Recirculated Draft Environmental Impact Report/
Supplemental Draft Environmental Impact Statement

Rio del Oro Specific Plan Project

State Clearinghouse #2003122057

APPENDIX N THROUGH R

Prepared for:

City of Rancho Cordova
and
U.S. Army Corps of Engineers,
Sacramento District

Prepared by:

EDAW
2022 J Street
Sacramento, CA 95814

April 2008

EDAW

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Rio del Oro Specific Plan Project

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APPENDIX N THROUGH R

Prepared for:

City of Rancho Cordova
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916/361-8384

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April 2008

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APPENDIX N

Project Consistency with City of Rancho Cordova General Plan Utilities and Services Systems Policies that Relate to Water Supply

APPENDIX N

Table 3.5 Project Consistency with City of Rancho Cordova General Plan Utilities and Services Systems Policies that Relate to Water Supply		
General Plan Policies	Consistency	Analysis
Policy ISF.2.1 Ensure the development of public infrastructure that meet the long-term needs of residents and ensure infrastructure is available at the time such facilities are needed (Further implemented by Action ISF.2.1.1 and ISF 2.1.2)	Yes, with Mitigation	The project's compliance with this policy is examined in detail in the recirculated DEIR/supplemental DEIS water supply analysis. Overall, the DEIR/DEIS analysis demonstrates consistency with this Policy. In summary, long-term potable water would be provided by Sacramento County Water Agency (SCWA). However, the permanent long-term water supply cannot be delivered to the project site until the SCWA facilities (Vineyard Surface Water Treatment Plant, the Freeport Regional Water Project, and the North Service Area Pipeline Project) have been constructed and are online. In the near term, Golden State Water Company has indicated that it would have an adequate water supply to serve Phase 1A. Several water supply options for providing initial water to the remaining Phase 1 development have been identified, including water from Golden State Water Company and other alternative sources. Mitigation Measures 3.5-2 and 3.5-3 include the requirements of Actions ISF 2.4.1 and 2.4.2 that certain showings on an available water supply and infrastructure be made prior to approval of various entitlements (see recirculated DEIR/supplemental DEIS Section 3.5 for a description of infrastructure improvements).
Action ISF.2.1.1 – Except when prohibited by state law, require sufficient capacity in all public facilities to maintain desired service levels and avoid capacity shortages, traffic congestion, or other negative effects on safety and quality of life.	Yes, with Mitigation	See discussion under Policy ISF 2.1 for water supply.
Action ISF.2.1.2 – Adopt a phasing plan for the development of public facilities in a logical manner that encourages the orderly development of roadways, water and sewer, and other public facilities.	Yes	As described in this recirculated DEIR/supplemental DEIS, a Public Facilities Infrastructure/Phasing Plan would be approved at the time of project approval. The plan would provide specific details regarding the phasing, sizing, alignment and location, cost estimates, and construction timing requirements for public facilities and infrastructure for each phase of the Rio del Oro project site.
Policy ISF.2.2 Coordinate with independent public service providers, including schools, parks and recreation, utility, transit, and other service districts, in developing service and financial planning strategies.	Yes	The City of Rancho Cordova has consulted with SCWA on water demand and supply for the project. A water supply assessment has been prepared and approved by SCWA for this project.
Policy ISF.2.3	Yes	The project includes a proposed financing plan. An approved financing plan will be approved at the time

Table 3.5 Project Consistency with City of Rancho Cordova General Plan Utilities and Services Systems Policies that Relate to Water Supply		
General Plan Policies	Consistency	Analysis
Ensure that adequate funding is available for all infrastructure and public facilities, and make certain that the cost of improvements is equitably distributed (Further implemented by Action ISF.2.3.1 and ISF 2.3.2).		of project approval. The financing plan would define the specific mechanisms required to fund capital costs of all infrastructure necessary as a result of specific plan buildout. The Financing Plan would define funding for the maintenance of new infrastructure and public services needed by the future residents and business locating within the Rio del Oro project site.
Action ISF.2.3.1 – Require secure financing for all components of the transportation system through the use of special taxes, assessment districts, developer dedications, or other appropriate mechanisms. Financing should be sufficient to complete required major public facilities at their full planned capacities in a single phase. Major facilities include roadways of collector size or larger; all wells, water transmission lines, treatment facilities, and storage tanks needed to serve the project; and all sewer trunk and interceptor lines and treatment plants or treatment plant capacity.	Yes	See Action ISF 2.1.2 and Policy 2.3 discussion above.
Action ISF.2.3.2 – Require new development to fund its fair share portion of its impacts to all public infrastructure and facilities.	Yes	See Policy ISF 2.3 discussion above.
Policy ISF.2.4 Ensure that water supply and delivery systems are available in time to meet the demand created by new development, or are guaranteed to be built by bonds or sureties (Further implemented by Action ISF.2.4.1).	Yes, with Mitigation	See discussion under Policies ISF.2.1. and 2.3 above for information on water supply, infrastructure and financing. Actions ISF 2.4.1 and 2.4.2 which implement this policy are required as mitigation measures in the recirculated DEIR/supplemental DEIS. Off-site water supply infrastructure for delivery of initial water supplies to the project site is included in the project design, as well as on-site water supply infrastructure that would be adequately sized to accommodate project-related water demands and fire-flow demands. An approved water supply assessment consistent with the requirements of SB 610 is provided in Appendix D of the DEIR/DEIS. See Mitigation Measures 3.5-2 and 3.5-3 of the recirculated DEIR/supplemental DEIS.
Action ISF.2.4.1 – The following shall be required for all legislative-level development projects, including community plans, general plan amendments, specific plans, rezonings, and other plan-level discretionary entitlements, but excluding tentative subdivisions maps, parcel maps, use permits, and other project-specific discretionary land-use entitlements or approvals: Proposed water supplies and delivery systems shall be identified at the time of development project approval to the satisfaction of the City. The water agency or	Yes, with Mitigation	See discussion under Policies 2.1, 2.3, and 2.4 above. This Action is required as a mitigation measure for the project. See Mitigation Measures 3.5-2 and 3.5-3 of the recirculated DEIR/supplemental DEIS.

Table 3.5 Project Consistency with City of Rancho Cordova General Plan Utilities and Services Systems Policies that Relate to Water Supply		
General Plan Policies	Consistency	Analysis
company proposing to provide service (collectively referred to as "water provider") to the project may provide several alternative methods of supply and/or delivery, provided that each is capable individually of providing water to the project. The project applicant or water provider shall make a factual showing prior to project approval that the water provider or providers proposing to serve the development project has or have legal entitlements to the identified water supplies or that such entitlements are reasonably foreseeable by the time of subsequent, project-specific discretionary land-use entitlements or approvals. This factual showing shall also demonstrate that the water provider's identified water supply is reasonably reliable over the long term (at least 20 years) under normal, single-dry and multiple-dry years. All required water treatment and delivery infrastructure for the project shall be in place at the time of subsequent, project-specific discretionary land-use entitlements or approvals, or shall be assured prior to occupancy through the use of bonds or other sureties to the City's satisfaction. Water infrastructure may be phased to coincide with the phased development of large-scale projects.		
Action ISF.2.4.2 – The following shall be required for project-specific discretionary land-use entitlements and approvals including, but not limited to, all tentative subdivision maps, parcel maps, or use permits. An assured water supply and delivery system shall be available or reasonably foreseeable at the time of project approval. The water agency providing service to the project may provide several alternative methods of supply and/or delivery, provided that each is capable individually of providing water to the project. The project applicant, water agency (or agencies), or water company (or companies) providing water service to the project site shall make a factual showing consistent with, or the City shall impose conditions similar to, those required by Government Code section 66473.7 in order to ensure an adequate water supply for development authorized by the project. Prior to recordation of any final subdivision map, or prior to City approval of any similar project-specific discretionary land use approval or entitlement required for nonresidential uses, the project applicant or water provider shall demonstrate the availability of a long-term, reliable water supply for the amount of development that would be authorized by the final	Yes, with Mitigation	See discussion under Policies 2.1, 2.3 and 2.4 above. This Action is required as a mitigation measure for the project (see Mitigation Measures 3.5-2 and 3.5-3 in Section 3.5 of the recirculated DEIR/supplemental DEIS).

Table 3.5 Project Consistency with City of Rancho Cordova General Plan Utilities and Services Systems Policies that Relate to Water Supply		
General Plan Policies	Consistency	Analysis
subdivision map or project-specific discretionary non-residential approval or entitlement. This assurance of water supply shall identify that the water provider has legal entitlement to the water source and that the water source is reasonably reliable (at least 20 years) under normal, dry and multiple dry years. Such demonstration shall consist of a written certification from the water provider that either existing sources are available or that needed improvements will be in place prior to occupancy. Offsite and onsite water infrastructure sufficient to provide adequate water to the subdivision shall be in place prior to the issuance of building permits or their financing shall be assured to the satisfaction of the City prior to the approval of the Final Map, consistent with the requirements of the Subdivision Map Act, or prior to the issuance of a similar, project-level entitlement for non-residential land uses. Offsite and onsite water distribution systems required to serve the subdivision shall be in place and contain water at sufficient quantity and pressure prior to the issuance of any building permits. Model homes may be exempted from this policy as determined appropriate by the City, and subject to approval by the City.		
Source: City of Rancho Cordova Planning Department 2008		

APPENDIX O

Air Quality Modeling
Golden State Water Company Pipeline

Road Construction Emissions Model — Version 5.2

Data Entry Worksheet

Note: Required data input sections have a yellow background.
Optional data input sections have a blue background. Only areas with a yellow or blue background can be modified. Program defaults have a white background.
The user is required to enter information in cells C10 through C28.

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

To begin a new project, click this button to clear data previously entered. This button will only work if you opted not to disable macros when loading this spreadsheet.

Input Type		
Project Name	Rio-Pipe Laying (GSWC)	
Construction Start Year	2008	Enter a Year between 2000 and 2010 inclusive
Project Type	1	1 New Road Construction 2 Road Widening 3 Bridge/Overpass Construction
Project Construction Time	5	months
Predominate Soil/Site Type: Enter 1, 2, or 3	1	1. Sand Gravel 2. Weathered Rock-Earth 3. Blasted Rock
On-Road Emission Factors: Enter 1, 2, 3, or 4	4	1. Emfac7fv1.1 4. Emfac2002 (default) 2. Emfac7G 3. Emfac2001
Project Length	1.85	miles
Total Project Area		acres
Maximum Area Disturbed/Day		acres
Water Trucks Used?	2	1. Yes 2. No
Soil Imported		yd^3/day
Soil Exported		yd^3/day
Average Truck Capacity	20	yd^3 (assume 20 if unknown)

The remaining sections of this sheet contain areas that can be modified by the user, although those modifications are optional.

Note: The program's estimates of construction period phase length can be overridden in cells C37 through C40.

Construction Periods	User Override of Construction Months	Program Calculated Months	2000	%	2001	%	2002	%	2003
Grubbing/Land Clearing	5.00	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grading/Excavation	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Drainage/Utilities/Sub-Grade	0.00	1.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving	0.00	0.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals	5.00	5.00							

Hauling emission default values can be overridden in cells C48 through C50.

Soil Hauling Emissions	User Override of Soil Hauling Defaults	Default Values				
User Input						
Miles/round trip	30	30			30	
Round trips/day	2	0			2	32
Vehicle miles traveled/day (calculated)			60			
Hauling Emissions	**ROG**	**NOx**	**CO**	**PM10**		
Emission rate (grams/mile)	0.65	7.23	6.11	0.24		
Pounds per day	0.1	1.0	0.8	0.0		
Tons per contruction period	0.00	0.00	0.00	0.00		

Worker commute default values can be overridden in cells C62 through C67.

Worker Commute Emissions	User Override of Worker Commute Default Values	Default Values				
Miles/ one-way trip	20	20			20	
One-way trips/day	2	2			2	
No. of employees: Grubbing/Land Clearing	20	5			20	
No. of employees: Grading/Excavation	0	5			0	
No. of employees: Drainage/Utilities/Sub-Grade	0	5			0	
No. of employees: Paving	0	5			0	42
	ROG	**NOx**	**CO**	**PM10**		
Emission rate (grams/mile)	0.24		5.10	0.04		
Emission rate (grams/trip)	1.37	0.62	13.67	0.02		
Pounds per day - Grubbing/Land Clearing	0.7	0.1	11.4	0.1		
Tons per const. Period - Grub/Land Clear	0.0	0.0	0.6	0.0		
Pounds per day - Grading/Excavation	0.0	0.0	0.0	0.0		
Tons per const. Period - Grading/Excavation	0.0	0.0	0.0	0.0		
Pounds per day - Drainage/Utilities/Sub-Grade	0.0	0.0	0.0	0.0		
Tons per const. Period - Drain/Utl/Sub-Grade	0.0	0.0	0.0	0.0		
Pounds per day - Paving	0.0	0.0	0.0	0.0		
Tons per const. Period - Paving	0.0	0.0	0.0	0.0		
tons per construction period	0.0	0.0	0.6	0.0		

Water truck default values can be overriden in cells C87 through C89 and E87 through E89.

Water Truck Emissions	Number of Water Trucks	Program Estimate of Number of Water Trucks	User Override of Water Truck Miles Traveled	Default Values Miles Traveled/Day	
Grubbing/Land Clearing - Exhaust		0		0	0
Grading/Excavation - Exhaust		0		0	0
Drainage/Utilities/Subgrade		0		0	0

	ROG	NOx	CO	PM10
Emission rate (grams/mile)	0.65	7.23	6.11	0.24
Pounds per day - Grubbing/Land Clearing	0.0	0.0	0.0	0.0
Tons per const. Period - Grub/Land Clear	0.00	0.00	0.00	0.00
Pound per day - Grading/Excavation	0.0	0.0	0.0	0.0
Tons per const. Period - Grading/Excavation	0.00	0.00	0.00	0.00
Pound per day - Drainage/Utilities/Subgrade	0.0	0.0	0.0	0.0
Tons per const. Period - Drainage/Utilities/Subgrade	0.00	0.00	0.00	0.00

Fugitive dust default values can be overridden in cells C104 and C105.

Fugitive PM10 Dust	User Override of Max Acreage/Day	Default Maximum Acreage/Day	pounds/day	tons/per period
Fugitive Dust - Grubbing/Land Clearing		0	0.0	0.0
Fugitive Dust - Grading/Excavation		0	0.0	0.0
Fugitive Dust - Drainage/Utilities/Subgrade		0	0.0	0.0

Off road equipment default number of vehicles can be overridden in cells B115 through B224.

Off-Road Equipment Emissions

Grubbing/Land Clearing Override of Default Number of Vehicles	Default Number of Vehicles *Program-estimate*	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day
1		Backhoes	0.67	2.40	4.54	0.36
		Bore/Drill Rigs	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00
0		Compactor	0.00	0.00	0.00	0.00
		Cranes	0.00	0.00	0.00	0.00
		Crawler Tractors	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00
0	0	Dozer	0.00	0.00	0.00	0.00
1		Excavator	1.84	6.34	6.47	0.34
		Forklifts, Rough Terrain	0.00	0.00	0.00	0.00
		Grader	0.00	0.00	0.00	0.00
1		Loaders, Rubber Tired	0.92	4.50	7.01	0.38
1		Off-Highway Trucks	3.60	13.62	13.98	0.72
		Other Construction Equip.	0.00	0.00	0.00	0.00
0		Pavers	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00
		Rollers	0.00	0.00	0.00	0.00
0	0	Scrapper	0.00	0.00	0.00	0.00
0	4	Signal Boards	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00
		Tractors	0.00	0.00	0.00	0.00
		Trenchers	0.00	0.00	0.00	0.00
		pounds per day	7.0	26.9	32.0	1.8
		tons per period	0.4	1.5	1.8	0.1

Grading/Excavation Override of Default Number of Vehicles	Number of Vehicles *Program-estimate*	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day
0		Backhoes	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00
0		Compactor	0.00	0.00	0.00	0.00
	0	Cranes	0.00	0.00	0.00	0.00
		Crawler Tractors	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00
		Dozer	0.00	0.00	0.00	0.00
0	0	Excavator	0.00	0.00	0.00	0.00
		Forklifts, Rough Terrain	0.00	0.00	0.00	0.00
0	0	Grader	0.00	0.00	0.00	0.00
0	0	Loaders, Rubber Tired	0.00	0.00	0.00	0.00
0		Off-Highway Trucks	0.00	0.00	0.00	0.00
0	0	Other Construction Equip.	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00
		Rollers	0.00	0.00	0.00	0.00
	0	Scrapper	0.00	0.00	0.00	0.00
0	4	Signal Boards	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00
		Tractors	0.00	0.00	0.00	0.00
		Trenchers	0.00	0.00	0.00	0.00
		max pounds per day	0.0	0.0	0.0	0.0
		tons per period	0.0	0.0	0.0	0.0

Drainage/Utilities/Subgrade Override of Default Number of Vehicles	Number of Vehicles *Program-estimate*	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day
		Backhoes	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00
	0	Compactor	0.00	0.00	0.00	0.00
		Cranes	0.00	0.00	0.00	0.00
		Crawler Tractors	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00
		Dozer	0.00	0.00	0.00	0.00

		Excavator	0.00	0.00	0.00	0.00
		Forklifts, Rough Terrain	0.00	0.00	0.00	0.00
	0	Grader	0.00	0.00	0.00	0.00
		Loaders, Rubber Tired	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00
		Other Construction Equip.	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00
		Rollers	0.00	0.00	0.00	0.00
	0	Scrapper	0.00	0.00	0.00	0.00
0	4	Signal Boards	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00
		Tractors	0.00	0.00	0.00	0.00
	0	Trenchers	0.00	0.00	0.00	0.00
		max pounds per day	0.0	0.0	0.0	0.0
		tons per period	0.0	0.0	0.0	0.0

Paving Override of Default Number of Vehicles	Number of Vehicles *Program-estimate*	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day
		Backhoes	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00
		Compactor	0.00	0.00	0.00	0.00
		Cranes	0.00	0.00	0.00	0.00
		Crawler Tractors	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00
		Dozer	0.00	0.00	0.00	0.00
		Excavator	0.00	0.00	0.00	0.00
		Forklifts, Rough Terrain	0.00	0.00	0.00	0.00
		Grader	0.00	0.00	0.00	0.00
		Loaders, Rubber Tired	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00
		Other Construction Equip.	0.00	0.00	0.00	0.00
	0	Pavers	0.00	0.00	0.00	0.00
	0	Paving Equipment	0.00	0.00	0.00	0.00
	0	Rollers	0.00	0.00	0.00	0.00
		Scrapper	0.00	0.00	0.00	0.00
0	4	Signal Boards	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00
		Tractors	0.00	0.00	0.00	0.00
		Trenchers	0.00	0.00	0.00	0.00
		pounds per day	0.0	0.0	0.0	0.0
		tons per period	0.0	0.0	0.0	0.0
Total Emissions (tons per construction period)			0.4	1.5	1.8	0.1

4

Equipment default values for horsepower, load factor, and hours/day can be overridden in cells C235 through C256, E235 through E256, and G235 through G256.

Equipment		Default Values Horsepower		Default Values Load Factor		Default Values Hours/day
Bore/Drill Rigs		218		0.75		8
Concrete/Industrial Saws		84		0.73		8
Cranes		190		0.43		8
Crawler Tractors		143		0.575		8
Crushing/Proc. Equipment		154		0.78		8
Excavators		180		0.58		8
Graders		174		0.575		8
Off-Highway Tractors		255		0.41		8
Off-Highway Trucks		417		0.49		8
Other Construction Equipment		190		0.62		8
Pavors		132		0.59		8
Paving Equipment		111		0.53		8
Rollers		114		0.43		8
Rough Terrain Forklifts		94		0.475		8
Rubber Tired Dozers		352		0.59		8
Rubber Tired Loaders		165		0.465		8
Scrapers		313		0.66		8
Signal Boards		25		0.82		8
Skid Steer Loaders		62		0.515		8
Surfacing Equipment		437		0.49		8
Tractors/Loaders/Backhoes		79		0.465		8
Trenchers		82		0.695		8

Hc

Default load factors from SCAQMD CEQA Handbook, 1993.

Default horsepower values from Appendix B, California Air Resources Board's Offroad Model (see also Appendix B of this spreadsheet).

Signal board horsepower based on: U.S. EPA, 1998. Final Regulatory Impact Analysis: Control of Emissions from Nonroad Diesel Engines (EPA420-R-98-016).

0 83

END OF DATA ENTRY SHEET

Road Construction Emissions Model — Version 5.2

Data Entry Worksheet

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

Note: Required data input sections have a yellow background.
Optional data input sections have a blue background. Only areas with a yellow or blue background can be modified. Program defaults have a white background.
The user is required to enter information in cells C10 through C28.

To begin a new project, click this button to clear data previously entered. This button will only work if you opted not to disable macros when loading this spreadsheet.

Input Type		
Project Name	Rio-Pump Station	
Construction Start Year	2008	Enter a Year between 2000 and 2010 inclusive
Project Type	1	1 New Road Construction 2 Road Widening 3 Bridge/Overpass Construction
Project Construction Time	8	months
Predominate Soil/Site Type: Enter 1, 2, or 3	1	1. Sand Gravel 2. Weathered Rock-Earth 3. Blasted Rock
On-Road Emission Factors: Enter 1, 2, 3, or 4	4	1. Emfac7fv1.1 4. Emfac2002 (default) 2. Emfac7G 3. Emfac2001
Project Length	0	miles
Total Project Area		acres
Maximum Area Disturbed/Day		acres
Water Trucks Used?	2	1. Yes 2. No
Soil Imported		yd^3/day
Soil Exported		yd^3/day
Average Truck Capacity	20	yd^3 (assume 20 if unknown)

The remaining sections of this sheet contain areas that can be modified by the user, although those modifications are optional.

Note: The program's estimates of construction period phase length can be overridden in cells C37 through C40.

Construction Periods	User Override of Construction Months	Program Calculated Months	2000	%	2001	%	2002	%
Grubbing/Land Clearing	8.00	0.80	0.00	0.00	0.00	0.00	0.00	0.00
Grading/Excavation	0.00	3.20	0.00	0.00	0.00	0.00	0.00	0.00
Drainage/Utilities/Sub-Grade	0.00	2.80	0.00	0.00	0.00	0.00	0.00	0.00
Paving	0.00	1.20	0.00	0.00	0.00	0.00	0.00	0.00
Totals	8.00	8.00						

Hauling emission default values can be overridden in cells C48 through C50.

Soil Hauling Emissions	User Override of Soil Hauling Defaults	Default Values				
User Input						
Miles/round trip	30	30			30	
Round trips/day	2	0			2	32
Vehicle miles traveled/day (calculated)			60			
Hauling Emissions	**ROG**	**NOx**	**CO**	**PM10**		
Emission rate (grams/mile)	0.65	7.23	6.11	0.24		
Pounds per day	0.1	1.0	0.8	0.0		
Tons per contruction period	0.00	0.00	0.00	0.00		

Worker commute default values can be overridden in cells C62 through C67.

Worker Commute Emissions	User Override of Worker Commute Default Values	Default Values				
Miles/ one-way trip	20	20			20	
One-way trips/day	2	2			2	
No. of employees: Grubbing/Land Clearing	20	0			20	
No. of employees: Grading/Excavation	0	0			0	
No. of employees: Drainage/Utilities/Sub-Grade	0	0			0	
No. of employees: Paving	0	0			0	42
	ROG	**NOx**	**CO**	**PM10**		
Emission rate (grams/mile)	0.24		5.10	0.04		
Emission rate (grams/trip)	1.37	0.62	13.67	0.02		
Pounds per day - Grubbing/Land Clearing	0.7	0.1	11.4	0.1		
Tons per const. Period - Grub/Land Clear	0.1	0.0	1.0	0.0		
Pounds per day - Grading/Excavation	0.0	0.0	0.0	0.0		
Tons per const. Period - Grading/Excavation	0.0	0.0	0.0	0.0		
Pounds per day - Drainage/Utilities/Sub-Grade	0.0	0.0	0.0	0.0		
Tons per const. Period - Drain/Util/Sub-Grade	0.0	0.0	0.0	0.0		
Pounds per day - Paving	0.0	0.0	0.0	0.0		
Tons per const. Period - Paving	0.0	0.0	0.0	0.0		
tons per construction period	0.1	0.0	1.0	0.0		

Water truck default values can be overriden in cells C87 through C89 and E87 through E89.

Water Truck Emissions	Number of Water Trucks	Program Estimate of Number of Water Trucks	User Override of Water Truck Miles Traveled	Default Values Miles Traveled/Day	
Grubbing/Land Clearing - Exhaust		0		0	0
Grading/Excavation - Exhaust		0		0	0
Drainage/Utilities/Subgrade		0		0	0
	ROG	NOx	CO	PM10	
Emission rate (grams/mile)	0.65	7.23	6.11	0.24	
Pounds per day - Grubbing/Land Clearing	0.0	0.0	0.0	0.0	
Tons per const. Period - Grub/Land Clear	0.00	0.00	0.00	0.00	
Pound per day - Grading/Excavation	0.0	0.0	0.0	0.0	
Tons per const. Period - Grading/Excavation	0.00	0.00	0.00	0.00	
Pound per day - Drainage/Utilities/Subgrade	0.0	0.0	0.0	0.0	
Tons per const. Period - Drainage/Utilities/Subgrade	0.00	0.00	0.00	0.00	

Fugitive dust default values can be overridden in cells C104 and C105.

Fugitive PM10 Dust	User Override of Max Acreage/Day	Default Maximum Acreage/Day	pounds/day	tons/per period
Fugitive Dust - Grubbing/Land Clearing		0	0.0	0.0
Fugitive Dust - Grading/Excavation		0	0.0	0.0
Fugitive Dust - Drainage/Utilities/Subgrade		0	0.0	0.0

Off road equipment default number of vehicles can be overridden in cells B115 through B224.

Off-Road Equipment Emissions

Grubbing/Land Clearing Override of Default Number of Vehicles	Default Number of Vehicles *Program-estimate*	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day
1		Backhoes	0.67	2.40	4.54	0.38
1		Bore/Drill Rigs	2.87	7.47	5.75	0.43
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00
1		Compactor	2.08	10.32	9.43	0.52
		Cranes	0.00	0.00	0.00	0.00
		Crawler Tractors	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00
0	0	Dozer	0.00	0.00	0.00	0.00
1		Excavator	1.84	6.34	6.47	0.34
		Forklifts, Rough Terrain	0.00	0.00	0.00	0.00
1		Grader	1.20	5.64	9.73	0.53
0		Loaders, Rubber Tired	0.00	0.00	0.00	0.00
0		Off-Highway Trucks	0.00	0.00	0.00	0.00
1		Other Construction Equip.	2.08	10.32	9.43	0.52
0		Pavers	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00
		Rollers	0.00	0.00	0.00	0.00
0	0	Scrapper	0.00	0.00	0.00	0.00
0	0	Signal Boards	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00
		Tractors	0.00	0.00	0.00	0.00
		Trenchers	0.00	0.00	0.00	0.00
		pounds per day	10.7	42.5	45.3	2.7
		tons per period	0.9	3.7	4.0	0.2

Grading/Excavation Override of Default Number of Vehicles	Number of Vehicles *Program-estimate*	Type	ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day
0		Backhoes	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00
0		Compactor	0.00	0.00	0.00	0.00
	0	Cranes	0.00	0.00	0.00	0.00
		Crawler Tractors	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00
		Dozer	0.00	0.00	0.00	0.00
0	0	Excavator	0.00	0.00	0.00	0.00
		Forklifts, Rough Terrain	0.00	0.00	0.00	0.00
0	0	Grader	0.00	0.00	0.00	0.00
0	0	Loaders, Rubber Tired	0.00	0.00	0.00	0.00
0		Off-Highway Trucks	0.00	0.00	0.00	0.00
0	0	Other Construction Equip.	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00
		Rollers	0.00	0.00	0.00	0.00
	0	Scrapper	0.00	0.00	0.00	0.00
0	0	Signal Boards	0.00	0.00	0.00	0.00

		Skid Steer Loaders	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00
		Tractors	0.00	0.00	0.00	0.00
		Trenchers	0.00	0.00	0.00	0.00
		max pounds per day	0.0	0.0	0.0	0.0
		tons per period	0.0	0.0	0.0	0.0

Drainage/Utilities/Subgrade	Number of Vehicles		ROG	CO	NOx	PM10
Override of Default Number of Vehicles	*Program-estimate*	Type	pounds/day	pounds/day	pounds/day	pounds/day
		Backhoes	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00
	0	Compactor	0.00	0.00	0.00	0.00
		Cranes	0.00	0.00	0.00	0.00
		Crawler Tractors	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00
		Dozer	0.00	0.00	0.00	0.00
		Excavator	0.00	0.00	0.00	0.00
		Forklifts, Rough Terrain	0.00	0.00	0.00	0.00
	0	Grader	0.00	0.00	0.00	0.00
		Loaders, Rubber Tired	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00
		Other Construction Equip.	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00
		Rollers	0.00	0.00	0.00	0.00
	0	Scrapper	0.00	0.00	0.00	0.00
0	0	Signal Boards	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00
		Tractors	0.00	0.00	0.00	0.00
	0	Trenchers	0.00	0.00	0.00	0.00
		max pounds per day	0.0	0.0	0.0	0.0
		tons per period	0.0	0.0	0.0	0.0

Paving	Number of Vehicles		ROG	CO	NOx	PM10
Override of Default Number of Vehicles	*Program-estimate*	Type	pounds/day	pounds/day	pounds/day	pounds/day
		Backhoes	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00
		Compactor	0.00	0.00	0.00	0.00
		Cranes	0.00	0.00	0.00	0.00
		Crawler Tractors	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00
		Dozer	0.00	0.00	0.00	0.00
		Excavator	0.00	0.00	0.00	0.00
		Forklifts, Rough Terrain	0.00	0.00	0.00	0.00
		Grader	0.00	0.00	0.00	0.00
		Loaders, Rubber Tired	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00
		Other Construction Equip.	0.00	0.00	0.00	0.00
	0	Pavers	0.00	0.00	0.00	0.00
	0	Paving Equipment	0.00	0.00	0.00	0.00
	0	Rollers	0.00	0.00	0.00	0.00
		Scrapper	0.00	0.00	0.00	0.00
0	0	Signal Boards	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00
		Tractors	0.00	0.00	0.00	0.00
		Trenchers	0.00	0.00	0.00	0.00
		pounds per day	0.0	0.0	0.0	0.0
		tons per period	0.0	0.0	0.0	0.0
Total Emissions (tons per construction period)			0.9	3.7	4.0	0.2

Equipment default values for horsepower, load factor, and hours/day can be overridden in cells C235 through C256, E235 through E256, and G235 through G256.

Equipment	Default Values Horsepower	Default Values Load Factor	Default Values Hours/day
Bore/Drill Rigs	218	0.75	8
Concrete/Industrial Saws	84	0.73	8
Cranes	190	0.43	8
Crawler Tractors	143	0.575	8
Crushing/Proc. Equipment	154	0.78	8
Excavators	180	0.58	8
Graders	174	0.575	8
Off-Highway Tractors	255	0.41	8
Off-Highway Trucks	417	0.49	8
Other Construction Equipment	190	0.62	8
Pavers	132	0.59	8

Paving Equipment		111		0.53		8
Rollers		114		0.43		8
Rough Terrain Forklifts		94		0.475		8
Rubber Tired Dozers		352		0.59		8
Rubber Tired Loaders		165		0.465		8
Scrapers		313		0.66		8
Signal Boards		25		0.82		8
Skid Steer Loaders		62		0.515		8
Surfacing Equipment		437		0.49		8
Tractors/Loaders/Backhoes		79		0.465		8
Trenchers		82		0.695		8

Default load factors from SCAQMD CEQA Handbook, 1993.

Default horsepower values from Appendix B, California Air Resources Board's Offroad Model (see also Appendix B of this spreadsheet).

Signal board horsepower based on: U.S. EPA, 1998. Final Regulatory Impact Analysis: Control of Emissions from Nonroad Diesel Engines (EPA420-R-98-016).

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END OF DATA ENTRY SHEET

APPENDIX P

Project Consistency with City of Rancho Cordova
Biological Resources Policies

APPENDIX P
PROJECT CONSISTENCY WITH CITY OF RANCHO CORDOVA BIOLOGICAL RESOURCES POLICIES

Table 3.10-1
Project Consistency with City of Rancho Cordova Biological Resources Policies

General Plan Policies	Consistency	Analysis
Policy OSPT.2.1 Review all proposals for new residential development to ensure compliance with the City's minimum open space standards.	Yes	The City has not formally adopted minimum open space standards. However, the proposed project design is generally consistent with the City's draft minimum open space requirements. Specifically, Action Item 2.1.5 has been implemented throughout the proposed project site with the incorporation of greenbelts and landscape corridors. Prior to approval of the proposed project and after formal adoption of the minimum open space standards, a final consistency determination with this policy will be made by the City.
Policy OSPT.2.3 Maximize the potential benefits of natural resource mitigation lands within urban development. (Further implemented through Actions OSPT.2.3.1 and OSPT.2.3.2)	Yes	The wetland 507-acre preserve/mitigation bank in the southern portion of the project area not only provides mitigation but also a benefit to the visual quality for the site. Trails are planned along the perimeter of the preserve (outside the actual preserve area) in order to increase the aesthetic value of the preserve (See exhibit 2-13 of the Draft EIR/EIS for a description of the Bikeway and Trails Plan).
Action OSPT.2.3.1: - Encourage projects to accomplish the following: Align roads and public spaces to take advantage of vistas over mitigation lands; Site publicly accessible trails adjacent to the boundaries of mitigation lands to take advantage of the open character and uninterrupted edge of the mitigation lands; and Consider locating public parks adjacent to mitigation lands to create a greater sense of open space and to take advantage of opportunities for vistas and trail connections.	Yes	See Policy 2.3 discussion above. Also see Draft EIR-EIS Exhibit 2-13 for a description of the Bikeway and Trails Plan. Relating to locating parks in close proximity to mitigation lands, exhibit 2-4 of the EIR/EIS shows a large 54 acre private recreation area immediately adjacent to the 507 acre wetland preserve.
Action OSPT.2.3.2 - Through the development review process, incorporate design features that increase visual access to natural resource mitigation lands.	Yes	The 507 acre wetland preserve is surrounded by trails and roadways that will give a relatively unimpeded view of the wetland preserve. See Policy discussion 2.3 above.
Policy NR.1.1 Protect rare, threatened, and endangered species and their habitats in accordance with State and federal law. (Further implemented through Actions NR.1.1.1 through NR.1.1.4)	Yes, with Mitigation	**Federally listed vernal pool invertebrate species** No project construction shall proceed in areas supporting potential habitat for federally listed vernal pool invertebrates, or within adequate buffer areas (250 feet or lesser distance deemed

Table 3.10-1 Project Consistency with City of Rancho Cordova Biological Resources Policies		
General Plan Policies	**Consistency**	**Analysis**
		sufficiently protective by a qualified biologist with approval from USFWS), until a Biological Opinion (BO) has been issued by USFWS in accordance with the Endangered Species Act and the project applicant(s) have abided by conditions in the BO (including conservation and minimization measures) intended to be completed before on-site construction (See mitigation measure 3.10-4). A revised draft wetland Mitigation Monitoring Program (MMP) was developed by ECORP Consulting in September 2007 and is the applicant's proposed plan for addressing project impacts on habitats that potentially support federally listed vernal pool invertebrates. The draft MMP, included in Appendix B to the EIR, is subject to review and approval by the appropriate regulatory agencies and has not been approved as of the date of this document. The design of the project's on-site and off-site mitigation under the draft MMP will be required to be viable to support federally listed vernal pool invertebrate species. The on-site preserve is a large contiguous area –507-acres in the southern portion of the project site. The wetland preserve would consist of the highest quality and highest density vernal pools and seasonal wetlands in the project area. (See EIR/EIS Section 3.10) Wetland acreages within the wetland preserve that provide potential habitat for federally listed vernal pool invertebrates include 20.4 acres of existing vernal pools, 2.5 acres of seasonal wetland swale, 3.3 acres of seasonal wetland, and the creation of approximately 17.9 acres of vernal pools that would provide habitat. The watershed in the preserve is sufficient to provide needed hydrology for all the existing and created vernal pools in the preserve area. This conclusion is based on the site design of the project and the hydrologic analysis of a topographic model of the wetland preserve derived from Light Detection and Ranging (LiDAR)- technology. The LiDAR analysis concluded that the configuration of the preserve conserves almost 100% of the original watershed area and would not negatively impact the hydrologic function of the vernal pools. The proposed project's construction design would retain interconnections between on-site habitats by including measures to reduce interference with the hydrology that sustains vernal pools on-site. Within the proposed

Table 3.10-1 Project Consistency with City of Rancho Cordova Biological Resources Policies		
General Plan Policies	**Consistency**	**Analysis**
		preserve of the proposed project, no alterations would be made to Morrison Creek. Where Morrison Creek approaches the western boundary of the project site downstream from the preserve, the creek would be modified to provide for project drainage and to permit construction of a large overbank flood-detention area. (EIR/EIS, p. 2-21) The proposed preserve is already bisected by existing roadways and culverts and the proposed roadways do not result in fragmentation of the on-site preserve. Although new roadways (Americanos and Rancho Cordova Parkway) will be constructed through the wetland preserve, the project would include a special bridge design ("con-span") where these roadways cross Morrison Creek in the wetland preserve (Exhibits 3.10-4 and 3.10-5) and where the southern portion of Villagio Drive crosses Morrison Creek. (EIR/EIS, p. 2-22) These natural substrate span crossings would be sized to provide for wildlife movement (including invertebrate species that occur in the preserve) and minimize habitat fragmentation. Furthermore, the alignment and design of the roadways is consistent with policies in the Circulation Element and Land Use Element of the General Plan. These two roadways are shown in the General Plan as critical north-south arterials needed to relieve congestion along Sunrise Boulevard and their environmental impacts on biological resources were programmatically addressed in the Rancho Cordova General Plan EIR. Although connectivity to off-site habitat is not required under the policy, the project preserve connects to the proposed preserve area to the east. There is no possible physical interconnection from the proposed preserve area to preserve lands on adjacent properties to the west and south because existing roadways (Sunrise Boulevard and Douglas Road) and development create a barrier to connectivity. In addition, there are no existing or proposed preserves adjacent to the south or west of the project site. Connectivity of Morrison Creek will be maintained upstream and downstream. **Valley Elderberry Longhorn Beetle (VELB)** The EIR includes mitigation measure 3.10-4b to address impacts to the Valley Elderberry Longhorn Beetle (VELB). Mitigation measure 3.10-4b requires that prior to construction, the applicant shall obtain a Biological Opinion

Table 3.10-1 Project Consistency with City of Rancho Cordova Biological Resources Policies		
General Plan Policies	**Consistency**	**Analysis**
		(BO) from USFWS under the Endangered Species Act, and that the applicant abides by all provisions contained in the BO, including conservation and minimization measures. At a minimum, a "no-net-loss" of VELB habitat shall be achieved. **Swainson's Hawk** Mitigation measure 3.10-4d included in Section 3.10 of this EIR would ensure that the proposed project would protect this species in accordance with State law. Mitigation measure 3.10-4d requires that the applicant shall preserve, to the satisfaction of the City, suitable Swainson's hawk foraging habitat to ensure 1:1 mitigation of habitat value. Project impacts and proposed mitigation approach has been generally reviewed by the City and California Department of Fish and Game. **Special Status Plants and Associated Habitat** The EIR/EIS presents mitigation measure 3.10-5 to address impacts to the population of Greene's legenere located on the project site. Mitigation measure 3.10-5 requires that a mitigation and monitoring plan be developed for Green's legenere that maintains viable plant populations on-site and shall include avoidance measures for the existing population to be retained and mitigation measures for the populations to be directly affected.
Action NR.1.1.1 - Incorporate large habitat preserves and interconnected wildlife corridors in new development areas to provide ample space for animal movement.	Yes, with Mitigation	The Project includes an on-site preserve that is a large area – 507-acres on the southern portion of the project site. Since the preserve is one nearly contiguous area, it provides on-site interconnections for invertebrate and other species. The roadways do not result in fragmentation of the on-site preserve. Although there will be new roads constructed through the wetland preserve, the project would include a special bridge design ("con-span") where the southern portion of Rancho Cordova Parkway crosses the wetland preserve and where the southern portion of Villagio Drive crosses Morrison Creek. (EIR/EIS, p. 2-22) Another con-span bridge would be constructed where Americanos Boulevard crosses Morrison Creek. (EIR/EIS, Exhibit 2-13). These natural substrate span crossings would provide for wildlife movement, including invertebrate species, and minimize habitat fragmentation. Bridge design

Table 3.10-1 Project Consistency with City of Rancho Cordova Biological Resources Policies		
General Plan Policies	**Consistency**	**Analysis**
		would include a large enough span area to provide movement corridors for terrestrial wildlife even during high flows (i.e., the entire span would not be inundated). Furthermore, the alignment and design of the roadways is consistent with policies in the Circulation Element and Land Use Element of the General Plan. These two roadways are shown in the General Plan as critical north-south arterials needed to relieve congestion along Sunrise Boulevard and their environmental effects were programmatically evaluated in the Rancho Cordova General Plan. See also discussion in Policy NR1.1 above.
Action NR.1.1.2 – Review projects through the entitlement process and CEQA analysis to ensure that they comply with this policy if the site contains unique habitat, creeks, and/or wooded corridors.	Yes, with Mitigation	This EIR/EIS evaluates the environmental effects on wetland and habitat conditions. See Policy NR 1.1and Action NR.1.1.1 discussion above.
Action NR.1.1.3 - As part of the consideration of development applications for individual Planning Areas containing habitats that support special-status plant and animal species that are planned to be preserved, the City shall require that these preserved habitats have interconnections with other habitat areas in order to maintain the viability of the preserved habitat to support the special-status species identified. The determination of the design and size of the "interconnections" shall be made by the City, as recommended by a qualified professional, and will include consultation with the California Department of Fish and Game and U.S. Fish and Wildlife Service.	Yes, with Mitigation	See Policy NR 1.1 and Action NR 1.1.1 discussion above for a description of preserved habitat on the project site. The on-site preserve has connectivity to support special-status species within the project. The watershed in the preserve is sufficient to provide needed hydrology for all the existing and created vernal pools in the preserve area. This conclusion is based on the site design of the project and GIS analysis of the watershed using a Light Detection and Ranging (LiDAR) -derivedtopographic model and wetland delineation conducted for the wetland preserve. The watershedanalysis concluded that the configuration of the preserve conserves almost 100% of the original watershed area and would not negatively impact the hydrologic function of the vernal pools that support special status species. The final preserved habitat mitigation will be developed in consultation with USFWS and DFG where required by law and mitigation measures in the EIR/EIS. The mitigation measure establishes success criteria and requires monitoring to ensure successful implementation. Although connectivity to off-site habitat is not required under the policy, the project wetland preserve connects to the proposed preserve area (as designated by the Rancho Cordova General Plan) to the east. There is no possible physical interconnection from the proposed preserve area to preserve lands on adjacent

Table 3.10-1 Project Consistency with City of Rancho Cordova Biological Resources Policies		
General Plan Policies	**Consistency**	**Analysis**
		properties to the west and south because no existing or proposed preserves are present to the south or west and existing roadways (Sunrise Boulevard and Douglas Road) and development create a barrier to connectivity. Given the disturbed conditions of the central and northern portions of the project site, no large habitat preservation areas (with the exception of VELB preserve sites) are proposed (consistent with the General Plan). However, the preserve design does include drainage parkways that would provide habitat and movement corridors for wildlife species.
Action NR.1.1.4 - Prior to the approval of any public or private development project in areas containing trees, the City shall require that a determinate survey be conducted during the nesting season (March 1 and August 31) to identify if active nesting by birds protected under the Migratory Bird Treaty Act (MBTA) is taking place. If all site disturbance is to occur outside this time, the actions described in this mitigation measure are not required. If nesting activity is observed, consultation with the City of Rancho Cordova Planning Department shall be conducted in order to determine the appropriate mitigation, if any, required to minimize impacts to nesting birds. No activity may occur within 100 feet of any nesting activity or as otherwise required following consultation with the California Department of Fish and Game.	Yes, with Mitigation	Mitigation Measure 3.10-4c presented in the EIR/EIS is consistent with this Action. It requires preconstruction surveys during the nesting season for raptors. If active nests are found, the measure requires that appropriate buffers be established to protect the nests. No project activity shall commence within the buffer area until a qualified biologist confirms that any young have fledged and the nest is no longer active.
Policy NR.1.2 Conserve Swainson's hawk habitat consistent with State policies and Department of Fish and Game Guidelines. (Further implemented through Action NR.1.2.1)	Yes, With Mitigation	Mitigation measures 3.10-4c and 3.10-4d included in Section 3.10 of this EIR would ensure that the proposed project is consistent with this policy. Project impacts and proposed mitigation approach has been generally reviewed by the City and California Department of Fish and Game (City of Rancho Cordova, 2007).
Action NR.1.2.1 – Establish a Swainson's Hawk Ordinance in coordination with the California Department of Fish and Game to establish the process of mitigating for the loss of Swainson's hawk foraging habitat based on habitat value lost to development. The ordinance will set forth a process where habitat lost to development will be mitigated through the permanent protection of equivalent or better existing habitat conditions (referred to hereafter as "mitigation lands"). The specific required mitigation ratios (habitat acreage lost	Yes, with Mitigation	The City has not formally adopted a Swainson's Hawk Ordinance. However, mitigation measure 3.10-4d presented in the EIR/EIS meets or exceeds the provisions contained in Action Item NR 1.2.1. See also Policy NR 1.2 discussion above.

