

Surface Water Delineation Work Plan
Arimol Group Inc. and Meadowbrook Cedar Inc. Properties
Lake Arrowhead, San Bernardino County
Lahontan Water Board Cleanup and Abatement Order #R6V-2013

July 22, 2013

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1 GOALS AND OBJECTIVES

Sometime around October 1 of 2011, construction activities disturbed surface water features on three privately owned parcels newly acquired by Arimol Group, Inc. and Meadowbrook Cedar Inc.. These activities were conducted without Federal and State regulatory approvals for projects that impact streams and wetlands. After visiting the parcels with a representative of the California Department of Fish and Wildlife (“CDFW”), the Lahontan Regional Water Quality Control Board (“Lahontan Water Board”) issued Cleanup and Abatement Order No. R6V-2013 (“CAO”). Among other technical studies, the CAO requires that the extent of impacted surface waters be delineated so that impacts of the construction activities on jurisdictional water features can be quantified. The delineation will also identify, in as much detail as can be supported by the data, the type(s) of water features that were affected and actions required for mitigation and restoration. Following this analysis, a restoration plan will be prepared for approval by the Lahontan Water Board and CDFW, and then implemented before the upcoming winter season according to the terms and conditions of the CAO.

The objective of this Work Plan is to describe delineation methods for determining the extent of jurisdictional water features that existed before Arimol and Meadowbrook took ownership of the parcels. The CAO defines these conditions as “pre-project conditions”.

2 DELINEATION METHODS

2.1 Definition of Pre-Project Conditions

The Lahontan Water Board has stated that the construction activities of concern occurred on three of five parcels owned by the “dischargers”. Reports available from the San Bernardino County Tax Assessor show acquisition dates for the three parcels (Table 1). All dates are in the year 2011. Therefore site conditions that existed before 2011 will be defined as “pre-project” conditions for the purpose of delineating the extent of jurisdictional surface waters and wetlands that were impacted by the project.

Table 1. Property Acquisition Dates

Parcel Address	San Bernardino County APN	Parcel Number (assigned by Lahontan Water Board)	Acquisition Date
1031 Meadowbrook Road	0336-134-02-0000	Parcel 1	May 31, 2011
995 Meadowbrook Road	0336-134-03-0000	Parcel 2	December 6, 2011
977 Meadowbrook Road	0336-134-05-0000	Parcel 3	December 6, 2011

2.2 Delineation Protocols

Protocols described in this Work Plan are based on two Manuals: 1) the 1987 U.S. Army Corps of Engineers (“USACE”) Wetlands Delineation Manual (USACE, 1987), following methods for Comprehensive Determinations for wetlands and other surface waters in Atypical Situations; and 2) the May 2010 Regional Supplement to the USACE Wetland Delineation Manual – Western Mountains, Valleys, and Coast Region Version 2.0 – Difficult Wetland Situations (USACE, 2010). Complexities of field observations (see Section 2.3 below) may require additional references for detecting indicators of wetland soils (e.g., Richardson and Vepraskas, 2001).

We have completed the preliminary data gathering and synthesis steps required under the 1987 Comprehensive Protocols (Section B) for developing a field sampling design. These data include U.S. Geological Survey (“USGS”) quadrangle maps, assessment of drainage patterns (from the USGS maps and field observation), National Wetlands Inventory maps (“NWI”), soil surveys, and remote sensing (aerial photographs). Based on this information, the remainder of this Work Plan describes site-specific methods that will be used to assess past wetland presence, following the 1987 Comprehensive Protocols for Atypical Situations (Section F).

2.2.1 Plot Layout

Documents reviewed to date indicate that while alignments of impacted streambeds and spring drainages are known with some confidence, the extent of jurisdictional wetlands that may have existed adjacent to these drainages

could only be estimated. Therefore the primary purpose of sampling will be to verify the accuracy of the estimated wetland boundaries.

Figure 1 shows a layout of transects and plots to be used for assessing three sets of wetland indicators as required under the 1987 and 2010 protocols: presence of hydrophytic vegetation, presence of soil indicators of wetlands, and indicators of wetland hydrology. Table 2 summarizes the number and type of plots. Transect and plot locations were selected based on the estimated boundaries of the impacted surface waters, and the aerial photograph in Figure 2 that shows pre-project conditions. Green areas in this photograph may have been wetlands, or may have simply been weeds. The plot layout is designed to distinguish these conditions. Plots will be located in the field using GPS coordinates obtained from the GIS map shown in Figure 1.

