



TETRA TECH EC, INC.

**DOCKET**

**09-AFC-8**

DATE JAN 11 2010

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January 11, 2010

California Energy Commission  
Docket No. 09-AFC-8  
1516 9<sup>th</sup> St.  
Sacramento, CA 95814

**Genesis Solar Energy Project - Docket Number 09-AFC-8**

Docket Clerk:

Included with this letter is one hard copy and one electronic copy of the **Genesis Solar Energy Project Application for Certification Data Request Responses to Set 1B.**

Sincerely,

Tricia Bernhardt  
Project Manager/Tetra Tech EC

cc: Mike Monasmith /CEC Project Manager



**Genesis Solar, LLC**

700 Universe Boulevard, Juno Beach, Florida 33408

January 11, 2010

Ms. Melissa Jones  
Executive Director  
California Energy Commission  
1516 Ninth Street  
Sacramento, CA 95814-5512

Dear Ms. Jones,

Pursuant to the provisions of Title 20, California Code of Regulation, Genesis Solar LLC, a Delaware limited liability company, hereby submits the **Genesis Solar Energy Project Application for Certification Data Request Responses to Set 1B**. The Genesis Solar Energy Project is a 250 megawatt solar electric generating facility to be located between the community of Desert Center and the city of Blythe in eastern Riverside County, California.

Responses to Data Requests #228 through #292 were compiled in response to the Energy Commission's Genesis Solar Energy Project (09-AFC-8) Data Requests, Set 1b, dated December 9, 2009 and posted December 10, 2009. This document provides the additional information necessary to fulfill the Application for Certification data requests for the following technical areas:

- Cultural Resources
- Visual Resources

If you have any questions, please contact Meg Russell at (561) 304-5609 or me at (561) 691-2889.

Sincerely,  
Genesis Solar, LLC



Scott Busa  
Director

## Cultural Resources

### **Item 228:**

#### **Information Required:**

In a table, please list all linear facilities that entail trenching or the excavation/drilling of holes for footings, and provide, for both the on- and off-site segments of each, the total length of each facility, and the trench dimensions (width and depth of excavation) or hole dimensions (diameter and depth of excavation) required to install each.

#### **Response:**

As we have chosen cultural resources review approach 3, no response is required.

### **Item 229:**

#### **Information Required:**

In a table, please list all buildings and equipment whose foundations require excavation (including the solar collectors and for the above-ground piping and electrical lines) and provide the dimensions and depths of holes that would be dug to construct these foundations.

#### **Response:**

As we have chosen cultural resources review approach 3, no response is required.

### **Item 230:**

#### **Information Required:**

In a table, please list all buildings and structures and provide the height of each.

#### **Response:**

As we have chosen cultural resources review approach 3, no response is required.

### **Item 231:**

#### **Information Required:**

Please provide a map or series of maps at a scale of 1"=300 feet showing the project components listed in the requested tables.

#### **Response:**

As we have chosen cultural resources review approach 3, no response is required.

### **Item 232:**

#### **Information Required:**

Please provide the dimensions and depth into the ground of the hole excavated for the LTU.

#### **Response:**

As we have chosen cultural resources review approach 3, no response is required.

**Item 233:**

**Information Required:**

Please provide a description of the process of constructing the LTU.

**Response:**

As we have chosen cultural resources review approach 3, no response is required.

**Item 234:**

**Information Required:**

Please explain from where the project would obtain general fill soil, if needed, and specifically the soil used to line the LTU and to construct the LTU berm. If any non-licensed, non-commercial soil borrow sites would be used:

- a. Please have a qualified archaeologist survey these sites and record on Department of Parks and Recreation (DPR) 523 forms any cultural resources that are identified; and
- b. Please submit to staff a report on the methods and results of these surveys, with recommendations for the treatment of any cultural resources identified in the surveys.

**Response:**

At the present time, there are no plans to utilize an off-site borrow pit to obtain fill soil. Should such a requirement appear at a future time, we would anticipate cultural resources survey and reporting of the APE for this project feature under a supplemental survey protocol to be established under the Cultural Resources Memorandum of Agreement (MOA) that is being produced for this project.

**Item 235:**

**Information Required:**

Please provide a scaled map showing the septic tank and leach field in relation to other project components.

**Response:**

As we have chosen cultural resources review approach 3, no response is required.

**Item 236:**

**Information Required:**

Please provide the surface dimensions and depth into the ground of the holes excavated for the septic tank and for the leach field.

**Response:**

As we have chosen cultural resources review approach 3, no response is required.

**Item 237:**

**Information Required:**

Please provide the surface dimensions and depth into the ground of the holes excavated for the swales, ditches, and two detention ponds.

**Response:**

As we have chosen cultural resources review approach 3, no response is required.

**Item 238:**

**Information Required:**

Please provide a map or a series of maps at a scale of 1"=500 feet showing the storm water management system components in relation to other project components.

**Response:**

As we have chosen cultural resources review approach 3, no response is required.

**Item 239:**

**Information Required:**

Please provide a description of the proposed project's expected use of the Blythe-Julian Hinds transmission line poles, including any reconductoring or pole replacement.

**Response:**

As we have chosen cultural resources review approach 3, no response is required.

**Item 240:**

**Information Required:**

Please provide a scaled map showing the locations of the pulling sites in relation to the gen-tie route.

**Response:**

As we have chosen cultural resources review approach 3, no response is required.

**Item 241:**

**Information Required:**

Please provide the dimensions of the surface area around the pulling sites that would be disturbed by the gen-tie conductoring.

**Response:**

As we have chosen cultural resources review approach 3, no response is required.

**Item 242:**

**Information Required:**

Please provide the typical dimensions and the greatest dimensions of a gen-tie pole work area and construction pad.

**Response:**

As we have chosen cultural resources review approach 3, no response is required.

**Item 243:**

**Information Required:**

Please provide a scaled map showing the locations of all possible boring pits in relation to other project components.

**Response:**

As we have chosen cultural resources review approach 3, no response is required.

**Item 244:**

**Information Required:**

Please provide the dimensions and depths into the ground of the holes that would need to be excavated for all trenchless construction boring pits.

**Response:**

As we have chosen cultural resources review approach 3, no response is required.

**Item 245:**

**Information Required:**

Please provide a scaled map showing the on-site route of the gen-tie transmission line and the on-site route of the Unit-1-to-Unit-2 transmission line, with pole locations indicated, in relation to the other project components.

**Response:**

As we have chosen cultural resources review approach 3, no response is required.

**Item 246:**

**Information Required:**

Please provide the diameter and depth of the holes that would be excavated to install the two transmission lines.

**Response:**

As we have chosen cultural resources review approach 3, no response is required.

**Item 247:**

**Information Required:**

Please provide a scaled map showing the routes of the on-site natural gas pipelines in relation to other project components.

**Response:**

As we have chosen cultural resources review approach 3, no response is required.

**Item 248:**

**Information Required:**

Please provide the length, width, and depth of the trenches for the on-site natural gas pipelines.

**Response:**

As we have chosen cultural resources review approach 3, no response is required.

**Item 249:**

**Information Required:**

Please provide a map or map series at a scale of 1:12,000 showing the routes of the main site access road, the natural gas pipeline, and the gen-tie transmission line, including, for the latter, the part which would share poles with the Blythe Energy Project Transmission Line, all new pole locations, all pull-sites, and any new access and spur roads.

**Response:**

As we have chosen cultural resources review approach 3, no response is required.

**Item 250:**

**Information Required:**

Please also show on this map or series the extent of pedestrian archaeological survey coverage of the three routes.

**Response:**

As we have chosen cultural resources review approach 3, no response is required.

**Item 251:**

**Information Required:**

Please provide the correct on- and off-site lengths for these three linear facilities.

**Response:**

As we have chosen cultural resources review approach 3, no response is required.

**Item 252:**

**Information Required:**

Please provide copies of the letters sent by BLM to the 58 other Native American groups and individuals on the Native American Heritage Commission-generated list, a copy of which was provided in the first Data Adequacy Supplement.

**Response:**

As we have chosen cultural resources review approach 3, no response is required.

**Item 253:**

**Information Required:**

Please provide to staff copies of any responses, received by the applicant since the filing of the AFC, from Native Americans to the applicant's informational letter regarding the proposed project.

**Response:**

As we have chosen cultural resources review approach 3, no response is required.

**Item 254:**

**Information Required:**

Please check field notes for all newly identified sites, ensure that the data in the DPR 523 forms are correct, and revise any forms in which errors are discovered:

**Response:**

Tetra Tech has reviewed the DPR 523 forms and has made any necessary revisions to the newly identified sites to ensure the data in the forms are correct. The revised DPR 523 forms have been submitted to the CEC under confidential cover.

**Item 255:**

**Information Required:**

Please determine on which of the six landforms identified in the geoarchaeological report each site is located and revise Entry A10 for all site forms accordingly.

**Response:**

Tetra Tech has reviewed the DPR 523 forms and has made revisions to the forms, including the landform information in Entry A10 from the geoarchaeological report. The revised DPR 523 forms have been submitted to the CEC under confidential cover.

**Item 256:**

**Information Required:**

Please provide interpretations as to site age, function, and ethnic affiliation for as many of the sites as possible, and revise Entry A13 for the site forms accordingly.

**Response:**

Tetra Tech has reviewed the DPR 523 forms and has made revisions to the forms, including the information in Entry A13 where possible. The revised DPR 523 forms have been submitted to the CEC under confidential cover.

**Item 257:**

**Information Required:**

Please provide, under confidential cover, the revised DPR 523 forms to staff.

**Response:**

The revised DPR 523 forms have been submitted to the CEC under confidential cover.

**Item 258:**

**Information Required:**

Please have the project geoarchaeologist submit for staff approval a research design the purpose of which would be to gather field data with which to test and augment the preliminary conclusions in his report. The research design should include the field work recommended in the geoarchaeological report (AFC, vol. 2, app. G, app. C, p. 6), as further detailed by staff here:

- a. Verify, on the ground, the boundaries of the landforms shown in Figure 2 of the geoarchaeological report, particularly the boundary between the “Younger



- Mixed Alluvial and Aeolian Deposits (Qyma)” and all adjacent landforms to the north of it;
- b. Verify, on the ground, the presence and location of all relict shorelines of Ford Dry Lake, wherever they appear to occur in the APE;
  - c. Investigate the landforms having the depositional energy and sedimentary characteristics (age, composition) that would have been conducive to the burial of archaeological deposits rather than those indicative of too great an age to contain archaeological deposits or too high-energy a depositional environment for the preservation of intact archaeological deposits; and
  - d. Acquire and process radiocarbon samples such as charcoal, ash, or soil humates with which to date each landform.

**Response:**

After the discussions we had during the 31 December 2009 DR workshop, it is our understanding that these DRs will be answered by the preliminary geomorphology report prepared by Miles Kinney to be provided later. CEC staff review of this report will ascertain if the on-going geomorphology studies will satisfy project geoarchaeology requirements.

**Item 259:**

**Information Required:**

Please have the geoarchaeologist implement the approved research design and provide to staff a report on the results, including more precise dates for the landforms and maps showing the refined landform boundaries and the actual and interpolated locations of relict lake shorelines, relative to the proposed project's APE, including the gen-tie transmission line.

**Response:**

Please see response to Item 258.

**Item 260:**

**Information Required:**

For any alternative site locations not on BLM lands (to be identified at a later date by staff), please provide to staff, under confidential cover, the following:

- a. Copies of DPR 523 site forms for all previously known cultural resources from California Historical Resources Information System (CHRIS) record searches, for the alternative locations, out to 1.0 mile beyond the sites' and associated linear facility corridors' boundaries;
- b. Copies of CHRIS reports of previous archaeological excavations and architectural surveys conducted within the boundaries of the alternative sites and their linear facility corridors;
- c. A copy of the results of the Native American Heritage Commission's (NAHC) sacred lands database search for each alternative location;
- d. Copies of all letters sent to and received from Native Americans identified by the NAHC as interested in development at each alternative location;

- e. A consultation with local historical societies and museums to establish the background history of the alternative project site locations;
- f. An examination of historic maps to identify former and extant buildings and structures, including trails, roads, and other infrastructure, aged 45 years or older, for each alternative location;
- g. A map at a scale of 1:24,000 depicting the locations of all previously known and map-identified cultural resources for each alternative location; and
- h. A discussion of the comparative advantages and disadvantages of the proposed project and each alternative location, with respect to cultural resources.

**Response:**

All information requested in Items 260a – g has been provided to the CEC under confidential cover.

Discussion for Item 260h follows.

**McCoy** – The McCoy alternative site is undeveloped and approximately 7 miles west/northwest of Blythe, California, and north of I-10. The McCoy alternative area is within the Mojave Desert on land managed by the BLM Palm Springs-South Coast field office. The McCoy alternative site is located at the southeastern base of the McCoy Mountains within the alluvial fans and the elevation ranges from 149 to 198 meters (490 to 650 feet). The soils consist of alluvial gravels, sand, and silt with patches of desert pavement. The area is dissected by several small washes that contribute to the larger northwest/southeast trending McCoy Dry Wash. Less than ten percent of the McCoy site has been archaeologically surveyed and only one previously recorded archaeological site (CA-RIV872T, prehistoric trail) was identified within the McCoy alternative location. Within the project region, several well-known trails led west from the Colorado River into the interior.

The proposed project area has the potential to contain prehistoric and historic cultural resources. Prehistoric archaeological sites are typically located near water, specifically near springs, on terraces near the shore of the dry lake bed, and in areas where natural resources were utilized. Prehistoric site types for the project area could include rock shelters, petroglyphs, special use sites, lithic scatters, temporary camps, gathering areas, sacred areas, trails, and isolated finds.

In addition, the Desert Center area is within the Desert Training Center/California Arizona Maneuver Area (DTC/CAMA) and Desert Strike (encompasses several training camps and maneuver areas in the region). The likelihood of encountering historic military sites or features is moderate and could include feature types such as refuse scatters, trails, rock alignments, tank tracks, firing range, rock cairns, foundations, and military-related isolates.

Implementing this alternative could result in cultural resource impacts similar to or greater than to those of the proposed project.

**Mule Mountain** – The Mule Mountain alternative site is currently undeveloped. Located just southeast of the Wiley's Well Rest Area approximately 17 miles west of Blythe, California, the Mule Mountain alternative lies a few miles south of I-10. This alternative area is within the Mojave Desert on land managed by the BLM Palm Springs-South

Coast field office. The site is located in an arid desert bolson characterized by low dunes, minor and major washes, bajadas, desert pavement, playas and alluvial aprons supporting the interface of saltbush scrub, creosote scrub, and more rarely, Ironwood/Palo Verde wash vegetation communities. The local geologic context is generally one of mixed Quaternary alluvium on the terraces just above the flood plain of gravel, pebbles, and sand, to silt, and clay. Soils in the area reflect the lithologies of the adjacent mountain ranges.

The proposed project area has a very high potential to contain prehistoric and historic cultural resources. The literature and record search revealed eight previous cultural resource investigations, 13 previously recorded archaeological sites, and 4 isolated finds directly within the Mule Mountain alternative location, though very little of the alternative site has undergone adequate cultural resource inventory. Nine previous archaeological studies, 21 archaeological sites (including two listed in the NRHP), and 8 isolated finds are located within a one-mile radius of the Mule Mountain site. Prehistoric archaeological sites are typically located near water, specifically near springs, on terraces near the shore of the dry lake bed, and in areas where natural resources were utilized. Prehistoric site types for the project area could include rock shelters, petroglyphs, special use sites, lithic scatters, temporary camps, gathering areas, sacred areas, trails, and isolated finds.

The likelihood of encountering historic military sites or features is moderate and could include feature types such as refuse scatters, trails, rock alignments, tank tracks, firing range, rock cairns, foundations, and military-related isolates.

Implementing this alternative could result in cultural resource impacts similar to or greater than to those of the proposed project.