Table 3.10-1 Project Consistency with City of Rancho Cordova Biological Resources Policies		
General Plan Policies	**Consistency**	**Analysis**
versus mitigation lands) and any other provisions to mitigation process shall be established through technical studies as part of the development of the ordinance and will take into account value of habitat to be converted in relation to habitat value of the mitigation lands (e.g., relation to nesting sites), proximity of the mitigation lands to adjacent conditions affecting habitat (e.g., nearby land uses and already permanently protected lands), and other relevant factors. The ordinance will also establish standards ensuring that mitigation land will be adequately protected and managed in perpetuity (e.g., via conservation easement, deed restriction or other appropriate method), and setting forth the timing of the required provision of mitigation lands in relation with the timing of the loss of habitat in the City (as its boundaries may be changed through subsequent annexations), such that mitigation lands shall be provided no later than prior to ground disturbance.		
Policy NR.1.3 Promote educational programs that inform the public about natural resources.	Yes	The proposed project is consistent with this policy due to the 507-acre wetland preserve proposed for the south portion of the site. The wetland preserve will be highly visible with trails surrounding the perimeter. The preserve will allow for up close viewing by the public and emphasize the importance and benefit of wetland areas.
Policy NR.1.4 Discourage the planting of invasive species.	Yes, With Mitigation	The proposed project includes the implementation of a wetland mitigation monitoring plan that includes the use of grazing and restoration activities to maintain the vegetation conditions of the preserve. Mitigation measure 3.10-1a would require monitoring to ensure that invasive species do not adversely impact the preserve.
Policy NR.1.6 Participate in the development of a habitat conservation plan to address the unique biological resources in Rancho Cordova.	Yes	The City is currently participating in the South Sacramento Habitat Conservation Plan process.
Policy NR.1.7 Prior to project approval, the City shall require a biological resources evaluation for private and public development projects in areas identified to contain or possibly contain listed plant and/or wildlife species based upon the City's biological resource mapping provided in the General Plan EIR or other technical	Yes, With Mitigation	Biological resources impacts were evaluated in technical reports prepared by the project applicant and peer reviewed by the EIR/EIS consultant. Project impacts will be mitigated so that any decline of affected special status species will not cause a substantial adverse impact on viability of regional populations of these species. The mitigation for federally listed vernal pool invertebrates requires no net loss of

Table 3.10-1 Project Consistency with City of Rancho Cordova Biological Resources Policies		
General Plan Policies	**Consistency**	**Analysis**
materials. (Further implemented through Action NR.1.7.1)		habitat (acreage, value and function) (Mitigation Measure 3.10-4a (see also Mitigation Measure 3.10-1a (mitigation for wetlands and vernal pool impacts)). The mitigation includes performance standards and criteria to ensure that created and preserved habitat will be successfully maintained. The mitigation is to be designed in coordination with USFWS consultation and regulatory process (Section 7 biological opinion) to ensure the viability of the species regional population is not adversely affected. Similarly, the mitigation for the Valley Elderberry Longhorn Beetle requires no net loss of habitat (Mitigation Measure 3.10-4b). New habitat will be subject to performance standards and success criteria to ensure that habitat will be successfully maintained. The mitigation is developed in coordination with USFWS and DFG. The mitigation includes the incidental take permit and Section 7 consultation process for federally protected species. These processes will also ensure that the viability of the species regional population is not adversely affected. Impacts to Swainson's hawk are mitigated by ensuring 1:1 mitigation of habitat value for foraging habitat lost as a result of the Project (Mitigation Measure 3.10-4c and 4d). The mitigation measure establishes criteria to determine a habitat value and requires consultation with DFG. Since impacted habitat will be replaced by habitat of equal acreage, value and function, the project will not result in decline of any protected species that will affect viability of regional populations. There is no evidence in the EIR/EIS that the loss of habitat from the project will result in an adverse significant impact on the viability of special status species in the region.
Action NR.1.7.1 - For those areas in which special status species are found or likely to occur or where the presence of species can be reasonably inferred, the City shall require mitigation of impacts to those species that ensure that the project does not contribute to the decline of the affected species populations in the region to the extent that their decline would impact the viability of the regional population. Mitigation shall be designed by the City in coordination with the U.S. Fish and Wildlife Service (USFWS) and the California Department of Fish and Game (CDFG), and		Project impacts will be mitigated so that any decline of affected special status species will not cause a substantial adverse impact on viability of regional populations of these species. The mitigation for federally listed vernal pool invertebrates requires no net loss of habitat (acreage, value and function) (Mitigation Measure 3.10-4a (see also Mitigation Measure 3.10-1a (mitigation for wetlands and vernal pool impacts)). The mitigation includes performance standards and criteria to ensure that created and preserved habitat will be successfully maintained. The

Table 3.10-1 Project Consistency with City of Rancho Cordova Biological Resources Policies		
General Plan Policies	**Consistency**	**Analysis**
shall emphasize a multi-species approach to the maximum extent feasible. This may include development or participation in a habitat conservation plan.		mitigation is to be designed in coordination with USFWS consultation and regulatory process (Section 7 biological opinion) to ensure the viability of the species population is not adversely affected. Similarly, the mitigation for the Valley Elderberry Longhorn Beetle requires no net loss of habitat (Mitigation Measure 3.10-4b). New habitat will be subject to performance standards and success criteria to ensure that habitat will be successfully maintained. The mitigation is developed in coordination with USFWS and DFG. The mitigation includes the incidental take permit and Section 7 consultation process for federally protected species. These processes will also ensure that the viability of the species population is not adversely affected. Impacts to Swainson's hawk are mitigated by ensuring 1:1 mitigation of habitat value for foraging habitat lost as a result of the Project (Mitigation Measure 3.10-4c and 4d). The mitigation measure establishes criteria to determine a habitat value and requires consultation with DFG. Habitat impacts will be mitigated through the preservation and creation of equal acreage, value and function, the project will not result in decline of any protected species that will affect viability of regional populations. There is no evidence in the EIR/EIS that the loss of habitat from the project will result in an adverse significant impact on the viability of special status species for the region. A loss of habitat on the project site does not constitute an effect that would result in loss of viability of species in the region since there is other habitat in the region that supports the species. See Policy NR 1.1 above for a discussion of mitigation required as a result of impacts to special status species.
Policy NR.1.8 The City shall encourage creation of habitat preserves that are immediately adjacent to each other in order to provide interconnected open space areas for animal movement.	Yes	This policy encourages, but does not require, creation of adjacent habitat preserves. As discussed above, the size and location of the proposed preserve supports many natural resources policies. The project wetland preserve connects to the proposed preserve area to the east. There is no possible physical interconnection from the proposed preserve area to lands on adjacent properties to the west and south because existing roadways (Sunrise Boulevard and Douglas Road) and development create a barrier to connectivity. There are no existing or proposed preserve

Table 3.10-1 Project Consistency with City of Rancho Cordova Biological Resources Policies		
General Plan Policies	**Consistency**	**Analysis**
		areas adjacent to the south or west of the project site and the Agency Conceptual Strategy does not recommend any. Connectivity of Morrison Creek would be maintained upstream and downstream of the project site, providing opportunities for animal movement. Given the disturbed conditions of the central and northern portions of the project site, no large habitat preservation areas (with the exception of VELB preserve sites) are proposed (consistent with the General Plan). However, the preserve design does include drainage parkways that would provide for habitat and movement of wildlife species.
Policy NR.1.9 The City shall require that impacts to riparian habitats be mitigated at a no net loss of existing function and value based on field survey and analysis of the riparian habitat to be impacted. No net loss may be accomplished by avoidance of the habitat, restoration of existing habitat, or creation of new habitat, or through some combination of the above.	Yes, with Mitigation	Section 3.10 of the EIR/EIS includes mitigation measures that address the loss of riparian habitat consistent with this policy. Mitigation measure 3.10-2b expressly requires that mitigation for impacts to riparian habitats meet the performance standard of "no net loss" of overall habitat values and functions through either on-site or off-site efforts. The types of mitigations under the measure are consistent with the options identified in this policy. As identified in Section 3.10 of the EIR/EIS, the majority of the riparian habitat is of poor quality and would be mitigated consistent with its current value (e.g., nesting and foraging habitat).
Policy NR.1.10 The City shall avoid the placement of new roadways within habitat preserve to the maximum extent feasible.	Yes	The proposed project minimizes roadway crossing of the proposed wetland preserve to Rancho Cordova Parkway and Americanos Boulevard to the extent feasible. The roadways also are designed to minimize impacts on the preserve (see discussion of Policy NR.1.11 below). These roadways are integral regional roadways that are key facilities under the General Plan Roadway System and Sizing Map and their environmental effects were considered in the Rancho Cordova General Plan EIR. Without these connections, the City's roadway system would not meet the key transportation provisions of the General Plan. Therefore, further avoidance of the placement of roadways in the habitat preserve areas is not feasible and would be inconsistent with the General Plan. Also, see discussion contained in policy NR 1.1.
Policy NR.1.11 In such cases where habitat preserves are crossed by a roadway, or where two adjacent preserves are separated by a roadway, the	Yes, With Mitigation	See discussion under Policy NR.1.10 above. Mitigation measures under Section 3.10 of the EIR/EIS address movement issues associated with changes to hydrologic conditions. The

Table 3.10-1 Project Consistency with City of Rancho Cordova Biological Resources Policies		
General Plan Policies	**Consistency**	**Analysis**
roadway shall be designed or updated with wildlife passable fencing separating the roadway from the preserve and/or shall incorporate design features that allow for the movement of wildlife across or beneath the road without causing a hazard for vehicles and pedestrians on the roadway.		proposed construction design includes measures to reduce interference with the hydrology that sustains vernal pools on-site, including the use of con span bridge systems as natural substrate span crossings over Morrison Creek. Rancho Cordova Parkway and Americanos Boulevard would cross Morrison Creek with a clear span of the delineated wetlands within the channel bank. These natural substrate span crossings would also provide for wildlife movement, including invertebrate species, and minimize habitat fragmentation. Bridge design would include a large enough span area to provide movement corridors for terrestrial wildlife even during high flows. Furthermore, wildlife passable fencing is required by the City along the preserve boundary. Also, see discussion contained in policy NR 1.1.
Policy NR.2.1 Require mitigation that provides for "no net loss" of wetlands consistent with current State and federal policies. (Further implemented by Action NR.2.1.1)	Yes, with Mitigation	The wetland preserve would consist of the highest quality and highest density vernal pools and seasonal wetlands in the project area. (See EIR/EIS Section 3.10) Wetland acreages within the wetland preserve that provide potential habitat for federally listed vernal pool invertebrates include 20.4 acres of existing vernal pools, 2.5 acres of seasonal wetland swale, 3.3 acres of seasonal wetland, and the creation of approximately 17.9 acres of vernal pools that would provide habitat. The watershed in the preserve is sufficient to provide needed hydrology for all the existing and created vernal pools in the preserve area based on GIS analysis of LiDAR-derived topographic models and wetland delineation. Furthermore, mitigation measures included in Section 3.10 of this EIR/EIS (see Mitigation Measures 3.10-1a and 3.10-1b) require that the applicant ensure no net loss of wetlands in accordance with federal and state policies (including obtaining a 404 permit).
Action NR.2.1.1 - During the environmental review process, evaluate feasible on-site alternatives that will reduce impacts to wetland resources and effectively preserve these resources.	Yes	Section 2.5 of the EIR/EIS presents an Impact Minimization Alternative. Under the Impact Minimization Alternative, project components would be reconfigured to avoid most, but not all impacts to USACE jurisdictional wetlands and high quality biological habitat. This alternative would result in 994.5 acres of wetland preserve in the southern portion of the project site. The City will determine if this alternative is feasible.

Table 3.10-1 Project Consistency with City of Rancho Cordova Biological Resources Policies		
General Plan Policies	**Consistency**	**Analysis**
Policy NR.2.2 Ensure that direct and indirect effects to wetland habitats are minimized by environmentally sensitive project siting and design, to the maximum extent feasible.	Yes, with Mitigation	Mitigation measures under Section 3.10 of the EIR/EIS (see Mitigation Measures 3.10-1a and 3.10-1b) address direct and indirect effects to wetland resources. Because of the General Plan designation for the project area, which contemplates fairly dense urban development, the avoidance of all wetland habitat is infeasible. However, wetlands have been avoided or impacts have been minimized where feasible. The on-site preserve is a large contiguous area that contains the highest quality and highest density vernal pools and seasonal wetlands in the project area. (See EIR/EIS Section 3.10)
Policy NR.2.4 Educate the public on the importance and benefit of wetlands areas.	Yes	The proposed project is consistent with this policy due to the 507-acre wetland preserve proposed for the south portion of the site. The wetland preserve will be highly visible with trails surrounding the perimeter. The preserve will allow for up close viewing by the public and emphasize the importance and benefit of wetland areas.
Action NR.2.4.1 - Develop trails and associated educational facilities (e.g., information kiosks, signage) around wetland and vernal pool preserves where possible while maintaining the integrity of sensitive natural resources.	Yes	See discussion under Policy NR 2.4.
Action NR.2.4.2 – Consider constructing low impact trails interior to preserves, such as elevated board walkways, in coordination with the U.S. Fish and Wildlife Service and U.S. Army Corps of Engineers.	Yes	The project does not include interior trails to the preserve, but trails along the perimeter. Trails are not located in the preserve in order to minimize impacts on the preserve area.
Policy NR.2.5 The City shall require that drainage improvements that discharge into areas of wetlands to be preserved are, to the maximum extent feasible, designed to mimic the undeveloped surface water flow conditions of the area in terms of seasonality, volume, and flow velocity.	Yes, with Mitigation	Section 3.10 of the EIR/EIS presents mitigation measure 3.10-1b (Include in Drainage Plans all Wetlands that Remain on-site). This measure requires that all project phases commit to implement all measures in their drainage plans to avoid and minimize erosion and runoff into Morrison Creek in the proposed preserve and all wetlands that would remain on-site. The project proposes that the majority of drainage discharge would be outside of the wetland preserve area. The only drainage that would enter into the preserve area is a portion of the run-off from roadways located in the preserve. However, this drainage would be treated before discharge. The GIS watershed analysis shows that watersheds necessary to maintain drainage flows to support wetlands in the preserve will be maintained.

Table 3.10-1 Project Consistency with City of Rancho Cordova Biological Resources Policies		
General Plan Policies	**Consistency**	**Analysis**
Policy NR.3.1 Coordinate with property owners and local interest groups, such as the Sacramento Urban Creeks Council, to restore, enhance, and preserve creeks in Rancho Cordova.	Yes	Morrison Creek is to retain its natural contours and condition throughout the Project's 507-acre preserve area. Morrison Creek will be channelized once it leaves the preserve area up to the point where it leaves the southwest corner of the site via a culvert. The existing condition of the corridor of this section of Morrison Creek is disturbed due to past mining practices and aerospace activities on the project site. Although channelization of a portion of Morrison creek is necessary to provide adequate drainage of the site and consistency with other City policies, the channelization will retain its existing alignment.
Policy NR.3.2 In general, the City will encourage the preservation of existing location, topography, and meandering alignment of creeks. Where necessary, and if consistent with other City policies, the creation and realignment of creek corridors shall be constructed to recreate the character of the natural creek corridor. Channelization and the use of concrete within creek corridors shall not be supported.	Yes	The project does propose the construction of drainage channels within the project area. Morrison Creek is to retain its natural contours and condition throughout the Project's 507-acre preserve area. Morrison Creek will be channelized once it leaves the preserve area up to the point where it leaves the southwest corner of the site via a culvert. The existing condition of the corridor of this section of Morrison Creek is disturbed due to past mining practices and aerospace activities on the project site. Although channelization of a portion of Morrison creek is necessary to provide adequate drainage of the site and consistency with other City policies, the channelization will not include a concrete channel or structure and the creek would retain its existing alignment.
Action NR.3.2.1 – Develop guidelines for channel creation or modification that will ensure channel meander, naturalized side slope, and varied channel bottom elevation are considered in design.	Yes	As of the date of this document, the City has not adopted formal guidelines regarding channel creation or modification. However, the City has reviewed proposed drainage improvements of the project (including channelization of a portion of Morrison Creek) associated with these policies and other policy provisions of the General Plan and has determined that they are generally consistent with the intent of these policies.
Policy NR.3.3 Encourage the creation of secondary flood control channels where the existing channel supports extensive riparian vegetation. (Further implemented through Action NR.3.3.1)	Yes, With Mitigation	The proposed construction of secondary drainage channels within the project area are designed to keep Morrison Creek in as much a natural state as possible (see Mitigation Measure 3.10-1b). See discussion under Policy NR 3.2 for a discussion of Morrison Creek. It is important to note that although Morrison Creek meanders in a natural state through the project site, Morrison Creek does not support riparian

Table 3.10-1 Project Consistency with City of Rancho Cordova Biological Resources Policies		
General Plan Policies	**Consistency**	**Analysis**
		vegetation.
Action NR 3.3.1 – Work with affected local, state, and federal agencies, including SACOG, the California Department of Water Resources, Delta Keepers, and the U.S. Army Corps of Engineers, to determine when natural creek corridors can and should accommodate storm flows or if separate storm water conveyance structures are necessary.	Yes, With Mitigation	Secondary stormwater conveyance structures have been incorporated into the project design. Consultation with affected agencies has occurred including U.S. Army Corps of Engineers and U.S. Fish and Wildlife Service. See Policy NR 3.3 discussion above.
Policy NR.3.4 Encourage projects that contain wetland preserves or creeks, or are located adjacent to wetland preserves or creeks, to be designed for visibility and, as appropriate, access.	Yes	The proposed project includes 507 acres of wetland preserve/mitigation bank that is located along several major roads, including Douglas Road along the southern limit of the project area. Access is limited due to the sensitivity of the wetlands. However, visibility is ensured due to wildlife passable fencing required by the City and by the siting of pathways and recreation along the outer edge of the preserve. The general siting and design of trails adjacent to the wetland preserve has been reviewed by the City, U.S. Army Corps of Engineers and U.S. Fish and Wildlife Service.
Action NR.3.4.1 - Establish performance standards for natural resource preserves that accomplish the following: Provide sufficient width for a mowed firebreak (where necessary), adjacent passive recreation uses, and access for channel maintenance and flood control. Offer sufficient width in and/or adjacent to preserves to allow for existing and created wildlife habitat, species sensitive to human disturbance, vegetative filtration for water quality, corridor for wildlife habitat linkage, protection from runoff, and other impacts of urban uses adjacent to the corridor. Allow for sufficient width adjacent to natural resource preserves to allow for trails and greenbelts. Prohibit the placement of water quality treatment structures designed to meet pollutant discharge requirements within mitigation preserves.	Yes	See discussion under Policy NR 3.4. The drainage parkway would handle project drainage and water quality control. A water quality swale would be constructed associated with the construction of Rancho Cordova Parkway to ensure pollutants are not discharged into preserve wetlands. The perimeter of the preserve would include buffer areas for the placement of trails.
Action NR.3.4.2 – Establish standards that allow public access in the floodplain and buffers along creek corridors and preserves. Mitigation measures shall be incorporated into environmental documents and conditions of approval that require open-view fencing adjacent to preserves.	Yes	See discussion under Policy NR 3.4.

Table 3.10-1 Project Consistency with City of Rancho Cordova Biological Resources Policies		
General Plan Policies	**Consistency**	**Analysis**
Action NR.3.4.3 – Establish standards and/or guidelines for development of adjoining wetland preserves or creeks to maximize visibility by designing the land plan with public streets on at least one side of the corridor or preserve with vertical curbs, gutters, footpath(s), street lighting, and post and cable barriers to prevent unauthorized vehicular entry into creek corridors and preserves.	Yes	See discussion under Policy NR 3.4.
Policy NR.4.1 Conserve native oak and landmark tree resources for their historic, economic, aesthetic, and environmental value.	Yes, with Mitigation	Mitigation measure 3.10-3 included in Section 3.10 of this EIR/EIS would conserve trees within the proposed project or ensure the mitigation for trees that cannot feasibly be retained in light of the development densities and intensities contemplated by the General Plan. Therefore, the proposed project is consistent with this policy.
Action NR.4.1.1 - Implement the City's Tree Preservation and Protection Ordinance (and update as necessary) to establish minimum requirements for preserving native trees and landmark trees in the City, including a definition of the size, species, and age requirements of landmark, oak, and other trees to be protected and/or replaced.	Yes, with Mitigation	The City has not yet established a tree ordinance consistent with its current General Plan and defers to the County Tree Ordinance when addressing impacts on trees within the City's sphere of influence. The County Ordinance addresses the standards in this Action. See also Policy NR 4.1 discussion above and Policy NR 4.4 discussion below.
Action NR.4.1.2 - Where feasible, require underground utility lines that are in close proximity to oaks and other landmark trees to be designed and installed to minimize impacts to trees. Work with the utility provider(s) to coordinate transmission line location and other potential impacts associated with the undergrounding of the utilities.	Yes	The project would likely remove 47 native oak trees greater than 6 inches dbh. No existing trees are expected to conflict with the installation of underground utility lines.
Action NR.4.1.3 - Establish development guidelines that require all oak habitat to be avoided to the maximum extent feasible. When avoidance is not possible, require mitigation efforts that result in preservation of in-kind habitat in the Planning Area.	Yes, with Mitigation	The project would result in the loss of 3 acres of oak woodland habitat. See discussion NR 4.1 for a description of tree mitigation.
Policy NR.4.2 Improve overall landscaping quality and sustainability in all areas visible to the public.	Yes	The project includes design guidelines that call for landscape treatments within the project area, including parks and public open space areas.
Policy NR.4.3 Promote trees as economic and environmental resources for the use, education, and enjoyment of current and future generations	Yes	The project includes design guidelines that call for landscape treatments and the general provision of trees within the project area, including parks and public open space areas.

Table 3.10-1 Project Consistency with City of Rancho Cordova Biological Resources Policies		
General Plan Policies	**Consistency**	**Analysis**
Policy NR.4.4 Prior to the approval of any public or private development project in areas identified or assumed to contain trees, the City shall require that a determinate survey of tree species and size be performed. If any native oaks or other native trees six inches or more in diameter at breast height (dbh), multitrunk native oaks or native trees of 10 inches or greater dbh, or non-native trees of 18 inches or greater dbh that have been determined by a certified arborist to be in good health are found to occur, such trees shall be avoided if feasible. If such trees cannot be avoided, the project applicant shall do one of the following: • All such trees shall be replaced at an inch-for-inch ratio. A replacement tree planting plan shall be prepared by a certified arborist or licensed landscape architect and shall be submitted to the City of Rancho Cordova for approval prior to removal of trees; or, • The project applicant shall submit a mitigation plan that provides for complete mitigation of the removal of such trees in coordination with the City of Rancho Cordova. The mitigation plan shall be subject to the approval of the City. • If the City of Ranch Cordova adopts a tree preservation ordinance at any time in the future, any future development activities shall be subject to that ordinance instead.	Yes, with Mitigation	Mitigation measure 3.10-3 presented in the EIR/EIS is consistent with the provisions set forth in Policy NR.4.4.
Source: Prepared by the City of Rancho Cordova Planning Department, 2008		

The City has proposed revisions to certain policies and actions in the Natural Resources Element of the General Plan in order to clarify the City's intent for these policy provisions. The proposed amendments involve policies NR.1.0, NR.1.11, NR.2.2 and NR.3.2 and action items NR1.1.1, NR.1.1.3 and NR.1.7.1. The proposed amendments also include the addition of a general definition of the term "feasible" which is consistent with the definition of that term under CEQA. The proposed definition of "feasible" is: "Feasible" means capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social and technological factors.

Although these are proposed amendments, for the purposes of providing full information and disclosure in this recirculated DEIR/supplemental DEIS, below is an analysis of the proposed Project's consistency with these proposed amendments.

Table 3.10-2 Project Consistency with Proposed Revisions to Certain General Plan Natural Resources Policies		
General Plan Policies	**Consistency**	**Analysis**
Proposed Revised Action NR.1.1.1 – Incorporate habitat preserves and interconnected wildlife corridors in new development areas to allow for animal movement where feasible and as necessary for viability of protected species	Yes, with Mitigation	The Project includes an on-site preserve that is a large area – 507-acres on the southern portion of the project site. Since the preserve is one nearly contiguous area, it provides on-site interconnections for invertebrate and other species. The watershed in the preserve is sufficient to provide needed hydrology for all the existing and created vernal pools in the preserve area. This conclusion is based on the site design of the project and the hydrologic analysis of a topographic model of the wetland preserve derived from Light Detection and Ranging (LiDAR)- technology. The LiDAR analysis concluded that the configuration of the preserve conserves almost 100% of the original watershed area and would not negatively impact the hydrologic function of the vernal pools. The proposed project's construction design would retain interconnections between on-site habitats by including measures to reduce interference with the hydrology that sustains vernal pools on-site. The roadways do not result in fragmentation of the on-site preserve. Although there will be new roads constructed through the wetland preserve, the project would include a special bridge design ("con-span") where the southern portion of Rancho Cordova Parkway crosses the wetland preserve and where the southern portion of Villagio Drive crosses Morrison Creek. (EIR/EIS, p. 2-22) Another con-span bridge would be constructed where Americanos Boulevard crosses Morrison Creek. (EIR/EIS, Exhibit 2-13). These natural substrate span crossings would provide for wildlife movement, including invertebrate species, and minimize habitat fragmentation. Bridge design would include a large enough span area to provide movement corridors for terrestrial wildlife even during high flows (i.e., the entire span would not be inundated). Furthermore, the alignment and design of the roadways is consistent with policies in the Circulation Element and Land Use Element of the General Plan. These two roadways are shown in the General Plan as critical north-south arterials needed to relieve congestion along Sunrise Boulevard and their environmental effects were programmatically evaluated in the Rancho Cordova General Plan EIR (State Clearinghouse No. 2005022137). Although connectivity to off-site habitat is not required under the policy, the project preserve

Table 3.10-2 Project Consistency with Proposed Revisions to Certain General Plan Natural Resources Policies		
General Plan Policies	**Consistency**	**Analysis**
		connects to the proposed preserve area to the east. There is no possible physical interconnection from the proposed preserve area to preserve lands on adjacent properties to the west and south because existing roadways (Sunrise Boulevard and Douglas Road) and development create a barrier to connectivity. In addition, there are no existing or proposed preserves adjacent to the south or west of the project site. Connectivity of Morrison Creek will be maintained upstream and downstream. See also discussion of compliance with Policy NR.1.1 on protection of special status species in Table 3.10.1.
Proposed Revised Action NR.1.1.3 - As part of the consideration of development applications for individual Planning Areas containing habitats that support special-status plant and animal species that are planned to be preserved, the City may require that these preserved habitats have interconnections with other habitat areas where feasible and appropriate to promote the viability of the preserved habitat to support the special-status species identified. The determination of the design and size of the "interconnections" shall be made by the City, with the consideration of a recommendation from a qualified professional, after the California Department of Fish and Game and U.S. Fish and Wildlife Service are provided with an opportunity to comment.	Yes, with Mitigation	See Action NR 1.1.1 discussion above for a description of preserved habitat on the project site. See also discussion of compliance with Policy NR.1.1 on protection of special status species in Table 3.10.1. The on-site preserve has connectivity to support special-status species within the project. The watershed in the preserve is sufficient to provide needed hydrology for all the existing and created vernal pools in the preserve area. This conclusion is based on the site design of the project and GIS analysis of the watershed using a Light Detection and Ranging (LiDAR) technology, topographic model and wetland delineation conducted for the wetland preserve. The watershed analysis concluded that the configuration of the preserve conserves almost 100% of the original watershed area and would not negatively impact the hydrologic function of the vernal pools that support special status species. The final preserved habitat mitigation will be developed in consultation with USFWS and DFG where required by law and mitigation measures in the EIR/EIS. The mitigation measure in this document establishes success criteria and requires monitoring to ensure successful implementation. Although connectivity to off-site habitat is not required under the policy to promote the viability of the habitat to support special-status species, the project wetland preserve connects to the proposed preserve area (as designated by the Rancho Cordova General Plan) to the east. There is no possible or feasible physical

Table 3.10-2 Project Consistency with Proposed Revisions to Certain General Plan Natural Resources Policies		
General Plan Policies	**Consistency**	**Analysis**
		interconnection from the proposed preserve area to preserve lands on adjacent properties to the west and south because no existing or proposed preserves are present to the south or west and existing roadways (Sunrise Boulevard and Douglas Road) and development create a barrier to connectivity. Given the disturbed conditions of the central and northern portions of the project site, no large habitat preservation areas (with the exception of VELB preserve sites) are proposed (consistent with the General Plan) and none would be feasible. However, the preserve design does include drainage parkways that would provide habitat and movement corridors for wildlife species. The design of the proposed habitat preserves has been reviewed by biologists, and CDFG and USFWS have been given an opportunity to review and comment.
Proposed Revised Action NR.1.7.1 - For those areas in which special status species are found or likely to occur, the City shall require feasible mitigation of impacts to those species that ensure that the project does not contribute to the decline of the affected species such that their decline would impact the viability of the species. Feasible mitigation shall be determined by the City after the U.S. Fish and Wildlife Service (USFWS) and the California Department of Fish and Game (CDFG)are provided an opportunity to comment, and may emphasize a multi-species approach. This may include development or participation in a habitat conservation plan.		Project impacts will be mitigated so that any decline of affected special status species will not cause a substantial adverse impact on viability of these species. The mitigation for federally listed vernal pool invertebrates requires no net loss of habitat (acreage, value and function) (Mitigation Measure 3.10-4a (see also Mitigation Measure 3.10-1a (mitigation for wetlands and vernal pool impacts)). The mitigation includes performance standards and criteria to ensure that created and preserved habitat will be successfully maintained. The mitigation is to be designed in coordination with USFWS consultation and regulatory process (Section 7 biological opinion) to ensure the viability of the species population is not adversely affected. Similarly, the mitigation for the Valley Elderberry Longhorn Beetle requires no net loss of habitat (Mitigation Measure 3.10-4b). New habitat will be subject to performance standards and success criteria to ensure that habitat will be successfully maintained. The mitigation is developed in coordination with USFWS and DFG. The mitigation includes the incidental take permit and Section 7 consultation process for federally protected species. These processes will also ensure that the viability of the species population is not adversely affected. Impacts to Swainson's hawk are mitigated by ensuring 1:1 mitigation of habitat value for foraging habitat lost as a result of the Project (Mitigation Measure 3.10-4c and 4d). The mitigation measure establishes criteria to determine a habitat value and requires consultation with

Table 3.10-2 Project Consistency with Proposed Revisions to Certain General Plan Natural Resources Policies		
General Plan Policies	**Consistency**	**Analysis**
		DFG. Since habitat impacts will be mitigated through the preservation and creation of equivalent habitat, value and function, the project will not result in decline of any protected species that will affect viability of the populations. There is no evidence in the EIR/EIS that the loss of habitat from the project will result in an adverse significant impact on the viability of special status species. A loss of habitat on the project site does not constitute an effect that would result in loss of viability of species since there is other available habitat that supports the species. See also discussion of consistency with Policy NR 1.1 in Table 3.10-1 for a discussion of mitigation required as a result of impacts to special status species.
Proposed Revised Policy NR.1.10 The placement of new roadways within habitat preserves shall be discouraged, but is not prohibited. This Policy shall not apply to roadways shown in the Circulation Element or needed to meet goals or policies of the Circulation Element.	Yes	Rancho Cordova Parkway and Americanos Boulevard are integral regional roadways that are key facilities shown in the General Plan Roadway System and Sizing Map in the Circulation Element and their environmental effects were considered in the Rancho Cordova General Plan EIR (State Clearinghouse No. 2005022137). Without these connections, the City's roadway system would not meet the key transportation provisions of the General Plan. Although this policy exempts these roadways, the proposed project minimizes roadway crossing of the proposed wetland preserve to the extent feasible. The roadways also are designed to minimize impacts on the preserve (see discussion of Policy NR.1.1.1 above and Policy NR.1.11 below). Therefore, further avoidance of the placement of roadways in the habitat preserve would be inconsistent with the General Plan and is not feasible. Also, see discussion contained in policy NR 1.1 in Table 3.10-1.
Proposed Revised Policy NR.1.11 In such cases where a new roadway crosses a habitat preserve or separates two adjacent preserves, the roadway shall include design features, where feasible and appropriate, to allow for the movement of wildlife across or beneath the road without causing a hazard for vehicles, bicycles and pedestrians on the roadway.	Yes, With Mitigation	See discussion under Policy NR.1.10 above. Mitigation measures under Section 3.10 of the EIR/EIS address movement issues associated with changes to hydrologic conditions. The proposed construction design includes measures to reduce interference with the hydrology that sustains vernal pools on-site, including the use of con span bridge systems as natural substrate span crossings over Morrison

Table 3.10-2 Project Consistency with Proposed Revisions to Certain General Plan Natural Resources Policies		
General Plan Policies	**Consistency**	**Analysis**
		Creek. Rancho Cordova Parkway and Americanos Boulevard would cross Morrison Creek with a clear span of the delineated wetlands within the channel bank. These natural substrate span crossings would also provide for wildlife movement, including invertebrate species, and minimize habitat fragmentation. Bridge design would include a large enough span area to provide movement corridors for terrestrial wildlife even during high flows. Furthermore, wildlife passable fencing is required by the City along the preserve boundary. Also, see discussion contained in under Action NR.1.1.1 above and policy NR 1.1 in Table 3.10.1.
Proposed Revised Policy NR.2.2 Ensure that direct and indirect effects to wetland habitats are mitigated to the extent feasible by environmentally sensitive project siting and design or other measures.	Yes, with Mitigation	Mitigation measures under Section 3.10 of the EIR/EIS (see Mitigation Measures 3.10-1a and 3.10-1b) address direct and indirect effects to wetland resources. Because of the General Plan designation for the project area, which contemplates fairly dense urban development, the avoidance of all wetland habitat is infeasible. However, wetlands have been avoided or impacts have been mitigated where feasible. The on-site preserve is a large contiguous area that contains the highest quality and highest density vernal pools and seasonal wetlands in the project area. (See EIR/EIS Section 3.10)
Proposed Revised Policy NR.3.2 In general, the City will encourage the preservation of existing location, topography, and meandering alignment of natural creeks. The modification, re-creation and realignment of natural creek corridors shall recreate the character of the natural creek corridor to the extent feasible, appropriate and consistent with other City policies. Channelization and the use of concrete within creek corridors shall be discouraged, but is not prohibited.	Yes	Morrison Creek is to retain its natural contours and condition throughout the Project's 507-acre preserve area. Morrison Creek will be channelized once it leaves the preserve area up to the point where it leaves the southwest corner of the site via a culvert. The existing condition of the corridor of this section of Morrison Creek is disturbed due to past mining practices and aerospace activities on the project site. Although channelization of a portion of Morrison creek is necessary to provide adequate drainage of the site and consistency with other City policies, the channelization will not include a concrete channel or structure and the creek would retain its existing alignment.
Source: Prepared by City of Rancho Cordova Planning Department, 2008		

APPENDIX Q

Draft Wetland Mitigation and Monitoring Plan

DRAFT

Wetland Mitigation and Monitoring Plan

For

Rio Del Oro

Sacramento County, California

11 September 2007

Prepared for:
Elliott Homes, Inc.
and
GenCorp Real Estate

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

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Rio Del Oro

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SUMMARY

This mitigation and monitoring plan has been prepared for the Rio del Oro project as required by the U.S. Army Corps of Engineers (Corps) and provides information supporting consultation under Section 7.

The project is located in Sacramento County, California. There are a total of 56.632 acres of waters of the U.S. on-site, including 35.485 acres of vernal pools, 6.044 acres of seasonal wetland swale, 6.418 acres of seasonal wetland, 3.540 acres of ponds, and 5.145 acre of ephemeral drainage. Of these 56.632 acres, 27.903 acres will be impacted. A total of 12.946 acres of non-jurisdictional (isolated) aquatic features also occur on the project site, including 2.414 acres of vernal pool, 0.653 acre of seasonal wetland swale, 9.158 acres of seasonal wetland, and a 0.721 acre of pond. These features occur primarily within the dredge tailings that cover much of the project site. Activities associated with project implementation will result in the grading and filling of wetlands to establish construction grade and the installation of infrastructure for mixed land use on the 3829± acre site.

As part of project implementation, a 507-acre area located in the southern portion of the project that contains the highest quality and density of vernal pools will be set aside as a Wetland Preserve. In addition to the 20.413 acres of preserved vernal pools and 8.316 acres of other wetland habitat, 17.867 acres of vernal pools will be restored/created in the Preserve. Wetland habitat will also be created within the major drainage corridors and the large detention basin that will be established on the site. These corridors will contain 20.785 acres of seasonal wetland habitat and 8.402 acres of low-flow channel. On-site compensatory vernal pool habitat will be monitored for 10 years and seasonal wetland habitat within the drainage corridor will be monitored for a 5-year period. Specific success criteria have been set forth in this document. The wetland preserve area will be permanently fenced and will be protected by Deed Restrictions and Conservation Easements and managed as wetland/wildlife habitat in perpetuity. Long-term monitoring and maintenance funding will be provided through an endowment, a Community Facilities District, or other similar mechanism such as a Mello-Roos District as approved by the Corps and the U.S. Fish and Wildlife Service (Service).

