Greenbriar Development Project
Conservation Strategy

January 2017

Prepared for:
Greenbriar Project Owner, LP
500 La Gonda Way, Suite 102
Danville, CA 94526

Prepared by:
HELIX Environmental Planning, Inc.
11 Natoma Street, Suite 155
Folsom, CA 95630

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CONSERVATION STRATEGY

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List of Abbreviated Terms

amsl	Above mean sea level
BMPs	Best management practices
CDFW	California Department of Fish and Wildlife (formerly California Department of Fish and Game)
CVRWQCB	Central Valley Regional Water Quality Control Board
EIR	Environmental Impact Report
ESA	Federal Endangered Species Act of 1973
GGS	Giant garter snake
GIS	Geographic information systems
HCP	Habitat Conservation Plan
I-5	Interstate-5
I-80	Interstate-80
ITP	Incidental Take Permit
MAP	Metro Air Park
MAP HCP	Metro Air Park Habitat Conservation Plan
MAP POA	Metro Air Park Property Owners' Association
NBHCP	Natomas Basin Habitat Conservation Plan
NCMWC	Natomas Central Mutual Water Company
OCP	Operating Conservation Program of the NBHCP
Quad	Quadrangle
RD 1000	Reclamation District 1000
SAFCA	Sacramento Area Flood Control Agency
SSMP	Site-Specific Management Plan
TAC	Technical Advisory Committee
TNBC	The Natomas Basin Conservancy
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VELB	Valley elderberry longhorn beetle

Chapter 1. Introduction

1.1. Introduction

This document describes the conservation strategy for the Greenbriar Development Project (referred to as the Greenbriar Conservation Strategy). The Greenbriar Development Project is a transit-oriented, mixed-density residential and retail/commercial development proposed on the Greenbriar Project Site with associated infrastructure to be constructed on adjacent lands. Within this document, the terms "Greenbriar Development Project" or "proposed project" are used to refer to the project in its full scope, which includes construction of a mixed-use development on the Greenbriar Project Site, off-site infrastructure improvements, establishment of several habitat reserves, and implementation of the Greenbriar Conservation Strategy. The term "Greenbriar Conservation Strategy" is used to refer specifically to the proposed conservation strategy, which includes the establishment of reserves and implementation of the other proposed conservation measures described further below.

1.2. Project Location

Properties associated with the Greenbriar Development Project consist of the Greenbriar Project Site and Off-site Improvement Lands, the Lone Tree Canal Reserve on the Greenbriar Project Site (On-site Reserve), and three Off-site Reserves (the Spangler Reserve, the Moody Reserve, and the North Nestor Reserve). All properties associated with the Greenbriar Development Project are located within the Natomas Basin, a geographic basin which lies predominantly within un-incorporated portions of Sacramento and Sutter Counties but also includes the northwest portion of the City of Sacramento. With the exception of the North Nestor Reserve, which is located in southern Sutter County, all of the properties are located in Sacramento County. The specific locations of each of the properties associated with the Greenbriar Development Project are presented on **Figure 1** and described in the following paragraphs.

The Greenbriar Project Site and Off-site Improvement Lands are situated in the City of Sacramento, approximately two miles east of the Sacramento River. The Greenbriar Project Site is bounded by I-5 to the south, Lone Tree Canal to the west, W. Elkhorn Boulevard to the north, and SR 99/70 to the east. The Off-site Improvement Lands are largely contiguous with the Greenbriar Project Site, and encompass a segment of W. Elkhorn Boulevard between Lone Tree Canal and the SR 99/70 interchange with Elkhorn Boulevard, the SR 99/70 southbound and northbound off-ramps at Elkhorn Boulevard, and an approximately 100-square-foot area south of I-5. The Greenbriar Project Site and Off-site Improvement Lands are located in Section 4, Township 9 North, and Section 33, Township 10 North of Range 4 East on the United States Geological Survey

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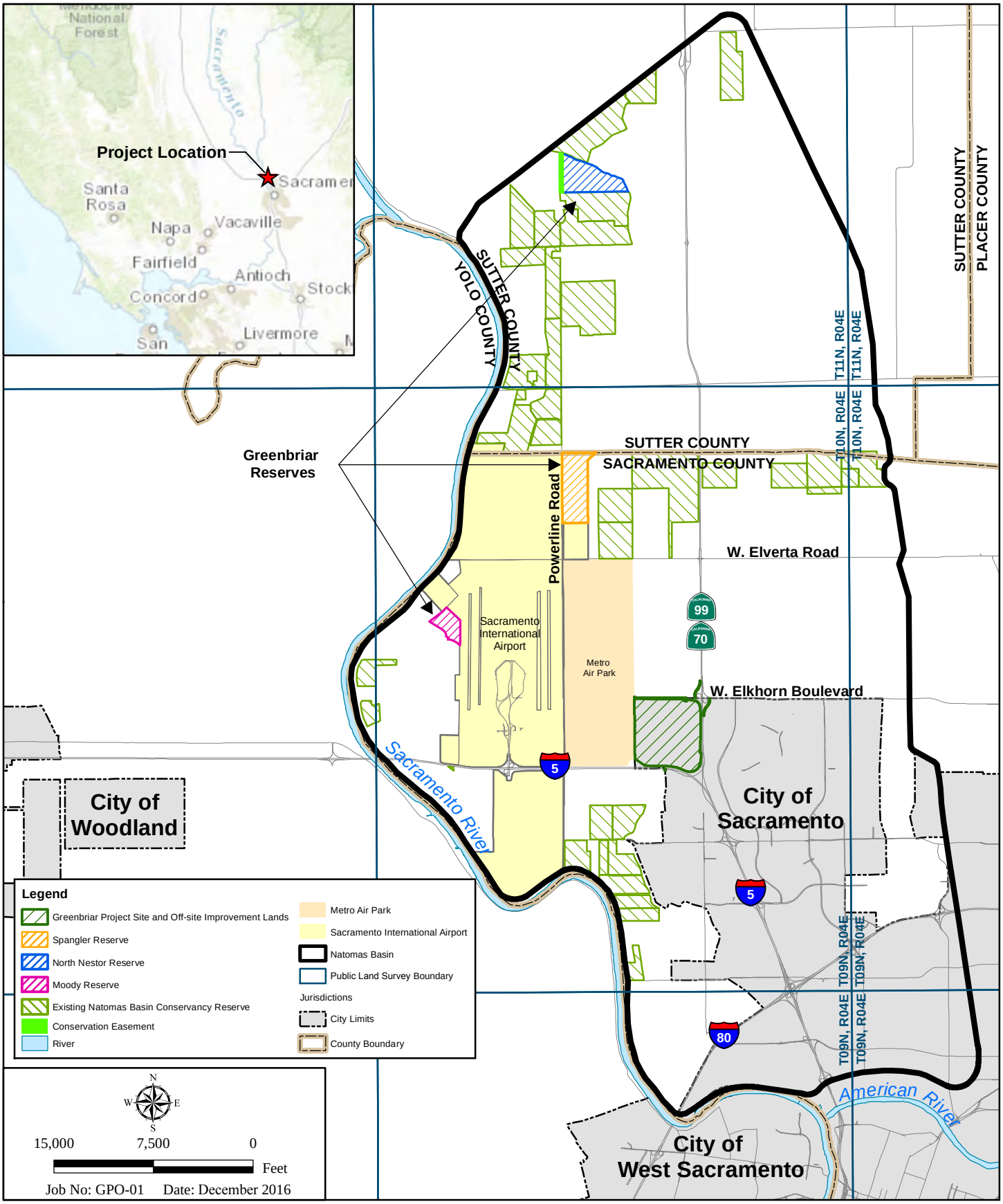

Regional Location and Site Vicinity

GREENBRIAR CONSERVATION STRATEGY

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Figure 1

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(USGS) 7.5-minute "Taylor Monument, CA" quadrangle (quad). The Lone Tree Canal Reserve is located along the west side of the Greenbriar Project Site and encompasses Lone Tree Canal and adjacent uplands.

The Spangler Reserve is located in unincorporated Sacramento County, approximately 2.6 miles northwest of the Greenbriar Project Site, east of Powerline Road and south of the Sacramento-Sutter County line. It is located in Sections 4 and 17, Township 10 North, Range 4 East on the USGS 7.5-minute "Taylor Monument, CA" quad.

The Moody Reserve is located at 7320 Walnut Road, adjacent to the west side of the Sacramento International Airport in unincorporated Sacramento County. The Moody Reserve is situated in the west-central portion of the Natomas Basin and is located in Section 24, Township 10 North, Range 3 East on the USGS 7.5-minute "Taylor Monument, CA" quad. This site is approximately 2.6 miles northwest of the Greenbriar Project Site.

The North Nestor Reserve is located on the east side of Power Line Road, between Howsley Road and Sankey Road in unincorporated Sutter County. The North Nestor Reserve is situated in the far northwestern portion of the Natomas Basin and is located in Section 19, Township 11 North, Range 4 East on the USGS 7.5-minute "Verona, CA" quad. This site is approximately 7.2 miles north of the Greenbriar Project Site.

1.3. Purpose of the Greenbriar Conservation Strategy

The Natomas Basin Habitat Conservation Plan (NBHCP), approved by the U.S. Fish & Wildlife Service (USFWS) and the California Department of Fish and Wildlife (CDFW; previously California Department of Fish and Game) in 2003, establishes the overall conservation program for the development of a 17,500-acre portion of the Natomas Basin. The Greenbriar Project Site where the mixed-use development would be constructed and the Off-Site Improvement Lands where off-site infrastructure improvements would occur are located within the boundaries of the NBHCP Plan Area, but are not within the City of Sacramento or Sutter County Permit Areas, as defined by the NBHCP, where take of NBHCP Covered Species was previously authorized. As a result, the potential effects of the development on the Greenbriar Project Site and Off-Site Improvement Lands were not evaluated in the NBHCP.

Because the Greenbriar Development Project would result in additional development and reserve establishment that was not addressed in the NBHCP, a project level effects analysis was prepared to evaluate its potential effects on the NBHCP Covered Species and their habitats, on the Operating Conservation Program (OCP) of the NBHCP, on the attainment of the NBHCP goals and objectives, and on the viability of the populations of Covered Species in the Natomas Basin. A Biological Assessment was also prepared for the Greenbriar Development Project because

implementation of the proposed project may incidentally take federally listed species and impact suitable habitat of federally listed species; therefore, implementation of the project requires the project applicant and a third-party plan operator to obtain incidental take authorizations for activities causing the potential for take of federally listed species associated with the proposed project.

The purpose of this Conservation Strategy is to describe the proposed project and environmental setting, outline the biological goals and objectives of the Conservation Strategy, describe the conservation measures to avoid, minimize and/or reduce impacts to special-status species during project implementation, and discuss the Reserve establishment, implementation, maintenance and long-term management. This document also provides a summary of the reserve management, dedication and funding sources for the reserve sites included in the Greenbriar Conservation Strategy. This conservation strategy has been prepared as a stand-alone document to describe the Greenbriar Conservation Strategy.

The October 2016 Greenbriar Effects Analysis evaluates the effect of the Greenbriar Development Project (including the Greenbriar Conservation Strategy) on the NBHCP, and demonstrates that the Greenbriar Development Project would not compromise the effectiveness of the NBHCP operating conservation program.

Chapter 2. Project Description

In addition to its conservation components, the Greenbriar Development Project includes a transit-oriented, mixed-density residential and retail/commercial development proposed on the Greenbriar Project Site with associated infrastructure to be constructed on adjacent lands. The Greenbriar Development Project encompasses 1,118 acres and includes the 577.0-acre Greenbriar Project Site where the development is proposed and the 12.76-acre Off-site Improvement Lands where the associated infrastructure improvements are proposed. Improvements planned by other entities on the Greenbriar Project Site and Off-site Improvement Lands are also incorporated into the project footprint. Additional properties associated with the proposed project include approximately 528.5 acres of land proposed to be established as On- and Off-site Reserves.

The Greenbriar Conservation Strategy includes the establishment of four habitat reserves. An On-site Reserve, referred to as the Lone Tree Canal Reserve, is proposed on a portion of the Greenbriar Project Site that would include the segment of Lone Tree Canal along the western boundary of the Greenbriar Project Site. The Lone Tree Canal Reserve will be enhanced to provide habitat for special-status species as part of the conservation strategy to offset potential impacts resulting from development of the proposed project. The Off-site Reserves consist of the Spangler Reserve, the Moody Reserve, and the North Nestor Reserve. All of the properties associated with the Greenbriar Development Project are located within the Natomas Basin, a geographic basin which lies predominantly within un-incorporated portions of Sacramento and Sutter Counties but also includes the northwest portion of the City of Sacramento. With the exception of the North Nestor Reserve, which is located in southern Sutter County, all of the properties are located in Sacramento County.

2.1. Greenbriar Project Site

The Greenbriar Project Site encompasses 577 acres; of which approximately 517 acres would be used to create a transit-oriented residential development with commercial and retail centers, arterial and local roads, an elementary school, neighborhood parks, and a detention basin. A total of 1.6 acres in the northeast corner of the project site would be dedicated for additional SR 99/70 right-of-way for future improvements to the SR 99/70 interchange with Elkhorn Boulevard. The remaining 58.4 acres on the Greenbriar Project Site are designated for open space, and include approximately 28.3 acres along Lone Tree Canal that will be preserved and managed for special-status species (Lone Tree Canal Reserve). **Figure 2** depicts the Greenbriar Project Site boundary and the location of the proposed conservation easement along Lone Tree Canal. Refer to **Figure 3** for the proposed design at the Greenbriar Project Site.

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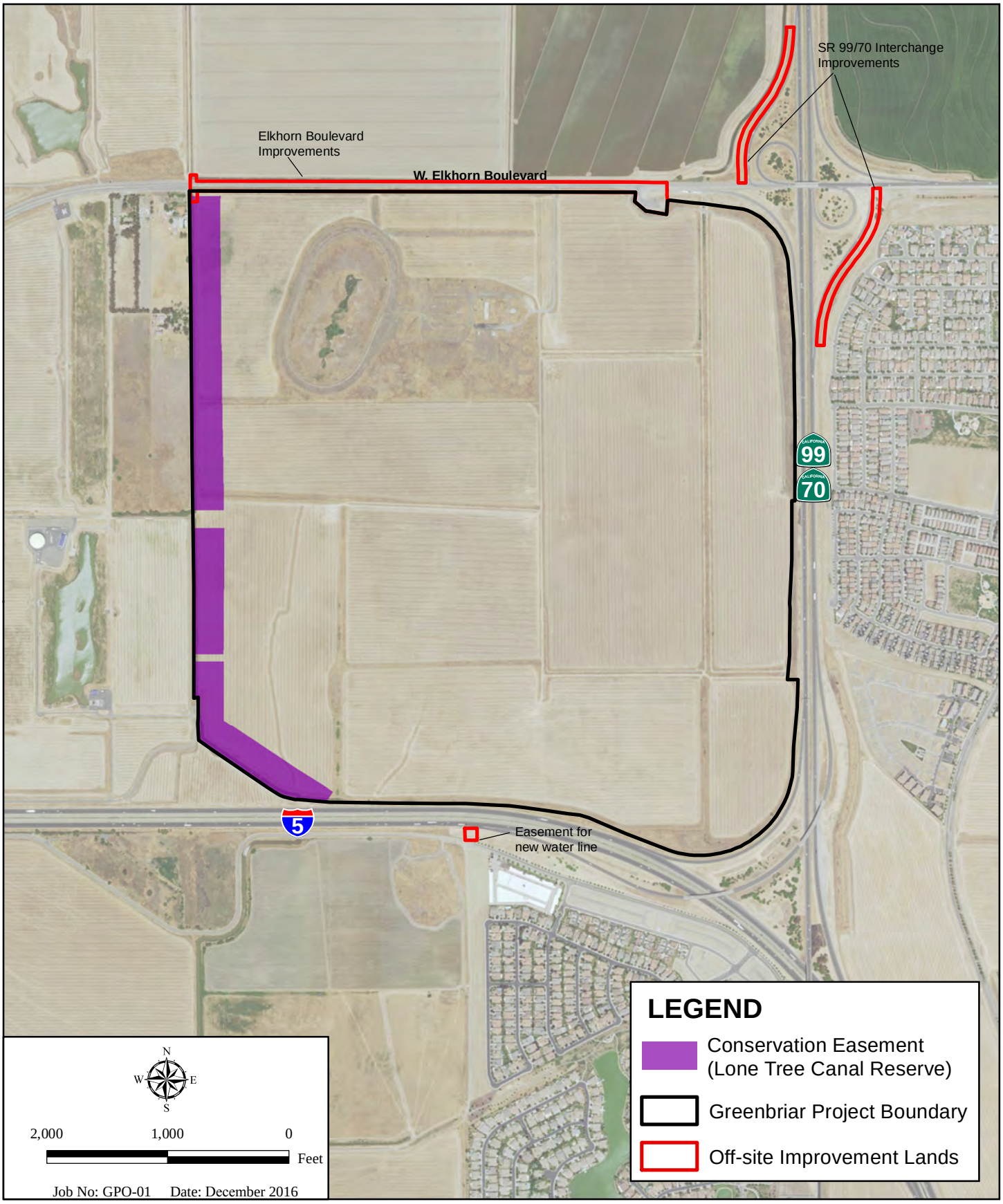

