

December 30, 2015

Mr. James D. Dotchin
Chief, Bureau of Industrial Site Cleanup
Nevada Division of Environmental Protection
2030 East Flamingo Road, Suite 230
Las Vegas, Nevada 89119

Subject: Work Plan (# 2015-140) for Initial Sampling of Groundwater – NERT Remedial Investigation, Downgradient Study Area, Henderson, Nevada

Dear Mr. Dotchin:

As requested by the Nevada Division of Environmental Protection (NDEP), AECOM is pleased to provide this work plan for performing initial groundwater sampling and analyses in support of the Downgradient Study Area component of the Nevada Environmental Response Trust (NERT) Remedial Investigation in Henderson, Nevada. The objectives of the sampling described are to assess current groundwater conditions and provide current data that will help refine the understanding of data gaps. These data will be used to select locations within the investigation area (Study Area) where additional monitoring wells are needed. This work plan includes a brief summary of the scope of work, a budget estimate and schedule.

SCOPE OF WORK

AECOM will conduct groundwater sampling activities in support of the NERT Remedial Investigation. The scope of work includes sampling of up to 90 groundwater monitoring wells within the Study Area as shown on **Figure 1**. All work will be conducted under the supervision of a Nevada Certified Environmental Manager (CEM).

Many of the existing wells in the Study Area have not been sampled since 2009. A comprehensive sampling of as many existing wells as possible will be performed to assess current groundwater conditions beneath the Study Area. As directed by NDEP, the scope of work and cost estimate are based on one-time sampling of up to 90 existing monitoring wells (**Table 1**). It is possible that some of the wells shown on Figure 1 may no longer be present or may not be in a condition that allows sampling so fewer than 90 wells may eventually be sampled.

It is anticipated that the work will be conducted in conformance with the Quality Assurance Project Plan (QAPP) and Field Sampling and Analysis Plan (FSAP) as described in AECOM Work Plan #2015-130. The QAPP and the FSAP will be updated to specifically address this scope of work

Pre-field activities

AECOM will contact property and well owners to obtain permission for access. NDEP, USEPA, NERT, property owners, and well owners will be notified of the schedule for sampling. Subcontracts for sampling support and the analytical laboratory will be procured to execute the scope of work.

The groundwater well locations will be visited to verify if a well is present and to document the condition of the well. At the request of NDEP, each well will be surveyed by a licensed land surveyor to update the horizontal location coordinates and elevation of each well. The depth to water and total depth of the well will be obtained. Measurements will be obtained from the marked or notched top of the well casing or, if no mark or notch is present, measurements will be from the north side of the casing. Groundwater monitoring wells will be sounded for depth to water and total well depth from top of casing. An electronic sounder, accurate to the nearest +/- 0.01 feet, will be used to measure depth to water in each well. Total well depth will be sounded from the surveyed top of casing by lowering the probe to the bottom of the well. A table summarizing the results of the well survey will be provided to NDEP and NERT.

Field activities

Groundwater sampling will be conducted using the "low-flow" method consistent with the "low-flow" sampling currently utilized by NERT. The pump intake will be positioned approximately at the midpoint of the well screen.

During groundwater sampling, a water quality meter (equipped with a flow-through cell) will be used during purging to track water quality field parameters and assess when stabilization of parameters has occurred. Samplers will conduct in-field measurements for depth to water; pH, electrical conductivity (EC), dissolved oxygen (DO), oxygen reduction potential (ORP), turbidity and temperature of groundwater samples. An appropriate water quality meter, calibrated as recommended by the manufacturer, will be used. All meter calibrations and field measurements will be recorded on the appropriate field forms and/or in the field logbook.

As requested by NDEP, samples will be analyzed for perchlorate, chlorate, chromium, total dissolved solids (TDS), bromide and chloride. The bromide and chloride analysis will be used to provide information regarding the concentrations of these chemicals in groundwater in the Downgradient Study Area. Defining baseline bromide concentrations in groundwater is important because it is under consideration for potential use in future tracer studies. Duplicate samples will be collected at a rate of 1 sample per 10 primary samples. Equipment blanks will be taken at a rate of one per day for each piece of non-dedicated equipment used. Samples will be placed into laboratory certified sample containers, sealed, labeled, recorded on Chain of Custody documentation, and placed in coolers for transport to TestAmerica laboratory, the NDEP-certified laboratory selected for this project.