To offset any temporal losses, the applicants propose a phased impact and mitigation plan that will establish the entire on-site vernal pool preserve in Phase One as well as the majority of compensatory vernal pool habitat in early phases, prior to the majority of impacts. In addition, 13 acres of seasonal wetland habitat at the Clay Station Mitigation Bank was constructed in 1994 and is already fully functioning.

The 160-acre± Cook property, located south of Highway 16 in Sacramento County, is proposed as additional mitigation (preservation of existing vernal pool and wetland habitat) for the Rio del Oro project. The Cook property is bordered to the north and west by existing conservation properties, to the east by Eagles Nest Road, and to the South by Florin Road. A preliminary wetland assessment conducted by ECORP Consulting, Inc. (ECORP) identified the following wetland habitats on the property; 2.67 acres of vernal pools, 9.90 acres of seasonal marsh, 2.63 acres of seasonal wetland swales, as well as other waters including a 6.51 acre pond and 0.58 acre intermittent drainage (Frye Creek). The remainder of the property includes associated uplands and approximately 21 acres of irrigated pasture.

The likelihood of the presence of listed vernal pool invertebrates, as well as the property's proximity to other regional conservation areas, makes the Cook Property an ideal location to mitigate impacts to biological resources resulting from the Rio del Oro project. While protocol-level branchiopod surveys have not been conducted on the Cook Property to date, it is likely that vernal pools on the property support vernal pool branchiopod crustaceans. The site is situated in an area of Sacramento County that is known to support several branchiopod species, including those that are federally-listed as threatened or endangered. Surveys conducted by ECORP and other investigators in the immediate vicinity of the Cook Property have identified vernal pool fairy shrimp (*Branchinecta lynchi*) (federal listed threatened), mid-valley fairy shrimp (*Branchinecta mesovallensis*), vernal pool tadpole shrimp (*Lepidurus packardi*) (federal listed endangered) and California fairy shrimp (*Linderiella occidentalis*).

PROJECT DESCRIPTION

Responsible Parties

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On-Site Vernal Pool Preserve

Present owner: Elliott Homes, Inc. and GenCorp Real Estate

Expected long-term owner: Sacramento Valley Open Space Conservancy, Wildlife Heritage Foundation, or other conservation-oriented third party

Parties responsible for long-term maintenance: Sacramento Valley Open Space Conservancy, Wildlife Heritage Foundation, or other conservation-oriented third party

On-Site Drainage Corridor

Present owner: Elliott Homes, Inc. and GenCorp Real Estate
Expected long-term owner: City of Rancho Cordova or other public entity
Parties responsible for long-term maintenance: City of Rancho Cordova, Sacramento Valley Open Space Conservancy, Wildlife Heritage Foundation, or other public entity

Off-Site Mitigation (Cook Property)

Present owner: Elliott Homes
Expected long-term owner: Sacramento Valley Conservancy
Parties responsible for long-term maintenance: Sacramento Valley Open Space Conservancy , Wildlife Heritage Foundation, or other public entity.

Off-Site Mitigation (Clay Station Mitigation Bank)

Present owner: Elliott Homes
Expected long-term owner: Elliott Homes
Parties responsible for long-term maintenance: Elliott Conservancy

Location of Project

The 3829± acre project site (Assessor's Parcel No. 072-0370-036,043,045-048,066,067,070,071, 072-0440-003,005-016, and 072-0540-023) is located south of White Rock Road, north of Douglas Road, and east of Sunrise Boulevard in the City of Rancho Cordova, California. The site corresponds to portions of Sections 5, 6, 7, 8, 9, and 10 of Township 8 North, Range 7 East, on the "Carmichael, California" U.S. Geological Survey 7.5-minute quadrangle and portions of Sections 31 and 32 of Township 9 North, Range 7 East, on the "Buffalo Creek, California" U.S. Geological Survey 7.5-minute quadrangle (Figure 1. *Project Site and Vicinity*).

Brief Description of Overall Project

The proposed project consists of grading and filling to establish construction grade and installation of infrastructure for a master-planned community on the 3829± acre parcel (Figure 2. *Land Use Plan*). The proposed land use plan would include high, medium, and low-density residential, retail/commercial, office, park, schools, wetland preserve and open space.

Jurisdictional Areas to be Filled

The project will permanently impact approximately 27.903 acres of waters of the U.S., composed of vernal pool (15.072 acres), seasonal wetland swale (3.587 acres), seasonal wetland (3.064 acres), pond (2.924 acres), and ephemeral drainage (3.256 acres) to be filled during construction grading.

Non-Jurisdictional Aquatic Resources to be Filled

The project will permanently impact 12.946 acres of isolated wetlands, composed of 2.414 acres of vernal pool, 0.653 acre of seasonal wetland swale, 9.158 acres of seasonal wetland, and 0.721 acre of pond. Seasonal wetland habitat to be considered within the drainage corridors is proposed as mitigation for the majority of impacts to isolated waters. Isolated vernal pool habitat mitigation will occur within the on-site preserve.

Types, Functions and Values of the Jurisdictional Areas on the Project Site To Be Directly and Indirectly Impacted

Types

The following table (Table 1 – *Waters/Wetlands Existing, Preserve, and Impact*) provides acreage of the wetlands and other waters of the U.S. that would be impacted by the proposed project. Descriptions of wetland categories follow. Please note that this plan includes mitigation for jurisdictional and non-jurisdictional waters.

Table 1 – Waters/Wetlands Existing, Preserve, and Impact			
Wetland Type	**Existing**	**Preserve**	**Impact**
Wetlands			
Vernal pool	35.485	20.413	15.072
Seasonal wetland swale	6.044	2.457	3.587
Seasonal wetland	6.418	3.354	3.064
Pond	3.540	0.616	2.924
Other Waters of the U.S.			
Ephemeral drainage	5.145	1.889	3.256
Total:	**56.632**	**28.729**	**27.903**

Functions, Values, and Baseline Information

A delineation of the project site was first conducted by Gibson and Skordal in 1999 and revised by ECORP on October 21, 2004 (Figure 3. *Wetland Delineation*). The delineation was verified by the Corps on January 10, 2005. A total of 56.632 acres of waters of the U.S. are located within the project site. In addition, 12.946 acres of non-jurisdictional wetlands were identified on the site. Determinate-level late season field surveys of special status plant species were conducted on June 9 ,12, 13, 14, 15, and July 3, 7, 10 of 2006. Rare plant surveys were also conducted on May 14, 19, 21, and 26 of 2003.

At the request of the Corps, ECORP conducted an assessment of the various wetland resources located within the Rio del Oro Project Area (Project Area) in 2004 (ECORP 2004). Data collected were used to support the on-site alternatives analysis component of the project's Environmental Impact Statement/Environmental Impact Report (EIS/EIR). The assessment compared the relative biological values of wetlands located within the project's on-site preserve with those wetlands to be filled as a result of project implementation. Most wetlands designated for fill are located in the northern and central portions of the Project Area, much of which is a historically manipulated landscape, largely the result of historical mining activities.

The 'relative value' of wetlands within preserve and impact areas was assessed by evaluating various ecological and biological conditions observed within the Project Area. Several characteristics were used to assess relative conservation value, including: 1) level of disturbance; 2) uniqueness of habitat; 3) wetland size, density, and connectivity; 4) hydrology;

5) occurrence of native and/or specialized plant species; and 6) occurrence of special-status species. Studies associated with the South Sacramento County Habitat Conservation Plan (HCP) have recognized many of these parameters as being important in assessing conservation value of vernal pool resources in the County. Data were collected during several survey efforts including a redelineation of wetlands on the property, an amphibian survey, and rare plant surveys conducted by ECORP during 2003, 2004, and 2006. The assessment investigation made the following fisndings.

The preserve area was found to be relatively undisturbed with the exception of minor disturbances resulting from cattle grazing practices. Vernal pool densities were found to vary, as several scattered clusters of vernal pools are present. Vernal pools range in size from small (0.002 acre) to large (1.3 acres), and occur in localized clumps that are often connected by linear seasonal wetland swales and drainages including the upper reaches of Morrison Creek. This continuity among wetlands serves to provide dispersal opportunities for wetland-dependant species including various aquatic invertebrates (including branchiopod crustaceans), amphibians, and a high diversity of plant species. In general, the variability in vernal pool sizes, depths, and degree of continuity increases the likelihood that favorable wetland conditions for plant and animal species will persist regardless of variable annual conditions, and that dispersal to suitable habitat is achievable. Studies associated with the South Sacramento County Habitat Conservation Plan HCP have, similarly, correlated increased vernal pool density and pool size with conservation value.

Generally, the inundation periods of the wetlands in the on-site preserve tend to be longer for the southern grassland vernal pools (preserve) than for seasonal wetlands to the north (impact area). Consequently, unique plant species adapted to the hydrological regime characteristic of vernal pools occur more frequently in the preserve area. These plants include several native, obligate hydrophytes such as coyote thistle (Eryngium vaseyi), slender popcorn flower (Plagiobothrys stipitatus), Carter's buttercup (Ranunculus bonariensis), and creeping spikerush (Eleocharis macrostachya). Rare plant surveys conducted by ECORP in May 2003 identified Greene's legenere (Legenere limosa - USFWS species of concern and CNPS List 1B species) in two wetlands in the planned preserve area. Additionally, several of the wetlands within the preserve have been found to support the federally threatened vernal pool fairy shrimp

(Branchinecta lynchi) and the federally endangered vernal pool tadpole shrimp (Lepidurus packardi).

In contrast, much of the northern two-thirds of the Project Area is highly disturbed, primarily due to gold dredging operations during the 1920s and 1950s. As a result of past dredging operations, long rows of cobble tailings, as high as 60 feet tall, were deposited throughout the site. The soils in these areas have been highly altered and consist primarily of Xerorthents with smaller patches of slickens deposits. The overall density of seasonal wetlands within the rock tailing areas was found to be much less than that of the proposed wetland preserve area, which accommodates a significant fraction of the property's vernal pools and seasonal wetlands. The wetlands in the dredger lands are much more scattered in their distribution. Many of these wetland features tend to be smaller and less interconnected, as evidenced by fewer seasonal wetland swales and drainages. The majority of these features are isolated between dredger tailings.

The dredger seasonal wetlands were found to be typically dominated by facultative, non-native wetland plants, including Mediterranean barley (Hordeum marinum), Italian ryegrass (Lolium multiflorum), and curly dock (Rumex crispus). Several of the seasonal wetlands also contain woody species such as willow (Salix sp) and Fremont cottonwood (Populus fremontii); however, these species appear to be deep-rooted remnants established when the area received more water, due to past Aerojet operations. The dredger wetlands typically support a lower diversity of plant species than the grassland wetlands in the proposed wetland preserve area.

Wet season branchiopod surveys of the dredger tailings in the upper portion of the Project Area were conducted by Gibson and Skordal in 2000 and 2001. Gibson and Skordal documented that the dredger tailings were unsuitable habitat for fairy shrimp, as no shrimp were found within the dredger wetlands. These surveys identified only a few Branchinecta lynchi and Lepidurus packardi in open grassland wetlands located along the outer edge of the survey area, adjacent to, but not within, the dredger tailings areas.

The relative biological and conservation value of wetlands located within the on-site wetland preserve were found to be higher than those for wetlands planned for fill. In general,

preserved wetlands are situated on lands that have experienced considerably less disturbance. The preserve accommodates an assemblage of vernal pools and other wetlands, situated on the Laguna Formation, that support a more diverse vegetation community than that present in mined portions of the property (i.e., the proposed development area). Additionally, wetland densities and connectivity are greater in the proposed preserve area, whereas most of the wetlands being impacted are either scattered in their distribution and/or are typically small, isolated features. The preserve encompasses vernal pools and wetlands of various sizes and depths that support several native plant species including special-status species.

ECORP's 2004 assessment of the relative conservation values of Rio del Oro's wetland resources is consistent with findings of previous studies associated with development of the South Sacramento County Habitat Conservation Plan (HCP), which have correlated increased vernal pool density and pool size with increased conservation value.

Descriptions of the wetland types follow.

Vernal Pools

Vernal pools are poorly drained, isolated depressions that occur within the annual grassland landscape. Vernal pools are fed by direct rainfall or surface run-off. Water ponds for several weeks at a time during the rainy season and may dry completely between storm events.

In the Mediterranean climate of California's Central Valley, fall rains initiate the "wetting" stage, during which seeds germinate and dormant perennials re-sprout. As soils saturate and standing water accumulates, the pool enters the "aquatic" phase. Inundation may be periodic or continuous, and this variability supports a diverse plant and animal community. As water levels recede, primarily through evaporation, the "drying" phase begins during which pool basins begin drying and plant flowering reaches its peak, followed by the setting of seeds. The final phase is the "drought" phase, which is characterized by dry soils and dead or dormant vegetation. Since vernal pools hold ponded water and have emergent vegetation, they are responsible for some nutrient uptake/transformation. However, because of the brief period of inundation of the vernal pools on the site, it is unlikely that the pools provides any significant

contribution to overall regional water quality (i.e., minimal effects on groundwater recharge, flood flows, or sediment stabilization).

There are numerous vernal pools throughout the annual grassland habitat portions of the project site, particularly in the non-mined areas. Vernal pools are types of shallow seasonal wetland depression that are typically dominated by annual native wetland plant species adapted to an annual wet/dry cycle. Vernal pools are flooded in the winter and spring but completely dry by summer. On-site vernal pools vary in maximum water depth from a couple of inches to 18 inches deep, and they range from 0.002 to 1.3 acres in size. Due to the timing of this wetland delineation, many of the species that ordinarily occupy the vernal pools during the wet season were lacking or their remains were not identifiable to species. Plant species observed within vernal pools include Carter's buttercup (*Ranunculus bonariensis*), Vasey's coyote-thistle (*Eryngium vaseyi*), creeping spikerush (*Eleocharis macrostachya*), and slender popcorn-flower (*Plagiobothrys stipitatus*). Typical wildlife associated with vernal pools includes various aquatic invertebrates and amphibians such as the pacific chorus frog.

The vernal pool fairy shrimp (*Branchinecta lynchi*) and vernal pool tadpole shrimp (*Lepidurus packardi*), listed as threatened and endangered (respectively), pursuant to the federal Endangered Species Act, are known to occur within several vernal pools in project area. Two years of wet season surveys have been performed on the site, and vernal pool tadpole and fairy shrimp were located in the open grassland habitat along the outer edges of the project site.

Seasonal Wetland and Seasonal Wetland Swale

Seasonal wetlands are scattered throughout both the mined and non-mined areas of the project site. These seasonal wetlands are ephemerally wet areas that are usually underlain by clay or a heavy clay loam that act to suspend runoff within low-lying areas. They become inundated during the winter and fall but dry completely during the summer months. Unlike vernal pool wetlands, vegetation inhabiting on-site seasonal wetlands are predominately non-native wetland generalist plants such as Italian ryegrass (*Lolium multiflorum*), barley (*Hordeum murinum*), dock (*Rumex* spp.) rabbits-foot grass (*Polypogon monspeliensis*). Less common are native species such as Baltic rush (*Juncus balticus*) and creeping spikerush (*Eleocharis macrostachya*).

Many of the seasonal wetlands that occur within the cobble tailings low areas also contain woody species such as willow and cottonwood. The vegetation in seasonal wetlands can function to remove/transform nutrients, as well as help with sediment stabilization. However, due to the size of these wetlands and the relatively low amount of water conveyed through this habitat, contribution to overall regional water quality is relatively low (i.e., minimal effects on groundwater recharge or flood flows).

Various seasonal wetland swales are located on the project site and consist of shallow, ephemerally wet areas that convey water between larger drainages or other wetland/water features during storm events. They occur as linear wetland features but lack bed-and-bank, and are lined with vegetation. Portions of a swale remain saturated into the growing season, support some hydrophytic vegetation, and exhibit hydric soil characteristics. The vegetation community of on-site swales consists primarily of non-native wetland generalist plants such as Italian ryegrass and Mediterranean barley, dock, as well as native annual species including coyote thistle.

When inundated, these seasonal wetlands potentially provide habitat for aquatic invertebrates and amphibians. For most of the remainder of the year, wildlife usage is similar to that of typical Central Valley non-native annual grassland habitat.

The isolated seasonal wetlands can provide habitat for vernal pool fairy and/or tadpole shrimp (*Branchinecta lynchi* and/or *Lepidurus packardi*, respectively). Some of the seasonal wetland depressions on the site have been considered potential habitat for listed crustaceans.

Pond

Several wetland features identified as ponds are present within the project site and consist primarily of modified or excavated basins or impounded drainages. They currently provide water for cattle grazing. For the most part, the ponds are seasonally inundated yet they hold water significantly longer than other seasonal wetland types. Several may even remain inundated throughout the year. The ponds largely lack emergent vegetation except for scarce individuals that exist around the high water mark.

Ponds can contribute to water quality through nutrient removal/transformation, collections of flood waters during local storm events, and reduction in sediment loads and turbidity. Many wildlife species are likely to use the stock ponds throughout the year and these may include great egret (*Ardea alba*), great blue heron (*A. nerodias*), belted kingfisher (*Ceryle alcyone*), bullfrog (*Rana catesbeiana*), and Pacific chorus frog. These ponds can be particularly important to wildlife seeking water during summer months, when other features have dried down.

Ephemeral Drainage

Ephemeral drainages are linear features that provide a conduit to flow during storm events. In general, they exhibit bed-and-bank characteristics and are largely un-vegetated due to the depth and scouring effects of flowing water. Occasionally however, some hydrophytic vegetation is present along the upper edges, and in areas where sediment accumulation provides suitable substrate for plant establishment. The dominant ephemeral drainage located on-site is Morrison Creek which runs from east to west through the southern section of the site and is identified on the U.S.G.S topographic map as a blue line feature. Ultimately, this feature drains into Mather Lake, located southwest from the Rio del Oro Project Area. Several other smaller sections of ephemeral drainages were mapped in the Project Area. They consist originally of seasonal wetland swale features that have eroded and developed bed-and-bank characteristics.

The channels are important to water quality in that they collect sheet flows and water from local storm events into larger drainages and tributaries. Depending on the flow capacity, the channels may also contribute to overall regional water quality in terms of nutrient transformation and sediment stabilization.

Soils

There are eleven different soils types mapped for the project area. Soil series mapped by the Natural Resource Conservation Service for the site include (145) Fiddyment fine sandy loam, 1-8% slopes; (158) Hicksville loam, occasionally flooded, 0-2% slopes; (159) Hicksville gravelly loam, 0-2% slopes; (181) Natomas loam, 0-2% slopes; (191) Red Bluff loam, 0-2% slopes;

(192) Red Bluff loam, 2-5% slopes; (193) Red Bluff Loam, 0-5% slopes; (196) Red Bluff-Xerorthents, dredge tailing complex, 2-5% slopes; (198) Redding gravelly loam, 0-8% slopes; (223) Slickens; and (245) Xerorthent, dredge tailings, 2-50% slopes (Figure 4. *Natural Resources Conservation Service Soil Types*). The Fiddyment, Hicksville, Natomas, Red Bluff, and Redding soils occur in the grasslands within areas which have not been disturbed by historic mining activities. The Slickens and Xerorthent dredge tailings soils occur with areas that have been substantially disturbed by historic mining activities.

GOALS OF MITIGATION

The overall goal of the proposed mitigation for the Rio del Oro project is to achieve no net loss of wetland functions and values and to preserve and enhance existing species habitat. This goal will be accomplished through a combination of on-site preservation/creation, off-site preservation, and purchase of off-site compensatory mitigation. On-site mitigation planned for the site includes creation of 17.867 acres of vernal pools, 20.785 acres of seasonal wetland and 8.402 acres of low-flow channel (Figure 5. *Wetland Preserve, Impact, and Compensation Plan* and Attachment A – *Wetland Preserve, Impact and Compensation Plan*). Vernal pool creation will occur within the proposed 507-acre Wetland Preserve, where a total of 20.413 acres of existing vernal pools will also be preserved. The preserve has been designed to protect Morrison Creek as well as the highest quality of vernal pools on the project site. The majority of the remainder of the site has been historically mined, and is currently dredger tailings.

Preservation and restoration/creation habitat proposed for the Rio del Oro project is located within the same recovery area for the listed branchiopods and plant species that may occur at the Rio del Oro site. Additional habitat at the Clay Station Mitigation Bank has also been documented to support vernal pool fairy shrimp and vernal pool tadpole shrimp.

Types

The following table (Table 2) presents acreages of wetlands and other Waters of the United States that would be impacted, preserved and created by the proposed project. Mitigation for non-jurisdictional features is also proposed. Descriptions of the mitigation components follow.

Table 2 - Waters/Wetlands, Existing, Avoidance, Impact, and Compensation Acreage

		Impacts		Mitigation			
Wetland Type	**Existing**	**Jurisdictional**	**Isolated**	**On-site Preservation**	**On-Site Creation**	**Off-Site Preservation**	**Off-Site Creation**
Vernal Pool	35.485	15.072	2.414	20.413	17.867	2.67	---
Seasonal wetland swale	6.044	3.587	0.653	2.457	---	---	---
Seasonal wetland	6.418	3.064	9.158	3.354	20.785	12.53	13
Pond	3.54	2.924	0.721	0.616	---	6.51	---
Ephemeral drainages	5.145	3.256	---	1.889	---	0.58	---
Channel	---	---	---	---	8.402	---	---
Total	**56.632**	**27.903**	**12.946**	**28.729**	**47.057**	**22.29**	**13**
		Total Impact:	**40.849**				

[1] A total of 22.29 wetland acres will be preserved at the Cook Property
[2] 13 acres of seasonal wetland habitat will be purchased at the Clay Station Mitigation Bank
[3] There is an additional 2.179 acres of indirect impacts to vernal pools

Characteristics, Functions and Values of Habitat to be Created/Enhanced

On-Site Mitigation

The functions and values of the habitat to be created or enhanced on-site will be designed to mimic those of the impacted habitats on the project site and successfully integrate with existing wetlands in the preserve (see Functions, Values, and Baseline Infrastructure, page 6). On-site mitigation will provide preservation and compensatory mitigation habitat for listed branchiopod and plant species within their core-recovery area.

A 507-acre vernal pool preserve area will be designated in the southern portion of the project site (Figure 6. *Conceptual Vernal Pool Preserve*). This area contains the highest concentration of high-value, undisturbed vernal pools on the project site. A total of 20.413 acres of vernal pools are located within the proposed preserve. Vernal pool creation totaling 17.867 acres (maintaining approximately 250' buffers from existing vernal pool features) will occur within this preserve area also. Other existing wetland features within the preserve include: 2.457 acre of seasonal wetland swale, 3.354 acres of seasonal wetland, 0.616 acre of pond, and 1.889 acres of ephemeral drainage. The portion of Morrison Creek located within this area will be preserved.

The proposed Rio del Oro Vernal Pool Preserve surface morphology has been analyzed using hydrologic modeling tools in ESRI's ArcGIS software. It was used to determine if the naturally-

occurring vernal pool and seasonal wetland (depressional wetlands) habitat is likely to function appropriately in a post-development setting and with the restoration and construction of additional vernal pools within the adjacent uplands. Specifically, the purpose of the investigation was to determine if the development of the surrounding property, the construction of Rancho Cordova Parkway, and the restoration and construction of additional vernal pool habitat would lead to a reduction of watershed area necessary to sustain the naturally-occurring depressional wetlands and proposed vernal pools. To accomplish this, the preserve area was mapped in May 2007, with LIDAR (Light Detection and Ranging) to develop a fine scale topographic model. Using the LIDAR-derived topographic model, the watershed boundaries of each depressional wetland were established. Using these data, ECORP staff determined the ratio of each existing depressional wetland to its corresponding watershed size.

This analysis suggests that the implementation of the Rio del Oro project will not decrease the watershed ratios below the levels necessary to sustain the existing depressional wetlands or the 17.87 acres of vernal pool restoration and construction proposed within the 507-acre Preserve. Further GIS analysis, in addition to a review of historic topography, historic aerial photography, and the results from a soils investigation, will be used to further refine the restoration and construction of this habitat such that each wetland feature is supported by a watershed of adequate size. The results of this analysis will dictate the optimal location of the proposed vernal pools such that they do not replace more upland watershed area than is required to sustain the existing depressional wetlands.

The GIS analysis of the LIDAR based topography was also used to analyze the affects of the proposed Rancho Cordova Parkway on existing depressional wetlands and proposed vernal pools within the Preserve. During the initial project design, the road was aligned such that it avoided direct impacts to the depressional wetlands within the Preserve. Further, the GIS analysis indicates that the proposed road alignment maintains sufficient watershed ratios for the depressional wetlands within the vicinity of the road. Therefore, the road construction should not reduce the watershed area necessary to sustain the existing depressional wetlands. Finally, the design of the vernal pool restoration and construction will incorporate the proposed Jaeger Road alignment. Attachment B provides a summary of the Watershed Analysis.

The wetland preserve is being designed to maximize protection of existing and compensatory vernal pool habitat. Drainage will be designed so that summer nuisance flows are directed to low-flow channels to be constructed along the perimeter of the preserve that will parallel a proposed trail system. The preserve configuration was also designed to maintain existing hydrology to preserve and compensatory vernal pool habitat. Areas adjacent to the preserve generally flow away from the preserve and as such, development of these areas will not compromise the hydrology of the protected resources.

In addition to the 507-acre wetland preserve area, 197 acres of drainage corridors and open space will be established on the project site. The 197 acres will be a re-creation of drainages that were previously on the site prior to dredging activities. The corridors will range from 200 to 300 feet wide and will consist of a meandering low-flow channel, adjacent wetlands, riparian plantings and a bike trail. A total of 25.342-acres of wetlands will be created within the corridors, including 8.402-acres of channel/low-flow habitat and 16.345-acres of seasonal wetlands (Figure 7. *Conceptual Corridor Plan*). These corridors will reestablish defined drainageways for the site which have not been present since the dredging operations completely altered the character and topography of the majority of the site. It is anticipated that riparian habitat to be established within the reestablished corridors will offset mitigation requirements that may be required by the California Department of Fish and Game.
Three detention basins (7, 6, and 26 acres in size) will be constructed as part of the project for flood protection. A total of 3.84-acres of seasonal wetlands will be constructed within the 26-acre detention basin that is located in the southwest corner of the project area and is contiguous with the proposed drainage corridors.

Off-Site Mitigation

The 160-acre± Cook property, located south of Highway 16 in Sacramento County, is proposed as additional mitigation for the Rio del Oro project (Figure 8. *Project Site and Vicinity – Cook Property*). The Cook property is bordered to the north and west by existing conservation properties, to the east by Eagles Nest Road, and to the South by Florin Road. A preliminary wetland assessment conducted by ECORP identified the following wetland habitats on the property; 2.67 acres of vernal pools, 9.90 acres of seasonal marsh, 2.63 acres of seasonal

wetland swales, as well as other waters including a 6.51 acre pond and 0.58 acre intermittent drainage (Frye Creek) (Figure 9. *Preliminary Wetland Assessment – Cooks Property*). The remainder of the property includes associated uplands and approximately 21 acres of irrigated pasture. A homestead is also present in the north-eastern portion of the property.

The Cook property is within the same core-recovery as Rio del Oro and has been identified by the Service staff as a important component in establishing a large-contiguous preserve area in the region.

The likelihood of the presence of listed vernal pool invertebrates, as well as the property's proximity to other regional conservation areas, makes the Cook Property an ideal location to mitigate impacts to biological resources resulting from the Rio del Oro project. While protocol-level branchiopod surveys have not been conducted on the Cook Property to date, it is likely that vernal pools on the property support vernal pool branchiopod crustaceans. The site is situated in an area of Sacramento County that is known to support several branchiopod species, including those that are federally-listed as threatened or endangered. Surveys conducted by ECORP and other investigators in the immediate vicinity of the Cook Property have identified vernal pool fairy shrimp (*Branchinecta lynchi*) (federal listed threatened), mid-valley fairy shrimp (*Branchinecta mesovallensis*), vernal pool tadpole shrimp (*Lepidurus packardi*) (federal listed endangered) and California fairy shrimp (*Linderiella occidentalis*). According to the California Natural Diversity Database vernal pool fairy shrimp and vernal pool tadpole shrimp have been documented 800 feet to the west of the property.

The project will also purchase 13-acres of seasonal wetland habitat at the Clay Station Mitigation Bank located on Clay Station Road in southern Sacramento County, approximately 15 miles south of the Rio del Oro project. The Clay Station Mitigation Bank site is bounded by Clay Station Road to the east, Laguna Creek and associated riparian habitat to the west, farmland to the north, and Brown's Creek to the south and is adjacent to other large preserves, such as Gill Ranch to the east. The Clay Station Mitigation Bank was established in 1994 and all wetland habitat has been monitored for 10 years. In addition to the site supporting fairy shrimp and tadpole shrimp, the Rio del Oro is well within the bank established service area. Wetland

habitat at Clay Station Mitigation Bank exhibits functions and values that are similar to those to be filled at the Rio del Oro site.

Evaluation of Temporal Losses

The created and restored habitat within the preserve area should begin functioning hydrologically during the first rainy season after completion of the excavation and countouring of the compensation wetlands. Substantial vegetative cover within the wetland features is expected to be established within two years after construction. It is also expected to increase annually and reach the established performance standards within three to five years. The project has developed a phased impact/compensation plan that will offset any temporal losses. The 507-acre vernal pool preserve will be established concurrent with Phase One and all of the compensatory vernal pool habitat will be constructed within the first two phases of the project (Figure 10. *Preserve Phasing*).

Although Phase One impacts total only 6.339 acres, 9.718 acres of vernal pool habitat and 4.09 acres of seasonal wetland constructed and approximately 51 acres of existing vernal pool and wetland habitat will be permanently protected and managed (on-site and off-site) concurrent with Phase One impacts. Subsequent project phases and associated mitigation acreages are presented in the table below (Table 3 – *Impact and Mitigation Phasing*) and on Figure 11. Mitigation habitat within the corridors will be constructed concurrent with build-out of those areas. This approach, providing excess mitigation in the early phases of the project, is proposed to eliminate potential temporal losses of wetland functions and values.

Additionally, the thirteen (13) acres of seasonal wetland habitat at the Clay Station Mitigation Bank was created approximately 10 years ago and is fully-functioning.

Table 3 – Impact and Mitigation Phasing

PHASE	AREA	IMPACTS	ON-SITE MITIGATION					OFF-SITE MITIGATION		TOTAL IMPACT	TOTAL MITIGATION
			Preservation		Creation			Preservation	Creation		
			Vernal Pool	Other	Vernal Pool	Low-Flow Channel	Seasonal Wetlands				
PHASE 1	Area 1a Area 2	2.350 3.989	20.413	8.316	9.718	0.250	3.840	22.290	13.000	6.339	78.827
PHASE 2	Area 1b	4.050	0	0	8.149	0	0	0	0	10.389	85.476
PHASE 3	Area 1c	7.920	0	0	0	2.000	0.140	0	0	18.309	88.116
PHASE 4	Area 1d	1.560	0	0	0	4.230	10.490	0	0	19.869	102.836
PHASE 5	Area 3	3.850	0	0	0	0.640	3.990	0	0	23.719	107.466
PHASE 6	Area 4	4.510	0	0	0	0	0	0	0	28.229	107.466
PHASE 7	Area 5	3.710	0	0	0	1.282	2.325	0	0	31.939	111.073
PHASE 8	Area 6	8.910	0	0	0	0	0	0	0	40.849	111.073
Totals:		40.849	20.413	8.316	17.867	8.402	20.785	22.290	13.000		

PROPOSED (ON-SITE) MITIGATION SITES

Mitigation Site

A 507-acre Wetland Preserve will be located in the southern portion of the project protection the majority of high-value, undisturbed vernal pool habitat on the Rio del Oro site. Several large drainage corridors, 200' – 300' feet in width, totaling 25,000 feet (4.7 miles) in length will also be established throughout the project. Theses corridors will be established drainages in areas where gold dredging activities have destroyed the naturals drainages years ago. A 26-acre detention basin in the southwest portion of the site will contain 3.84 acres of seasonal wetland habitat.

Ownership Status

<u>507-acre Vernal Pool Preserve</u>

Present owner of the mitigation site:

Elliott Homes, Inc. and GenCorp Real Estate

Expected long-term owner of the mitigation site:
Sacramento Valley Open Space Conservancy, Wildlife Heritage Foundation, or other conservation-oriented third party

Parties responsible for long-term maintenance of the mitigation site:
Sacramento Valley Open Space Conservancy, Wildlife Heritage Foundation, or other conservation-oriented third party

Point of Contact for Corps Access to the Site:
During construction and 5-year monitoring: Elliott Homes, Inc. and GenCorp Real Estate
Following Corps Sign-off: Sacramento Valley Open Space Conservancy, Wildlife Heritage Foundation, or other conservation-oriented third party

Deed Restrictions, Conservation Easements and Operations and Management:
Deed restrictions/conservation easements will be recorded and will require that the on-site constructed wetland and open space areas are maintained as wetland and wildlife habitat in perpetuity. A detailed Operations and Management (O&M) Plan has bee drafted for the long-term monitoring at the 507-acre preserve by ECORP. Copies of proposed language will be submitted to the Corps for approval prior to recordation and copies of the recorded documents will be provided to the Corps no later than 30 days subsequent to recordation. In addition, recordation will occur prior to the start of project construction.

Drainage Corridors
Present owner of the mitigation site:
Elliott Homes, Inc. and GenCorp Real Estate

Expected long-term owner of the mitigation site:
City of Rancho Cordova or other public entity

Parties responsible for long-term maintenance of the mitigation site:
City of Rancho Cordova or other public agency

Point of Contact for Corps Access to the Site:

During construction and 5-year monitoring: Elliott Homes, Inc. and GenCorp Real Estate

Following Corps Sign-off: City of Rancho Cordova, Sacramento Valley Open space Conservancy, Wildlife Heritage Foundation, or other public agency

Deed Restrictions, Conservation Easements and Operations and Management:

Deed restrictions and conservation easements will be recorded and will require that the on-site constructed wetland and open space areas are maintained as wetland and wildlife habitat in perpetuity. A detailed Operations and Management (O&M) Plan has bee drafted for the long-term monitoring at the drainage corridors by ECORP. Copies of proposed language will be submitted to the Corps for approval prior to recordation and copies of the recorded documents will be provided to the Corps no later than 30 days subsequent to recordation. In addition, recordation will occur prior to the start of project construction.

Existing Functions, Values, Baseline Information of Mitigation Sites

507-acre Vernal Pool Preserve

The existing functions and values of the 507-acre preserve site are similar to those for the un-mined habitats to be impacted, as the mitigation site within the same watershed and compensatory habitat will be designed to mimic those affect by project implementation. The functions and values of the proposed mitigation exceeds those of the marginal wetland features found in the mining tailings (see Functions, Values and Baseline Information, page 6).

Drainage Corridors

Currently, the locations where the drainage corridors will be constructed consist of dredger tailings – large linear cobble piles. There is very little connectivity between the limited amount of wetlands that occur between the tailings. These features were determined to be isolated and non-jurisdictional by the Corps.

Present Use of Mitigation Area

507-acre Vernal Pool Preserve

The proposed mitigation area (within the project site) is currently a fallow undeveloped property and is used for cattle grazing. The proposed mitigation area has existing wetland features including 20.413 acres of vernal pools, 2.457 acres of seasonal wetland swale, 3.354 acres of seasonal wetland, 0.616 acre of pond, and 1.889 acres of ephemeral drainage.

Two areas (Kappa/Gamm complex is the "Metal-Lived Hole" area) within the preserve will undergo further clean-up activies prior to being preserved in perpetuity.

The Kappa/Gamma Complex is located within the eastern side of the preserve and is approximately 30 acres in size. The Kappa/Gamma Complex facilities were used for several activities including the testing of the Thor rocket, the development and testing of hydrogen components, for evaluation of the use of self-igniting propellant, and testing of engines and supply systems. Testing activities generated wastewater that was channeled to concrete-lined burn basins where the wastewater would be burned off and the remaining fluids were pumped to an unlined percolation pond that contained several deep, dry wells to enhance the percolation of wastewater into the soil. The Kappa/Gamma Complex currently contains volatile organic compounds within shallow surrounding soils and in January 2006 a Remedial Action Plan for institutional control (land use restrictions) was approved by the California Department of Toxic Substances Control.

The Metal-Lined Hole area is located within the western portion of the preserve and occupies approximately a 1- to 2-acre location. The area contains two 80-foot circular concrete curbs and a 1.8-foot-diameter by 9-foot-deep vertical steel pipe surrounded by a 6-foot-square concrete pad (36 square feet), which is approximately 1 foot thick. Originally the Metal-Lined Hole was full of an unknown oily fluid that was pumped into three drums by the Mcdonnell Aircraft Corporation for appropriate off-site disposal. The Metal-Lined Hole was later filled with bentonite and capped with a layer of cement. In 1978 Metal-Lined Hole the site was leased to Cetec Antenna Company where the Metal-Lined Hole was used for a vertical antenna array and

the concrete curbs were used for horizontal antenna arrays until the late 1980s when it was decommissioned. The Final Remedial Action Plan for this site indicated that the trace volatile organic compounds concentrations of limited extent near the site did not warrant further remedial actions. In December 2000 the Final Remedial Action Plan was approved by the California Department of Toxic Substances Control.

Groundwater-water monitoring wells are also located within the project preserve.

Drainage Corridors

There are a few areas that cattle are able to use for grazing, but overall there are no current active uses for the dredger tailing areas. These areas were previously used as buffers for testing facilities that are no longer active, with exception of some surface mining of the exposed aggregate.

Jurisdictional Delineation

The jurisdictional delineation for the on-site mitigation sites are included in the delineation for the entire project site.

Present and Proposed Uses of All Adjacent Areas

Adjacent land use in areas surrounding the mitigation site is at present agricultural to the west, north and south, and light industrial to the east. The permit for which this mitigation plan has been developed authorizes mixed-use development to north and west. Residential development is being developed south of the proejct (across Douglas Road) as part of the Sunridge Specific Plan Area. The Rio del Oro project has designed it's preserve area to be consistent with the agency-proposed preserve configuration to the east, allowing for contiguous continuation of the open space in the future.

Zoning

The Mitigation Area is currently zoned as industrial with aggregate resource overlay. The mitigation area will be rezoned as open space.

Implementation Plan

Rationale for Expecting Implementation Success

ECORP has successfully designed and overseen the construction of numerous other compensation wetlands in Sacramento County – including many vernal pool mitigation banks and projects. This experience will be used in the design and construction of the compensation habitat for the Rio del Oro project. In addition, the mitigation will be constructed in proximity to existing, functioning features within an established watershed. An extensive watershed analysis has been conducted for the proposed compensatory vernal pool habitat within the 507-acre preserve (see on-site mitigation, page 14). In addition, Davis[2] Soil Scientists have conducted soil testing of the site and has concluded the soils are appropriate for vernal pool restoration/creation. The Clay Station Mitigation Bank was designed and construction oversight was conducted by ECORP. The site is regularly visited by resource agency staff during bank tours and considered an exammple of a successful creation/restoration project.

Responsible Parties

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AGENT:

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Schedule

Grading is expected to begin immediately after all requirements for commencement of construction have been fulfilled. Although Phase One impacts total only 6.11 acres, a total of 9.718 acres of vernal pool habitat will be constructed and approximately 51 acres of vernal pool and wetland habitat will be permanently protected and managed (on-site and off-site) concurrent with Phase One impacts. Mitigation habitat within the corridors will be constructed concurrent with build-out of those areas. This approach, providing excess mitigation in the early phases of the project, is proposed to eliminate potential temporal losses of wetland functions and values. Figure 10 presents anticipated phasing of the project.

As-Built Conditions

An aerial photo will be taken in the first winter after the wetlands have been constructed. The wetland areas will be digitized and wetland acreage will be calculated. This wetland "as-built" will be included in the annual monitoring reports and will verify that the mitigation acreages specified in the permit have been constructed. If there are significant changes from the original plans, these will be indicated in indelible red ink.

Maintenance During Monitoring Period

Maintenance Activities

In order to ensure that the constructed wetlands and preserved wetlands are adequately protected during construction, the following actions will be taken. First, the boundaries of the entire area to be preserved will be temporarily fenced to ensure that the area is not disturbed during the construction of the rest of the project. After project completion, permanent fencing will be installed along the perimeter of the entire preserve area. Fencing should be sufficient to prevent vehicle access into the area. Permanent signs identifying the open space area will be placed along the perimeter of the fence.

On-going maintenance activities will include trash removal, inspections for erosion control problems, inspections for invasion of exotic species, repair/replacement of fencing and signage, and inspections for vandalism. If necessary, for reasons such as obstruction of outfalls, flood protection, removal of exotic species, or thatch buildup, the removal of vegetation may be needed within the upland perimeter areas. If vegetation removal is required it will be conducted by hand. This action will be appropriately timed, and will be consistent with the Deed Restrictions and Conservation Easements governing the preserve. The condition of the channel will be evaluated during monitoring visits. The Corps will be notified if any action beyond this is required during the monitoring period. If thatch removal or extensive erosion control work is deemed necessary, the Corps will be provided with a plan for review, and Corps approval will be required prior to implementation. The deed restrictions and conservation easement outlining the permitted and prohibited activities, will be submitted to the appropriate agencies for review and approval.