**Black Hills** – The Black Hills alternative site is undeveloped and approximately 10 north of Blythe, California, and north of I-10. The Black Hills alternative area is within the Mojave Desert on land managed by the BLM Palm Springs-South Coast field office. The Black Hills alternative site is located at the southwestern base of the Big Maria Mountains within the alluvial fans and the elevation ranges from 228 to 289 meters (750 to 950 feet). The south/southwestern portion of the alternative site is located at the eastern edge of a broad valley between the Big Maria and the McCoy Mountains. The soils consist of volcanic and granitic rocky areas, alluvial gravels, and patches of desert pavement. Several small washes cross the site.

Less than ten percent of the Black Hills site has undergone archaeological survey. Preliminary literature and record search results identified 2 previously recorded prehistoric archaeological sites (trails) and 1 historic site (military refuse associated with "Desert Strike") within the Black Hills alternative location. Within the project region, several well-known prehistoric trails led west from the Colorado River into the interior.

The proposed project area has the potential to contain prehistoric and historic cultural resources. Prehistoric archaeological sites are typically located near water, specifically near springs, on terraces near the shore of the dry lake bed, and in areas where natural resources were utilized. Prehistoric site types for the project area could include rock shelters, petroglyphs, special use sites, lithic scatters, temporary camps, gathering areas, sacred areas, trails, and isolated finds.

In addition, the Black Hills area is within the DTC/CAMA and Desert Strike (encompasses several training camps and maneuver areas in the region). The likelihood of encountering historic military sites or features is moderate and could include feature types such as refuse scatters, trails, rock alignments, tank tracks, firing range, rock cairns, foundations, and military-related isolates.

Implementing this alternative could result in cultural resource impacts similar to those of the proposed project.

**Desert Center** – The Desert Center alternative site is undeveloped and just east of Highway 177 and approximately 10 miles northeast of Desert Center, California. The Desert Center alternative site is within the Mojave Desert on land managed by the BLM Palm Springs-South Coast field office. The Desert Center alternative is located at the southeastern base of the Coxcomb Mountains within the bajadas, alluvial fans, and northwestern edge of Palen Dry Lake within the northwestern portion of the Chuckwalla Valley. The soils consist of alluvial gravels, sand, and silt. The area is dissected by several large and small washes that contribute to the larger Palen Dry Lake. The Desert Center alternative site landforms are similar to that of the proposed Genesis Solar site.

Preliminary geoarchaeological investigations undertaken at the Genesis Solar site by this project indicate that during most of the Holocene, it was a seasonal water body that would have attracted periodic usage by prehistoric populations. Sites along the lake margins would be expected to show patterns of utilization for gathering and processing of plant foods and hunting of waterfowl and other animals (milling sites, complex habitation sites, roasting pits, etc). It is also highly likely that Palen Dry Lake was a pluvial lake during the Late Pleistocene and Early Holocene, with corresponding implications for settlement patterns during those early periods.

Less than ten percent of the Desert Center site has been archaeological surveyed. Preliminary literature and record search results identified 4 previously recorded prehistoric archaeological sites within the Desert Center alternative location. In addition, similar to the proposed Genesis Solar site, these previously recorded prehistoric sites have been identified specifically on terraces near the shore of the dry lake bed.

Prehistoric and ethnographic background context and recorded archaeological site data suggest the area is in a high archaeological sensitivity zone and that the following site types could be encountered in the region: trails, rock art sites, complex habitation sites, lithic scatters, milling sites, quarry sites, temporary camps, pottery drops, roasting pits, special use localities, and isolates.

In addition, the Desert Center area is within the DTC/CAMA (encompasses several training camps and maneuver areas in the region). The likelihood of encountering historic military sites or features is moderate and could include feature types such as refuse scatters, trails, rock alignments, tank tracks, firing range, rock cairns, foundations, and military-related isolates.

Implementing this alternative could result in cultural resource impacts similar to or greater than to those of the proposed project.

**Item 261:**

**Information Required:**

If the applicant has analyzed other alternatives, unique to the proposed project, please provide to staff the above requested information for each additional alternative.

**Response:**

There are no other alternatives than the four referenced in Item 260.

**Item 262:**

**Information Required:**

Please provide a copy of Thomas T. Taylor's "Draft Historic Context Statement: the Southern California Transmission/Distribution Line Systems within the Angeles National Forest" (2005).

**Response:**

As we have chosen cultural resources review approach 3, no response is required.

**Item 263:**

**Information Required:**

263. Please have a qualified architectural historian provide a discussion of the project's potential impacts to the integrity of setting and integrity of feeling of Wiley's Well Road.

**Response:**

As we have chosen cultural resources review approach 3, no response is required.

**Item 264:**

**Information Required:**

If impacts to the integrity of setting and integrity of feeling of Wiley's Well Road are possible, please have the architectural historian make recommendations on the eligibility of Wiley's Well Road for the NRHP and for the CRHR, stating how the resource does or does not meet the eligibility criteria for these listings.

**Response:**

As we have chosen cultural resources review approach 3, no response is required.

**Item 265:**

**Information Required:**

Please have the architectural historian evaluate all seven aspects of integrity for Wiley's Well Road.

**Response:**

As we have chosen cultural resources review approach 3, no response is required.

**Item 266:**

**Information Required:**

Please have the architectural historian complete for submission to staff the DPR 523b (Building, Structure, and Object) and DPR 523e (Linear Structure) forms for Wiley's Well Road.

**Response:**

As we have chosen cultural resources review approach 3, no response is required.

**Item 267:**

**Information Required:**

Please have a qualified architectural historian provide a discussion of the project's potential impacts to the integrity of setting and integrity of feeling of the Blythe-Eagle Mountain 161-kV transmission line.

**Response:**

As we have chosen cultural resources review approach 3, no response is required.

**Item 268:**

**Information Required:**

If impacts to the integrity of setting and integrity of feeling of the Blythe-Eagle Mountain 161-kV transmission line are possible, please have the architectural historian make recommendations on the eligibility of the Blythe-Eagle Mountain 161-kV transmission line for the NRHP and for the CRHR, stating how the resource does or does not meet the eligibility criteria for these listings.

**Response:**

As we have chosen cultural resources review approach 3, no response is required.

**Item 269:**

**Information Required:**

Please have the architectural historian evaluate all seven aspects of integrity for the Blythe-Eagle Mountain 161-kV transmission line.

**Response:**

As we have chosen cultural resources review approach 3, no response is required.

**Item 270:**

**Information Required:**

Please have the architectural historian complete for submission to staff the DPR 523b (Building, Structure, and Object) and DPR 523e (Linear Structure) forms for the Blythe-Eagle Mountain 161-kV transmission line.

**Response:**

As we have chosen cultural resources review approach 3, no response is required.

**Item 271:**

**Information Required:**

Please provide a copy of the geotechnical report for the proposed project when it becomes available.

**Response:**

The Geotechnical Report (also referred to as Appendix E-3 of the AFC) was docketed at the CEC with a date of October 26<sup>th</sup>, 2009 and posted on October 27<sup>th</sup>, 2009. It was docketed with the Geophysical Report (also referred to as Appendix E-2 of the AFC). These two items were docketed together and the word “geotechnical” does not appear in the CEC docketing title, hence the potential confusion.

**Item 272:**

**Information Required:**

Please provide to staff a series of scaled and dimensioned plan-and-profile views of the proposed project’s (and alternative locations’) impact blocks.

**Response:**

Please reference the attached Figures DR-272a and 272b for depth and height impacts associated with the project.

**Item 273:**

**Information Required:**

Please explicitly discuss the efficacy of modeling the potential archaeological characteristics and spatial distribution of at-this-time unknown Native American traditional use areas on the basis of available ethnographic information and theoretical principles of ethnogeography.

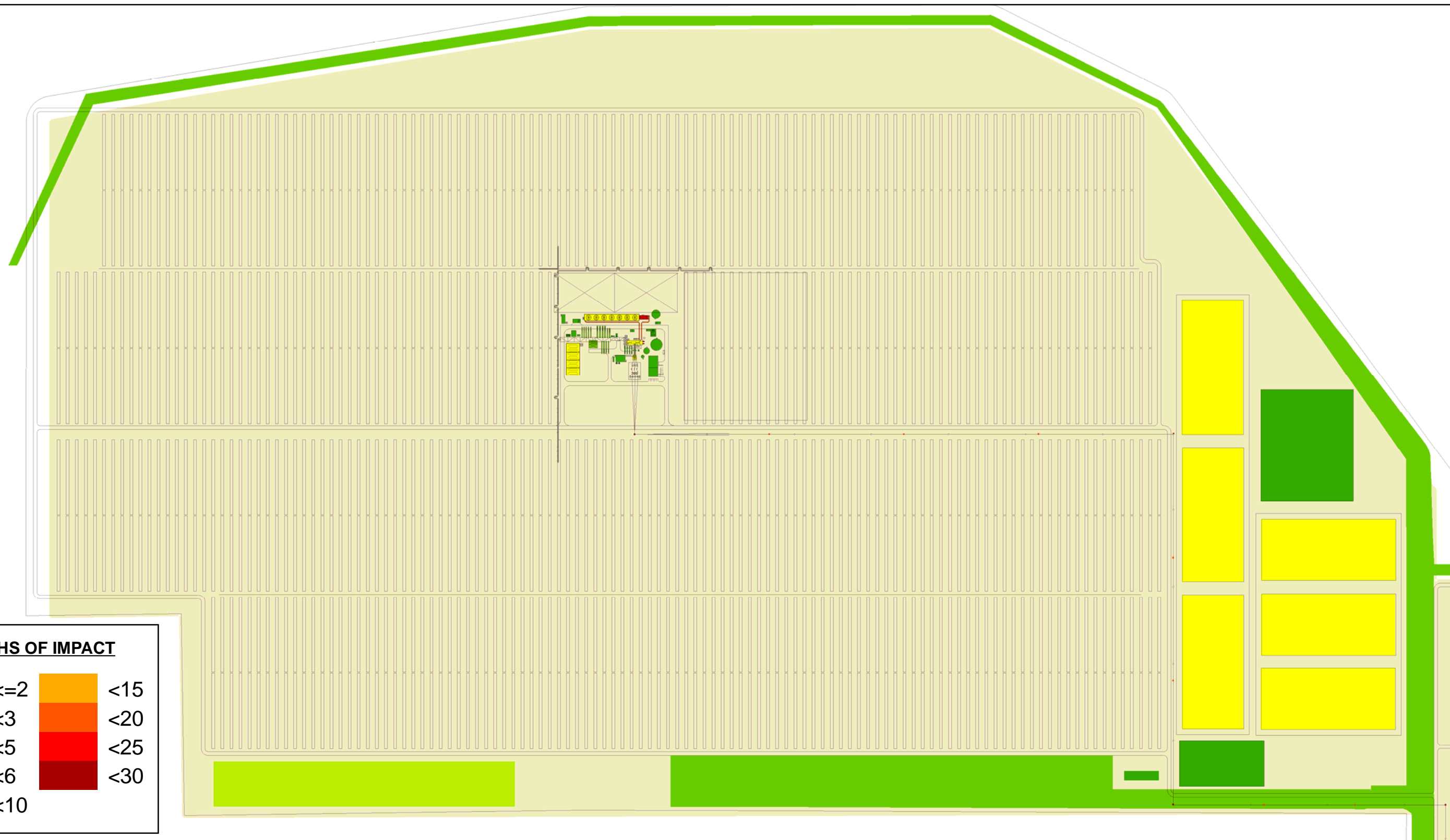
**Response:**

After the discussions we had during the 31 December 2009 DR workshop, it is our understanding that these DRs are a request to evaluate the efficacy of using ethnographic information on land/resource use and environmental information to model and project the probable location of archaeological sites within the project area.

We understand how this approach could be of value for projects that cover very large areas that encompass multiple environmental zones. For example, ethnographically documented use of particular plants (mesquite, yucca, agave, etc.) could be used to project the locations of site types that might be expected in environmental zones where those plants occur within the project area.

In reviewing our project with this objective in mind, it appears that the general northwest to southeast axis of orientation of the project APE restricts it to the margin of Ford Dry Lake, which also follows that orientation. Preliminary information from the ongoing geoarchaeology/geomorphology research for the project indicates that Ford Dry Lake is a playa lake that held water periodically from the late Pleistocene throughout the Holocene.

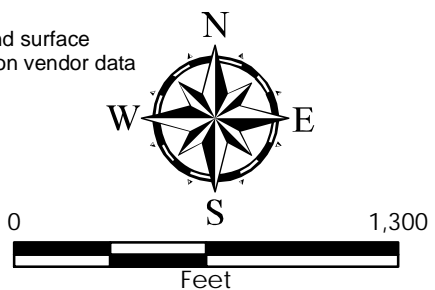
Within the project APE therefore, the most important environmental variable conditioning its prehistoric use is the lake itself. Results of the Class III survey show this




**DEPTHS OF IMPACT**

Lightest Green	<=2	Orange	<15
Light Green	<3	Red-Orange	<20
Medium Green	<5	Red	<25
Light Yellow-Green	<6	Dark Red	<30
Yellow	<10		

NOTES:  
 Depths are feet below ground surface  
 Depths may change based on vendor data  
 All locations approximate

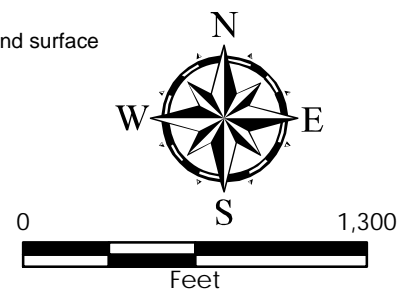


GENESIS SOLAR, LLC		 <b>WorleyParsons</b> resources & energy	
<b>SHEET 1</b>		SWL	JF
		52004617	1/2010
		<b>DR 272A</b> sheet 1	





NOTES:  
 Depths are feet below ground surface  
 All locations approximate



GENESIS SOLAR, LLC



**WorleyParsons**  
 resources & energy

SHEET 2

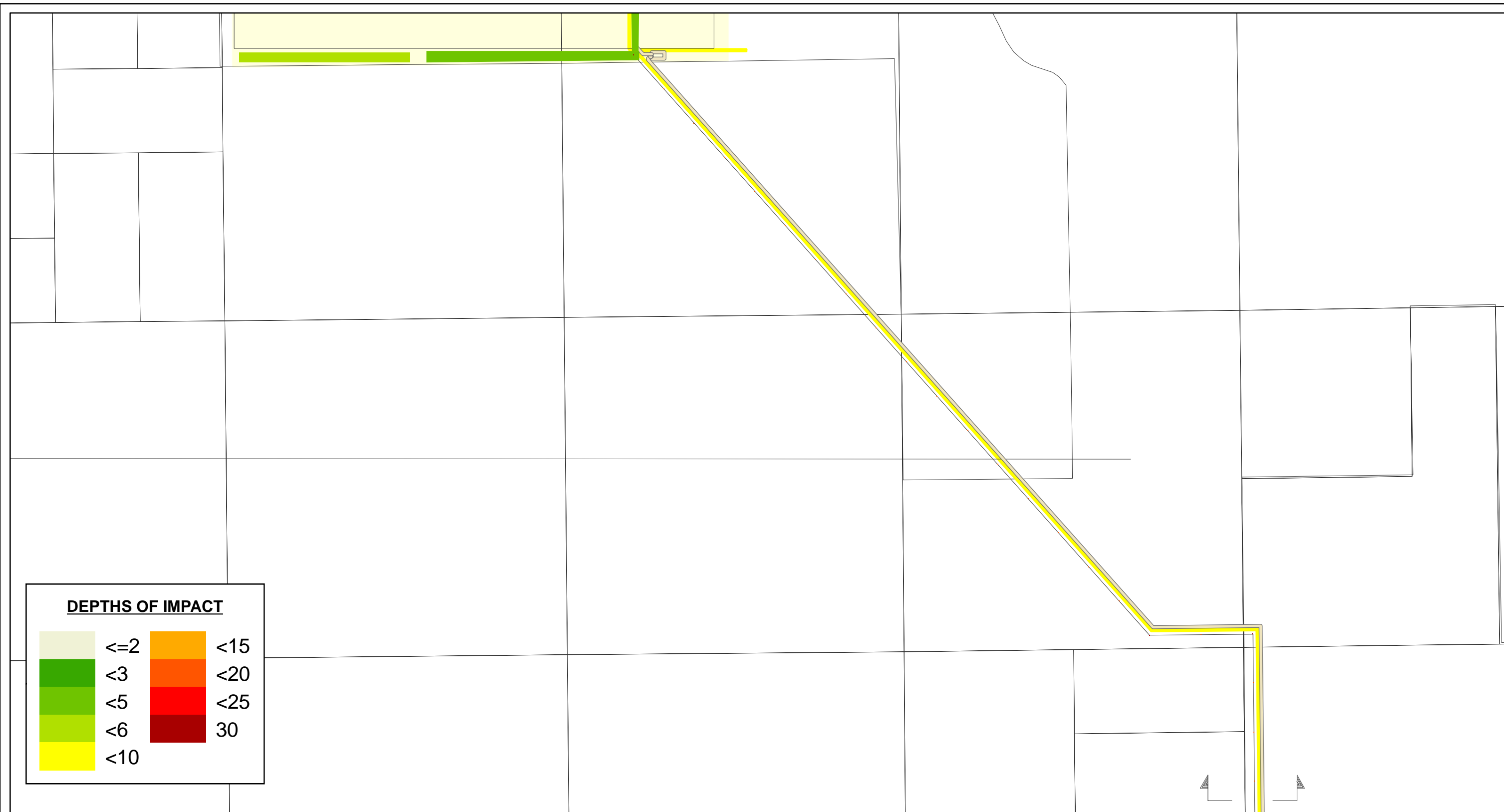
SWL

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1/2010

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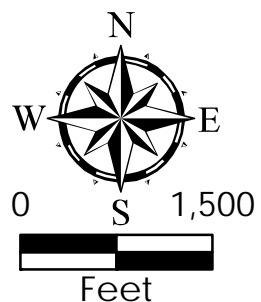
**DR 272A**  
**sheet 2**

