

EXHIBIT 19**FORM OF LENDERS CONSENT**

same-time information system or otherwise), hereby represents and warrants that as of the date of this Consent:

(A) It (i) is a corporation duly formed and validly existing under the laws of the state of its organization, (ii) is duly qualified, authorized to do business and in good standing in every jurisdiction necessary to perform its obligations under this Consent and the PPA, and (iii) has all requisite corporate power and authority to enter into and to perform its obligations hereunder and under the PPA, and to carry out the terms hereof and thereof and the transactions contemplated hereby and thereby;

(B) the execution, delivery and performance of this Consent and the PPA have been duly authorized by all necessary corporate action on its part and do not require any approvals, material filings with, or consents of any entity or person which have not previously been obtained or made;

(C) each of this Consent and the PPA is in full force and effect;

(D) each of this Consent and the PPA has been duly executed and delivered on its behalf and constitutes its legal, valid and binding obligation, enforceable against it in accordance with its terms;

(E) the execution, delivery and performance by it of this Consent and the PPA, and the consummation of the transactions contemplated hereby, will not result in any violation of, breach of or default under any term of (i) its formation or governance documents, or (ii) any material contract or material agreement to which it is a party or by which it or its property is bound, or of any material requirements of Law presently in effect having applicability to it, the violation, breach or default of which could have a material adverse effect on its ability to perform its obligations under this Consent;

(F) (i) neither NVE nor, to NVE's actual knowledge, any other party to the PPA, is in default of any of its obligations thereunder; (ii) NVE and, to NVE's actual knowledge, Borrower has complied with all conditions precedent to the effectiveness of its obligations under the PPA; (iii) to NVE's actual knowledge, no event or condition exists which would either immediately or with the passage of any applicable grace period or giving of notice, or both, enable either NVE or Borrower to terminate or suspend its obligations under the PPA; and (iv) the PPA has not been amended, modified or supplemented in any manner except as set forth herein and in the recitals hereto; and

(G) NVE has no notice of, and has not consented to, any previous assignment by Borrower of all or any part of its rights under the PPA.

SECTION 3. NOTICES

All notices required or permitted hereunder shall be in writing and shall be effective (a) upon receipt if hand delivered, (b) upon telephonic verification of receipt if sent by facsimile and (c) if otherwise delivered, upon the earlier of receipt or three (3) Business Days after being sent registered or certified mail, return receipt requested, with proper postage affixed thereto, or by private courier or delivery service with charges prepaid, and addressed as specified below:

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If to NVE:

[_____]

[_____]

[_____]

Telephone No.: [_____]

Telecopy No.: [_____]

Attn: [_____]

If to Administrative Agent:

[_____]

[_____]

[_____]

Telephone No.: [_____]

Telecopy No.: [_____]

Attn: [_____]

If to Borrower:

[_____]

[_____]

[_____]

Telephone No.: [_____]

Telecopy No.: [_____]

Attn: [_____]

Any party shall have the right to change its address for notice hereunder to any other location within the United States by giving thirty (30) days written notice to the other parties in the manner set forth above. Further, the Tax Investor shall be entitled to receive notices from NVE by providing written notice to NVE of Tax Investor's address for notices. NVE's failure to provide any notice to the Tax Investor shall not be a breach of this Consent.

SECTION 4. CONFIRMATION, TERMINATION, AMENDMENT AND GOVERNING LAW

NVE agrees to (a) confirm its continuing obligation hereunder in writing upon the reasonable request of (and at the expense of) Borrower, Administrative Agent, the Tax Investor, the Lenders or any of their respective successors, transferees or assigns, and (b) on no more than three (3) occasions during the term of the PPA, deliver an estoppel to Tax Investor and Administrative Agent representing that the matters set forth in Section 2 above remain true and correct. No termination, amendment, variation or waiver of any provisions of this Consent shall be effective unless in writing and executed by the parties hereto. This Consent shall be governed by the laws of the State of New York (without giving effect to the principles thereof relating to conflicts of law except Section 5-1401 and 5-1402 of the New York General Obligations Law).

SECTION 5. COUNTERPARTS

This Consent may be executed in one or more duplicate counterparts, and when executed and delivered by all the parties listed below, shall constitute a single binding agreement.

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In case any provision of this Consent, or the obligations of any of the parties hereto, shall be invalid, illegal or unenforceable, the validity, legality and enforceability of the remaining provisions, or the obligations of the other parties hereto, shall not in any way be affected or impaired thereby.

SECTION 7. ACKNOWLEDGMENTS BY BORROWER.

Borrower, by its execution hereof, acknowledges and agrees that notwithstanding any term to the contrary in the PPA, NVE may perform as set forth herein and that neither the execution of this Consent, the performance by NVE of any of the obligations of NVE hereunder, the exercise of any of the rights of NVE hereunder, or the acceptance by NVE of performance of the PPA by any party other than Borrower shall (1) release Borrower from any obligation of Borrower under the PPA, (2) constitute a consent by NVE to, or impute knowledge to NVE of, any specific terms or conditions of the Financing Agreement, the Security Agreement or any of the other Financing Documents, or (3) except as otherwise expressly provided herein, constitute a waiver by NVE of any of its rights under the PPA. Borrower and Administrative Agent acknowledge hereby for the benefit of NVE that none of the Financing Agreement, the Security Agreement, the Financing Documents or any other documents executed in connection therewith (other than this Consent to the extent expressly provided herein) alter, amend, modify or impair (or purport to alter, amend, modify or impair) any provisions of the PPA. Borrower shall have no rights against NVE on account of this Consent.

SECTION 8. JURY TRIAL WAIVER

THE PARTIES EACH HEREBY IRREVOCABLY WAIVE ALL RIGHT TO TRIAL BY JURY IN ANY ACTION, PROCEEDING OR COUNTERCLAIM ARISING OUT OF OR RELATING THIS AGREEMENT OR THE TRANSACTIONS CONTEMPLATED HEREBY. EACH PARTY FURTHER WAIVES ANY RIGHT TO CONSOLIDATE ANY ACTION IN WHICH A JURY TRIAL HAS BEEN WAIVED WITH ANY OTHER ACTION IN WHICH A JURY TRIAL CANNOT BE OR HAS NOT BEEN WAIVED.

IN WITNESS WHEREOF, the parties by their officers duly authorized, have duly executed this Consent as of the date first set forth above.

Nevada Power Company

By: _____

Name: _____

Title: _____

_____,

a _____

By: _____

Name: _____

Title: _____

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_____,
as Administrative Agent for the Lenders

[Borrower]

By: _____
Name: _____
Title: _____

[Tax Investor]

By: _____
Name: _____
Title: _____

EXHIBIT 20**FORM OF GUARANTEE**

This GUARANTEE (this “Guarantee”), dated as of _____, 20__, is issued by [_____] a [_____] organized and existing under the laws of [_____] (“Guarantor”) in favor of Nevada Power Company, a Nevada corporation doing business as NV Energy (“Company”).

Pursuant to that certain Long-Term Renewable Power Purchase Agreement, dated as of _____, 20__ (as the same may be amended, modified or supplemented from time to time, the “Agreement”), by and between Company and [_____] a [_____] [_____] of which Guarantor is the [direct][indirect] parent (“Subsidiary”), and pursuant to which Guarantor will indirectly benefit from the terms and conditions thereof, and the performance by Subsidiary of its obligations thereunder, and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Guarantor hereby covenants, undertakes and agrees with Company as follows:

Section 1. Definitions. Capitalized terms used herein and not otherwise defined shall have their respective meanings as set forth in the Agreement.

Section 2. Guarantee.

(a) **Guarantee.** Guarantor hereby irrevocably and unconditionally guarantees to and for the benefit of Company, the full and prompt payment by Subsidiary of each and every obligation of Subsidiary arising under the Agreement up to the limitations set forth in the Agreement, including, without limitation, the payment when due of all indemnities, refunds and liquidated damages payable at any time under the Agreement (the “Guaranteed Obligations”). The Guaranteed Obligations shall further include, without limitation, (i) interest accruing as part of the Guaranteed Obligations according to the terms thereof following the commencement by or against the Subsidiary of any case or proceeding under any Applicable Law relating to bankruptcy, insolvency, reorganization, winding-up, liquidation, dissolution or composition or adjustment of debt and (ii) all reasonable costs and expenses (including reasonable attorneys’ fees), if any, incurred in successfully enforcing Company’s rights under this Guarantee. Guarantor further agrees that if Subsidiary shall fail to pay or perform in full when due all or any part of the Guaranteed Obligations, Guarantor will promptly pay (or promptly procure the payment of) the same in accordance with, and up to the limitations set forth in the Agreement.

(b) **Nature of Guarantee.** The Guarantee and the obligations of Guarantor hereunder shall continue to be effective or be automatically reinstated, as the case may be, even if at any time payment of any of the Guaranteed Obligations is rendered unenforceable or is rescinded or must otherwise be returned by Company upon the occurrence of any action or event including, without limitation, the bankruptcy, reorganization, winding-up, liquidation, dissolution or insolvency of the Subsidiary, Guarantor, any other Person or otherwise, all as though the payment had not been made.

(c) **Absolute Guarantee.** Guarantor agrees that its obligations under this Guarantee are irrevocable, absolute, independent, unconditional and continuing and shall not be affected by any circumstance that constitutes a legal or equitable discharge of a guarantor or surety other than payment in full of the Guaranteed Obligations. In furtherance of the foregoing and without limiting the generality thereof, Guarantor agrees, subject to the other terms and conditions hereof, as follows:

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(i) this Guarantee is a guarantee of payment when due and not of collectability;

(ii) Company may from time to time in accordance with the terms of the Agreement, without notice or demand and without affecting the validity or enforceability of this Guarantee or giving rise to any limitation, impairment or discharge of Guarantor's liability hereunder, (A) renew, extend, accelerate or otherwise change the time, place, manner or terms of payment or performance of the Guaranteed Obligations, (B) settle, compromise, release or discharge, or accept or refuse any offer of performance with respect to, or substitutions for, the Guaranteed Obligations or any agreement relating thereto and/or subordinate the payment or performance of the same to the payment or performance of any other obligations, (C) request and accept other guaranties of or security for the Guaranteed Obligations and take and hold security for the payment or performance of this Guarantee or the Guaranteed Obligations, (D) release, exchange, compromise, subordinate or modify, with or without consideration, any security for payment or performance of the Guaranteed Obligations, any other guarantees of the Guaranteed Obligations, or any other obligation of any person with respect to the Guaranteed Obligations, (E) enforce and apply any security now or hereafter held by or for the benefit of Company in respect of this Guarantee or the Guaranteed Obligations and direct the order or manner of sale thereof, or exercise any other right or remedy that Company may have against any such security, as Company in its discretion may determine consistent with the Agreement and any applicable security agreement, and even though such action operates to impair or extinguish any right of reimbursement or subrogation or any other right or remedy of Guarantor against Subsidiary or any other guarantor of the Guaranteed Obligations or any other guarantee of or security for the Guaranteed Obligations, and (F) exercise any other rights available to Company under the Agreement, at law or in equity; and

(iii) this Guarantee and the obligations of Guarantor hereunder shall be valid and enforceable and shall not be subject to any limitation, impairment or discharge for any reason (other than payment in full of the Guaranteed Obligations and otherwise as set forth in this Guarantee), including, without limitation, the occurrence of any of the following, whether or not Guarantor shall have had notice or knowledge of any of them: (A) any failure to assert or enforce, or agreement not to assert or enforce, or the stay or enjoining, by order of court, by operation of law or otherwise, or the exercise or enforcement of, any claim or demand or any right, power or remedy with respect to the Guaranteed Obligations or any agreement relating thereto, or with respect to any other guarantee of or security for the payment or performance of the Guaranteed Obligations; (B) any waiver, amendment or modification of, or any consent to departure from, any of the terms or provisions of the Agreement or any agreement or instrument executed pursuant thereto or of any other guarantee or security for the Guaranteed Obligations; (C) the Guaranteed Obligations, or any agreement relating thereto, at any time being found to be illegal, invalid or unenforceable in any respect; (D) the personal or corporate incapacity of any person; (E) any change in the financial condition, or the bankruptcy, administration, receivership or insolvency of Subsidiary or any other person, or any rejection, release, stay or discharge of Subsidiary's or any other person's obligations in connection with any bankruptcy, administration, receivership or similar proceeding or otherwise or any disallowance of all or any portion of any claim by Company, its successors or permitted assigns in connection with any such proceeding; (F) any change in the corporate existence of, or cessation of existence of, Guarantor or the Subsidiary (whether by way of merger, amalgamation, transfer, sale, lease or otherwise); (G) the failure to create, preserve, validate, perfect or protect any security interest granted to, or in favor of, any person; (H) any substitution, modification, exchange, release, settlement or compromise of any

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security or collateral for or guaranty of any of the Guaranteed Obligations or failure to apply such security or collateral or failure to enforce such guaranty; (I) the existence of any claim, set-off, or other rights which Guarantor or any affiliate thereof may have at any time against Company or any affiliate thereof in connection with any matter unrelated to the Agreement; and (J) any other act or thing or omission, or delay to do any other act or thing, which may or might in any manner or to any extent vary the risk of Guarantor as an obligor in respect of the Guaranteed Obligations.

(d) **Currency.** All payments made by Guarantor hereunder shall be made in U.S. dollars in immediately available funds.

(e) **Defenses.** Notwithstanding anything herein to the contrary, Guarantor specifically reserves to itself all rights, counterclaims and other defenses that the Subsidiary is or may be entitled to arising from or out of the Agreement, except for any defenses arising out of the bankruptcy, insolvency, dissolution or liquidation of the Subsidiary, the lack of power or authority of the Subsidiary to enter into the Agreement and to perform its obligations thereunder, or the lack of validity or enforceability of the Subsidiary's obligations under the Agreement or any transaction thereunder.

Section 3. Other Provisions of the Guarantee.

(a) **Waivers by Guarantor.** Guarantor hereby waives for the benefit of Company, to the maximum extent permitted by Applicable Law:

- (i) notice of acceptance hereof;
- (ii) notice of any action taken or omitted to be taken by Company in reliance hereon;
- (iii) any right to require Company, as a condition of payment by Guarantor, to (A) proceed against or exhaust its remedies against Subsidiary or any person, including any other guarantor of the Guaranteed Obligations, or (B) proceed against or exhaust any security held from Subsidiary or any person, including any other guarantor of the Guaranteed Obligations;
- (iv) subject to Clause 2(e), any defense arising by reason of the incapacity, lack of authority or any disability of Subsidiary including, without limitation, any defense based on or arising out of the lack of validity or the unenforceability of the Guaranteed Obligations or any agreement or instrument relating thereto or by reason of the cessation of the liability of Subsidiary from any cause other than payment in full of the Guaranteed Obligations or termination of this Guarantee in accordance with its terms;
- (v) any requirement that Company protect, secure, perfect or insure any security interest or lien or any property subject thereto;
- (vi) any requirement that Company be diligent or prompt in making demands hereunder or give notices of default under the Agreement, notices of any renewal, extension or modification of the Guaranteed Obligations or any agreement related thereto, and any right to consent to any thereof; and

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(vii) any event, occurrence or other circumstance which might otherwise constitute a legal or equitable discharge of a surety, including promptness, diligence, notice of acceptance and notice of any default under the Agreement, notice of presentment, demand, protest, and notice of dishonor or nonpayment, notice of acceleration or other demand and any other notice with respect to this Guarantee.

(b) Deferral of Subrogation. Until such time as the Guaranteed Obligations have been paid or performed in full, notwithstanding any payment made by Guarantor hereunder or the receipt of any amounts by Company with respect to the Guaranteed Obligations, (i) Guarantor (on behalf of itself, its successors and assigns, including any surety) hereby expressly agrees not to exercise any right, nor assert the impairment of such rights, it may have to be subrogated to any of the rights of Company against Subsidiary or against any other collateral security held by Company for the payment or performance of the Guaranteed Obligations, (ii) Guarantor agrees that it will not seek any reimbursement from Company in respect of payments or performance made by Guarantor in connection with the Guaranteed Obligations, or amounts realized by Company in connection with the Guaranteed Obligations and (iii) Guarantor shall not claim or prove in a liquidation or other insolvency proceeding of the Subsidiary in competition with the Company. If any amount shall be paid to Guarantor on account of such subrogation rights at any time when all of the Guaranteed Obligations shall not have been paid in full or otherwise fully satisfied, such amount shall be held in trust by Guarantor for the benefit of Company and shall forthwith be paid to Company, to be credited and applied to the Guaranteed Obligations.

Section 4. Representations and Warranties of Guarantor. Guarantor hereby represents, warrants, and undertakes to Company as follows:

(a) Guarantor is duly organized, validly existing and in good standing under the laws of its jurisdiction of organization, and has the corporate power, authority and legal right to own its property and assets and to transact the business in which it is engaged.

(b) Guarantor has full power, authority and legal right to execute and deliver this Guarantee and all other instruments, documents and agreements required by the provisions of this Guarantee to be executed, delivered and performed by Guarantor, and to perform its obligations hereunder and thereunder.

(c) The execution, delivery and performance of this Guarantee and all other instruments, documents and agreements required by the provisions of this Guarantee to be executed, delivered and performed by Guarantor have been duly authorized by all necessary company action on the part of Guarantor and do not contravene or conflict with Guarantor's memorandum and articles of association.

(d) This Guarantee and all other instruments, documents and agreements required by the provisions of this Guarantee to be executed, delivered and performed by Guarantor have been duly executed and delivered by Guarantor and constitute the legal, valid and binding obligations of Guarantor, enforceable against it in accordance with their respective terms.

(e) Neither the execution and delivery of this Guarantee nor the performance of the terms and conditions hereof by Guarantor shall result in (i) a violation or breach of, or a default under, or a right to accelerate, terminate or amend, any contract, commitment or other obligation

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to which Guarantor is a party or is subject or by which any of its assets are bound, or (ii) a violation by Guarantor of any Applicable Law.

(f) There are no actions, suits, investigations, proceedings, condemnations, or audits by or before any court or other governmental or regulatory authority or any arbitration proceeding pending or, to its actual knowledge after due inquiry, threatened against or affecting Guarantor, its properties, or its assets.

(g) All necessary action has been taken under Applicable Laws to authorize the execution, delivery and performance of this Guarantee. No governmental approvals or other consents, approvals, or notices of or to any person are required in connection with the execution, delivery, performance by Guarantor, or the validity or enforceability, of this Guarantee.

Section 5. Notices. All notices, demands, instructions, waivers, consents, or other communications required or permitted hereunder shall be in writing in the English language and shall be sent by personal delivery, courier, certified mail or facsimile, to the following addresses:

(a) If to Guarantor:

[_____]

[_____]

[_____]

[_____]

Attention: [_____]

Facsimile: [_____]

(b) If to Company:

Nevada Power Company

6226 W. Sahara Avenue

Las Vegas, Nevada 89146

Facsimile No.: 702-402-2455

Email: ContractManagement@nvenergy.com

Attn: [_____]

With a copy to (which shall not constitute notice):

Nevada Power Company

6226 W. Sahara Avenue

Las Vegas, Nevada 89146

Facsimile: (702) 402-2069

Attn: [_____]

The addresses and facsimile numbers of either party for notices given pursuant to this Guarantee may be changed by means of a written notice given to the other party at least three (3) Business Days (being a day on which clearing banks are generally open for business in the jurisdiction of the party to whom a notice is sent) prior to the effective date of such change. Any notice required or authorized to be given hereunder shall be in writing (unless otherwise provided) and shall be served (i) personally, (ii) by courier service or (iii) by facsimile transmission addressed to the

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relevant Person at the address stated below or at any other address notified by that Person as its address for service. Any notice so given personally shall be deemed to have been served on delivery, any notice so given by express courier service shall be deemed to have been served the next Business Day after the same shall have been delivered to the intended Person, and any notice so given by facsimile transmission shall be deemed to have been served on dispatch unless dispatched after the recipient's normal business hours on a Business Day or dispatched on any day other than a Business Day, in which case such notice shall be deemed to have been delivered on the next Business Day. As proof of such service it shall be sufficient to produce a receipt showing personal service, the receipt of a courier company showing the correct address of the addressee or an activity report of the sender's facsimile machine showing the correct facsimile number of the Person on whom notice is served and the correct number of pages transmitted.

Section 6. Miscellaneous Provisions.

(a) **Waiver; Remedies Cumulative.** No failure on the part of Company to exercise, and no delay on the part of Company in exercising, any right or remedy, in whole or in part hereunder shall operate as a waiver thereof. No single or partial exercise of any right or remedy shall preclude any other or further exercise thereof or the exercise of any other right or remedy. No waiver by Company shall be effective unless it is in writing and such writing expressly states that it is intended to constitute such waiver. Any waiver given by Company of any right, power or remedy in any one instance shall be effective only in that specific instance and only for the purpose for which given, and will not be construed as a waiver of any right, power or remedy on any future occasion. The rights and remedies of Company herein provided are cumulative and not exclusive of any rights or remedies provided by Applicable Law.

(b) **Successors and Assigns.** This Guarantee shall be binding upon the successors of Guarantor and shall inure to the benefit of Company and its successors and permitted assigns. Guarantor shall not assign or transfer all or any part of its rights or obligations hereunder without the prior written consent of Company. Any purported assignment or delegation without such written consent shall be null and void. Company may assign its rights and obligations hereunder to any assignee of its rights under the Agreement permitted in accordance with the Agreement.

(c) **Amendment.** This Guarantee may not be modified, amended, terminated or revoked, in whole or in part, except by an agreement in writing signed by Company and Guarantor.

(d) **Termination, Limits and Release.** This Guarantee is irrevocable, unconditional and continuing in nature and is made with respect to all Guaranteed Obligations now existing or hereafter arising and shall remain in full force and effect until the earlier of (i) the time when in accordance with the terms of the Agreement all of the Guaranteed Obligations are fully satisfied and discharged, and (ii) then, and only then, this Guarantee shall automatically be released and shall be of no further force and effect; otherwise, it shall remain in full force and effect. Other than as set forth in the previous sentence, no release of this Guarantee shall be valid unless executed by Company and delivered to Guarantor. Except with respect to (x) claims made by, damages incurred by, or amounts payable to third parties pursuant to an indemnity given under the Agreement and (y) claims arising out of Subsidiary's fraud or willful misconduct, under no circumstances will Guarantor's aggregate liability hereunder exceed the amount of Operating Security required in the Agreement. Additionally, and notwithstanding the preceding sentence or any other provision of the Agreement or this Guarantee, on and after the date of any termination

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of the Agreement, under no circumstances will Guarantor's aggregate liability hereunder exceed the amount of Operating Security required in the Agreement.

(e) Law and Jurisdiction.

(i) THIS GUARANTEE IS GOVERNED BY AND SHALL BE CONSTRUED IN ACCORDANCE WITH THE LAWS OF THE STATE OF NEVADA, WITHOUT REGARD FOR ANY PRINCIPLES OF CONFLICTS OF LAW THAT WOULD DIRECT OR PERMIT THE APPLICATION OF THE LAW OF ANY OTHER JURISDICTION.

(ii) GUARANTOR AND COMPANY IRREVOCABLY AGREE THAT THE STATE AND FEDERAL COURTS LOCATED IN WASHOE COUNTY, NEVADA, SHALL HAVE EXCLUSIVE JURISDICTION TO HEAR AND DETERMINE ANY SUIT, ACTION OR PROCEEDING, AND TO SETTLE ANY DISPUTE, WHICH MAY ARISE OUT OF OR IN CONNECTION WITH THIS GUARANTEE, AND FOR SUCH PURPOSES HEREBY IRREVOCABLY SUBMIT TO THE JURISDICTION OF SUCH COURTS, AND GUARANTOR CONSENTS TO THE JURISDICTION OF, AND TO THE LAYING OF VENUE IN, SUCH COURTS FOR SUCH PURPOSES AND HEREBY WAIVES ANY DEFENSE BASED ON LACK OF VENUE OR PERSONAL JURISDICTION OR OF INCONVENIENT FORUM.

(f) Survival. All representations and warranties made in this Guarantee and by Guarantor in any other instrument, document, or agreement delivered pursuant hereto or in connection herewith shall survive the execution and delivery of this Guarantee.

(g) Severability. Any provision of this Guarantee that is prohibited or unenforceable in any jurisdiction shall, as to such jurisdiction, be ineffective to the extent of such prohibition or unenforceability without invalidating the remaining provisions hereof, and any such prohibition or unenforceability in any jurisdiction shall not invalidate or render unenforceable such provision in any other jurisdiction. Where provisions of law or regulation resulting in such prohibition or unenforceability may be waived they are hereby waived by Guarantor and Company to the full extent permitted by law so that this Guarantee shall be deemed a valid binding agreement in each case enforceable in accordance with its terms.

(h) Third Party Rights. The terms and provisions of this Guarantee are intended solely for the benefit of Company and Guarantor and their respective successors and permitted assigns, and it is not the intention of Company or Guarantor to confer upon any other persons any rights by reason of this Guarantee.

(i) No Set-off, Deduction or Withholding. Guarantor hereby guarantees that payments hereunder shall be made without set-off or counterclaim and free and clear of and without deduction or withholding for any taxes; provided, that if the Guarantor shall be required under Applicable Law to deduct or withhold any taxes from such payments, then (i) the sum payable by Guarantor shall be increased as necessary so that after making all required deductions and withholdings (including deductions and withholdings applicable to additional sums payable pursuant to this sentence) the Company receives an amount equal to the sum it would have received had no such deduction or withholding been required, (ii) Guarantor shall make such deduction or withholding, and (iii) Guarantor shall timely pay the full amount deducted or withheld to the relevant governmental authority in accordance with Applicable Law.

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(j) Waiver of Right to Trial by Jury. TO THE FULLEST EXTENT PERMITTED BY LAW, EACH OF GUARANTOR AND COMPANY WAIVES ANY RIGHT IT MAY HAVE TO A TRIAL BY JURY IN RESPECT OF LITIGATION DIRECTLY OR INDIRECTLY ARISING OUT OF, UNDER OR IN CONNECTION WITH THIS GUARANTEE. EACH OF GUARANTOR AND COMPANY FURTHER WAIVES ANY RIGHT TO CONSOLIDATE ANY ACTION IN WHICH A JURY TRIAL HAS BEEN WAIVED WITH ANY OTHER ACTION IN WHICH A JURY TRIAL CANNOT BE OR HAS NOT BEEN WAIVED.

(k) Counterparts; Facsimile Signatures. This Guarantee may be executed in any number of counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument. Signatures delivered by facsimile shall be deemed to be original signatures.

[Signature page follows.]

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IN WITNESS WHEREOF, Guarantor has duly executed this Guarantee on the day and year first before written.

[GUARANTOR]

Name:

Title:

Acknowledged and Accepted:

**NEVADA POWER COMPANY D/B/A NV
ENERGY, A NEVADA CORPORATION**

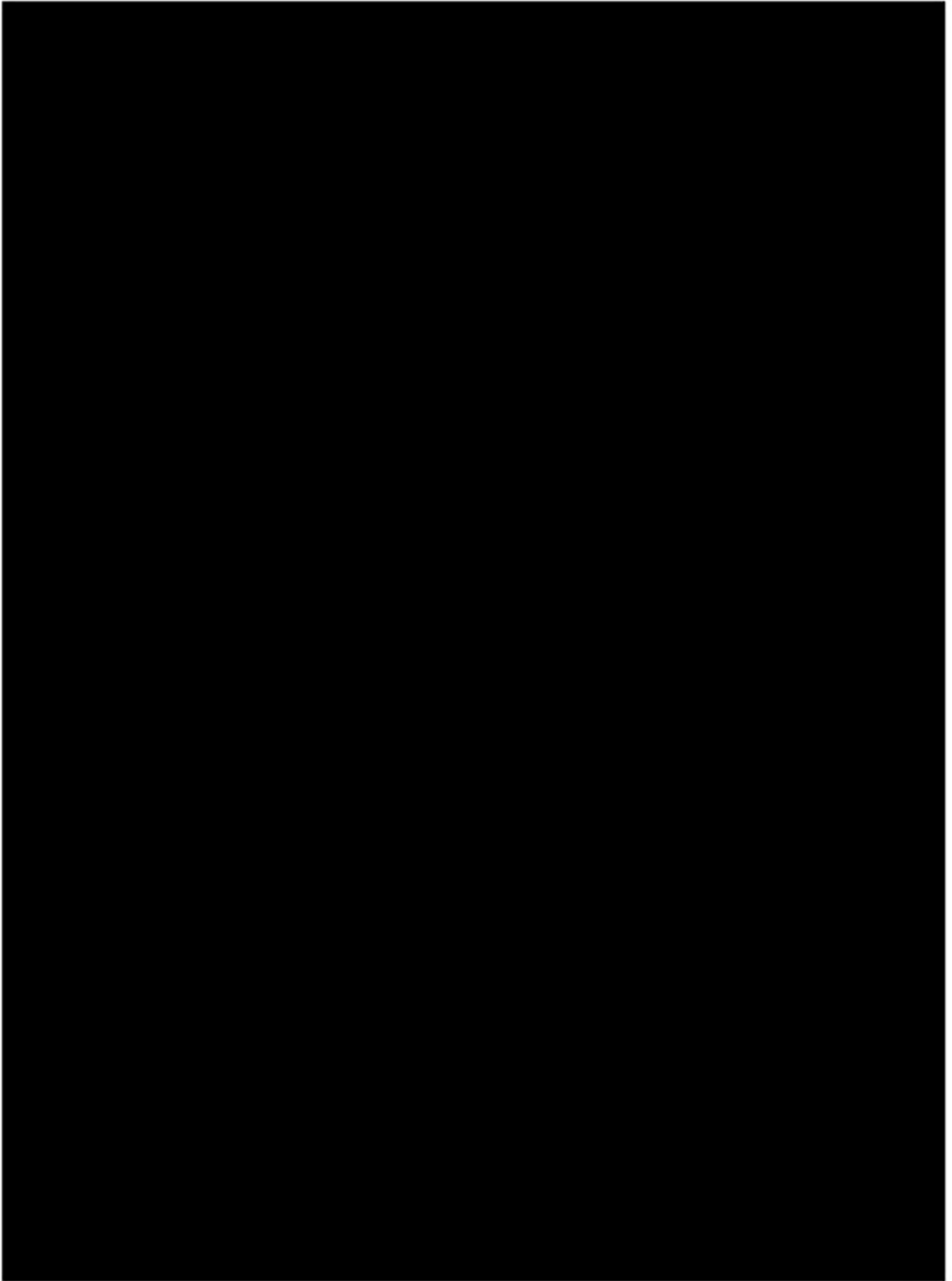
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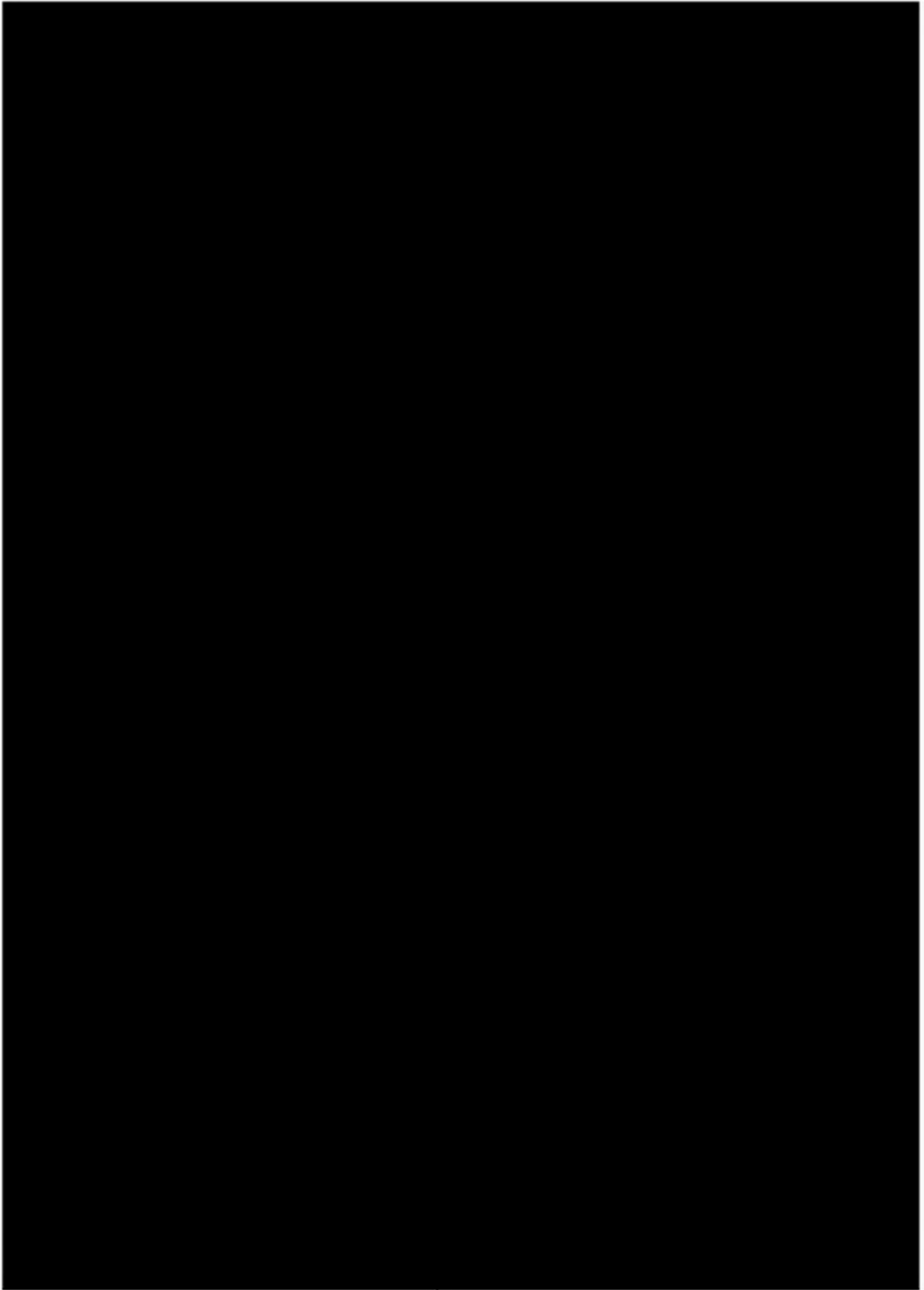
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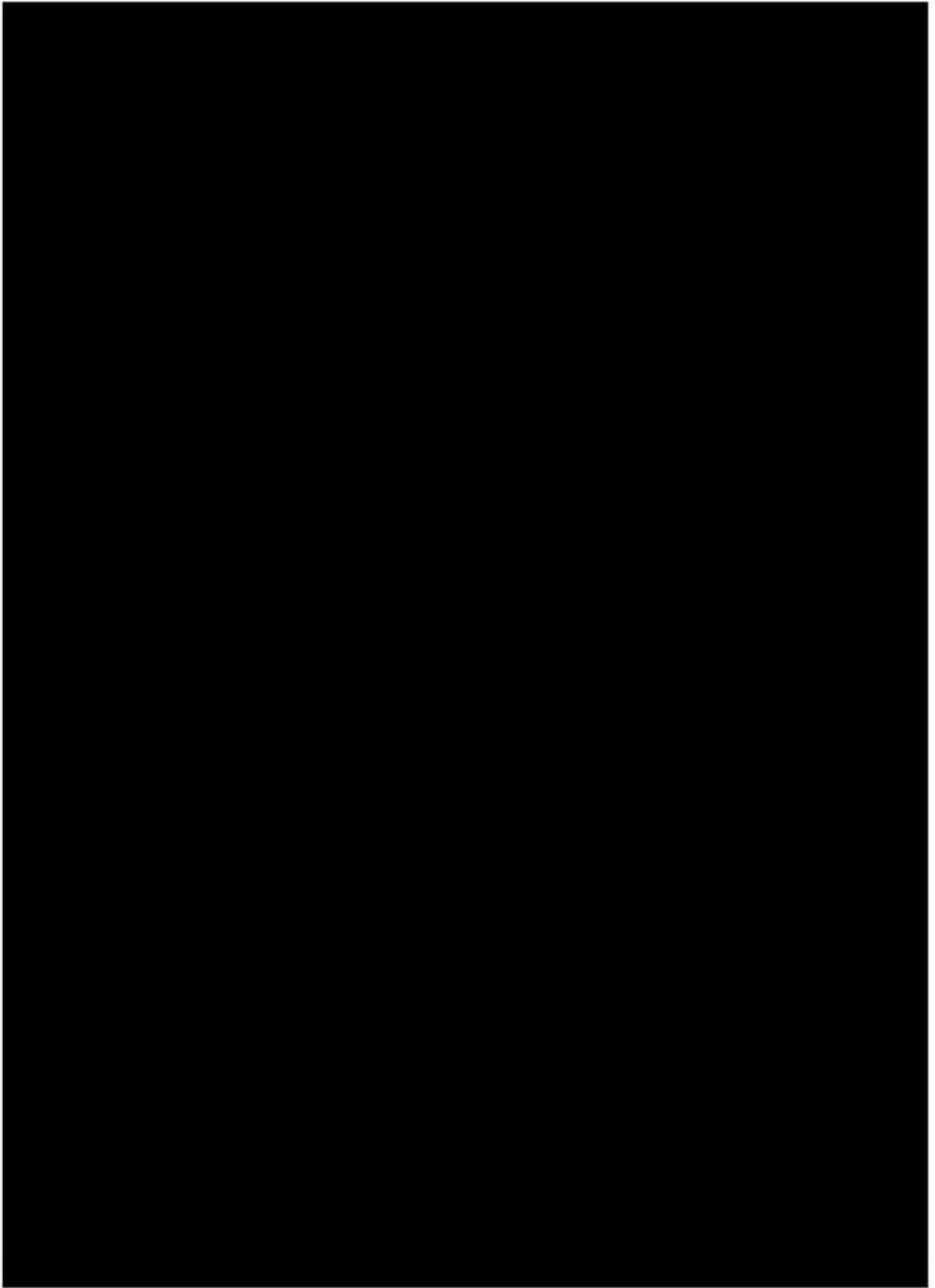
EXHIBIT 21

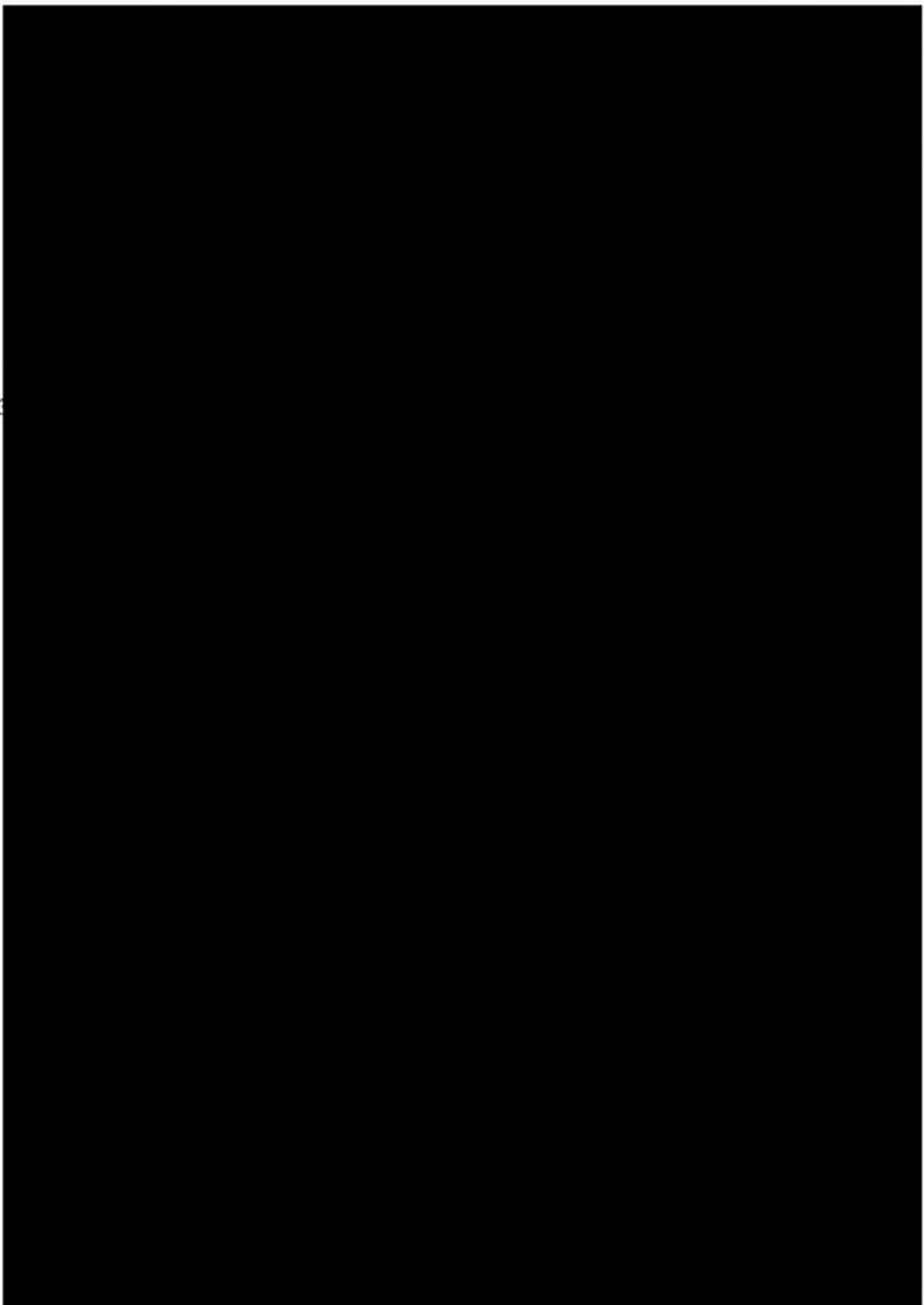
WORK SITE AGREEMENT

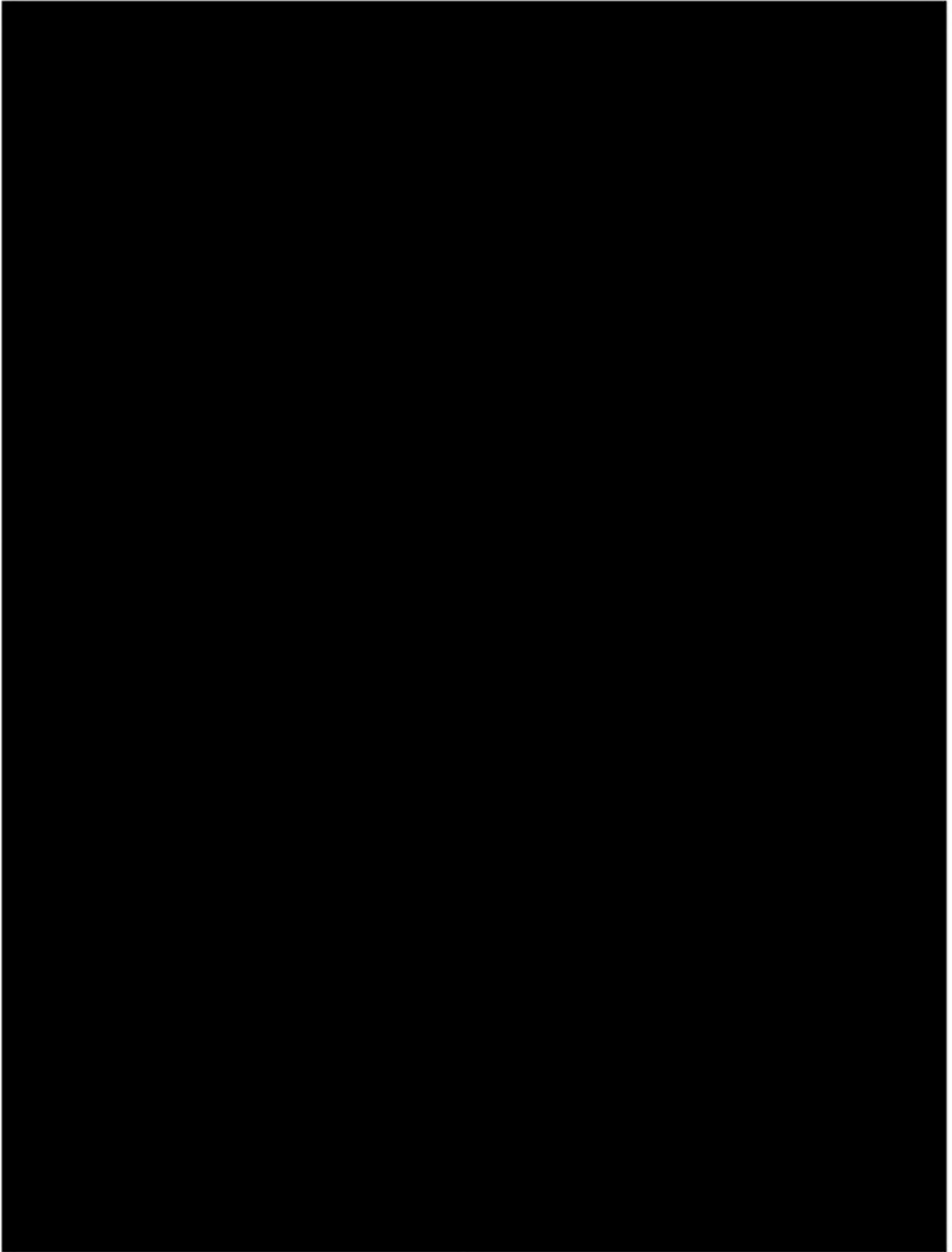
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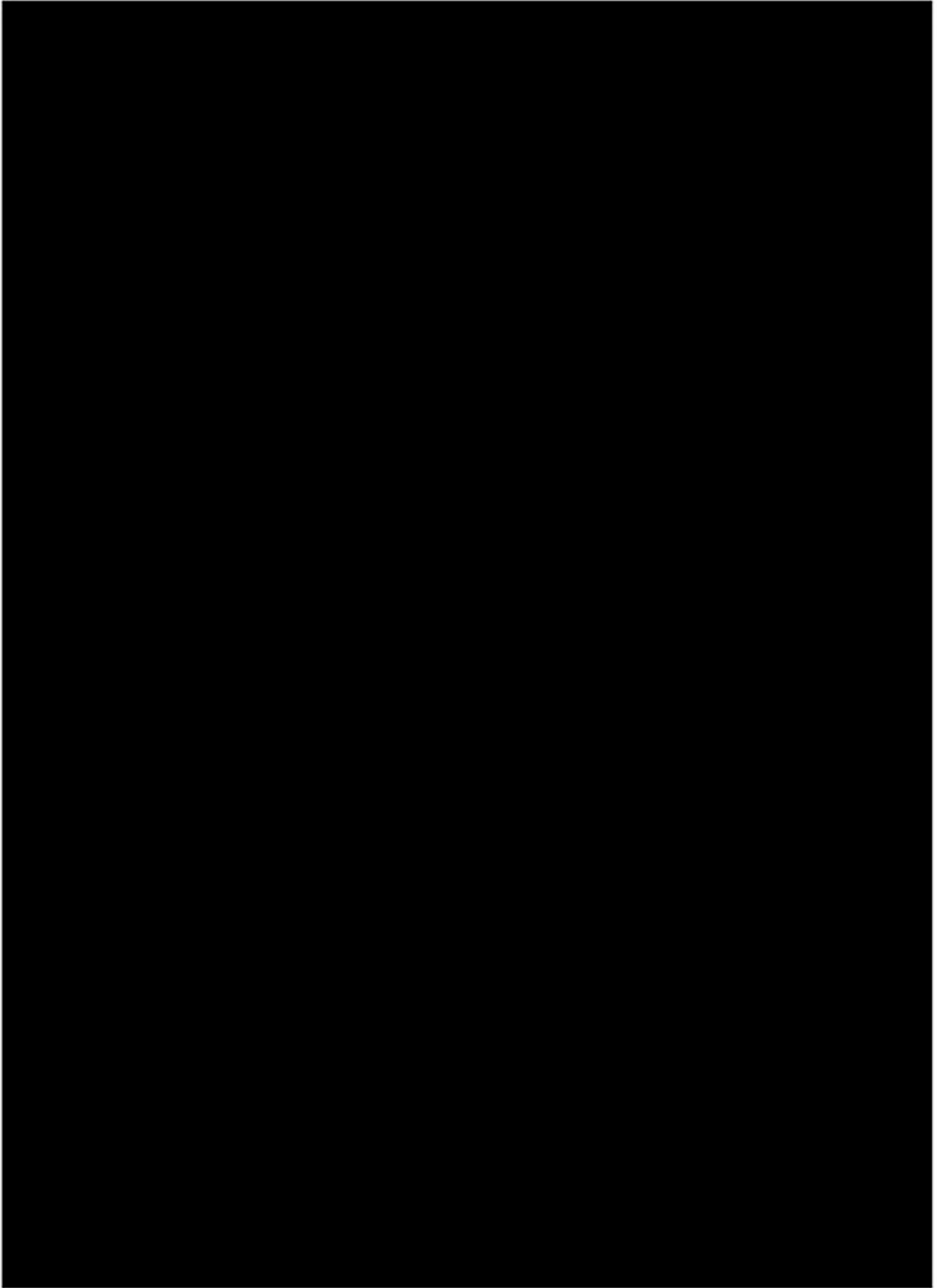


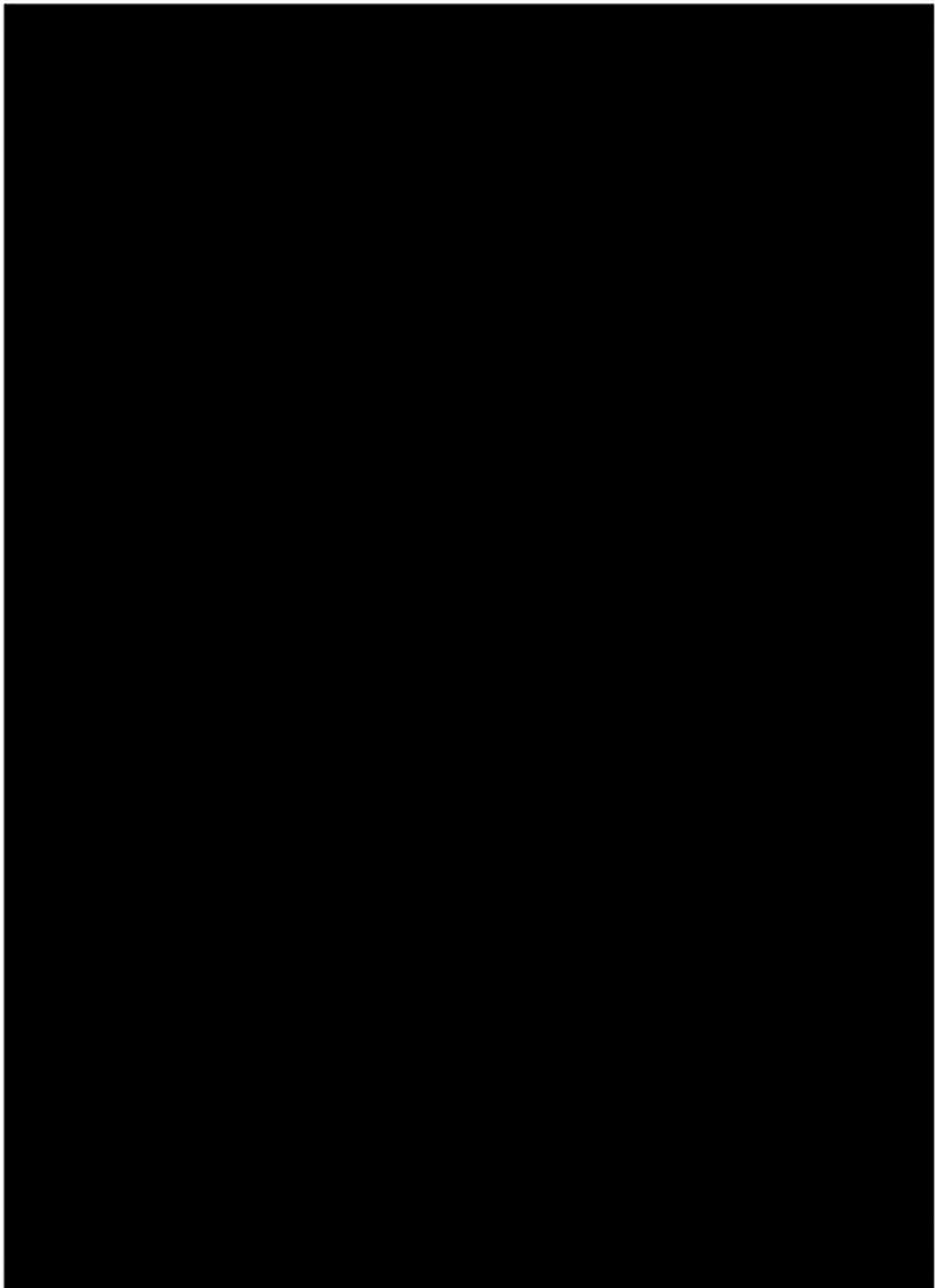


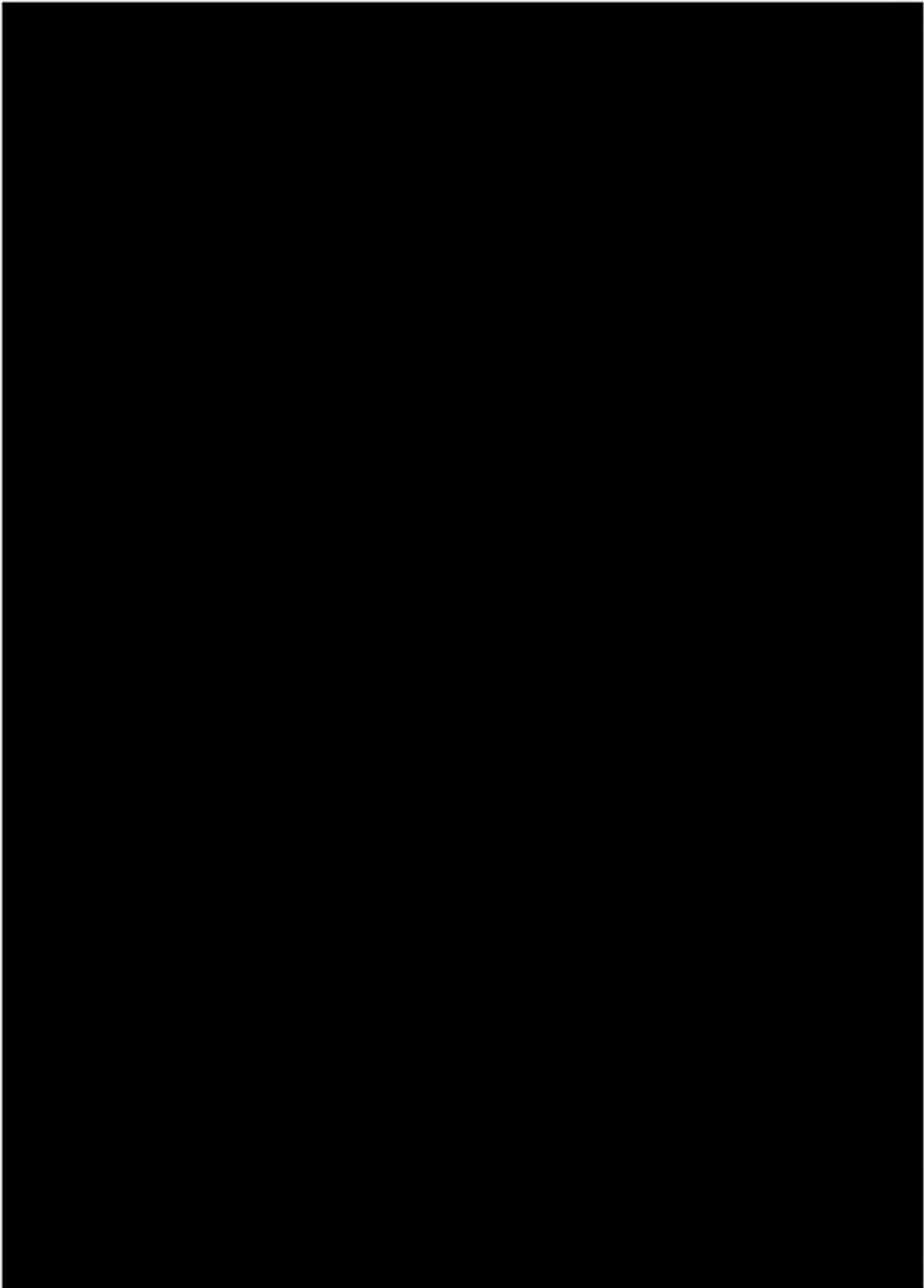


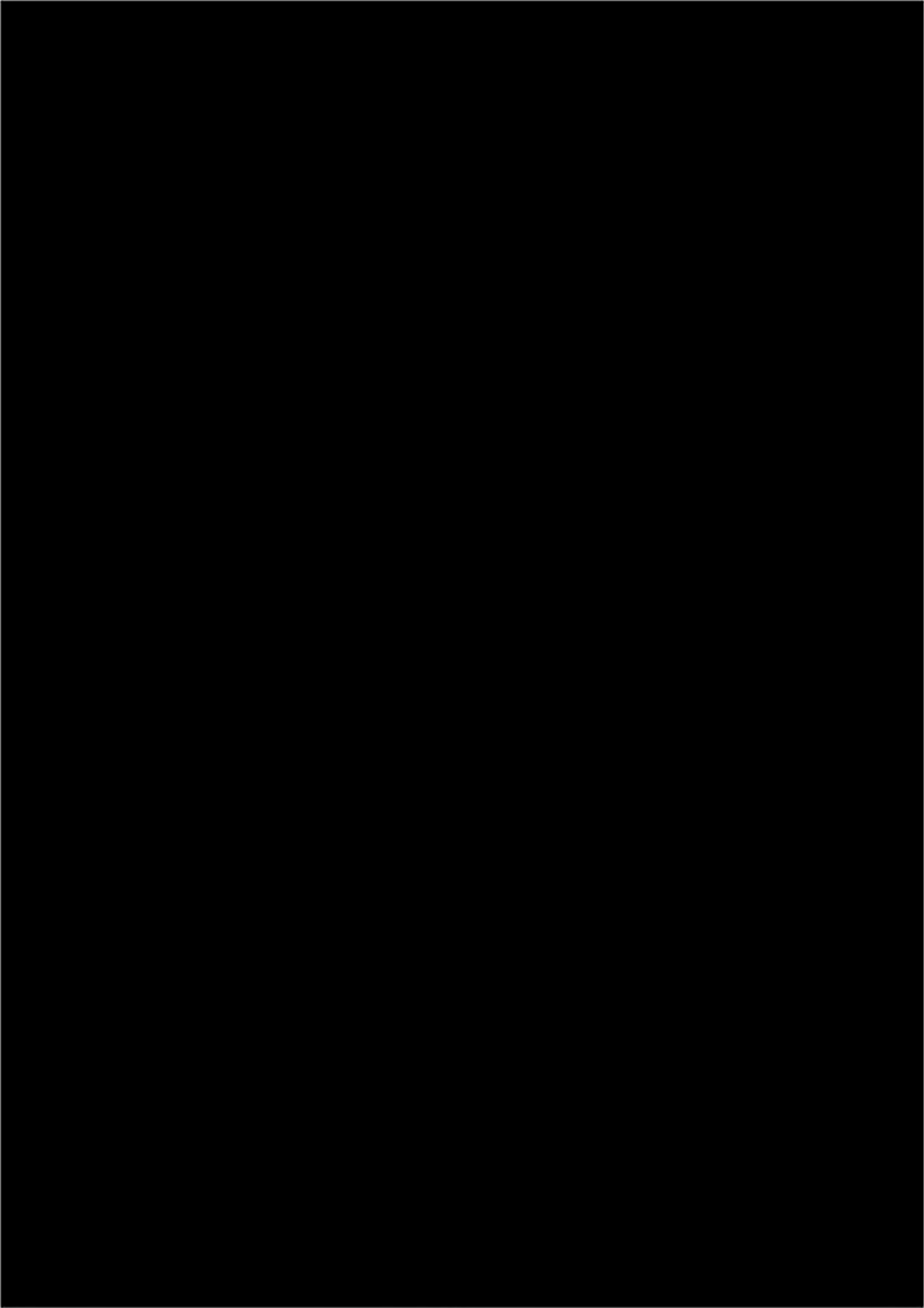


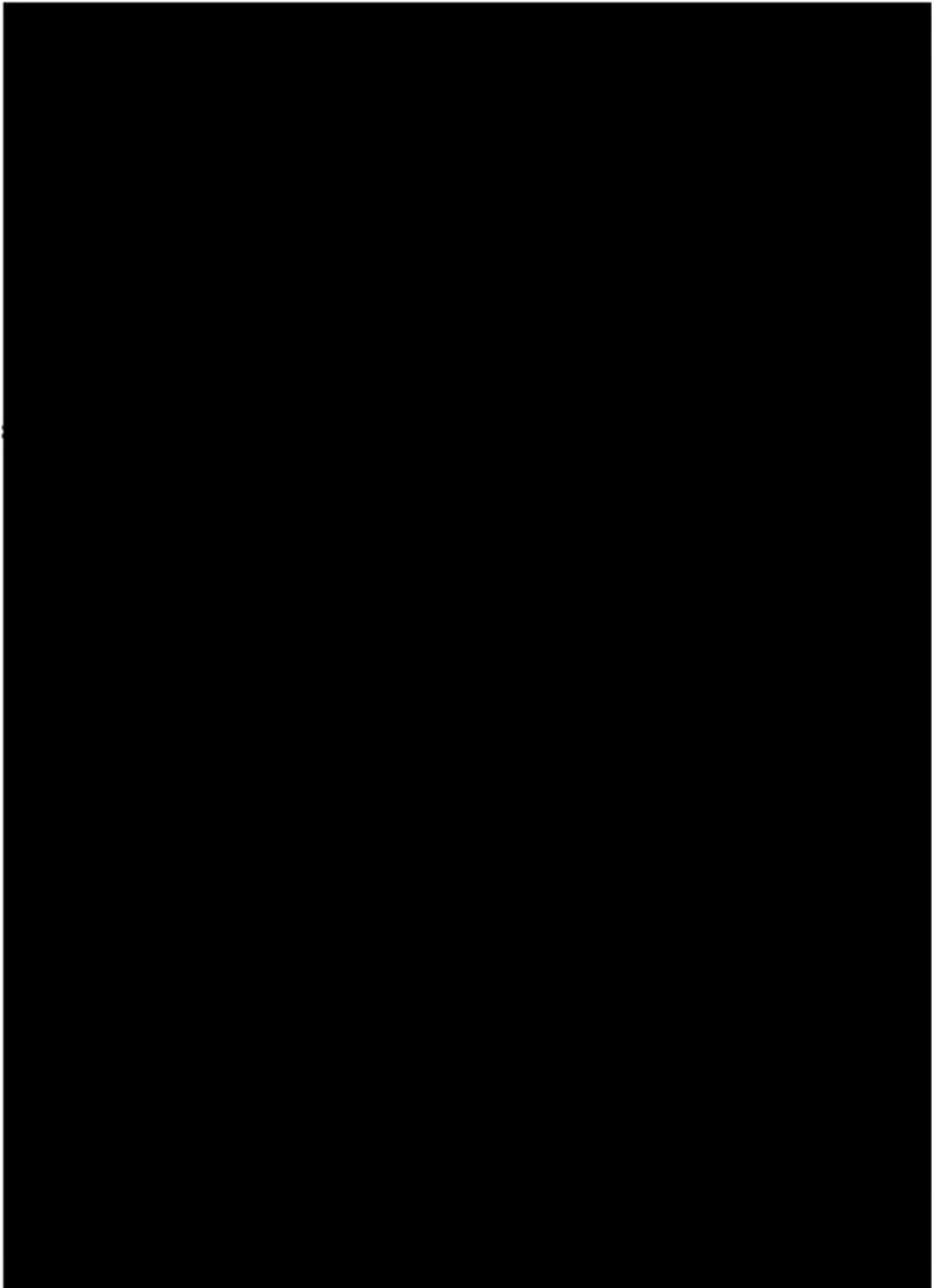




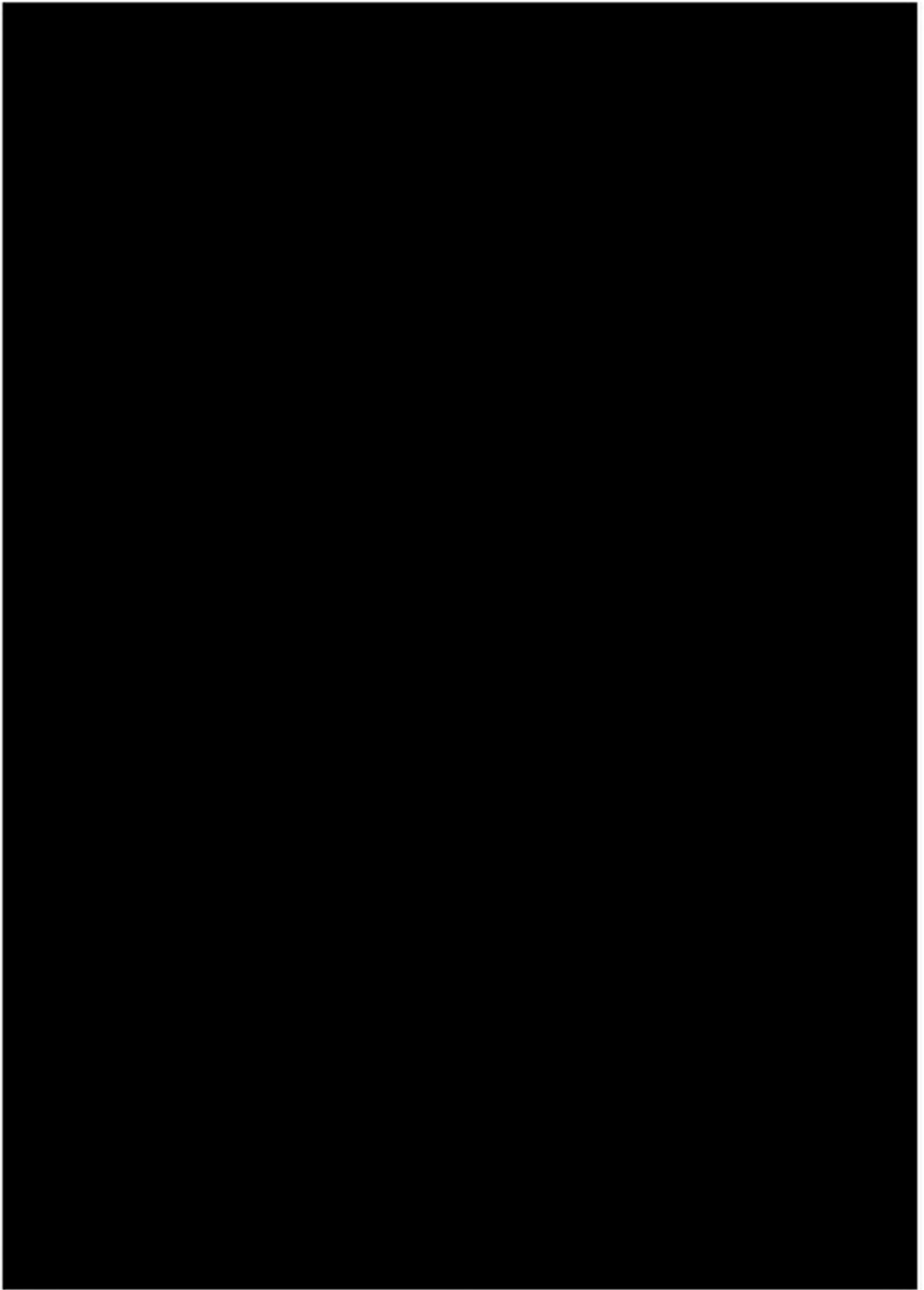








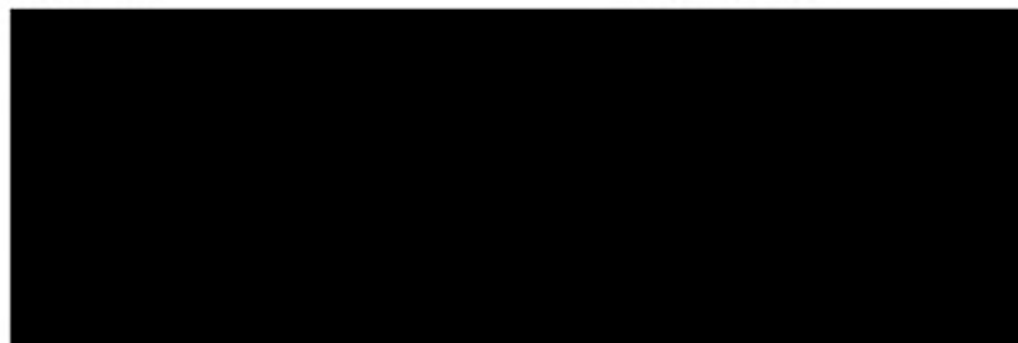






To Owner:

To the Unions:



11. TERM OF AGREEMENT

- 11.1. The term of this Agreement shall commence on the date an agreement is executed between NV Energy and Owner for the Project regarding this Project as identified in Section 1.2, and shall continue in effect until completion of all Covered Work pursuant to Article 2.

SIGNATURE PAGE FOLLOWS

IN WITNESS WHEREOF, the Parties have caused this Agreement to be executed and effective as of May 1, 2018.

[Owner Company]

IBEW LOCAL 357

By:

Its:

By:

Its:

IN WITNESS WHEREOF, the Parties have caused this Agreement to be executed and effective as of May 1, 2018.

