remediated and the bottom elevations backfilled to depths consistent with the OU-E lowland restoration grading plan.

- Remaining OU-E lowland concrete foundations and retaining walls will be removed.

- Pond 8 surface water flow (i.e., on-site surface runoff and City storm water discharge from the Alder Creek and Maple Creek watersheds) will be routed into the OU-E lowland to allow dewatering of Pond 8 in preparation for sediment management as defined in the pending OU-E remedial action plan.

- Following Pond 8 sediment management, the pond will be closed and the north wall (i.e., south wall of OU-E lowland) will be regraded to create a stable slope between the OU-E lowland and upland terrace.

- Closure of Pond 8 will result in the loss of approximately 7.3 acres of state and USACE jurisdictional waters, and potential ESHA, for which compensatory mitigation will be provided in the restored OU-E lowland (Section 4.2.3) and Maple Creek Riparian Corridor (MCRC; Section 4.3.2.1).

- The OU-E wetland will include sufficient volume, morphologic, and vegetative characteristics to facilitate flow control and flow energy dissipation during storm runoff events from the contributing watersheds.

- Mill Site Specific Plan storm water management planning for future development in the northern portion of the site will route pretreated storm water into the OU-E lowland. An area of approximately 18.4 acres north of the OU-E lowland will contribute estimated flows of approximately 39 cubic feet per second during a 100-year, 24-hour event. These projected flows will be incorporated in the OU-E lowland design.

- Upon completion of the OU-E restoration, the north and south segments of the California Coastal Trail (CCT) will be connected via a trail segment through the OU-E lowland area. The preferred alternative routes the CCT along the top of the beach berm to facilitate access to Soldier Bay and provide wet and dry season access.

4.2.3 Proposed Restoration Design

The OU-E lowland restoration components associated with the preferred alternative are described below; descriptions are organized by habitat type or physical feature. MPC Restoration Project features addressed include refurbishing of the beach berm and creation/restoration of ponded wetlands, low marsh, high marsh, and coastal shrub and grassland habitat. Figures 4-2 through 4-5 present details of the OU-E lowland and MCRC (Section 4.3) draft conceptual design. The OU-E lowland and MCRC are the central features of the MPC Restoration Project.

4.2.3.1 Beach Berm

In the preferred alternative, the beach berm will remain in place and continue to provide protection for the OU-E lowland area from high surf wave energy during storm events and serve as a platform for the CCT during wet and dry conditions. The following potential modifications for the beach berm are proposed:

- Box culvert - A low-profile box culvert consisting of three precast concrete cells (approximately 3 feet high by 10 feet wide and approximately 20 feet long) will be installed in the beach berm in the vicinity of the current Pond 6 outfall. The box culverts will be sized to safely pass the peak flow volume associated with a 100-year storm event, and the invert of the box culvert will serve as the controlling elevation for discharge from the OU-E lowland. A geotechnical evaluation of the beach berm will be conducted to determine the type and extent of the tie in (e.g., wing walls) and reinforcement (e.g., rip rap) necessary to secure the box culvert in the berm during high flow and surf conditions.

- Beach Stability - Rip rap will be placed at the outlet for the box culvert to dissipate flow energy and prevent erosion of Soldier Beach.

- Beach Berm Appearance - The outboard surface of the beach berm is currently protected with riprap consisting of large rock and concrete debris. The outboard surface of the beach berm will be modified to improve its appearance, provide safe public access to Soldier Beach, and provide continued erosion protection. Methods under consideration include but are not limited to:
  - Removal of the concrete debris and consistent use of rock riprap
  - Removal of the concrete debris and rock riprap, consolidation of the rock rip rap and the introduction of geogrid mats and native woody and herbaceous plantings tolerant of salt spray
  - Removal of concrete debris and rock riprap and installation of articulated block mats

- CCT - Future CCT development is proposed to occur along the top of the beach berm and over the box culvert. It is anticipated that the City will design and construct an all weather trail or will opt for a seasonal trail using native materials. It is anticipated that final design of the CCT will include public safety features such as railings on both sides of the trail at and near the box culvert and stairs or other safe pathway to Soldier Beach.

4.2.3.2 OU-E Lowland Wetlands

The OU-E lowland wetland will consist of three primary habitat types: ponded wetlands, low marsh, and high marsh. The extent, characteristics, and functions of these habitat types in the OU-E lowland wetland are described below. The OU-E lowland wetland will be approximately 6.26 acres and will encompass all of the OU-E lowland between the beach berm and the mouth of the restored MCRC at the eastern end of OU-E lowland (Figure 4-2). Coastal shrub and native grassland habitat will be created on the slopes surrounding the OU-E lowland wetland.

Ponded Wetland

Approximately 0.88 acre of ponded wetland will be created/restored in the OU-E lowland. Characteristics of the ponded wetlands are presented below:

- The daylighted Maple Creek Channel will discharge to the OU-E lowland into a ponded wetland (the Forebay) designed to dissipate energy and release flows to the low and high marsh areas.

- The Aftbay is located on the inboard side of the beach berm in the approximate location of Pond 6. The Aftbay will dissipate energy from the marsh system and release flows via a box culvert in the beach berm above the high tide line adjacent to Soldier Bay.

- Both ponded wetlands will be approximately 2 to 3 feet deep and will be fed by groundwater during the dry season. They will also provide flow retention during low to moderate flows and will regulate discharge of water through the system.

- Bottom materials used to construct the Forebay are expected to be composed of stone and soil to help prevent erosion. Following maturation of the restored system, sediment in the Aftbay is expected to be composed of silty or clayey loam.

- Vegetative species expected in the ponded wetlands will primarily be tall emergent and floating hydrophytes. Revegetation is expected to occur through natural recruitment from local seed source on the site. Therefore, these species are not expected to be necessary for a planting plan. However, Table 4-1 presents typical species expected to occur in this habitat.

- Ponded wetland habitat is expected to provide the following ecological functions: perennial aquatic habitat, wildlife habitat, carbon sequestration and storage, nutrient (e.g., phosphorous and nitrogen) sequestration and storage, surface water filtration, sediment retention, and storm flow retardation.

Low Marsh

Approximately 2.90 acres of low marsh will be created/restored in the OU-E lowland. Low marsh makes up one of the two central components of the OU-E lowland wetland (high marsh being the second), and is described by the following features:

- Low marsh habitat will directly connect flow between the Forebay and Aftbay and will be approximately 100 to 125 feet wide. A small meandering low-flow channel is expected to develop in the low marsh. The low marsh habitat will provide the primary flow path for low to moderate flows. Hydrology of the low

marsh area will be supplied by direct groundwater discharge during the dry season. Therefore, the low marsh habitat is classified as herbaceous seep wetlands.

- Following maturation of the restored system, soil in the low marsh areas is expected to be silty to clayey loam.

- Vegetation expected in the low marsh will primarily be tall emergent hydrophytes. Revegetation will be achieved through a combination of seeding and natural recolonization from local seed sources on the site. Table 4-1 presents typical species expected to occur in low marsh habitat.

- Low marsh habitat is expected to provide the following ecological functions: wildlife habitat, perennial aquatic habitat, carbon sequestration and storage, nutrient (e.g., phosphorous and nitrogen) sequestration and storage, surface water filtration, sediment retention, and stormwater retardation.

High Marsh

Approximately 2.49 acres of high marsh will be created/restored in the OU-E lowland (Figure 4-2). High marsh will make up approximately 40 percent of the OU-E lowland wetland, and is described by the following features:

- High marsh habitat will be created on a floodplain area approximately 1-foot higher than the low marsh plain. High marsh habitat will encourage low to moderate flow in the low marsh to meander though the OU-E lowland, thereby increasing residence time. During high flow events, surface water will overtop the high marsh area and flow directly between the Forebay and Aftbay. Surface hydrology in the high marsh is expected to be dominated by wet season flows and precipitation. During the dry season, the high marsh is expected to have moist to saturated soils within 1-foot of the ground surface due to the high groundwater table. Due to this hydrologic regime, the MPC Restoration Project defines the high marsh area as herbaceous seasonal wetland.

- Following maturation of the restored system, soil in the high marsh areas is expected to be sandy loam.

- Vegetation expected in the high marsh will primarily be tall emergent hydrophytes. However, some shrub species will be present in the areas where drier conditions occur. Additionally, willow fascines may be used to help stabilize slopes at the outside bends of the low marsh areas. High marsh revegetation will occur through a combination of seeding, planting, and natural recolonization. Table 4-1 presents typical species expected to occur in high marsh habitat.

- High marsh habitat is expected to provide the following ecological functions: wildlife habitat, seasonal aquatic habitat, carbon sequestration and storage, nutrient sequestration and storage, surface water filtration, sediment retention, and storm flow retardation.

Coastal Shrub and Grassland Habitat

Approximately 12.17 acres of coastal shrub and grassland habitat will be created adjacent to the OU-E lowland, and approximately 0.45 acre of seasonal and seep wetlands will be enhanced through creation of this habitat (Figure 4-2).

- Coastal shrub habitat will be created in the ruderal areas currently located on the hillsides immediately north of the OU-E lowland and the regraded slope created following the remove of Pond 8 and the spillway, cribwall, and north wall dam (Figure 4-2).

- Existing Wetlands B, C, and D, and E-7 and E-8 (Figure 2-3b) will not be disturbed as part of this habitat creation. However, these wetland areas will be enhanced through creation of a more ecologically functional surrounding habitat and control of invasive species.

- Vegetation in this habitat will be consistent with coastal shrub and grassland habitats present in the Fort Bragg area. Additionally, invasive species (e.g., pampas grass) currently dominating these areas will be controlled.

- The coastal shrub and grassland habitat will be dominated by a mosaic of native herbaceous and woody shrub vegetation and native grasses. Table 4-1 presents typical species that would be expected to occur in this coastal habitat. However, species that would be planted following construction may vary slightly depending on availability from local/regional nurseries.

- Coastal shrub and grassland habitat is expected to provide the following ecological functions: wildlife habitat, perennial aquatic seeps, carbon sequestration and storage, and nutrient sequestration and storage. This habitat will also reduce velocity of surface runoff from the areas surrounding the OU-E lowland compared to current conditions, increasing surface water filtration, and groundwater recharge. Furthermore, this habitat will facilitate infiltration and reduce the velocity of surface runoff between the OU-E wetland habitats and future development on the upland terraces to the north and east.

4.3 Maple Creek Riparian Corridor Restoration

During the MPC Restoration Project scoping process, the following key objectives were incorporated into the preferred alternative:

- Rerouting of surface flow from Maple and Alder Creek storm drainages around Pond 8 to the OU-E lowland to facilitate management of sediment in Pond 8 prior to closure of the pond and removal of the dam

- A strong community interest to daylight historic Maple Creek and restore riparian habitat to the site

- A practical objective to limit the construction of hard structures and creation of related maintenance and operational requirements

These objectives guided design of the MCRC component of the MPC Restoration Project.

The following section describes current conditions for the surface drainages that will need to be rerouted to dewater Pond 8 (i.e., Maple Creek and Alder Creek storm drainages), a description of the restoration and enhancements proposed in the preferred alternative to daylight Maple Creek, connect the restored Maple Creek channel and associated riparian area (MCRC) to the existing MSRA, and manage flows from the Alder Creek storm drainage. Figures 4-2 through 4-5 present the plan view, cross-sections and profile of the proposed Maple Creek activities.

4.3.1 Current Conditions

Pond 8 receives direct surface runoff from the ruderal and impervious surfaces located to the south and east of the pond, Basin S including the South Ponds, as well as piped stormwater and base flow from the Maple Creek watershed (124 acres) in the City of Fort Bragg, the on-site MSRA (30 acres), and from the Alder Creek watershed (103 acres) in the City.

- The lands immediately south and east of Pond 8 formerly contained a sawmill, planer, and weigh station facilities located in OU-D. The majority of these facilities have been removed and soil remediation has occurred.

- The Maple Creek storm drain is fed almost entirely urban runoff and baseflow input from drainage basin C, as defined in the City's *Storm Drainage Master Plan* (Winzler and Kelly 2004).

- Wetland D-1 and Wetland L (Figure 2-3c) convey surface water runoff from the MSRA to Wetland J and a short above-grade section of the Maple Creek channel. The magnitude of the site's surface water input to Maple Creek is expected to be small when compared to that of the City.

The Maple Creek storm drain enters the site at the northeast corner of the MSRA via two 36-inch culverts and runs through a deeply incised channel for a distance of approximately 200 feet where it enters a 36-inch culvert that routes the flow to the southeast corner of Pond 8. The surface channel, which is in poor

condition, runs through an area densely vegetated with invasive species (Himalayan blackberry [*Rubus discolor*]), is cut off from its surrounding floodplain, and shows field indicators of moderate to severe channel degradation (e.g., downcutting of the channel bed, erosion of the channel banks at the headwall on the east end of Maple Creek adjacent to Highway 1, and slumping of channel banks as the channel bed erodes).

Historically, flows in Maple Creek would likely have been regulated by riparian buffers and vegetated landscapes with little to no impervious surface resulting in a high degree of infiltration and surface runoff retardation, which collectively reduce the intensity and magnitude of storm event flows. Development of the City's urban landscape in the Maple Creek watershed over the past 100 years or more has substantially increased the amount of impervious surfaces, removed riparian and vegetated buffers, culverted Maple Creek throughout the watershed, and facilitated rapid discharge of stormwater flows. These changes result in short-duration, high-intensity flows in response to precipitation events (ARCADIS 2011b).

The MSRA contributes on-site surface runoff during storm events and base flow resulting from emergent groundwater. The MSRA is described as follows:

- The Maple Street Riparian Area encompasses approximately 30 acres located on the eastern edge of the site (Figures 2-3 and 2-3c). It contains a mix of forest and grassland upland (approximately 24 acres), degraded riparian habitat (approximately 2 acres), wetlands (approximately 3 acres), and channelized drainage features (approximately 962 linear feet). The MSRA captures the on-site runoff from these areas and funnels into the existing Maple Creek drainage channel in Wetland D-1 prior to entering the culvert to Pond 8. The man-made drainage channels capture runoff from portions of OU-D. The aquatic features in this area are components of OU-E.

- Wetland L is a spring-fed linear stream channel feature (Figure 2-3c) that is thought to be the channelized drainage that captures flow from the historical Maple Creek (Figure 4-1).

- Vegetation in MSRA is dominated by a mix of native and invasive species. The dominant species in the northern portion of the MSRA is invasive Himalayan blackberry. A few native species of trees, dominated by red alder, are present in a limited woody overstory. The abandoned Maple Creek floodplain is a seep wetland area with groundwater discharge at the surface through much of the year. The floodplain is primarily herbaceous cover, dominated by a mix of native and invasive wetland grasses and forbs. The Maple Creek channel and abandoned floodplain are surrounded by steep berms on all sides that transition to the site and Highway 1. The MSRA uplands support native and non-native grasses and forbs and a Bishop pine overstory.

Alder Creek drainage captures stormwater runoff from the City of Fort Bragg Basin D (Winsler and Kelly 2004) and conveys baseflow from the historic Alder Creek watershed. Alder Creek is piped throughout the watershed. It enters the site northeast of Pond 8 and discharges to the northeast corner of Pond 8.

Pond 5 is located immediately east of Pond 8. This triangular pond received water pumped from Pudding Creek, which was then transferred to Pond 8. Pond 5 currently receives only surface runoff from the upgradient paved areas and potentially emergent groundwater during the wet season. Stormwater is actively pumped from Pond 5 into Pond 8, when necessary, to prevent overflow. The pond is predominately open water but does support cattails and ruderal vegetation along its margin and steep banks.

4.3.2 Related Site Closure and Site Development Activities and Objectives

The following activities associated with the MPC remediation and demolition will occur in the Maple Creek stream restoration area or influence restoration activities:

- Surface water discharge to Pond 8 from the Alder Creek and Maple Creek drainages will be rerouted around Pond 8 to the OU-E lowland wetland. This will likely occur in two steps: the first to route flow around the northeast corner of Pond 8 and the second to shift the restored MCRC to its final position cutting across the northeast corner of Pond 8 following Pond 8 closure.

- The culverted Maple Creek drainage will be restored to create the 1,500-foot-long MCRC.

- The northern end of the MSRA will be regraded to connect with the restored MCRC and provide a stable stream channel and confluence with the existing MSRA drainages (i.e., Wetlands J, K, D-1, and D-2; Figure 2-3c).

- Impacted sediment in the MSRA drainage channel (i.e., Wetland L; Figure 2-3c) and soil in the restoration of the affected channel will be remediated.

- Alder Creek drainage will be connected to the MCRC and OU-E Lowland wetland.

- Pond 5 (Figure 4-2) will be connected hydraulically to the MCRC through the Alder Creek drainage outfall.

- Transportation and utility routing between the north and southern portions of the site will need to be designed to accommodate the restored MCRC.

4.3.3 Proposed Restoration Design

The various components of the Maple Creek restoration activities are described in the following sections.

4.3.3.1 Maple Creek Riparian Corridor

To create a continuous ecological system between the OU-E lowland and the existing MSRA, the MPC Restoration Project preferred alternative proposes to daylight the culverted Maple Creek storm drain in a flow path similar to the historical Maple Creek. Due to the expected increase of intensity of flows in the Maple Creek channel, compared to those likely historically present, the channel will need to flow slightly to the north and west of its historical location (Figure 4-1) to reduce channel grade and to allow for energy dissipation of the water flow as the new channel enters the OU-E lowland. The new MCRC will contain three distinct habitat components: stream channel, riparian floodplain, and riparian upland. These components are further described below.

Restored Stream Channel

The new Maple Creek channel will create approximately 1,500 linear feet of stream channel with a 180-foot-wide riparian corridor (approximately 0.68 acre). The new Maple Creek stream channel will be the primary conduit for site and City surface flow to the OU-E lowland, and is described below:

- The new Maple Creek channel will have an overall slope of approximately 2 percent with intermittent rock weirs (e.g., boulder arches) installed to form pool, glide, and riffle habitats and encourage flow dispersal on to the channel floodplain. The channel will be approximately 10 feet wide at the bottom and approximately 2 feet deep with 2:1 (horizontal to vertical distance) slopes meeting the adjacent floodplain. The new Maple Creek channel will be designed to convey estimated peak channel forming flow (i.e., between the 1.5- and 2-year return period storm). A conceptual cross-section of the new stream channel is presented as cross-sections A and B on Figure 4-3.

- Flow within the new Maple Creek channel will be dominated by storm flow from the City and the site during the rainy season. During the dry season, Maple Creek drainage conveys modest base flow from the Maple Creek watershed and Maple Street Riparian Area. This flow will be supplemented by emergent groundwater because the proposed channel bottom is expected to be below the groundwater table during the dry season. Figure 4-4 shows the channel bottom profile and the representative dry season (i.e., October) groundwater level measurements for 2010.

- The channel bottom will be constructed of cobble and gravel of an appropriate diameter to withstand sheer stress of predicted flows and to prevent mass erosion and downcutting of the channel.

- Vegetation is not expected to grow in the newly created stream channel except along the channel margins in areas where slower flow conditions occur near geomorphic flow control features.

Riparian Flood Plain

A substantial component of the MCRC will be the riparian floodplain created adjacent to the new Maple Creek stream channel. The riparian floodplain will transmit stream flow during storms exceeding the channel forming flow, will mitigate volume and velocity of overland stormflows into the aquatic habitat present in the stream channel, and will provide allochthonous organic input to the aquatic ecosystem. The riparian floodplain will contain two aquatic sub-habitats (seasonal and seep riparian wetlands) as defined by typical groundwater levels in relation of the riparian floodplain surface elevation. Approximately 0.69 acre of seasonal riparian wetlands and 1.36 acres of seep riparian wetlands will be created in the Maple Creek riparian floodplain. Distinguishing characteristics of the riparian floodplain and two sub-habitats are described below:

- The riparian floodplain will be designed to transmit peak flow of the 100-year return period storm with a minimum of 1 foot of freeboard above the high water mark. Depressional areas will also be graded in the floodplain to pond surface water as storm flows recede. Width of the floodplain on either side of the channel will vary as the stream channel meanders within the floodplain. However, the floodplain will total approximately 60 feet in width. The riparian floodplain will abut the riparian upland slopes that transition to the surrounding existing grade. Cross-sections A and B on Figure 4-3 present two conceptual cross-sections of the riparian floodplain as the stream channel meanders from left to right.

- The riparian floodplain will consist of two sub-habitats: seep riparian wetlands and seasonal riparian wetlands. Approximately the first 500 linear feet of the new riparian floodplain are defined as seasonal riparian wetlands in the conceptual design, as the primary source of hydrology will be overflow from the creek channel during the rainy season. The remaining 1,000 linear feet of riparian floodplain is defined as seep riparian wetland in the conceptual design because the floodplain surface will be approximately 1 foot below the current dry season groundwater table (Figure 4-3).

- Following maturation of the restored system, soils comprising the floodplain areas are expected to be sand to sandy loams derived primarily from the existing soil profile in the restoration area.

- The riparian floodplain is expected to be dominated by herbaceous and woody plant communities, with shrubs and low trees dominating the canopy, saplings dominating the understory, and herbaceous wetland vegetation dominating the groundcover. Vegetation comprising the seasonal and seep wetland areas is expected be similar with species more adapted to continually saturated conditions being more prevalent in the riparian seep wetland areas. The depressional areas in the floodplain will likely retain water for longer periods than other areas of the floodplain and will likely provide habitat for more obligate wetland species. Revegetation of the riparian floodplain will occur through a combination of planting, seeding, and natural recolonization. Table 4-1 presents typical species that would be expected to occur

in the riparian floodplain area. However, species that would be planted following construction may vary slightly depending on availability from local/regional nurseries.

- Riparian floodplain habitat will provide ecological functions typical of small perennial coastal stream systems, including wildlife and aquatic habitat, groundwater exchange, carbon sequestration and storage, carbon export to the adjacent aquatic system, nutrient sequestration and storage, sediment retention, and stormwater retardation.

Riparian Upland

The upland riparian habitat will occupy approximately 50 feet on each side of the riparian floodplain areas. Approximately 3.29 acres of riparian upland will be created in the MCRC. The riparian upland will mitigate volume and velocity of overland storm flows to the aquatic habitat present in the stream channel and riparian floodplain wetlands by retarding surface flow as it drains from the surrounding elevations to the riparian floodplain areas.

- The transition slope between the riparian floodplain and the surrounding existing grade will be a minimum of 3:1 (horizontal to vertical distance) to provide stability. Cross-sections A and B on Figure 4-3 present conceptual cross-sections depicting riparian upland transition slopes and areas as they extend onto the existing grade.

- Following maturation of the restored system, soils comprising the floodplain areas are expected to be sandy loams composed predominantly of existing site soils.

- The upland habitat is expected to be dominated by a tall woody canopy, a relatively open shrub understory, and herbaceous groundcover. Vegetative species present in the riparian upland are expected to be those more adapted to dry conditions. However, deep-rooted species more accustomed to wetter habitats will likely appear as the slope transitions from the existing grade to the riparian floodplain. Revegetation of the riparian upland will occur through a combination of planting, seeding, and natural recolonization. Table 4-1 presents typical species that would be expected to occur in the riparian upland area. However, species that would be planted following construction may vary slightly depending on availability from local/regional nurseries.

- Riparian upland habitat is expected to provide the following ecological functions: wildlife habitat, carbon sequestration and storage, carbon export to the adjacent aquatic system, nutrient sequestration and storage, surface runoff retardation, and sediment retention.

Collectively, the MCRC (i.e., stream channel, floodplain, and riparian upland) will provide the following ecological functions:

- Wildlife riparian habitat and a migration corridor between the Soldier Bay, the OU-E wetland, and MSRA; the riparian corridor will provide vertical structure and cover, which is lacking on the site

- Aquatic habitats in the form of perennial stream, perennial seep, floodplain depressional wetlands, and seasonal floodplain wetlands

- Water quality benefits related to groundwater exchange, nutrient storage and cycling, sediment retention, and stormwater and surface runoff retardation

- The stream system is not expected to provide habitat for fish due to the upstream culverting and lack of upstream freshwater fish habitat and existing populations

4.3.3.2 Maple Street Riparian Area

Remediation and Maple Creek restoration activities in the MSRA include excavation of impacted sediment in the Wetland L stream channel, removal of the culvert connecting Wetland L to the current Maple Creek channel, and enhancement of Wetland J to create a more stable and ecologically functional confluence for the Maple Creek drainage from the City with Wetland L and drainage D-1.

Remediation of Wetland L sediment will remove surface sediment impacted by site-related constituents and ash from the previously adjacent Ash pile, which was remediated in September 2006. The location, extent, and methods of remediation will be defined in the OU-E Remedial Action Plan (pending). Following sediment treatment, the remediation action area will be restored to existing grade and revegetated with native plants suitable for the habitat areas.

The objective of the Wetland J/Maple Creek Confluence activities is to create a stable entrance to the restored MCRC for the Maple Creek drainage from the City and tie in the other surface drainages from the MSRA (i.e., Wetland L and Drainage D-1; Figure 2-3c). This area will receive short duration and high intensity storm flows generated by the impervious surfaces in Basin C during the wet season, and base flow and emergent groundwater throughout the wet and dry seasons. The preferred alternative includes the following:

- The existing segment of the Maple Creek channel that passes through Wetland J (Figure 2-2c) will be broadened and the near-vertical banks will be regraded to provide more stable conditions (Figure 4-5, Cross-section C-C'). This cross-section should only be viewed as conceptual, as detailed survey information is necessary to evaluate current elevations of the channel bottom, morphology of the channel cross-sections, and elevations of the adjacent abandoned floodplain. Approximately, 0.05 acre (400 linear feet) of the Maple Creek channel will be enhanced.

- Rip rap and cobble will be placed at the discharge for the Maple Creek drainage pipes adjacent to Highway 1 to raise the initial channel elevation and dissipate the energy of the laminar piped flow to retard channel incision that is currently occurring.

- The culvert and overlying soil that connects Wetland L to Wetland J will be removed, and the southwest portion of Wetland J will be regraded to establish stable channel slopes and banks transitioning into the confluence at the head of the restored MCRC. Approximately 150 linear feet (0.01 acre) of stream channel and 0.18 acre of riparian habitat will be created.

- The created MSRA tributary channel will have a narrow herbaceous seep wetland floodplain adjacent to the creek with an upland transition area dominated by herbaceous and shrub vegetation with some overstory woody plants.

- Existing invasive wetland and riparian plants will be removed within the construction footprint.

- Vegetation to be planted in the new MSRA tributary section will be similar to that proposed in the Maple Creek riparian floodplain and riparian upland, as discussed in Section 4.3.2.1 and presented in Table 4-1. However, species that would be planted following construction may vary slightly depending on availability from local/regional nurseries.

- Regraded slopes will be a minimum of 3:1 (horizontal to vertical distance) for stability and will be further evaluated as more detailed survey data for the Maple Creek corridor is obtained. Figure 4-5 (Cross-sections D-D' and E-E') presents conceptual cross-sections of the new MSRA tributary channel as it transitions to the current surrounding grade. These cross-sections should only be viewed as conceptual, as detailed survey information is necessary to evaluate current elevations of the channel bottom, morphology of the channel cross-sections, and elevations of the adjacent abandoned floodplain.

Habitat restoration and enhancement actions in the MSRA will provide following ecological benefits:

- Daylighting of approximately 150 feet of stream channel and creation of the Wetland J and Wetland L confluence

- Retardation of Maple Creek channel incision and improved management of storm flow discharge from the Basin C Maple Creek storm drain

- Connection of the existing MSRA habitat to the restored MCRC

- A reduction in the prevalence of exotic/invasive riparian and aquatic plants within the construction footprint

4.3.3.3 Alder Creek Drainage

The Alder Creek drainage currently conveys base flow and stormwater runoff from Basin D in the City to the northeast corner of Pond 8. The Alder Creek drainage is expected to provide approximately 40 percent of the inflow to the OU-E lowland wetlands. The MPC Restoration Project preferred alternative does not include daylighting Alder Creek, but does not preclude such an action in the future. During construction of the MCRC, approximately the last 100 feet of the Alder Creek drainage pipe will be removed and a new pipe segment will be added to redirect the Alder Creek flows to a constructed outfall in the MCRC (Figure 4-2). Design of the outfall will be determined during the engineering phase of work.

Although daylighting the Alder Creek drainage is not considered in the preferred alternative, the proposed action does not preclude daylighting Alder Creek in the future.

4.3.3.4 Pond 5

Pond 5 currently does not have a hydrologic connection to other aquatic features on the site. The preferred alternative originally proposed to relocate Pond 5 and provide equivalent or enhanced aquatic features at a point in the MPC Restoration Project where they could be an integral part of the ecosystem. The CCC has indicated that, although isolated, Pond 5 could not be relocated, but should remain at its current location and size and be connected hydraulically to the MCRC. To achieve this objective, a flow control weir will be installed in the northwest corner of Pond 5, and the spillage will be conveyed via pipeline to the Alder Creek drainage outfall in the MCRC.

Herbaceous and woody riparian vegetation will be planted in a 30-foot buffer around Pond 5 to provide enhanced ecological function for the buffer, retard surface flow, and facilitate sediment deposition.

4.4 South Ponds Channel

Basin S and sub-catchment O-2 surface runoff is conveyed to Pond 8 via several drainages ditches and culverts (Figure 2-2). Surface flow from these areas will need to be rerouted before Pond 8 sediment management, closure, and dam removal can occur. The South Ponds (i.e., Pond 1 through 4) are located in OU-E, approximately 1,200 feet south of the OU-E lowland area (Figures 2-3 and 2-3c). The MPC Restoration Project preferred alternative proposes to daylight the western end of the stream channel that historically drained the Basin S and South Ponds area and discharged to the Pacific Ocean over the coastal bluff. Figure 4-6 presents the conceptual design for the South Ponds channel restoration.

4.4.1 Current Conditions

The South Ponds are former industrial ponds that were part of the wastewater treatment system for the site. They are not USACE jurisdictional waters/wetlands, but may be waters of the state and/or coastal ESHAs (ARCADIS 2011a). The South Ponds are the central aquatic feature in an on-site drainage area of approximately 68 acres referred to as Basin S (Figure 2-2). The area north of the South Ponds is dominated by impervious surfaces (primarily asphalt and concrete foundations). The South Ponds receive runoff from the Consolidation Cell located to the south and east of Pond 4. The Consolidation Cell is contained within the area demarcated as having ongoing construction activities on Figure 2-3c. The largest portion of the Basin S watershed consists of compacted dirt with ruderal vegetation, and a large portion of this area drains to Pond 3 northwest (NW) through drainage ditches and swales. Basin S eventually drains into the southwest end of Pond 8 through a series of small surface drainages and subsurface pipes. The foundations of the former log ramp and log debarker are located immediately northwest of the western end of Pond 3 NW. The City Waste Water Treatment Plant (WWTP) and the north extent of the southern CCT property are directly west of the South Ponds area along the coastal bluffs.

The 1873 Geodetic Survey Map (Figure 2-1) indicates that prior to development of the site, an unnamed stream channel discharged off of the coastal bluff face at two locations between the current locations of the WWTP and west end of Pond 8. During development of the site, the stream channel was piped, backfilled, and graded. Rip rap was placed at the mouth of the historical stream channel and concreted over at the coastal bluff face (Appendix B).

4.4.2 Related Site Closure and Site Development Activities and Objectives

The following activities associated with the MPC remediation and demolition will occur in the South Pond channel restoration area or influence MPC restoration activities:

- Surface runoff and emergent groundwater generated in the approximately 78-acre Basin S and O-2 watershed area currently drains into the southwest end of Pond 8. This surface flow will need to be rerouted prior the management of sediment in Pond 8.

- Storm drains that currently capture storm water runoff from the area immediately south of the Planer building and direct the flow to Pond 8 may be rerouted to the proposed South Pond channel.

- An unnamed historic stream channel shown on the 1873 Geodetic Survey Map (Figures 2-1and 4-1) will be restored between the South Ponds and the historic creek mouth at the coastal bluff within the Open Space area designated in the Mill Site Specific Plan (Figure 4-6). For discussion purposes, the channel is referred to herein as “South Ponds Channel” and will be a component of the “South Ponds Riparian

Corridor." Restoration of the South Ponds Riparian Corridor will create approximately 650 linear feet of stream channel and 0.95 acre of riparian habitat.