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Schedule

Annual maintenance inspections of the channel will occur concurrently with other monitoring activities for the first five years after construction, or until mitigation success obligations have been met. Compensatory Vernal Pool habitat will be monitored seven years over a ten-year

period. Annually, biologists will evaluate the need for vegetation removal, including the removal of thatch, erosion control measures, trash removal, vandalism, and other maintenance activities. Inspections will be an ongoing activity and trash removal will occur as needed.

Monitoring Plan

Vernal Pools

Final Success Criteria

The overall goal of mitigation is no net loss of wetland functions and values. This goal will be met through the creation of 17.867 acres of vernal pool and the preservation of 20.413 acres of vernal pool. Compensatory vernal pool habitat will be monitored seven years over a ten-year period.

In order to judge whether or not the goal of no net loss of function and values has been met for the on-site compensation vernal pools, a set of final success criteria have been developed. These success criteria are based on the final goal of mitigation as creation of vernal pools with functions and values similar to the preserved vernal pool habitat. By comparing the preserved to the compensation habitat, we can ensure the functions and values of the impacted portion of the project are replaced. For the constructed vernal pool habitat, at the end of the monitoring period, it must meet specific success criteria, after three years of no human intervention, as listed in Table 4.

Table 4 – Success Criteria Compensation Vernal Pool

Hydrology:	1)	The maximum depth of the created vernal pools will not be greater than 18 inches.
Vegetation:	1)	The aerial coverage of vegetation for 90% of the created vernal pools must be equal to or greater than 85%, and the aerial coverage of vegetation for the remaining 10% of the created vernal pools must be 50-80%.
	2)	Species richness will equal or exceed 10 species.
	3)	The percentage of the total relative cover (as calculated by the sum of all the cover class mid-points) attributable to "vernal pool indicators" or "vernal pool associates"[1] must be as follows: 25% of the pools shall attain ≥90% total relative cover, 50% shall attain 75-90%, and 25% shall attain a value of ≥50%.
	4)	All dominant species (those with a Braun-Blanquet cover scale of 3 or greater) will be "vernal pool indicators" or "vernal pool associates."[1]

[1] As defined in the California Department of Fish and Game's list: *Catalog of Plant Species Known to be Associated with Vernal Pools* (CDFG 1997) or other vernal pool literature.

Monitoring will be conducted for ten years. The monitoring period will begin with the first rainy season following the construction activities. See Constructed Vernal Pool Monitoring Schedule - Years 1-10 Table 5 below for an outline of the monitoring schedule by monitoring year. Monitoring will be extended beyond the ten-year period only for those wetlands that are not meeting success criteria.

Target Jurisdictional Acreage to be Created/Enhanced

An aerial photo will be taken in the first winter after the wetlands have been constructed. The ponded wetland areas will be digitized and a wetland acreage will be calculated. This wetland "as-built" will be included in the annual monitoring reports and will verify that the mitigation acreages specified in the permit have been constructed.

Monitoring Methods

In order to determine if the constructed wetlands are functioning properly, the following hydrology, vegetation, and wildlife monitoring program will be adopted.

Table 5 - Constructed Vernal Pool Monitoring Schedule - Years 1-10

Constructed and Reference Vernal Pools	Hydrology	Invertebrates	Vegetation	Photo Documentation	General Preserve Monitoring
First Year	Yes - All of the Constructed Pools and all of the Reference Pools	Yes - 20*% of the Constructed Pools and all of the Reference Pools	Yes - All Constructed Pools informally monitored by an experienced biologist/botanist.	Yes	Yes - Meet with grazing contractor
Second Year	Yes - All of the Constructed Pools and all of the Reference Pools	Yes - 20*% of the Constructed Pools and all of the Reference Pools	Yes - All Constructed Pools informally monitored by an experienced biologist/botanist.	Yes	Yes - Meet with grazing contractor
Third Year	None	Yes - 20*% of the Constructed Pools and all of the Reference Pools	Yes - All Constructed Pools informally monitored by an experienced biologist/botanist. Pools that appear to be functioning poorly will be considered for remediation. Remediation, if implemented, will occur during Summer of the third year.	Yes	Yes - Meet with grazing contractor
Fourth Year	None	Yes - 20*% of the Constructed Pools and all of the Reference Pools	Yes - 50% of the Constructed Pools and Reference Pools will be floristically monitored.	Yes	Yes - Meet with grazing contractor
Fifth Year	None	Yes - 20*% of the Constructed Pools and all of the Reference Pools	Yes - 50% of the Constructed Pools and Reference Pools will be floristically monitored.	Yes	Yes - Meet with grazing contractor
Sixth Year	None**	Yes - 20*% of the Constructed Pools and all of the Reference Pools	None**	Yes	Yes - Meet with grazing contractor
Seventh Year	None**	Yes - 20*% of the Constructed Pools and all of the Reference Pools	None**	Yes	Yes - Meet with grazing contractor
Eighth Year	Yes - All of the Constructed Pools and all of the Reference Pools**	Yes - 20*% of the Constructed Pools and all of the Reference Pools	Yes - All Constructed Pools that do not meet the hydrology and vegetation success criteria in the fifth year will be monitored. All Reference Pools will be monitored.	Yes	Yes - Meet with grazing contractor
Ninth Year	None	Yes - 20*% of the Constructed Pools and all of the Reference Pools	Yes - All Constructed Pools that do not meet the hydrology and vegetation success criteria in the eighth year will be monitored. All Reference Pools will be monitored.	Yes	Yes - Meet with grazing contractor
Tenth Year	Yes - All of the Constructed Pools and all of the Reference Pools	Yes - 20*% of the Constructed Pools and all of the Reference Pools	Yes - All Constructed Pools and Reference Pools will be monitored.	Yes	Yes - Meet with grazing contractor

* The 20% of Constructed Pools that monitor listed vernal pool invertebrates will be the same in each individual year, however in the first through fifth years a different 20% will be chosen, such that in the fifth year all pools will have been monitored once.

** Any remediated pools will be monitored in these years.

***Monitoring will be conducted for ten years. The monitoring period will begin with the first rainy season following the construction activities. Monitoring will be extended beyond the ten-year period only for those wetlands that are not meeting success criteria.

Hydrology

The purpose of hydrologic monitoring is to determine if the constructed vernal pools are inundated for periods sufficient to support appropriate wetland biota. Staff gauges will be placed in 10% of the created vernal pools. Staff gauges will reflect a variety of created habitat depths. The exact placement of the gauges cannot be anticipated prior to creation, but the first monitoring report will include a map indicating actual locations. For comparison, staff gauges will also be placed in 5% of the on-site preserved vernal pools. Staff gauges will be read a minimum of three times between December 15th and June 15th of each monitoring season, with at least one reading occurring during the estimated period of maximum inundation (usually during January or February). In addition, a minimum of 50% of the created vernal pools will be randomly selected and biologists will record the maximum depth. During the final monitoring year, maximum depth will be recorded for 100% of the created vernal pools.

Aerial photographs will also be used for hydrologic monitoring. Two aerial photographs will be taken during each monitoring year. Photographs will be taken once during the peak period of inundation, typically during January or February and once when the vernal pool plants are flowering, typically April or May. Such aerial photographs give an excellent overview of the mitigation area and its micro-watershed. Aerial photographs can help identify areas that warrant additional attention during subsequent field visits. In particular, aerial photographs will be used to help identify: 1) areas that do not pond water, 2) areas that are ponding late in the season, and 3) off-site activities that may be affecting hydrologic function within the mitigation area. These aerial photos can also be used to estimate actual pool area for the constructed wetlands.

Floristics

Floristic surveys of created and preserved on-site vernal pools will be conducted each spring during peak flowering period.. Timing of floristic surveys will be adjusted according to site specific conditions. Data collected from each monitored wetland will include an estimate of percent aerial vegetative cover, a cumulative species list, and an estimate of the relative cover of each species using the modified Braun-Blanquet cover estimate scale (0=<1%, 1=1-5%,

2=6-25%, 3=26-50%, 4=51-75%, and 5=76-100%). A cumulative plant species list will then be generated for each wetland.

Data from each monitored wetland will be entered into a database. From this database, the following will be calculated for each monitored wetland: number of species, number of wetland species, number of native species, number of dominant species (species with a Braun-Blanquet cover class of 3 or greater), the Prevalence Index, the number of "vernal pool indicators" and "vernal pool associates" with a Braun-Blanquet cover class of 2 or greater, the sum of all of the cover class mid-points, the sum of all of the native vernal pool species cover class mid-points, and the percentage of the overall relative native vernal pool species cover (as calculated by the sum of the cover class mid-points) attributable to native species.

Prior to the first season of monitoring, 25% of the created wetlands will be randomly selected. Each of these wetlands will be floristically monitored during each of the five monitoring years. During the second and fourth monitoring season, another 25% will be randomly selected for floristic monitoring. In addition, monitoring biologists will visit each created wetland every monitoring season and will monitor any additional wetlands that, by a subjective assessment, do not appear to be functioning properly (e.g., very low vegetative cover, dominance by non-native generalist species, etc.). For comparison, a random selection of existing vernal pools at the mitigation site will be monitored each year. During the final year of monitoring, 100% of the created vernal pools will be monitored.

Finally, in the first few monitoring years, the revegetation of the disturbed upland areas will be assessed, with particular attention given to assessing the spread of exotic non-native species such as yellow star-thistle (Centaurea solstitialis).

The Prevalence Index (PI) is a standard method used to determine whether a floristic data set can be categorized as being that of a wetland or an upland community. Plant species categories used to calculate the PI will be based upon those described by Reed (1997) and weighted according to Table 6.

Table 6 – Plant Species Category Weighting	
Wetland Status	**Weighting**
Obligate Wetland (OBL)	1
Facultative Wetland (FACW)	2
Facultative (FAC)	3
Facultative Upland (FACU)	4
Obligate Upland (UPL)	5

The Prevalence Index for each wetland is calculated using the following formula:

$$PI = \frac{1*f(OBL) + 2*f(FACW) + 3*f(FAC) + 4*f(FACU) + 5*f(UPL)}{f(OBL) + f(FACW) + f(FAC) + f(FACU) + f(UPL)}$$

Where: f(OBL) = a measure of abundance for OBL species,
f(FACW)= a measure of abundance for FACW species, etc.

The Prevalence Index is a standard method of determining whether a wetland data set is categorized as a wetland or upland plant community. To be considered a wetland, the area must have a PI value less than 3.0 (Federal Interagency Committee for Wetland Delineation, 1989). However, PI values within disturbed areas can range higher, depending on plant species.

Several supplemental summary statistics and indices will be calculated for the vernal pools, which are described below.

Relative Wetland Cover

Relative cover of wetland species is defined as the percentage of the total vegetative cover that is made up of wetland plant species within an individual wetland. Wetland species include

those categorized as obligate (OBL), facultative wetland (FACW), or facultative (FAC) (Reed 1988).[1]

Species Richness

Species richness is defined as the total number of plant species recorded within an individual wetland.

Wetland Species Richness

Wetland species richness is defined as the total number of wetland plant species recorded within an individual wetland. Wetland plants include those that are categorized as obligate (OBL), facultative wetland (FACW), or facultative (FAC) (Reed 1988).

Native Species Richness

Native species richness is defined as the number of native plant species found in an individual wetland.

Vascular Plant Species Frequency of Occurrence

Frequency of occurrence is defined as the number of pools in which a species is observed within a given preserve, divided by the number of pools sampled. For example, if 100 pools were surveyed and Species A was recorded in 37 of them, the frequency of occurrence of Species A would be 0.37.

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[1] Categories found in the *National List of Plant Species That Occur in Wetlands: California (Region 0)* (Reed 1988):
Obligate Wetland (OBL) = occur almost always in wetlands (>99% probability).
Facultative Wetland (FACW) = usually occur in wetlands (67%-99% probability).
Facultative (FAC) = equally likely to occur in wetlands and non-wetlands (34%-66% probability).
Facultative Upland (FACU) = usually occur in non-wetlands (67%-99% probability).
Obligate Upland (UPL) = occur almost always in non-wetlands (>99% probability).

Wildlife

Wildlife surveys will occur in conjunction with hydrologic and floristic monitoring visits. A biologist will walk a meandering transect through the compensation wetland area and generate a cumulative list of the type and number of all species observed utilizing the compensation wetland area. Wildlife signs, such as scat, pellets, or bones, will also be noted. In addition, any wildlife observed during hydrologic or vegetation monitoring surveys will be noted and included in an annual cumulative list of wildlife found within the Wetland Preserve.

Seasonal Wetlands

Final Success Criteria

The overall goal of mitigation is no net loss of wetland functions and values. This goal will be met through the creation of 3.84 acres of seasonal wetland are proposed within the large detention basin located in the southwest corner of the site. The wetlands will be monitored over a period of 5 years or until success criteria have been met. At the end of the monitoring period, the constructed seasonal wetland must exhibit the range of functions and values described below Table 7. Once established criteria have been met and approved by the Corps, no further monitoring of the mitigation wetland will be required.

Table 7 – Success Criteria Compensation Seasonal Wetland

Performance Standard:	1) Wetland will be inundated or saturated for sufficient periods to support a predominance of wetland plant species (those listed as FAC, FACW, or OBL in *The National List of Plant Species that Occur in Wetlands: California (Region 0)* (Reed 1997).
Success Criteria:	1) 95% of the wetland acreage must be inundated or saturated for period of sufficient duration to support wetland vascular plants as the most prevalent and dominant component; 2) Prevalence Index will be less than 3.0; 3) The following annual minimum vegetative cover values will be met: Year 1: Minimum 10% relative cover Year 2: Minimum 30% relative cover Year 3: Minimum 50% relative cover Year 4: Minimum 60% relative cover Year 5: Greater than or equal to 70% relative cover

Target Jurisdictional Acreage to be Created/Enhanced

An aerial photo will be taken in the first winter after the wetlands have been constructed. The ponded wetland areas will be digitized and a wetland acreage will be calculated. This wetland "as-built" will be included in the annual monitoring reports and will verify that the mitigation acreages specified in the permit have been constructed.

Monitoring Methods

In order to determine if the constructed wetland are functioning properly, the following hydrology, vegetation, and wildlife monitoring program will be adopted.

Hydrology

The purpose of hydrologic monitoring is to determine if the constructed seasonal wetlands are inundated for periods sufficient to support appropriate wetland biota.

Aerial photographs will also be used for hydrologic monitoring. Two aerial photographs will be taken during each monitoring year. Photographs will be taken once during the peak period of inundation, typically during January or February and once when the vernal pool plants are flowering, typically April or May. Such aerial photographs give an excellent overview of the mitigation area and its micro-watershed. Aerial photographs can help identify areas that warrant additional attention during subsequent field visits. In particular, aerial photographs will be used to help identify: 1) areas that do not pond water, 2) areas that are ponding late in the season, and 3) off-site activities that may be affecting hydrologic function within the mitigation area. These aerial photos can also be used to estimate actual pool area for the constructed wetlands.

Floristics

To collect vegetation data from the constructed seasonal wetland, a point-intercept sampling procedure will be used (Federal Interagency Committee for Wetland Delineation 1989). During

the first monitoring season, baseline transects will be established that run the length of the constructed feature. To create a potential starting point along this baseline, the start of each one-foot interval will be considered our baseline grid. After determining the length (in feet) of the baseline transect, a random number table will be used to select three starting points for data collection. Beginning at each randomly selected starting point, a pen or pencil will be spun in the air and, when it falls, the direction it is pointing will be the direction of that data collection transect. For each of these data collection transects, all of the plants present at points located at two-foot intervals along that transect will be recorded. If there is more than one plant vertically, both should be recorded. If there are no plants present, the point will be noted as bare ground but excluded from subsequent calculations.

Once the data has been collected, each species will be assigned the appropriate indicator status (i.e., OBL, FACW, FAC, FACU, and UPL). Then, for each transect, the frequency of occurrence of plants in each of the indicator status categories will be calculated. These data will be plugged in the standard Prevalence Index calculation:

$$PI = \frac{(1.0*F1) + (2.0*F2) + (3.0*F3) + (4.0*F4) + (5.0*F5)}{\sum (F1 + F2 + F3 + F4 + F5)}$$

Where: F1 = Frequency of occurrence for OBL species
F2 = Frequency of occurrence for FACW species
F3 = Frequency of occurrence for FAC species
F4 = Frequency of occurrence for FACU
F5 = Frequency of occurrence for UPL and other species not meeting above categories

Using the resulting three PI values, the standard error will be calculated. If the standard error is greater than 0.20, then additional randomly selected transects (up to a maximum of three) will be sampled. Once the standard error is 0.20 or less or a total of six transects have been sampled, a mean PI will be calculated for the constructed wetland.

In addition to the PI data collection, an estimate of total vegetative cover will be made by visual assessment. This value is based upon aerial coverage of the total vegetative aggregate and excludes the cover of non-vegetative components such as bare ground, rocks, and algal matting.

Wildlife

Wildlife surveys will occur in conjunction with hydrologic and floristic monitoring visits. A biologist will walk a meandering transect through the compensation wetland area and generate a cumulative list of the type and number of all species observed utilizing the compensation wetland area. Wildlife signs, such as scat, pellets, or bones, will also be noted. In addition, any wildlife observed during hydrologic or vegetation monitoring surveys will be noted and included in an annual cumulative list of wildlife found within the Wetland Preserve.

Low-Flow Channel and Adjacent Seasonal Wetlands

A set of final success criteria have been developed for the constructed channel and associated seasonal wetland basins.

At the end of the monitoring period, the constructed channel must exhibit the range of functions and values described below. In addition, the channel habitat must meet specific success criteria, after three years of no human intervention, as listed in Table 8.

Table 8 – Success Criteria: Compensation Channel

Hydrology:	1)	Flows will be appropriate to support the establishment and dominance of hydrophytic vegetation.
Vegetation:	1)	Each wetland bench area will be dominated by hydrophytic vegetation.
	2)	Each wetland bench area will have a Prevalence Index of less than 3.0; and 90% of the realigned channel will be covered with hydrophytic vegetation or
	3)	open water.

Target Jurisdictional Acreage to be Created/Enhanced

An aerial photo will be taken in the first winter after the channel has been constructed. The ponded wetland areas will be digitized and a wetland acreage will be calculated. This wetland "as-built" will be included in the annual monitoring reports and will verify that the mitigation acreages specified in the permit have been constructed.

Monitoring Methods

In order to determine if the constructed wetlands are functioning properly, the following hydrology, vegetation, and wildlife monitoring program will be adopted.

Hydrology

Hydrology will be assessed twice annually, once during the peak period of inundation, typically during January or February and then again later in the season. Aerial photographs of the constructed wetland may be used to estimate the extent of inundation. Using the aerial photo, the channel will be ranked according to its approximate percent of inundation: 4 = channel is 100% inundated, 3 = channel $\geq$ 80% inundated, 2 = channel <80% and $\geq$ 50% inundated, 1 = channel <50% inundated, and 0 = channel not inundated. These aerial photos can also be used to estimate actual area for the constructed channel habitat. Hydrology may also be assessed by direct observation during appropriately timed site visits.

Vegetation

In order to accurately evaluate the performance of the compensation channel as well as the wetland benches, two methods of monitoring will be used, the point-intercept method (for the channel) and the species list/percent cover method (for the seasonal wetland benches). Floristic surveys of created and preserved on-site vernal pools will be conducted each spring during peak flowering period. Timing of floristic surveys will be adjusted according to site specific conditions.

Three transects will be randomly selected within the constructed wetland channel. Plant species data will be collected by the point-intercept sampling method at one-foot intervals along each transect. All plant species (or bare ground where no plants are present) at the one-foot interval will be recorded. The prevalence index and the percent vegetative cover will be calculated.

Floristic data will also be collected for the created seasonal wetland benches within the channel. A species list and an estimate of the cover of each species present will be collected. The cover estimate will be based upon the Braun-Blanquet scale. In addition, an estimate of total vegetative cover will be made by visual assessment. This value will be based upon aerial coverage of the total vegetative aggregate, excluding non-vegetative cover such as bare ground, rocks and algal matting. Data from each monitored bench will be entered into a database. From this database, the following will be calculated for each monitored wetland: relative wetland cover, species richness, native species richness, Prevalence Index (PI), and vascular plant species frequency of occurrence.

Completion of Mitigation

Notification of Completion

When the initial monitoring period is complete, and if the applicant believes that the final success criteria have been met, the applicant shall notify the Corps when submitting the final annual report that documents this completion. If appropriate, a current delineation of the created wetland area will be submitted with the report, along with copies of field data sheets.

Corps Confirmation

Following receipt of the report, the Corps may require a site visit to confirm the completion of the mitigation effort.

Contingency Measures

Initiating Procedures

If any annual performance criterion is not met for all or any portion of the mitigation project in any year, or if the final success criteria are not met, the applicant shall prepare an analysis of the cause or causes of failure, and if deemed necessary by the Corps, propose remedial action for approval. If the mitigation site has not met the performance criterion, the responsible party's maintenance and monitoring obligations continue until the Corps gives final project confirmation. Any required remediation measures will presume that all the functions and values of the implemented wetlands have been adequately mitigation, including providing habitat for listed special-status species that potentially occur at the Rio del Oro site.

Alternative Locations for Contingency Mitigation

A feasibility study will be done prior to the construction of the compensation tributary on-site. If results of this study indicate that the proposed wetland construction site will not support the desired habitat, then another Corps approved site and/or a Corps approved mitigation bank or off-site mitigation facility will be used for the remaining mitigation requirements.

Funding Mechanism

To be determined.

PROPOSED OFF-SITE MITIGATION

Cook Property

The proposed off-site 160-acre± Cook Property is bordered to the north and west by conservation properties, to the east by Eagles Nest Road, and to the South by Florin Road, in Sacramento County (Figure 12. *Cook Property Location*). A wetland assessment conducted by

ECORP revealed that the following wetland types are present at the property; 2.67 acres of vernal pools, 9.90 acres of seasonal marsh, 2.63 acres of seasonal wetland swales, as well as other waters including a 6.51 acre pond and 0.58 acre intermittent drainage (Frye creek) (see Figure 9).

The likelihood of the presence of listed vernal pool invertebrates, as well as the property's proximity to other regional conservation areas, makes the Cook Property an ideal location to mitigate impacts to biological resources resulting from the Rio del Oro project. While protocol-level branchiopod surveys have not been conducted on the Cook Property to date, it is likely that vernal pools on the property support vernal pool branchiopod crustaceans. The site is situated in an area of Sacramento County that is known to support several branchiopod species, including those that are federally-listed as threatened or endangered. Surveys conducted by ECORP and other investigators in the immediate vicinity of the Cook Property have identified vernal pool fairy shrimp (*Branchinecta lynchi*) (federal listed threatened), mid-valley fairy shrimp (*Branchinecta mesovallensis*), vernal pool tadpole shrimp (*Lepidurus packardi*) (federal listed endangered) and California fairy shrimp (*Linderiella occidentalis*).
According to the California Natural Diversity Database vernal pool fairy shrimp and vernal pool tadpole shrimp have been documented 800 feet to the west of the property (Figure 13).

Ownership Status

Present owner of the Off-Site mitigation site:
Elliott Homes, Inc.

Expected long-term owner of the Off-Site mitigation site:
Sacramento Valley Open Space Conservancy, Wildlife Heritage Foundation, or other conservation-oriented third party

Parties responsible for long-term maintenance of the Off-Site mitigation site:
Sacramento Valley Open Space Conservancy, Wildlife Heritage Foundation, or other conservation-oriented third party

Point of Contact for Corps Access to the Site:

Elliott Homes, Inc.

Following Corps Sign-off: Sacramento Valley Open Space Conservancy, Wildlife Heritage Foundation or other conservation-oriented third party

Deed Restrictions, Conservation Easements, and Operations and Management:

Deed restrictions and/or conservation easements will be recorded and will require that the site be maintained as wetland and wildlife habitat in perpetuity. A detailed O&M Plan will be developed for the Cook Property and funded by an endowment. Copies of proposed language will be submitted to the Service for approval prior to recordation and copies of the recorded documents will be provided to the Service no later than 30 days subsequent to recordation. In addition, recordation will occur prior to or concurrent with the start of project construction.

Existing Functions, Values, Baseline Information – Cook Property

The 160-acre± Cook property, located south of Highway 16 in Sacramento County, is proposed as additional mitigation for the Rio del Oro project (Figure 8. *Project Site and Vicinity – Cook Property*). The Cook property is bordered to the north and west by existing conservation properties, to the east by Eagles Nest Road, and to the South by Florin Road. A preliminary wetland assessment conducted by ECORP identified the following wetland habitats on the property; 2.67 acres of vernal pools, 9.90 acres of seasonal marsh, 2.63 acres of seasonal wetland swales, as well as other waters including a 6.51 acre pond and 0.58 acre intermittent drainage (Frye Creek) (Figure 9. *Preliminary Wetland Assessment – Cooks Property*). The remainder of the property includes associated uplands and approximately 21 acres of irrigated pasture. A homestead is also present in the north-eastern portion of the property.

The Cook property is within the same core-recovery as Rio del Oro and has been identified by the Service staff as a important component in establishing a large-contiguous preserve area in the region.

The likelihood of the presence of listed vernal pool invertebrates, as well as the property's proximity to other regional conservation areas, makes the Cook Property an ideal location to

mitigate impacts to biological resources resulting from the Rio del Oro project. While protocol-level branchiopod surveys have not been conducted on the Cook Property to date, it is likely that vernal pools on the property support vernal pool branchiopod crustaceans. The site is situated in an area of Sacramento County that is known to support several branchiopod species, including those that are federally-listed as threatened or endangered. Surveys conducted by ECORP and other investigators in the immediate vicinity of the Cook Property have identified vernal pool fairy shrimp (*Branchinecta lynchi*) (federal listed threatened), mid-valley fairy shrimp (*Branchinecta mesovallensis*), vernal pool tadpole shrimp (*Lepidurus packardi*) (federal listed endangered) and California fairy shrimp (*Linderiella occidentalis*).

Present Use of Mitigation Area

A preliminary wetland assessment conducted by ECORP revealed that the following wetland types are present at the property; 2.67 acres of vernal pools, 9.90 acres of seasonal marsh, 2.63 acres of seasonal wetland swales, as well as other waters including a 6.51 acre pond and 0.58 acre intermittent drainage (Frye creek). The property also includes associated uplands and 21.27 acres of irrigated pasture. Homesteads are also present in the north-eastern portion of the property. In addition to wetland preservation, the property has the option of gaining additional income from grazing, as well as the continued use of crop production within the two irrigated pastures.

Clay Station Mitigation Bank

Ownership Status

Present owner of the Off-Site mitigation site:
Elliott Homes, Inc.

Expected long-term owner of the Off-Site mitigation site:
Elliott Homes, Inc.

Parties responsible for long-term maintenance of the Off-Site mitigation site:

The Elliott Conservancy

Point of Contact for Corps Access to the Site:

ECORP Consulting, Inc.
Contact: Bjorn Gregersen
2525 Warren Drive
Rocklin, California 95677
Phone: (916) 782-9100
Fax: (916) 782-9134

Following Corps Sign-off:

ECORP Consulting, Inc.
Contact: Bjorn Gregersen
2525 Warren Drive
Rocklin, California 95677
Phone: (916) 782-9100
Fax: (916) 782-9134

Deed Restrictions and Conservation Easements:

Deed restrictions and conservation easements have been recorded for the Clay Station Mitigation Bank.

Existing Functions, Values, Baseline Information – Clay Station Mitigation Bank

The Clay Station Mitigation Bank site is bounded by Clay Station Road to the east, Laguna Creek and associated riparian habitat to the west, farmland to the north, and Brown's Creek to the south and is adjacent to other large preserves, such as Gill Ranch to the east. The Clay Station Mitigation Bank was established in 1994 and all wetland habitat has been monitored for 10 years. In addition to the site supporting fairy shrimp and tadpole shrimp, the Rio del Oro is well within the bank established service area. Wetland habitat at Clay Station Mitigation Bank exhibits functions and values that are similar to those to be filled at the Rio del Oro site. The Mitigation Banking Review Team has authorized CSMB to sell credits to offset impacts in a service area that includes Rio del Oro.

Present Use of Mitigation Area

The site is managed as wetland and endangered species habitat in perpetuity, which includes limited grazing to prevent thatch build-up.

Present and Proposed Uses of All Adjacent Areas

The CSMB is surrounded by agricultural uses and is also adjacent to other established conservation parcels, including the 10,000-acres Gill Ranch property.

Zoning

The CSMB area is zoned as open space.

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LIST OF FIGURES

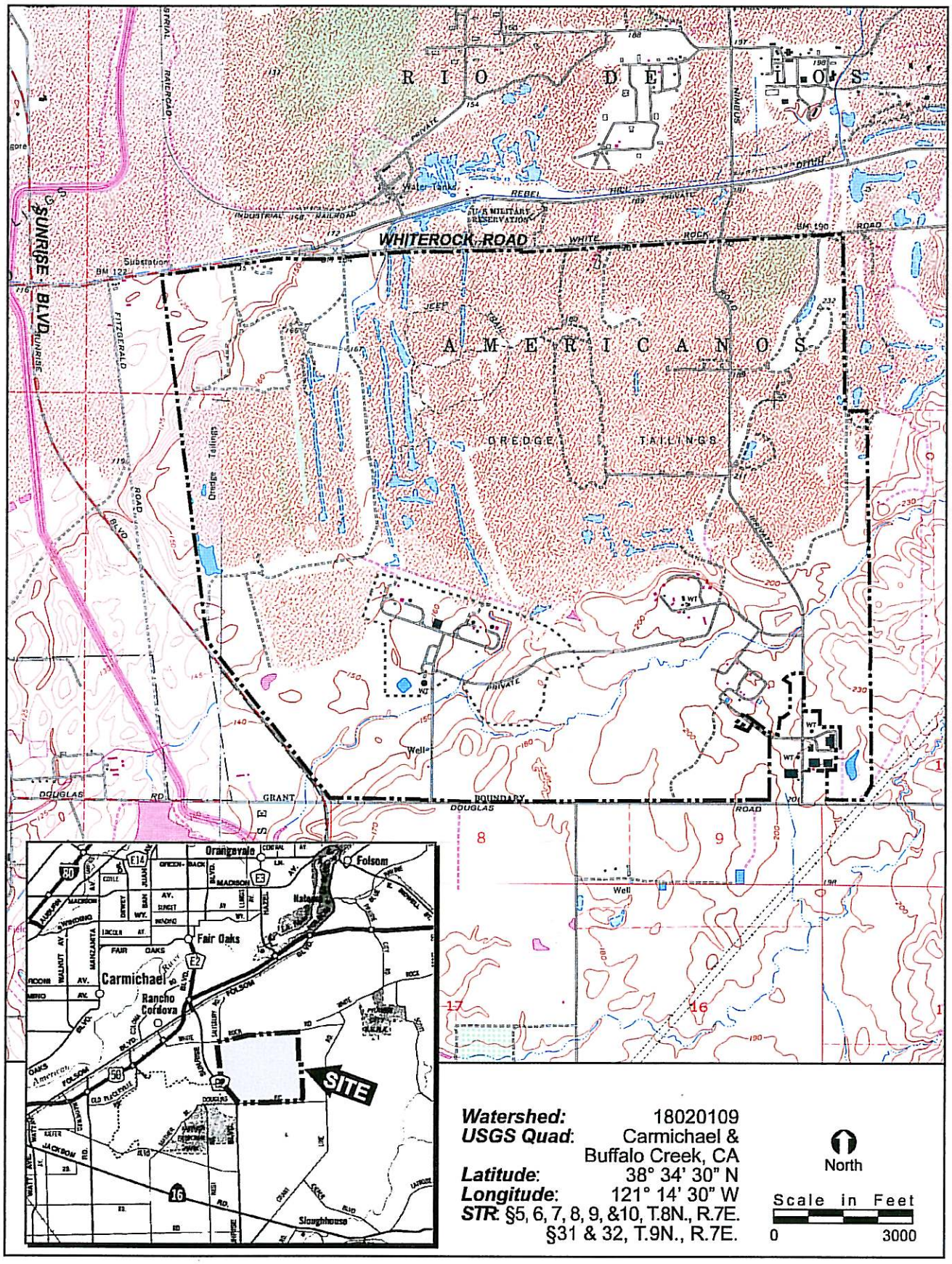

FIGURE 1. Project Site and Vicinity

2002-009 Rio del Oro

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

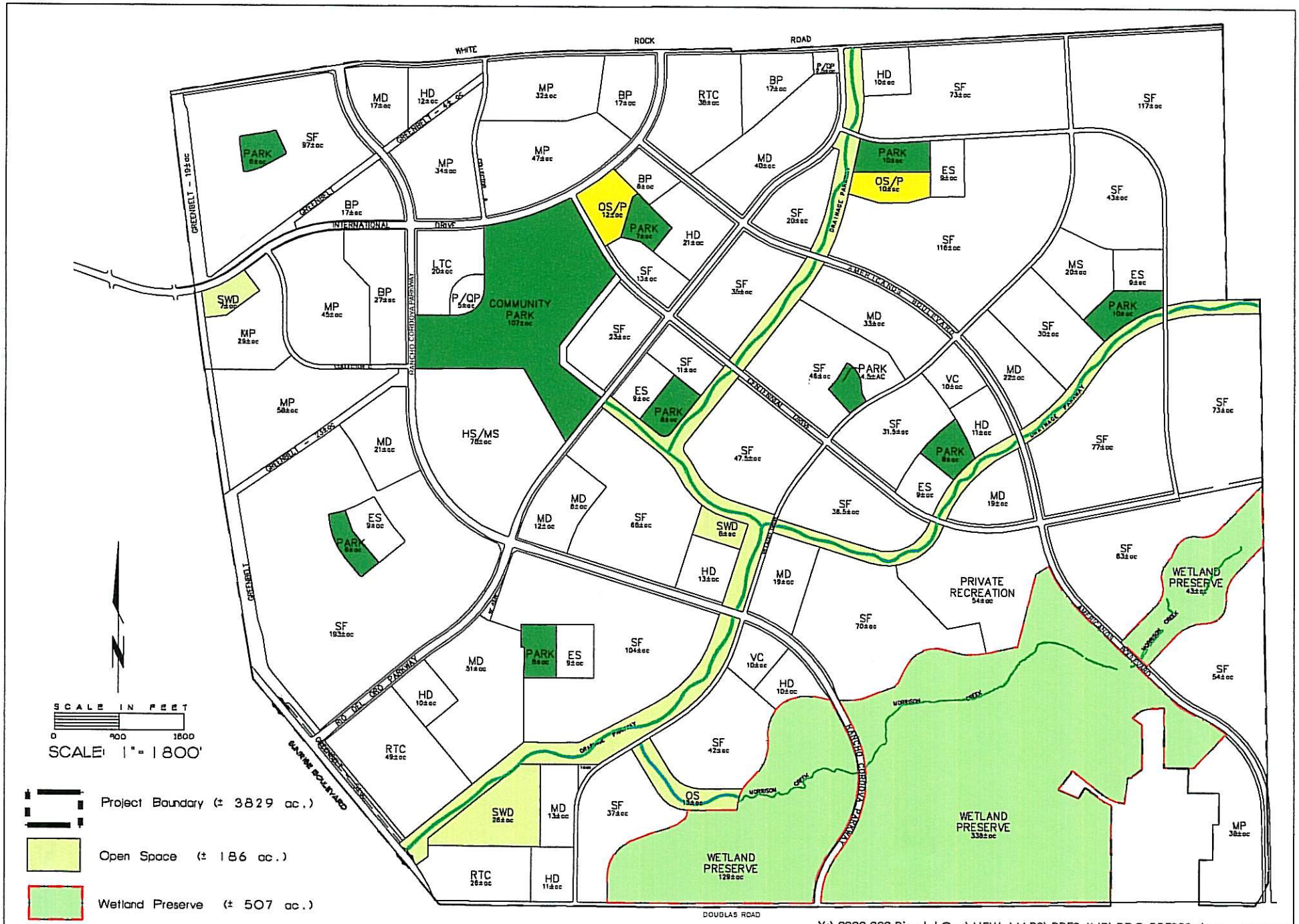

FIGURE 2. Land Use Plan

2002-009 RIO DEL ORO

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CLASSIFICATION	JURISDICTIONAL ACREAGE	ISOLATED ACREAGE	EXISTING ACREAGE
Wetlands:			
Vernal Pool	35.485	2.414	37.899
Seasonal Wetland Swale	6.044	0.653	6.697
Seasonal Wetland	6.418	9.158	15.576
Other Waters:			
Ephemeral drainage	5.145	---	5.145
Pond	3.540	0.721	4.261
TOTAL:	56.632	12.948	69.578

Isolated wetlands

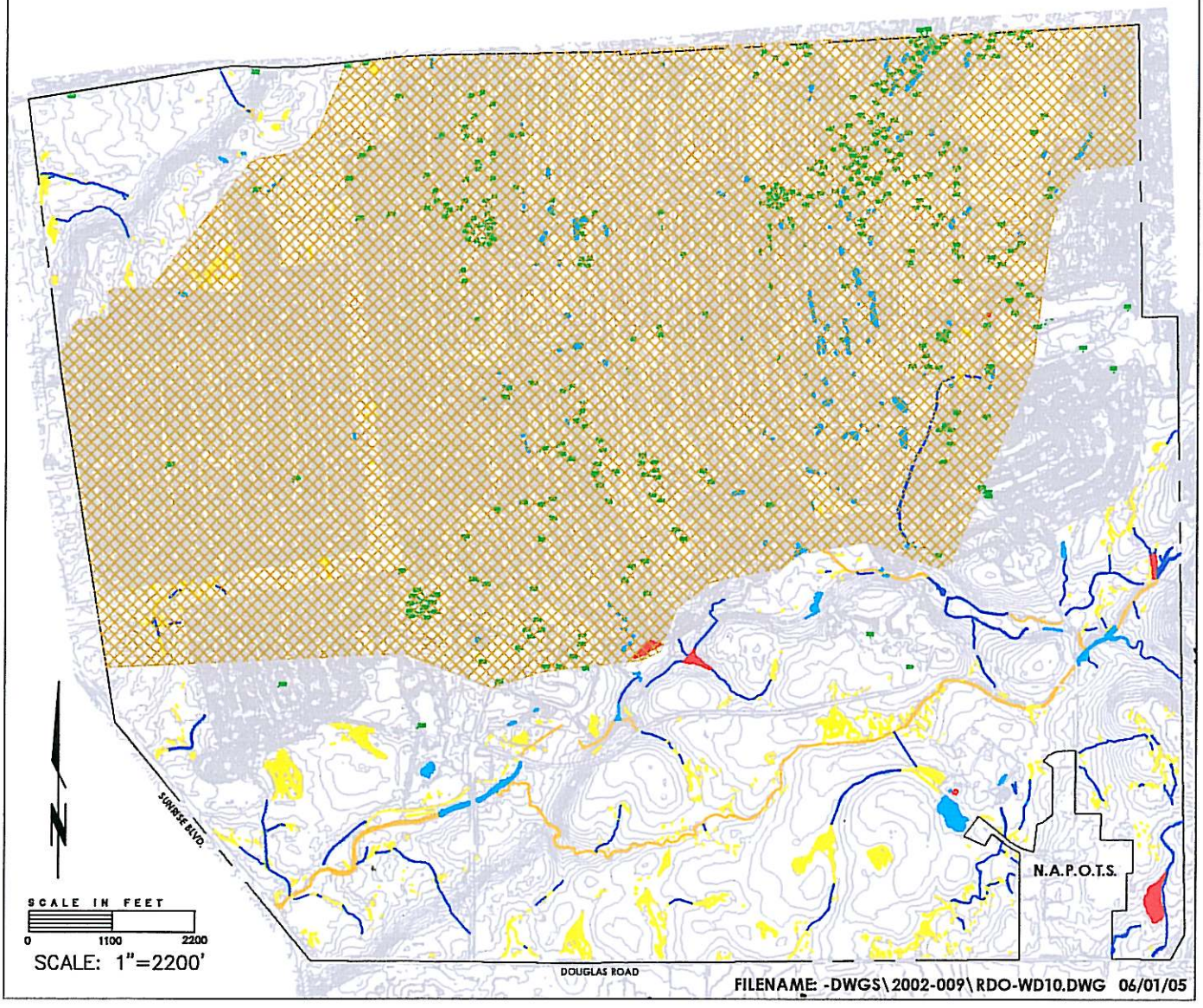

FIGURE 3. Wetland Delineation

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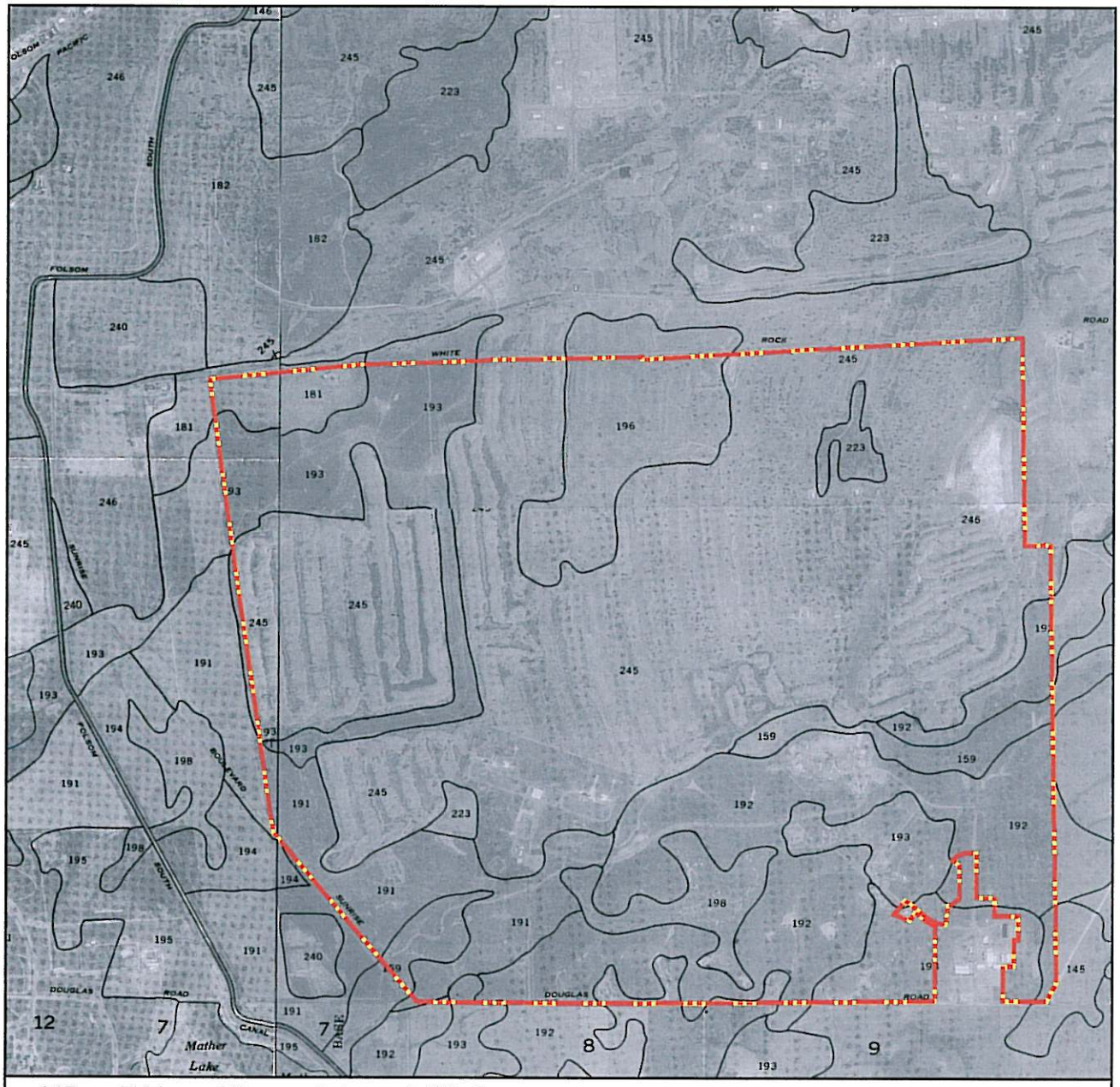

145	Fiddyment fine sandy loam, 1-8% slopes
158*	Hicksville loam, occassionally flooded, 0-2% slopes
159*	Hicksville gravelly loam, occasionally flooded, 0-2% slopes
181	Natomas loam, 0-2% slopes
191*	Red Bluff loam, 0-2% slopes
192*	Red Bluff loam, 2-5% slopes
193*	Red Bluff - Redding complex, 0-5% slopes
196*	Red Bluff-Xerorthents, 2-50% slopes
198*	Redding gravelly loam, 0-8% slopes
223**	Slickens
245*	Xerorthents, dredge tailings, 2-50% slope

North

Scale in Feet

0 3000

* Soil unit contains listed hydric inclusions.
** Soil unit contists of listed hydric components.