[Owner Company



By: Thomas Buttgenbach

Its: Co-President

IBEW LOCAL 357



By:

Its:

EXHIBIT 22

REACTIVE CAPABILITY CURVES

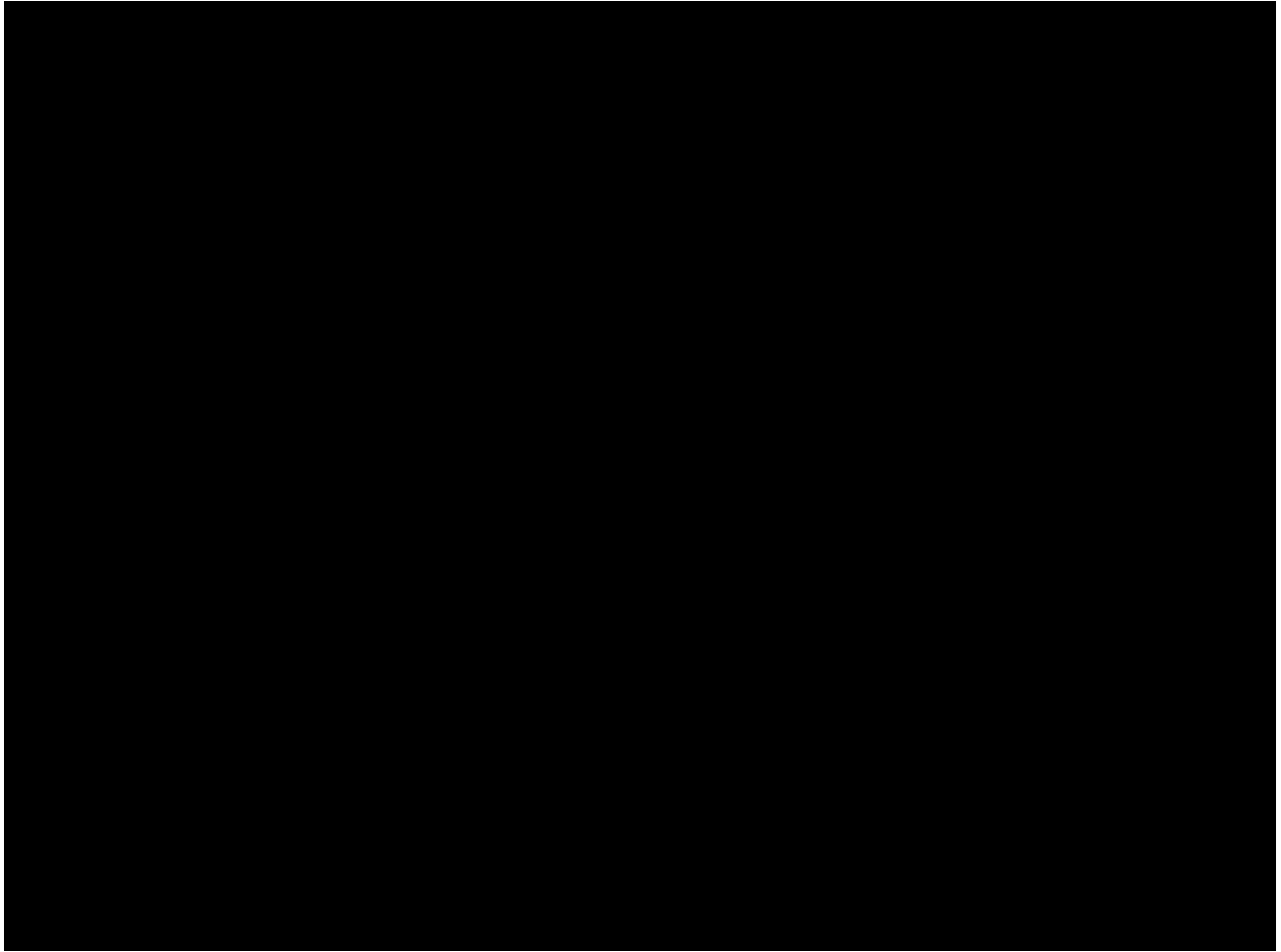


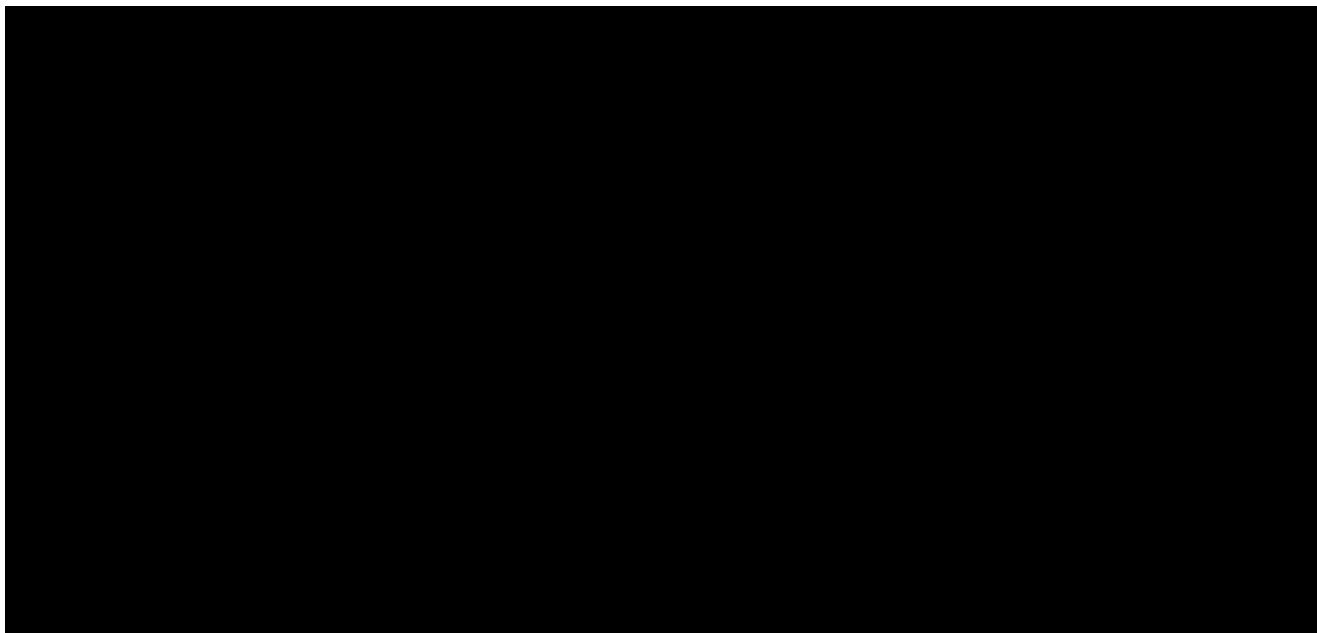
EXHIBIT 23

APPROVED VENDORS LIST

[To be provided by Buyer]

EXHIBIT 24

PURCHASE OPTION MINIMUM PRICE CALCULATION





Department of Comprehensive Planning

500 S Grand Central Pkwy • Box 551741 • Las Vegas NV 89155-1741
(702) 455-4314 • Fax (702) 455-3271

Nancy A. Amundsen, Director

NOTICE OF ADMINISTRATIVE DECISION

March 26, 2020

LINDA BULLEN
BULLEN LAW, LLC
8635 W SAHARA #454
LAS VEGAS, NV 89117

REFERENCE: UC-20-0130

On March 12, 2020, the Governor of Nevada declared a state of emergency related to the COVID-19 virus. Similarly, on March 15, 2020, the Clark County Manager declared a state of emergency related to the prevention of the spread of the COVID-19 virus. In light of the state of emergency and recognizing the importance of advancing routine development applications during this time of crisis, the Clark County Zoning Administrator is authorized to exercise discretion in approving or conditionally approving use permit, design review, waiver, and tentative map applications that otherwise would have been placed on the routine action item portion of the Clark County Zoning Commission and Clark County Planning Commission Agendas and that have not been met with more than nominal opposition.

The above-referenced application was **APPROVED** by the Zoning Administrator subject to the conditions listed below. You will be required to comply with all conditions prior to the issuance of a building permit or a business license, whichever occurs first.

Per Clark County Code Section 30.16.210.15.E, the Administrative Decision of the Zoning Administrator may be appealed to the Board of County Commissioners by submitting a written request by 5:00 p.m. of the fifth judicial day from the date indicated on this letter.

Time limits to commence, complete, or review this approval, apply only to this specific application. A property may have several approved applications on it with each having its own expiration date. **It is the applicant's responsibility to keep each application current.**

CONDITIONS:

Current Planning

- Applicant shall submit to the County, every 6 months, verification that the applicant has a workforce of at least 50% Nevadans during construction.
- Applicant is advised that a substantial change in circumstances or regulations may warrant denial or added conditions to an extension of time; the extension of time may be denied if the project has not commenced or there has been no substantial work towards completion within the time specified; and that this application must commence within 2 years of approval date or it will expire.

BOARD OF COUNTY COMMISSIONERS

MARILYN KIRKPATRICK, Chair • LAWRENCE WEEKLY, Vice Chair
LARRY BROWN • JAMES B. GIBSON • JUSTIN C. JONES • MICHAEL NAFT • TICK SEGERBLOM
YOLANDA T. KING, County Manager



Department of Environment and Sustainability,
 Division of Air Quality
 4701 W. Russell Rd. Suite 200 2nd Floor
 Las Vegas, NV 89118
 Main Number: (702)455-5942
 Fax Number: (702)383-9994

Dust Control Operating Permit (DCOP) For Construction Activities

This permit does not exempt the permittee from compliance with the Endangered Species Act

Permit #: 52380 - Revision #0

Permittee: 325 MK 8 ME LLC

Project: Eagle Shadow Mountain Solar Project

Project Address: SW of Hwy 15 and SR 168

Cross Streets: Hwy 15/NV-168 SW

Effective Date: 5/20/2020

Expiration Date: 5/20/2021

Revision Date:

Project Acreage: 3.9

Area: ENE - East/Northeast

Notes/Additional Permit Conditions

Onsite Project Manager:

Name: Joe Berg

Company: Dashiell Corp

Phone Number: 318.245.0159

Responsible Official:

Name: Benjamin Droz

Company: 325 MK 8 ME LLC

Phone Number: 702.597.1010

Cell Number: 917.224.4396

Dust control measures must occur 24 hours a day, 7 days a week.

This permit is not valid until all fees are paid in full and a complete copy of the permit with conditions and the dust mitigation plan is posted on the project site.

It is a condition of the issuance of any operating permit required by the commission or pursuant to any local ordinance for the control of air pollution that the holder of the operating permit agrees to permit inspection of the premises to which the permit relates by any authorized officer of the department at any time during the holder's hours of operation without prior notice. This condition must be stated on each application form and operating permit. NRS 445B.580.

The issuance of this PERMIT does not relieve the PERMITTEE from compliance with all other applicable federal, state, county and local ordinances and regulations. Issuance of this PERMIT shall not be a defense to violations of any applicable ordinances or regulations.

Dust Control Operating Permit (DCOP) Application Clark County Department of Air Quality				For DAQ Use Only			
NOTE: Demolition by implosion is not covered by this application -- use Implosion Operating Permit Application.				Invoice Number: _____			
Application Type (Select One): ☒ New ☐ Renewal ☐ Modification				Applicant Type (Select One): ☐ Property Owner ☒ Developer ☐ Easement Holder ☐ Contractor ☐ Government			
1. Responsible Official (Applicant) Information:				Received by email on 5-11-2020 at 1:58 PM From: Jennifer Kraus			
Responsible Official Name:		Responsible Official Title:		Permittee (Owner/Company/Organization Name):			
BENJAMIN DROZ				325 MK 8ME LLC			
Permittee Mailing and Email Address Information							
Number:	Direction:	Street:			Street Type:	Suite:	PO Box:
10	E	53RD			ST	17TH FLOOR	
City:	NEW YORK			State:	NY	Zip:	10022
Email:	BDROZ@CAPDYN.COM cc			Primary Communication Method: ☒ Email ☐ US Postal			
Phone Numbers							
Office:	212-798-3420	Extension:		Cell:	917-224-4396	Fax:	
2. Construction Site Superintendent or other designated On-site Representative:							
Name:		Title:		Company:			
JOE BERG		PROJ MANAGER		DASHIELL CORP			
Email:	JOSEPH.BERG@DASHIELL.COM			Dust Card #:	SU 5/20/20		Card Expires:
Office:	713-578-6678	Extension:		Cell:	318-245-0159	Fax:	
3. Project Information:							
Permit # (For new permit, enter NEW; otherwise, enter existing DCOP #):				NEW			
Project Name (same as signage):				EAGLE SHADOW MOUNTAIN SOLAR PROJECT			
Project Description: REPLACEMENT OF AN 230 KV OVERHEAD TRANSMISSION LINE OF .333 MILES LOCATED ON BLM LAND IN CLARK COUNTY, NEVADA. THIS PORTION OF THE OVERHEAD LINE INCLUDES 2 TRANSMISSION LINE POLES, 1 PULL STATION, 0 LAYDOWN YARDS, 0 MILES OF NEW ACCESS ROADS. 5,556.7 LINEAR FT OF EXISTING DIRT TWO TRACK ROAD WILL BE UTILIZED FOR ACCESS. 5,140.3 FT OF THE EXISTING ROADS ARE 16 FEET WIDE, THE REMAINING 416.5 LINEAR FEET OF ROAD IS 22 FEET WIDE.							
Modification Acreage Added:		0		Modification Acreage Removed:		0	
Project Modification Description: cc Jennifer Kraus-- kraus@corecivil.com BLM N-97443							
Portable crushing and/or powered screening equipment supporting an on-site single construction activity and remaining onsite for less than 12 months is exempt from the stationary source permitting requirements of AQR Section 12.1 and will instead be subject to the conditions of the Dust Control Operating Permit issued pursuant to AQR Section 94. This exemption does not apply to equipment listed as emission units in a current minor source permit unless the permit states otherwise.							
Will portable crushing or powered screening occur onsite? ☐ Yes ☒ No							
If yes, what is the anticipated date that equipment will be brought onsite? _____							
What is the duration equipment will remain onsite? _____							
Project Attributes (check all that apply): ☐ Residential ☒ Commercial ☐ Government Facility ☒ Infrastructure Utilities ☐ Flood Control ☐ Airport ☐ Soil Remediation ☐ Structure Demolition ☒ Roadway ☐ Blasting							
Projects less than two weeks in duration may qualify for a sign waiver.							
Does the project qualify for a sign waiver request? ☐ Yes ☒ No							
Is a sign waiver requested for this project? ☐ Yes ☒ No							

Project Physical Location							
Number:	Direction:	Street:				Street Type:	Suite:
N/A		NA SW OF HWY 15 AND SR 168.					
City:	NA MOAPA			State:	NV	Zip:	89025
List major cross streets and the proximity to the intersection:							
1st Cross Street:			2nd Cross Street:			Proximity:	
HIDDEN VALLEY ROAD HWY 15			NV-168			NE SW	
4. Project Disturbed Surface Area:							
a. Project Disturbed Surface Area Information:							
Nonlinear Area Disturbed (Acreage in Tenths)							
(e.g., project site, stockpiles, staging areas, etc.)							
New/Current Total Nonlinear Project Acreage:		1.8		Total Proposed Nonlinear Project Acreage (new/renewal/modifications):		1.8	
Linear Area Disturbed (Not Within Nonlinear Area)							
(e.g., new unpaved access roads, off-site that may include trenching for utilities, street development, road work, etc.)							
Enter total number of linear segments:						4	
New/Current DCOP Maximum Linear Dimensions: (enter dimensions for new/current DCOP)				Proposed DCOP Maximum Linear Dimensions: (enter dimensions for DCOP modification/renewal DCOP)			
Linear Length:	Length Unit of Measure:	Linear Width (feet):	Linear Length:	Length Unit of Measure:	Linear Width (feet):		
497	Feet	16	497	Feet	16		
1,165	Feet	16	1,165	Feet	16		
3,478	Feet	16	3,478	Feet	16		
416	Feet	22	416	Feet	22		
New/Current Total Linear Project Acreage:		2.1		Proposed Total Linear Project Acreage:		2.1	
(1) Nonlinear Area Acreage Subtotal:	1.8	(2) Linear Area Acreage Subtotal:	2.1	Total Project Area Disturbed (1) + (2):	3.9	Modification Acreage Increase:	0
b. Project Parcel. List a parcel number for the project. Particulate Emission Potential (PEP) will automatically be determined by the parcel number. If your project spans multiple parcel numbers, DAQ reserves the right to request the parcel number be changed to account for a higher soil PEP.				Parcel Number		Project PEP	
				04207000004		LOW/MODERATE LOW	
If the project acreage is ten acres or more or if project trenching activities are one mile in length or more, a detailed supplement to the Dust Mitigation Plan must be submitted with this application in accordance with Section 94.5.5 of the Clark County Air Quality Regulations (AQRs) and Appendix B of the Construction Activities Dust Control Handbook.							
Project Map Must Be Attached to DCOP Application NOTE: Air Quality does not accept engineering drawings.							
5. Responsible Official (Applicant) Certification Statement. By signing this permit application, the signatory certifies the following:							
a. As the Responsible Official (applicant), I am authorized on behalf of the Owner Builder/Company/Organization (permittee) listed in Section 1 to apply for this Dust Control Operating Permit (DCOP) and to commit to all of the terms and conditions therein.							
b. Before disturbing soils on a parcel, enacting a grade change, constructing a structure and/or appurtenances, or installing, constructing, or modifying equipment that emits an air pollutant, you must contact and obtain all required permits from Clark County's Department of Comprehensive Planning, Building Department, Department of Air Quality (Title 30 Notice) and the municipality with jurisdiction.							
c. The permit issued in response to this application is not a substitute for obtaining the property owner's permission to use land associated with the project. Issuance of the DCOP is intended only for controlling the emission of air pollutants and assuring compliance with the AQRs. Clark County cannot be held liable for any unauthorized use of the land.							
d. If applying on behalf of the permittee listed in Section 1, the permittee shall be responsible for complying with requirements of this DCOP and the AQRs. Otherwise, the applicant listed in Section 1 shall be the responsible party.							

- e. The permittee accepts responsibility for assuring that all contractors, subcontractors, and other persons on the construction site defined by this permit comply with the terms and conditions of the DCOP, the associated Dust Mitigation Plan and the AQRs.
- f. In accordance with the DCOP and the AQRs, the applicant and the permittee shall consent to inspection of the site during normal hours of operation by DAQ staff without prior notice to determine compliance with the terms and conditions of the DCOP and the AQRs.
- g. If the project has 50 or more acres of actively disturbed soil, the permittee shall notify DAQ and identify the on-site Dust Control Monitor for the project(s). In addition, this notification requirement applies to the following circumstances:
- When the permittee has common control of multiple adjacent projects that individually have less than 50 acres of actively disturbed soil, but the combined project has 50 or more acres of actively disturbed soil; or
 - When the permittee has common control of multiple projects that are not adjacent, but are within a common master-planned community and have 50 or more acres of actively disturbed soil.
- The permittee shall notify DAQ using the current notification form, which is available on the DAQ website and at the front counter of the main office, before disturbing the soil. The Dust Control Monitor must be on-site at all times when construction activities occur and shall manage dust prevention and control on-site.

Applicant Certification

BENJAMIN DROZ	DocuSigned by:  5E2A3EA7362C424	05/10/2020
Responsible Official Name	Applicant's Signature	Signature Date
Advisories		
a. DCOP acreage fee is based on total project acreage of disturbed surface area (Item 4.a. of this application), which is rounded up to the next whole acre. If the project is less than 1 acre, a minimum of 1 acre shall apply to the project for fee purposes. All fees must be paid in full at the time of application; otherwise, the application cannot be accepted.		
b. Any payment made to the department in conjunction with this application may only be refunded to the permittee with the approval of the Board of County Commissioners. Approved refunds may not be issued to a preparer. Only the applicant or permittee may request a refund, which must contain written justification, a completed federal W-9 Form, a copy of the invoice/receipt, a completed Clark County Supplier Addition/Maintenance/Update form, and a copy of the cancelled check (front & back) . The Control Officer shall have sole discretion to approve/disapprove the request for refund approval.		
c. Stormwater Advisory: Be advised that all land disturbances that exceed 1 acre or are adjacent to a waterway must submit a "Notice of Intent" to the Nevada Division of Environmental Protection that certifies a Storm Water Pollution Prevention Plan has been developed and is maintained for the site. Contact NDEP at (775) 687-9429 for an application, information, and instructions.		
d. Payment : Invoice payments must be made by check, money order, or credit card. Checks and money orders must be made payable to Department of Air Quality or DAQ . Credit card payment must be made in person at the DAQ main office.		

ENE/218
HRM

5/20/20



DUST MITIGATION PLAN

Permit # :		NEW	
Project Name:	EAGLE SHADOW MOUNTAIN SOLAR PROJECT		
Company (Permittee):	325 MK 8ME LLC		
Total Project Area Disturbed:	3.9	Particulate Emission Potential (PEP):	LOW/MODERATE LOW

If the project acreage is ten acres or more or if project trenching activities are one mile in length or more, a detailed supplement to the Dust Mitigation Plan must be submitted with this application in accordance with Section 94.5.5 of the Clark County Air Quality Regulations (AQRs) and Appendix B of the Construction Activities Dust Control Handbook.

Water Source (check all that apply)	Water Application Method (check all that apply)
☐ Hydrant with Jones Valve ☐ Stand Tanks ☐ Ponds ☒ Well ☒ Other (Describe Below): THE WATER SOURCE WOULD BE A WELL, IN CONJUNCTION WITH THE USE OF A J-STAND AND POTENTIALLY SOME BAKER TANKS.	☐ Fire Hose ☒ Water Trucks/Pulls ☐ Other (Describe Below):

Project Activities:

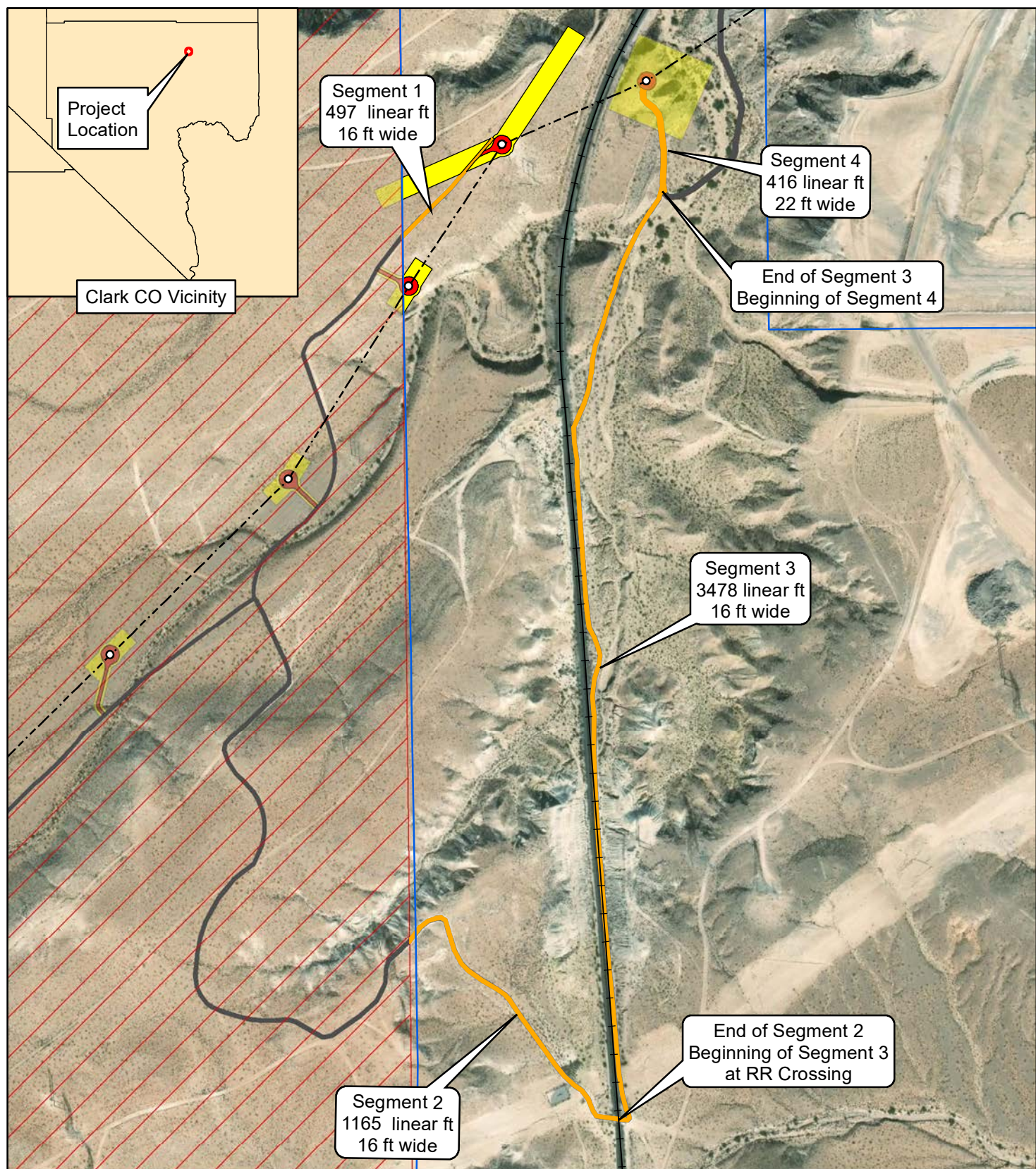
The Dust Mitigation Plan applies to the following project activities: **Backfilling** (Filling area previously excavated or trenched); **Blasting - Abrasive** (Sandblasting and/or abrasive blasting); **Blasting Soil & Rock** (Explosive blasting of soil and rock); **Clearing & Grubbing** (Clearing and grubbing for site preparation and vacant land cleanup); **Clearing Forms, Foundations and Slabs** (Clearing and cleaning of forms, foundations and slabs prior to pouring concrete); **Crushing** (Crushing of construction and demolition debris, rock and soil); **Cut and/or Fill** (Cut and/or fill soils for site grade preparation); **Demolition - Mechanical/Manual** (Mechanical and manual demolition of walls, stucco, concrete, freestanding structures, buildings, load-bearing walls and/or removal of transit pipe); **Disturbed Soil** (Disturbed soil throughout project including between structures); **Disturbed Land - Long Term Stabilization** (Large tracts of disturbed land that will not have continuing activity for more than 30 days); **Dust Suppressants** (Selection and use of chemical and organic dust suppressing agents and other dust palliatives); **Importing/Exporting Materials** (Importing or exporting of soil, aggregate, decorative rock, debris, Type II and other bulk material); **Landscaping** (Installation of sod, decorative rock, desert or other landscape material); **Paving/Subgrade Preparation** (Subgrade preparation for paving streets, parking lots, etc.); **Sawing/Cutting Material** (Sawing or cutting materials such as concrete, asphalt, block or pipe); **Screening** (Screening of rock, soil or construction debris); **Staging Areas** (Staging areas, equipment storage, vehicle parking lots, and material storage areas); **Stockpiles** (Stockpiling of materials, such as Type II, other soils, rock or debris, for future use or export); **Trackout Prevention and Cleanup** (Prevention and cleanup of mud, silt and soil tracked out onto paved roads); **Traffic - Unpaved Routes and Parking** (Construction related traffic on unpaved interior and/or access roads and unpaved employee/worker parking areas); **Trenching** (Trenching with track or wheel mounted excavator, shovel, backhoe or trencher); and **Truck Loading** (Loading trucks with materials including construction and demolition debris, rock and soil).

This DCP Application and Dust Mitigation Plan does not include project activities related to **Demolition - Implosion** (Implosive demolition of a structure, using explosives).

Best Management Practices (BMPs) - Control Measures:

The permittee shall comply with all requirements of Section 94 of the AQRs, all requirements of the current *Clark County Dust Control Handbook*, and all provisions of the DCOP issued from this application.

For each project activity listed in this Dust Mitigation Plan, the permittee shall comply with the requirements for the associated BMPs in the *Dust Control Handbook*. Where options are listed for a BMP requirement, the permittee shall apply one or more of the control measures to comply with the requirement. The permittee will apply corresponding control measures for the PEP for the project soil type(s).



Eagle Shadow Mountain Solar Project

Dust Control Permit Location Map

Clark CO, Nevada

0 500
Feet
1 inch = 500 feet

- Proposed Poles
- Proposed Gen-Tie Line
- ▨ Moapa River Reservation
- ▭ BLM Parcel Boundary
- ▭ Linear Disturbance
- ▭ Permanent Non-Linear Disturbance (0.2 ac)
- ▭ Temporary Non-Linear Disturbance (1.6 ac)

Property lines are approximate and are intended for planning purposes only

Date: 5/7/2020
CORE Project #: 20-057



SBE 26-113 Pg 640

From: [Jennifer Kraus](#)
To: [Heather Mackinnon](#)
Subject: RE: 325 NK 8ME LLC-EABLE SHADOW MOUNTAIN SOLAR PROJECT
Date: Wednesday, May 20, 2020 2:09:01 PM
Attachments: [image003.png](#)

Heather,

CORE Consultants has been hired to coordinate permits for the Eagle Shadow Mountain Solar Project, therefore I was forwarded your email response to follow up with further information. The email chain is below.

On the dust control permit application, we are replacing the Construction Site Superintendent from Robert Mathews to Joe Berg.

Joe Berg, PMP
 Project Manager
 Dashiell Corporation
Joseph.Berg@Dashiell.com
 Office: 713-578-6057
 Cell: 713-494-9846
 12301 Kurland Drive Suite 400
 Houston, TX 77034

I will email a Dust Class Registration Form for Joe Berg to aqdc@clarkcountynv.gov and cc you in a separate email.

The project developer, 325 NK 8ME LLC, has a BLM ROW Grant with serial number N-97443. Could you please let me know how to pay for the dust control permit fee electronically with a credit card?

Thank you,
 Jennifer Kraus
 Senior Project Manager
 Cell 720.724.3531



1950 W Littleton Blvd Suite 109
 Littleton CO 80120
 303.703.4444
CoreCivil.com

From: Benjamin Droz <BDroz@capdyn.com>
Sent: Tuesday, May 12, 2020 11:49 AM
To: 'Heather Mackinnon' <MacKinno@ClarkCountyNV.gov>
Cc: Jason Moretz <jmoretz@8minute.com>; Luke Shillington <lshillington@8minute.com>
Subject: RE: 325 NK 8ME LLC-EABLE SHADOW MOUNTAIN SOLAR PROJECT

Hi Heather,

Thank you, I am confirming receipt and adding Jason and Luke to the email chain. We are working to address the below expeditiously.

Regards,
Ben

CapitalDynamics

Benjamin Droz
Vice President, Clean Energy Infrastructure

10 East 53rd Street, 17th Floor
New York, NY 10022
bdroz@capdyn.com

Direct +1 212 798 3420
Mobile +1 917 224 4396
Main +1 212 798 3400

Visit our website capdyn.com

Please consider the environment in deciding whether to print this e-mail.

From: Heather Mackinnon <MackInno@ClarkCountyNV.gov>
Sent: Tuesday, May 12, 2020 2:42 PM
To: Benjamin Droz <BDroz@capdyn.com>
Subject: 325 NK 8ME LLC-EABLE SHADOW MOUNTAIN SOLAR PROJECT
Importance: High

Greetings,

Please respond as soon as possible so not to delay the approval process. I have reviewed your Dust Control Operating Permit application and have questions and/or need additional information. Applications cannot be updated with verbal authorization so **please reply to this email**. If you have questions, feel free to email me those inquiries.

Robert Mathews needs to send in a dust class registration form ASAP **and cc me**. See link and info below. I will follow up with you once normal operations resume if he does not register.

http://www.clarkcountynv.gov/airquality/compliance/Pages/Compliance_DustForms.aspx

Dust Class registration forms can be submitted electronically at aqdc@clarkcountynv.gov **without a designated class date listed**. DAQ will contact the registrant to confirm a class date and collect payment once normal operations are resumed. If your dust card expired or is expiring during this time period, DAQ will still honor the card.

The area highlighted on the map submitted includes acreage on BLM land. Is the area included in your temporary construction easement or do you have a contract, minerals contract, or bid number?

Regards,

Offices are currently closed, we are working remotely.

Heather Mackinnon

**Clark County Department of
Environment and Sustainability**

4701 W. Russell Rd, #200

Las Vegas NV 89118

Office 702-455-1524

For Dust Control Applications and Forms, click on link below.

You must use **INTERNET EXPLORER** as your search engine. If you have your default browser set to anything else, such as Chrome, the forms will not work.

[Compliance_DustForms](#)

Disclaimer: This message (incl. attachments) is confidential, for the exclusive use of the intended recipient and may contain privileged information. Capital Dynamics may be required to provide detailed information to regulatory, self-regulatory and governmental authorities of jurisdictions in which it operates as part of any inquiry or examination by such authorities. Such information may include details concerning your relationship with Capital Dynamics and any and all data you have provided to, and any communication with, Capital Dynamics or any of its managed funds. By using the services of Capital Dynamics, you consent to the disclosure of such information as indicated. For the full disclaimer please see www.capdyn.com/terms-of-use

Best Management Practices (BMPs) & Control Measures

BMP 01

BACKFILLING

Definition: Filling area previously excavated or trenched.

PEP/Soil Type: L (Low), ML (Moderate Low), MH (Moderate High) & H (High).

The permittee shall comply with all applicable requirements for activities performed pursuant to this Dust Control Operating Permit (DCOP). If a requirement has control measures listed, permittee shall comply with one or more of the control measures. If control measures for the requirement are contingent on the project PEP/Soil Type, permittee shall comply with one or more of the control measure for the designated PEP/Soil Type.

Requirement: Stabilize backfill material when not actively handling.

- 01-01 Water backfill material to maintain moisture or to form crust when not actively handling.
- 01-02 Apply and maintain a dust palliative to backfill material to form crust when not actively handling.
- 01-03 Cover or enclose backfill material when not actively handling.

Requirement: Stabilize backfill material during handling.

- 01-04 Empty loader bucket slowly and minimize drop height from loader bucket.
- 01-05 Dedicate water truck or large hose to backfilling equipment and apply water as needed.

Requirement: Stabilize backfill material during handling based on project soil type.

- 01-07 L & ML: Apply and mix water into the backfill material until optimum moisture is reached.
- 01-08 MH: Apply and mix water and tackifier solution into the backfill material until optimum moisture is reached.
- 01-09 H: Apply and mix water and surfactant solution into the backfill material until optimum moisture is reached.

Requirement: Stabilize soil at completion of backfilling activity.

- 01-10 Apply water and maintain disturbed soils in a stable condition until permanent stabilization is complete.
- 01-11 Apply and maintain a dust palliative on disturbed soils to form a crust following backfilling activity.

Requirement: Stabilize material while using pipe padder equipment.

- 01-12 Mix moist soil with dry soil until the optimum moisture is reached.
- 01-13 Dedicate water truck or large hose to equipment and apply water as needed.

Best Management Practices (BMPs) & Control Measures

BMP 02

BLASTING - ABRASIVE

Definition: Sandblasting and/or abrasive blasting.

PEP/Soil Type: L (Low), ML (Moderate Low), MH (Moderate High) & H (High).

The permittee shall comply with all applicable requirements for activities performed pursuant to this Dust Control Operating Permit (DCOP). If a requirement has control measures listed, permittee shall comply with one or more of the control measures. If control measures for the requirement are contingent on the project PEP/Soil Type, permittee shall comply with one or more of the control measure for the designated PEP/Soil Type.

Requirement: Stabilize surface soils where support equipment and vehicles will operate.

02-01 Pre-water and maintain surface soils in a stabilized condition where support equipment and vehicles will operate.

02-02 Apply and maintain a dust palliative on surface soils where support equipment and vehicles will operate.

Requirement: Limit visible emissions to no more than an average of 40% opacity for any period aggregating 3 minutes in any 60-minute period pursuant to Air Quality Regulations.

02-03 Hydro-blasting, using water as the propellant, must be conducted in a manner to maintain visible emissions within opacity standards.

02-04 Dry, unconfined blasting with abrasive material must use only those abrasives that are approved and certified by the California Air Resources Board (CARB) for such use (see Attachment 3: CARB-Approved Abrasives Information).

Requirement: Stabilize particulate matter in surrounding area following blasting.

02-05 Clean particulate material from surrounding area and water disturbed soils following blasting.

02-06 Apply and maintain a dust palliative to surrounding area following blasting.

Best Management Practices (BMPs) & Control Measures

BMP 03

BLASTING - SOIL & ROCK

Definition: Explosive blasting of soil and rock.

PEP/Soil Type: L (Low), ML (Moderate Low), MH (Moderate High) & H (High).

The permittee shall comply with all applicable requirements for activities performed pursuant to this Dust Control Operating Permit (DCOP). If a requirement has control measures listed, permittee shall comply with one or more of the control measures. If control measures for the requirement are contingent on the project PEP/Soil Type, permittee shall comply with one or more of the control measure for the designated PEP/Soil Type.

Requirement: A Blasting Supplemental form must be filled out, submitted and approved by the DAQEM prior to any blasting (see Appendix A: Dust Control Permit Supplemental Forms)

Requirement: No blasting within 1,500 feet of a residential area, occupied building or major roadway, when wind direction is toward these structures.

Requirement: Blasting shall be between the hours of 8:00 a.m. and 4:30 p.m., excluding Saturdays, Sundays and holidays unless prior permission is obtained from the Control Officer.

Requirement: No blasting allowed when the National Weather Service forecasts wind gusts above 25 miles per hour (mph).

03-01 Prior to setting explosive charges in holes, document current and predicted weather conditions as provided by the National Weather Service. If the current forecast is for wind gusts of 25 mph or greater or they are forecasted to be 25 mph or greater within the next 24 hours, do not charge any blast holes. When setting explosive charges, monitor weather reports for wind gusts of 25 mph or greater on the National Weather Service Radio and/or Internet sites. If wind gusts above 25 mph are stated, d

Requirement: Stabilize surface soils where drills, support equipment and vehicles will operate.

03-02 Pre-water and maintain surface soils in a stabilized condition where drills, support equipment and vehicles will operate.

03-03 Apply and maintain a dust palliative on surface soils where drills, support equipment and vehicles will operate.

Requirement: Stabilize soil during blast preparation activities.

03-04 Limit the blast footprint area to no larger than what can be practically stabilized immediately following the blast.

03-05 Maintain surface rock and vegetation where possible to reduce exposure of disturbed soil to wind.

Requirement: Stabilize soil during blast preparation activities based on project soil type.

03-06 L & ML: Presoak surface soils to depth of the caliche or bedrock with water using water trucks, water pulls, sprinklers or wobblers.

03-07 MH: Presoak surface soils to depth of the caliche or bedrock with water and tackifier mixture using water trucks, water pulls, sprinklers or wobblers.

03-08 H: Presoak surface soils to depth of the caliche or bedrock with water and surfactant mixture using water trucks, water pulls, sprinklers or wobblers.

Requirement: Stabilize soil after blasting.

03-09 Water disturbed soils to form crust immediately following blast and safety clearance.

03-10 Apply and maintain a dust palliative to form crust immediately following blast and safety clearance.

Best Management Practices (BMPs) & Control Measures

BMP 04

CLEARING & GRUBBING

Definition: Clearing and grubbing for site preparation and vacant land cleanup.

PEP/Soil Type: L (Low), ML (Moderate Low), MH (Moderate High) & H (High).

The permittee shall comply with all applicable requirements for activities performed pursuant to this Dust Control Operating Permit (DCOP). If a requirement has control measures listed, permittee shall comply with one or more of the control measures. If control measures for the requirement are contingent on the project PEP/Soil Type, permittee shall comply with one or more of the control measure for the designated PEP/Soil Type.

Requirement: Stabilize surface soils where support equipment and vehicles will operate.

04-01 Pre-water and maintain surface soils in a stabilized condition where support equipment and vehicles will operate.

04-02 Apply and maintain a dust palliative on surface soils where support equipment and vehicles will operate.

Requirement: Stabilize soil during clearing and grubbing activities.

04-03 L & ML: Apply water during clearing and grubbing activities.

04-04 MH: Apply water and tackifier mixture during clearing and grubbing activities.

04-05 H: Apply water and surfactant mixture during clearing and grubbing activities.

Requirement: Stabilize disturbed soil immediately after clearing and grubbing activities.

04-06 Water disturbed soils to form crust immediately following clearing and grubbing activities.

04-07 Apply and maintain a dust palliative on disturbed soils to form crust immediately following clearing and grubbing activities.

Best Management Practices (BMPs) & Control Measures

BMP 05

CLEARING FORMS, FOUNDATIONS AND SLABS

Definition: Clearing and cleaning of forms, foundations and slabs prior to pouring concrete.

PEP/Soil Type: L (Low), ML (Moderate Low), MH (Moderate High) & H (High).

The permittee shall comply with all applicable requirements for activities performed pursuant to this Dust Control Operating Permit (DCOP). If a requirement has control measures listed, permittee shall comply with one or more of the control measures. If control measures for the requirement are contingent on the project PEP/Soil Type, permittee shall comply with one or more of the control measure for the designated PEP/Soil Type.

Requirement: Limit visible emissions to no more than an average of 20% opacity for any period aggregating 3 minutes in any 60-minute period pursuant to Air Quality Regulations.

05-01 Use single stage pours, unless prohibited by engineering design or building code, to minimize clearing.

Requirement: Limit visible emissions to no more than an average of 20% opacity for any period aggregating 3 minutes in any 60-minute period by complying with at least one of the additional control measures.

05-02 Use water spray to clear forms, foundations and slabs.

05-03 Use sweeping and water spray to clear forms, foundations and slabs.

05-04 Use industrial vacuum to clear forms, foundations and slabs prior to the use of high pressure air to blow soil and debris.

05-05 Use industrial vacuum to clear forms, foundations and slabs.

Best Management Practices (BMPs) & Control Measures

BMP 06

CRUSHING

Definition: Crushing of construction and demolition debris, rock and soil.

PEP/Soil Type: L (Low), ML (Moderate Low), MH (Moderate High) & H (High).

The permittee shall comply with all applicable requirements for activities performed pursuant to this Dust Control Operating Permit (DCOP). If a requirement has control measures listed, permittee shall comply with one or more of the control measures. If control measures for the requirement are contingent on the project PEP/Soil Type, permittee shall comply with one or more of the control measure for the designated PEP/Soil Type.

Requirement: Obtain the appropriate Operating Permit for powered crushers prior to engaging in crushing activity. Comply with permit conditions.

Requirement: Stabilize surface soils where support equipment and vehicles will operate.

06-01 Pre-water and maintain surface soils in a stabilized condition where support equipment and vehicles will operate.

06-02 Apply and maintain a dust palliative to surface soils where support equipment and vehicles will operate.

Requirement: Stabilize material before crushing.

06-03 Pre-water material prior to loading into crusher.

06-04 Test material to determine moisture content and silt loading, crush only material that is at optimum moisture content.

Requirement: Stabilize material during crushing.

06-05 Apply water to stabilize material so as to remain in compliance with opacity standards and permit conditions, during crushing.

06-06 Monitor emissions opacity. Make adjustments to remain in compliance with opacity standards and permit conditions.

Requirement: Stabilize material after crushing.

06-07 Water crushed material to form crust immediately following crushing.

06-08 Apply and maintain a dust palliative to crushed material.

Best Management Practices (BMPs) & Control Measures

BMP 07

CUT AND/OR FILL

Definition: Cut and/or fill soils for site grade preparation.

PEP/Soil Type: L (Low), ML (Moderate Low), MH (Moderate High) & H (High).

The permittee shall comply with all applicable requirements for activities performed pursuant to this Dust Control Operating Permit (DCOP). If a requirement has control measures listed, permittee shall comply with one or more of the control measures. If control measures for the requirement are contingent on the project PEP/Soil Type, permittee shall comply with one or more of the control measure for the designated PEP/Soil Type.

Requirement: Stabilize surface soils where support equipment and vehicles will operate.

07-01 Pre-water and maintain surface soils in a stabilized condition where support equipment and vehicles will operate.

07-02 Apply and maintain a dust palliative to surface soils where support equipment and vehicles will operate.

Requirement: Pre-water soils based on project soil type.

07-03 Dig a test hole to depth of cut or equipment penetration to determine if soils are moist at depth. Continue to pre-water if not moist to depth of cut.

07-04 L & ML: Pre-water with sprinklers or wobblers to allow time for penetration.

07-05 L & ML: Pre-water with water trucks or water pulls to allow time for penetration.

07-06 MH: Pre-water with a water and tackifier mixture using sprinklers or wobblers to allow time for penetration.

07-07 MH: Pre-water with a water and tackifier mixture using water trucks or water pulls to allow time for penetration.

07-08 H: Pre-water with a water and surfactant mixture using sprinklers or wobblers to allow time for penetration.

07-09 H: Pre-water with a water and surfactant mixture using water trucks or water pulls to allow time for penetration.

Requirement: Stabilize soil during cut activities.

07-10 Apply water, using water truck or water pull, to depth of cut prior to subsequent cuts.

07-11 No cut activities fill only.

Requirement: Stabilize soil after cut and fill activities.

07-12 Water disturbed soils to form crust following fill and compaction.

07-13 Apply and maintain a dust palliative on disturbed soils to form crust following fill and compaction.

Best Management Practices (BMPs) & Control Measures

BMP 08

DEMOLITION - IMPLOSION

Definition: Implosive demolition of a structure, using explosives.

PEP/Soil Type: L (Low), ML (Moderate Low), MH (Moderate High) & H (High).

The permittee shall comply with all applicable requirements for activities performed pursuant to this Dust Control Operating Permit (DCOP). If a requirement has control measures listed, permittee shall comply with one or more of the control measures. If control measures for the requirement are contingent on the project PEP/Soil Type, permittee shall comply with one or more of the control measure for the designated PEP/Soil Type.

Requirement: A Demolition Supplemental form (see Appendix A) and a Supplement To The Dust Mitigation Plan (see Appendix B) must be filled out, submitted and approved by the Control Officer prior to implosion.

Requirement: An asbestos survey must be conducted on any facility before demolition can commence.

Requirement: A complete Clark County NESHAP Notification form must be submitted to the DAQEM at least ten working days prior to demolition. The asbestos survey must be attached to this notification.

Requirement: All friable and non-friable asbestos containing material must be removed from the facility prior to implosion.

Requirement: Confine blasting to times when wind direction is away from closest residential areas, occupied buildings and major roadways.

Requirement: Implosion time must be pre-approved by the Control Officer.

Requirement: Monitor and document current weather conditions and weather predictions from National Weather Service.

08-01 Prior to setting explosive charges, obtain and document current and predicted weather conditions as provided by the National Weather Service. If wind advisory (over 20 miles per hour gusts or average wind speed of 10 miles per hour) is current or forecasted for blast period, do not set charges and do not blast. Maintain a calibrated anemometer and log ambient air velocity and direction within 1,000 feet of the implosion site, beginning at least 1 (one) hour prior to and 15 minutes after the impl

Requirement: Stabilize surface area where support equipment and vehicles will be operated.

08-02 Restrict support equipment and vehicles to existing paved and/or stable areas.

08-03 If paved and/or stable areas do not already exist, pre-water and maintain surface soils in a stabilized condition where support equipment and vehicles will operate.

08-04 If paved and/or stable areas do not already exist, apply and maintain a dust palliative on surface soils where support equipment and vehicles will be operated.

Requirement: Stabilize demolition debris immediately following blast and safety clearance.

08-05 Apply water to debris immediately following blast and safety clearance.

08-06 Apply and maintain a dust palliative to debris immediately following blast and safety clearance.

Requirement: Stabilize and clean surrounding area immediately following blast and safety clearance.

08-07 Water all disturbed soil surfaces to establish crust and prevent wind erosion of soil.

08-08 Thoroughly clean blast debris from paved and other surfaces following blast and safety clearance.

Best Management Practices (BMPs) & Control Measures

BMP 09

DEMOLITION - MECHANICAL/MANUAL

Definition: Mechanical and manual demolition of walls, stucco, concrete, freestanding structures, buildings, load-bearing walls and/or removal of transit pipe.

PEP/Soil Type: L (Low), ML (Moderate Low), MH (Moderate High) & H (High).

The permittee shall comply with all applicable requirements for activities performed pursuant to this Dust Control Operating Permit (DCOP). If a requirement has control measures listed, permittee shall comply with one or more of the control measures. If control measures for the requirement are contingent on the project PEP/Soil Type, permittee shall comply with one or more of the control measure for the designated PEP/Soil Type.

Requirement: For renovation or demolition of a structure, a Demolition Supplemental form (see Appendix A) must be filled out, submitted and approved by the Control Officer prior to commencing demolition.

Requirement: An asbestos survey must be conducted on any facility or structure that is subject to NESHAP requirements before demolition can commence.

Requirement: A complete Clark County NESHAPS Notification form must be submitted to the DAQEM at least ten working days prior to demolition. The asbestos survey must be attached to this notification.

Requirement: Stabilize surface soils where support equipment and vehicles will operate.

09-01 Pre-water and maintain surface soils in a stabilized condition where support equipment and vehicles will operate.

09-02 Apply and maintain a dust palliative to surface soils where support equipment and vehicles will operate.

09-03 Area where support equipment and vehicles will operate is completely covered with paving or concrete.

Requirement: Stabilize demolition debris during handling.

09-04 Apply water to demolition debris during handling.

Requirement: Stabilize debris following demolition.

09-05 Apply water to stabilize demolition debris.

09-06 Apply a dust palliative to stabilize demolition debris.

Requirement: Stabilize surrounding area following demolition.

09-07 Apply water to stabilize surrounding area following demolition.

09-08 Apply and maintain a dust palliative to stabilize surrounding area following demolition.

Best Management Practices (BMPs) & Control Measures

BMP 10

DISTURBED SOIL

Definition: Disturbed soil throughout project including between structures.

PEP/Soil Type: L (Low), ML (Moderate Low), MH (Moderate High) & H (High).

The permittee shall comply with all applicable requirements for activities performed pursuant to this Dust Control Operating Permit (DCOP). If a requirement has control measures listed, permittee shall comply with one or more of the control measures. If control measures for the requirement are contingent on the project PEP/Soil Type, permittee shall comply with one or more of the control measure for the designated PEP/Soil Type.

Requirement: For each non-linear project to be permitted for 5 acres or less; install perimeter wind barrier 3 feet or more in height made of material with a porosity of 50% or less.

Requirement: Limit vehicle traffic and disturbance of soils where possible.

10-01 Limit vehicle traffic and disturbance of soils with the use of fencing, barriers, barricades, and/or wind barriers.

Requirement: Stabilize and maintain stability of all disturbed soil throughout construction site.

10-02 Apply water to stabilize disturbed soils. Soils must be kept in a sufficiently damp, crusted or covered condition.

10-03 Apply and maintain a dust palliative based on soil type and future plans.

Requirement: Soil conditions, including preventive and corrective measures, must be recorded every day the construction project is active.

10-04 Record soil conditions and dust control actions in daily project records.

Best Management Practices (BMPs) & Control Measures

BMP 11

DISTURBED LAND - LONG TERM STABILIZATION

Definition: Large tracts of disturbed land that will not have continuing activity for more than 30 days.

PEP/Soil Type: L (Low), ML (Moderate Low), MH (Moderate High) & H (High).

The permittee shall comply with all applicable requirements for activities performed pursuant to this Dust Control Operating Permit (DCOP). If a requirement has control measures listed, permittee shall comply with one or more of the control measures. If control measures for the requirement are contingent on the project PEP/Soil Type, permittee shall comply with one or more of the control measure for the designated PEP/Soil Type.

Requirement: Stabilize soil to meet standards required by Air Quality Regulation Section 90.

- 11-01 Apply and maintain a dust palliative on disturbed soils for long-term stabilization.
- 11-02 Stabilize disturbed soil with vegetation for long-term stabilization.
- 11-03 Pave or apply surface rock for long-term stabilization.
- 11-04 Use wind breaks in accordance with a site-specific plan approved by the Control Officer and Region IX Administrator of the EPA.
- 11-05 Apply water and maintain soils in a visible damp or crusted condition for temporary stabilization.

Requirement: Prevent access to limit soil disturbance.

- 11-06 Prevent access by fencing, ditches, vegetation, berms or other suitable barrier or means approved by the Control Officer.

Best Management Practices (BMPs) & Control Measures

BMP 12

DUST SUPPRESSANTS - SELECTION AND USE

Definition: Selection and use of chemical and organic dust suppressing agents and other dust palliatives.

PEP/Soil Type: L (Low), ML (Moderate Low), MH (Moderate High) & H (High).

The permittee shall comply with all applicable requirements for activities performed pursuant to this Dust Control Operating Permit (DCOP). If a requirement has control measures listed, permittee shall comply with one or more of the control measures. If control measures for the requirement are contingent on the project PEP/Soil Type, permittee shall comply with one or more of the control measure for the designated PEP/Soil Type.

Requirement: Follow CCHD “Interim Policy on Dust Palliatives Use In Clark County, Nevada”.

Requirement: Record use of suppressants and dust palliatives and retain records.

Requirement: Follow applicable federal and state regulations.

Requirement: Select method of long-term stabilization taking into consideration future land use.

12-01 For traffic area applications use Table 1: Traffic Area Application Requirements, Appropriate Use of Liquid Dust Palliatives and Application Rates, from the Interim Policy on Dust Palliatives Use in Clark County, Nevada.

12-02 For non-traffic area applications use Table 2: Non-Traffic Area Application Requirements, Appropriate Use of Liquid Dust Palliatives and Application Rates, from the Interim Policy on Dust Palliatives Use in Clark County, Nevada.

Best Management Practices (BMPs) & Control Measures

BMP 13

IMPORTING/EXPORTING MATERIALS

Definition: Importing or exporting of soil, aggregate, decorative rock, debris, Type II and other bulk material.

PEP/Soil Type: L (Low), ML (Moderate Low), MH (Moderate High) & H (High).

The permittee shall comply with all applicable requirements for activities performed pursuant to this Dust Control Operating Permit (DCOP). If a requirement has control measures listed, permittee shall comply with one or more of the control measures. If control measures for the requirement are contingent on the project PEP/Soil Type, permittee shall comply with one or more of the control measure for the designated PEP/Soil Type.

Requirement: Limit visible dust opacity from vehicular operations.

13-01 Apply water and limit vehicle speeds to 15 mph on the work site.

13-02 Apply and maintain dust suppressant on haul routes.

Requirement: Check belly-dump truck seals regularly and remove any trapped rocks to prevent spillage.

Requirement: Maintain 3-6 inches of freeboard to minimize spillage.

Requirement: Stabilize materials during transport on site.

13-03 Use tarps or other suitable enclosures on haul trucks.

13-04 Stabilize materials with water.

Requirement: Clean wheels and undercarriage of haul trucks prior to leaving construction site.

Best Management Practices (BMPs) & Control Measures

BMP 14

LANDSCAPING

Definition: Installation of sod, decorative rock, desert or other landscape material.

PEP/Soil Type: L (Low), ML (Moderate Low), MH (Moderate High) & H (High).

The permittee shall comply with all applicable requirements for activities performed pursuant to this Dust Control Operating Permit (DCOP). If a requirement has control measures listed, permittee shall comply with one or more of the control measures. If control measures for the requirement are contingent on the project PEP/Soil Type, permittee shall comply with one or more of the control measure for the designated PEP/Soil Type.

Requirement: Stabilize soils, materials and slopes during handling.

- 14-01 L & ML: Apply water prior to leveling or any other earth moving activity to keep the soil moist throughout the process.
- 14-02 MH: Apply a water and tackifier mixture prior to leveling or any other earth moving activity to keep the soil moist throughout the process.
- 14-03 H: Apply a water and surfactant mixture prior to leveling or any other earth moving activity to keep the soil moist throughout the process.

Requirement: Stabilize soils, materials and slopes at completion of activity.

- 14-04 Stabilize sloping surfaces using soil binders until vegetation or ground cover can effectively stabilize the slope.
- 14-05 Apply water and maintain sloping surfaces in a crusted condition.
- 14-06 Maintain effective cover over materials.

Best Management Practices (BMPs) & Control Measures

BMP 15

PAVING/SUBGRADE PREPARATION

Definition: Subgrade preparation for paving streets, parking lots, etc.

PEP/Soil Type: L (Low), ML (Moderate Low), MH (Moderate High) & H (High).

The permittee shall comply with all applicable requirements for activities performed pursuant to this Dust Control Operating Permit (DCOP). If a requirement has control measures listed, permittee shall comply with one or more of the control measures. If control measures for the requirement are contingent on the project PEP/Soil Type, permittee shall comply with one or more of the control measure for the designated PEP/Soil Type.

Requirement: Stabilize soils prior to activities.

15-01 Pre-water subgrade surface until optimum moisture content is reached and maintained.

Requirement: Stabilize soils during activities.

15-02 Maintain at least 70% of optimum moisture content for Type II material while aggregate is being applied.

Requirement: Stabilize soils following activities.

15-03 Place tack coat on Type II aggregate base immediately after it is applied.

15-04 Apply water to Type II aggregate base immediately after it is applied.

Requirement: Stabilize adjacent disturbed soils following paving activities.

15-05 Stabilize adjacent disturbed soils following paving activities by crusting with water.

15-06 Stabilize adjacent disturbed soils following paving activities by applying a dust palliative.

15-07 Stabilize adjacent disturbed soils following paving activities with immediate landscaping activity or installation of vegetative or rock cover.

15-08 There are no soils adjacent to paving activities.

Best Management Practices (BMPs) & Control Measures

BMP 16**SAWING/CUTTING MATERIAL**

Definition: Sawing or cutting materials such as concrete, asphalt, block or pipe.

PEP/Soil Type: L (Low), ML (Moderate Low), MH (Moderate High) & H (High).

The permittee shall comply with all applicable requirements for activities performed pursuant to this Dust Control Operating Permit (DCOP). If a requirement has control measures listed, permittee shall comply with one or more of the control measures. If control measures for the requirement are contingent on the project PEP/Soil Type, permittee shall comply with one or more of the control measure for the designated PEP/Soil Type.

Requirement: Limit visible emissions to no more than an average of 20% opacity, pursuant to Air Quality Regulations.

16-01 Use water to control dust when cutting materials.

16-02 Use a vacuum to collect dust when cutting materials.

Best Management Practices (BMPs) & Control Measures

BMP 17

SCREENING

Definition: Screening of rock, soil or construction debris.

PEP/Soil Type: L (Low), ML (Moderate Low), MH (Moderate High) & H (High).

The permittee shall comply with all applicable requirements for activities performed pursuant to this Dust Control Operating Permit (DCOP). If a requirement has control measures listed, permittee shall comply with one or more of the control measures. If control measures for the requirement are contingent on the project PEP/Soil Type, permittee shall comply with one or more of the control measure for the designated PEP/Soil Type.

Requirement: If using a powered screen, obtain the appropriate Operating Permit for powered screens prior to engaging in screening activity. Comply with permit conditions.

Requirement: Drop material through the screen slowly and minimize drop height.

Requirement: Stabilize surface soils where support equipment and vehicles will operate.

17-01 Pre-water and maintain surface soils in a stabilized condition where support equipment and vehicles will operate.

17-02 Apply and maintain a dust palliative on surface soils where support equipment and vehicles will operate.

Requirement: Pre-treat material prior to screening.

17-03 Apply sufficient water to obtain at least 70% optimum moisture in material prior to screening.

17-04 Apply a dust suppressant to material prior to screening.

Requirement: Stabilize material during screening.

17-05 Dedicate water truck or large hose to screening operation and apply water as needed to prevent dust.

17-06 Apply water to material as it is being dropped through the screen.

17-07 Install wind barrier upwind of screen as high as the screen drop point and made of material with a porosity of 50% or less.

Requirement: Stabilize material and surrounding area immediately after screening.

17-08 Apply water to stabilize screened material and surrounding area after screening.

17-09 Apply and maintain a dust palliative to stabilize screened material and surrounding area after screening.

Best Management Practices (BMPs) & Control Measures

BMP 18

STAGING AREAS

Definition: Staging areas, equipment storage, vehicle parking lots, and material storage areas.

PEP/Soil Type: L (Low), ML (Moderate Low), MH (Moderate High) & H (High).

The permittee shall comply with all applicable requirements for activities performed pursuant to this Dust Control Operating Permit (DCOP). If a requirement has control measures listed, permittee shall comply with one or more of the control measures. If control measures for the requirement are contingent on the project PEP/Soil Type, permittee shall comply with one or more of the control measure for the designated PEP/Soil Type.

Requirement: Limit visible dust opacity from vehicular operations.

- 18-01 Limit vehicle speeds to 15 mph in the staging area and on all unpaved access routes.
- 18-02 Apply and maintain dust suppressant on all vehicle traffic areas in the staging areas and unpaved access routes.

Requirement: Stabilize staging area soils during use.

- 18-03 Pre-water and maintain surface soils in a stabilized condition where support equipment and vehicles will operate.
- 18-04 Apply and maintain a dust palliative to surface soils where support equipment and vehicles will be operated.

Requirement: Stabilize staging area soils at project completion.

- 18-05 Apply a dust palliative.
- 18-06 Apply screened or washed Type II aggregate.
- 18-07 Use wind breaks in accordance with a site-specific plan approved by the Control Officer and Region IX Administrator of the EPA.
- 18-08 Pave with thin paving.
- 18-09 Completed project will cover staging area with buildings, paving, and/or landscaping.
- 18-10 Apply water to form adequate crust and prevent access.

Best Management Practices (BMPs) & Control Measures

BMP 19

STOCKPILES

Definition: Stockpiling of materials, such as Type II, other soils, rock or debris, for future use or export.

PEP/Soil Type: L (Low), ML (Moderate Low), MH (Moderate High) & H (High).

The permittee shall comply with all applicable requirements for activities performed pursuant to this Dust Control Operating Permit (DCOP). If a requirement has control measures listed, permittee shall comply with one or more of the control measures. If control measures for the requirement are contingent on the project PEP/Soil Type, permittee shall comply with one or more of the control measure for the designated PEP/Soil Type.

Requirement: To the extent possible, maintain stockpile to avoid steep sides or faces.

Requirement: Stockpile location and height must be maintained pursuant to Air Quality Regulations. Stockpiles located within 100 yards of occupied buildings must not be constructed over 8 feet in height.

19-01 Stockpiles will not be constructed over 8 feet in height.

19-02 Stockpiles will be constructed over 8 feet high and must have a road bladed to the top to allow water truck access or must have a sprinkler irrigation system installed, used and maintained.

Requirement: Stabilize surface soils where support equipment and vehicles will operate.

19-03 Pre-water and maintain surface soils in a stabilized condition where support equipment and vehicles will operate.

19-04 Apply and maintain a dust palliative on surface soils where support equipment and vehicles will operate.

Requirement: Stabilize stockpile materials during handling.

19-05 Maintain stockpile materials with at least 70% optimum moisture content.

19-06 Remove material from the downwind side of the stockpile, when safe to do so.

Requirement: Stabilize stockpile materials during handling based on the project soil type.

19-07 L & ML: Apply water during stacking, loading and unloading operations.

19-08 MH: Apply a water and tackifier mixture during stacking, loading and unloading operations.

19-09 H: Apply a water and surfactant mixture during stacking, loading and unloading operations.

Requirement: Stabilize stockpiles at completion of activity.

19-10 Water stockpiles to form a crust immediately at the completion of activity.

19-11 Apply and maintain a dust palliative to all outer surfaces of the stockpiles.

19-12 Provide and maintain wind barriers on 3 sides of the pile, whose length is no less than equal to the length of the pile, whose distance from the pile is no more than twice the height of the pile, whose height is equal to the pile height, and made of material with a porosity of 50% or less.

19-13 Apply a cover or screen to stockpiles.

Best Management Practices (BMPs) & Control Measures

BMP 20

TRACKOUT PREVENTION AND CLEANUP

Definition: Prevention and cleanup of mud, silt and soil tracked out onto paved roads.

PEP/Soil Type: L (Low), ML (Moderate Low), MH (Moderate High) & H (High).

The permittee shall comply with all applicable requirements for activities performed pursuant to this Dust Control Operating Permit (DCOP). If a requirement has control measures listed, permittee shall comply with one or more of the control measures. If control measures for the requirement are contingent on the project PEP/Soil Type, permittee shall comply with one or more of the control measure for the designated PEP/Soil Type.

Requirement: In soils that have a PEP classification of “High”, pave construction activities roadways as early as possible.

Requirement: Use of soil to create a ramp for vehicle access over a curb is prohibited.

Requirement: Trackout conditions, including preventive and corrective measures, must be recorded daily for every day that the construction project access is used by vehicles.

20-01 Record soil conditions and dust control actions in daily project records.

Requirement: Prevent dust from trackout.

20-02 Immediately clean trackout from paved surfaces to maintain dust control. Trackout must not extend 50 feet or more.

20-03 Maintain dust control during working hours and clean trackout from paved surfaces at the end of the work shift/day. Trackout must not extend 50 feet or more and must be cleaned daily, at minimum.

Requirement: Install and maintain trackout control devices in effective condition at all access points where paved and unpaved access or travel routes intersect.

20-04 Install gravel pad(s) consisting of 1” to 3” rough diameter, clean, wellgraded gravel or crushed rock. Minimum dimensions must be 30 feet wide by 3 inches deep, and, at minimum, 50’ or the length of the longest haul truck, whichever is greater. Re-screen, wash or apply additional rock in gravel pad to maintain effectiveness.

20-05 Install wheel shakers. Clean wheel shakers on a regular basis to maintain effectiveness.

20-06 Install wheel washers. Maintain wheel washers on a regular basis to maintain effectiveness.

20-07 Install wheel shakers in the event that trackout cannot be controlled with gravel pads.

20-08 Install wheel washer in the event that trackout cannot be controlled with gravel pads and wheel shakers.

20-09 Motorized vehicles will only operate on paved surfaces.

Requirement: All exiting traffic must be routed over selected trackout control device(s).

20-10 Clearly establish and enforce traffic patterns to route traffic over selected trackout control device(s).

20-11 Limit site accessibility to routes with trackout control devices in place by installing effective barriers on unprotected routes.

Best Management Practices (BMPs) & Control Measures

BMP 21

TRAFFIC - UNPAVED ROUTES AND PARKING

Definition: Construction related traffic on unpaved interior and/or access roads and unpaved employee/worker parking areas.

PEP/Soil Type: L (Low), ML (Moderate Low), MH (Moderate High) & H (High).

The permittee shall comply with all applicable requirements for activities performed pursuant to this Dust Control Operating Permit (DCOP). If a requirement has control measures listed, permittee shall comply with one or more of the control measures. If control measures for the requirement are contingent on the project PEP/Soil Type, permittee shall comply with one or more of the control measure for the designated PEP/Soil Type.

Requirement: Limit visible dust opacity from vehicular operations.

21-01 Limit vehicle speeds to 15 mph on all unpaved routes and parking areas.

21-02 Apply and maintain dust palliative on all vehicle travel areas.

Requirement: Stabilize all haul routes.

21-03 Apply water to haul routes and maintain in a stabilized condition.

21-04 Apply a dust palliative to haul routes and maintain in a stabilized condition.

21-05 Apply gravel to haul routes and maintain in a stabilized condition.

21-06 Supplement dust palliative or aggregate applications with watering, if necessary.

Requirement: Stabilize all off-road and parking areas.

21-07 Apply water to off-road traffic and parking areas and maintain in a stabilized condition.

21-08 Apply gravel to off-road traffic and parking areas and maintain in a stabilized condition.

21-09 Apply recycled asphalt (or other suitable material) to off-road traffic and parking areas and maintain in a stabilized condition.

21-10 Apply and maintain a dust palliative (designed for vehicle traffic) to off-road traffic and parking areas and maintain in a stabilized condition.

Best Management Practices (BMPs) & Control Measures

BMP 22

TRENCHING

Definition: Trenching with track or wheel mounted excavator, shovel, backhoe or trencher.

PEP/Soil Type: L (Low), ML (Moderate Low), MH (Moderate High) & H (High).

The permittee shall comply with all applicable requirements for activities performed pursuant to this Dust Control Operating Permit (DCOP). If a requirement has control measures listed, permittee shall comply with one or more of the control measures. If control measures for the requirement are contingent on the project PEP/Soil Type, permittee shall comply with one or more of the control measure for the designated PEP/Soil Type.

Requirement: Stabilize surface soils where trenching equipment, support equipment and vehicles will operate.

- 22-01 Pre-water and maintain surface soils in a stabilized condition where trenching equipment, support equipment and vehicles will operate.
- 22-02 Apply and maintain a dust palliative to surface soils where trenching equipment, support equipment and vehicles will operate.

Requirement: Presoak soils prior to trenching activities based on the project soil type.

- 22-03 Pre-water surface, pre-trench to 18" depth, soak soils via pre-trench prior to deep trenching.
- 22-04 L & ML: Presoak soil with water using sprinklers or wobblers.
- 22-05 L & ML: Presoak with water, using water truck and/or water pull.
- 22-06 MH: Presoak soil with a water and tackifier mixture using water pulls and/or water trucks.
- 22-07 MH: Presoak soil with a water and tackifier mixture using sprinklers or wobblers.
- 22-08 H: Presoak soil with a water and surfactant mixture using water pulls and/or water trucks.
- 22-09 H: Presoak soil with a water and surfactant mixture using sprinklers or wobblers.

Requirement: Stabilize soil during trenching activities based on the project soil type.

- 22-10 L & ML: Complete trenching with a dedicated water truck or large hose maintaining water as needed to prevent dust.
- 22-11 L & ML: Use spray nozzles mounted on trenching machine.
- 22-12 MH: Complete trenching with a dedicated water truck or large hose maintaining a water and tackifier mixture as needed to prevent dust.
- 22-13 H: Complete trenching with a dedicated water truck or large hose maintaining a water and surfactant mixture as needed to prevent dust.

Requirement: Stabilize soils at the completion of trenching activities.

- 22-14 Use water to form crust on excavated soil windrow as it is formed.
- 22-15 Use dust palliative to form crust on excavated soil windrow as it is formed.

Best Management Practices (BMPs) & Control Measures

BMP 23

TRUCK LOADING

Definition: Loading trucks with materials including construction and demolition debris, rock and soil.

PEP/Soil Type: L (Low), ML (Moderate Low), MH (Moderate High) & H (High).

The permittee shall comply with all applicable requirements for activities performed pursuant to this Dust Control Operating Permit (DCOP). If a requirement has control measures listed, permittee shall comply with one or more of the control measures. If control measures for the requirement are contingent on the project PEP/Soil Type, permittee shall comply with one or more of the control measure for the designated PEP/Soil Type.

Requirement: Ensure all loads are covered prior to leaving the construction site and traveling on public roadways.

Requirement: Stabilize surface soils where loaders, support equipment and vehicles will operate.

23-01 Pre-water and maintain surface soils in a stabilized condition where loaders, support equipment and vehicles will operate.

23-02 Apply and maintain a dust palliative on surface soils where loaders, support equipment and vehicles will operate.

Requirement: Stabilize material during loading.

23-03 Empty loader bucket slowly and keep loader bucket close to the truck to minimize the drop height while dumping.

Requirement: Stabilize material during loading based on the project soil type.

23-04 L & ML: Mix material with water prior to loading.

23-05 L & ML: Spray material with water while loading.

23-06 MH: Mix material with a water and tackifier mixture prior to loading.

23-07 MH: Spray material with a water and tackifier mixture while loading.

23-08 H: Mix material with a water and surfactant mixture prior to loading.

23-09 H: Spray material with a water and surfactant mixture while loading.



April 11, 2019
Kleinfelder Project No.: 20191344.001A

Mr. Tristan Cooke, PE, LEED-AP
325MK8me, LLC
211 Sutter Street; 6th Floor
San Francisco, California 94108

**SUBJECT: Geotechnical Exploration Report
Eagle Shadow Mountain Solar Project
Moapa River Indian Reservation, USA**

Dear Mr. Cooke:

We are pleased to present our geotechnical exploration report for the Eagle Shadow Mountain Solar Project, a 2,985-acre solar development located approximately 10 miles north of US-93 and I-15 Interchange in the Moapa River Indian Reservation, USA. We have prepared this report in general accordance with the geotechnical scope of services presented in our revised proposal dated May 23, 2018 (Kleinfelder Proposal No. LAS18P78699_R3). Scope items addressed in this report included subsurface exploration, field and laboratory soil testing, geotechnical engineering evaluation and geotechnical recommendations for design and construction. At the e-mail request of 325MK8me, LLC on February 5, 2019, the data report and geotechnical design criteria for the solar array and substation have been combined in this document. As also requested, load testing of prototype piles and other scope items such as dust permit support will be provided under separate covers.

We appreciate this opportunity to work with you on this project. If you have any questions regarding this report or need additional information, please do not hesitate to contact us.

Respectfully submitted,

KLEINFELDER

Marc Moncilovich, PG (AZ)
Project Manager

Jonathan Lehman-Svoboda, PE
Principal Geotechnical Engineer



**GEOTECHNICAL EXPLORATION REPORT
EAGLE SHADOW MOUNTAIN SOLAR PROJECT
MOAPA RIVER INDIAN RESERVATION, USA
KLEINFELDER PROJECT NO.: 20191344.001A**

April 11, 2019

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A Report Prepared for:

Mr. Tristan Cooke, PE, LEED-AP
325MK8me, LLC
211 Sutter Street; 6th Floor
San Francisco, California 94108

**GEOTECHNICAL EXPLORATION REPORT
EAGLE SHADOW MOUNTAIN SOLAR PROJECT
MOAPA RIVER INDIAN RESERVATION, USA**

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February 27, 2019

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- A Apparent Soil Resistivity Measurements (7 pages)
- B Graphics and Soil Description Keys (2 pages)
- Boring and Test Pit Logs (58 pages)
- C Laboratory Test Results (38 pages)
- D Thermal Resistivity Results (4 pages)
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- F Corrosion Control Recommendations (6 pages)



**GEOTECHNICAL EXPLORATION REPORT
EAGLE SHADOW MOUNTAIN SOLAR PROJECT
MOAPA RIVER INDIAN RESERVATION, USA**

1 INTRODUCTION

1.1 GENERAL

Kleinfelder, Inc. (Kleinfelder) is pleased to present this geotechnical exploration report for 325MK 8me, LLC (8me) in association with the Eagle Shadow Mountain Solar Project a 2,985-acre solar development located approximately 10 miles north of US-93 and I-15 Interchange in the Moapa River Indian Reservation, USA. The location of the site is presented on Figure 1, General Site Vicinity Map.

The purposes of this evaluation were to explore the subsurface conditions, collect samples for laboratory testing, load test prototype post foundations to assess engineering performance and provide photovoltaic (PV) development-specific opinions and recommendations regarding site development, site grading and design criteria for foundations, and dust permit soil sampling and support following Clark County guidelines. The pile load testing program and dust permit sampling and support are submitted under separate covers. The services provided were in general accordance with the scope of work outlined in our proposal dated May 23, 2018 (Kleinfelder Proposal No. LAS18P78699_R3).