4.4.3 Proposed Restoration Design

The MPC Restoration Project requires that surface drainage from Basin S be rerouted to bypass Pond 8. To accommodate the rerouting of surface drainage, the preferred alternative proposes to create a new stream channel and riparian corridor that will reestablish a portion of the historical drainage for the South Ponds area. The restored stream channel and associated riparian corridor will transmit surface water from the South Ponds and the surrounding site drainage basin to the historic creek mouth at the coast bluff prior to stabilization of Pond 8. Habitat types that will be created in the South Ponds area include stream channel, riparian floodplain, and riparian upland habitat. These habitats are described in more detail below.

Stream Channel

The surface water flow from the South Ponds will flow through the current culvert and discharge to the restored South Ponds Channel, which will flow in the approximate historical location of the stream that drained this area prior to site development. The South Ponds Channel will be approximately 650 feet long and provide 0.13 acre of stream habitat. Surface runoff from other parts of Basin S and O-2 will enter the stream channel within the daylighted section.

- The South Ponds Channel will have an overall slope of approximately 2 to 3 percent. The channel will be approximately 3 feet wide at the bottom and approximately 1 foot deep with 3:1 (horizontal to vertical distance) slopes meeting the adjacent floodplain. The channel will be designed to hold peak channel forming flows (i.e., between the 1.5- and 2-year return period storm). A conceptual cross-section of the new channel is presented as cross-section F-F' on Figure 4-6.

- Flow within the South Ponds Channel will be dominated by surface water flow from the site during the rainy season. During the dry season, emergent groundwater will provide base flow, and all of the channel bottom is expected to be below the groundwater table during the dry season in wet and normal water years. Figure 4-6 shows the channel bottom profile and the estimated groundwater level measurements for 2010 (direct measurements from groundwater monitoring wells were not available for this area).

- The channel bottom will be constructed of cobble and gravel of an appropriate diameter to withstand sheer stress of predicted flows and to prevent mass erosion and down cutting of the channel.

- No vegetation is expected to grow in the stream channel with the exception of the shallow margins of the stream where it transitions to the channel floodplain.

Riparian Flood Plain

A riparian floodplain will be created adjacent to the South Ponds Channel. The riparian floodplain will transmit flow during storms exceeding the channel forming flow, will mitigate volume and velocity of stormflows to the aquatic habitat present in the stream channel, and the associated riparian vegetation will provide allochthonous organic input to the aquatic ecosystem. The riparian floodplain will contain seep riparian wetlands, as defined by typical groundwater levels in relation of the riparian floodplain surface elevation. Approximately 0.12 acre of seep riparian wetland will be created in the South Ponds Riparian Corridor. Distinguishing characteristics of the seep riparian wetland are described below:

- The floodplain will be designed to transmit peak flow of the 100-year 24-hour return period storm with a minimum of 1 foot of freeboard above the estimated high water mark. Width of the floodplain on either side of the channel will vary as the stream channel meanders within the floodplain. However, the floodplain will be approximately 8 feet in total width. The riparian floodplain will abut the riparian upland slopes that transition to the surrounding existing grade. Figure 4-6 presents a conceptual cross-section of the South Ponds riparian floodplain.

- The South Ponds riparian floodplain will be composed of seep riparian wetlands. The 650 linear feet of riparian floodplain is defined as seep riparian wetlands in the conceptual design because the floodplain surface will be approximately 1 foot below the dry season groundwater table during most water years.

- Following maturation of the restored system, soils comprising the floodplain areas are expected to be sandy loams.

- The South Ponds riparian floodplain will to be dominated by herbaceous and woody plant communities, with shrubs and low trees dominating the canopy, saplings dominating the understory, and herbaceous wetland vegetation dominating the groundcover. Vegetation comprising the seasonal and seep wetland areas is expected will be species adapted to the continually saturated conditions that will be prevalent in the riparian seep wetland areas. Riparian floodplain revegetation will occur through a combination of planting, seeding, and natural recolonization. Table 4-1 presents typical species that would be expected to occur in the riparian floodplain area. However, species that would be planted following construction may vary slightly depending on availability from local/regional nurseries.

Riparian Upland

The riparian upland associated with the South Ponds riparian corridor will mitigate volume and velocity of stormflows to the wetland and aquatic habitats present in the floodplain and stream channel and will retard surface flow as it drains from the surrounding elevations to the riparian floodplain areas. The upland riparian

habitat will be approximately 30 feet to each side of the riparian floodplain areas (Figure 4-6). Approximately 0.83 acre of riparian upland will be created in the South Ponds riparian corridor.

- The transition slope from the riparian floodplain to the surrounding existing grade will be a minimum of 3:1 (horizontal to vertical distance) to provide stability. Figure 4-6 presents a conceptual cross-section depicting riparian upland transition slopes and areas as they extend onto the existing grade.

- Following maturation of the restored system, soils in the floodplain areas are expected to be sandy loams.

- The upland buffer is expected to include tall woody canopy with shrubby understory and herbaceous groundcover near the eastern end with the tall woody overstory diminishing as the channel flows westward towards the coastal bluff. Vegetative species present in the riparian upland are expected to be those more adapted to dry conditions. However, deep-rooted species more accustomed to wetter habitats will likely appear as the slope transitions from the existing grade to the riparian floodplain. Revegetation will occur through a combination of planting, seeding, and natural recolonization. Table 4-1 presents typical species that would be expected to occur in the riparian upland area. However, species that would be planted following construction may vary slightly depending on availability from local/regional nurseries.

Ecological functions provided by the South Ponds Channel, riparian floodplain, and upland include: wildlife habitat and migration corridor, seasonal and perennial aquatic habitat, surface runoff retardation, sediment retention, water quality improvement, groundwater exchange, nutrient storage, and cycling.

The proposed daylighting of the historic stream channel is consistent with CCC policy for restoration of historic ecological habitat features, LCP policies, and the proposed Mill Site Specific Plan land use policies for the Mill Pond Open Space District. The stream channel and associated riparian habitat will provide an aesthetically pleasing contribution to the open space and provide a visual buffer between the central portion of the MPC and the City WWTP.

5. Proposed Mitigation Concepts

Remediation and closure activities in the MPC Restoration Project will impact potential ESHAs, including potentially state and federal jurisdictional waters/wetlands. Required remediation and closure activities are likely to impact the following potential ESHAs and jurisdictional features:

- Ponded wetlands (7.56 acres total)
  - OU-E lowland: Pond 6 (0.17 acre) and Pond 7 (0.10 acre)
  - Pond 8 (7.29 acres)

- Bedrock groundwater seeps and wetlands adjacent to the Pond 8 spillway are not expected to be disturbed during removal of the spillway; in some areas, seeps that are currently covered by concrete will be daylighted

Impacts to these potential ESHAs, including potential state and federal waters/wetlands, will require compensatory mitigation meeting requirements of the federal Clean Water Act, Porter-Cologne Water Quality Control Act, California Fish and Game Code, and CCA, as administered by the City and the CCC. Therefore, the MPC Restoration Project preferred alternative proposes to create, restore, and enhance stream, wetland and upland habitats in the OU-E lowland, MCRC, MSRA, and the South Ponds Riparian Corridor. These restoration activities will restore a broad range of habitat types in an integrated ecosystem within the Mill Site Specific Plan Open Space component that will reflect habitat and hydrologic conditions historically present on the site prior to development. Figure 5-1 depicts the footprint of the MPC Restoration Project preferred alternative overlain on the Mill Site Specific Plan land use plan.

Waters/wetlands and other habitat areas currently existing on the site are degraded and possess limited functional value, primarily because they are small and isolated from one another by large areas with ruderal and impervious surfaces and lack natural hydrology (Section 2.3). Proposed activities will create two new waters/wetlands systems that will have increased ecological function, water quality benefits, and visual conditions, and provide for improved community recreational, educational, and stewardship opportunities, through the following design aspects:

- Creating larger contiguous waters/wetlands systems in the OU-E lowland, thereby, creating an interconnected system with increased structural diversity allowing for greater variation in microhabitats

- Increasing the percentage of wetlands in the system with a consistent hydrologic source (i.e., groundwater), thereby reducing dependence on high-intensity, short-duration storm flows from the site and City

- Creating natural stream habitats, including associated riparian floodplains and upland buffers, to hydrologically connect the wetland areas to the landscape; streams and riparian areas will:
  - allow for more consistent inflows and outflows of surface water compared to culvert and pipes
  - mitigate the influence of flashy storm flows by increasing the cross-sectional flow area and increasing the roughness of the bed surface
  - provide a source of course organic matter and nutrient input into the wetland and stream habitats and a natural point for carbon and nutrient export
- Creating corridors for wildlife movement that are largely absent on the site, thereby decreasing ecological isolation of the various ecosystem components
- Creating new upland and ecotone habitats at the waters/wetlands edges to:
  - allow refuge for wetland dependent species during flood events
  - reduce velocity and erosive potential of surface flow from surrounding areas during storm events
  - create a natural transition between wetland/aquatic habitats and upland habitats, which is largely absent from most of the site currently
- Controlling invasive species, to the extent practical, allowing for more diverse native vegetation in the newly created habitats

In addition to the ecological benefits that the MPC Restoration Project will provide, proposed activities will help protect water quality and improve flood attenuation in the system. Creating stream habitats with broad vegetated floodplains and adjacent vegetated upland habitats will reduce the intensity and magnitude of peak flows and lengthen the duration of storm-flow into the wetlands. This will reduce velocity of flow, decreasing erosion and allow for greater residence time in the wetland areas. Additionally, the sinuous nature of the proposed low marsh in the OU-E lowland will help retain water for longer periods of time, rather than letting flows pass directly from the inlet to the outlet, as currently occurs in Pond 8. The increased hydrologic residence time afforded by these features will allow more nutrient and pollutant removal through biological and physical processes and will attenuate storm-flows over a longer period of time.

Community benefits provided by the MPC Restoration Project preferred alternative include:

- Improved visual conditions in the central portion of the Mill Site, the MSRA, and in the Open Space south of Pond 8

- Recreational access along the CCT between the north and south CCT segments through and around the OU-E lowland and Soldier Bay, MCRC, and MSRA

- The restoration and successional development of the physical structure and ecological function of the aquatic and terrestrial habitat areas to provide a substantial educational opportunity for the community and numerous opportunities of community stewardship of the habitat areas in the future

Table 5-1 presents a habitat accounting for the MPC Restoration Project that provides the foundation for addressing compensatory mitigation requirements of the participating regulatory agencies. Table 5-1 presents the following:

- Acreages of the various habitat types currently present that may be affected by remediation or restoration activities

- Acreages of impacts anticipated to result from remediation activities and disturbances required to create the proposed MPC Restoration Project

- Expected acreages to be restored/created for each of the various habitat types and the resulting net gain or loss of each habitat type

- Acreages of enhancement for habitats not directly restored or created by the MPC Restoration Project, but positively affected by proposed activities

In addition to the habitat acreages presented in Table 5-1, the MPC Restoration Project proposes to create 50-foot-wide buffers around all the restoration areas, consistent with CCA policy. Buffers around the restoration areas generally fit within the Mill Site Specific Plan Open Space designated areas (Figure 4-2). Where buffers are within designated Open Space areas, the MPC Restoration Project proposes that buffers be seeded with native vegetation consistent with Specific Plan Open Space policies. Where buffers will extend beyond designated Open Space areas, buffers may be a mixture of native and/or landscaped vegetation. The MPC Restoration Project preferred alternative proposes to use buffers 50 feet in width, because this buffer width allows for increased upland habitat restoration acreage, and (in combination with the restored upland habits adjacent to the waters/wetlands) provides abundant mitigation of potential influences from development surrounding the more sensitive waters/wetlands habitats.

The MPC Restoration Project, as currently conceived, anticipates a range of mitigation ratios depending on the type and quality of the habitat impacted and the type, quality, and prevalence of the habitat type restored. The dominant habitat types on site under current conditions are former industrial ponds that provide open water and vegetated perennial wetland. There are several small areas that are bedrock groundwater seeps along the coastal bluffs, a few small seep wetlands are present in the OU-E lowland, and

the MSRA provides a small channelized stream and riparian canopy consisting of a mix of native and non-native species.

As described in Section 2.3, most of the wetland habitats on the site are of low-quality and provide less than half of the ecological function of a typical reference wetland system. Using details presented for the MPC Restoration Project preferred alternative, ARCADIS estimated CRAM scores for the OU-E lowland, enhanced reach of Maple Creek (i.e., Drainage D-1), and MCRC portions of the MPC Restoration Project. Appendix A presents details of this evaluation. Results of the CRAM evaluation for restored conditions in the OU-E lowland suggest that the restored low and high marsh wetland system will increase the overall ecological function of the OUE- lowland wetlands from its current state of 51 percent (calculated as the average CRAM score for potential wetlands in the OU-E lowland) to 82 percent. This represents an approximate 60 percent increase in functional capacity of the restored depressional wetland system compared to its current conditions. Results of the CRAM evaluation for restored conditions in the enhanced section of Maple Creek (i.e. Drainage D-1) suggest that the restored riverine wetland habitat will increase the overall ecological function of this remnant of Maple Creek from its current state of 50 percent to 70 percent. This represents an approximate 40 percent increase in functional capacity of the restored riverine and riparian system compared to its current state. The newly created MCRC system is estimated to have a functional capacity of 73 percent of a reference system.

Figure 5-2 presents results for each of the CRAM attributes, scaled to 100% of their total possible scores, and presents the overall CRAM score, scaled to 100% of their total possible scores, for proposed conditions of the OU-E lowland, enhanced reach of Maple Creek, and MCRC. Figure 5-2 also presents similar information for current conditions of wetlands in these areas for comparison. Current conditions for the MCRC are not presented in Figure 5-2, because this habitat does not currently exist on the site.

The MPC Restoration Project wetlands are not expected to achieve a CRAM ecological function score equivalent to a reference wetland, because a reference wetland is assumed to have minimal adjacent development and would have an upgradient watershed that provides a full range of hydrologic functions (e.g., flow attenuation, groundwater infiltration and water storage). By contrast, the restored OU-E lowland, enhanced section of Maple Creek, and MCRC CRAM scores are specifically limited by the upgradient urban watershed hydrology (i.e., high intensity flows or short duration) and landscape connectivity, which is a physical constraint of the existing and future surrounding developed landscape. The constraints of landscape connectivity and water source are aspects of the overall surrounding landscape that are likely outside of the influence of the restoration design, because current development will not be removed and future development is an integral component of the Mill Site Specific Plan. These aspects are further discussed below.

- The landscape connectivity score of the Buffer and Landscape Context attribute for the OU-E lowland is unlikely to increase due to current and future development associated with the City and the Mill Site

Specific Plan, particularly due to development east of Highway 1. For the landscape connectivity score to approach that of a reference riverine wetland system, the MPC Restoration Project would require at least 400 meters of riparian buffer both upstream and downstream of the evaluated reach. Furthermore, the buffer width score of the Buffer and Landscape Context attribute approaching a reference system requires an average buffer width of at least 190 meters (approximately 625 feet) for depressional and riverine wetland systems. Therefore, it is apparent that current and proposed development constraints surrounding the MPC Restoration Project area prevent approaching reference scores for either landscape connectivity or buffer width in the Buffer and Landscape Context attribute.

- The water source score in the Hydrology attribute is unlikely to increase due to the flashy nature of stormwater flows resulting from a developed landscape with abundant impervious surfaces. In terms of the CRAM evaluation the low hydrology score results from more than 20% of the upgradient watershed being primarily urban runoff. Although some improvements in hydrology may be achieved through the programmatic control of impervious surfaces and future improvement in the City's storm drainage system, substantial changes in the flows dynamics entering Maple Creek are unlikely to occur in the foreseeable future due to the presence of City development.

Using the CRAM analysis to evaluate the overall increase in function that the MPC Restoration Project provides does not fully account for the hydrological and ecological connectivity of the proposed integrated habitat area. The CRAM analysis for each component of the MPC Restoration Project reflects conditions as specifically developed for distinct wetland types (e.g., depressional and riverine). While some aspects of landscape connectivity are captured in CRAM scores, because of the separation of different wetlands into distinct assessment areas some integrated ecological functions provided by connections between a diversity of landscape and wetland types are not fully reflected. Therefore, the proposed project will provide additional ecological benefit not strictly evaluated in the quantitative CRAM analysis.

In the process of restoring habitat types that existed on the site historically, but are now rare on the site and within the developed portions of the City, the MPC Restoration Project will also meet remedial objectives for the site and provide compensatory mitigation for impacts resulting from soil/sediment management activities. Where such habitats are identified and can be restored, it is within the participating agencies policies to allow out-of-kind mitigation (i.e., perennial ponded wetland such as Pond 8 is replaced in part with stream and riparian woodland corridor) and to provide mitigation ratios on the order of 1:1. The proposed MPC Restoration Project design has been developed with anticipation that such opportunities will be evaluated and incorporated into the final design where feasible.

6. Conceptual Construction Schedule

Implementation of the MPC Restoration Project will require the careful scheduling and integration of the remediation, demolition, restoration and revegetation components of the project. This section provides a conceptual overview of the construction sequencing currently envisioned to complete the MPC Restoration Project. This schedule is driven by the DSOD requirement that the Pond 8 dam be removed by the end of 2015. Specifics regarding construction sequencing are preliminary and may change as the project undergoes specific engineering studies and design or if the conceptual design changes. The conceptual schedule is also depicted in a Gantt chart in Figure 6-1 (in preparation).

OU-E Lowland Remediation and Demolition

- Manage sediment and backfill Ponds 6 and 7.
- Manage soil/sediment in other areas identified in the OU-E Remedial Action Plan (RAP).
- Demolish and remove remaining foundations and other OU-E lowland infrastructure. North wall support provided by the concrete retaining wall will remain.

Construction of Outfall Culverts at Beach Berm

- Survey and stake for construction at the beach berm to provide a new outfall for drainage (i.e., Station 0+00; Figure 4-3).
- Excavate beach berm, construct headwall and apron formwork, and place three 10-foot by 3-foot box culverts.
- Construct beach berm headwall and apron, install piping control measures, install impermeable membrane, and backfill with imported clay soils (less permeable than excavated sands).
- Place limited riprap to control erosion of beach and berm from potentially accelerated flows.
- Reface outboard surface of the beach berm and/or revegetate.

Grading of Proposed Wetland at OU-E Lowland

- Survey and stake OU-E lowland area (Station 1+00 to 14+00; Figure 4-3), delineating and protecting existing jurisdictional ESHAs on the hillsides.

- Excavate proposed low marsh and pond wetlands in OU-E lowland.
- Buttress slope of Pond 8 north wall with spoils from proposed low marsh and ponded wetlands.
- Excavate proposed high marsh wetland area and cut tie-in to existing topography.
- Install erosion control measures and plant/seed wetland and north OU-E coastal shrub habitats, as necessary.

Grading of Proposed Maple Creek Riparian Corridor

- Survey and stake proposed MCRC with temporary channel to bypass Pond 8.
- Excavate proposed MCRC and temporary bypass channel to discharge into the Forebay on east end of OU-E lowland (Station 14+00; Figure 4-4).
- Abandon existing Maple Creek pipeline to Pond 8.
- Construct new Alder Creek outfall and reroute existing Alder Creek storm drain pipeline.

South Ponds Riparian Corridor

- Survey and set offset stakes for the proposed channel alignment per the final drawings, including the main channel, floodplain, and 3:1 transition slopes to route South Pond and Basin S flow around Pond 8.
- Excavate the South Ponds Riparian Corridor from the low-lying area where South Pond pipeline surfaces to the bluff. This will include the main channel, floodplain, and 3:1 transition slope of variable width to tie in to existing topography.
- Connect the South Ponds Channel to the historical creek discharge on the coastal bluff (i.e., side slopes up to existing grade and channel bottom) to minimize destructive erosion condition.
- Install rock geomorphic flow control structures along channel, as necessary, paying particular attention along the descent to the bluff.
- Tie in Basin O-2 surface drainage and storm drains from the Planer building that currently discharge to Pond 8 west.

- Install erosion control measures and revegetate riparian area.
- Install flow control discharge weir and begin discharge to the South Ponds Riparian Corridor.

Pond 8 Sediment Management and Regrading

- Manage sediment in Pond 8 in accordance with requirements of the OU-E RAP. The OU-E RAP will be prepared following the completion of the OU-E Feasibility Study.
- Backfill and compact Pond 8 beginning at northeastern end and working westward.
- Remove north wall supports and utilities and regrade to tie in to OU-E lowland and Pond 8 upland surfaces at 5:1 slope.
- Remove dam concrete spillway and exposed portions of the cribwall, and regrade established stable slope from Planer Building elevation to coastal bluff bedrock.
- Vegetate former Pond 8 and slope with native upland grasses and coastal shrub species.
- Once backfilling in the alignment of proposed downstream location of MCRC is complete, excavate final downstream end of proposed MCRC.
- Install rock geomorphic flow control structures and install floodplain wetland depressions.
- Install erosion control measures and re-vegetate corridor.
- Abandon Maple Creek bypass channel.

Maple Street Riparian Area Regrading and Slope Stabilization

- Survey and stake MSRA for remediation (as needed) and regrading.
- Install temporary diversion conduits from Maple Creek headwall at Highway 1 to bypass existing Maple Street corridor and discharge into completed MCRC.
- Install temporary weir/check dam in MSRA Wetland L to capture base flow and reroute via temporary overland pipe to the MCRC.

- Remediate Wetland L sediment as required by the OU-E RAP; backfill and restore banks as needed.

- Remove MSRA Wetland L culvert, install step/pool transition to Maple Creek channel and regrade slopes in MSRA, lay back slope from existing toe of slope to approximately 3:1 proposed slope, and rehabilitate low flow channel.

- Place erosion control protection and re-vegetate MSRA as transition to proposed MCRC.

- Abandon diversion conduit that bypasses Maple Creek and allow flow to discharge into newly graded channel.

Post Dam Removal Construction

- Complete “Soldier Bay” CCT segment across the beach berm, install beach access, and install CCT crossing at South Pond Riparian Corridor.

- Develop MCRC road cross and utility corridor (To be determined).

7. References

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ARCADIS

TABLES

Table 2-1
Mill Pond Complex Restoration Project Existing Features

Mill Pond Complex Restoration Draft Conceptual Design
Former Georgia-Pacific Wood Products Facility
Fort Bragg, California

Waters/Wetlands Identification	General Site Location	Historical Use	Hydrologic Inputs	USACE Jurisdictional Status*	MPC Restoration Project Influence
OU-E lowlands and Adjacent Areas					
Pond 5	Central portion of site, east of OU-E lowland	Water storage for fire suppression	Direct precipitation and overland flow from Highway 1 and portions of site Basin O-1.	Non-jurisdictional	Enhanced through creation of 50-foot buffer.
Pond 6	OU-E lowland	Used as a settling basin for process water used during the operation of the powerhouse.	Groundwater seep, overland flow from the OU-E lowland and direct precipitation.	Jurisdictional	Following sediment management activities, the area will be restored as part of the OU-E lowland wetland system.
Pond 7	OU-E lowland	Used as a settling basin for process water used during the operation of the powerhouse.	Groundwater seep, overland flow from the OU-E lowland and direct precipitation.	Non-jurisdictional	Following sediment management activities, the area will be restored as part of the OU-E lowland wetland system.
Pond 8	Central portion of site, adjacent to southern boundary of OU-E lowland	Created from rerouted and culverted flow from Maple and Alder Creeks. Used to float logs for processing during site operations.	Stormwater flow from City Basins C and D and site Basins O-1, O-2, S, F, E, and J. May have minor groundwater influence. Direct precipitation.	Jurisdictional	Following sediment management activities, the area will be restored as part of the coastal shrub habitat adjacent to the OU-E lowland.
North Pond	OU-E lowland	Used as a settling basin for water used during the operation of the hydraulic debarker.	Direct precipitation and overland flow from the OU-E lowland and adjacent hillsides.	Jurisdictional	Following sediment management activities, the area will be restored as part of the OU-E lowland wetland system.
Wetland E-1	OU-E lowland	None	Groundwater seep, overland flow from the OU-E lowland, and direct precipitation.	Undetermined**	Wetland areas will be regraded and restored as part of the OU-E lowland wetland system.
Wetland E-2	OU-E lowland	None	Groundwater seep, overland flow from the OU-E lowland, and direct precipitation.	Undetermined**	Wetland areas will be regraded and restored as part of the OU-E lowland wetland system.
Wetland E-3	OU-E lowland	None	Water seep from Pond 8.	Undetermined**	Wetland areas will be regraded and restored as part of the OU-E lowland wetland system.
Wetland E-4	OU-E lowland	Building foundation	Groundwater and direct precipitation.	Undetermined**	Wetland areas will be regraded and restored as part of the OU-E lowland wetland system.
Wetland E-5/E-6	OU-E lowland	None	Groundwater seep, overland flow from the OU-E lowland, and direct precipitation.	Undetermined**	Wetland areas will be regraded and restored as part of the OU-E lowland wetland system.
Wetland E-7	OU-E lowland	None	Overland flow from the OU-E lowland and direct precipitation.	Undetermined**	Enhanced through creating of surrounding coastal shrub habitat.
Wetland E-8	OU-E lowland	None	Groundwater seep, overland flow from the OU-E lowland, and direct precipitation.	Undetermined**	Enhanced through creating of surrounding coastal shrub habitat.
Wetland B	OU-E lowland	None	Groundwater seep, overland flow and direct precipitation.	Jurisdictional	Enhanced through creating of surrounding coastal shrub habitat.
Wetland C	OU-E lowland	None	Groundwater seep, overland flow and direct precipitation.	Jurisdictional	Enhanced through creating of surrounding coastal shrub habitat.
Wetland D	OU-E lowland	None	Culverted stormwater flow from upland portions of site basin O-1 and direct precipitation.	Non-jurisdictional	Enhanced through creating of surrounding coastal shrub habitat.
Maple Creek and Maple Street Riparian Area					
Wetland L	Maple Street Riparian Area, between former Ash Pile and Highway 1	None. Likely part of the riparian areas associated with the historical flow of Maple Creek.	Overland flow from Site Basin E, groundwater, and direct precipitation.	Jurisdictional	Areas disturbed by remediation will be restored and revegetated. Wetland L will be connected to Maple Creek through daylighting of the culverted flow at the northern end.
Wetland J	North of Maple Street Riparian Area, directly adjacent to Maple Creek	None. Likely part of the riparian areas associated with the historical flow of Maple Creek.	Overland flow from site Basin J, groundwater, and direct precipitation.	Jurisdictional	Enhanced through control of invasive species and connection to newly created Maple Creek Riparian Corridor.
Drainage D1	Southern portion of the site, North of Maple Street Riparian Area and directly adjacent to Highway 1	Flow path for Maple Creek drainage following rerouting and culverting during City and site development	Primarily stormwater flow from City Basin C. Lesser inputs from overland flow originating from direct precipitation; groundwater; and site Basins E, F, and J.	Jurisdictional	Enhanced through regrading of incised channel, control of invasive species, and connection to newly created Maple Creek Riparian Corridor.

Notes:

MPC - Mill Pond Complex

USACE - United States Army Corps of Engineers

* Delineated boundaries of potential waters/wetlands have been submitted to Regional Water Quality Control Board (RWQCB) and California Coastal Commission (CCC). However, jurisdiction other than that for USACE (i.e., waters of the state by RWQCB or coastal environmentally sensitive habitat area by CCC) has not yet been determined.

** Delineated boundaries of potential waters/wetlands have been submitted to USACE. However, jurisdiction has not yet been determined.

Table 4-1
Mill Pond Complex Restoration Potential Species List

Mill Pond Complex Restoration Draft Conceptual Design
Former Georgia-Pacific Wood Products Facility
Fort Bragg, California

Species Name	Common Name	California Indicator Status	Ponded Wetlands	Low Marsh	High Marsh	Wet Meadow/ Seasonal Wetland	Riparian Floodplain	Riparian Upland	Coastal shrub
Herbaceous Species									
Athyrium filix-femina	lady fern	FAC			x	x	x		
Agrostis pallens	seashore bentgrass	NI				x	x	x	
Carex lyngbyei	Lyngby's sedge	OBL		x	x				
Carex obnupta	slough sedge	OBL		x	x	x	x		
Carex viridula	green sedge	OBL			x	x	x		
Cyperus eragrostis	nutsedge	FACW		x	x	x	x		
Deschampsia cespitosa	tufted hairgrass	FACW		x	x	x	x		
Elymus glaucus	blue wildrye	FACU					x	x	x
Festuca idahoensis	Idaho fescue	UPL						x	x
Festuca rubra	red fescue	FAC				x	x	x	
Heracleum lanatum	cow parsnip	FACU							x
Hordeum brachyantherum	barley	FACW			x	x	x		
Hydrocotyle ranunculoides	marsh pennywort	OBL	x						
Iris douglasiana	Douglas iris	UPL							x
Juncus bolanderi	Bolander's rush	OBL		x	x	x			
Juncus effusus	soft rush	OBL		x	x	x	x		
Juncus patens	blue-green rush	FAC			x	x	x		
Lysichiton americanus	yellow skunk cabbage	OBL			x				
Mimulus guttatus	seep monkey flower	OBL		x	x	x			
Nuphar lutea ssp polysepalum	yellow pond lily	OBL	x						
Oenanthe sarmentosa	water parsely	OBL		x	x	x	x		
Polystichum munitum	western sword fern	UPL						x	
Potamogeton natans	pondweed	OBL	x						
Scirpus microcarpus	panicled bulrush	OBL		x	x	x	x		
Typha latifolia	cattail	OBL		x					
Woodwardia fimbriata	giant chain fern	FACW		x					
Shrub Species									
Baccharis pilularis	coyote brush	UPL							x
Gaultheria shallon	salal	UPL						x	x
Myrica californica	California wax myrtle	FAC			x		x	x	
Rhamnus californica	California coffeeberry	UPL							x
Rosa nutkana	Nootka rose	NI						x	
Salix hookeriana	coastal willow	FACW			x		x	x	
Salix lasiolepis	arroyo willow	FACW			x	x	x	x	
Sambucus racemosa	red elderberry	FACU			x			x	
Tree Species									
Abies grandis	grand fir	UPL					x		
Alnus rubra	red alder	FACW					x	x	
Lithocarpus densiflorus	tanbark oak	UPL							x
Pinus contorta	beach pine	FAC						x	
Pseudotsuga menziesii	Douglas fir	UPL						x	

Notes:

1. Indicator status does not include "+" or "-" values.

2. Indicator status from: USDA, NRCS. 2011. The PLANTS Database (http://plants.usda.gov, 6 April 2011). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

Definitions:

OBL: Obligate species likely found in wetland habitats

FACW: Facultative wetland species likely to be found in wetland habitats

FAC: Facultative species equally likely to be found in wetlands and upland habitats

FACU: Facultative species likely to be found in drier wetland habitats

UPL: Upland species not likely to be found in wetland habitats

NI: No indicator available

Table 5-1
Mill Pond Complex Restoration Habitat Accounting

Mill Pond Complex Restoration Draft Conceptual Design
Former Georgia-Pacific Wood Products Facility
Fort Bragg, California

OU-E Lowland and Maple Creek Riparian Corridor

	Current	Impacts	Restored/Created	Net Gain/Loss	Enhanced
Waters/Wetlands Habitat					
Ponded Wetlands	8.21	7.63	0.88	-6.75	0.58
Herbaceous Seep Wetlands	0.66	0.22	2.90	2.68	0.44
Herbaceous Seasonal Wetlands	1.00	0.99	2.49	1.50	0.01
Riparian Seep Wetlands	0.00	0.00	1.36	1.36	0.00
Riparian Seasonal Wetlands	0.76	0.00	0.69	0.69	0.72
Stream Channel	0.05	0.00	0.68	0.68	0.05
Waters/Wetlands Subtotal	**10.69**	**8.84**	**8.99**	**0.16**	**1.80**
Upland Habitat					
Riparian Upland Habitat	0.00	0.00	3.29	3.29	0.00
Coastal Shrub/Grassland	0.00	0.00	12.17	12.17	0.00
Upland Habitat Subtotal	**0.00**	**0.00**	**15.47**	**15.47**	**0.00**
TOTALS	**10.69**	**8.84**	**24.46**	**15.62**	**1.80**