Table 2. Transects and Plots

Transect	Location	Minimum Number of Plots	Excavation Method
1	North spring, Parcels 1 & 3	5	hand auger
2	South spring, Parcels 1 and 2	4	hand auger
3	Parcel 1	4	backhoe
4	Parcel 1	5	backhoe
5	Parcel 1	5	backhoe

Due to anticipated complexities related to detection of soil and hydrologic indicators of wetlands in alluvial soils, soils will be characterized at locations within the estimated boundaries of the impacted surface water feature, and at locations outside of the estimated boundaries. In the field, data from these plots may warrant additional sampling to define the transition boundary between wetland and upland. In this case, the additional locations will be noted in the field and included in the delineation report.

The depth of fill material in the surface waters is unknown. Therefore a backhoe will be used to excavate test plots along transects 3, 4, and 5. A hand auger will be used where a backhoe is impractical, i.e. transects 1 and 2. Plots will be at least two feet deep unless field observations indicate a different depth is warranted.

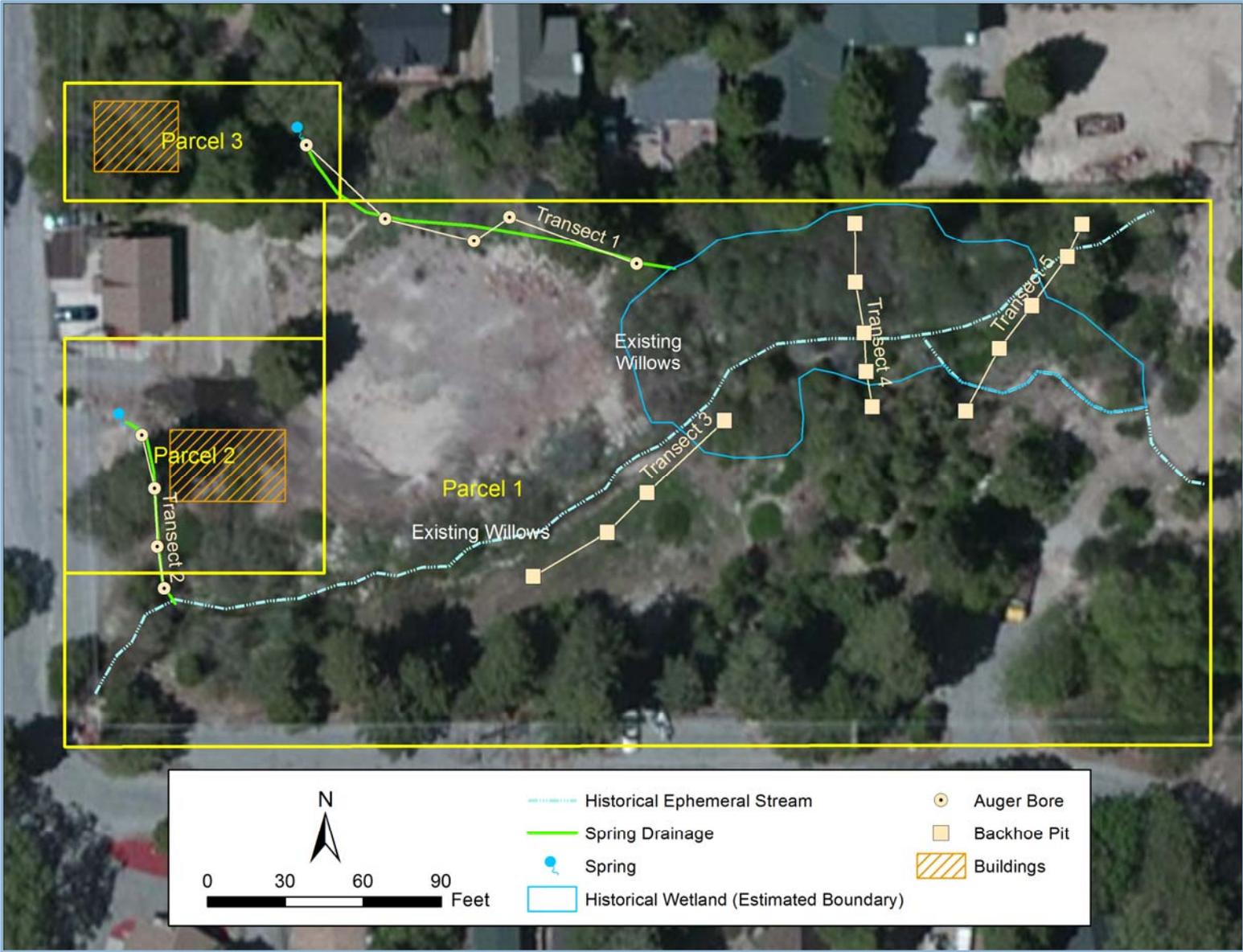


Figure 1. Layout of Sample Plots

2.2.2 Determination of Wetland Conditions

Presence/absence of three sets of wetland indicators will be evaluated for each plot: hydrophytic vegetation, hydric soil, and wetland hydrology. Data collection will include photographs of each plot.