The conclusions and recommendations presented in this report are based on the subsurface information encountered in our explorations, the results of load testing, our site observations, and our experience with similar development. The recommendations contained in this report are subject to the provisions and requirements outlined in the Limitations sections of this report. In addition, a brochure prepared by the Geoprofessional Business Association (GBA) has been included following the text of this report. We recommend that all individuals using this report read the limitations along with the attached document.



1.2 PROJECT DESCRIPTION

The general project location is presented on Figure 1; however, we understand that the approximate southern half of the site will be developed in this phase. PV solar arrays, a substation, and ancillary structures will be constructed along with aggregate and/or asphalt concrete paved roadways. The arrays will cover an area of approximately 2,985 acres. The substation is proposed along the eastern project boundary. We understand that a dead-end monopole tower will be located in the substation and will tie into a proposed transmission line. We anticipate an embedment of 20 to 30 feet will be required for the monopole tower foundation.

Specific equipment pad and equipment loads were not available at the time this report prepared. Based on our experience with previous projects, we anticipate transformer equipment weights of up to 260 kips which will be supported on mat foundations. We anticipate that ancillary structures will be founded on shallow foundations with maximum spread loads 4,000 psf. We understand that paved roads will be subjected to HS-20 vehicle loads with a low frequency of vehicular traffic loading.

We understand site grading in the PV array area is anticipated to generally follow the existing site topography. We assume that localized cuts and fills up to a few feet may be required.

1.3 SCOPE

Kleinfelder's geotechnical scope of services included:

- Reviewing aerial photography review and performing geological reconnaissance for earth fissures;
- Drilling twenty-nine (29) hollow stem auger borings and excavating twenty-eight (28) test pit excavations. The borings located in the PV array footprint were drilled to depths of approximately 15 or 20-feet below ground surface (bgs). One boring within the proposed substation area was advanced to 50 feet bgs. Test pits were excavated to depths of 8 feet below existing ground surface or to practical refusal;



- Performing Wenner 4-pin soil resistivity survey arrays consisting of two perpendicular measurements with varying probe spacings at ten (10) locations provided in advance for approval by me;
- Geotechnical laboratory testing on selected samples to evaluate engineering properties. Laboratory testing included soil classification, in place moisture and unit weight determinations, moisture-density relationship (modified proctor), expansion potential under varying surcharge loads, and R-Value testing for pavement design;
- Submitting samples to an outside laboratory for chemical laboratory testing to evaluate soil corrosion potential. Corrosion potential testing included pH of soil, water soluble sulfates, chlorides, sulfides, oxidation-reduction potential, and laboratory electrical resistivity;
- Provide corrosion recommendations for buried metal;
- Submitting samples to an outside laboratory for thermal resistivity in accordance with IEEE STD 442;
- Evaluating of the field and laboratory data to develop geotechnical recommendations and substation foundation design parameters presented in this report;
- Pre-design lateral and axial load testing on a total of sixty-eight (68) prototype pile foundations (4 piles at 17 load test locations across the site), with results and site-specific performance data for design of prototype pile foundations provided under separate cover; and
- Performing surface soil analysis per Clark County Department of Air Quality (CCDAQ) procedures, provided under a separate cover.



2 FIELD EXPLORATION AND LABORATORY TESTING

2.1 FIELD EXPLORATION

Kleinfelder's geotechnical field exploration was conducted to evaluate subsurface conditions, obtain soil samples for laboratory testing, and evaluate the performance of foundation posts to support PV panels. The field exploration included geologic reconnaissance, borings, test pit excavations, and field resistivity testing. The approximate locations of the explorations are presented in Figure 2, Exploration Location Map. The borings and test pits were located in the field using waypoints programed into a hand-held global positioning unit (GPS).

2.2 IN-SITU SOIL APPARENT RESISTIVITY TESTING

Soil resistivity was measured using the Wenner four-electrode method at ten (10) locations. Two perpendicular measurements at varying pin spacings were performed at each test location. Measurements were obtained using a SuperSting R-1 soil resistivity meter manufactured by Advanced Geosciences, Inc. Resistivity measurements were conducted with maximum probe spacing's ranging from 20 feet to 200 feet. The approximate center of each resistivity survey is shown on Figure 2. The results are tabulated in Appendix A.

2.3 SUBSURFACE EXPLORATION

The subsurface exploration included twenty-nine (29) exploratory borings (SA-1 through SA-28 and SB-1) and twenty-eight (28) test pit excavations (TP-1 through TP-28) within the proposed project site. Kleinfelder geotechnical staff observed drilling and test pit excavation operations and maintained a log of the subsurface conditions encountered.

Exploratory borings were completed on December 3rd through 11th, 2018. Borings were drilled with a CME 1050 drill rig equipped with hollow-stem augers. Borings were generally advanced to depths of approximately 15 to 20 feet bgs. Boring SB-1 was drilled to a depth of 50 feet within the proposed substation limits to provide design information for the proposed monopole dead-end structure. At a minimum, driven samples were collected every 2.5 feet in the upper 10 feet and



every 5 feet thereafter. Bulk samples of the auger cuttings were also obtained at selected depths. Standard Penetration Test (SPT, 1.375-inch I.D.) split spoon sampler and ring-lined, California split spoon sampler (3-inch outside diameter with 2.4-inch diameter rings) were driven using a hydraulically actuated, auto-trip hammer. The split spoon samplers were driven with a 140-pound hammer free-falling through a distance of 30 inches. Unless noted otherwise, the sampler driving resistance was recorded as number of blows per 6 inches of penetration. The penetration test results are presented on the boring logs at the corresponding sampling depth.

A Kleinfelder geotechnical professional maintained logs in the field of the subsurface conditions encountered. Soil samples from the borings were classified in the field in general accordance with ASTM D2488. Observations of the sample recovery; range of particle sizes and angularity; plasticity; color; moisture; and soil consistency or relative density were recorded in the field. Drill rig response and drill time was observed and noted on the logs during drilling. Cemented soils were identified based on the presence of cemented rinds on the gravel and sand clasts with breaks across clasts observed in the auger cuttings and samples, auger response, and resistance to driven sampling. Portions of each sample were packaged and transported to our laboratory for additional testing. The lines defining boundaries between soil types on the logs are based on Kleinfelder's field observations and interpolation between samples and are therefore approximate. Transition between soil types may be abrupt or may be gradual.

Test pit excavations were completed using a Case 580 backhoe on November 26th through 28th, 2018. Test pits TP-1 through TP-28 were excavated to approximately 8 feet bgs or to practical refusal, whichever occurred first. Representative bulk samples were obtained from the test pits.

Keys to the soil descriptions and symbols used to describe the subsurface conditions encountered are presented in Appendix B. Soil classifications, samples, and other field observations and testing are recorded on the Boring Logs and Test Pit Logs in Appendix B.

2.4 LABORATORY TESTING

Laboratory tests were performed on selected soils obtained from the explorations to evaluate their physical and engineering properties in general accordance with ASTM test procedures. The geotechnical laboratory testing consisted of:



- Twenty-one (21) gradation analyses (ASTM C117 and C136), seventeen (17) percent passing the number 200 sieve determinations (ASTM C117), and thirty-seven (37) Atterberg limits tests (ASTM D4318) to support our field classifications.
- Three (3) R-value measurements (ASTM D2844) performed to evaluate subgrade characteristics for use in pavement design.
- Five (5) expansion tests (Clark County Building Department Procedure, modified for varying loads) performed to evaluate potential volume changes of plastic soils when saturated.
- Fourteen (14) water content determinations (ASTM D2216) and four (4) in-place dry unit weight measurements (ASTM D2397).
- Eleven (11) maximum dry unit weight and optimum moisture content determinations (ASTM D1557) performed to support thermal resistivity testing and Clark County dust control specifications.

The results of the laboratory tests are presented in order as described above in Appendix C. The test results are also presented on the boring logs in Appendix B.

2.4.1 Thermal Resistivity Testing

Ten (10) bulk samples were obtained from the test pits and borings for thermal resistivity testing. The samples were sent to Geotherm USA in Livermore, California along with the proctor curve provided by Kleinfelder. The thermal resistivity test samples were compacted to approximately 85% maximum dry density at optimum moisture. The tests were performed in general accordance with IEEE Std. 442-1981. The results of the thermal resistivity testing, including graphical results of the thermal dry-out curves are presented in Appendix D.

2.4.2 Corrosivity Testing

Twenty-three (23) near-surface soil samples were tested by Veritas Laboratory for chemical analyses. The samples were tested for pH, miller box resistivity under “as received” and saturated moisture conditions, water-soluble sulfates, water-soluble sodium, water-soluble sodium sulfate,



water-soluble chlorides, and oxidation-reduction potential. The results of corrosion testing are presented on the Veritas Laboratories test data sheets in Appendix E.

2.5 LOAD TESTING OF DESIGN PROTOTYPE PILE FOUNDATIONS

Concurrent with the geotechnical evaluation, Kleinfelder subcontracted an experienced PV contractor to procure and install a total of sixty-eight (68) prototype piles. Kleinfelder performed a preconstruction pile testing program that included laterally and axially loading prototype steel piles. The purpose of the load testing program was to obtain site-specific performance data for design of prototype pile foundations. The results of the load testing program will be provided under a separate cover.



3 GENERAL SITE CONDITIONS

3.1 SURFACE CONDITIONS

The site is located in undeveloped desert. The site slopes overall down from the west to the east. Due to the size of the site, cultural resource restrictions, and budgeted time allotments, our field reconnaissance was limited to observations made traveling between the locations explored. Accumulation of cemented soils, cobbles, and boulders were observed at the ground surface. A cover of typical desert vegetation was also present. Several washes up to several feet deep and a few to more than 10 feet wide are present at the site. The overall surface drainage direction ranges is southeast to south-southeast, from the north to south across the site.

3.2 SUBSURFACE CONDITIONS

The near surface soils encountered in the explorations generally consisted of medium dense to very dense granular soils. The granular soils encountered had fines (material passing the No. 200 Sieve) contents ranging from approximately 20 to 40 percent with plasticity indices typically ranging from non-plastic to 15.

Near-surface, high-plasticity, fine-grained soils were present in a few of the explorations, generally located near the center and eastern portions of the site. Swell testing performed indicates that the near-surface, fine-grained soils may be subject to volume changes if wetted. Table 3.2-1 is a summary of swell testing performed.

**Table 3.2-1: Swell Testing Summary**

Exploration Designation	Depth (feet)	Description	Sample Preparation	Moisture Content (%)	Dry Density (pcf)	Initial Moisture Content (%)	Final Moisture Content (%)	Surcharge (psf)	Expansion (%)
SA-21	5	Sandy ELASTIC SILT (MH)	In-place	14	107	14	20	600	2.8
			Remolded	16	112	0*	22	60	11.8
SA-26	5	Sandy LEAN CLAY (CL)	In-place	3	125	3	6	600	6.7
			Remolded	14	115	0*	26	60	21.7
SA-26	10	Lean CLAY (CL)	Remolded	15	114	0*	19	1200	3.3

*Samples oven dried prior to testing

Near surface moderately to strongly cemented soils were encountered in 52 of the 57 explorations performed across the site. Table 3.2-2 is a summary of the depth to first moderately to strongly cemented layer encountered at in the borings.

Table 3.2-2: Summary of Cemented Soils Encountered in the Borings

Boring Designation	Approximate Depth to First Moderately to Strongly Cemented Layer (feet)	Approximate Thickness of First Moderately to Strongly Cemented Layer (feet)
SA-1	5½	15*
SA-2	7½	7½*
SA-3	½	14½*
SA-4	½	14½
SA-5	½	19½
SA-6	3	12*
SA-7	3	12*



Table 3.2-2(Continued): Summary of Cemented Soils Encountered in the Borings

Boring Designation	Approximate Depth to First Moderately to Strongly Cemented Layer (feet)	Approximate Thickness of First Moderately to Strongly Cemented Layer (feet)
SA-8	10	5*
SA-9	1	14
SA-10	5½	9½
SA-11	3½	16½*
SA-12	1	14*
SA-13	1	19*
SA-14	2	13*
SA-15	3	17
SA-16	5	10*
SA-17	4	11*
SA-18	1	14*
SA-19	1	14*
SA-20	8	7
SA-21	Not Encountered	
SA-22	5	2½
SA-23	1	14*
SA-24	1	15*
SA-25	1	10
SA-26	Not Encountered	
SA-27	1	6½
SA-28	1	9
SB-1	1	11

**Boring terminated in cemented layer*

Weakly to moderately cemented layers were also encountered in the borings. Additional details of the cemented soils encountered are presented on the Boring Logs in Appendix B.

Backhoe refusal occurred in 25 of 28 test pits performed across the site. Table 3.2-3 is a summary of depth to backhoe refusal on cemented soils.

Table 3.2-3: Summary of Backhoe Refusal

Test Pit Designation	Depth to Backhoe Refusal on Cemented Soils (Feet)
TP-1	4
TP-2	2½
TP-3	1
TP-4	½
TP-5	3
TP-6	1½
TP-7	1½
TP-8	2½
TP-9	1
TP-10	2
TP-11	1
TP-12	1
TP-13	2
TP-14	2
TP-15	2½
TP-16	1
TP-17	2
TP-18	2
TP-19	N/A - Excavated to 8 feet
TP-20	1½
TP-21	N/A - Excavated to 8 feet
TP-22	1½
TP-23	3
TP-24	2½
TP-25	N/A - Excavated to 8 feet
TP-26	1½
TP-27	1½
TP-28	1½

N/A – Not Applicable

Analytical chemical testing performed on near surface samples indicates water soluble sodium sulfate contents typically ranging from less than 0.001 percent to approximately 0.2 percent, with one test result greater than 0.2 percent for the material tested between 4 and 8 feet in Test Pit TP-21. Solubility and sulfates contents up to 0.32 and 0.8 percent, respectively, were measured. Table 3.2-4 is a summary of the chemical testing performed.



Table 3.2-4: Summary of Chemical Testing

Exploration Designation	Sample Depth, feet	USCS Group Symbol	*Resistivity (as Received), Ohm-cm	Resistivity (Saturated)	Sodium, Percent	Sodium Sulfate, Percent	Solubility	pH	Sulfate, Percent	Chloride, mg/Kg	Redox, mV	Sulfides, mg/Kg
SA-4	½ - 5	N/A**	49000	4100	0.0023	0.0072	0.01	8.88	0.009	25	197	1.6
SA-20	2½ - 5	SC	8000	745	0.021	0.065	0.032	8.48	0.06	180	201	ND
SA-21	5	CL	12500	1600	0.0086	0.0089	0.0098	8.75	0.006	60	231	0.77
SA-24	2½ - 7½	N/A**	16000	1720	0.0042	0.013	0.014	8.74	0.028	45	229	2.1
SA-25	2½ - 7½	N/A**	5100	800	0.018	0.055	0.036	8.52	0.075	140	242	0.85
SA-27	2½ - 7	N/A**	26500	3100	0.005	0.013	0.017	8.87	0.009	45	246	0.64
SA-27	15	MH	1000	330	0.015	0.046	0.13	8.3	0.41	120	273	0.56
TP-1	0-1	SM	4200	2700	0.0021	0.0065	0.0074	8.7	0.008	25	251	2.5
TP-4	0-½	SC	4450	1550	0.0019	0.006	0.01	8.64	0.0045	40	277	27
TP-6	0-1	SC-SM	880	135	0.07	0.22	0.15	7.96	0.22	1200	261	ND
TP-8	0-1	GC	675	100	0.06	0.19	0.18	7.89	0.2	1800	284	1.8
TP-10	0-1	SC	9500	2650	0.0015	0.0022	0.023	8.65	0.0015	25	267	1.5
TP-12	0-1	SC	7200	1250	0.0023	0.0073	0.012	8.48	0.016	20	272	1.2
TP-13	0-1	SM	5500	2700	0.0015	0.0046	0.0098	8.73	0.0035	ND	267	1.3
TP-15	0-1	ML	9400	3000	0.0015	0.0045	0.0082	8.79	0.004	35	269	0.76
TP-19	0-1	SM	5200	2100	0.0012	0.0038	0.01	8.69	0.007	30	294	0.61
TP-20	0-1	SM	3950	3290	0.0016	0.0049	0.019	8.71	0.0035	25	176	2.3
TP-21	0-1	SC	4600	1400	0.0072	0.012	0.023	8.67	0.008	70	133	ND
TP-21	4-8	CH	900	180	0.11	0.35	0.32	8.29	0.8	520	195	ND
TP-23	0-1	SM	9800	3100	0.0011	0.0034	0.0086	8.55	0.0065	20	198	ND
TP-25	0-1	SC	26500	3200	0.0016	0.0015	0.0092	8.49	0.001	25	198	ND
TP-26	0-1	SC-SM	6650	3460	0.00097	0.003	0.016	8.66	0.0035	ND	211	4.7
TP-28	0-1	GM	10500	2750	0.0011	0.0015	0.0084	8.48	0.001	ND	220	0.84

*Samples received by the analytical laboratory at the approximate in-place moisture content.

**N/A – Not Applicable, material tested consisted of cemented sand and gravel processed by the augers.



Three R-value tests were performed on near surface samples; R-values of 25 to 52 were measured.

3.3 GROUNDWATER

Groundwater was not observed during drilling or immediately following the completion of any of our subsurface explorations. It is possible that variations in groundwater elevations may occur due to seasonal changes, run-off and precipitation. Groundwater levels at other times and locations may be different from those described in this report.

4 GENERAL SITE GEOLOGY

4.1 GEOLOGIC SETTING

Dry Lake Valley is located in the Basin and Range province, characterized by roughly parallel, north- to northeast-trending mountain ranges and intervening valleys. The site is located in the southwest end of Dry Lake Valley on an alluvial fan composed of incised sedimentary deposits of Quaternary and Quaternary- to Tertiary-aged alluvium. The Dry Lake Range is exposed on the east side of the project area and is composed predominantly of interbedded carbonates and siliciclastic sedimentary rocks. The Arrow Canyon Range borders the site to the west and is also composed of the interbedded carbonates limestone and dolomite.

The area geology as mapped by House and others (2010) is represented on Figure 3. At the subject site, the majority of surficial deposits are mapped as Quaternary old and intermediate-age alluvial fan deposits (Afi and Afo). The youngest active small alluvial fan (Afy) channel is mapped in the eastern half of the site near the center and lays on top of an east to west trending Late Quaternary unit comprised of Older Young alluvial fan deposits (Afyo). These alluvial units are typically composed of sand, and gravel with variable amounts of clay and silt with weakly to highly cemented sand and gravel (caliche). In the upper northeast section of the site a small area of Holocene to middle Pleistocene Undivided Spring deposit (Su) is mapped. Locally, this unit is typically composed of fine grained, gypsiferous, high plastic clay and underlies the alluvial fan deposits (House, 2010).

4.2 FAULTING

No Quaternary faults are mapped at the site. The nearest mapped Quaternary faults are the California Wash Fault located approximately 3.8 miles east, and the Arrow Canyon Range fault, located approximately 5 miles west of the site (USGS, 2010, Quaternary fault and fold database, accessed February 5th, 2019, earthquake.usgs.gov/hazards/qfaults/). The California Wash fault is a west dipping normal fault with a strike of approximately N15°E. This fault is believed to have moved within the last 15,000 years (Bidgoli, 2003). The Arrow Canyon Range Fault is generally believed to have last moved during early to late Pleistocene time. Two earthquakes near the project area have



been recorded. On August 8, 1966 an earthquake occurred approximately 9.5 miles north of the site with a magnitude of 3.6, and on September 25th, 2012 an earthquake with a magnitude of 3.6 occurred approximately 4 miles southwest of the site (UNR, Nevada Seismological Lab, www.seismo.unr.edu/Earthquake).

4.3 EARTH FISSURES

As part of our scope of work described in the proposal, Kleinfelder performed an aerial photography review of the subject site, and subsequent ground reconnaissance, to look for ground cracking associated with earth fissures which are known to exist in the area. Earth fissures are cracks in the ground which originate at depth and propagate to the surface. In the Las Vegas valley, fissures form in as the result of stresses associated with subsidence due to groundwater withdrawal, often in the area of pre-existing faults. Fissures may also form due to other causes, such as due to tectonic stresses. Fissures typically manifest at the ground surface as open cracks or aligned sinkholes and depressions. A typical fissure width due to tensional stresses is thought to be on the order of a few inches or less. Where the fissures occur in erodible soils, fissures may increase to widths of several feet.

A fissure zone is located approximately 1½ miles south of the site and was first described by Keaton and Miller in 1992 (Keaton, Jeffery R., Miller, Julianne J., 1992, Dry Lake Valley Earth Fissure System, Clark County, Nevada, Association of Engineering Geologists, 35th Annual Meeting Proceedings, p. 129). The Dry Lake Valley earth fissure system, as described by Keaton and Miller, trends approximately 355°. This trend is within 5° of the Arrow Canyon Range, and within 20° of the north projection of the Dry Lake Mountain Range. Keaton and Miller concluded that although uncertainty exists as to the cause of the Dry Lake Valley fissure system, the earth fissures appear to be natural and not caused by groundwater withdrawal, rather a result of regional tectonic stresses based on the similarity of orientations to the normal-faulted mountain ranges that bound the Dry Lake Valley. Keaton and Miller also concluded that the Dry Lake Valley earth fissure system is actively forming based on the “delicate cracks and vertical to overhanging sides of prominent voids”. The location of the Keaton Miller study area in relation to the project site is shown on Figure 4.



As part of our aerial photography review, we identified several parallel lineaments north of the project area and possibly extending into the project area, identified by linear vegetated zones on the aerial photographs. The lineaments are more clearly expressed to the north of the project site on the aerial photographs than on the project site.

On February 5, 2019 Kleinfelder visited what appeared to be the largest of the lineaments observed in the aerial imagery north of the PV array development area. Additional parallel lineaments within a zone approximately 1,000 feet in width are present on aerial photographs. Aligned hairline to open cracks greater than a foot in width were observed. The cracking was intermittent but could be traced along what we judge to be a single lineament several thousand feet in length. The locations of these fissure traces in relation to the subject site are presented on Figure 4. A photograph key for the area of reconnaissance north of the site and the Keaton Miller study area is included on Figure 4, with the referenced photographs presented on Figures 5 through 8.

The cracking was expressed as linear openings in resistant layers of cemented sand and gravel (Figure 5, Locations 1 through 4) with a few cracks observed in the sandy alluvium along the trace of the fissure (Figure 6, Locations 5 through 7), suggesting that the fissures are either actively propagating or the surface expression of cracking at depth is in varying stages of evolution. One area of ground cracking was observed within the project boundary but outside of the area proposed for development (Figures 4 and 6, Location 8). The trend of the fissure traces observed are generally similar to the Keaton and Miller fissures. The traces of the observed fissures north and south of the site are aligned and this alignment extends across the Eagle Shadow Mountain Solar site.

It is our opinion that the observed fissures south of the site (Keaton and Miller study area) and the fissures observed north of the site are related and are a manifestation of the regional stress regime underlying the site and surrounding areas. The expression of the fissures at the ground surface appears to be very dependent on the type of soil materials: the Keaton and Miller study area consists of highly eroded surface cracks connected to linear subsurface cavities, several feet wide and tens of feet deep, in fine-grained, non-cemented soils. The fissuring observed to the north of the proposed PV array consists of open cracks in strongly cemented sand and gravel.



Although fissures were not observed within the area of the proposed PV array and substation development during the field exploration and site reconnaissance, it is possible these features may develop in the future and propagate to the surface due to natural processes. It is possible site grading or changes in drainage patterns associated with the project development could expose or facilitate the expression of pre-existing fissures. Discussion of the engineering aspects and remediation of fissures is presented in Section 5 of this report.

5 CONCLUSIONS AND RECOMMENDATIONS

The conclusions and recommendations presented below are based on the subsurface conditions observed in the explorations, laboratory test results, engineering analyses, and experience with similar solar projects as well as our general knowledge of past performance of development on sites underlain by similar soil conditions. Geotechnical considerations include the potential for ground cracking due to fissures; shallow layers of strongly cemented sand and gravel; and the presence of clayey soils with a large potential for volume change when wetted.

Fissures As described in Section 4.0, surface cracking interpreted to be earth fissures are present north and south of the site. A reconnaissance of the site was made; cracking was observed extending into the site but outside the area of proposed development. It is not possible to predict when, where or to what extent earth fissures will impact the site in the future. Most of the proposed PV array is located in areas with shallow cementation, similar to the fissured area north of the site. If ground cracking were to manifest on developed areas of the site underlain by cemented soils, it is likely that the cracking would be expressed similar to those present north of the site (hairline to approximately 1 foot widths).

Fissures have the potential to enlarge through erosion, particularly where they occur in non-cemented soils. Therefore, control of surface and subsurface flow is important to control erosion impacts of potential fissures. A grading plan was not available at the time this report was prepared. At a minimum, we recommend that grading in the area of the proposed PV array be limited to surficial disturbances and to not disturb or excavate the near surface cemented soils. As a precaution, we recommend observation for fissures be performed during grading. Additionally, we recommend that contingencies to address potential distress due to ground cracking be considered as part of the development plan, including routine inspection for cracking and evidence of fissures, as well as maintenance in the event future cracking occurs in developed areas.

If fissures develop within the developed areas of the project site, there are remediation methods commonly used in the Las Vegas area that would be applicable to this site. The alternatives for remediation will depend on the soil or ground conditions in the area the fissure is expressed and the type of improvement impacted. Fissures that occur directly under the support piles for a tracker



row could destabilize an individual tracker, but a fissure only a few feet away could have no impact on the row. Affected trackers could be remediated through bracing, replacement or underpinning of the affected pile/columns. If fissures occur under concrete pads or other shallow foundations, loss of support and settlement of structures can occur, and underpinning or replacement pads may need to be constructed. Electrical cables could need patching or extension. For access roads, a fissure could disrupt traffic temporarily until the fissure can be bridged.

The portion of the project area that could be impacted by fissures appears to be the western array area. Based on the observed alignments, the planned substation location appears to be well away from the locations of the lineaments observed in the aerial photographs. PV development generally includes little site grading, the structures are very light, presenting little surcharge to the earth and the structures are not occupied and are very tolerant of movement and deflection. In many ways, PV development offers lower overall risks in fissure areas than most other types of development. The primary risk to a PV development in fissure area will be loss of function of one or a few rows of trackers until the foundations can be stabilized, excessive strain on electrical conductors crossing a fissure, or settlement of a power conversion station. Trackers can be stabilized and fixed if fissuring occurs. The use of messenger wire carrier systems (CAB) and strain controls (wire loops) should prevent ground effects on string wires and DC collection cables. Underground cabling can be repaired if damaged. Power conversion stations founded on piles are expected to be less affected by fissure-induced settlement than pad-mounted equipment.

It should further be noted that fissures are expected to develop slowly, rather than abruptly, especially considering the minimal surcharge a PV development imparts on the earth. Regular maintenance inspections typical for PV installations should be able to identify fissure development with adequate time to remediate problems before general failures occur.

Typical remediation methods that have been used to lessen the impact of fissures have been overexcavation and reinforcement with layers of geogrid and aggregate base in areas of vehicle travel such as below roadways and in parking areas. In areas where foundations supporting structures have been impacted, underpinning with micropiles has been used. Based on inferences made from observation of the fissures occurring in the cemented layers north of the site, it is possible that remediation of cracking related to fissures in cemented soil layers could be accomplished through periodic sealing with grout or a lean concrete mix. The infiltration of surface water into fissured areas will increase the potential for enlargement of fissures. Strict moisture



control will be required in these areas. The site should be graded such that all surface water flows are directed well away from fissured areas. Infiltration of surface water into fissured areas will increase the potential for enlargement of fissures.

It is important to note that fissures are large-scale, through-going geologic features that cannot be eliminated; on-going observation, maintenance, and remediation will reduce the impact of these features if they develop in the future on the site.

Expansive Soils The near surface soils are generally granular and have low-plasticity fines; however, there are areas where medium to high plasticity, fine-grained soils and granular soils with high plasticity fines are present near the surface. High plasticity clayey soils are also present with depth and were encountered below cemented soils in numerous locations. Based on our experience with similar sites, there is a potential for large volume changes in the subsurface if the high plasticity soils become wet. As above, we recommend that grading in the area of the proposed PV array be limited to surficial disturbances and to not disturb or excavate the near surface cemented soils. Expansive soils should be overexcavated beneath concrete slabs on grade, flexible pavements, and structures with sustained loads less than 1,000 pounds per square foot (psf) per the recommendations in Sections 5.1.3 and 5.1.4.

Due to the widespread occurrence of thick, resistant layers of cemented sand and gravel, pre- drilling of pile test holes was performed. Following drilling, the pile excavations were backfilled with the auger returns. The piles were driven through the backfill and then tested. We anticipate this method will also be used for production. To reduce the potential for introduction of moisture into loose backfill during periods of precipitation and the resulting saturation and expansion of the subsurface soils, we recommend the backfilled pile excavations be finished with a low-permeability plug as follows:

1. Backfill the excavated hole to approximately 9 inches of the finished grade surface with the excavated materials, tamped in three to five lifts.
2. Backfill the remaining 9 inches of hole depth with bentonite powder blended with the remaining drill cuttings at a ratio of one-part bentonite to 10 parts soil.
3. Hydrate (water) the backfill by mixing at least one gallon of water into the soil/bentonite mixture.



4. Drive the pile.

In addition, the civil design should include drainage provisions to protect PV array foundations and other foundations from exposure to sheet flow.

Cemented Soils Backhoe refusal on cemented soils occurred at depths generally less than 5 feet and as shallow as 1 foot below existing grade in 25 of the 28 test pit excavations. Although we recommend that grading be limited to surficial disturbances, excavations for utility installations will likely encounter cemented soils that will require specialized excavation equipment.

5.1 EARTHWORK

5.1.1 General

Site preparation and earthwork operations should be performed in accordance with applicable codes, safety regulations and other local, state, or federal guidelines. Compaction recommendations in this report refer to the maximum dry density and optimum moisture content values determined by the Modified Proctor compaction test (ASTM D1557).

5.1.2 Site Preparation and Demolition

The locations of equipment pads, roadways, substations, areas of fill within the PV arrays, and individual foundation locations in all areas, should be stripped of vegetation and deleterious, organic material, including tree and other roots greater than 3-inches in maximum dimension. Stripping operations should be observed by the geotechnical engineer. We recommend that locations for equipment pads, spread or mat foundations, and roadways be scarified; moisture conditioned, and recompacted at least one foot below proposed subgrade. Scarification and recompaction is not required where cemented soils area encountered. The recompacted zone should extend laterally at least one foot beyond the extents of the improvement. Stripping of the organic materials outside of individual pile areas is not required under the array area not to be filled.



5.1.3 Subgrade Preparation

The suitability of the exposed subgrade should be evaluated by the geotechnical engineer after site preparation by observing proof rolling or probing of the subgrade under equipment pads, roadway locations, or areas of fill within the PV arrays. Proof rolling should be conducted using a fully-loaded dump truck or similar, heavy, rubber-tired construction equipment. Unstable areas identified during proof rolling should be overexcavated to exposed competent, stable subgrade and backfilled with Engineered Fill as recommended in the Engineered Fill section of this report.

Expansive soils are present at the site. Testing for expansion following the Clark County Building Department Procedure should be performed where structures with spread loads less than 1,000 psf are proposed and the subgrade soils have a plasticity index greater than 15. Flexible asphalt concrete pavement and concrete slabs on grade should be tested under a 60 psf surcharge. Table 5.1.3 provides a summary of overexcavation expansive soils beneath pavements and concrete slabs on grade.

Table 5.1.3 – Overexcavation of Expansive Soils

Percent Expansion Under a 60 psf Surcharge	Recommended Overexcavation for Concrete Slab on Grade (feet)	Recommended Overexcavation Beneath Flexible Pavement Sections (feet)
4 – 8	2	1
8 – 12	3	2
12 – 16	4	3
16 - 20	Kleinfelder should be consulted for additional recommendations	

**Overexcavation beneath slab-on-grade, pavements, pavers, and exterior flatwork begins at the bottom of the subgrade.*

An expansion testing program that considers the design foundation loads may be developed with input from Kleinfelder to aid in development of overexcavation recommendations for spread foundations with sustained loads less than 1,000 psf, if planned for the site. We should be contacted for additional recommendations if 4 percent or more expansion is measured on samples with a surcharge loads greater than 60 psf and up to 1,000 psf.

The concentration of sodium sulfate present at levels greater than 0.2 percent is an indicator of a potential for chemical heave. Chemical heave occurs due to volume change associated with mineral formation with changes in temperature. One test result indicates a sodium sulfate level greater than 0.2 percent; however, this test result is representative of a combined bulk sampled



obtained from 4 to 8 feet in Test Pit TP-21. Shallower testing indicates sodium sulfate levels up to approximately 0.2 percent. Testing for sodium sulfate should be performed during construction beneath concrete slab on grade and structures with spread loads less than 1,000 psf. Subgrade soils with sodium sulfate levels greater than 0.2 percent should be overexcavated one foot beneath bottom of slab and replaced with a 12-inch thick thermal blanket consisting of compacted Clark County Type II aggregate base.

5.1.4 Engineered Fill

We anticipate that the near surface on-site soils can be used as Engineered Fill and utility trench backfill provided the material has a percent expansion of less than 4 percent under a 60 psf surcharge, water soluble sodium sulfate concentrations less than 0.2 percent, and free of particles larger than 4-inches in diameter, organic matter, and other deleterious materials. Cobbles and boulders area present at the site and present in the subsurface. It is likely that screening of oversized particles will be required.

5.1.4.1 Select Imported Granular Fill

Select imported granular fill should consist of granular material that is well-graded between coarse and fine sizes. It should contain no clay balls, roots, organic matter, or other deleterious materials, and have a maximum particle size of 2 inches, with less than 12 percent passing the U.S. No. 200 Sieve. Imported fill materials to be used for Engineered Fill should be sampled and tested for approval by the geotechnical engineer prior to being transported to the site. Please provide a minimum of 2 business days to allow for qualification testing.

5.1.4.2 Imported Aggregate Base Course/Crushed Rock

Aggregate base course should meet the specifications of the Clark County Type II aggregate base.



5.1.5 Fill Placement and Compaction

Fill materials that meet the requirements for Engineered Fill or select imported granular fill should be moistened to within 2 percent of optimum moisture content, placed in loose lifts of less than 8 inches, and compacted to at least 95 percent of the maximum dry density. Compaction of fill materials in areas not underlain by structures or roadways, such as landscape areas, may be reduced to 90 percent relative compaction. We estimate a shrinkage factor of approximately 10 to 20 percent based on our estimates of in-place density, results of laboratory testing, and experience from other projects. This shrinkage factor does not include material losses due to screening of oversized particles and does not apply to uncontrolled backfill as needed for PV array and combiner box pile installations. Aggregate base course and crushed rock should be moistened to within 2 percent of optimum moisture content and compacted to at least 95 percent of maximum dry density.

Due to the prevalence of near-surface cemented soils, we anticipate that pre-drilling of pile excavations will be performed across the majority of the site. To reduce the potential for introduction of moisture into loose backfill during periods of precipitation and the resulting saturation and expansion of the subsurface soils, we recommend the backfilled pile excavations be finished with a low-permeability plug as follows:

1. Backfill the excavated hole to approximately 9 inches of the finished grade surface with the excavated materials, tamped in three to five lifts.
2. Backfill the remaining 9 inches of hole depth with bentonite powder blended with the remaining drill cuttings at a ratio of one-part bentonite to 10 parts soil.
3. Hydrate (water) the backfill by mixing at least one gallon of water into the soil/bentonite mixture.
4. Drive the pile.



5.1.6 Temporary Excavations

Excavations must comply with applicable local, state, and federal safety regulations including the current OSHA Excavation and Trench Safety Standards. Construction site safety is the responsibility of the contractor, who shall also be solely responsible for the means, methods, and sequencing of construction operations. We are providing the information below as a service to our client; under no circumstances should the information provided be interpreted to mean that Kleinfelder is assuming responsibility for construction site safety or the Contractor's activities.

On-site materials may be considered Type C soils with regard to the OSHA regulations. OSHA requires a maximum slope inclination of 1½:1 (horizontal: vertical) for Type C soils for excavations up to 20 feet deep. If groundwater is present in excavations, flatter slopes may be required to maintain stability. The Contractor's OSHA-qualified "competent person" must make the actual determination of soil type and allowable slope inclinations in the field whenever personnel exposure is anticipated.

5.1.7 Trench Backfill

Trench backfill placed beneath structures or roadway should be compacted as described in Section 5.1.5. Trench backfill placed outside structures or roadway should consist of approved, on-site or import soils placed in lifts no greater than 8 inches loose thickness and compacted to at least 90 percent of maximum dry density. Trench backfill should be mechanically compacted. Jetting is not an appropriate method for compaction and should not be used. Trench backfill may be compacted to 85 percent of maximum dry density where located outside the footprint of structures with the understanding that increased settlement may occur in these areas.

5.1.8 Earthwork Observation and Testing

We consider geotechnical observation and testing during construction a continuation of this evaluation. As the firm that provided the geotechnical evaluation for this project, Kleinfelder is the Geotechnical Engineer of Record, and should be retained to confirm that the recommendations of this report are properly incorporated in the design of this project and are properly implemented during construction. These services provide Kleinfelder the opportunity to observe the actual



conditions encountered during construction and to evaluate the applicability of the recommendations presented in this report to the site conditions.

5.2 LIQUEFACTION AND SEISMIC DESIGN CONSIDERATIONS

Earthquake-induced soil liquefaction can be described as a significant loss of soil strength and stiffness caused by an increase in pore water pressure resulting from cyclic loading during shaking. Liquefaction is most prevalent in loose to medium dense, sandy and gravely soils below the groundwater table, but can also occur in non-plastic to low-plasticity, finer grained soils. Saturated loose granular soils were not encountered in the explorations performed at the subject site. Based on the soil classification data and lack of shallow groundwater, the potential for liquefaction at this site is judged to be low.

The following seismic site parameters for design are established by the 2018 International Building Code (2018 IBC). These parameters were calculated using the California Office of Statewide Health Planning and Development (OSHPD) online application <https://seismicmaps.org/> and the approximate northeast corner of the site where the site is appears to be nearest to the California Wash Fault (N36.5583°, W114.7694°).

TABLE 5.2-1: 2018 IBC SEISMIC DESIGN PARAMETERS

Design Parameter	Parameter Value
Site Classification	D
S_s (g)	0.682
S_1 (g)	0.221
F_a	1.254
F_v	*null
SDS (g)	0.587
SD1 (g)	*null

**null per Section 11.4.8 of ASCE 7-16*

5.3 SOIL CORROSIVITY

Results of the corrosivity testing for the samples tested are presented in Table 3.2-4 below, and also in Appendix E. Based on the corrosion testing performed on near surface soils obtained from the site, the soils are classified as providing Sulfate Exposure Class S2 as defined in



Table 19.3.1.1 of the 2014 American Concrete Institute (ACI) Manual 318. We therefore recommend that all concrete in contact with the on-site soils be formulated with an appropriate cement type, water-cement ratio, and an appropriate minimum compressive strength to resist Sulfate Expose Class S2, as outlined in Table 19.3.1.1 of the ACI Manual 318.

The results of corrosion engineering performed for buried metals is presented in Appendix F.

5.4 SUBSTATION EQUIPMENT FOUNDATIONS

The following recommendations are for equipment pads within the PV array area and the substation structures.

5.4.1 Shallow Foundation Design

The substation equipment structures may be supported on a reinforced concrete mat slab, spread footing foundations, or drilled foundations with depth to diameter ratios less than 4. Based on the results of the field exploration, laboratory testing, our engineering analysis, and our experience with similar projects, shallow foundations may be supported by native, undisturbed medium dense to dense granular soils or properly compacted Engineered Fill prepared according to recommendations presented in Section 5.1. Expansion testing should be performed beneath foundations with spread loads less than 1,000 psf per Section 5.1.3 to determine overexcavation requirements for the on-site expansive soils.

The design and construction criteria presented below should be observed.

- Foundations should be constructed on prepared native soils or on properly placed and compacted Engineered Fill, as described above. In no case should foundations for a single structure be supported by a combination of cemented and non-cemented soils. If both cemented and non-cemented soils are encountered in foundation excavations for a single structure, then the cemented soils should be overexcavated so that a minimum of 1 foot of Engineered Fill may be placed between the bottom of the footing and cemented soils in all areas.



- Foundations a minimum of 1-foot wide, bearing as described above, with a minimum 12-inch embedment below adjacent finished grade, may be proportioned for a maximum allowable bearing pressure of 2,000 pounds per square foot (psf). An additional 400 psf for each additional foot of foundation width or embedment may be utilized up to a maximum allowable bearing pressure of 4,000 psf. The bearing capacity was calculated using a factor of safety of 3.0.
- A modulus of subgrade reaction, K_{V1} , of 200 tons per cubic foot may be used for design of mat foundations. K_{V1} refers to a 1-foot-square plate and should be adjusted for actual foundation dimensions using the following equation (B is foundation width in feet):

$$K_v = K_{v1} \left(\frac{B + 1}{2B} \right)^2$$

- The friction acting along the base of the foundation may be computed using an ultimate coefficient of friction of 0.65. An appropriate factor of safety should be used during design.
- An ultimate passive earth pressure may be computed using an equivalent fluid density of 450 pounds per cubic foot (pcf) for the sides of foundations cast against undisturbed soil or properly placed and compacted Engineered Fill. An appropriate factor of safety should be used during design. Passive pressure in the upper foot should be neglected unless confined by concrete slab-on-grade.
- We estimate total settlements of foundations should be less than one inch. Total settlement of mat foundations should be evaluated with the modulus of subgrade reaction. We anticipate that differential settlement to be one half of the total settlement.
- Foundations excavations should be observed by the geotechnical engineer to confirm the subsurface conditions and foundation recommendations.
- To maintain the desired support, foundations adjacent to utility trenches or other existing foundations should be deepened as necessary so that their bearing surfaces are below an imaginary plane having an inclination of 1.5 horizontal to 1 vertical, extending upward from the bottom edge of the adjacent foundations or utility trenches.



- Prior to placing reinforcement steel or concrete, foundation excavations should be cleaned of any debris, disturbed soil or water. All foundation excavations should be observed by a representative of Kleinfelder just prior to placing steel or concrete. The purpose of these observations is to check that the bearing soils encountered in the foundation excavations are similar to those assumed in analysis and the recommendations contained herein are implemented during construction.

5.4.2 Monopole Drilled Shaft Foundation

We anticipate that the dead-end monopole structure located in the substation will be supported on drilled shaft foundation. Boring SB-1 was used as the basis for estimating the axial and lateral resistances values presented in this Section. If the tower location is revised, we should be contacted for additional recommendations. Ultimate and allowable skin friction values are presented in Table 5.4.2-1.

TABLE 5.4.2-1: DRILLED SHAFT AXIAL CAPACITY – BORING SB-1

Bottom Layer Depth (feet)	Ultimate Downward Skin Friction (ksf)	Allowable Downward Skin Friction (ksf)	Ultimate Uplift Skin Friction (ksf)	Allowable Uplift Skin Friction (ksf)
2½	0.08	0.04	0.06	0.03
10	3.0	1.5	2.2	1.1
40	1.7	0.9	1.2	0.6

*Minimum embedment of 5 pier diameters is required

**Calculated using a factor of safety of 2

Lateral design parameters for use in lateral load analysis of drilled shaft foundations using LPILE software (by Ensoft, Inc., Version 2018) are provided in Table 5.4.2-2.

**TABLE 5.4.2-2: LPILE GEOTECHNICAL PARAMETERS – BORING SB-1**

Lpile Parameters							
Bottom Layer Depth (feet)	P-Y Model	Effective Unit Weight (pcf)	Initial K-value (pci)	Friction Angle (degrees)	Uniaxial Compressive Strength (psi)	Undrained Shear Strength (psf)	Strain at 50% of Strength (e50)
2½	Sand (Reese)	125	225	34	--	--	--
10	Vuggy Limestone	130	--	--	4,000	--	--
40	Stiff Clay without Free Water	120	--	--	--	3,000	(use default)

Additional considerations for drilled pier foundations include:

- Piers should be designed by a qualified structural engineer.
- Reduction of axial and lateral capacity is required for group effects where drilled shafts are spaced closer than 3 and 6 diameters, respectively. Kleinfelder should be contacted for additional recommendations if drilled shafts are proposed that are closer than the above spacings.
- We recommend pier foundation concrete be designed and placed at a slump between 5- and 7-inches.
- Concrete placement should occur immediately after pier hole drilling, cleaning, and installation of reinforcement and observation. Concrete should be placed in one continuous placement without any cold joints.
- A minimum pier diameter of 24 inches is recommended to allow for pier cleaning and observation.
- The installation of the drilled piers should be observed by a Kleinfelder representative to observe the construction techniques and confirm the subsurface conditions are as anticipated from our exploratory borings.
- For foundations constructed in accordance to the recommendations presented herein, total foundation settlement should be less than 1-inch.



5.4.3 Concrete Slab on Grade

Support for concrete slab-on-grade may be provided by 4 inches of Clark County Type II aggregate base compacted to 95 percent maximum dry density underlain completely by structural fill or native soils with an expansion potential less than 4 percent under a 60 psf surcharge. In no case should slabs-on-grade be underlain by soils with an expansion potential greater than 4 percent under a 60 psf surcharge without remediation as described in Section 5.1. The thickness of aggregate base should be increased to a minimum of 6 inches where slabs are thickened for support of heavy vehicle or machinery loads.

As described previously, testing for chemical heave should be performed. Where sodium sulfate levels are greater than 0.2 are present in the subgrade for support of concrete slab on grade, the thickness of the Clark County Type II aggregate base should be increased to 12 inches.

All concrete slabs should be designed to minimize cracking as a result of shrinkage. The concrete section and reinforcement should be designed by a structural engineer.

Special precautions must be taken during the placement and curing of the proposed concrete slabs. Excessive slump of the concrete and/or improper curing procedures used during either hot or cold weather conditions could lead to excessive shrinkage, cracking, or curling in the pads. We recommend that all concrete design, placement, and curing operations be performed in accordance with the most current ACI Manual.

5.5 ACCESS ROADS

Near surface soils encountered in the explorations were predominately silty sand with gravel. An R-Value of 25 was selected for design. Subgrades for access roads should be prepared in accordance with the recommendations of Section 5.1.2 and 5.1.3.

The on-site access roads during construction will be subjected to heavy equipment and equipment (lowboy) loads of up to 90 tons for step-up transformers. However, after the construction period, the traffic volumes will be light, with only occasional trucks weighing up to 75,000 lbs. The road sections are designed based on post-construction traffic volumes, with the assumption that frequent maintenance of the aggregate base roads will occur during construction. Loading



information provided by the project team indicates up to five passenger cars/day and one HS-20 loading every 2 weeks. We assumed a design life of 20 years. Based on the design life and loading provided, the loading is defined by AASHTO as “low” equivalent single axle loads.

Based on the findings, we recommend that gravel roads be surfaced with a 4-inch thick section of aggregate base course over compacted subgrade. As stated above, this design based on post-construction traffic and is not sufficient for the anticipated construction traffic loading. During construction, aggregate-surfaced roads will require periodic maintenance to maintain the surface. Routine grading of the surface should be anticipated to remediate rutting and washboard surfaces. Periodic addition of aggregate base course material may be required throughout the life of the roadway.

Table 5.5-1 presents recommended minimum asphalt concrete pavement sections.

**TABLE 5.5.1-1: RECOMMENDED MINIMUM ASPHALT CONCRETE PAVEMENT SECTIONS
(For Granular Subgrade Soils)**

Use	Asphalt Concrete (inches)	Aggregate Base (inches)
On-site access roadway	3.0	4.0

Aggregate Base

Aggregate base materials should meet current Clark County specifications for Type II aggregate base.

Pavement Maintenance

A crack sealing program should be performed annually to slow pavement deterioration. Any areas where surface water stands on the surface should be remediated. Over time as cracking becomes more pronounced, a slurry seal coat should be applied.

Construction Recommendations

The pavement sections provided above are contingent on the following recommendations being implemented during construction:

- Subgrade should be prepared as recommended in Section 5.1 of this report.



- Subgrade soils should be in a stable, non-pumping condition at the time the aggregate base materials are placed and compacted.
- Aggregate base materials should be compacted to at least 95 percent relative compaction (ASTM D1557).
- Asphalt paving materials and placement methods should meet current Clark County specifications.
- Adequate drainage (both surface and subsurface) should be provided such that the subgrade soils and aggregate base materials are not allowed to become wet.

The performance of roads will be affected by the drainage provisions constructed. We recommend road surfaces and subgrades be provided with cross-slope of at least 2 percent to move water off of the roadway. The use of drainage ditches along the sides of road should be considered to drain the base course and improve road stability in wet conditions.



6 CLOSURE

6.1 LIMITATIONS

This work was performed in a manner consistent with that level of care and skill ordinarily exercised by other members of Kleinfelder's profession practicing in the same locality, under similar conditions and at the date the services are provided. Our conclusions, opinions, and recommendations are based on a limited number of observations and data. It is possible that conditions could vary between or beyond the data evaluated. Kleinfelder makes no other representation, guarantee, or warranty, express or implied, regarding the services, communication (oral or written), report, opinion, or instrument of service provided.

The scope of services was limited to 29 borings, 28 test pits, and 10 field resistivity locations. It should be recognized that definition and evaluation of subsurface conditions are difficult. Judgments leading to conclusions and recommendations are generally made with incomplete knowledge of the subsurface conditions present due to the limitations of data from field studies.

This report may be used only by the Client and the registered design professional in responsible charge and only for the purposes stated for this specific engagement within a reasonable time from its issuance, but in no event later than two (2) years from the date of the report. Kleinfelder is not responsible for the use of this report for purposes other than those stated for this specific engagement.

The work performed was based on project information provided by Client. If Client does not retain Kleinfelder to review any plans and specifications, including any revisions or modifications to the plans and specifications, Kleinfelder assumes no responsibility for the suitability of our recommendations. In addition, if there are any changes in the field to the plans and specifications, Client must obtain written approval from Kleinfelder's engineer that such changes do not affect our recommendations. Failure to do so will vitiate Kleinfelder's recommendations.



Recommendations contained in this report are based on field observations and subsurface explorations, limited laboratory tests, and our present knowledge of the proposed construction. It is likely that soil, rock or groundwater conditions will vary between or beyond the points explored. If soil, rock, or groundwater conditions are encountered during construction that differ from those described herein, the Client is responsible for notifying Kleinfelder immediately so that we may reevaluate the recommendations of this report. If the scope of the proposed construction, including the estimated building loads, and the design depths or locations of the foundations changes from that described in this report, the conclusions and recommendations contained in this report are not considered valid unless the changes are reviewed, and the conclusions of this report are modified or approved in writing, by Kleinfelder.

Kleinfelder offers various levels of investigative and engineering services to suit the varying needs of different clients. Although risk can never be eliminated, more detailed and extensive studies yield more information, which may help understand and manage the level of risk. Since detailed study and analysis involves greater expense, our clients participate in determining levels of service, which provide information for their purposes at acceptable levels of risk. The client and key members of the design team should discuss the issues covered in this report with Kleinfelder, so that the issues are understood and applied in a manner consistent with the owner's budget, tolerance of risk and expectations for future performance and maintenance.

Kleinfelder cannot be responsible for interpretation by others of this report or the conditions encountered in the field.

The scope of services for this subsurface exploration and geotechnical report did not include environmental assessments or evaluations regarding the presence or absence of wetlands or hazardous substances in the soil, surface water, or groundwater at this site.

6.2 ADDITIONAL SERVICES

As the geotechnical engineering firm that performed the geotechnical evaluation for this project, Kleinfelder should be retained to confirm that the recommendations of this report are properly incorporated in the design of this project, and properly implemented during construction. This may avoid misinterpretation of the information by other parties and will allow us to review and modify



our recommendations if variations in the soil conditions are encountered. As a minimum Kleinfelder should be retained to provide the following continuing services for the project:

- Review the project plans and specifications, including any revisions or modifications;
- Observe and evaluate the site earthwork operations to confirm subgrade soils are suitable for construction of foundations, slabs-on-grade, pavements, and placement of engineered fill;
- Confirm engineered fill for the structure and other improvements is placed and compacted per the project specifications;
- Observe foundation bearing soils to confirm conditions are as anticipated; and

Additional information concerning the scope and cost of these services can be obtained from our office. We appreciate the opportunity to be of service on this project. Should you have any questions regarding this report or wish to discuss additional services, please do not hesitate to contact us.



7 REFERENCES

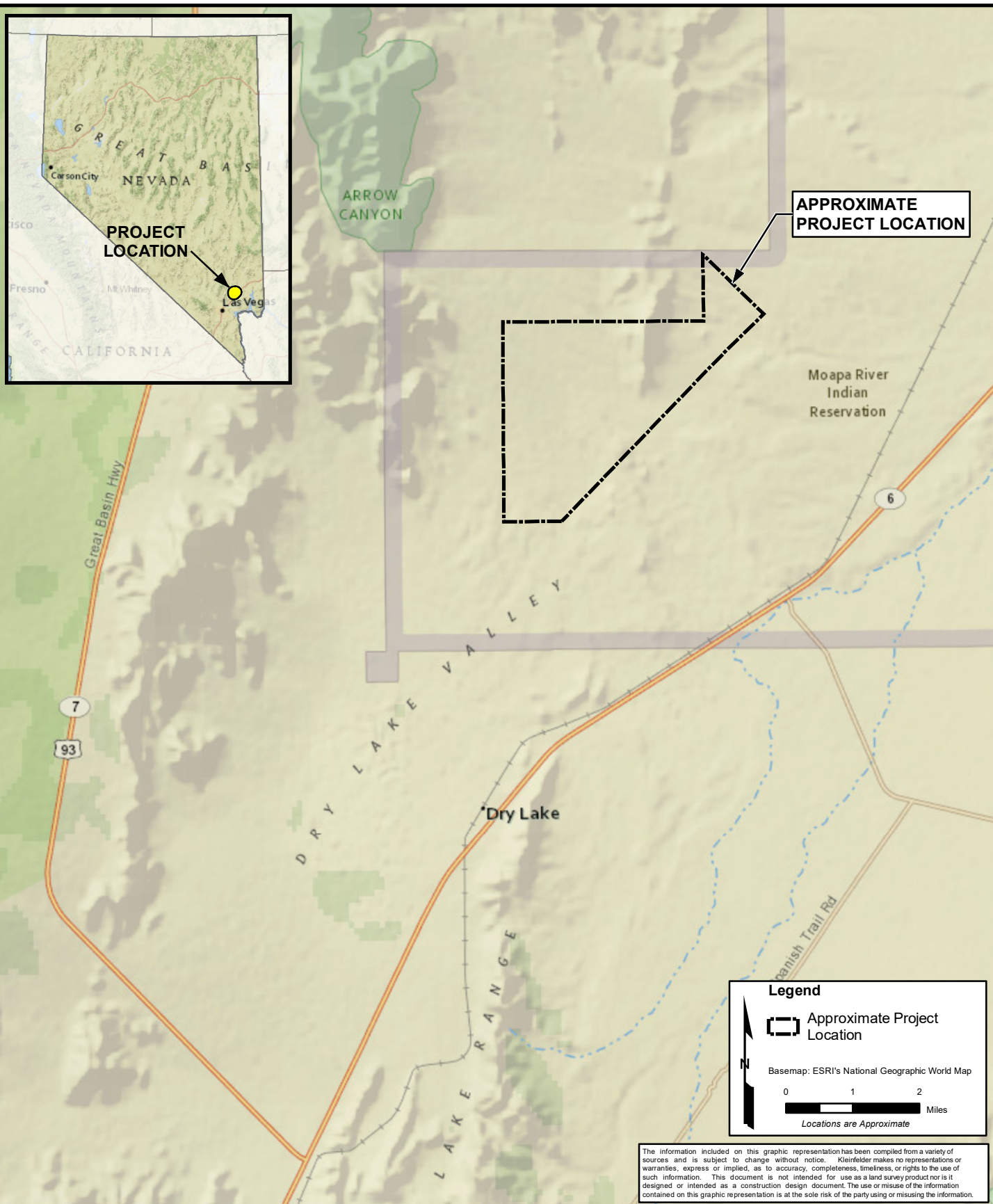
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Date: 2/22/2019 BY: KHagan

FILE: L:\2019\20191344.001A - Eagle Shadow Mountain Solar\2.0 Technical Information\2.8 GIS

LAS VEGAS, NV



PROJECT: 20191344
 DRAWN: JAN 2019
 DRAWN BY: KFH
 CHECKED BY: MM
 FILE NAME: Fissures_F1.mxd

GENERAL SITE VICINITY MAP

EAGLE SHADOW MOUNTAIN SOLAR PROJECT
 MOAPA RIVER INDIAN RESERVATION, USA

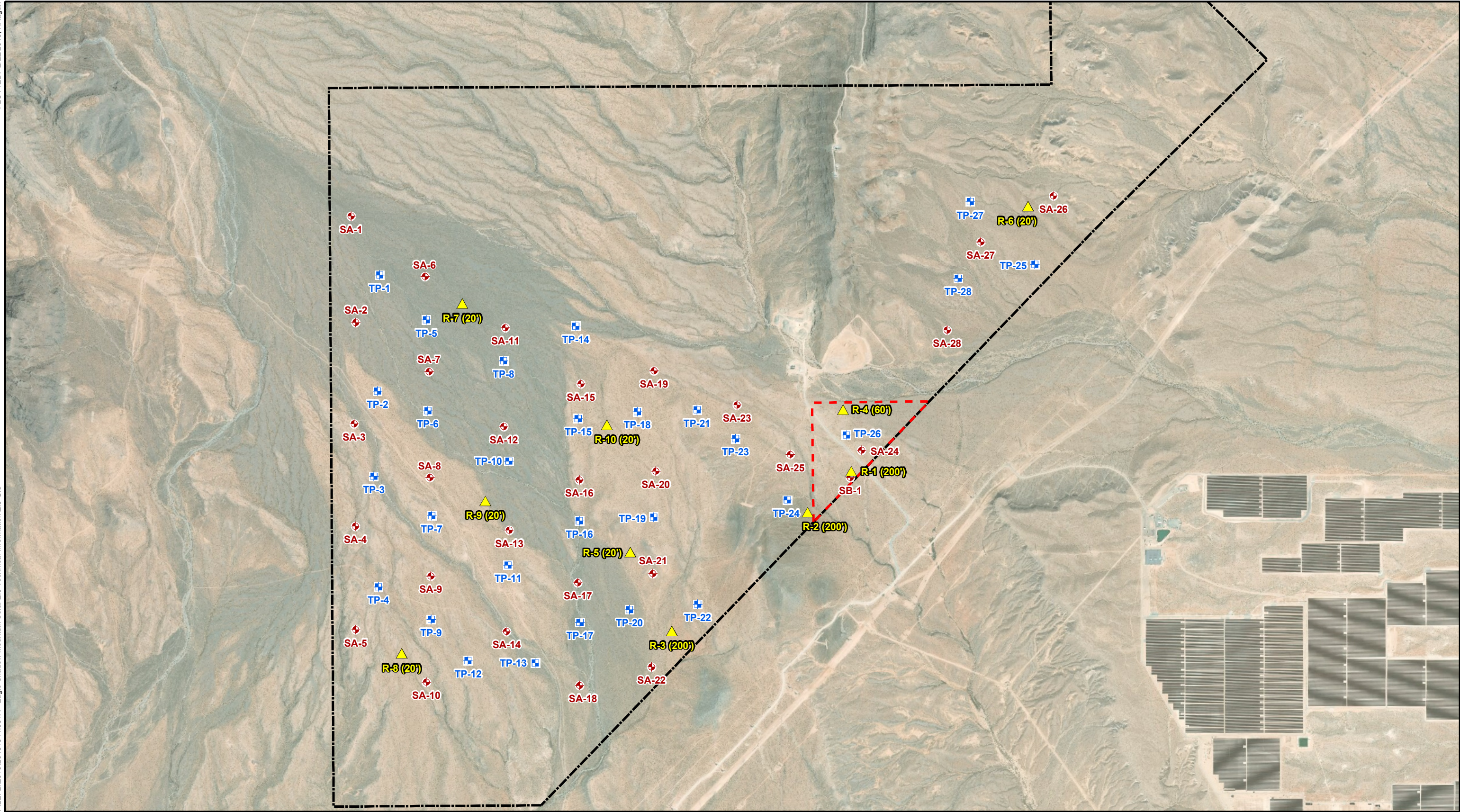
FIGURE

1

PLOTTED: 2/22/2019, KHagan

FILE: L:\2019\20191344.001A - Eagle Shadow Mountain Solar\2.0 Technical Information\2.8 GIS

LAS VEGAS, NV



Locations are Approximate

Aerial: ESRI World Imagery, DigitalGlobe, images dated 7/4/2016, 7/4/2017

Legend

- Boring Location
- Test Pit Location
- Field Resistivity Line (maximum electrode spacing, feet)
- Approximate Proposed Substation Area
- Approximate Project Area

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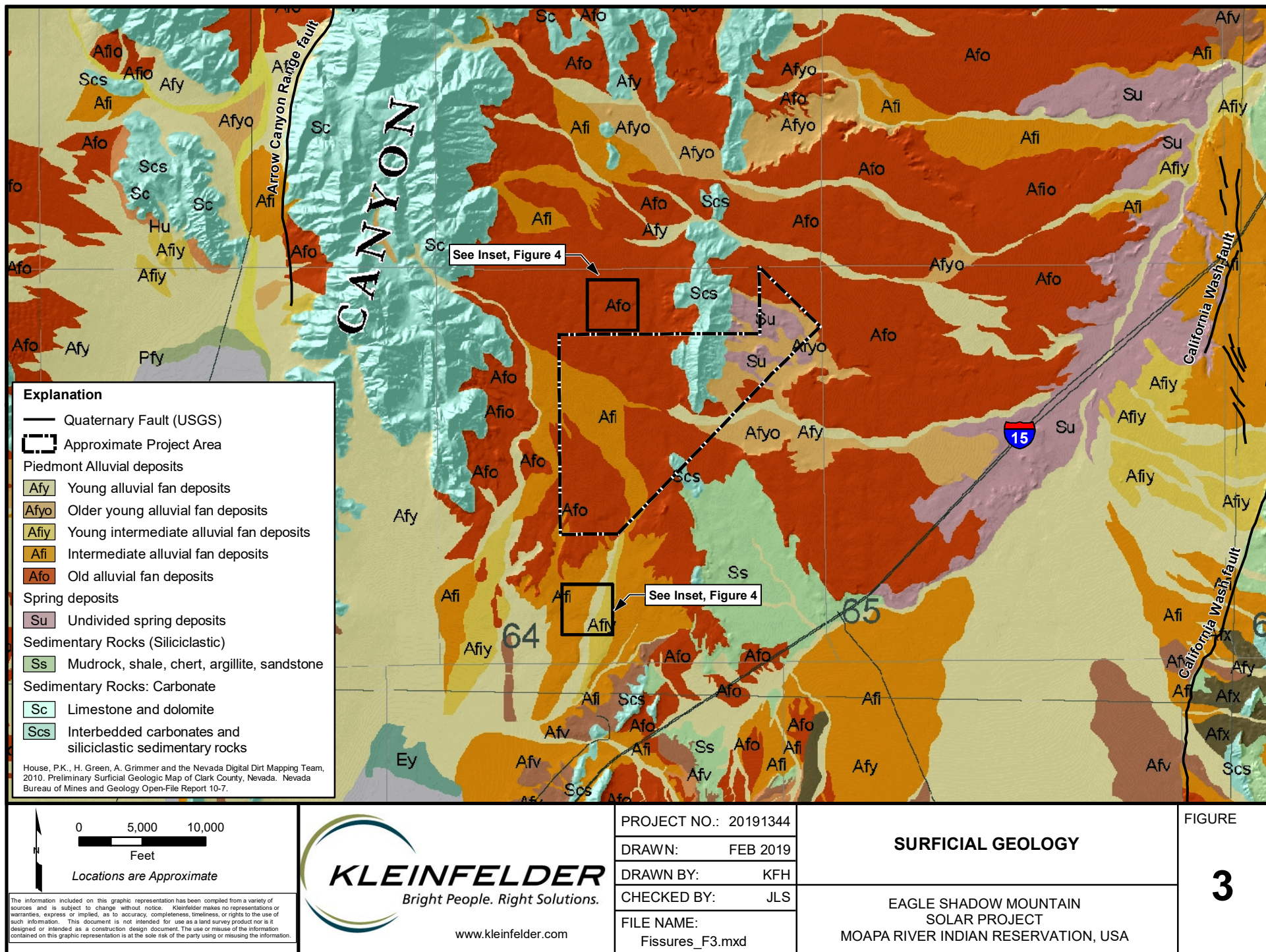
PROJECT NO.:	20191344
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DRAWN BY:	KFH
CHECKED BY:	MM
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EXPLORATION LOCATION MAP

EAGLE SHADOW MOUNTAIN SOLAR PROJECT
MOAPA RIVER INDIAN RESERVATION, USA

FIGURE

2

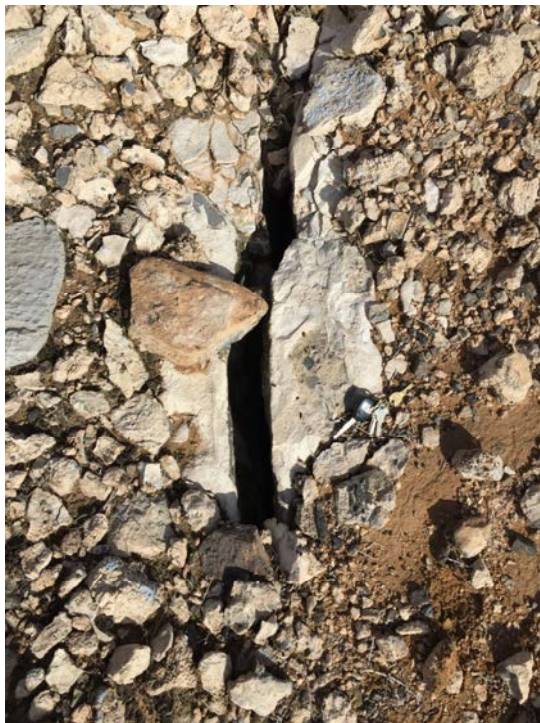




Location 1



Location 2



Location 3



Location 4

See Figure 4 for photograph locations

Original in Color



PROJECT:	20191344
DRAWN:	FEB 2019
DRAWN BY:	KFH
CHECKED BY:	JLS
FILE NAME:	Fissures_F5to8.ppt

**PHOTOGRAPHS OF SURFICIAL
CRACKING OBSERVED - NORTH OF
PROJECT AREA**

EAGLE SHADOW MOUNTAIN SOLAR PROJECT
MOAPA RIVER INDIAN RESERVATION, USA

FIGURE

5



Location 5



Location 6



Location 7



Location 8

See Figure 4 for photograph locations

Original in Color



PROJECT:	20191344
DRAWN:	FEB 2019
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FILE NAME:	Fissures_F5to8.ppt

**PHOTOGRAPHS OF SURFICIAL
CRACKING OBSERVED - NORTH OF
PROJECT AREA**

EAGLE SHADOW MOUNTAIN SOLAR PROJECT
MOAPA RIVER INDIAN RESERVATION, USA

FIGURE

6



Location 9



Location 10



Location 11



Location 12

See Figure 4 for photograph locations

Original in Color

 KLEINFELDER <i>Bright People. Right Solutions.</i> www.kleinfelder.com	PROJECT: 20191344	PHOTOGRAPHS OF SURFICIAL CRACKING OBSERVED – KEATON MILLER STUDY AREA	FIGURE 7
	DRAWN: FEB 2019		
	DRAWN BY: KFH	EAGLE SHADOW MOUNTAIN SOLAR PROJECT MOAPA RIVER INDIAN RESERVATION, USA	
	CHECKED BY: JLS		
	FILE NAME: Fissures_F5to8.ppt		



Location 13



Location 14

See Figure 4 for photograph locations

Original in Color

	PROJECT:	20191344	PHOTOGRAPHS OF SURFICIAL CRACKING OBSERVED – KEATON MILLER STUDY AREA	FIGURE 8
	DRAWN:	FEB 2019		
	DRAWN BY:	KFH	EAGLE SHADOW MOUNTAIN SOLAR PROJECT MOAPA RIVER INDIAN RESERVATION, USA	
	CHECKED BY:	JLS		
	FILE NAME:	Fissures_F5to8.ppt		



Appendix A



APPENDIX A

Apparent Soil Resistivity Measurements (7 pages)

Project Name: Eagle Shadow Mountain Solar

Project Number: 20191344

Test Location: R-1

Lat., long.: 36.53943, -114.79841

Line Orientation	Spacing (feet)	$2*\pi*a$	Soil Resistance (Ω)	*Apparent Resistivity (Ω -ft)
N-S	2.5	15.7	464.90	7303
	5	31.4	113.40	3563
	7.5	47.1	44.72	2107
	10	62.8	21.63	1359
	15	94.2	7.18	677
	20	125.7	3.92	493
	25	157.1	2.18	343
	30	188.5	1.42	267
	40	251.3	0.73	183
	50	314.2	0.49	155
	60	377.0	0.37	138
	70	439.8	0.25	109
	80	502.7	0.19	93
	90	565.5	0.14	77
	100	628.3	0.11	69
	125	785.4	0.08	61
	150	942.5	0.05	50
	175	1099.6	0.04	48
	200	1256.6	0.04	48
E-W	2.5	15.7	423.40	6651
	5	31.4	122.30	3842
	7.5	47.1	46.77	2204
	10	62.8	19.48	1224
	15	94.2	7.70	726
	20	125.7	4.47	561
	25	157.1	2.82	443
	30	188.5	1.72	324
	40	251.3	0.88	222
	50	314.2	0.53	165
	60	377.0	0.33	124
	70	439.8	0.24	106
	80	502.7	0.19	97
	90	565.5	0.15	87
	100	628.3	0.13	81
	125	785.4	0.08	66
	150	942.5	0.06	61
	175	1099.6	0.05	57
	200	1256.6	0.05	57

Apparent Resistivity = $2\pi*a*$ Resistance

Project Name: Eagle Shadow Mountain Solar
 Project Number: 20191344
 Test Location: R-2
 Lat., long.: 36.53697, -114.80172

Line Orientation	Spacing (feet)	$2*\pi*a$	Soil Resistance (Ω)	*Apparent Resistivity (Ω -ft)
NE-SW	2.5	15.7	577.70	9074
	5	31.4	124.00	3896
	7.5	47.1	30.44	1434
	10	62.8	8.92	560
	15	94.2	3.45	325
	20	125.7	1.75	220
	25	157.1	0.95	149
	30	188.5	0.63	118
	40	251.3	0.28	70
	50	314.2	0.17	54
	60	377.0	0.12	44
	70	439.8	0.09	39
	80	502.7	0.07	37
	90	565.5	0.06	34
	100	628.3	0.05	33
	125	785.4	0.04	32
	150	942.5	0.03	27
	175	1099.6	0.03	29
	200	1256.6	0.02	27
NW-SE	2.5	15.7	502.90	7900
	5	31.4	97.93	3077
	7.5	47.1	24.74	1166
	10	62.8	9.68	608
	15	94.2	3.37	318
	20	125.7	1.82	229
	25	157.1	1.11	175
	30	188.5	0.66	125
	40	251.3	0.32	80
	50	314.2	0.18	57
	60	377.0	0.13	48
	70	439.8	0.10	43
	80	502.7	0.08	40
	90	565.5	0.07	38
	100	628.3	0.06	36
	125	785.4	0.04	33
	150	942.5	0.03	30
	175	1099.6	0.03	28
	200	1256.6	0.02	27

Apparent Resistivity = $2\pi*a*$ Resistance

Project Name: Eagle Shadow Mountain Solar
 Project Number: 20191344
 Test Location: R-3
 Lat., long.: 36.529872, -114.811939

Line Orientation	Spacing (feet)	$2*\pi*a$	Soil Resistance (Ω)	*Apparent Resistivity (Ω -ft)
NE-SW	2.5	15.7	259.60	4078
	5	31.4	48.60	1527
	7.5	47.1	8.37	394
	10	62.8	3.90	245
	15	94.2	1.16	109
	20	125.7	0.82	103
	25	157.1	0.64	101
	30	188.5	0.57	107
	40	251.3	0.48	121
	50	314.2	0.43	134
	60	377.0	0.39	147
	70	439.8	0.37	162
	80	502.7	0.34	171
	90	565.5	0.32	181
	100	628.3	0.30	188
	125	785.4	0.26	207
	150	942.5	0.23	214
	175	1099.6	0.19	213
	200	1256.6	0.16	206
NW-SE	2.5	15.7	199.20	3129
	5	31.4	56.59	1778
	7.5	47.1	16.76	790
	10	62.8	5.48	344
	15	94.2	1.34	127
	20	125.7	0.81	102
	25	157.1	0.66	104
	30	188.5	0.59	111
	40	251.3	0.51	128
	50	314.2	0.47	146
	60	377.0	0.42	159
	70	439.8	0.39	174
	80	502.7	0.34	173
	90	565.5	0.33	188
	100	628.3	0.31	192
	125	785.4	0.26	200
	150	942.5	0.21	201
	175	1099.6	0.18	198
	200	1256.6	0.15	193

Apparent Resistivity = $2\pi*a*$ Resistance

Project Name Eagle Shadow Mountain Solar

Project Number: 20191344

Test Location: R-4

Lat., long.: 36.54314, -114.7990

Line Orientation	Spacing (feet)	$2*\pi*a$	Soil Resistance (Ω)	*Apparent Resistivity (Ω -ft)
NE-SW	2.5	15.7	831.60	13063
	5	31.4	200.85	6310
	7.5	47.1	67.24	3169
	10	62.8	29.55	1857
	15	94.2	12.95	1221
	20	125.7	6.63	833
	25	157.1	5.92	930
	30	188.5	4.26	802
	40	251.3	1.61	404
	50	314.2	0.88	276
	60	377.0	0.48	180
NW-SE	2.5	15.7	814.30	12791
	5	31.4	179.25	5631
	7.5	47.1	69.96	3297
	10	62.8	24.23	1522
	15	94.2	15.49	1460
	20	125.7	7.74	972
	25	157.1	5.19	815
	30	188.5	3.40	641
	40	251.3	1.56	393
	50	314.2	0.73	230
	60	377.0	0.37	138

Apparent Resistivity = $2\pi*a*$ Resistance

Project Name: Eagle Shadow Mountain Solar
 Project Number: 20191344
 Test Location: R-5
 Lat., long.: 36.53464, -114.81501

Line Orientation	Spacing (feet)	$2*\pi*a$	Soil Resistance (Ω)	*Apparent Resistivity (Ω -ft)
N-S	2.5	15.7	287.00	4508
	5	31.4	30.10	946
	7.5	47.1	424.00	900
	10	62.8	3.33	209
	15	94.2	1.47	138
	20	125.7	0.93	117
E-W	2.5	15.7	502.50	7893
	5	31.4	30.73	965
	7.5	47.1	7.47	352
	10	62.8	3.98	250
	15	94.2	1.94	183
	20	125.7	0.88	111

Apparent Resistivity = $2\pi*a*$ Resistance

Test Location: R-6
 Lat., long.: 36.55534, -114.78503

Line Orientation	Spacing (feet)	$2*\pi*a$	Soil Resistance (Ω)	*Apparent Resistivity (Ω -ft)
N-S	2.5	15.7	59.74	938
	5	31.4	22.68	713
	7.5	47.1	9.02	425
	10	62.8	5.22	328
	15	94.2	1.64	154
	20	125.7	0.69	87
E-W	2.5	15.7	47.64	748
	5	31.4	19.42	610
	7.5	47.1	9.91	467
	10	62.8	5.33	335
	15	94.2	1.54	145
	20	125.7	0.65	82

Apparent Resistivity = $2\pi*a*$ Resistance

Project Name: Eagle Shadow Mountain Solar
 Project Number: 20191344
 Test Location: R-7
 Lat., long.: 36.82754, -114.82753

Line Orientation	Spacing (feet)	$2*\pi*a$	Soil Resistance (Ω)	*Apparent Resistivity (Ω -ft)
N-S	2.5	15.7	1442.00	22651
	5	31.4	496.00	15582
	7.5	47.1	141.80	6682
	10	62.8	96.61	6070
	15	94.2	29.32	2763
	20	125.7	11.72	1473
E-W	2.5	15.7	1462.00	22965
	5	31.4	401.90	12626
	7.5	47.1	148.30	6988
	10	62.8	77.35	4860
	15	94.2	24.77	2335
	20	125.7	11.55	1451

Apparent Resistivity = $2\pi*a*$ Resistance

Test Location: R-8
 Lat., long.: 36.52863, -114.83217

Line Orientation	Spacing (feet)	$2*\pi*a$	Soil Resistance (Ω)	*Apparent Resistivity (Ω -ft)
N-S	2.5	15.7	635.50	9982
	5	31.4	92.80	2915
	7.5	47.1	25.32	1193
	10	62.8	10.17	639
	15	94.2	5.26	495
	20	125.7	3.83	481
E-W	2.5	15.7	665.20	10449
	5	31.4	88.03	2766
	7.5	47.1	23.22	1094
	10	62.8	10.12	636
	15	94.2	5.41	509
	20	125.7	4.10	515

Apparent Resistivity = $2\pi*a*$ Resistance

Project Name: Eagle Shadow Mountain Solar

Project Number: 20191344

Test Location: R-9

Lat., long.: 36.53781, -114.82583

Line Orientation	Spacing (feet)	$2*\pi*a$	Soil Resistance (Ω)	*Apparent Resistivity (Ω -ft)
N-S	2.5	15.7	348.50	5474
	5	31.4	184.70	5803
	7.5	47.1	91.11	4293
	10	62.8	58.56	3679
	15	94.2	19.97	1882
	20	125.7	5.74	722
E-W	2.5	15.7	854.80	13427
	5	31.4	228.30	7172
	7.5	47.1	51.90	2446
	10	62.8	18.32	1151
	15	94.2	8.66	816
	20	125.7	2.18	274

Apparent Resistivity = $2\pi*a*$ Resistance

Test Location: R-10

Lat., long.: 36.54234, -114.81667

Line Orientation	Spacing (feet)	$2*\pi*a$	Soil Resistance (Ω)	*Apparent Resistivity (Ω -ft)
N-S	2.5	15.7	65.87	1035
	5	31.4	12.28	386
	7.5	47.1	5.16	243
	10	62.8	2.23	140
	15	94.2	1.18	111
	20	125.7	0.86	108
E-W	2.5	15.7	166.20	2611
	5	31.4	10.74	337
	7.5	47.1	4.85	228
	10	62.8	2.44	153
	15	94.2	1.14	107
	20	125.7	0.74	92

Apparent Resistivity = $2\pi*a*$ Resistance





APPENDIX B

Graphics and Soil Description Keys (2 pages)
Boring and Test Pit Logs (58 pages)

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PROJECT NUMBER: 20191344.001A
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GINT TEMPLATE: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB**SAMPLER AND DRILLING METHOD GRAPHICS**

	BULK / GRAB / BAG SAMPLE
	MODIFIED CALIFORNIA SAMPLER (2 or 2-1/2 in. (50.8 or 63.5 mm.) outer diameter)
	CALIFORNIA SAMPLER (3 in. (76.2 mm.) outer diameter)
	STANDARD PENETRATION SPLIT SPOON SAMPLER (2 in. (50.8 mm.) outer diameter and 1-3/8 in. (34.9 mm.) inner diameter)
	SHELBY TUBE SAMPLER
	NQ CORE SAMPLE (1.874 in. (47.6 mm.) core diameter)
	HOLLOW STEM AUGER
	SOLID STEM AUGER
	WASH BORING
	VANE SHEAR

GROUND WATER GRAPHICS

	WATER LEVEL (level where first observed)
	WATER LEVEL (level after exploration completion)
	WATER LEVEL (additional levels after exploration)
	OBSERVED SEEPAGE

NOTES

- The report and graphics key are an integral part of these logs. All data and interpretations in this log are subject to the explanations and limitations stated in the report.
- Lines separating strata on the logs represent approximate boundaries only. Actual transitions may be gradual or differ from those shown.
- No warranty is provided as to the continuity of soil or rock conditions between individual sample locations.
- Logs represent general soil or rock conditions observed at the point of exploration on the date indicated.
- In general, Unified Soil Classification System designations presented on the logs were based on visual classification in the field and were modified where appropriate based on gradation and index property testing.
- Fine grained soils that plot within the hatched area on the Plasticity Chart, and coarse grained soils with between 5% and 12% passing the No. 200 sieve require dual USCS symbols, ie., GW-GM, GP-GM, GW-GC, GP-GC, GC-GM, SW-SM, SP-SM, SW-SC, SP-SC, SC-SM.
- If sampler is not able to be driven at least 6 inches then 50/X indicates number of blows required to drive the identified sampler X inches with a 140 pound hammer falling 30 inches.