Maple Street Riparian Area Tributary

	Current	Impacts	Restored/Created	Net Gain/Loss	Enhanced
Waters/Wetlands Habitat					
Ponded Wetlands	0.00	0.00	0.00	0.00	0.00
Herbaceous Seep Wetlands	0.00	0.00	0.00	0.00	0.00
Herbaceous Seasonal Wetlands	0.00	0.00	0.00	0.00	0.00
Riparian Seep Wetlands	0.00	0.00	0.00	0.00	0.00
Riparian Seasonal Wetlands	0.00	0.00	0.00	0.00	0.00
Stream Channel	0.00	0.00	0.01	0.01	0.00
Waters/Wetlands Subtotal	**0.00**	**0.00**	**0.02**	**0.02**	**0.00**
Upland Habitat					
Riparian Upland Habitat	0.00	0.00	0.18	0.18	0.00
Coastal Shrub/Grassland	0.00	0.00	0.00	0.00	0.00
Upland Habitat Subtotal	**0.00**	**0.00**	**0.18**	**0.18**	**0.00**
TOTALS	**0.00**	**0.00**	**0.20**	**0.20**	**0.00**

South Ponds Riparian Corrdior

	Current	Impacts	Restored/Created	Net Gain/Loss	Enhanced
Waters/Wetlands Habitat					
Ponded Wetlands	0.00	0.00	0.00	0.00	0.00
Herbaceous Seep Wetlands	0.00	0.00	0.00	0.00	0.00
Herbaceous Seasonal Wetlands	0.00	0.00	0.00	0.00	0.00
Riparian Seep Wetlands	0.00	0.00	0.12	0.12	0.00
Riparian Seasonal Wetlands	0.00	0.00	0.00	0.00	0.00
Stream Channel	0.00	0.00	0.13	0.13	0.00
Waters/Wetlands Subtotal	**0.00**	**0.00**	**0.25**	**0.25**	**0.00**
Upland Habitat					
Riparian Upland Habitat	0.00	0.00	0.83	0.83	0.00
Coastal Shrub/Grassland	0.00	0.00	0.00	0.00	0.00
Upland Habitat Subtotal	**0.00**	**0.00**	**0.83**	**0.83**	**0.00**
TOTALS	**0.00**	**0.00**	**1.08**	**1.08**	**0.00**

Combined Mill Pond Complex Restoration Project

	Current	Impacts	Restored/Created	Net Gain/Loss	Enhanced
Waters/Wetlands Habitat					
Ponded Wetlands	8.21	7.63	0.88	-6.75	0.58
Herbaceous Seep Wetlands	0.66	0.22	2.90	2.68	0.44
Herbaceous Seasonal Wetlands	1.00	0.99	2.49	1.50	0.01
Riparian Seep Wetlands	0.00	0.00	1.48	1.48	0.00
Riparian Seasonal Wetlands	0.76	0.00	0.69	0.69	0.72
Stream Channel	0.05	0.00	0.82	0.82	0.05
Waters/Wetlands Subtotal	**10.69**	**8.84**	**9.26**	**0.43**	**1.80**
Upland Habitat					
Riparian Upland Habitat	0.00	0.00	3.48	3.48	0.00
Coastal Shrub/Grassland	0.00	0.00	12.17	12.17	0.00
Upland Habitat Subtotal	**0.00**	**0.00**	**15.65**	**15.65**	**0.00**
TOTALS	**10.69**	**8.84**	**24.91**	**16.07**	**1.80**

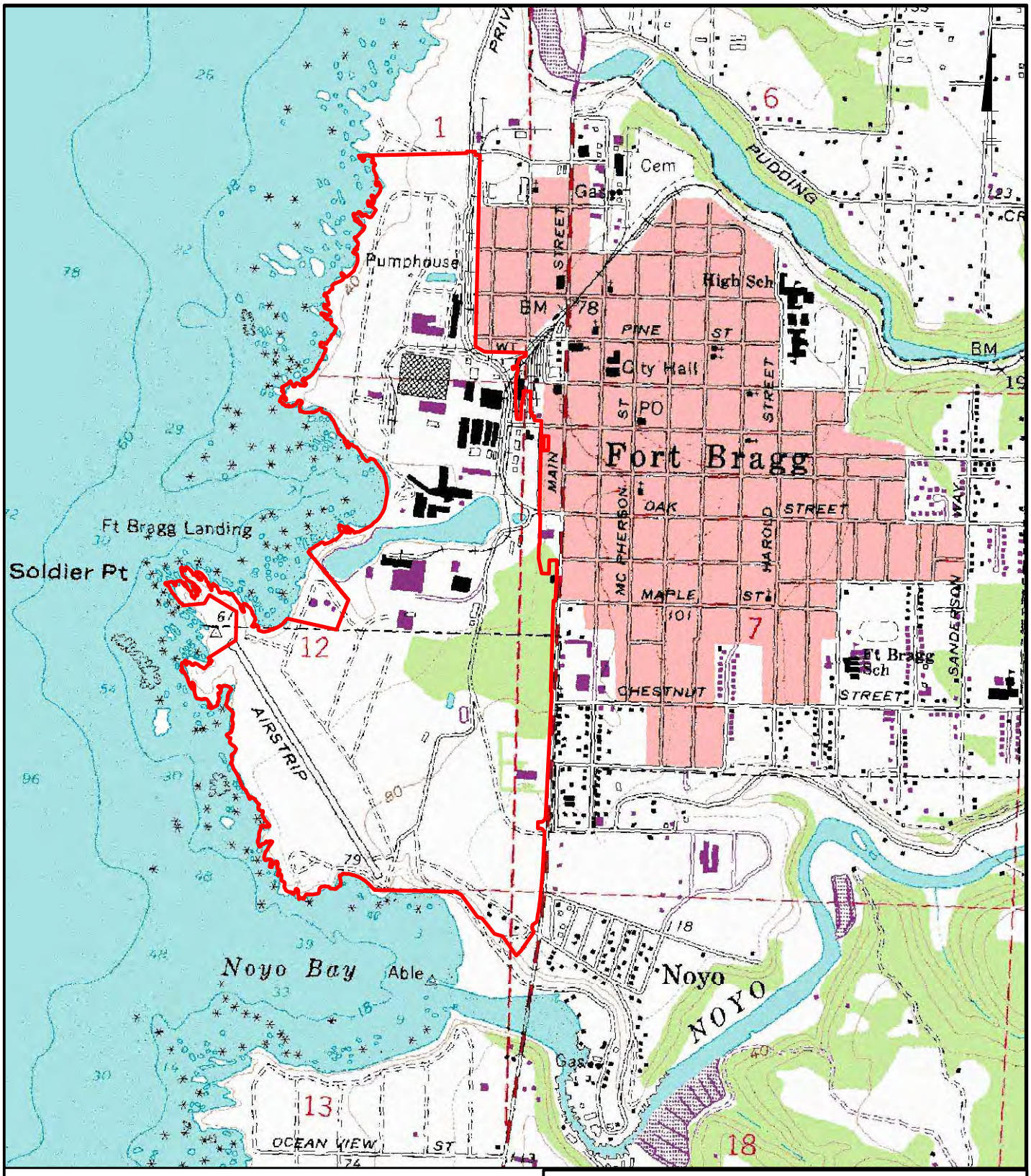
Notes:

All values are presented in acres.

Estimates are based on conceptual designs developed for the Mill Pond Complex DRAFT Conceptual Design Report May 2011.

ARCADIS

FIGURES



LEGEND:

SITE BOUNDARY

DRAFT

0 800 1,600 Feet

GRAPHIC SCALE

FORMER GEORGIA-PACIFIC WOOD PRODUCTS FACILITY
FORT BRAGG, CALIFORNIA

MILL POND COMPLEX RESTORATION DRAFT CONCEPTUAL DESIGN REPORT

SITE LOCATION MAP

ARCADIS

FIGURE
1-1

CITY: HR DIV/GROUP: AIT GIS DB:BCG
Project # B006613 8.0006.00001
I:\FortBragg\MXD\MillPond_ComplexRestoration\March2011\Fig 1-1 SiteLocation.mxd - 4/5/2011 @ 9:29:42 AM

CITY: HR DIV/GROUP: AIT GIS DB:BCG
Project # B0066138.0006.00001
I:\FortBragg\MXD\MillPond_ComplexRestoration\March2011\Fig 1-2 OU_MajorFeatures.mxd - 4/21/2011 @ 10:37:33 AM

Glass Beach #1
Glass Beach #2
Glass Beach #3
Pacific Ocean
Soldier Bay
City of Fort Bragg
Parcel 1
Parcel 2
Parcel 3
Parcel 4
Parcel 5
Parcel 6
Parcel 7
Parcel 8
Parcel 9
Parcel 10
Pump House
Pond 9
Helicopter Pad
Dry Shed #2
Explosives Bunker
Resaw #6
Glue Lam
Former Planer #1
Former Dry Shed #1
Former Mobile Equipment Shops
Dry Shed #5
Truck Loading Shed
Planer #50
Dry Shed #4
Guard Shack
Storage Shed
Conference Room
Generator Shed
Radio Room
Offsite Office
Yard Office
Kilns
Machine Shop
Construction Engineering
Break Room
Main Office Parking
Green Chain
Covered Shed
Lath Building
Sewage Pumping Station
Training Building
North Pond Area
Sawmill #1
Plant Supply
Truck Dump
Press Building
Pond 6
Powerhouse
Pond 5
Pond 7
Former Fly Ash Reinjection System
Former Mobile Equipment Shop
Poly Tanks Pad
Pond 8
Former Cooling Towers
Former Tire Shop
City of Fort Bragg Wastewater Treatment Plant
Pump House
Former Washdown Building
Former Fuel Storage and Dispenser Building
Offsite Office
Former Blower Building
Former Planer #2
Shipping Office
Offsite Office
Former Transformer Building
Former Mill Hog
Time Clock Shed
Former Shaker Screen Building
Johnson Property APN: 018-430-04
Former Barker Building
Former Sorter Building
Former Sawmill #2
Scale Office
Scale House
Truck Ramp
Pond 3
Truck Ramp
Tally Shack
Pond 3
Pump House
Pond 2
South Ponds Area
Pond 1
Pond 4
Former Sheep Barn Area
Water Filtration and Purifier System
Chemical Storage Shed
Green Houses
Main Packing Shed
Chemical Mixing Shed
Conex Boxes
Corporation Yard Shed
Guard Shack
North Noyo Point Road Dwellings

LEGEND:
FORMER INDUSTRIAL POND
STRUCTURE
FORMER STRUCTURE
FORMER STRUCTURE-FOUNDATION INTACT
FACILITY PARCEL

OPERABLE UNITS
COASTAL TRAIL/PARK ACQUISITION (OU-A)
"OFFSITE" NON-INDUSTRIAL (OU-B)
NORTHERN (OU-C)
SOUTHERN (OU-D)
PONDS/PARK (OU-E)

PROPERTY OWNED BY OTHERS

DRAFT

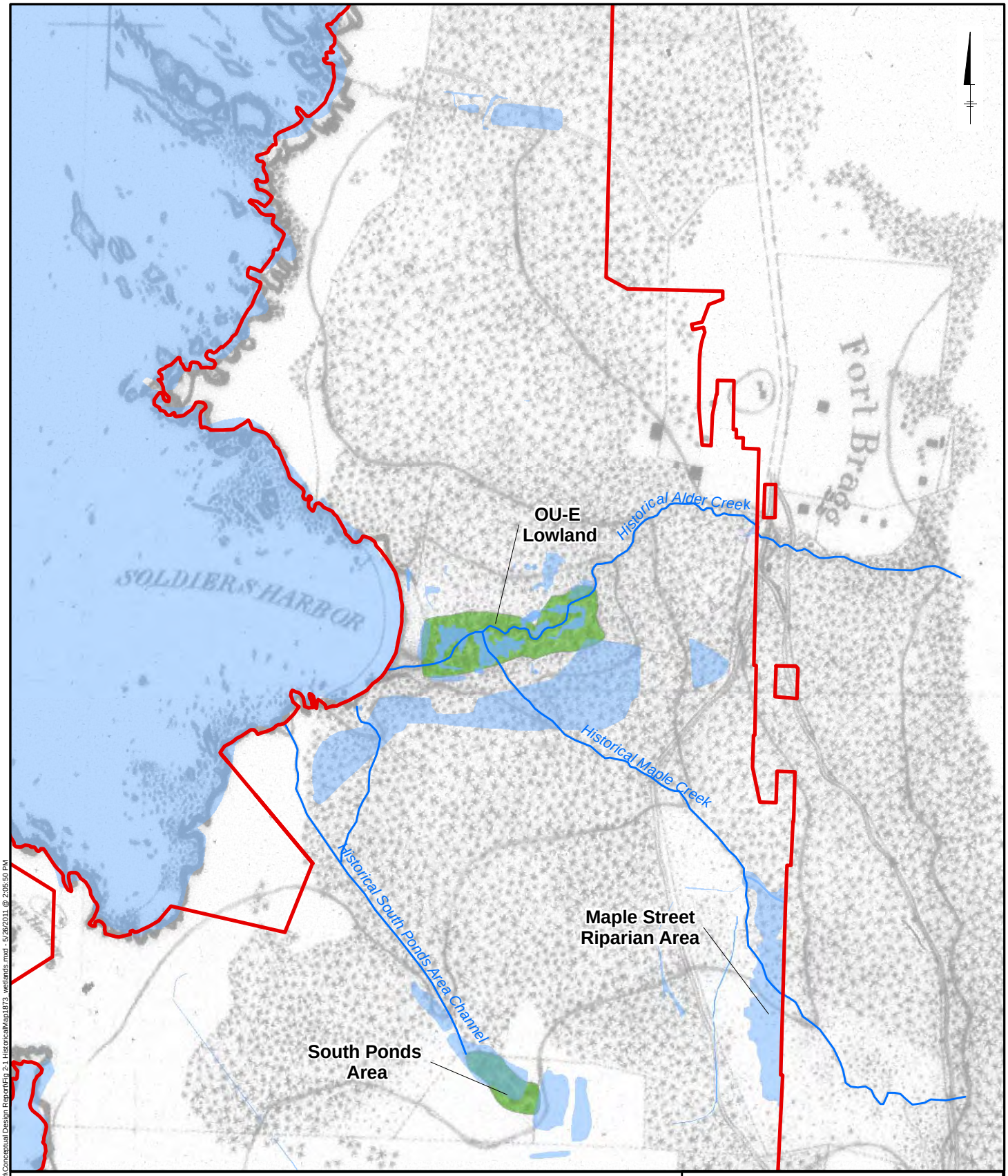
0 620 1,240 Feet
GRAPHIC SCALE

FORMER GEORGIA-PACIFIC WOOD PRODUCTS FACILITY
FORT BRAGG, CALIFORNIA
MILL POND COMPLEX RESTORATION DRAFT CONCEPTUAL DESIGN REPORT

OPERABLE UNITS AND MAJOR FEATURES

ARCADIS

FIGURE
1-2



LEGEND:

- FACILITY BOUNDARY
- CURRENT AQUATIC FEATURES
- APPROXIMATE EXTENT OF HISTORICAL WETLAND FEATURES
- APPROXIMATE EXTENT OF HISTORICAL CREEK FEATURES

DRAFT

SOURCE:
1873 U.S. COAST SURVEY MAP. POINT CABRILLO TO PUDDING CREEK, MENDOCINO COUNTY, CALIFORNIA. REGISTER NO. 1363 B. PROVIDED BY UNIVERSITY OF ALABAMA

0 300 600 1,200 Feet

FORMER GEORGIA-PACIFIC WOOD PRODUCTS FACILITY
FORT BRAGG, CALIFORNIA
MILL POND COMPLEX RESTORATION DRAFT CONCEPTUAL DESIGN REPORT

HISTORICAL MAP WITH CURRENT AND HISTORICAL AQUATIC FEATURES

ARCADIS

FIGURE
2-1

CITY: HR DIV/GROUP: AIT GIS DB:BCG
Project # B006138.0006.00001
I:\FortBragg\MXD\MillPond Complex\Restoration\Conceptual Design Report\Fig 2-1 HistoricalMap1873_wetlands.mxd - 5/26/2011 @ 2:05:50 PM

CITY: HR DIV/GROUP: IM GIS DB: BCG
Project # B0066138.0007.00001
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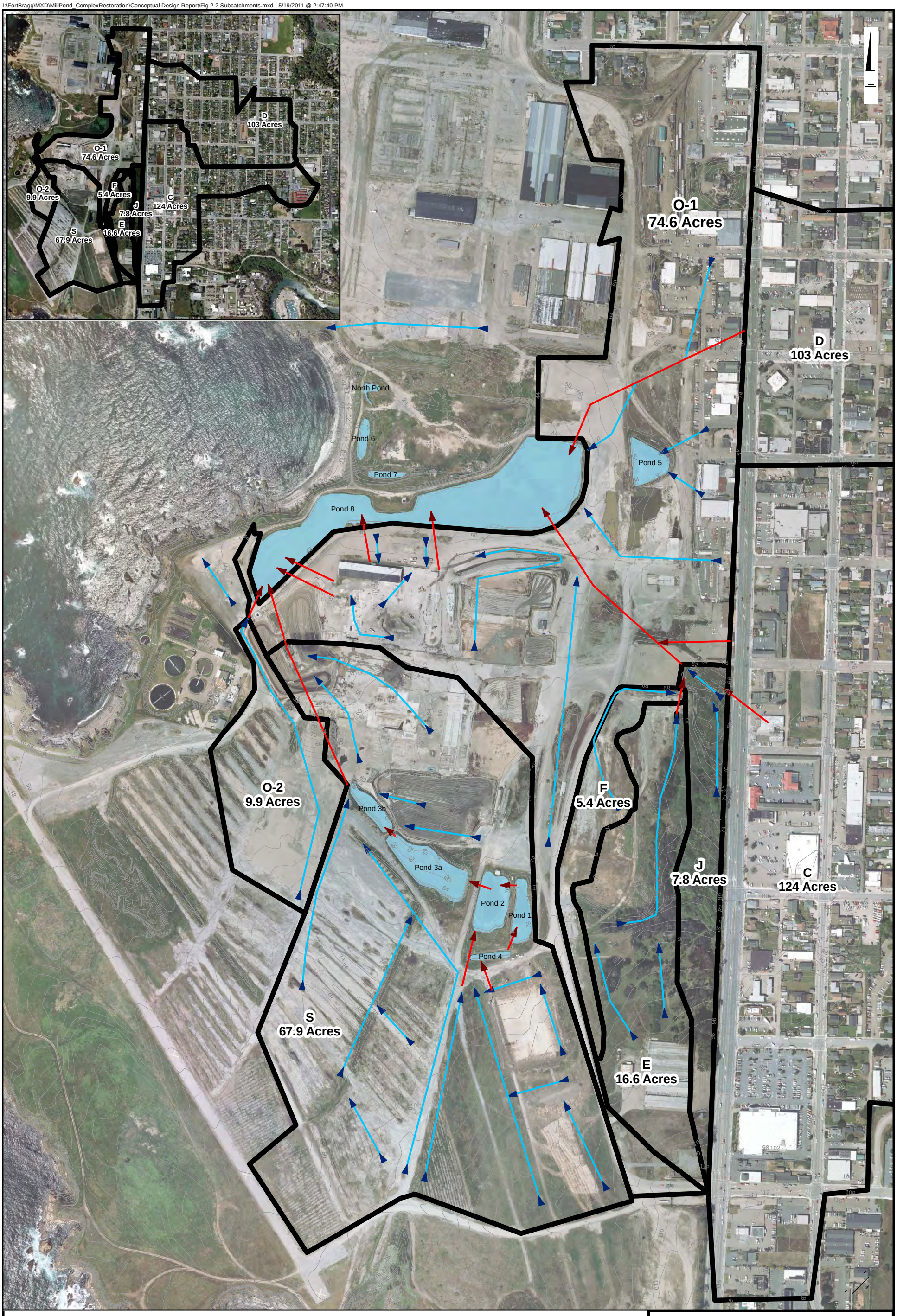


LEGEND

- FLOW DIRECTION
- PIPE LOCATION (APPROX.)
- CONTOURS
- SUBCATCHMENT BOUNDARY
- PONDS

NOTE: PIPE LOCATIONS ARE APPROXIMATE AND NOT ALL SURFACE WATER FLOW PATHS ARE SHOWN

DRAFT

0 400 800 Feet
GRAPHIC SCALE

FORMER GEORGIA-PACIFIC WOOD PRODUCTS FACILITY
FORT BRAGG, CALIFORNIA

MILL POND COMPLEX RESTORATION DRAFT CONCEPTUAL DESIGN REPORT

CURRENT DRAINAGE BASINS FOR MILL POND COMPLEX RESTORATION PROJECT

ARCADIS

FIGURE
2-2

CITY: HR DIV/GROUP: IM GIS DB: BCG
Project # B0066138.0006.00001
I:\FortBragg\MXD\MillPond_ComplexRestoration\Conceptual Design Report\Fig 2-3 WetlandDelineationMap_All_sizeD.mxd - 5/26/2011 @ 2:06:53 PM

Wetland C-1
P-1
P-2
Wetland A
Pond A
P-4
P-3
Wetland C-2
North Pond/Wetland F
Wetland SB-2b
Wetland E-7
Wetland B
Wetland C
Wetland E-8
P-19
P-20
Wetland C3
Wetland E-1 East
Seep SB-1
Seep SB-2a
P-17
P-18
Wetland D
Seep SB-3
P-5
Wetland E-1 West
P-6
Wetland SB-4
Wetland E-6
P-16
P-8
P-7
Pond 6/Wetland G
P-11
Wetland E-2
Seep SB-5
P-15
P-10
P-9
Seep SB-6
Seep SB-7
P-14
P-12
Pond5/Wetland E
Seep SB-8
P-13
Wetland E-3
Seep SB-9
Pond7/WetlandH
Wetland E-4
Pond8/Wetland I
Seep SB-10
Wetland SB-10
Seep SB-11
Wetland D-1c
Drainage D1
Wetland D-1b
Wetland J
Wetland D-1
Wetland D-1a
Wetland L
Wetland D-2*
Pond 2/Wetland N
Wetland K
P-21
Pond 3 NW/Wetland P
Riparian Area
SOUTH PONDS
Wetland R
Pond 1/Wetland M
P-22
Pond 3 SE/Wetland O
MAPLE STREET RIPARIAN AREA
Pond 4/Wetland Q
Wetland S

NOTES:
1. WATERS/WETLANDS BOUNDARIES PREVIOUSLY DELINEATED BY WRA (2009) WERE APPROVED BY THE USACE ON MARCH 15, 2010 (USACE FILE # 2009-00372N).
2. THREE-PARAMETER WETLANDS ARE DEFINED AS WETLANDS WHERE:
   1) EVIDENCE OF WETLAND HYDROLOGY, HYDRIC SOIL, AND HYDROPHYTIC VEGETATION WERE PRESENT DURING FIELD INVESTIGATIONS, OR
   2) LACK OF EVIDENCE FROM ONE OR MORE OF THE THREE PARAMETERS WAS DUE TO PROBLEMATIC/DISTURBED CONDITIONS.

* WETLAND CHARACTERISTICS FOR WETLAND D-2 WERE ASSESSED FROM SOIL BORING P-22. DUE TO THE PRESENCE OF DENSE SHRUB AND BRAMBLE, WETLAND BOUNDARIES FOR WETLAND D-2 WERE DELINEATED FROM SOIL BORINGS P-21 AND P-22 AND VEGETATIVE CHARACTERISTICS IN AERIAL PHOTOGRAPHY. THEREFORE, THE BOUNDARIES OF WETLAND D-2 MAY CONTAIN AN UPLAND AND WETLAND MOSAIC.

LEGEND

- SOIL PIT LOCATION
- RIPARIAN AREA
- **POTENTIAL ENVIRONMENTALLY SENSITIVE HABITAT AREAS (ESHA)**
- WIDTH OF POTENTIAL GROUNDWATER SEEP/WATERS OF THE STATE (ARCADIS 2010; NOT YET APPROVED)
- POTENTIAL WET ESHA (ARCADIS 2010; NOT YET APPROVED)
- USACE JURISDICTIONAL WATERS/ WETLANDS (WRA 2009; APPROVED BY THE USACE 3/15/10)
- NON-JURISDICTIONAL WATERS/WETLANDS (WRA 2009)
- SEASONAL WETLAND
- WETLAND SEEP
- INDUSTRIAL POND
- SEASONAL WETLAND DITCH
- RIPARIAN WETLAND
- BEDROCK GROUNDWATER SEEP
- PERENNIAL WATERS
- THREE-PARAMETER WETLAND
- AREA NOT EVALUATED BASED ON ONGOING CONSTRUCTION ACTIVITIES

DRAFT

0 300 600 Feet
GRAPHIC SCALE

FORMER GEORGIA-PACIFIC WOOD PRODUCTS FACILITY
FORT BRAGG, CALIFORNIA
MILL POND COMPLEX RESTORATION DRAFT CONCEPTUAL DESIGN REPORT

POTENTIAL ENVIRONMENTALLY SENSITIVE HABITAT AREAS

ARCADIS

FIGURE 2-3

CITY: HR DIV/GROUP: IM GIS DB: BCG
Project # B0066138.0006.00001
I:\FortBragg\MXD\MillPond_ComplexRestoration\Conceptual Design Report\Fig 2-3a WetlandDelineationMap_North.mxd - 5/13/2011 @ 12:36:02 PM

NOTES:
1. WATERS/WETLANDS BOUNDARIES PREVIOUSLY DELINEATED BY WRA (2009) WERE APPROVED BY THE USACE ON MARCH 15, 2010 (USACE FILE # 2009-00372N).
2. THREE-PARAMETER WETLANDS ARE DEFINED AS WETLANDS WHERE:
   1) EVIDENCE OF WETLAND HYDROLOGY, HYDRIC SOIL, AND HYDROPHYTIC VEGETATION WERE PRESENT DURING FIELD INVESTIGATIONS, OR
   2) LACK OF EVIDENCE FROM ONE OR MORE OF THE THREE PARAMETERS WAS DUE TO PROBLEMATIC/DISTURBED CONDITIONS.

LEGEND

- SOIL PIT LOCATION

POTENTIAL ENVIRONMENTALLY SENSITIVE HABITAT AREAS (ESHA)

- POTENTIAL WET ESHA (ARCADIS 2010; NOT YET APPROVED)
- USACE JURISDICTIONAL WATERS/ WETLANDS (WRA 2009; APPROVED BY THE USACE 3/15/10)
- NON-JURISDICTIONAL WATERS/WETLANDS (WRA 2009)
- SEASONAL WETLAND
- WETLAND SEEP
- INDUSTRIAL POND
- THREE-PARAMETER WETLAND

DRAFT

0 220 440 Feet
GRAPHIC SCALE

FORMER GEORGIA-PACIFIC WOOD PRODUCTS FACILITY
FORT BRAGG, CALIFORNIA
MILL POND COMPLEX RESTORATION DRAFT CONCEPTUAL DESIGN REPORT

POTENTIAL ENVIRONMENTALLY SENSITIVE HABITAT AREAS - NORTHERN

ARCADIS

FIGURE
2-3a

Seep SB-2b
Seep SB-1
Seep SB-2a
Seep SB-3
P-5
Wetland SB-4
North Pond/Wetland F
Wetland E-7
P-17
P-19
Wetland E-8
P-18
Wetland B
Wetland C
Wetland D
Wetland E-1
P-6
P-7
P-8
Wetland E-5
Wetland E-6
P-16
Pond 6/Wetland G
P-10
P-15
P-11
Wetland E-2
P-14
P-13
P-12
P-9
Pond 7/Wetland H
Wetland E-4
Wetland E-3
Pond 8/Wetland I
P-20
Wetland C3
Pond 5
Wetland E
Seep SB-5
Seep SB-6
Seep SB-7
Seep SB-8
Seep SB-9
Wetland SB-10
Seep SB-12
Seep SB-11

NOTES:
1. WATERS/WETLANDS BOUNDARIES PREVIOUSLY DELINEATED BY WRA (2009) WERE APPROVED BY THE USACE ON MARCH 15, 2010 (USACE FILE # 2009-00372N).
2. THREE-PARAMETER WETLANDS ARE DEFINED AS WETLANDS WHERE:
   1) EVIDENCE OF WETLAND HYDROLOGY, HYDRIC SOIL, AND HYDROPHYTIC VEGETATION WERE PRESENT DURING FIELD INVESTIGATIONS, OR
   2) LACK OF EVIDENCE FROM ONE OR MORE OF THE THREE PARAMETERS WAS DUE TO PROBLEMATIC/DISTURBED CONDITIONS.

LEGEND

- SOIL PIT LOCATION

POTENTIAL ENVIRONMENTALLY SENSITIVE HABITAT AREAS (ESHA)

- WIDTH OF POTENTIAL GROUNDWATER SEEP/WATERS OF THE STATE (ARCADIS 2010; NOT YET APPROVED)
- POTENTIAL WET ESHA (ARCADIS 2010; NOT YET APPROVED)
- USACE JURISDICTIONAL WATERS/WETLANDS (WRA 2009; APPROVED BY THE USACE 3/15/10)
- NON-JURISDICTIONAL WATERS/WETLANDS (WRA 2009)
- SEASONAL WETLAND
- WETLAND SEEP
- INDUSTRIAL POND
- BEDROCK GROUNDWATER SEEP
- THREE-PARAMETER WETLAND

DRAFT

0 170 340 Feet

GRAPHIC SCALE

FORMER GEORGIA-PACIFIC WOOD PRODUCTS FACILITY
FORT BRAGG, CALIFORNIA

MILL POND COMPLEX RESTORATION DRAFT CONCEPTUAL DESIGN REPORT

POTENTIAL ENVIRONMENTALLY SENSITIVE HABITAT AREAS - CENTRAL

ARCADIS

FIGURE **2-3b**

CITY: HR DIV/GROUP: IM GIS DB: BCG
Project # B006138.0006.00001
I:\FortBragg\MXD\MillPond_ComplexRestoration\Conceptual Design Report\Fig 2-3b WetlandDelineationMap_Central.mxd - 5/26/2011 @ 2:09:30 PM

NOTES:
1. WATERS/WETLANDS BOUNDARIES PREVIOUSLY DELINEATED BY WRA (2009) WERE APPROVED BY THE USACE ON MARCH 15, 2010 (USACE FILE # 2009-00372N).
2. THREE-PARAMETER WETLANDS ARE DEFINED AS WETLANDS WHERE:
   1) EVIDENCE OF WETLAND HYDROLOGY, HYDRIC SOIL, AND HYDROPHYTIC VEGETATION WERE PRESENT DURING FIELD INVESTIGATIONS, OR
   2) LACK OF EVIDENCE FROM ONE OR MORE OF THE THREE PARAMETERS WAS DUE TO PROBLEMATIC/DISTURBED CONDITIONS.

* WETLAND CHARACTERISTICS FOR WETLAND D-2 WERE ASSESSED FROM SOIL BORING P-22. DUE TO THE PRESENCE OF DENSE SHRUB AND BRAMBLE, WETLAND BOUNDARIES FOR WETLAND D-2 WERE DELINEATED FROM SOIL BORINGS P-21 AND P-22 AND VEGETATIVE CHARACTERISTICS IN AERIAL PHOTOGRAPHY. THEREFORE, THE BOUNDARIES OF WETLAND D-2 MAY CONTAIN AN UPLAND AND WETLAND MOSAIC.