NRCS Soil Survey, Sacramento County, California, 1993.

FIGURE 4. Natural Resources Conservation Service Soil Types

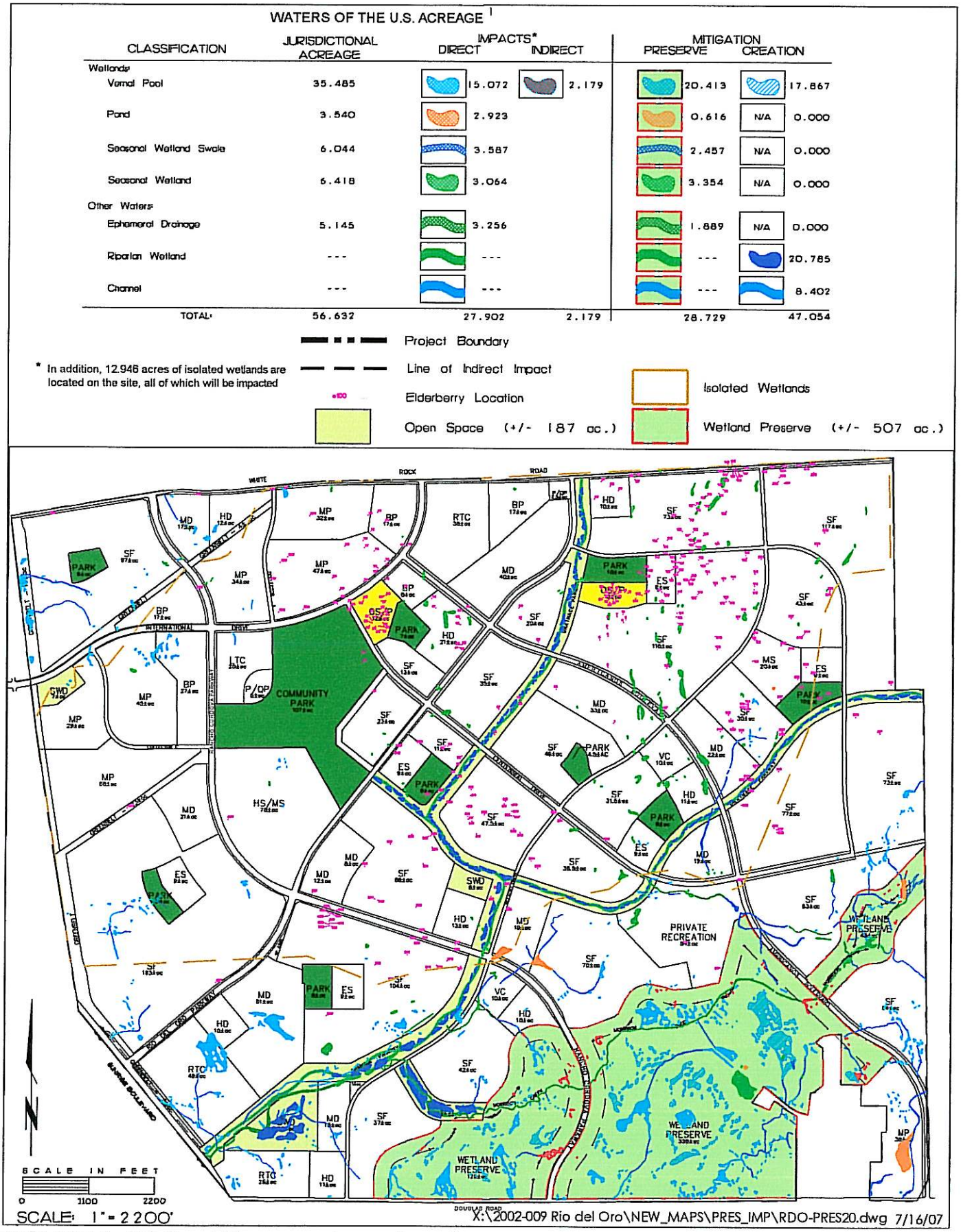

FIGURE 5. Wetland Preserve, Impact, and Compensation Plan

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CLASSIFICATION	MITIGATION PRESERVE		CREATION	
Wetlands:				
Vernal Pool		20.413		17.867
Pond		0.616	N/A	0.000
Seasonal Wetland Swale		2.457	N/A	0.000
Seasonal Wetland		3.354	N/A	0.000
Other Waters:				
Ephemeral Drainage		1.889	N/A	0.000
TOTAL:		28.729		17.867

Project Boundary

Wetland Preserve (+/- 507 ac.)

Open Space (+/- 187 ac.)

SCALE IN FEET
0 350 700
SCALE: 1"=700'

PARK 8±ac
SF 77±ac
MD 19±ac
SF 63±ac
WETLAND PRESERVE 43±ac
PRIVATE RECREATION 54±ac
SF 70±ac
AMERICANOS BOULEVARD
MORRISON CREEK
SF 54±ac
RK ac
ES 9±ac
SF 104±ac
VC 10±ac
HD 10±ac
DRAINAGE PARKWAY
SF 42±ac
1±ac
OS 13±ac
MD 13±ac
SF 37±ac
HD 11±ac
WETLAND PRESERVE 129±ac
RANCHO CORDOVA PARKWAY
WETLAND PRESERVE 338±ac
MP 38±ac
DOUGLAS ROAD

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FIGURE 6. Conceptual Vernal Pool Preserve

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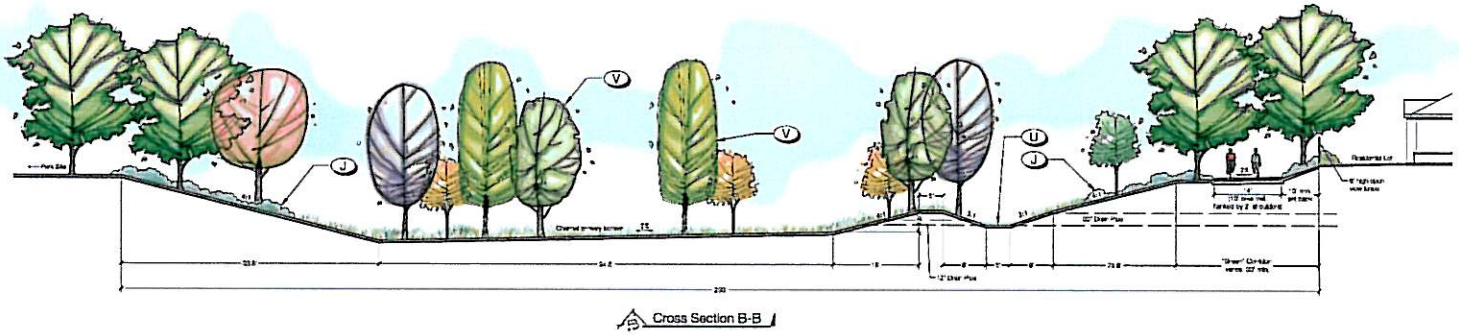
Plan Legend

- (A) Class I bike trail, with signage and striping
- (B) Bike trail connection to adjacent residential neighborhood
- (C) Grassy drainage channel area with supplemental riparian tree and dee pot plantings, slope varies.
- (D) Seasonal wetlands
- (E) Bench seating area for wildlife viewing, resting or reading.
- (F) Directional bike trail signage
- (G) Interpretive overlook with informational kiosk
- (H) Bike trail bridge crossing over drainage channel
- (I) Bike trail low flow connection through bottom of drainage channel.
- (J) Native and drought-tolerant meandering buffer planting area, slope varies.
- (K) Picnic area with tables and trash receptacles
- (L) Neighborhood park boundary
- (M) Park access walk from bike trail
- (N) Turf accent nodes along edges of drainage channel
- (O) Park bench seating area with views out across drainage channel
- (P) Perimeter park pathway
- (Q) Park gathering area with gazebo and group seating centered on axial view out to drainage channel
- (R) Bench seating
- (S) Open turf area
- (T) Formal passive seating area surrounded by rose garden.
- (U) Meandering low flow channel filtering runoff from adjacent neighborhoods prior to release into lower channel bottom and pools.
- (V) Supplemental riparian tree and dee pot plantings
- (W) Trail continues to Community Park



Source: HLA, *Drainage Parkway*, 040407.

FIGURE 7. Conceptual Corridor Plan

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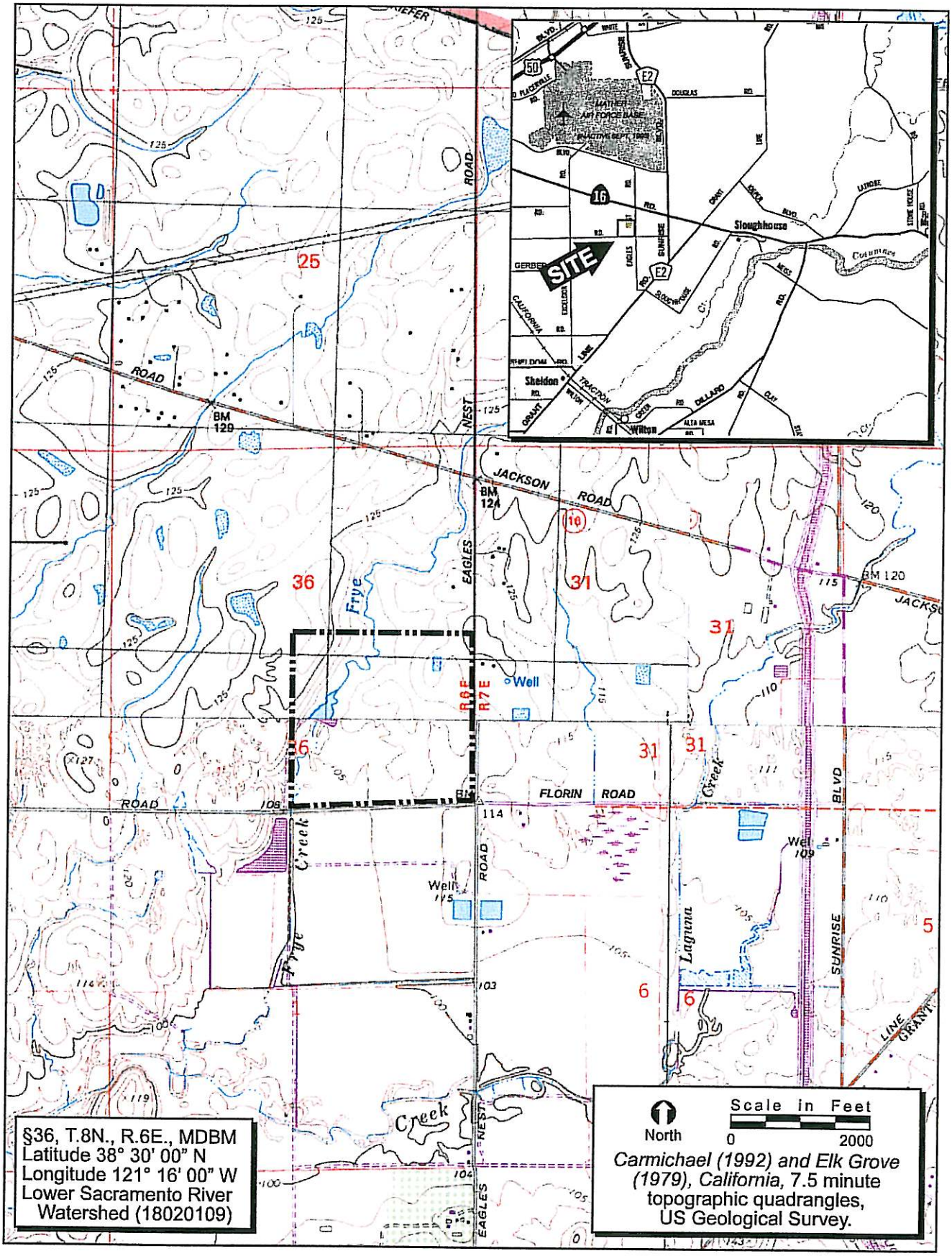

FIGURE 8. Project Site and Vicinity - Cook Property

2002-009 Rio del Oro - Cook Property

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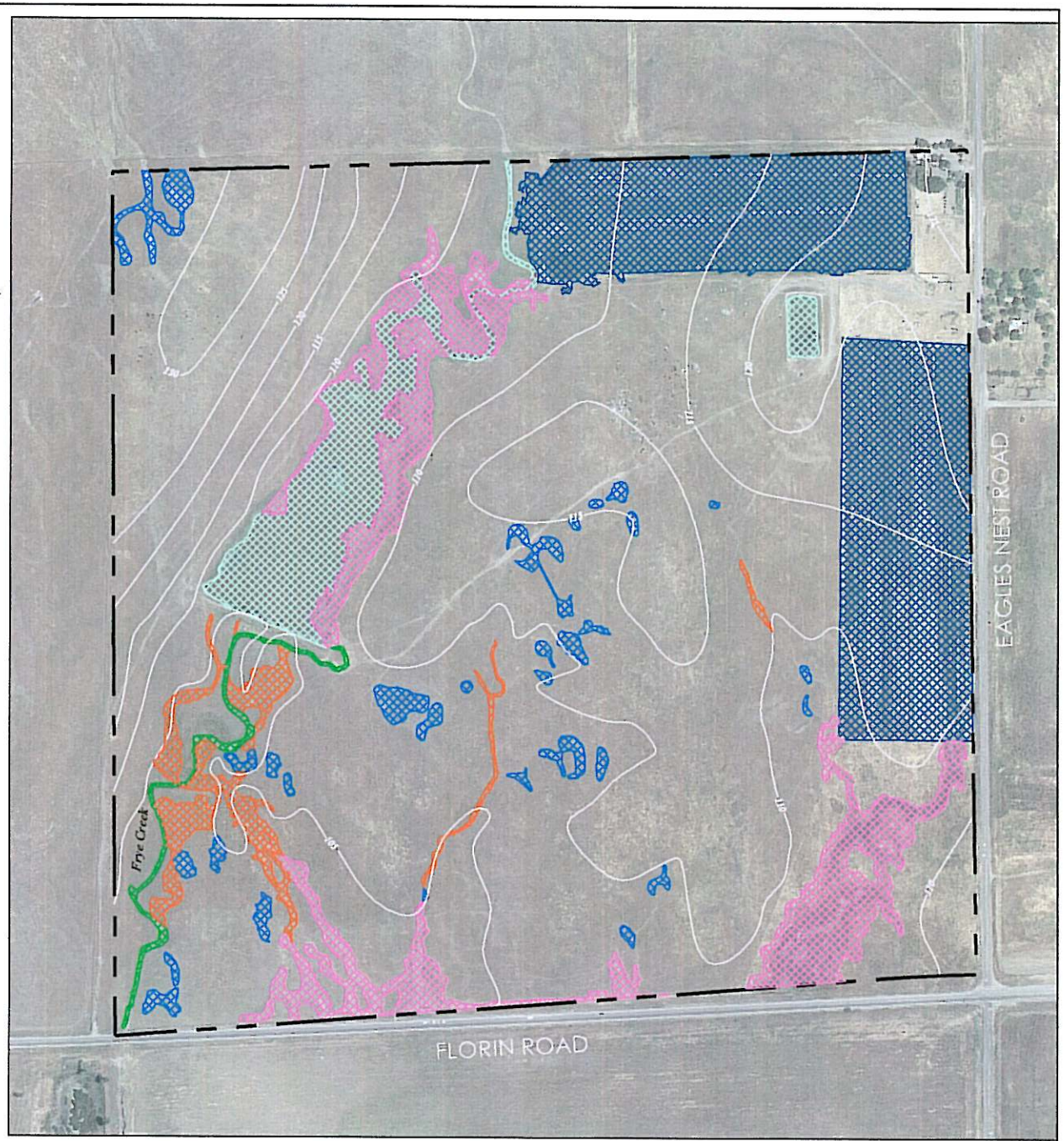
APPROXIMATE WATERS OF THE U.S. ACREAGE[1]

CLASSIFICATION	APPROXIMATE ACREAGE
WETLANDS:	
Vernal Pool	2.67
Seasonal Marsh	9.90
Seasonal Wetland Swale	2.63
OTHER WATERS:	
Pond	6.51
Intermitent Drainage	0.58
TOTAL:	22.29

OTHER FEATURES[2]

Project Boundary	±160
Irrigated Pastures	21.27



X:\2002-009 Rio del Oro\WA\Cook Mit\Cook-WA.dwg 28 JULY 2006

FIGURE 9. Preliminary Wetland Assessment - Cook Property

2002-009 Rio Del Oro

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WETLAND PRESERVE & CREATION TOTAL

CLASSIFICATION	PHASE 1 ACREAGE	PHASE 2 ACREAGE
Vernal Pool	20.413	0.000
Pond	0.617	0.000
Seasonal Wetland Swale	2.457	0.000
Seasonal Wetland	3.354	0.000
Ephemeral Drainage	1.889	0.000
Created Wetlands	0.718	5.149
TOTAL:	30.873	5.149

Project Boundary

Wetland Preserve (+/- 507 ac.)

SCALE IN FEET
0 400 800
SCALE: 1"=800'

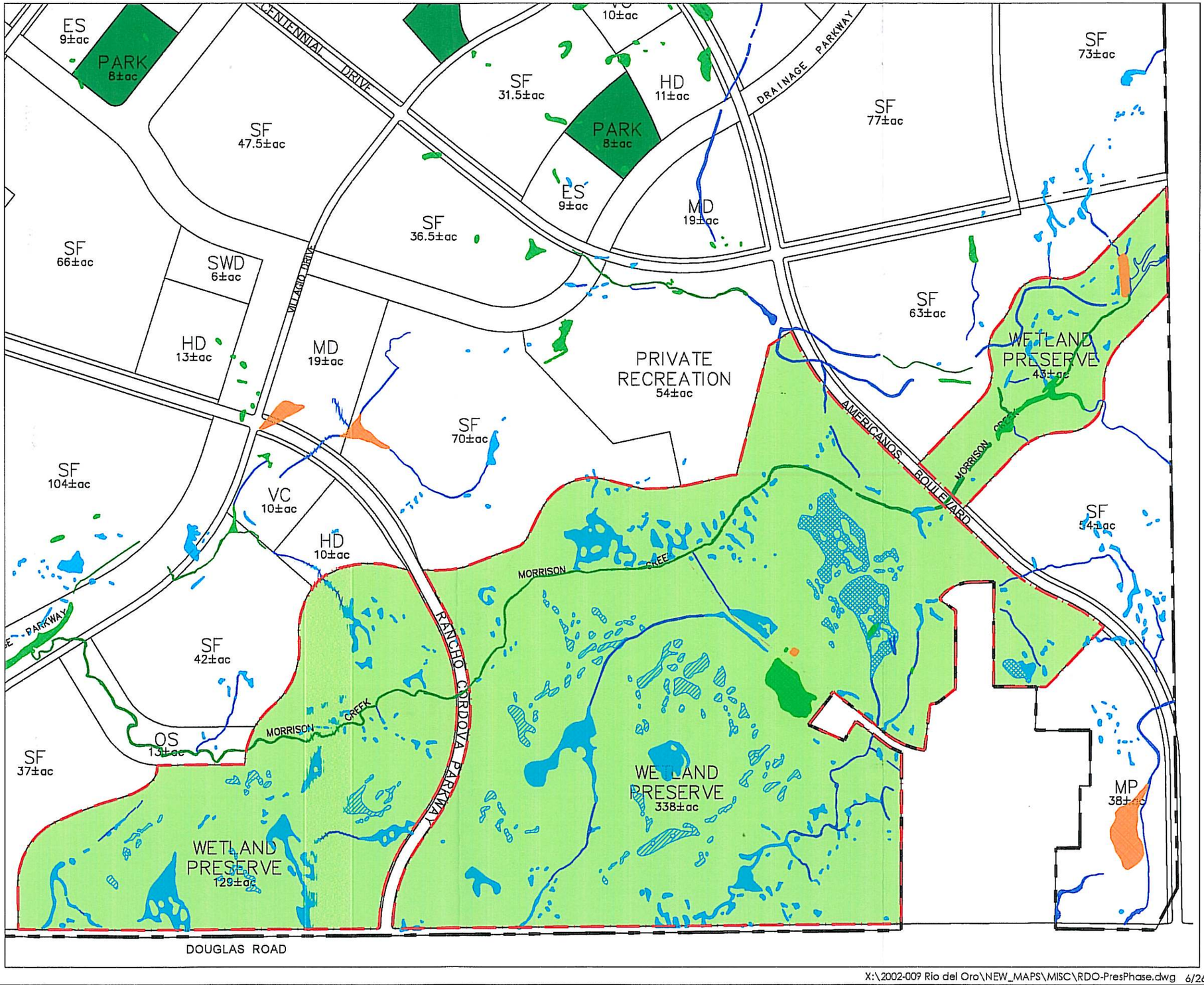

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FIGURE 10. Preserve Phasing

2002-009 RIO DEL ORO

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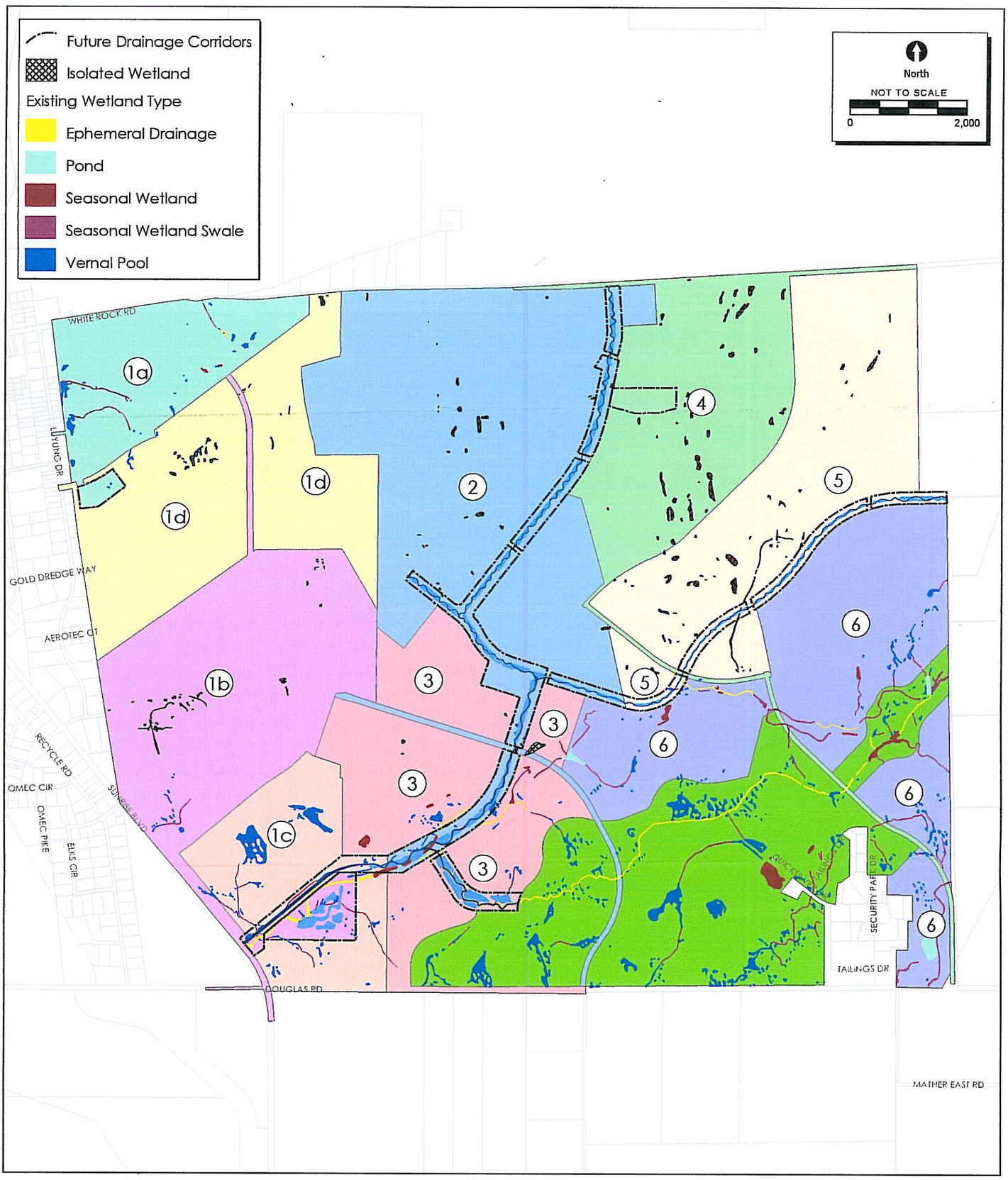

		Construction											
		PHASE1a	PHASE1b	PHASE1c	PHASE1d	PHASE2	PHASE3	PHASE4	PHASE5	PHASE6	Construction Total	Preserve	Total
Constructed Drainage Feature	Channel Upland	0.00	24.21	12.04	0.00	79.07	7.92	0.00	27.25	0.01	150.51	0.00	150.51
	Drainage Feature	0.00	0.25	2.00	0.00	4.23	0.64	0.00	1.26	0.00	8.38	0.00	8.38
	Wetland Feature	0.00	3.84	0.14	0.00	10.49	3.99	0.00	2.31	0.00	20.79	0.00	20.79
	Total	0.00	28.30	14.19	0.00	93.79	12.56	0.00	30.82	0.01	179.68	0.00	179.68

		Impact											
		PHASE1a	PHASE1b	PHASE1c	PHASE1d	PHASE2	PHASE3	PHASE4	PHASE5	PHASE6	Impact Total	Preserve	Total
Isolated	Pond					0.11	0.58		0.03		0.72		0.72
	Seasonal Wetland		0.04		0.11	1.90	0.09	4.25	2.77		9.16		9.16
	Seasonal Wetland Swale		0.07						0.58		0.65		0.65
	Vernal Pool		0.98		1.20		0.01		0.22		2.41		2.41
Isolated Total			1.08		1.31	2.01	0.69	4.25	3.60		12.95		12.95
Non-Isolated	Ephermal Drainage	0.02	1.41	0.50		0.12	0.83	0.03	0.04	0.28	3.23	1.91	5.15
	Pond						0.02			2.90	2.92	0.62	3.54
	Seasonal Wetland	0.08		0.31		1.07	0.79			0.81	3.06	3.35	6.42
	Seasonal Wetland Swale	0.36	0.26	0.36		0.02	0.36	0.11	0.02	2.08	3.57	2.47	6.04
	Vernal Pool	1.89	1.29	6.74	0.25	0.54	1.15	0.12	0.05	2.84	14.87	20.61	35.49
Non-Isolated Total		2.35	2.96	7.92	0.25	1.75	3.16	0.26	0.11	8.91	27.67	28.96	56.63
Wetland Total		2.35	4.05	7.92	1.56	3.76	3.85	4.51	3.71	8.91	40.62	28.96	69.58
Upland		176.52	413.39	173.45	345.07	685.03	342.35	317.67	404.13	436.54	3294.21	481.52	3775.73
Property Total		178.87	417.43	181.37	346.63	688.79	346.20	322.18	407.84	445.45	3334.83	510.48	3845.31

Location: J:\GIS_Maps\2002-009_Rio_Del_Oro\Phased_Impacts\PhasedImpacts_v2(2007-06-21)\PhasedImpacts_v2.mxd

FIGURE 11. Phase Impact Analysis

2002-009 Rio del Oro

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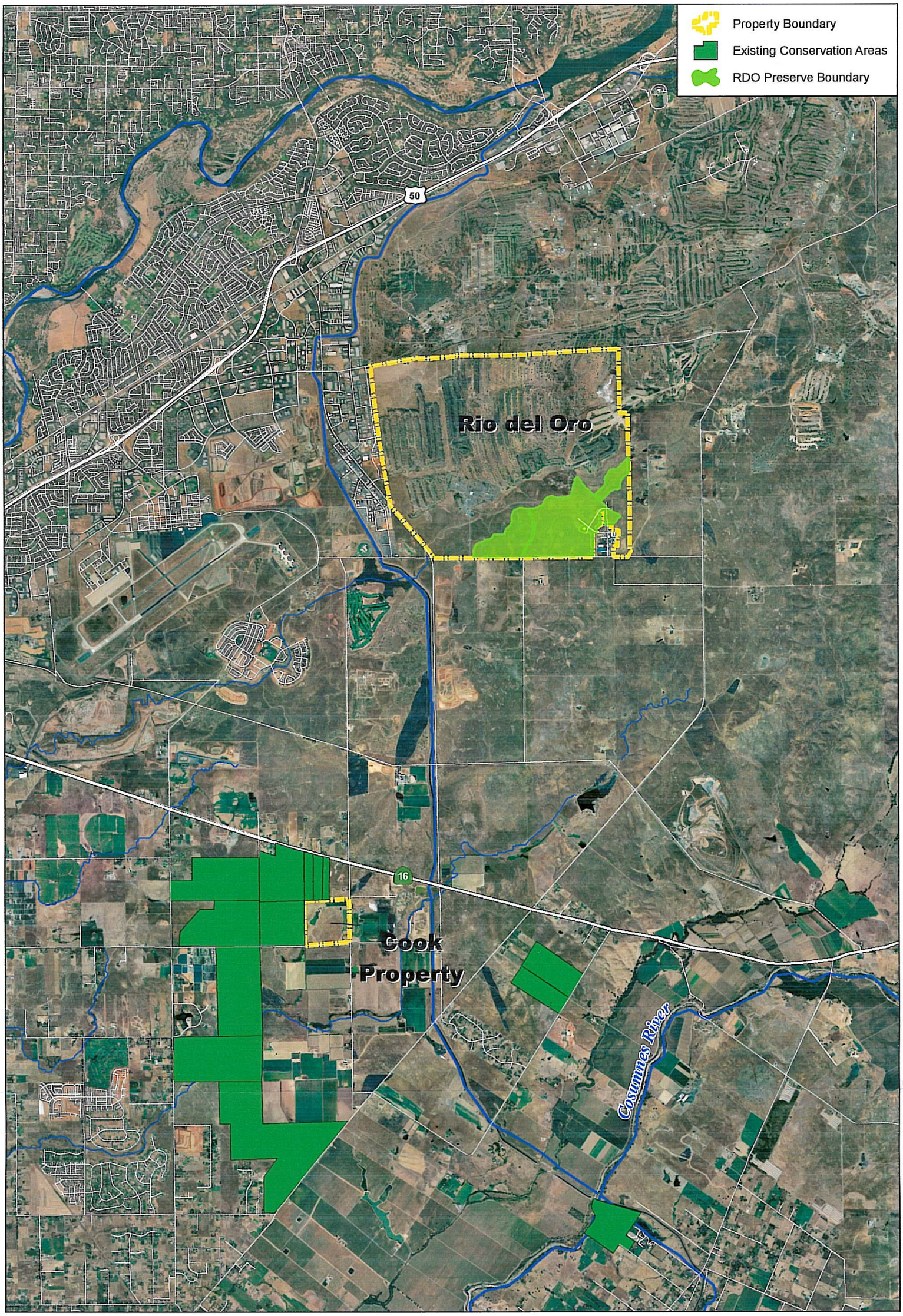

Location: J:\GIS_Maps\2002-009_Rio_Del_Oro\Cook_Property_Location(Tabloid).mxd

FIGURE 12. Cook Property Location

1 inch equals 1 miles

0 0.5 1 2 Miles

2002-009 Rio Del Oro

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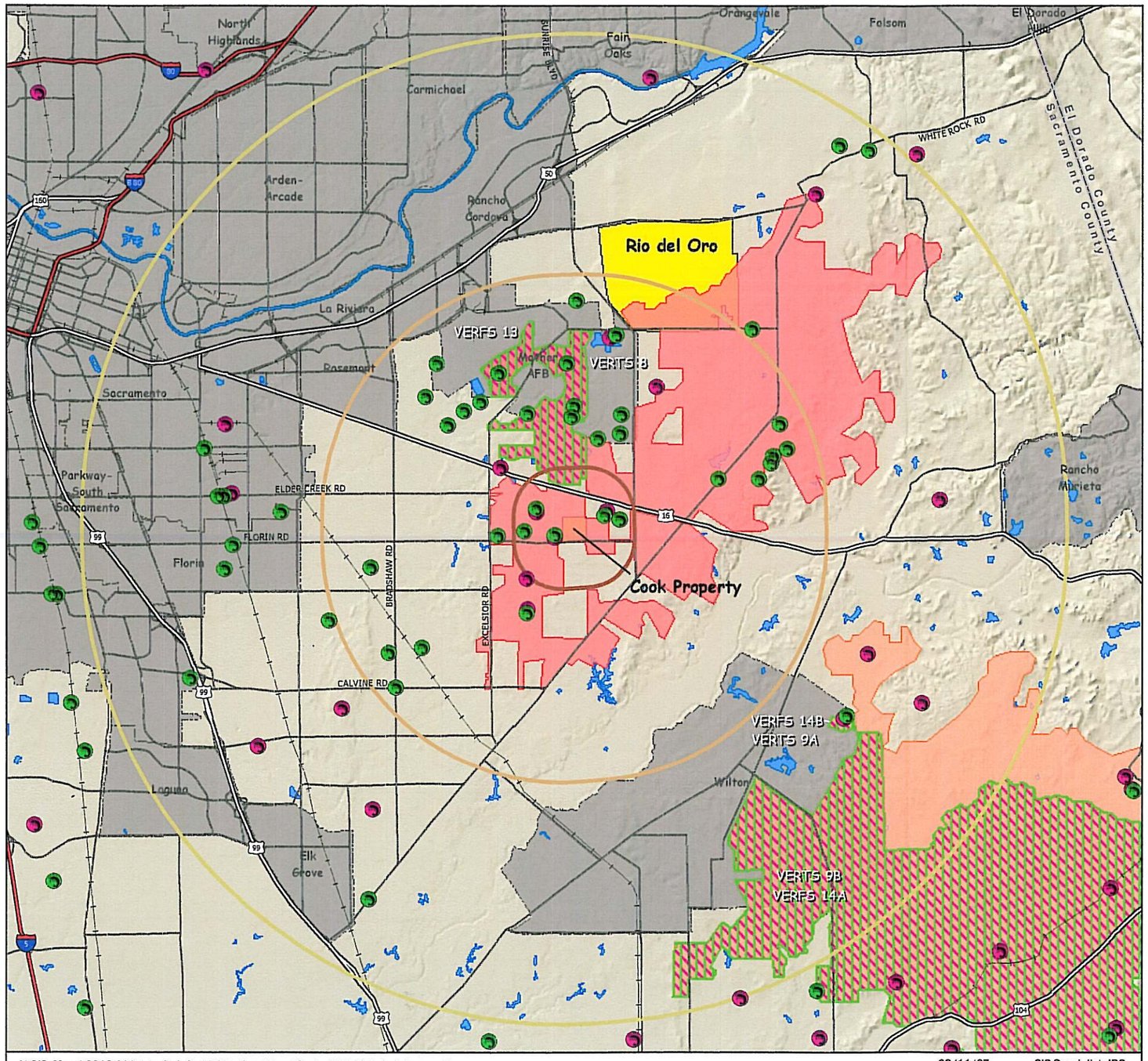

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FIGURE 13. CNDDB Occurrences of Federally Listed Shrimp Species

2002-009 Rio del Oro - Cook Property

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Map Features

Administrative Boundaries
- [1] Project Boundary
- City Boundary
- County Boundary

Distance From Project
- 1 mile
- 5 mile
- 10 mile

Transportation
- Interstate
- State Highway
- Roads
- Railroads

Aquatic Features
- Lakes and Reservoirs
- Rivers

[2] CNDDB Occurrences of Federally Listed Shrimp

Endangered
- Vernal Pool Tadpole Shrimp

Threatened
- Vernal Pool Fairy Shrimp

Critical Habitat
- [3] Vernal Pool Fairy Shrimp
- [3] Vernal Pool Tadpole Shrimp

Southeastern Sacramento Valley Core Areas
- [4] Cosumnes/Rancho Seco
- [4] Mather

This map may include multiple species' occurrences at each location, some of which may not be visible on this graphic. The CNDDB occurrences shown may not reflect the actual location of the occurrence.

1 " equals 13,000 '

SCALE IN FEET
0 6,500 13,000

NOTES

[1] Project Boundary: Sacramento County GIS Parcel Database (Boundary Approximate)

[2] CDFG California Natural Diversity Database (CNDDB), September 2007 Update (GIS Shapefile)

[3] USFWS Vernal Pool Species Final Critical Habitat, February 2006.

[4] USFWS Vernal Pool Recovery Core Areas, April 2006.