Data Evaluation

Data generated from sampling activities will undergo two levels of review in accordance with the data validation requirements specified in the QAPP for the NERT Site RI/FS. Approximately 90 percent of the data will be validated to NDEP Stage-2b and approximately 10 percent of data will be validated to NDEP Stage-4. Once data are validated they will be summarized in tables and presented on maps for interpretation. Data will be provided to NDEP contractors for incorporation into the master database. In addition, the validated data will be provided to NERT. Maps showing the potentiometric surface, along with isoconcentration contours of perchlorate, chlorate, chromium,

and TDS will be constructed to depict the current groundwater conditions and analyte concentrations within the NERT Downgradient Study Area. The contour maps will also take into consideration recent data collected on the adjoining NERT Core Plume Study Area. Tables and maps will be provided to NDEP and NERT for review and discussion.

Investigation-Derived Waste Management

In general, investigation-derived waste (IDW) for the collection of groundwater samples will consist mainly of purged groundwater, equipment cleaning water and used personal protection equipment (PPE) (e.g., disposable nitrile gloves) and household trash such as used paper towels, etc. The IDW will be managed consistent with the Field Guidance Document (FGD) 001 Managing Investigative Derived Waste dated January 24, 2014.

Reporting

A technical memorandum will be prepared that will summarize the results of this groundwater evaluation. The technical memorandum will include a brief description of field methods used and will present the survey results, updated well construction details, summary tables of groundwater elevations, field data and analytical results, and groundwater elevation and concentration contour maps. The technical memorandum will also include copies of the field data sheets, the final laboratory report and data validation summary memorandum.

A draft technical memorandum will be prepared for review by NDEP. Upon receipt of NDEP comments, the technical memorandum will be submitted to NERT and USEPA for comment. Upon the finalization of the document, the technical memorandum will be submitted to NDEP, USEPA and the NERT Stakeholders.

Deliverable(s): Technical Memorandum (Draft and Final).

PRELIMINARY SCHEDULE AND ESTIMATED COST

The following summarizes the preliminary implementation schedule and estimated cost for Work Plan # 2015-140:

Task Order and Title	Approximate Schedule	Estimated Cost
2015-140-01 – Initial Sampling of Groundwater (AECOM)	December 2015 – July 2016	\$120,658
2015-140-02 – Groundwater Sampling Subcontractor	January 2016 – March 2016	\$54,552
2015-140-03 – Laboratory Subcontractor	January 2016 – March 2016	\$11,684
2015-140-04 – Surveyor Subcontractor	January 2016 – March 2016	\$9,000
2015-140-05 – Drilling Subcontractor	January 2016 – March 2016	\$16,205
Work Plan Total		\$212,099

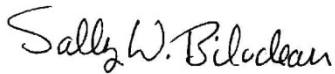
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A detailed breakdown of the cost is included in **Table 2**. Scope of work and cost details for task order 2015-140-01 (AECOM labor) have been uploaded in the NDEP BMI financial database. The subcontractor task orders (2015-140-02, 2015-140-03, 2015-140-04 and 2015-140-05) will be uploaded once subcontractor unit costs have been entered by NDEP's database consultant. If this work plan meets with your approval, please send AECOM your authorization at your earliest convenience.

If you have any questions regarding this work plan, or if AECOM may be of further assistance, please contact Carmen Caceres-Schnell at (805) 764-4031 or either of the undersigned.