LEGEND

- SOIL PIT LOCATION
- RIPARIAN AREA

POTENTIAL ENVIRONMENTALLY SENSITIVE HABITAT AREAS (ESHA)

- WIDTH OF POTENTIAL GROUNDWATER SEEP/WATERS OF THE STATE (ARCADIS 2010; NOT YET APPROVED)
- POTENTIAL WET ESHA (ARCADIS 2010; NOT YET APPROVED)
- USACE JURISDICTIONAL WATERS/ WETLANDS (WRA 2009; APPROVED BY THE USACE 3/15/10)
- NON-JURISDICTIONAL WATERS/WETLANDS (WRA 2009)
- SEASONAL WETLAND
- WETLAND SEEP
- INDUSTRIAL POND
- SEASONAL WETLAND DITCH
- RIPARIAN WETLAND
- BEDROCK GROUNDWATER SEEP
- PERENNIAL WATERS
- THREE-PARAMETER WETLAND
- AREA NOT EVALUATED BASED ON ONGOING CONSTRUCTION ACTIVITIES

0 300 600 Feet
GRAPHIC SCALE

DRAFT

FORMER GEORGIA-PACIFIC WOOD PRODUCTS FACILITY
FORT BRAGG, CALIFORNIA

MILL POND COMPLEX RESTORATION DRAFT CONCEPTUAL DESIGN REPORT

POTENTIAL ENVIRONMENTALLY SENSITIVE HABITAT AREAS - SOUTHERN

ARCADIS

FIGURE 2-3c

CITY: HR DIV/GROUP: IM GIS DB: BCG
Project # B006613B.0006.00001
I:\FortBragg\MXD\MillPond_ComplexRestoration\Conceptual Design Report\Fig 2-3c WetlandDelineationMap_South.mxd - 5/26/2011 @ 2:09:26 PM

CITY: HR DIV/GROUP: GIS DB: BG
Project # B0066138.0007.00001
I:\FortBragg\MXD\MillPond_ComplexRestoration\Conceptual Design Report\Fig 2-4 CRAM_Areas.mxd - 5/13/2011 @ 12:46:20 PM

LEGEND:

- WATERS/WETLAND AREAS
- PERENNIAL DEPRESSIONAL WETLAND ASSESSMENT AREA (AA) BOUNDARY
- RIVERINE WETLAND AA BOUNDARY

DRAFT

0 250 500 Feet

GRAPHIC SCALE

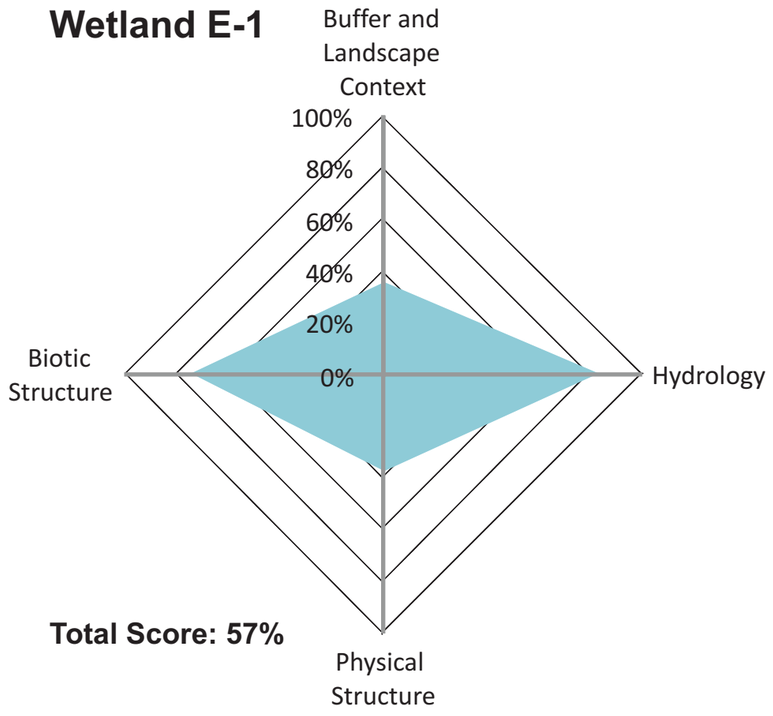
FORMER GEORGIA-PACIFIC WOOD PRODUCTS FACILITY
FORT BRAGG, CALIFORNIA

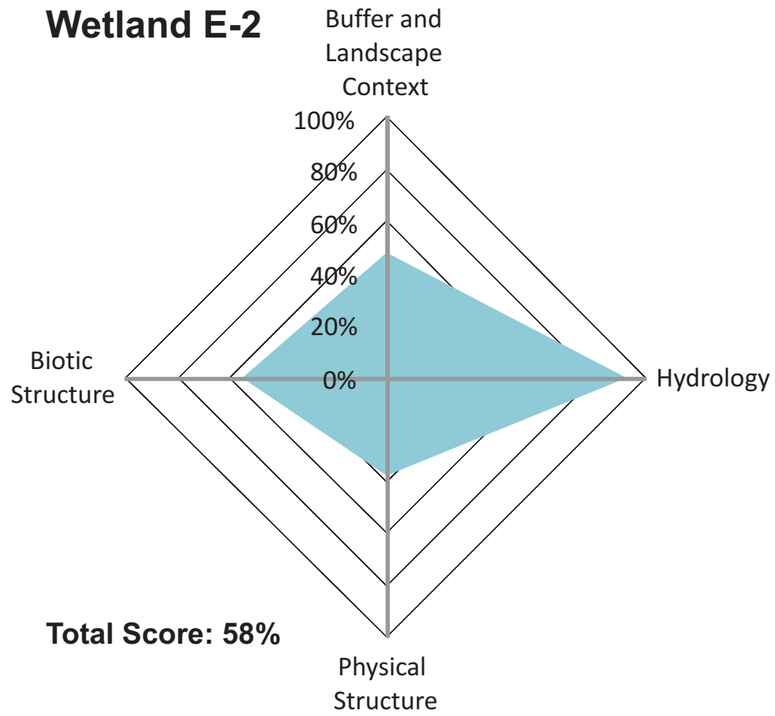
MILL POND COMPLEX RESTORATION DRAFT CONCEPTUAL DESIGN REPORT

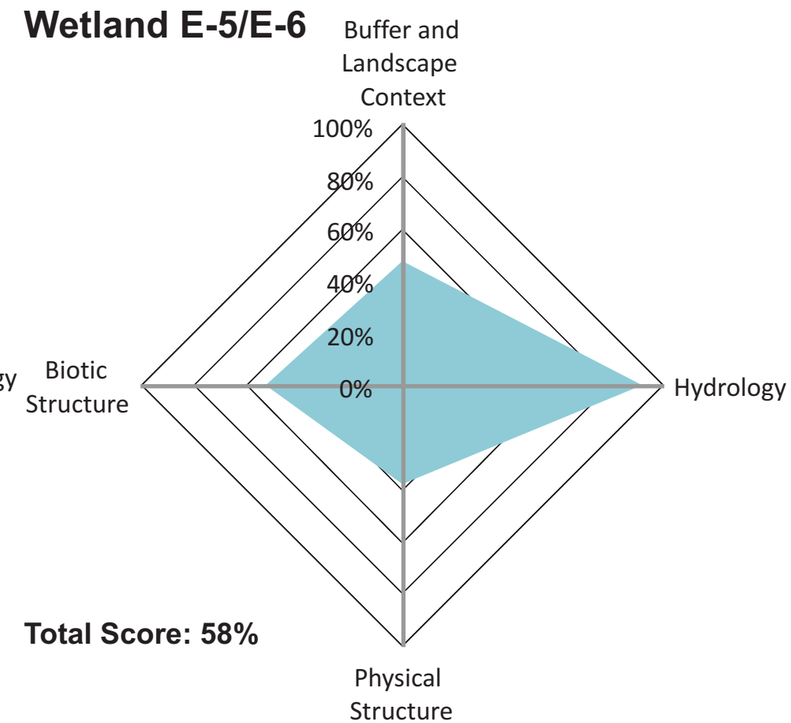
CALIFORNIA RAPID ASSESSMENT METHOD FOR WETLANDS ASSESSMENT AREAS

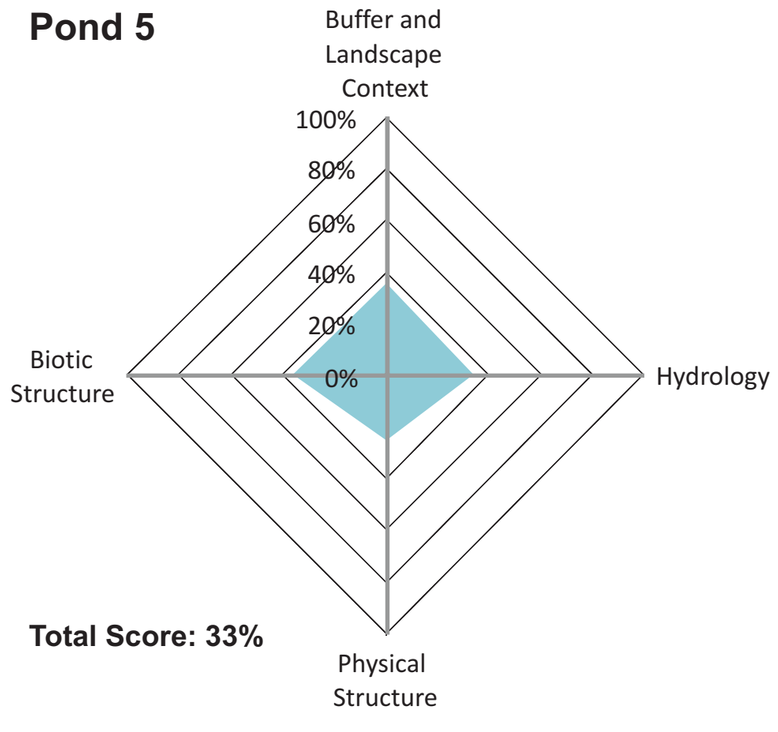
ARCADIS

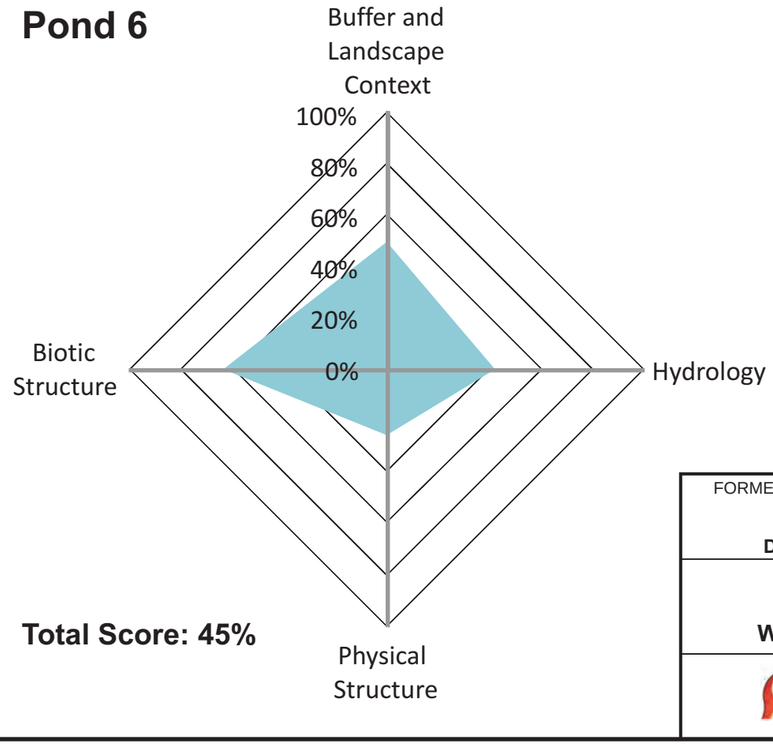
FIGURE
2-4











FORMER GEORGIA-PACIFIC WOOD PRODUCTS FACILITY
FORT BRAGG, CALIFORNIA
MILL POND COMPLEX RESTORATION
DRAFT CONCEPTUAL DESIGN REPORT

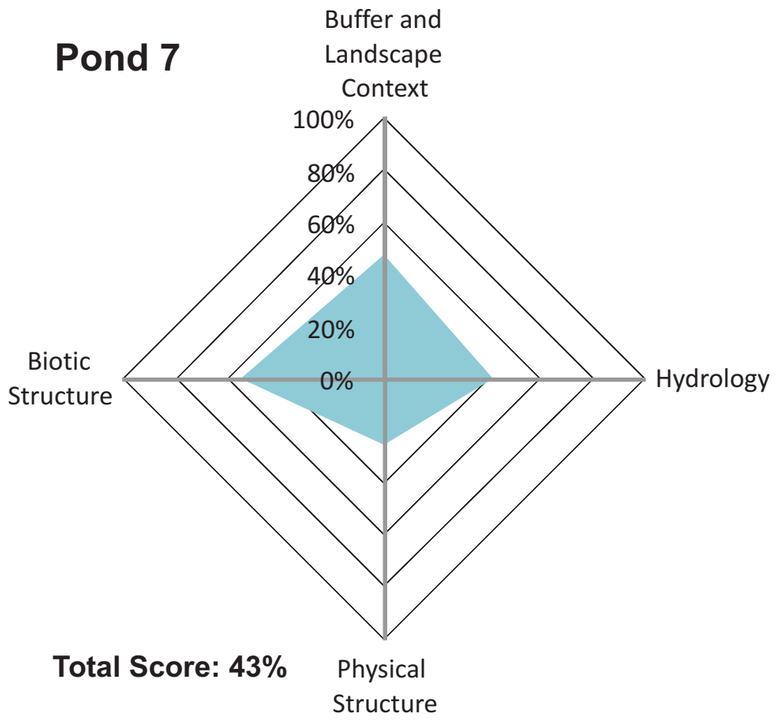
CALIFORNIA RAPID ASSESSMENT METHODS FOR WETLANDS ATTRIBUTE SCORES

ARCADIS

FIGURE
2-5a

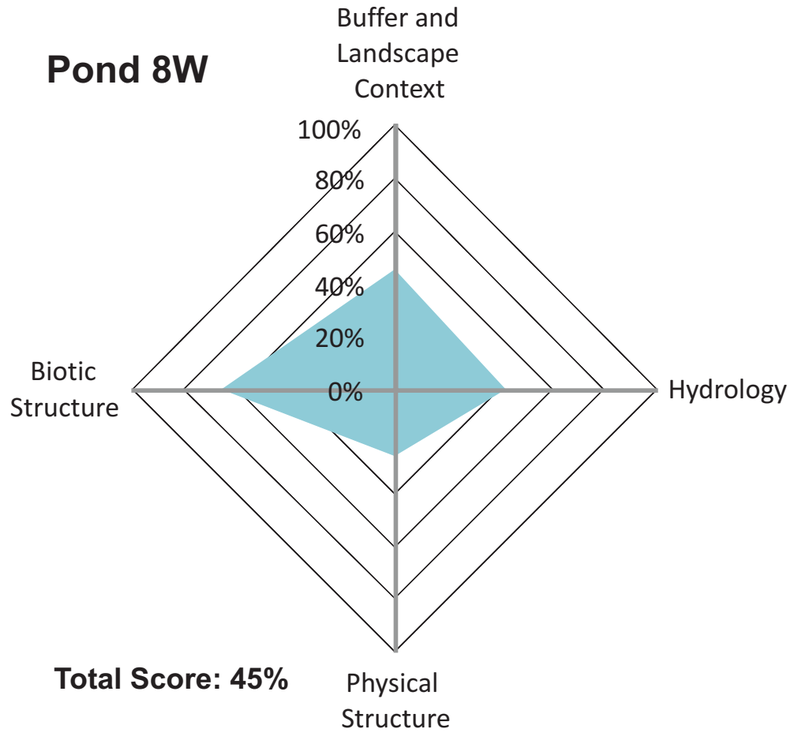
05/11/2011 SYRACUSE-141ENV-DJHOWES
B006613800070000\1/CDR/66138G01.CDR

Pond 7



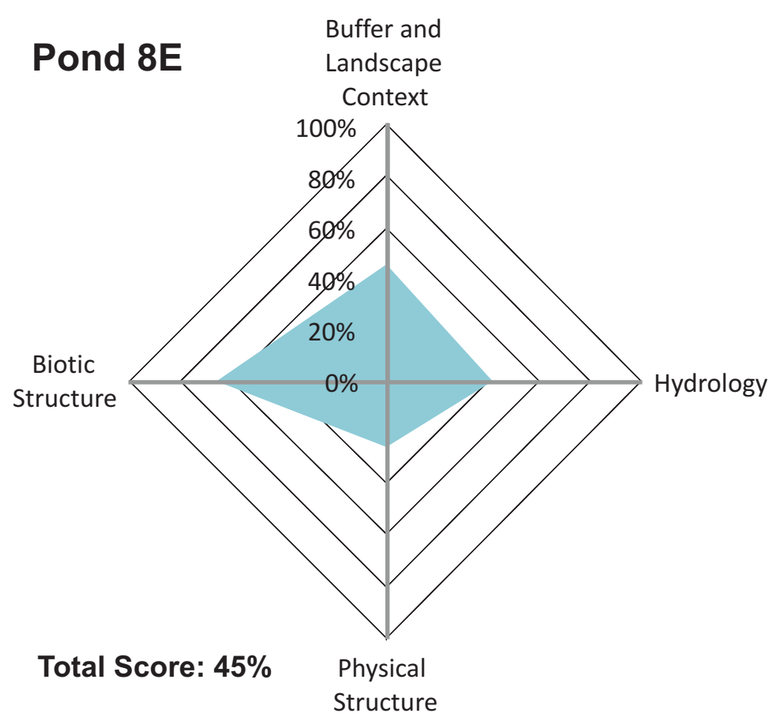
Total Score: 43%

Pond 8W



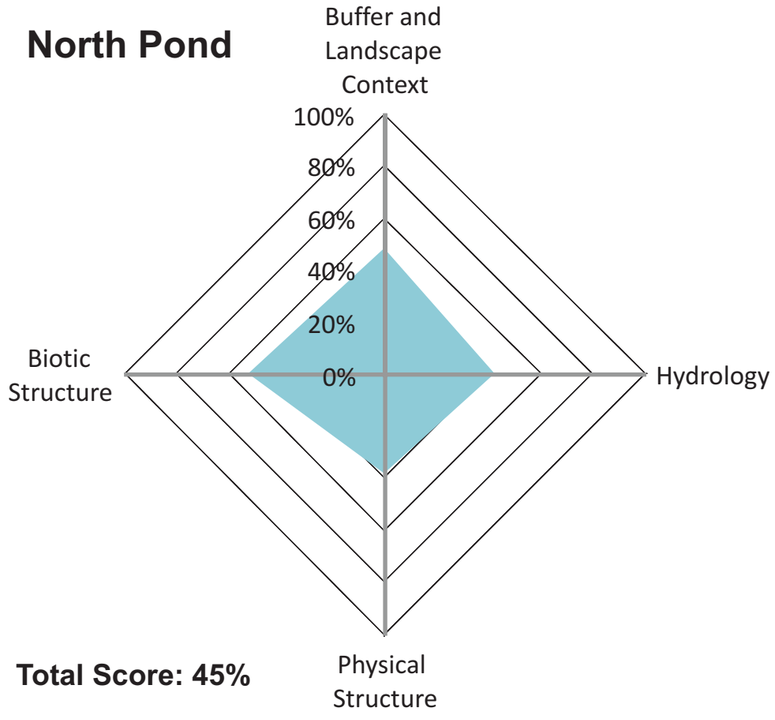
Total Score: 45%

Pond 8E



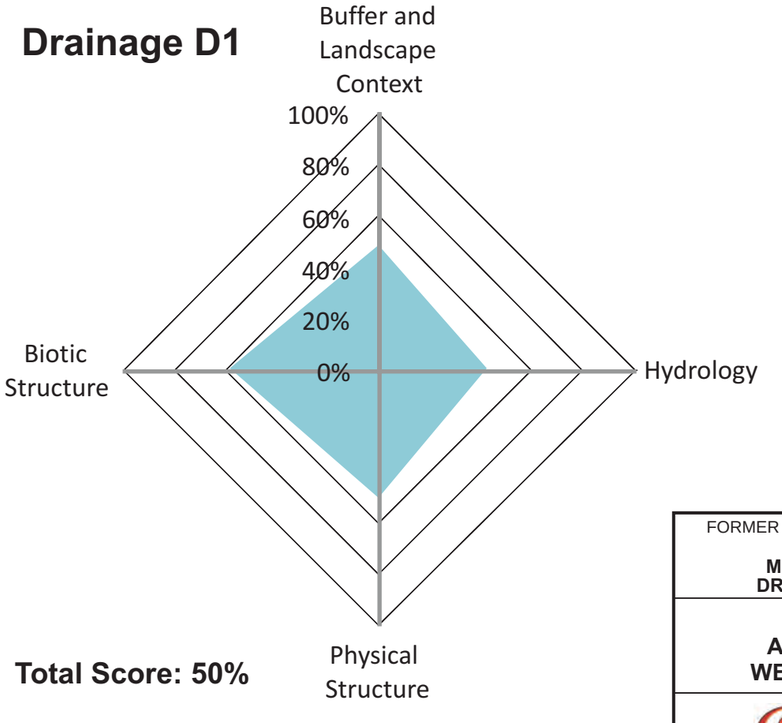
Total Score: 45%

North Pond



Total Score: 45%

Drainage D1



Total Score: 50%

FORMER GEORGIA-PACIFIC WOOD PRODUCTS FACILITY
FORT BRAGG, CALIFORNIA

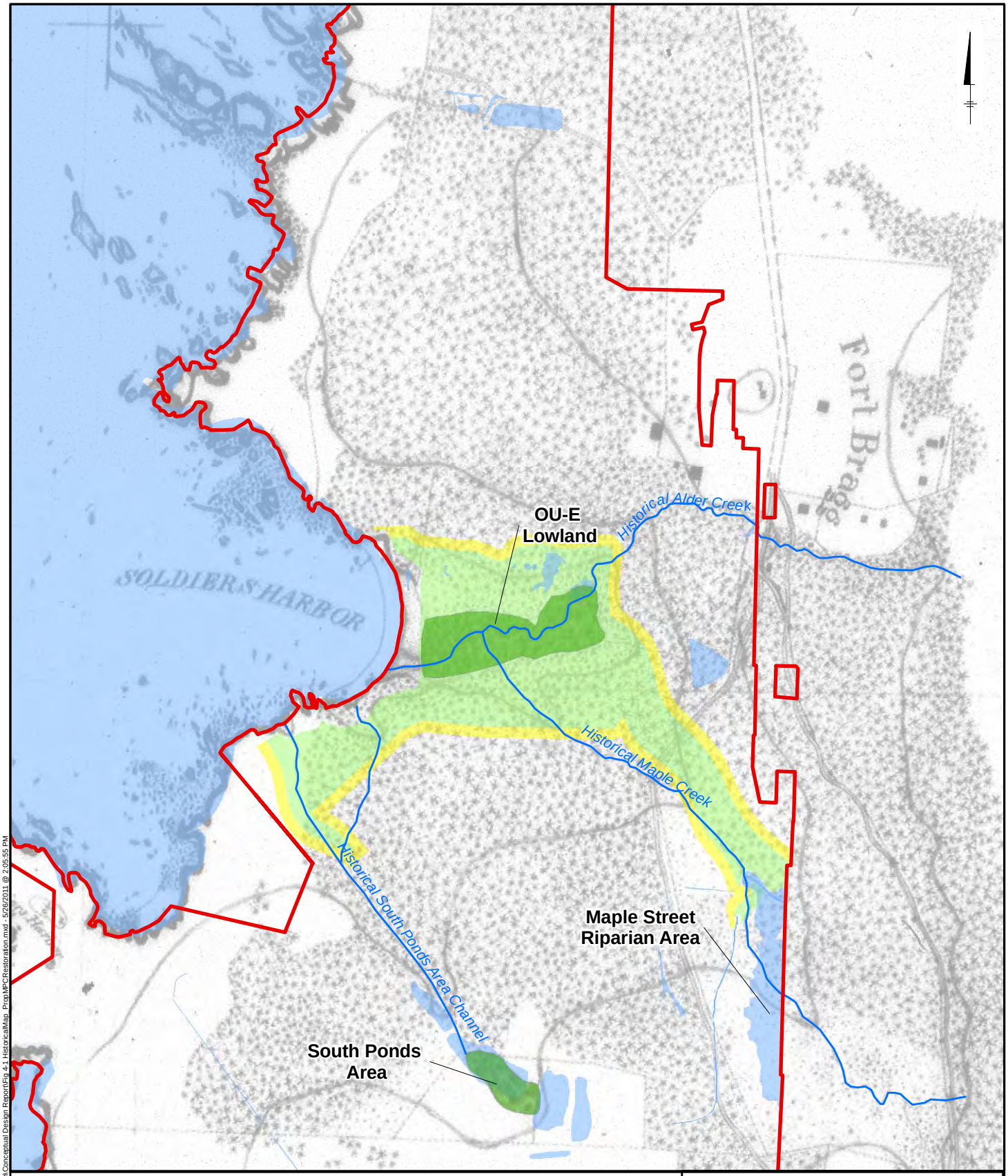
MILL POND COMPLEX RESTORATION
DRAFT CONCEPTUAL DESIGN REPORT

CALIFORNIA RAPID ASSESSMENT METHODS FOR WETLANDS ATTRIBUTE SCORES

ARCADIS

FIGURE
2-5b

05/13/2011 SYRACUSE-141ENV-DJHOWES
B0066138\0007\00001\CDR\66138G02.CDR



LEGEND:

- FACILITY BOUNDARY
- CURRENT AQUATIC FEATURES
- PROPOSED MILL POND COMPLEX RESTORATION HABITATS
- 50-FOOT BUFFER
- APPROXIMATE EXTENT OF HISTORICAL WETLAND FEATURES
- APPROXIMATE EXTENT OF HISTORICAL CREEK FEATURES

DRAFT

SOURCE:
1873 U.S. COAST SURVEY MAP. POINT CABRILLO TO PUDDING CREEK, MENDOCINO COUNTY, CALIFORNIA. REGISTER NO. 1363 B. PROVIDED BY UNIVERSITY OF ALABAMA

0 300 600 1,200 Feet

FORMER GEORGIA-PACIFIC WOOD PRODUCTS FACILITY
FORT BRAGG, CALIFORNIA
MILL POND COMPLEX RESTORATION DRAFT CONCEPTUAL DESIGN REPORT

HISTORICAL MAP WITH HABITATS RESULTING FROM PROPOSED MPC RESTORATION

ARCADIS

FIGURE
4-1

CITY: HR DIV/GROUP: AIT GIS DB:BCG
Project # B006138.0006.00001
I:\FortBragg\MXD\MillPond Complex\Restoration\Conceptual Design Report\Fig 4-1 HistoricalMap_PropMPCRestoration.mxd - 5/26/2011 @ 2:05:55 PM

CONSTRUCT 175LF OF PROPOSED 36" PIPE

10'X20' RIPRAP

35' WIDE HEADWALL & THREE 10'X3' BOX CULVERTS

EXISTING BERM ROAD

EXISTING 36" RCP ALDER LINE Qwe = 121 CFS (WINZLER & KELLY)

PROPOSED PIPE AND WEIR FROM POND 5 TO ALDER LINE

APPROXIMATE EXTENT OF EXISTING POND 5

REMOVE 150LF EXISTING 36" PIPE

CHANNEL LOW FLOW FLOW LINE & CHANNEL STATIONING CENTER LINE

SEDIMENT STABILIZATION AND POND BACKFILLING

APPROXIMATE EXTENT OF EXISTING POND 8

REMOVE EXISTING 32" PIPE

EXISTING 32" PIPE TO REMAIN

CHANNEL LOW FLOW FLOW LINE

REMOVE EXISTING 32" PIPE

MAPLE STREET RIPARIAN AREA

EXISTING HEADWALL & CULVERTS
1-54" HDPE, INV=59.38
2-30" CSP, INV=59.38

TOTAL Qwe = 121 CFS (WINZLER & KELLY)

CONSTRUCT RIPRAP WITH 10 INCH MAX ROUNDED ROCK TO PROVIDE ENERGY DISSIPATION AT PIPE OUTFALL. QUARRY TO SELECT BEIGE-BROWN COLORING TO MATCH NATURAL SETTING

HWY 1

LEGEND:

- EXISTING EDGE OF ROAD
- EXISTING CONTOUR
- WETLANDS IDENTIFIED FOR ENHANCEMENT
- OPEN SPACE LAND USE
- RIPARIAN CORRIDOR
- FLOODPLAIN DEPRESSIONS
- PONDED AREAS
- HIGH MARSH
- LOW MARSH
- CONTOURED SLOPE/ SCRUB-SHRUB HABITAT
- WATER/WETLANDS DELINEATED ADJACENT TO THE MILL POND COMPLEX RESTORATION PROJECT
- RIPARIAN AREA DELINEATED ADJACENT TO THE MILL POND COMPLEX RESTORATION AREA
- APPROXIMATE 50-FOOT BUFFER

NOTES:

1. THE TOPOGRAPHIC INFORMATION SHOWN REPRESENTS CURRENT FIELD CONDITIONS.

0 120' 240'

FORMER GEORGIA-PACIFIC WOOD PRODUCTS FACILITY
FORT BRAGG, CALIFORNIA
MILL POND COMPLEX RESTORATION
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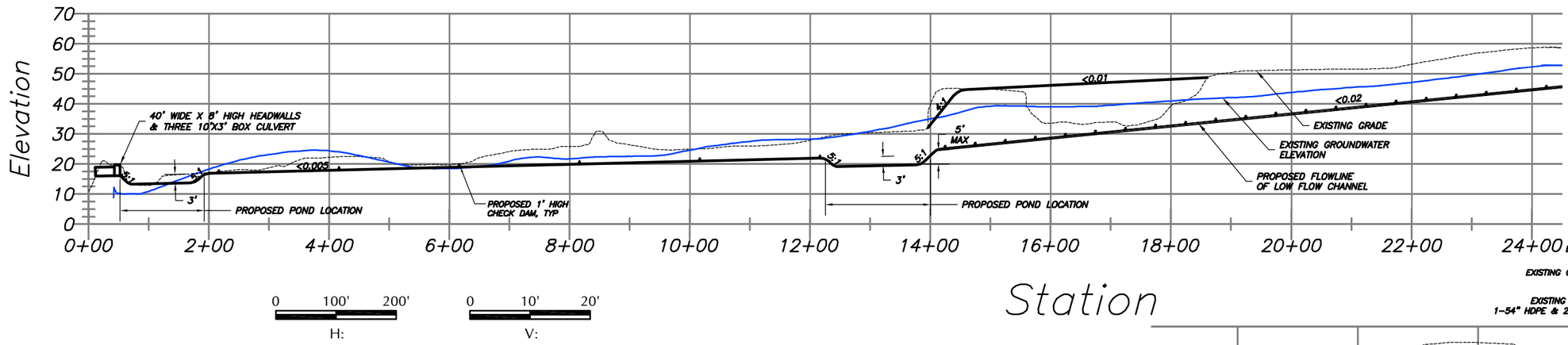
OUE-LOWLAND AND MAPLE CREEK DRAFT CONCEPTUAL PLAN

ARCADIS

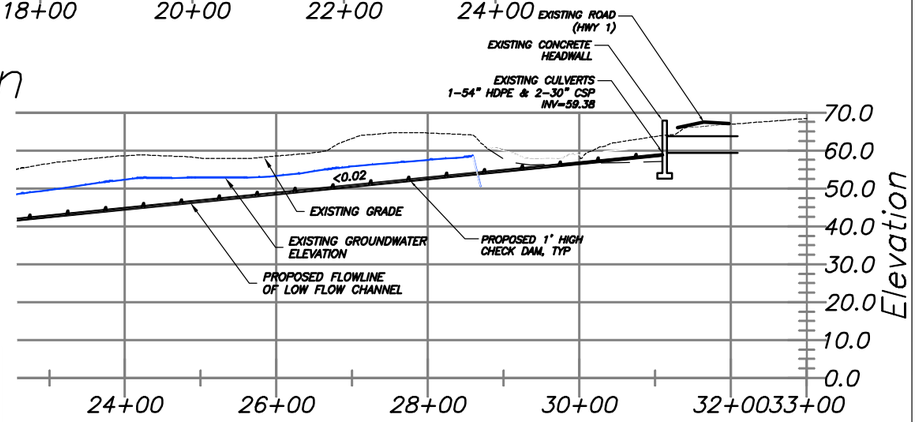
FIGURE
4-2

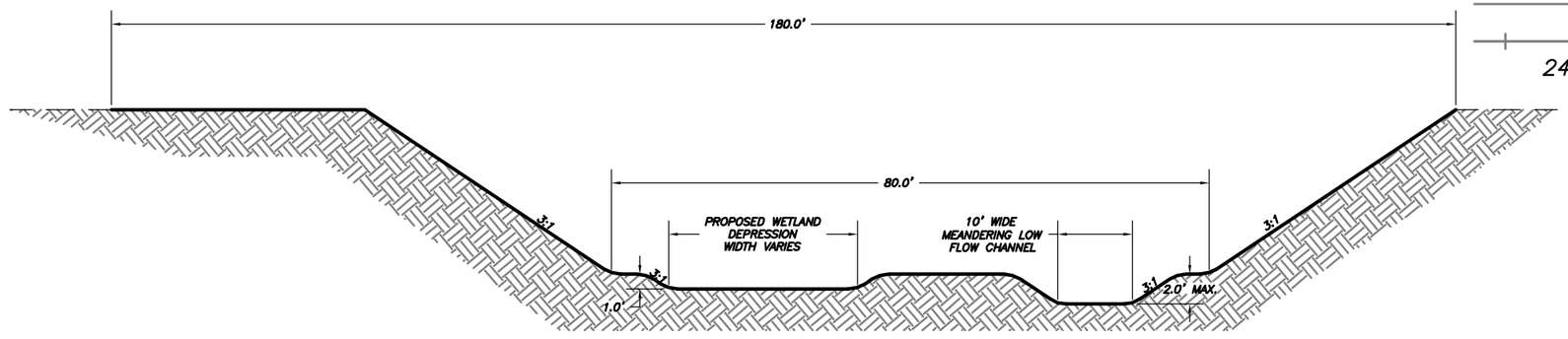
PROFILE VIEW



0 100' 200'
H:

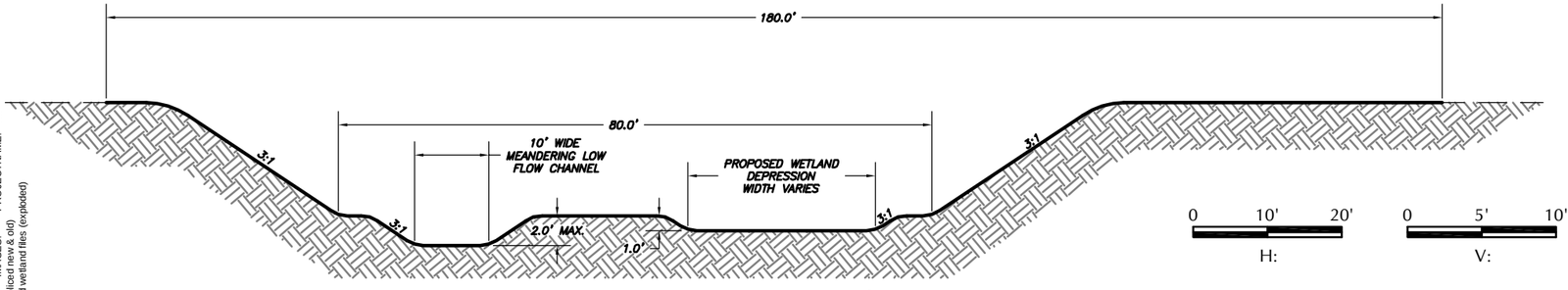
0 10' 20'
V:





SECTION A–A'

PROPOSED STA 14+75 SECTION OF RIPARIAN CORRIDOR



0 10' 20'
H:

0 5' 10'
V:

SECTION B–B'

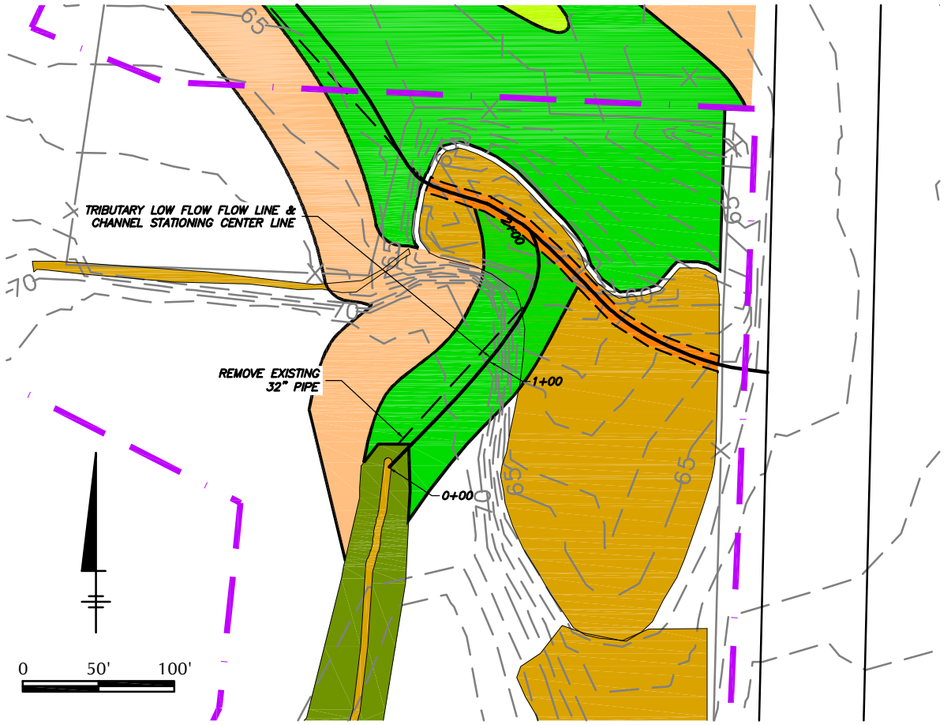
PROPOSED STA 27+00 SECTION OF RIPARIAN CORRIDOR

FORMER GEORGIA-PACIFIC WOOD PRODUCTS FACILITY
FORT BRAGG, CALIFORNIA
MILL POND COMPLEX RESTORATION
DRAFT CONCEPTUAL DESIGN REPORT

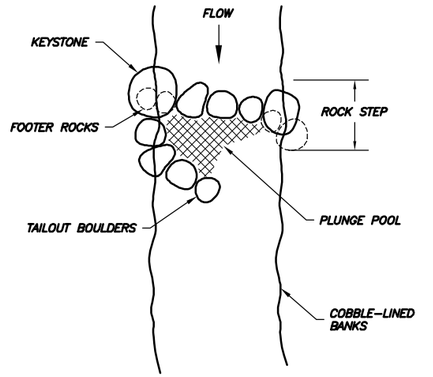
NEW MAPLE CREEK RIPARIAN SYSTEM
DRAFT CONCEPTUAL PROFILE & CROSS-SECTIONS

ARCADIS

FIGURE
4-3



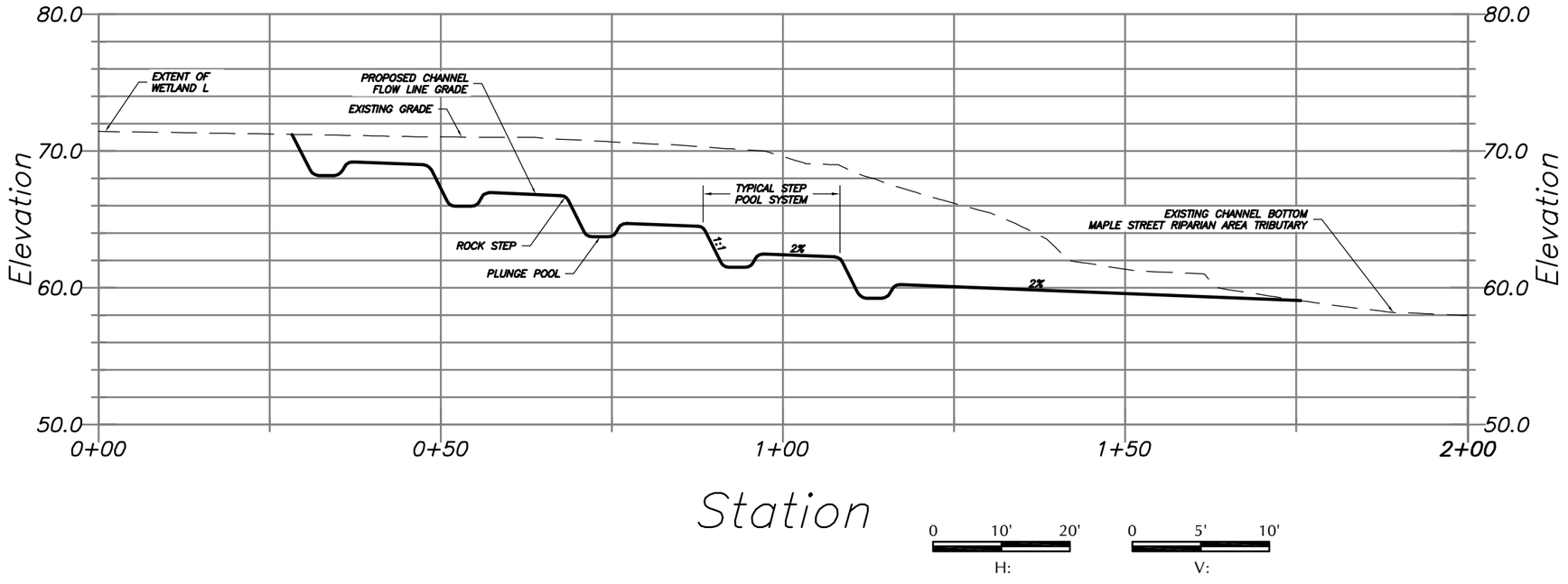
REFER TO FIGURE 4-2



TYPICAL POOL STEP SYSTEM – PLAN VIEW

NOT TO SCALE

TRIBUTARY PROFILE



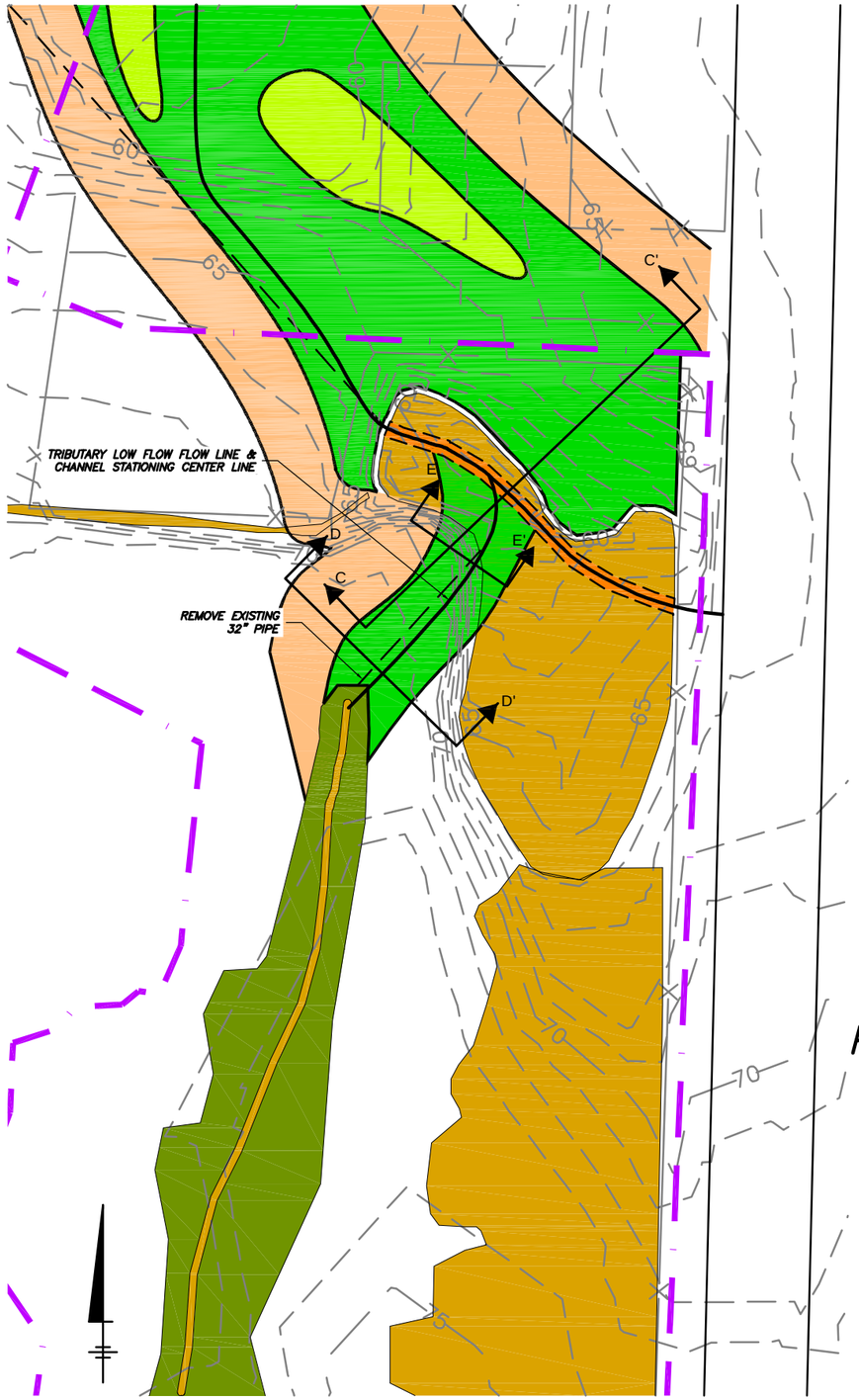
FORMER GEORGIA-PACIFIC WOOD PRODUCTS FACILITY
FORT BRAGG, CALIFORNIA

MILL POND COMPLEX RESTORATION
DRAFT CONCEPTUAL DESIGN REPORT

NEW MSRA TRIBUTARY STREAM CHANNEL DRAFT CONCEPTUAL PROFILE

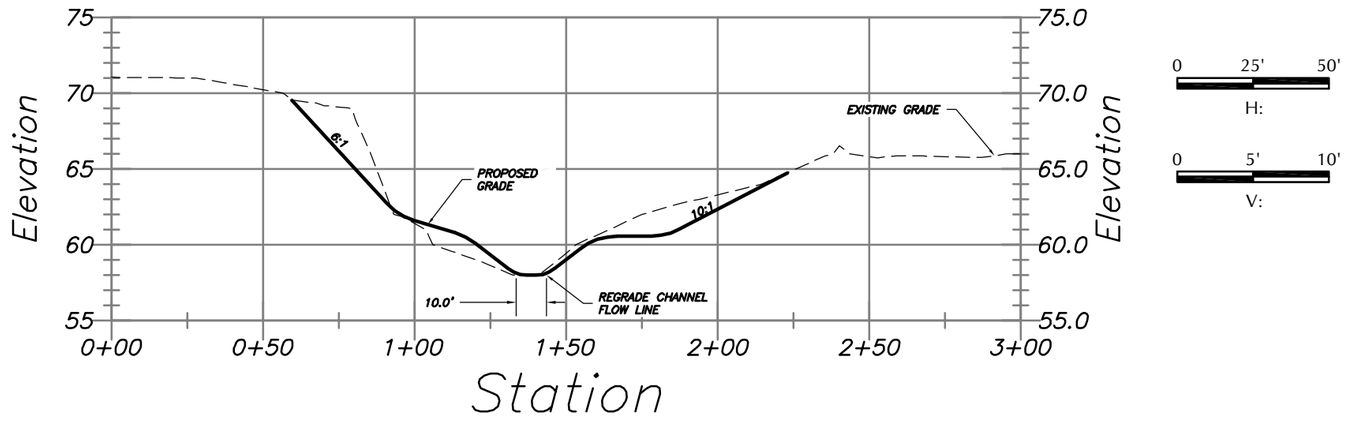
ARCADIS

FIGURE
4-4

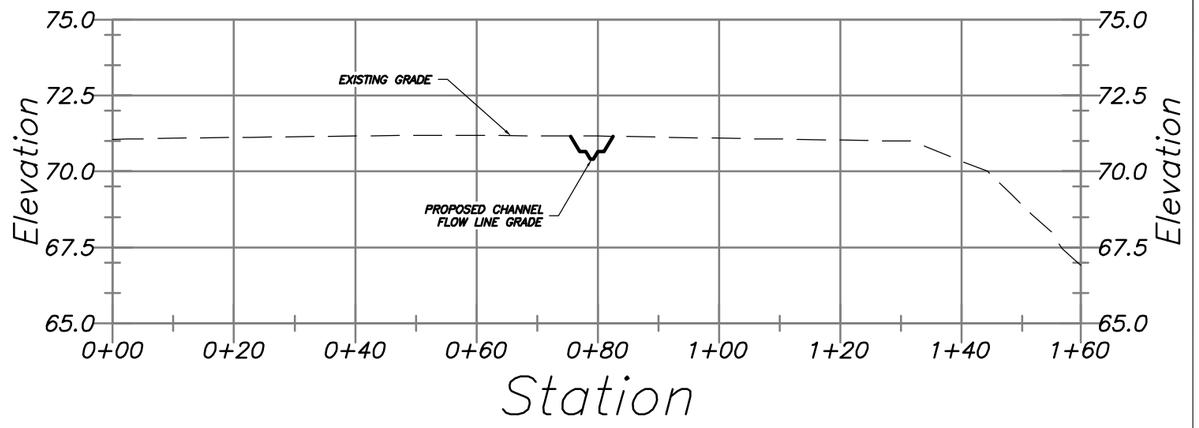


REFER TO FIGURE 4-2

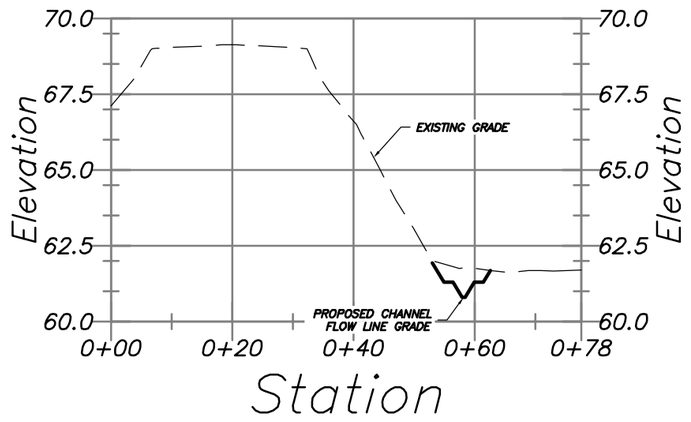
CROSS–SECTION C–C'



PRELIMINARY CROSS–SECTION D–D'



PRELIMINARY CROSS–SECTION E–E'



0 12.5' 25'
H:

0 2.5' 5'
V:

0 12.5' 25'
H:

0 2.5' 5'
V:

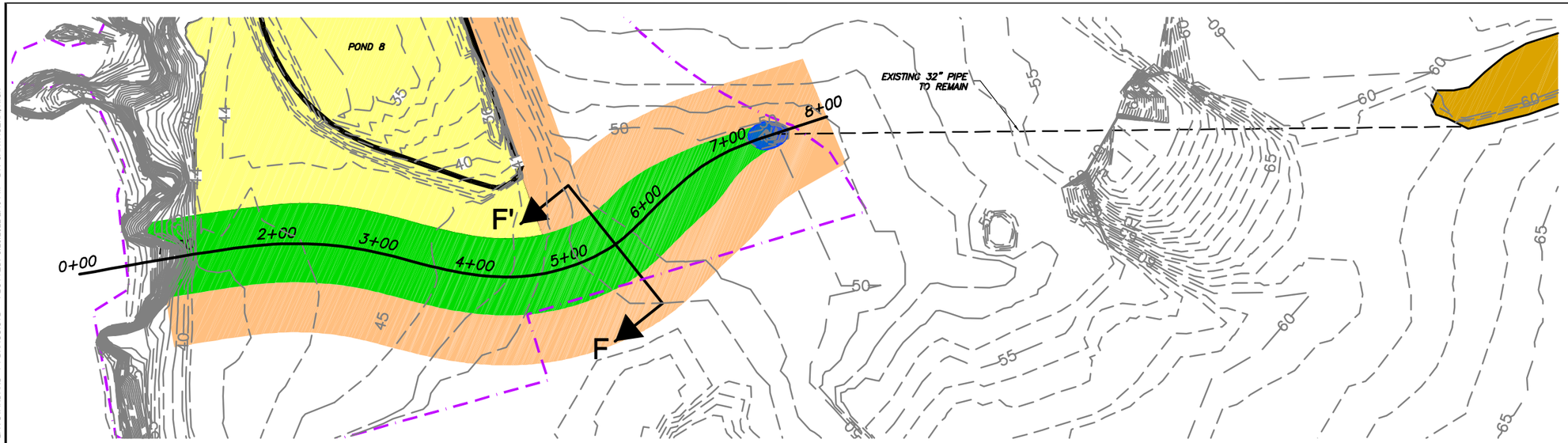
FORMER GEORGIA-PACIFIC WOOD PRODUCTS FACILITY
FORT BRAGG, CALIFORNIA

MILL POND COMPLEX RESTORATION
DRAFT CONCEPTUAL DESIGN REPORT

ENHANCED MAPLE CREEK CORRIDOR AND NEW MSRA TRIBUTARY
DRAFT CONCEPTUAL CROSS-SECTION

ARCADIS

FIGURE
4-5



LEGEND:

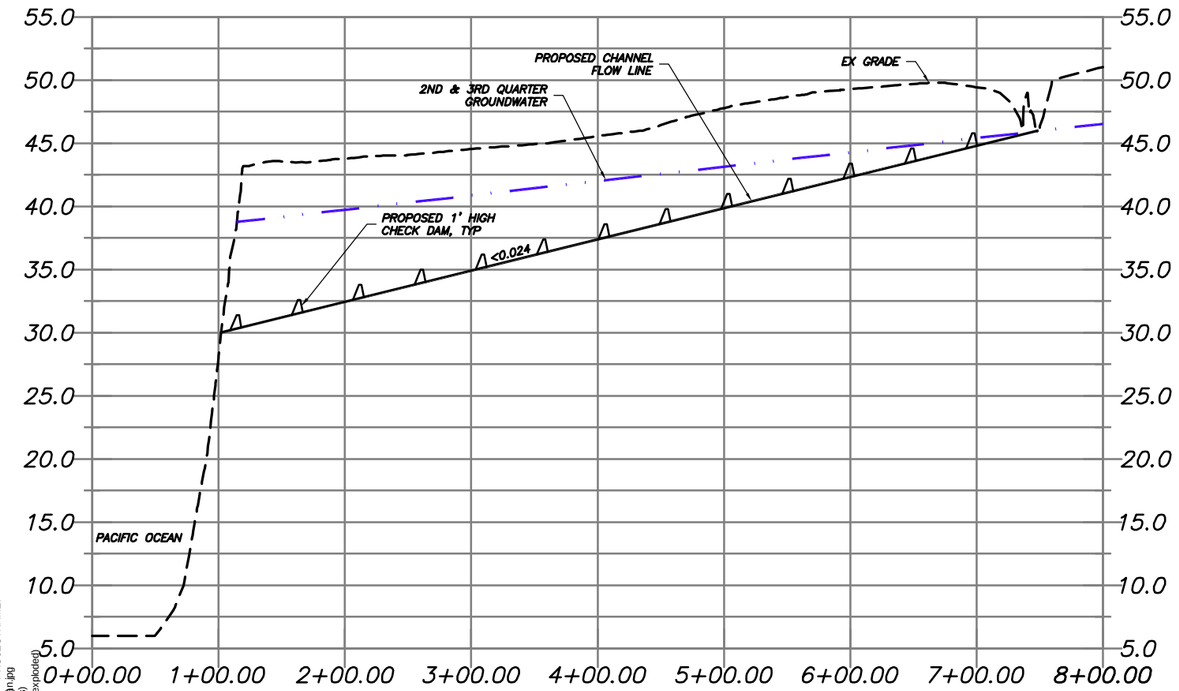
- EX CONTOUR
- EX GROUND PROFILE ELEVATION
- GROUND PROFILE ELEVATION
- OPEN SPACE LAND USE
- RIPARIAN CORRIDOR
- EXISTING DRAINAGE DITCH
- CONTOURED SLOPE/ SCRUB-SHRUB HABITAT
- APPROXIMATE 50-FOOT BUFFER
- WATER/WETLANDS DELINEATED ADJACENT TO THE MILL POND COMPLEX RESTORATION PROJECT

0 60' 120'

NOTES:

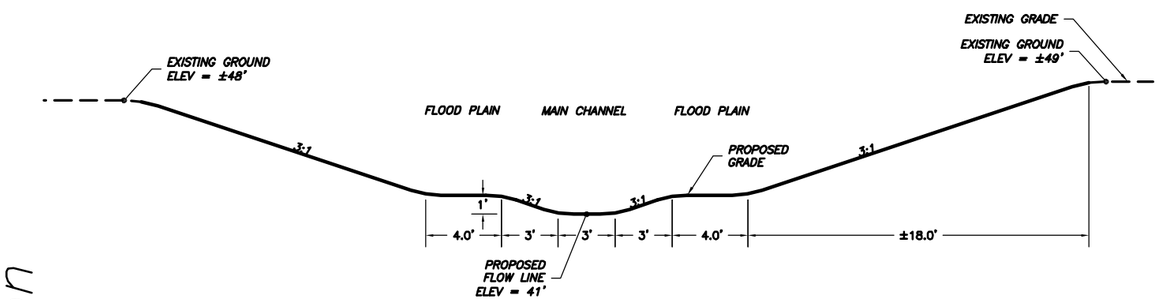
1. THE TOPOGRAPHIC INFORMATION SHOWN REPRESENTS CURRENT FIELD CONDITIONS.

Channel Alignment



0 60' 120'
H:

0 6' 12'
V:



CREEK CROSS SECTION F – F'

0 4' 8'

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FORT BRAGG, CALIFORNIA
MILL POND COMPLEX RESTORATION
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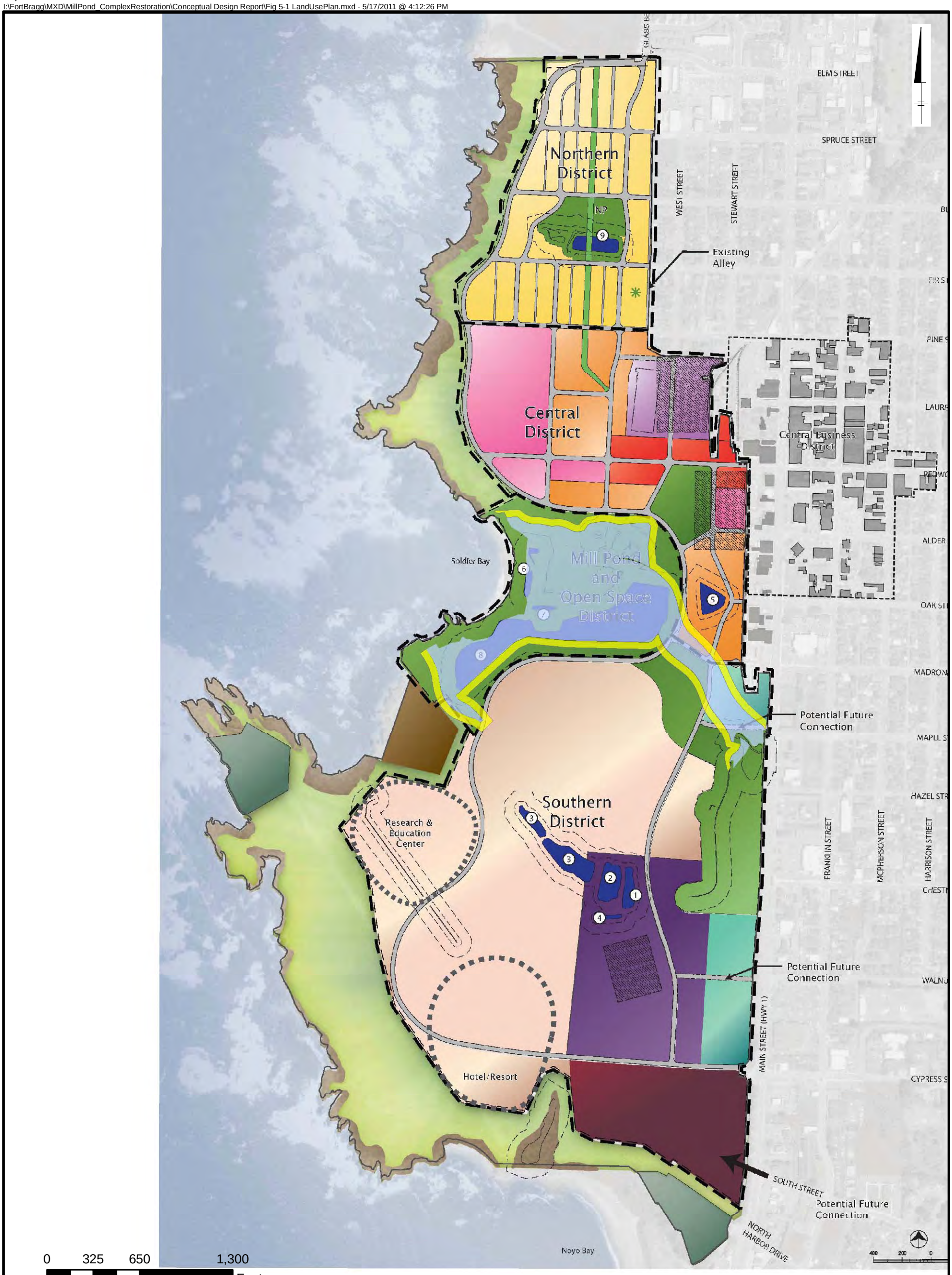
SOUTH PONDS
SURFACE WATER REROUTING
DRAFT CONCEPTUAL DESIGN

ARCADIS

FIGURE
4-6

CITY: HR DIV/GROUP: AIT GIS DB:BCG
Project # B0066138.0006.00001
I:\FortBragg\MXD\MillPond_ComplexRestoration\Conceptual Design Report\Fig 5-1 LandUsePlan.mxd - 5/17/2011 @ 4:12:26 PM



LEGEND:

Land Use Plan

- Specific Plan Area Boundary
- Specific Plan Study Area Boundary
- District Boundary
- Conceptual Neighborhood Park Location
- Alternative Neighborhood Park Location
- Mill Site Residential (MSR)
- Mill Site Commercial Mixed-Use (MSCMU)
- Mill Site Visitor Serving (MSVS)
- Mill Site Mixed-Use Residential (MSMU-R)
- Mill Site Light Industrial Flex (MSLIF)
- Future Coastal Trail and Parkland Area
- Open Space
- Mill Site Highway Commercial (MSHC)
- Mill Site Industrial (MSI)
- Mill Site Mixed-Use Employment Zone (MUEZ)
- Mill Site Urban Reserve (MSUR)
- Restricted Land Use Area
- Public Facilities
- Timber Resources Industrial
- Opportunity / Use Priority Sites
- Proposed Footprint of Conceptual Restoration Design
- 50-foot Buffer