Aerial: ESRI 2014

Project Boundary and Conservation Easement Location

GREENBRIAR CONSERVATION STRATEGY

Figure 2

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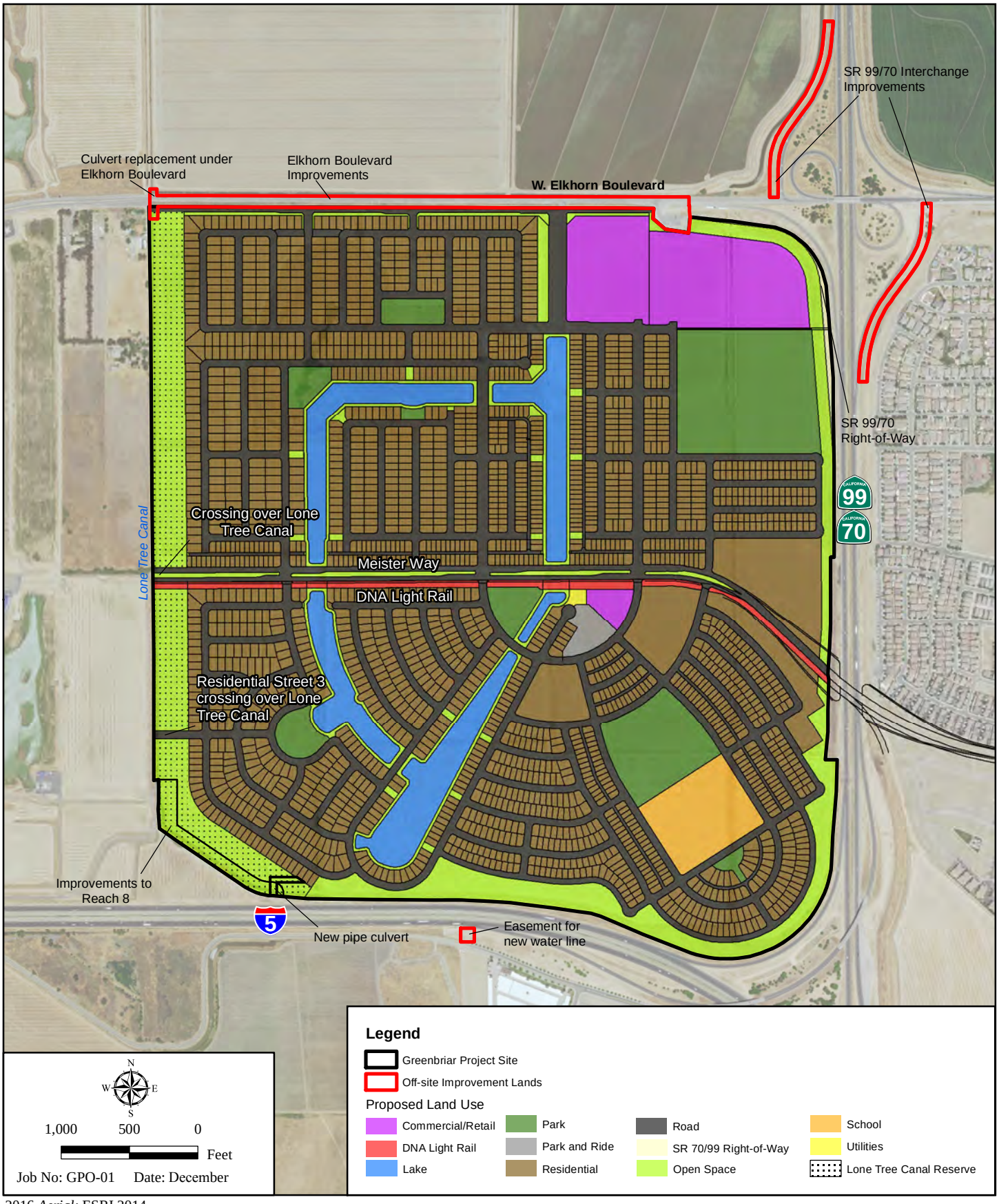

2016 *Aerial:* ESRI 2014

Greenbriar Project Design

GREENBRIAR CONSERVATION STRATEGY

Figure 3

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Single-family residences will be the primary development on the Greenbriar Project Site. Two multi-family residential developments will be constructed south of Meister Way, and one north of Meister Way near the eastern Greenbriar Project Site limit near the Green Line to the Airport light rail station. Commercial properties are proposed for construction in the northeast corner of the Greenbriar Project Site, and a smaller commercial property is proposed to be located south of Meister Way. An elementary school site is proposed near the southeast corner of the Greenbriar Project Site, near SR 99/70 and I-5. Neighborhood parks will be located throughout the Greenbriar Project Site – a community park is proposed for construction near the northeast corner of the Greenbriar Project Site. **Table 1** presents the acres and percentage for each proposed land use in the Greenbriar Project Site.

Table 1. Proposed Greenbriar Project Site land use by type, acres, and percent

Land use	Acres	Percent
Residential (single and multi-family)	377.3	65.4
Commercial/retail	42	7.2
Parks and school	50.8	8.8
Detention Basin	46.9	8.1
Open space	58.4	10.0
Additional SR 99/70 right-of-way	1.6	0.2
Total	**577.0 acres**	

Source: Digital project design provided by Wood Rodgers dated June 2012 (Rodgers 2012).

2.2. Lone Tree Canal Reserve

The Lone Tree Canal Reserve is an approximately 250-foot-wide corridor along the western boundary of the Greenbriar Project Site that will be set aside for preservation. The Lone Tree Canal Reserve includes the entire Lone Tree Canal (top-of-bank to top-of-bank), which includes approximately 3.1 acres of waters of the U.S., and an approximately 200-to 225-foot-wide upland buffer on the east side of the canal. **Appendix A** is a schematic design of the Lone Tree Canal corridor and open space buffer, which make up the Lone Tree Canal Reserve.

The entire corridor designated for the Lone Tree Canal Reserve encompasses approximately 31.3 acres; however, construction activities associated with several development-related improvements on the Greenbriar Project Site and Off-site Improvement Lands will result in 3.0 acres of impacts within the Lone Tree Canal Reserve. These improvements are presented in **Table**

2. Therefore, a net acreage of approximately 28.3 acres will be preserved and managed for Giant Garter Snake (GGS) in the Lone Tree Canal Reserve.

Table 2. Improvements within the Lone Tree Canal Reserve

Improvement	Description	Area (acres)
Meister Way	Meister Way and the Green Line to the Airport light rail line will cross over the open-space buffer at the Lone Tree Canal Reserve via a 54-inch culvert.	1.6*
Residential Street 3	This residential street will cross over the open-space buffer at the Lone Tree Canal Reserve via a 54-inch culvert.	1.0**
Drainage	The existing 30-inch diameter pipe culvert under W. Elkhorn Boulevard will be replaced with a 54-inch diameter pipe culvert (overlapping the Lone Tree Canal Reserve).	0.1
	A 60-inch-diameter lake outfall pipe will be installed to drain to Lone Tree Canal and the existing culvert at I-5	0.3
	A 8-inch-diameter pipe will be installed to drain to Lone Tree Canal near the northern project boundary from detention basins proposed for construction on the Greenbriar Project Site	0.0***
Total area of disturbance		**3.0**

Source: *Greenbriar Project Acreage Calculations Memorandum* prepared by Wood Rodgers.

Note: Actual culvert sizes have changed based on hydrology studies and design refinements and are potentially subject to future revision; however, the footprint of the impact has not changed and is sufficient in size to accommodate any potential future revisions to culvert sizes and designs.

*Includes footprint of the Meister Way and Green Line to the Airport light rail line crossing plus a construction area north and south of the crossing. This acreage estimate is likely conservative because some or all of the construction area may be restored to pre-project or better conditions and would only be a temporary impact.

*Includes footprint of residential street crossing plus a construction area north and south of the crossing. This acreage estimate is likely conservative because some or all of the construction area may be restored to pre-project or better conditions and would only be a temporary impact.

***Included in construction footprint of 54-inch diameter pipe culvert installed to replace existing 30-inch diameter pipe culvert under W. Elkhorn Boulevard.

A total of 28.3 acres of Lone Tree Canal Reserve will be temporarily disturbed during habitat enhancing activities. Approximately 3.2 acres of the Lone Tree Canal Reserve will be temporarily disturbed for improvements along reach 8 of Lone Tree Canal planned by the MAP project (these improvements are not part of the Greenbriar Development Project).

An 8-inch-diameter drain pipe will be installed to drain to Lone Tree Canal near the northern project boundary, from detention basins proposed for construction on the Greenbriar Project Site. The purpose of the drain pipe is to provide supplemental flows to Lone Tree Canal in the event that additional water is required to maintain water sufficient to support GGS during its active season. The drain pipe will include a slide gate that will be physically operated as needed. The detention basin water supply will be stormwater that could be supplemented by groundwater. The drain pipe installation area is within the area that will be impacted by replacement of the existing 30-inch-diameter pipe culvert under W. Elkhorn Boulevard at Lone Tree Canal with a 54-inch culvert capable of conveying 100-year storm flows.

In addition, approximately 3.1 acres of engineered fill will be permanently placed along the eastern boundary of the Lone Tree Canal Reserve. The engineered fill will be an extension of the adjacent building pads at a 3:1 slope, with a maximum width of 25 feet at the bottom and a depth of approximately 8 to 10 feet at the eastern boundary of the reserve. Habitat disturbance due to the placement of the engineered fill will be temporary because the engineered fill will be hydro-seeded and will be established as grassland habitat upon completion of construction.

2.3. Off-site Improvement Lands

The Off-site Improvement Lands encompass approximately 12.76 acres, and include improvements to W. Elkhorn Boulevard and the SR 99/70 interchange at W. Elkhorn Boulevard, as well as drainage and utility improvements.

2.4. Improvements by Others

Proposed developments and infrastructure improvements that will be constructed by other entities occur on and in the vicinity of the Greenbriar Project Site; in some cases, infrastructure improvements planned by others would benefit the Greenbriar Development Project as well as other projects. The Greenbriar Development Project has incorporated planned improvements by others on the Greenbriar Project Site and Off-site Improvement Lands, and plans to construct improvements planned by others necessary to complete the Project, if not constructed prior to the Greenbriar Development Project.

Planned/already completed improvements by other entities on the Greenbriar Project Site and Off-site Improvement Lands include dedication of the SR 99/70 southbound on-ramp right-of-way at Elkhorn Boulevard to the County of Sacramento, construction of the proposed Green Line to the Airport light rail line by Sacramento Regional Transit along Meister Way through the Greenbriar Project Site, construction of the Off-site Sewer Force Main and Natomas/MAP Trunk Sewer Connection Improvements by the MAP Property Owners Association (POA) on the Greenbriar Project Site (already completed), extension by the MAP POA of Meister Way from its current

terminus at Lone Tree Canal, through the Greenbriar Project Site to SR 99/70, construction by the MAP POA of W. Elkhorn Boulevard, along the northern Greenbriar Project Site boundary from Lone Tree Canal to SR 99/70, addition of one lane to the SR 99/70 southbound and northbound Elkhorn Boulevard off-ramps by the County of Sacramento, and the MAP POA will widen W. Elkhorn Boulevard (not on the Greenbriar Project Site), and replace the existing pipe culvert under W. Elkhorn Boulevard with a 54-inch-diameter pipe culvert.

The MAP project also plans to construct improvements along Lone Tree Canal by widening and deepening reach 8 of the canal, flattening the side slopes to 2:1, and constructing two 78-inch-diameter culverts under I-5. These improvements are not part of the Greenbriar Development Project. This action and other development associated with the MAP project (and their effects on threatened and endangered species) are covered under the MAP Habitat Conservation Plan (HCP) (Thomas Reid Associates 2001).

2.5. Project Schedule

Construction of the proposed development at the Greenbriar Project Site is scheduled to begin in 2017 and is expected to occur in at least two phases, referred to as Phase 1 and Phase 2, over a 5 to 10-year period. Phase 1 will primarily develop land north of Meister Way as well as implement construction and restoration activities within and immediately adjacent to the Lone Tree Canal Reserve. Phase 2 will primarily develop land south of Meister Way. Single-family residences will be the primary development on the Greenbriar Project Site. Two multi-family residential components will be constructed south of Meister Way, and one north of Meister Way near the eastern Greenbriar Project Site limit. Commercial properties are proposed for construction in the northeast corner of the Greenbriar Project Site, and a smaller commercial property is proposed to be located south of Meister Way. An elementary school site is proposed near the southeast corner of the Greenbriar Project Site. Neighborhood parks will be located throughout the Greenbriar Project Site – a community park is proposed for construction near the northeast corner of the Greenbriar Project Site.[1]

Timing of construction of the proposed Meister Way overpass will be determined based on Project transportation impacts identified in the Final EIR (EDAW 2007) and through the financing plan prepared for the Project, which will be prepared in consultation with the City of Sacramento. Timing for the extension of light rail service and construction of a light rail station will depend on Sacramento Regional Transit's schedule for implementation.

[1] Tentative Master Parcel and Tentative Subdivision Maps prepared by Wood Rodgers (July 2012)

2.6. Calculation of Reserve Land

The Greenbriar Conservation Strategy is habitat-based, consistent with the NBHCP. Reserve land would be preserved as wildlife habitat in perpetuity. The project development footprint is a total of 589.76 acres, comprising the 577.0-acre Greenbriar Project Site and 12.76 acres of Off-Site Improvement Lands. The Greenbriar Conservation Strategy reserve land would provide sufficient compensatory mitigation to offset impacts to all of the land on the Greenbriar Project Site and Off-Site Improvement Lands that would be developed. Mitigation is not needed for previously developed land and/or land impacts previously mitigated by other entities.

Consistent with the NBHCP, Greenbriar will dedicate reserve land in the amount of the total gross acreage of the development footprint on the Greenbriar Project Site and Off-Site Improvement Lands excluding acres that are either 1) previously developed or 2) will be protected on-site in perpetuity as wildlife habitat through conveyance of a conservation easement or fee title. Improvements by other entities have not been excluded from the reserve land calculation because it is unknown whether these improvements will be constructed by the Project Applicant or another entity. The following paragraphs describe areas within the Greenbriar Project Site and Off-site Improvement Lands that were excluded from the calculation of land dedication and summarize the net acreage of currently undeveloped land that would be developed as a result of the Project.

2.6.1. Greenbriar Project Site

A total of three areas totaling 40 acres on the Greenbriar Project Site are excluded from the calculation of reserve land proposed for preservation in perpetuity to off-set impacts of the proposed development: the net acreage of the on-site reserve land being dedicated as the Lone Tree Canal Reserve (28.3 acres), a 10.1-acre area that was disturbed by the MAP POA to construct the MAP Off-Site Sewer Force Main and Natomas/MAP Trunk Sewer Connection Improvements, and a 1.6-acre area that is dedicated as future right-of-way for the Elkhorn Blvd interchange.

Additional reserve land is not necessary to offset impacts associated with establishment of the Lone Tree Canal Reserve because this on-site reserve is being protected in perpetuity as wildlife habitat and open space through conveyance of a conservation easement or fee title. The 10.1-acre area that was impacted by the MAP POA, which includes a 20-foot wide easement granted to the Sacramento Regional Sanitation District, was identified as an Off-Site Infrastructure Improvement in the MAP HCP (a 100-foot-wide x 17,700-foot-long construction envelope was evaluated for the sewer infrastructure in the MAP HCP although the exact location has changed slightly). This area was disturbed and mitigated by the MAP POA. The MAP HCP states MAP POA will oversee construction of the off-site infrastructure improvements and payment of mitigation fees which will be funded through the same Mello Roos bond (or a similar bonding mechanism) that funds the initial infrastructure improvements (MAP HCP Chapter 1.C.2.c. page 13). The 1.6-acre area

dedicated for future right-of-way for the Elkhorn Blvd interchange was excluded from the calculated acreage of reserve land because it will be dedicated as right-of-way for the interchange prior to site development.

Table 3 summarizes the net acreage of development impacts on the Greenbriar Project Site that would be implemented by the Project Applicant.

Table 3. Calculation of the Net Acreage of Development Impacts on the Greenbriar Project Site Implemented by the Project Applicant

Description	Acreage
Gross Acreage of Greenbriar Project Site	577.0
Land that would not be developed by the Project Applicant	
Net Acreage of the Lone Tree Canal Reserve*	(28.3)
MAP Off-Site Sewer Force Main and Natomas/MAP Trunk Sewer Connection Improvements (existing previously mitigated disturbance)**	(10.1)
SR 99/70 Southbound On-Ramp Right-of-Way at Elkhorn Boulevard***	(1.6)
Total	***40.0***
Net Acreage of Development Impacts on the Greenbriar Project Site	**537.0**

*The Lone Tree Canal Reserve is being protected in perpetuity as wildlife habitat through conveyance of a conservation easement or fee title.

**A sewer force main and trunk sewer connection have been constructed on 10.1 acres of the Greenbriar Project Site by the MAP POA; these impacts are identified in the MAP HCP and are required to be mitigated under the MAP HCP (see MAP HCP CH 1.C.2.b. on page 13).

***A total of 1.6 acres will be dedicated for future right-of-way for the Elkhorn Boulevard interchange. This area is not being disturbed as part of the proposed project and is not considered part of the project's gross impact acreage.

2.6.2. Off-site Improvement Lands

Two areas on the Off-site Improvement Lands are excluded from the calculation of reserve land proposed to off-set impacts: a 3.2-acre segment composed of existing pavement on W. Elkhorn Boulevard and a 3.0-acre segment along the south side of W. Elkhorn Boulevard that was disturbed by the MAP POA to construct the Off-site Sewer Force Main Connection.

Table 4 summarizes the net acreage of development impacts on the Off-Site Improvement Lands that would be implemented by the Project Applicant.

Table 4. Calculation of the Net Acreage of Development Impacts on the Off-Site Improvement Lands Implemented by the Project Applicant

Description	Acreage
Gross Acreage of Off-Site Improvement Lands	12.76
Land that would not be developed by the Project Applicant	
Elkhorn Boulevard existing pavement*	(4.46)
MAP Off-Site Sewer Force Main Connection Improvements (existing previously mitigated disturbance)**	(3.0)
Total	***7.46***
Net Acreage of Development Impacts on the Off-Site Improvement Lands	**5.3**

*Reserve land is not proposed to off-set impacts to portions of a project site that have been previously developed.

**A sewer force main connection has been constructed on 3.0 acres of the Off-Site Improvement Lands by the MAP POA; these impacts are identified in the MAP HCP and are required to be mitigated under the MAP HCP (see MAP HCP CH 1.C.2.b. on page 13).

2.7. Off-Site Reserves

On- and Off-Site Reserves will be established in perpetuity to off-set impacts to special-status species that would result from development activities on the Greenbriar Project Site and Off-site Improvement Lands. These reserves include the Lone Tree Canal Reserve on the Greenbriar Project Site, described above, and three Off-Site Reserves: the Spangler Reserve, the Moody Reserve, and the North Nestor Reserve. The Spangler Reserve is located approximately 2.5 miles northwest of the Greenbriar Project Site, southeast of the intersection of Powerline Road and the Sacramento-Sutter county line. The site is currently in rice cultivation, and would consist of created seasonal wetland, managed marsh, and upland habitats, as well as some continued rice cultivation after reserve establishment. The Moody Reserve is immediately east of Sacramento International Airport and north of the Teal Bend Golf Club. The site is currently used for alfalfa cultivation and would continue without any land use change after reserve establishment. The North Nestor Reserve is near the northern tip of the Natomas Basin, approximately 0.25-mile south of the Natomas Cross Canal. The site is currently in active rice cultivation and would continue without any land use change after reserve establishment and would be a permitted use under the conservation easement.

Proposed activities at the reserves include creating, enhancing, and managing habitat for the Covered Species. Land use categories in the overall Off-Site Reserves will include rice, upland, and managed marsh to be consistent with the target land uses for the TNBC reserve system, which consist of roughly 50% rice, 25% managed marsh and 25% upland. A total of approximately 557 acres of reserve land would offset development impacts to 542.3 acres of land on the Greenbriar

Project Site and Off-Site Improvement Lands (1.03:1 ratio). The Greenbriar Conservation Strategy includes 259.4 acres of rice (46.6%), 143.8 acres of managed marsh (25.8%), and 153.9 acres of upland (27.6%) within the planned reserves. A summary of the proposed land use within each category (rice, managed marsh, upland) at each of the Project's reserves is provided in **Table 5**.