ABBREVIATIONS

WOH - Weight of Hammer
WOR - Weight of Rod

UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487)

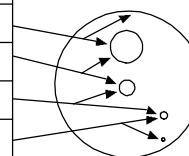
GRAVELS (More than half of coarse fraction is larger than the #200 sieve)	CLEAN GRAVEL WITH <5% FINES	Cu ≥ 4 and 1 ≤ Cc ≤ 3		GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
		Cu < 4 and/or 1 > Cc > 3		GP	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
	GRAVELS WITH 5% TO 12% FINES	Cu ≥ 4 and 1 ≤ Cc ≤ 3		GW-GM	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE FINES
				GW-GC	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE CLAY FINES
		Cu < 4 and/or 1 > Cc > 3		GP-GM	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE FINES
				GP-GC	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE CLAY FINES
	GRAVELS WITH > 12% FINES			GM	SILTY GRAVELS, GRAVEL-SILT-SAND MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
				GC-GM	CLAYEY GRAVELS, GRAVEL-SAND-CLAY-SILT MIXTURES
SANDS (Half or more of coarse fraction is smaller than the #4 sieve)	CLEAN SANDS WITH <5% FINES	Cu ≥ 6 and 1 ≤ Cc ≤ 3		SW	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
		Cu < 6 and/or 1 > Cc > 3		SP	POORLY GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
	SANDS WITH 5% TO 12% FINES	Cu ≥ 6 and 1 ≤ Cc ≤ 3		SW-SM	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE FINES
				SW-SC	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE CLAY FINES
		Cu < 6 and/or 1 > Cc > 3		SP-SM	POORLY GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE FINES
				SP-SC	POORLY GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE CLAY FINES
	SANDS WITH > 12% FINES			SM	SILTY SANDS, SAND-GRAVEL-SILT MIXTURES
				SC	CLAYEY SANDS, SAND-GRAVEL-CLAY MIXTURES
				SC-SM	CLAYEY SANDS, SAND-SILT-CLAY MIXTURES
FINE GRAINED SOILS (Half or more of material is smaller than the #200 sieve)	SILTS AND CLAYS (Liquid Limit less than 50)			ML	INORGANIC SILTS AND VERY FINE SANDS, SILTY OR CLAYEY FINE SANDS, SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				CL-ML	INORGANIC CLAYS-SILTS OF LOW PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
	SILTS AND CLAYS (Liquid Limit 50 or greater)			OL	ORGANIC SILTS & ORGANIC SILTY CLAYS OF LOW PLASTICITY
				MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILT
				CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
				OH	ORGANIC CLAYS & ORGANIC SILTS OF MEDIUM-TO-HIGH PLASTICITY

 KLEINFELDER Bright People. Right Solutions.	PROJECT NO.: 20191344	GRAPHICS KEY Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA	FIGURE B-1
	DRAWN BY: AB CHECKED BY: MM DATE: 2/22/2019 REVISED: -		

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GRAIN SIZE

DESCRIPTION	SIEVE SIZE	GRAIN SIZE	APPROXIMATE SIZE
Boulders	>12 in. (304.8 mm.)	>12 in. (304.8 mm.)	Larger than basketball-sized
Cobbles	3 - 12 in. (76.2 - 304.8 mm.)	3 - 12 in. (76.2 - 304.8 mm.)	Fist-sized to basketball-sized
Gravel	coarse 3/4 - 3 in. (19 - 76.2 mm.)	3/4 - 3 in. (19 - 76.2 mm.)	Thumb-sized to fist-sized
	fine #4 - 3/4 in. (#4 - 19 mm.)	0.19 - 0.75 in. (4.8 - 19 mm.)	Pea-sized to thumb-sized
Sand	coarse #10 - #4	0.075 - 0.19 in. (2 - 4.9 mm.)	Rock salt-sized to pea-sized
	medium #40 - #10	0.017 - 0.075 in. (0.43 - 2 mm.)	Sugar-sized to rock salt-sized
	fine #200 - #40	0.0029 - 0.017 in. (0.07 - 0.43 mm.)	Flour-sized to sugar-sized
Fines	Passing #200	<0.0029 in. (<0.07 mm.)	Flour-sized and smaller

**SECONDARY CONSTITUENT**

	AMOUNT	
Term of Use	Secondary Constituent is Fine Grained	Secondary Constituent is Coarse Grained
Trace	<5%	<15%
With	≥5 to <15%	≥15 to <30%
Modifier	≥15%	≥30%

MOISTURE CONTENT

DESCRIPTION	FIELD TEST
Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible free water, usually soil is below water table

CEMENTATION

DESCRIPTION	FIELD TEST
Weakly	Crumbles or breaks with handling or slight finger pressure
Moderately	Crumbles or breaks with considerable finger pressure
Strongly	Will not crumble or break with finger pressure

CONSISTENCY - FINE-GRAINED SOIL

CONSISTENCY	SPT - N ₆₀ (# blows / ft)	Pocket Pen (tsf)	UNCONFINED COMPRESSIVE STRENGTH (Q _u)(psf)	VISUAL / MANUAL CRITERIA
Very Soft	<2	PP < 0.25	<500	Thumb will penetrate more than 1 inch (25 mm). Extrudes between fingers when squeezed.
Soft	2 - 4	0.25 ≤ PP < 0.5	500 - 1000	Thumb will penetrate soil about 1 inch (25 mm). Remolded by light finger pressure.
Medium Stiff	4 - 8	0.5 ≤ PP < 1	1000 - 2000	Thumb will penetrate soil about 1/4 inch (6 mm). Remolded by strong finger pressure.
Stiff	8 - 15	1 ≤ PP < 2	2000 - 4000	Can be imprinted with considerable pressure from thumb.
Very Stiff	15 - 30	2 ≤ PP < 4	4000 - 8000	Thumb will not indent soil but readily indented with thumbnail.
Hard	>30	4 ≤ PP	>8000	Thumbnail will not indent soil.

FROM TERZAGHI AND PECK, 1948; LAMBE AND WHITMAN, 1969; FHWA, 2002; AND ASTM D2488

APPARENT / RELATIVE DENSITY - COARSE-GRAINED SOIL

APPARENT DENSITY	SPT-N ₆₀ (# blows/ft)	MODIFIED CA SAMPLER (# blows/ft)	CALIFORNIA SAMPLER (# blows/ft)	RELATIVE DENSITY (%)
Very Loose	<4	<4	<5	0 - 15
Loose	4 - 10	5 - 12	5 - 15	15 - 35
Medium Dense	10 - 30	12 - 35	15 - 40	35 - 65
Dense	30 - 50	35 - 60	40 - 70	65 - 85
Very Dense	>50	>60	>70	85 - 100

FROM TERZAGHI AND PECK, 1948

STRUCTURE

DESCRIPTION	CRITERIA
Stratified	Alternating layers of varying material or color with layers at least 1/4-in. thick, note thickness.
Laminated	Alternating layers of varying material or color with the layer less than 1/4-in. thick, note thickness.
Fissured	Breaks along definite planes of fracture with little resistance to fracturing.
Slickensided	Fracture planes appear polished or glossy, sometimes striated.
Blocky	Cohesive soil that can be broken down into small angular lumps which resist further breakdown.
Lensed	Inclusion of small pockets of different soils, such as small lenses of sand scattered through a mass of clay; note thickness.

REACTION WITH HYDROCHLORIC ACID

DESCRIPTION	FIELD TEST
None	No visible reaction
Weak	Some reaction, with bubbles forming slowly
Strong	Violent reaction, with bubbles forming immediately

PLASTICITY

DESCRIPTION	LL	FIELD TEST
Non-plastic	NP	A 1/8-in. (3 mm.) thread cannot be rolled at any water content.
Low (L)	< 30	The thread can barely be rolled and the lump or thread cannot be formed when drier than the plastic limit.
Medium (M)	30 - 50	The thread is easy to roll and not much time is required to reach the plastic limit. The thread cannot be rerolled after reaching the plastic limit. The lump or thread crumbles when drier than the plastic limit.
High (H)	> 50	It takes considerable time rolling and kneading to reach the plastic limit. The thread can be rerolled several times after reaching the plastic limit. The lump or thread can be formed without crumbling when drier than the plastic limit.

ANGULARITY

DESCRIPTION	CRITERIA
Angular	Particles have sharp edges and relatively plane sides with unpolished surfaces.
Subangular	Particles are similar to angular description but have rounded edges.
Subrounded	Particles have nearly plane sides but have well-rounded corners and edges.
Rounded	Particles have smoothly curved sides and no edges.

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PROJECT NUMBER: 20191344.001A
GINT TEMPLATE: E:KLF_STANDARD_GINT_LIBRARY_2017.GLB [LEGEND 2 (SOIL_DESC KEY)]

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PROJECT NO.: 20191344
DRAWN BY: AB
CHECKED BY: MM
DATE: 2/22/2019
REVISED: -

SOIL DESCRIPTION KEY

Eagle Shadow Mountain Solar Project
Moapa River Indian Reservation, USA

FIGURE

B-2

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PROJECT NUMBER: 20191344.001A

GINT FILE: C:\users\mpalmer\desktop\20191344.001a.gpj
GINT TEMPLATE: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_BORING/TEST PIT SOIL LOG]

Date Begin - End: 12/05/2018		Drilling Company: Cascade		BORING LOG SA-1									
Logged By: A. Bajramovic		Drill Crew: T.Sakaida											
Hor.-Vert. Datum: WGS84		Drilling Equipment: CME 1050		Hammer Type - Drop: 140 lb. Auto - 30 in.									
Plunge: -90 degrees		Drilling Method: Hollow Stem Auger											
Weather: Cloudy		Bore Diameter: 4.25 in. O.D.											

Depth (feet)	Graphical Log	FIELD EXPLORATION			LABORATORY RESULTS									
		Latitude: 36.55507° Longitude: -114.83572° Surface Condition: Typical cover of desert vegetation, with cobbles present	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks	
														Lithologic Description
5		Poorly Graded GRAVEL with Silt and Sand (GP-GM): fine to coarse-grained gravel, non-plastic, light brown, slightly moist, medium dense to dense											Drill rig chatter to maximum depth explored	
		- dense below 2.5 feet	BC=28 20 23	18"									1.5 ft/min drill rate between 2.5 and 5 feet	
		Cemented SAND and GRAVEL: tan, slightly moist, moderately to strongly cemented	BC=26 50/4"	10"									1 ft/min drill rate between 5 and 7.5 feet	
			BC=50/2"	2"									0.6 ft/min drill rate between 7.5 and 10 feet	
			BC=50/3"	3"									3.75 ft/min drill rate between 10 and 15 feet	
15		- interlayered weakly to moderately cemented zones below 15 feet	BC=28 50/3"	9"								1.7 ft/min drill rate between 15 and 20 feet		
20			BC=50/3"	NR										
		The boring was terminated at approximately 20.3 ft. below ground surface. The boring was backfilled on December 05, 2018.				GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during drilling or after completion. GENERAL NOTES: Latitude and longitude obtained using a hand held GPS unit.								
25														
30														

	PROJECT NO.: 20191344	BORING LOG SA-1	BORING
	DRAWN BY: AB, MAP		
	CHECKED BY: JLS	Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA	SA-1
	DATE: 2/22/2019		
	REVISED: -	PAGE: 1 of 1	

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PROJECT NUMBER: 20191344.001A
GINT FILE: C:\users\mpalmer\desktop\20191344.001a.gpj
GINT TEMPLATE: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_BORING/TEST PIT SOIL LOG]

Date Begin - End: 12/05/2018		Drilling Company: Cascade		BORING LOG SA-2									
Logged By: A. Bajramovic		Drill Crew: T.Sakaida											
Hor.-Vert. Datum: WGS84		Drilling Equipment: CME 1050		Hammer Type - Drop: 140 lb. Auto - 30 in.									
Plunge: -90 degrees		Drilling Method: Hollow Stem Auger											
Weather: Cloudy		Bore Diameter: 4.25 in. O.D.											

Depth (feet)	Graphical Log	FIELD EXPLORATION			LABORATORY RESULTS								Additional Tests/ Remarks	
		Latitude: 36.54864° Longitude: -114.83544° Surface Condition: Typical cover of desert vegetation, with cobbles present	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)		
		Lithologic Description												
5		Clayey SAND with Gravel (SC): fine to coarse-grained sand, low to medium plasticity, light brown, slightly moist, medium dense to dense, with probable cobbles - very dense below 2.5 feet	BC=50/5"	4"									Drill rig chatter below 3 inches 0.8 ft/min drill rate between 3 inches and 2.5 feet	
													0.8 ft/min drill rate between 2.5 and 5 feet	
														1.25 ft/min drill rate between 5 and 7.5 feet
														1 ft/min drill rate between 7.5 and 10 feet
														0.8 ft/min drill rate between 10 and 15 feet
15		Cemented SAND and GRAVEL: tan, slightly moist, moderately to strongly cemented	BC=50/5"	5"										
			BC=50/3"	3"										
			BC=50/4"	4"										
The boring was terminated at approximately 15.3 ft. below ground surface. The boring was backfilled on December 05, 2018. <u>GROUNDWATER LEVEL INFORMATION:</u> Groundwater was not observed during drilling or after completion. <u>GENERAL NOTES:</u> Latitude and longitude obtained using a hand held GPS unit.														

	PROJECT NO.: 20191344	BORING LOG SA-2 Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA	BORING SA-2
	DRAWN BY: AB, MAP		
	CHECKED BY: JLS		
	DATE: 2/22/2019		
	REVISED: -		

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PAGE: 1 of 1

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GINT FILE: C:\users\mpalmer\desktop\20191344_001a.gpj
 GINT TEMPLATE: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_BORING/TEST PIT SOIL LOG]

Date Begin - End: 12/04/2018		Drilling Company: Cascade		BORING LOG SA-3									
Logged By: A. Bajramovic		Drill Crew: T.Sakaida											
Hor.-Vert. Datum: WGS84		Drilling Equipment: CME 1050		Hammer Type - Drop: 140 lb. Auto - 30 in.									
Plunge: -90 degrees		Drilling Method: Hollow Stem Auger											
Weather: Cloudy		Bore Diameter: 4.25 in. O.D.											

Depth (feet)	Graphical Log	FIELD EXPLORATION			LABORATORY RESULTS								Additional Tests/ Remarks			
		Latitude: 36.54253° Longitude: -114.83561° Surface Condition: Typical cover of desert vegetation	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)				
		Lithologic Description														
0		Silty SAND with Gravel (SM): fine to coarse-grained sand, non-plastic, light brown, slightly moist, medium dense to dense, with caliche nodules														
0		Cemented SAND and GRAVEL: tan, slightly moist, moderately to strongly cemented														
5		- interlayered weakly to moderately cemented zones below 5 feet														
5			BC=50/3"	3"												Drill rig chatter below 0.5 feet 0.3 ft/min drill rate between 0.5 and 2.5 feet
5			BC=14 32 50/3"	15"												0.7 ft/min drill rate between 5 and 7.5 feet
5			BC=50/4"	4"												0.5 ft/min drill rate between 7.5 and 10 feet
10			BC=50/2"	2"												0.2 ft/min drill rate between 10 and 15 feet
15			BC=50/0"	NR												
		The boring was terminated at approximately 15.1 ft. below ground surface. The boring was backfilled on December 04, 2018.				GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during drilling or after completion. GENERAL NOTES: Latitude and longitude obtained using a hand held GPS unit.										
20																
25																
30																

	PROJECT NO.: 20191344	BORING LOG SA-3 Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA	BORING SA-3
	DRAWN BY: AB, MAP		
	CHECKED BY: JLS		
	DATE: 2/22/2019		
	REVISED: -		

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PROJECT NUMBER: 20191344.001A
GINT FILE: C:\users\mpalmer\desktop\20191344.001a.gpj
GINT TEMPLATE: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_BORING/TEST PIT SOIL LOG]

Date Begin - End: 12/04/2018		Drilling Company: Cascade		BORING LOG SA-4									
Logged By: A. Bajramovic		Drill Crew: T. Sakaida											
Hor.-Vert. Datum: WGS84		Drilling Equipment: CME 1050		Hammer Type - Drop: 140 lb. Auto - 30 in.									
Plunge: -90 degrees		Drilling Method: Hollow Stem Auger											
Weather: Sunny		Bore Diameter: 4.25 in. O.D.											

Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS									
		Latitude: 36.53633° Longitude: -114.83556° Surface Condition: Typical cover of desert vegetation	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks		
		Lithologic Description													
0		Silty SAND with Gravel (SM): fine to coarse-grained sand, non-plastic, light brown, slightly moist, medium dense to dense												*Resistivity (as Received)= 49000 Ohm-cm Resistivity (Saturated)= 4100 Ohm-cm Sodium= 0.0023% Sodium Sulfate= 0.0072% Solubility= 0.01% pH= 8.88 Sulfates= 0.009% Chlorides= 25 mg/Kg Redox= 197 mV Sulfides= 1.6 mg/Kg ASTM D1557 Method A= Max. Dry Unit Wt.: 129.7 pcf Opt. Water Content: 8.5% Drill rig chatter below 0.5 feet 0.1 ft/min drill rate between 0.5 and 2.5 feet 0.7 ft/min drill rate between 2.5 and 5 feet 1.25 ft/min drill rate between 5 and 7.5 feet 0.8 ft/min drill rate between 7.5 and 10 feet 0.7 ft/min drill rate between 10 and 15 feet	
5		Cemented SAND and GRAVEL: tan, slightly moist, moderately to strongly cemented	BC=50/5"	5"											
		- interlayered weakly to moderately cemented zones below 5 feet	BC=22 50/6"	12"											
			BC=50/5"	5"											
10			BC=50/4"	4"											
15		Sandy Elastic SILT (MH): high plasticity, brown, slightly moist, hard	BC=21 33 48	18"	MH	16.9			67	69	31				
20			BC=20 44 50/5"	15"											
25		The boring was terminated at approximately 21.4 ft. below ground surface. The boring was backfilled on December 04, 2018.					GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during drilling or after completion. GENERAL NOTES: *Gradation, Atterberg Limits, Chemical Test, and Modified Proctor test data is representative of Cemented Sand and Gravel broken by the augers and sampled from the returns. Latitude and longitude obtained using a hand held GPS unit.								
30															

	PROJECT NO.: 20191344	BORING LOG SA-4	BORING
	DRAWN BY: AB, MAP		
	CHECKED BY: JLS	Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA	SA-4
	DATE: 2/22/2019		
	REVISED: -		

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OFFICE FILTER: LAS VEGAS

PROJECT NUMBER: 20191344.001A

GINT FILE: C:\users\mpalmer\desktop\20191344.001a.gpj
GINT TEMPLATE: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_BORING/TEST PIT SOIL LOG]

Date Begin - End: 12/04/2018		Drilling Company: Cascade		BORING LOG SA-5									
Logged By: A. Bajramovic		Drill Crew: T. Sakaida											
Hor.-Vert. Datum: WGS84		Drilling Equipment: CME 1050		Hammer Type - Drop: 140 lb. Auto - 30 in.									
Plunge: -90 degrees		Drilling Method: Hollow Stem Auger											
Weather: Cloudy		Bore Diameter: 4.25 in. O.D.											

Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS									
		Latitude: 36.53009° Longitude: -114.83562° Surface Condition: Typical cover of desert vegetation	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks		
														Lithologic Description	
0		Silty SAND with Gravel (SM): fine to coarse-grained sand, non-plastic, light brown, slightly moist, medium dense to dense													
5		Cemented SAND and GRAVEL: tan, slightly moist, moderately to strongly cemented	BC=50/5"	5"										Drill rig chatter below 0.5 feet 0.4 ft/min drill rate between 0.5 and 2.5 feet 0.8 ft/min drill rate between 2.5 and 5 feet	
10		- interlayered weakly to moderately cemented zones below 5 feet	BC=28 50/5"	13"										1.25 ft/min drill rate between 5 and 7.5 feet	
15			BC=50/5"	7"										0.8 ft/min drill rate between 7.5 and 10 feet	
20			BC=50/5"	5"										1.1 ft/min drill rate between 10 and 15 feet	
25		Fat CLAY (CH): high plasticity, brown, slightly moist, very stiff	BC=50/4"	5"										1.4 ft/min drill rate between 15 and 20 feet	
30		- hard below 21.5 feet	BC=10 11 14	18"											
35			BC=15 25 37	16"		19.5	103.9								
		The boring was terminated at approximately 23 ft. below ground surface. The boring was backfilled on December 04, 2018.				GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during drilling or after completion. GENERAL NOTES: Latitude and longitude obtained using a hand held GPS unit.									

	PROJECT NO.: 20191344	BORING LOG SA-5	BORING
	DRAWN BY: AB, MAP		
	CHECKED BY: JLS	Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA	SA-5
	DATE: 2/22/2019		
	REVISED: -	PAGE: 1 of 1	

PLOTTED: 02/26/2019 02:30 PM BY: MPalmer

OFFICE FILTER: LAS VEGAS

PROJECT NUMBER: 20191344.001A
GINT TEMPLATE: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_BORING/TEST PIT SOIL LOG]

GINT FILE: C:\users\mpalmer\desktop\20191344.001a.gpj

Date Begin - End: 12/05/2018		Drilling Company: Cascade		BORING LOG SA-6									
Logged By: A. Bajramovic		Drill Crew: T.Sakaida											
Hor.-Vert. Datum: WGS84		Drilling Equipment: CME 1050		Hammer Type - Drop: 140 lb. Auto - 30 in.									
Plunge: -90 degrees		Drilling Method: Hollow Stem Auger											
Weather: Cloudy		Bore Diameter: 4.25 in. O.D.											

Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS									
		Latitude: 36.55139° Longitude: -114.83021° Surface Condition: Typical cover of desert vegetation, with cobbles present	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks		
														Lithologic Description	
		Poorly Graded GRAVEL with Silt and Sand (GP-GM): fine to coarse-grained gravel, non-plastic, light brown, slightly moist, medium dense to dense											Drill rig chatter below 0.5 feet		
5		Cemented SAND and GRAVEL: tan, slightly moist, moderately to strongly cemented	BC=45 50/3"	9"									1 ft/min drill rate between 5 and 7.5 feet		
			BC=50/3"	NR									0.6 ft/min drill rate between 7.5 and 10 feet		
10			BC=50/5"	5"									0.7 ft/min drill rate between 10 and 15 feet		
15			BC=50/1"	1"											
			BC=50/4"	4"											
		The boring was terminated at approximately 15.3 ft. below ground surface. The boring was backfilled on December 05, 2018.					GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during drilling or after completion. GENERAL NOTES: Latitude and longitude obtained using a hand held GPS unit.								
20															
25															
30															

	PROJECT NO.: 20191344	BORING LOG SA-6 Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA	BORING SA-6
	DRAWN BY: AB, MAP		
	CHECKED BY: JLS		
	DATE: 2/22/2019		
	REVISED: -		

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PROJECT NUMBER: 20191344.001A
GINT FILE: C:\users\mpalmer\desktop\20191344.001a.gpj
GINT TEMPLATE: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_BORING/TEST PIT SOIL LOG]

Date Begin - End: 12/05/2018		Drilling Company: Cascade		BORING LOG SA-7									
Logged By: A. Bajramovic		Drill Crew: T.Sakaida											
Hor.-Vert. Datum: WGS84		Drilling Equipment: CME 1050		Hammer Type - Drop: 140 lb. Auto - 30 in.									
Plunge: -90 degrees		Drilling Method: Hollow Stem Auger											
Weather: Cloudy		Bore Diameter: 4.25 in. O.D.											

Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS							
		Latitude: 36.54563° Longitude: -114.82996° Surface Condition: Typical cover of desert vegetation, with cobbles present	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
		Poorly Graded GRAVEL with Silt and Sand (GP-GM): fine to coarse-grained gravel, non-plastic, light brown, slightly moist, medium dense to dense											Drill rig chatter below 1 foot
		Cemented SAND and GRAVEL: tan, slightly moist, moderately to strongly cemented	BC=23 50/5"	11"									0.5 ft/min drill rate between 2.5 and 5 feet
5			BC=50/4"	4"									1 ft/min drill rate between 5 and 7.5 feet
			BC=44 50/2"	8"									1.25 ft/min drill rate between 7.5 and 10 feet
10			BC=50/3"	3"									1 ft/min drill rate between 10 and 15 feet
15			BC=50/4"	4"									
		The boring was terminated at approximately 15.3 ft. below ground surface. The boring was backfilled on December 05, 2018.					GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during drilling or after completion. GENERAL NOTES: Latitude and longitude obtained using a hand held GPS unit.						
20													
25													
30													

	PROJECT NO.: 20191344	BORING LOG SA-7 Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA	BORING SA-7
	DRAWN BY: AB, MAP		
	CHECKED BY: JLS		
	DATE: 2/22/2019		
	REVISED: -		

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PROJECT NUMBER: 20191344.001A
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GINT TEMPLATE: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_BORING/TEST PIT SOIL LOG]

Date Begin - End: 12/06/2018		Drilling Company: Cascade		BORING LOG SA-8									
Logged By: A. Bajramovic		Drill Crew: T. Sakaida											
Hor.-Vert. Datum: WGS84		Drilling Equipment: CME 1050		Hammer Type - Drop: 140 lb. Auto - 30 in.									
Plunge: -90 degrees		Drilling Method: Hollow Stem Auger											
Weather: Cloudy		Bore Diameter: 4.25 in. O.D.											

Depth (feet)	Graphical Log	FIELD EXPLORATION			LABORATORY RESULTS								
		Latitude: 36.53925° Longitude: -114.82997° Surface Condition: Typical cover of desert vegetation	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
		Lithologic Description											
		Silty SAND with Gravel (SM): fine to coarse-grained sand, non-plastic, light brown, slightly moist, medium dense to dense, with caliche nodules											
		- dense below 2.5 feet	BC=15 15 22	15"		5.8							
5		- very dense, with interlayered weakly to moderately cemented zones below 5 feet	BC=29 50/5"	10"									2.5 ft/min drill rate between 5 and 7.5 feet Drill rig chatter below 5.5 feet
			BC=16 48 50/5"	17"									2.5 ft/min drill rate between 7.5 and 10 feet
10		Cemented SAND and GRAVEL: tan, slightly moist, moderately to strongly cemented	BC=50/6"	6"									1.1 ft/min drill rate between 10 and 15 feet
15			BC=50/3"	NR									
The boring was terminated at approximately 15.3 ft. below ground surface. The boring was backfilled on December 06, 2018.					GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during drilling or after completion. GENERAL NOTES: Latitude and longitude obtained using a hand held GPS unit.								
20													
25													
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	PROJECT NO.: 20191344	BORING LOG SA-8 Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA	BORING
	DRAWN BY: AB, MAP		SA-8
	CHECKED BY: JLS		
	DATE: 2/22/2019		
	REVISED: -		

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PROJECT NUMBER: 20191344.001A
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Date Begin - End: 12/06/2018		Drilling Company: Cascade		BORING LOG SA-9									
Logged By: A. Bajramovic		Drill Crew: T.Sakaida											
Hor.-Vert. Datum: WGS84		Drilling Equipment: CME 1050		Hammer Type - Drop: 140 lb. Auto - 30 in.									
Plunge: -90 degrees		Drilling Method: Hollow Stem Auger											
Weather: Cloudy		Bore Diameter: 4.25 in. O.D.											

Depth (feet)	Graphical Log	FIELD EXPLORATION			LABORATORY RESULTS									
		Latitude: 36.53330° Longitude: -114.82997° Surface Condition: Typical cover of desert vegetation	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks	
		Lithologic Description												
0		Silty SAND with Gravel (SM): fine to coarse-grained sand, light brown, slightly moist, medium dense to dense, with caliche nodules												
5		Cemented SAND and GRAVEL: tan, slightly moist, moderately to strongly cemented	BC=50/6"	6"										Drill rig chatter below 1 foot
		- interlayered weakly to moderately cemented zones below 5 feet	BC=46 50/5"	11"										1 ft/min drill rate between 1 and 2.5 feet
			BC=50/4"	4"										2.5 ft/min drill rate between 2.5 and 5 feet
10			BC=50/5"	5"										2.5 ft/min drill rate between 5 and 7.5 feet
15			BC=50/2"	2"										1.7 ft/min drill rate between 7.5 and 10 feet
20		The boring was terminated at approximately 15.2 ft. below ground surface. The boring was backfilled on December 06, 2018.				GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during drilling or after completion. GENERAL NOTES: Latitude and longitude obtained using a hand held GPS unit.								
25														
30														

	PROJECT NO.: 20191344	BORING LOG SA-9 Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA	BORING SA-9
	DRAWN BY: AB, MAP		
	CHECKED BY: JLS		
	DATE: 2/22/2019		
	REVISED: -		

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PROJECT NUMBER: 20191344.001A
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GINT FILE: C:\users\mpalmer\desktop\20191344.001a.gpj

Date Begin - End: 12/03/2018		Drilling Company: Cascade		BORING LOG SA-10									
Logged By: A. Bajramovic		Drill Crew: T. Sakaida											
Hor.-Vert. Datum: WGS84		Drilling Equipment: CME 1050		Hammer Type - Drop: 140 lb. Auto - 30 in.									
Plunge: -90 degrees		Drilling Method: Hollow Stem Auger											
Weather: Sunny		Bore Diameter: 4.25 in. O.D.											

Depth (feet)	Graphical Log	FIELD EXPLORATION			LABORATORY RESULTS									
		Latitude: 36.52689° Longitude: -114.83007° Surface Condition: Typical cover of desert vegetation, adjacent to wash up to 5 feet wide and 3 feet deep	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks	
		Lithologic Description												
0 - 5		Silty SAND with Gravel (SM): fine to coarse-grained sand, non-plastic, light brown, slightly moist, medium dense to dense - dense to very dense below 2.5 feet	BC=21 25 24	18"									0.1 ft/min drill rate between surface and 2.5 feet Drill rig chatter from 0.5 to 14.5 feet 1.25 ft/min drill rate between 2.5 and 5 feet	
5 - 10		Cemented SAND and GRAVEL: tan, slightly moist, moderately to strongly cemented	BC=33 50/5"	11"									1.7 ft/min drill rate between 5 and 7.5 feet	
10 - 15			BC=50/6"	6"									0.6 ft/min drill rate between 7.5 and 10 feet	
15 - 20		Sandy Fat CLAY (CH): high plasticity, brown, slightly moist, hard	BC=12 22 33	18"		19.3							1.7 ft/min drill rate between 10 and 15 feet	
20 - 21.4			BC=21 35 50/5"	15"										
		The boring was terminated at approximately 21.4 ft. below ground surface. The boring was backfilled on December 03, 2018.			GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during drilling or after completion. GENERAL NOTES: Latitude and longitude obtained using a hand held GPS unit.									

	PROJECT NO.: 20191344	BORING LOG SA-10 Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA	BORING SA-10
	DRAWN BY: AB, MAP		
	CHECKED BY: JLS		
	DATE: 2/22/2019		
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PROJECT NUMBER: 20191344.001A

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Date Begin - End: 12/07/2018		Drilling Company: Cascade		BORING LOG SA-11										
Logged By: A. Bajramovic		Drill Crew: T. Sakaida												
Hor.-Vert. Datum: WGS84		Drilling Equipment: CME 1050		Hammer Type - Drop: 140 lb. Auto - 30 in.										
Plunge: -90 degrees		Drilling Method: Hollow Stem Auger												
Weather: Cloudy/ Rainy		Bore Diameter: 4.25 in. O.D.												
Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS								
		Latitude: 36.54827° Longitude: -114.82423° Surface Condition: Typical cover of desert vegetation, with cobbles present		Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
		Lithologic Description												
0		Clayey SAND with Gravel (SC): fine to coarse-grained sand, low to medium plasticity, brown, slightly moist, medium dense to dense - with probable cobbles below 1 foot		BC=15 28 50/5"	16"	0.9								Drill rig chatter below 1 foot 0.5 ft/min drill rate between 1 and 2.5 feet 0.8 ft/min drill rate between 2.5 and 5 feet
5		Cemented SAND and GRAVEL: tan, slightly moist, moderately to strongly cemented		BC=50/4"	4"									
				BC=50/4"	4"									
10				BC=50/3"	3"									
15				BC=50/4"	4"									
20				BC=50/3"	NR									
The boring was terminated at approximately 20.3 ft. below ground surface. The boring was backfilled on December 07, 2018. GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during drilling or after completion. GENERAL NOTES: Latitude and longitude obtained using a hand held GPS unit.														
25														
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	PROJECT NO.: 20191344	BORING LOG SA-11	BORING SA-11
	DRAWN BY: AB, MAP		
	CHECKED BY: JLS	Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA	
	DATE: 2/22/2019 REVISED: -		

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PROJECT NUMBER: 20191344.001A
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Date Begin - End: 12/06/2018		Drilling Company: Cascade		BORING LOG SA-12															
Logged By: A. Bajramovic		Drill Crew: T.Sakaida																	
Hor.-Vert. Datum: WGS84		Drilling Equipment: CME 1050		Hammer Type - Drop: 140 lb. Auto - 30 in.															
Plunge: -90 degrees		Drilling Method: Hollow Stem Auger																	
Weather: Cloudy		Bore Diameter: 4.25 in. O.D.																	
Depth (feet)	Graphical Log	FIELD EXPLORATION			LABORATORY RESULTS								Additional Tests/ Remarks						
		Latitude: 36.54229° Longitude: -114.82439° Surface Condition: Typical cover of desert vegetation, with cobbles and boulders present	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)							
		Lithologic Description																	
0		Clayey SAND with Gravel (SC): fine to coarse-grained sand, low to medium plasticity, brown, slightly moist, medium dense to dense Cemented SAND and GRAVEL: tan, slightly moist, moderately to strongly cemented																	
5			BC=50/2"	2"															Drill rig chatter below 4 inches 0.4 ft/min drill rate between 4 inches and 2.5 feet 2.5 ft/min drill rate between 2.5 and 5 feet
			BC=50/3"	3"															1.7 ft/min drill rate between 5 and 7.5 feet
			BC=50/3"	3"															0.8 ft/min drill rate between 7.5 and 10 feet
10			BC=50/4"	4"															1.7 ft/min drill rate between 10 and 15 feet
15		BC=50/5"	3"																
		The boring was terminated at approximately 15.4 ft. below ground surface. The boring was backfilled on December 06, 2018. <u>GROUNDWATER LEVEL INFORMATION:</u> Groundwater was not observed during drilling or after completion. <u>GENERAL NOTES:</u> Latitude and longitude obtained using a hand held GPS unit.																	
20																			
25																			
30																			
		PROJECT NO.: 20191344		BORING LOG SA-12								BORING							
		DRAWN BY: AB, MAP		Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA								SA-12							
		CHECKED BY: JLS																	
		DATE: 2/22/2019																	
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PROJECT NUMBER: 20191344.001A
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Date Begin - End: 12/06/2018		Drilling Company: Cascade		BORING LOG SA-13										
Logged By: A. Bajramovic		Drill Crew: T. Sakaida												
Hor.-Vert. Datum: WGS84		Drilling Equipment: CME 1050		Hammer Type - Drop: 140 lb. Auto - 30 in.										
Plunge: -90 degrees		Drilling Method: Hollow Stem Auger												
Weather: Cloudy		Bore Diameter: 4.25 in. O.D.												
Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS								
		Latitude: 36.53601° Longitude: -114.82405° Surface Condition: Typical cover of desert vegetation		Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
		Lithologic Description												
5		Clayey SAND with Gravel (SC): fine to coarse-grained sand, low to medium plasticity, brown, slightly moist, medium dense to dense Cemented SAND and GRAVEL: tan, slightly moist, moderately to strongly cemented	BC=50/3"	3"										1 ft/min drill rate between 5 inches and 2.5 feet Drill rig chatter below 0.5 feet 0.4 ft/min drill rate between 2.5 and 5 feet
			BC=50/5"	5"										0.4 ft/min drill rate between 0.5 and 2.5 feet
			BC=38 50/4"	10"										0.4 ft/min drill rate between 0.5 and 2.5 feet
			BC=50/4"	3"										Louder drill rig chatter, slower drilling below 10 feet 0.7 ft/min drill rate between 10 and 15 feet
			BC=50/3"	3"										0.4 ft/min drill rate between 0.5 and 2.5 feet
20		BC=50/4"	4"											
		The boring was terminated at approximately 20.3 ft. below ground surface. The boring was backfilled on December 06, 2018.				GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during drilling or after completion. GENERAL NOTES: Latitude and longitude obtained using a hand held GPS unit.								
25														
30														

	PROJECT NO.: 20191344	BORING LOG SA-13 Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA	BORING SA-13
	DRAWN BY: AB, MAP		
	CHECKED BY: JLS		
	DATE: 2/22/2019		
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 GINT TEMPLATE: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_BORING/TEST PIT SOIL LOG]

Date Begin - End: 12/03/2018		Drilling Company: Cascade		BORING LOG SA-14									
Logged By: A. Bajramovic		Drill Crew: T. Sakaida											
Hor.-Vert. Datum: WGS84		Drilling Equipment: CME 1050		Hammer Type - Drop: 140 lb. Auto - 30 in.									
Plunge: -90 degrees		Drilling Method: Hollow Stem Auger											
Weather: Sunny		Bore Diameter: 4.25 in. O.D.											

Depth (feet)	Graphical Log	FIELD EXPLORATION			LABORATORY RESULTS								Additional Tests/ Remarks
		Latitude: 36.52990° Longitude: -114.82432° Surface Condition: Typical cover of desert vegetation, with cobbles present	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	
		Lithologic Description											
5		Poorly Graded GRAVEL with Silt and Sand (GP-GM): fine to coarse-grained gravel, non-plastic, light brown, slightly moist, medium dense to dense, probable cobbles Cemented SAND and GRAVEL: tan, slightly moist, moderately to strongly cemented	BC=50/3"	3"									Drill rig chatter below 1 foot
		BC=50/3"	3"										0.2 ft/min drill rate between 2.5 and 5 feet
		BC=50/4"	4"										0.8 ft/min drill rate between 5 and 7.5 feet
		BC=50/3"	3"										1 ft/min drill rate between 7.5 and 10 feet
		BC=50/3"	3"										0.9 ft/min drill rate between 10 and 15 feet
15			BC=50/3"	3"									
		The boring was terminated at approximately 15.3 ft. below ground surface. The boring was backfilled on December 03, 2018.				GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during drilling or after completion. GENERAL NOTES: Latitude and longitude obtained using a hand held GPS unit.							
20													
25													
30													

	PROJECT NO.: 20191344	BORING LOG SA-14 Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA	BORING SA-14
	DRAWN BY: AB, MAP		
	CHECKED BY: JLS		
	DATE: 2/22/2019		
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PROJECT NUMBER: 20191344.001A

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Date Begin - End: 12/07/2018		Drilling Company: Cascade		BORING LOG SA-15									
Logged By: A. Bajramovic		Drill Crew: T. Sakaida											
Hor.-Vert. Datum: WGS84		Drilling Equipment: CME 1050		Hammer Type - Drop: 140 lb. Auto - 30 in.									
Plunge: -90 degrees		Drilling Method: Hollow Stem Auger											
Weather: Cloudy		Bore Diameter: 4.25 in. O.D.											

Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS									
		Latitude: 36.54483° Longitude: -114.81890° Surface Condition: Typical cover of desert vegetation, with cobbles present	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks		
														Lithologic Description	
5		Silty SAND with Gravel (SM): fine to coarse-grained sand, non-plastic, brown, slightly moist, medium dense to dense Clayey SAND with Gravel (SC): fine to coarse-grained sand, low to medium plasticity, brown, slightly moist, medium dense to dense Cemented SAND and GRAVEL: tan, slightly moist, moderately to strongly cemented - interlayered weakly to moderately cemented zones below 7.5 feet	BC=29 50/5"	9"									1 ft/min drill rate between 4 inches and 2.5 feet Drill rig chatter from 1 to 20 feet		
			BC=50/6"	6"									1.25 ft/min drill rate between 2.5 and 5 feet		
			BC=12 50/4"	10"									1.7 ft/min drill rate between 5 and 7.5 feet		
			BC=50/5"	5"									1.25 ft/min drill rate between 7.5 and 10 feet		
			BC=50/3"	NR									1.7 ft/min drill rate between 10 and 15 feet		
20		Lean CLAY (CL): low to medium plasticity, brown, moist, hard	BC=11 19 26	18"		17.8							2 ft/min drill rate between 15 and 20 feet		
25			BC=13 21 50/5"	17"											
30		- very stiff below 30 feet	BC=10 13 16	18"											

The boring was terminated at approximately 31.5 ft. below ground surface. The boring was backfilled on December 07, 2018.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
Latitude and longitude obtained using a hand held GPS unit.

	PROJECT NO.: 20191344	BORING LOG SA-15	BORING
	DRAWN BY: AB, MAP		
	CHECKED BY: JLS	Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA	SA-15
	DATE: 2/22/2019		
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Date Begin - End: 12/07/2018		Drilling Company: Cascade		BORING LOG SA-16									
Logged By: A. Bajramovic		Drill Crew: T.Sakaida											
Hor.-Vert. Datum: WGS84		Drilling Equipment: CME 1050		Hammer Type - Drop: 140 lb. Auto - 30 in.									
Plunge: -90 degrees		Drilling Method: Hollow Stem Auger											
Weather: Cloudy		Bore Diameter: 4.25 in. O.D.											
Depth (feet)	Graphical Log	FIELD EXPLORATION			LABORATORY RESULTS								
		Latitude: 36.53903° Longitude: -114.81878° Surface Condition: Typical cover of desert vegetation, with cobbles and boulders present	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
		Lithologic Description											
5		Clayey SAND with Gravel (SC): fine to coarse-grained sand, non-plastic, brown, slightly moist, medium dense to dense, with probable cobbles and/or boulders, with caliche nodules - very dense, with interlayered weakly to moderately cemented zones below 2.5 feet	BC=11 27 50/5"	16"								Drill rig chatter below 4 inches 0.4 ft/min drill rate between 4 inches and 2.5 feet 0.5 ft/min drill rate between 2.5 and 5 feet	
		Cemented SAND and GRAVEL: tan, slightly moist, moderately to strongly cemented	BC=50/4"	4"								1.7 ft/min drill rate between 5 and 7.5 feet	
10			BC=50/5"	8"								1.25 ft/min drill rate between 7.5 and 10 feet	
			BC=50/4"	6"								1.7 ft/min drill rate between 10 and 15 feet	
15			BC=50/4"	5"									
The boring was terminated at approximately 15.3 ft. below ground surface. The boring was backfilled on December 07, 2018.					GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during drilling or after completion. GENERAL NOTES: Latitude and longitude obtained using a hand held GPS unit.								
20													
25													
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	PROJECT NO.: 20191344	BORING LOG SA-16	BORING
	DRAWN BY: AB, MAP		
	CHECKED BY: JLS	Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA	SA-16
DATE: 2/22/2019			
REVISED: -			PAGE: 1 of 1

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PROJECT NUMBER: 20191344.001A
GINT FILE: C:\users\mpalmer\desktop\20191344.001a.gpj
GINT TEMPLATE: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_BORING/TEST PIT SOIL LOG]

Date Begin - End: 12/07/2018		Drilling Company: Cascade		BORING LOG SA-17									
Logged By: A. Bajramovic		Drill Crew: T.Sakaida											
Hor.-Vert. Datum: WGS84		Drilling Equipment: CME 1050		Hammer Type - Drop: 140 lb. Auto - 30 in.									
Plunge: -90 degrees		Drilling Method: Hollow Stem Auger											
Weather: Cloudy		Bore Diameter: 4.25 in. O.D.											

Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS							
		Latitude: 36.53282° Longitude: -114.81895° Surface Condition: Typical cover of desert vegetation	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
		Silty SAND with Gravel (SM): fine to coarse-grained sand, non-plastic, brown, slightly moist, medium dense to dense, with caliche nodules											Drill rig chatter below 0.5 feet
			BC=9 16 30	16"									1.25 ft/min drill rate between 2.5 and 5 feet
5		Cemented SAND and GRAVEL: tan, slightly moist, moderately to strongly cemented											Drill rig chatter louder, slower drilling below 4 feet
			BC=50/5"	6"									1.25 ft/min drill rate between 5 and 7.5 feet
			BC=50/5"	5"									0.6 ft/min drill rate between 7.5 and 10 feet
10			BC=50/4"	4"									2 ft/min drill rate between 10 and 15 feet
15			BC=50/4"	4"									
The boring was terminated at approximately 15.3 ft. below ground surface. The boring was backfilled on December 07, 2018. <u>GROUNDWATER LEVEL INFORMATION:</u> Groundwater was not observed during drilling or after completion. <u>GENERAL NOTES:</u> Latitude and longitude obtained using a hand held GPS unit.													
20													
25													
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	PROJECT NO.: 20191344	BORING LOG SA-17 Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA	BORING SA-17
	DRAWN BY: AB, MAP		
	CHECKED BY: JLS		
	DATE: 2/22/2019		
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PROJECT NUMBER: 20191344.001A
GINT TEMPLATE: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_BORING/TEST PIT SOIL LOG]

GINT FILE: C:\users\mpalmer\desktop\20191344.001a.gpi

Date Begin - End: 12/03/2018		Drilling Company: Cascade		BORING LOG SA-18									
Logged By: A. Bajramovic		Drill Crew: T.Sakaida											
Hor.-Vert. Datum: WGS84		Drilling Equipment: CME 1050		Hammer Type - Drop: 140 lb. Auto - 30 in.									
Plunge: -90 degrees		Drilling Method: Hollow Stem Auger											
Weather: Sunny		Bore Diameter: 4.25 in. O.D.											

Depth (feet)	Graphical Log	FIELD EXPLORATION			LABORATORY RESULTS								
		Latitude: 36.52660° Longitude: -114.81887° Surface Condition: Typical cover of desert vegetation	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
5		Silty SAND with Gravel (SM): fine to coarse-grained sand, non-plastic, brown, slightly moist, medium dense to dense Cemented SAND and GRAVEL: tan, slightly moist, moderately to strongly cemented	BC=50/2"	2"									Drill rig chatter below 1 foot 0.15 ft/min drill rate between 1 and 2.5 feet 0.25 ft/min drill rate between 2.5 and 5 feet 0.13 ft/min drill rate between 5 and 7.5 feet 0.14 ft/min drill rate between 7.5 and 10 feet 1 ft/min drill rate between 10 and 15 feet
BC=50/5"			3"										
BC=50/2"			2"										
BC=50/2"			2"										
BC=50/2"			2"										
15			BC=50/1"	1"									
The boring was terminated at approximately 15.1 ft. below ground surface. The boring was backfilled on December 03, 2018.													
GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during drilling or after completion. GENERAL NOTES: Latitude and longitude obtained using a hand held GPS unit.													

	PROJECT NO.: 20191344	BORING LOG SA-18	BORING
	DRAWN BY: AB, MAP		
	CHECKED BY: JLS	Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA	SA-18
DATE: 2/22/2019			
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Date Begin - End: 12/08/2018		Drilling Company: Cascade		BORING LOG SA-19									
Logged By: J. Andreini		Drill Crew: T.Sakaida											
Hor.-Vert. Datum: WGS84		Drilling Equipment: CME 1050		Hammer Type - Drop: 140 lb. Auto - 30 in.									
Plunge: -90 degrees		Drilling Method: Hollow Stem Auger											
Weather: Sunny		Bore Diameter: 4.25 in. O.D.											

Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS							
		Latitude: 36.54559° Longitude: -114.81314° Surface Condition: Typical cover of desert vegetation	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
0		Silty SAND with Gravel (SM): fine to coarse-grained sand, non-plastic, light brown, slightly moist, medium dense to dense											
5		Cemented SAND and GRAVEL: tan, slightly moist, moderately to strongly cemented	BC=50/3"	5"									Drill rig chatter below 0.5 feet 0.4 ft/min drill rate between 6 inches and 2.5 feet 0.5 ft/min drill rate between 2.5 and 5 feet
10		- interlayered weakly to moderately cemented zones below 10 feet	BC=50/5"	2"									1.7 ft/min drill rate between 5 and 7.5 feet Less drill rig chatter, faster drill rate below 6 feet 1.7 ft/min drill rate between 7.5 and 10 feet Increased drill rig chatter below 8 feet 1.7 ft/min drill rate between 10 and 15 feet
15			BC=50/5"	12"									
20			BC=40 48 50/5"	16"									
25			BC=50/5"	6"									
30		The boring was terminated at approximately 15.4 ft. below ground surface. The boring was backfilled on December 08, 2018.				GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during drilling or after completion. GENERAL NOTES: Latitude and longitude obtained using a hand held GPS unit.							

	PROJECT NO.: 20191344	BORING LOG SA-19 Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA	BORING SA-19
	DRAWN BY: JG, MAP		
	CHECKED BY: JLS		
DATE: 2/22/2019			
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PROJECT NUMBER: 20191344.001A
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GINT TEMPLATE: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_BORING/TEST PIT SOIL LOG]

Date Begin - End: 12/08/2018		Drilling Company: Cascade		BORING LOG SA-20											
Logged By: J. Andreini		Drill Crew: T.Sakaida													
Hor.-Vert. Datum: WGS84		Drilling Equipment: CME 1050		Hammer Type - Drop: 140 lb. Auto - 30 in.											
Plunge: -90 degrees		Drilling Method: Hollow Stem Auger													
Weather: Sunny		Bore Diameter: 4.25 in. O.D.													
Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS									
		Latitude: 36.53953° Longitude: -114.81305° Surface Condition: Typical cover of desert vegetation	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks		
		Lithologic Description													
5		Clayey SAND with Gravel (SC): fine to coarse-grained sand, high plasticity, light brown, slightly moist, medium dense to dense - very dense below 2.5 feet	BC=22 41 49	12"	SC			77	26	81	48	Drill rig chatter from 1 to 15 feet 0.75 ft/min drill rate between 1 and 2.5 feet Resistivity (as Received)=8000 Ohm-cm Resistivity (Saturated)=745 Ohm-cm Sodium= 0.021% Sodium Sulfate= 0.065% Solubility= 0.032% pH= 8.48 Sulfates= 0.06% Chlorides= 180 mg/Kg Redox= 201 mV Sulfides= <0.5 mg/Kg ASTM D1557 Method A= Max. Dry Unit Wt.: 115.0 pcf Opt. Water Content: 13.3% 1.25 ft/min drill rate between 2.5 and 5 feet 2.5 ft/min drill rate between 5 and 7.5 feet 1.25 ft/min drill rate between 7.5 and 10 feet 1.7 ft/min drill rate between 10 and 15 feet			
10		Cemented SAND and GRAVEL: tan, slightly moist, moderately to strongly cemented	BC=14 21 26	17"											
15		Clayey SAND (SC): high plasticity, light brown, slightly moist, very dense - gypsum in sample at 15 feet	BC=27 50/2"		SC										
20		Fat CLAY (CH): high plasticity, brown, slightly moist, hard	BC=20 33 50/5"		CH										
25		The boring was terminated at approximately 21.4 ft. below ground surface. The boring was backfilled on December 08, 2018.				GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during drilling or after completion. GENERAL NOTES: Latitude and longitude obtained using a hand held GPS unit.									
30															



PROJECT NO.: 20191344
 DRAWN BY: JG, MAP
 CHECKED BY: JLS
 DATE: 2/22/2019
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BORING LOG SA-20

Eagle Shadow Mountain Solar Project
 Moapa River Indian Reservation, USA

BORING

SA-20

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PROJECT NUMBER: 20191344.001A
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Date Begin - End: 12/08/2018		Drilling Company: Cascade		BORING LOG SA-21											
Logged By: J. Andreini		Drill Crew: T.Sakaida													
Hor.-Vert. Datum: WGS84		Drilling Equipment: CME 1050		Hammer Type - Drop: 140 lb. Auto - 30 in.											
Plunge: -90 degrees		Drilling Method: Hollow Stem Auger													
Weather: Sunny		Bore Diameter: 4.25 in. O.D.													
Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS									
		Latitude: 36.53340° Longitude: -114.81335° Surface Condition: Typical cover of desert vegetation	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks		
		Silty, Clayey SAND with Gravel (SC-SM): fine to coarse-grained sand, low plasticity, brown, slightly moist, medium dense to dense													
5		Silty SAND with Gravel (SM): fine to coarse-grained sand, non-plastic, brown, slightly moist, medium dense	BC=8 10 16	16"	CL					69	43	19	Expansion/Compression= Expansion= 2.8% under 600 psf when wetted. Expansion/Compression= Expansion= 11.8% under 60 psf when wetted. Resistivity (as Received)= 12500 Ohm-cm Resistivity (Saturated)= 1600 Ohm-cm Sodium= 0.0086% Sodium Sulfate= 0.0089% Solubility= 0.0098% pH= 8.75 Sulfates= 0.006% Chlorides= 60 mg/Kg Redox= 231 mV Sulfides= 0.77 mg/Kg		
		Sandy Lean CLAY (CL): fine-grained sand, low plasticity, light brown, slightly moist, very stiff to hard - gypsum in sample at 5 feet - interlayered weakly to moderately cemented zone between 6 and 7 feet - gypsum in sample at 7.5 feet	BC=16 35 50/5"	16"											
10		Elastic SILT (MH): high plasticity, brown, slightly moist, hard - gypsum in sample at 10 feet	BC=10 15 27	18"	MH					95	63	31			
15		- gypsum in sample at 15 feet - very stiff below 15 feet	BC=9 27 50/5"	14"											
20			BC=8 10 13	18"											
25			BC=14 18 27	18"											
		The boring was terminated at approximately 21.5 ft. below ground surface. The boring was backfilled on December 08, 2018.				GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during drilling or after completion. GENERAL NOTES: Latitude and longitude obtained using a hand held GPS unit.									
		PROJECT NO.: 20191344		BORING LOG SA-21		BORING									
		DRAWN BY: JG, MAP CHECKED BY: JLS DATE: 2/22/2019 REVISED: -		Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA		SA-21									
				SBE 26-113 Pg 753		PAGE: 1 of 1									

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Date Begin - End: 12/08/2018	Drilling Company: Cascade	BORING LOG SA-22
Logged By: J. Andreini	Drill Crew: T.Sakaida	
Hor.-Vert. Datum: WGS84	Drilling Equipment: CME 1050	
Plunge: -90 degrees	Drilling Method: Hollow Stem Auger	
Weather: Sunny	Bore Diameter: 4.25 in. O.D.	
Hammer Type - Drop: 140 lb. Auto - 30 in.		

Depth (feet)	Graphical Log	FIELD EXPLORATION			LABORATORY RESULTS								Additional Tests/ Remarks
		Latitude: 36.52770° Longitude: -114.81530° Surface Condition: Typical cover of desert vegetation	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	
		Lithologic Description											
		Silty SAND with Gravel (SM): fine to coarse-grained sand, non-plastic, light brown, slightly moist, medium dense to dense - interlayered weakly to moderately cemented zones below 2.5 feet		BC=30 50/3"	4"	SM	6.4		93	49	58	26	Drill rig chatter below 0.5 feet



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 DRAWN BY: JG, MAP
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BORING LOG SA-22

Eagle Shadow Mountain Solar Project
 Moapa River Indian Reservation, USA

BORING

SA-22

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Date Begin - End: 12/08/2018		Drilling Company: Cascade		BORING LOG SA-23									
Logged By: J. Andreini		Drill Crew: T.Sakaida											
Hor.-Vert. Datum: WGS84		Drilling Equipment: CME 1050		Hammer Type - Drop: 140 lb. Auto - 30 in.									
Plunge: -90 degrees		Drilling Method: Hollow Stem Auger											
Weather: Sunny		Bore Diameter: 4.25 in. O.D.											

Depth (feet)	Graphical Log	FIELD EXPLORATION			LABORATORY RESULTS									
		Latitude: 36.54348° Longitude: -114.80693° Surface Condition: Typical cover of desert vegetation	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks	
		Lithologic Description												
0		Silty, Clayey SAND with Gravel (SC-SM): fine to coarse-grained sand, low to medium plasticity, brown, slightly moist, medium dense to dense Cemented SAND and GRAVEL: tan, slightly moist, moderately to strongly cemented	BC=50/3"	3"									0.5 ft/min drill rate between 2 inches and 2.5 feet Drill rig chatter, slow drill rate below 0.5 feet 1.25 ft/min drill rate between 2.5 and 5 feet Faster drill rate below 4 feet	
5	BC=50/4"		4"									1 ft/min drill rate between 5 and 7.5 feet		
10	BC=50/4"		4"									1 ft/min drill rate between 7.5 and 10 feet		
15	BC=50/5"		4"									2.2 ft/min drill rate between 10 and 15 feet		
15.4	BC=50/5"		5"											
		The boring was terminated at approximately 15.4 ft. below ground surface. The boring was backfilled on December 08, 2018.												
		GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during drilling or after completion. GENERAL NOTES: Latitude and longitude obtained using a hand held GPS unit.												

	PROJECT NO.: 20191344	BORING LOG SA-23 Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA	BORING SA-23
	DRAWN BY: JG, MAP		
	CHECKED BY: JLS		
DATE: 2/22/2019			
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PROJECT NUMBER: 20191344.001A
KLF_BORING/TEST PIT SOIL LOGGINT FILE: C:\users\mpalmer\desktop\20191344.001a.gpj
GINT TEMPLATE: E\KLF_STANDARD_GINT_LIBRARY_2017.GLB

Date Begin - End: 12/11/2018		Drilling Company: Cascade		BORING LOG SA-24									
Logged By: A. Bajramovic		Drill Crew: T. Sakaida											
Hor.-Vert. Datum: WGS84		Drilling Equipment: CME 1050		Hammer Type - Drop: 140 lb. Auto - 30 in.									
Plunge: -90 degrees		Drilling Method: Hollow Stem Auger											
Weather: Cloudy		Bore Diameter: 4.25 in. O.D.											
Depth (feet)	Graphical Log	FIELD EXPLORATION			LABORATORY RESULTS								Additional Tests/ Remarks
		Latitude: 36.54069° Longitude: -114.79764° Surface Condition: Typical cover of desert vegetation	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	
		Lithologic Description											
0		Clayey SAND with Gravel (SC): low to medium plasticity, brown, slightly moist, medium dense to dense, with caliche nodules											Drill rig chatter from 0.5 to 16 feet 0.4 ft/min drill rate between 6 inches and 2.5 feet *Resistivity (as Received)= 16000 Ohm-cm Resistivity (Saturated)= 1720 Ohm-cm Sodium= 0.0042% Sodium Sulfate= 0.013% Solubility= 0.014% pH= 8.74 Sulfates= 0.028% Chlorides= 45 mg/Kg Redox= 229 mV Sulfides= 2.1 mg/Kg ASTM D1557 Method A= Max. Dry Unit Wt.: 130.1 pcf Opt. Water Content: 8.9% 0.6 ft/min drill rate between 2.5 and 5 feet 1.25 ft/min drill rate between 5 and 7.5 feet 1 ft/min drill rate between 7.5 and 10 feet 1.25 ft/min drill rate between 10 and 15 feet
5		Cemented SAND and GRAVEL: tan, slightly moist, moderately to strongly cemented	BC=50/3"	3"				78	23	28	6		
			BC=50/5"	5"									
			BC=50/5"	5"									
10			BC=50/5"	5"									
15			BC=50/4"	4"									
20		Elastic SILT (MH): high plasticity, brown, slightly moist, hard	BC=12 19 28		MH	14.2			98	70	34		
25			BC=23 31 43			13.5	114.2						
30		The boring was terminated at approximately 26.5 ft. below ground surface. The boring was backfilled on December 11, 2018.					GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during drilling or after completion. GENERAL NOTES: *Gradation, Atterberg Limits, Chemical Test, and Modified Proctor test data is representative of Cemented Sand and Gravel broken by the augers and sampled from the returns. Latitude and longitude obtained using a hand held GPS unit.						



PROJECT NO.: 20191344
 DRAWN BY: AB, MAP
 CHECKED BY: JLS
 DATE: 2/22/2019
 REVISED: -

BORING LOG SA-24

Eagle Shadow Mountain Solar Project
 Moapa River Indian Reservation, USA

BORING

SA-24

PLOTTED: 02/26/2019 02:30 PM BY: MPalmer

OFFICE FILTER: LAS VEGAS

PROJECT NUMBER: 20191344.001A
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GINT TEMPLATE: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_BORING/TEST PIT SOIL LOG]

Date Begin - End: 12/10/2018		Drilling Company: Cascade		BORING LOG SA-25									
Logged By: A. Bajramovic		Drill Crew: T. Sakaida											
Hor.-Vert. Datum: WGS84		Drilling Equipment: CME 1050		Hammer Type - Drop: 140 lb. Auto - 30 in.									
Plunge: -90 degrees		Drilling Method: Hollow Stem Auger											
Weather: Cloudy		Bore Diameter: 4.25 in. O.D.											
Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS							
		Latitude: 36.54046° Longitude: -114.80298° Surface Condition: Typical cover of desert vegetation	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
		Lithologic Description											
5		Clayey SAND with Gravel (SC): fine to coarse-grained sand, low to medium plasticity, brown, slightly moist, medium dense to dense, with caliche nodules	BC=50/2"	3"				82	25	29	9	Drill rig chatter from 4 inches to 11 feet 0.5 ft/min drill rate between 4 inches and 2.5 feet *Resistivity (as Received)= 5100 Ohm-cm Resistivity (Saturated)= 800 Ohm-cm Sodium= 0.018% Sodium Sulfate= 0.055% Solubility= 0.036% pH= 8.52 Sulfates= 0.075% Chlorides= 140 mg/Kg Redox= 242 mV Sulfides= 0.85 mg/Kg ASTM D1557 Method A= Max. Dry Unit Wt.: 127.6 pcf Opt. Water Content: 9.6% 0.2 ft/min drill rate between 2.5 and 5 feet 1 ft/min drill rate between 5 and 7.5 feet 1.25 ft/min drill rate between 7.5 and 10 feet	
		Cemented SAND and GRAVEL: tan, slightly moist, moderately to strongly cemented	BC=50/3"	4"									
10			BC=27 50/2"	8"									
			BC=50/5"	5"									
15		Lean CLAY with Sand (CL): low to medium plasticity, brown, slightly moist, very stiff to hard	BC=8 19 25	18"									
		- hard below 15 feet	BC=33 50/4"	10"									
20		The boring was terminated at approximately 17.3 ft. below ground surface. The boring was backfilled on December 10, 2018.					GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during drilling or after completion. GENERAL NOTES: *Gradation, Atterberg Limits, Chemical Test, and Modified Proctor test data is representative of Cemented Sand and Gravel broken by the augers and sampled from the returns. Latitude and longitude obtained using a hand held GPS unit.						
25													
30													

 KLEINFELDER Bright People. Right Solutions.	PROJECT NO.: 20191344	BORING LOG SA-25	BORING
	DRAWN BY: AB, MAP		
	CHECKED BY: JLS	Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA	SA-25
	DATE: 2/22/2019		
	REVISED: -	PAGE: 1 of 1	

PLOTTED: 02/26/2019 02:30 PM BY: MPalmer

OFFICE FILTER: LAS VEGAS

PROJECT NUMBER: 20191344.001A

KLF BORING/TEST PIT SOIL LOG

Date Begin - End:	12/10/2018	Drilling Company:	Cascade	BORING LOG SA-26
Logged By:	A. Bajramovic	Drill Crew:	T.Sakaida	
Hor.-Vert. Datum:	WGS84	Drilling Equipment:	CME 1050	
Plunge:	-90 degrees	Drilling Method:	Hollow Stem Auger	
Weather:	Cloudy	Bore Diameter:	4.25 in. O.D.	
			Hammer Type - Drop:	140 lb. Auto - 30 in.

Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS							
		Latitude: 36.55596° Longitude: -114.78310° Surface Condition: Typical cover of desert vegetation	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
		Lithologic Description											
		Sandy Lean CLAY with Gravel (CL): medium plasticity, brown, slightly moist, stiff											
5		- gypsum in sample at 5 feet - hard below 5 feet		BC=9 12 15	15"	CL				70	30	13	Expansion/Compression= Expansion= 6.7% under 600 psf when wetted. Expansion/Compression= Expansion= 21.7% under 60 psf when wetted.
		- gypsum in sample at 7.5 feet		BC=8 19 24	18"								
10		Lean CLAY (CL): medium plasticity, brown, slightly moist, stiff, interlayered weakly to moderately cemented zone between 10 and 11 feet - gypsum in sample at 10 feet		BC=11 25 45	18"								
15		- gypsum in sample at 15 feet		BC=24 50/5"	11"	CL				97	38	17	Expansion/Compression= Expansion= 3.3% under 1,200 psf when wetted.
20		- gypsum in sample at 20 feet		BC=19 17 23	18"		13.3						
				BC=18 50/4"	10"								
25		The boring was terminated at approximately 20.8 ft. below ground surface. The boring was backfilled on December 10, 2018.						GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during drilling or after completion. GENERAL NOTES: Latitude and longitude obtained using a hand held GPS unit.					
30													

	PROJECT NO.: 20191344	BORING LOG SA-26	BORING
	DRAWN BY: AB, MAP		
	CHECKED BY: JLS	Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA	SA-26
DATE: 2/22/2019			
REVISED: -			
SBE 26-113 Pg 758			PAGE: 1 of 1

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OFFICE FILTER: LAS VEGAS

PROJECT NUMBER: 20191344.001A

GINT FILE: C:\users\mpalmer\desktop\20191344.001a.gpj
GINT TEMPLATE: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_BORING/TEST PIT SOIL LOG]

Date Begin - End: 12/10/2018		Drilling Company: Cascade		BORING LOG SA-27											
Logged By: A. Bajramovic		Drill Crew: T. Sakaida													
Hor.-Vert. Datum: WGS84		Drilling Equipment: CME 1050		Hammer Type - Drop: 140 lb. Auto - 30 in.											
Plunge: -90 degrees		Drilling Method: Hollow Stem Auger													
Weather: Cloudy		Bore Diameter: 4.25 in. O.D.													
Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS									
		Latitude: 36.55322° Longitude: -114.78859° Surface Condition: Typical cover of desert vegetation, with cobbles present		Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks	
		Lithologic Description													
5		Silty SAND with Gravel (SM): fine to coarse-grained sand, non-plastic, brown, slightly moist, medium dense to dense	BC=50/4"	4"						70	21	32	7	Drill rig chatter from 0.5 to 7.5 feet 1.3 ft/min drill rate between 6 inches and 2.5 feet *Resistivity (as Received)= 26500 Ohm-cm Resistivity (Saturated)= 3100 Ohm-cm Sodium= 0.005% Sodium Sulfate= 0.013% Solubility= 0.017% pH= 8.87 Sulfates= 0.009% Chlorides= 45 mg/Kg Redox= 246 mV Sulfides= 0.64 mg/Kg ASTM D1557 Method B= Max. Dry Unit Wt.: 129.3 pcf Opt. Water Content: 9.3% 0.8 ft/min drill rate between 2.5 and 5 feet 1.7 ft/min drill rate between 5 and 7.5 feet	
		Cemented SAND and GRAVEL: tan, slightly moist, moderately to strongly cemented	BC=50/4"	4"											
10		Clayey SAND (SC): low to medium plasticity, brown, slightly moist, very dense, with caliche nodules	BC=34 49 36	16"											
		- medium dense below 10 feet	BC=6 6 6	9"						28					
15		Elastic SILT (MH): high plasticity, brown, slightly moist, stiff	BC=9 22 29	18"	MH	13.3				73	62	28			
20		- gypsum in sample at 20 feet	BC=8 10 23	18"									Resistivity (as Received)= 1000 Ohm-cm Resistivity (Saturated)= 330 Ohm-cm Sodium= 0.015% Sodium Sulfate= 0.046% Solubility= 0.13% pH= 8.3 Sulfates= 0.41% Chlorides= 120 mg/Kg Redox= 273 mV Sulfides= 0.56 mg/Kg		
21.5		The boring was terminated at approximately 21.5 ft. below ground surface. The boring was backfilled on December 10, 2018.				GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during drilling or after completion. GENERAL NOTES: *Gradation, Atterberg Limits, Chemical Test, and Modified Proctor test data is representative of Cemented Sand and Gravel broken by the augers and sampled from the returns. Latitude and longitude obtained using a hand held GPS unit.									
25															
30															



PROJECT NO.: 20191344
 DRAWN BY: AB, MAP
 CHECKED BY: JLS
 DATE: 2/22/2019
 REVISED: -

BORING LOG SA-27

Eagle Shadow Mountain Solar Project
 Moapa River Indian Reservation, USA

BORING

SA-27

PLOTTED: 02/26/2019 02:30 PM BY: MPalmer

OFFICE FILTER: LAS VEGAS

PROJECT NUMBER: 20191344.001A
GINT TEMPLATE: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_BORING/TEST PIT SOIL LOG]

GINT FILE: C:\users\mpalmer\desktop\20191344.001a.gpj

Date Begin - End:	12/10/2016	Drilling Company:	Cascade	BORING LOG SA-28
Logged By:	A. Bajramovic	Drill Crew:	T. Sakaida	
Hor.-Vert. Datum:	WGS84	Drilling Equipment:	CME 1050	
Plunge:	-90 degrees	Drilling Method:	Hollow Stem Auger	
Weather:	Cloudy	Bore Diameter:	4.25 in. O.D.	
		Hammer Type - Drop:	140 lb. Auto - 30 in.	

Depth (feet)	Graphical Log	FIELD EXPLORATION			LABORATORY RESULTS									
		Latitude: 36.54789° Longitude: -114.79116° Surface Condition: Typical cover of desert vegetation	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks	
		Lithologic Description												
		Silty SAND with Gravel (SM): fine to coarse-grained sand, non-plastic, brown, slightly moist, medium dense to dense				CL	16.2				81	31	13	2.3 ft/min drill rate between 3 inches and 2.5 feet Drill rig chatter from 0.5 to 10 feet 0.8 ft/min drill rate between 2.5 and 5 feet 1.7 ft/min drill rate between 5 and 7.5 feet 2.5 ft/min drill rate between 7.5 and 10 feet
		Cemented SAND and GRAVEL: tan, slightly moist, moderately to strongly cemented		BC=50/4"	7"									
5				BC=50/6"	6"									
		- interlayered weakly to moderately cemented zones below 7.5 feet		BC=25 50/3"	9"									
10		Lean CLAY with Sand (CL): medium plasticity, brown, slightly moist, hard		BC=18 26 21	18"									
15		Lean CLAY (CL): low to medium plasticity, brown, slightly moist, hard		BC=16 32 45	18"									
20				BC=13 22 32	18"									
25		The boring was terminated at approximately 21.5 ft. below ground surface. The boring was backfilled on December 05, 2018.												GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during drilling or after completion. GENERAL NOTES: Latitude and longitude obtained using a hand held GPS unit.
30														



PROJECT NO.: 20191344
 DRAWN BY: AB, MAP
 CHECKED BY: JLS
 DATE: 2/22/2019
 REVISED: -

BORING LOG SA-28

Eagle Shadow Mountain Solar Project
 Moapa River Indian Reservation, USA

BORING

SA-28

PLOTTED: 02/26/2019 02:30 PM BY: MPalmer

OFFICE FILTER: LAS VEGAS

PROJECT NUMBER: 20191344.001A
KLF_BORING/TEST PIT SOIL LOGGINT FILE: C:\users\mpalmer\desktop\20191344.001a.gpj
GINT TEMPLATE: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB

Date Begin - End: 12/11/2018		Drilling Company: Cascade		BORING LOG SB-1											
Logged By: A. Bajramovic		Drill Crew: T. Sakaida													
Hor.-Vert. Datum: WGS84		Drilling Equipment: CME 1050		Hammer Type - Drop: 140 lb. Auto - 30 in.											
Plunge: -90 degrees		Drilling Method: Hollow Stem Auger													
Weather: Sunny		Bore Diameter: 4.25 in. O.D.													
Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS									
		Latitude: 36.53904° Longitude: -114.79850° Surface Condition: Typical cover of desert vegetation		Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks	
		Lithologic Description													
5		Silty SAND with Gravel (SM): fine to coarse-grained sand, non-plastic, light brown, slightly moist, medium dense to dense, with caliche nodules	BC=50/4"	6"										0.8 ft/min drill rate between 5 inches and 2.5 feet Drill rig chatter from 0.5 to 12 feet 0.3 ft/min drill rate between 2.5 and 5 feet	
		Cemented SAND and GRAVEL: tan, slightly moist, moderately to strongly cemented	BC=50/3"	4"									1 ft/min drill rate between 5 and 7.5 feet		
			BC=50/6"	6"									1.25 ft/min drill rate between 7.5 and 10 feet		
			BC=50/4"	4"											
15		Silty SAND (SM): high plasticity, brown, slightly moist, dense	BC=9 13 17	18"	SM				46	56	25				
20	Sandy Elastic SILT (MH): high plasticity, brown, slightly moist, hard	BC=18 36 50/5"	16"	MH	12.1	117.7		50	61	28					
25		BC=14 24 31	18"												
30	Fat CLAY with Sand (CH): high plasticity, brown, slightly moist, hard	BC=13 24 37	16"	CH	17.3			84	68	43					

PROJECT NO.: 20191344

DRAWN BY: AB, MAP

CHECKED BY: JLS

DATE: 2/22/2019

REVISED: -

BORING LOG SB-1

Eagle Shadow Mountain Solar Project
Moapa River Indian Reservation, USA

BORING

SB-1

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OFFICE FILTER: LAS VEGAS

PROJECT NUMBER: 20191344.001A
GINT FILE: C:\users\mpalmer\desktop\20191344.001a.gpj
GINT TEMPLATE: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_BORING/TEST PIT SOIL LOG]

Date Begin - End: 12/11/2018		Drilling Company: Cascade		BORING LOG SB-1									
Logged By: A. Bajramovic		Drill Crew: T.Sakaida											
Hor.-Vert. Datum: WGS84		Drilling Equipment: CME 1050		Hammer Type - Drop: 140 lb. Auto - 30 in.									
Plunge: -90 degrees		Drilling Method: Hollow Stem Auger											
Weather: Sunny		Bore Diameter: 4.25 in. O.D.											
Depth (feet)	Graphical Log	FIELD EXPLORATION			LABORATORY RESULTS								
		Latitude: 36.53904° Longitude: -114.79850° Surface Condition: Typical cover of desert vegetation	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
		Fat CLAY with Sand (CH): high plasticity, brown, slightly moist, hard	BC=12 26 32	18"	CL					76	49	22	
40			BC=14 32 50/4"	16"									
45			BC=13 18 20	18"									
		Lean CLAY with Sand (CL): low to medium plasticity, brown, slightly moist, hard	BC=23 50/5"	11"									
50		- increasing sand below 50 feet											
The boring was terminated at approximately 50.9 ft. below ground surface. The boring was backfilled on December 11, 2018. GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during drilling or after completion. GENERAL NOTES: Latitude and longitude obtained using a hand held GPS unit.													
55													
60													
65													
		PROJECT NO.: 20191344 DRAWN BY: AB, MAP CHECKED BY: JLS DATE: 2/22/2019 REVISED: -		BORING LOG SB-1 Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA								BORING SB-1	
SBE 26-113 Pg 762													
PAGE: 2 of 2													

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OFFICE FILTER: LAS VEGAS

PROJECT NUMBER: 20191344.001A
[KLF_BORING/TEST PIT SOIL LOG]GINT FILE: C:\users\mpalmer\desktop\20191344.001a.gpj
GINT TEMPLATE: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB

Date Begin - End: 11/26/2018		Excavation Company: Pearson Excavation		TEST PIT LOG TP-1									
Logged By: A. Bajramovic		Excavation Crew: Matt T.											
Hor.-Vert. Datum: WGS84		Excavation Equip.: CASE 580, 18" Bucket											
Plunge: N/A degrees		Excav. Dimensions: 3.5 ft x 8 ft											
Weather: Sunny													
Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS							
		Latitude: 36.55151° Longitude: -114.83361° Surface Condition: Typical cover of desert vegetation, with cobbles present		Sample Type	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks	
		Lithologic Description											
		Silty SAND with Gravel (SM): fine to coarse-grained sand, slightly moist, non-plastic, brown, with cobbles		X	SM			74	27	NP	NP	Easy to excavate to 4 feet Resistivity (as Received)=4200 Ohm-cm Resistivity (Saturated)=2700 Ohm-cm Sodium= 0.0021% Sodium Sulfate= 0.0065% Solubility= 0.0074% pH= 8.7 Sulfates= 0.008% Chlorides= 25 mg/Kg Redox= 251 mV Sulfides= 2.5 mg/Kg R-Value= 52 Very difficult to excavate below 4 feet	
5		The test pit was terminated at approximately 4 ft. below ground surface. Backhoe refusal on cemented soils at approximately 4 ft. below ground surface. The test pit was backfilled on November 26, 2018.					GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during excavation or after completion. GENERAL NOTES: Latitude and longitude obtained using a hand held GPS unit.						
10													
		PROJECT NO.: 20191344		TEST PIT LOG TP-1						TEST PIT			
		DRAWN BY: AB, MAP		Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA						TP-1			
		CHECKED BY: MNM, JLS											
		DATE: 2/22/2019											
		REVISED: -		SBE 26-113 Pg 763						PAGE: 1 of 1			

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Date Begin - End: 11/26/2018
Logged By: A. Bajramovic
Hor.-Vert. Datum: WGS84
Plunge: N/A degrees
Weather: Sunny

Excavation Company: Pearson Excavation
Excavation Crew: Matt T.
Excavation Equip.: CASE 580, 18" Bucket
Excav. Dimensions: 3 ft x 8 ft

TEST PIT LOG TP-2

Depth (feet)	Graphical Log	FIELD EXPLORATION	LABORATORY RESULTS								Additional Tests/ Remarks
		Latitude: 36.54449° Longitude: -114.83383° Surface Condition: Typical cover of desert vegetation, with cobbles present Lithologic Description	Sample Type	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	
		Silty SAND with Gravel (SM): fine to coarse-grained sand, non-plastic, brown, slightly moist, with cobbles - weakly to moderately cemented below 1.5 feet	X								Easy to excavate Difficult to excavate below 1.5 feet Very difficult to excavate below 2.5 feet
5		The test pit was terminated at approximately 2.5 ft. below ground surface. Backhoe refusal on cemented soils at approximately 2.8 ft. below ground surface. The test pit was backfilled on November 26, 2018.									
10		GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during excavation or after completion. GENERAL NOTES: Latitude and longitude obtained using a hand held GPS unit.									



PROJECT NO.: 20191344
 DRAWN BY: AB, MAP
 CHECKED BY: MNM, JLS
 DATE: 2/22/2019
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TEST PIT LOG TP-2

Eagle Shadow Mountain Solar Project
 Moapa River Indian Reservation, USA

TEST PIT

TP-2

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 PROJECT NUMBER: 20191344.001A
 GINT FILE: C:\users\mpalmer\desktop\20191344.001a.gpj
 GINT TEMPLATE: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_BORING/TEST PIT SOIL LOG]

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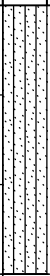
PROJECT NUMBER: 20191344.001A
[KLF_BORING/TEST PIT SOIL LOG]GINT FILE: C:\users\mpalmer\desktop\20191344.001a.gpj
GINT TEMPLATE: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB

Date Begin - End: 11/26/2018		Excavation Company: Pearson Excavation		TEST PIT LOG TP-3												
Logged By: A. Bajramovic		Excavation Crew: Matt T.														
Hor.-Vert. Datum: WGS84		Excavation Equip.: CASE 580, 18" Bucket														
Plunge: N/A degrees		Excav. Dimensions: 3 ft x 7 ft														
Weather: Sunny																
Depth (feet)	Graphical Log	FIELD EXPLORATION					LABORATORY RESULTS									
		Latitude: 36.53935° Longitude: -114.83417° Surface Condition: Typical cover of desert vegetation, with cobbles present					Sample Type	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks	
		Lithologic Description														
		Silty SAND with Gravel (SM): fine to coarse-grained sand, slightly moist, non-plastic, brown, with cobbles													Easy to excavate Very difficult to excavate below 1 foot	
The test pit was terminated at approximately 1 ft. below ground surface. Backhoe refusal on cemented soils at approximately 1 ft. below ground surface. The test pit was backfilled on November 26, 2018. GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during excavation or after completion. GENERAL NOTES: Latitude and longitude obtained using a hand held GPS unit.																
5																
10																
		PROJECT NO.: 20191344 DRAWN BY: AB, MAP CHECKED BY: MNM, JLS DATE: 2/22/2019 REVISED: -		TEST PIT LOG TP-3 Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA							TEST PIT TP-3					
												SBE 26-113 Pg 765				
												PAGE: 1 of 1				

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OFFICE FILTER: LAS VEGAS

PROJECT NUMBER: 20191344.001A
[KLF_BORING/TEST PIT SOIL LOG]GINT FILE: C:\users\mpalmer\desktop\20191344.001a.gpj
GINT TEMPLATE: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB

Date Begin - End: 11/26/2018		Excavation Company: Pearson Excavation		TEST PIT LOG TP-5											
Logged By: A. Bajramovic		Excavation Crew: Matt T.													
Hor.-Vert. Datum: WGS84		Excavation Equip.: CASE 580, 18" Bucket													
Plunge: N/A degrees		Excav. Dimensions: 3 ft x 8 ft													
Weather: Sunny															
Depth (feet)	Graphical Log	FIELD EXPLORATION					LABORATORY RESULTS								
		Latitude: 36.54877° Longitude: -114.83014° Surface Condition: Typical cover of desert vegetation, with cobbles present					Sample Type	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
		Lithologic Description													
		Silty SAND with Gravel (SM): fine to coarse-grained sand, slightly moist, non-plastic, brown, with cobbles					X								Easy to excavate
5		The test pit was terminated at approximately 3 ft. below ground surface. Backhoe refusal on cemented soils at approximately 3 ft. below ground surface. The test pit was backfilled on November 26, 2018.													
10															
												<u>GROUNDWATER LEVEL INFORMATION:</u> Groundwater was not observed during excavation or after completion.			
												<u>GENERAL NOTES:</u> Latitude and longitude obtained using a hand held GPS unit.			
		PROJECT NO.: 20191344		TEST PIT LOG TP-5							TEST PIT TP-5				
		DRAWN BY: AB, MAP													
		CHECKED BY: MNM, JLS		Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA											
		DATE: 2/22/2019													
		REVISED: -		SBE 26-113 Pg 767							PAGE: 1 of 1				

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OFFICE FILTER: LAS VEGAS

PROJECT NUMBER: 20191344.001A
[KLF_BORING/TEST PIT SOIL LOG]GINT FILE: C:\users\mpalmer\desktop\20191344.001a.gpj
GINT TEMPLATE: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB

Date Begin - End: 11/27/2018		Excavation Company: Pearson Excavation		TEST PIT LOG TP-6									
Logged By: A. Bajramovic		Excavation Crew: Matt T.											
Hor.-Vert. Datum: WGS84		Excavation Equip.: CASE 580, 18" Bucket											
Plunge: N/A degrees		Excav. Dimensions: 3 ft x 6 ft											
Weather: Sunny													

Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS							
		Latitude: 36.54327° Longitude: -114.83009° Surface Condition: Typical cover of desert vegetation, with cobbles present		Sample Type	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/Remarks	
		Lithologic Description											
		Silty, Clayey SAND with Gravel (SC-SM): fine to coarse-grained sand, slightly moist, low plasticity, brown, with cobbles			SC-SM			74	41	25	5	Easy to excavate Resistivity (as Received) =880 Ohm-cm Resistivity (Saturated) =135 Ohm-cm Sodium = 0.07% Sodium Sulfate = 0.22% Solubility = 0.15% pH = 7.96 Sulfates = 0.22% Chlorides = 1200 mg/Kg Redox = 261 mV Sulfides = <0.5 mg/Kg Very difficult to excavate below 1.5 feet	
5		The test pit was terminated at approximately 1.5 ft. below ground surface. Backhoe refusal on cemented soils at approximately 1.5 ft. below ground surface. The test pit was backfilled on November 27, 2018.											
10													

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during excavation or after completion.

GENERAL NOTES:
Latitude and longitude obtained using a hand held GPS unit.

TEST PIT LOG TP-6

Eagle Shadow Mountain Solar Project
Moapa River Indian Reservation, USA

 KLEINFELDER Bright People. Right Solutions.	PROJECT NO.: 20191344	TEST PIT LOG TP-6	TEST PIT
	DRAWN BY: AB, MAP		TP-6
	CHECKED BY: MNM, JLS		
	DATE: 2/22/2019		
	REVISED: -		

SBE 26-113 Pg 768

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PLOTTED: 02/26/2019 02:31 PM BY: MPalmer

Date Begin - End:	11/26/2018	Excavation Company:	Pearson Excavation	TEST PIT LOG TP-7
Logged By:	A. Bajramovic	Excavation Crew:	Matt T.	
Hor.-Vert. Datum:	WGS84	Excavation Equip.:	CASE 580, 18" Bucket	
Plunge:	N/A degrees	Excav. Dimensions:	3 ft x 7 ft	
Weather:	Sunny			

Depth (feet)	Graphical Log	FIELD EXPLORATION	LABORATORY RESULTS								Additional Tests/ Remarks
		Latitude: 36.53694° Longitude: -114.82986° Surface Condition: Typical cover of desert vegetation, with cobbles and boulders present	Sample Type	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	
		Lithologic Description									
		Clayey SAND with Gravel (SC): fine to coarse-grained sand, slightly moist, low to medium plasticity, brown, with cobbles and boulders									Easy to excavate
											Very difficult to excavate below 1.5 feet
		The test pit was terminated at approximately 1.5 ft. below ground surface. Backhoe refusal on cemented soils at approximately 1.5 ft. below ground surface. The test pit was backfilled on November 26, 2018. GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during excavation or after completion. GENERAL NOTES: Latitude and longitude obtained using a hand held GPS unit.									

OFFICE FILTER: LAS VEGAS

PROJECT NUMBER: 20191344.001A
[KLF_BORING/TEST PIT SOIL LOG]GINT FILE: C:\users\mpalmer\desktop\20191344.001a.gpj
GINT TEMPLATE: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB

PROJECT NO.: 20191344
 DRAWN BY: AB, MAP
 CHECKED BY: MNM, JLS
 DATE: 2/22/2019
 REVISED: -

TEST PIT LOG TP-7

Eagle Shadow Mountain Solar Project
 Moapa River Indian Reservation, USA

TEST PIT

TP-7

PAGE: 1 of 1

PLOTTED: 02/26/2019 02:31 PM BY: MPalmer

Date Begin - End: 11/27/2018
Logged By: A. Bajramovic
Hor.-Vert. Datum: WGS84
Plunge: N/A degrees
Weather: Sunny

Excavation Company: Pearson Excavation
Excavation Crew: Matt T.
Excavation Equip.: CASE 580, 18" Bucket
Excav. Dimensions: 3 ft x 9 ft

TEST PIT LOG TP-8

Depth (feet)	Graphical Log	FIELD EXPLORATION	LABORATORY RESULTS								Additional Tests/ Remarks
		Latitude: 36.54626° Longitude: -114.82438° Surface Condition: Typical cover of desert vegetation, with cobbles and boulders present Lithologic Description	Sample Type	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	
		Clayey GRAVEL with Sand (GC): fine to coarse-grained gravel, slightly moist, low plasticity, brown, with cobbles and boulders The test pit was terminated at approximately 2.5 ft. below ground surface. Backhoe refusal on cemented soils at approximately 2.5 ft. below ground surface. The test pit was backfilled on November 27, 2018.		GC			50	21	25	10	Easy to excavate Resistivity (as Received)= 675 Ohm-cm Resistivity (Saturated)= 100 Ohm-cm Sodium= 0.06% Sodium Sulfate= 0.19% Solubility= 0.18% pH= 7.89 Sulfates= 0.2% Chlorides= 1800 mg/Kg Redox= 284 mV Sulfides= 1.8 mg/Kg Very difficult to excavate below 2.5 feet

GROUNDWATER LEVEL INFORMATION:

Groundwater was not observed during excavation or after completion.

GENERAL NOTES:

Latitude and longitude obtained using a hand held GPS unit.



PROJECT NO.: 20191344
 DRAWN BY: AB, MAP
 CHECKED BY: MNM, JLS
 DATE: 2/22/2019
 REVISED: -

TEST PIT LOG TP-8

Eagle Shadow Mountain Solar Project
 Moapa River Indian Reservation, USA

TEST PIT

TP-8

PAGE: 1 of 1

OFFICE FILTER: LAS VEGAS

 PROJECT NUMBER: 20191344.001A
 GINT FILE: C:\users\mpalmer\desktop\20191344.001a.gpj
 GINT TEMPLATE: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_BORING/TEST PIT SOIL LOG]

PLOTTED: 02/26/2019 02:31 PM BY: MPalmer

Date Begin - End: 11/26/2018
Logged By: A. Bajramovic
Hor.-Vert. Datum: WGS84
Plunge: N/A degrees
Weather: Sunny

Excavation Company: Pearson Excavation
Excavation Crew: Matt T.
Excavation Equip.: CASE 580, 18" Bucket
Excav. Dimensions: 3 ft x 6 ft

TEST PIT LOG TP-9

Depth (feet)	Graphical Log	FIELD EXPLORATION	LABORATORY RESULTS								Additional Tests/ Remarks
		Latitude: 36.53067° Longitude: -114.82995° Surface Condition: Typical cover of desert vegetation, with cobbles and boulders present	Sample Type	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	
		Clayey SAND with Gravel (SC): fine to coarse-grained sand, slightly moist, low to medium plasticity, brown, with cobbles and boulders									Very difficult to excavate below 1 foot
5		The test pit was terminated at approximately 1 ft. below ground surface. Backhoe refusal on cemented soils at approximately 1 ft. below ground surface. The test pit was backfilled on November 26, 2018. GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during excavation or after completion. GENERAL NOTES: Latitude and longitude obtained using a hand held GPS unit.									
10											



PROJECT NO.: 20191344
 DRAWN BY: AB, MAP
 CHECKED BY: MNM, JLS
 DATE: 2/22/2019
 REVISED: -

TEST PIT LOG TP-9

Eagle Shadow Mountain Solar Project
 Moapa River Indian Reservation, USA

TEST PIT

TP-9

PAGE: 1 of 1

OFFICE FILTER: LAS VEGAS

PROJECT NUMBER: 20191344.001A
 KLF_BORING/TEST PIT SOIL LOG

GINT FILE: C:\users\mpalmer\desktop\20191344.001a.gpj
 GINT TEMPLATE: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB

PLOTTED: 02/26/2019 02:31 PM BY: MPalmer

Date Begin - End: 11/27/2018
Logged By: A. Bajramovic
Hor.-Vert. Datum: WGS84
Plunge: N/A degrees
Weather: Cloudy

Excavation Company: Pearson Excavation
Excavation Crew: Matt T.
Excavation Equip.: CASE 580, 18" Bucket
Excav. Dimensions: 3 ft x 37 ft

TEST PIT LOG TP-10

Depth (feet)	Graphical Log	FIELD EXPLORATION		LABORATORY RESULTS									
		Latitude: 36.54019° Longitude: -114.82403° Surface Condition: Typical cover of desert vegetation, with cobbles present		Sample Type	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/Remarks	
		Lithologic Description											
		Clayey SAND with Gravel (SC): fine to coarse-grained sand, slightly moist, medium plasticity, brown, with cobbles			SC			67	27	30	13	Easy to excavate Resistivity (as Received) =9500 Ohm-cm Resistivity (Saturated) =2650 Ohm-cm Sodium = 0.0015% Sodium Sulfate = 0.0022% Solubility = 0.023% pH = 8.65 Sulfates = 0.0015% Chlorides = 25 mg/Kg Redox = 267 mV Sulfides = 1.5 mg/Kg Very difficult to excavate below 2 feet	
5		The test pit was terminated at approximately 2 ft. below ground surface. Backhoe refusal on cemented soils at approximately 2 ft. below ground surface. The test pit was backfilled on November 27, 2018.											
10													

GROUNDWATER LEVEL INFORMATION:
 Groundwater was not observed during excavation or after completion.
GENERAL NOTES:
 Latitude and longitude obtained using a hand held GPS unit.



PROJECT NO.: 20191344
 DRAWN BY: AB, MAP
 CHECKED BY: MNM, JLS
 DATE: 2/22/2019
 REVISED: -

TEST PIT LOG TP-10

Eagle Shadow Mountain Solar Project
 Moapa River Indian Reservation, USA

TEST PIT

TP-10

PAGE: 1 of 1

OFFICE FILTER: LAS VEGAS

PROJECT NUMBER: 20191344.001A
 GINT TEMPLATE: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_BORING/TEST PIT SOIL LOG]

GINT FILE: C:\users\mpalmer\desktop\20191344.001a.gpj

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OFFICE FILTER: LAS VEGAS

PROJECT NUMBER: 20191344.001A
[KLF_BORING/TEST PIT SOIL LOG]GINT FILE: C:\users\mpalmer\desktop\20191344.001a.gpj
GINT TEMPLATE: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB

Date Begin - End: 11/26/2018		Excavation Company: Pearson Excavation		TEST PIT LOG TP-11									
Logged By: A. Bajramovic		Excavation Crew: Matt T.											
Hor.-Vert. Datum: WGS84		Excavation Equip.: CASE 580, 18" Bucket											
Plunge: N/A degrees		Excav. Dimensions: 3 ft x 8 ft											
Weather: Sunny													

Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS							Additional Tests/ Remarks
		Latitude: 36.53391° Longitude: -114.82417° Surface Condition: Typical cover of desert vegetation, with cobbles and boulders present		Sample Type	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)		
		Lithologic Description											
		Silty SAND with Gravel (SM): fine to coarse-grained sand, slightly moist, non-plastic, brown, with cobbles and boulders		X									Very difficult to excavate below 1 foot
The test pit was terminated at approximately 1 ft. below ground surface. Backhoe refusal on cemented soils at approximately 1 ft. below ground surface. The test pit was backfilled on November 26, 2018. <u>GROUNDWATER LEVEL INFORMATION:</u> Groundwater was not observed during excavation or after completion. <u>GENERAL NOTES:</u> Latitude and longitude obtained using a hand held GPS unit.													

	PROJECT NO.: 20191344	TEST PIT LOG TP-11	TEST PIT
	DRAWN BY: AB, MAP		
	CHECKED BY: MNM, JLS	Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA	
DATE: 2/22/2019			
REVISED: -			

SBE 26-113 Pg 773
 PAGE: 1 of 1

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OFFICE FILTER: LAS VEGAS

PROJECT NUMBER: 20191344.001A
GINT TEMPLATE: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_BORING/TEST PIT SOIL LOG]

GINT FILE: C:\users\mpalmer\desktop\20191344.001a.gpj

Date Begin - End: 11/26/2018		Excavation Company: Pearson Excavation		TEST PIT LOG TP-12									
Logged By: A. Bajramovic		Excavation Crew: Matt T.											
Hor.-Vert. Datum: WGS84		Excavation Equip.: CASE 580, 18" Bucket											
Plunge: N/A degrees		Excav. Dimensions: N/A ft											
Weather: Sunny													
Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS							
		Latitude: 36.52817° Longitude: -114.82722° Surface Condition: Typical cover of desert vegetation			Sample Type	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/Remarks
		Lithologic Description											
		Clayey SAND with Gravel (SC): fine to coarse-grained sand, slightly moist, low plasticity, brown, with cobbles			X	SC			79	35	29	12	Resistivity (as Received)= 7200 Ohm-cm Resistivity (Saturated)= 1250 Ohm-cm Sodium= 0.0023% Sodium Sulfate= 0.0073% Solubility= 0.012% pH= 8.48 Sulfates= 0.016% Chlorides= 20 mg/Kg Redox= 272 mV Sulfides= 1.2 mg/Kg R-Value= 25 Very difficult to excavate below 1 foot
5		The test pit was terminated at approximately 1 ft. below ground surface. Backhoe refusal on cemented soils at approximately 1 ft. below ground surface. The test pit was backfilled on November 26, 2018.											
10		GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during excavation or after completion. GENERAL NOTES: Latitude and longitude obtained using a hand held GPS unit.											
		PROJECT NO.: 20191344		TEST PIT LOG TP-12								TEST PIT	
		DRAWN BY: AB, MAP											
		CHECKED BY: MNM, JLS		Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA								TP-12	
DATE: 2/22/2019													
REVISED: -		SBE 26-113 Pg 774								PAGE: 1 of 1			

PLOTTED: 02/26/2019 02:31 PM BY: MPalmer

OFFICE FILTER: LAS VEGAS

PROJECT NUMBER: 20191344.001A
[KLF_BORING/TEST PIT SOIL LOG]GINT FILE: C:\users\mpalmer\desktop\20191344.001a.gpj
GINT TEMPLATE: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB

Date Begin - End: 11/26/2018		Excavation Company: Pearson Excavation		TEST PIT LOG TP-13										
Logged By: A. Bajramovic		Excavation Crew: Matt T.												
Hor.-Vert. Datum: WGS84		Excavation Equip.: CASE 580, 18" Bucket												
Plunge: N/A degrees		Excav. Dimensions: 3 ft x 6 ft												
Weather: Sunny														
Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS								
		Latitude: 36.52799° Longitude: -114.82217° Surface Condition: Typical cover of desert vegetation, with cobbles present				Sample Type	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
		Lithologic Description												
		Silty SAND with Gravel (SM): fine to coarse-grained sand, slightly moist, non-plastic, brown, with cobbles				X	SM			68	22	NP	NP	Easy to excavate Resistivity (as Received)= 5500 Ohm-cm Resistivity (Saturated)= 2700 Ohm-cm Sodium= 0.0015% Sodium Sulfate= 0.0046% Solubility= 0.0098% pH= 8.73 Sulfates= 0.0035% Chlorides= 0.0 mg/Kg Redox= 267 mV Sulfides= 1.3 mg/Kg Very difficult to excavate below 2 feet
5		The test pit was terminated at approximately 2 ft. below ground surface. Backhoe refusal on cemented soils at approximately 2 ft. below ground surface. The test pit was backfilled on November 26, 2018.												
10		GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during excavation or after completion. GENERAL NOTES: Latitude and longitude obtained using a hand held GPS unit.												
		PROJECT NO.: 20191344		TEST PIT LOG TP-13								TEST PIT		
		DRAWN BY: AB, MAP												
		CHECKED BY: MNM, JLS		Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA								TP-13		
		DATE: 2/22/2019												
		REVISED: -		SBE 26-113 Pg 775								PAGE: 1 of 1		

PLOTTED: 02/26/2019 02:31 PM BY: MPalmer

Date Begin - End: 11/28/2018
Logged By: A. Bajramovic
Hor.-Vert. Datum: WGS84
Plunge: N/A degrees
Weather: Sunny

Excavation Company: Pearson Excavation
Excavation Crew: Matt T.
Excavation Equip.: CASE 580, 18" Bucket
Excav. Dimensions: 3 ft x 7 ft

TEST PIT LOG TP-14

Depth (feet)	Graphical Log	FIELD EXPLORATION		LABORATORY RESULTS							
		Latitude: 36.54831° Longitude: -114.81896° Surface Condition: Typical cover of desert vegetation, with cobbles and boulders present	Sample Type	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
		Lithologic Description									
		Silty SAND with Gravel (SM): fine to coarse-grained sand, slightly moist, non-plastic, brown, with cobbles and boulders									Easy to excavate
											Very difficult to excavate below 2 feet
5		The test pit was terminated at approximately 2 ft. below ground surface. Backhoe refusal on cemented soils at approximately 2 ft. below ground surface. The test pit was backfilled on November 28, 2018.									
10		GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during excavation or after completion. GENERAL NOTES: Latitude and longitude obtained using a hand held GPS unit.									



PROJECT NO.: 20191344
 DRAWN BY: AB, MAP
 CHECKED BY: MNM, JLS
 DATE: 2/22/2019
 REVISED: -

TEST PIT LOG TP-14

Eagle Shadow Mountain Solar Project
 Moapa River Indian Reservation, USA

TEST PIT

TP-14

PAGE: 1 of 1

OFFICE FILTER: LAS VEGAS

PROJECT NUMBER: 20191344.001A
 GINT TEMPLATE: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_BORING/TEST PIT SOIL LOG]

GINT FILE: C:\users\mpalmer\desktop\20191344.001a.gpj

PLOTTED: 02/26/2019 02:31 PM BY: MPalmer

OFFICE FILTER: LAS VEGAS

PROJECT NUMBER: 20191344.001A
[KLF_BORING/TEST PIT SOIL LOG]GINT FILE: C:\users\mpalmer\desktop\20191344.001a.gpj
GINT TEMPLATE: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB

Date Begin - End: 11/28/2018		Excavation Company: Pearson Excavation		TEST PIT LOG TP-15									
Logged By: A. Bajramovic		Excavation Crew: Matt T.											
Hor.-Vert. Datum: WGS84		Excavation Equip.: CASE 580, 18" Bucket											
Plunge: N/A degrees		Excav. Dimensions: 3 ft x 8 ft											
Weather: Sunny													

Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS							
		Latitude: 36.54273° Longitude: -114.81884° Surface Condition: Typical cover of desert vegetation		Sample Type	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/Remarks	
		Lithologic Description											
		Sandy SILT (ML): slightly moist, non-plastic, brown		ML				95	67	NP	NP	Easy to excavate Resistivity (as Received)= 9400 Ohm-cm Resistivity (Saturated)= 3000 Ohm-cm Sodium= 0.0015% Sodium Sulfate= 0.0045% Solubility= 0.0082% pH= 8.79 Sulfates= 0.004% Chlorides= 35 mg/Kg Redox= 269 mV Sulfides= 0.76 mg/Kg ASTM D1557 Method A= Max. Dry Unit Wt.: 110.5 pcf Opt. Water Content: 14.7% R-Value= 50 Very difficult to excavate below 2.5 feet	
5		The test pit was terminated at approximately 2.5 ft. below ground surface. Backhoe refusal on cemented soils at approximately 2.5 ft. below ground surface. The test pit was backfilled on November 28, 2018.											
10		GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during excavation or after completion. GENERAL NOTES: Latitude and longitude obtained using a hand held GPS unit.											

	PROJECT NO.: 20191344	TEST PIT LOG TP-15	TEST PIT
	DRAWN BY: AB, MAP		
	CHECKED BY: MNM, JLS	Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA	TP-15
	DATE: 2/22/2019		
	REVISED: -	PAGE: 1 of 1	

PLOTTED: 02/26/2019 02:31 PM BY: MPalmer

Date Begin - End: 11/27/2018
Logged By: A. Bajramovic
Hor.-Vert. Datum: WGS84
Plunge: N/A degrees
Weather: Sunny

Excavation Company: Pearson Trencher
Excavation Crew: Matt T.
Excavation Equip.: CASE 580, 18" Bucket
Excav. Dimensions: 3 ft x 8 ft

TEST PIT LOG TP-17

Depth (feet)	Graphical Log	FIELD EXPLORATION		LABORATORY RESULTS							
		Latitude: 36.53042° Longitude: -114.81882° Surface Condition: Typical cover of desert vegetation, with cobbles and boulders present	Sample Type	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
		Lithologic Description									
		Silty SAND with Gravel (SM): fine to coarse-grained sand, slightly moist, non-plastic, brown, with cobbles and boulders									Easy to excavate
											Very difficult to excavate below 2 feet
5		The test pit was terminated at approximately 2 ft. below ground surface. Backhoe refusal on cemented soils at approximately 2 ft. below ground surface. The test pit was backfilled on November 27, 2018.									
10		GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during excavation or after completion. GENERAL NOTES: Latitude and longitude obtained using a hand held GPS unit.									



PROJECT NO.: 20191344
 DRAWN BY: AB, MAP
 CHECKED BY: MNM, JLS
 DATE: 2/22/2019
 REVISED: -

TEST PIT LOG TP-17

Eagle Shadow Mountain Solar Project
 Moapa River Indian Reservation, USA

TEST PIT

TP-17

PAGE: 1 of 1

OFFICE FILTER: LAS VEGAS

PROJECT NUMBER: 20191344.001A
 GINT TEMPLATE: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_BORING/TEST PIT SOIL LOG]

GINT FILE: C:\users\mpalmer\desktop\20191344.001a.gpj

PLOTTED: 02/26/2019 02:31 PM BY: MPalmer

Date Begin - End: 11/28/2018
Logged By: A. Bajramovic
Hor.-Vert. Datum: WGS84
Plunge: N/A degrees
Weather: Sunny

Excavation Company: Pearson Excavation
Excavation Crew: Matt T.
Excavation Equip.: CASE 580, 18" Bucket
Excav. Dimensions: 3 ft x 9 ft

TEST PIT LOG TP-18

Depth (feet)	Graphical Log	FIELD EXPLORATION		LABORATORY RESULTS									
		Latitude: 36.34312° Longitude: -114.81441° Surface Condition: Typical cover of desert vegetation, with cobbles present	Sample Type	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks		
		Lithologic Description											
		Silty SAND with Gravel (SM): fine to coarse-grained sand, slightly moist, non-plastic, brown, with cobbles										Easy to excavate	
												Very difficult to excavate below 2 feet	
5		The test pit was terminated at approximately 2 ft. below ground surface. Backhoe refusal on cemented soils at approximately 2 ft. below ground surface. The test pit was backfilled on November 28, 2018.											
10		GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during excavation or after completion. GENERAL NOTES: Latitude and longitude obtained using a hand held GPS unit.											



PROJECT NO.: 20191344
 DRAWN BY: AB, MAP
 CHECKED BY: MNM, JLS
 DATE: 2/22/2019
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TEST PIT LOG TP-18

Eagle Shadow Mountain Solar Project
 Moapa River Indian Reservation, USA

TEST PIT

TP-18

PAGE: 1 of 1

OFFICE FILTER: LAS VEGAS

 PROJECT NUMBER: 20191344.001A
 gINT TEMPLATE: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_BORING/TEST PIT SOIL LOG]
 gINT FILE: C:\users\mpalmer\desktop\20191344.001a.gpj

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PROJECT NUMBER: 20191344.001A
GINT FILE: C:\users\mpalmer\desktop\20191344.001a.gpj
GINT TEMPLATE: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_BORING/TEST PIT SOIL LOG]

Date Begin - End: 11/27/2018		Excavation Company: Pearson Excavation		TEST PIT LOG TP-19									
Logged By: A. Bajramovic		Excavation Crew: Matt T.											
Hor.-Vert. Datum: WGS84		Excavation Equip.: CASE 580, 18" Bucket											
Plunge: N/A degrees		Excav. Dimensions: 3 ft x 13 ft											
Weather: Sunny													
Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS							
		Latitude: 36.53674° Longitude: -114.81325° Surface Condition: Typical cover of desert vegetation, with cobbles present			Sample Type	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
		Lithologic Description											
5		Silty SAND with Gravel (SM): fine to coarse-grained sand, slightly moist, non-plastic, brown, with cobbles				SM			80	23	NP	NP	Easy to excavate to 8 feet Resistivity (as Received) =5200 Ohm-cm Resistivity (Saturated) =2100 Ohm-cm Sodium = 0.0012% Sodium Sulfate = 0.0038% Solubility = 0.01% pH = 8.69 Sulfates = 0.007% Chlorides = 30 mg/Kg Redox = 294 mV Sulfides = 0.61 mg/Kg ASTM D1557 Method A = Max. Dry Unit Wt.: 121.4 pcf Opt. Water Content: 12.5%
10		The test pit was terminated at approximately 8 ft. below ground surface. The test pit was backfilled on November 27, 2018.					GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during excavation or after completion. GENERAL NOTES: Latitude and longitude obtained using a hand held GPS unit.						
		PROJECT NO.: 20191344 DRAWN BY: AB, MAP CHECKED BY: MNM, JLS DATE: 2/22/2019 REVISED: -		TEST PIT LOG TP-19 Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA								TEST PIT TP-19 PAGE: 1 of 1	

PLOTTED: 02/26/2019 02:31 PM BY: MPalmer

OFFICE FILTER: LAS VEGAS

PROJECT NUMBER: 20191344.001A
[KLF_BORING/TEST PIT SOIL LOG]GINT FILE: C:\users\mpalmer\desktop\20191344.001a.gpj
GINT TEMPLATE: E\KLF_STANDARD_GINT_LIBRARY_2017.GLB

Date Begin - End: 11/27/2018		Excavation Company: Pearson Excavation		TEST PIT LOG TP-20											
Logged By: A. Bajramovic		Excavation Crew: Matt T.													
Hor.-Vert. Datum: WGS84		Excavation Equip.: CASE 580, 18" Bucket													
Plunge: N/A degrees		Excav. Dimensions: 3 ft x 7 ft													
Weather: Sunny															
Depth (feet)	Graphical Log	FIELD EXPLORATION					LABORATORY RESULTS								
		Latitude: 36.53116° Longitude: -114.81512° Surface Condition: Typical cover of desert vegetation, with cobbles present					Sample Type	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
		Lithologic Description													
		Silty SAND with Gravel (SM): fine to coarse-grained sand, slightly moist, non-plastic, brown, with cobbles					X	SM			60	18	NP	NP	Resistivity (as Received)= 3950 Ohm-cm Resistivity (Saturated)= 3290 Ohm-cm Sodium= 0.0016% Sodium Sulfate= 0.0049% Solubility= 0.019% pH= 8.71 Sulfates= 0.0035% Chlorides= 25 mg/Kg Redox= 176 mV Sulfides= 2.3 mg/Kg Very difficult to excavate below 1.5 feet
5		The test pit was terminated at approximately 1.5 ft. below ground surface. Backhoe refusal on cemented soils at approximately 1.5 ft. below ground surface. The test pit was backfilled on November 27, 2018.													
10															
		GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during excavation or after completion. GENERAL NOTES: Latitude and longitude obtained using a hand held GPS unit.													
		PROJECT NO.: 20191344		TEST PIT LOG TP-20										TEST PIT TP-20	
		DRAWN BY: AB, MAP													
		CHECKED BY: MNM, JLS		Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA											
DATE: 2/22/2019															
REVISED: -		SBE 26-113 Pg 782										PAGE: 1 of 1			

PLOTTED: 02/26/2019 02:31 PM BY: MPalmer

OFFICE FILTER: LAS VEGAS

PROJECT NUMBER: 20191344.001A
GINT TEMPLATE: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_BORING/TEST PIT SOIL LOG]

Date Begin - End: 11/28/2018		Excavation Company: Pearson Excavation		TEST PIT LOG TP-21									
Logged By: A. Bajramovic		Excavation Crew: Matt T.											
Hor.-Vert. Datum: WGS84		Excavation Equip.: CASE 580, 18" Bucket											
Plunge: N/A degrees		Excav. Dimensions: 3 ft x 14 ft											
Weather: Sunny													
Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS							
		Latitude: 36.54320° Longitude: -114.80993° Surface Condition: Typical cover of desert vegetation			Sample Type	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/Remarks
		Lithologic Description											
		Clayey SAND with Gravel (SC): fine to coarse-grained sand, slightly moist, low plasticity, brown			SC				73	23	28	10	Easy to excavate to 8 feet Resistivity (as Received) =4600 Ohm-cm Resistivity (Saturated) =1400 Ohm-cm Sodium = 0.0072% Sodium Sulfate = 0.012% Solubility = 0.023% pH = 8.67 Sulfates = 0.008% Chlorides = 70 mg/Kg Redox = 133 mV Sulfides = <0.5 mg/Kg
5		Fat CLAY (CH): slightly moist, high plasticity, brown, with gypsum			CH					96	74	54	Resistivity (as Received) =900 Ohm-cm Resistivity (Saturated) =180 Ohm-cm Sodium = 0.11% Sodium Sulfate = 0.35% Solubility = 0.32% pH = 8.29 Sulfates = 0.8% Chlorides = 520 mg/Kg Redox = 195 mV Sulfides = <0.5 mg/Kg
10		The test pit was terminated at approximately 8 ft. below ground surface. The test pit was backfilled on November 28, 2018. <u>GROUNDWATER LEVEL INFORMATION:</u> Groundwater was not observed during excavation or after completion. <u>GENERAL NOTES:</u> Latitude and longitude obtained using a hand held GPS unit.											
		PROJECT NO.: 20191344 DRAWN BY: AB, MAP CHECKED BY: MNM, JLS DATE: 2/22/2019 REVISED: -		TEST PIT LOG TP-21 Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA								TEST PIT TP-21	
SBE 26-113 Pg 783												PAGE: 1 of 1	

PLOTTED: 02/26/2019 02:32 PM BY: MPalmer

OFFICE FILTER: LAS VEGAS

PROJECT NUMBER: 20191344.001A
GINT FILE: C:\users\mpalmer\desktop\20191344.001a.gpj
GINT TEMPLATE: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_BORING/TEST PIT SOIL LOG]

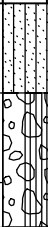
Date Begin - End: 11/28/2018		Excavation Company: Pearson Excavation		TEST PIT LOG TP-23									
Logged By: A. Bajramovic		Excavation Crew: Matt T.											
Hor.-Vert. Datum: WGS84		Excavation Equip.: CASE 580, 18" Bucket											
Plunge: N/A degrees		Excav. Dimensions: 3 ft x 8 ft											
Weather: Sunny													
Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS							
		Latitude: 36.54145° Longitude: -114.80707° Surface Condition: Typical cover of desert vegetation		Sample Type	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/Remarks	
		Lithologic Description											
		Silty SAND (SM): fine to coarse-grained sand, slightly moist, non-plastic, brown		X	SM			88	33	NP	NP	Easy to excavate Resistivity (as Received)=9800 Ohm-cm Resistivity (Saturated)=3100 Ohm-cm Sodium= 0.0011% Sodium Sulfate= 0.0034% Solubility= 0.0086% pH= 8.55 Sulfates= 0.0065% Chlorides= 20 mg/Kg Redox= 198 mV Sulfides= <0.5 mg/Kg ASTM D1557 Method A= Max. Dry Unit Wt.: 106.3 pcf Opt. Water Content: 14.3% Very difficult to excavate below 3 feet	
5		The test pit was terminated at approximately 3 ft. below ground surface. Backhoe refusal on cemented soils at approximately 3 ft. below ground surface. The test pit was backfilled on November 28, 2018. GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during excavation or after completion. GENERAL NOTES: Latitude and longitude obtained using a hand held GPS unit.											
10													
		PROJECT NO.: 20191344		TEST PIT LOG TP-23								TEST PIT	
		DRAWN BY: AB, MAP		Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA								TP-23	
		CHECKED BY: MNM, JLS											
		DATE: 2/22/2019											
		REVISED: -		SBE 26-113 Pg 785								PAGE: 1 of 1	

PLOTTED: 02/26/2019 02:32 PM BY: MPalmer

Date Begin - End: 11/28/2018
Logged By: A. Bajramovic
Hor.-Vert. Datum: WGS84
Plunge: N/A degrees
Weather: Sunny

Excavation Company: Pearson Excavation
Excavation Crew: Matt T.
Excavation Equip.: CASE 580, 18" Bucket
Excav. Dimensions: 3 ft x 8 ft

TEST PIT LOG TP-24

Depth (feet)	Graphical Log	FIELD EXPLORATION		LABORATORY RESULTS							
		Latitude: 36.53772° Longitude: -114.80322° Surface Condition: Typical cover of desert vegetation	Sample Type	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
		Lithologic Description									
		Silty SAND with Gravel (SM): fine to coarse-grained sand, slightly moist, non-plastic, brown									Easy to excavate
		Poorly Graded GRAVEL with Silt and Sand (GP-GM): fine to coarse-grained sand, slightly moist, non-plastic, brown									Very difficult to excavate below 2.5 feet
5		The test pit was terminated at approximately 2.5 ft. below ground surface. Backhoe refusal on cemented soils at approximately 2.5 ft. below ground surface. The test pit was backfilled on November 28, 2018.			GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during excavation or after completion. GENERAL NOTES: Latitude and longitude obtained using a hand held GPS unit.						
10											



PROJECT NO.: 20191344
 DRAWN BY: AB, MAP
 CHECKED BY: MNM, JLS
 DATE: 2/22/2019
 REVISED: -

TEST PIT LOG TP-24

Eagle Shadow Mountain Solar Project
 Moapa River Indian Reservation, USA

TEST PIT

TP-24

PAGE: 1 of 1

OFFICE FILTER: LAS VEGAS

PROJECT NUMBER: 20191344.001A
 GINT FILE: C:\users\mpalmer\desktop\20191344.001a.gpj
 GINT TEMPLATE: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_BORING/TEST PIT SOIL LOG]

PLOTTED: 02/26/2019 02:32 PM BY: MPalmer

OFFICE FILTER: LAS VEGAS

PROJECT NUMBER: 20191344.001A
GINT FILE: C:\users\mpalmer\desktop\20191344.001a.gpj
GINT TEMPLATE: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_BORING/TEST PIT SOIL LOG]

Date Begin - End: 11/28/2018		Excavation Company: Pearson Excavation		TEST PIT LOG TP-25										
Logged By: A. Bajramovic		Excavation Crew: Matt T.												
Hor.-Vert. Datum: WGS84		Excavation Equip.: CASE 580, 18" Bucket												
Plunge: N/A degrees		Excav. Dimensions: N/A ft												
Weather: Sunny														
Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS								
		Latitude: 36.55183° Longitude: -114.78456° Surface Condition: Typical cover of desert vegetation				Sample Type	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/Remarks
		Lithologic Description												
		Clayey SAND with Gravel (SC): fine to coarse-grained sand, slightly moist, medium plasticity, brown				X	SC			69	21	37	13	Easy to excavate to 8 feet Resistivity (as Received)= 26500 Ohm-cm Resistivity (Saturated)= 3200 Ohm-cm Sodium= 0.0016% Sodium Sulfate= 0.0015% Solubility= 0.0092% pH= 8.49 Sulfates= 0.001% Chlorides= 25 mg/Kg Redox= 198 mV Sulfides= <0.5 mg/Kg
		Fat CLAY (CH): slightly moist, high plasticity, brown, with gypsum				X	CH				86	72	55	
5														
10		The test pit was terminated at approximately 8 ft. below ground surface. The test pit was backfilled on November 28, 2018.												
						GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during excavation or after completion. GENERAL NOTES: Latitude and longitude obtained using a hand held GPS unit.								
		PROJECT NO.: 20191344		TEST PIT LOG TP-25						TEST PIT				
		DRAWN BY: AB, MAP												
		CHECKED BY: MNM, JLS		Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA						TP-25				
DATE: 2/22/2019														
REVISED: -		SBE 26-113 Pg 787						PAGE: 1 of 1						

PLOTTED: 02/26/2019 02:32 PM BY: MPalmer

OFFICE FILTER: LAS VEGAS

PROJECT NUMBER: 20191344.001A
[KLF_BORING/TEST PIT SOIL LOG]GINT FILE: C:\users\mpalmer\desktop\20191344.001a.gpj
GINT TEMPLATE: E\KLF_STANDARD_GINT_LIBRARY_2017.GLB

Date Begin - End: 11/28/2018		Excavation Company: Pearson Excavation		TEST PIT LOG TP-26									
Logged By: A. Bajramovic		Excavation Crew: Matt T.											
Hor.-Vert. Datum: WGS84		Excavation Equip.: CASE 580, 18" Bucket											
Plunge: N/A degrees		Excav. Dimensions: 2.5 ft x 7 ft											
Weather: Sunny													
Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS							
		Latitude: 36.54161° Longitude: -114.79876° Surface Condition: Typical cover of desert vegetation			Sample Type USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks	
		Lithologic Description											
		Silty, Clayey SAND with Gravel (SC-SM): fine to coarse-grained sand, slightly moist, low plasticity, brown			SC-SM			85	39	25	6	Resistivity (as Received)= 6650 Ohm-cm Resistivity (Saturated)= 3460 Ohm-cm Sodium= 0.00097% Sodium Sulfate= 0.003% Solubility= 0.016% pH= 8.66 Sulfates= 0.0035% Chlorides= 0.0 mg/Kg Redox= 211 mV Sulfides= 4.7 mg/Kg ASTM D1557 Method A= Max. Dry Unit Wt.: 117.4 pcf Opt. Water Content: 12.6% Very difficult to excavate below 1.5 feet	
5		The test pit was terminated at approximately 1.5 ft. below ground surface. Backhoe refusal on cemented soils at approximately 1.5 ft. below ground surface. The test pit was backfilled on November 28, 2018.											
10		GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during excavation or after completion. GENERAL NOTES: Latitude and longitude obtained using a hand held GPS unit.											
		PROJECT NO.: 20191344 DRAWN BY: AB, MAP CHECKED BY: MNM, JLS DATE: 2/22/2019 REVISED: -		TEST PIT LOG TP-26 Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA						TEST PIT TP-26			
SBE 26-113 Pg 788												PAGE: 1 of 1	

PLOTTED: 02/26/2019 02:32 PM BY: MPalmer

OFFICE FILTER: LAS VEGAS

PROJECT NUMBER: 20191344.001A
GINT TEMPLATE: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_BORING/TEST PIT SOIL LOG]

GINT FILE: C:\users\mpalmer\desktop\20191344.001a.gpj

Date Begin - End: 11/28/2018		Excavation Company: Pearson Excavation		TEST PIT LOG TP-28									
Logged By: A. Bajramovic		Excavation Crew: Matt T.											
Hor.-Vert. Datum: WGS84		Excavation Equip.: CASE 580, 18" Bucket											
Plunge: N/A degrees		Excav. Dimensions: 3 ft x 8 ft											
Weather: Sunny													
Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS							
		Latitude: 36.55103° Longitude: -114.79032° Surface Condition: Typical cover of desert vegetation		Sample Type	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/Remarks	
		Lithologic Description											
		Silty GRAVEL with Sand (GM): fine to coarse-grained gravel, slightly moist, non-plastic, brown			GM			59	24	NP	NP	Resistivity (as Received)= 10500 Ohm-cm Resistivity (Saturated)= 2750 Ohm-cm Sodium= 0.0011% Sodium Sulfate= 0.0015% Solubility= 0.0084% pH= 8.48 Sulfates= 0.001% Chlorides= 0.0 mg/Kg Redox= 220 mV Sulfides= 0.84 mg/Kg ASTM D1557 Method C= Max. Dry Unit Wt.: 114.3 pcf Opt. Water Content: 13.5% Very difficult to excavate below 1.5 feet	
The test pit was terminated at approximately 1.5 ft. below ground surface. Backhoe refusal on cemented soils at approximately 1.5 ft. below ground surface. The test pit was backfilled on November 28, 2018.													
GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during excavation or after completion. GENERAL NOTES: Latitude and longitude obtained using a hand held GPS unit.													
 KLEINFELDER <i>Bright People. Right Solutions.</i>		PROJECT NO.: 20191344 DRAWN BY: AB, MAP CHECKED BY: MNM, JLS DATE: 2/22/2019 REVISED: -		TEST PIT LOG TP-28 Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA								TEST PIT TP-28	
SBE 26-113 Pg 790												PAGE: 1 of 1	



Appendix C



APPENDIX C

Laboratory Test Results (38 pages)

Exploration ID	Depth (ft.)	Sample Description	Water Content (%)	Dry Unit Wt. (pcf)	Sieve Analysis (%)			Atterberg Limits			Additional Tests
					Passing 3/4"	Passing #4	Passing #200	Liquid Limit	Plastic Limit	Plasticity Index	
SA-4	0.5 - 5.0	CEMENTED SAND AND GRAVEL			95	84	28	22	17	5	*Resistivity (as Received)=49000 Ohm-cm Resistivity (Saturated)=4100 Ohm-cm Sodium= 0.0023% Sodium Sulfate= 0.0072% Solubility= 0.01% pH= 8.88 Sulfates= 0.009% Chlorides= 25 mg/Kg Redox= 197 mV Sulfides= 1.6 mg/Kg ASTM D1557 Method A= Uncorrected Maximum Dry Unit Weight: 129.7 pcf Uncorrected Optimum Water Content: 8.5% Corrected Maximum Dry Unit Weight: 136.6 Corrected Optimum Water Content: 6.6
SA-4	15.0	SANDY ELASTIC SILT (MH)	16.9				67	69	38	31	
SA-5	21.5	FAT CLAY (CH)	19.5	103.9							
SA-8	2.5	SILTY SAND WITH GRAVEL (SM)	5.8								
SA-10	15.0	SANDY FAT CLAY (CH)	19.3								
SA-11	2.5	CLAYEY SAND WITH GRAVEL (SC)	0.9								
SA-15	20.0	LEAN CLAY (CL)	17.8								

NOTE:
 *Gradation, Atterberg Limits, Chemical Test, and Modified Proctor test data is representative of Cemented Sand and Gravel broken by the augers and sampled from the returns.

Refer to the Geotechnical Evaluation Report or the supplemental plates for the method used for the testing performed above.
 NP = NonPlastic



PROJECT NO.: 20191344
 DRAWN BY: AB
 CHECKED BY: MM
 DATE: 2/22/2019
 REVISED: -

**LABORATORY TEST
 RESULT SUMMARY**

Eagle Shadow Mountain Solar Project
 Moapa River Indian Reservation, USA

TABLE

C-1

SBE 26-113 Pg 794

Exploration ID	Depth (ft.)	Sample Description	Water Content (%)	Dry Unit Wt. (pcf)	Sieve Analysis (%)			Atterberg Limits			Additional Tests
					Passing 3/4"	Passing #4	Passing #200	Liquid Limit	Plastic Limit	Plasticity Index	
SA-21	5.0	SANDY LEAN CLAY (CL)					69	43	24	19	Expansion/Compression= Expansion= 2.8% under 600 psf when wetted. Expansion/Compression= Expansion= 11.8% under 60 psf when wetted. Resistivity (as Received)= 12500 Ohm-cm Resistivity (Saturated)= 1600 Ohm-cm Sodium= 0.0086% Sodium Sulfate= 0.0089% Solubility= 0.0098% pH= 8.75 Sulfates= 0.006% Chlorides= 60 mg/Kg Redox= 231 mV Sulfides= 0.77 mg/Kg
SA-21	10.0	ELASTIC SILT (MH)					95	63	32	31	
SA-22	10.0 - 15.0	SILTY SAND (SM)			95	93	49	58	32	26	
SA-22	15.0	SILTY SAND (SM)	6.4								

NOTE:
*Gradation, Atterberg Limits, Chemical Test, and Modified Proctor test data is representative of Cemented Sand and Gravel broken by the augers and sampled from the returns.

Refer to the Geotechnical Evaluation Report or the supplemental plates for the method used for the testing performed above.
NP = NonPlastic

	PROJECT NO.: 20191344	LABORATORY TEST RESULT SUMMARY Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA	TABLE C-3
	DRAWN BY: AB CHECKED BY: MM DATE: 2/22/2019 REVISED: -		

SBE 26-113 Pg 795

Exploration ID	Depth (ft.)	Sample Description	Water Content (%)	Dry Unit Wt. (pcf)	Sieve Analysis (%)			Atterberg Limits			Additional Tests
					Passing 3/4"	Passing #4	Passing #200	Liquid Limit	Plastic Limit	Plasticity Index	
SA-24	2.5 - 7.5	CEMENTED SAND AND GRAVEL			98	78	23	28	22	6	*Resistivity (as Received)=16000 Ohm-cm Resistivity (Saturated)=1720 Ohm-cm Sodium= 0.0042% Sodium Sulfate= 0.013% Solubility= 0.014% pH= 8.74 Sulfates= 0.028% Chlorides= 45 mg/Kg Redox= 229 mV Sulfides= 2.1 mg/Kg ASTM D1557 Method A= Uncorrected Maximum Dry Unit Weight: 130.1 pcf Uncorrected Optimum Water Content: 8.9% Corrected Maximum Dry Unit Weight: 136.7 Corrected Optimum Water Content: 6.7
SA-24	20.0	ELASTIC SILT (MH)	14.2				98	70	36	34	
SA-24	25.0	ELASTIC SILT (MH)	13.5	114.2							

NOTE:
 *Gradation, Atterberg Limits, Chemical Test, and Modified Proctor test data is representative of Cemented Sand and Gravel broken by the augers and sampled from the returns.

Refer to the Geotechnical Evaluation Report or the supplemental plates for the method used for the testing performed above.
 NP = NonPlastic



PROJECT NO.: 20191344
 DRAWN BY: AB
 CHECKED BY: MM
 DATE: 2/22/2019
 REVISED: -

**LABORATORY TEST
 RESULT SUMMARY**

Eagle Shadow Mountain Solar Project
 Moapa River Indian Reservation, USA

TABLE

C-4

Exploration ID	Depth (ft.)	Sample Description	Water Content (%)	Dry Unit Wt. (pcf)	Sieve Analysis (%)			Atterberg Limits			Additional Tests
					Passing 3/4"	Passing #4	Passing #200	Liquid Limit	Plastic Limit	Plasticity Index	
SA-25	2.5 - 7.5	CEMENTED SAND AND GRAVEL			100	82	25	29	20	9	*Resistivity (as Received)=5100 Ohm-cm Resistivity (Saturated)=800 Ohm-cm Sodium= 0.018% Sodium Sulfate= 0.055% Solubility= 0.036% pH= 8.52 Sulfates= 0.075% Chlorides= 140 mg/Kg Redox= 242 mV Sulfides= 0.85 mg/Kg ASTM D1557 Method A= Uncorrected Maximum Dry Unit Weight: 127.6 pcf Uncorrected Optimum Water Content: 9.6% Corrected Maximum Dry Unit Weight: 133.4 Corrected Optimum Water Content: 7.8
SA-26	5.0	SANDY LEAN CLAY (CL)					70	30	17	13	Expansion/Compression= Expansion= 6.7% under 600 psf when wetted. Expansion/Compression=
SA-26	10.0	LEAN CLAY (CL)					97	38	21	17	Expansion= 21.7% under 60 psf when wetted. Expansion/Compression=
SA-26	15.0	LEAN CLAY (CL)	13.3								Expansion= 3.3% under 1,200 psf when wetted.

NOTE:
 *Gradation, Atterberg Limits, Chemical Test, and Modified Proctor test data is representative of Cemented Sand and Gravel broken by the augers and sampled from the returns.

Refer to the Geotechnical Evaluation Report or the supplemental plates for the method used for the testing performed above.
 NP = NonPlastic

	PROJECT NO.: 20191344	LABORATORY TEST RESULT SUMMARY Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA	TABLE C-5
	DRAWN BY: AB CHECKED BY: MM DATE: 2/22/2019 REVISED: -		

SBE 26-113 Pg 797

Exploration ID	Depth (ft.)	Sample Description	Water Content (%)	Dry Unit Wt. (pcf)	Sieve Analysis (%)			Atterberg Limits			Additional Tests
					Passing 3/4"	Passing #4	Passing #200	Liquid Limit	Plastic Limit	Plasticity Index	
SA-27	2.5 - 7.0	CEMENTED SAND AND GRAVEL			94	70	21	32	25	7	*Resistivity (as Received)=26500 Ohm-cm Resistivity (Saturated)=3100 Ohm-cm Sodium= 0.005% Sodium Sulfate= 0.013% Solubility= 0.017% pH= 8.87 Sulfates= 0.009% Chlorides= 45 mg/Kg Redox= 246 mV Sulfides= 0.64 mg/Kg ASTM D1557 Method B= Uncorrected Maximum Dry Unit Weight: 129.3 pcf Uncorrected Optimum Water Content: 9.3% Corrected Maximum Dry Unit Weight: 138.5 Corrected Optimum Water Content: 6.6
SA-27	10.0	CLAYEY SAND (SC)					28				
SA-27	15.0	ELASTIC SILT WITH SAND (MH)	13.3				73	62	34	28	Resistivity (as Received)=1000 Ohm-cm Resistivity (Saturated)=330 Ohm-cm Sodium= 0.015% Sodium Sulfate= 0.046% Solubility= 0.13% pH= 8.3 Sulfates= 0.41% Chlorides= 120 mg/Kg Redox= 273 mV Sulfides= 0.56 mg/Kg
SA-28	10.0	LEAN CLAY WITH SAND (CL)					81	31	18	13	
SA-28	15.0	LEAN CLAY (CL)	16.2								

NOTE:
 *Gradation, Atterberg Limits, Chemical Test, and Modified Proctor test data is representative of Cemented Sand and Gravel broken by the augers and sampled from the returns.

Refer to the Geotechnical Evaluation Report or the supplemental plates for the method used for the testing performed above.
 NP = NonPlastic



PROJECT NO.: 20191344
 DRAWN BY: AB
 CHECKED BY: MM
 DATE: 2/22/2019
 REVISED: -

LABORATORY TEST
 RESULT SUMMARY

Eagle Shadow Mountain Solar Project
 Moapa River Indian Reservation, USA

TABLE

C-6

[illegible]

C-7

Exploration ID	Depth (ft.)	Sample Description	Water Content (%)	Dry Unit Wt. (pcf)	Sieve Analysis (%)			Atterberg Limits			Additional Tests
					Passing 3/4"	Passing #4	Passing #200	Liquid Limit	Plastic Limit	Plasticity Index	
TP-4	0.0 - 0.5	CLAYEY SAND WITH GRAVEL (SC)			92	82	41	23	14	9	Resistivity (as Received)=4450 Ohm-cm Resistivity (Saturated)=1550 Ohm-cm Sodium= 0.0019% Sodium Sulfate= 0.006% Solubility= 0.01% pH= 8.64 Sulfates= 0.0045% Chlorides= 40 mg/Kg Redox= 277 mV Sulfides= 27 mg/Kg ASTM D1557 Method A= Uncorrected Maximum Dry Unit Weight: 121.1 pcf Uncorrected Optimum Water Content: 11.7% Corrected Maximum Dry Unit Weight: 127.2 Corrected Optimum Water Content: 9.5
TP-6	0.0 - 1.0	SILTY, CLAYEY SAND WITH GRAVEL (SC-SM)			84	74	41	25	20	5	Resistivity (as Received)=880 Ohm-cm Resistivity (Saturated)=135 Ohm-cm Sodium= 0.07% Sodium Sulfate= 0.22% Solubility= 0.15% pH= 7.96 Sulfates= 0.22% Chlorides= 1200 mg/Kg Redox= 261 mV Sulfides= <0.5 mg/Kg

NOTE:
 *Gradation, Atterberg Limits, Chemical Test, and Modified Proctor test data is representative of Cemented Sand and Gravel broken by the augers and sampled from the returns.

 Refer to the Geotechnical Evaluation Report or the supplemental plates for the method used for the testing performed above.
 NP = NonPlastic

	PROJECT NO.: 20191344	LABORATORY TEST RESULT SUMMARY Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA	TABLE C-8
	DRAWN BY: AB CHECKED BY: MM DATE: 2/22/2019 REVISED: -		

SBE 26-113 Pg 800

Exploration ID	Depth (ft.)	Sample Description	Water Content (%)	Dry Unit Wt. (pcf)	Sieve Analysis (%)			Atterberg Limits			Additional Tests
					Passing 3/4"	Passing #4	Passing #200	Liquid Limit	Plastic Limit	Plasticity Index	
TP-8	0.0 - 1.0	CLAYEY GRAVEL WITH SAND (GC)			79	50	21	25	15	10	Resistivity (as Received)= 675 Ohm-cm Resistivity (Saturated)= 100 Ohm-cm Sodium= 0.06% Sodium Sulfate= 0.19% Solubility= 0.18% pH= 7.89 Sulfates= 0.2% Chlorides= 1800 mg/Kg Redox= 284 mV Sulfides= 1.8 mg/Kg
TP-10	0.0 - 1.0	CLAYEY SAND WITH GRAVEL (SC)			83	67	27	30	17	13	Resistivity (as Received)= 9500 Ohm-cm Resistivity (Saturated)= 2650 Ohm-cm Sodium= 0.0015% Sodium Sulfate= 0.0022% Solubility= 0.023% pH= 8.65 Sulfates= 0.0015% Chlorides= 25 mg/Kg Redox= 267 mV Sulfides= 1.5 mg/Kg

NOTE:
 *Gradation, Atterberg Limits, Chemical Test, and Modified Proctor test data is representative of Cemented Sand and Gravel broken by the augers and sampled from the returns.