BASEMAP SOURCE: LAND USE PLAN (FEBRUARY 2011) AS DEVELOPED FOR THE MILL SITE SPECIFIC PLAN

FORMER GEORGIA-PACIFIC WOOD PRODUCTS FACILITY
FORT BRAGG, CALIFORNIA

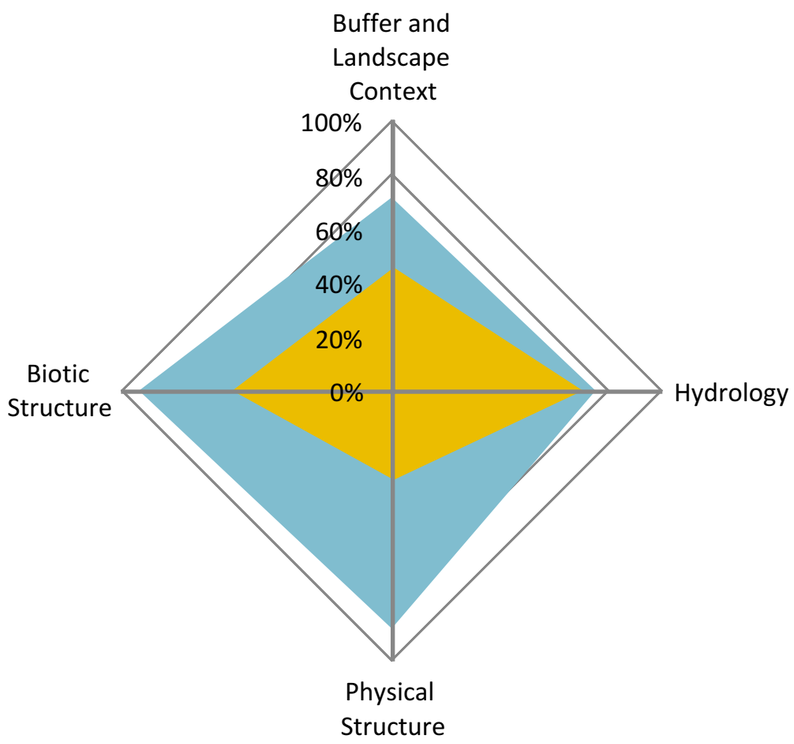
MILL POND COMPLEX RESTORATION DRAFT CONCEPTUAL DESIGN REPORT

CONCEPTUAL RESTORATION DESIGN AND PROPOSED LAND USE PLAN

ARCADIS

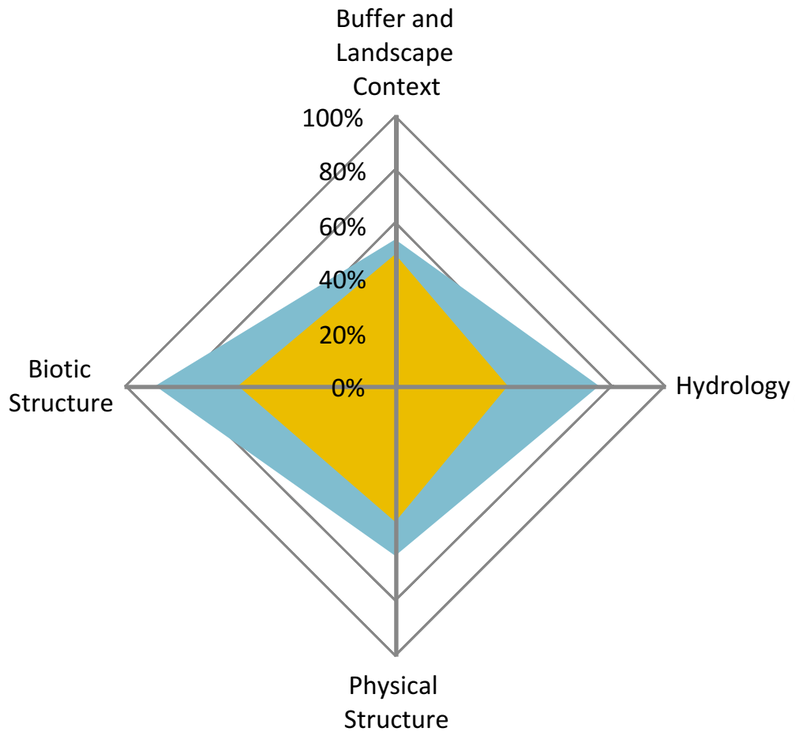
FIGURE
5-1

Restored OU-E Lowland Depressional Wetland



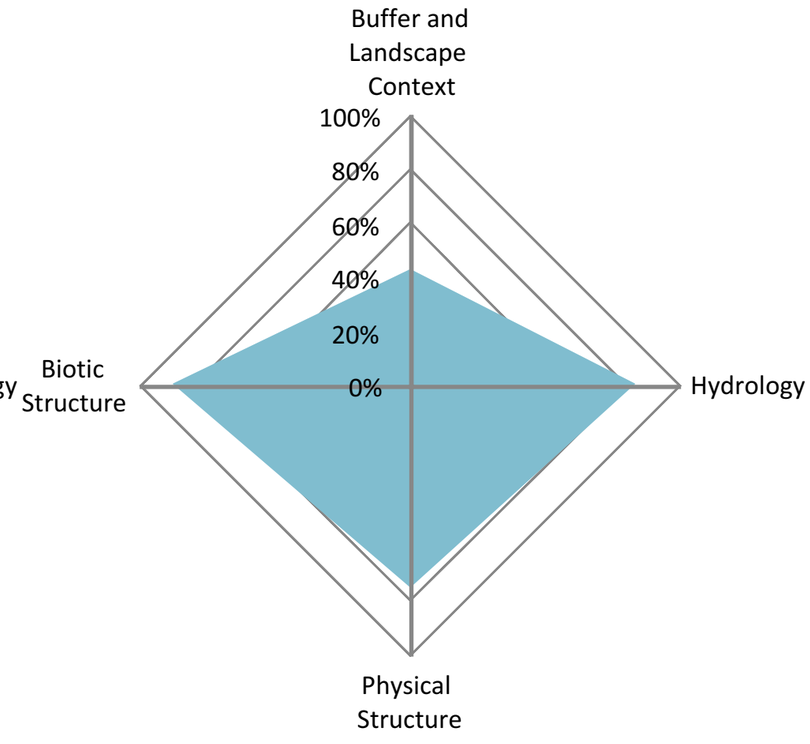
Average Depressional Wetland Total Score[1]: 52%
Restored Depressional Wetland Total Score: 82%

Enhanced Drainage D1 Riverine Wetland



Drainage D1 Riverine Wetland Total Score: 50%
Enhanced Drainage D1 Riverine Wetland Total Score: 70%

Created Maple Creek Riparian Corridor



Created Maple Creek Riparian Corridor Total Score: 73%

Note:
1. Average Total Score is an average of the Total Score values of Depressional Wetlands located in OU-E (i.e., E-1, E-2, E-5/E-6, Pond 6, and Pond 7).

LEGEND:

= Restored Condition CRAM Score

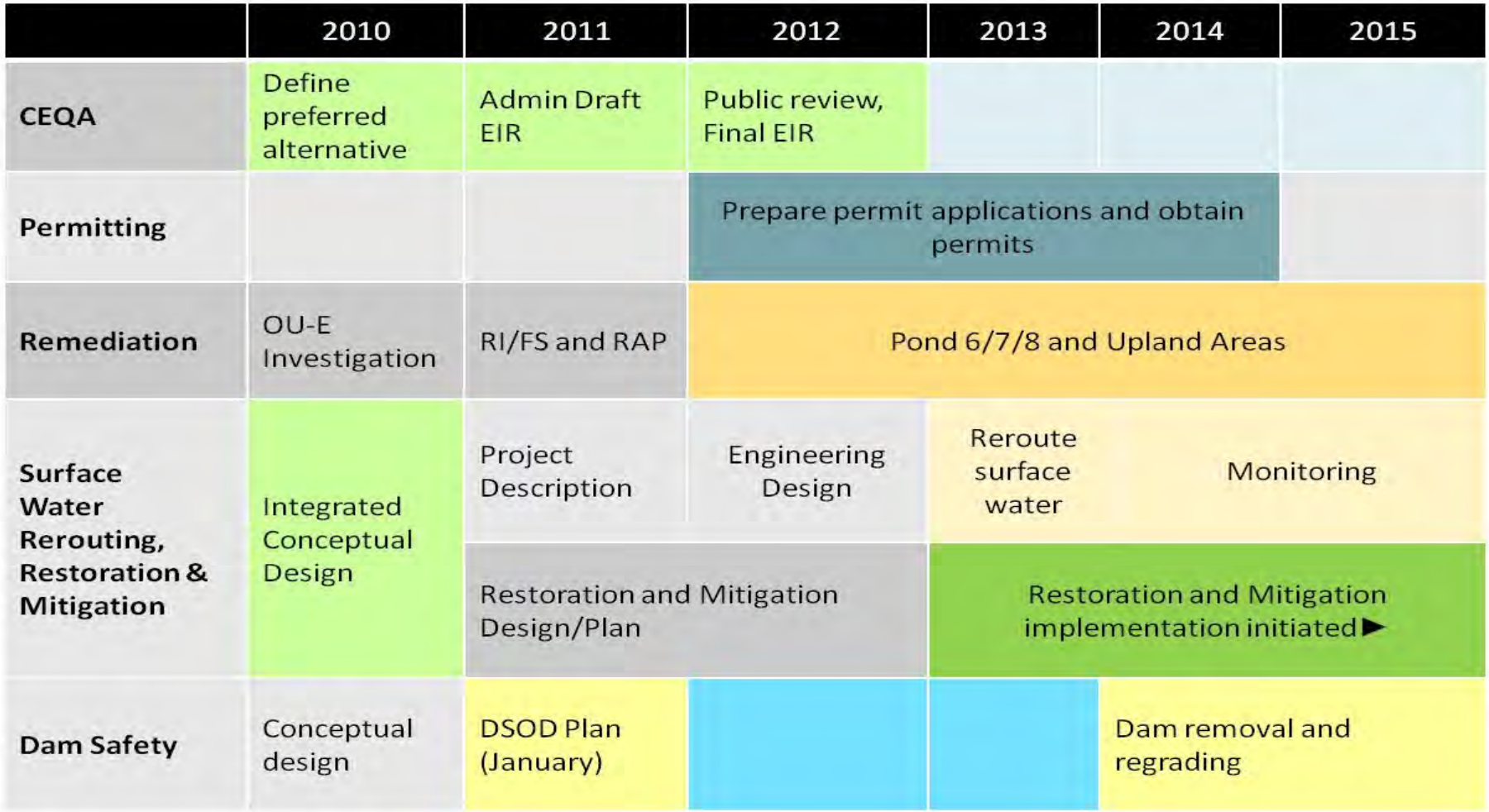
= Current Condition CRAM Score

FORMER GEORGIA-PACIFIC WOOD PRODUCTS FACILITY
FORT BRAGG, CALIFORNIA
MILL POND COMPLEX RESTORATION DRAFT CONCEPTUAL DESIGN REPORT

RESTORED CONDITION WETLANDS ATTRIBUTE SCORES

ARCADIS

FIGURE **5-2**



Former Georgia-Pacific Wood Products Facility
Fort Bragg, California

MILL POND COMPLEX RESTORATION
DRAFT CONCEPTUAL DESIGN REPORT

DRAFT MILL POND COMPLEX PRELIMINARY CONSTRUCTION SCHEDULE

ARCADIS

FIGURE
6-1

Figure 6-1 MPC Preliminary Construction Schedule.xls

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Appendix A

California Rapid Assessment Method for Wetlands Results for Site Closure Activities Memorandum

ARCADIS U.S., Inc.
2033 North Main Street
Suite 340
Walnut Creek
California 94596
Tel 925 274 1100
Fax 925 274 1103

MEMO

To:
Julie Raming, Georgia-Pacific LLC

Copies:
Michael Davis
Alicia Guerra
Michael Fleischner
Jamie Tull

From:
Alex Francisco

Date:
June 1, 2011

ARCADIS Project No.:
B0066138.0007

Subject:
California Rapid Assessment Method for Wetlands Results for Site Closure Activities

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ARCADIS U.S., Inc. (ARCADIS) ecologists evaluated the delineated potential state or federal jurisdictional waters and associated wetlands (potential waters/wetlands) on the Georgia-Pacific LLC Fort Bragg Former Wood Products Facility (site) that fall within the Mill Pond Complex (MPC) restoration project footprint. ARCADIS followed guidance provided in *California Rapid Assessment Method (CRAM) for Wetlands* (Collins et al. 2008) to assess the ecological function of the potential waters/wetlands. The goal of CRAM is to

> "*provide rapid, scientifically defensible, standardized, cost-effective assessments of the status and trends in the condition of wetlands and the performance of related policies, programs and projects throughout California.*"

Current Conditions

ARCADIS ecologists conducted field investigations for the CRAM assessment in June and December 2010. ARCADIS focused the evaluation on potential waters/wetlands associated with Pond 8, the Operable Unit-E (OU-E) lowland, and the open channel section of Maple Creek on the site. Areas that are not proposed for disturbance during restoration activities (e.g., wetlands identified for enhancement on the natural slopes outside of the OU-E lowland) were not included in this evaluation, because these areas are

not expected to be directly impacted during construction of the restoration project. Additionally, in accordance with CRAM guidance, wetlands that were less than 0.04 acre in size were not included in this evaluation. ARCADIS evaluated a total of 10 potential waters/wetlands areas (identified as assessment areas [AAs] in the CRAM guidance). ARCADIS ecologists classified the potential waters/wetlands located on site as perennial depressional and riverine. With the exception of Drainage D-1, the AAs were evaluated according the CRAM guidance for depressional wetlands. Drainage D-1 was evaluated according to the CRAM guidance for riverine wetlands. The AAs evaluated are presented in Figure 1.

The approximate extent of the AA at each evaluated potential waters/wetlands was based on the delineated boundary identified by ARCADIS (2011a) or WRA (2009) and CRAM guidance (Collins et al. 2008). ARCADIS evaluated each AA for four attributes: buffer and landscape context, hydrology, physical structure, and biotic structure. Figures 2 and 3 present results for each of these attributes scaled to 100% of their total possible scores and presents the overall CRAM score for each waters/wetlands scaled to 100% of their total possible scores. Field data sheets used to document conditions in and calculate attribute scores for each AA are attached.

ARCADIS ecologists evaluated the Buffer and Landscape Context attribute for each AA based on aerial photographs and knowledge of site features, and the remaining attributes based on field investigation activities. For perennial depression wetlands, the Buffer and Landscape Context attribute is based on surrounding buffers and presence of adjacent aquatic features. The desktop evaluation of this attribute requires various distance estimates from the AA boundaries. An example of the distance measurements taken to evaluate an AA is presented as Figure 4, and details regarding calculations of this attribute for each AA are presented in Table 1. The Biotic Structure attribute is based on the distribution and composition of the plant community. An example of plant community evaluations conducted in each AA is presented as Figure 5, and details regarding calculations of this attribute for each AA are presented in Table 2.

For drainage D-1, in addition to the Buffer and Landscape Context and Biotic Structure attributes, the Hydrologic Connectivity attribute required specific calculations based on the estimated bankfull and flood prone depths and widths. Specific calculations for these three attributes for Drainage D-1 are presented in Table 3. Figures 6 and 7 visually present data used to calculate the Buffer and Landscape Context and Biotic Structure attributes for Drainage D-1.

Total CRAM scores indicate that waters/wetlands evaluated on the site possess between 33% and 58% of the total functional capacity that a reference wetland system could attain. These decreased CRAM scores indicate the generally degraded character of the site waters/wetlands in their current condition. Industrial ponds on the site (i.e., Ponds 5 through 8) scored lowest in the CRAM evaluation (i.e., between 33% and 45% of total functional capacity). Seasonal and seep wetlands that have developed in the OU-E lowland since demolition of the building foundations in this area scored the highest in the CRAM evaluation (i.e.,

57% to 58% of total functional capacity). CRAM scores for Drainage D-1 indicate that this section of Maple Creek has 50% of the total functional capacity of a reference riparian wetland system.

Generally, CRAM results suggest that the depressional wetlands (i.e., industrial ponds and seep and seasonal wetlands) are most limited by physical structure (i.e., an average score of 31% of total). These isolated aquatic features are typically small, and lack topographical complexity and physical structural diversity, which limits development of microhabitats that would support increased biological diversity. The higher CRAM scores for seep and seasonal wetlands in the OU-E lowland (i.e., E-1, E-2 and E-5/E-6) can be attributed to higher scores for the Hydrology attribute. The seep and seasonal wetlands have a more natural hydrologic regime with less anthropogenic influence, which results in a more consistent source of hydrology. In contrast, the industrial ponds are fed by primarily flashy stormwater flows from developed areas (i.e., the site or the City) or are artificially impounded to prevent natural drawdown.

CRAM scores for Drainage D-1 suggest that the riverine wetland is most limited by the Hydrology attribute. Field indicators that caused the reductions in the Hydrology attribute include urban stormwater runoff being the primary hydrologic source and the presence of significant erosion of the stream bed and bank.

Results of the CRAM evaluation demonstrate the limited ecological function that the evaluated potential waters/wetlands on the site provide, compared to a typical reference system. The results also provide the reasons why ecological function may be limited (i.e., small isolated nature of depressional wetlands limiting structural complexity, and erosion and degradation of stream channel and banks resulting from flashy stormwater flows coming into Maple Creek).

Proposed Conditions

The baseline evaluation described above provides a method to evaluate the overall ecological function of the wetland systems in the site landscape and compare the ecological function of the proposed restored wetland systems under the MPC restoration project. Using details presented in the MPC Restoration DRAFT Conceptual Design (ARCADIS 2011b), ARCADIS estimated CRAM scores for the OU-E lowland and Maple Creek riparian corridor portions of the MPC restoration project.

CRAM attributes were scored based on the assumption that the evaluation would be conducted following the apex of the restored condition. Therefore, the assumed evaluation condition may differ from the condition of the restoration project at the conclusion of the monitoring period. Monitoring programs are designed to evaluate a restored system to assess if that system has reached a self-sustaining state that meets restoration project objectives and depicts a system that is able to adapt to changing environmental conditions with minimal human maintenance or intervention. Therefore, while restoration project targets may be met during the monitoring period, there may be some components of the CRAM attributes that have not yet fully developed and will develop as the system reaches its apex state. For instance,

microtopography and structural patches may develop over longer periods of time than would occur during typical restoration monitoring programs (e.g., 5 to 10 years). Therefore, estimated CRAM scores discussed below should not be viewed as conditions that would necessarily exist at the conclusion of monitoring.

ARCADIS established two conceptual AAs within the proposed restoration design: depressional wetlands in the OU-E Lowland (i.e., low marsh, high marsh and ponded wetland areas) and riparian wetlands in the Maple Creek riparian corridor area. ARCADIS evaluated the OU-E lowland based on the CRAM depressional wetland assessment guidance and the Maple Creek riparian corridor based on the CRAM riverine wetland assessment guidance.

ARCADIS bounded the extent of the conceptual AAs based on the proposed restoration design and ARCADIS' understanding of proposed final conditions. General assumptions used to estimate CRAM attribute scores are presented on the CRAM data sheets and summarized below.

- The Buffer and Landscape Context attribute evaluation for each AA is based on the extent of habitats included in the MPC Restoration DRAFT Conceptual Design and associated buffers (ARCADIS 2011b). The Buffer and Landscape Context attribute evaluation did not include open space areas, as designated in the Site Specific Plan, adjacent to the restoration project and buffer boundaries, because these areas were assumed to be urbanized parks with active recreation that are excluded from buffer calculations under CRAM guidance. Distance measurements taken to evaluate the Buffer and Landscape Context attribute for the OU-E lowland and Maple Creek riparian corridor AAs are presented in Figures 8 and 9, respectively.

- The Hydrology attribute evaluation for each AA is based on knowledge of the proposed hydrologic inputs to the restored systems and assumptions regarding stormflow attenuations that may result following removal of culverts and restoration of open channel stream flows.

- The Physical Structure attribute evaluation for each AA is based on conceptual design aspects and observations of similar wetland systems near the site.

- The Biotic Structure attribute is based on the proposed composition of the plant communities included in the restoration design and the locations of various habitat types in the conceptual design. Co-dominant species are assumed to be common species proposed for each of the habitat types contained in the AA and are also assumed to include one or two additional invasive species that may be present. Invasive species present is assumed to be 20% or less of the co-dominant species.

Results of the CRAM evaluation for restored conditions in the OU-E lowland suggest that the restored low and high marsh wetland system will increase the overall ecological function of the OUE- lowland wetlands

from its current state of 51 percent to 82 percent. This represents an approximate 60 percent increase in functional capacity of the restored depressional wetland system compared to its current conditions[1]. Results of the CRAM evaluation for restored conditions in the enhanced section of Maple Creek (i.e., Drainage D-1) suggest that the restored riverine wetland habitat will increase the overall ecological function of this remnant of Maple Creek from its current state of 50 percent to 70 percent. This represents an approximate 40 percent increase in functional capacity of the restored riverine and riparian system compared to its current state. The newly created MCRC system is estimated to have a functional capacity of 73 percent of a reference system.

Figure 10 presents results for each of the CRAM attributes, scaled to 100% of their total possible scores and presents the overall CRAM score, scaled to 100% of their total possible scores, for proposed conditions of the OU-E lowland, enhanced reach of Maple Creek, and MCRC. Figure 10 also presents similar information for current conditions of wetlands in these areas for comparison. Current conditions for the MCRC are not presented in Figure 10, because this habitat does not currently exist on the site.

The MPC Restoration Project wetlands are not expected to achieve a CRAM ecological function score equivalent to a reference wetland, because a reference wetland is assumed to have minimal adjacent development and would have an upgradient watershed that provides a full range of hydrologic functions (e.g., flow attenuation, groundwater infiltration and water storage). By contrast, the restored OU-E lowland, enhanced section of Maple Creek, and MCRC CRAM scores are specifically limited by the upgradient urban watershed hydrology (i.e., high intensity flows or short duration) and landscape connectivity, which is a physical constraint of the existing and future surrounding developed landscape. The constraints of landscape connectivity and water source are aspects of the overall surrounding landscape that are likely outside of the influence of the restoration design, because current development will not be removed and future development is an integral component of the Mill Site Specific Plan. These aspects are further discussed below.

- The landscape connectivity score of the Buffer and Landscape Context attribute for the OU-E lowland is unlikely to increase due to current and future development associated with the City and the Mill Site Specific Plan, particularly due to development east of Highway 1. For the landscape connectivity score to approach that of a reference riverine wetland system, the MPC Restoration Project would require at least 400 meters of riparian buffer both upstream and downstream of the evaluated reach. Furthermore, the buffer width score of the Buffer and Landscape Context attribute approaching a reference system requires an average buffer width of at least 190 meters (approximately 625 feet) for depressional and riverine wetland systems. Therefore, it is apparent that current and proposed development constraints

[1] The current ecological function of wetlands in the OU-E lowland was taken as an average of the total CRAM scores for Pond 6, Pond 7, North Pond and Wetlands E-1, E-2 and E-5/E-6.

surrounding the MPC Restoration Project area prevent approaching reference scores for either landscape connectivity or buffer width in the Buffer and Landscape Context attribute.

- The water source score in the Hydrology attribute is unlikely to increase due to the flashy nature of stormwater flows resulting from a developed landscape with abundant impervious surfaces. In terms of the CRAM evaluation the low hydrology score results from more than 20% of the upgradient watershed being primarily urban runoff. Although some improvements in hydrology may be achieved through the programmatic control of impervious surfaces and future improvement in the City's storm drainage system, substantial changes in the flows dynamics entering Maple Creek are unlikely to occur in the foreseeable future due to the presence of City development.

Using the CRAM analysis to evaluate the overall increase in function that the MPC Restoration Project provides does not fully account for the hydrological and ecological connectivity of the proposed integrated habitat area. The CRAM analysis for each component of the MPC Restoration Project reflects conditions as specifically developed for distinct wetland types (e.g., depressional and riverine). While some aspects of landscape connectivity are captured in CRAM scores, because of the separation of different wetlands into distinct assessment areas some integrated ecological functions provided by connections between a diversity of landscape and wetland types are not fully reflected. Therefore, the proposed project will provide additional ecological benefit not strictly evaluated in the quantitative CRAM analysis.

REFERENCES

ARCADIS U.S., Inc. 2011a. Environmentally Sensitive Habitat Areas Delineation Report. Prepared for Georgia-Pacific LLC. April.

ARCADIS U.S., Inc. 2011b. Mill Pond Complex DRAFT Conceptual Design. In preparation for Georgia-Pacific LLC.

Collins, J.N., E.D. Stein, M. Sutula, R. Clark, A.E. Fetscher, L. Grenier, C. Grosso, and A. Wiskind. 2008. California Rapid Assessment Method (CRAM) for Wetlands, v. 5.0.2. 157 pp. September.

WRA, Inc. 2009. Delineation of Potential Section 404 Jurisdictional Wetlands and Waters. Former Georgia-Pacific Fort Bragg Wood Products Facility, Fort Bragg, Mendocino County, California. Prepared for Georgia-Pacific, LLC. September.

Table A-1
Perennial Depressional Wetlands - Buffer and Landscape Connectivity Attribute Calculations

MPC Restoration Draft Conceptual Design
Former Georgia-Pacific Wood Products Facility
Fort Bragg, California

Pond 5

Attribute	Metric	Value	Rating	Value
Landscape Connectivity	Average Percentage of Transect Length with Wetland Habitat	16%	D	3
	Percent of AA Perimeter with Buffer	50%	B	9
	Average Buffer Width	29.63	D	3
Buffers	Buffer Condition	Mostly disturbed	C	6
Raw Attribute Score				8.583629
Final Attribute Score				36%

North Pond

Attribute	Metric	Value	Rating	Value
Landscape Connectivity	Average Percentage of Transect Length with Wetland Habitat	29%	C	6
	Percent of AA Perimeter with Buffer	100%	A	12
	Average Buffer Width	184	B	9
Buffers	Buffer Condition	Highly disturbed	D	3
Raw Attribute Score				11.5836292
Final Attribute Score				48%

Wetland E-1

Attribute	Metric	Value	Rating	Value
Landscape Connectivity	Average Percentage of Transect Length with Wetland Habitat	22%	D	3
	Percent of AA Perimeter with Buffer	100%	A	12
	Average Buffer Width	140	B	9
Buffers	Buffer Condition	Highly disturbed	D	3
Raw Attribute Score				8.583629
Final Attribute Score				36%

Pond 6

Attribute	Metric	Value	Rating	Value
Landscape Connectivity	Average Percentage of Transect Length with Wetland Habitat	36%	C	6
	Percent of AA Perimeter with Buffer	100%	A	12
	Average Buffer Width	225	A	12
Buffers	Buffer Condition	Highly disturbed	D	3
Raw Attribute Score				12
Final Attribute Score				50%

Pond 8W

Attribute	Metric	Value	Rating	Value
Landscape Connectivity	Average Percentage of Transect Length with Wetland Habitat	44%	C	6
	Percent of AA Perimeter with Buffer	35%	C	6
	Average Buffer Width	242	A	12
Buffers	Buffer Condition	Highly disturbed	D	3
Raw Attribute Score				11.0453785
Final Attribute Score				46%

Wetland E-2

Attribute	Metric	Value	Rating	Value
Landscape Connectivity	Average Percentage of Transect Length with Wetland Habitat	41%	C	6
	Percent of AA Perimeter with Buffer	100%	A	12
	Average Buffer Width	169	B	9
Buffers	Buffer Condition	Highly disturbed	D	3
Raw Attribute Score				11.58363
Final Attribute Score				48%

Pond 7

Attribute	Metric	Value	Rating	Value
Landscape Connectivity	Average Percentage of Transect Length with Wetland Habitat	37%	C	6
	Percent of AA Perimeter with Buffer	100%	A	12
	Average Buffer Width	183.00	B	9
Buffers	Buffer Condition	Highly disturbed	D	3
Raw Attribute Score				11.58363
Final Attribute Score				48%

Pond 8E

Attribute	Metric	Value	Rating	Value
Landscape Connectivity	Average Percentage of Transect Length with Wetland Habitat	30%	C	6
	Percent of AA Perimeter with Buffer	35%	C	6
	Average Buffer Width	223.88	A	12
Buffers	Buffer Condition	Highly disturbed	D	3
Raw Attribute Score				11.0453785
Final Attribute Score				46%

Wetland E-5 and E-6

Attribute	Metric	Value	Rating	Value
Landscape Connectivity	Average Percentage of Transect Length with Wetland Habitat	34%	C	6
	Percent of AA Perimeter with Buffer	100%	A	12
	Average Buffer Width	175	B	9
Buffers	Buffer Condition	Highly disturbed	D	3
Raw Attribute Score				11.58363
Final Attribute Score				48%

Table A-2
Perennial Depressional Wetlands - Biotic Structure Attribute Calculations

MPC Restoration Draft Conceptual Design
Former Georgia-Pacific Wood Products Facility
Fort Bragg, California

Pond 5

Plant Layer	Co-dominant Species	Native (N) or Invasive (I)
Floating/Short	Myriophyllum aquaticum	I
Tall	Typha latifolia	N
2 layers	2 co-dominant species	50% invasive

Pond 6

Plant Layer	Co-dominant Species	Native (N) or Invasive (I)
Short	Mimulus guttatus	N
	Hydrocotyle ranunculoides	N
Medium	Oenanthe sarmentosa	N
	Alisma plantago-aquatica	N
Tall	Typha latifolia	N
3 layers	5 co-dominant species	0% invasive

Pond 7

Plant Layer	Co-dominant Species	Native (N) or Invasive (I)
Short	Hydrocotyl ranunculoides	N
Medium	Oenanthe sarmentosa	N
Tall	Typha latifolia	N
3 layers	3 co-dominant species	0% invasive

North Pond

Plant Layer	Co-dominant Species	Native (N) or Invasive (I)
Medium	Oenanthe sarmentosa	N
	Scirpus microcarpus	N
	Juncus effusus	N
Tall	Typha latifolia	N
2 layers	4 co-dominant species	0% invasive

Pond 8W

Plant Layer	Co-dominant Species	Native (N) or Invasive (I)
Short	Hydrocotyl ranunculoides	N
	Myriophyllum aquaticum	I
Medium	Athyrium felix-femina	N
	Juncus effusus	N
	Oenanthe sarmentosa	N
	Scirpus microcarpus	N
Tall	Typha latifolia	N
3 layers	7 co-dominant species	14% invasive

Pond 8E

Plant Layer	Co-dominant Species	Native (N) or Invasive (I)
Short	Hydrocotyl ranunculoides	N
	Myriophyllum aquaticum	I
Medium	Athyrium felix-femina	N
	Juncus effusus	N
	Oenanthe sarmentosa	N
	Scirpus microcarpus	N
Tall	Typha latifolia	N
3 layers	7 co-dominant species	14% invasive

Wetland E-1

Plant Layer	Co-dominant Species	Native (N) or Invasive (I)
Short	Unknown	-
	Juncus bolanderi	N
	Deschampsia cespitosa	N
Medium	Cyperus eragrostis	N
	Deschampsia cespitosa	N
	Polypogon monspeliensis	I
	Juncus effusus	N
Tall	Cortaderia jubata	I
	Typha latifolia	N
3 layers	8 co-dominant species	25% invasive

Wetland E-2

Plant Layer	Co-dominant Species	Native (N) or Invasive (I)
Short	Grass (unknown)	-
Medium	Cortaderia selloana	I
	Scirpus microcarpus	N
	Cyperus eragrostis	N
	Deschampsia cespitosa	N
Tall	Cortaderia selloana	I
	Typha latifolia	N
3 layers	6 co-dominant species	~17% invasive

Wetland E-5 and E-6

Plant Layer	Co-dominant Species	Native (N) or Invasive (I)
Short	Cotula coronopifolia	I
	Grass (unknown)	-
	Plantago coronopus	N
	Lotus corniculatus	N
Medium	Holcus lanatus	I
	Deschampsia cespitosa	N
	Cyperus eragrostis	N
Tall	Cortaderia selloana	I
3 layers	8 co-dominant species	~38% invasive

Table A- 3
Riverine Wetlands - Attribute 1, 2, and 4 Calculations

MPC Restoration Draft Conceptual Design
Former Georgia-Pacific Wood Products Facility
Fort Bragg, California

Attribute 1: Buffer and Landscape Context

Attribute	Metric	Value	Rating
Landscape Connectivity	Distance of non-buffer segments	500/500	D
Buffers	Percent of AA Perimeter with Buffer	100%	A
	Average Buffer Width (meters)	90	C
	Buffer Condition	Somewhat undisturbed	B

Attribute 2: Hydrologic Connectivity

Attribute	Metric	Value	Rating
Entrenchment Ratio Calculations	Estimated bankfull width	7'7"	
	Estimated bankfull depth	1'10"	
	Estimated flood prone depth	3'8"	
	Estimated flood prone width	10'10"	
Entrenchment Ratio		1.43	D

Attribute 4: Biotic Structure

Plant Layer	Co-dominant Species Observed	Native (N) or Invasive (I)
Short	Scirpus microcarpus	N
	Lolium perenne	N
	Holcus lanatus	I
	Oenanthe sarmentosa	N
Medium Tall	Holcus lanatus	I
	Rubus discolor	I
	Rhamnus sp.	N
	Myrica californica	N
Very Tall	Alnus rubra	N
4 layers	9 co-dominant species	33% invasive

AA Name: Pond 5				(m/d/y)	12	7	10
Attributes and Metrics		**Scores**					
Buffer and Landscape Context							
Landscape Connectivity (D)		D					
Buffer submetric A: Percent of AA with Buffer	B						
Buffer submetric B: Average Buffer Width	D						
Buffer submetric C: Buffer Condition	C						
$D + [C \times (A \times B)^{1/2}]^{1/2}$ = **Attribute Score**		Raw	Final	Final Attribute Score =			
		8.584	36%	(Raw Score/24)100			
Hydrology							
Water Source		C					
Hydroperiod or Channel Stability		D					
Hydrologic Connectivity		D					
Attribute Score		Raw	Final	Final Attribute Score =			
		12	33%	(Raw Score/36)100			
Physical Structure							
Structural Patch Richness		D					
Topographic Complexity		D					
Attribute Score		Raw	Final	Final Attribute Score =			
		6	25%	(Raw Score/24)100			
Biotic Structure							
Plant Community submetric A: Number of Plant Layers	C						
Plant Community submetric B: Number of Co-dominant species	D						
Plant Community submetric C: Percent Invasion	D						
Plant Community Metric *(average of submetrics A-C)*		4					
Horizontal Interspersion and Zonation		C					
Vertical Biotic Structure		D					
Attribute Score		Raw	Final	Final Attribute Score =			
		13	36%	(Raw Score/36)100			
Overall AA Score		33%		**Average of Final Attribute Scores**			