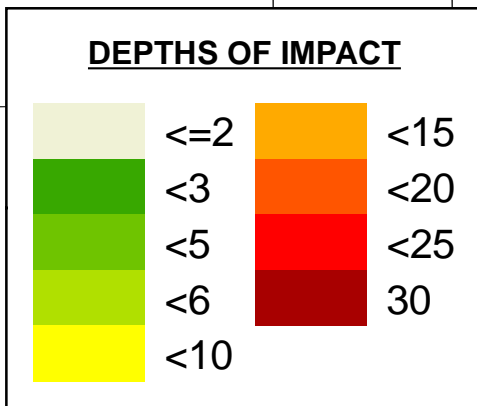
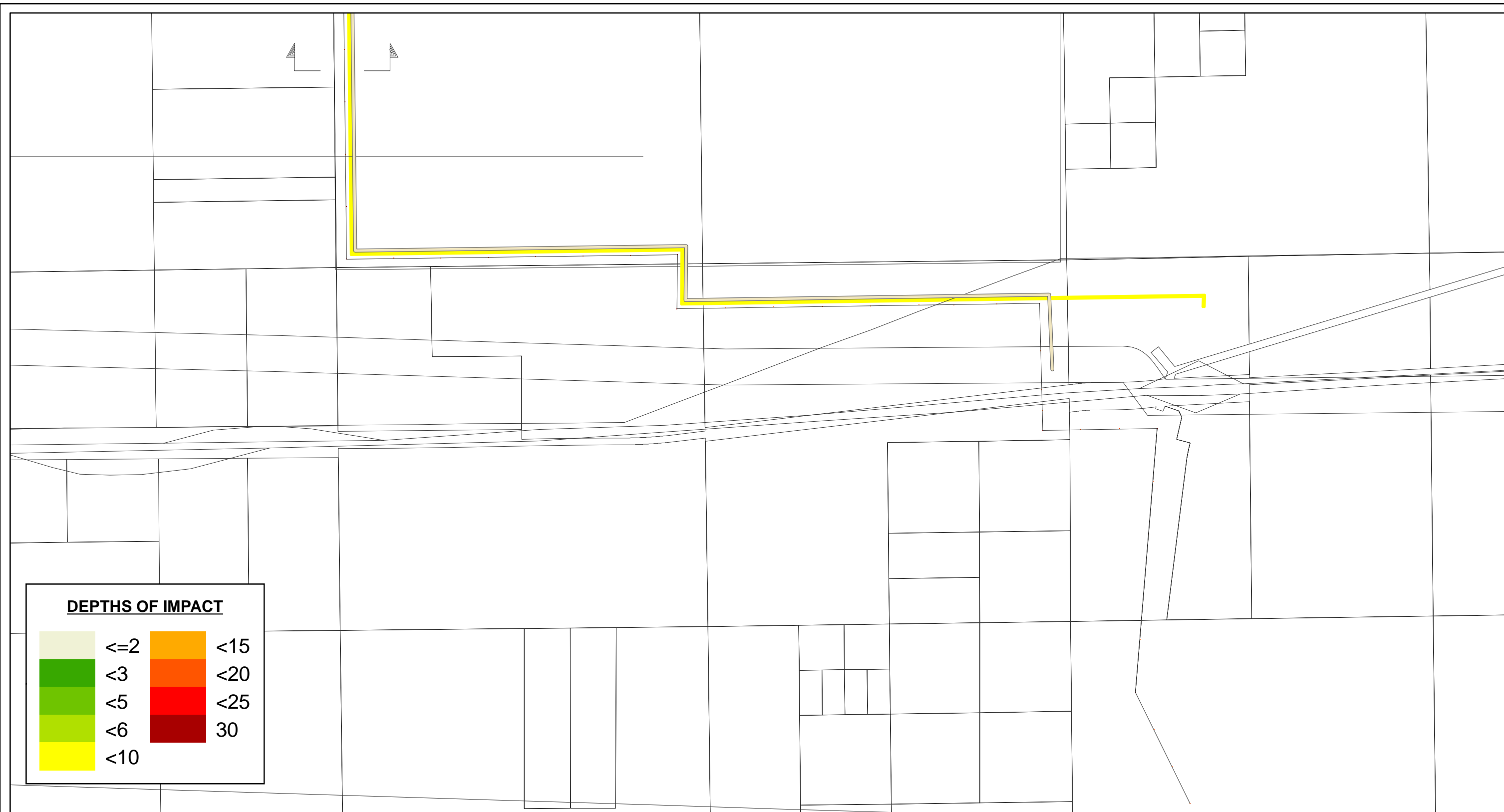


**DEPTHS OF IMPACT**

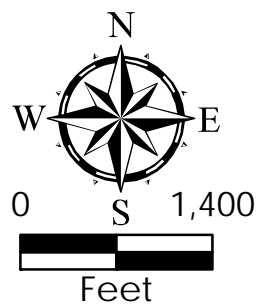
<=2	<15
<3	<20
<5	<25
<6	30
<10	

**NOTES:**  
 Depths are feet below ground surface  
 Depths may change based on vendor data  
 All locations approximate





NOTES:  
 Depths are feet below ground surface  
 Depths may change based on vendor data  
 All locations approximate



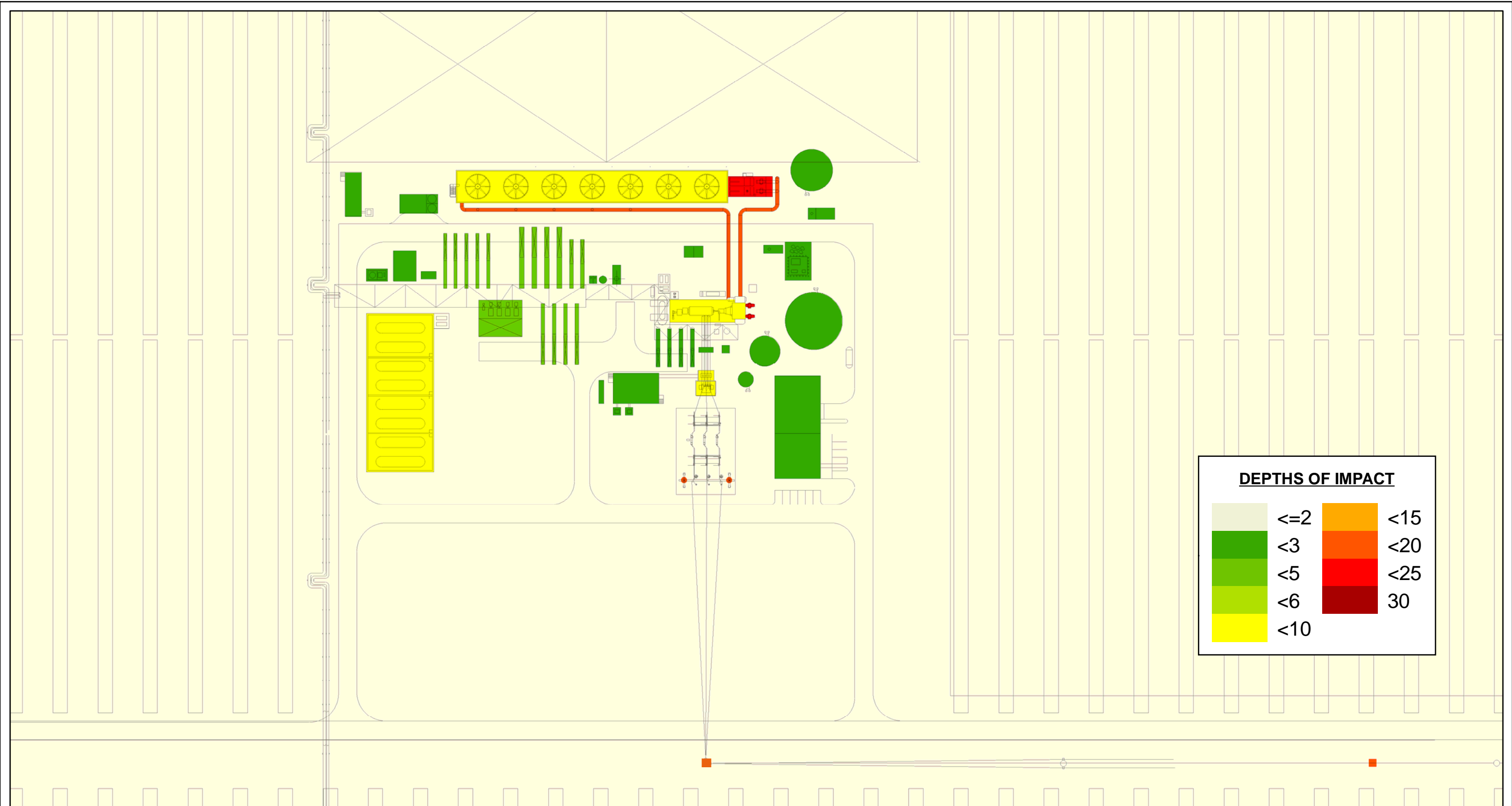
GENESIS SOLAR, LLC












**WorleyParsons**  
resources & energy

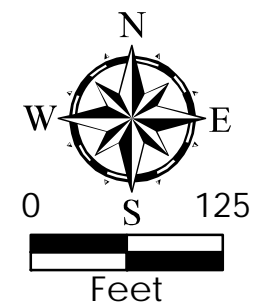
**SHEET 4**


SWL	JF	1/2010
52004617		<b>DR 272A</b> sheet 4

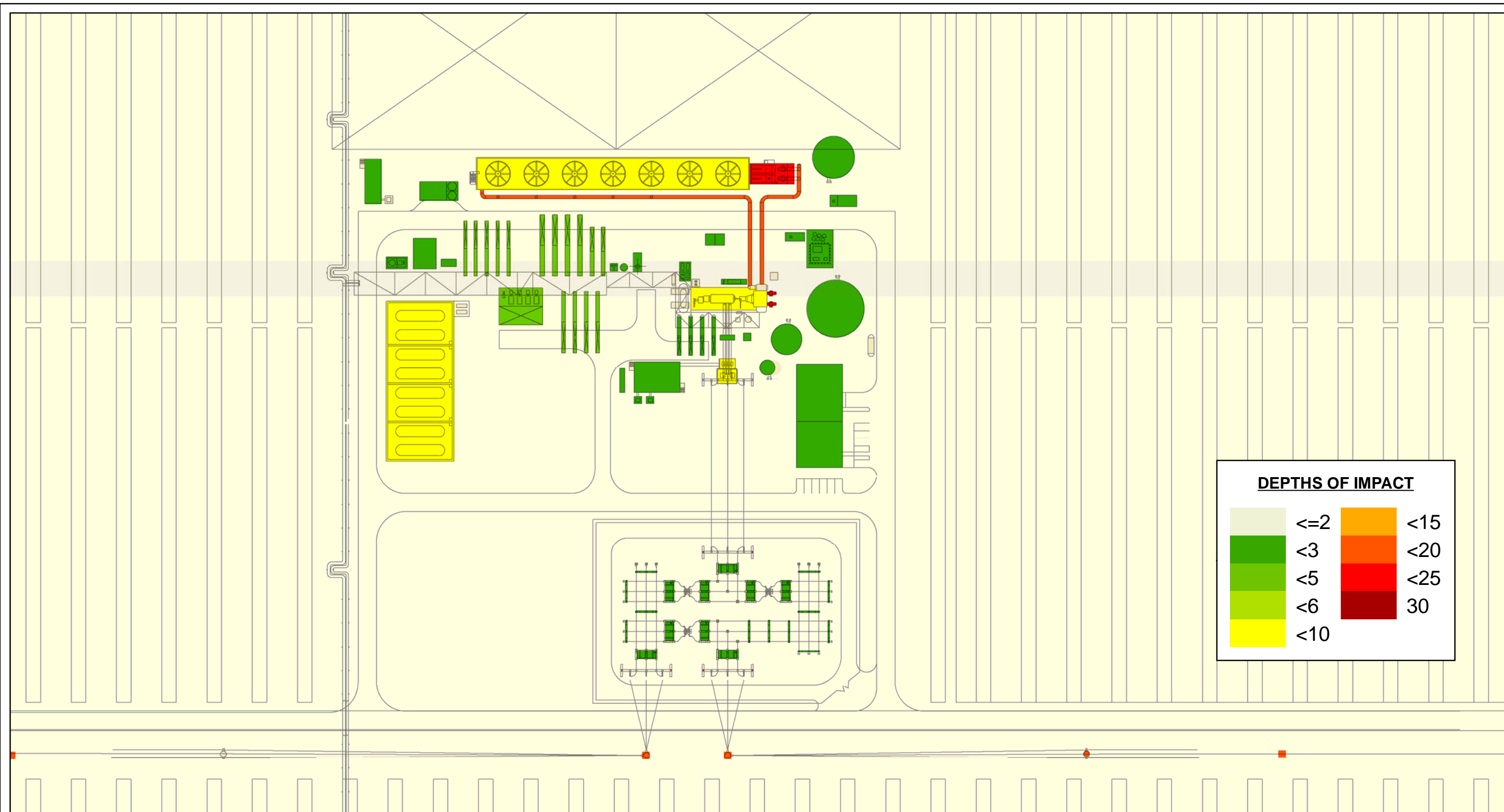


DEPTHS OF IMPACT			
	<=2		<15
	<3		<20
	<5		<25
	<6		30
	<10		

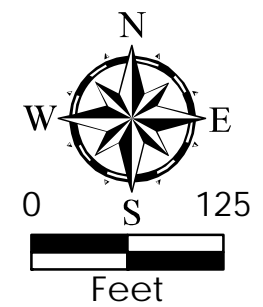
NOTES:  
 Depths are feet below ground surface  
 Depths may change based on vendor data  
 All locations approximate



GENESIS SOLAR, LLC		 <b>WorleyParsons</b> resources & energy	
<b>POWER BLOCK UNIT 1          GRADING-CONSTRUCTION          DEPTHS OF IMPACT</b>		SWL	JF
		52004617	1/2010
		<b>DR 272A          sheet 5</b>	