Table 5. Summary of the Proposed Land Use by Category (Rice, Managed Marsh, Upland) at the Greenbriar Development Project's Reserves*

	Lone Tree Canal Reserve	Spangler Reserve	Moody Reserve	North Nestor Reserve	Total Acres
Rice	--	40.3	--	219.1	259.4
Managed Marsh	1.8	142.0	--	--	143.8
Upland	26.5	53.1	74.3	--	153.9
Total acres	**28.3**	**235.4**	**74.3**	**219.1**	**557.1**

*Consistent with the NBHCP, a significant portion of the rice and managed marsh will be managed to provide habitat for upland-dependent species (e.g., Swainson's hawk foraging).

Chapter 3. Environmental Setting

This chapter describes the region in which the proposed project is located in order to provide a context and existing conditions of the Reserve Sites. The region's topography, soils, vegetation, watercourses and level of human or natural disturbance are discussed.

3.1. Description of Existing Biological and Physical Conditions

3.1.1. Environmental Setting

Transportation land uses border the Greenbriar Project Site to the north, east, and south. West Elkhorn Boulevard to the north is an arterial roadway. SR 70/99 to the east and I-5 to the south are major regional transportation corridors. Current land use to the west of the Greenbriar Project Site (the planned MAP development) is undeveloped land/idle cropland. A residential property is located west of the Greenbriar Project Site, south of West Elkhorn Boulevard. Land use in the immediate vicinity includes agricultural cropland to the north and southwest and residential development to the east and southeast. Refer to **Figure 4** for the land use in the region.

The Greenbriar Project Site is primarily used for intensive agricultural practices and contains irrigation canals. Lone Tree Canal follows the western site boundary and is maintained by Reclamation District 1000 (RD 1000) under an existing easement. Additional irrigation canals throughout the Greenbriar Project Site are managed and maintained by the Natomas Central Mutual Water Company (NCMWC) and RD 1000 under existing easements but are currently not in use.

The majority of the site is being dry farmed for grass hay and has been for over a decade. A portion of the property was cultivated for rice until 2004 and the remainder of the property has been used for cropland for 20 years or more. Previously cultivated crops include rice, sugar beets and wheat.

The northwest section of the site contains remnant development from a horserace track and an irrigated polo field that were in use from approximately 1980 to the early 2000s. The developed area is surrounded by undeveloped land. An existing drainage structure constructed for the MAP Project and a 20-foot-wide utility easement granted to the Sacramento Regional Sanitation District are located in the northeast corner of the Greenbriar Project Site (approximately 10.1 acres of existing disturbance).

The Off-site Improvement Lands are developed for transportation land uses (roadways).

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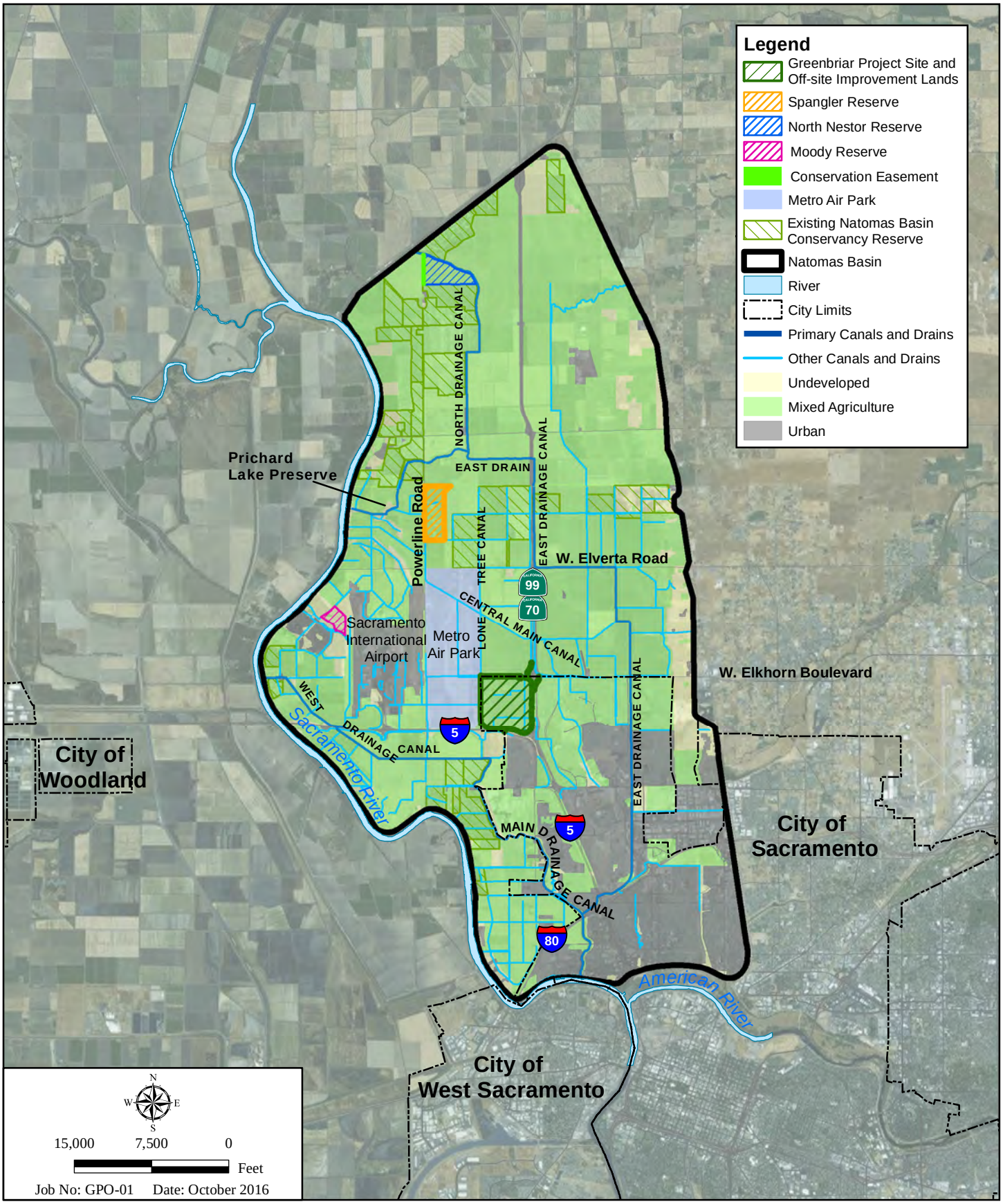

Source: TNBC, DWR (1998, 2000, 2010) *Aerial:* ESRI 2014

Environmental Setting

GREENBRIAR CONSERVATION STRATEGY

Figure 4

HELIX Environmental Planning

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3.1.1.1. SPANGLER RESERVE

Land use in the vicinity of the Spangler Reserve consists primarily of active and inactive agricultural cropland (e.g., rice, grass hay) as well as habitat reserves managed by TNBC and other non-profit entities. The Spangler Reserve is located approximately 1 mile northwest of the Sacramento International Airport. Sacramento County owns the parcel adjacent to the southern boundary of the Spangler Reserve.

The Spangler Reserve is currently used for intensive agricultural production of rice. Irrigation canals and drainage ditches transect and follow the perimeter of the site, and are connected by culverts. The rice fields are laser-leveled and delineated by small levees. Access roads follow the canals/ditches, and one access road crosses longitudinally through the center of the site.

3.1.1.2. MOODY RESERVE

The Moody Reserve is located in the west central portion of the Natomas Basin approximately 0.4 mile southeast of the Sacramento River, between the Sacramento International Airport and Teal Bend Golf Course. Major land uses in the vicinity of the Moody Reserve include the Teal Bend Golf Course, fallow and active agricultural fields, and the Sacramento International Airport. The Moody Reserve occurs within the historic floodplain of the Sacramento River and supports remnant valley oak woodland and riparian habitat, which also occurs in the vicinity of the site. In addition to the Sacramento River and its riparian corridor, notable biological habitats in the vicinity of the Moody Reserve includes the recently constructed Lower GGS/Drainage canal (approximately 50 feet in width at top-of-bank) that exists along a significant portion of the southeastern boundary of the Moody Reserve; a drainage containing perennial wetlands and a mature riparian corridor (ranging from approximately 175 to 500 feet in width) that parallels the southern and eastern boundaries of the Moody Reserve; and fallow agricultural lands to the north of the Moody Reserve that contain remnant valley oak woodland/savannah with scattered valley oaks and elderberry shrubs with an understory of annual grasses.

The Moody Reserve consists primarily of alfalfa fields, which comprise the interior portion of the site. Irrigation canals and drainage ditches, which are used to periodically flood-irrigate and then subsequently drain the alfalfa fields, follow the southern, western, and northern perimeters of the site. Walnut Road is a single lane, unpaved road that demarcates the northwestern site boundary. The southeastern corner of the site contains a small area that is not farmed that supports grassland, riparian, and seasonal wetland habitat associated with the riparian corridor south of the site.

3.1.1.3. NORTH NESTOR RESERVE

The North Nestor Reserve is located in the northwestern portion of the Natomas Basin in an area used primarily for agricultural production. The Natomas Cross Canal is located approximately

0.25-mile north of the site, the Sacramento River is located approximately 1.6 miles southwest of the site, and the SR 99/70 corridor is located approximately 0.8 mile east of the site. Power Line Road forms the western site boundary and North Drainage Canal forms the northern site boundary. Major land uses adjacent to the site include existing habitat reserve consisting of managed marsh at the TNBC Lucich North reserve north of the site and preserved rice lands at the TNBC Nestor reserve south of the site as well as privately-owned agricultural fields to the northeast, east, and west.

The North Nestor Reserve is currently used for agricultural production of rice. Irrigation canals and drainage ditches follow the perimeter of the site, and are connected by culverts. The rice fields are laser-leveled and delineated by small levees. Access roads follow the canals/ditches, and along the tops of the levees delineating the rice fields.

3.1.2. Climate

The climate of the Natomas Basin is Mediterranean, characterized by wet, cool winters and dry, hot summers. At the Sacramento International Airport (approximately 1 to 2 miles west of the Greenbriar Project Site), mean daily maximum and minimum temperatures are 92 degrees Fahrenheit and 58 degrees Fahrenheit in July, and 54 degrees Fahrenheit and 39 degrees Fahrenheit in January (NCDC 2004). The mean annual precipitation is 18 inches, with over 90 percent occurring as rain from October to May. Winter storms can cause localized flooding.

3.1.3. Topography and Geology

The topography of the Natomas Basin where the Project properties occur is relatively flat, with elevations at the Greenbriar Project Site (including Lone Tree Canal Reserve) and the Off-site Improvement Lands ranging from approximately 5 to 25 feet above mean sea level (amsl). The interior portions of the Natomas Basin are an average of approximately 20 feet amsl; elevations at the Spangler Reserve range from 20 to 25 feet amsl, elevations at the Moody Reserve range from 20 to 26 feet amsl, and elevations at the North Nestor Reserve range from 18 to 23 feet amsl. The Greenbriar Project Site, Off-site Improvement Lands, and Reserve Sites are located in the Natomas Basin in northwestern Sacramento County in the Sacramento Valley. This area is located in the central portion of the Great Valley geomorphic province of California, which includes most of Sacramento County. The Great Valley is an approximately 50-mile-wide and 400-mile-long alluvial plain that lies between the mountains and foothills of the Sierra Nevada to the east and the Coast Ranges to the west. This alluvial plain was once covered by ocean. As a result, the valley is underlain by an asymmetrical depression (formed by intersecting, downward sloping folds of bedrock) in which various sedimentary deposits have accumulated in a sequence of units (known as the Great Valley Sequence) for more than 100 million years.

Formation of the Great Valley Sequence began with marine sediments from the receding ocean and was followed more recently by river deposits (alluvial deposits) washing down from the Sierra Nevada, Klamath, Cascade, and Coast Ranges. The United States Geological Survey (USGS) Geologic Map of the Late Cenozoic Deposits of the Sacramento Valley and Northern Sierran Foothills, California shows the project area to be underlain by undivided Holocene basin deposits and the lower member of the Riverbank Formation (Helley and Harwood 1985, cited in Wallace Kuhl & Associates). The Holocene basin deposits (which occurred within the last 10,000 years) consist of fine-grained silt and clay derived from the nearby mountain ranges and deposited by the Sacramento and American Rivers. The lower member of the Riverbank Formation consists of red semi-consolidated gravel, sand, silt, and clay derived from the nearby mountain ranges and deposited by the Sacramento and American Rivers.

3.1.4. Hydrology

The Natomas Basin historically contained marshland and a variety of wetlands. After the Sacramento River levee system was completed around 1915, the area was drained and converted to farmland. Subsequently, a network of channels and pumping stations were constructed in the Natomas Basin in the 1930s for flood control and irrigation. The NCMWC maintains and operates the water delivery channels throughout the Natomas Basin, and the RD 1000 maintains and operates agricultural drainage and flood control channels.

3.1.4.1. Greenbriar Project Site and Off-Site Improvement Lands

The Greenbriar Project Site features a network of irrigation and drainage canals following the perimeter of each agricultural field, and the western (Lone Tree Canal), southern, and eastern boundaries of the site. Irrigation canals are also located on the Off-site Improvement Lands along W. Elkhorn Boulevard. The NBHCP identifies and describes the canals following the perimeter of the site as part of a regional water drainage system, and the interior canals as part of a water delivery system. Canals on the Greenbriar Project Site were constructed to convey irrigation or drainage, and are connected to the system of canals and ditches developed and maintained by the NCMWC and RD 1000. There are also canals on the site that are maintained by the landowner. The Greenbriar Project Site was irrigated for agricultural purposes until 2003, and water was pumped through the irrigation ditches from a lift station located approximately 0.5 mile north of the site. Water delivery to the Greenbriar Project Site from the pump station has since ceased due to changes in agricultural production on the site; the ditches are largely dry except during rain events.

The Lone Tree Canal on the Greenbriar Project Site is an indirect tributary to the Sacramento River via the West Drainage Canal. In the Natomas Basin, Lone Tree Canal collects drainage flows and runoff from adjacent properties, including MAP and the Greenbriar Project Site, and flows

southward, where it is conveyed under I-5 through a multi-cell concrete box culvert, to the West Drainage Canal.

3.1.4.2. SPANGLER RESERVE

Hydrology on the Spangler Reserve is currently managed as part of the local agricultural and flood control system managed by NCMWC and RD 1000. A network of irrigation canals and drainage ditches follow the perimeter of the Spangler Reserve. The Powerline Ditch is located along the western limit of the Spangler Reserve. Additionally, a drainage ditch follows the eastern site limit and another transects the northern half of the site. An irrigation canal along its southern and southwestern boundary connects to Pritchard Lake, approximately 0.6 mile west of the Spangler Reserve. These canals and ditches contribute to the overall network of channels throughout the Natomas Basin, which are direct tributaries to the Sacramento River, located approximately 1.5 mile west of the Spangler Reserve. The agricultural fields at the Spangler Reserve are periodically flooded for rice production and are expected to be flooded or saturated for the duration of the growing season (May 15 through September 15). Following crop harvest, the fields are flooded from November 15 through February 15 for weed control.

3.1.4.3. MOODY RESERVE

Hydrology on the Moody Reserve is also currently managed as part of the local agricultural and flood control system managed by the NCMWC and the RD 1000. Irrigation canals and drainage ditches follow the southern, western, and northern perimeters of the Moody Reserve, and one small ditch bisects the western portion of the site. These canals and ditches contribute to the overall network of channels throughout the Natomas Basin, which are direct tributaries to the Sacramento River, located approximately 0.4-mile northwest of the Moody Reserve. The alfalfa fields at the Moody Reserve are periodically flooded for alfalfa production from early spring through late fall.

3.1.4.4. NORTH NESTOR RESERVE

Hydrology on the North Nestor Reserve is currently managed as part of the local agricultural and flood control system managed by the NCMWC and the RD 1000. Irrigation canals and drainage ditches follow the perimeter of the site. The North Drainage Canal comprises the northern site boundary, and connects with the Natomas Cross Canal approximately 0.13-mile northwest of the reserve site. These canals and ditches contribute to the overall network of channels throughout the Natomas Basin, which are direct tributaries to the Sacramento River, located approximately 1.6 miles southwest of the North Nestor Reserve. The agricultural fields at the North Nestor Reserve are periodically flooded for rice production and are expected to be flooded or saturated for the duration of the growing season (May 15 through September 15). Following crop harvest, the fields are flooded from November 15 through February 15 for weed control.

3.1.5. Habitat Types

Habitat types, also referred to as vegetation or plant communities, are assemblages of plant and animal species that usually coexist in the same area. Naturally-occurring habitat types are classified based upon their dominant flora and fauna and the life form (e.g., grass/forb, shrub, tree) of the dominant species. Habitats characterized by a high level of anthropogenic disturbance are often classified by the dominant land use of the habitat.

3.1.5.1. GREENBRIAR PROJECT SITE AND OFF-SITE IMPROVEMENT LANDS

Habitat types/land uses in the Greenbriar Project Site and Off-site Improvement Lands include grass hay, ruderal/disturbed, abandoned irrigation canal, remnant structure, seasonal wetland, scrub shrub wetland, seasonal marsh, active irrigation canal, and ditch. Each habitat type is described in detail in the following sections.

Grass Hay

The Greenbriar Project Site contains 432.84 acres in intensive agricultural production of grass hay. Typical species include oats (*Avena* sp.), barley (*Hordeum* sp.), and ryegrass (*Lolium* sp.).

Ruderal/Disturbed

A total of 116.45 acres of the Greenbriar Project Site contain ruderal/disturbed habitat located in the northwestern portion of the site, following the perimeters of the fields and canals, and within the dirt access roads. Approximately 7.21 acres of ruderal/disturbed habitat occurs on the Off-site Improvement Lands along W. Elkhorn Boulevard, I-5, and SR 99/70.

The ruderal/disturbed habitat at the Greenbriar Project Site and the Off-site Improvement Lands is largely characterized by areas moderately to densely vegetated with herbaceous plant species typically associated with previously disturbed, unmanaged areas. The dirt access roads are sparsely vegetated as a result of continued use. The dominant plant species associated with the ruderal/disturbed habitat on the Greenbriar Project Site and Off-site Improvement Lands include soft brome (*Bromus hordeaceus*), wild oat (*Avena* sp.), mouse-tail grass (*Vulpia myuros*), long-beaked filaree (*Erodium botrys*), woodland geranium (*Geranium molle*), chick weed (*Stellaria media*), milk thistle (*Silybum marianum*), star thistle (*Centaurea solstitialis*), barley (*Hordeum murinum* ssp. *leporinum*), clover (*Trifolium* sp.), and shepherd's purse (*Capsella bursa-pastoris*).

Abandoned Irrigation Canal

The Greenbriar Project Site features a network of irrigation canals no longer in use. The canals on the site previously functioned for agricultural irrigation and water was deployed by a pump. The Greenbriar Project Site is no longer actively irrigated; therefore, the majority of the canals have colonized with disturbed upland vegetation. Canals still used to convey irrigation water (e.g., Lone

Tree Canal) or canals directly connecting with water-holding canals exhibit hydrophytic vegetation, and are described under aquatic habitats in the following section.