It is anticipated that relic soil indicators will carry the greatest weight in determining the extent of wetland features, for reasons explained below.

Soil Indicators

During a site visit on July 17, 2013, it was observed that some vegetation has begun to recover from disturbances on site. Observations of remnant native vegetation on the parcels indicate that the pre-project vegetation community may have consisted of a willow overstory with a seasonally wet meadow community composed of herbaceous species. The willows can persist on shallow groundwater and do not necessarily indicate presence of a wetland. Therefore in this situation, as pointed out in the supplemental protocols (USACE, 2010), much of the wetland determination in this atypical situation will focus on the herbaceous understory and soil indicators that a meadow wetland was present. It is anticipated that detection of such a feature may be challenging because a meadow understory, consisting of shallow-rooted sedges, rushes, and forbs, can be transient, even under natural conditions. Unless they are in continual contact with groundwater, these herbaceous species depend on a combination of adequate rainfall and fine soils with high clay content that retain water through the growing season. Their stream association often derives from overbank deposits of fine sediments – soil that can take many years to develop during normal and dry years, only to be scoured and removed during wet years.

Therefore, based on the above considerations, soil composition, hydric soil indicators (e.g. redoxymorphic features, gleyed soil), and soil stratigraphy will be the primary focus of data collection in the test plots. It is not known if the soil stratigraphy was disrupted by construction. The delineation must not only

determine whether or not relic soil indicators of wetlands are present, it must determine whether high clay content and/or a water-retaining layer (aquitar) is still present and extensive enough to re-establish a meadow understory community with the willows. If an aquitar is not present, we will determine whether its absence is due to the project and, if so, how it can be restored.

Reference Sites

Reference sites serve two purposes: 1) provide data on vegetation, soil, and hydrology indicators in an undisturbed state, to which the study site data can be compared; and 2) development of performance criteria for monitoring restoration success.

Unfortunately we could not locate any reference sites close to the project area. However, staff of the San Bernardino National Forest referred us to two candidate reference sites. One of these sites is located west of Lake Arrowhead, the other is located in Running Springs. Both sites are on Forest land. We will investigate these sites and their suitability for comparison to the project site as part of the wetland delineation. If interpretation of data collected on the project site proves to be problematic, and the reference site(s) are determined to be representative of pre-project conditions, the site(s) will be used to help resolve interpretation issues. At a later stage, as part of development of the restoration plan, the reference site(s) will also be used to establish success criteria.

2.2.3 Avoidance of Sensitive Resource Impacts

No impacts to surface waters are expected from this work and therefore no permits are expected to be required. The California Department of Fish and Wildlife has identified potential for one sensitive species to occur in the area: southern rubber boa. A survey for this species will be conducted prior to excavation of the sample plots.

2.2.4 Schedule

Per the CAO, the surface water delineation will be initiated by August 19, 2013, with the delineation report and restoration plan submitted by September 13, 2013. Field work will be coordinated with the Lahontan Water Board and California Department of Fish and Wildlife, with a minimum of 72 hours advance notification.

3 DOCUMENTATION AND REPORTING

Report content will include the following, at minimum:

- Description of all methods and indicators used in the delineation;
- Field data forms;
- Description, quantification, and illustration of the full extent of all surface waters in their pre-project condition;
- Scaled site plans illustrating pre-project surface and subsurface soils, hydrology, topography, surface waters, and vegetation;
- Scaled site plans illustrating current surface and subsurface soils, hydrology, topography, surface waters, and vegetation;
- Cross-section diagrams depicting lateral and vertical extent of all wetlands and other surface waters; and
- Deviations from this Work Plan and rationale for such deviations.

The Report will be certified by the Dischargers and the person who conducts the delineation. The Report will be submitted concurrently to the Lahontan Water Board, CDFW, USACE, and San Bernardino County Land Use Services.

4 REFERENCES

Richardson, J.L. and M.J. Vepraskas (editors), 2001. Wetland Soils: Genesis, Hydrology, Landscapes, and Classification. CRC Press, LLC.

U.S. Army Corps of Engineers (USACE), 1987. Corps of Engineers Wetlands Delineation Manual. Wetlands Research Program Technical Report Y-87-1 (on-line edition). Environmental Laboratory, U.S. Army Corps of Engineers Waterways Experiment Station, Vicksburg, MS..

USACE, 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0), ed. J.S. Wakeley, R.W. Lichvar, and C.V. Noble. ERDC/EL TR-10-3. Vicksburg, MS: U.S. Army Engineer Research and Development Center.