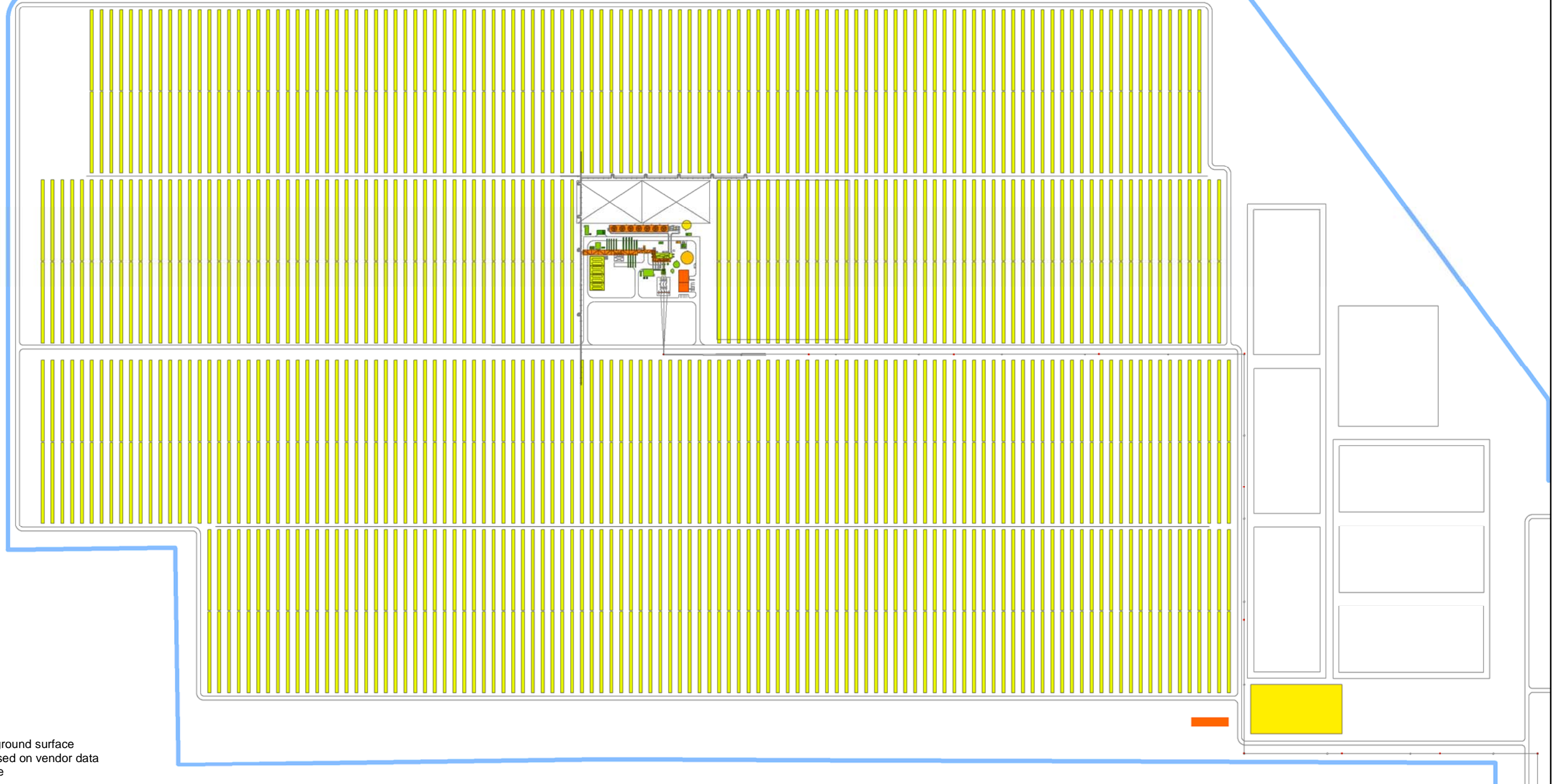
NOTES:  
 Depths are feet below ground surface  
 Depths may change based on vendor data  
 All locations approximate



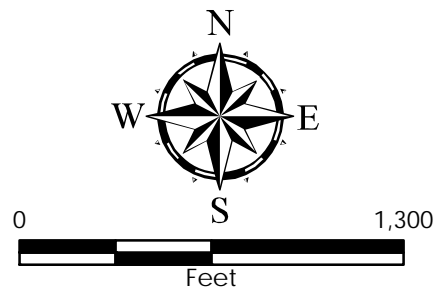
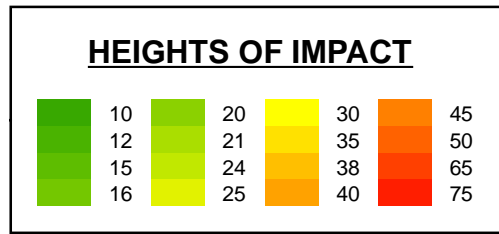
GENESIS SOLAR, LLC		 <b>WorleyParsons</b> resources & energy	
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<b>POWER BLOCK UNIT 2          GRADING-CONSTRUCTION          DEPTHS OF IMPACT</b>	SWL	PM	1/2010
	52004617		<b>DR 272A          sheet 6</b>

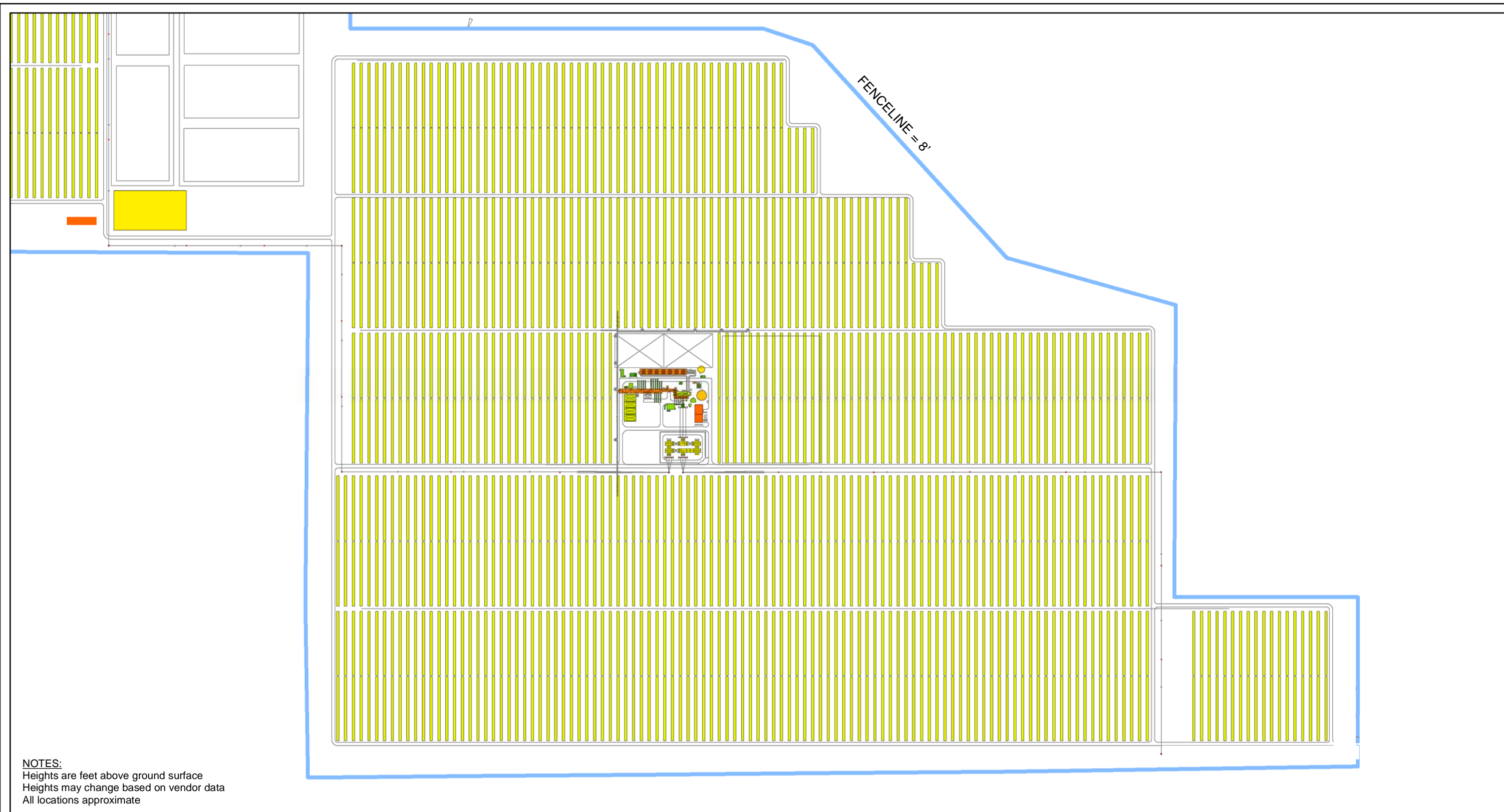
FENCELINE = 8'



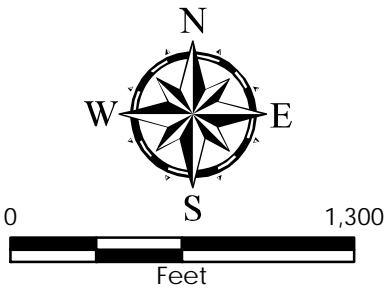
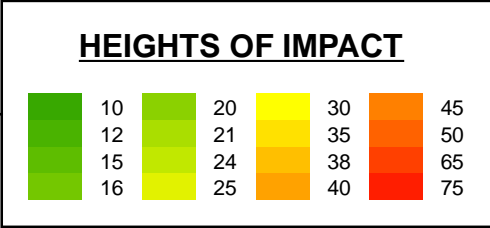
NOTES:  
 Heights are feet above ground surface  
 Heights may change based on vendor data  
 All locations approximate




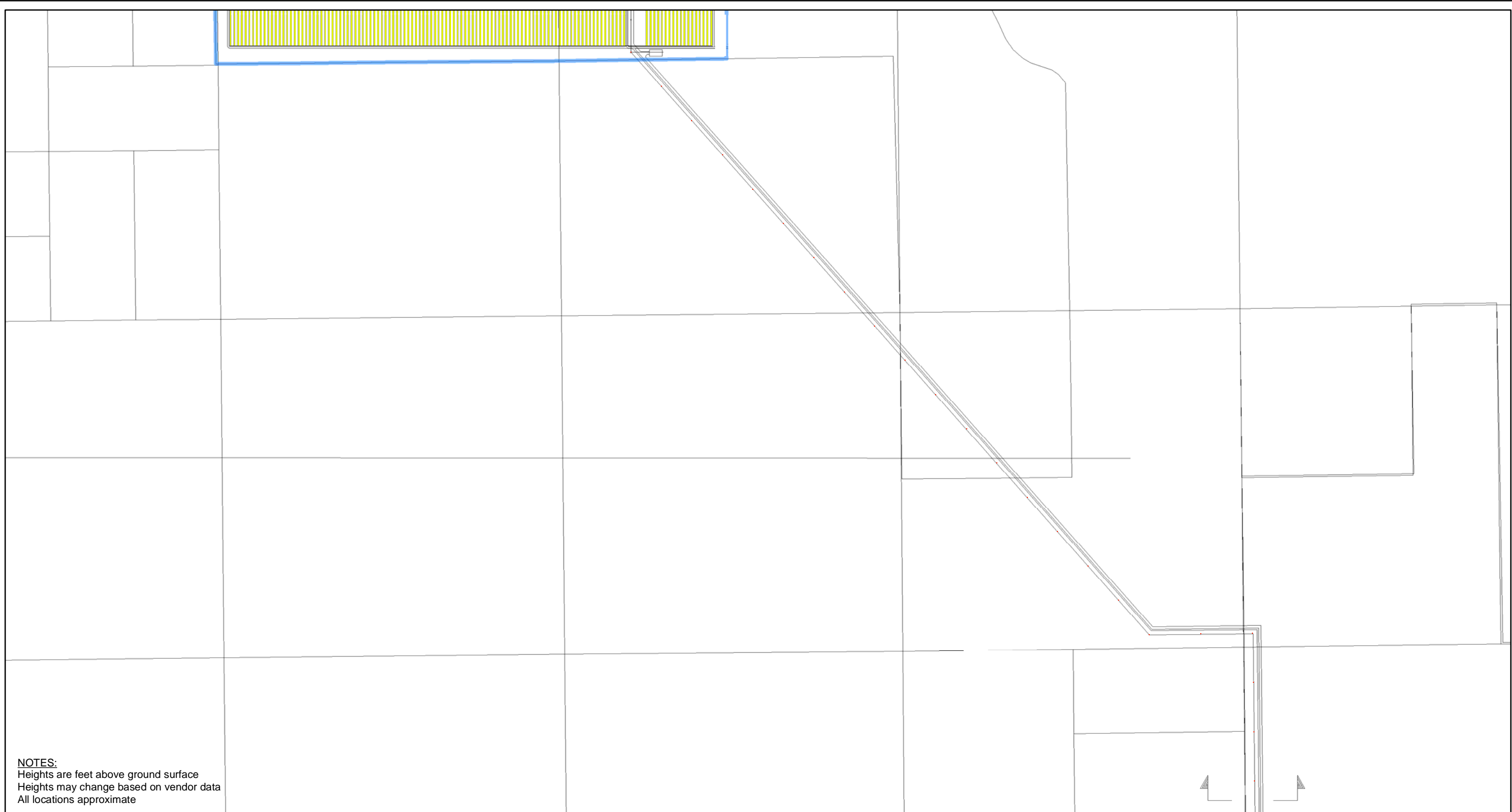
GENESIS SOLAR, LLC		 <b>WorleyParsons</b> resources & energy	
<b>SHEET 1</b>		SWL	JF
		52004617	1/2010
		<b>DR 272B</b> sheet 1	



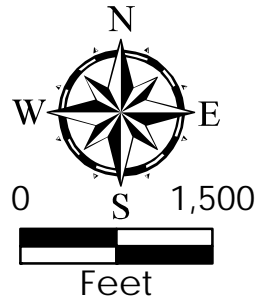
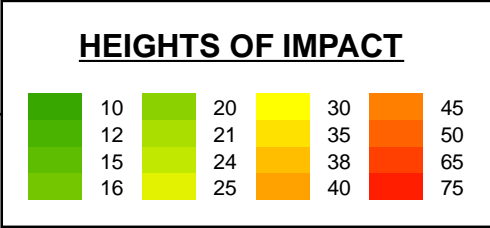
NOTES:  
 Heights are feet above ground surface  
 Heights may change based on vendor data  
 All locations approximate



GENESIS SOLAR, LLC		 <b>WorleyParsons</b> resources & energy	
<b>SHEET 2</b>		SWL	JF
		52004617	1/2010
		<b>DR 272B</b> sheet 2	



NOTES:  
 Heights are feet above ground surface  
 Heights may change based on vendor data  
 All locations approximate