Approximately 8.63 acres of abandoned irrigation canal occurs on the Greenbriar Project Site. The canals contain earthen banks and bottoms with steep sides. Culverts and head gates connecting to other canals off-site are closed, preventing water from entering the channels, and blocking aquatic habitat connectivity through the Greenbriar Project Site. This habitat features varying densities of non-native grasses and forbs including milk thistle (*Silybum marianum*), curly dock (*Rumex crispus*), and black mustard (*Brassica nigra*).

Approximately 0.01 acre of abandoned irrigation canal occurs on the Off-site Improvement Lands.

Remnant Structure

Approximately 0.27 acre of dilapidated building foundations associated with the previous horserace track and polo field remain on the Greenbriar Project Site. The foundations have become vegetated with disturbed upland species such as milk thistle, star thistle, and black mustard, and the westernmost foundation contains openings and burrows providing suitable habitat for a variety of ground dwelling animals, including western burrowing owl.

Seasonal Wetlands

Seasonal wetlands on the Greenbriar Project Site and Off-site Improvement Lands are topographic depressions with a hydrologic regime characterized by temporary saturation or inundation capable of supporting hydrophytic plant species and hydric soils. Plant species in seasonal wetlands are adapted to withstand short periods of saturation or saturated soil conditions but will not withstand prolonged periods of inundation.

Approximately 11.49 acres of seasonal wetland occur on the Greenbriar Project Site, and approximately 0.38 acre of seasonal wetland occurs on the Off-site Improvement Lands.

The seasonal wetlands in the grass hay fields on the Greenbriar Project Site have been significantly altered and are planted with grass for hay production. These wetlands are characterized by seasonally saturated soils. The seasonal wetlands in the previously developed portion of the site (the northwest corner) are seasonally inundated and support hydrophytic plant species such as Italian ryegrass (*Festuca perennis*) and curly dock (*Rumex crispus*).

Scrub Shrub Wetland

The approximately 1.34-acre remnant water feature in the center of the horserace track on the Greenbriar Project Site previously contained seasonal marsh; however, it is no longer artificially irrigated, and does not support herbaceous vegetation typical of a perennial or seasonal marsh. The

feature previously supported a stand of trees that were removed during the winter of 2012/2013 consistent with proposed measures to remove potential nesting habitat on the site. Sandbar willow (*Salix exigua*) and Himalayan blackberry (*Rubus armeniancus*) occur along the perimeter and encroach on the bottom of the feature. The bottom of the feature is primarily devoid of herbaceous vegetation; however, herbaceous species intermittently present in the bottom of the feature at the time of the site visit on April 17, 2012 included: bull thistle (*Cirsium vulgare*), black mustard, bristly oxtongue (*Helminthotheca echioides*), broad leaved peppergrass (*Lepidium latifolium*), and curly dock.

This feature is seasonally inundated as a result of storms, and may support annual wetland vegetation following sufficient saturation or inundation; however, herbaceous wetland vegetation is generally lacking.

Seasonal Marsh

Seasonal marsh is wetland that is seasonally inundated or saturated, but the hydrology persists through the majority of the warm season which may support plants capable of withstanding extended periods of inundation or saturation such as perennial herbaceous plant species. Approximately 0.31 acre of seasonal marsh occurs on the Greenbriar Project Site. The seasonal marshes on the Greenbriar Project Site are primarily located near roadways or adjacent to canal berms where the topography of the right-of-way results in seasonal inundation. No seasonal marsh was identified on the Off-site Improvement Lands.

Active Irrigation Canal

Irrigation canals in the Natomas Basin are used for agricultural irrigation and drainage, and the water levels are largely managed through artificial means consistent with agricultural needs. As described earlier, the Greenbriar Project Site is no longer actively irrigated; therefore, the irrigation canals transecting the site largely support disturbed upland vegetation and do not function as aquatic habitat.

However, the Lone Tree Canal on the Greenbriar Project Site and Off-site Improvement Lands is actively used to convey irrigation water. The Lone Tree Canal contains 3.06 acre of active irrigation canal on the Greenbriar Project Site, and 0.06 acre on the Off-site Improvement Lands. On all properties, the active irrigation canals support hydrophytic vegetation along the bottoms and banks, but are devoid of adjacent riparian vegetation due to the agricultural function of the features. On the Greenbriar Project Site and Off-site Improvement Lands, Lone Tree Canal supports emergent vegetation indicative of prolonged periods of inundation, including cattails (*Typha angustifolia, T. latifolia*), common tule (*Schoenoplectus acutus*), and tall flatsedge (*Cyperus eragrostis*). Abandoned irrigation canals on the Greenbriar Project Site connecting

directly with Lone Tree Canal exhibit wetland vegetation near their confluence with Lone Tree Canal, likely supported by groundwater seepage and stormwater ponding.

Ditch

An approximately 0.08-acre ditch located on the Off-site Improvement Lands is a grass-lined depression that collects runoff from the southbound SR 99/70 off-ramp at W. Elkhorn Boulevard. This ditch is inundated in response to seasonal precipitation and supports disturbed/ruderal habitat.

Table 6 summarizes the habitat types identified in the properties associated with the Greenbriar Development Project. **Figures 5a and 5b** are habitat maps for the Greenbriar Project Site and the Off-Site Improvement Lands. **Figures 6a and 6b** are habitat maps for the Spangler Reserve. **Figure 7** is the habitat map for the Moody Reserve. **Figure 8** is the habitat map for the North Nestor Reserve.

Table 6. Existing Vegetation Community/Habitat Type by Project Property

Vegetation Community/ Habitat Type	Greenbriar Project Site (acres)	Off-site Improvement Lands (acres)	Spangler Reserve (acres)	Moody Reserve (acres)	North Nestor Reserve (acres)	Total (acres)
Upland						
Grass hay	432.84	--	--	--	--	**432.84**
Alfalfa agriculture	--	--	--	55.48	--	**55.48**
Non-native grassland	--	--	--	3.63	--	**3.63**
Ruderal/ disturbed	116.45	7.21	12.1	9.36		**145.12**
Abandoned irrigation canal	8.63	0.01	--	--	--	**8.64**
Graded/paved	2.69	5.02	--	--	--	**7.71**
Developed/ remnant structure	0.27	--	--	--	--	**0.27**
Aquatic						
Rice agriculture	--	--	217.43	--	219.1	**436.53**
Seasonal wetland	11.49	0.38	--	0.20	--	**12.07**

Active irrigation canal	3.06	0.06	4.55	--	--	**7.67**
Scrub shrub wetland	1.34	--	--	--	--	**1.34**
Seasonal marsh	0.31	--	--	--	--	**0.31**
Riparian	--	--	--	5.4	--	**5.4**
Ditch	--	0.08	0.92	0.23	--	**1.23**
Total	**577.0***	**12.76**	**235.4**	**74.3**	**219.1**	**1,118.56***

*Total may not add due to rounding

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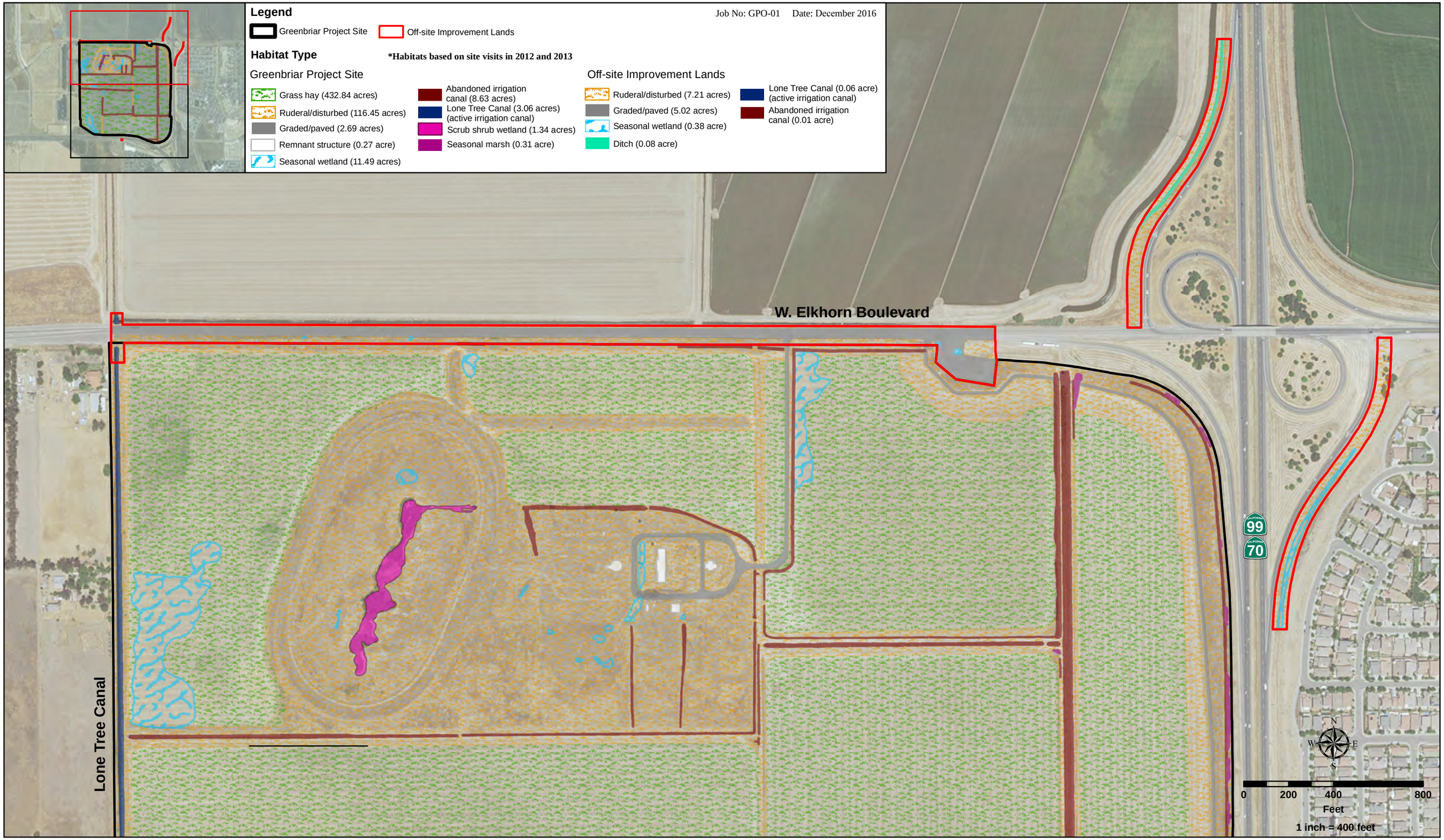

Aerial: ESRI 2014

Habitat Map: Greenbriar Project Site and Off-site Improvement Lands

GREENBRIAR CONSERVATION STRATEGY

Figure 5a

HELIX Environmental Planning

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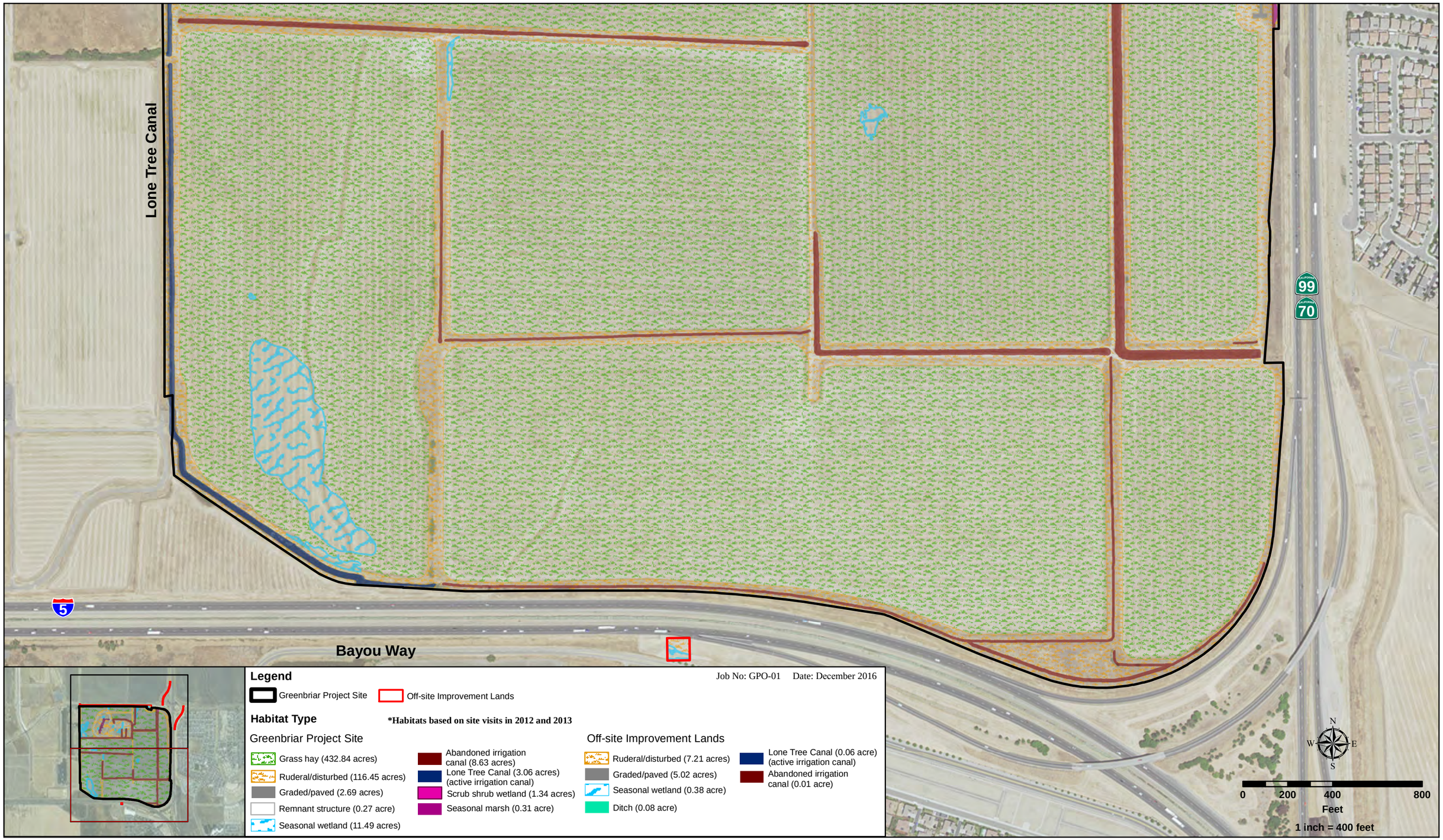

Aerial: ESRI 2014

Habitat Map: Greenbriar Project Site and Off-site Improvement Lands

GREENBRIAR CONSERVATION STRATEGY

Figure 5b

HELIX Environmental Planning

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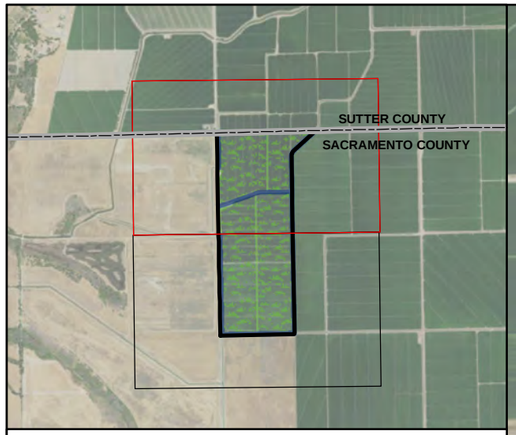

Legend

Spangler Reserve

Habitat Type

Rice (229.53 acres)

Active irrigation canal (4.55 acres)

Ditch (0.92 acre)

County Boundary

***Habitats based on site visits in 2012**

N
W E
S

0 200 400 800

Feet

1 inch = 400 feet

Job No: GPO-01 Date: December 2016

Aerial: ESRI 2014

Habitat Map: Spangler Reserve

GREENBRIAR CONSERVATION STRATEGY

Figure 6a

HELIX Environmental Planning

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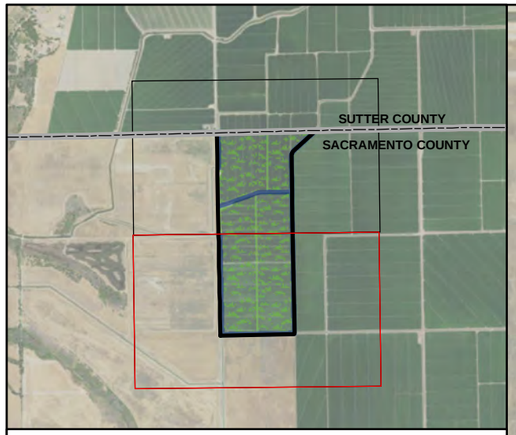

Legend

Spangler Reserve

Habitat Type

Rice (229.53 acres)

Active irrigation canal (4.55 acres)

Ditch (0.92 acre)

County Boundary

***Habitats based on site visits in 2012**

N
W E
S

0 200 400 800

Feet

1 inch = 400 feet

Job No: GPO-01 Date: December 2016

Powerline Road

Aerial: ESRI 2014

Habitat Map: Spangler Reserve

GREENBRIAR CONSERVATION STRATEGY

Figure 6b

HELIX Environmental Planning

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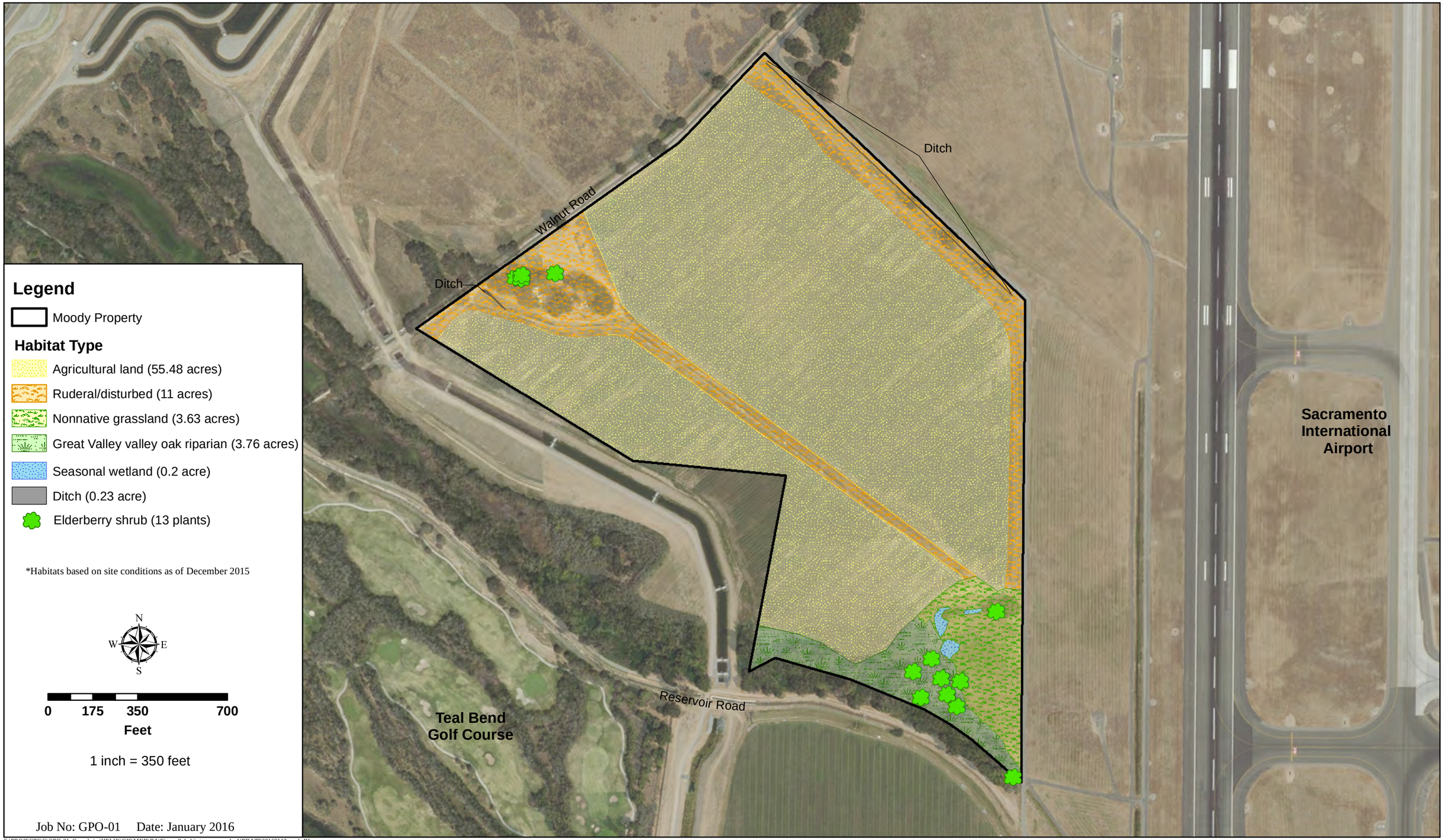