AA Name: Pond 6				(m/d/y)	6	15	10
Attributes and Metrics		**Scores**					
Buffer and Landscape Context							
Landscape Connectivity (D)		C					
Buffer submetric A: *Percent of AA with Buffer*	A						
Buffer submetric B: *Average Buffer Width*	A						
Buffer submetric C: *Buffer Condition*	D						
D + [C x (A x B) $^{1/2}$] $^{1/2}$ = **Attribute Score**		Raw	Final	Final Attribute Score = (Raw Score/24)100			
		12	50%				
Hydrology							
Water Source		C					
Hydroperiod or Channel Stability		C					
Hydrologic Connectivity		D					
Attribute Score		Raw	Final	Final Attribute Score = (Raw Score/36)100			
		15	42%				
Physical Structure							
Structural Patch Richness		D					
Topographic Complexity		D					
Attribute Score		Raw	Final	Final Attribute Score = (Raw Score/24)100			
		6	25%				
Biotic Structure							
Plant Community submetric A: *Number of Plant Layers*	B						
Plant Community submetric B: *Number of Co-dominant species*	D						
Plant Community submetric C: *Percent Invasion*	A						
Plant Community Metric *(average of submetrics A-C)*		8					
Horizontal Interspersion and Zonation		B					
Vertical Biotic Structure		C					
Attribute Score		Raw	Final	Final Attribute Score = (Raw Score/36)100			
		23	64%				
Overall AA Score		45%		**Average of Final Attribute Scores**			

AA Name: Pond 7				(m/d/y)	6	15	10
Attributes and Metrics		**Scores**					
Buffer and Landscape Context							
Landscape Connectivity (D)		C					
Buffer submetric A: *Percent of AA with Buffer*	A						
Buffer submetric B: *Average Buffer Width*	B						
Buffer submetric C: *Buffer Condition*	D						
D + [C x (A x B) $^{1/2}$] $^{1/2}$ = **Attribute Score**		Raw	Final	Final Attribute Score = (Raw Score/24)100			
		11.58	48%				
Hydrology							
Water Source		C					
Hydroperiod or Channel Stability		C					
Hydrologic Connectivity		D					
Attribute Score		Raw	Final	Final Attribute Score = (Raw Score/36)100			
		15	42%				
Physical Structure							
Structural Patch Richness		D					
Topographic Complexity		D					
Attribute Score		Raw	Final	Final Attribute Score = (Raw Score/24)100			
		6	25%				
Biotic Structure							
Plant Community submetric A: *Number of Plant Layers*	B						
Plant Community submetric B: *Number of Co-dominant species*	D						
Plant Community submetric C: *Percent Invasion*	A						
Plant Community Metric *(average of submetrics A-C)*		8					
Horizontal Interspersion and Zonation		C					
Vertical Biotic Structure		C					
Attribute Score		Raw	Final	Final Attribute Score = (Raw Score/36)100			
		20	56%				
Overall AA Score		43%		**Average of Final Attribute Scores**			

AA Name: North Pond				(m/d/y)	6	15	10
Attributes and Metrics		**Scores**					
Buffer and Landscape Context							
Landscape Connectivity (D)		C					
Buffer submetric A: *Percent of AA with Buffer*	A						
Buffer submetric B: *Average Buffer Width*	B						
Buffer submetric C: *Buffer Condition*	D						
D + [C x (A x B) $^{1/2}$] $^{1/2}$ = **Attribute Score**		Raw	Final	Final Attribute Score = (Raw Score/24)100			
		11.58	48%				
Hydrology							
Water Source		C					
Hydroperiod or Channel Stability		C					
Hydrologic Connectivity		D					
Attribute Score		Raw	Final	Final Attribute Score = (Raw Score/36)100			
		15	42%				
Physical Structure							
Structural Patch Richness		D					
Topographic Complexity		C					
Attribute Score		Raw	Final	Final Attribute Score = (Raw Score/24)100			
		9	38%				
Biotic Structure							
Plant Community submetric A: *Number of Plant Layers*	C						
Plant Community submetric B: *Number of Co-dominant species*	D						
Plant Community submetric C: *Percent Invasion*	A						
Plant Community Metric *(average of submetrics A-C)*		7					
Horizontal Interspersion and Zonation		C					
Vertical Biotic Structure		C					
Attribute Score		Raw	Final	Final Attribute Score = (Raw Score/36)100			
		19	53%				
Overall AA Score		45%		**Average of Final Attribute Scores**			

AA Name: Pond 8W				(m/d/y)	6	15	10
Attributes and Metrics		**Scores**					
Buffer and Landscape Context							
Landscape Connectivity (D)		C					
Buffer submetric A: Percent of AA with Buffer	C						
Buffer submetric B: Average Buffer Width	A						
Buffer submetric C: Buffer Condition	D						
D + [C x (A x B) $^{1/2}$] $^{1/2}$ = **Attribute Score**		Raw	Final	Final Attribute Score = (Raw Score/24)100			
		11.05	46%				
Hydrology							
Water Source		C					
Hydroperiod or Channel Stability		D					
Hydrologic Connectivity		C					
Attribute Score		Raw	Final	Final Attribute Score = (Raw Score/36)100			
		15	42%				
Physical Structure							
Structural Patch Richness		D					
Topographic Complexity		D					
Attribute Score		Raw	Final	Final Attribute Score = (Raw Score/24)100			
		6	25%				
Biotic Structure							
Plant Community submetric A: Number of Plant Layers	B						
Plant Community submetric B: Number of Co-dominant species	C						
Plant Community submetric C: Percent Invasion	A						
Plant Community Metric *(average of submetrics A-C)*		9					
Horizontal Interspersion and Zonation		B					
Vertical Biotic Structure		C					
Attribute Score		Raw	Final	Final Attribute Score = (Raw Score/36)100			
		24	67%				
Overall AA Score		45%		**Average of Final Attribute Scores**			

AA Name: Pond 8E				(m/d/y)	6	15	10
Attributes and Metrics		**Scores**					
Buffer and Landscape Context							
Landscape Connectivity (D)		C					
Buffer submetric A: Percent of AA with Buffer	C						
Buffer submetric B: Average Buffer Width	A						
Buffer submetric C: Buffer Condition	D						
D + [C x (A x B) $^{1/2}$] $^{1/2}$ = **Attribute Score**		Raw	Final	Final Attribute Score = (Raw Score/24)100			
		11.05	46%				
Hydrology							
Water Source		C					
Hydroperiod or Channel Stability		D					
Hydrologic Connectivity		C					
Attribute Score		Raw	Final	Final Attribute Score = (Raw Score/36)100			
		15	42%				
Physical Structure							
Structural Patch Richness		D					
Topographic Complexity		D					
Attribute Score		Raw	Final	Final Attribute Score = (Raw Score/24)100			
		6	25%				
Biotic Structure							
Plant Community submetric A: Number of Plant Layers	B						
Plant Community submetric B: Number of Co-dominant species	C						
Plant Community submetric C: Percent Invasion	A						
Plant Community Metric *(average of submetrics A-C)*		9					
Horizontal Interspersion and Zonation		B					
Vertical Biotic Structure		C					
Attribute Score		Raw	Final	Final Attribute Score = (Raw Score/36)100			
		24	67%				
Overall AA Score		45%		**Average of Final Attribute Scores**			

AA Name: Wetland E-1				(m/d/y)	12	7	10
Attributes and Metrics		**Scores**					
Buffer and Landscape Context							
Landscape Connectivity (D)		D					
Buffer submetric A: *Percent of AA with Buffer*	A						
Buffer submetric B: *Average Buffer Width*	B						
Buffer submetric C: *Buffer Condition*	D						
D + [C x (A x B) $^{1/2}$] $^{1/2}$ = **Attribute Score**		Raw	Final	Final Attribute Score = (Raw Score/24)100			
		8.584	36%				
Hydrology							
Water Source		A					
Hydroperiod or Channel Stability		B					
Hydrologic Connectivity		B					
Attribute Score		Raw	Final	Final Attribute Score = (Raw Score/36)100			
		30	83%				
Physical Structure							
Structural Patch Richness		D					
Topographic Complexity		C					
Attribute Score		Raw	Final	Final Attribute Score = (Raw Score/24)100			
		9	38%				
Biotic Structure							
Plant Community submetric A: *Number of Plant Layers*	B						
Plant Community submetric B: *Number of Co-dominant species*	C						
Plant Community submetric C: *Percent Invasion*	B						
Plant Community Metric *(average of submetrics A-C)*		8					
Horizontal Interspersion and Zonation		B					
Vertical Biotic Structure		B					
Attribute Score		Raw	Final	Final Attribute Score = (Raw Score/36)100			
		26	72%				
Overall AA Score		57%		**Average of Final Attribute Scores**			

AA Name: Wetland E-2				(m/d/y)	12	7	10
Attributes and Metrics		**Scores**					
Buffer and Landscape Context							
Landscape Connectivity (D)		C					
Buffer submetric A: *Percent of AA with Buffer*	A						
Buffer submetric B: *Average Buffer Width*	B						
Buffer submetric C: *Buffer Condition*	D						
D + [C x (A x B) $^{1/2}$] $^{1/2}$ = **Attribute Score**		Raw	Final	Final Attribute Score = (Raw Score/24)100			
		11.58	48%				
Hydrology							
Water Source		A					
Hydroperiod or Channel Stability		B					
Hydrologic Connectivity		A					
Attribute Score		Raw	Final	Final Attribute Score = (Raw Score/36)100			
		33	92%				
Physical Structure							
Structural Patch Richness		D					
Topographic Complexity		C					
Attribute Score		Raw	Final	Final Attribute Score = (Raw Score/24)100			
		9	38%				
Biotic Structure							
Plant Community submetric A: *Number of Plant Layers*	B						
Plant Community submetric B: *Number of Co-dominant species*	C						
Plant Community submetric C: *Percent Invasion*	B						
Plant Community Metric *(average of submetrics A-C)*		8					
Horizontal Interspersion and Zonation		C					
Vertical Biotic Structure		C					
Attribute Score		Raw	Final	Final Attribute Score = (Raw Score/36)100			
		20	56%				
Overall AA Score		58%		**Average of Final Attribute Scores**			

AA Name: Wetland E-5 and E-6				(m/d/y)	12	7	10
Attributes and Metrics		**Scores**					
Buffer and Landscape Context							
Landscape Connectivity (D)		C					
Buffer submetric A: *Percent of AA with Buffer*	A						
Buffer submetric B: *Average Buffer Width*	B						
Buffer submetric C: *Buffer Condition*	D						
D + [C x (A x B) $^{1/2}$] $^{1/2}$ = **Attribute Score**		Raw	Final	Final Attribute Score = (Raw Score/24)100			
		11.58	48%				
Hydrology							
Water Source		A					
Hydroperiod or Channel Stability		B					
Hydrologic Connectivity		A					
Attribute Score		Raw	Final	Final Attribute Score = (Raw Score/36)100			
		33	92%				
Physical Structure							
Structural Patch Richness		D					
Topographic Complexity		C					
Attribute Score		Raw	Final	Final Attribute Score = (Raw Score/24)100			
		9	38%				
Biotic Structure							
Plant Community submetric A: *Number of Plant Layers*	B						
Plant Community submetric B: *Number of Co-dominant species*	C						
Plant Community submetric C: *Percent Invasion*	C						
Plant Community Metric *(average of submetrics A-C)*		7					
Horizontal Interspersion and Zonation		C					
Vertical Biotic Structure		C					
Attribute Score		Raw	Final	Final Attribute Score = (Raw Score/36)100			
		19	53%				
Overall AA Score		58%		**Average of Final Attribute Scores**			

AA Name: Drainage D1				(m/d/y)	12	7	10
Attributes and Metrics		**Scores**		**Non-confined**			
Buffer and Landscape Context							
Landscape Connectivity (D)		D					
Buffer submetric A: *Percent of AA with Buffer*	A						
Buffer submetric B: *Average Buffer Width*	C						
Buffer submetric C: *Buffer Condition*	B						
D + [C x (A x B) $^{1/2}$] $^{1/2}$ = **Attribute Score**		Raw	Final	Final Attribute Score = (Raw Score/24)100			
		11.74	49%				
Hydrology							
Water Source		C					
Hydroperiod or Channel Stability		C					
Hydrologic Connectivity		D					
Attribute Score		Raw	Final	Final Attribute Score = (Raw Score/36)100			
		15	42%				
Physical Structure							
Structural Patch Richness		D					
Topographic Complexity		B					
Attribute Score		Raw	Final	Final Attribute Score = (Raw Score/24)100			
		12	50%				
Biotic Structure							
Plant Community submetric A: *Number of Plant Layers*	A						
Plant Community submetric B: *Number of Co-dominant species*	B						
Plant Community submetric C: *Percent Invasion*	C						
Plant Community Metric *(average of submetrics A-C)*		9					
Horizontal Interspersion and Zonation		C					
Vertical Biotic Structure		C					
Attribute Score		Raw	Final	Final Attribute Score = (Raw Score/36)100			
		21	58%				
Overall AA Score		50%		**Average of Final Attribute Scores**			

AA Name: Proposed OU-E Lowland				(m/d/y)	5	4	2011
Attributes and Metrics		**Scores**		**Comments**			
Buffer and Landscape Context				Buffer and Landscape Connectivity attribute is limited by the nature of the surrounding landscape (i.e., current development and proposed development under the Site Specific Plan). Therefore, this attribute has limited potential for increase due to proposed restoration activities.			
Landscape Connectivity (D)		C					
Buffer submetric A: Percent of AA with Buffer	A						
Buffer submetric B: Average Buffer Width	B						
Buffer submetric C: Buffer Condition	A						
$D + [C \times (A \times B)^{1/2}]^{1/2}$ = **Attribute Score**		Raw	Final	Final Attribute Score = (Raw Score/24)100			
		17.17	72%				
Hydrology				Developed land occupies >20% of contributing landscape; Groundwater discharge and stormwater are expected to provide similar magnitude of dry-season flow, and natural hydrologic filling and draining of system will occur. Beach berm separates system from ocean.			
Water Source		C					
Hydroperiod or Channel Stability		A					
Hydrologic Connectivity		B					
Attribute Score		Raw	Final	Final Attribute Score = (Raw Score/36)100			
		27	75%				
Physical Structure				Based on observations in depressional wetlands near site and proposed design elements, 7 to 10 structural patches are expected. Two distinct benches with abundant microtopography expected.			
Structural Patch Richness		B					
Topographic Complexity		A					
Attribute Score		Raw	Final	Final Attribute Score = (Raw Score/24)100			
		21	88%				
Biotic Structure				Floating, short, medium, and tall layers are expected. Ten or more codominant species expected. Invasive species expected to be less than 20% in coverage. Based on observations in depressional wetlands near the site, dense herbaceous vegetation with extensive overlapping canopy is expected to dominate wetland areas.			
Plant Community submetric A: Number of Plant Layers	A						
Plant Community submetric B: Number of Co-dominant species	B						
Plant Community submetric C: Percent Invasion	B						
Plant Community Metric *(average of submetrics A-C)*		10					
Horizontal Interspersion and Zonation		A					
Vertical Biotic Structure		A					
Attribute Score		Raw	Final	Final Attribute Score = (Raw Score/36)100			
		34	94%				
Overall AA Score		82%		**Average of Final Attribute Scores**			

AA Name: Proposed Maple Creek Riparian Corridor				(m/d/y)	12	7	10
Attributes and Metrics		**Scores**		**Comments**			
Buffer and Landscape Context				Unconfined stream system.			
Landscape Connectivity (D)		D		More than 200 meters of non-buffer upstream of Highway 1 culvert. Buffer area adjacent to the stream channel is limited by the proposed development in the Site Use Plan. Buffer adjacent to the stream channel is expected to be relatively undisturbed with a few human uses (e.g., walking trail and road overpasses).			
Buffer submetric A: Percent of AA with Buffer	A						
Buffer submetric B: Average Buffer Width	D						
Buffer submetric C: Buffer Condition	B						
D + [C x (A x B) $^{1/2}$] $^{1/2}$ = **Attribute Score**		Raw	Final	Final Attribute Score = (Raw Score/24)100			
		10.35	43%				
Hydrology				Developed land occupies >20% of the contributing landscape. Groundwater discharge and stormwater are expected to provide similar magnitude of dry-season flow. Stream channel will be designed for equilibrium state with an entrenchment ratio of 3.64.			
Water Source		C					
Hydroperiod or Channel Stability		A					
Hydrologic Connectivity		A					
Attribute Score		Raw	Final	Final Attribute Score = (Raw Score/36)100			
		30	83%				
Physical Structure				10-13 structural patches are expected based on observations of similar systems adjacent to the site and the project design. Two distinct grade breaks are included in the channel design; microtopography may or may not develop in the			
Structural Patch Richness		B					
Topographic Complexity		B					
Attribute Score		Raw	Final	Final Attribute Score = (Raw Score/24)100			
		18	75%				
Biotic Structure				Short, medium, tall and very tall layers are expected. Twelve or more codominant species expected. Invasive species expected to be less than 20% in coverage. Horizontal interspersion is expected to be moderate based on design of floodplain pool areas, wetland seeps on the transition slopes, and upland riparian canopy. Vertical overlap between the canopy, shrub understory and herbaceous groundcover is expected to be extensive.			
Plant Community submetric A: Number of Plant Layers	A						
Plant Community submetric B: Number of Co-dominant species	A						
Plant Community submetric C: Percent Invasion	B						
Plant Community Metric *(average of submetrics A-C)*		11					
Horizontal Interspersion and Zonation		B					
Vertical Biotic Structure		A					
Attribute Score		Raw	Final	Final Attribute Score = (Raw Score/36)100			
		32	89%				
Overall AA Score		73%		**Average of Final Attribute Scores**			

AA Name: Proposed Enhanced Drainage D1				(m/d/y)	5	7	10
Attributes and Metrics		**Scores**		**Non-confined**			
Buffer and Landscape Context				More than 200 meters of non-buffer upstream of Highway 1 culvert. There is no non-buffer downstream. Buffer adjacent to the stream channel is expected to be relatively undisturbed with a few human uses (e.g., walking trail and road overpasses).			
Landscape Connectivity (D)		D					
Buffer submetric A: Percent of AA with Buffer	A						
Buffer submetric B: Average Buffer Width	C						
Buffer submetric C: Buffer Condition	A						
D + [C x (A x B) $^{1/2}$] $^{1/2}$ = **Attribute Score**		Raw	Final	Final Attribute Score = (Raw Score/24)100			
		13.09	55%				
Hydrology				Developed land occupies >20% of the contributing landscape. Groundwater discharge and stormwater provide dry-season flow. Entrenchment ratio of 2.22 based on regrading design and an assumed 2-foot bankfull depth and 3-foot floodprone depth.			
Water Source		C					
Hydroperiod or Channel Stability		B					
Hydrologic Connectivity		A					
Attribute Score		Raw	Final	Final Attribute Score = (Raw Score/36)100			
		27	75%				
Physical Structure				Structural patch complexity is expected to increase slightly from existing conditions.			
Structural Patch Richness		C					
Topographic Complexity		B					
Attribute Score		Raw	Final	Final Attribute Score = (Raw Score/24)100			
		15	63%				
Biotic Structure				Short, medium, tall and very tall layers are expected. Twelve or more codominant species expected. Invasive species expected to be less than 20% in coverage. Horizontal interspersion is expected to be moderate based on enhancement design. Vertical overlap between the canopy, shrub understory and herbaceous groundcover is expected to be extensive.			
Plant Community submetric A: Number of Plant Layers	A						
Plant Community submetric B: Number of Co-dominant species	A						
Plant Community submetric C: Percent Invasion	B						
Plant Community Metric *(average of submetrics A-C)*		11					
Horizontal Interspersion and Zonation		B					
Vertical Biotic Structure		A					
Attribute Score		Raw	Final	Final Attribute Score = (Raw Score/36)100			
		32	89%				
Overall AA Score		70%		**Average of Final Attribute Scores**			

CITY: HR DIV/GROUP: GIS DB: BG
Project # B0066138.0007.00001
I:\FortBragg\MXD\MillPond_ComplexRestoration\CRAM_EvaluationMemo\Fig 1 CRAM_Areas.mxd - 5/12/2011 @ 3:12:34 PM

LEGEND:

- WATERS/WETLAND AREAS
- PERENNIAL DEPRESSIONAL WETLAND ASSESSMENT AREA (AA) BOUNDARY
- RIVERINE WETLAND AA BOUNDARY

DRAFT

0 250 500 Feet

GRAPHIC SCALE

FORMER GEORGIA-PACIFIC WOOD PRODUCTS FACILITY
FORT BRAGG, CALIFORNIA

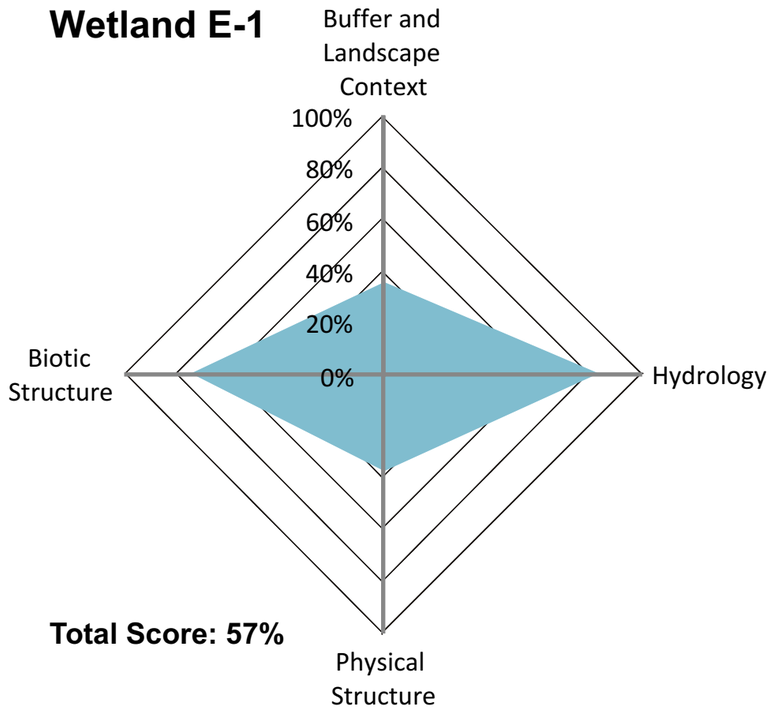
CRAM EVALUATION MEMORANDUM

CALIFORNIA RAPID ASSESSMENT METHOD FOR WETLANDS ASSESSMENT AREAS

ARCADIS

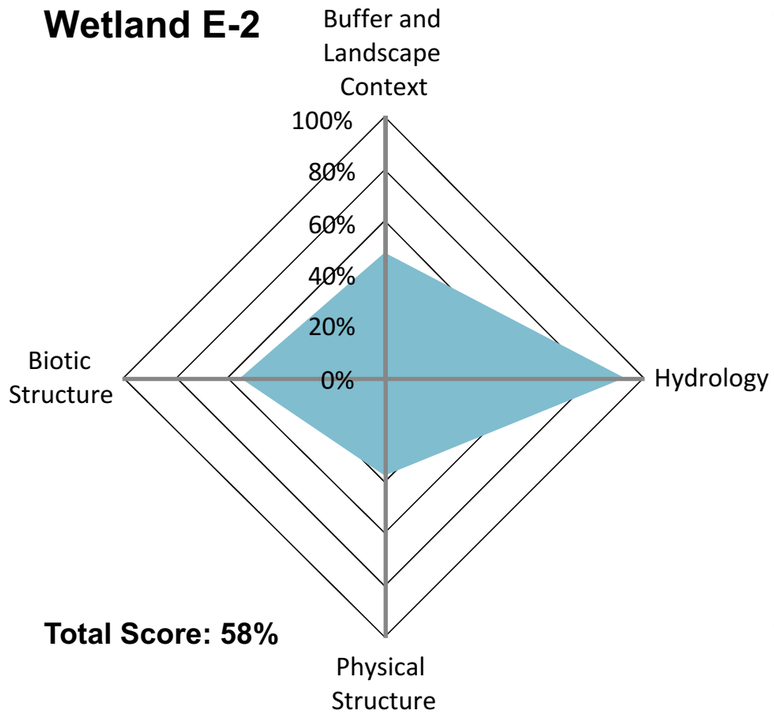
FIGURE 1

Wetland E-1



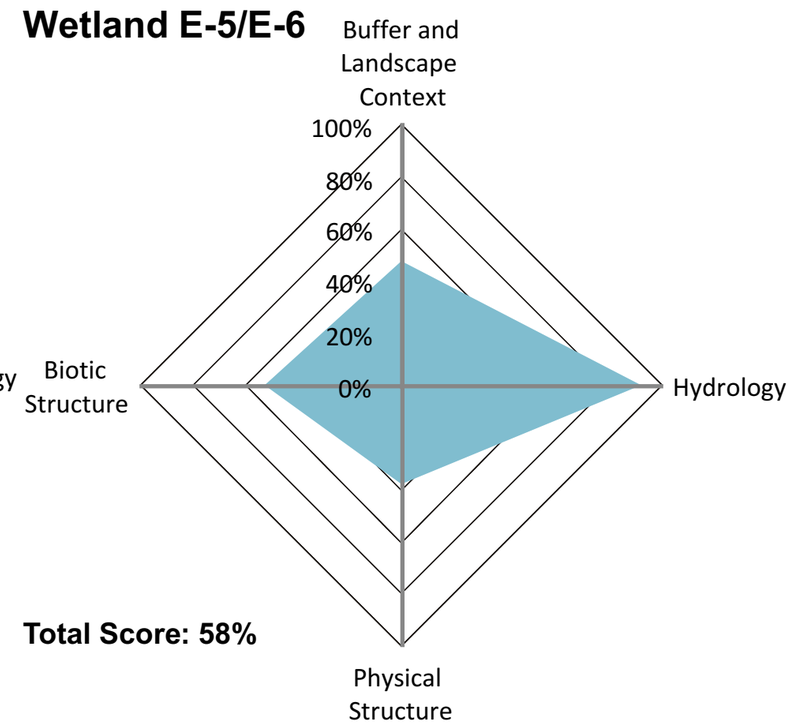
Total Score: 57%

Wetland E-2



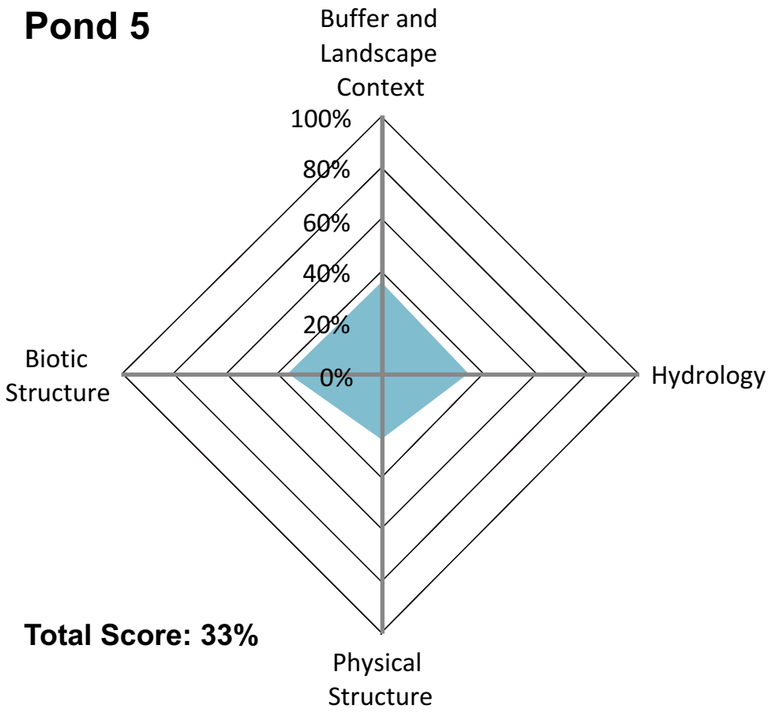
Total Score: 58%

Wetland E-5/E-6



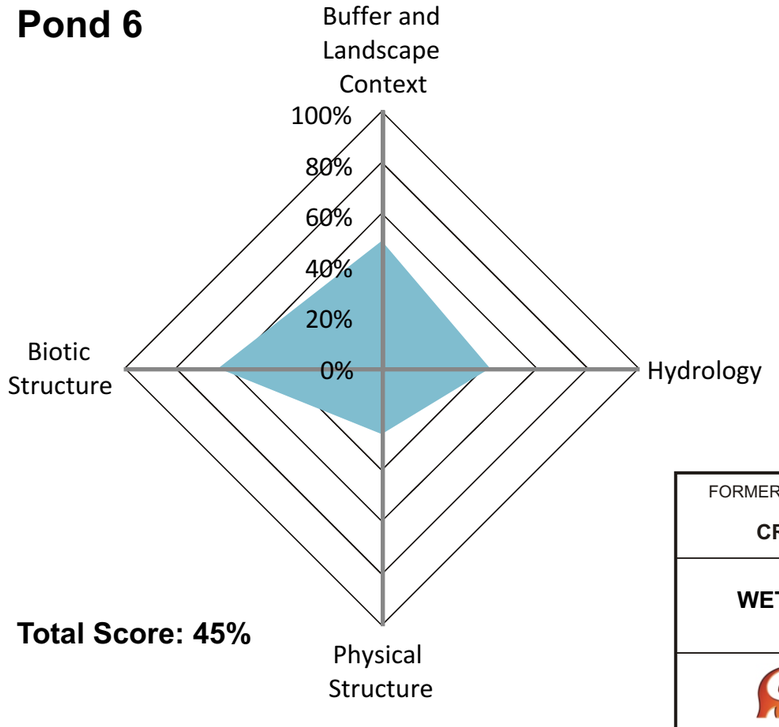
Total Score: 58%

Pond 5



Total Score: 33%

Pond 6



Total Score: 45%

FORMER GEORGIA-PACIFIC WOOD PRODUCTS FACILITY
FORT BRAGG, CALIFORNIA

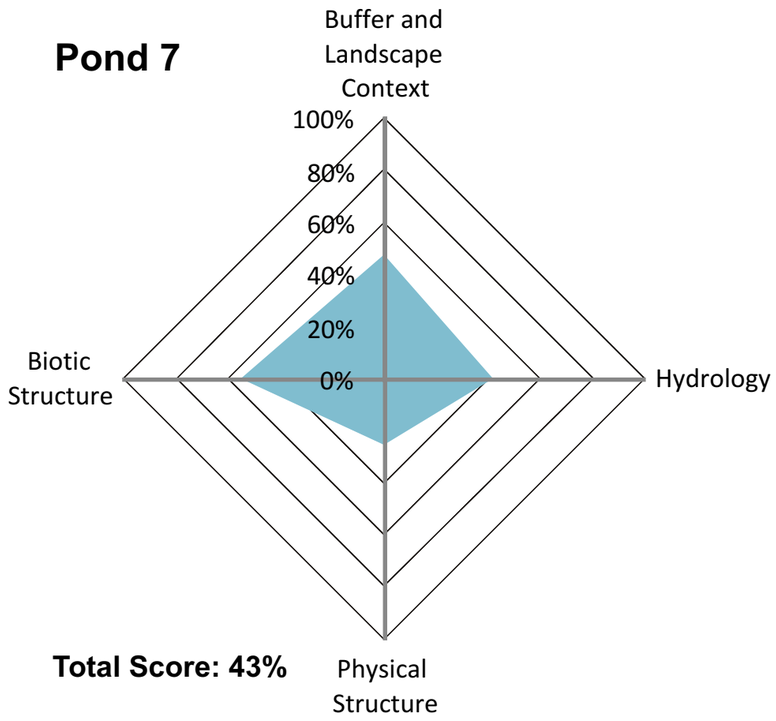
CRAM EVALUATION MEMORANDUM

WETLANDS ASSESSMENT SCORES

ARCADIS

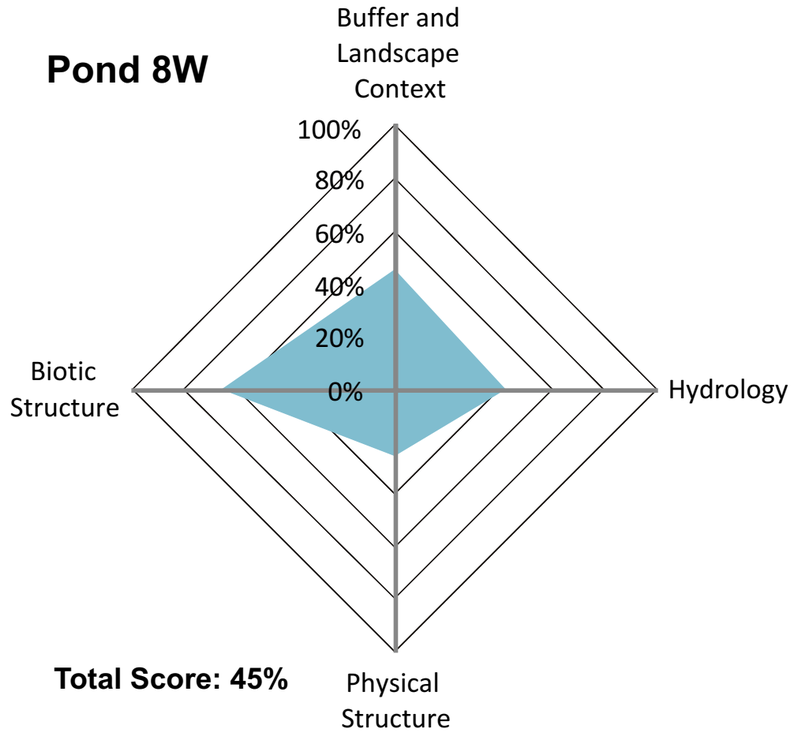
FIGURE
2

Pond 7



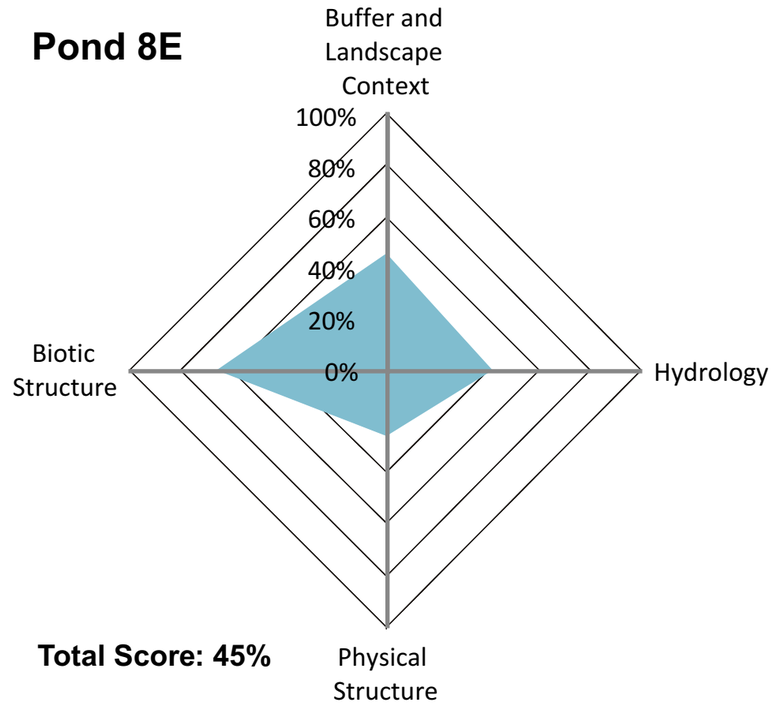
Total Score: 43%

Pond 8W



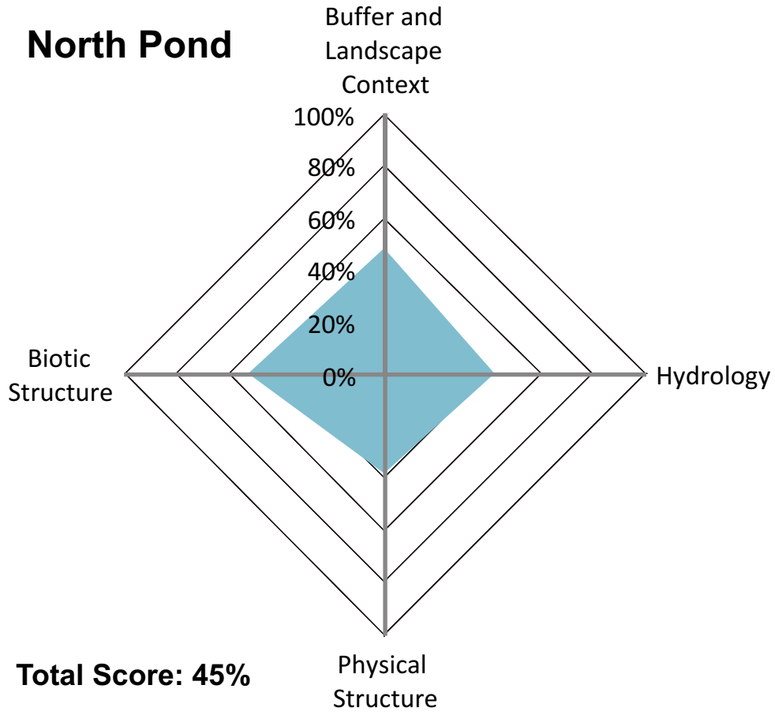
Total Score: 45%

Pond 8E



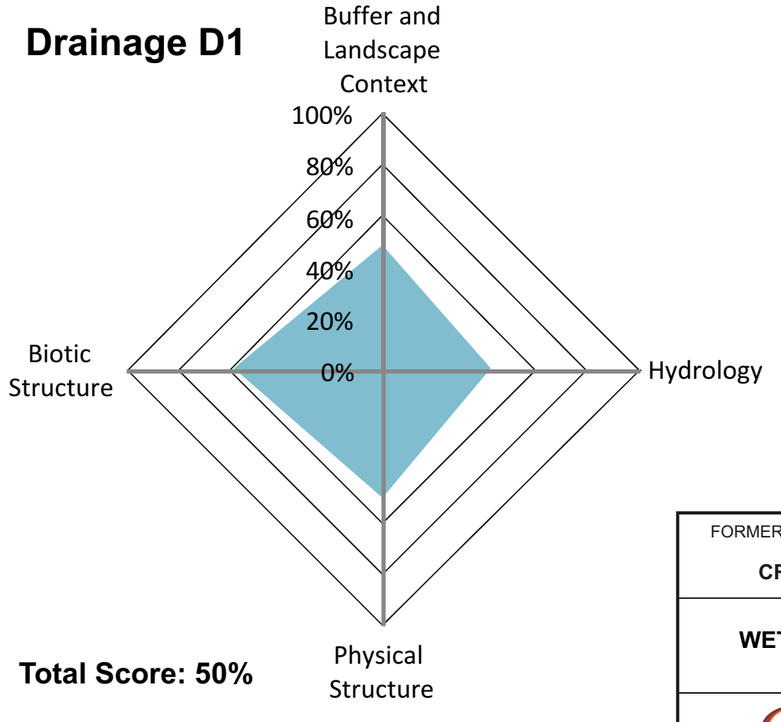
Total Score: 45%

North Pond



Total Score: 45%

Drainage D1



Total Score: 50%

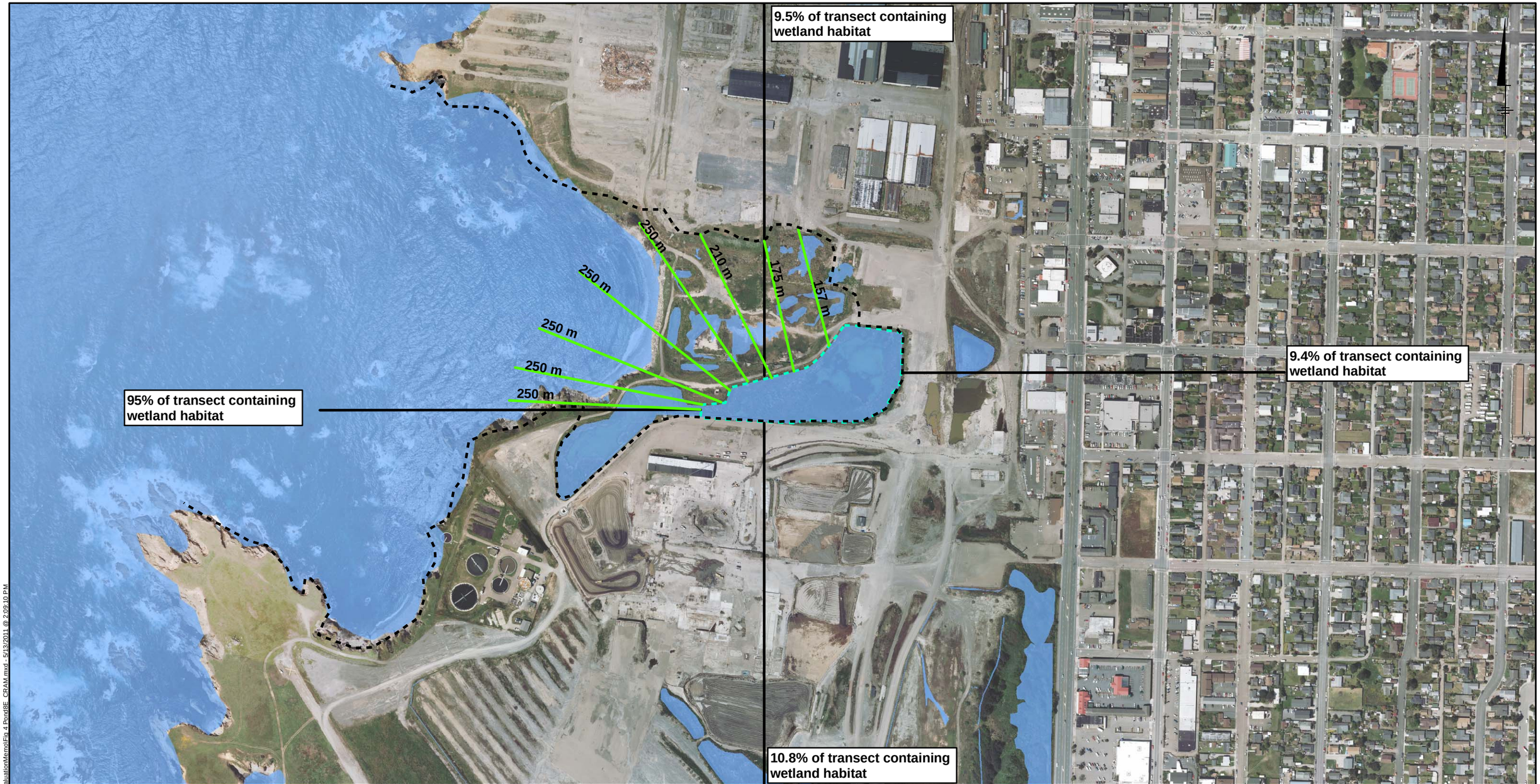
FORMER GEORGIA-PACIFIC WOOD PRODUCTS FACILITY
FORT BRAGG, CALIFORNIA

CRAM EVALUATION MEMORANDUM

WETLANDS ASSESSMENT SCORES

ARCADIS

FIGURE
3



LEGEND:

- BUFFER WIDTH
- EVALUATION OF LANDSCAPE CONNECTIVITY (500m)
- ASSESSMENT AREA (AA) BOUNDARY
- APPROXIMATE EXTENT OF BUFFER
- EXTENT OF WATERS/WETLANDS

NOTES:

1. ASSESSMENT AREA (AA) BOUNDARY DETERMINED BY BERM SURROUNDING MAN-MADE POND. AA BOUNDARY DRAWN AT TOE OF SLOPE.
2. LANDSCAPE CONNECTIVITY METRIC IS EVALUATED BASED ON PRESENCE OF WETLANDS WITHIN 500M OF AA. THESE WETLANDS INCLUDE BOTH DELINEATED WATERS/WETLANDS ON SITE AND WETLANDS IDENTIFIED BY THE NWI WETLANDS MAPPER.
3. BUFFER METRIC IS EVALUATED BASED ON THE PRESENCE OF BUFFERS THAT ARE BOTH ADJACENT TO THE AA BOUNDARY AND WITHIN 250M OF THE AA. BUFFERS INCLUDE THE OPEN OCEAN THAT IS NOT IMMEDIATELY ADJACENT TO THE AA. BUFFERS ALSO INCLUDE DECOMMISSIONED AREAS THAT HAVE BEEN REVEGETATED, TRAILS, VEGETATED DAMS, AND PONDS.

DRAFT

0 125 250 Meters

FORMER GEORGIA-PACIFIC WOOD PRODUCTS FACILITY
FORT BRAGG, CALIFORNIA
CRAM EVALUATION MEMORANDUM

EXAMPLE DEPRESSIONAL WETLAND ASSESSMENT AREA - POND 8E BUFFERS AND LANDSCAPE CONNECTIVITY

ARCADIS

FIGURE 4

CITY: HR DIV/GROUP: GIS DB: BG
B400661.38.0007.00001
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LEGEND:

ASSESSMENT AREA (AA) BOUNDARY

PLANT LAYER

NOTES:

1. AA BOUNDARY DETERMINED BY BERM SURROUNDING MAN-MADE POND FOR STORMWATER MANAGEMENT. AA BOUNDARY DRAWN AT TOE OF SLOPE.

DRAFT

0 55 110 Meters

FORMER GEORGIA-PACIFIC WOOD PRODUCTS FACILITY
FORT BRAGG, CALIFORNIA
CRAM EVALUATION MEMORANDUM

EXAMPLE DEPRESSIONAL WETLAND ASSESSMENT AREA - POND 8E HORIZONTAL VEGETATION INTERSPERSION

ARCADIS

FIGURE 5

CITY: HR DIV/GROUP: IM GIS DB: BCG
Project #: B0066136.0007.00001
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LEGEND

- OPERATIONAL UNIT
- WATERS/WETLAND AREAS
- APPROXIMATE EXTENT OF BUFFER
- ASSESSMENT AREA (AA) BOUNDARY
- BUFFER WIDTH
- EVALUATION OF LANDSCAPE CONNECTIVITY (500M)

NOTES:
1. ASSESSMENT AREA (AA) BOUNDARY DETERMINED BY EXTENT OF DAYLIGHTED PORTION OF MAPLE STREET CREEK.
2. LANDSCAPE CONNECTIVITY METRIC IS EVALUATED BASED ON THE AMOUNT OF NON-BUFFER SEGMENTS ADJACENT TO THE STREAM WITHIN 500M UPSTREAM AND DOWNSTREAM OF THE AA.
3. BUFFER METRIC IS EVALUATED BASED ON THE PRESENCE OF BUFFERS ON EITHER SIDE OF THE RIVERINE AA BOUNDARY AND WITHIN 250M OF THE AA. BUFFERS INCLUDE THE OPEN OCEAN THAT IS NOT IMMEDIATELY ADJACENT TO THE AA. BUFFERS ALSO INCLUDE DECOMMISSIONED AREAS THAT HAVE BEEN REVEGETATED, TRAILS, VEGETATED DAMS, AND PONDS.

DRAFT

0 70 140 Meters

FORMER GEORGIA-PACIFIC WOOD PRODUCTS FACILITY
FORT BRAGG, CALIFORNIA
CRAM EVALUATION MEMORANDUM

RIVERINE WETLAND
ASSESSMENT AREA - DRAINAGE D1
BUFFERS AND LANDSCAPE CONNECTIVITY

ARCADIS

FIGURE 6

CITY: HR DIV/GROUP: IM GIS_DB: BCG
Project #: B0066138.0007.00001
I:\Fort Bragg\MXD\MillPond_ComplexRestoration\CRAM_EvaluationMemo\Fig 6 DrainageD1_landscape.mxd - 5/13/2011 @ 9:04:14 AM

LEGEND

- ASSESSMENT AREA (AA) BOUNDARY
- PLANT LAYER
- EXTENT OF DRAINAGE D1

NOTES:
1. ASSESSMENT AREA (AA) BOUNDARY DETERMINED BY EXTENT OF DAYLIGHTED PORTION OF MAPLE STREET CREEK.

DRAFT

0 6 12 Meters

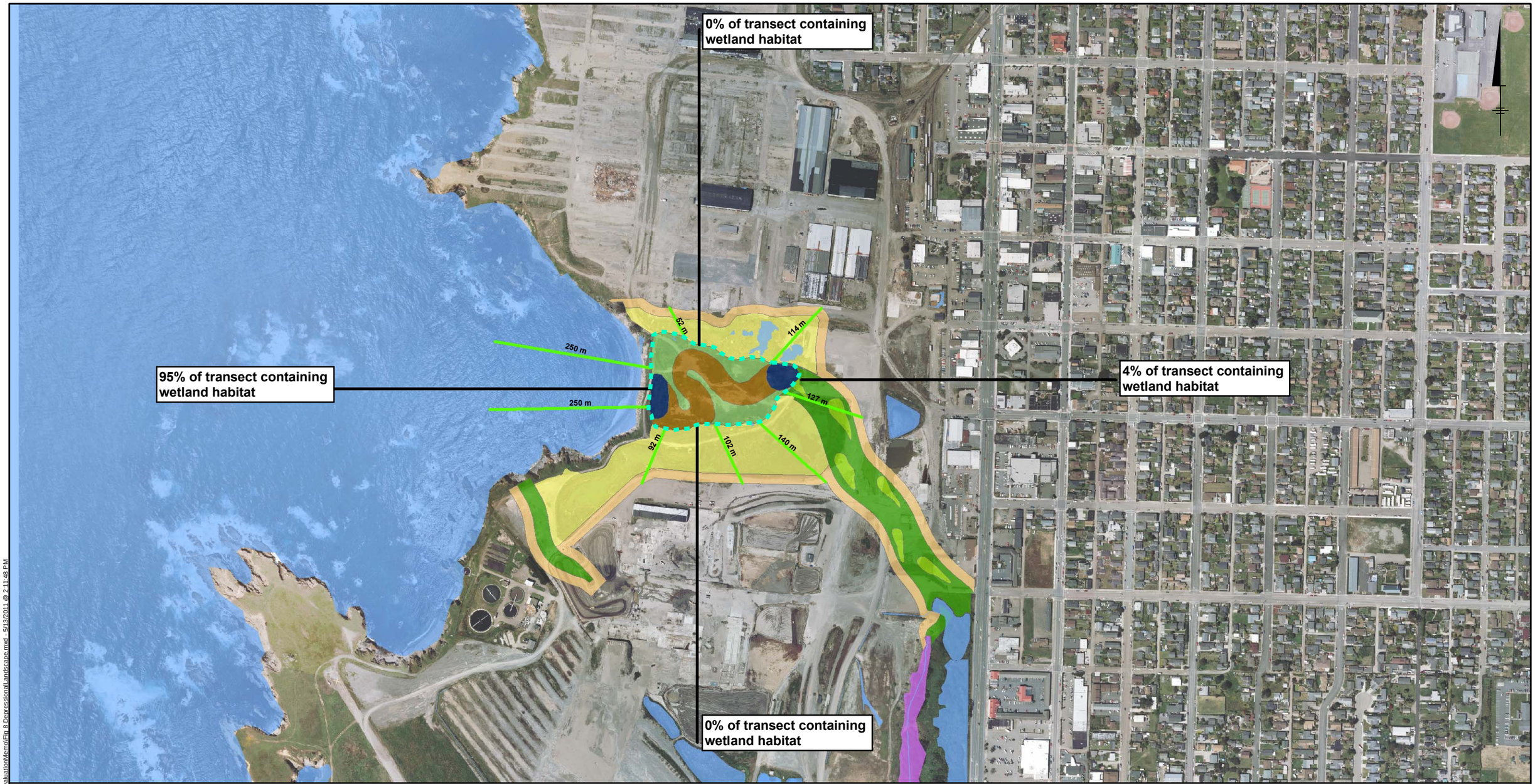
FORMER GEORGIA-PACIFIC WOOD PRODUCTS FACILITY
FORT BRAGG, CALIFORNIA
CRAM EVALUATION MEMORANDUM

RIVERINE WETLAND
ASSESSMENT AREA - DRAINAGE D1
HORIZONTAL VEGETATION INTERSPERSION

ARCADIS

FIGURE
7

CITY: HR DIV/GROUP: IM GIS DB: BCG
Project #: B0066138.0007.00001
I:\certified\IM\ADMillRoad_Complex\Restoration\CRAM_EvaluationMemo\Fig 7 DrainageD1_landscape.mxd - 5/13/2011 @ 9:37:59 AM



LEGEND:

- BUFFER WIDTH
- EVALUATION OF LANDSCAPE CONNECTIVITY (500m)
- ASSESSMENT AREA (AA) BOUNDARY
- EXTENT OF WATERS/WETLANDS ADJACENT TO RESTORATION PROJECT
- HIGH MARSH
- LOW MARSH
- PONDED AREAS
- CONTOURED SLOPE/ SCRUB-SHRUB HABITAT
- RIPARIAN CORRIDOR
- FLOODPLAIN DEPRESSIONS
- APPROXIMATE 50-FOOT BUFFER
- RIPARIAN AREA DELINEATED ADJACENT TO THE MILL POND COMPLEX RESTORATION AREA

NOTES:
1. ASSESSMENT AREA (AA) - BOUNDARY DETERMINED BY EDGE OF PROPOSED WETLAND HABITAT IN OU-E LOWLAND.
2. LANDSCAPE CONNECTIVITY METRIC IS EVALUATED BASED ON PRESENCE OF WETLANDS WITHIN 500M OF AA. THESE WETLANDS INCLUDE BOTH DELINEATED WATERS/WETLANDS ON SITE AND WETLANDS IDENTIFIED BY THE NWI WETLANDS MAPPER.
3. BUFFER METRIC IS EVALUATED BASED ON THE PRESENCE OF BUFFERS THAT ARE BOTH ADJACENT TO THE AA BOUNDARY AND WITHIN 250M OF THE AA. BUFFERS INCLUDE THE OPEN OCEAN THAT IS NOT IMMEDIATELY ADJACENT TO THE AA. BUFFERS INCLUDE UPLAND RESTORATION AREAS, BUT DO NOT INCLUDE AREAS DESIGNATED AS PARK OPEN SPACE.

DRAFT

0 150 300 Meters

FORMER GEORGIA-PACIFIC WOOD PRODUCTS FACILITY
FORT BRAGG, CALIFORNIA
CRAM EVALUATION MEMORANDUM

OU-E LOWLAND PROPOSED CONDITIONS DEPRESSIONAL WETLAND ASSESSMENT AREA - BUFFERS AND LANDSCAPE CONNECTIVITY

ARCADIS

FIGURE 8

CITY: HR DIV/GROUP: GIS DB: BG
B006138.0007.00001
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LEGEND:

- BUFFER WIDTH
- EVALUATION OF LANDSCAPE CONNECTIVITY (500m)
- ASSESSMENT AREA (AA) BOUNDARY
- EXTENT OF WATERS/WETLANDS ADJACENT TO RESTORATION PROJECT
- HIGH MARSH
- LOW MARSH
- PONDED AREAS
- CONTOURED SLOPE/ SCRUB-SHRUB HABITAT
- RIPARIAN CORRIDOR
- FLOODPLAIN DEPRESSIONS
- APPROXIMATE 50-FOOT BUFFER
- EXTENT OF RIPARIAN AREA ADJACENT TO RESTORATION PROJECT

NOTES:
1. ASSESSMENT AREA (AA) BOUNDARY DETERMINED BY EXTENT OF PROPOSED MAPLE STREET CREEK.
2. LANDSCAPE CONNECTIVITY METRIC IS EVALUATED BASED ON THE AMOUNT OF NON-BUFFER SEGMENTS ADJACENT TO THE STREAM WITHIN 500M UPSTREAM AND DOWNSTREAM OF THE AA.
3. BUFFER METRIC IS EVALUATED BASED ON THE PRESENCE OF BUFFERS ON EITHER SIDE OF THE RIVERINE AA BOUNDARY AND WITHIN 250M OF THE AA. BUFFERS INCLUDE THE OPEN OCEAN THAT IS NOT IMMEDIATELY ADJACENT TO THE AA. BUFFERS ALSO INCLUDE DECOMMISSIONED AREAS THAT HAVE BEEN REVEGETATED, TRAILS, VEGETATED DAMS, AND PONDS.

DRAFT

0 125 250 Meters

FORMER GEORGIA-PACIFIC WOOD PRODUCTS FACILITY
FORT BRAGG, CALIFORNIA
CRAM EVALUATION MEMORANDUM

MAPLE STREET RIPARIAN CORRIDOR PROPOSED CONDITIONS WETLAND ASSESSMENT AREA - BUFFERS AND LANSCAPE CONNECTIVITY

ARCADIS

FIGURE 9

CITY: HR DIV/GROUP: GIS DB: BG
B0066138.0006.00001
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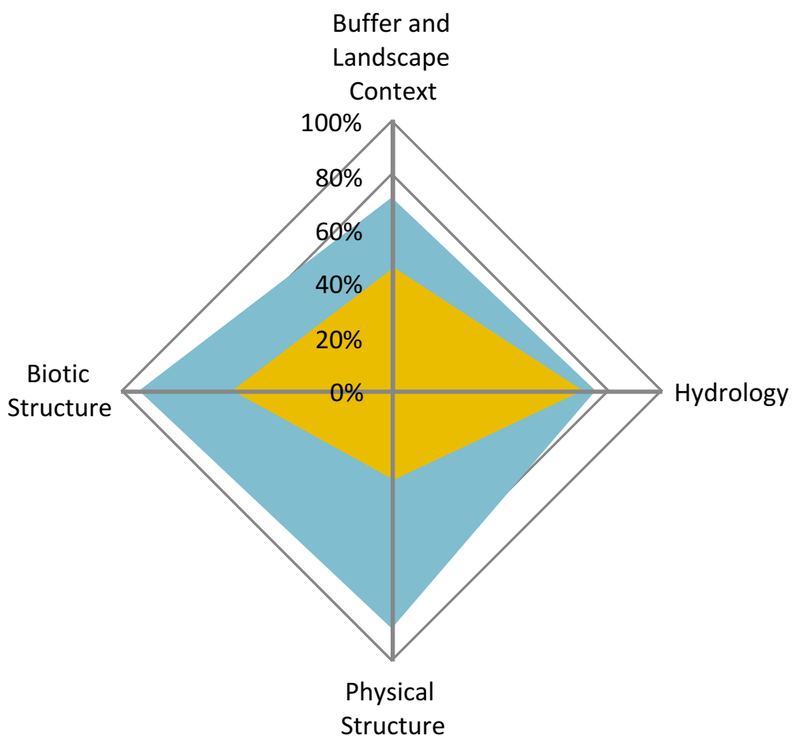
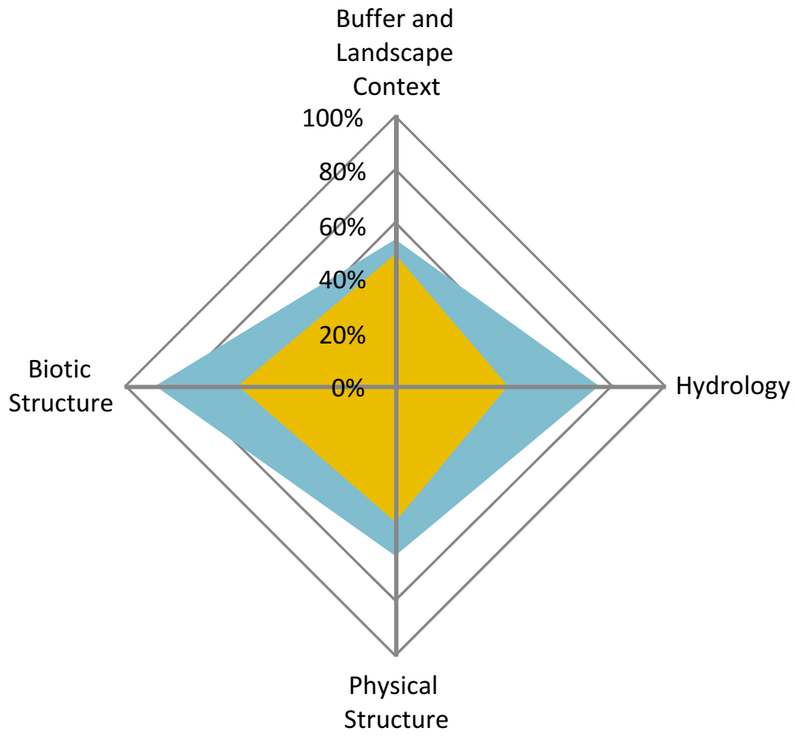
Restored OU-E Lowland Depressional Wetland



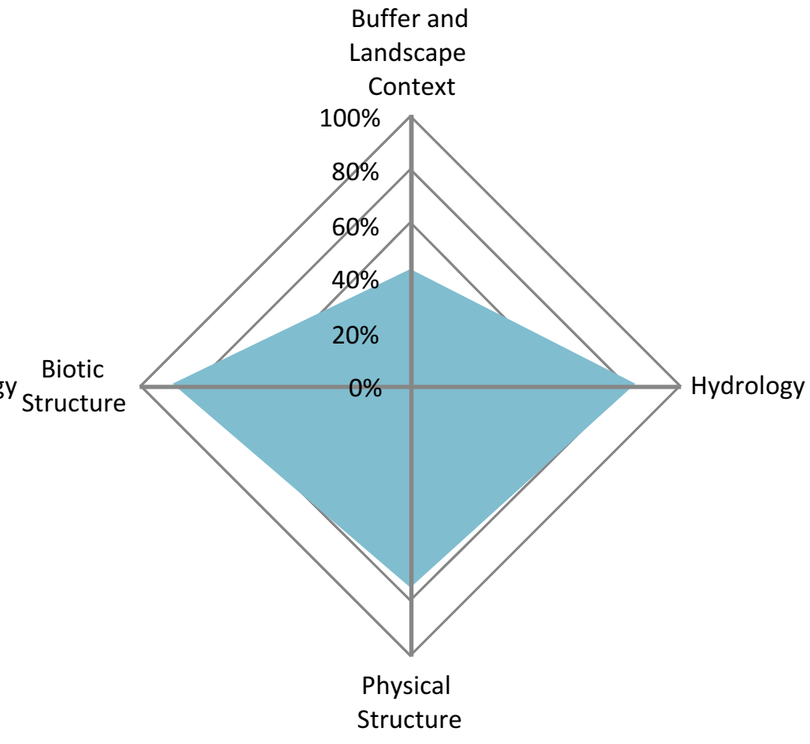
Average Depressional Wetland Total Score[1]: 52%
Restored Depressional Wetland Total Score: 82%

Enhanced Drainage D1 Riverine Wetland



Drainage D1 Riverine Wetland Total Score: 50%
Enhanced Drainage D1 Riverine Wetland Total Score: 70%

Created Maple Creek Riparian Corridor



Created Maple Creek Riparian Corridor Total Score: 73%

Note:
1. Average Total Score is an average of the Total Score values of Depressional Wetlands located in OU-E (i.e., E-1, E-2, E-5/E-6, Pond 6, and Pond 7).

LEGEND:

= Restored Condition CRAM Score

= Current Condition CRAM Score

FORMER GEORGIA-PACIFIC WOOD PRODUCTS FACILITY
FORT BRAGG, CALIFORNIA

CRAM EVALUATION MEMORANDUM

RESTORED CONDITION WETLANDS ATTRIBUTE SCORES

ARCADIS

FIGURE **10**

06/01/2011 SYRACUSE-141ENV-DJHOWES
B0066138/0001/00007/CDR/66138G06.CDR

ARCADIS

Appendix B

South Ponds Historical Outfall Location Photograph

Appendix B

South Ponds Historical Outfall Location Photograph

Photo: Rip-rap and concrete closure of the historical stream channel from the South Ponds area. The outlet is a small beach area adjacent to Soldier Bay.