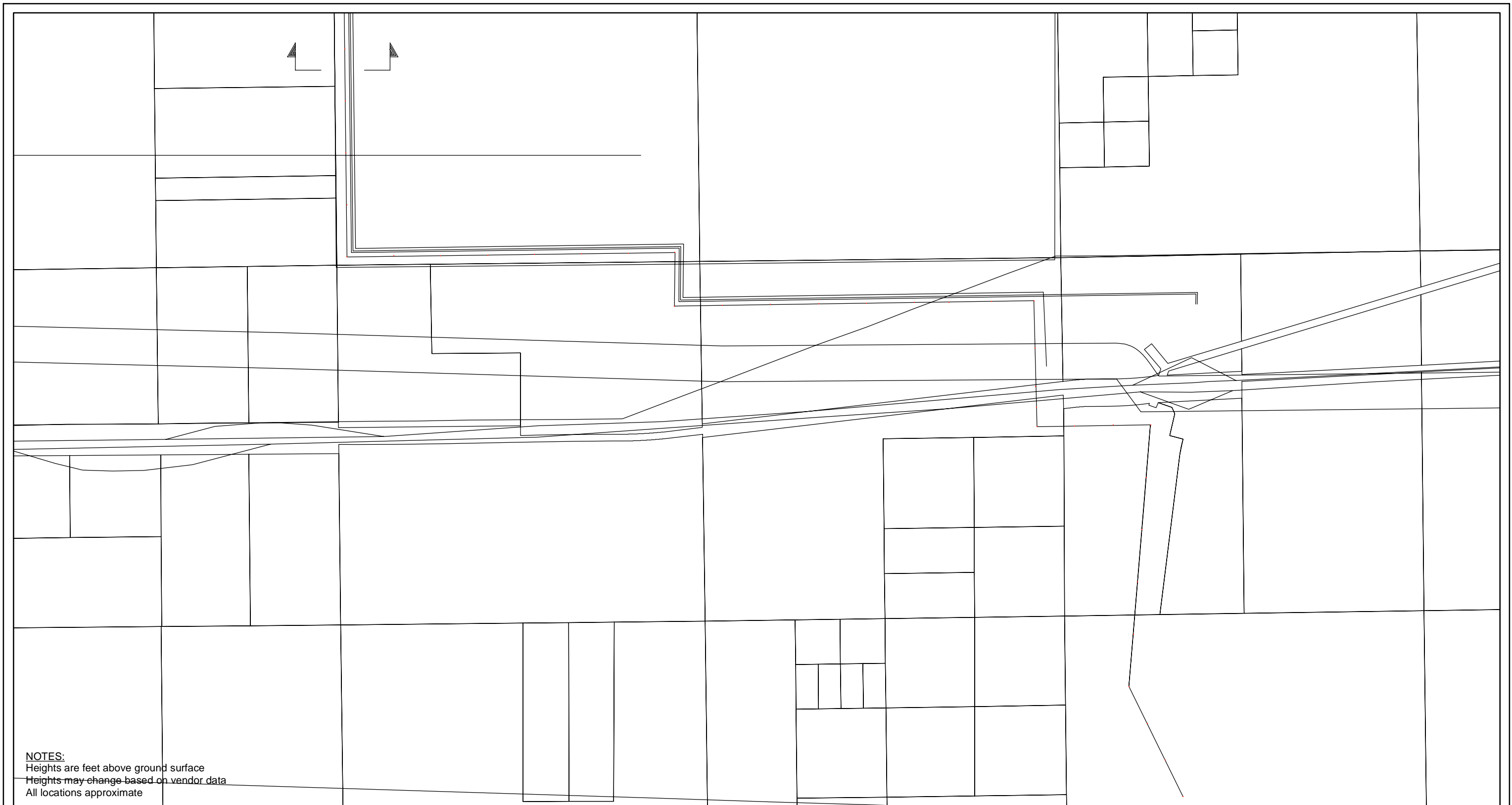
GENESIS SOLAR, LLC



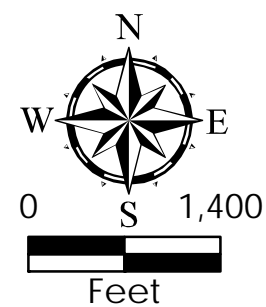
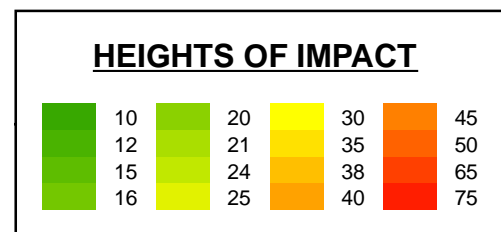
**WorleyParsons**  
resources & energy

<b>SHEET 3</b>	SWL	JF	1/2010
	52004617		<b>DR 272B</b> sheet 3





NOTES:  
 Heights are feet above ground surface  
 Heights may change based on vendor data  
 All locations approximate



GENESIS SOLAR, LLC

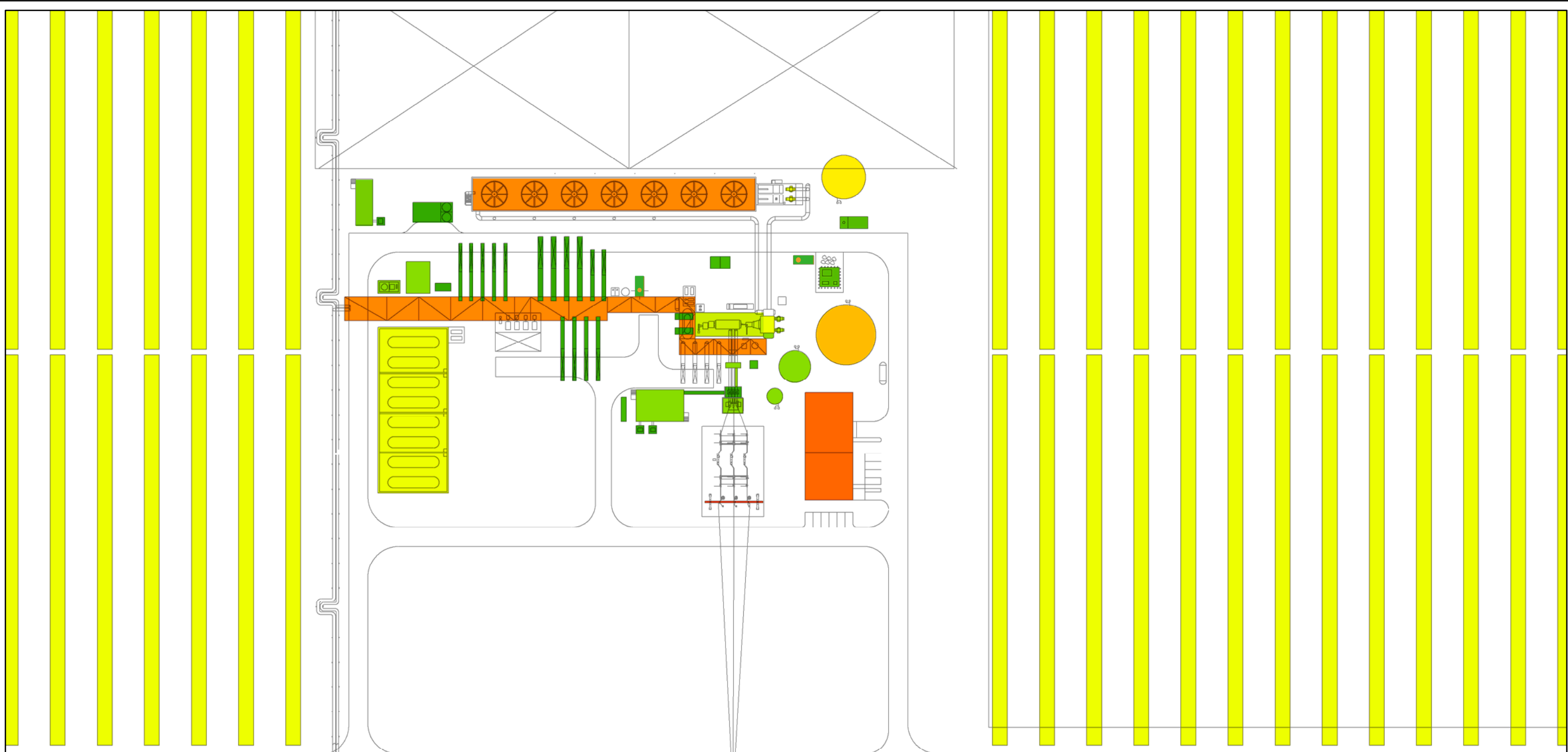


SHEET 4

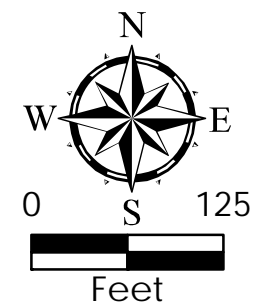
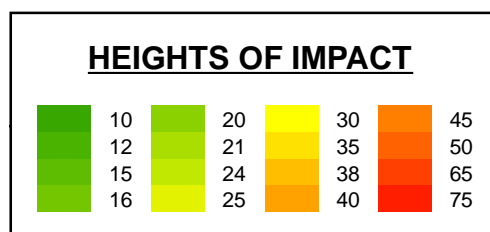
SWL      JF      1/2010

52004617

**DR 272B**  
**sheet 4**



NOTES:  
 Heights are feet above ground surface  
 Heights may change based on vendor data  
 All locations approximate



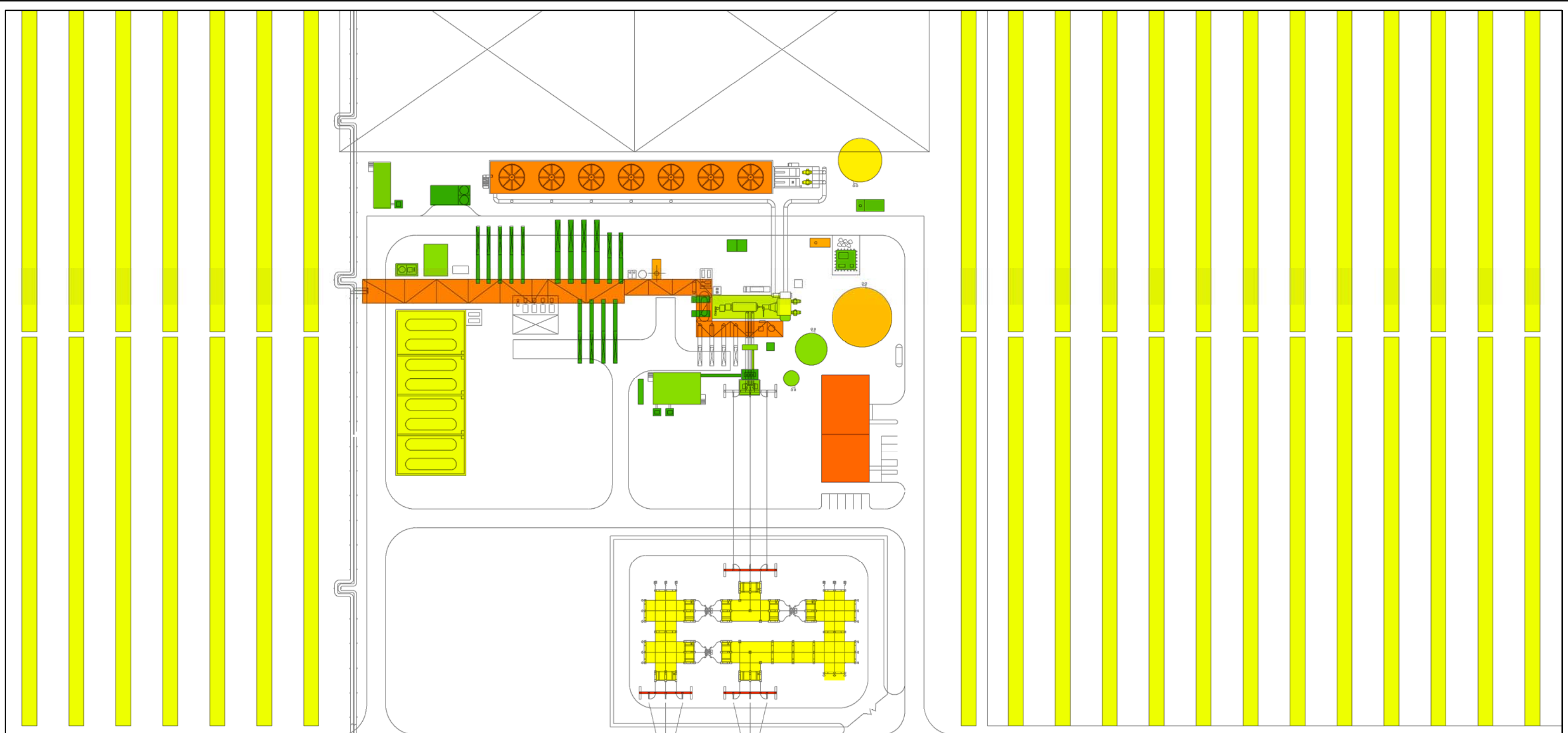
GENESIS SOLAR, LLC



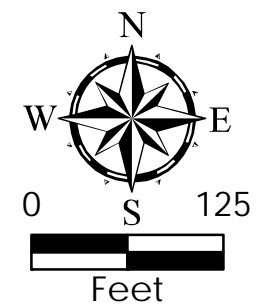
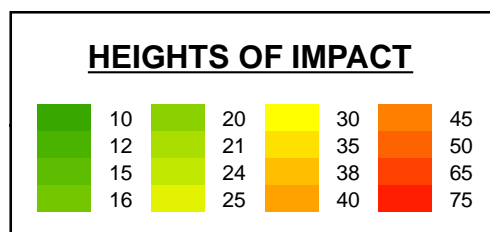
**WorleyParsons**  
resources & energy

**POWER BLOCK UNIT 1 CONSTRUCTION  
HEIGHTS OF IMPACT**

SWL	JF	1/2010
52004617	<b>DR 272B sheet 5</b>	



**NOTES:**  
 Heights are feet above ground surface  
 Heights may change based on vendor data  
 All locations approximate



GENESIS SOLAR, LLC

**POWER BLOCK UNIT 2 CONSTRUCTION HEIGHTS OF IMPACT**

SWL	PM	1/2010
52004617	<b>DR 272B sheet 6</b>	

by the clustering of large sites along the north margin of Ford Dry Lake. Prehistoric inhabitants of whatever ethnic affiliation would have used the lake when filled as a water source, a source of plant foods that may have grown along its margins, and a source of game of all types that would also be attracted to the water source.

Our ongoing geoarchaeology/geomorphology research has as one of its goals, the delineation and dating of relict lakeshores (see DRs 258,259). The expectation has been these relict lakeshores will be the location of possible buried sites, and that the delineation of them will inform future data recovery efforts and the construction monitoring program.

We believe that the physical extent of the project APE is too restricted to encompass any more environmental/resource zones than the prehistoric lakeshore itself. We submit that the current effort we are undertaking to map these lakeshores and use them to predict probable buried site locations actually fulfills the intent of "...modeling the potential archaeological characteristics and spatial distribution of ...Native American traditional use areas.." called for in these DRs.

**Item 274:**

**Information Required:**

If reasonably practicable, please develop such a model and submit for staff review and approval a research plan for the field verification in the APE of the model's predictions and recordation of identified traditional use areas.

**Response:**

Please see response to Item 273.

**Item 275:**

**Information Required:**

Please implement the staff-approved plan and provide to staff a report on the results and a comprehensive discussion of the traditional use areas in and adjacent to the project APE that may be subject to the visual impact of the construction, operation, and maintenance of the proposed project (e. g., landforms in sight of the APE on which sacred or other traditional activities took place). Please include any additional DPR 523 site forms in an appendix.

**Response:**

Please see response to Item 273.