Refer to the Geotechnical Evaluation Report or the supplemental plates for the method used for the testing performed above.
 NP = NonPlastic

	PROJECT NO.: 20191344	LABORATORY TEST RESULT SUMMARY Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA	TABLE C-9
	DRAWN BY: AB CHECKED BY: MM DATE: 2/22/2019 REVISED: -		

SBE 26-113 Pg 801

Exploration ID	Depth (ft.)	Sample Description	Water Content (%)	Dry Unit Wt. (pcf)	Sieve Analysis (%)			Atterberg Limits			Additional Tests
					Passing 3/4"	Passing #4	Passing #200	Liquid Limit	Plastic Limit	Plasticity Index	
TP-12	0.0 - 1.0	CLAYEY SAND WITH GRAVEL (SC)			91	79	35	29	17	12	Resistivity (as Received)=7200 Ohm-cm Resistivity (Saturated)=1250 Ohm-cm Sodium= 0.0023% Sodium Sulfate= 0.0073% Solubility= 0.012% pH= 8.48 Sulfates= 0.016% Chlorides= 20 mg/Kg Redox= 272 mV Sulfides= 1.2 mg/Kg R-Value= 25
TP-13	0.0 - 1.0	SILTY SAND WITH GRAVEL (SM)			82	68	22	NP	NP	NP	Resistivity (as Received)=5500 Ohm-cm Resistivity (Saturated)=2700 Ohm-cm Sodium= 0.0015% Sodium Sulfate= 0.0046% Solubility= 0.0098% pH= 8.73 Sulfates= 0.0035% Chlorides= 0.0 mg/Kg Redox= 267 mV Sulfides= 1.3 mg/Kg

NOTE:
 *Gradation, Atterberg Limits, Chemical Test, and Modified Proctor test data is representative of Cemented Sand and Gravel broken by the augers and sampled from the returns.

 Refer to the Geotechnical Evaluation Report or the supplemental plates for the method used for the testing performed above.
 NP = NonPlastic

	PROJECT NO.: 20191344	LABORATORY TEST RESULT SUMMARY Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA	TABLE C-10
	DRAWN BY: AB CHECKED BY: MM DATE: 2/22/2019 REVISED: -		

SBE 26-113 Pg 802

Exploration ID	Depth (ft.)	Sample Description	Water Content (%)	Dry Unit Wt. (pcf)	Sieve Analysis (%)			Atterberg Limits			Additional Tests
					Passing 3/4"	Passing #4	Passing #200	Liquid Limit	Plastic Limit	Plasticity Index	
TP-15	0.0 - 1.0	SANDY SILT (ML)			100	95	67	NP	NP	NP	Resistivity (as Received)= 9400 Ohm-cm Resistivity (Saturated)= 3000 Ohm-cm Sodium= 0.0015% Sodium Sulfate= 0.0045% Solubility= 0.0082% pH= 8.79 Sulfates= 0.004% Chlorides= 35 mg/Kg Redox= 269 mV Sulfides= 0.76 mg/Kg R-Value= 50 ASTM D1557 Method A= Uncorrected Maximum Dry Unit Weight: 110.5 pcf Uncorrected Optimum Water Content: 14.7% Corrected Maximum Dry Unit Weight: 112.5 Corrected Optimum Water Content: 13.9

NOTE:
 *Gradation, Atterberg Limits, Chemical Test, and Modified Proctor test data is representative of Cemented Sand and Gravel broken by the augers and sampled from the returns.

Refer to the Geotechnical Evaluation Report or the supplemental plates for the method used for the testing performed above.
 NP = NonPlastic



PROJECT NO.: 20191344

DRAWN BY: AB

CHECKED BY: MM

DATE: 2/22/2019

REVISED: -

LABORATORY TEST RESULT SUMMARY

Eagle Shadow Mountain Solar Project
Moapa River Indian Reservation, USA

TABLE

C-11

SBE 26-113 Pg 803

Exploration ID	Depth (ft.)	Sample Description	Water Content (%)	Dry Unit Wt. (pcf)	Sieve Analysis (%)			Atterberg Limits			Additional Tests
					Passing 3/4"	Passing #4	Passing #200	Liquid Limit	Plastic Limit	Plasticity Index	
TP-19	0.0 - 1.0	SILTY SAND WITH GRAVEL (SM)			93	80	23	NP	NP	NP	Resistivity (as Received)= 5200 Ohm-cm Resistivity (Saturated)= 2100 Ohm-cm Sodium= 0.0012% Sodium Sulfate= 0.0038% Solubility= 0.01% pH= 8.69 Sulfates= 0.007% Chlorides= 30 mg/Kg Redox= 294 mV Sulfides= 0.61 mg/Kg ASTM D1557 Method A= Uncorrected Maximum Dry Unit Weight: 121.4 pcf Uncorrected Optimum Water Content: 12.5% Corrected Maximum Dry Unit Weight: 128.3 Corrected Optimum Water Content: 10.1
TP-20	0.0 - 1.0	SILTY SAND WITH GRAVEL (SM)			83	60	18	NP	NP	NP	Resistivity (as Received)= 3950 Ohm-cm Resistivity (Saturated)= 3290 Ohm-cm Sodium= 0.0016% Sodium Sulfate= 0.0049% Solubility= 0.019% pH= 8.71 Sulfates= 0.0035% Chlorides= 25 mg/Kg Redox= 176 mV Sulfides= 2.3 mg/Kg

NOTE:
 *Gradation, Atterberg Limits, Chemical Test, and Modified Proctor test data is representative of Cemented Sand and Gravel broken by the augers and sampled from the returns.

Refer to the Geotechnical Evaluation Report or the supplemental plates for the method used for the testing performed above.
 NP = NonPlastic

	PROJECT NO.: 20191344 DRAWN BY: AB CHECKED BY: MM DATE: 2/22/2019 REVISED: -	LABORATORY TEST RESULT SUMMARY Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA	TABLE C-12
	SBE 26-113 Pg 804		

Exploration ID	Depth (ft.)	Sample Description	Water Content (%)	Dry Unit Wt. (pcf)	Sieve Analysis (%)			Atterberg Limits			Additional Tests
					Passing 3/4"	Passing #4	Passing #200	Liquid Limit	Plastic Limit	Plasticity Index	
TP-21	0.0 - 1.0	CLAYEY SAND WITH GRAVEL (SC)			90	73	23	28	18	10	Resistivity (as Received)=4600 Ohm-cm Resistivity (Saturated)=1400 Ohm-cm Sodium= 0.0072% Sodium Sulfate= 0.012% Solubility= 0.023% pH= 8.67 Sulfates= 0.008% Chlorides= 70 mg/Kg Redox= 133 mV Sulfides= <0.5 mg/Kg
TP-21	4.0 - 8.0	FAT CLAY (CH)					96	74	20	54	Resistivity (as Received)=900 Ohm-cm Resistivity (Saturated)=180 Ohm-cm Sodium= 0.11% Sodium Sulfate= 0.35% Solubility= 0.32% pH= 8.29 Sulfates= 0.8% Chlorides= 520 mg/Kg Redox= 195 mV Sulfides= <0.5 mg/Kg

NOTE:
 *Gradation, Atterberg Limits, Chemical Test, and Modified Proctor test data is representative of Cemented Sand and Gravel broken by the augers and sampled from the returns.

Refer to the Geotechnical Evaluation Report or the supplemental plates for the method used for the testing performed above.
 NP = NonPlastic

	PROJECT NO.: 20191344 DRAWN BY: AB CHECKED BY: MM DATE: 2/22/2019 REVISED: -	LABORATORY TEST RESULT SUMMARY Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA	TABLE C-13
	SBE 26-113 Pg 805		

Exploration ID	Depth (ft.)	Sample Description	Water Content (%)	Dry Unit Wt. (pcf)	Sieve Analysis (%)			Atterberg Limits			Additional Tests
					Passing 3/4"	Passing #4	Passing #200	Liquid Limit	Plastic Limit	Plasticity Index	
TP-23	0.0 - 1.0	SILTY SAND (SM)			96	88	33	NP	NP	NP	Resistivity (as Received)=9800 Ohm-cm Resistivity (Saturated)=3100 Ohm-cm Sodium= 0.0011% Sodium Sulfate= 0.0034% Solubility= 0.0086% pH= 8.55 Sulfates= 0.0065% Chlorides= 20 mg/Kg Redox= 198 mV Sulfides= <0.5 mg/Kg ASTM D1557 Method A= Uncorrected Maximum Dry Unit Weight: 106.3 pcf Uncorrected Optimum Water Content: 14.3% Corrected Maximum Dry Unit Weight: 111.1 Corrected Optimum Water Content: 12.9
TP-25	0.0 - 1.0	CLAYEY SAND WITH GRAVEL (SC)			87	69	21	37	24	13	Resistivity (as Received)=26500 Ohm-cm Resistivity (Saturated)=3200 Ohm-cm Sodium= 0.0016% Sodium Sulfate= 0.0015% Solubility= 0.0092% pH= 8.49 Sulfates= 0.001% Chlorides= 25 mg/Kg Redox= 198 mV Sulfides= <0.5 mg/Kg
TP-25	3.0 - 4.0	FAT CLAY (CH)					86	72	17	55	

NOTE:
 *Gradation, Atterberg Limits, Chemical Test, and Modified Proctor test data is representative of Cemented Sand and Gravel broken by the augers and sampled from the returns.

 Refer to the Geotechnical Evaluation Report or the supplemental plates for the method used for the testing performed above.
 NP = NonPlastic

	PROJECT NO.: 20191344	LABORATORY TEST RESULT SUMMARY Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA	TABLE C-14
	DRAWN BY: AB CHECKED BY: MM DATE: 2/22/2019 REVISED: -		

SBE 26-113 Pg 806

Exploration ID	Depth (ft.)	Sample Description	Water Content (%)	Dry Unit Wt. (pcf)	Sieve Analysis (%)			Atterberg Limits			Additional Tests
					Passing 3/4"	Passing #4	Passing #200	Liquid Limit	Plastic Limit	Plasticity Index	
TP-26	0.0 - 1.0	SILTY, CLAYEY SAND WITH GRAVEL (SC-SM)			92	85	39	25	19	6	Resistivity (as Received)=6650 Ohm-cm Resistivity (Saturated)=3460 Ohm-cm Sodium= 0.00097% Sodium Sulfate= 0.003% Solubility= 0.016% pH= 8.66 Sulfates= 0.0035% Chlorides= 0.0 mg/Kg Redox= 211 mV Sulfides= 4.7 mg/Kg ASTM D1557 Method A= Uncorrected Maximum Dry Unit Weight: 117.4 pcf Uncorrected Optimum Water Content: 12.6% Corrected Maximum Dry Unit Weight: 122.7 Corrected Optimum Water Content: 10.8

NOTE:

*Gradation, Atterberg Limits, Chemical Test, and Modified Proctor test data is representative of Cemented Sand and Gravel broken by the augers and sampled from the returns.

Refer to the Geotechnical Evaluation Report or the supplemental plates for the method used for the testing performed above.
NP = NonPlastic



PROJECT NO.: 20191344

DRAWN BY: AB

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DATE: 2/22/2019

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LABORATORY TEST RESULT SUMMARY

Eagle Shadow Mountain Solar Project
Moapa River Indian Reservation, USA

SBE 26-113 Pg 807

TABLE

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Exploration ID	Depth (ft.)	Sample Description	Water Content (%)	Dry Unit Wt. (pcf)	Sieve Analysis (%)			Atterberg Limits			Additional Tests
					Passing 3/4"	Passing #4	Passing #200	Liquid Limit	Plastic Limit	Plasticity Index	
TP-28	0.0 - 1.0	SILTY GRAVEL WITH SAND (GM)			77	59	24	NP	NP	NP	Resistivity (as Received)=10500 Ohm-cm Resistivity (Saturated)=2750 Ohm-cm Sodium= 0.0011% Sodium Sulfate= 0.0015% Solubility= 0.0084% pH= 8.48 Sulfates= 0.001% Chlorides= 0.0 mg/Kg Redox= 220 mV Sulfides= 0.84 mg/Kg ASTM D1557 Method C= Uncorrected Maximum Dry Unit Weight: 114.3 pcf Uncorrected Optimum Water Content: 13.5% Corrected Maximum Dry Unit Weight: 123.1 Corrected Optimum Water Content: 10.6

NOTE:
 *Gradation, Atterberg Limits, Chemical Test, and Modified Proctor test data is representative of Cemented Sand and Gravel broken by the augers and sampled from the returns.

 Refer to the Geotechnical Evaluation Report or the supplemental plates for the method used for the testing performed above.
 NP = NonPlastic

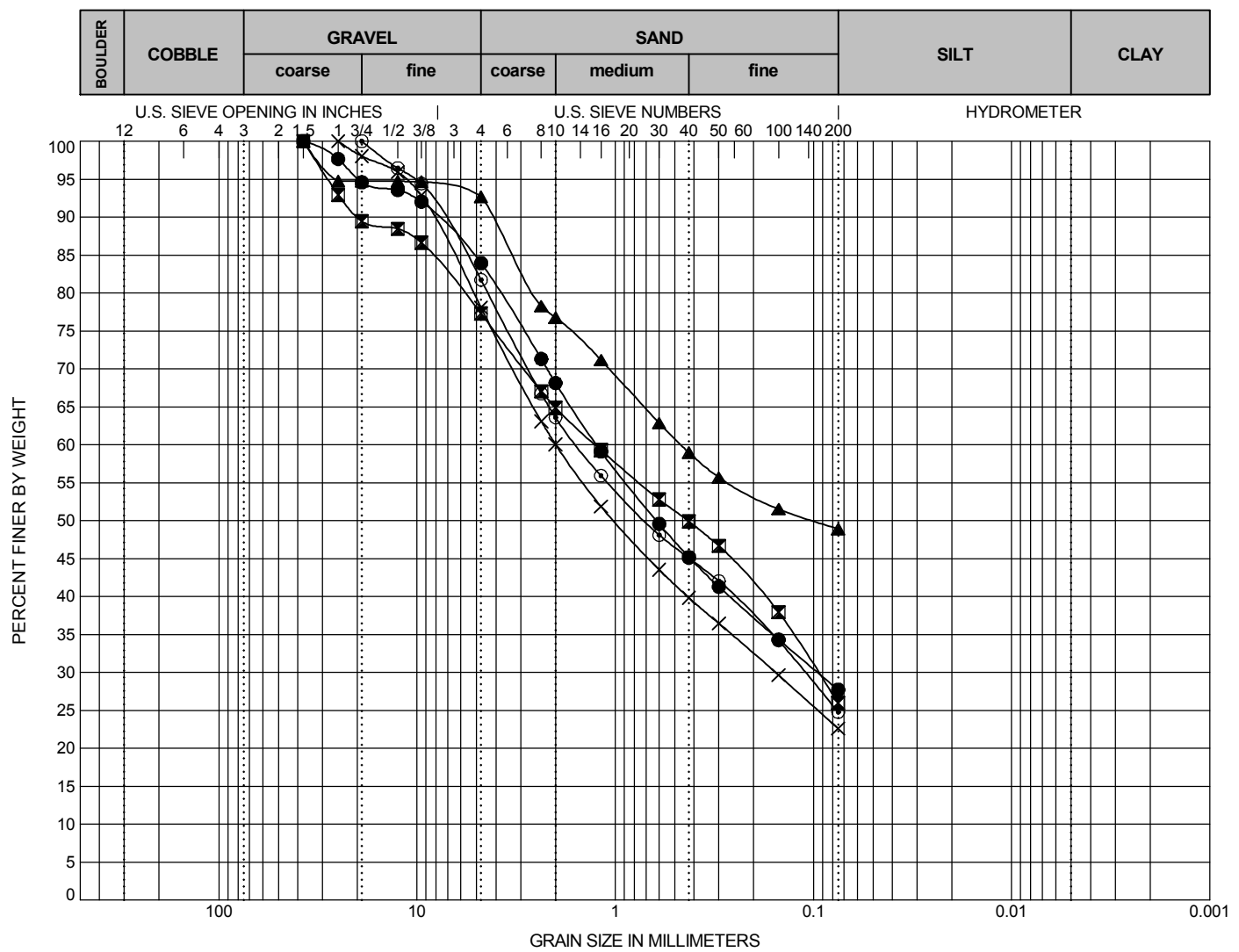
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	SBE 26-113 Pg 808		

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PROJECT NUMBER: 20191344.001A

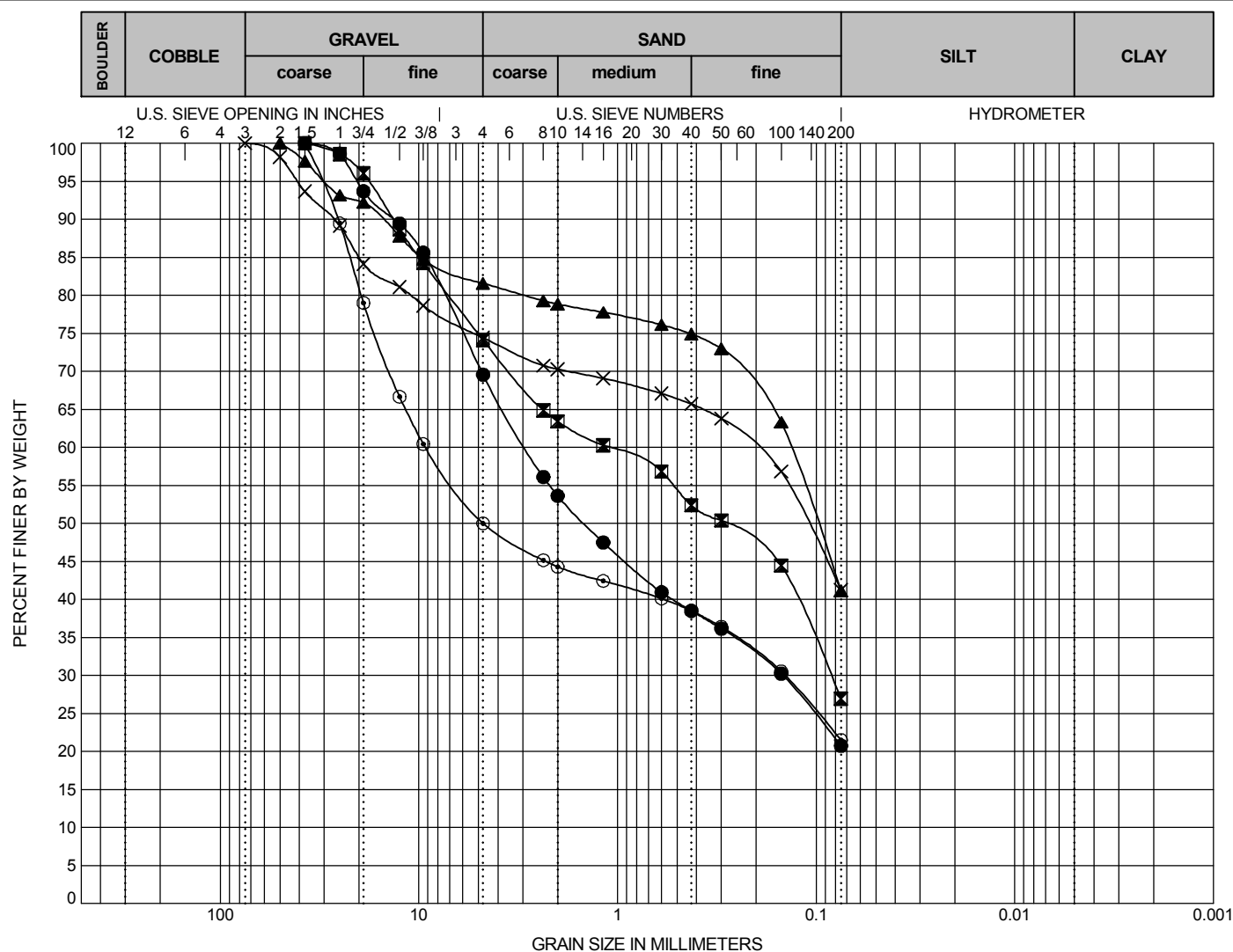
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PROJECT NUMBER: 20191344.001A

GINT FILE: C:\users\mpalmer\desktop\20191344.gpi
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Exploration ID		Depth (ft.)	Sample Description									LL	PL	PI
●	SA-27	2.5 - 7	CEMENTED SAND AND GRAVEL									32	25	7
☒	TP-1	0 - 1	SILTY SAND with GRAVEL (SM)									NP	NP	NP
▲	TP-4	0 - 0.5	CLAYEY SAND with GRAVEL (SC)									23	14	9
✕	TP-6	0 - 1	SILTY, CLAYEY SAND with GRAVEL (SC-SM)									25	20	5
◎	TP-8	0 - 1	CLAYEY GRAVEL with SAND (GC)									25	15	10
Exploration ID		Depth (ft.)	D ₁₀₀	D ₆₀	D ₃₀	D ₁₀	C _c	C _u	Passing 3/4"	Passing #4	Passing #200	%Silt	%Clay	
●	SA-27	2.5 - 7	37.5	2.892	0.148	NM	NM	NM	94	70	21	NM	NM	
☒	TP-1	0 - 1	37.5	1.119	0.085	NM	NM	NM	96	74	27	NM	NM	
▲	TP-4	0 - 0.5	50	0.135	NM	NM	NM	NM	92	82	41	NM	NM	
✕	TP-6	0 - 1	75	0.206	NM	NM	NM	NM	84	74	41	NM	NM	
◎	TP-8	0 - 1	37.5	9.238	0.144	NM	NM	NM	79	50	21	NM	NM	

Sieve Analysis and Hydrometer Analysis testing performed in general accordance with ASTM D422.
NP = Nonplastic
NM = Not Measured

Coefficients of Uniformity - $C_u = D_{60} / D_{10}$
Coefficients of Curvature - $C_c = (D_{30})^2 / D_{60} D_{10}$
 D_{60} = Grain diameter at 60% passing
 D_{30} = Grain diameter at 30% passing
 D_{10} = Grain diameter at 10% passing

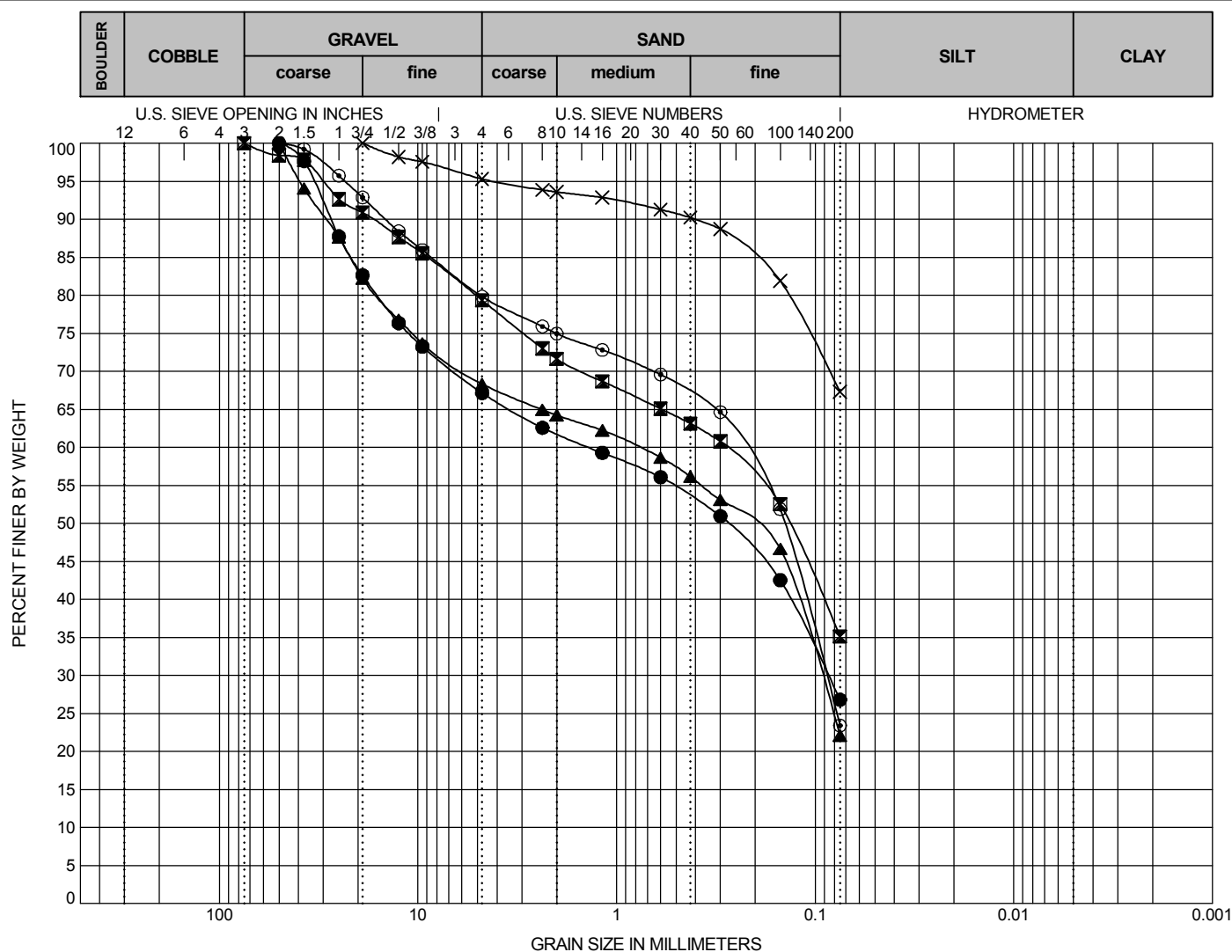
	PROJECT NO.: 20191344	SIEVE ANALYSIS	FIGURE
	DRAWN BY: AB, MAP		
	CHECKED BY: MNM, JLS	Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA	C-18
	DATE: 2/22/2019		
	REVISED: -		

PLOTTED: 02/22/2019 12:15 PM BY: MPalmer

OFFICE FILTER: LAS VEGAS

PROJECT NUMBER: 20191344.001A

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Exploration ID		Depth (ft.)	Sample Description								LL	PL	PI
●	TP-10	0 - 1	CLAYEY SAND with GRAVEL (SC)								30	17	13
▣	TP-12	0 - 1	CLAYEY SAND with GRAVEL (SC)								29	17	12
▲	TP-13	0 - 1	SILTY SAND with GRAVEL (SM)								NP	NP	NP
✕	TP-15	0 - 1	SANDY SILT (ML)								NP	NP	NP
◎	TP-19	0 - 1	SILTY SAND with GRAVEL (SM)								NP	NP	NP
Exploration ID	Depth (ft.)	D ₁₀₀	D ₆₀	D ₃₀	D ₁₀	Cc	Cu	Passing 3/4"	Passing #4	Passing #200	%Silt	%Clay	
●	TP-10	0 - 1	50	1.377	0.086	NM	NM	NM	83	67	27	NM	NM
▣	TP-12	0 - 1	75	0.281	NM	NM	NM	NM	91	79	35	NM	NM
▲	TP-13	0 - 1	50	0.775	0.094	NM	NM	NM	82	68	22	NM	NM
✕	TP-15	0 - 1	19	NM	NM	NM	NM	NM	100	95	67	NM	NM
◎	TP-19	0 - 1	50	0.233	0.088	NM	NM	NM	93	80	23	NM	NM

Sieve Analysis and Hydrometer Analysis testing performed in general accordance with ASTM D422.
NP = Nonplastic
NM = Not Measured

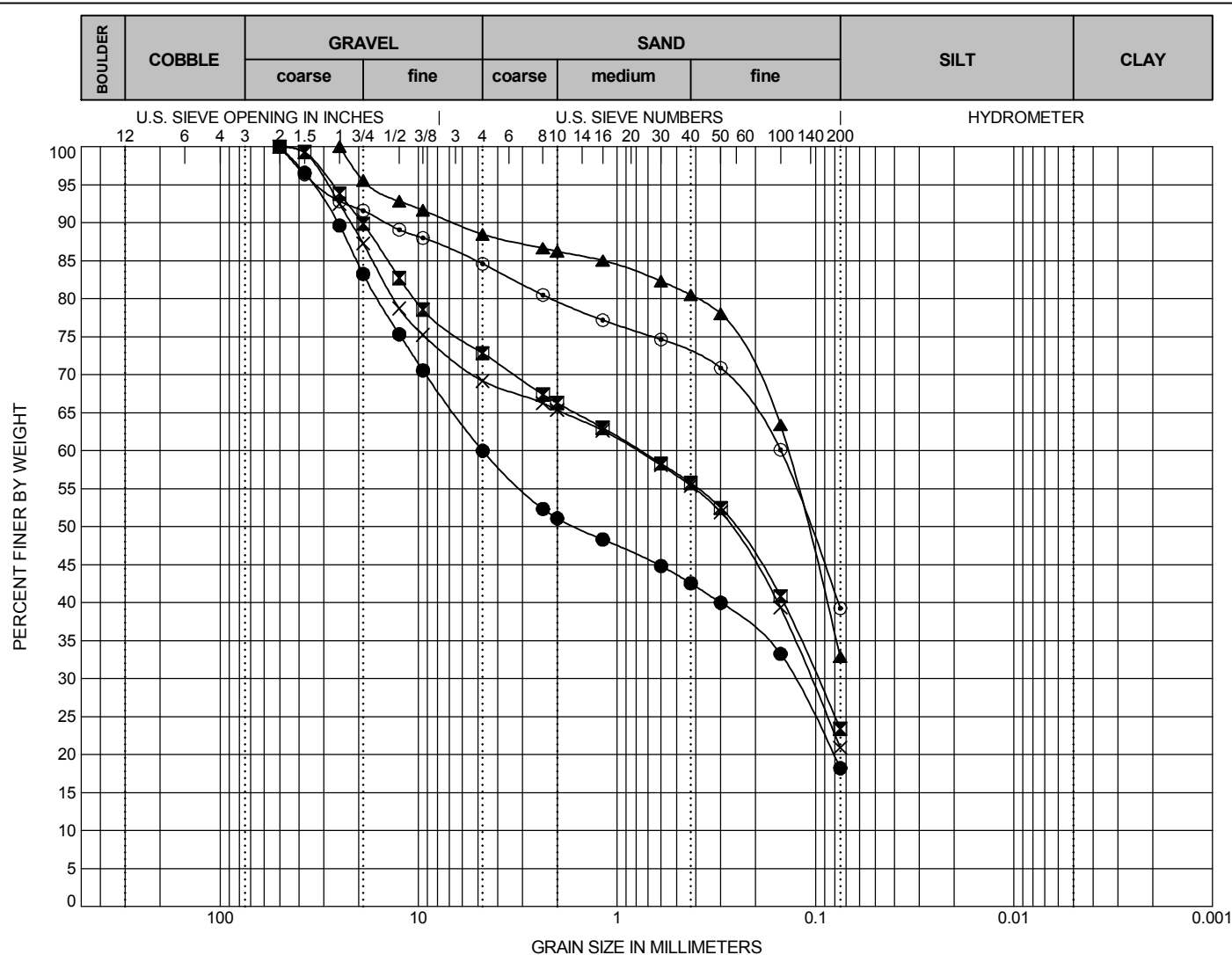
Coefficients of Uniformity - $C_u = D_{60} / D_{10}$
Coefficients of Curvature - $C_c = (D_{30})^2 / D_{60} D_{10}$
D₆₀ = Grain diameter at 60% passing
D₃₀ = Grain diameter at 30% passing
D₁₀ = Grain diameter at 10% passing

	PROJECT NO.: 20191344	SIEVE ANALYSIS Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA	FIGURE C-19
	DRAWN BY: AB, MAP CHECKED BY: MNM, JLS DATE: 2/22/2019 REVISED: -		

PLOTTED: 02/22/2019 12:15 PM BY: MPalmer

OFFICE FILTER: LAS VEGAS

PROJECT NUMBER: 20191344.001A

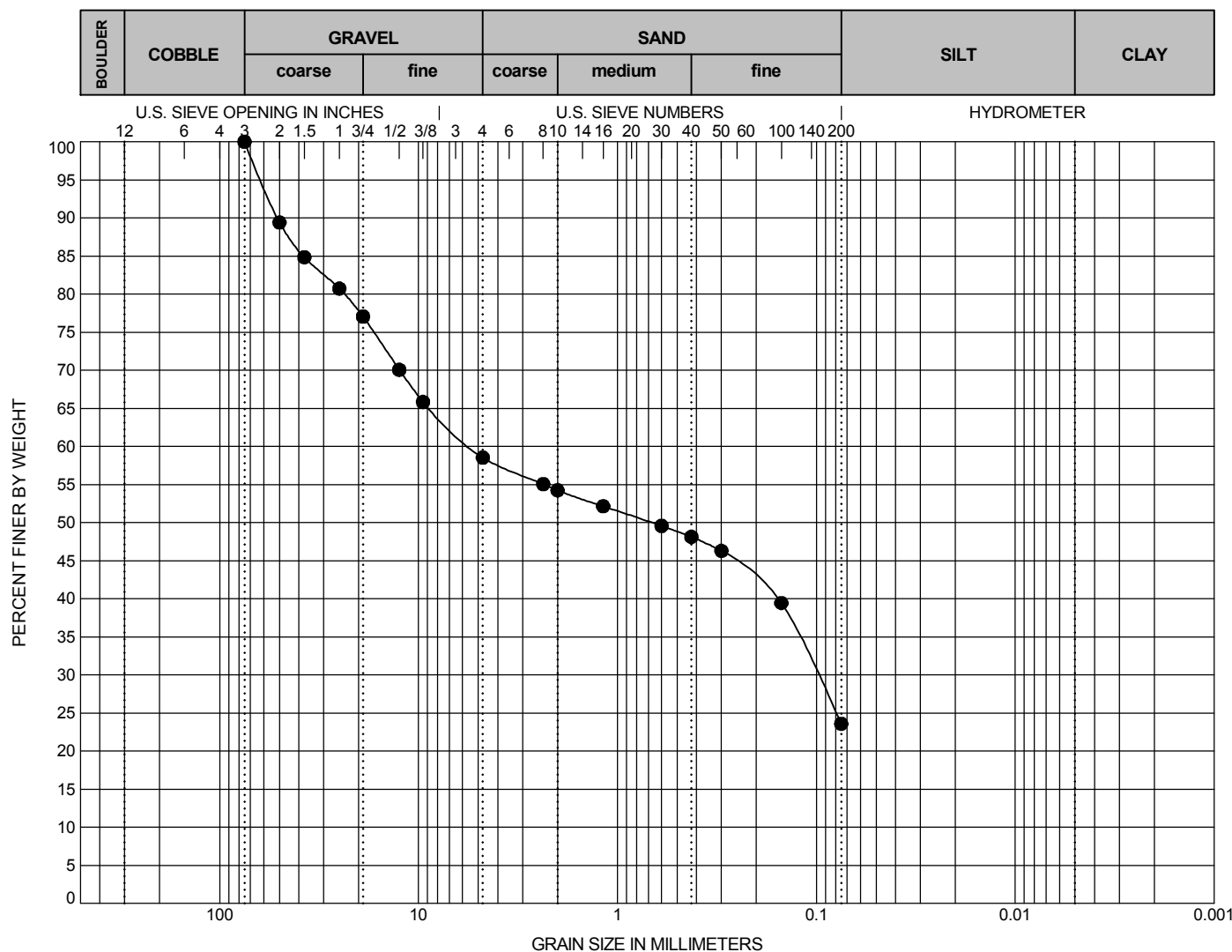
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PROJECT NUMBER: 20191344.001A

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Exploration ID	Depth (ft.)	Sample Description								LL	PL	PI
● TP-28	0 - 1	SILTY GRAVEL with SAND (GM)								NP	NP	NP
Exploration ID	Depth (ft.)	D ₁₀₀	D ₆₀	D ₃₀	D ₁₀	C _c	C _u	Passing 3/4"	Passing #4	Passing #200	%Silt	%Clay
● TP-28	0 - 1	75	5.466	0.099	NM	NM	NM	77	59	24	NM	NM

Sieve Analysis and Hydrometer Analysis testing performed in general accordance with ASTM D422.
NP = Nonplastic
NM = Not Measured

Coefficients of Uniformity - $C_u = D_{60} / D_{10}$
Coefficients of Curvature - $C_c = (D_{30})^2 / D_{60} D_{10}$
D₆₀ = Grain diameter at 60% passing
D₃₀ = Grain diameter at 30% passing
D₁₀ = Grain diameter at 10% passing

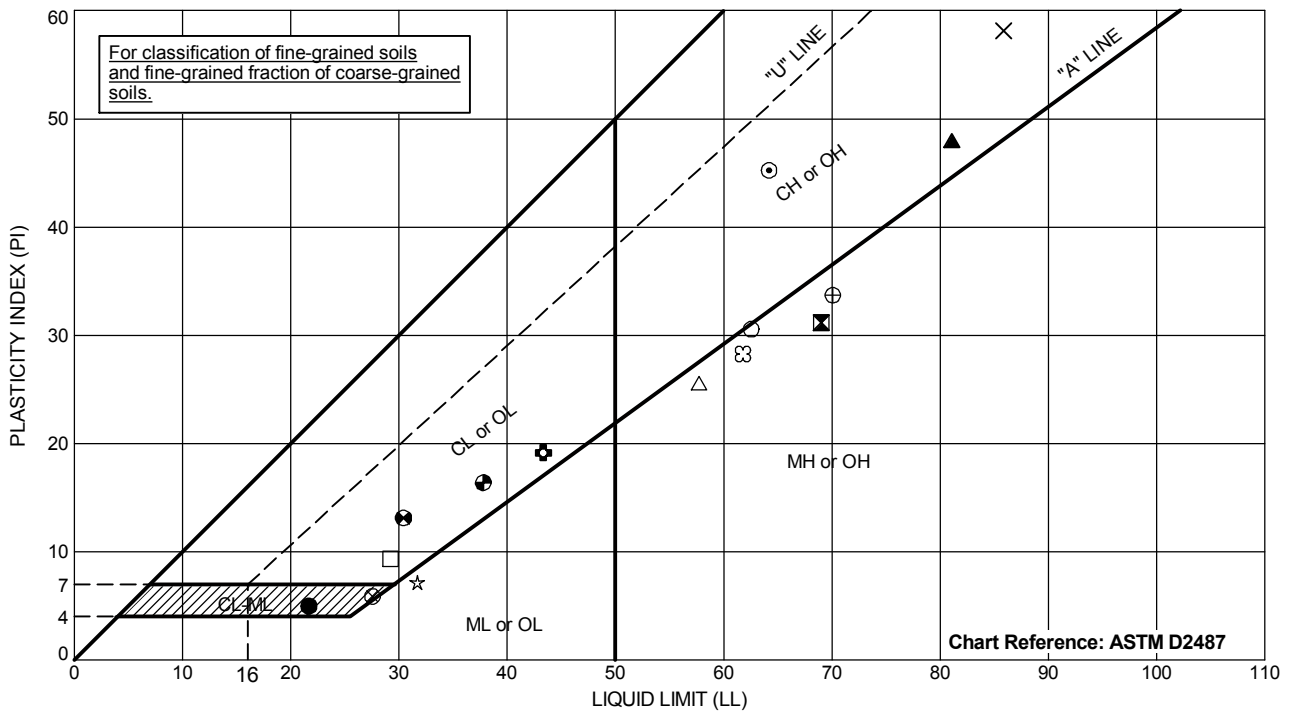
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	DRAWN BY: AB, MAP CHECKED BY: MNM, JLS DATE: 2/22/2019 REVISED: -		

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PROJECT NUMBER: 20191344.001A

gINT FILE: C:\users\mpalmer\desktop\20191344.gpi
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Exploration ID	Depth (ft.)	Sample Description	Passing #200	LL	PL	PI
● SA-4	0.5 - 5	CEMENTED SAND AND GRAVEL	28	22	17	5
⊠ SA-4	15	SANDY ELASTIC SILT (MH)	67	69	38	31
▲ SA-20	2.5 - 5	CLAYEY SAND with GRAVEL (SC)	26	81	33	48
× SA-20	15	CLAYEY SAND (SC)	35	86	28	58
⊙ SA-20	20	FAT CLAY (CH)	89	64	19	45
⊕ SA-21	5	SANDY LEAN CLAY (CL)	69	43	24	19
○ SA-21	10	ELASTIC SILT (MH)	95	63	32	31
△ SA-22	10 - 15	SILTY SAND (SM)	49	58	32	26
⊗ SA-24	2.5 - 7.5	CEMENTED SAND AND GRAVEL	23	28	22	6
⊕ SA-24	20	ELASTIC SILT (MH)	98	70	36	34
□ SA-25	2.5 - 7.5	CEMENTED SAND AND GRAVEL	25	29	20	9
⊕ SA-26	5	SANDY LEAN CLAY (CL)	70	30	17	13
⊕ SA-26	10	LEAN CLAY (CL)	97	38	21	17
★ SA-27	2.5 - 7	CEMENTED SAND AND GRAVEL	21	32	25	7
⊗ SA-27	15	ELASTIC SILT with SAND (MH)	73	62	34	28

Testing performed in general accordance with ASTM D4318.
NP = Nonplastic
NM = Not Measured



PROJECT NO.: 20191344
DRAWN BY: AB, MAP
CHECKED BY: JLS
DATE: 2/22/2019
REVISED: -

ATTERBERG LIMITS

Eagle Shadow Mountain Solar Project
Moapa River Indian Reservation, USA

FIGURE

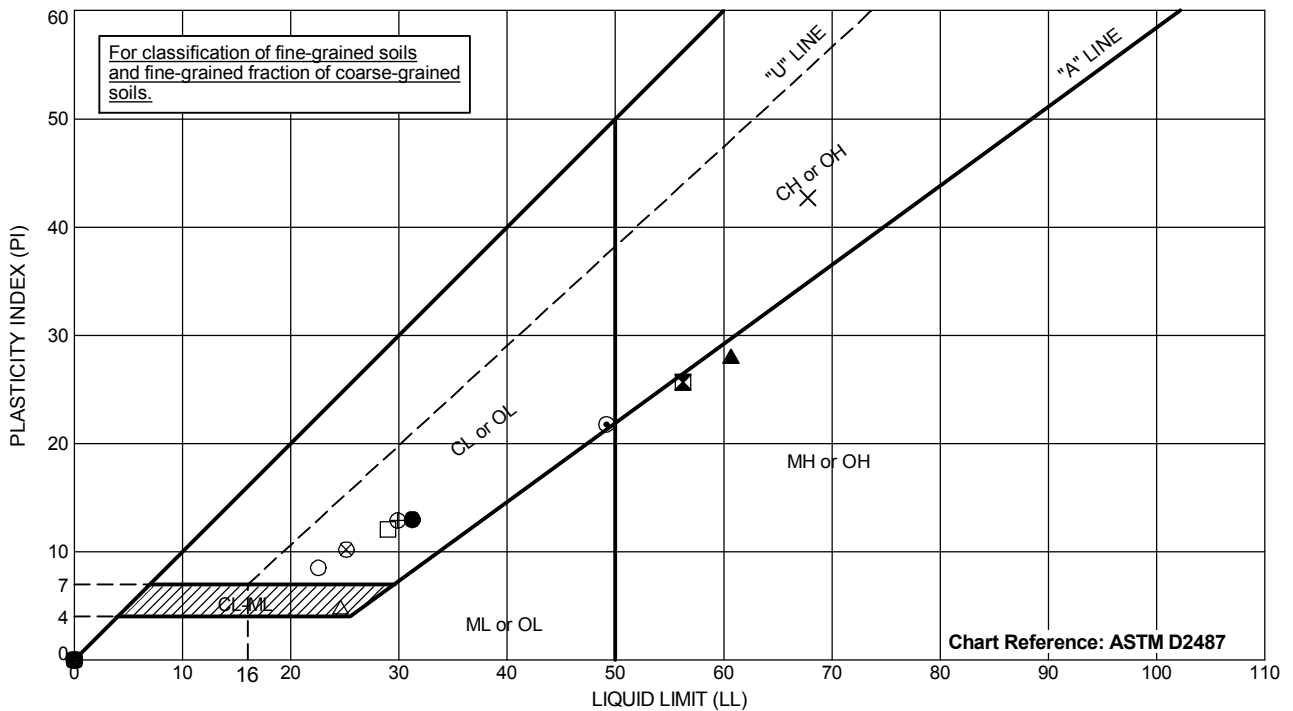
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OFFICE FILTER: LAS VEGAS

PROJECT NUMBER: 20191344.001A

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Exploration ID	Depth (ft.)	Sample Description	Passing #200	LL	PL	PI
● SA-28	10	LEAN CLAY with SAND (CL)	81	31	18	13
☒ SB-1	15	SILTY SAND (SM)	46	56	31	25
▲ SB-1	20	SANDY ELASTIC SILT (MH)	50	61	33	28
✕ SB-1	30	FAT CLAY with SAND (CH)	84	68	25	43
⊙ SB-1	45	LEAN CLAY with SAND (CL)	76	49	27	22
⊕ TP-1	0 - 1	SILTY SAND with GRAVEL (SM)	27	NP	NP	NP
○ TP-4	0 - 0.5	CLAYEY SAND with GRAVEL (SC)	41	23	14	9
△ TP-6	0 - 1	SILTY, CLAYEY SAND with GRAVEL (SC-SM)	41	25	20	5
⊗ TP-8	0 - 1	CLAYEY GRAVEL with SAND (GC)	21	25	15	10
⊕ TP-10	0 - 1	CLAYEY SAND with GRAVEL (SC)	27	30	17	13
□ TP-12	0 - 1	CLAYEY SAND with GRAVEL (SC)	35	29	17	12
⊕ TP-13	0 - 1	SILTY SAND with GRAVEL (SM)	22	NP	NP	NP
⊕ TP-15	0 - 1	SANDY SILT (ML)	67	NP	NP	NP
★ TP-19	0 - 1	SILTY SAND with GRAVEL (SM)	23	NP	NP	NP
⊗ TP-20	0 - 1	SILTY SAND with GRAVEL (SM)	18	NP	NP	NP

Testing performed in general accordance with ASTM D4318.
NP = Nonplastic
NM = Not Measured



PROJECT NO.: 20191344
DRAWN BY: AB, MAP
CHECKED BY: MNM, JLS
DATE: 2/22/2019
REVISED: -

ATTERBERG LIMITS

Eagle Shadow Mountain Solar Project
Moapa River Indian Reservation, USA

FIGURE

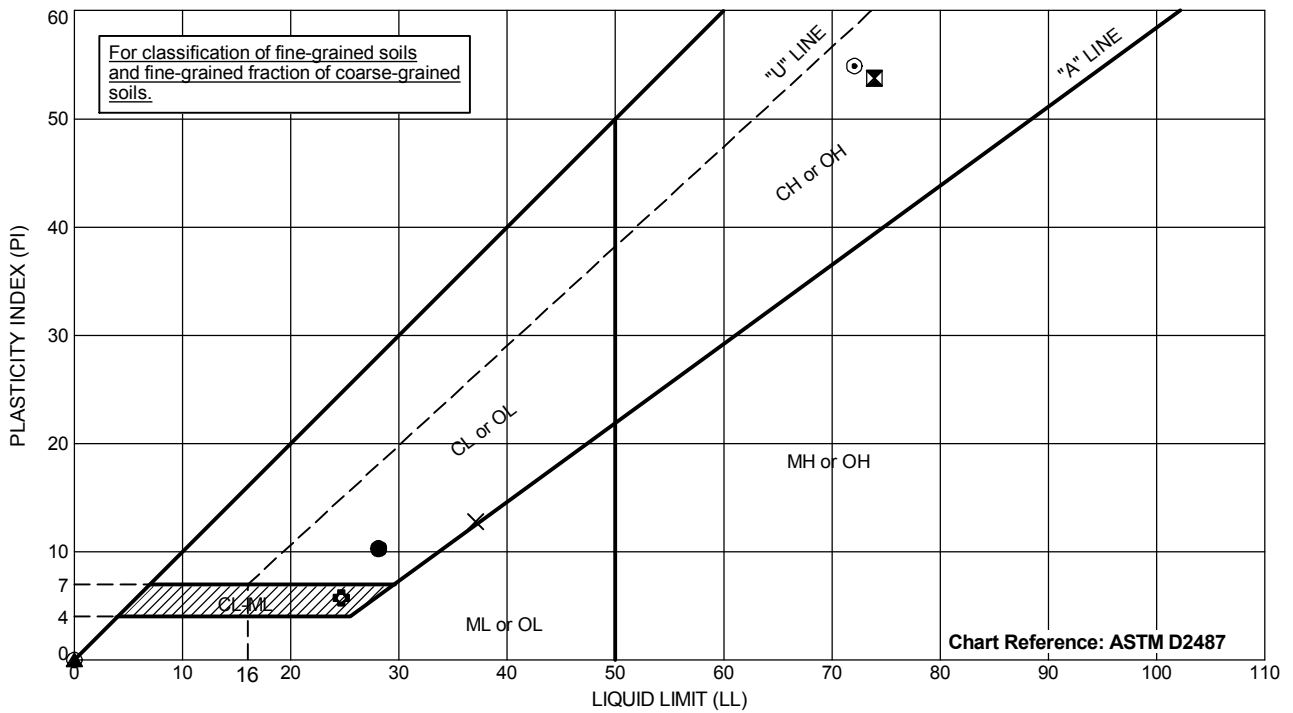
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OFFICE FILTER: LAS VEGAS

PROJECT NUMBER: 20191344.001A

PROJECT NUMBER: 20191344.001A
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Exploration ID	Depth (ft.)	Sample Description	Passing #200	LL	PL	PI
● TP-21	0 - 1	CLAYEY SAND with GRAVEL (SC)	23	28	18	10
☒ TP-21	4 - 8	FAT CLAY (CH)	96	74	20	54
▲ TP-23	0 - 1	SILTY SAND (SM)	33	NP	NP	NP
✕ TP-25	0 - 1	CLAYEY SAND with GRAVEL (SC)	21	37	24	13
⊙ TP-25	3 - 4	FAT CLAY (CH)	86	72	17	55
⊕ TP-26	0 - 1	SILTY, CLAYEY SAND with GRAVEL (SC-SM)	39	25	19	6
○ TP-28	0 - 1	SILTY GRAVEL with SAND (GM)	24	NP	NP	NP

Testing performed in general accordance with ASTM D4318.
 NP = Nonplastic
 NM = Not Measured

PROJECT NO.: 20191344

DRAWN BY: AB, MAP

CHECKED BY: MNM, JLS

DATE: 2/22/2019

REVISED: -

ATTERBERG LIMITS

Eagle Shadow Mountain Solar Project
 Moapa River Indian Reservation, USA

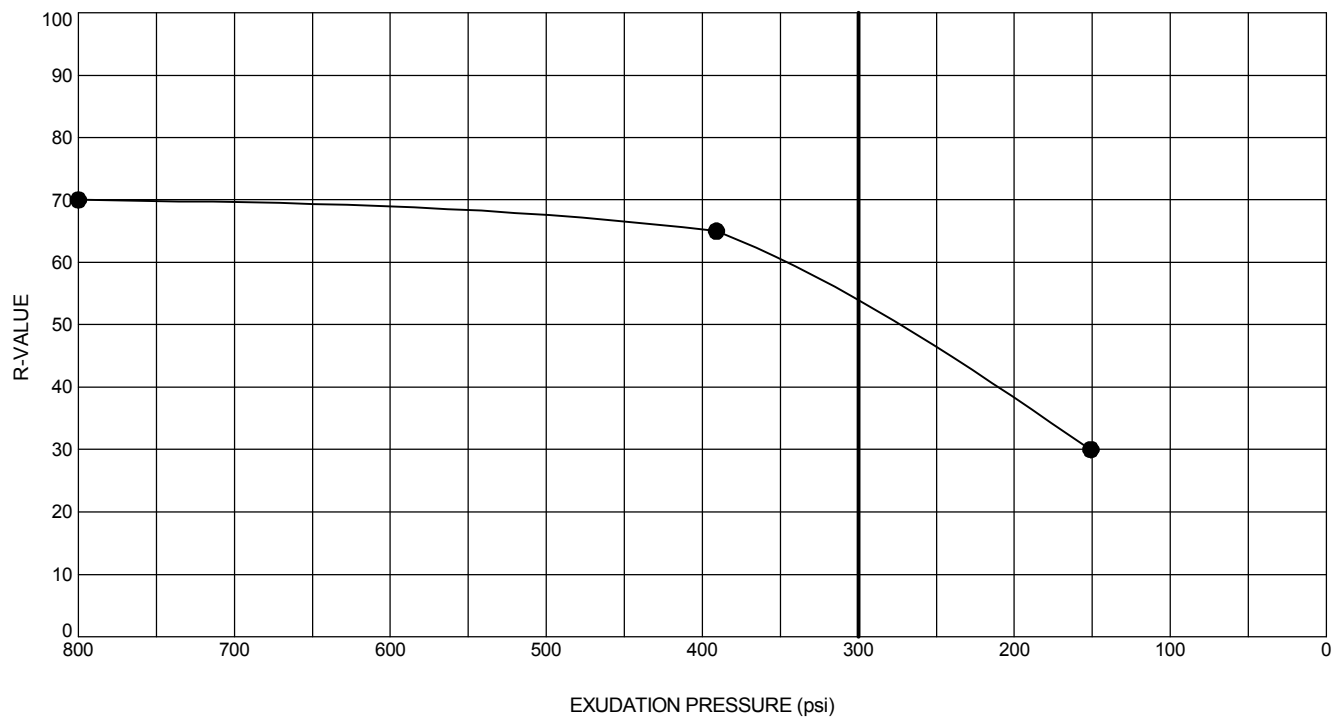
FIGURE

C-24

SBE 26-113 Pg 816

PLOTTED: 02/22/2019 12:16 PM BY: MPalmer

OFFICE FILTER: LAS VEGAS

PROJECT NUMBER: 20191344.001A
gint template: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_R-VALUE (REVERSED)]

Exploration ID	Depth (ft.)	Sample Description			R-Value @ 300 psi Exudation Pressure
TP-1	0 - 1	SILTY SAND with GRAVEL (SM)			52
Specimen No.	Moisture at Time of Test (%)	Dry Unit Weight (pcf)	Expansion Pressure (psi)	Exudation Pressure (psi)	Corrected Resistance Value
1	11.9	121.2	0	151	30
2	8.0	128.7	0	391	65
3	4.0	142.4	0	800	70

Testing performed in general accordance with ASTM D2844.



PROJECT NO.: 20191344
 DRAWN BY: AB, MAP
 CHECKED BY: MNM, JLS
 DATE: 2/22/2019
 REVISED: -

R-VALUE

Eagle Shadow Mountain Solar Project
 Moapa River Indian Reservation, USA

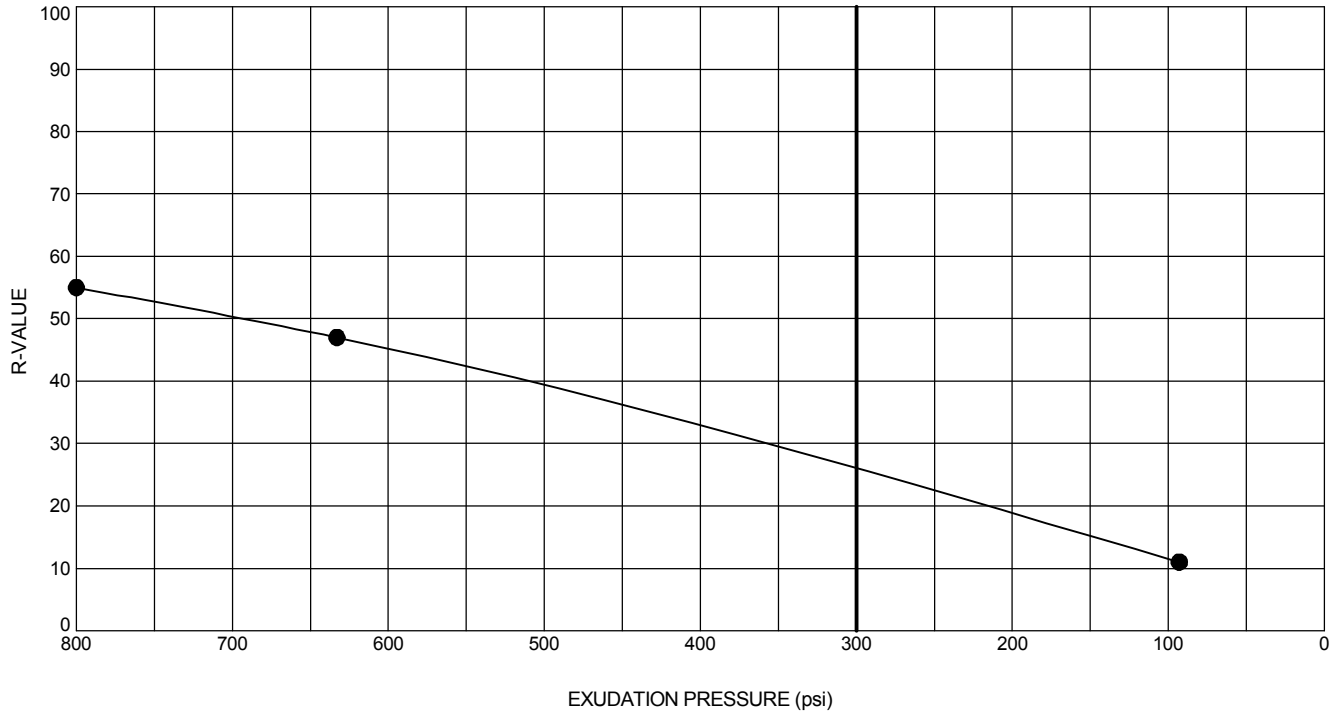
FIGURE

C-25

PLOTTED: 02/22/2019 12:16 PM BY: MPalmer

OFFICE FILTER: LAS VEGAS

PROJECT NUMBER: 20191344.001A
 GINT FILE: C:\users\mpalmer\desktop\20191344.gpi
 GINT TEMPLATE: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_R-VALUE (REVERSED)]



Exploration ID	Depth (ft.)	Sample Description			R-Value @ 300 psi Exudation Pressure
TP-12	0 - 1	CLAYEY SAND with GRAVEL (SC)			25
Specimen No.	Moisture at Time of Test (%)	Dry Unit Weight (pcf)	Expansion Pressure (psi)	Exudation Pressure (psi)	Corrected Resistance Value
1	11.0	120.0	0	633	47
2	8.0	128.3	0	800	55
3	13.9	113.9	0	93	11

Testing performed in general accordance with ASTM D2844.

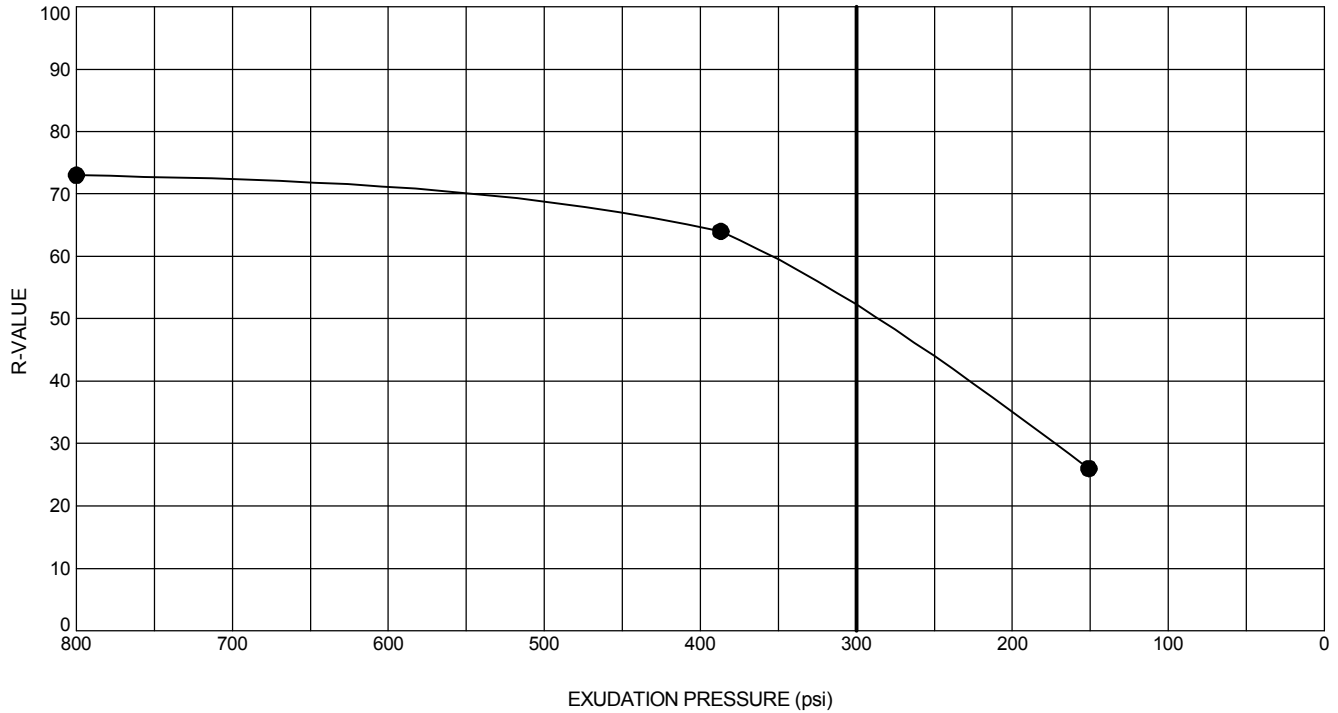
	PROJECT NO.: 20191344	R-VALUE Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA	FIGURE C-26
	DRAWN BY: AB, MAP CHECKED BY: MNM, JLS DATE: 2/22/2019 REVISED: -		

PLOTTED: 02/22/2019 12:16 PM BY: MPalmer

OFFICE FILTER: LAS VEGAS

PROJECT NUMBER: 20191344.001A

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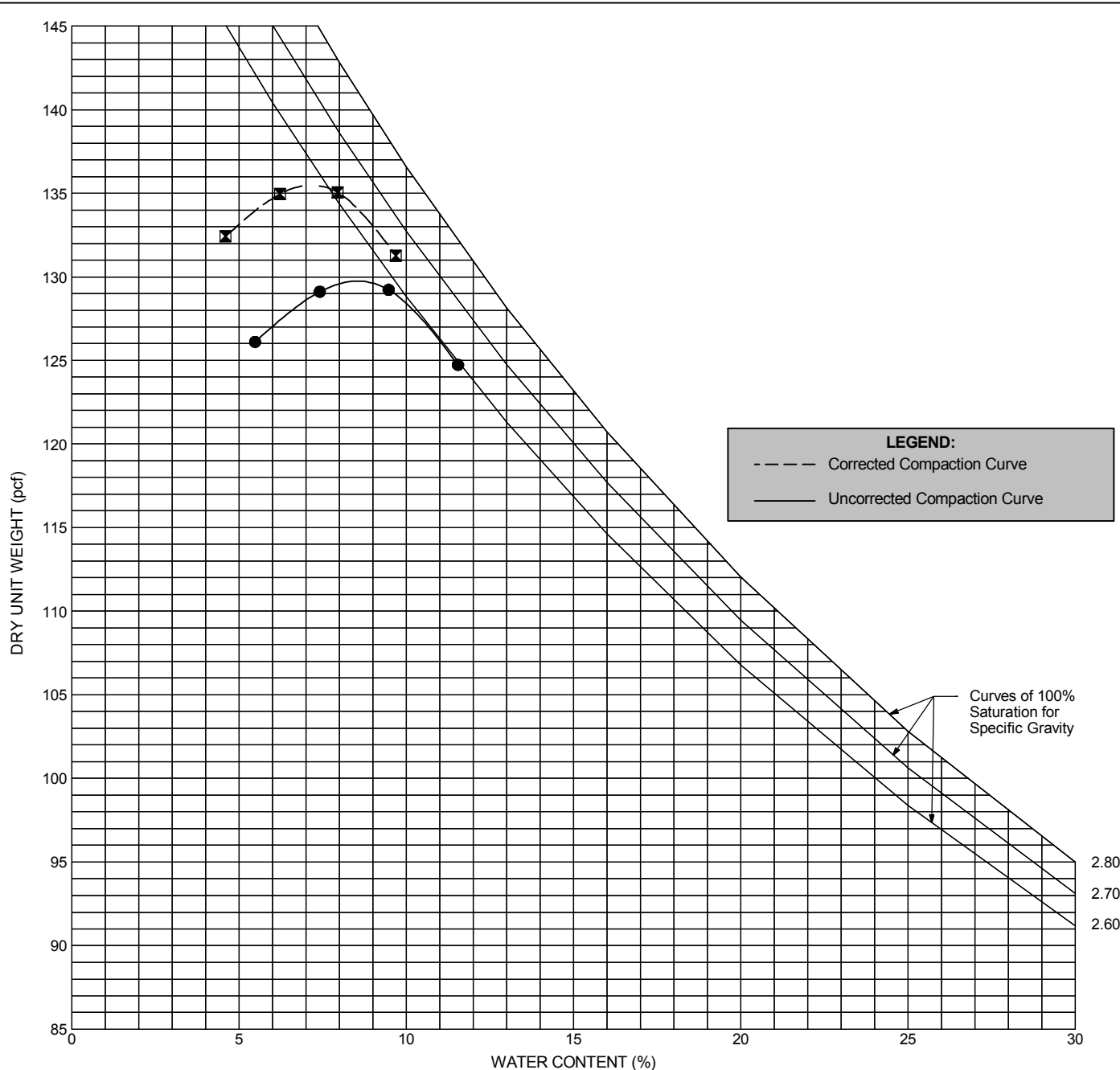


Exploration ID	Depth (ft.)	Sample Description			R-Value @ 300 psi Exudation Pressure
TP-15	0 - 1	SANDY SILT (ML)			50
Specimen No.	Moisture at Time of Test (%)	Dry Unit Weight (pcf)	Expansion Pressure (psi)	Exudation Pressure (psi)	Corrected Resistance Value
1	12.0	118.5	0	151	26
2	10.0	121.2	0	387	64
3	8.0	124.0	0	800	73

Testing performed in general accordance with ASTM D2844.