Map Extents Located on USGS 7.5' Quadrangles: Rio Linda, Citrus Heights, Folsom, Clarksville, Sacramento East, Carmichael, Buffalo Creek, Folsom SE, Florin, Elk Grove, Sloughhouse, Carbondale, Bruceville, Galt, Clay and Goose Creek, CA

LIST OF ATTACHMENTS

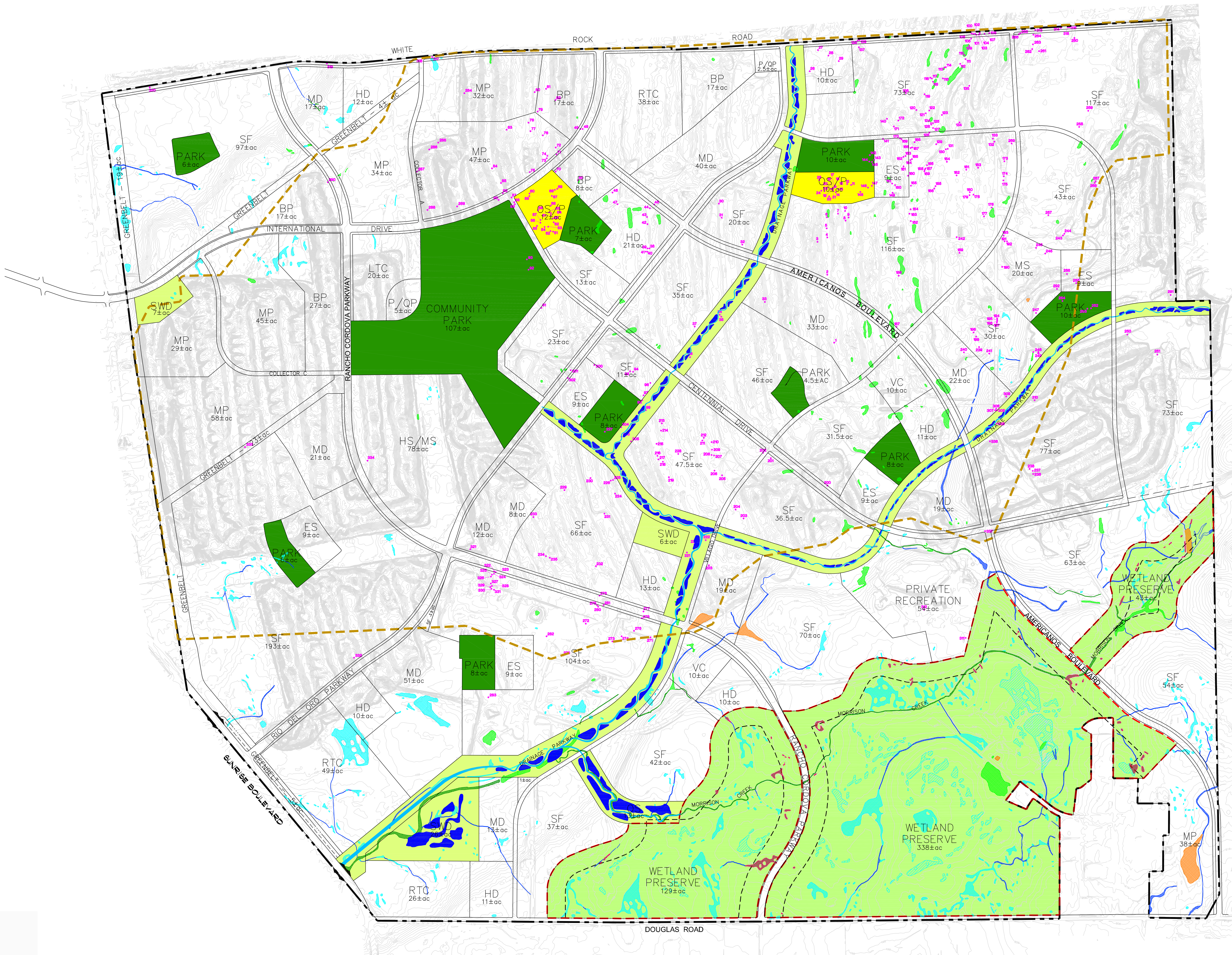
Attachment A – Wetland Preserve, Impact and Compensation Plan

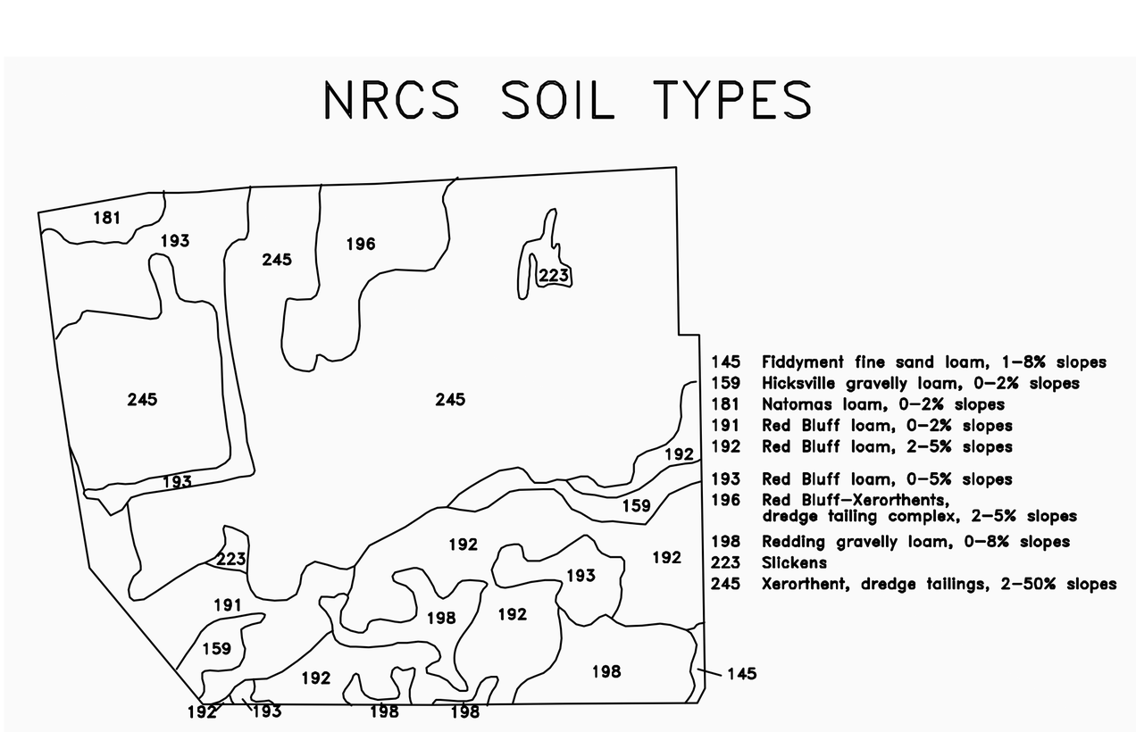
Attachment B – Watershed Analysis of the Hydrologic Function of the Rio Del Oro Preserve for Preservation for Existing Wetlands and Construction of Mitigation Wetlands

Attachment C – Preliminary Wetland Assessment Cook Property

ATTACHMENT A

Wetland Preserve, Impact and Compensation Plan





JOB NAME: RIO DEL ORO - PRES/IMP
PROJECT NO: 2002-009
MAP SCALE: 1"=500'
DATE: 18 OCTOBER 2006
REVISION: 08/27/07
FILE NAME: RDO-PRES20.dwg

WATERS OF THE U.S. ACREAGE

CLASSIFICATION	EXISTING Jurisdictional Acreage	EXISTING Isolated Acreage	IMPACTS Direct Jurisdictional Acreage	IMPACTS Direct Isolated Acreage	IMPACTS Indirect Jurisdictional Acreage	IMPACTS Indirect Isolated Acreage	MITIGATION Preserve	MITIGATION Creation
Wetlands:								
Vernal Pool	35.485	2.414	15.072	2.414	2.179	–	20.413[1]	17.867
Pond	3.540	0.721	2.924	0.721	–	–	0.616	N/A 0.000
Seasonal Wetland Swale	6.044	0.653	3.587	0.653	–	–	2.457	N/A 0.000
Seasonal Wetland	6.418	9.158	3.064	9.158	–	–	3.354	N/A 0.000
Other Waters:								
Ephemeral Drainage	5.145	–	3.256	–	–	–	1.889	N/A 0.000
Riparian Wetland	–	–	–	–	–	–	–	20.785
Channel	–	–	–	–	–	–	–	8.402
TOTAL:	56.632	12.946	27.903	12.946	2.179	–	28.729	47.054

[1] In addition, 12.946 acres of isolated wetlands are located on the site, all of which will be impacted

Project Boundary
Line of Indirect Impact
●100 Elderberry Location and ID#
Wetland Preserve (+/- 507 ac.)
Open Space (+/- 187 ac.)
VELB Preserve (+/- 44 ac.)
Park (+/- 179 ac.)
Isolated Wetlands

NOTES

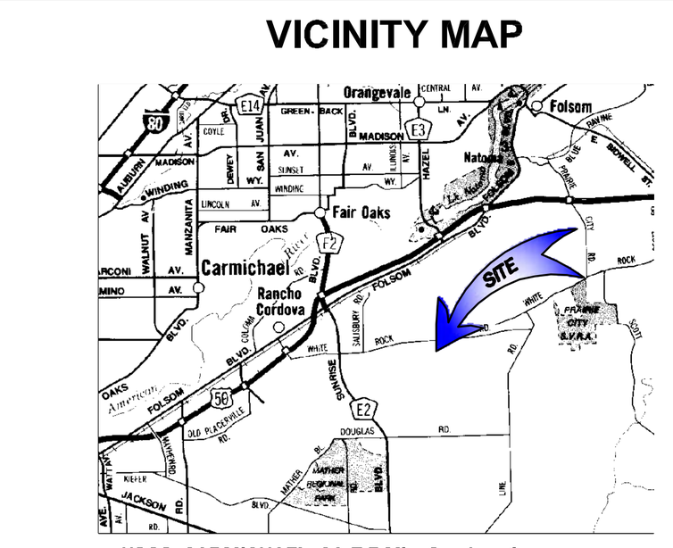
Gross Project Acreage: ± 3829

Base data source: G.C. Wallace

This exhibit depicts information and data produced in strict accord with the U.S. Army Corps of Engineers wetland delineation methods described in the 1987 Corps of Engineers Wetland Delineation Manual and conforms to specifications per the Corps Sacramento District. However, wetland boundaries have not been legally surveyed and may be subject to minor adjustments if exact locations are required.

SCALE IN FEET
0 250 500 1000
SCALE: 1"=500'

VICINITY MAP



USGS: CARMICHAEL, CA 7.5 Min. Quadrangle

RIO DEL ORO

PROPOSED PRESERVE/IMPACT MAP

DATE: 18 OCTOBER 2006	REVISION DATE: 08/27/07	PROJECT NUMBER: 2002-009
CAD SPECIALIST: CN/MC/KO/JH	SCALE: 1"=500'	MAP NAME: RDO-PRES20.dwg
MAP LOCATION: X:\2002-009 Rio del Oro\NEW_MAPS\PRES_IMP		
WETLAND VERIFICATION LETTER DATE:		PM: BG

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Northern California 2525 Warren Drive, Rocklin, CA. 95677, Ph: 916.782.9100 • **Bay Area** 2100 Embarcadero, Ste. 202, Oakland, CA. 94606, Ph: 510.434.0150 • **Orange County** 1801 Park Court Place Bldg B. Ste. 103, Santa Ana, CA. 92701, Ph: 714.648.0630 • **Inland Empire** 412 East State St., Redlands, CA. 92373, Ph: 909.307.0046

ATTACHMENT B

Watershed Analysis of the Hydrologic Function of the Rio Del Oro Preserve for Preservation for Existing Wetlands and Construction of Mitigation Wetlands

DRAFT

Watershed Analysis of the Hydrologic Function of the Rio del Oro Preserve for Preservation of Existing Wetlands and Construction of Mitigation Wetlands

Sacramento County, California

11 September 2007

Prepared for:
Elliott Homes, Inc.
and
GenCorp Real Estate

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

CONTENTS

Watershed Analysis of the Hydrologic Function of the Rio del Oro Preserve for Preservation of Existing Wetlands and Construction of Mitigation Wetlands

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LIST OF TABLES

LIST OF ATTACHMENTS

INTRODUCTION

ECORP Consulting, Inc. (ECORP) has conducted a model-based hydrologic analysis of the existing vernal pools and other wetlands within the proposed Rio del Oro preserve to address comments provided on the project Draft EIR/EIS, specifically regarding potential adverse hydrologic effects to existing wetlands or proposed compensatory wetlands within the designated preserve.

The analysis evaluated the verified wetland delineation of the Rio del Oro preserve and adjacent watersheds. A total of 295 vernal pools were located within the preserve. Vernal pools are topographic basins within the grassland community and are typically underlain with an impermeable or semi-permeable hardpan or duripan layer. Vernal pools are inundated through the wet season and are dry by late spring through the following wet season. Sixteen (16) seasonal wetlands were also mapped within the Rio del Oro project site. Seasonal wetlands are ephemerally wet areas where runoff accumulates within low-lying depressions and/or adjacent to watercourses. These areas may remain inundated for extended periods into the spring and summer. Additionally, there are three stock ponds present on the site. These man-made features have historically been used to support cattle grazing operations.

The Rio del Oro Project proposes to establish a 507-acre vernal pool and wetland preserve in the southern portion of the project. This preserve contains 227 vernal pools totaling 20.413 acres and 48 other wetlands totaling 8.316 acres. The overall preserve configuration was established by assessing the watersheds of existing vernal pools and wetlands to be preserved as well as maintaining 250' buffers wherever possible.

Rancho Cordova Parkway, a proposed major thoroughfare to highway 50, will connect to a previously established location south of Douglas Road. Due to this connection the Parkway must transect the proposed preserve. The alignment of the Parkway was designed to avoid and buffer as many wetlands as possible.

In addition to preservation, compensatory vernal pool mitigation will also occur within the 507-acre preserve. A total of 17.867 acres of vernal pool habitat will be constructed to satisfy mitigation requirements of the project. The preliminary compensatory wetland plan was designed to minimize indirect impacts to existing habitat by maintaining 200' to 250' buffers to existing vernal pools.

OBJECTIVES

The objectives of the investigation were to determine:

1. If the proposed Rio del Oro preserve configuration will negatively impact any existing vernal pools or seasonal wetlands within the preserve,
2. If the proposed Rio del Oro preserve will support the construction of mitigation vernal pools without indirectly impacting existing vernal pools and seasonal wetlands, and
3. If the proposed construction of Rancho Cordova Parkway through the Rio del Oro preserve will indirectly impact any existing or proposed mitigation wetlands.

METHODS

ECORP took a six (6) step approach to assess potential direct and indirect impacts to the seasonal wetlands and vernal pools within the preserve. These include:

1. Acquiring a high resolution Light-Imaging Detection And Ranging (LIDAR) based topographic survey;
2. Creating a grid model of the preserve;
3. Utilizing industry standard hydrologic assessment tools to determine the physical characteristics of the site;
4. Establishing a method for assessing the hydrologic boundaries between individual seasonal wetlands and vernal pools and their watershed areas;
5. Establishing a baseline for typical wetland to watershed ratios, and;
6. Modeling potential future watershed characteristics based on the construction of 17.867 acres of mitigation vernal pools and the construction of Rancho Cordova Parkway.

This approach provides a comprehensive quantitative assessment of current preserve characteristics, models the change in the topography of the preserve based on the proposed mitigation wetland design and the Rancho Cordova Parkway alignment, and evaluates how the changes to the preserve characteristics will modify hydrologic characteristics of each individual seasonal wetland and vernal pool and its corresponding watershed.

ESTABLISHING THE GROUND MODEL

Traditional Ground Models

The first step in establishing a high quality hydrologic model of any project site is to develop an elevation model of the study area. Large scale projects require high quality topographic ("topo") information, traditionally generated using photogrametric methods. Traditional topo is created through the analysis of stereoscopic orthophoto pairs, coupled with a site survey. This topographic data is supplied as contour lines placed at 1-foot, 2-foot, or greater intervals and spot elevations, with the focus of the data being on the contour lines to generate the description of the ground surface. These topographic contour lines are generated through a combination of computer based, automation processes and the effort of a photogramatic technician, who provides quality control and assurance that the contours created are readable, logical and aesthetically pleasing. This type of topographic model provides an easy to read, topographically exact method for site evaluation; however, it has some limitations.

There are three limitations of traditionally derived topography important to this study:

1. The ratio of the contour interval to the physical characteristics of the features of interest;
2. The deficiency of information describing the ground elevations between contours, and;
3. The aesthetically pleasing nature of the contours.

The first limitation of traditional topographic mapping is the contour interval spacing. This is important to this study because the depressional wetland features of interest are vernal pools

and seasonal wetlands, which can be very shallow in depth (<1ft deep.) Only the largest and deepest wetlands have physical characteristics that exceed the threshold that allow them to be mapped using traditional topographic methods. Many sites in the Sacramento Valley Area with depressional wetland features are unable to be properly depicted due to the limitations of traditional photogrametric methods. This threshold also affects the mapping of the site micro-topography. Small ridges and hummocks determine micro-scale surface water flow across the site and are unable to be properly mapped with this method.

The second limitation of using traditionally derived topography for this study is the deficiency of elevation information between contours. Most topographic datasets provide spot elevations spaced at regular or irregular intervals across a site. They tend to be spaced in intervals much larger than the size of the depressional features and micro-topography of interest. Like the aforementioned vertical feature tolerance for contours, not all features of interest are depicted in the topographic model of the site.

The final limitation of traditionally derived topographic contours concerns their aesthetically pleasing nature. Because traditional topo is developed with the intent of being read by surveyors, engineers and architects, many topographic features are omitted from the contours in an effort to keep them simple to read and pleasing to use. For example, a traditional photogrametric approach to mapping a drainage feature creates smooth and regular contours, providing an easy to read and straightforward to visualize depiction of the drainage. In contrast, the actual drainage may contain topography greater than one foot in elevation (e.g., rocks, ponds, and other features). Small topographic features may be omitted from the final topographic data to make it more usable, but the removal of these features decreases the utility of the contours for micro-scale hydrologic modeling. The limitations of traditionally derived topo do not allow for the detailed evaluation of seasonal wetlands, vernal pools, and their micro-watersheds.

The LIDAR Based Model

Due to the limitations of traditionally derived topographic contours, an alternative higher density source of topography was required for the present analysis. Airborne LIDAR was selected as the topographic data collection method of choice for this study. LIDAR, an acronym for Light-Imaging Detection And Ranging, also known as ALSM (Airborne Laser Swath Mapping) or Laser Altimetry or LADAR (Laser Detection and Ranging) is an optical remote sensing technology that measures properties of scattered light to find range and/or other information of a distant target. LIDAR system components include a high precision survey GPS (Global Positioning System) unit, an IMS (Inertial Measurement System), and a laser (usually in the 600-1500 nanometer range.)

The LIDAR system is mounted in an aircraft which flies transects across a project site. While in flight, the laser sweeps across the site sending pulses of light to the ground, and records the time it takes for those pulses to return to the aircraft. Meanwhile, the GPS unit records the precise location of the laser and the IMS measures the pitch, roll and yaw of the aircraft. At the hanger, this information is loaded into a computer and the data are processed to provide locations and elevations for all spots from which the laser received reflected pulses. These locations, or returns, are then filtered to remove x,y,z values depicting trees, buildings and other non-ground features. This 'Bare Earth' dataset is then distributed for use. An example of

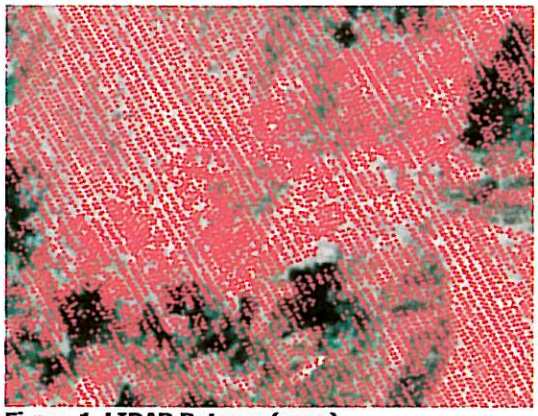


Figure 1. LIDAR Returns (x,y,z)

these filtered spot elevations (in red) can be seen in Figure 1, where pulses reflected from tree canopy (dark green) have been removed.

The LIDAR derived Bare Earth measurements represent a different method for depicting the ground surface than traditional topographic contours. Depending on the sensor and the altitude of the flight, LIDAR returns can achieve vertical precision of up to +/-3 inches relative to each other. This allows LIDAR data to accurately represent the physical characteristics of depressional wetland features. The data primarily rely on the massive number of spot elevations recorded by the sensor to depict topography. The data represents a nearly continuous field of elevation values across the site, allowing for the mapping of mirco-scale features which otherwise are not detected by traditional topo. Figure 2 depicts the density of point elevations around vernal pools. Contour lines can be generated from the Bare Earth dataset, and because the LIDAR sensor captures all ground features, contour lines resulting from LIDAR represent a more precise model of the earth for the purposes of micro-scale modeling.

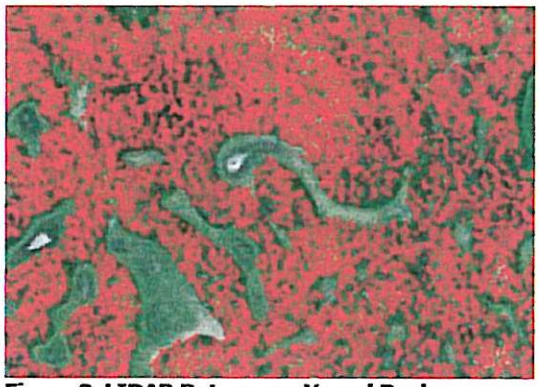


Figure 2. LIDAR Returns on Vernal Pool Grassland Landscape

Project LIDAR Topographic Model

The LIDAR based aerial survey of the preserve was conducted by Airborne1 in April 2007 using a Partnavia fixed wing aircraft equipped with an Optech 2050 LIDAR system. Transects of the site were flown at an altitude of 4500 feet with the sensor operating 50,000 pulses/second at a scan angle of 18º and a scan frequency of 30 Hz. The resulting recoded data have an average point spacing of 2ft, and a vertical RMSE of 7 inches, well within the accuracy and parameters required for mapping depressional wetland features.

Once the Bare Earth LIDAR topography was delivered to ECORP it was loaded into a GIS (Geographic Information System), so that the 15 million data points (x,y,z spot heights with an average ground distance of two feet,) could be analyzed, interpreted and checked for quality. All spot heights were loaded into an ESRI (Environmental Science Research Institute) File Geodatabase, and converted into a continuous field raster based DEM (Digital Elevation Model) in the ESRI GRID format. The GRID format is the standard structure used for most topographic modeling within a GIS. Converting the data to a GRID normalizes the data point spacing and greatly increases the speed at which the data can be interpreted and analyzed. Creating a DEM allows for the use of file based modeling tools that have been developed, peer reviewed, and are considered industry standard for many applications.

The resultant dataset depicts the sites physical characteristics and allows for a visual assessment of the site, as well as the measurement of quantitative parameters. Figure 3 depicts a shaded relief model of the DEM, where purple line represents the preserve boundary.

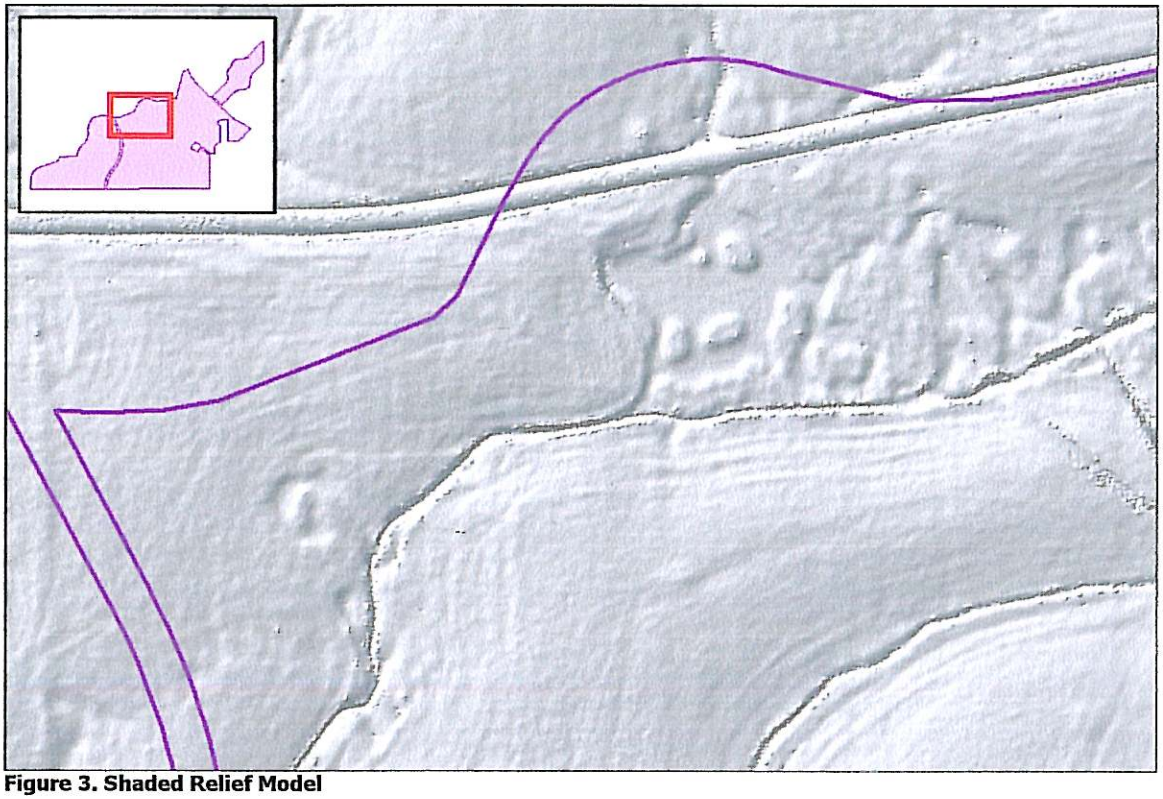


Figure 3. Shaded Relief Model

This representation of the topographic model clearly shows the location of various topographic features within the preserve boundary, including an existing road running east-west along the northern boundary of the preserve. Remnant features created by past farming can be seen in the form of striations paralleling the drainages, indicating that this area was once used for active farming.

After the shaded model of the DEM was computed, a curvature model of the preserve was created. The curvature model, shown in Figure 4, quantitatively measures the convexity or concavity of each cell within the DEM, establishing the relief of the terrain and quickly identifying depressions on the landscape. The model represents a combination of the slope and aspect values for the site, and provides a visual representation of the site that can be quickly checked against field collected data.

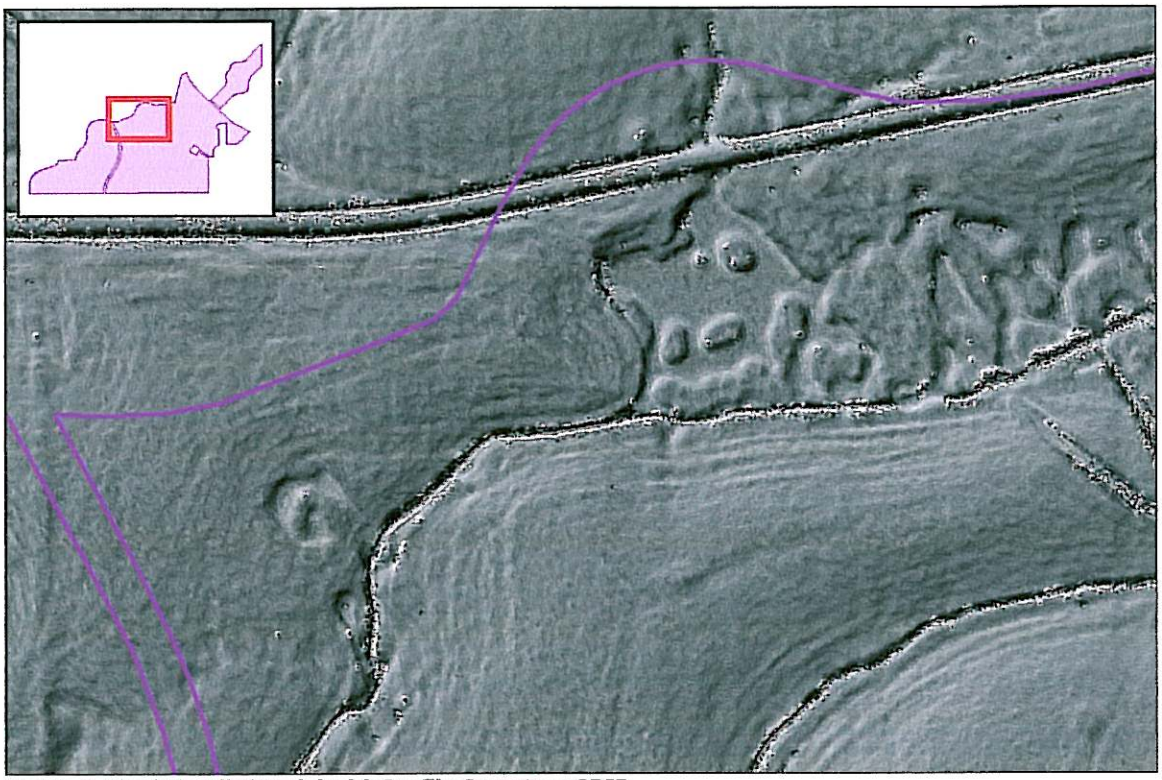


Figure 4. Shaded Relief Model with Profile Curvature GRID

Overlaying the depressional wetlands from the wetland delineation on top of the shaded elevation curvature model provides additional indication of the accuracy of the LIDAR topographic survey. A graphic depiction of this overlay can be seen in Figure 5. The boundaries of the depressional wetlands match the locations computed by the model, suggesting that the LIDAR survey is sufficient for mapping the micro topography of the site. Once the LIDAR survey was checked against the field collected data, the hydrologic model could be created.

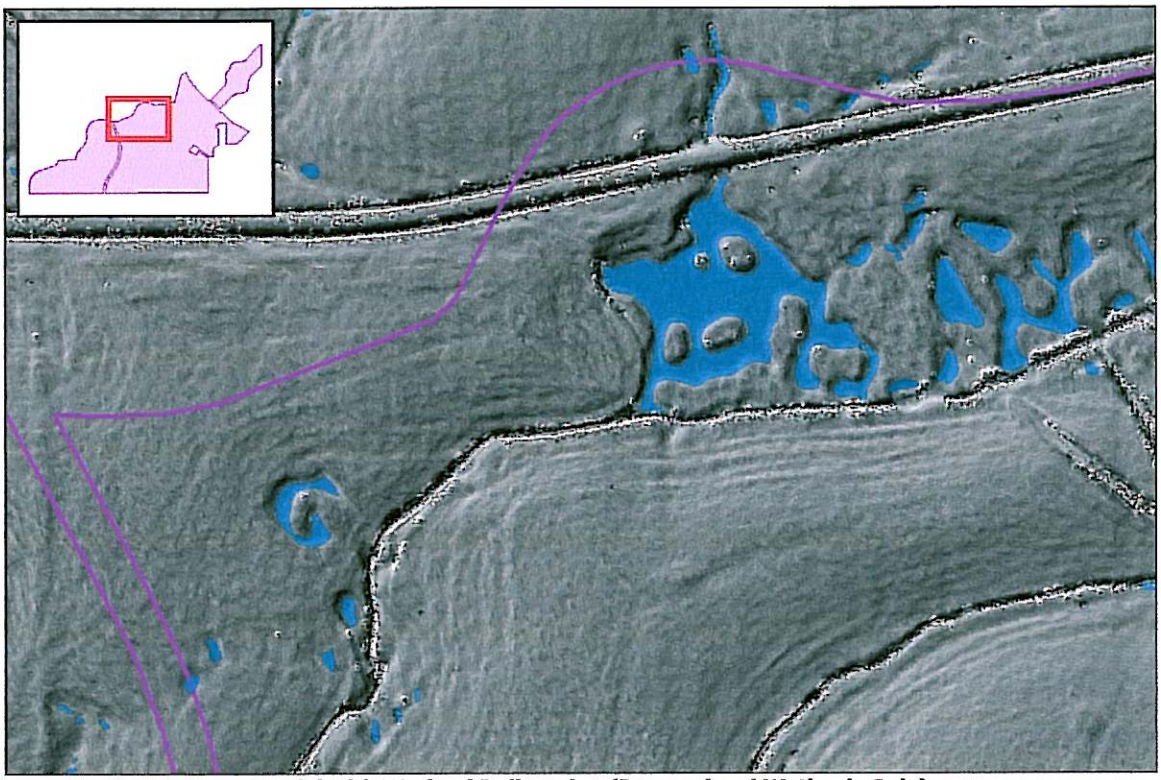


Figure 5. Shaded Relief Model with Wetland Delineation (Depressional Wetlands Only)

HYDROLOGIC MODEL

The preserve's surface hydrology was evaluated and characterized using the hydrology tool package available in ESRI's ArcInfo. The tool set allows for the preparation of a hydrologically correct DEM that can be used to define the characteristics of a project site, including potential surface water conveyance pathways, watershed boundaries, and water feature connectivity. The process involves creating a DEM, measuring the change in elevation to determine the flow direction of water that falls onto any cell within the elevation grid, and determining the accumulated upstream watershed for any depressional water feature within the model.

The primary challenge of modeling a site containing depressional wetland features is that the majority of hydrologic modeling tools have been designed for flow-through hydraulic systems. The models require the water which enters the system must eventually exit the system in order to evaluate site characteristics. In order to model a vernal pool grassland landscape, it is necessary to be able to describe the site with existing depressions. It is then imperative to evaluate the process that allows depressional wetlands to fill before reaching their maximum volume, and finally to be able to model the site as a flow through system once the pools have reached their maximum capacity. Before the depressional wetlands fill for the season they act as sinks on the landscape, storing surface water and keeping it from flowing out of the system. Once they are full the network of wetlands and swales becomes a flow through system, where water falling within the watershed makes its way down through the system via a flowpath nework that includes both riverine and depressional wetlands.

The description of the depressional hydrologic system is achieved by using a flow masking technique. The flow masking technique allows the modeler to treat the edges of the depressional wetlands like a hydrologic sink. This method assumes that water that enters the wetland never exits the wetland. By defining the limits of the wetlands as a sink, the hydrologic tools used to identify the upper limits of a drainage's watershed can be applied. This allows the automation of the calculation of the watershed for each individual depressional wetland. This method for establishing the watersheds of each depressional wetland works well because it establishes the outer boundary of the area that drains into each wetland and tabulates the total water contribution of both surface sheet flow and flow from swales or other riverine features. It also allows the storage of the wetlands and their corresponding watersheds' physical characteristics within a database for later analysis. Once the watersheds have been computed for each wetland, the sink-based, masked flow model can be reevaluated and run as a flow through model. The flow through model can then be used to create a flowpath network, which allows for additional parameterizing and characterizing of the system.

Preserve Specific Hydrologic Model

The hydrologic model for the preserve was computed from a combination of field collected wetland data and the DEM created from the LIDAR based topography. The model was generated by creating a hydrologically correct DEM using the field collected depressional wetland boundaries as a mask. Flow direction was computed allowing the creation of an accumulated flow GRID. Each cell in this dataset contains the value of the total aggregated upstream area. Cells with higher values have larger watersheds and are more likely to represent drainage features, while cells with lower values have smaller watershed areas. Most importantly, cells with a value of 0 represent the upper hydrologic boundary of at least one depressional wetland feature. These values for the preserve were aggregated and converted to the flow paths and watershed boundaries, depicted in yellow and red in Figure 6. Once the watershed boundaries were created, the spatial statistics were computed for each wetland feature and its corresponding micro-watershed.

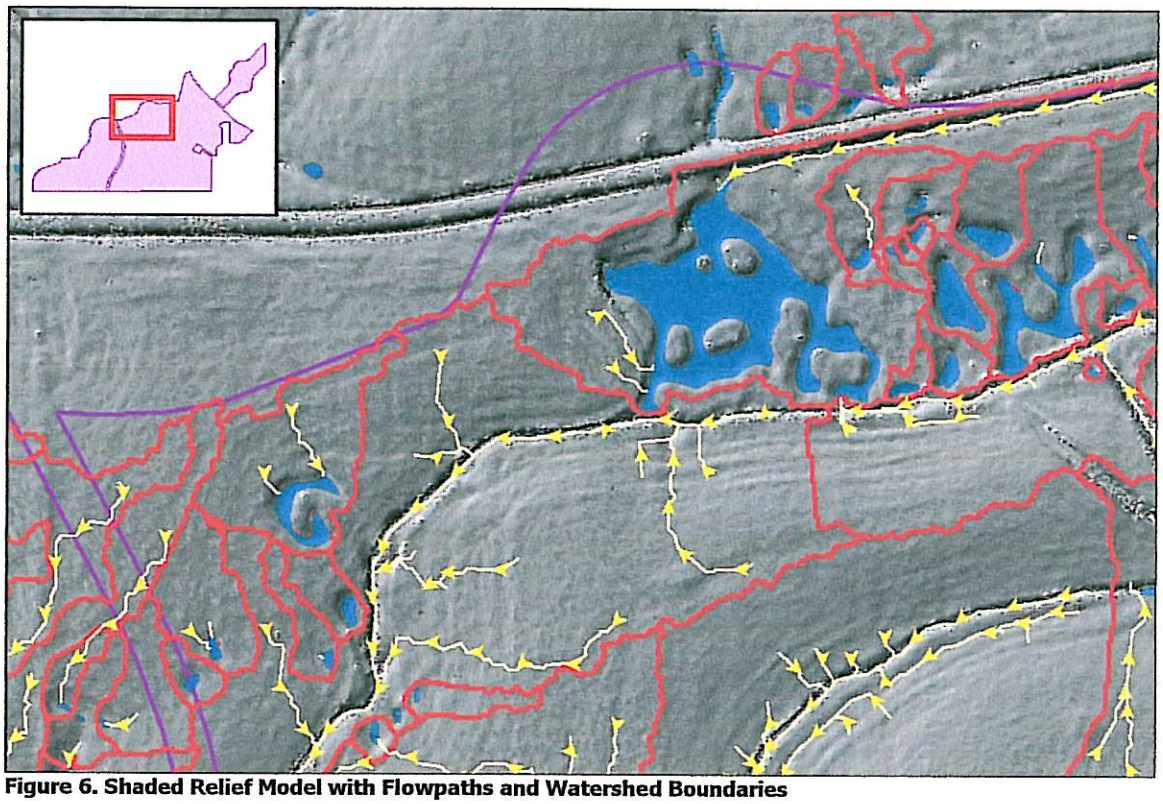


Figure 6. Shaded Relief Model with Flowpaths and Watershed Boundaries

Spatial Statistics

A sub-data set was generated that compiled the area (size) of each depressional wetland feature and the area of its corresponding micro-watershed. ECORP's fluvial geomorphologist then evaluated the distribution of the data to determine appropriate depressional wetland size classes for subsequent evaluation. Each depressional wetland size class was then analyzed to determine the minimum watershed area necessary to sustain current runoff inundation levels. Each depressional wetland size class was further evaluated to determine the WWR. The WWRs were then statistically analyzed to determine the minimum WWR for each depressional wetland size class. The overall analysis consisted of the following steps.

1. Sort the existing depressional wetland data set based on wetland area
   - Using hydrologic flow network analysis tools within GIS the LIDAR data were coupled with the wetland delineation to determine the number, type, and acreage of each wetland feature and its corresponding watershed area.

2. Determine the appropriate depressional wetland size classes
   - The wetland data set was stratified based on discrete size classes. Fourteen (14) size classes (12 vernal pool, 2 seasonal wetland) were defined for the Rio del Oro preserve based on depressional wetland acreages.

3. Determine the minimum watershed area for each wetland size class
   - The smallest watershed area within each depressional wetland size class represents the minimum watershed area require to sustain wetlands within the size class.

4. Determine the WWR for each depressional wetland within each wetland size class based on the minimum watershed acreage.
   - The WWR was determined for each depressional wetland within each wetland size class by dividing the minimum watershed acreage for each wetland size class by the acreage of each individual depressional wetland.

5. Determine the mean WWR for each depressional wetland size class.
   - WWR results from individual wetland size classes were statistically analyzed to determine the minimum, maximum, mean, variance, standard deviation, and 95 % confidence interval (CI).

6. Determine the watershed area required for each depressional wetland within each wetland size class based on the mean WWR for each wetland size class.
   - The watershed area for each wetland within each wetland size class was determined by multiplying the wetland area by the mean WWR.

7. Determine potential indirect impacts to existing depressional wetlands due to preserve configuration.
   - Potential impacts to each depressional wetland were determined utilizing the WWR value for each wetland size class.

8. Determine the total watershed area required for existing depressional wetlands within the Rio del Oro preserve.
   - The calculated wetland watershed sizes were summed to determine the total area within the Rio del Oro preserve necessary to sustain the current hydrologic functions of the depressionalwetlands within the preserve.

9. Determine the potential indirect impacts due to the construction of the proposed Rancho Cordova Parkway through the Rio del Oro preserve.

RESULTS AND DISCUSSION

In order to evaluate the long-term viability of the Rio del Oro preserve, a series of analyses were conducted. These analyses assessed the size of the proposed preserve, the amount of watershed area required to support the existing wetlands within the preserve, the potential impacts due to the construction of Rancho Cordova Parkway through the preserve, the required mitigation wetlands to be constructed within the preserve, and the watershed area necessary to support the hydrologic function of each mitigation wetland. The process and justification for each step will be discussed individually.

Watershed Area Required to Support Existing Depressional Wetlands

The analysis combined data collected from the wetland delineation with the LIDAR data. The wetland delineation provided the aerial extent of the existing wetlands in accordance with the verified wetland delineation. LIDAR data allowed for the development of high resolution topography as described above.