**Item 276:**

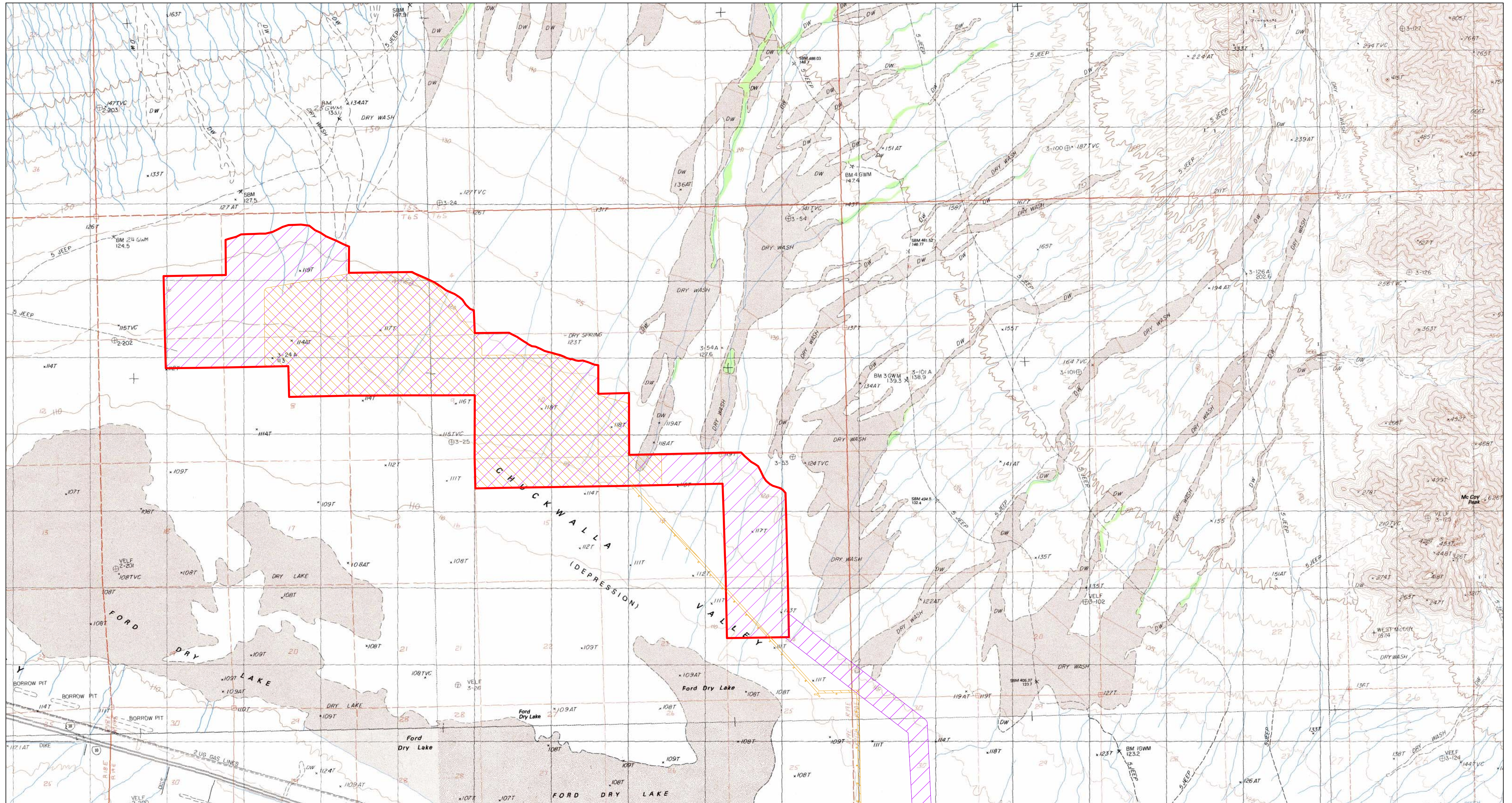
**Information Required:**

Please provide revised Figures 3-a and 3-b showing the APE as cross-hatched areas, with the cross-hatching appropriately labeled in the legends of both figures.

**Response:**

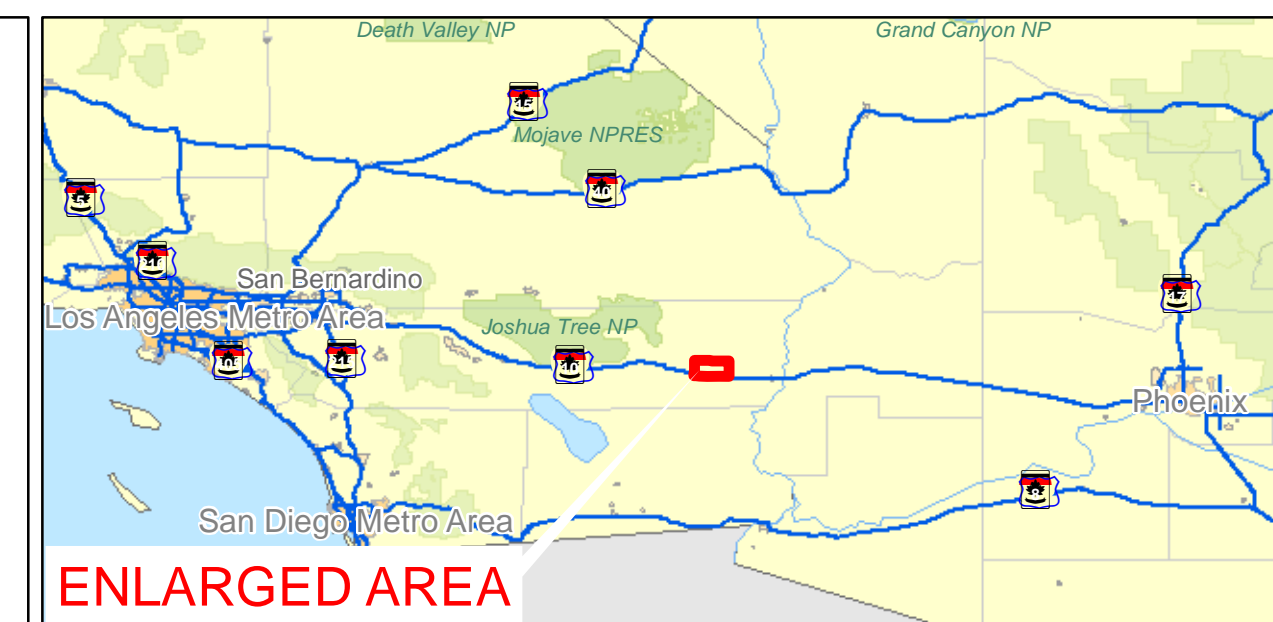
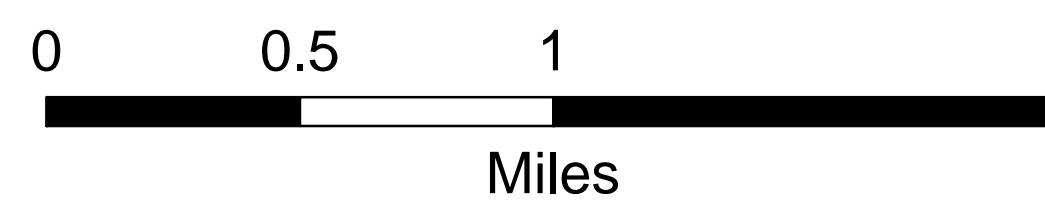
Please see attached Figure DR276 (3a) and DR276 (3b).





- Final Proposed Project Boundary
- Class III Survey Area
- Area of POfential Effect / Project Footprint

USGS 1:24K Quadrangles: Aztec Mines, Sidewinder Well, Ford Dry Lake, McCoy Springs, Hopkins Well, East of Aztec Mines

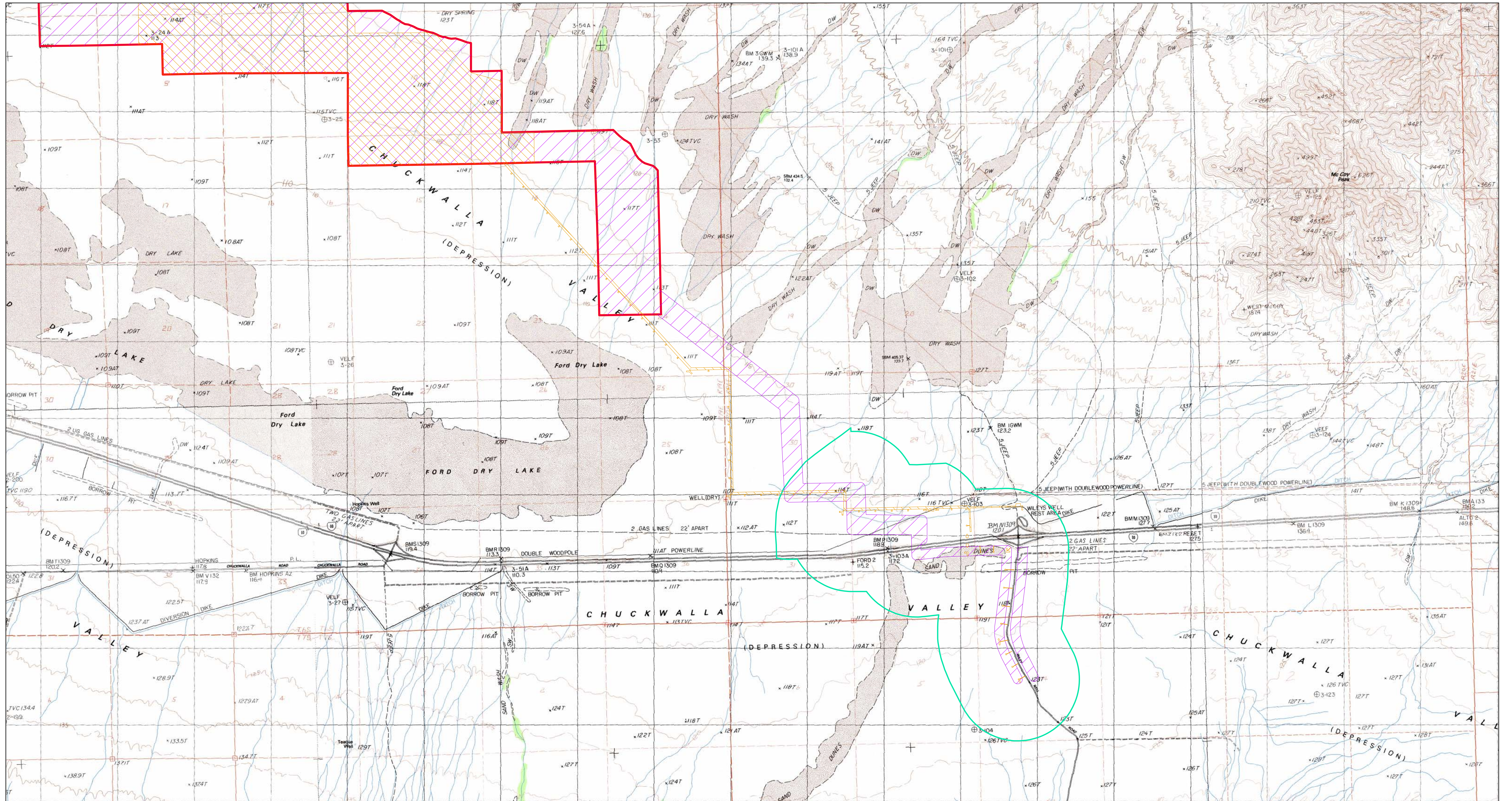




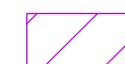

## GENESIS SOLAR, LLC

DR 276 (Figure3-a) Genesis Solar Energy Project  
 Project Area Current Proposed Right-of-Way  
 and Surveyed Area

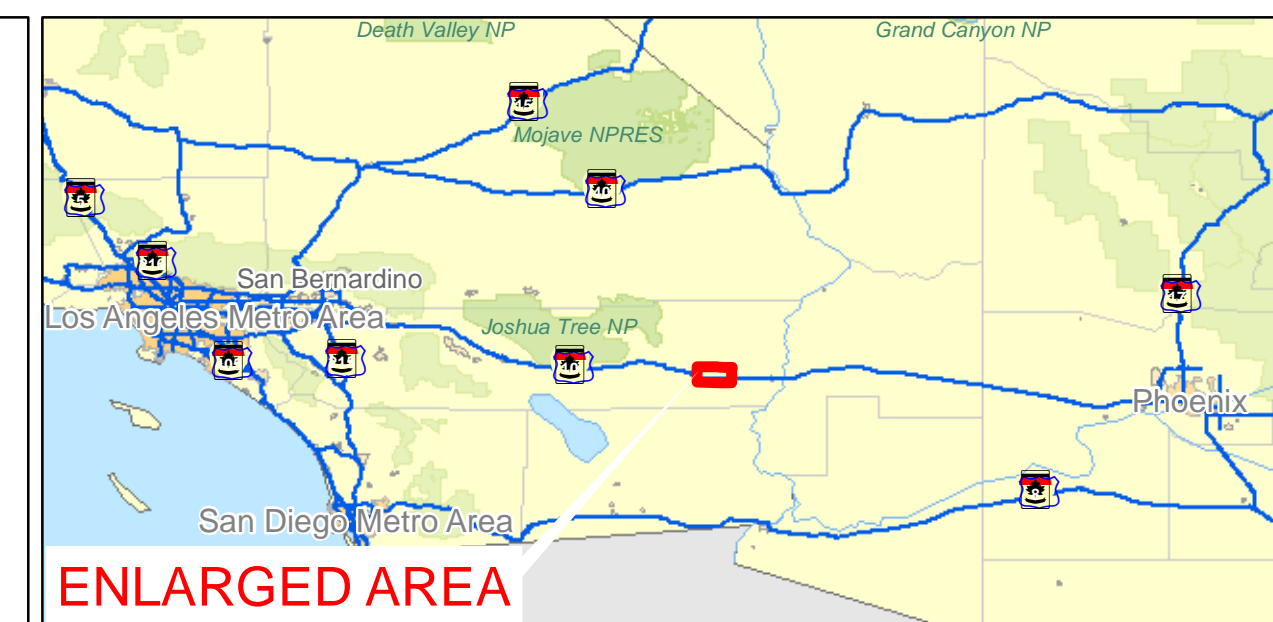
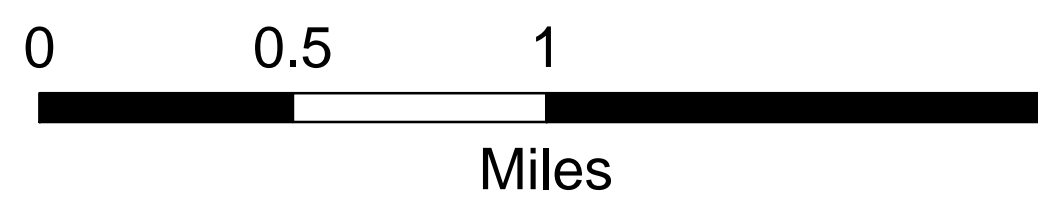






-  Final Proposed Project Boundary
-  Built Environment (Architectural Survey) Surveyed Area
-  Class III Survey Area
-  Area of Potential Effect / Project Footprint

USGS 1:24K Quadrangles: Aztec Mines, Sidewinder Well, Ford Dry Lake, McCoy Springs, Hopkins Well, East of Aztec Mines



## GENESIS SOLAR, LLC

DR 276 (Figure3-b) Genesis Solar Energy Project Interconnect Current Proposed Right-of-Way and Surveyed Area





**Item 277:**

**Information Required:**

Please provide a definition of the archaeological surface APE for the proposed project, identifying the areas included in it.

**Response:**

Please see attached Figure DR277.

**Item 278:**

**Information Required:**

Please provide the following basic statistics, for the proposed plant site, and for any alternative plant sites:

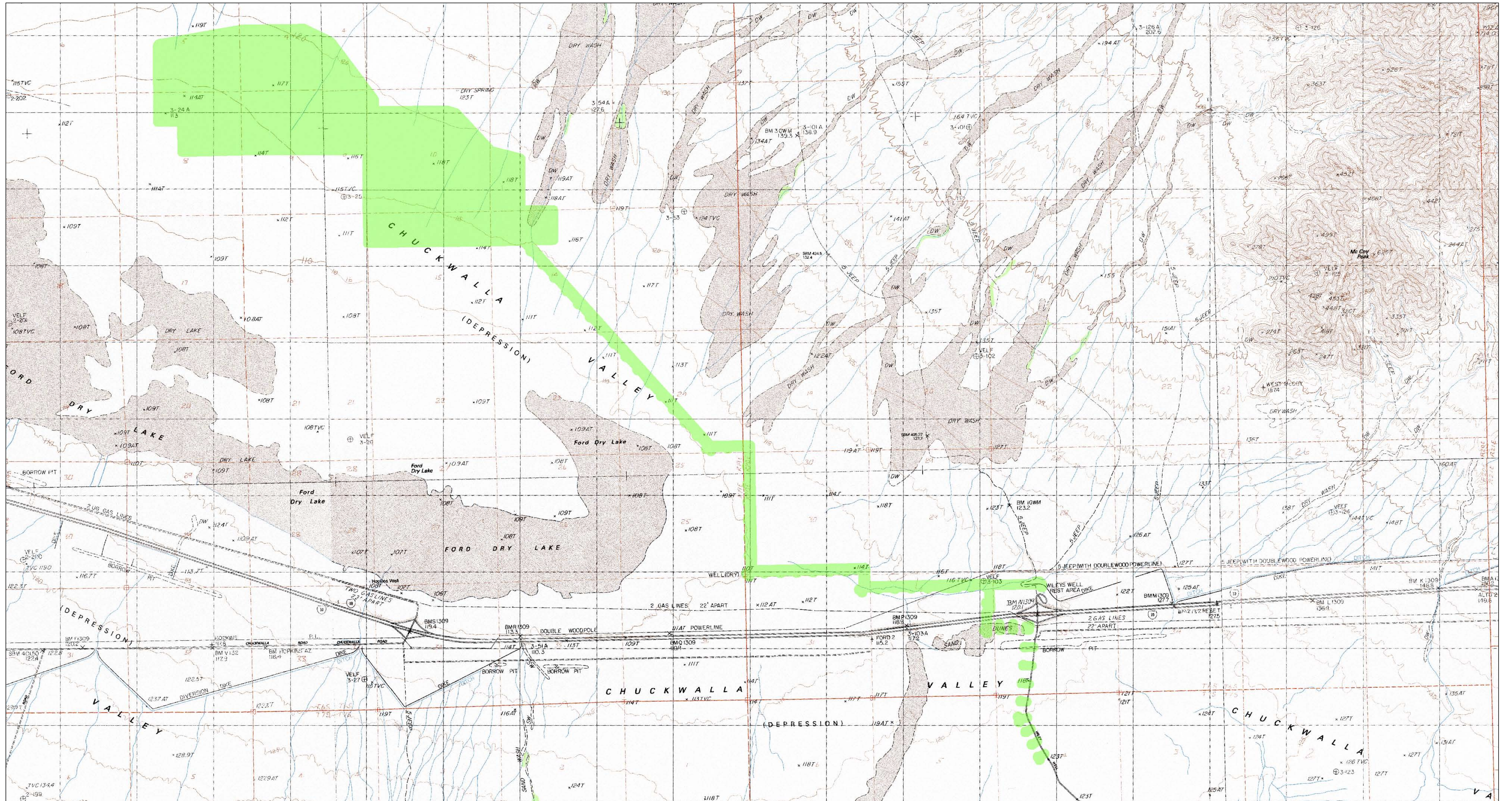
- a. Total number of previously known prehistoric archaeological sites;
- b. Total number of new prehistoric archaeological sites;
- c. Total number of previously known historic-period archaeological sites;
- d. Total number of new historic-period archaeological sites;
- e. Total number of previously known prehistoric isolates;
- f. Total number of new prehistoric isolates;
- g. Total number of previously known historic-period isolates; and
- h. Total number of new historic-period isolates.