Legend

Moody Property

Habitat Type

- Agricultural land (55.48 acres)
- Ruderal/disturbed (11 acres)
- Nonnative grassland (3.63 acres)
- Great Valley valley oak riparian (3.76 acres)
- Seasonal wetland (0.2 acre)
- Ditch (0.23 acre)
- Elderberry shrub (13 plants)

*Habitats based on site conditions as of December 2015

N W E S

0 175 350 700

Feet

1 inch = 350 feet

Job No: GPO-01 Date: January 2016

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Aerial: ESRI 2014

HELIX Environmental Planning

Habitat Map: Moody Property

GREENBRIAR CONSERVATION STRATEGY

Figure 7

Aerial: ESRI 2014

Habitat Map: North Nestor Reserve

GREENBRIAR CONSERVATION STRATEGY

Figure 8

HELIX Environmental Planning

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3.1.5.2. SPANGLER RESERVE

The entire Spangler Reserve is in active rice production. Current habitat types in the Spangler Reserve include rice, ruderal/disturbed, active irrigation canals, and drainage ditch. Each habitat type is described in detail in the following sections.

Rice

The majority of the Spangler Reserve (217.43 acres) is composed of a monoculture of intensive agricultural production of rice.

Ruderal/Disturbed

Approximately 12.1 acres of the Spangler Reserve is composed of ruderal/disturbed habitat. This habitat occurs around the edges of the rice fields, within the dirt access roads, and in equipment staging and turnaround areas throughout the Spangler Reserve. Vegetation in this habitat is sparse and consists primarily of annual grasses and forbs.

Active Irrigation Canal

Approximately 4.55 acres of active irrigation canal occurs on the Spangler Reserve. The active irrigation canals support hydrophytic vegetation along the bottoms and banks, but are devoid of adjacent riparian vegetation due to the agricultural function of the features. Active irrigation canals along the western and southern perimeter of the Spangler Reserve carry high water volumes, and do not support emergent vegetation; however, the canal that bisects the northern portion of the site and the canal along the eastern perimeter contain low water levels and support hydrophytic vegetation including *Veronica americana*, *Typha* sp., *Cyperus eragrostis*, *Polypogon* sp., *Juncus* sp., *Rumex* sp., and *Equisetum arvense*.

Drainage Ditch

An approximately 0.92-acre ditch located on the Spangler Reserve is a shallow, sparsely vegetated depression that collects runoff from Powerline Road. This ditch is inundated in response to seasonal precipitation and supports disturbed/ruderal habitat.

3.1.5.3. MOODY RESERVE

The primary existing land use of the Moody Reserve is agricultural production. Habitat types in the Moody Reserve include agricultural fields, ruderal/disturbed, non-native grassland, Great Valley valley oak riparian, irrigation ditch, and seasonal wetland. Each habitat type is described in detail in the following sections.

Agricultural Fields

The majority of the Moody Reserve is composed of agricultural fields currently being used for the production of alfalfa (*Medicago sativa*). A total of 55.48 acres of agricultural fields occur on the site. Alfalfa production in the region involves periodic flooding of the fields for irrigation. Alfalfa may be harvested every 28 days from spring to fall, and is typically flood irrigated two or three times during the growing cycle (UCD Alfalfa Working Group 2007). At the time of the October 17, 2014 site visit, the majority of the site was being flood irrigated for alfalfa production. At the time of the survey on March 9, 2015, the fields were dry and the fields were fallow or in early spring production. Opportunistic grasses and forbs had begun to colonize the fields, including short fruit stork's bill (*Erodium brachycarpum*), bur clover (*Medicago polymorpha*), redmaids (*Calandrinia ciliata*), Bermuda grass (*Cynodon dactylon*), common cudweed (*Gnaphalium luteo-album*), telegraph weed (*Heterotheca grandiflora*), and wild oat (*Avena fatua*).

Ruderal/Disturbed

A total of 9.36 acres of ruderal/disturbed habitat occurs on the Moody Property. This habitat type is characterized by sparse weedy vegetation (ruderal) and/or areas dominated by horticultural plantings associated with prior site uses (disturbed). The ruderal and disturbed habitats are combined into one habitat type because they both largely lack native or naturalized vegetation but are not in agricultural use. The ruderal habitat type is associated with the margins of the agricultural fields, the dirt access roads, the edges of the irrigation and drainage channels, and an equipment staging area. Vegetation in this habitat ranges from sparse to dense and consists of plant species similar to the weedy species colonizing the harvested agricultural fields. Additional common species in the ruderal disturbed habitat include fiddleneck (*Amsinckia menziesii*), annual bluegrass (*Poa annua*), and wild radish (*Raphanus sativus*).

The disturbed area is composed of a variety of native and horticultural trees and shrubs including valley oak (*Quercus lobata*), weeping willow (*Salix babylonica*), Mediterranean cypress (*Cupressus sempervirens*), coast redwood (*Sequoia semperivens*), pine (*Pinus* sp.), white mulberry (*Morus alba*), cork oak (*Quercus suber*), and citrus (*Citrus* sp.). Several elderberry shrubs (*Sambucus nigra*) occur in the disturbed area, as well as various horticultural shrubs. The groundcover within the disturbed area features various grasses and forbs, including wild oat, wild radish, miner's lettuce (*Claytonia perfoliata*), ripgut brome (*Bromus diandrus*), and common bedstraw (*Galium aparine*).

Non-native Grassland

A total of 3.63 acres of non-native grassland occurs in the southeastern portion of the Moody Reserve in an undeveloped area not being used for agricultural production. The non-native grassland is characterized primarily by ripgut brome and yellow star thistle. Additional grasses and

forbs observed within this habitat include telegraph weed, Bermuda grass, annual vetch (*Vicia* sp.), wild radish, and geranium (*Geranium dissectum*). A large Gooding's willow (*Salix goodingii*) and a stand of Himalayan blackberry (*Rubus armeniancus*) and poison oak (*Toxicodendron diversilobum*) shrubs are located in the northern portion of the non-native grassland.

Great Valley Valley Oak Riparian

A total of 5.4 acres of Great Valley valley oak riparian habitat occurs on the Moody Reserve along the southern boundary of the site. Great Valley valley oak riparian is typically a medium to tall (rarely to 100 feet) broadleafed, winter-deciduous, closed canopy riparian forest dominated by valley oak. Understories include scattered Oregon ash (*Fraxinus latifolia*), Northern California walnut (*Juglans hindsii*), and California sycamore (*Platanus racemosa*), as well as young valley oak. Long-stemmed, woody vines including Clematis (*Clematis* sp.) wild grape (*Vitis* sp.) or poison oak are often conspicuous, and are more scattered throughout the shady understory (Holland 1986). On the Moody Reserve, this habitat is associated with an off-site drainage that parallels the north side of Reservoir Road. The overstory of the riparian habitat is characterized by mature valley oaks, with lesser numbers of Fremont's cottonwood (*Populus fremontii*), box elder (*Acer negundo*), and willow (*Salix* spp.). Adjacent to the non-native grassland, the riparian corridor is dominated by narrow leaved willow (*Salix exigua*) and sapling valley oaks. The understory is composed of a variety of grasses and forbs.

Irrigation Ditch

Two irrigation ditches totaling 0.23 acre are present on the Moody Reserve: a longer concrete-lined irrigation ditch that follows the northeastern site boundary and a short irrigation ditch with soil bed and banks that occurs south of the residential dwelling. These features were constructed as part of the irrigation system for agricultural activities on the site and are fed by a NCMWC ditch north of Walnut Road. Both ditches are maintained relatively free of vegetation and water levels within the ditches are artificially managed with pumps and drains. At the time of the field survey on March 9, 2015 no water was present in either ditch; however, remnant vegetative debris observed in the longer ditch along the northeastern site boundary indicates that when water is present the ditch may provide seasonal wetland habitat. Remnant emergent vegetation in the northern channel able to be identified at the time of the survey included common tule (*Schoenoplectus acutus*) and water speedwell (*Veronica anagallis-aquatica*). A combination of upland and moderately hydrophytic species occur along the banks and outer berms of both ditches including ripgut brome, Italian ryegrass, and horsetail (*Equisetum* sp.).

Seasonal Wetland

A total of 0.20 acre of seasonal wetland habitat composed of three separate wetland features is present in the southeastern portion of the Moody Reserve within the non-native grassland and

adjacent to the Great Valley valley oak riparian habitat. The seasonal wetlands occupy low points in the topography and are vegetated primarily with Italian ryegrass and rush. The seasonal wetlands appear to be inundated periodically via overflow from the drainage south of the Moody Reserve as well as stormwater runoff from the surrounding uplands. Based on the vegetation composition of the seasonal wetlands, they appear to be characterized primarily by prolonged saturation rather than inundation. No plant species characteristic of vernal pool habitats were observed within the seasonal wetlands.

3.1.5.4. NORTH NESTOR RESERVE

The entire North Nestor Reserve is in intensive rice production. Rice fields occupy a total of 219.1 acres on the North Nestor Reserve. No significant canals or ditches are present on the site. Irrigation and drainage for the site is primarily performed by a network of canals and ditches around the site's perimeter.

3.1.6. Wildlife

The properties associated with the Greenbriar Development Project provide suitable habitat for a variety of wildlife species commonly inhabiting agricultural land in the Natomas Basin. The larger expanses of terrestrial habitats (e.g., grass hay, alfalfa, ruderal/disturbed) on the Greenbriar Project Site and the Moody Reserve provide suitable foraging habitat for raptors such as white-tailed kite (*Elanus leucurus*), northern harrier (*Circus cyaneus*), red-tailed hawk (*Buteo jamaicensis*), Swainson's hawk, and western burrowing owl. Common grassland birds such as the western meadow lark (*Sturnella neglecta*) may use the grass hay, non-native grassland, or ruderal/disturbed habitats on these two sites for nesting, and the emergent and dense weedy vegetation along the canals/ditches provide potential nesting habitat for birds such as red-winged black bird (*Agelaius phoeniceus*). During the winter, the agricultural fields provide potential foraging habitat for migratory waterfowl, raptors, and passerines. Common mammals including coyote (*Canis latrans*), California jackrabbit (*Lepus californicus*), raccoons (*Procyon lotor*), Botta's pocket gopher (*Thomomys bottae*), California vole (*Microtus californicus*), and mule deer (*Odocoileus hemionus*) are present on the Greenbriar Project Site and the Moody Reserve.

The rice fields at the Spangler Reserve and the North Nestor Reserve support a variety of wildlife depending on the season. In the spring and summer, the rice fields may support foraging bird species such as black-crowned night-heron (*Nycticorax nycticorax*), Canada goose (*Branta canadensis*) cinnamon teal (*Anas cyanoptera*), mallard (*Anas platyrhynchos*), gadwall (*Anas strepera*), and killdeer (*Charadrius vociferous*); in the fall and winter, the flooded rice fields provide foraging habitat for migrating or overwintering waterfowl, waders, shorebirds, and gulls. When fallow, the rice fields provide terrestrial habitat similar to non-irrigated cropland or disturbed

annual grassland. Mammals including coyotes and raccoons would be expected to use the Spangler Reserve and the North Nestor Reserve.

The canals on the Greenbriar Project Site, Spangler Reserve, and North Nestor Reserve supporting permanent or seasonal aquatic habitat as well as the rice fields at the Spangler Reserve and the North Nestor Reserve provide suitable habitat for common aquatic and semi-aquatic species such as mosquitofish (*Gambusia affinis*), bullfrog (*Rana catesbeiana*), and Pacific tree frog (*Pseudacris regilla*). These areas also provide potential habitat for GGS, and western pond turtle.

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Chapter 4. BIOLOGICAL GOALS AND OBJECTIVES

4.1. Biological Goals and/or Objectives

The following are the biological goals and objectives of the Greenbriar Conservation Strategy:

- Dedicate and preserve reserve land in perpetuity to provide habitat for the 22 plant and animal species covered by the NBHCP. Proposed activities at the reserves include creating, enhancing, and managing habitat for the NBHCP Covered Species. A total of approximately 557 acres of reserve land is proposed for permanent preservation to offset development impacts to 542.3 acres of land on the Greenbriar Project Site and Off-site Improvement Lands (1.03:1 ratio).
- Use avoidance and minimization measures to protect special-status species and biological resources during implementation of the Greenbriar Development Project, including the Reserve establishments.
- Establish and manage the Lone Tree Canal Reserve on the Greenbriar Project Site, and three Off-site Reserves: the Spangler Reserve, the Moody Reserve, and the North Nestor to provide a reserve composition of rice, upland, and managed marsh in a manner consistent with the NBHCP reserve composition requirements for the TNBC reserve system to the extent feasible.
- Establish 80.2 acres of wetlands and other waters of the U.S. on the Spangler Reserve to achieve “no net loss” of wetlands or other waters of the U.S. in the Natomas Basin.

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Chapter 5. CONSISTENCY WITH NBHCP RESERVE ACQUISITION CRITERIA

The NBHCP contains several overall acquisition/evaluation criteria to be considered when a piece of land is being evaluated for its suitability as a potential reserve. The overall acquisition criteria in the NBHCP are listed below along with an evaluation of consistency between the Greenbriar Development Project's reserves and such criteria.

The NBHCP provides for a general division of habitat types within TNBC's system of reserves as follows: 50% rice production, 25% managed marsh, and 25% upland habitat.

Approximately 557 acres of reserve land is proposed in the Greenbriar Conservation Strategy to offset impacts to 542.3 acres of land on the Greenbriar Project Site and Off-Site Improvement Areas (1.03:1 ratio). The Greenbriar Conservation Strategy proposes 259.4 acres of rice (46.6%), 143.8 acres of managed marsh (25.8%), and 153.9 acres of upland (27.6%), roughly meeting or exceeding the NBHCP ratio in each category.

Land has legal water rights to an adequate water supply to serve the anticipated uses (wetland or upland) of the proposed reserve.

NCMWC manages consolidated riparian and appropriative water rights for approximately 238 landowners in the Natomas Basin. NCMWC is considered one of the most senior water rights holders in the Sacramento Basin. With priority dates as far back as 1916, NCMWC is senior to both the Central Valley Project and State Water Project. After completion of the Central Valley Project substantially altered hydrology in the Sacramento River, NCMWC entered into a settlement contract with the Bureau of Reclamation that established a base diversion entitlement of 98,200 acre-feet per year, with a potential reduction of up to 25 percent in critically dry years when annual inflow to Shasta Lake is less than 3.2 million acre-feet (City of Sacramento *et al.* 2003).

The groundwater basin underlying the Natomas Basin is part of a larger basin system underlying the Central Valley. Groundwater in the region generally flows eastward from the Sacramento River toward the McLellan/North Highlands area. Groundwater in the Natomas Basin is found in discontinuous zones that vary in depth and water quality, and is typically at depths of 10 to 50 feet below grade. Approximately 20,000 acre-feet of groundwater are used for irrigation in the Natomas Basin annually (City of Sacramento *et al.* 2003).

All Greenbriar Conservation Strategy off-site reserves are located on properties served by NCMWC. The North Nestor Reserve and the Moody Reserve would remain in their current uses.

Water deliveries to these two sites are provided by the NCMWC; these water deliveries would continue consistent with the existing land use at each site.

Water supply and drainage at the Spangler Reserve is currently managed as part of the local agricultural and flood control system managed by NCMWC and RD 1000. The rice fields at the Spangler Reserve are periodically flooded for rice production and are expected to be flooded or saturated for the duration of the growing season (May 15 through September 15). Following crop harvest, the fields are flooded from November 15 through February 15 for weed control. Water use for Spangler Reserve operation is expected to be less than the current annual water usage for rice cultivation. RD 1000 staff indicated that a flow-through of 1 cubic foot per second, which is within the range or higher than is anticipated to be required by the proposed site design, would not pose an issue to the existing RD 1000 drainage system.

It is the legal responsibility and obligation of the MAP POA to maintain aquatic habitat in Lone Tree Canal throughout the GGS active season, in perpetuity. The MAP HCP includes provisions to ensure that water levels are maintained at or above 12 inches of depth (Thomas Reid Associates 2001). To provide a back-up water supply, an 8-inch-diameter drain pipe will be installed to drain to Lone Tree Canal near the northern boundary of the Greenbriar Project Site, from detention basins proposed for construction. The purpose of the drain pipe is to provide supplemental flows to Lone Tree Canal in the event that additional water is required to maintain water sufficient to support GGS during its active season. The drain pipe will include a slide gate that will be physically operated as needed. The detention basin water supply will be supplemented, if needed, by groundwater.

Land is capable of supporting appropriate agricultural cultivation in conjunction with either wetland or upland habitat reserve.

The Greenbriar Development Project's proposed reserves were chosen specifically because they are already being used for agricultural cultivation consistent with the requirements of the NBHCP Covered Species and have existing agricultural uses consistent with the existing TNBC reserve system. The Moody Reserve is currently in alfalfa production (and has been for many years) and is capable of supporting continued alfalfa production. The Spangler Reserve and the North Nestor Reserve are both currently in rice production (and have been for many years) and are both capable of supporting continued rice production. The Lone Tree Canal Reserve, while not in agricultural production, represents important north/south connectivity for GGS and is thus consistent with other goals of the NBHCP.