Sincerely,



Sally Bilodeau, CEM
Project Manager



Harry Van Den Berg, PE
Principal-in-Charge

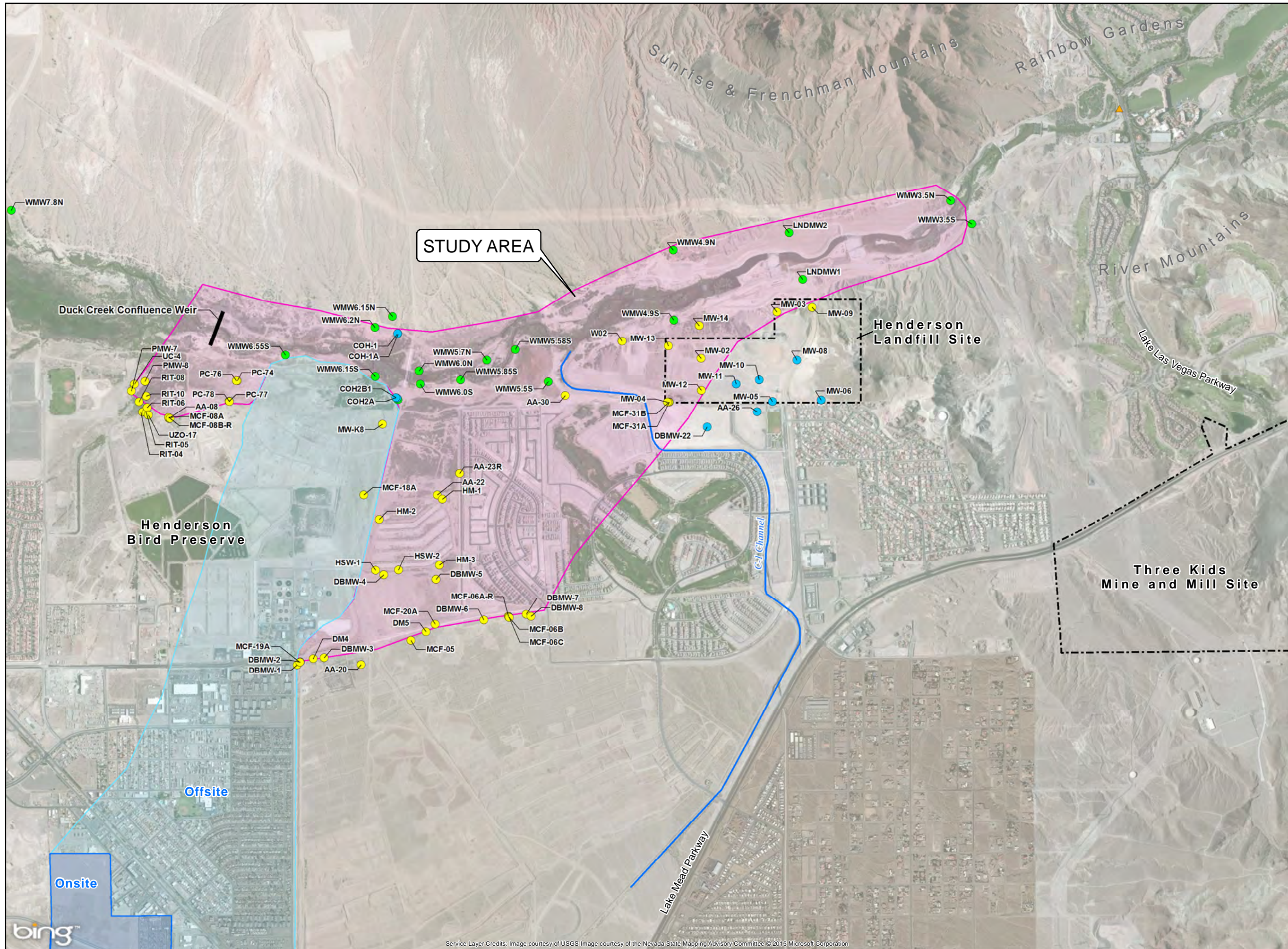
Attachments: Table 1 - List of Wells Proposed for Sampling
Table 2 – Detailed Cost Breakdown
Figure 1 – Groundwater Sampling Locations

Table 1 List of Wells Proposed for Sampling
 NERT Remedial Investigation, Downgradient Study Area
 Henderson, Nevada