**Response:**

Below are the basic statistics for the proposed Genesis Solar plant site:

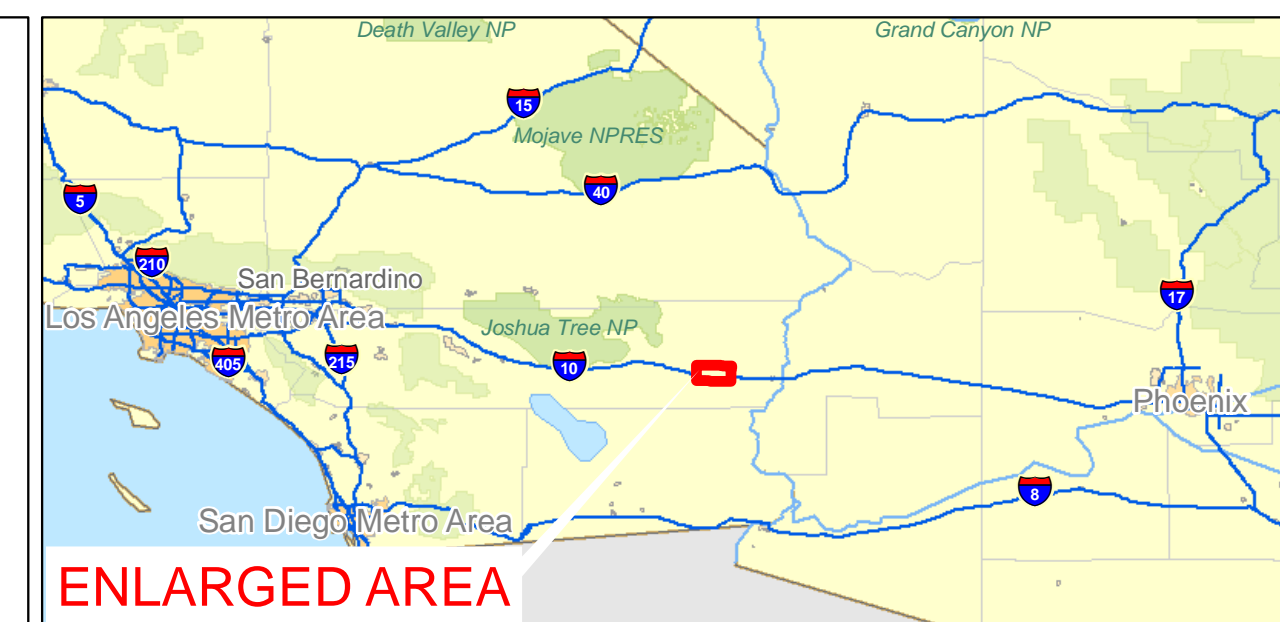
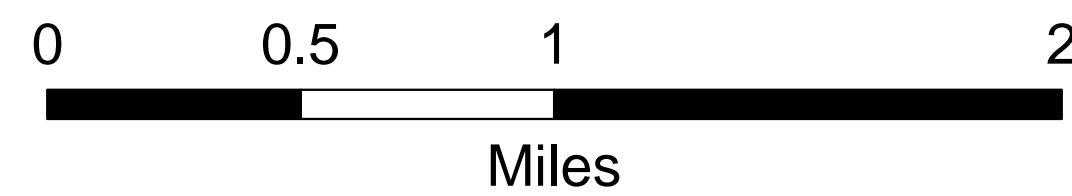
- a. Total number of previously known prehistoric archaeological sites;  
Record searches revealed no previously recorded prehistoric archaeological sites within or adjacent to the proposed plant site.
- b. Total number of new prehistoric archaeological sites;  
The Class II and III survey efforts resulted in the recordation of 20 newly recorded prehistoric archaeological sites, and one (1) dual component site within or adjacent to the CEC Data Survey Requirement area (which encompasses the proposed plant site).
- c. Total number of previously known historic-period archaeological sites;  
Record searches located no previously recorded historic archaeological sites within or adjacent to the proposed plant site.
- d. Total number of new historic-period archaeological sites;  
The Class II and III survey efforts resulted in the recordation of 5 newly recorded historic archaeological sites within or adjacent to the CEC Data Survey Requirement area (which encompasses the proposed plant site).





 200' Buffer of Proposed Area of Potential Effect

USGS 1:24K Quadrangles: Aztec Mines, Sidewinder Well, Ford Dry Lake, McCoy Springs, Hopkins Well, East of Aztec Mines



## GENESIS SOLAR, LLC

DR 277 Genesis Solar Energy Project  
 Archaeological Surface APE/Footprint  
 for the Facility and  
 Currently Proposed Linear Route





e. Total number of previously known prehistoric isolates;

Record searches revealed no previously recorded prehistoric isolates within or adjacent to the proposed plant site.

f. Total number of new prehistoric isolates;

The Class II and III survey efforts resulted in the recordation of 18 newly recorded prehistoric isolates within or adjacent to the CEC Data Survey Requirement area (which encompasses the proposed plant site).

g. Total number of previously known historic-period isolates; and

Record searches revealed no previously recorded historic-period isolates within or adjacent to the proposed plant site.

h. Total number of new historic-period isolates.

The Class II and III survey efforts resulted in the recordation of 12 newly recorded historic-period isolates within or adjacent to the CEC Data Survey Requirement area (which encompasses the proposed plant site).

**Response for alternative locations:**

Below are the basic CHRIS record search statistics for the proposed **McCoy Alternative**:

a. Total number of previously known prehistoric archaeological sites;

One (1) prehistoric site.

b. Total number of new prehistoric archaeological sites;

None.

c. Total number of previously known historic-period archaeological sites;

None.

d. Total number of new historic-period archaeological sites;

None.

e. Total number of previously known prehistoric isolates;

None.

f. Total number of new prehistoric isolates;

None.

g. Total number of previously known historic-period isolates; and

None.

h. Total number of new historic-period isolates.

None.

Below are the basic CHRIS record search statistics for the proposed **Desert Center Alternative** site:

- a. Total number of previously known prehistoric archaeological sites;  
Four (4) prehistoric sites.
- b. Total number of new prehistoric archaeological sites;  
None.
- c. Total number of previously known historic-period archaeological sites;  
None.
- d. Total number of new historic-period archaeological sites;  
None.
- e. Total number of previously known prehistoric isolates;  
None.
- f. Total number of new prehistoric isolates;  
None.
- g. Total number of previously known historic-period isolates; and  
None.
- h. Total number of new historic-period isolates.  
None.

Below are the basic CHRIS record search statistics for the proposed **Black Hills Alternative** site:

- a. Total number of previously known prehistoric archaeological sites;  
One (1) prehistoric sites.
- b. Total number of new prehistoric archaeological sites;  
None.
- c. Total number of previously known historic-period archaeological sites;  
One (1) historic site.
- d. Total number of new historic-period archaeological sites;  
None.
- e. Total number of previously known prehistoric isolates;  
None.
- f. Total number of new prehistoric isolates;  
None.
- g. Total number of previously known historic-period isolates; and  
None.

h. Total number of new historic-period isolates.

None.

Below are the basic CHRIS record search statistics for the proposed **Mule Mountain Alternative** site:

a. Total number of previously known prehistoric archaeological sites;

Twelve (12) prehistoric sites.

b. Total number of new prehistoric archaeological sites;

None.

c. Total number of previously known historic-period archaeological sites;

Seven (7) historic sites.

d. Total number of new historic-period archaeological sites;

None.

e. Total number of previously known prehistoric isolates;

None.

f. Total number of new prehistoric isolates;

None.

g. Total number of previously known historic-period isolates; and

None.

h. Total number of new historic-period isolates.

None.

**Item 279:**

**Information Required:**

Please provide the following basic statistics, for each linear facility route, and for any alternative facility routes:

a. Total number of previously known prehistoric archaeological sites;

b. Total number of new prehistoric archaeological sites;

c. Total number of previously known historic-period archaeological sites;

d. Total number of new historic-period archaeological sites;

e. Total number of previously known prehistoric isolates;

f. Total number of new prehistoric isolates;

g. Total number of previously known historic-period isolates; and

h. Total number of new historic-period isolates.

**Response:**

To date, there are no proposed alternative facility routes. Since the August 31, 2009 filing of the Genesis Solar Application for Certification (09 AFC 08) changes have been made to the proposed linear route. The Bureau of Land Management staff requested that the original proposed route for linear facilities be rerouted to avoid sensitive Sand Dunes and another applicant's Right of Way filing. This "new" or "currently" proposed linear route is within the original CHRIS record search area (filed under confidential cover on August 31, 2009), however, the newly proposed linear has not undergone archaeological survey. An archaeological survey of the newly proposed linear will be conducted at a future date. We anticipate cultural resources survey and reporting of the APE for this project feature under a supplemental survey protocol to be established under the Cultural Resources Memorandum of Agreement (MOA) that is being produced for this project.

Below is Data Request 279 response for the original AFC filing linear route and the newly proposed linear route:

*a. Total number of previously known prehistoric archaeological sites;*

Original Surveyed Route: Record searches identified two (2) previously recorded prehistoric archaeological sites within or adjacent to the original linear route corridor. However, while artifacts were observed near the proposed route corridor, both an informal field reconnaissance and the subsequent Class III survey successfully relocated each of these sites, and found no surface manifestations for either site *within* the as-then-defined survey corridor, suggesting potential map plot inaccuracies.

Current Route: Two (2) previously recorded prehistoric archaeological sites lie within or adjacent to the current linear route corridor.

*b. Total number of new prehistoric archaeological sites;*

Original Surveyed Route: One dual component (1) and three (3) prehistoric archaeological sites were recorded within or adjacent to the original linear facilities route survey corridor as a result of the Class III survey effort.

Current Route: Most of the current linear corridor has not yet been surveyed for the presence or absence of cultural resources. However, portions of the corridor overlap with the Class III survey area associated with the original route. As a result, one prehistoric archaeological site recorded as part of the Class III effort lies partially within current route.

*c. Total number of previously known historic-period archaeological sites;*

Original Surveyed Route: Record searches identified one (1) previously recorded historic-period archaeological sites within or adjacent to the original linear route corridor. However, the Class III survey successfully relocated the site, and found no surface manifestations for the site *within* the as-then-defined survey corridor.

Current Route: One (1) previously recorded historic-period archaeological site appears to lie adjacent to the current linear route corridor (in a portion surveyed for the Class III survey of the original route). On the ground efforts suggest that the site actually lies outside the route corridor.

*d. Total number of new historic-period archaeological sites;*

Original Surveyed Route: The Class III survey effort yielded two (2) newly recorded historic-period archaeological sites.

Current Route: Some of the current linear corridor has not yet been surveyed for the presence or absence of cultural resources. However, portions of the corridor overlap with the Class III survey area associated with the original route. As a result, one historic-period archaeological site recorded as part of the Class III effort lies partially within current route.

*e. Total number of previously known prehistoric isolates;*

Original Surveyed Route: Record searches revealed no previously recorded prehistoric isolates within or adjacent to the original linear route.

Current Route: Some of the current linear corridor has not yet been surveyed for the presence or absence of cultural resources.

*f. Total number of new prehistoric isolates;*

Original Surveyed Route: Ten (10) new prehistoric isolates were recorded.

Current Route: Some of the current linear corridor has not yet been surveyed for the presence or absence of cultural resources.

*g. Total number of previously known historic-period isolates; and*

Original Surveyed Route: Record searches revealed no previously recorded historic-period isolates within or adjacent to the original linear route.

Current Route: Some of the current linear corridor has not yet been surveyed for the presence or absence of cultural resources.

*h. Total number of new historic-period isolates.*

Original Surveyed Route: Ten (10) new prehistoric isolates were recorded within the original linear route.

Current Route: Some of the current linear corridor has not yet been surveyed for the presence or absence of cultural resources.

**Item 280:**

**Information Required:**

Please provide a map, at a scale accommodating easy legibility, depicting all locations for new and previously known archaeological sites and isolates in or within 200 feet of the boundaries of the APE.

**Response:**

This map has been provided to the CEC under confidential cover.

**Item 281:**

**Information Required:**

For all archaeological sites for which project impacts cannot be avoided, please submit for staff approval a plan, including a research design and methods that do not entail significant impacts to the sites, for using test excavations or the CARIDAP protocol to

determine if any subsurface deposits are present and to acquire sufficient data to make recommendations of National Register of Historic Places (NRHP) and CRHR eligibility for these sites, with the potential of the recovered data evaluated according to its applicability to the research questions posed in the research design. The testing plan should include the following analyses:

- a. Dating all or a sample of datable materials recovered from tested sites, including obsidian, charcoal, bone, and shell;
- b. Detailed lithic analysis of debitage addressing manufacturing techniques and sourcing of toolstone materials, including, if locally derived, an estimated collection radius; and
- c. Site-specific and landscape- or APE-based strategies for ceramic analysis to generate such attributions as source, age, mineral content, and paste characteristics that are consistent with J. Schaefer's ongoing research efforts.

**Response:**

As we have chosen cultural resources review approach 3, no response is required.

**Item 282:**

**Information Required:**

Please provide to staff a report on the testing and results at these sites, presenting an analysis of the recovered data and recommendations regarding the NRHP and CRHR eligibility of the sites.

**Response:**

As we have chosen cultural resources review approach 3, no response is required.

## Visual Resources

### **Item 283:**

#### **Information Required:**

For the benefit of the analysis and readers, please prepare an additional simulation from eastbound I-10 at middleground distance, from a viewpoint east of AFC Figure 5.10-4 and west of Figure 5.10-5.

#### **Response:**

As explained in Section 5.10.1.7 of the AFC, the BLM-VRM System defines three distance zones – (1) foreground/middleground, (2) background, and (3) seldom seen. Foreground/middleground (FG/MG) is the area that can be seen for a distance of 3 to 5 miles from the viewer. Beyond 3 to 5 miles, and extending to 15 miles, landscapes are classified by the BLM as background (BG). The BLM classifies areas that are visually blocked or screened by topography and/or are more than 15 miles away as seldom seen (SS).