Land is capable of either supporting or being improved to support various NBHCP Covered Species associated with the anticipated type of habitat (wetland or upland) proposed for the potential reserve.

All of the proposed reserves associated with the Greenbriar Development Project have been assessed and determined to support NBHCP Covered Species and/or their habitats in their current condition. The Lone Tree Canal Reserve provides habitat for GGS and other Covered Species dependent on canal habitats as well as upland foraging habitat for Swainson's hawk and other bird species. The Spangler Reserve and North Nestor Reserve both provide habitat for GGS and other Covered Species dependent on rice and canal habitats. The Moody Reserve provides nesting and upland foraging habitat for Swainson's hawk and other bird species. Habitat value at all of the reserve sites will be maintained and/or enhanced upon reserve establishment.

Upland or wetland specific criteria will be applied as appropriate.

Of the Greenbriar Development Project's proposed reserves, only the Spangler Reserve is proposed for substantial habitat creation. The design of the proposed managed marsh at the Spangler Reserve was developed in coordination with Mr. Eric C. Hansen, GGS scientist. Mr. Hansen found the site to be suitable to support managed marsh. In addition, he found the managed marsh design to be "wholly consistent with the general design elements of giant garter habitat creation…through its simplicity it overcomes many of the challenges experienced with habitats comprising larger, more complex management units." Mr. Hansen also found that by increasing both the number of management units (i.e. managed marsh cells) and the ability to exercise a greater degree of control over local conditions, the managed marsh design at the Spangler Reserve provides superior opportunities to measure the species' response to different conditions and to adaptively manage habitat.

Land is adequately removed from incompatible urban development or uses (i.e., situated a minimum of 800 feet from existing urban lands or lands that are designated for urban uses in an adopted general plan). Mitigation lands that do not comply with the 800-foot setback requirement may be acquired on a case-by-case basis under certain circumstances such as cases where the value of the site warrants preservation (e.g., Fisherman's Lake).

Existing urban lands is defined as "lands that are intensively or completely developed for urban, commercial, or residential uses or are adjacent to or within the immediate vicinity of intensively developed areas, such that the direct and indirect effects of such development are significantly incompatible with the objectives and purposes of the reserve system and would be likely to have significant adverse effects on the reserve viability or on Covered Species inhabiting the reserve lands."

No lands meeting the definition of "existing urban lands" in the NBHCP occur within 800 feet of any of the proposed Off-Site Reserves (North Nestor Reserve, Spangler Reserve, Moody Reserve). The North Nestor Reserve is bordered by existing TNBC reserves on the north (managed marsh) and south (rice lands) sides – the remaining lands adjacent to the site are agricultural lands in active rice production. A parcel with a homestead and agriculture-related equipment and structures occurs approximately 575 feet south of the southwestern corner of the North Nestor Reserve. Activities on the parcel are not incompatible with the objectives and purposes of the reserve system. This is evidenced by the fact that the TNBC reserve (Nestor) that is adjacent to the south side of the North Nestor Reserve directly abuts the developed parcel with no buffer. The TNBC Bennett North reserve also abuts the same developed parcel with no buffer.

The Spangler Reserve is bordered by agricultural lands in active rice production on the north and east sides, by fallow agricultural land on the south side, and Powerline Road and airport property on the west side. Although some "development" occurs adjacent to the Spangler Reserve in the form of lands in uses other than agriculture (i.e. Powerline Road and airport property), these lands are not incompatible with the objectives and purposes of the reserve system. Powerline Road is a rural two-lane farm road that experiences very low traffic volumes. A total of seven existing TNBC reserves abut Powerline Road between the Spangler Reserve and where the pavement ends on Powerline Road just north of Sankey Road. The adjacent airport property is in grass hay production and provides Swainson's hawk foraging habitat. One TNBC reserve (Atkinson) directly abuts the airport property just west of the Spangler Reserve.

The Moody Reserve is bordered by airport property to the north and east, by Jacob's Slough, agricultural land in alfalfa production and the Teal Bend Golf Course to the south, and Sacramento Area Flood Control Agency (SAFCA) mitigation land to the west. The closest distance between a runway/taxiway and the Moody Reserve is approximately 650 feet. This runway/taxiway parallels the eastern border of the Moody Reserve for approximately 1,800 feet. To the north of the Moody Reserve, there are no runways/taxiways within 800 feet. The developed portions of the Teal Bend Golf Course are 600+ feet away from the southern border of the Moody Reserve and are separated from the site by Jacob's Slough and a well-developed riparian corridor with 80+ foot tall trees. None of these land uses (airport lands, Teal Bend Golf Course) are incompatible with the objectives and purposes of the reserve system. This is evidenced by the fact that the Moody Reserve and adjacent riparian woodlands support nesting and foraging Swainson's hawk, which would be the primary purpose of the reserve along with providing habitat for other upland dependent Covered Species. During a site visit by HELIX biologists in July 2015, six Swainson's hawks were observed foraging in the Moody Reserve and perching on trees in the site.

Although the Lone Tree Canal will be within 25± feet of planned "urban land uses" along the west side (MAP) and 250± feet from "urban land uses" on the east side (Greenbriar development), it is an important north/south corridor for GGS and other Covered Species and its preservation and enhancement as proposed by the Greenbriar Development Project would support the NBHCP goal of maintaining habitat connectivity between the southern and central Basin. As stated by Mr. Hansen in his previously referenced letter, the Lone Tree Canal Reserve would provide higher quality habitat for GGS post-implementation of the Greenbriar Development Project than it does in its current condition because the site is currently in active hay production (right up to the edge of Lone Tree Canal), which is unsuitable as upland habitat for GGS. The Greenbriar Conservation Strategy includes restoring and preserving a 250-foot upland buffer on the east side of the canal, which would provide suitable upland habitat for GGS. It is worth noting, as pointed out by Mr. Hansen, that the Greenbriar Project Site is the only available option for upland creation along Lone Tree Canal because the snake exclusion wall associated with MAP limits the creation of upland to the west of Lone Tree Canal. Similar to Fisherman's Lake, the Lone Tree Canal warrants preservation regardless of its proximity to urban land uses for the reasons stated above.

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Chapter 6. CONSERVATION MEASURES

The proposed conservation measures for the Greenbriar Development Project pertaining to special-status species and habitats are presented below. These avoidance and minimization measures would protect special status species during construction activities on the Greenbriar Development Project Site as well as during development of the Reserves. Specific conservation measures, however, are not necessary for the following species as they would not be affected by the project: white-faced ibis, bank swallow, California tiger salamander, western spadefoot, vernal pool fairy shrimp, vernal pool tadpole shrimp, midvalley fairy shrimp, Boggs Lake hedge hyssop, Sacramento orcutt grass, slender orcutt grass, Colusa grass, and legenere. Species with and without specific conservation measures will benefit from the habitat enhancement and preservation element of the Greenbriar Conservation Strategy, which includes establishing the Lone Tree Canal Reserve, the Moody Reserve, the Spangler Reserve, and the North Nestor Reserve for the benefit of all of the Covered Species.

6.1. Giant Garter Snake Conservation Measures

General Measure

a. The Project Applicant shall obtain appropriate authorization for incidental take of GGS from USFWS and CDFW.

Habitat Creation, Preservation, and Management in the Lone Tree Canal Linear Open Space/ Buffer Area

b. To ensure that development of the Greenbriar Project Site does not diminish habitat connectivity for GGS between the southwest and northwest zones in the Basin identified in the NBHCP, approximately 28.3 acres along Lone Tree Canal shall be protected and managed as GGS habitat. This on-site habitat preservation shall protect an approximately 250-foot wide corridor of GGS habitat that includes the canal and approximately 200-225 feet of adjacent uplands. Uplands within the linear open space/buffer area shall be managed as perennial grassland as described below. Additional aquatic habitat for GGS shall be created along the east bank of Lone Tree Canal by recontouring the bank to facilitate the growth of freshwater marsh plants.

c. To ensure that the Project does not preclude GGS movement along Lone Tree Canal, all new road crossings of Lone Tree Canal shall be designed to minimize obstacles to GGS movement.

d. Upland habitat within the Lone Tree Canal Reserve shall be created and managed to provide refugia for GGS during the winter dormant period. Upland habitat within the linear open space/buffer areas shall be converted to native grassland and managed, in perpetuity, as grassland habitat.

e. Aquatic habitat shall be maintained throughout the GGS active season in Lone Tree Canal, in perpetuity. This is the legal responsibility and obligation of the MAP POA. The MAP HCP includes provisions for maintaining water in the canal such that the basic habitat requirements of the GGS are met. The MAP HCP also provides a road map, through "Changed Circumstances", to address procedures to follow if water is not being maintained in the canal to meet these requirements. As described in the MAP HCP, the MAP is legally obligated to assure these requirements are met, and financial and procedural mechanisms are included in the MAP HCP to enforce this. It is, therefore, assumed that MAP will provide water to Lone Tree Canal, as required by the MAP HCP and ITP, in perpetuity. It is also assumed that USFWS will use all reasonable means available to it, to enforce this MAP HCP requirement. If water is not provided to Lone Tree Canal by the MAP to meet the habitat requirements of GGS as required by the MAP HCP and USFWS exhausts its enforcement responsibilities, the Project Applicant shall assume the responsibility of providing suitable GGS aquatic habitat throughout the section of Lone Tree Canal in the Lone Tree Canal Reserve. However, as stated herein, the Project Applicant shall only assume this responsibility if it has been sufficiently demonstrated to the City of Sacramento that USFWS has exhausted all reasonable means to compel MAP to comply with the relevant conditions of the MAP ITP.

f. An 8-inch-diameter drain pipe will be installed to drain to Lone Tree Canal near the northern boundary of the Greenbriar Project Site from detention basins proposed for construction on the Greenbriar Project Site. The purpose of the drain pipe is to provide supplemental flows to Lone Tree Canal in the event that additional water is required to maintain water sufficient to support GGS during its active season. The drain pipe will include a slide gate that will be physically operated as needed. The water supply will be stormwater and/or groundwater from pumps installed as part of the project.

g. A masonry and metal fencing barrier shall be installed between the GGS habitat linear open space/buffer area and the adjacent development on the Greenbriar Project Site to ensure that GGS do not enter the development area, and to prohibit humans and pets from entering the GGS habitat. The design of this barrier shall be subject to USFWS and CDFW review and approval. The entire length of the barrier shall be maintained on the preserve side by a nonprofit land trust to ensure that vegetation or debris does not accumulate near the barrier

and provide opportunities for wildlife and pets to climb over the barrier. On the development side, CC&Rs shall prohibit accumulation of vegetation or debris adjacent to the barrier. Chain link fencing shall be placed at both ends of the corridor, with locked gates permitting entry only by RD 1000 and NCMWC for channel maintenance, and by the preserve manager for habitat monitoring and maintenance purposes.

h. Specific requirements associated with the barrier shall be developed through consultation with USFWS and CDFW, and may include the following and/or other specifications that CDFW and USFWS consider to be equally or more effective:

- Adequate height and below-ground depth to prevent snakes or burrowing mammals from providing a through-route for snakes by establishing burrows from one side to the other crossing;
- Constructed using extruded concrete or block construction extending a minimum of 36-inches above ground level;
- Maintenance to repair the barrier and to prevent the establishment of vegetation or collection of debris that could provide snakes with a climbing surface allowing them to breech the barrier;
- A cap or lip extending at least two-inches beyond the barrier's vertical edge to prevent snakes from gaining access along the barrier's top edge; and,
- Signage to discourage humans and their pets from entering the area.

i. The Lone Tree Canal Reserve shall be protected in perpetuity under a conservation easement and will be managed to sustain the value of this area for GGS habitat connectivity. Compliance and biological effectiveness monitoring shall be performed and annual monitoring reports prepared. This monitoring, reporting, and adaptive management shall be performed as described in the SSMP prepared for the project in coordination with USFWS and CDFW.

On-site Avoidance and Minimization Measures

j. The measures described below shall be implemented to avoid and minimize take of GGS during construction activities, including construction of managed marsh habitat:

- All grading activity within GGS habitat (aquatic habitat and uplands within 200 feet of aquatic habitat) shall be restricted to a period between May 1 and September 30.

Because this is during the snakes' active stage, it would allow GGS to actively move away from danger and thereby reduce chances of GGS mortality. Additionally, this restriction is timed to avoid grading during the snakes' breeding, dispersal, fall foraging and over-wintering periods, when they are most vulnerable to disturbance. If grading cannot be scheduled between May 1 and September 30, the Project Applicant shall contact the USFWS to determine whether additional measures are necessary to avoid and/or minimize take of GGS. Grading shall only occur during the period between October 1 and April 30 upon written USFWS approval.

- A qualified biologist with experience identifying GGS shall survey the construction area for GGS no more than 24 hours prior to the start of any construction activities resulting in ground disturbance or vegetation removal. If construction activities stop for a period of two weeks or more, a new GGS survey shall be completed no more than 24 hours prior to the re-start of construction activities.

- Between April 15 and September 30, all irrigation ditches, canals, or other aquatic habitat within the construction area shall be completely dewatered, with no ponded water remaining, for at least 15 consecutive days prior to the excavation or filling in of the dewatered habitat. The purpose of dewatering the aquatic habitat prior to ground disturbing activities in the aquatic habitat is to compel GGS to leave the area on their own. A qualified biological monitor shall ensure that dewatered habitat does not continue to support GGS prey, which could attract snakes into the area. Netting and salvage of prey may be necessary if a site cannot be completely dewatered.

- To minimize habitat disturbance during construction of the urban development, the Lone Tree Canal Reserve shall be bordered on the outer edge with exclusionary fencing to prevent GGS from entering the construction area (a permanent barrier will be installed with improvements at the Lone Tree Canal Reserve).

- Clearing and grading shall be confined to the minimum area necessary to facilitate construction activities as determined by a qualified biologist. Habitat that will be avoided shall be cordoned off, clearly flagged, and designated as an "Environmentally Sensitive Area" by a qualified biologist. To prevent GGS from entering the development area during construction, the exclusionary fencing protecting the Lone Tree Canal Reserve shall be erected during the GGS active season (May 1 and October 1) preceding construction when GGS are less likely to occupy upland retreats on the Greenbriar Project Site, and shall remain intact for the

duration of construction. The development area side of the exclusion fence shall be routinely monitored for any GGS that may have potentially been stranded by the fence, not finding their way through the fence into the canal. Snakes encountered should be relocated to the nearest suitable habitat off-site by a qualified biologist.

- All construction personnel shall receive worker environmental awareness training from a qualified biologist prior to commencing any construction-related activities. This training shall instruct workers on how to identify the GGS and its habitat, and what to do if a GGS is encountered during construction activities.

- A qualified biological monitor shall be present during grading activities within 200 feet of aquatic GGS habitat to ensure that construction activities do not encroach into unauthorized areas. If a live GGS is found during construction activities, the biological monitor shall immediately notify USFWS. The biological monitor shall have the authority to stop construction in the vicinity of the snake. The snake shall be monitored and given a chance to leave the area on its own. If the snake does not leave on its own within 1 working day, the biological monitor shall consult with the USFWS to determine any necessary additional measures. Any GGS mortality shall also be reported by the biological monitor within 1 working day to USFWS. Any project-related activity that results in GGS mortality shall cease so that this activity can be modified to the extent practicable to avoid future mortality.

- Upon completion of construction activities, construction debris shall be completely removed from the site. If this material is situated near existing GGS aquatic habitat, and it is to be removed between October 1 and April 30, it shall be inspected by a qualified biologist prior to removal to assure that GGS are not using it for hibernaculae or temporary refuge.

- No plastic, monofilament, jute, or similar erosion control matting that could entangle snakes shall be placed when working within 200 feet of snake aquatic or rice habitat. Possible substitutions include coconut coir matting, tactified hydroseeding compounds, or other material approved by CDFW and USFWS.

- Upon locating dead, injured or sick threatened or endangered wildlife species (Federal), the USFWS's Division of Law Enforcement and the Sacramento Fish and Wildlife Office will be notified within one working day. Written notification to both offices must be made within 3 calendar days and must include the date, time, and location of the finding of a specimen and any other pertinent information.

6.2. VELB Conservation Measures

- If possible, the elderberry shrub will be transplanted when the plant is dormant, approximately November through the first two weeks in February, after it has lost its leaves.

- The plant will be cut back 3 to 6 feet from the ground or to 50 percent of its height (whichever is taller) by removing branches and stems above this height. The trunk and all stems measuring 1 inch or greater in diameter at ground level will be replanted. Any leaves remaining on the plant will be removed.

- A hole will be excavated of adequate size to receive the transplant.

- The plant will be excavated using a Vermeer™ spade, backhoe, front end loader, or other suitable equipment, taking as much of the root ball as possible, and will be replanted immediately. The plant will only be moved by the root ball. The root ball will be secured with wire and wrapped with damp burlap. The burlap will be dampened as necessary to keep the root ball wet. Care will be taken to ensure that the soil is not dislodged from around the roots of the transplant. Soil at the transplant site will be moistened prior to transplant if the soil at the site does not contain adequate moisture.

6.3. Swainson's Hawk Conservation Measures

a. Surveys shall be conducted by a qualified biologist on and adjacent to the Greenbriar Project Site, Spangler Reserve, and any other properties associated with the Greenbriar Development Project where construction or restoration activities resulting in ground disturbance or mechanized land clearing would occur. The surveys shall be conducted consistent with the *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley* (SHTAC 2000) in the calendar year that construction is scheduled to commence.

b. If breeding Swainson's hawks (i.e. exhibiting nest building or nesting behavior) are identified, no new disturbances (e.g., heavy equipment operation associated with construction) will occur within 0.5 mile of an active nest between March 15 and September 15, or until a qualified biologist, with concurrence by CDFW, has either determined that young have fledged or that the nest is no longer occupied, or that construction can commence with pre-cautions in place (would be determined in coordination with CDFW). Routine disturbances such as agricultural activities, commuter traffic, and routine facility maintenance activities within 0.5 mile of an active nest are not restricted.

c. Where disturbance of a Swainson's hawk nest cannot be avoided, the nest tree may be destroyed during the non- nesting season. For purposes of this provision, the Swainson's hawk nesting season is defined as March 15 to September 15. If a nest tree (any tree that has an active nest in the year the impact is to occur) must be removed, tree removal shall only occur between September 15 and February 1.

d. If a Swainson's hawk nest tree is to be removed and fledglings are present, the tree may not be removed until September 15 or until a qualified biologist in coordination with CDFW has determined that the young have fledged and are no longer dependent upon the nest tree.

e. If construction or other project related activities which may disturb nesting birds are proposed within a 1/4 mile buffer zone of an active nest, intensive monitoring (funded by the Project Applicant) by a qualified biologist will be required. Exact implementation of this measure will be based on specific information at the construction area.