	PROJECT NO.: 20191344	R-VALUE Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA	FIGURE C-27
	DRAWN BY: AB, MAP CHECKED BY: MNM, JLS DATE: 2/22/2019 REVISED: -		

PLOTTED: 02/22/2019 01:17 PM BY: MPalmer



Exploration ID		Depth (ft.)		Sample Description			
● SA-4		0.5 - 5		CEMENTED SAND AND GRAVEL			
Passing 3/4"	Passing #4	Passing #200	LL	PL	PI	Uncorrected Max Dry Unit Wt. (pcf)	Uncorrected Opt. Water Content (%)
95	84	28	22	17	5	129.7	8.5
Exploration ID		Depth (ft.)		Fraction > #4 sieve (%)		Corrected Max Dry Unit Wt. (pcf)	Corrected Opt. Water Content (%)
☒ SA-4		0.5 - 5		16.1		136.6	6.6

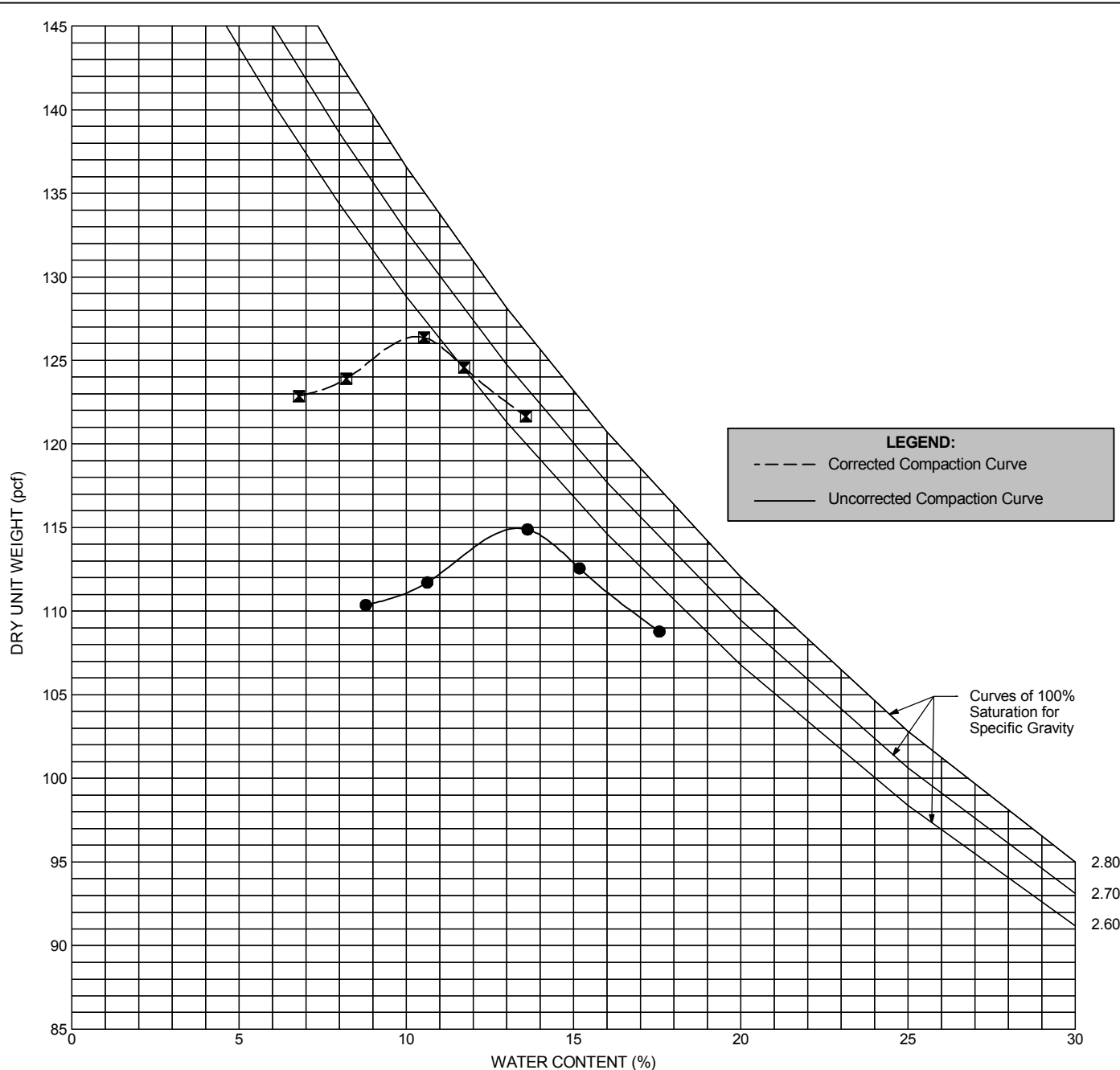
Testing performed in general accordance with ASTM D1557 Method A.
 Oversized correction method performed in general accordance with ASTM D4718.
 NP = Nonplastic
 NM = Not Measured

	PROJECT NO.: 20191344 DRAWN BY: AB, MAP CHECKED BY: JLS DATE: 2/22/2019 REVISED: -	COMPACTION CURVE Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA	FIGURE C-28
	SBE 26-113 Pg 820		

PROJECT NUMBER: 20191344.001A
 OFFICE FILTER: LAS VEGAS
 GINT FILE: KLF_gint_master_2017
 GINT TEMPLATE: E:KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_COMP CURVE (2.6 - 2.8 AV)RC]

PLOTTED: 02/22/2019 01:17 PM BY: MPalmer

PROJECT NUMBER: 20191344.001A
 OFFICE FILTER: LAS VEGAS
 GINT FILE: KLF_gint_master_2017
 GINT TEMPLATE: E:KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_COMP CURVE (2.6 - 2.8 AV)RC]

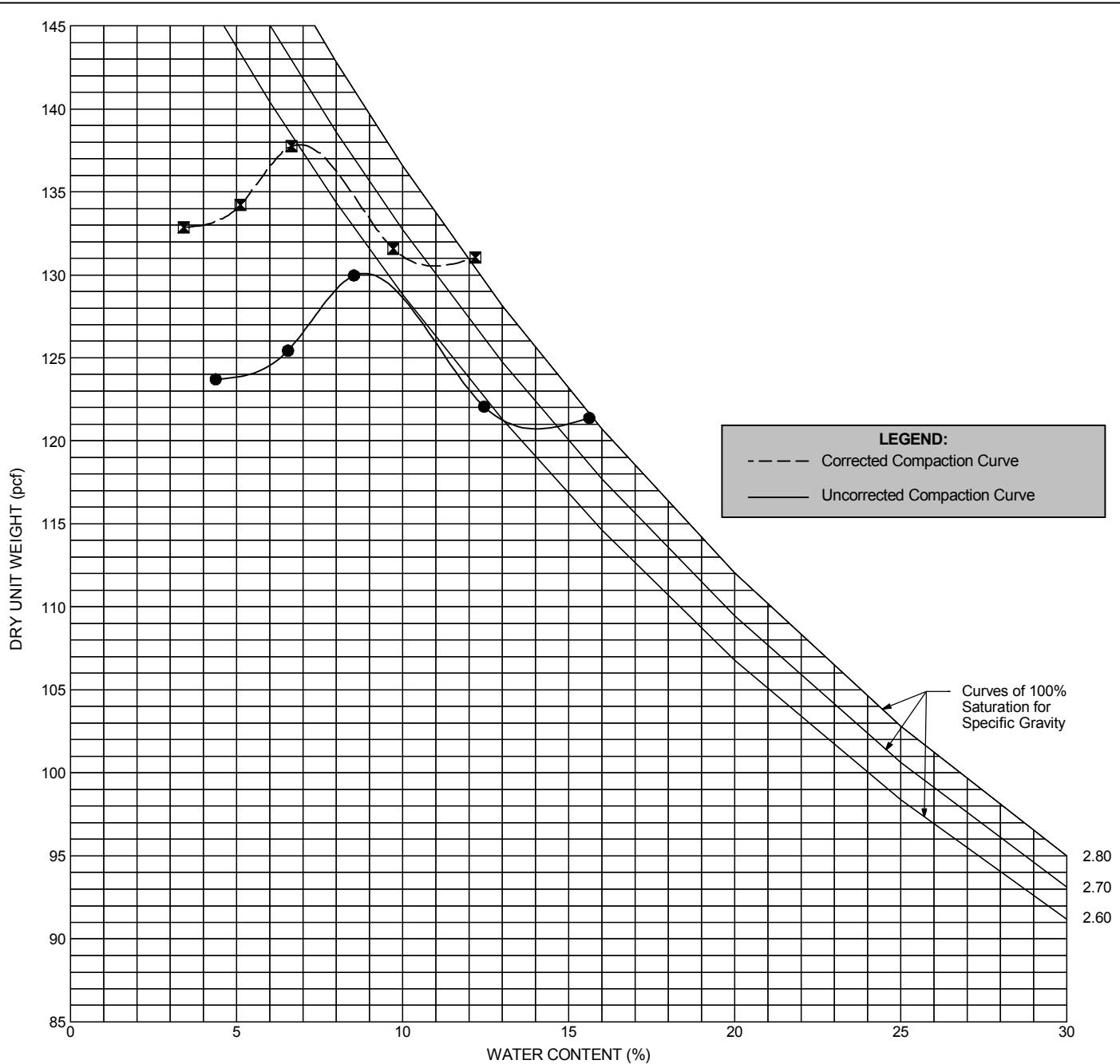


Exploration ID		Depth (ft.)		Sample Description			
●	SA-20	2.5 - 5		CLAYEY SAND with GRAVEL (SC)			
Passing 3/4"	Passing #4	Passing #200	LL	PL	PI	Uncorrected Max Dry Unit Wt. (pcf)	Uncorrected Opt. Water Content (%)
89	77	26	81	33	48	115.0	13.3
Exploration ID		Depth (ft.)		Fraction > #4 sieve (%)		Corrected Max Dry Unit Wt. (pcf)	Corrected Opt. Water Content (%)
■	SA-20	2.5 - 5		22.7		124.0	10.1

Testing performed in general accordance with ASTM D1557 Method A.
 Oversized correction method performed in general accordance with ASTM D4718.
 NP = Nonplastic
 NM = Not Measured

	PROJECT NO.: 20191344	COMPACTION CURVE Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA	FIGURE C-29
	DRAWN BY: JG, MAP CHECKED BY: JLS DATE: 2/22/2019 REVISED: -		

PLOTTED: 02/22/2019 01:17 PM BY: MPalmer



Exploration ID		Depth (ft.)		Sample Description			
●	SA-24	2.5 - 7.5		CEMENTED SAND AND GRAVEL			
Passing 3/4"	Passing #4	Passing #200	LL	PL	PI	Uncorrected Max Dry Unit Wt. (pcf)	Uncorrected Opt. Water Content (%)
98	78	23	28	22	6	130.1	8.9
Exploration ID		Depth (ft.)		Fraction > #4 sieve (%)	Corrected Max Dry Unit Wt. (pcf)		Corrected Opt. Water Content (%)
■	SA-24	2.5 - 7.5		21.9	136.7		6.7

Testing performed in general accordance with ASTM D1557 Method A.
 Oversized correction method performed in general accordance with ASTM D4718.
 NP = Nonplastic
 NM = Not Measured



PROJECT NO.: 20191344
 DRAWN BY: AB, MAP
 CHECKED BY: JLS
 DATE: 2/22/2019
 REVISED: -

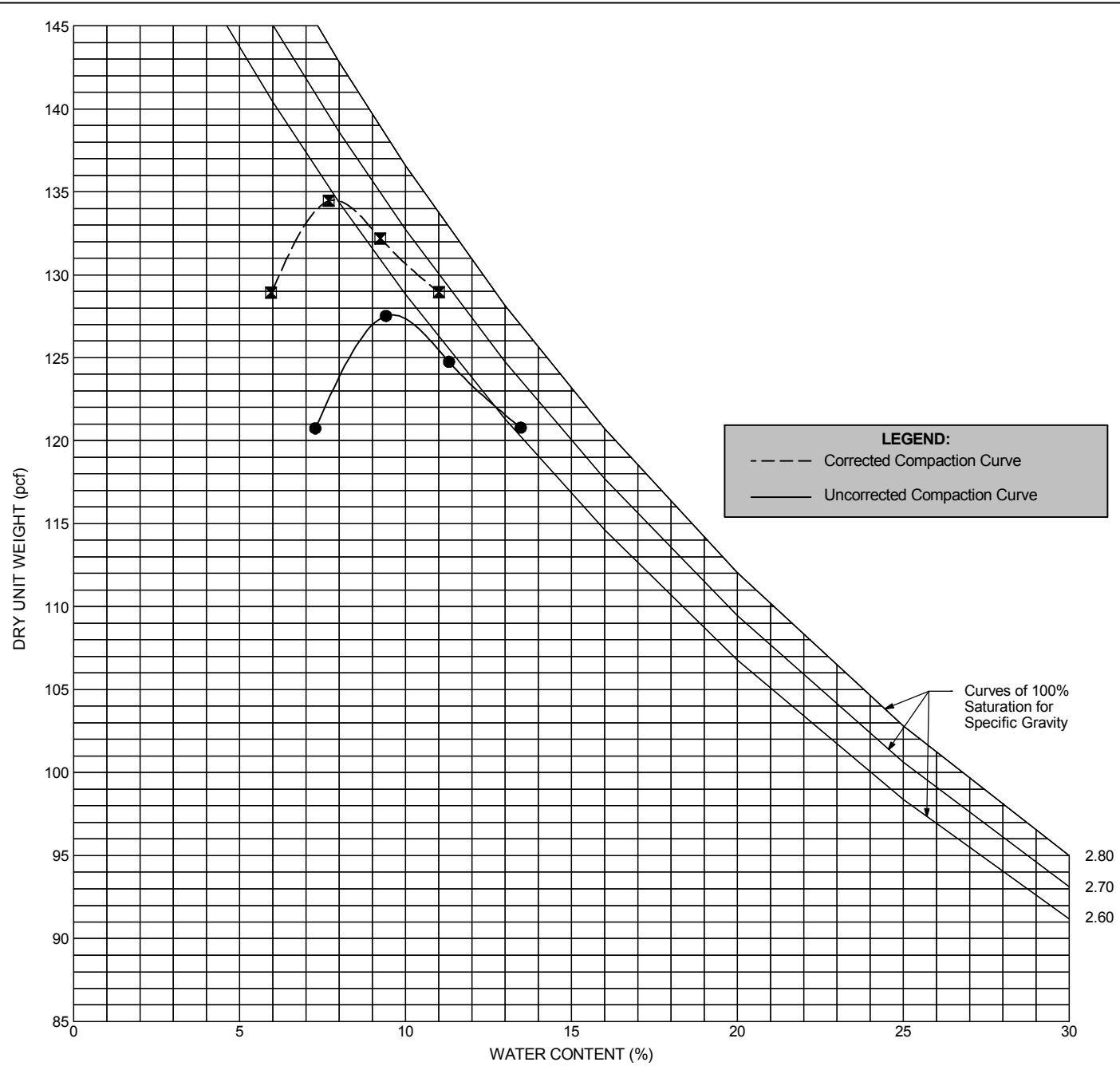
COMPACTION CURVE

Eagle Shadow Mountain Solar Project
 Moapa River Indian Reservation, USA

FIGURE
 C-30

PLOTTED: 02/22/2019 01:17 PM BY: MPalmer

PROJECT NUMBER: 20191344.001A
 OFFICE FILTER: LAS VEGAS
 GINT FILE: KLF_gint_master_2017
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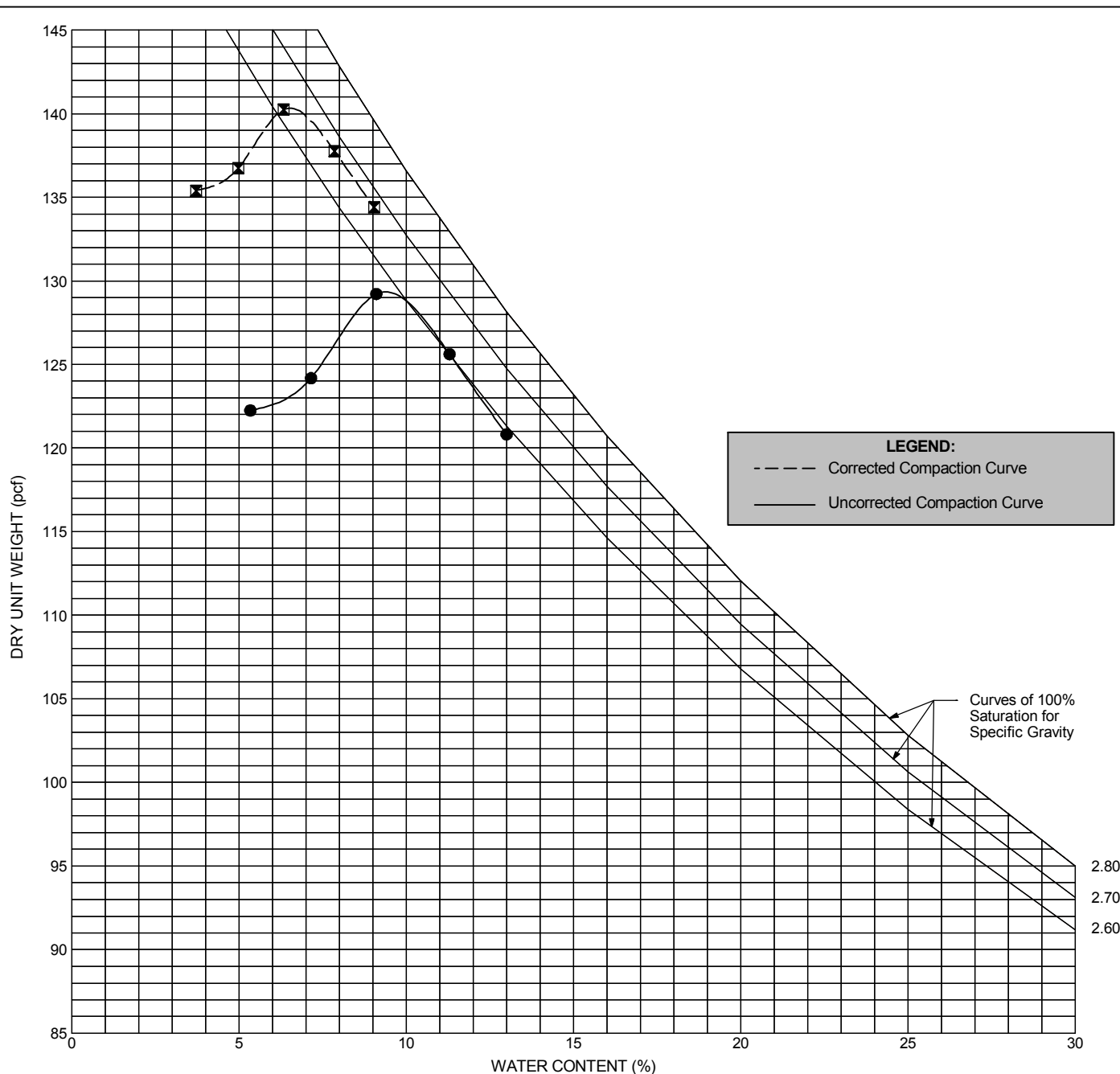


Exploration ID		Depth (ft.)		Sample Description			
●	SA-25	2.5 - 7.5		CEMENTED SAND AND GRAVEL			
Passing 3/4"	Passing #4	Passing #200	LL	PL	PI	Uncorrected Max Dry Unit Wt. (pcf)	Uncorrected Opt. Water Content (%)
100	82	25	29	20	9	127.6	9.6
Exploration ID		Depth (ft.)		Fraction > #4 sieve (%)		Corrected Max Dry Unit Wt. (pcf)	Corrected Opt. Water Content (%)
■	SA-25	2.5 - 7.5		18.3		133.4	7.8

Testing performed in general accordance with ASTM D1557 Method A.
 Oversized correction method performed in general accordance with ASTM D4718.
 NP = Nonplastic
 NM = Not Measured

	PROJECT NO.: 20191344 DRAWN BY: AB, MAP CHECKED BY: JLS DATE: 2/22/2019 REVISED: -	COMPACTION CURVE Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA	FIGURE C-31
	SBE 26-113 Pg 823		

PLOTTED: 02/22/2019 01:17 PM BY: MPalmer



Exploration ID		Depth (ft.)		Sample Description			
●	SA-27	2.5 - 7		CEMENTED SAND AND GRAVEL			
Passing 3/4"	Passing #4	Passing #200	LL	PL	PI	Uncorrected Max Dry Unit Wt. (pcf)	Uncorrected Opt. Water Content (%)
94	70	21	32	25	7	129.3	9.3
Exploration ID		Depth (ft.)		Fraction > #4 sieve (%)		Corrected Max Dry Unit Wt. (pcf)	Corrected Opt. Water Content (%)
☒	SA-27	2.5 - 7		30.5		138.5	6.6

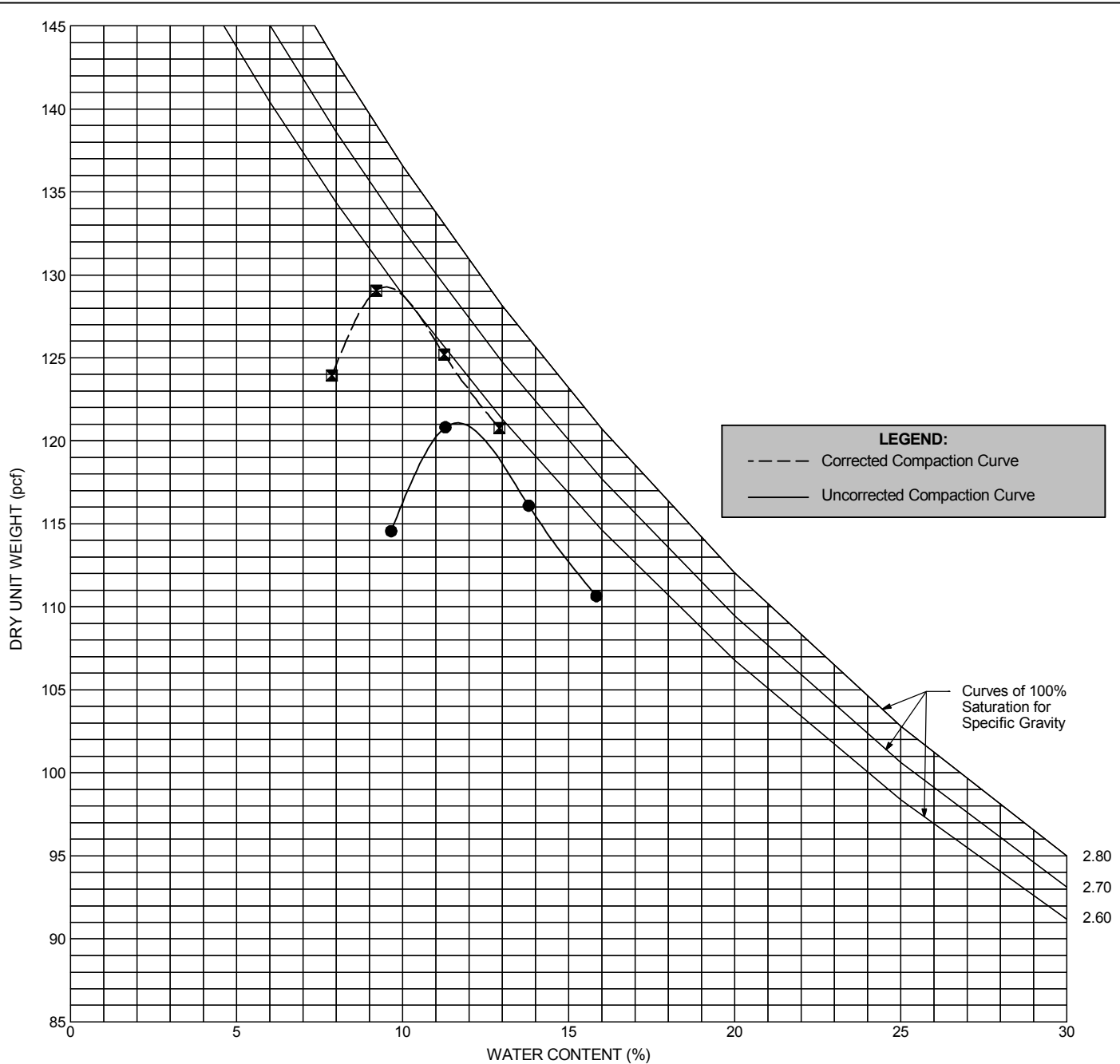
Testing performed in general accordance with ASTM D1557 Method B.
 Oversized correction method performed in general accordance with ASTM D4718.
 NP = Nonplastic
 NM = Not Measured

	PROJECT NO.: 20191344 DRAWN BY: AB, MAP CHECKED BY: JLS DATE: 2/22/2019 REVISED: -	COMPACTION CURVE Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA	FIGURE C-32
	SBE 26-113 Pg 824		

PROJECT NUMBER: 20191344.001A
 OFFICE FILTER: LAS VEGAS
 GINT TEMPLATE: E:KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_COMP CURVE (2.6 - 2.8 AV)RC]

GINT FILE: KLF_gint_master_2017

PLOTTED: 02/22/2019 01:17 PM BY: MPalmer



Exploration ID		Depth (ft.)		Sample Description			
●	TP-4	0 - 0.5		CLAYEY SAND with GRAVEL (SC)			
Passing 3/4"	Passing #4	Passing #200	LL	PL	PI	Uncorrected Max Dry Unit Wt. (pcf)	Uncorrected Opt. Water Content (%)
92	82	41	23	14	9	121.1	11.7
Exploration ID		Depth (ft.)		Fraction > #4 sieve (%)		Corrected Max Dry Unit Wt. (pcf)	Corrected Opt. Water Content (%)
■	TP-4	0 - 0.5		18.4		127.2	9.5

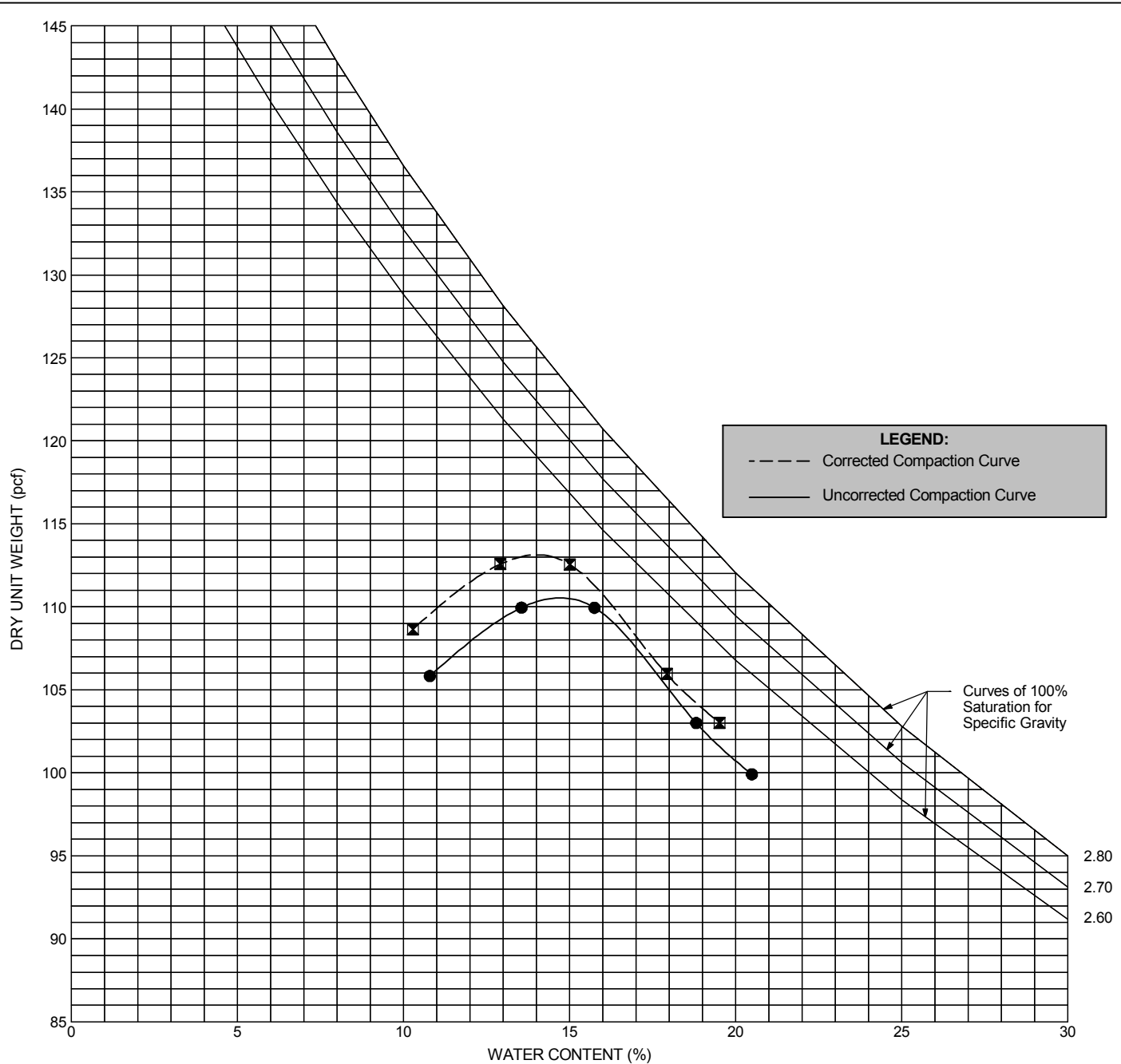
Testing performed in general accordance with ASTM D1557 Method A.
 Oversized correction method performed in general accordance with ASTM D4718.
 NP = Nonplastic
 NM = Not Measured

	PROJECT NO.: 20191344 DRAWN BY: AB, MAP CHECKED BY: MNM, JLS DATE: 2/22/2019 REVISED: -	COMPACTION CURVE Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA	FIGURE C-33
	SBE 26-113 Pg 825		

PROJECT NUMBER: 20191344.001A
 OFFICE FILTER: LAS VEGAS
 GINT FILE: KLF_gint_master_2017
 GINT TEMPLATE: E:KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_COMP CURVE (2.6 - 2.8 AV)RC]

PLOTTED: 02/22/2019 01:17 PM BY: MPalmer

PROJECT NUMBER: 20191344.001A
 OFFICE FILTER: LAS VEGAS
 GINT FILE: KLF_gint_master_2017
 GINT TEMPLATE: E:KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_COMP CURVE (2.6 - 2.8 AV)RC]



Exploration ID		Depth (ft.)		Sample Description			
● TP-15		0 - 1		SANDY SILT (ML)			
Passing 3/4"	Passing #4	Passing #200	LL	PL	PI	Uncorrected Max Dry Unit Wt. (pcf)	Uncorrected Opt. Water Content (%)
100	95	67	NP	NP	NP	110.5	14.7
Exploration ID		Depth (ft.)		Fraction > #4 sieve (%)		Corrected Max Dry Unit Wt. (pcf)	Corrected Opt. Water Content (%)
☒ TP-15		0 - 1		4.7		112.5	13.9

Testing performed in general accordance with ASTM D1557 Method A.
 Oversized correction method performed in general accordance with ASTM D4718.
 NP = Nonplastic
 NM = Not Measured

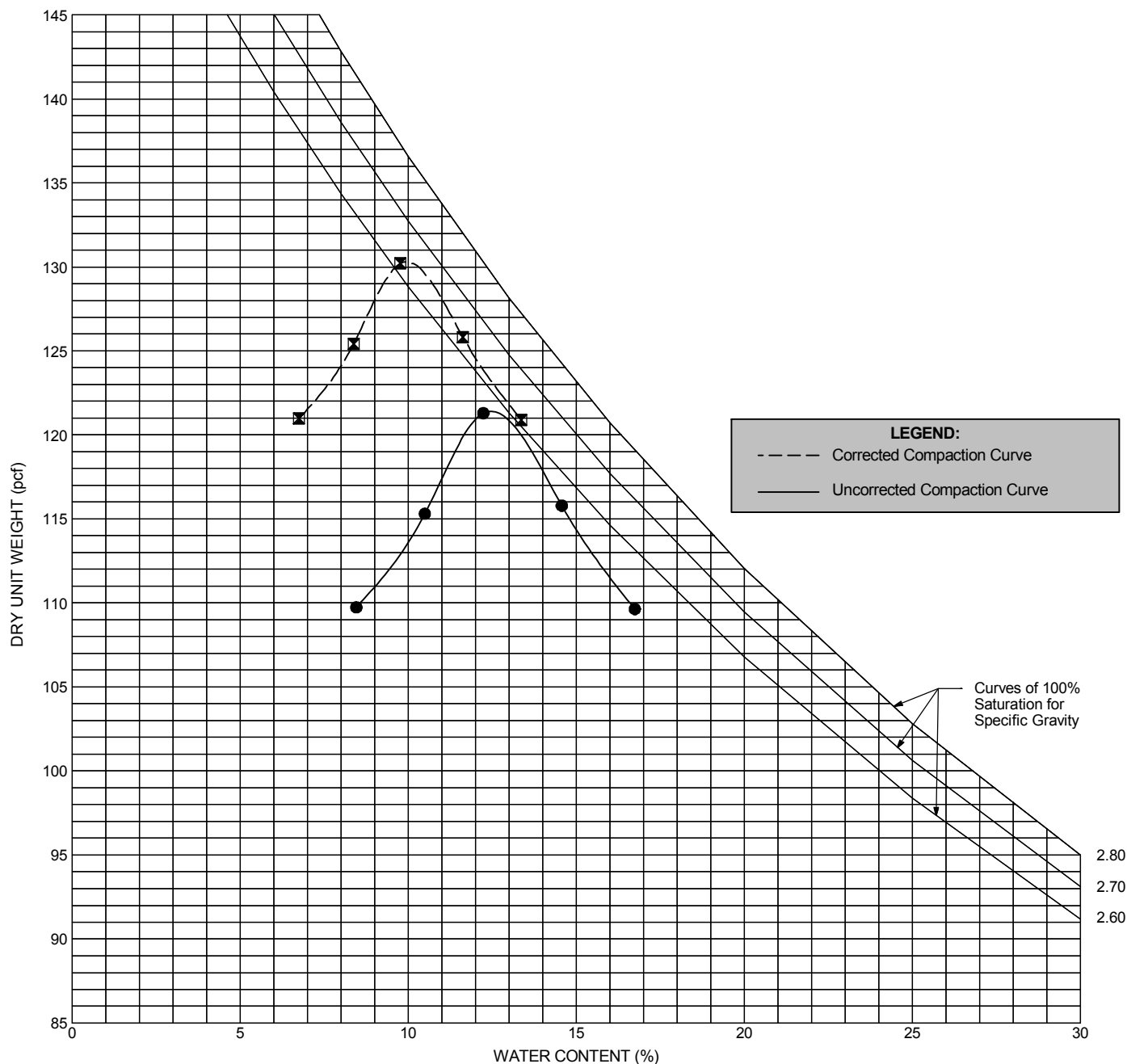
	PROJECT NO.: 20191344 DRAWN BY: AB, MAP CHECKED BY: MNM, JLS DATE: 2/22/2019 REVISED: -	COMPACTION CURVE Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA	FIGURE C-34
	SBE 26-113 Pg 826		

PLOTTED: 02/22/2019 01:17 PM BY: MPalmer

OFFICE FILTER: LAS VEGAS

PROJECT NUMBER: 20191344.001A
GINT LIBRARY: 2017.GLB [KLF_COMP CURVE (2.6 - 2.8 AV)RC]

GINT FILE: KLF_gint_master_2017
GINT TEMPLATE: E:KLF_STANDARD_GINT_LIBRARY_2017.GLB



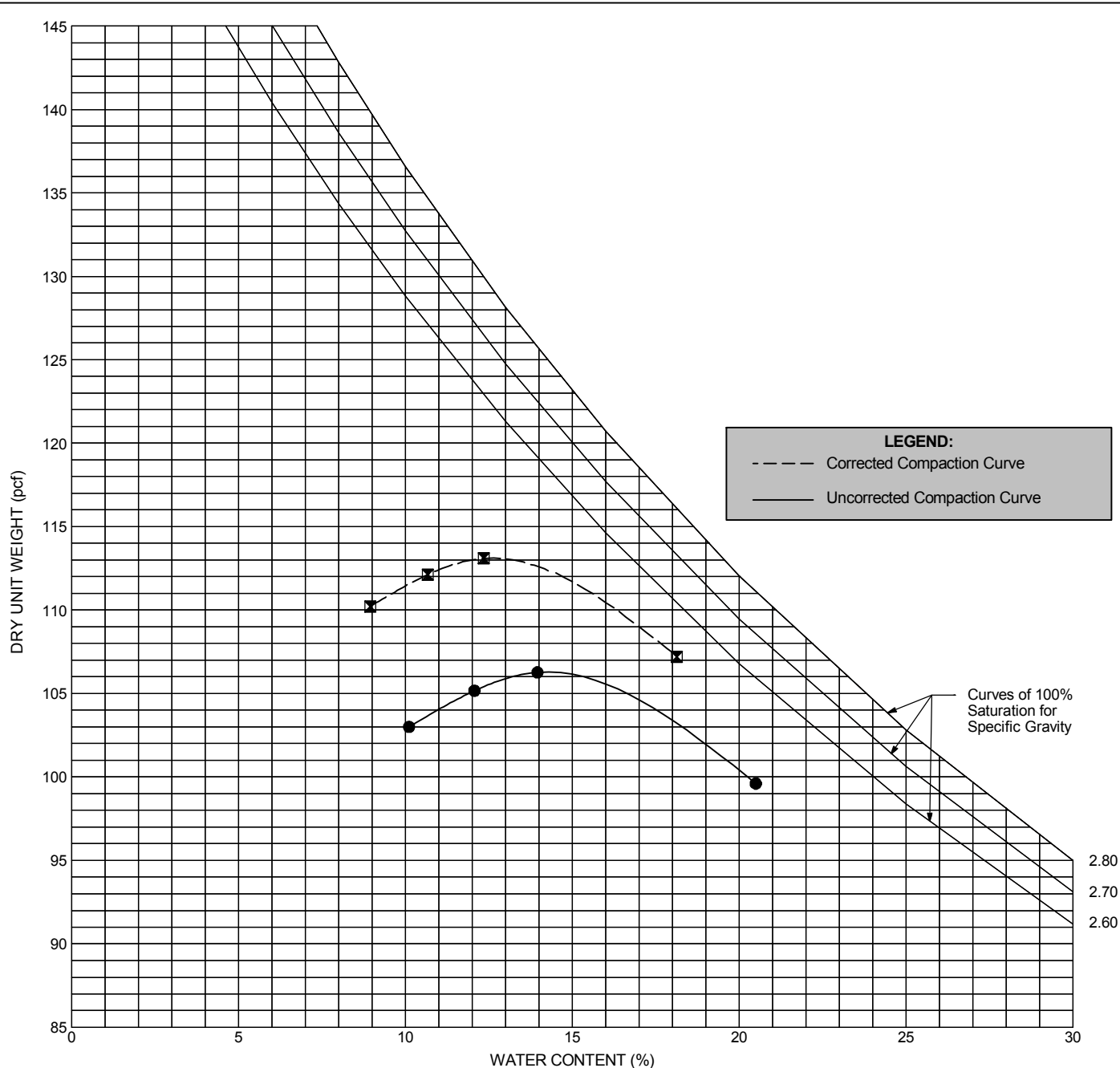
Exploration ID		Depth (ft.)		Sample Description			
● TP-19		0 - 1		SILTY SAND with GRAVEL (SM)			
Passing 3/4"	Passing #4	Passing #200	LL	PL	PI	Uncorrected Max Dry Unit Wt. (pcf)	Uncorrected Opt. Water Content (%)
93	80	23	NP	NP	NP	121.4	12.5
Exploration ID		Depth (ft.)		Fraction > #4 sieve (%)		Corrected Max Dry Unit Wt. (pcf)	Corrected Opt. Water Content (%)
☒ TP-19		0 - 1		20.2		128.3	10.1

Testing performed in general accordance with ASTM D1557 Method A.
Oversized correction method performed in general accordance with ASTM D4718.
NP = Nonplastic
NM = Not Measured

	PROJECT NO.: 20191344	COMPACTION CURVE Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA	FIGURE
	DRAWN BY: AB, MAP CHECKED BY: MNM, JLS DATE: 2/22/2019 REVISED: -		C-35

PLOTTED: 02/22/2019 01:17 PM BY: MPalmer

PROJECT NUMBER: 20191344.001A
 OFFICE FILTER: LAS VEGAS
 GINT FILE: KLF_gint_master_2017
 GINT TEMPLATE: E:KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_COMP CURVE (2.6 - 2.8 AV)RC]



Exploration ID		Depth (ft.)		Sample Description			
● TP-23		0 - 1		SILTY SAND (SM)			
Passing 3/4"	Passing #4	Passing #200	LL	PL	PI	Uncorrected Max Dry Unit Wt. (pcf)	Uncorrected Opt. Water Content (%)
96	88	33	NP	NP	NP	106.3	14.3
Exploration ID		Depth (ft.)		Fraction > #4 sieve (%)		Corrected Max Dry Unit Wt. (pcf)	Corrected Opt. Water Content (%)
☒ TP-23		0 - 1		11.5		111.1	12.9

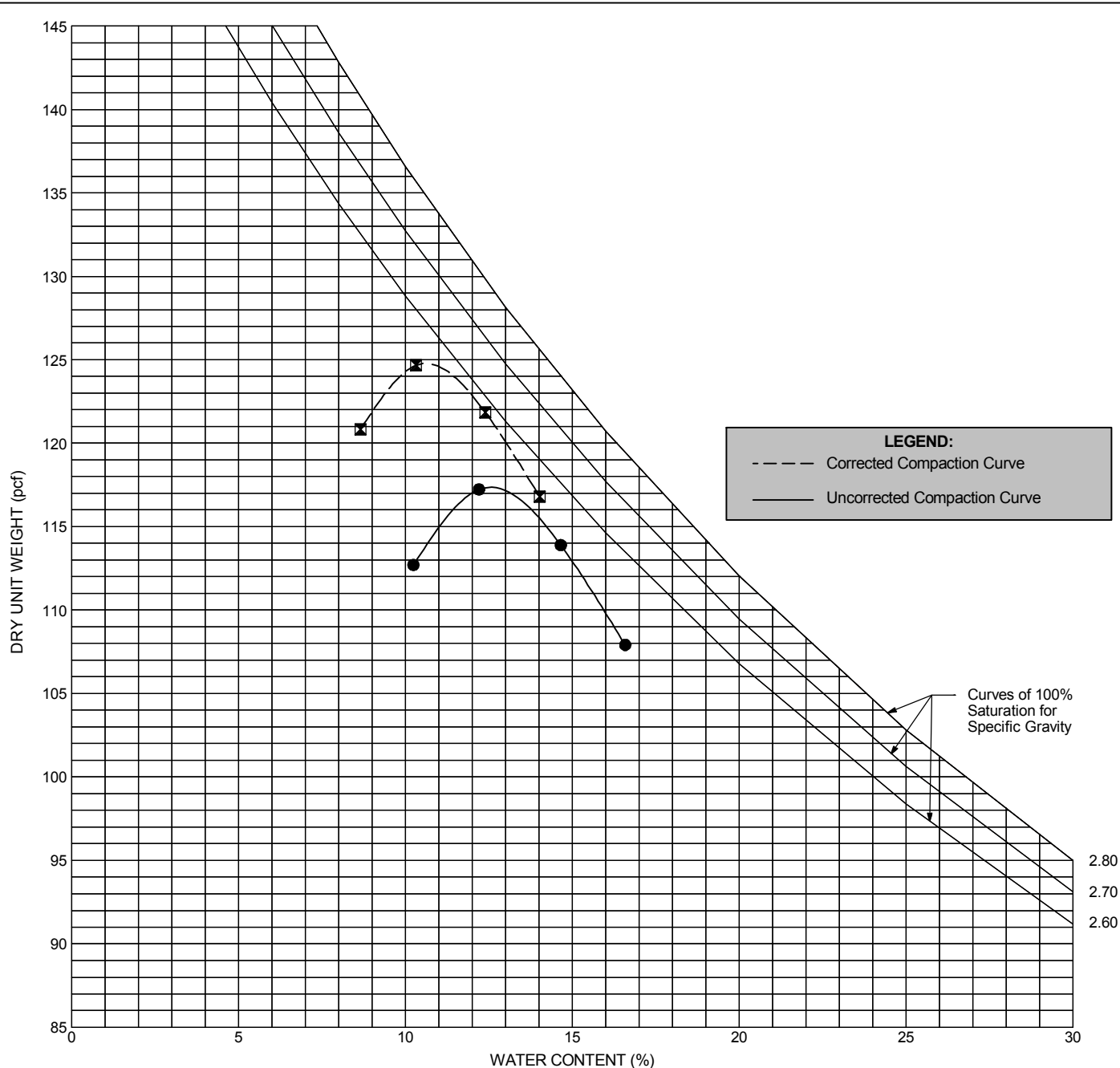
Testing performed in general accordance with ASTM D1557 Method A.
 Oversized correction method performed in general accordance with ASTM D4718.
 NP = Nonplastic
 NM = Not Measured

	PROJECT NO.: 20191344 DRAWN BY: AB, MAP CHECKED BY: MNM, JLS DATE: 2/22/2019 REVISED: -	COMPACTION CURVE Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA	FIGURE C-36
	SBE 26-113 Pg 828		

PLOTTED: 02/22/2019 01:18 PM BY: MPalmer

OFFICE FILTER: LAS VEGAS

PROJECT NUMBER: 20191344.001A
GINT FILE: KLF_gint_master_2017
GINT TEMPLATE: E:KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_COMP CURVE (2.6 - 2.8 AV)RC]



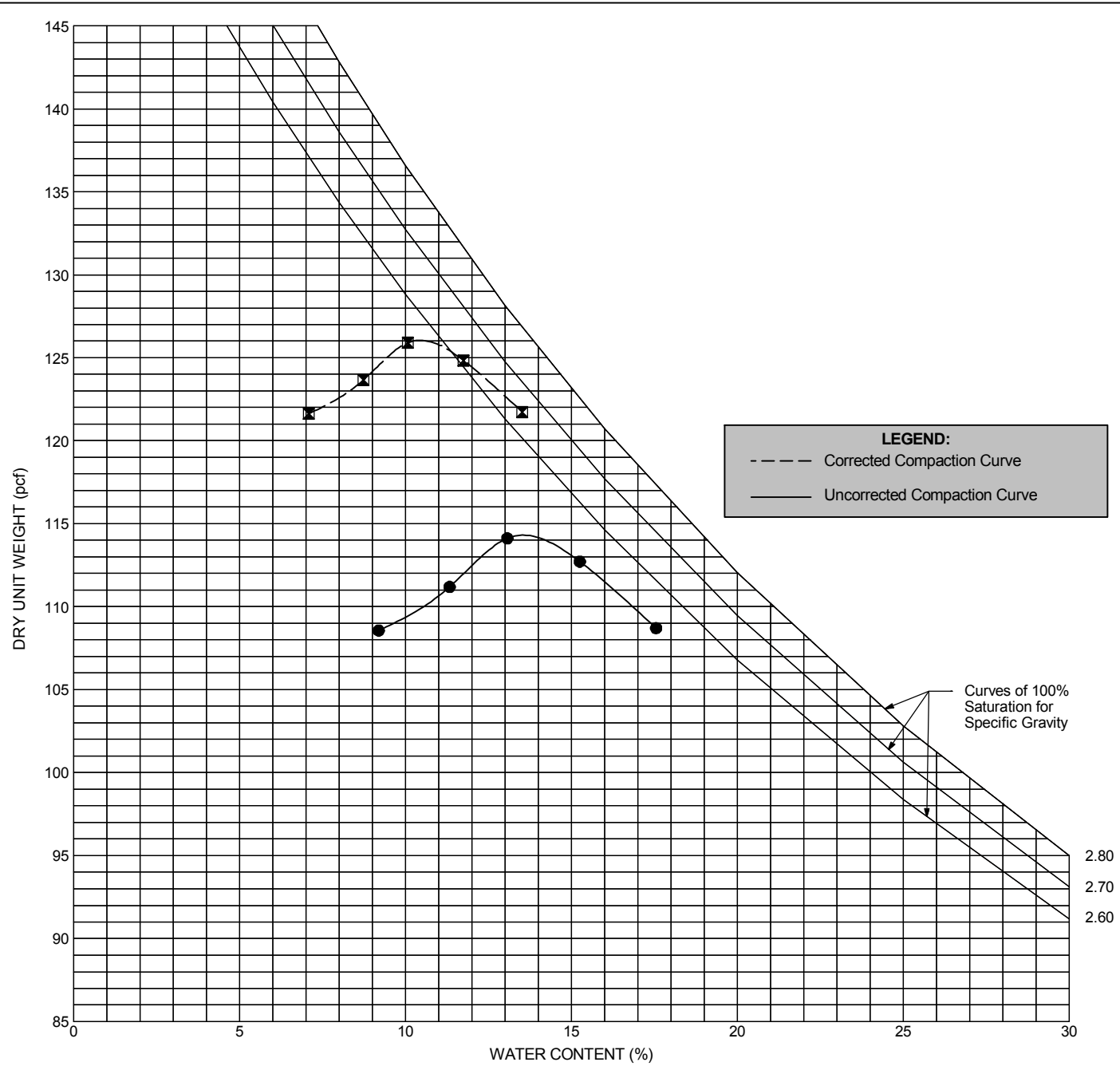
Exploration ID		Depth (ft.)		Sample Description			
● TP-26		0 - 1		SILTY, CLAYEY SAND with GRAVEL (SC-SM)			
Passing 3/4"	Passing #4	Passing #200	LL	PL	PI	Uncorrected Max Dry Unit Wt. (pcf)	Uncorrected Opt. Water Content (%)
92	85	39	25	19	6	117.4	12.6
Exploration ID		Depth (ft.)		Fraction > #4 sieve (%)		Corrected Max Dry Unit Wt. (pcf)	Corrected Opt. Water Content (%)
☒ TP-26		0 - 1		15.4		122.7	10.8

Testing performed in general accordance with ASTM D1557 Method A.
Oversized correction method performed in general accordance with ASTM D4718.
NP = Nonplastic
NM = Not Measured

	PROJECT NO.: 20191344	COMPACTION CURVE Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA	FIGURE C-37
	DRAWN BY: AB, MAP CHECKED BY: MNM, JLS DATE: 2/22/2019 REVISED: -		

PLOTTED: 02/22/2019 01:18 PM BY: MPalmer

PROJECT NUMBER: 20191344.001A
 OFFICE FILTER: LAS VEGAS
 GINT FILE: KLF_gint_master_2017
 GINT TEMPLATE: E:KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_COMP CURVE (2.6 - 2.8 AV)RC]



Exploration ID		Depth (ft.)		Sample Description			
● TP-28		0 - 1		SILTY GRAVEL with SAND (GM)			
Passing 3/4"	Passing #4	Passing #200	LL	PL	PI	Uncorrected Max Dry Unit Wt. (pcf)	Uncorrected Opt. Water Content (%)
77	59	24	NP	NP	NP	114.3	13.5
Exploration ID		Depth (ft.)		Fraction > 3/4" sieve (%)		Corrected Max Dry Unit Wt. (pcf)	Corrected Opt. Water Content (%)
☒ TP-28		0 - 1		23.0		123.1	10.6

Testing performed in general accordance with ASTM D1557 Method C.
 Oversized correction method performed in general accordance with ASTM D4718.
 NP = Nonplastic
 NM = Not Measured

	PROJECT NO.: 20191344 DRAWN BY: AB, MAP CHECKED BY: MNM, JLS DATE: 2/22/2019 REVISED: -	COMPACTION CURVE Eagle Shadow Mountain Solar Project Moapa River Indian Reservation, USA	FIGURE C-38
	SBE 26-113 Pg 830		



Appendix D



APPENDIX D

Thermal Resistivity Results (4 pages)



4370 Contractors Common
Livermore, CA 94551
Tel: 925-999-9232
Fax: 925-999-8837
info@geothermusa.com

February 7, 2019

Kleinfelder

6280 South Valley View Blvd, Suite 500
Las Vegas, NV 89118

Attn: Marc Moncilovich, PG

**Re: Thermal Analysis of Native Soil Samples
Eagle Shadow Mountain Solar, Moapa Indian Reservation, Clark County, NV**

The following are the results of thermal dryout tests conducted on ten (10) bulk samples of native soil from the referenced project received at our laboratory.

Thermal Dryout Tests: Per your request, the samples were tested at the 'optimum' moisture content and 85% of the density provided by Kleinfelder. The tests were conducted in accordance with the IEEE standard 442-2017. The results are tabulated below and the thermal dryout curves are presented in **Figures 1 and 2**.

Sample ID, , Soil Description, Thermal Resistivity, Moisture and Dry Density

Sample ID	Description (Kleinfelder)	Thermal Resistivity (°C-cm/W)		Moisture Content (%)	Dry Density (lb/ft³)
		Wet	Dry		
TP-4 @ 0'-0.5'	Clayey sand w/ gravel	84	180	10	108
TP-15 @ 0'-1'	Sandy silt	70	259	14	95
TP-19 @ 0'-1'	Silty sand w/ gravel	52	199	10	109
TP-23 @ 0'-1'	Silty sand	64	231	13	94
TP-26 @ 0'-1'	Silty, clayey sand w/ gravel	61	197	11	104
SA-4 @ 0.5'-5'	Poorly Graded Sand w/ Gravel	62	133	7	116
SA-20 @ 2.5'-5'	Silty sand	83	203	10	105
SA-24 @ 2.5'-7.5'	Silty, clayey sand w/ gravel	62	141	7	116
SA-25 @ 2.5'-7.5'	Clayey sand w/ gravel	67	147	8	113
SA-27 @ 2.5'-5'	Silty sand w/ gravel	58	125	8	114

COOL SOLUTIONS FOR UNDERGROUND POWER CABLES
THERMAL SURVEYS, CORRECTIVE BACKFILLS & INSTRUMENTATION



Comments: The thermal characteristics depicted in the dryout curves apply for the samples at their respective test dry density.

Please contact us if you have any questions or if we can be of further assistance.

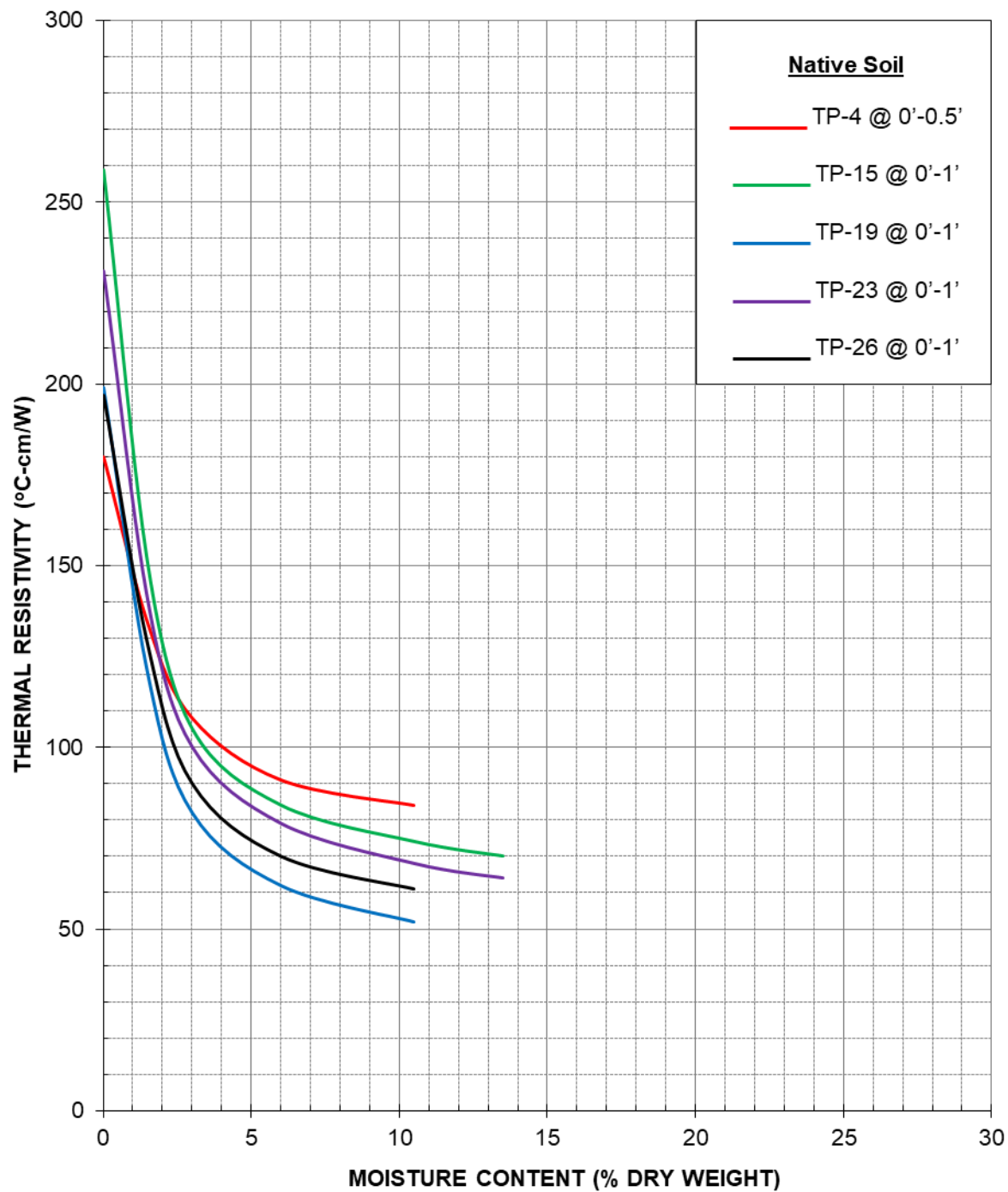
Geotherm USA

A handwritten signature in black ink, appearing to read "Deepak Parmar", is positioned above the printed name.

Deepak Parmar



THERMAL DRYOUT CURVES



Kleinfelder

Thermal Analysis of Native Soils

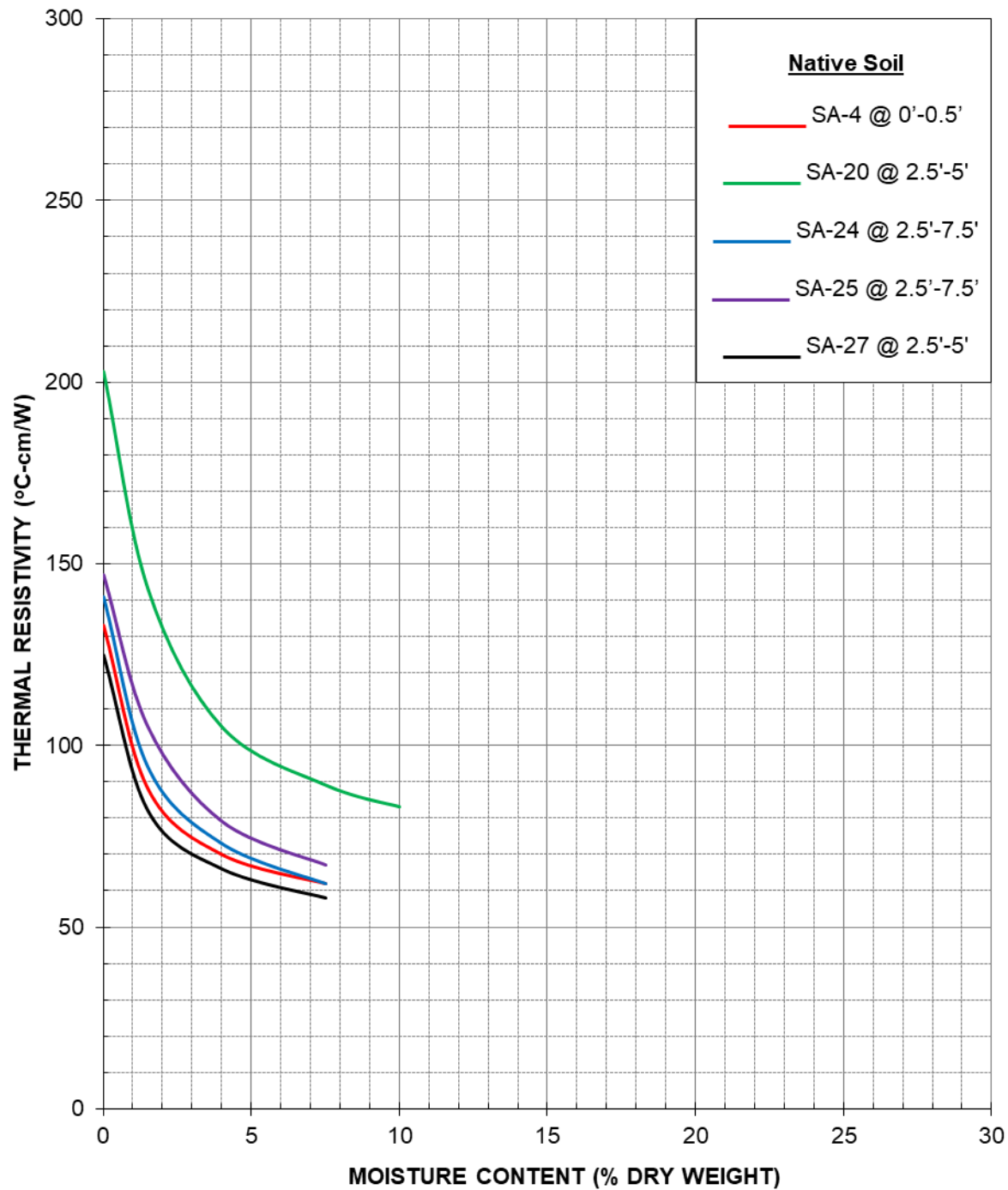
Eagle Shadow Mountain Solar, Moapa Indian Reservation, Clark County, NV

February 2019

Figure 1



THERMAL DRYOUT CURVES



Kleinfelder

Thermal Analysis of Native Soils

Eagle Shadow Mountain Solar, Moapa Indian Reservation, Clark County, NV

February 2019

Figure 2



Appendix E



APPENDIX E

Soil Chemical Test Results (48 pages)



6245 Harrison Drive, Suite 4, Las Vegas, NV 89120

(702) 321-8315 Phone

(702) 597-2098 Fax

Email: veritaslabs@msn.com

CLIENT NAME: Kleinfelder
6280 S. Valley View Blvd., Ste. 500
Las Vegas, NV 89118

PROJECT MGR: Kris Ross

CLIENT PROJECT NAME: **Eagle Shadow Mountain**
CLIENT PROJECT NUMBER: 20191344
VERITAS LAB ORDER ID: V19A084
DATE RECEIVED AT LAB: Jan-23-2019 14:20

Presented herein are the analytical results for samples received from the above referenced project.

Samples submitted for this project were not sampled by Veritas Laboratories. Unless otherwise noted, samples were received by Veritas Laboratories with proper and complete documentation.

Veritas Laboratories is approved by the Clark County Department of Building as a Quality Assurance Agency (QAA) for inspection and testing services, Category G-CT.

Submitted soil samples for this project were extracted for solubility parameters in a 1:5 (soil to water) ratio and the results corrected for this dilution.

Should you have any questions or comments regarding this report or if we can be of further service to you, please do not hesitate to contact me at (702) 321-8315.

Sincerely,

Bruce G. Cunningham
Laboratory Director
Veritas Laboratories
Nevada Lab Certification ID NV00918

1/31/19

Date



6245 Harrison Drive, Suite 4, Las Vegas, NV 89120

(702) 321-8315 Phone

(702) 597-2098 Fax

Email: veritaslabs@msn.com

CLIENT COMPANY NAME: Kleinfelder
 CLIENT PROJECT NAME: **Eagle Shadow Mountain**
 CLIENT PROJECT NUMBER: 20191344
 VERITAS LAB ORDER ID: V19A084

SAMPLE SUMMARY

CLIENT SAMPLE ID	VERITAS SAMPLE ID	MATRIX	DATE/TIME COLLECTED	DATE/TIME RECEIVED
SA-4 @ 0.5-5'	V19A084-01	Soil		1/23/19 14:20
SA-20 @ 2.5-3.0'	V19A084-02	Soil		1/23/19 14:20
SA-21 @ 5'	V19A084-03	Soil		1/23/19 14:20
SA-24 @ 2.5-7.5'	V19A084-04	Soil		1/23/19 14:20
SA-25 @ 2.5-7.5'	V19A084-05	Soil		1/23/19 14:20
SA-27 @ 2.5-7.0'	V19A084-06	Soil		1/23/19 14:20
SA-27 @ 15' SPT	V19A084-07	Soil		1/23/19 14:20
TP 1 : 0-1'	V19A084-08	Soil		1/23/19 14:20
TP 4: 0-0.5'	V19A084-09	Soil		1/23/19 14:20
TP 6 : 0-1'	V19A084-10	Soil		1/23/19 14:20
TP 8 : 0-1'	V19A084-11	Soil		1/23/19 14:20
TP 10 : 0-1'	V19A084-12	Soil		1/23/19 14:20
TP 12 : 0-1'	V19A084-13	Soil		1/23/19 14:20
TP 13 : 0-1'	V19A084-14	Soil		1/23/19 14:20
TP 15 : 0-1'	V19A084-15	Soil		1/23/19 14:20
TP 19 : 0-1'	V19A084-16	Soil		1/23/19 14:20
TP 20 : 0-1'	V19A084-17	Soil		1/23/19 14:20
TP 21 : 0-1'	V19A084-18	Soil		1/23/19 14:20
TP 21 : 4-8'	V19A084-19	Soil		1/23/19 14:20
TP 23 : 0-1'	V19A084-20	Soil		1/23/19 14:20
TP 25 : 0-1'	V19A084-21	Soil		1/23/19 14:20
TP 26 : 0-1'	V19A084-22	Soil		1/23/19 14:20
TP 28 : 0-1'	V19A084-23	Soil		1/23/19 14:20



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CLIENT COMPANY NAME: Kleinfelder
 CLIENT PROJECT NAME: **Eagle Shadow Mountain**
 CLIENT PROJECT NUMBER: 20191344
 VERITAS LAB ORDER ID: V19A084

ANALYTICAL RESULTS

CLIENT SAMPLE ID: **SA-4 @ 0.5-5'** DATE/TIME SAMPLED: 1/23/19 0:00
 VERITAS SAMPLE ID: V19A084-01 DATE/TIME RECEIVED: 1/23/19 14:20

Matrix: Soil

Analysis: Soil Solubility/Corrosion Parameters

PARAMETER	RESULT	UNITS	METHOD	DATE ANALYZED
pH	8.88	pH Units	EPA 9045 D	1/25/19
Redox Potential (ORP)	197	mV	SM 2580B	1/28/19
Resistivity (as Received)	49000	Ohm-cm	ASTM G57	1/25/19
Resistivity (Saturated)	4100	Ohm-cm	ASTM G57	1/30/19
Water Soluble Sodium	0.0023	%	EPA 6010B	1/29/19
Water Soluble Sulfate	0.0090	%	SM 4500-SO4 E	1/29/19
Soluble Sulfide	1.6	mg/Kg	SM 4500-S2-D	1/30/19
Total Available Water Soluble Sodium Sulfate	0.0072	%	Calculation	1/29/19
Total Soluble Salts (Solubility)	0.010	%	SM 2540C	1/29/19
Water Soluble Chloride	25	mg/Kg	SM 4500-Cl B	1/29/19



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 CLIENT PROJECT NUMBER: 20191344
 VERITAS LAB ORDER ID: V19A084

ANALYTICAL RESULTS

CLIENT SAMPLE ID: **SA-20 @ 2.5-3.0'** DATE/TIME SAMPLED: 1/23/19 0:00
 VERITAS SAMPLE ID: V19A084-02 DATE/TIME RECEIVED: 1/23/19 14:20

Matrix: Soil

Analysis: Soil Solubility/Corrosion Parameters

PARAMETER	RESULT	UNITS	METHOD	DATE ANALYZED
pH	8.48	pH Units	EPA 9045 D	1/25/19
Redox Potential (ORP)	201	mV	SM 2580B	1/28/19
Resistivity (as Received)	8000	Ohm-cm	ASTM G57	1/25/19
Resistivity (Saturated)	745	Ohm-cm	ASTM G57	1/30/19
Water Soluble Sodium	0.021	%	EPA 6010B	1/29/19
Water Soluble Sulfate	0.060	%	SM 4500-SO4 E	1/29/19
Soluble Sulfide	<0.50	mg/Kg	SM 4500-S2-D	1/30/19
Total Available Water Soluble Sodium Sulfate	0.065	%	Calculation	1/29/19
Total Soluble Salts (Solubility)	0.032	%	SM 2540C	1/29/19
Water Soluble Chloride	180	mg/Kg	SM 4500-Cl B	1/29/19



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 CLIENT PROJECT NUMBER: 20191344
 VERITAS LAB ORDER ID: V19A084

ANALYTICAL RESULTS

CLIENT SAMPLE ID: **SA-21 @ 5'** DATE/TIME SAMPLED: 1/23/19 0:00
 VERITAS SAMPLE ID: V19A084-03 DATE/TIME RECEIVED: 1/23/19 14:20

Matrix: Soil

Analysis: Soil Solubility/Corrosion Parameters

PARAMETER	RESULT	UNITS	METHOD	DATE ANALYZED
pH	8.75	pH Units	EPA 9045 D	1/25/19
Redox Potential (ORP)	231	mV	SM 2580B	1/28/19
Resistivity (as Received)	12500	Ohm-cm	ASTM G57	1/25/19
Resistivity (Saturated)	1600	Ohm-cm	ASTM G57	1/30/19
Water Soluble Sodium	0.0086	%	EPA 6010B	1/29/19
Water Soluble Sulfate	0.0060	%	SM 4500-SO4 E	1/29/19
Soluble Sulfide	0.77	mg/Kg	SM 4500-S2-D	1/30/19
Total Available Water Soluble Sodium Sulfate	0.0089	%	Calculation	1/29/19
Total Soluble Salts (Solubility)	0.0098	%	SM 2540C	1/29/19
Water Soluble Chloride	60	mg/Kg	SM 4500-Cl B	1/29/19



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 VERITAS LAB ORDER ID: V19A084

ANALYTICAL RESULTS

CLIENT SAMPLE ID: **SA-24 @ 2.5-7.5'** DATE/TIME SAMPLED: 1/23/19 0:00
 VERITAS SAMPLE ID: V19A084-04 DATE/TIME RECEIVED: 1/23/19 14:20

Matrix: Soil

Analysis: Soil Solubility/Corrosion Parameters

PARAMETER	RESULT	UNITS	METHOD	DATE ANALYZED
pH	8.74	pH Units	EPA 9045 D	1/25/19
Redox Potential (ORP)	229	mV	SM 2580B	1/28/19
Resistivity (as Received)	16000	Ohm-cm	ASTM G57	1/25/19
Resistivity (Saturated)	1720	Ohm-cm	ASTM G57	1/30/19
Water Soluble Sodium	0.0042	%	EPA 6010B	1/29/19
Water Soluble Sulfate	0.028	%	SM 4500-SO4 E	1/29/19
Soluble Sulfide	2.1	mg/Kg	SM 4500-S2-D	1/30/19
Total Available Water Soluble Sodium Sulfate	0.013	%	Calculation	1/29/19
Total Soluble Salts (Solubility)	0.014	%	SM 2540C	1/29/19
Water Soluble Chloride	45	mg/Kg	SM 4500-Cl B	1/29/19



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 CLIENT PROJECT NUMBER: 20191344
 VERITAS LAB ORDER ID: V19A084

ANALYTICAL RESULTS

CLIENT SAMPLE ID: **SA-25 @ 2.5-7.5'** DATE/TIME SAMPLED: 1/23/19 0:00
 VERITAS SAMPLE ID: V19A084-05 DATE/TIME RECEIVED: 1/23/19 14:20

Matrix: Soil

Analysis: Soil Solubility/Corrosion Parameters

PARAMETER	RESULT	UNITS	METHOD	DATE ANALYZED
pH	8.52	pH Units	EPA 9045 D	1/25/19
Redox Potential (ORP)	242	mV	SM 2580B	1/28/19
Resistivity (as Received)	5100	Ohm-cm	ASTM G57	1/25/19
Resistivity (Saturated)	800	Ohm-cm	ASTM G57	1/30/19
Water Soluble Sodium	0.018	%	EPA 6010B	1/29/19
Water Soluble Sulfate	0.075	%	SM 4500-SO4 E	1/29/19
Soluble Sulfide	0.85	mg/Kg	SM 4500-S2-D	1/30/19
Total Available Water Soluble Sodium Sulfate	0.055	%	Calculation	1/29/19
Total Soluble Salts (Solubility)	0.036	%	SM 2540C	1/29/19
Water Soluble Chloride	140	mg/Kg	SM 4500-Cl B	1/29/19



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 VERITAS LAB ORDER ID: V19A084

ANALYTICAL RESULTS

CLIENT SAMPLE ID: **SA-27 @ 2.5-7.0'** DATE/TIME SAMPLED: 1/23/19 0:00
 VERITAS SAMPLE ID: V19A084-06 DATE/TIME RECEIVED: 1/23/19 14:20

Matrix: Soil

Analysis: Soil Solubility/Corrosion Parameters

PARAMETER	RESULT	UNITS	METHOD	DATE ANALYZED
pH	8.87	pH Units	EPA 9045 D	1/25/19
Redox Potential (ORP)	246	mV	SM 2580B	1/28/19
Resistivity (as Received)	26500	Ohm-cm	ASTM G57	1/25/19
Resistivity (Saturated)	3100	Ohm-cm	ASTM G57	1/30/19
Water Soluble Sodium	0.0050	%	EPA 6010B	1/29/19
Water Soluble Sulfate	0.0090	%	SM 4500-SO4 E	1/29/19
Soluble Sulfide	0.64	mg/Kg	SM 4500-S2-D	1/30/19
Total Available Water Soluble Sodium Sulfate	0.013	%	Calculation	1/29/19
Total Soluble Salts (Solubility)	0.017	%	SM 2540C	1/29/19
Water Soluble Chloride	45	mg/Kg	SM 4500-Cl B	1/29/19



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 VERITAS LAB ORDER ID: V19A084

ANALYTICAL RESULTS

CLIENT SAMPLE ID: **SA-27 @ 15' SPT** DATE/TIME SAMPLED: 1/23/19 0:00
 VERITAS SAMPLE ID: V19A084-07 DATE/TIME RECEIVED: 1/23/19 14:20

Matrix: Soil

Analysis: Soil Solubility/Corrosion Parameters

PARAMETER	RESULT	UNITS	METHOD	DATE ANALYZED
pH	8.30	pH Units	EPA 9045 D	1/25/19
Redox Potential (ORP)	273	mV	SM 2580B	1/28/19
Resistivity (as Received)	1000	Ohm-cm	ASTM G57	1/25/19
Resistivity (Saturated)	330	Ohm-cm	ASTM G57	1/30/19
Water Soluble Sodium	0.015	%	EPA 6010B	1/29/19
Water Soluble Sulfate	0.41	%	SM 4500-SO4 E	1/29/19
Soluble Sulfide	0.56	mg/Kg	SM 4500-S2-D	1/30/19
Total Available Water Soluble Sodium Sulfate	0.046	%	Calculation	1/29/19
Total Soluble Salts (Solubility)	0.13	%	SM 2540C	1/29/19
Water Soluble Chloride	120	mg/Kg	SM 4500-Cl B	1/29/19



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ANALYTICAL RESULTS

CLIENT SAMPLE ID: **TP 1 : 0-1'** DATE/TIME SAMPLED: 1/23/19 0:00
 VERITAS SAMPLE ID: V19A084-08 DATE/TIME RECEIVED: 1/23/19 14:20

Matrix: Soil

Analysis: Soil Solubility/Corrosion Parameters

PARAMETER	RESULT	UNITS	METHOD	DATE ANALYZED
pH	8.70	pH Units	EPA 9045 D	1/25/19
Redox Potential (ORP)	251	mV	SM 2580B	1/28/19
Resistivity (as Received)	4200	Ohm-cm	ASTM G57	1/25/19
Resistivity (Saturated)	2700	Ohm-cm	ASTM G57	1/30/19
Water Soluble Sodium	0.0021	%	EPA 6010B	1/29/19
Water Soluble Sulfate	0.0080	%	SM 4500-SO4 E	1/29/19
Soluble Sulfide	2.5	mg/Kg	SM 4500-S2-D	1/30/19
Total Available Water Soluble Sodium Sulfate	0.0065	%	Calculation	1/29/19
Total Soluble Salts (Solubility)	0.0074	%	SM 2540C	1/29/19
Water Soluble Chloride	25	mg/Kg	SM 4500-Cl B	1/29/19



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ANALYTICAL RESULTS

CLIENT SAMPLE ID: **TP 4: 0-0.5'** DATE/TIME SAMPLED: 1/23/19 0:00
 VERITAS SAMPLE ID: V19A084-09 DATE/TIME RECEIVED: 1/23/19 14:20

Matrix: Soil

Analysis: Soil Solubility/Corrosion Parameters

PARAMETER	RESULT	UNITS	METHOD	DATE ANALYZED
pH	8.64	pH Units	EPA 9045 D	1/25/19
Redox Potential (ORP)	277	mV	SM 2580B	1/28/19
Resistivity (as Received)	4450	Ohm-cm	ASTM G57	1/25/19
Resistivity (Saturated)	1550	Ohm-cm	ASTM G57	1/30/19
Water Soluble Sodium	0.0019	%	EPA 6010B	1/29/19
Water Soluble Sulfate	0.0045	%	SM 4500-SO4 E	1/29/19
Soluble Sulfide	27	mg/Kg	SM 4500-S2-D	1/30/19
Total Available Water Soluble Sodium Sulfate	0.0060	%	Calculation	1/29/19
Total Soluble Salts (Solubility)	0.010	%	SM 2540C	1/29/19
Water Soluble Chloride	40	mg/Kg	SM 4500-Cl B	1/29/19