GIS tools tabulated the number of depressional wetlands within the site, type of each wetland, size of each wetland, and the size of the corresponding micro-watershed for each wetland. Wetland data were sorted by type and then size (area). The data were further stratified based on wetland size classes. Size classes were based on appropriate size classes and natural breaks in the data. Analysis of the data yielded fourteen (14) wetland size classes, 12 for vernal pools and 2 for seasonal wetlands (Table 1.0).

Wetlands within each wetland size class were sorted based on the size of the wetland watershed (micro-watershed). The smallest watershed within each wetland size class represents the minimum watershed area required to support hydrologic function of wetlands within the size class. The minimum watershed size was then used to determine the amount of watershed area needed to support each wetland within the size class. This was accomplished by dividing the minimum watershed value for each wetland size class by the size of the wetland to determine the watershed-to-wetland ratio (WWR). The WWR values for each wetland size class were then statistically analyzed to determine the mean watershed size required to sustain wetlands within each size class. This analysis was determined at the 95% confidence interval (CI).

Table 1.0 – Wetland size class distribution for Rio del Oro project site with associated mean watershed/wetland ratio (WWR) at the 95 % CI.

Wetland Type	Wetland Size Class (acres)	Minimum Watershed Size Required per Acre of Wetland	Sample Size
Vernal Pool	0.004 – 0.01	1.829, +/- 0.201	19
	0.011 - 0.02	2.855, +/- 0.142	68
	0.021 - 0.03	1.829, +/- 0.059	54
	0.031 - 0.04	3.557, +/- 0.085	38
	0.041 - 0.05	2.173, +/- 0.056	28
	0.051 - 0.06	2.270, +/- 0.064	15
	0.061 - 0.07	4.387, +/- 0.100	16
	0.08 – 0.10	2.911, +/- 0.164	17
	0.11 – 0.20	3.781, +/- 0.487	14
	0.21 – 0.37	2.016, +/- 0.261	12
	0.47 – 0.81	3.172, +/- 0.482	8
	1.40 – 2.60	5.598, +/- 1.408	6
Seasonal Wetland	0.01 – 0.05	2.194, +/- 1.020	8
	0.10 – 0.55	5.147, +/- 2.463	6

Impacts to Existing Wetlands Due to Preserve Configuration

All wetlands directly impacted by the proposed Rio del Oro development are included in the mitigation wetland total and were not analyzed. The location of the proposed preserve boundary results in indirect impact to the watersheds of sixty (60) wetlands[1]. The preliminary results indicate the loss of watershed area due to the preserve's configuration will impact the hydrologic functions of one existing vernal pool wetland, VP-317 (Figure 7.) Upon further investigation, the proposed preserve configuration conserves almost 100% of the original watershed area (Table 2.0). VP-317 falls into the largest vernal pool wetland size class (1.40 – 2.60). This vernal pool wetland size class has a WWR of 5.598 +/- 1.408. VP-317 has a wetland area of 2.05 acres with an actual WWR of 4.74. This actual WWR value of 4.74 falls within the 95 % confidence interval of the WWR for this vernal pool wetland size class (WWR 95 % CI = 4.19 – 5.60). The WWRs for the remaining fifty-nine (59) vernal pools are greater than their required WWRs, indicating the proposed Rio del Oro preserve configuration will not negatively impact the hydrologic function of these vernal pools.

Table 2.0 – Impact totals for wetland VP-317.

Wetland ID	Wetland Acreage	Original Watershed Acreage	Post Construction Watershed Acreage	Percent Watershed Preserved
VP-317	2.047	9.698	9.625	99.25 %

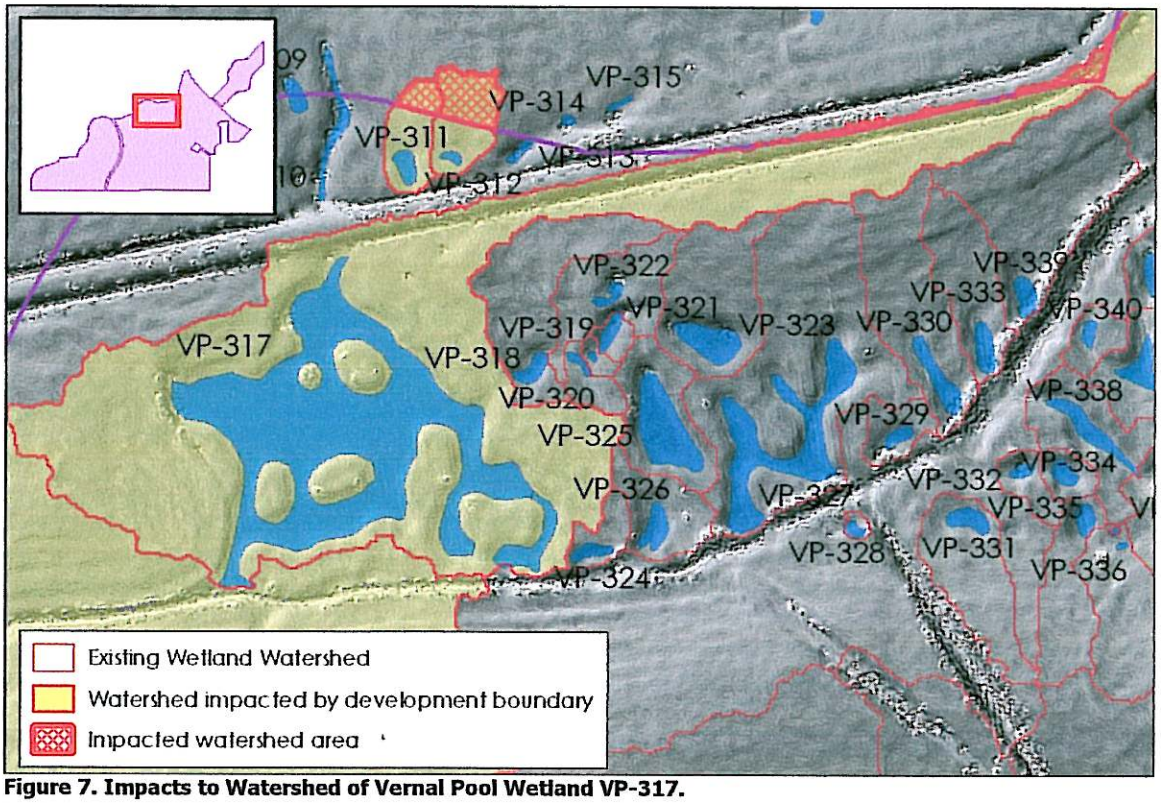


Figure 7. Impacts to Watershed of Vernal Pool Wetland VP-317.

[1] See Attachment A for a full-site image of all impacts resulting from the preserve's configuration.

Impacts Due to Rancho Cordova Parkway

The proposed road (Rancho Cordova Parkway) through the Rio del Oro preserve affects the watersheds of twelve (12) vernal pools. Because the proposed road follows a local ridge (topographic high) through the preserve, direct impacts are limited to one vernal pool (VP-287). This impact has been accounted for in the project impacts and wetland mitigation plan. Potential indirect impacts to the watersheds of the remaining eleven (11) vernal pools are minimal and do not negatively impact the hydrologic functions of these vernal pools. The eleven indirectly impacted vernal pools all have WWRs greater than their required WWRs for each vernal pool size class (Table 3.0).

Table 3.0 – Change in watershed/wetland ratio (WWR) to wetlands with watersheds indirectly impacted by Rancho Cordova Parkway.

Wetland ID #	Wetland Acreage	Original WWR	Final WWR[1]	Required WWR
VP-332	1.3285	8.66	7.65	5.598
VP-334	0.0039	130.77	128.77	1.829
VP-268	0.0051	172.52	70.56	1.829
VP-269	0.0052	120.24	108.07	1.829
VP-259	0.0200	137.95	88.36	1.829
VP-251	0.0306	133.53	46.35	3.557
VP-288	0.0193	55.58	52.37	2.855
VP-257	0.0188	82.00	77.44	2.844
VP-254	0.1677	15.40	8.90	3.781
VP-237	0.0692	63.71	42.91	4.387
VP-240	0.5770	20.01	9.48	3.172

[1]. "Final" represents the WWR after the road is constructed.

For example, Figure 8 illustrates how wetlands VP-251 and VP-240 are impacted by the proposed Rancho Cordova Parkway[2]. VP-251 has a vernal pool area of 0.0306 acres with an original watershed size of 4.08 acres (WWR = 133.53). VP-251 will lose 2.63 total acres from its watershed, 1.66 acres directly impacted by the footprint of the road and 0.97 acres from the upland area separated by the construction of the road, resulting in a final watershed area of 1.45 acres (WWR = 46.35). VP-240 has a vernal pool area of 0.5770 acres with an original watershed size of 10.80 acres (WWR = 20.01). VP-240 will lose 5.50 total acres from its watershed, 3.44 acres directly impacted by the footprint of the road and 2.06 acres from the upland area separated by the construction of the road, resulting in a final watershed area of 5.30 acres (WWR = 9.48).

Total watershed area removed from VP-251: [1.66 ac + 0.97 ac] = 2.63 ac
Total watershed area removed from VP-240: [3.44 ac + 2.06 ac] = 5.50 ac

VP-251 is in vernal pool size class 0.031 – 0.04 acre with a WWR of 3.557. Each vernal pool in this size class requires 3.557 acres of watershed for every 1.000 acre of vernal pool wetland. This indicates that 0.0306 acres of vernal pool require 0.109 acres of watershed area. VP-240

[2] See Attachment B for a full-site image of all vernal pool wetlands impacted by Racnho Cordova Parkway.

is in wetland size class 0.47 – 0.81 acre with a WWR of 3.172. This indicates that 0.5770 acre of vernal pool require 1.830 acres of watershed area.

Watershed area required for:
VP-251, [0.0306 ac wetland x 3.557 WWR] = 0.109 ac. watershed
VP-240, [0.5770 ac wetland x 3.172 WWR] = 1.830 ac. watershed

The remaining watershed area for wetlands VP-251 and VP-240 are 1.45 acres and 5.30 acres respectively. These are 1.34 and 3.47 acres greater than the required watershed size (Table 4.0) for their respective wetlands. This illustrates that the proposed Rancho Cordova Parkway through the Rio del Oro preserve will not negatively impact the watersheds of these vernal pools or their hydrologic function.

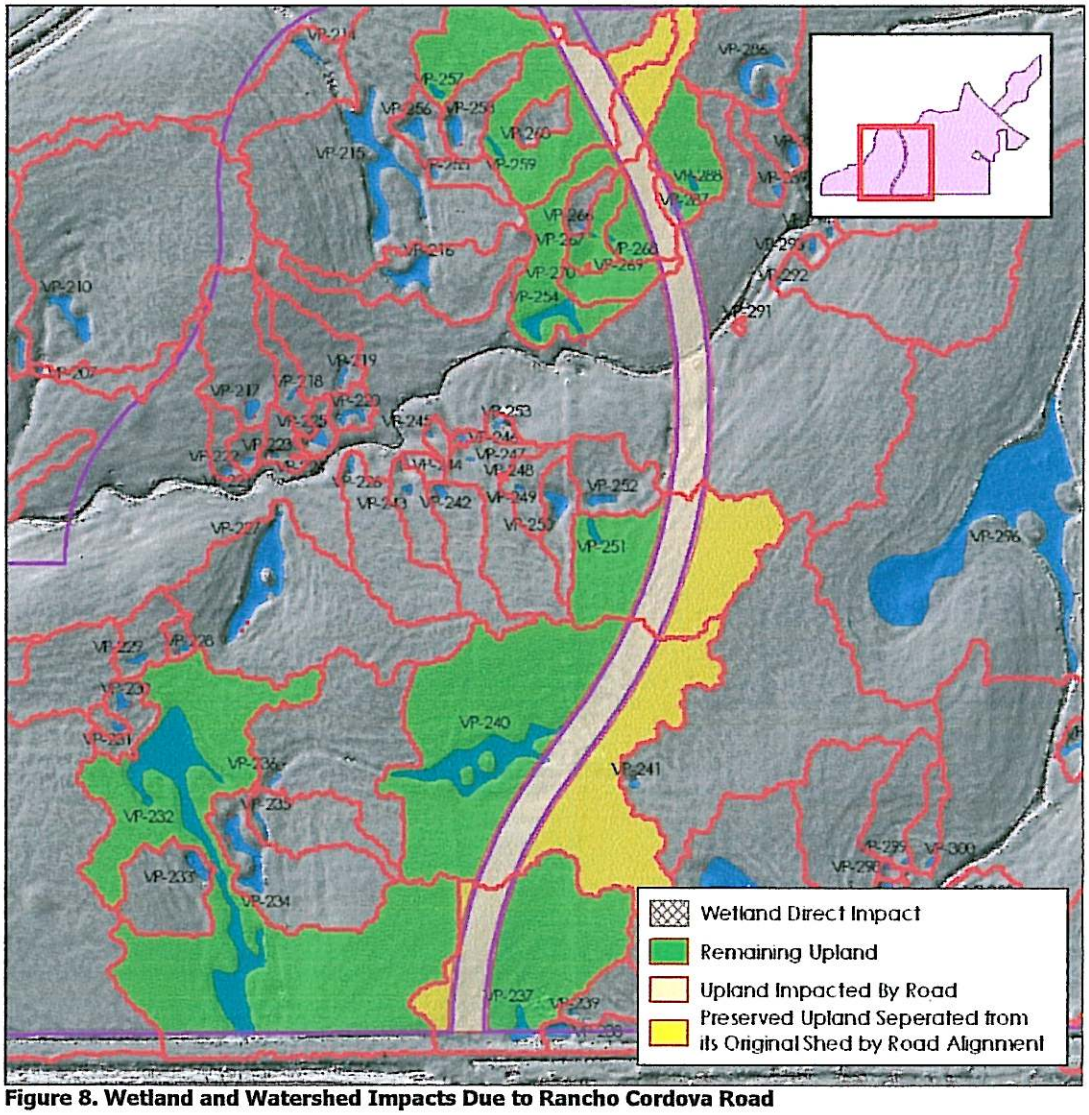


Figure 8. Wetland and Watershed Impacts Due to Rancho Cordova Road

Table 4.0. Impacts to vernal pools VP-251 and VP-240 due to Rancho Cordova Parkway.

Wetland ID	Original Wetland Size (ac.)	Truncated Watershed Size (ac.)	Watershed/ Wetland Ratio	Required Watershed Size (ac.)	Watershed Size Difference (ac.)
VP-251	0.03	1.45	3.557	0.109	+ 1.34
VP-240	0.58	5.30	3.172	1.830	+ 3.47

Suitability of Preserve for Construction of Mitigation Wetlands

To determine the feasibility of constructing mitigation wetlands within the Rio del Oro preserve, the WWRs for the current wetlands within the preserve were calculated. The current mitigation preserve area is 507 acres with 28.85 acres of vernal pools and waters of the U.S. The greatest WWR calculated for the existing wetland size classes within the Rio del Oro project site is 5.598 (+/- 1.408). This indicates that 5.598 acres of watershed are required for every 1.000 acres of wetland. Using the conservative WWR value of 7.01 (5.598 + 1.408) acres with the present wetland total within the preserve of 28.85 yields a total required watershed size of 202.24 acres.

[28.85 wetlands acres x 7.01 WWR] = 202.24 ac. of watershed

The Rio del Oro preserve is 507 acres in area. Removing the 28.85 acres of wetlands and waters of the US from the total preserve area results in 481.15 acres of watershed area. The construction of Rancho Cordova Parkway within the proposed Rio del Oro preserve will eliminate an additional 30.33 acres leaving 450.82 acres. Existing wetlands within the preserve require 202.24 acres of watershed, leaving a total of 248.58 acres available for the construction of mitigation wetlands and their required watersheds within the preserve. The project proposes to build 17.867 acres of mitigation wetlands within the Rio del Oro preserve[3]. Using the conservative WWR of 7.01 indicates a total of 125.25 acres of watershed are required to support the hydrologic function of 17.867 acres of mitigation wetlands preserve. This is 123.33 acres less than the available 248.58 acres and represents only half (50.39%) of the area within the proposed preserve available for the construction of mitigation wetlands.

Acres of watershed required to support the construction of 17.867 acres of mitigation wetlands: [17.867 wetland acres x 7.01 WWR] = 125.25 ac of watershed

CONCLUSIONS

The hydrologic analysis of the proposed Rio del Oro preserve allows us to make the following conclusions:

Overall Preserve Configuration

The size and configuration of the 507-acre proposed preserve located in the southern portion of the Rio Del Oro project adequately preserves and protects the watersheds of the existing vernal

[3] See attachment C for a full-site layout of the proposed mitigation wetlands within the preserve.

pools and seasonal wetlands. No additional indirect impacts, not already identified and accounted for in the mitigation plan, are expected to occur. The watersheds of the preserved wetlands meet or exceed the minimum required watershed needed to sustain them.

Compensatory Vernal Pool Habitat

Based on our analysis, the construction of the proposed compensatory vernal pool habitat within the preserve will not adversely affect the hydrology of the existing vernal pools and wetlands. Compensatory vernal pools will have sufficient watershed area while also maintaining seasonal watersheds for existing wetland features so that wetland functions and values are established and maintained, respectively.

Rancho Cordova Parkway

The construction of Rancho Cordova Parkway will not directly or indirectly impact wetlands not already considered impacted pursuant to the mitigation plan. Construction of the Parkway will remove and truncate portions of watersheds of some wetlands, but all wetlands will retain watersheds that meet or exceed their calculated needs.

LIST OF ATTACHMENTS

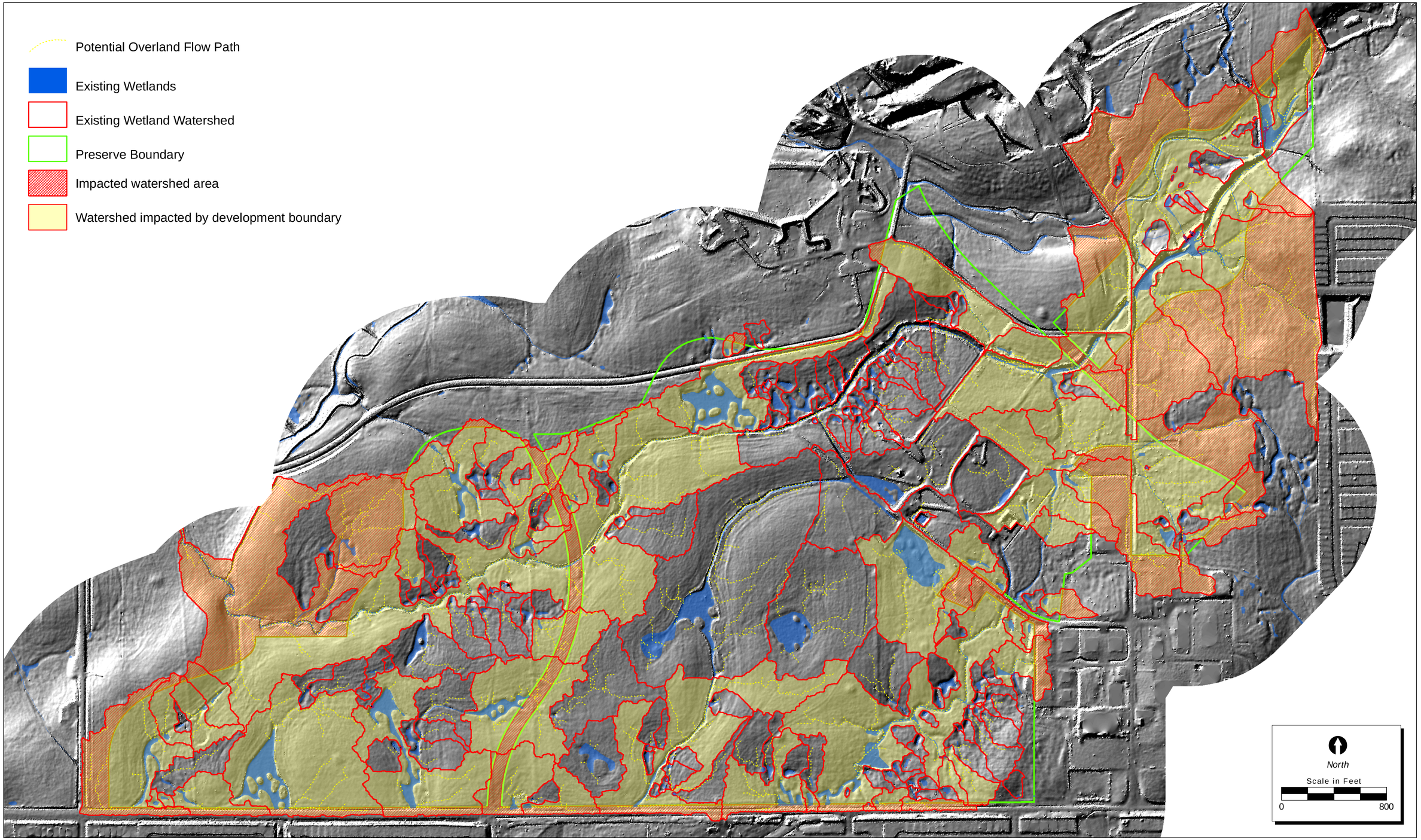
Attachment A – Proposed Mitigation Preserve with Existing Wetlands, Watersheds and Flow Paths

Attachment B – Rancho Cordova Parkway – Affects on Watersheds

Attachment C – Proposed Mitigation Preserve with Existing and Proposed Compensatory Wetlands and Watersheds

ATTACHMENT A

Proposed Mitigation Preserve with Existing Wetlands, Watersheds and Flow Paths



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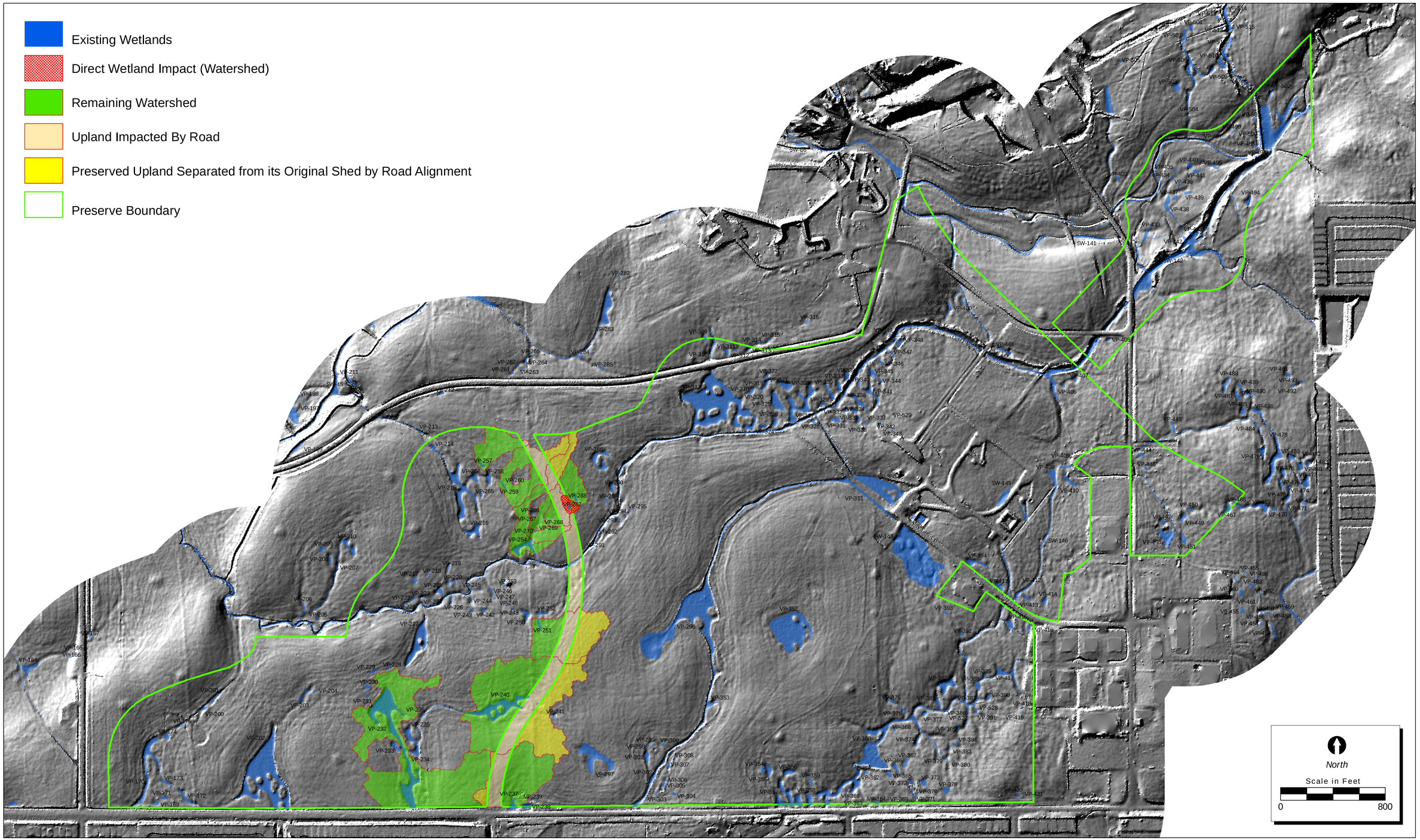
Attachment A. Proposed Mitigation Preserve with Existing Wetlands, Watersheds and Flow Paths

2002-009 Rio del Oro

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

ATTACHMENT B

Rancho Cordova Parkway – Affects on Watersheds



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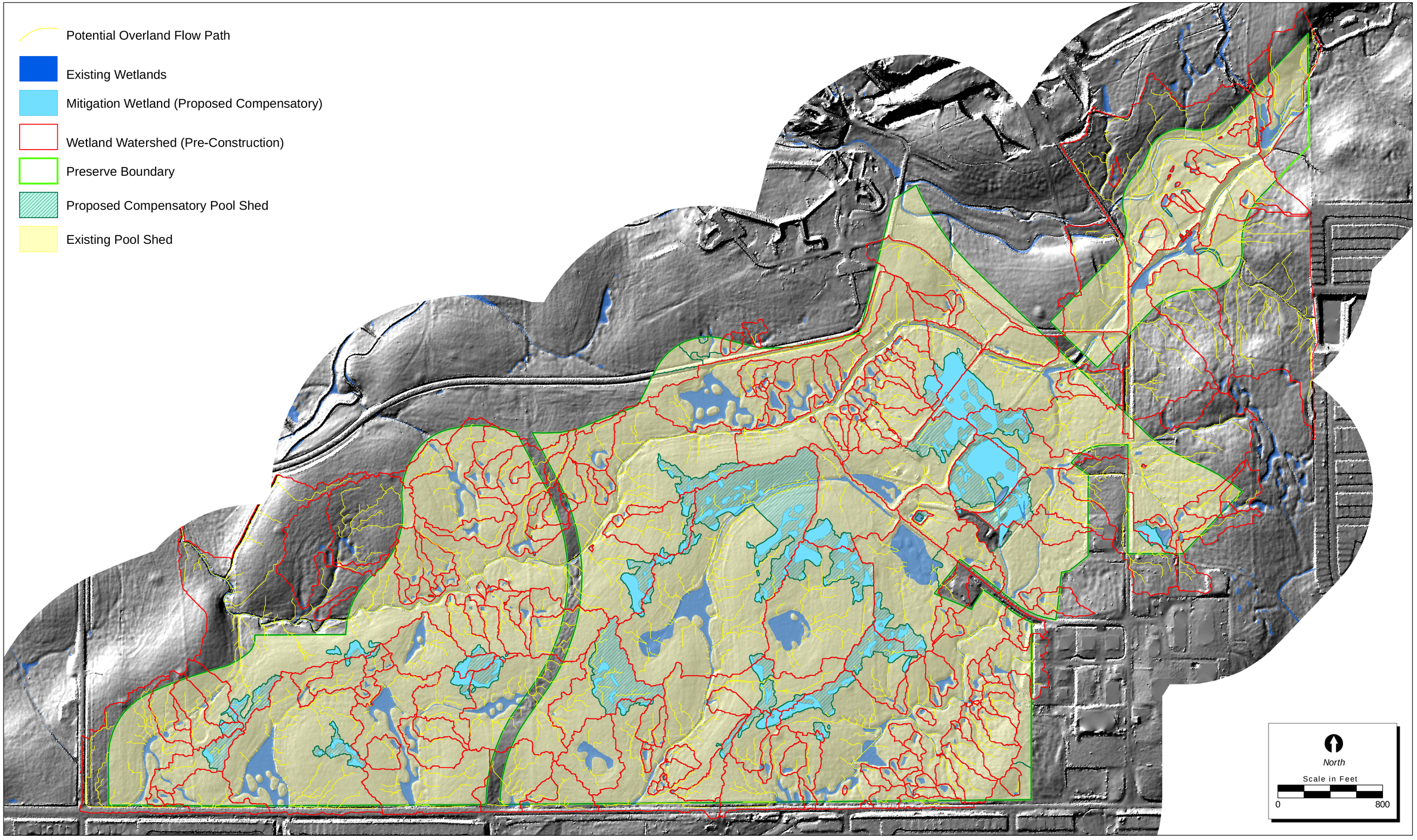
Attachment B. Rancho Cordova Parkway - Affects on Watersheds

2002-009 Rio del Oro

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

ATTACHMENT C

Proposed Mitigation Preserve with Existing Wetlands, Watersheds and Flow Paths



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Attachment C. Proposed Mitigation Preserve with Existing and Proposed Compensatory Wetlands and Watersheds

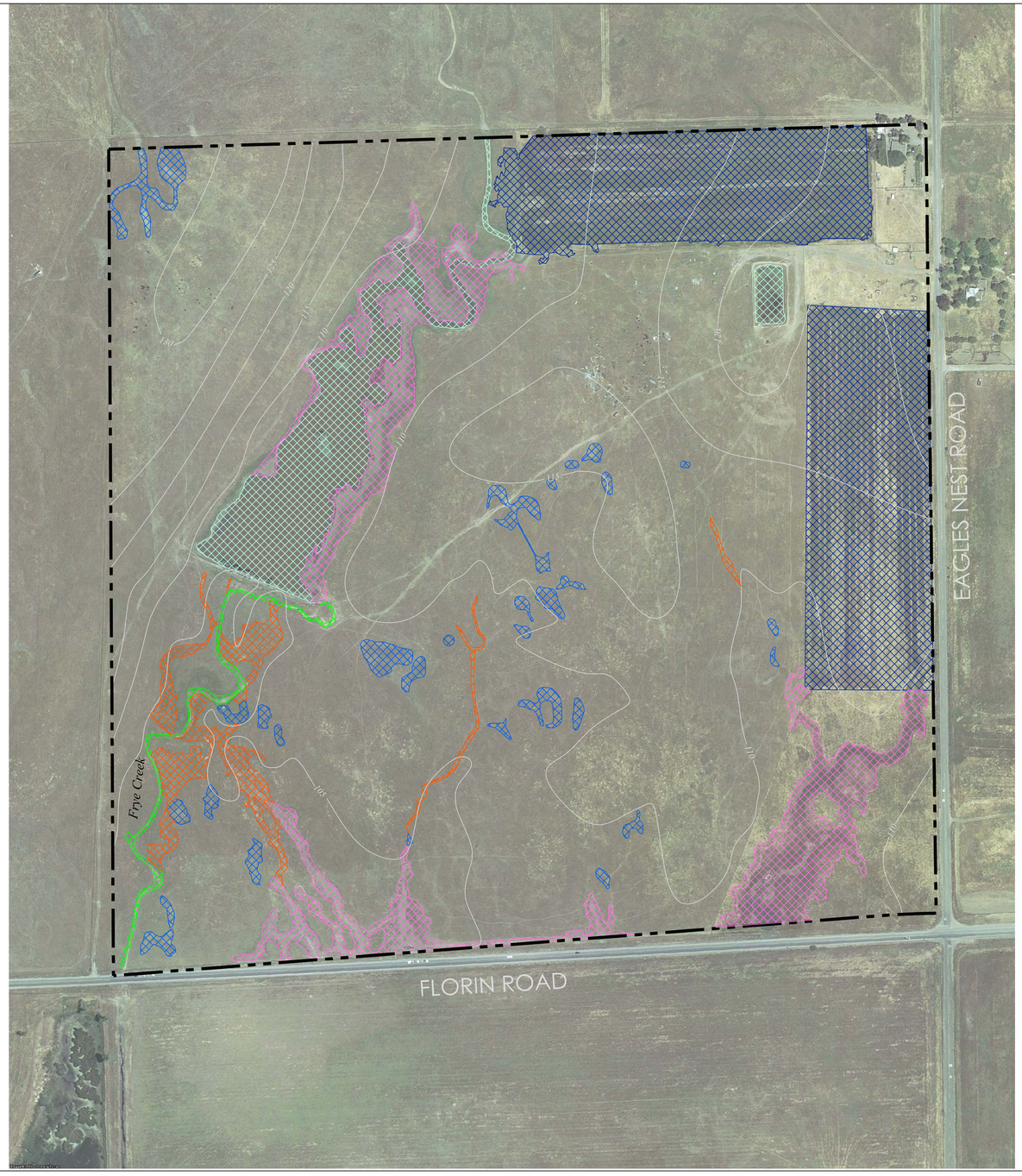
2002-009 Rio del Oro

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

ATTACHMENT C

Preliminary Wetland Assessment Cook Property

PROJECT NAME: Rio Del Oro - WETLAND ASSESSMENT



APPROXIMATE WATERS OF THE U.S. ACREAGE[1]

CLASSIFICATION	APPROXIMATE ACREAGE
WETLANDS:	
Vernal Pool	2.67
Seasonal Marsh	9.90
Seasonal Wetland Swale	2.63
OTHER WATERS:	
Pond	6.51
Intermitent Drainage	0.58
TOTAL:	22.29

OTHER FEATURES

Project Boundary[2]	±160
Irrigated Pastures	21.27

NOTES

Gross project acreage: ±160

Aerial photo source: Globe Explorer, October 1999.

Topographic data source: Digitized from U.S.G.S. Quadrangle

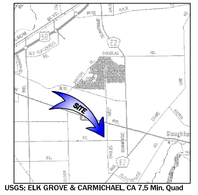
[1] *The information depicted on this graphic represents a preliminary wetland assessment. The assessment was not conducted in accordance with the Corps of Engineers Wetland Delineation Manual and Sacramento District Minimum Standards. The project boundaries, wetland boundaries, and acreage values are approximate.*

[2] Boundary source:
The project boundary extents depicted on this graphic have been extracted from the GIS parcel database provided by the assessor of Sacramento County and have not been ground surveyed. ECORP holds no liability to the accuracy of the boundary and recommends a future formal property survey.

SCALE IN FEET
0 100 200 400

SCALE: 1"=200'

VICINITY MAP



USGS: ELK GROVE & CARMICHAEL, CA 7.5 Min. Quad

JOB NAME: Rio Del Oro - WA
PROJECT NO.: 2002-009
MAP SCALE: 1"=200'
DATE: 28 JULY 2006
REVISION: —
FILE NAME: Cook-WA.dwg

RIO DEL ORO

PRELIMINARY WETLAND ASSESSMENT COOK PROPERTY

DATE: 28 JULY 2006	REVISION DATE: —	PROJECT NUMBER: 2002-009
CAD SPECIALIST: JLH	SCALE: 1"=200'	MAP NAME: Cook-WA.dwg
MAP LOCATION: X:\2002-009 Rio del Oro\WA\Cook Mit		QA/QC:
WETLAND VERIFICATION LETTER DATE:		PM: BG

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APPENDIX R

Draft Valley Elderberry Longhorn Beetle Mitigation Plan

DRAFT

Valley Elderberry Longhorn Beetle Mitigation Plan

For

Rio Del Oro

Sacramento County, California

Superseded Date:
11 September 2007

Original Date:
18 January 2006

Prepared for:
Elliott Homes, Inc.
and
GenCorp Real Estate

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

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Valley Elderberry Longhorn Beetle Mitigation Plan

Rio Del Oro

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1.0 BACKGROUND INFORMATION

At the request of Elliott Homes, Inc. and GenCorp Real Estate, Gibson and Skordal conducted a Valley elderberry longhorn beetle (VELB) and elderberry shrub survey during the summer of 2000 within the Rio del Oro property (Project Area). The property is located north of Douglas Road, south of White Rock Road, and east of Sunrise Boulevard in Sacramento County, CA (Figure 1. *Project Site and Vicinity*). The ±3,829 acre site corresponds to portions of Sections 5, 6, 7, 8, 9, 10, 31, and 32, Townships 8 and 9 North, and Range 7 East, Mount Diablo Base Meridian (MDBM) of the "Carmichael, California" and "Buffalo Creek, California" 7.5-minute topographic quadrangles (U.S. Department of the Interior, Geological Survey, photorevised 1993).

Gibson and Skordal completed a series of elderberry surveys during July and August of 2000. The survey effort adhered to the current established conservation guidelines for the VELB (USFWS 1999). A total of 329 elderberry shrubs were identified in the Project Area, the majority of which are scattered throughout the dredge tailings on-site (Figure 2. *Elderberry Shrub Locations*). The elderberry shrubs observed within the Project Area range in size from small shrubs to large size trees. Forty-two (42) elderberry shrubs exhibit VELB evidence in the form of apparent exit holes, comprising approximately 13% of the total existing shrubs within the Project Area. Elderberry survey data are summarized in Attachment A.

The Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) became listed as a threatened species in 1980 (Federal Register 45: 52803-52807). As a result, impacts to potential VELB habitat require mitigation measures in general compliance with the requirements outlined in the U.S. Fish and Wildlife Service (USFWS) Conservation Guidelines for the Valley Elderberry Longhorn Beetle (USFWS 1999).

1.1 Project Implementation

The proposed project will involve grading and filling activities to establish construction grade and installation of infrastructure for a master-planned community on the ±3,829 – acre parcel.