6.4. Waters of the U.S. and Waters of the State Conservation Measures

a. Prior to Project approval, the Project Applicant shall obtain a verified wetland delineation from the USACE. Based on the results of the verified delineation, the Project Applicant shall commit to replace, restore, or enhance on a "no net loss" basis, in accordance with the USACE and the Central Valley Regional Water Quality Control Board (CVRWQCB), as appropriate for each agency's jurisdiction, the acreage of all waters of the U.S. and wetland habitats, including "isolated" wetlands that would be removed with implementation of the Project. Wetland restoration, enhancement, and/or replacement shall be at a location and by methods acceptable to the USACE, CDFW, and CVRWQCB, as determined during the Section 404, Section 1600, and Section 401 permitting processes.

b. The Project Applicant shall prepare and submit a habitat mitigation and monitoring plan to the USACE for the creation of jurisdictional waters at a mitigation ratio no less than 1:1 acres of created waters of the U.S., including wetlands, to each acre filled. The mitigation plans shall demonstrate how the USACE criteria for jurisdictional waters will be met through implementation. Wetland mitigation achieved through reserve establishment to benefit Covered Species can satisfy this measure if conducted in such a way that it meets both habitat function and the USACE criteria for creation of waters of the U.S. The wetland creation section of the habitat mitigation and monitoring plan shall include the following:

    - target areas for creation,
    - a complete biological assessment of the existing resources on the target areas,

- specific creation and restoration plans for each target area,
- performance standards for success that will illustrate that the compensation ratios are met, and
- a monitoring plan including schedule and annual report format.

c. The Project Applicant shall secure the following permits and regulatory approvals, as necessary, and implement all permit conditions before implementation of any construction activities associated with the Project:

- Authorization for the fill of jurisdictional waters of the U.S. shall be secured prior to placing any fill in jurisdictional wetlands from the USACE through the Clean Water Act (CWA) Section 404 permitting process. Timing for compliance with the specific conditions of the 404 permit shall be per conditions specified by the USACE as part of permit issuance. It is expected that the Project would require an individual permit because wetland impacts would total more than 0.5 acre. In its final stage and once approved by the USACE, the mitigation plan is expected to detail proposed wetland restoration, enhancement, and/or replacement activities that would ensure no net loss of jurisdictional wetlands function and values in the project vicinity. As required by Section 404, approval and implementation of the wetland mitigation and monitoring plan shall ensure no net loss of jurisdictional waters of the U.S., including jurisdictional wetlands. Mitigation for impacts to "isolated" wetlands shall be included in the same mitigation plan. All mitigation requirements identified through this process shall be implemented before construction begins in any areas containing wetland features.
- Prior to construction in any areas containing wetland features, the project applicant shall obtain water quality certification pursuant to Section 401 of the CWA for the project. Any measures required as part of the issuance of water quality certification shall be implemented.
- The Project Applicant shall obtain a Streambed Alteration Agreement under Section 1600 et seq. of the California Fish & Game Code for impacts to Waters of the State as defined under Section 1602 of the California Fish & Game Code.

d. The Project Applicant shall file a report of waste discharge with the CVRWQCB for activities affecting "isolated" waters of the state, if applicable.

6.5. Delta Tule Pea and Sanford's Arrowhead Conservation Measures

a. Before the initiation of any ground-disturbing or vegetation-clearing activities within suitable habitat, the Project Applicant shall retain a qualified botanist to conduct focused surveys for Delta tule pea and Sanford's arrowhead. The botanist shall conduct surveys for these special-status plant species at the appropriate time of year when the target species would be in flower, and therefore, clearly identifiable. Surveys shall be conducted following the approved CDFW protocol for surveying for special-status plant species. If no special-status plants are found during focused surveys, the botanist shall document the findings in a letter report to USFWS and CDFW and no further measures shall be required.

b. If special-status plant populations are found, the Project Applicant shall consult with CDFW to determine the appropriate mitigation measures for any population that may be affected by the Project.

c. Special-status plants will be avoided if they occur outside of the construction limits. Fencing and signage will be placed around any avoided special-status plant(s) identifying the plant location(s) as an environmentally sensitive area that must be protected during construction. Appropriate BMPs will be implemented to protect the plants from fugitive dust, sedimentation, harmful substances, or contaminated runoff from the construction area that could harm the plants.

d. Mitigation measures may include creation of off-site populations on project mitigation sites, through seed collection or transplanting, preserving and enhancing existing populations, or restoring or creating suitable habitat in sufficient quantities to compensate for the impact.

6.6. Western Burrowing Owl Conservation Measures

a. In the calendar year that construction is scheduled to commence, surveys will be conducted by a qualified biologist to determine presence/absence of western burrowing owls and/or occupied burrows in the Greenbriar Project Site and accessible areas within 500 feet according to the CDFW's *Staff Report on Burrowing Owls* (CDFW 2012). Winter survey(s) shall be conducted between December 1 and January 31 and nesting survey(s) shall be conducted between April 15 and July 15. Pre-construction surveys shall also be conducted within 30 days prior to construction to ensure that no additional western burrowing owls have established territories since the initial surveys. If no western burrowing owls are found during any of the surveys, a letter report documenting survey methods and findings shall be submitted to CDFW, and no further mitigation will be necessary.

b. Occupied burrows shall not be disturbed during the nesting season (February 1 through August 31) unless a qualified biologist verifies through non-invasive measures that either: 1) the birds have not begun egg-laying and incubation; or 2) that juveniles from the occupied burrows are foraging independently and are capable of independent survival.

c. If nest sites are found, the USFWS and CDFW shall be contacted regarding suitable mitigation measures, which may include a 300 foot buffer from the nest site during the breeding season (February 1 - August 31), or a relocation effort for the burrowing owls if the birds have not begun egg-laying and incubation or the juveniles from the occupied burrows are foraging independently and are capable of independent survival. If on-site avoidance is required, the location of the buffer zone will be determined by a qualified biologist. The developer shall mark the limit of the buffer zone with yellow caution tape, stakes, or temporary fencing. The buffer will be maintained throughout the construction period.

d. If relocation of the owls is approved for the site by CDFW, the developer shall hire a qualified biologist to prepare a plan for relocating the owls to a suitable site. The relocation plan must include: (a) the location of the nest and owls proposed for relocation; (b) the location of the proposed relocation-site; (c) the number of owls involved and the time of year when the relocation is proposed to take place; (d) the name and credentials of the biologist who will be retained to supervise the relocation; (e) the proposed method of capture and transport for the owls to the new site; (f) a description of the site preparations at the relocation-site (e.g., enhancement of existing burrows, creation of artificial burrows, one-time or long-term vegetation control, etc.); and (g) a description of efforts and funding support proposed to monitor the relocation. Relocation options may include passive relocation to another area of the site not subject to disturbance through one way doors on burrow openings, or construction of artificial burrows in accordance CDFW guidelines.

e. Where on-site avoidance is not possible, disturbance and/or destruction of burrows shall be offset through development of suitable habitat on the Project's reserves. Such habitat shall include creation of new burrows with adequate foraging area (a minimum of 6.5 acres or 300 feet radii) around the newly created burrows. This habitat (created burrows and associated foraging habitat) will be protected and managed in perpetuity as burrowing owl habitat according to guidelines established in the Site Specific Management Plan for the reserve. Management activities in the burrowing owl habitats on the reserve shall include but are not limited to 1) vegetation management (grazing, mowing, burning), management of ground squirrels and other fossorial mammals, semi-annual and annual artificial burrow

cleaning and maintenance (if applicable), control of non-native weeds and wildlife potentially detrimental to burrowing owls, and trash removal.

6.7. Western Pond Turtle Conservation Measures

a. All construction personnel shall receive worker environmental awareness training from a qualified biologist prior to commencing any construction-related activities. This training shall instruct workers on how to identify the western pond turtle and its habitat, and what to do if a western pond turtle is encountered during construction activities.

b. A pre-construction survey will be conducted for nesting pond turtle by a qualified biologist. If nesting areas for pond turtles are identified within the survey limits, a buffer area of 300 feet shall be established between the nesting site and the aquatic habitat (e.g. canal or ditch) located near the nesting site. The buffer shall be indicated by temporary fencing if construction has or will begin before the nesting period has ended (the period from egg laying to emergence of hatchlings is normally April to November). Any western pond turtles observed in the survey limits will be reported to the CNDDB.

c. A qualified biological monitor(s) will be present during any dewatering of the canals to relocate any western pond turtles in the canals to suitable habitat up or downstream of the area of disturbance. Prior to dewatering, CDFW will be notified of the intent to conduct western pond turtle monitoring and potential relocation. If western pond turtle is encountered in the construction area during dewatering activities, work shall be halted until the individual has left the work area on its own or been relocated by a qualified biologist.

d. Additionally, as stated in the avoidance and minimization measures for GGS, between April 15 and September 30, all irrigation ditches, canals, or other aquatic habitat within the construction area shall be completely dewatered, with no ponded water remaining, for at least 15 consecutive days prior to the excavation or filling in of the dewatered habitat. The purpose of dewatering the aquatic habitat prior to filling is to compel turtles to leave the area on their own. A qualified biological monitor shall ensure that dewatered habitat does not continue to support suitable prey which could attract turtles into the area. Netting and salvage of prey may be necessary if a site cannot be completely dewatered.

6.8. Loggerhead Shrike Conservation Measures

a. If construction begins during the breeding season for loggerhead shrikes (March 1 to July 31), pre-construction surveys for loggerhead shrike shall be conducted by a qualified biologist on the Greenbriar Project Site, Spangler Reserve, and any other proposed construction/restoration areas (involving ground disturbance or vegetation removal) as well

as on publicly accessible land within 500 feet of those sites (and on private land if permission is granted by the land owner). The pre-construction surveys will be conducted by a qualified biologist within two weeks prior to commencement of construction to determine presence/absence of nesting loggerhead shrike. If surveys determine loggerhead shrikes are present, the following measures shall be implemented to avoid disturbance to occupied nests during the nesting season:

- A boundary shall be marked by brightly colored construction fencing that establishes a buffer zone a minimum of 100 feet from the active nest. No project-related disturbance shall occur within the fenced, 100-foot buffer during the nesting season (March 31 to July 31) or until the young have fledged and are no longer dependent on the nest as determined by a qualified biologist.

6.9. Tri-colored Blackbird Conservation Measures

a. If construction begins during the nesting season for tri-colored blackbirds (May 15 to July 31), pre-construction surveys will be conducted by a qualified biologist within two weeks prior to commencement of construction to determine presence/absence of tri-colored blackbird nests within the Greenbriar Project Site, Spangler Reserve, and any other proposed construction/restoration areas (involving ground disturbance or vegetation removal) as well as on publicly accessible land within 500 feet of those sites (and on private land if permission is granted by the land owner). If surveys determine tri-colored blackbirds are present, the following measures shall be implemented to avoid disturbance to occupied nesting colonies during the nesting season:

   - A boundary shall be marked by brightly colored construction fencing that establishes a buffer zone a minimum of 500 feet from the active colony. No project-related disturbance shall occur within the 500 foot fenced buffer area during the nesting season to July 31, or while birds are present.

   - A qualified biologist must determine the young tri-colored blackbirds have fledged and nest sites are no longer active before the nest site may be disturbed.

b. If construction commences outside of the nesting season (August 1 to May 14), no avoidance and minimization measures are necessary.

6.10. Aleutian Canada Goose Conservation Measures

Precautionary measures will be implemented consistent with measures included in the NBHCP to avoid potential impacts to foraging Aleutian Canada geese if they are present during ground

disturbance or vegetation disturbance/removal associated with construction or restoration activities on the Greenbriar Project Site, Spangler Reserve, or any other properties associated with the Greenbriar Development Project.

a. A pre-construction survey for Aleutian Canada geese shall be conducted within two weeks prior to beginning construction if construction is scheduled to commence during the time of year that this species would be present in the Basin (October 1 through May 15). If Aleutian Canada geese are identified, CDFW should be consulted regarding the appropriate avoidance and minimization measures to avoid impacts to this species. Such measures shall be appropriate for the use (e.g. foraging, roosting, etc.) and activity of the species, since this species is a seasonal visitor to the Basin. Measures may include postponing the start of construction until the birds have left on their own accord, or implementing deterrents to encourage the birds to leave the site on their own accord.

6.11. General Nesting Bird Conservation Measures

a. The following avoidance and minimization measures shall be implemented prior to site disturbance to avoid impacts to nesting raptors and other birds on the project sites or immediately adjacent properties. This is a general nesting bird protection measure. Specific measures for special-status bird species are listed individually.

    - In order to avoid impacts to nesting birds, a nesting survey shall be conducted within the Greenbriar Project Site, Spangler Reserve, and/or any other sites as needed prior to commencing with earth-moving or construction work if this work would occur during the typical nesting season (between February 1 and August 31).

    - The nesting survey shall include examination of all areas on or within 300 feet of the entire site, not just trees slated for removal, since ground vibrations and noise from earth-moving equipment can disturb nesting birds and potentially result in nest abandonment. Areas within 300 feet of the site shall be surveyed on foot if accessible or from within the site or publicly accessible areas by scanning the surrounding land with the aid of binoculars.

    - If nesting birds are identified during the surveys, CDFW shall be notified to determine the appropriate buffer, orange construction fence shall be installed to establish a 300-foot radius around the nest unless a qualified biologist determines that a lesser distance will adequately protect the nest (refer to discussion below for more detail). If the tree or nest is located off the site, then the buffer shall be demarcated per the above where the buffer intersects the site.

- The size of the non-disturbance buffer may be altered if a qualified biologist conducts behavioral observations and determines the nesting birds are well acclimated to disturbance. If this occurs, the biologist shall prescribe a modified buffer that allows sufficient room to prevent undue disturbance/harassment to the nesting birds. If the buffer is reduced, the qualified biologist shall remain on site to monitor the behavior of the nesting birds during construction in order to ensure that the reduced buffer does not result in take of eggs or nestlings.

- No construction or earth-moving activity shall occur within the established buffer until it is determined by a qualified biologist that the young have fledged (are no longer dependent on the nest or the adults for feeding) and have attained sufficient flight skills to avoid project construction zones. This typically occurs by August 31. This date may be earlier or later, and shall be determined by a qualified biologist. If a qualified biologist is not hired to monitor the nesting raptors then the full 300-foot buffer(s) shall be maintained in place from February 1 through the month of August. The buffer may be removed and work may proceed as otherwise planned within the buffer on September 1.

Chapter 7. RESERVE DESIGN

7.1. Lone Tree Canal Reserve

The Project Applicant will implement habitat-enhancing features by contouring the east bank of Lone Tree Canal to create a 3:1 slope, hydro-seeding the slope with native vegetation, allowing emergent vegetation to establish along the toe of the new slope, installing a snake wall and protective fencing, and by establishing the Lone Tree Canal Reserve under a conservation easement.

To ensure that the project maintains habitat connectivity for GGS between the southern (Fisherman's Lake) and northwestern zones of the Natomas Basin and to provide foraging habitat for Swainson's hawk, the following measures will be implemented along Lone Tree Canal at the Greenbriar Project Site:

- Approximately 28.3 acres along Lone Tree Canal shall be protected, enhanced, and managed as GGS habitat and Swainson's hawk foraging habitat (i.e., the Lone Tree Canal Reserve). This on-site habitat preservation shall protect an approximately 250-foot-wide corridor that includes Lone Tree Canal and approximately 200 feet of adjacent uplands along the east side of the canal. A 25-foot-wide setback from the Lone Tree Canal Reserve boundary has been provided on the adjacent MAP property, west of the reserve boundary. Uplands within the Lone Tree Canal Reserve will be converted to, and managed as, perennial grassland as described below. Additional aquatic and upland habitat for GGS shall be created along the east bank of Lone Tree Canal. This habitat shall be managed in perpetuity as high-quality habitat for GGS.
- To ensure that the project does not diminish GGS movement along Lone Tree Canal, the culverts used for the proposed roadways crossing Lone Tree Canal (Meister Way and Residential Street 3) shall be designed to allow passage by GGS.
- Upland habitat within the Lone Tree Canal Reserve shall be enhanced and managed to provide cover and refugia for the GGS during the winter dormant period.
- The east bank of the canal, which currently has a nearly vertical slope, will be recontoured to a 3:1 slope (horizontal:vertical). This will reduce the amount of maintenance required in the channel (e.g., dredging, bank repair) and facilitate the growth of freshwater marsh plants.
- The upland areas within the Lone Tree Canal Reserve will be seeded with native perennial grasses, to provide upland habitat for the GGS for cover and to provide

additional refugia during the winter dormant period. The grassland will also provide foraging habitat for Swainson's hawk.

- A masonry and metal fencing barrier (aka "snake wall") shall be installed between the Lone Tree Canal Reserve and the adjacent development on the Greenbriar Project Site, at the boundary of the Lone Tree Canal Reserve along W. Elkhorn Boulevard, and at the Meister Way and Residential Street 3 crossings of the Lone Tree Canal Reserve. The barrier will ensure that GGS do not enter the development area and will serve to prevent humans and pets from entering the reserve. The design of the barrier will be subject to USFWS review and approval. The barrier shall be maintained on the reserve side by a USFWS-approved third party Plan Operator to ensure that vegetation and/or debris does not accumulate near the barrier and provide opportunities for wildlife and pets to climb over the barrier. On the development side, adjacent to the barrier, Covenants, Conditions, and Restrictions (CC&Rs) shall prohibit accumulation of vegetation or debris adjacent to the barrier.

  Specific design requirements for the barrier include:

  - Chain link fencing will be placed at either end of the corridor and at Meister Way, with locked gates permitting entry only by RD 1000 and NCMWC for channel maintenance, and by the Plan Operator for habitat monitoring and maintenance purposes.
  - Adequate height and below-ground depth to prevent snakes or burrowing mammals from providing a through-route for snakes by establishing burrows from one side to the other;
  - The barrier will be constructed using extruded concrete or block construction extending a minimum of 36-inches above ground level;
  - The barrier will include a cap or lip extending at least two-inches beyond the barrier's vertical edge to prevent snakes from gaining access along the barrier's top edge; and
  - Signage to discourage humans from entering the Lone Tree Canal Reserve.

The following measures relate to management of the Lone Tree Canal Reserve:

- The Lone Tree Canal Reserve shall be protected in perpetuity under a conservation easement and will be managed to sustain the value of this area for GGS habitat connectivity. Compliance and biological effectiveness monitoring shall be performed and annual monitoring reports prepared. This monitoring, reporting, and adaptive

management shall be performed as described in the Site Specific Management Plan (SSMP) prepared for the reserve.