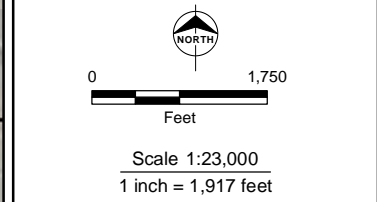
Well ID	Well Location	Screen Interval	Water Zone	Lithology
MW-K8	BMI	40	Shallow	Qal
PMW-7	BMI	20	Shallow	Qal/xMCF
PMW-8	BMI	20	Shallow	Qal/xMCF
RIT-04	BMI	14	Shallow	Qal/xMCF
RIT-05	BMI	10	Shallow	Qal
RIT-06	BMI	10	Shallow	Qal
RIT-08	BMI	10	Shallow	Qal
RIT-10	BMI	15	Shallow	Qal
UC-4	BMI	30	Shallow	Qal
UZO-17	BMI	30	Shallow	Qal/xMCF
AA-08	BMI	30	Shallow	Qal
AA-20	BMI	20	Shallow	Qal
AA-22	BMI	20	Shallow	Qal
AA-23R	BMI	25	Shallow	Qal
AA-30	BMI	20	Shallow	Qal
DBMW-1	BMI	30	Shallow	Qal/UMCF
DBMW-2	BMI	20	Shallow	Qal
DBMW-3	BMI	20	Shallow	Qal/UMCF
DBMW-4	BMI	20	Shallow	Qal/UMCF
DBMW-5	BMI	20	Shallow	UMCF
DBMW-6	BMI	20	Shallow	Qal/UMCF
DBMW-7	BMI	20	Shallow	UMCF
DBMW-8	BMI	20	Shallow	UMCF
DM4	BMI	15	Shallow	Qal
DM5	BMI	15	Shallow	Qal
MCF-05	BMI	10	Middle	UMCF
MCF-06A-R	BMI	20	Deep	UMCF
MCF-06B	BMI	15	Shallow	UMCF
MCF-06C	BMI	15	Shallow	UMCF
MCF-08A	BMI	20	Deep	UMCF
MCF-08B-R	BMI	20	Middle	UMCF
MCF-18A	BMI	20	Deep	UMCF
MCF-19A	BMI	20	Deep	UMCF
MCF-20A	BMI	20	Deep	UMCF
MCF-31A	BMI	20	Deep	UMCF
MCF-31B	BMI	20	Middle	UMCF
MW-02	BMI	NA	Shallow	NA
MW-03	BMI	NA	Shallow	Qal
MW-04	BMI	NA	Shallow	Qal
MW-09	BMI	NA	NA	NA

Table 1 List of Wells Proposed for Sampling
 NERT Remedial Investigation, Downgradient Study Area
 Henderson, Nevada

Well ID	Well Location	Screen Interval	Water Zone	Lithology
MW-12	BMI	NA	Shallow	NA
MW-13	BMI	NA	Shallow	Qal
MW-14	BMI	NA	Shallow	NA
PC-74	BMI	10	Shallow	Qal
PC-76	BMI	5	Shallow	Qal
PC-77	BMI	10	Shallow	Qal
PC-78	BMI	10	Shallow	Qal
COH-1	BMI	10	Middle	UMCf
COH-1A	BMI	10	Shallow	Qal
W02	BMI	NA	Middle	UMCf
HM-1	BMI	NA	NA	NA
HM-2	BMI	NA	Shallow	NA
HM-3	BMI	NA	NA	NA
HSW-1	BMI	NA	NA	NA
HSW-2	BMI	NA	NA	NA
COH2A	SNWA	NA	NA	NA
COH2B1	SNWA	NA	NA	NA
LNDMW1	SNWA	NA	NA	NA
LNDMW2	SNWA	NA	NA	NA
WMW3.5N	SNWA	NA	NA	NA
WMW3.5S	SNWA	NA	NA	NA
WMW4.9N	SNWA	NA	NA	NA
WMW4.9S	SNWA	NA	NA	NA
WMW5.58S	SNWA	NA	NA	NA
WMW5.5S	SNWA	NA	NA	NA
WMW5.7N	SNWA	NA	NA	NA
WMW5.85S	SNWA	NA	NA	NA
WMW6.0N	SNWA	NA	NA	NA
WMW6.0S	SNWA	NA	NA	NA
WMW6.15N	SNWA	NA	NA	NA
WMW6.15S	SNWA	NA	NA	NA
WMW6.2N	SNWA	NA	NA	NA
WMW6.55S	SNWA	NA	NA	NA
WMW7.8N	SNWA	NA	NA	NA



- Legend**
- ▲ Lake Las Vegas Intake
 - BMI Well
 - City of Henderson Well
 - SNWA Well
 - Channels
 - Weir
 - Area of Interest
 - NERT Regional Groundwater Remedial Investigation Area
 - NERT Offsite Study Area
 - NERT Onsite Study Area



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NERT
Regional Groundwater
Remedial Investigation

**GROUNDWATER
SAMPLING LOCATIONS**

Date: 12/16/2015 Project: 60477365

AECOM **Figure 1**