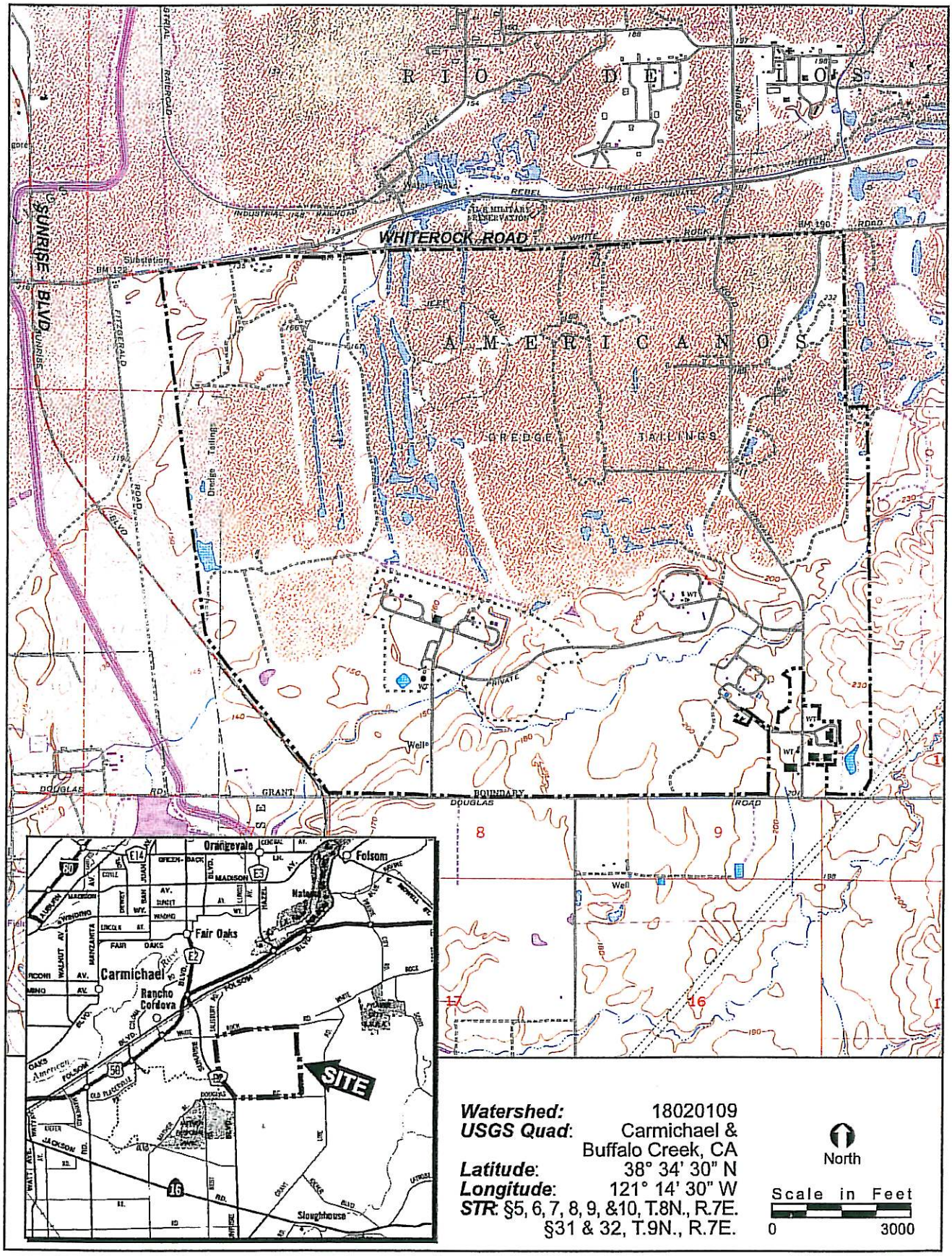

FIGURE 1. Project Site and Vicinity

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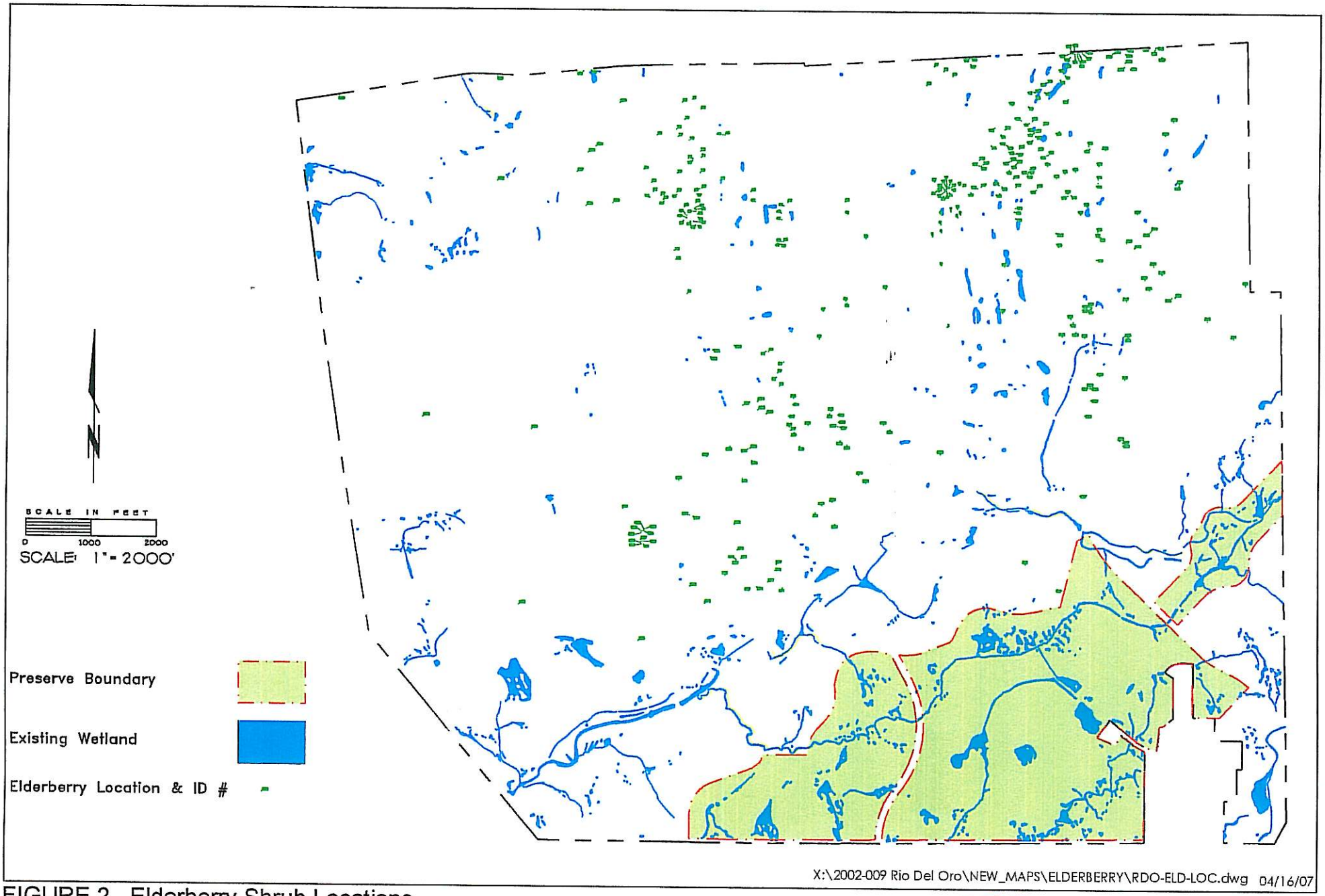

FIGURE 2. Elderberry Shrub Locations

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The proposed land use plan includes high, medium, and low-density residential, retail/commercial, office, park, schools, wetland preserve, and open space areas.

The current land use plan will directly impact 292 of the elderberry shrubs within the Project Area. On behalf of Elliott Homes Inc. and GenCorp Real Estate, ECORP Consulting, Inc. conducted an analysis of the required mitigation measures necessary to compensate for this total net loss. Mitigation calculations followed the compensation requirements outlined in the USFWS VELB Conservation Guidelines (USFWS 1999). These guidelines define mitigation measures based on the number of stems by diameter classes at ground level, the presence or absence of evidence/exit holes, and whether the elderberry shrubs occur in riparian habitats. Each of the 292 impacted shrubs are proposed for transplantation. An additional 2,997 elderberry seedlings and 3,869 associated natives will be planted and protected within conservation areas totaling 22-acres (Figure 3. *Elderberry Mitigation Area*). Thirty-seven (37) shrubs will remain in two on-site elderberry habitat preserves.

2.0 INTRODUCTION

This document provides information pertaining to the life history, habitat requirements, and threats posed to the elderberry habitat within the Project Area. This report summarizes VELB mitigation measures for the Project and describes how the proposed compensation measures comply with the USFWS Conservation Guidelines for the VELB (USFWS 1999). The ultimate goal of mitigation measures presented in this report is to avoid and minimize adverse effects on the VELB and the elderberry habitat. Mitigation will be accomplished through a combination of avoidance measures, compensatory mitigation (transplantation, additional plantings, and associated native plantings), and monitoring.

WATERS OF THE U.S. ACREAGE

CLASSIFICATION	JURISDICTIONAL ACREAGE	IMPACTS DIRECT	IMPACTS INDIRECT	MITIGATION PRESERVE	MITIGATION CREATION
Wetlands:					
Vernal Pool	35.485	15.072	2.179	18.234	17.867
Pond	3.540	2.923		0.617	N/A 0.000
Seasonal Wetland Swale	6.044	3.530		2.514	N/A 0.000
Seasonal Wetland	6.418	3.064		3.354	N/A 23.4[1]
Other Waters:					
Ephemeral Drainage	5.145	3.556		1.590	N/A 0.000
Riparian Wetland	---	---		---	20.785[2]
Channel	---	---		---	6.229[2]
TOTAL:	56.632	27.903	2.179	26.309	68.281

[1] Assume 60% of detention basin can be seasonal wetland

[2] Proposed Corridor Plan

[3] Includes 2.179 ac. of vernal pool habitat within 250' buffer. This habitat included in indirect impacts.

Project Boundary

Line of Indirect Impact

Elderberry Location

Open Space (+/- 197 ac.)

VELB Preserve (+/- 22 ac.)

Isolated Wetlands

Wetland Preserve (+/- 507 ac.)

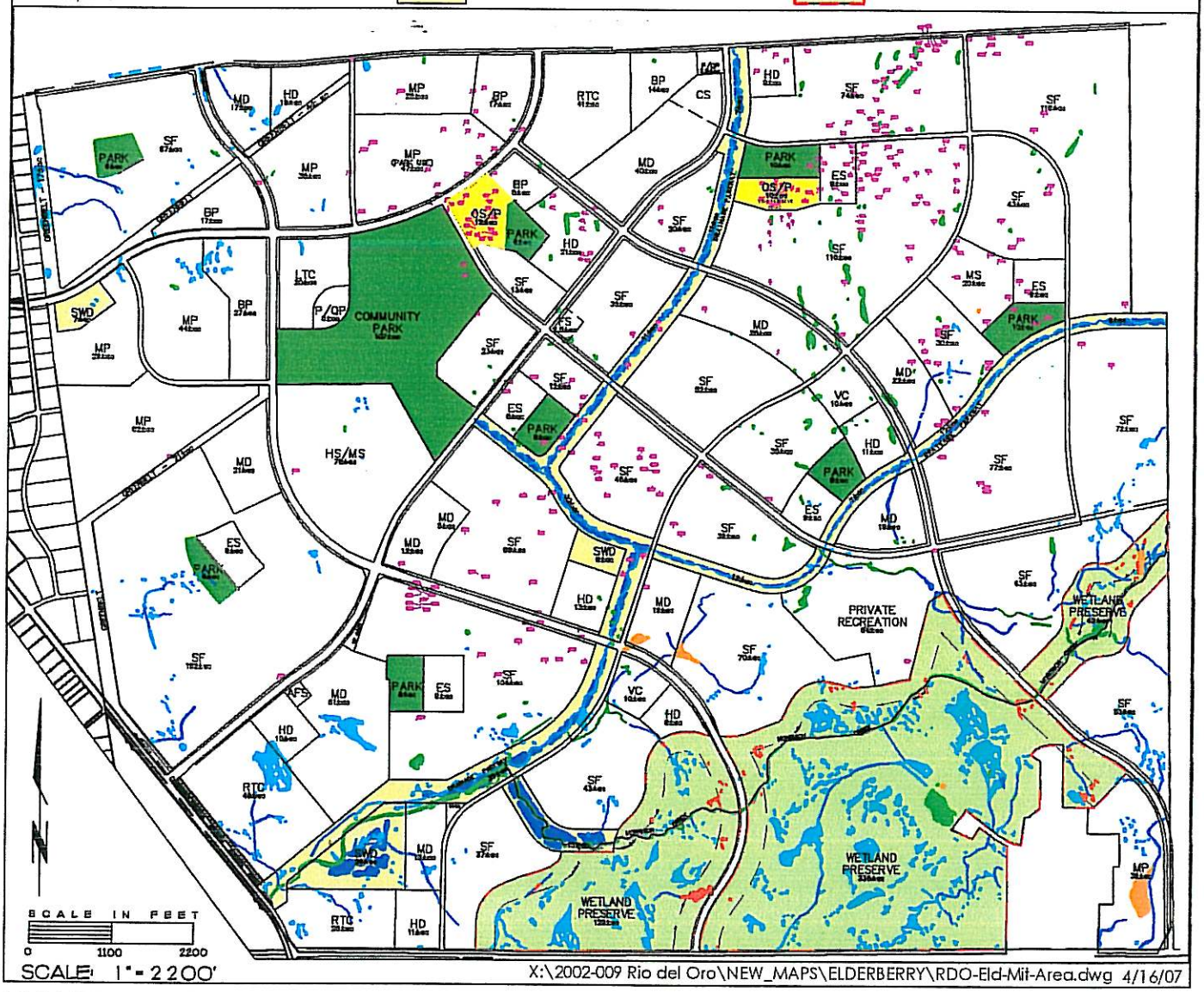

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FIGURE 3. Elderberry Mitigation Area

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3.0 VELB LIFE HISTORY CYCLE AND OTHER ATTRIBUTES

3.1 Description and Taxonomy

The Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) is a member of the Cerambycidae family and is known from California alone. Subspecies separation is based on distribution and male color pattern variation (Barr 1991). The 'dimorphus' of its name alludes to morphological differences between males and females. Females are typically larger than males, and can grow up to two inches. They have shorter segmented antenna, and have dark metallic green forewings with red margins. The male's antenna is at least as long as its body and the prominent segmented antenna is what the common name 'longhorn' refers to. Males have red forewings and dark green spots.

3.2 Ecological Relationships

The VELB can only be found in association with its exclusive host plant the elderberry, typically blue elderberry (*Sambucus mexicana*) and occasionally red elderberry (*Sambucus racemosa*). VELB range is limited and includes all of California's Central Valley from Shasta County in the north to Kern County in the south at elevations below 3,000 feet (Barr 1991). Elderberry shrubs generally occur in riparian communities surrounding the American, San Joaquin, Tule, Kings, Kaweah, and Sacramento rivers and along outlying tributaries of these watersheds (USFWS 1999). They also occur in upland savannah areas adjacent to some riparian habitats.

Early work on the VELB has demonstrated that isolated elderberry shrubs and lone-standing drainages are less likely to support beetle populations than dense elderberry shrubs within riparian communities that have some connectivity to other habitats (Collinge et al. 2001).

3.3 Life Cycle

Adult beetles are present on elderberry shrubs from March through June. Adult males are short lived and survive for only a few days. Females persist for up to a month. They feed exclusively on the leaves and flowers of the host plant. During this time period mating occurs and females

lay their eggs on the stems, leaves, and in bark crevices of elderberry shrubs. Hundreds of oblong, reddish brown eggs are laid which are about 2.5 to 3.0mm long and ridged. The eggs typically hatch within 24 to 48 hours and small larvae emerge. The larvae burrow themselves into the plant stems immediately. VELB larvae remain inside the elderberry stems for 1 to 2 years feeding on its pith. Their feeding activities create a distinctive gallery (feeding chamber) that is a hollow tunnel filled with frass and shredded wood (Barr 1991). Larvae mature and eventually pupate into adults. Adult beetles then chew an exit hole and emerge out of the shrub completing the life cycle. Although few researchers have seen adult beetles, their exit holes are often visible. Exit holes are circular or oval and are typically 5 to 15 mm. in diameter. Most exit holes are located in the basal portions of elderberry stems, generally not above heights of 4 feet.

3.4 Habitat Requirements

Elderberry shrubs are a common component of the Central Valley's lush riparian forests. This distinctive plant community surrounds the region's rivers, streams, and numerous watershed tributaries. The VELB appears to occur more frequently in thick riparian stands with high elderberry densities as opposed to sparse and highly fragmented riparian habitats.

3.5 Threats

Habitat loss and fragmentation are the most significant threats to the VELB. It is estimated that over 90% of the riparian habitat in California has been removed over the last century. Agricultural activities and conversion, suburban and urban development, aggregate mining sites, channelization, infrastructures such as damns and levees, and flood control practices continue to replace the riparian forests throughout the state. In addition to habitat loss and fragmentation, exotic and invasive species pose a threat to the beetle. In particular the Argentine ant (*Linepithema humile*), an introduced species in riparian habitats, is a major threat to the distribution and survival of the VELB. Pesticide and herbicide use, insecticidal drift from fields and orchards, pollution and inappropriate chemical disposal, over grazing, and general mismanagement are several other factors contributing to the VELB demise.

4.0 MITIGATION MEASURES

The following VELB habitat mitigation plan has been prepared for the Rio del Oro site to mitigate known and potential direct and indirect impacts to elderberry shrubs within the proposed development areas of the project. A summary of proposed compensation (i.e., plantings or mitigation unit purchase) for direct and indirect impacts is included in Table 1.

Table 1 – Proposed Elderberry Impacts and Mitigation

Location	Exit Holes	Number of Stems (by Diameter) at Ground Level			Elderberry Plantings	Associated Native
	Present	1" to 3"	> 3" & < 5"	≥ 5"	Required	Plantings Required
Non-Riparian	No	27	3	5	48	48
Riparian	No	568	115	149	2077	2077
Non-Riparian	Yes	1	0	2	14	28
Riparian	Yes	95	21	44	858	1716
				Subtotal:	2997	3869

Total Plantings: 6866
Number of Transplants: 292
Total Credits: 686.6
Total Onsite Credits: 532.4
Credits Needed: 154.2

Based on the 2,997 elderberry plantings, plus the 3,869 associated native plantings, there is a total of 6,866 plantings that are required for mitigation, which is the equivalent of 686.6 credits. There are 10 plantings, 5 elderberry seedlings and 5 associated Natives, per credit. In order to convert the credits into acreages, 686.6 is multiplied by 1,800 square feet, which equals 1,235,880 square feet or 28.37 acres. Onsite, there is a total of 22 acres designated for mitigation, which will accommodate 532.4 onsite credits. This leaves a balance of 154.2 credits, or 6.37 acres of habitat that will be purchased at an offsite mitigation bank.

ECORP Consulting has contacted various VELB mitigation banks to inquire about available VELB credits. To date, three mitigation banks, or combination of banks, have been identified that could provide the balance of VELB credits needed for the Rio del Oro project. The USFWS has also indicated that service-area restrictions are no longer a factor, which should allow for more banks to offer mitigation for the Rio del Oro project.

4.1 Regulatory Context

Impacts to VELB habitat are subject to compliance with the federal Endangered Species Act (ESA). According to general compensation guidelines for impacts to VELB, as stipulated by the Guidelines (USFWS 1999), VELB habitat avoidance should be a priority. Complete avoidance can be assumed when a 100-foot buffer would be established and maintained around all elderberry plants containing stems measuring one inch or greater in diameter at ground level. Encroachments into the 100-foot buffer require USFWS approval and may require mitigation for indirect impacts. If avoidance is not feasible, the Guidelines recommend transplantation of all existing elderberries that cannot be avoided by the project to a conservation area, and the establishment of new elderberry plants and associated native vegetation within the conservation area. This requires an incidental take permit issued by the USFWS. Replacement ratios for impacts (i.e., transplanted or destroyed) to elderberry stems one inch or greater in diameter at ground level, range from 1:1 to 8:1 (new plantings to affected stems). These ratios are based on stem size class, presence or absence of exit holes (evidence of VELB use), and location (riparian or non-riparian). For example, a replacement ratio of 1:1 is specified for elderberry shrubs located within non-riparian communities, with no evidence of VELB use and stems between one and three inches at ground level. A 4:1 replacement ratio is specified for shrubs where VELB evidence is apparent, stems are between one and three inches in diameter, and the shrub is riparian in habitat. An 8:1 replacement ratio is specified for elderberry shrubs where VELB evidence is apparent, stems are greater than five inches in diameter, and the shrub is located in a riparian community.

The Guidelines also describe recommended methods and timing for transplantation and planting activities, as well as habitat protection measures. The Guidelines indicate that recent studies have shown that VELB are more abundant in dense native plant communities, with mature overstory and mixed understory. Consequently, establishment of various native plants, at a given ratio to elderberries, is recommended. Compensation VELB habitat is typically monitored over a 10-year period.

The following mitigation measures have been prepared specifically for the Rio del Oro Project Area to address direct and indirect impacts to the 292 elderberry shrubs within the Project Area.

These mitigation measures adhere to and satisfy the recommendations of the USFWS Conservation Guidelines for the Valley Elderberry Longhorn Beetle (USWFS 1999). Mitigation will be accomplished through a combination of avoidance, transplantation into designated preserves, compensatory mitigation (additional elderberry plantings and associated native plantings), and monitoring efforts.

4.2 Avoidance/Protection

Two designated elderberry habitat preserves totaling 22-acres have been established within the Project Area (see Figure 3). Preserve #1 is located in the northwest corner of the site and has 19 existing elderberry shrubs that will be avoided and permanently protected. Preserve #2 is located in the northeastern corner of the site and supports 18 elderberry shrubs (Figure 4. *Detail of Preserve/Mitigation Areas*). These shrubs will also be avoided during the project activities and permanently protected. As recommended in the USFWS guidelines (USFWS 1999), these areas will be fenced off during construction and a 100-foot buffer zone will be established with brightly colored pin-flags. Contractors working in the vicinity of the preserves will be briefed on the need to avoid damaging the elderberry shrubs and forewarned regarding the consequences for not complying with these instructions. The members of the various work crews will also be informed about the status of the beetle and the need to protect its elderberry host. Signs indicating the necessary information, as outlined in the USFWS guidelines (USFWS 1999), will be erected every 50 feet along the edges of the avoidance/preservation areas.

Following construction activities, both of the elderberry preserves will be fenced and monitored as stipulated in the Mitigation Plan for Rio del Oro and the project's long-term Operations and Management Plan. During future monitoring efforts, particular attention will be given to ensure that the avoided elderberry bushes survive and thrive (i.e., maintenance of fencing and signs, weed control, trash removal, etc.). These preserve areas will be permanently fenced and will be protected by deed restrictions and conservation easements. The property will be managed as wildlife habitat in perpetuity. Such management will be funded by an endowment established by the applicant (Elliott Homes, Inc. and GenCorp Real Estate) and carried out by the City of Rancho Cordova or a third-party conservation entity.

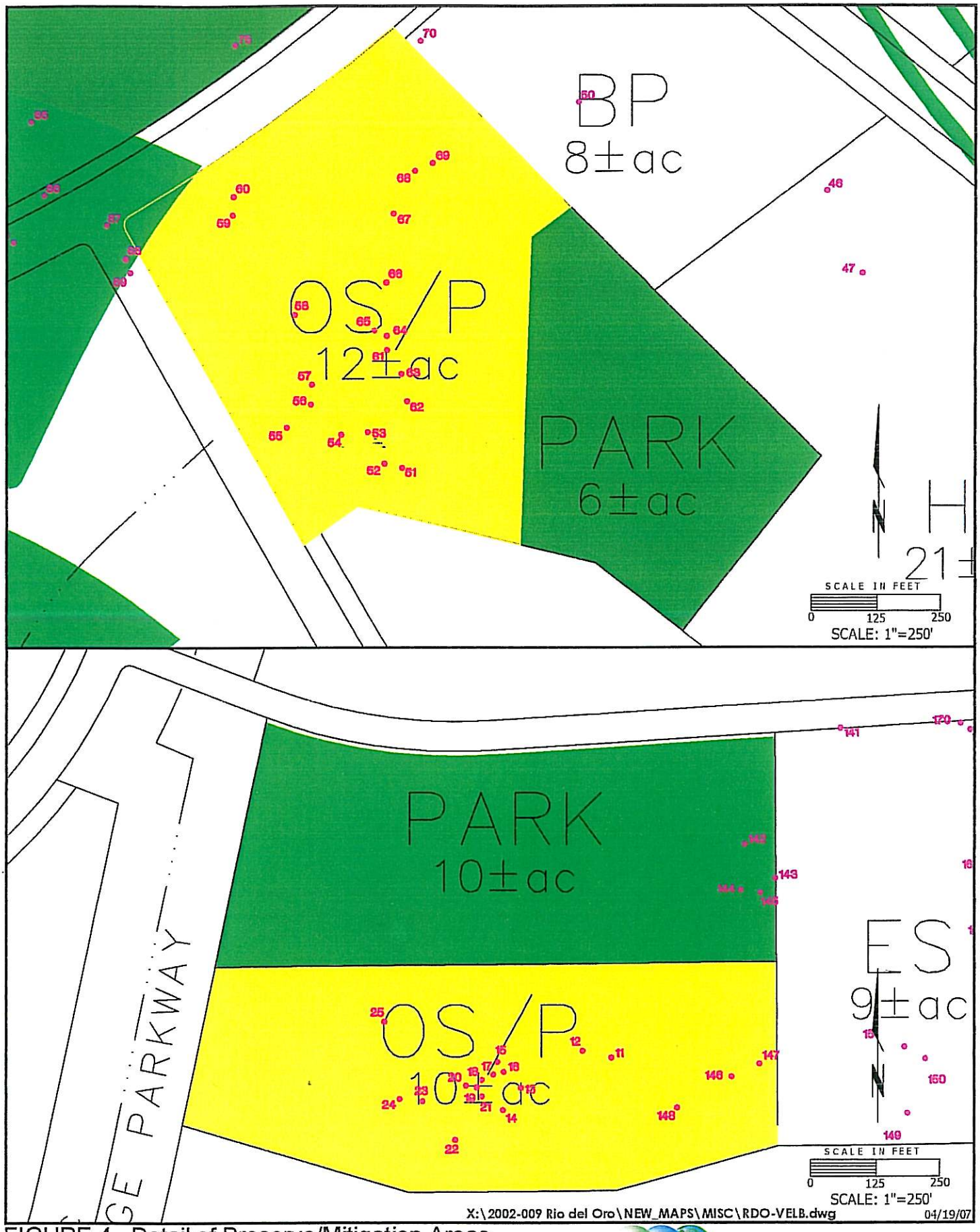

FIGURE 4. Detail of Preserve/Mitigation Areas

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4.3 Transplantation

As part of project mitigation plan implementation, the 292 elderberry shrubs that will be impacted by the project activities will be transplanted into the designated elderberry preserve areas and/or off-site locations. Transplantation activities will be conducted according to the recommendations supplied by the USFWS guidelines. Elderberry shrubs will be transplanted to the two conservations areas on the Rio del Oro site. Transplantation will occur at the appropriate time of year and a qualified biological monitor will observe all transplantation acts. The actual elderberry shrub transplanting will be conducted according to the "Transplanting Procedure" which is also outlined in the USFWS guidelines (USFWS 1999).

4.4 Additional Plantings

According to the USFWS guidelines, each elderberry stem with a diameter measuring 1.0 inch or greater that is adversely affected must be replaced. This includes all impacted elderberry shrubs, even if they are proposed transplants (USFWS 1999). According to ECORP Consulting, Inc.'s mitigation calculations, a total of 2,997 additional elderberry plantings are required to mitigate the impacts to existing shrubs that will ensue from the project activities (Table 1). The calculated additional plantings will be placed into the two designated elderberry habitat preserves.

4.5 Associated Native Plantings

According to USFWS, the VELB seems to prefer densely populated native plant communities, in which multiple elderberry shrubs are scattered throughout an established overstory layer and a diverse native understory layer. As such a total of 3,869 associated native plantings will be established in addition to elderberry plants. The types of species used will be determined by a restoration specialist. A list of common plants used in VELB restoration projects is included as Attachment B

4.6 Monitoring and Maintenance

Monitoring of the VELB mitigation preserve areas and corridors will occur over a ten year period, concurrent with monitoring of the greater Rio del Oro Vernal Pool Preserve.

One of the primary goals of this plan is to protect existing and transplanted elderberry shrubs from potential threats to their survival, as a means of safeguarding VELB habitat. Potential threats include excessive competition from invasive non-native vegetation, hydrological changes, herbicide/fertilizer residues, and human disturbances.

Invasive non-native annual plants can also impact VELB populations. Many invasive non-native annuals were introduced into the Sacramento Valley in the 1700's by Spanish missionaries (Barry, 1996). These invasive annuals have since flourished, competing with native grassland and riparian vegetation.

Changes in hydrology can also have a significant impact on VELB habitat. As modifications to the landscape can directly influence the hydrology of riparian and drainage areas, measures need to be implemented to ensure that the hydrology of VELB habitat preserves is not compromised.

In addition, human disturbances such as litter and motorized vehicle disturbance can negatively effect VELB populations. Trash and landscape clippings are often disposed of in preserves and can smother vegetation and introduce exotic non-native plant species into the preserve. Other human disturbance threats include motorized vehicles and foot traffic through designated VELB habitat preserve areas.

The VELB mitigation plantings will be monitored on a yearly basis during the appropriate period (mid-February through June) concurrent with other planned monitoring activities. Adaptive management decisions should be made based upon monitoring results. Elderberry shrubs and the associated native plantings within preserve areas will be surveyed to determine overall health and to assess approximate VELB population size.

4.6.1 Methods

Per USFWS guidelines, the population of valley elderberry longhorn beetles, the general condition of the conversation area, and the condition of the elderberry and associated native plantings in the conservation area will be monitored over a period of ten (10) consecutive years. If conservation planting is done in stages (i.e., not all planting is implemented in the same time period), each stage of conservation planting will have a different start date for the required monitoring time.

4.6.2 Surveys

Each year a minimum of two site visits between February 14 and June 30 will be made by a qualified biologist. Surveys will include:

1. A population census of the adult beetles, including the number of beetles observed, their condition, behavior, and their precise locations. Visual counts will be used; mark-recapture or other methods involving handling or harassment will not be used.
2. A census of beetle exit holes in elderberry stems, noting their precise locations and estimated ages.
3. An evaluation of plants and associated native plants within the preserve areas, including the number of plants, their size and condition.
4. An evaluation of the adequacy of the fencing, signs, and weed control efforts in the avoidance and conservation areas.
5. A general assessment of the habitat, including any real or potential threats to the beetle and its host plants, such as erosion, fire, excessive grazing, off-road vehicle use, vandalism, excessive weed growth, etc.

4.6.3 Reports

A written report, presenting a analyzing the data from the project monitoring will be prepared by a qualified biologist for ten (10) consecutive years. Copies of the report will be submitted by December 31 of the same year to the Service (Chief of Endangered Species, Sacramento fish

and Wildlife Office), and the Department of Fish and Game (Supervisor, Environmental Services, Department of Fish and Gem, 1416 Ninth Street, Sacramento, California 95814; and Staff Zoologist, California Natural Diversity Data Base, Department of Fish and Game, 1220 S Street, Sacramento, California 95814). The report will explicitly address the status and progress of the transplanted and planted elderberry and associated native plants and trees, as well as any failings of the conservation plan and the steps taken to correct them. Any observations of beetles or fresh exit holes will be noted. Copies of original field notes, raw data, and photographs of the conservation area will be included with the report. A vicinity map of the site and maps showing where the individual adult beetles and exit holes were observed must be included. For the elderberry and associated native plants the survival rate, condition, and size of the plants will be analyzed. Real and likely future threats will be addressed along with suggested remedies and preventative measures (e.g. limiting public access, more frequent removal of invasive non-native vegetation, etc.).

A copy of each monitoring report, along with the original field notes, photographs, correspondence, and all other pertinent material, will be deposited at the California Academy of Sciences (Librarian, California Academy of Sciences, Golden Gate Park, San Francisco, California 94118) by December 31 of the year that monitoring is done and the report is prepared. The Service's Sacramento Fish and Wildlife Office will be provided with a copy of the receipt form the Academy library acknowledging receipt of the material, or the library catalog number assigned to it.

4.6.4 Access

Biologists and law enforcement personnel from the California Department of Fish and Game and the Service will be given complete access to the project site to monitor transplanting activities. Personnel from both these agencies will be given complete access to the project and the conservation area to monitor the beetle and its habitat in perpetuity.

4.6.5 Success Criteria

A minimum survival rate of at least 60 percent of the elderberry plants and 60 percent of the associated native plants will be maintained throughout the monitoring period. Within one year of discovery that survival has dropped below 60 percent, the applicant must replace failed plantings to bring survival above this level. The Service will make any determination as to the applicant's replacement responsibilities arising from circumstances beyond its control, such as plants damaged or killed as a result of severe flooding or vandalism.

5.0 CONCLUSION

Gibson and Skordal conducted a VELB survey of the Rio del Oro Project Area during the summer of 2000. Surveys identified 329 elderberry shrubs within the Project Area. Approximately 13% of the identified elderberries had VELB evidence in the form of beetle exit holes. Development of the Rio del Oro project will result in direct impacts to 292 elderberry shrubs. Measures proposed to mitigate direct and indirect impacts to VELB habitat within the Project Area include avoidance of 37 remaining elderberry shrubs within two designated preserve areas (e.g. fencing and monitoring during construction activity) and the transplantation of impacted populations. In addition to the previously mentioned VELB mitigation measures an additional 2,997 elderberry seedlings and 3,869 associated natives will be planted and protected within conservation areas totaling 22-acres. An additional 154.2 VELB credits will be purchased at a USFWS approved mitigation bank. All the VELB habitat preserves will be monitored over a ten year period concurrent with monitoring of the greater vernal pool preserve.

6.0 REFERENCES

Barr C. B., 1991. The distribution, habitat, and status of the Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*. U.S. Fish and Wildlife Service; Sacramento, California.

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LIST OF ATTACHMENTS

Attachment A – Elderberry Shrub Survey Data Summary

Attachment B – Native Plants Used in VELB Restoration

ATTACHMENT A

Elderberry Shrub Survey Data Summary

SHRUBS WITH EVIDENCE

Elb. Ref. No.	1"-3"	3"-5"	>5"	Exit Holes	Riparian
11	1	1	3	Y	Y
14			1	Y	Y
15	4	1	1	Y	Y
26	3			Y	Y
32	1		2	Y	Y
46			1	Y	Y
51	1		1	Y	Y
68			2	Y	Y
70	1		1	Y	Y
72	1	3	1	Y	Y
73	1		1	Y	Y
79			1	Y	Y
86		1	1	Y	Y
91		1	1	Y	Y
96			2	Y	Y
100			2	Y	Y
124	3	2		Y	Y
142			1	Y	Y
153	2			Y	Y
166			1	Y	Y
167	1	1		Y	Y
179	4	3	1	Y	Y
199	6	1	1	Y	Y
200	6	2	1	Y	Y
201	7	1	1	Y	Y
203	9	1	3	Y	Y
213	1		4	Y	Y
214	4		1	Y	Y
231	6		1	Y	Y
239	12		2	Y	Y
242	1		1	Y	Y
243			1	Y	Y
246		1	2	Y	Y
248	1		2	Y	Y
249	7		1	Y	Y
258			2	Y	Y
260	12	3	2	Y	Y
268	4	1		Y	Y
273			1	Y	N
278			1	Y	Y
283	5		1	Y	Y
289			1	Y	Y

SHRUBS WITHOUT EVIDENCE

Elb. Ref. No.	1"-3"	3"-5"	>5"	Exit Holes	Riparian
1	1	2	1	N	Y
2	1	2	1	N	Y
3			1	N	Y
4			1	N	Y
5		2		N	Y

6			1	N	Y
7			1	N	Y
8	2			N	Y
9			1	N	Y
10	2			N	Y
12			2	N	Y
13			1	N	Y
16			2	N	Y
17	1	1	1	N	Y
18	4		1	N	Y
19		1	1	N	Y
20			2	N	Y
21		1		N	Y
22		1		N	Y
23		2		N	Y
24	2	1	1	N	Y
25	16	5	1	N	Y
27	1		1	N	Y
28	4		1	N	Y
29	7	2	6	N	Y
30	5	1		N	Y
31			1	N	Y
33	3			N	Y
34	2		1	N	Y
35	3		1	N	Y
36	5		2	N	Y
37	2		1	N	Y
38	1		1	N	Y
39	1	5	1	N	Y
40				N	Y
41	6	1		N	Y
42	3		1	N	Y
43			1	N	Y
44	3		1	N	Y
45	6	2	2	N	Y
47	1			N	Y
48	1		1	N	Y
49	2		1	N	Y
50	2	1		N	Y
52			1	N	Y
53	2		1	N	Y
54	7	2	2	N	Y
55			1	N	Y
56			1	N	Y
57	1		1	N	Y
58			1	N	Y
59	2	1	2	N	Y
60	2	1		N	Y
61	1			N	Y
62	1			N	Y
63	4			N	Y
64	3			N	Y

65	4			N	Y
66	3			N	Y
67			2	N	Y
69	2		1	N	Y
71		2		N	Y
74	4		1	N	Y
75			1	N	Y
76		1	1	N	Y
77			1	N	Y
78			1	N	Y
80			1	N	Y
81			1	N	Y
82		1	1	N	Y
83		3	2	N	Y
84	2		1	N	Y
85		1		N	Y
87	1	1		N	Y
88			1	N	Y
89	3	1	1	N	Y
90	4	1	1	N	Y
92	23		1	N	Y
93		1		N	Y
94	4		1	N	Y
95	1		1	N	Y
97	4		1	N	Y
98	2		1	N	Y
99	2	1		N	Y
101	7			N	Y
102	3			N	Y
103	2		1	N	Y
104	7			N	Y
105	2			N	Y
106	2			N	Y
107	5			N	Y
108	4			N	Y
109	4			N	Y
110	2			N	Y
111	2		1	N	Y
112	7			N	Y
113	2	2	1	N	Y
114	1	1		N	Y
115	3		2	N	Y
116	2		1	N	Y
117	2	1		N	Y
118	7	1	2	N	Y
119	3	5		N	Y
120	2	1		N	Y
121	1		3	N	Y
122	4		4	N	Y
123	10			N	Y
125	1	2	1	N	Y
126			1	N	Y

127	1			N	Y
128	1	1		N	Y
129			1	N	Y
130	3	2	1	N	Y
131	2	1		N	Y
132	1			N	Y
133	6			N	Y
134	1			N	Y
135			1	N	Y
136	2	1		N	Y
137	1		2	N	Y
138	1		3	N	Y
139	1		1	N	Y
140	5		2	N	Y
141		1	1	N	Y
143			1	N	Y
144	3			N	Y
145		1		N	Y
146		1	1	N	Y
147	4	2	3	N	Y
148	1			N	Y
149	4			N	Y
150	1			N	Y
151	1		1	N	Y
152	3	1		N	Y
154	5	1		N	Y
155	1			N	Y
156	1			N	Y
157	1	1		N	Y
158	4	1		N	Y
159	5		3	N	Y
160	2			N	Y
161	3		1	N	Y
162		1		N	Y
163			1	N	Y
164	1			N	Y
165	2		1	N	Y
168	4	1		N	Y
169	2		1	N	Y
170		2	2	N	Y
171	1	1		N	Y
172	4	1		N	Y
173	2	3	2	N	Y
174	1			N	Y
175				N	Y
176	2			N	Y
177	1			N	Y
178		1	3	N	Y
180			1	N	Y
181	1			N	Y
182	1		1	N	Y
183	2			N	Y

184	2			N	Y
185	3			N	Y
186			1	N	Y
187			1	N	Y
188	3			N	Y
189	2	1		N	Y
190	1			N	Y
191	7	2		N	Y
192	3			N	Y
193	3			N	Y
194	2		1	N	Y
195	8	1		N	Y
196	5			N	Y
197	1	1		N	Y
198	2	3	2	N	Y
202	3		1	N	Y
204	1			N	Y
205	2	1		N	Y
206	1		1	N	Y
207			1	N	Y
208	4	1		N	Y
209	8		1	N	Y
210	11			N	Y
211	1	2	1	N	Y
212	1			N	Y
215	6	1	1	N	Y
216		1	1	N	Y
217	6	1	1	N	Y
218	3			N	Y
219	2	1		N	Y
220	1			N	Y
221		3	1	N	Y
222	1	1		N	Y
223	7	1		N	Y
224	4			N	Y
225	3	1		N	Y
226	4	1		N	Y
227	4	3		N	Y
228	4	1		N	Y
229			3	N	Y
230	3			N	Y
232			1	N	Y
233	3		1	N	Y
234	3		1	N	Y
235	8	2		N	Y
236	1			N	Y
237	1			N	Y
238	1			N	Y
240	5		1	N	Y
241				N	Y
244		1		N	Y
245			2	N	Y

247	2			N	Y
250	2		2	N	Y
251			1	N	Y
252	1	2		N	Y
253			1	N	Y
254	4		1	N	Y
255	1			N	Y
256	2			N	Y
257				N	Y
259	1			N	Y
261	5			N	Y
262	3			N	Y
263	3	1		N	Y
264	1			N	Y
265	3			N	Y
266	1			N	Y
267	3	1		N	Y
269			1	N	Y
270	2			N	Y
271	4			N	Y
272	6			N	Y
274	10	1		N	N
275	1			N	Y
276	7	1		N	Y
277	4			N	Y
279	3		1	N	Y
280	3			N	Y
281	5			N	Y
282	3			N	Y
284	1		1	N	Y
285			1	N	Y
286	1	1		N	Y
287	3			N	Y
288	1	2		N	Y
290	4	1	1	N	Y
291	5	1		N	Y
292	1			N	Y
300			1	N	Y
301			1	N	Y
302			1	N	Y
303	8		2	N	Y
304	3	1		N	Y
305	11			N	Y
306			1	N	Y
307			2	N	Y
308			1	N	Y
309	1	1	1	N	Y
310	1		1	N	Y
311		2	1	N	N
312			1	N	Y
313	6			N	Y
314	5			N	Y

315		1		N	Y
316	2	1		N	Y
317	3		1	N	N
318	4		1	N	N
319	6			N	N
320	4			N	N
321	3		1	N	Y
322		1	1	N	Y
323	1		1	N	Y
324	3	1		N	Y
325	2			N	Y
326		1		N	Y
327			1	N	Y
328			1	N	Y
329			1	N	Y
330			1	N	Y
331			1	N	Y
332			1	N	Y
333	1	1		N	Y
334	1			N	Y
335	1	1		N	Y
336			1	N	Y
337	3	1		N	Y
TOTAL	755	160	236		

ATTACHMENT B

Native Plants Used in VELB Restoration

Native Plants for Use in Restoration

Scientific Name	Common Name
Trees	
Acer negundo	Box elder
Aesculus californica	California buckeye
Alnus rhombifolia	White alder
Fraxinus latifolia	Oregon ash
Juglans californica	California black walnut
Platanus racemosa	Western sycamore
Populus fremontii	Fremont cottonwood
Quercus douglasii	Blue oak
Quercus lobata	Valley oak
Quercus wislizeni	Interior live oak
Salix exigua	Narrowleaf willow
Salix gooddingii	Gooding's black willow
Salix laevigata	Red willow
Salix lasiolepis	Arroyo willow
Shrubs	
Baccharis pilularis	Coyote brush
Ceanothus cuneatus	Wedgeleaf ceanothus
Cephalanthus occidentalis	Button-willow
Cercis occidentalis	Western redbud
Fremontodendron californicum	Flannelbush
Heteromeles arbutifolia	Toyon
Mimulus aurantiacus	Bush monkeyflower
Rhamnus ilicifolia	Hollyleaf redberry
Rhamnus tomentella	Hoary coffeeberry
Rubus ursinus	California blackberry
Rosa californica	California rose
Salix exigua	Narrow-leaved willow
Salix lasiolepis	Arroyo willow
Vitis californica	California wild grape
Grasses	
Bromus carinatus	California brome
Elymus elymoides	Squirreltail
Elymus glaucus	Blue wildrye
Frestuca idahoiensis	Idaho fescue
Hordeum branchyantherum	Meadow barley
Leymus triticoides	Creeping wildrye
Melica californica	Oniongrass
Muhlenbergia rigens	Deer grass
Nassella pulchra	Purple needle grass
Poa secunda	One-sided bluegrass