- Aquatic habitat shall be maintained throughout the GGS active season in Lone Tree Canal, in perpetuity. This is the legal responsibility and obligation of the MAP Property Owners' Association (MAP POA). The MAP HCP includes provisions (Thomas Reid Associates 2001) to ensure that water levels are maintained at or above 12 inches of depth. If water is not provided to Lone Tree Canal by the MAP to meet the habitat requirements of GGS, as required by the MAP HCP, and USFWS exhausts its enforcement responsibilities, the Project Applicant shall assume the responsibility of providing water for GGS aquatic habitat throughout the section of Lone Tree Canal within the Lone Tree Canal Reserve.
- Assuming this backup water responsibility was a mitigation measure in the City of Sacramento's Draft EIR for the Greenbriar Project (EDAW 2006). However, as stated in the EIR, the project applicant shall only assume this responsibility if it has been sufficiently demonstrated to the City of Sacramento that USFWS has exhausted all reasonable means to compel MAP to comply with the relevant conditions of the MAP ITP. Specific requirements related to ensuring suitable aquatic habitat in Lone Tree Canal is present, in perpetuity, throughout the GGS active season, shall be developed through consultation with CDFW and USFWS, and included in the SSMP for the Lone Tree Canal Reserve. If needed, the 8-inch drain pipe mentioned above would provide supplemental flows to Lone Tree Canal from the detention basins on the Greenbriar Project Site.

Table 7 is a description of the proposed habitats at the Lone Tree Canal Reserve by category of upland and managed marsh.

Table 7. Description of Proposed Habitats at the Lone Tree Canal Reserve by Category

Category	Specific Habitat	Acres
Upland	Perennial grassland between Lone Tree Canal and the development on the Greenbriar Project Site	26.5
	Subtotal	***26.5***
Managed Marsh	Lone Tree Canal; open water with emergent vegetation	1.8
	Subtotal	***1.8***
	Total Site Acreage	**28.3**

7.2. Spangler Reserve

The 235.4-acre Spangler Reserve is currently in rice production, and consists of rice fields with a supporting network of agricultural drains as well as upland berms along the perimeter of the rice

fields and drains. The Spangler Reserve shall be protected as habitat for GGS and Swainson's hawk and will also provide habitat for other NBHCP Covered Species. The Spangler property currently is divided into a 75.3-acre northern portion and an approximately 160-acre southern portion by a drainage ditch. Upon completion of reserve establishment, approximately 40.3 acres of the northern portion of the site will remain in rice production and best management practices for rice farming will be implemented. The remaining approximately 35 acres in the northern portion will be permanently converted to upland habitat to provide foraging for Swainson's hawk and upland refugia for GGS. To ensure additional foraging opportunities at the Spangler Reserve for Swainson's hawk, it is envisioned that approximately 20% of the rice fields will be fallowed each year on a rotating schedule (this percentage could vary based on management considerations). The southern portion of the site will be used for creation of a managed marsh complex (142.0 acres) and upland habitat (18.1 acres). Approximately half of the managed marsh will be created in the first of two phases; the remaining managed marsh will be created in the second phase. In the interim period between completion of Phase 1 and commencement of Phase 2, the acreage of managed marsh planned for creation in Phase 2 will remain in rice production.

The managed marsh and upland habitat will be constructed within the existing rice field infrastructure. Currently, the 160-acre southern portion of the Spangler Reserve consists of 27 individual rice cells surrounded by berms. To create managed marsh, the interior of 23 of those cells will be converted to a mosaic of open water, perennial bulrush marsh, and upland habitat. Other elements of the managed marsh complex will include linear water supply ditches and upland components including higher elevation uplands between the marsh habitats (high ground hibernaculae for GGS) and upland buffers to protect the managed marsh from surrounding land uses, and maintenance roads. The remaining four cells will be used to create annual grassland with interspersed seasonal wetlands.

New bypass ditches and control structures will be constructed to allow control of the water delivery to each individual cell in the managed marsh so that each cell can be maintained individually without affecting water delivery to the surrounding cells. It is anticipated that dewatering of each cell would occur every five to seven years in order to maintain a minimum of 20% open water in each cell for optimal GGS habitat and that up to 1/3 of the cells would be dewatered for maintenance purposes in any one year (with the exception of the four cells used for creation of seasonal wetland). Once dewatered, the cells will be disced to remove excess tules and cattails and left fallow for one season. If possible, row crops compatible with Swainson's hawk foraging will be planted within fallow cells. If planting of row crops is not feasible in a given year, the cells will be seeded with a mix of annual grasses and forbs that will attract small mammals and in turn provide foraging habitat for Swainson's hawk. The fallow cells will be returned to marsh the following season. An appropriate mix of grasses and forbs will also be planted in upland areas such as on the cell berms, in high ground areas, and along the field access roads.

A preliminary assessment of the suitability of the Spangler Reserve as an Off-site Reserve was included in the *Draft Conceptual Habitat Restoration Design* prepared by Wildlands, Inc. (Wildlands 2005). Based on this assessment, the Spangler Reserve is suitable for management as a reserve due to its size, connectivity to the Natomas Basin's network of canals and drains, and its proximity to existing NBHCP reserves.

A review of the Spangler Reserve managed marsh design was conducted by GGS scientist, Mr. Eric C. Hansen, and he found the design "novel in its design, scale, and simplicity while remaining wholly consistent with the general design elements of giant garter habitat creation." He further stated that "through its simplicity, however, it overcomes many of the challenges experienced with habitats comprising larger, more complex management units while potentially increasing carrying capacity. As reserve land that is separate from the HCPs, the Spangler Reserve augments the 2,500-acre reserve block that the NBHCP will maintain in the northeast corner of the Natomas Basin. Implementing a novel design also provides superior opportunities to measure the species' response to different conditions and to manage habitat adaptively. These factors are all benefits to the NBHCP and the MAP HCP and the persistence of GGS in the Natomas Basin over time." A description of the proposed habitats at the Spangler Reserve by category (rice, managed marsh, upland) is included as **Table 8**.

Table 8. Description of Proposed Habitats at the Spangler Reserve by Category*

Category	Specific Habitat	Acres
Rice	Managed rice fields consisting of individual rice cells, interior berms, and ditches/canals	40.3
Managed Marsh	Managed marsh complex with open water, bulrush marsh, and upland components	142.0
Upland	Annual grassland including created seasonal wetlands	53.1
	Total Site Acreage	**235.4**

*Consistent with the NBHCP, a significant portion of the rice and managed marsh will be managed to provide habitat for upland-dependent species (e.g., Swainson's hawk foraging).

7.3. Moody Reserve

The 74±acre Moody Reserve is an agricultural parcel currently being used for alfalfa production. The entire site is classified as "upland." No changes in land use are planned for the site. It is currently envisioned that the site would remain in agricultural production of alfalfa or other upland crops (i.e., non-rice crops) that provide high quality foraging habitat for Swainson's hawk adjacent to high quality nesting habitat on the adjacent properties. A conservation easement will be placed on the site to preserve the property as a biological reserve in perpetuity for the benefit of Swainson's hawk and other NBHCP Covered Species. Site management practices will be modified as needed to provide optimal habitat for Swainson's hawk and other Covered Species such as

implementing protective measures for elderberry shrubs on the site. A description of the proposed habitats at the Moody Reserve by category (upland) is included as **Table 9**.

Table 9. Summary of Proposed Habitats at the Moody Reserve by Category

Category	Specific Habitat	Acres
Upland	Agricultural fields currently being used to cultivate alfalfa	55.48
	Ruderal habitat in field margins, dirt roads, and dirt parking areas	9.36
	Great Valley valley oak riparian habitat (includes disturbed riparian)	5.4
	Non-native grassland in an uncultivated corner of the site	3.63
	Irrigation ditches used periodically to irrigate the agricultural fields	0.23
	Seasonal wetlands within the non-native grassland in an uncultivated corner of the site	0.20
	Total Site Acreage	**74.3**

7.4. North Nestor Reserve

The 219.1-acre North Nestor Reserve is an agricultural parcel currently being used to grow rice. The entire site is composed of active rice fields. The North Nestor Reserve will be managed in rice and will maintain biological connectivity between existing TNBC reserves to the north and south. A 13.6-acre easement area has been defined along the western boundary of the North Nestor Reserve, which could be managed separately by TNBC to further the NBHCP goal of establishing a habitat reserve of 2,500 acres in the Natomas Basin. The remainder of the North Nestor Reserve's management would be modified as needed to benefit NBHCP Covered Species, such as by modifying the rice production practices to allow a percentage of the rice fields to fallow each year to provide foraging habitat for Swainson's hawk and other NBHCP Covered Species. Currently it is envisioned that approximately 20% of the rice would be left fallow on a rotational basis each year; this percentage could vary based on management considerations. A description of the proposed habitats at the North Nestor Reserve by category (rice) is included as **Table 10**.

Table 10. Summary of Proposed Habitats at the North Nestor Reserve by Category*

Category	Specific Habitat	Acres
Rice Fields	Managed rice fields consisting of individual rice cells, interior berms, ditches/canals, access roads, and perimeter berms	219.1
	Total Site Acreage	**219.1**

*Consistent with the NBHCP, a significant portion of the rice will be managed to provide habitat for upland-dependent species (e.g., Swainson's hawk foraging).

Chapter 8. RESERVE IMPLEMENTATION

In order to implement the reserve designs described in **Chapter 7**, site-specific reserve implementation and monitoring plans will be developed as a component of the Site Specific Management Plans for each reserve site in accordance with **Chapter 10**, below. The reserve implementation and monitoring plans will be prepared in coordination with USFWS, CDFW, and USACE prior to establishment of the specific reserve. The Moody and North Nestor reserves are intended to remain in their current agricultural uses, while the Lone Tree Canal Reserve and Spangler Reserve will be modified to enhance existing habitat opportunities on those reserves.

Site-specific implementation and monitoring plans will include additional details regarding reserve establishment, including, as applicable, contouring activities, native species palettes for seeding various areas, fencing, and an implementation schedule.

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Chapter 9. ADAPTIVE MANAGEMENT

Under adaptive management, monitoring and conservation plans are developed concurrently to form a single adaptive management plan. Adaptive management means adopting new tools and approaches to management in light of changing circumstances, new data, and scientific advances. The adaptive management program for the Greenbriar Conservation Strategy includes regular monitoring of reserves and comparison of reserve performance to success standards defined in the site-specific management plans for each reserve site. Adaptive management measures may be implemented concurrently with the Greenbriar Conservation Strategy conservation measures.

If activities cannot be carried out as outlined in the plan, or the Reserve is performing poorly upon implementation of the measures outlined in the SSMP for reserve establishment, the Applicant or the third-party plan operator will notify the USACE, USFWS, and CDFW. Modifications to the SSMP will be made as needed and submitted to the USFWS and CDFW for approval. No substantive modifications to the Reserve design will be made without approval by the USFWS and CDFW.

If monitoring or other information indicates that the Reserve is not progressing towards meeting the goals of the SSMP, the plan operator will notify the USACE, USFWS, and CDFW as soon as possible. USACE, USFWS, and CDFW will evaluate and pursue measures to address deficiencies in the Plan in consultation with the responsible parties. Measures will be implemented as necessary to ensure that the Reserve meets the biological goals and objectives reflected in the SSMP for the specific reserve site including but not limited to: site modifications, design changes, revisions to maintenance requirements, and revisions to monitoring requirements. Performance standards may be revised to account for measures taken to address deficiencies in the Reserve. No other revisions to performance standards will be allowed except in the case of natural disasters.

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Chapter 10. MAINTENANCE, MONITORING, AND LONG-TERM MANAGEMENT

10.1. Site-specific Management Plans

A final site-specific management plan (SSMP) for each of the reserves must be approved by the USFWS, CDFW, and USACE (as applicable) prior to implementation of the Greenbriar Conservation Strategy. This chapter contains guidelines and a general outline for content of the SSMPs.

10.1.1. Installation at Spangler and Lone Tree Canal

Reserve establishment at the Spangler and Lone Tree Canal reserves includes habitat creation and enhancement components as described in **Chapter 7**. Reserve Establishment Plans will be prepared for the Spangler Reserve and the Lone Tree Canal Reserve, and submitted to the USFWS and CDFW for approval prior to implementation of the Greenbriar Conservation Strategy. Because the Spangler Reserve includes aquatic habitat establishment as compensatory mitigation for impacts to jurisdictional waters of the U.S. affected by the Greenbriar Development Project, a mitigation plan for waters of the U.S. at the Spangler Reserve will be submitted to the USACE. Because bank recontouring at the Lone Tree Canal Reserve will result in temporary impact to waters of the U.S. in Lone Tree Canal, a restoration plan for waters of the U.S. at the Lone Tree Canal Reserve will be submitted to the USACE. Reserve Establishment Plans, and the additional plans provided to the USACE, will include success criteria for the created/enhanced habitats at the Spangler and Lone Tree Canal reserves. No Reserve Establishment Plans or success criteria are required for the Moody and North Nestor reserves, as there is no habitat creation or enhancement component at those reserves.

Installation of habitat creation/enhancement at the Spangler and Lone Tree Canal reserves will be monitored by a qualified biologist to ensure that all conservation measures provided in **Chapter 6** are implemented during reserve establishment. Monitoring will be performed full- or part-time as needed for the duration of construction activities. Upon completion of habitat creation/enhancement, the Land Manager will submit an as-built report to the USFWS, CDFW, and USACE. No as-built reports will be submitted for the Moody and North Nestor reserves, as there is no habitat creation/enhancement component of reserve establishment at those reserves.

10.1.2. Maintenance at Spangler and Lone Tree Canal

Habitat creation/enhancement success at the Spangler and Lone Tree Canal reserves will be maintained and monitored for a minimum of five years following the completion of reserve establishment. The maintenance period will begin on the date given in the final as-built report for

each reserve. The maintenance period will continue for at least 5 years from the start date, and will not end until the reserve has met success criteria for at least 3 years without remedial actions. Remedial actions include such things as irrigation or other supplemental watering, planting, seeding, fertilizing, or earthwork. Routine maintenance activities are not considered remedial actions.

The following minimum maintenance requirements will be met throughout the maintenance period at the Spangler and Lone Tree Canal reserves:

- Fence and signage maintenance
- Weed control
- Plant replacement (as needed)
- Vegetation clearing
- Trash and debris removal
- Pest control (as needed)

1.1.2.1. MONITORING AND REPORTING

A qualified biologist will conduct effectiveness and compliance monitoring at the Spangler and Lone Tree Canal reserves during the maintenance period and will provide regular reports to the Land Manager and maintenance contractor. Reports will include a summary of general reserve conditions, and will detail any maintenance issues requiring attention by the maintenance contractor. The Land Manager will submit an annual report to the USFWS, CDFW, and USACE including a description of the maintenance and monitoring activities in the previous year, any remedial measures or adaptive management measures taken in the previous year, and an assessment of the progress of the reserve toward final success criteria.

10.1.3. Long-Term Management

Following achievement of final success criteria at the Spangler and Lone Tree Canal reserves, and beginning immediately in the Moody and North Nestor reserves, each reserve will be subject to long-term habitat management. The SSMP for each reserve will include site-specific long-term management and monitoring activities appropriate for the resources managed at each reserve. Long-term management at all reserves will be based on an adaptive management program designed to ensure maintenance of the intended habitat values at each reserve as summarized above in Chapter 9.

Long-term management will include general monitoring of conditions in the reserves and species-specific monitoring tailored to the resources conserved at each reserve. Species-specific monitoring may include monitoring for GGS, Swainson's hawk, and VELB, where appropriate, consistent

with the methods used by TNBC in its annual effectiveness monitoring for the NBHCP. GGS is expected to use habitats at the Spangler, Lone Tree Canal, and North Nestor reserves; Swainson's hawk is expected to use habitats at the Spangler, Lone Tree Canal, Moody, and North Nestor reserves; VELB is not known to occur in the Natomas Basin, but the Moody Reserve supports suitable habitat. Occurrence of other Covered Species on the reserves will be noted as part of routine reserve monitoring. Site-specific monitoring at the Spangler and Lone Tree Canal reserves will include monitoring the condition of created/restored waters of the U.S. in accordance with requirements of the USACE.

Minimum reporting requirements for long-term management will include an annual report on the performance of the reserve and the status of the funding mechanism, for each reserve. The Land Manager will provide a copy of the annual report for each reserve to the USFWS, CDFW, and USACE. Additional reporting may be required for species-specific surveys, and will be detailed in the SSMP for each reserve.

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Chapter 11. RESERVE LAND DEDICATION

The project applicant will dedicate the Reserve lands by granting a conservation easement to a USFWS-, CDFW-, and USACE-approved third party Plan Operator. A conservation easement is "binding upon successive owners of such land, and the purpose of which is to retain land predominantly in its natural, scenic, historical, agricultural, forested, or open-space condition" (Civ. Code, § 815.1). California state law recognizes that conservation easements are perpetual in duration and can be considered public uses (Civ. Code, § 815.2; Code Civ. Proc., § 1240.055).

The Reserves will be protected in perpetuity via conservation easements held by a qualified third-party entity (Civ. Code Section, § 815.3; Gov. Code, § 65965). Specifically, the easement holder must be (i) a tax- exempt nonprofit organization qualified under section 501(c) (3) of the Internal Revenue Code of 1986, as amended, and qualified to do business in California; (ii) a "qualified organization" as defined in section 170(h) (3) of the Internal Revenue Code; and (iii) an organization which has as its primary and principal purpose and activity the protection and preservation of natural lands or resources in its natural, scenic, agricultural, forested, or open space condition or use

The conservation easement will ensure that the Reserves will be retained forever in a natural, restored, or enhanced condition as contemplated by the management plan, and will define the prohibited and allowable activities within the Reserve to ensure maintenance of its conservation values. The conservation easement will also set forth the responsibilities of the third-party easement holder with respect to management and monitoring of the Reserve in perpetuity.

Like other properties, lands upon which a conservation easement has been placed can be subject to eminent domain proceedings as a means to make such lands available for other public uses such as road expansions. A property that is already appropriated to public use may only be acquired by eminent domain to put the property to a "more necessary public use than the use to which the property is appropriated" (Code Civ. Proc., § 1240.610). Any public agency proposing to carry out eminent domain proceedings on a property covered by a conservation easement must provide notice and fair market value compensation to both the land owner and the conservation easement holder (Code Civ. Proc., § 1240.055). Compensation for the conservation easement portion must be used for the "purchase of property that replaces the natural resource characteristics the original mitigation was intended to protect, or as near as reasonably feasible." (See Gov. Code, § 65966, subd. [j]). Thus, California law protects the habitat value of conservation properties even in the eminent domain context.

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Chapter 12. FUNDING

Pursuant to California Government Code Section 65965 *et seq*., the long-term management of the Reserve will be funded by an endowment, to be held, managed, invested, and disbursed solely for, and permanently restricted to, the long-term stewardship of the Reserve property for which the funds were set aside. The endowment or other structure for funding the reserve sites will be calculated by estimating enhancement, management, administration, and monitoring costs. Prior to execution of the conservation easement or other instrument of dedication (e.g., deed restriction, offer of dedication) the project applicant and/or the USFWS-approved third party Plan Operator will submit the conservation easement or other instrument to USFWS and CDFW for review and concurrence. Concurrence will be required before the transfer is final.

The amount of the endowment for each Reserve site will be based on the Property Analysis Record (PAR), which is included in each site's SSMP.

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13.2. Personal Communications

Eric Hansen, private consultant, Natomas, CA. October 20, 2005 written comments on a preliminary draft of the biology section for the Greenbriar Project DEIR provided to Leo Edson, EDAW.

Appendix A Lone Tree Canal Corridor Schematic Design