Additional photographs were not taken in locations between Figures 5.10-4 and 5.10-5; Even if additional photography was obtained and used to prepare a new simulation, as requested, the proposed facility would still be visible only in the background viewing distance zone, not in the middleground as claimed above.

Please note that nothing is planned to occur within the yellow “Project Site” boundary closest to Figures 5.10-4 and 5.10-5. The proposed “Facility Footprint” is more than 5 miles away from either of the two vantage points depicted in Figures 5.10-4 and 5.10-5, making both of these vantage points, and any point between, background viewing distances, as defined by BLM-VRM methodology. The key observation points (KOPs) were developed with BLM’s assistance and guidance and CEC staff was invited in July 2009 to participate in the meetings to develop the KOPs.

### **Item 284:**

#### **Information Required:**

Please provide close-up photographs of SCAs of the type proposed for the Genesis project. Please include photographs showing fronts, backs and mounting structures for the SCAs. If SCAs in the photographs differ in detail from those proposed under the Genesis project, please describe the differences.

#### **Response:**

The following photograph depicts the Solar Millennium EuroTrough installed at the SEGS Kramer Junction facility in the stow position. The photograph shows the backing structure, supports and ball joint pipe linkage that is expected. The use of the EuroTrough is not a requirement and is used as an example. The design will change if a different vendor is chosen. The major differences between the EuroTrough shown and most vendors is the backing structure. Front views of all trough manufacturers will be similar and can be seen in the response to Data Request 286 below. Some providers, such as SkyFuel, have developed a thin film reflective surface instead of the glass mirrors like the EuroTrough, which looks slightly different in that there are fewer seams in the reflective surface. However the overall appearance of the solar collector is very similar.



**Item 285:**

**Information Required:**

Please characterize the maximum potential brightness (luminance) of diffuse and spread reflection from mirrors in candela per square meter.

**Response:**

Due to the geometry of the mirror all light is directed to be concentrated on a focal point. Based on previous studies, once the beam is approximately 10 ft past the focal point, the beam is essentially the same strength as a beam of sunlight [1]. Based on information from different sources sunlight on a bright day can range between  $1.0 \times 10^9$  candela per square meter-steradian and  $1.6 \times 10^9$  candela per square meter-steradian.

**Item 286:**

**Information Required:**

Please describe whether any portion of the HCEs would be visible to viewers on the ground, either on-or off-site. Please characterize the maximum potential brightness (luminance) of heated HCEs in candela per square meter.



**Response:**

A portion of the HCE will always be visible from the ground due to the geometry of the parabolic trough, the observer's location, and the time of day. Since the size of the HCE is approximately 70 mm as proposed, the percentage of HCE within the observer's field of view will decrease with distance. Furthermore the concern is only for the portion of the HCE facing the parabolic mirror as there is no visible luminance for the outer portion of the HCE. The largest portion of heated HCE is visible when the trough is horizontal during the noon hour while an observer is standing next to the solar collector.

Preliminary calculations were developed for an observer standing approximately 10 meters from the HCE which indicate that there is no potential for retinal damage or flash blindness due to reflected light from the HCE. This is confirmed by the fact that the Kramer Junction facility has not reported any incidents of flash blindness or retinal damage or any other medical cases due to light exposure during the more than 20 years of operation. A single SCA was used for checking onsite viewer conditions for operators and ten SCA, or one full side of the facility, was used for offsite viewers defined as being 100 meters and farther from the source. Since the solar field is in a remote location and oriented in the north to south direction with limited public access to the east or west of the facility the chance for pedestrian traffic near the project is minimized. The maximum potential brightness of the heated portion of the HCE will be approximately 2000 watts per square meters or  $1.3 \times 10^6$  lumens per square meter.

For reference, photos from the SEGS facilities have been included to show the HCE tubes while in operation.









**Item 287:**

**Information Required:**

Please explain whether any portion of the directly reflected solar radiation could pass by the HCEs (the steel tube annulus) due to the total divergence factor of the reflectors. If so, how much? Is this amount sufficient to cause any potential retinal damage or flash blindness? Are there measures that would prevent such inadvertent off-site reflection (such as shielding of the HCEs, etc.)?

**Response:**

A portion of the reflected solar radiation will miss the HCE and pass freely into space. The quantity of missed radiation is estimated to be approximately 3% of what is reflected by the mirrors [3].

The applicant is not aware of any experimental data linking concentrating solar projects to flash blindness or retinal damage. Furthermore, operating projects owned by the Applicant have not reported incidents or received complaints associated with retinal damage or flash blindness due to mirror reflection. Since similar technology is proposed for the Project the Applicant does not anticipate any issues regarding flash blindness or retinal damage. There are no current feasible measures to limit offsite reflection regarding elevated observers. HCE shielding would greatly affect the efficiency of absorbing solar radiation and have minimal impact on elimination of stray reflected light.

## Visual Resources – Visible Plume

### **Item 288:**

#### **Information Required:**

Please provide a copy of the applicant's cooling tower plume analysis, including an electronic copy of the SACTI cooling tower modeling input and output files including the meteorological data file(s), as well as, any raw meteorological data files (in a ready to use spreadsheet format) used to create the SACTI meteorological data input file(s).

#### **Response:**

The modeling data was provided with the Data Adequacy submission for the AFC. The electronic files were docketed on October 15, 2009.

#### **Genesis Solar Energy Project - Docket Number 09-AFC-8**

Docket Clerk:

Included with this letter are 3 CD-ROM disks which contain copies of the modeling files used by the Genesis Solar Energy Project to conduct the visible plume analysis. The modeling technique is referred to as the Seasonal Annual Cooling Tower Impact Program (SACTIP). This electronic data compliments the information contained in the Data Adequacy Supplement, Attachment H, docketed on October 13th, 2009.

### **Item 289:**

#### **Information Required:**

Please summarize for the cooling towers the conditions that affect vapor plume formation including cooling tower heat rejection, exhaust temperature, and exhaust mass flow rate. Please provide values to complete the table.

#### **Response:**

In response to Data Request 289, Table DR-289 has been provided. Data Request 289 proposed an operating condition of 30 °F at 90% relative humidity; however, no operational hours were identified for this condition, so the predicted coldest temperature with significant power output was used. Based on the hourly Typical Meteorological Year (TMY) data and the predicted output, the lowest dry bulb temperature when the plant would be in operation is 40 °F; at this data point, the plant is estimated to be operating at approximately 30% load with 40% of the full load heat rejection (at the design point ambient conditions). An assumed elevated relative humidity of 80% was used. All other cases shown in the table assume the plant is operating at 100% load.

**Table DR-289 (125 MW Plant)**

Parameter	Cooling Tower Exhausts		
Number of Cells	7 cells (1x7)		
Cell Height	13.81 m (45.3 ft)		
Cell Exit Diameter	9.64 m (31.6 ft)		
Tower Housing Length	89.8 m (294.7 ft)		
Tower Housing Width	13.01 m (42.7 ft)		
Ambient DB Temperature (°F)	40	65	100
Ambient WB Temperature (°F)	37.5	51.9	66.3
Ambient Relative Humidity (%)	80	40	15
Number of Cells in Operation	2	7	7
Heat Rejection (MW/hr)	90.9	222.3	223.1
Exhaust Temperature (°F)	84.7	82.6	90.9
Exhaust Flow Rate (lb/hr) <sup>1</sup>	10,549,224	36,774,460	35,897,076

Note 1. 10% margin has been added to the exhaust flow rate provided by the vendor.

**Item 290:****Information Required:**

Please provide the variation in average cooling tower heat load per hour (military time) for each month.

**Response:**

Table DR-290 provides the variation in average cooling tower heat load per hour for each month, as a percentage of the full load heat duty at the design point. The table was generated using the average dry bulb temperature for each hour of each respective month, the corresponding wet bulb temperature based on the ASHRAE dry bulb vs. wet bulb frequency matrix, and the average plant load based on the TMY data and predicted output.

**Table DR-290 – 125 MW Plant**

Hours	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.5	-	-	-	-	-	-	-	-	-	-	-	-
1.5	-	-	-	-	-	-	-	-	-	-	-	-
2.5	-	-	-	-	-	-	-	-	-	-	-	-
3.5	-	-	-	-	-	-	-	-	-	-	-	-
4.5	-	-	-	-	-	-	-	-	-	-	-	-
5.5	-	-	-	-	-	-	-	-	-	-	-	-
6.5	-	-	-	22.8%	48.8%	59.0%	37.1%	22.4%	-	-	-	-
7.5	-	-	44.4%	67.9%	88.0%	96.7%	79.5%	69.8%	65.1%	43.6%	20.0%	-
8.5	25.7%	38.4%	79.1%	87.1%	91.1%	96.7%	85.9%	80.8%	85.5%	71.1%	49.9%	25.8%
9.5	45.4%	52.1%	78.9%	88.4%	94.0%	96.4%	85.2%	86.1%	87.9%	72.4%	53.0%	43.5%
10.5	46.4%	48.7%	79.2%	87.6%	91.0%	96.2%	92.7%	84.6%	87.0%	70.2%	51.8%	44.1%
11.5	46.7%	45.4%	76.5%	88.6%	91.6%	95.0%	91.5%	83.3%	85.6%	69.0%	50.0%	40.9%
12.5	48.5%	41.7%	76.2%	92.2%	91.9%	96.3%	87.3%	87.2%	82.7%	73.4%	52.9%	44.4%
13.5	51.5%	46.7%	80.1%	92.3%	90.7%	96.5%	90.1%	87.7%	83.1%	78.6%	56.6%	49.7%
14.5	57.7%	55.3%	76.2%	81.1%	90.1%	96.3%	88.1%	87.8%	80.8%	79.4%	60.3%	55.8%
15.5	54.0%	66.4%	74.4%	78.6%	89.1%	93.7%	90.3%	86.9%	82.3%	72.0%	41.4%	46.2%
16.5	-	29.6%	59.5%	66.8%	78.5%	85.1%	81.7%	74.3%	61.0%	18.1%	-	-
17.5	-	-	-	-	33.5%	53.6%	48.9%	29.9%	15.0%	-	-	-
18.5	-	-	-	-	-	-	-	-	-	-	-	-
19.5	-	-	-	-	-	-	-	-	-	-	-	-
20.5	-	-	-	-	-	-	-	-	-	-	-	-
21.5	-	-	-	-	-	-	-	-	-	-	-	-
22.5	-	-	-	-	-	-	-	-	-	-	-	-
23.5	-	-	-	-	-	-	-	-	-	-	-	-

**Item 291:****Information Required:**

Please provide heat rejection reduction assumptions, with or without corresponding ambient condition assumptions, which staff can use to determine when cooling tower cells would be shut off when operating at reduced cooling loads and/or when operating under favorable ambient conditions.

**Response:**

Table DR-291 identifies a preliminary cooling tower operation plan based on varying heat load levels. Design point ambient conditions were used, and are assumed to be constant under the varying heat loads. Fixed speed fans are also assumed in this analysis. The number of fans in operation for a given heat load were chosen to maintain a reasonable approach temperature, comparable to the design point approach temperature. Actual fan operation will vary depending on ambient conditions and best practices to maintain optimum plant performance.

**Table DR-291**

<b>Duty</b>	<b>Cells in Operation</b>
60-100%	7
40%-60%	6
25%-40%	5
15%-25%	4
10%-15%	3
< 10%	2

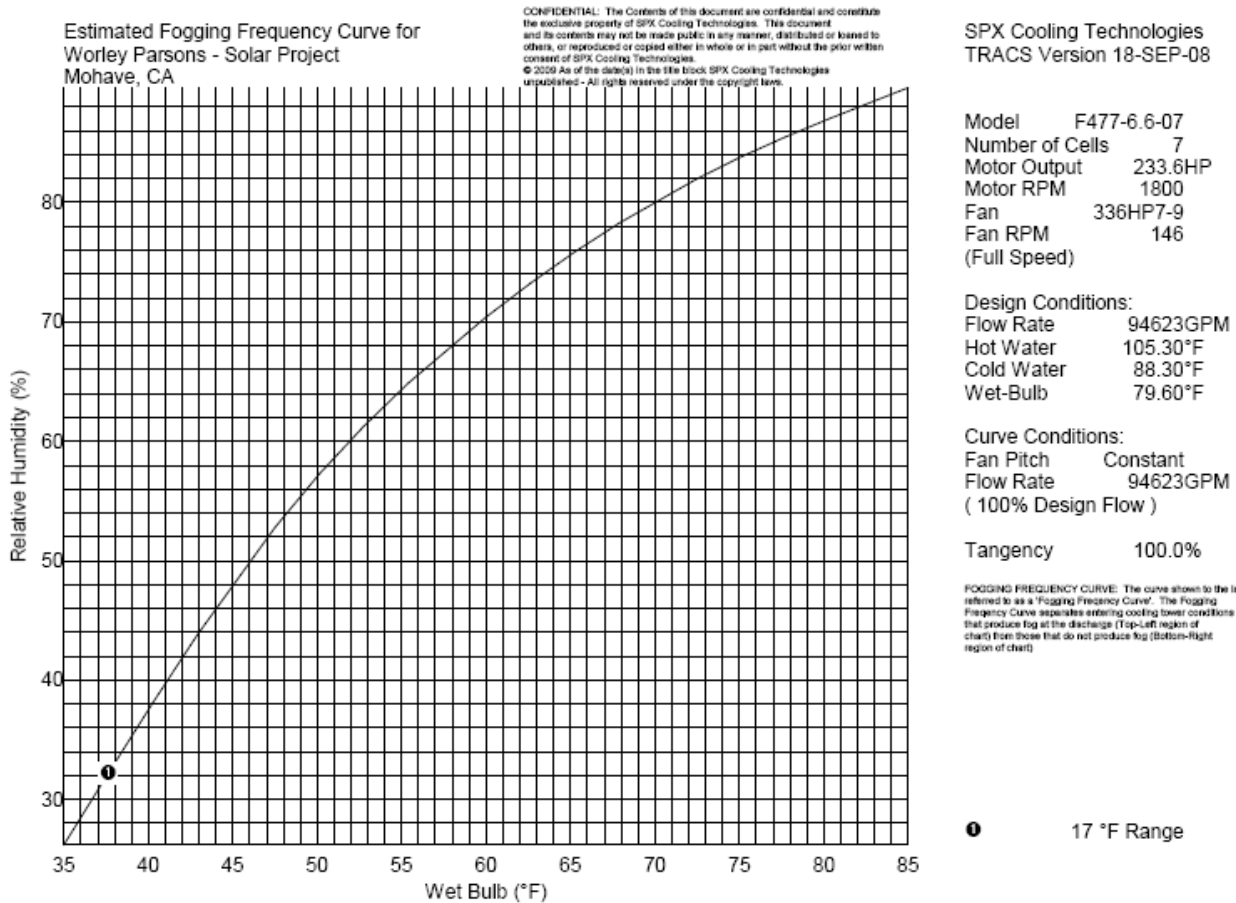
**Item 292:****Information Required:**

Please provide the cooling tower manufacturer and model number information and a fogging frequency curve from the cooling tower vendor for the two cooling towers, if available.

**Response:**

The anticipated manufacturer and model number for both cooling towers are SPX Cooling Technologies, Model No. F477-6.6-7. A fogging frequency curve for the proposed cooling tower was provided in Appendix B.1 of the AFC, but has been included in this response as Figure DR-292.

**Figure DR-292**



Time: 10:34:10 Date: 07-15-2009 Drawn By: CJH

**Item 293:**

**Information Required:**

Please identify if the cooling tower fan motors will be dual speed or have variable speed/flow controllers.

**Response:**

Preliminary performance analysis was completed assuming the cooling tower fan motors to be single speed. However, at this point in the design, other cooling tower fan motor options are still under consideration.

**REFERENCES**

- [1] Glint and Glare Study, San Joaquin Solar Project, Appendix L of the AFC, URS Corporation, November 26, 2008.
- [2] Hazard Analyses of Glint and Glare from Concentrating Solar Power Plants, Clifford K. Ho, Cheryl M. Ghanbari, and Richard B. Diver. Solar PACES 2009, Berlin, Germany, September 15-18, 2009.
- [3] Abengoa Mojave Solar Project (09-AFC-5): Written Response to Data, Request Set 1B (nos. 1-86).