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 CLIENT PROJECT NUMBER: 20191344
 VERITAS LAB ORDER ID: V19A084

ANALYTICAL RESULTS

CLIENT SAMPLE ID: **TP 6 : 0-1'** DATE/TIME SAMPLED: 1/23/19 0:00
 VERITAS SAMPLE ID: V19A084-10 DATE/TIME RECEIVED: 1/23/19 14:20

Matrix: Soil

Analysis: Soil Solubility/Corrosion Parameters

PARAMETER	RESULT	UNITS	METHOD	DATE ANALYZED
pH	7.96	pH Units	EPA 9045 D	1/25/19
Redox Potential (ORP)	261	mV	SM 2580B	1/28/19
Resistivity (as Received)	880	Ohm-cm	ASTM G57	1/25/19
Resistivity (Saturated)	135	Ohm-cm	ASTM G57	1/30/19
Water Soluble Sodium	0.070	%	EPA 6010B	1/29/19
Water Soluble Sulfate	0.22	%	SM 4500-SO4 E	1/29/19
Soluble Sulfide	<0.50	mg/Kg	SM 4500-S2-D	1/30/19
Total Available Water Soluble Sodium Sulfate	0.22	%	Calculation	1/29/19
Total Soluble Salts (Solubility)	0.15	%	SM 2540C	1/29/19
Water Soluble Chloride	1200	mg/Kg	SM 4500-Cl B	1/29/19



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 VERITAS LAB ORDER ID: V19A084

ANALYTICAL RESULTS

CLIENT SAMPLE ID: **TP 8 : 0-1'** DATE/TIME SAMPLED: 1/23/19 0:00
 VERITAS SAMPLE ID: V19A084-11 DATE/TIME RECEIVED: 1/23/19 14:20

Matrix: Soil

Analysis: Soil Solubility/Corrosion Parameters

PARAMETER	RESULT	UNITS	METHOD	DATE ANALYZED
pH	7.89	pH Units	EPA 9045 D	1/25/19
Redox Potential (ORP)	284	mV	SM 2580B	1/28/19
Resistivity (as Received)	675	Ohm-cm	ASTM G57	1/25/19
Resistivity (Saturated)	100	Ohm-cm	ASTM G57	1/30/19
Water Soluble Sodium	0.060	%	EPA 6010B	1/29/19
Water Soluble Sulfate	0.20	%	SM 4500-SO4 E	1/29/19
Soluble Sulfide	1.8	mg/Kg	SM 4500-S2-D	1/30/19
Total Available Water Soluble Sodium Sulfate	0.19	%	Calculation	1/29/19
Total Soluble Salts (Solubility)	0.18	%	SM 2540C	1/29/19
Water Soluble Chloride	1800	mg/Kg	SM 4500-Cl B	1/29/19



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ANALYTICAL RESULTS

CLIENT SAMPLE ID: **TP 10 : 0-1'** DATE/TIME SAMPLED: 1/23/19 0:00
 VERITAS SAMPLE ID: V19A084-12 DATE/TIME RECEIVED: 1/23/19 14:20

Matrix: Soil

Analysis: Soil Solubility/Corrosion Parameters

PARAMETER	RESULT	UNITS	METHOD	DATE ANALYZED
pH	8.65	pH Units	EPA 9045 D	1/25/19
Redox Potential (ORP)	267	mV	SM 2580B	1/28/19
Resistivity (as Received)	9500	Ohm-cm	ASTM G57	1/25/19
Resistivity (Saturated)	2650	Ohm-cm	ASTM G57	1/30/19
Water Soluble Sodium	0.0015	%	EPA 6010B	1/29/19
Water Soluble Sulfate	0.0015	%	SM 4500-SO4 E	1/29/19
Soluble Sulfide	1.5	mg/Kg	SM 4500-S2-D	1/30/19
Total Available Water Soluble Sodium Sulfate	0.0022	%	Calculation	1/29/19
Total Soluble Salts (Solubility)	0.023	%	SM 2540C	1/29/19
Water Soluble Chloride	25	mg/Kg	SM 4500-Cl B	1/29/19



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ANALYTICAL RESULTS

CLIENT SAMPLE ID: **TP 12 : 0-1'** DATE/TIME SAMPLED: 1/23/19 0:00
 VERITAS SAMPLE ID: V19A084-13 DATE/TIME RECEIVED: 1/23/19 14:20

Matrix: Soil

Analysis: Soil Solubility/Corrosion Parameters

PARAMETER	RESULT	UNITS	METHOD	DATE ANALYZED
pH	8.48	pH Units	EPA 9045 D	1/25/19
Redox Potential (ORP)	272	mV	SM 2580B	1/28/19
Resistivity (as Received)	7200	Ohm-cm	ASTM G57	1/28/19
Resistivity (Saturated)	1250	Ohm-cm	ASTM G57	1/30/19
Water Soluble Sodium	0.0023	%	EPA 6010B	1/29/19
Water Soluble Sulfate	0.016	%	SM 4500-SO4 E	1/29/19
Soluble Sulfide	1.2	mg/Kg	SM 4500-S2-D	1/30/19
Total Available Water Soluble Sodium Sulfate	0.0073	%	Calculation	1/29/19
Total Soluble Salts (Solubility)	0.012	%	SM 2540C	1/29/19
Water Soluble Chloride	20	mg/Kg	SM 4500-Cl B	1/29/19



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 VERITAS LAB ORDER ID: V19A084

ANALYTICAL RESULTS

CLIENT SAMPLE ID: **TP 13 : 0-1'** DATE/TIME SAMPLED: 1/23/19 0:00
 VERITAS SAMPLE ID: V19A084-14 DATE/TIME RECEIVED: 1/23/19 14:20

Matrix: Soil

Analysis: Soil Solubility/Corrosion Parameters

PARAMETER	RESULT	UNITS	METHOD	DATE ANALYZED
pH	8.73	pH Units	EPA 9045 D	1/25/19
Redox Potential (ORP)	267	mV	SM 2580B	1/28/19
Resistivity (as Received)	5500	Ohm-cm	ASTM G57	1/28/19
Resistivity (Saturated)	2700	Ohm-cm	ASTM G57	1/30/19
Water Soluble Sodium	0.0015	%	EPA 6010B	1/29/19
Water Soluble Sulfate	0.0035	%	SM 4500-SO4 E	1/29/19
Soluble Sulfide	1.3	mg/Kg	SM 4500-S2-D	1/30/19
Total Available Water Soluble Sodium Sulfate	0.0046	%	Calculation	1/29/19
Total Soluble Salts (Solubility)	0.0098	%	SM 2540C	1/29/19
Water Soluble Chloride	0.0	mg/Kg	SM 4500-Cl B	1/29/19



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 VERITAS LAB ORDER ID: V19A084

ANALYTICAL RESULTS

CLIENT SAMPLE ID: **TP 15 : 0-1'** DATE/TIME SAMPLED: 1/23/19 0:00
 VERITAS SAMPLE ID: V19A084-15 DATE/TIME RECEIVED: 1/23/19 14:20

Matrix: Soil

Analysis: Soil Solubility/Corrosion Parameters

PARAMETER	RESULT	UNITS	METHOD	DATE ANALYZED
pH	8.79	pH Units	EPA 9045 D	1/25/19
Redox Potential (ORP)	269	mV	SM 2580B	1/28/19
Resistivity (as Received)	9400	Ohm-cm	ASTM G57	1/28/19
Resistivity (Saturated)	3000	Ohm-cm	ASTM G57	1/30/19
Water Soluble Sodium	0.0015	%	EPA 6010B	1/29/19
Water Soluble Sulfate	0.0040	%	SM 4500-SO4 E	1/29/19
Soluble Sulfide	0.76	mg/Kg	SM 4500-S2-D	1/30/19
Total Available Water Soluble Sodium Sulfate	0.0045	%	Calculation	1/29/19
Total Soluble Salts (Solubility)	0.0082	%	SM 2540C	1/29/19
Water Soluble Chloride	35	mg/Kg	SM 4500-Cl B	1/29/19



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ANALYTICAL RESULTS

CLIENT SAMPLE ID: **TP 19 : 0-1'** DATE/TIME SAMPLED: 1/23/19 0:00
 VERITAS SAMPLE ID: V19A084-16 DATE/TIME RECEIVED: 1/23/19 14:20

Matrix: Soil

Analysis: Soil Solubility/Corrosion Parameters

PARAMETER	RESULT	UNITS	METHOD	DATE ANALYZED
pH	8.69	pH Units	EPA 9045 D	1/25/19
Redox Potential (ORP)	294	mV	SM 2580B	1/28/19
Resistivity (as Received)	5200	Ohm-cm	ASTM G57	1/28/19
Resistivity (Saturated)	2100	Ohm-cm	ASTM G57	1/30/19
Water Soluble Sodium	0.0012	%	EPA 6010B	1/29/19
Water Soluble Sulfate	0.0070	%	SM 4500-SO4 E	1/29/19
Soluble Sulfide	0.61	mg/Kg	SM 4500-S2-D	1/30/19
Total Available Water Soluble Sodium Sulfate	0.0038	%	Calculation	1/29/19
Total Soluble Salts (Solubility)	0.010	%	SM 2540C	1/29/19
Water Soluble Chloride	30	mg/Kg	SM 4500-Cl B	1/29/19



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Email: veritaslabs@msn.com

CLIENT COMPANY NAME: Kleinfelder
 CLIENT PROJECT NAME: **Eagle Shadow Mountain**
 CLIENT PROJECT NUMBER: 20191344
 VERITAS LAB ORDER ID: V19A084

ANALYTICAL RESULTS

CLIENT SAMPLE ID: **TP 20 : 0-1'** DATE/TIME SAMPLED: 1/23/19 0:00
 VERITAS SAMPLE ID: V19A084-17 DATE/TIME RECEIVED: 1/23/19 14:20

Matrix: Soil

Analysis: Soil Solubility/Corrosion Parameters

PARAMETER	RESULT	UNITS	METHOD	DATE ANALYZED
pH	8.71	pH Units	EPA 9045 D	1/25/19
Redox Potential (ORP)	176	mV	SM 2580B	1/29/19
Resistivity (as Received)	3950	Ohm-cm	ASTM G57	1/28/19
Resistivity (Saturated)	3290	Ohm-cm	ASTM G57	1/30/19
Water Soluble Sodium	0.0016	%	EPA 6010B	1/29/19
Water Soluble Sulfate	0.0035	%	SM 4500-SO4 E	1/29/19
Soluble Sulfide	2.3	mg/Kg	SM 4500-S2-D	1/30/19
Total Available Water Soluble Sodium Sulfate	0.0049	%	Calculation	1/29/19
Total Soluble Salts (Solubility)	0.019	%	SM 2540C	1/29/19
Water Soluble Chloride	25	mg/Kg	SM 4500-Cl B	1/29/19



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CLIENT COMPANY NAME: Kleinfelder
 CLIENT PROJECT NAME: **Eagle Shadow Mountain**
 CLIENT PROJECT NUMBER: 20191344
 VERITAS LAB ORDER ID: V19A084

ANALYTICAL RESULTS

CLIENT SAMPLE ID: **TP 21 : 0-1'** DATE/TIME SAMPLED: 1/23/19 0:00
 VERITAS SAMPLE ID: V19A084-18 DATE/TIME RECEIVED: 1/23/19 14:20

Matrix: Soil

Analysis: Soil Solubility/Corrosion Parameters

PARAMETER	RESULT	UNITS	METHOD	DATE ANALYZED
pH	8.67	pH Units	EPA 9045 D	1/25/19
Redox Potential (ORP)	133	mV	SM 2580B	1/29/19
Resistivity (as Received)	4600	Ohm-cm	ASTM G57	1/28/19
Resistivity (Saturated)	1400	Ohm-cm	ASTM G57	1/30/19
Water Soluble Sodium	0.0072	%	EPA 6010B	1/29/19
Water Soluble Sulfate	0.0080	%	SM 4500-SO4 E	1/29/19
Soluble Sulfide	<0.50	mg/Kg	SM 4500-S2-D	1/30/19
Total Available Water Soluble Sodium Sulfate	0.012	%	Calculation	1/29/19
Total Soluble Salts (Solubility)	0.023	%	SM 2540C	1/29/19
Water Soluble Chloride	70	mg/Kg	SM 4500-Cl B	1/29/19



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Email: veritaslabs@msn.com

CLIENT COMPANY NAME: Kleinfelder
 CLIENT PROJECT NAME: **Eagle Shadow Mountain**
 CLIENT PROJECT NUMBER: 20191344
 VERITAS LAB ORDER ID: V19A084

ANALYTICAL RESULTS

CLIENT SAMPLE ID: **TP 21 : 4-8'** DATE/TIME SAMPLED: 1/23/19 0:00
 VERITAS SAMPLE ID: V19A084-19 DATE/TIME RECEIVED: 1/23/19 14:20

Matrix: Soil

Analysis: Soil Solubility/Corrosion Parameters

PARAMETER	RESULT	UNITS	METHOD	DATE ANALYZED
pH	8.29	pH Units	EPA 9045 D	1/25/19
Redox Potential (ORP)	195	mV	SM 2580B	1/29/19
Resistivity (as Received)	900	Ohm-cm	ASTM G57	1/28/19
Resistivity (Saturated)	180	Ohm-cm	ASTM G57	1/30/19
Water Soluble Sodium	0.11	%	EPA 6010B	1/29/19
Water Soluble Sulfate	0.80	%	SM 4500-SO4 E	1/29/19
Soluble Sulfide	<0.50	mg/Kg	SM 4500-S2-D	1/30/19
Total Available Water Soluble Sodium Sulfate	0.35	%	Calculation	1/29/19
Total Soluble Salts (Solubility)	0.32	%	SM 2540C	1/29/19
Water Soluble Chloride	520	mg/Kg	SM 4500-Cl B	1/29/19



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CLIENT COMPANY NAME: Kleinfelder
 CLIENT PROJECT NAME: **Eagle Shadow Mountain**
 CLIENT PROJECT NUMBER: 20191344
 VERITAS LAB ORDER ID: V19A084

ANALYTICAL RESULTS

CLIENT SAMPLE ID: **TP 23 : 0-1'** DATE/TIME SAMPLED: 1/23/19 0:00
 VERITAS SAMPLE ID: V19A084-20 DATE/TIME RECEIVED: 1/23/19 14:20

Matrix: Soil

Analysis: Soil Solubility/Corrosion Parameters

PARAMETER	RESULT	UNITS	METHOD	DATE ANALYZED
pH	8.55	pH Units	EPA 9045 D	1/25/19
Redox Potential (ORP)	198	mV	SM 2580B	1/29/19
Resistivity (as Received)	9800	Ohm-cm	ASTM G57	1/28/19
Resistivity (Saturated)	3100	Ohm-cm	ASTM G57	1/30/19
Water Soluble Sodium	0.0011	%	EPA 6010B	1/29/19
Water Soluble Sulfate	0.0065	%	SM 4500-SO4 E	1/29/19
Soluble Sulfide	<0.50	mg/Kg	SM 4500-S2-D	1/30/19
Total Available Water Soluble Sodium Sulfate	0.0034	%	Calculation	1/29/19
Total Soluble Salts (Solubility)	0.0086	%	SM 2540C	1/29/19
Water Soluble Chloride	20	mg/Kg	SM 4500-Cl B	1/29/19



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CLIENT COMPANY NAME: Kleinfelder
 CLIENT PROJECT NAME: **Eagle Shadow Mountain**
 CLIENT PROJECT NUMBER: 20191344
 VERITAS LAB ORDER ID: V19A084

ANALYTICAL RESULTS

CLIENT SAMPLE ID: **TP 25 : 0-1'** DATE/TIME SAMPLED: 1/23/19 0:00
 VERITAS SAMPLE ID: V19A084-21 DATE/TIME RECEIVED: 1/23/19 14:20

Matrix: Soil

Analysis: Soil Solubility/Corrosion Parameters

PARAMETER	RESULT	UNITS	METHOD	DATE ANALYZED
pH	8.49	pH Units	EPA 9045 D	1/25/19
Redox Potential (ORP)	198	mV	SM 2580B	1/29/19
Resistivity (as Received)	26500	Ohm-cm	ASTM G57	1/28/19
Resistivity (Saturated)	3200	Ohm-cm	ASTM G57	1/30/19
Water Soluble Sodium	0.0016	%	EPA 6010B	1/29/19
Water Soluble Sulfate	0.0010	%	SM 4500-SO4 E	1/29/19
Soluble Sulfide	<0.50	mg/Kg	SM 4500-S2-D	1/31/19
Total Available Water Soluble Sodium Sulfate	0.0015	%	Calculation	1/29/19
Total Soluble Salts (Solubility)	0.0092	%	SM 2540C	1/29/19
Water Soluble Chloride	25	mg/Kg	SM 4500-Cl B	1/29/19



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CLIENT COMPANY NAME: Kleinfelder
 CLIENT PROJECT NAME: **Eagle Shadow Mountain**
 CLIENT PROJECT NUMBER: 20191344
 VERITAS LAB ORDER ID: V19A084

ANALYTICAL RESULTS

CLIENT SAMPLE ID: **TP 26 : 0-1'** DATE/TIME SAMPLED: 1/23/19 0:00
 VERITAS SAMPLE ID: V19A084-22 DATE/TIME RECEIVED: 1/23/19 14:20

Matrix: Soil

Analysis: Soil Solubility/Corrosion Parameters

PARAMETER	RESULT	UNITS	METHOD	DATE ANALYZED
pH	8.66	pH Units	EPA 9045 D	1/25/19
Redox Potential (ORP)	211	mV	SM 2580B	1/29/19
Resistivity (as Received)	6650	Ohm-cm	ASTM G57	1/28/19
Resistivity (Saturated)	3460	Ohm-cm	ASTM G57	1/30/19
Water Soluble Sodium	0.00097	%	EPA 6010B	1/29/19
Water Soluble Sulfate	0.0035	%	SM 4500-SO4 E	1/29/19
Soluble Sulfide	4.7	mg/Kg	SM 4500-S2-D	1/31/19
Total Available Water Soluble Sodium Sulfate	0.0030	%	Calculation	1/29/19
Total Soluble Salts (Solubility)	0.016	%	SM 2540C	1/29/19
Water Soluble Chloride	0.0	mg/Kg	SM 4500-Cl B	1/29/19



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Email: veritaslabs@msn.com

CLIENT COMPANY NAME: Kleinfelder
 CLIENT PROJECT NAME: **Eagle Shadow Mountain**
 CLIENT PROJECT NUMBER: 20191344
 VERITAS LAB ORDER ID: V19A084

ANALYTICAL RESULTS

CLIENT SAMPLE ID: **TP 28 : 0-1'** DATE/TIME SAMPLED: 1/23/19 0:00
 VERITAS SAMPLE ID: V19A084-23 DATE/TIME RECEIVED: 1/23/19 14:20

Matrix: Soil

Analysis: Soil Solubility/Corrosion Parameters

PARAMETER	RESULT	UNITS	METHOD	DATE ANALYZED
pH	8.48	pH Units	EPA 9045 D	1/25/19
Redox Potential (ORP)	220	mV	SM 2580B	1/29/19
Resistivity (as Received)	10500	Ohm-cm	ASTM G57	1/28/19
Resistivity (Saturated)	2750	Ohm-cm	ASTM G57	1/30/19
Water Soluble Sodium	0.0011	%	EPA 6010B	1/29/19
Water Soluble Sulfate	0.0010	%	SM 4500-SO4 E	1/29/19
Soluble Sulfide	0.84	mg/Kg	SM 4500-S2-D	1/31/19
Total Available Water Soluble Sodium Sulfate	0.0015	%	Calculation	1/29/19
Total Soluble Salts (Solubility)	0.0084	%	SM 2540C	1/29/19
Water Soluble Chloride	0.0	mg/Kg	SM 4500-Cl B	1/29/19

VERITAS LABORATORIES

SOIL SOLUBILITY AND CORROSION TESTING ORDER FORM

Client: Kleinfelder Date/Time Sampled: _____
 Project Name: East Mountain Project Number: 20191344
 Lab #: _____ Sample ID: SA-4005-5

VIA0084-01

- ☐ Soil Solubility Suite #1: WSSS
 Soluble Sodium, Soluble Sulfate, Total Sodium Sulfates
- ☐ Soil Solubility Suite #2: WSSS & Solubility (Total Salts)
 Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), Total Sodium Sulfates
- ☐ Soil Solubility Suite #3: WSSS, Solubility, pH, Soluble Chloride
 Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), pH, Soluble Chloride, Total Sodium Sulfates
- ☐ Soil Solubility Suite #4: Sulfate, Solubility (Total Salts), Soluble Chloride
 Soluble Sulfate, Solubility (Total Salts), Soluble Chloride
- ☐ Soil Solubility Suite #5: WSSS, Solubility (Total Salts), Soluble Chloride
 Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), Soluble Chloride, Total Sodium Sulfates
- ☒ Soil Solubility Suite #6: Corrosion Suite w/Solubility (Total Salts), AASHTO Resistivity *ASTM C571 runs received then saturated*
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity (AASHTO), Solubility (Total Salts), Total Sodium Sulfates
- ☐ Soil Solubility Suite #7: Corrosion Suite w/Solubility (Total Salts), NDOT Resistivity
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity (NDOT), Solubility (Total Salts), Total Sodium Sulfates
- ☐ Corrosion Suite
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Total Sodium Sulfates
- ☐ Corrosion Suite w/Resistivity
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity*, Total Sodium Sulfates
 * _____ NDOT (T235) * _____ AASHTO (T288)
- ☐ Corrosion Suite w/Solubility (Total Salts)
 Soluble Sodium, Soluble Sulfate, Chloride, pH, Redox, Sulfide, Solubility (Total Salts), Total Sodium Sulfates
 _____ Sulfate _____ Solubility (Total Salts) _____ pH _____ Chloride
 _____ Resistivity (NDOT T235) _____ Resistivity (AASHTO T288)

*Received: B. G/L
 1/23/19, 2:20p
 23.5°C*

VERITAS LABORATORIES

SOIL SOLUBILITY AND CORROSION TESTING ORDER FORM

Client: Kleinfelder Date/Time Sampled: 20191349
 Project Name: Engle Shadow Mountain Wdf Project Number: 20191349
 Lab #: _____ Sample ID: SA-20 @ 2.5-3.0'

V19A084-02

- ☐ Soil Solubility Suite #1: WSSS
Soluble Sodium, Soluble Sulfate, Total Sodium Sulfates
- ☐ Soil Solubility Suite #2: WSSS & Solubility (Total Salts)
Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), Total Sodium Sulfates
- ☐ Soil Solubility Suite #3: WSSS, Solubility, pH, Soluble Chloride
Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), pH, Soluble Chloride, Total Sodium Sulfates
- ☐ Soil Solubility Suite #4: Sulfate, Solubility (Total Salts), Soluble Chloride
Soluble Sulfate, Solubility (Total Salts), Soluble Chloride
- ☐ Soil Solubility Suite #5: WSSS, Solubility (Total Salts), Soluble Chloride
Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), Soluble Chloride, Total Sodium Sulfates
- ☒ Soil Solubility Suite #6: Corrosion Suite w/Solubility (Total Salts), AASHTO Resistivity *ASTM G57, run as received then saturated*
Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity (AASHTO), Solubility (Total Salts), Total Sodium Sulfates
- ☐ Soil Solubility Suite #7: Corrosion Suite w/Solubility (Total Salts), NDOT Resistivity
Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity (NDOT), Solubility (Total Salts), Total Sodium Sulfates
- ☐ Corrosion Suite
Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Total Sodium Sulfates
- ☐ Corrosion Suite w/Resistivity
Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity*, Total Sodium Sulfates
* _____ NDOT (T235) * _____ AASHTO (T288)
- ☐ Corrosion Suite w/Solubility (Total Salts)
Soluble Sodium, Soluble Sulfate, Chloride, pH, Redox, Sulfide, Solubility (Total Salts), Total Sodium Sulfates
____ Sulfate ____ Solubility (Total Salts) ____ pH ____ Chloride
____ Resistivity (NDOT T235) ____ Resistivity (AASHTO T288)

VERITAS LABORATORIES

SOIL SOLUBILITY AND CORROSION TESTING ORDER FORM

Client: Kleinfelder Date/Time Sampled: 11/9/04
 Project Name: ccajr Shadow Mtn Project Number: 2491344
 Lab #: 14 Sample ID: 5921-51

- ☐ Soil Solubility Suite #1: WSSS
 Soluble Sodium, Soluble Sulfate, Total Sodium Sulfates
- ☐ Soil Solubility Suite #2: WSSS & Solubility (Total Salts)
 Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), Total Sodium Sulfates
- ☐ Soil Solubility Suite #3: WSSS, Solubility, pH, Soluble Chloride
 Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), pH, Soluble Chloride, Total Sodium Sulfates
- ☐ Soil Solubility Suite #4: Sulfate, Solubility (Total Salts), Soluble Chloride
 Soluble Sulfate, Solubility (Total Salts), Soluble Chloride
- ☐ Soil Solubility Suite #5: WSSS, Solubility (Total Salts), Soluble Chloride
 Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), Soluble Chloride, Total Sodium Sulfates
- ☒ Soil Solubility Suite #6: Corrosion Suite w/Solubility (Total Salts), ~~NDOT Resistivity~~ ASTM G 57 run as received then saturated
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity (AASHTO), Solubility (Total Salts), Total Sodium Sulfates
- ☐ Soil Solubility Suite #7: Corrosion Suite w/Solubility (Total Salts), NDOT Resistivity
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity (NDOT), Solubility (Total Salts), Total Sodium Sulfates
- ☐ Corrosion Suite
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Total Sodium Sulfates
- ☐ Corrosion Suite w/Resistivity
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity*, Total Sodium Sulfates
 * _____ NDOT (T235) * _____ AASHTO (T288)
- ☐ Corrosion Suite w/Solubility (Total Salts)
 Soluble Sodium, Soluble Sulfate, Chloride, pH, Redox, Sulfide, Solubility (Total Salts), Total Sodium Sulfates:
 _____ Sulfate _____ Solubility (Total Salts) _____ pH _____ Chloride
 _____ Resistivity (NDOT T235) _____ Resistivity (AASHTO T.288)

VERITAS LABORATORIES

SOIL SOLUBILITY AND CORROSION TESTING ORDER FORM

Client: Kleinfelder Date/Time Sampled: _____
 Project Name: Eagle Shadar Mountain Solar Project Number: 20191344
 Lab #: _____ Sample ID: SA-24 @ 2.5-7.5'

V19A084-04

- ☐ Soil Solubility Suite #1: WSSS
Soluble Sodium, Soluble Sulfate, Total Sodium Sulfates
- ☐ Soil Solubility Suite #2: WSSS & Solubility (Total Salts)
Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), Total Sodium Sulfates
- ☐ Soil Solubility Suite #3: WSSS, Solubility, pH, Soluble Chloride
Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), pH, Soluble Chloride, Total Sodium Sulfates
- ☐ Soil Solubility Suite #4: Sulfate, Solubility (Total Salts), Soluble Chloride
Soluble Sulfate, Solubility (Total Salts), Soluble Chloride
- ☐ Soil Solubility Suite #5: WSSS, Solubility (Total Salts), Soluble Chloride
Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), Soluble Chloride, Total Sodium Sulfates
- ☒ Soil Solubility Suite #6: Corrosion Suite w/Solubility (Total Salts), ~~AASHTO Resistivity~~ ASTM G57, run as received then saturated
Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity (AASHTO), Solubility (Total Salts), Total Sodium Sulfates
- ☐ Soil Solubility Suite #7: Corrosion Suite w/Solubility (Total Salts), NDOT Resistivity
Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity (NDOT), Solubility (Total Salts), Total Sodium Sulfates
- ☐ Corrosion Suite
Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Total Sodium Sulfates
- ☐ Corrosion Suite w/Resistivity
Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity*, Total Sodium Sulfates
* _____ NDOT (T235) * _____ AASHTO (T288)
- ☐ Corrosion Suite w/Solubility (Total Salts)
Soluble Sodium, Soluble Sulfate, Chloride, pH, Redox, Sulfide, Solubility (Total Salts), Total Sodium Sulfates
- ____ Sulfate ____ Solubility (Total Salts) ____ pH ____ Chloride
 ____ Resistivity (NDOT T235) ____ Resistivity (AASHTO T288)

VERITAS LABORATORIES

SOIL SOLUBILITY AND CORROSION TESTING ORDER FORM

Client: Kleinfelder Date/Time Sampled: 20191244
 Project Name: Eagle Mountain Solar Project Number: SA-25 @ 2.5-7.5
 Lab #: _____ Sample ID: _____

- ☐ Soil Solubility Suite #1: WSSS
 Soluble Sodium, Soluble Sulfate, Total Sodium Sulfates
- ☐ Soil Solubility Suite #2: WSSS & Solubility (Total Salts)
 Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), Total Sodium Sulfates
- ☐ Soil Solubility Suite #3: WSSS, Solubility, pH, Soluble Chloride
 Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), pH, Soluble Chloride, Total Sodium Sulfates
- ☐ Soil Solubility Suite #4: Sulfate, Solubility (Total Salts), Soluble Chloride
 Soluble Sulfate, Solubility (Total Salts), Soluble Chloride
- ☐ Soil Solubility Suite #5: WSSS, Solubility (Total Salts), Soluble Chloride
 Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), Soluble Chloride, Total Sodium Sulfates
- ☒ Soil Solubility Suite #6: Corrosion Suite w/Solubility (Total Salts), AASHTO Resistivity *ASTM G57 run as received, then saturated*
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity (AASHTO), Solubility (Total Salts), Total Sodium Sulfates
- ☐ Soil Solubility Suite #7: Corrosion Suite w/Solubility (Total Salts), NDOT Resistivity
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity (NDOT), Solubility (Total Salts), Total Sodium Sulfates
- ☐ Corrosion Suite
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Total Sodium Sulfates
- ☐ Corrosion Suite w/Resistivity
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity*, Total Sodium Sulfates
 * _____ NDOT (T235) * _____ AASHTO (T288)
- ☐ Corrosion Suite w/Solubility (Total Salts)
 Soluble Sodium, Soluble Sulfate, Chloride, pH, Redox, Sulfide, Solubility (Total Salts), Total Sodium Sulfates
 _____ Sulfate _____ Solubility (Total Salts) _____ pH _____ Chloride
 _____ Resistivity (NDOT T235) _____ Resistivity (AASHTO T288)

VERITAS LABORATORIES

SOIL SOLUBILITY AND CORROSION TESTING ORDER FORM

Client: Kleinfelder Date/Time Sampled: _____
 Project Name: Edge Shadow Mfg. Solar Project Number: 20191344
 Lab #: _____ Sample ID: SA-27 @ 2.5-7.0'

V19A084-06

- ☐ Soil Solubility Suite #1: WSSS
 Soluble Sodium, Soluble Sulfate, Total Sodium Sulfates
- ☐ Soil Solubility Suite #2: WSSS & Solubility (Total Salts)
 Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), Total Sodium Sulfates
- ☐ Soil Solubility Suite #3: WSSS, Solubility, pH, Soluble Chloride
 Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), pH, Soluble Chloride, Total Sodium Sulfates
- ☐ Soil Solubility Suite #4: Sulfate, Solubility (Total Salts), Soluble Chloride
 Soluble Sulfate, Solubility (Total Salts), Soluble Chloride
- ☐ Soil Solubility Suite #5: WSSS, Solubility (Total Salts), Soluble Chloride
 Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), Soluble Chloride, Total Sodium Sulfates
- ☒ Soil Solubility Suite #6: Corrosion Suite w/Solubility (Total Salts), AASHTO Resistivity ASTM G57, run as received then saturated
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity (AASHTO), Solubility (Total Salts), Total Sodium Sulfates
- ☐ Soil Solubility Suite #7: Corrosion Suite w/Solubility (Total Salts), NDOT Resistivity
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity (NDOT), Solubility (Total Salts), Total Sodium Sulfates
- ☐ Corrosion Suite
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Total Sodium Sulfates
- ☐ Corrosion Suite w/Resistivity
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity*, Total Sodium Sulfates
 * _____ NDOT (T235) * _____ AASHTO (T288)
- ☐ Corrosion Suite w/Solubility (Total Salts)
 Soluble Sodium, Soluble Sulfate, Chloride, pH, Redox, Sulfide, Solubility (Total Salts), Total Sodium Sulfates
- ____ Sulfate ____ Solubility (Total Salts) ____ pH ____ Chloride
 ____ Resistivity (NDOT T235) ____ Resistivity (AASHTO T288)

VERITAS LABORATORIES

SOIL SOLUBILITY AND CORROSION TESTING ORDER FORM

Client: Kleinfelder Date/Time Sampled: 11:27 AM 1-15-19 DG
 Project Name: Ecigle Shadow MT Project Number: 20191314 (7)
 Lab #: Las Vegas Sample ID: 5127 @ 151 SEP

- ☐ Soil Solubility Suite #1: WSSS
 Soluble Sodium, Soluble Sulfate, Total Sodium Sulfates
- ☐ Soil Solubility Suite #2: WSSS & Solubility (Total Salts)
 Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), Total Sodium Sulfates
- ☐ Soil Solubility Suite #3: WSSS, Solubility, pH, Soluble Chloride
 Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), pH, Soluble Chloride, Total Sodium Sulfates
- ☐ Soil Solubility Suite #4: Sulfate, Solubility (Total Salts), Soluble Chloride
 Soluble Sulfate, Solubility (Total Salts), Soluble Chloride
- ☐ Soil Solubility Suite #5: WSSS, Solubility (Total Salts), Soluble Chloride
 Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), Soluble Chloride, Total Sodium Sulfates
- ☒ Soil Solubility Suite #6: Corrosion Suite w/Solubility (Total Salts), ~~AASHTO Resistivity~~ ASTM: G57 run as received then stabilized
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity (AASHTO), Solubility (Total Salts), Total Sodium Sulfates
- ☐ Soil Solubility Suite #7: Corrosion Suite w/Solubility (Total Salts), NDOT Resistivity
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity (NDOT), Solubility (Total Salts), Total Sodium Sulfates
- ☐ Corrosion Suite
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Total Sodium Sulfates
- ☐ Corrosion Suite w/Resistivity
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity*, Total Sodium Sulfates
 _____ NDOT (T235) _____ AASHTO (T288)
- ☐ Corrosion Suite w/Solubility (Total Salts)
 Soluble Sodium, Soluble Sulfate, Chloride, pH, Redox, Sulfide, Solubility (Total Salts), Total Sodium Sulfates
 _____ Sulfate _____ Solubility (Total Salts) _____ pH _____ Chloride
 _____ Resistivity (NDOT T235) _____ Resistivity (AASHTO T288)

VERITAS LABORATORIES

SOIL SOLUBILITY AND CORROSION TESTING ORDER FORM

Client: KLEINFELDE Date/Time Sampled: _____
 Project Name: Eagle Shadow Mountain Project Number: 2014 1344
 Lab #: _____ Sample ID: TP1 10-1

119A084-08

- ☐ Soil Solubility Suite #1: WSSS
 Soluble Sodium, Soluble Sulfate, Total Sodium Sulfates
- ☐ Soil Solubility Suite #2: WSSS & Solubility (Total Salts)
 Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), Total Sodium Sulfates
- ☐ Soil Solubility Suite #3: WSSS, Solubility, pH, Soluble Chloride
 Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), pH, Soluble Chloride, Total Sodium Sulfates
- ☐ Soil Solubility Suite #4: Sulfate, Solubility (Total Salts), Soluble Chloride
 Soluble Sulfate, Solubility (Total Salts), Soluble Chloride
- ☐ Soil Solubility Suite #5: WSSS, Solubility (Total Salts), Soluble Chloride
 Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), Soluble Chloride, Total Sodium Sulfates
- ☒ Soil Solubility Suite #6: Corrosion Suite w/Solubility (Total Salts), AASHTO Resistivity ASTM G57
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity (AASHTO), Solubility (Total Salts), Total Sodium Sulfates
- ☐ Soil Solubility Suite #7: Corrosion Suite w/Solubility (Total Salts), NDOT Resistivity
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity (NDOT), Solubility (Total Salts), Total Sodium Sulfates
- ☐ Corrosion Suite
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Total Sodium Sulfates
- ☐ Corrosion Suite w/Resistivity
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity*, Total Sodium Sulfates
- * _____ NDOT (T235) * _____ AASHTO (T288)
- ☐ Corrosion Suite w/Solubility (Total Salts)
 Soluble Sodium, Soluble Sulfate, Chloride, pH, Redox, Sulfide, Solubility (Total Salts), Total Sodium Sulfates
- ____ Sulfate _____ Solubility (Total Salts) _____ pH _____ Chloride
- ____ Resistivity (NDOT T235) _____ Resistivity (AASHTO T288)

Run as received,
 then saturated

SOIL SOLUBILITY AND CORROSION TESTING ORDER FORM

Client: _____ Date/Time Sampled: _____
 Project Name: Eagle Shadow Mt Project Number: 20191344
 Lab #: _____ Sample ID: _____

TP4 10-015

191084-09

- ☐ Soil Solubility Suite #1: WSSS
 Soluble Sodium, Soluble Sulfate, Total Sodium Sulfates
- ☐ Soil Solubility Suite #2: WSSS & Solubility (Total Salts)
 Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), Total Sodium Sulfates
- ☐ Soil Solubility Suite #3: WSSS, Solubility, pH, Soluble Chloride
 Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), pH, Soluble Chloride, Total Sodium Sulfates
- ☐ Soil Solubility Suite #4: Sulfate, Solubility (Total Salts), Soluble Chloride
 Soluble Sulfate, Solubility (Total Salts), Soluble Chloride
- ☐ Soil Solubility Suite #5: WSSS, Solubility (Total Salts), Soluble Chloride
 Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), Soluble Chloride, Total Sodium Sulfates
- ☒ Soil Solubility Suite #6: Corrosion Suite w/Solubility (Total Salts), ~~AASHTO Resistivity~~ ASTM G57 run as received
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity (AASHTO), Solubility (Total Salts), Total Sodium Sulfates
- ☐ Soil Solubility Suite #7: Corrosion Suite w/Solubility (Total Salts), NDOT Resistivity
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity (NDOT), Solubility (Total Salts), Total Sodium Sulfates
- ☐ Corrosion Suite
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Total Sodium Sulfates
- ☐ Corrosion Suite w/Resistivity
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity*, Total Sodium Sulfates
 * _____ NDOT (T235) * _____ AASHTO (T288)
- ☐ Corrosion Suite w/Solubility (Total Salts)
 Soluble Sodium, Soluble Sulfate, Chloride, pH, Redox, Sulfide, Solubility (Total Salts), Total Sodium Sulfates
- ____ Sulfate _____ Solubility (Total Salts) _____ pH _____ Chloride
 _____ Resistivity (NDOT T235) _____ Resistivity (AASHTO T288) _____

SOIL SOLUBILITY AND CORROSION TESTING ORDER FORM

Client: KLEINFELDER Date/Time Sampled: _____
 Project Name: Eagle Shadow Mountain Project Number: 20191344
 Lab #: _____ Sample ID: _____

- ☐ Soil Solubility Suite #1: WSSS
 Soluble Sodium, Soluble Sulfate, Total Sodium Sulfates
- ☐ Soil Solubility Suite #2: WSSS & Solubility (Total Salts)
 Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), Total Sodium Sulfates
- ☐ Soil Solubility Suite #3: WSSS, Solubility, pH, Soluble Chloride
 Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), pH, Soluble Chloride, Total Sodium Sulfates
- ☐ Soil Solubility Suite #4: Sulfate, Solubility (Total Salts), Soluble Chloride
 Soluble Sulfate, Solubility (Total Salts), Soluble Chloride
- ☐ Soil Solubility Suite #5: WSSS, Solubility (Total Salts), Soluble Chloride
 Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), Soluble Chloride, Total Sodium Sulfates
- ☒ Soil Solubility Suite #6: Corrosion Suite w/Solubility (Total Salts), ~~AASHTO Resistivity~~ ASTM G57 run as received
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, ~~Sulfide~~, Resistivity (AASHTO), Solubility (Total Salts), Total Sodium Sulfates
- ☐ Soil Solubility Suite #7: Corrosion Suite w/Solubility (Total Salts), NDOT Resistivity
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity (NDOT), Solubility (Total Salts), Total Sodium Sulfates
- ☐ Corrosion Suite
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Total Sodium Sulfates
- ☐ Corrosion Suite w/Resistivity
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity*, Total Sodium Sulfates
 * _____ NDOT (T235) * _____ AASHTO (T288)
- ☐ Corrosion Suite w/Solubility (Total Salts)
 Soluble Sodium, Soluble Sulfate, Chloride, pH, Redox, Sulfide, Solubility (Total Salts), Total Sodium Sulfates
- ____ Sulfate _____ Solubility (Total Salts) _____ pH _____ Chloride
 _____ Resistivity (NDOT T235) _____ Resistivity (AASHTO T288)

TP6 10-1'

V19A084-10

SOIL SOLUBILITY AND CORROSION TESTING ORDER FORM

Client: KLEINFELDER
 Project Name: Eagle Shadow Mountain Date/Time Sampled: _____
 Lab #: _____ Sample ID: _____ Project Number: 20191344

- ☐ Soil Solubility Suite #1: WSSS
 Soluble Sodium, Soluble Sulfate, Total Sodium Sulfates
- ☐ Soil Solubility Suite #2: WSSS & Solubility (Total Salts)
 Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), Total Sodium Sulfates
- ☐ Soil Solubility Suite #3: WSSS, Solubility, pH, Soluble Chloride
 Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), pH, Soluble Chloride, Total Sodium Sulfates
- ☐ Soil Solubility Suite #4: Sulfate, Solubility (Total Salts), Soluble Chloride
 Soluble Sulfate, Solubility (Total Salts), Soluble Chloride
- ☐ Soil Solubility Suite #5: WSSS, Solubility (Total Salts), Soluble Chloride
 Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), Soluble Chloride, Total Sodium Sulfates
- ☒ Soil Solubility Suite #6: Corrosion Suite w/Solubility (Total Salts), AASHTO Resistivity ASTM G57, run as received
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity (AASHTO), Solubility (Total Salts), Total Sodium Sulfates
- ☐ Soil Solubility Suite #7: Corrosion Suite w/Solubility (Total Salts), NDOT Resistivity
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity (NDOT), Solubility (Total Salts), Total Sodium Sulfates
- ☐ Corrosion Suite
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Total Sodium Sulfates
- ☐ Corrosion Suite w/Resistivity
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity*, Total Sodium Sulfates
 * _____ NDOT (T235) * _____ AASHTO (T288)
- ☐ Corrosion Suite w/Solubility (Total Salts)
 Soluble Sodium, Soluble Sulfate, Chloride, pH, Redox, Sulfide, Solubility (Total Salts), Total Sodium Sulfates
 _____ Sulfate _____ Solubility (Total Salts) _____ pH _____ Chloride
 _____ Resistivity (NDOT T235) _____ Resistivity (AASHTO T288)

TP810-1'

19A084-11

CENTAS LABORATORIES
SOIL SOLUBILITY AND CORROSION TESTING ORDER FORM

Client: KLEINFEIDEN Date/Time Sampled: _____
 Project Name: Egle Station Mountain Project Number: 20191344
 Lab #: _____ Sample ID: _____

V19A084-12

TP 10 : 0-1'

- ☐ Soil Solubility Suite #1: WSSS
Soluble Sodium, Soluble Sulfate, Total Sodium Sulfates
- ☐ Soil Solubility Suite #2: WSSS & Solubility (Total Salts)
Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), Total Sodium Sulfates
- ☐ Soil Solubility Suite #3: WSSS, Solubility, pH, Soluble Chloride
Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), pH, Soluble Chloride, Total Sodium Sulfates
- ☐ Soil Solubility Suite #4: Sulfate, Solubility (Total Salts), Soluble Chloride
Soluble Sulfate, Solubility (Total Salts), Soluble Chloride
- ☐ Soil Solubility Suite #5: WSSS, Solubility (Total Salts), Soluble Chloride
Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), Soluble Chloride, Total Sodium Sulfates
- ☒ Soil Solubility Suite #6: Corrosion Suite w/Solubility (Total Salts), ~~AASHTO Resistivity~~ *ASTM G57, run as received The Saturated*
Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity (AASHTO), Solubility (Total Salts), Total Sodium Sulfates
- ☐ Soil Solubility Suite #7: Corrosion Suite w/Solubility (Total Salts), NDOT Resistivity
Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity (NDOT), Solubility (Total Salts), Total Sodium Sulfates
- ☐ Corrosion Suite
Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Total Sodium Sulfates
- ☐ Corrosion Suite w/Resistivity
Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity*, Total Sodium Sulfates
* _____ NDOT (T235) * _____ AASHTO (T288)
- ☐ Corrosion Suite w/Solubility (Total Salts)
Soluble Sodium, Soluble Sulfate, Chloride, pH, Redox, Sulfide, Solubility (Total Salts), Total Sodium Sulfates
____ Sulfate ____ Solubility (Total Salts) ____ pH ____ Chloride
____ Resistivity (NDOT T235) ____ Resistivity (AASHTO T288) _____

VERITAS LABORATORIES

SOIL SOLUBILITY AND CORROSION TESTING ORDER FORM

Client: KLEINFELDER Date/Time Sampled: _____
 Project Name: Eagle Shadow Mt Project Number: 20191344
 Lab #: _____ Sample ID: _____

V19A084-13

TP 12: 0-1'

ASTM G57

- ☐ Soil Solubility Suite #1: WSSS
Soluble Sodium, Soluble Sulfate, Total Sodium Sulfates
- ☐ Soil Solubility Suite #2: WSSS & Solubility (Total Salts)
Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), Total Sodium Sulfates
- ☐ Soil Solubility Suite #3: WSSS, Solubility, pH, Soluble Chloride
Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), pH, Soluble Chloride, Total Sodium Sulfates
- ☐ Soil Solubility Suite #4: Sulfate, Solubility (Total Salts), Soluble Chloride
Soluble Sulfate, Solubility (Total Salts), Soluble Chloride
- ☐ Soil Solubility Suite #5: WSSS, Solubility (Total Salts), Soluble Chloride
Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), Soluble Chloride, Total Sodium Sulfates
- ☒ Soil Solubility Suite #6: Corrosion Suite w/Solubility (Total Salts), ~~AASHTO Resistivity~~ 1 *run as received, then saturated*
Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity (AASHTO), Solubility (Total Salts), Total Sodium Sulfates
- ☐ Soil Solubility Suite #7: Corrosion Suite w/Solubility (Total Salts), NDOT Resistivity
Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity (NDOT), Solubility (Total Salts), Total Sodium Sulfates
- ☐ Corrosion Suite
Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Total Sodium Sulfates
- ☐ Corrosion Suite w/Resistivity
Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity*, Total Sodium Sulfates
* _____ NDOT (T235) * _____ AASHTO (T288)
- ☐ Corrosion Suite w/Solubility (Total Salts)
Soluble Sodium, Soluble Sulfate, Chloride, pH, Redox, Sulfide, Solubility (Total Salts), Total Sodium Sulfates
- ____ Sulfate _____ Solubility (Total Salts) _____ pH _____ Chloride
 ____ Resistivity (NDOT T235) _____ Resistivity (AASHTO T288)

VERITAS LABORATORIES

SOIL SOLUBILITY AND CORROSION TESTING ORDER FORM

Client: Kleinfelder Date/Time Sampled: 9:23 AM 1-15-18 DG
 Project Name: Eagle Shadow MT Project Number: 20191344 (G)
 Lab #: Las Vegas Sample ID: TR13 0-1

☐ Soil Solubility Suite #1: WSSS

Soluble Sodium, Soluble Sulfate, Total Sodium Sulfates

☐ Soil Solubility Suite #2: WSSS & Solubility (Total Salts)

Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), Total Sodium Sulfates

☐ Soil Solubility Suite #3: WSSS, Solubility, pH, Soluble Chloride

Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), pH, Soluble Chloride, Total Sodium Sulfates

☐ Soil Solubility Suite #4: Sulfate, Solubility (Total Salts), Soluble Chloride

Soluble Sulfate, Solubility (Total Salts), Soluble Chloride

☐ Soil Solubility Suite #5: WSSS, Solubility (Total Salts), Soluble Chloride

Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), Soluble Chloride, Total Sodium Sulfates

☒ Soil Solubility Suite #6: Corrosion Suite w/Solubility (Total Salts), ~~AASHTO Resistivity~~ ASTM G57 then Sturated

Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity (AASHTO), Solubility (Total Salts), Total Sodium Sulfates

☐ Soil Solubility Suite #7: Corrosion Suite w/Solubility (Total Salts), NDOT Resistivity

Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity (NDOT), Solubility (Total Salts), Total Sodium Sulfates

☐ Corrosion Suite

Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Total Sodium Sulfates

☐ Corrosion Suite w/Resistivity

Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity*, Total Sodium Sulfates

* _____ NDOT (T235) * _____ AASHTO (T288)

☐ Corrosion Suite w/Solubility (Total Salts)

Soluble Sodium, Soluble Sulfate, Chloride, pH, Redox, Sulfide, Solubility (Total Salts), Total Sodium Sulfates

____ Sulfate ____ Solubility (Total Salts) ____ pH ____ Chloride

____ Resistivity (NDOT T235) ____ Resistivity (AASHTO T288)

V19A084-14

run AS received

VERITAS LABORATORIES

SOIL SOLUBILITY AND CORROSION TESTING ORDER FORM

Client: Klein Felder Date/Time Sampled: 8:56 a.m. 1-15-19
 Project Name: Eagle Shadow MT Project Number: 2091344 (7)
 Lab #: Las Vegas Sample ID: TP-15 @ 0-1'

- ☐ Soil Solubility Suite #1: WSSS
Soluble Sodium, Soluble Sulfate, Total Sodium Sulfates
- ☐ Soil Solubility Suite #2: WSSS & Solubility (Total Salts)
Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), Total Sodium Sulfates
- ☐ Soil Solubility Suite #3: WSSS, Solubility, pH, Soluble Chloride
Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), pH, Soluble Chloride, Total Sodium Sulfates
- ☐ Soil Solubility Suite #4: Sulfate, Solubility (Total Salts), Soluble Chloride
Soluble Sulfate, Solubility (Total Salts), Soluble Chloride
- ☐ Soil Solubility Suite #5: WSSS, Solubility (Total Salts), Soluble Chloride
Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), Soluble Chloride, Total Sodium Sulfates
- ☒ Soil Solubility Suite #6: Corrosion Suite w/Solubility (Total Salts), AASHTO Resistivity ASTM G57 than saturated.
Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity (AASHTO), Solubility (Total Salts), Total Sodium Sulfates
- ☐ Soil Solubility Suite #7: Corrosion Suite w/Solubility (Total Salts), NDOT Resistivity
Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity (NDOT), Solubility (Total Salts), Total Sodium Sulfates
- ☐ Corrosion Suite
Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Total Sodium Sulfates
- ☐ Corrosion Suite w/Resistivity
Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity*, Total Sodium Sulfates
* _____ NDOT (T235) * _____ AASHTO (T288)
- ☐ Corrosion Suite w/Solubility (Total Salts)
Soluble Sodium, Soluble Sulfate, Chloride, pH, Redox, Sulfide, Solubility (Total Salts), Total Sodium Sulfates
____ Sulfate ____ Solubility (Total Salts) ____ pH ____ Chloride
____ Resistivity (NDOT T235) ____ Resistivity (AASHTO T288) ____

V19A084-15

run as required

VERITAS LABORATORIES

SOIL SOLUBILITY AND CORROSION TESTING ORDER FORM

Client: KLEINFELDER Date/Time Sampled: _____
 Project Name: Eagle Shadow Rd Project Number: 20191344
 Lab #: _____ Sample ID: TP1910-11

- ☐ Soil Solubility Suite #1: WSSS
 Soluble Sodium, Soluble Sulfate, Total Sodium Sulfates
- ☐ Soil Solubility Suite #2: WSSS & Solubility (Total Salts)
 Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), Total Sodium Sulfates
- ☐ Soil Solubility Suite #3: WSSS, Solubility, pH, Soluble Chloride
 Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), pH, Soluble Chloride, Total Sodium Sulfates
- ☐ Soil Solubility Suite #4: Sulfate, Solubility (Total Salts), Soluble Chloride
 Soluble Sulfate, Solubility (Total Salts), Soluble Chloride
- ☐ Soil Solubility Suite #5: WSSS, Solubility (Total Salts), Soluble Chloride
 Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), Soluble Chloride, Total Sodium Sulfates
- ☒ Soil Solubility Suite #6: Corrosion Suite w/Solubility (Total Salts), ~~AASHTO Resistivity~~ run as received, Then Saturated
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity (AASHTO), Solubility (Total Salts), Total Sodium Sulfates
- ☐ Soil Solubility Suite #7: Corrosion Suite w/Solubility (Total Salts), NDOT Resistivity
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity (NDOT), Solubility (Total Salts), Total Sodium Sulfates
- ☐ Corrosion Suite
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Total Sodium Sulfates
- ☐ Corrosion Suite w/Resistivity
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity*, Total Sodium Sulfates
 * _____ NDOT (T235) * _____ AASHTO (T288)
- ☐ Corrosion Suite w/Solubility (Total Salts)
 Soluble Sodium, Soluble Sulfate, Chloride, pH, Redox, Sulfide, Solubility (Total Salts), Total Sodium Sulfates
- ____ Sulfate _____ Solubility (Total Salts) _____ pH _____ Chloride
 ____ Resistivity (NDOT T235) _____ Resistivity (AASHTO T288) _____

VERITAS LABORATORIES

SOIL SOLUBILITY AND CORROSION TESTING ORDER FORM

Client: Kleinfelder Date/Time Sampled: 9:25 AM 1-15-19 DG
 Project Name: Eagle Shadow MT Project Number: 20191344 (7)
 Lab #: Las Vegas Sample ID: TP 20 @ 0-1

- ☐ Soil Solubility Suite #1: WSSS
 Soluble Sodium, Soluble Sulfate, Total Sodium Sulfates
- ☐ Soil Solubility Suite #2: WSSS & Solubility (Total Salts)
 Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), Total Sodium Sulfates
- ☐ Soil Solubility Suite #3: WSSS, Solubility, pH, Soluble Chloride
 Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), pH, Soluble Chloride, Total Sodium Sulfates
- ☐ Soil Solubility Suite #4: Sulfate, Solubility (Total Salts), Soluble Chloride
 Soluble Sulfate, Solubility (Total Salts), Soluble Chloride
- ☐ Soil Solubility Suite #5: WSSS, Solubility (Total Salts), Soluble Chloride
 Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), Soluble Chloride, Total Sodium Sulfates
- ☒ Soil Solubility Suite #6: Corrosion Suite w/Solubility (Total Salts), ~~AASHTO Resistivity~~ ASTM G57 *run as recieved then saturated.*
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity (AASHTO), Solubility (Total Salts), Total Sodium Sulfates
- ☐ Soil Solubility Suite #7: Corrosion Suite w/Solubility (Total Salts), NDOT Resistivity
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity (NDOT), Solubility (Total Salts), Total Sodium Sulfates
- ☐ Corrosion Suite
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Total Sodium Sulfates
- ☐ Corrosion Suite w/Resistivity
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity*, Total Sodium Sulfates
 * _____ NDOT (T235) * _____ AASHTO (T288)
- ☐ Corrosion Suite w/Solubility (Total Salts)
 Soluble Sodium, Soluble Sulfate, Chloride, pH, Redox, Sulfide, Solubility (Total Salts), Total Sodium Sulfates
 _____ Sulfate _____ Solubility (Total Salts) _____ pH _____ Chloride
 _____ Resistivity (NDOT T235) _____ Resistivity (AASHTO T288)

V19A084-17

run as recieved
ASTM G57 then
saturated.

VERITAS LABORATORIES

SOIL SOLUBILITY AND CORROSION TESTING ORDER FORM

Client: Kleinfield Date/Time Sampled: _____
 Project Name: Eagle Mt Project Number: 20191344
 Lab #: _____ Sample ID: _____

- ☐ Soil Solubility Suite #1: WSSS
 Soluble Sodium, Soluble Sulfate, Total Sodium Sulfates
- ☐ Soil Solubility Suite #2: WSSS & Solubility (Total Salts)
 Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), Total Sodium Sulfates
- ☐ Soil Solubility Suite #3: WSSS, Solubility, pH, Soluble Chloride
 Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), pH, Soluble Chloride, Total Sodium Sulfates
- ☐ Soil Solubility Suite #4: Sulfate, Solubility (Total Salts), Soluble Chloride
 Soluble Sulfate, Solubility (Total Salts), Soluble Chloride
- ☐ Soil Solubility Suite #5: WSSS, Solubility (Total Salts), Soluble Chloride
 Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), Soluble Chloride, Total Sodium Sulfates
- ☒ Soil Solubility Suite #6: Corrosion Suite w/Solubility (Total Salts), ~~AASHTO Resistivity~~ ASTM 657 Run as received Then Saturated
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity (AASHTO), Solubility (Total Salts), Total Sodium Sulfates
- ☐ Soil Solubility Suite #7: Corrosion Suite w/Solubility (Total Salts), NDOT Resistivity
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity (NDOT), Solubility (Total Salts), Total Sodium Sulfates
- ☐ Corrosion Suite
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Total Sodium Sulfates
- ☐ Corrosion Suite w/Resistivity
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity*, Total Sodium Sulfates
 * _____ NDOT (T235) * _____ AASHTO (T288)
- ☐ Corrosion Suite w/Solubility (Total Salts)
 Soluble Sodium, Soluble Sulfate, Chloride, pH, Redox, Sulfide, Solubility (Total Salts), Total Sodium Sulfates
- ____ Sulfate ____ Solubility (Total Salts) ____ pH ____ Chloride
 ____ Resistivity (NDOT T235) ____ Resistivity (AASHTO T288)

TP21 10-11

V19A004-18

VERITAS LABORATORIES

SOIL SOLUBILITY AND CORROSION TESTING ORDER FORM

Client: Eagle Shadow Mt Date/Time Sampled: 20191344
 Project Name: Eagle Shadow Mt Project Number: 20191344
 Lab #: _____ Sample ID: _____

- TP21:4-8'
- U9A084-19
- ☐ Soil Solubility Suite #1: WSSS
Soluble Sodium, Soluble Sulfate, Total Sodium Sulfates
- ☐ Soil Solubility Suite #2: WSSS & Solubility (Total Salts)
Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), Total Sodium Sulfates
- ☐ Soil Solubility Suite #3: WSSS, Solubility, pH, Soluble Chloride
Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), pH, Soluble Chloride, Total Sodium Sulfates
- ☐ Soil Solubility Suite #4: Sulfate, Solubility (Total Salts), Soluble Chloride
Soluble Sulfate, Solubility (Total Salts), Soluble Chloride
- ☐ Soil Solubility Suite #5: WSSS, Solubility (Total Salts), Soluble Chloride
Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), Soluble Chloride, Total Sodium Sulfates
- ☒ Soil Solubility Suite #6: Corrosion Suite w/Solubility (Total Salts), ~~AASHTO Resistivity~~ *ASTM G57*
run as received then saturated
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity (AASHTO), Solubility (Total Salts), Total Sodium Sulfates
- ☐ Soil Solubility Suite #7: Corrosion Suite w/Solubility (Total Salts), NDOT Resistivity
Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity (NDOT), Solubility (Total Salts), Total Sodium Sulfates
- ☐ Corrosion Suite
Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Total Sodium Sulfates
- ☐ Corrosion Suite w/Resistivity
Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity*, Total Sodium Sulfates
 * _____ NDOT (T235) * _____ AASHTO (T288)
- ☐ Corrosion Suite w/Solubility (Total Salts)
Soluble Sodium, Soluble Sulfate, Chloride, pH, Redox, Sulfide, Solubility (Total Salts), Total Sodium Sulfates
- ____ Sulfate ____ Solubility (Total Salts) ____ pH ____ Chloride
 ____ Resistivity (NDOT T235) ____ Resistivity (AASHTO T288)

VERITAS LABORATORIES

SOIL SOLUBILITY AND CORROSION TESTING ORDER FORM

Client: Kleinfelder Date/Time Sampled: 9:08 AM 1-15-19 DG
 Project Name: Eagle Shadow MT Project Number: 20191344 (7)
 Lab #: Las Vegas Sample ID: TP 23 0 0-1

- ☐ Soil Solubility Suite #1: WSSS
Soluble Sodium, Soluble Sulfate, Total Sodium Sulfates
- ☐ Soil Solubility Suite #2: WSSS & Solubility (Total Salts)
Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), Total Sodium Sulfates
- ☐ Soil Solubility Suite #3: WSSS, Solubility, pH, Soluble Chloride
Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), pH, Soluble Chloride, Total Sodium Sulfates
- ☐ Soil Solubility Suite #4: Sulfate, Solubility (Total Salts), Soluble Chloride
Soluble Sulfate, Solubility (Total Salts), Soluble Chloride
- ☐ Soil Solubility Suite #5: WSSS, Solubility (Total Salts), Soluble Chloride
Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), Soluble Chloride, Total Sodium Sulfates
- ☒ Soil Solubility Suite #6: Corrosion Suite w/Solubility (Total Salts), ~~AASHTO Resistivity~~ ASTM G57 run 45 reviewed than Saturated
Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity (AASHTO), Solubility (Total Salts), Total Sodium Sulfates
- ☐ Soil Solubility Suite #7: Corrosion Suite w/Solubility (Total Salts), NDOT Resistivity
Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity (NDOT), Solubility (Total Salts), Total Sodium Sulfates
- ☐ Corrosion Suite
Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Total Sodium Sulfates
- ☐ Corrosion Suite w/Resistivity
Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity*, Total Sodium Sulfates
* _____ NDOT (T235) * _____ AASHTO (T288)
- ☐ Corrosion Suite w/Solubility (Total Salts)
Soluble Sodium, Soluble Sulfate, Chloride, pH, Redox, Sulfide, Solubility (Total Salts), Total Sodium Sulfates
____ Sulfate _____ Solubility (Total Salts) _____ pH _____ Chloride
____ Resistivity (NDOT T235) _____ Resistivity (AASHTO T288)

119A084-20

ASTM G57 run 45 reviewed than Saturated

71.0

VERITAS LABORATORIES

SOIL SOLUBILITY AND CORROSION TESTING ORDER FORM

Client: R. LEINFEIDER Date/Time Sampled: _____
 Project Name: Eagle Mountain Shadow Project Number: 20191344
 Lab #: _____ Sample ID: _____

- ☐ Soil Solubility Suite #1: WSSS
 Soluble Sodium, Soluble Sulfate, Total Sodium Sulfates
- ☐ Soil Solubility Suite #2: WSSS & Solubility (Total Salts)
 Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), Total Sodium Sulfates
- ☐ Soil Solubility Suite #3: WSSS, Solubility, pH, Soluble Chloride
 Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), pH, Soluble Chloride, Total Sodium Sulfates
- ☐ Soil Solubility Suite #4: Sulfate, Solubility (Total Salts), Soluble Chloride
 Soluble Sulfate, Solubility (Total Salts), Soluble Chloride
- ☐ Soil Solubility Suite #5: WSSS, Solubility (Total Salts), Soluble Chloride
 Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), Soluble Chloride, Total Sodium Sulfates
- ☒ Soil Solubility Suite #6: Corrosion Suite w/Solubility (Total Salts), AASHTO Resistivity *ASTM G57, as noted, the standard*
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity (AASHTO), Solubility (Total Salts), Total Sodium Sulfates
- ☐ Soil Solubility Suite #7: Corrosion Suite w/Solubility (Total Salts), NDOT Resistivity
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity (NDOT), Solubility (Total Salts), Total Sodium Sulfates
- ☐ Corrosion Suite
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Total Sodium Sulfates
- ☐ Corrosion Suite w/Resistivity
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity*, Total Sodium Sulfates
 * _____ NDOT (T235) * _____ AASHTO (T288)
- ☐ Corrosion Suite w/Solubility (Total Salts)
 Soluble Sodium, Soluble Sulfate, Chloride, pH, Redox, Sulfide, Solubility (Total Salts), Total Sodium Sulfates
 _____ Sulfate _____ Solubility (Total Salts) _____ pH _____ Chloride
 _____ Resistivity (NDOT T235) _____ Resistivity (AASHTO T288)

TP25: 0-1'

V19A084-21

ASTM G57, as noted, the standard

VERITAS LABORATORIES

SOIL SOLUBILITY AND CORROSION TESTING ORDER FORM

Client: KLEINFELDER Date/Time Sampled: _____
 Project Name: _____ Project Number: 20191344
 Lab #: _____ Sample ID: _____

- ☐ Soil Solubility Suite #1: WSSS
 Soluble Sodium, Soluble Sulfate, Total Sodium Sulfates
- ☐ Soil Solubility Suite #2: WSSS & Solubility (Total Salts)
 Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), Total Sodium Sulfates
- ☐ Soil Solubility Suite #3: WSSS, Solubility, pH, Soluble Chloride
 Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), pH, Soluble Chloride, Total Sodium Sulfates
- ☐ Soil Solubility Suite #4: Sulfate, Solubility (Total Salts), Soluble Chloride
 Soluble Sulfate, Solubility (Total Salts), Soluble Chloride
- ☐ Soil Solubility Suite #5: WSSS, Solubility (Total Salts), Soluble Chloride
 Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), Soluble Chloride, Total Sodium Sulfates
- ☒ Soil Solubility Suite #6: Corrosion Suite w/Solubility (Total Salts), ~~AASHTO Resistivity~~ *run as received, then saturated*
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity (AASHTO), Solubility (Total Salts), Total Sodium Sulfates
- ☐ Soil Solubility Suite #7: Corrosion Suite w/Solubility (Total Salts), NDOT Resistivity
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity (NDOT), Solubility (Total Salts), Total Sodium Sulfates
- ☐ Corrosion Suite
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Total Sodium Sulfates
- ☐ Corrosion Suite w/Resistivity
 Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity*, Total Sodium Sulfates
 * _____ NDOT (T235) * _____ AASHTO (T288)
- ☐ Corrosion Suite w/Solubility (Total Salts)
 Soluble Sodium, Soluble Sulfate, Chloride, pH, Redox, Sulfide, Solubility (Total Salts), Total Sodium Sulfates
 _____ Sulfate _____ Solubility (Total Salts) _____ pH _____ Chloride
 _____ Resistivity (NDOT T235) _____ Resistivity (AASHTO T288)

TP26 : 0-11

V19A084-22

ASTM G57

VERITAS LABORATORIES

SOIL SOLUBILITY AND CORROSION TESTING ORDER FORM

Client: Kleinfelder Date/Time Sampled: 9:50AM 1-15-19
 Project Name: Leight Shadow MT Project Number: 20191344 (7)
 Lab #: Las Vegas Sample ID: TP-2860-1

- ☐ Soil Solubility Suite #1: WSSS
Soluble Sodium, Soluble Sulfate, Total Sodium Sulfates
- ☐ Soil Solubility Suite #2: WSSS & Solubility (Total Salts)
Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), Total Sodium Sulfates
- ☐ Soil Solubility Suite #3: WSSS, Solubility, pH, Soluble Chloride
Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), pH, Soluble Chloride, Total Sodium Sulfates
- ☐ Soil Solubility Suite #4: Sulfate, Solubility (Total Salts), Soluble Chloride
Soluble Sulfate, Solubility (Total Salts), Soluble Chloride
- ☐ Soil Solubility Suite #5: WSSS, Solubility (Total Salts), Soluble Chloride
Soluble Sodium, Soluble Sulfate, Solubility (Total Salts), Soluble Chloride, Total Sodium Sulfates
- ☒ Soil Solubility Suite #6: Corrosion Suite w/Solubility (Total Salts), ~~AASHTO Resistivity~~ ASTM G57 than sturater
Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity (AASHTO), Solubility (Total Salts), Total Sodium Sulfates
- ☐ Soil Solubility Suite #7: Corrosion Suite w/Solubility (Total Salts), NDOT Resistivity
Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity (NDOT), Solubility (Total Salts), Total Sodium Sulfates
- ☐ Corrosion Suite
Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Total Sodium Sulfates
- ☐ Corrosion Suite w/Resistivity
Soluble Sodium, Soluble Sulfate, Soluble Chloride, pH, Redox, Sulfide, Resistivity*, Total Sodium Sulfates
* _____ NDOT (T235) * _____ AASHTO (T288)
- ☐ Corrosion Suite w/Solubility (Total Salts)
Soluble Sodium, Soluble Sulfate, Chloride, pH, Redox, Sulfide, Solubility (Total Salts), Total Sodium Sulfates
____ Sulfate ____ Solubility (Total Salts) ____ pH ____ Chloride
____ Resistivity (NDOT T235) ____ Resistivity (AASHTO T288)

V19A084-23

run as received



Appendix F



APPENDIX F

Corrosion Control Recommendations (6 pages)



April 10, 2019
Kleinfelder Project No.: 20191344.001A

Mr. Tristan Cooke, PE, LEED-AP
325MK 8me LLC
211 Sutter Street; 6th Floor
San Francisco, CA 94108

**SUBJECT: Corrosion Control Recommendations
Eagle Shadow Mountain Solar Project
Moapa River Indian Reservation, USA**

Dear Mr. Cooke:

Per your request, Kleinfelder, Inc. (Kleinfelder) presents corrosion control recommendations for the Eagle Shadow Mountain Solar Project, a photovoltaic (PV) solar electric generating project planned in Moapa River Indian Reservation, north of Las Vegas, Nevada. Kleinfelder performed geotechnical investigation for the project (Project number 20191344.001A, report dated 2/27/19).

Kleinfelder assumes that the PV racking will be installed on driven piles fabricated from 6-inch steel beams (W6x7, W6x15, or similar) and that the pile embedment will be approximately 7 to 9 feet. Subsurface data were provided in the geotechnical engineering report by Kleinfelder. We understand the design life of the structure is 40 years.

Based on the soil, groundwater, and laboratory testing data presented in the geotechnical engineering report, as well as material standards and industry reports, Kleinfelder is providing an assessment for galvanic and atmospheric corrosion, estimated corrosion rates, and recommendations for protection against corrosion.

Corrosion is defined as the deterioration of a metal that results from a reaction with its environment. "External corrosion" occurs below grade, where the pile is in contact with soil but at depths where relatively anoxic soils conditions exist. "Atmospheric corrosion" occurs within the soil to air transition zone located approximately 18-inches below grade to the top of pile above grade and is primarily due to moisture and oxygen but can be accentuated by other airborne contaminants such as sodium chloride.

CORROSION EVALUATION

Information presented in the following paragraphs was considered in assessing the potential for external and atmospheric corrosion of the piles for the subject project.

Surface Conditions:

The proposed site is located in undeveloped desert. The site slopes overall down from the west to the east. Cemented soils, cobbles, and boulders were observed at the ground surface. A cover of typical desert vegetation was also present. Several washes up to several feet deep and a few to more than 10 feet wide are present at the site.

Subsurface:

The near surface soils encountered in the explorations generally consisted of medium dense to very dense granular soils. The granular soils encountered had silt and clay contents ranging from approximately 20 to 40 percent with plasticity indices typically ranging from non-plastic to 15. Near-surface, high-plasticity, fine-grained soils were present in a few of the explorations, generally located near the center and eastern portions of the site.

Climate:

The site is located where the average rainfall for the year is approximately 5 inches¹.

Laboratory Test Results:

The geotechnical engineering report provided laboratory chemical test results on 23 samples. A summary of the results is presented in Table 1.

Table 1 – Laboratory Test Results Summary

	Chloride Concentration (ppm)	Sulfate Concentration (ppm)	Red-Ox Potential (mV)	pH
Minimum Value	0	10	133	8
Average Value	193	835	234	8.5
Maximum Value	1800	8000	294	8.9

10 Sulfide concentrations >1 ppm with maximum value of 27 ppm for all samples.
ppm – Parts per Million;
mV – millivolt

Field Resistivity Test Results:

The geotechnical engineering report provided results of 20 in-situ soil resistivity lines using the Wenner four-pin method (ASTM method G57). This reading type by nature of the test is averaged to a depth equal to the pin spacing; therefore this test considers the entire depth. Resistivity results from depths up to 70' were considered for the corrosion rate calculations.

¹ <https://www.usclimatedata.com/climate/north-las-vegas/nevada/united-states/usnv0142>
20191344.001A/DEN19L91867
© 2019 Kleinfelder

Table 2 – Field Resistivity Test Results (Ω -cm)

Test Location	Spacing (ft)											
	2.5	5	7.5	10	15	20	25	30	40	50	60	70
Min. Value	22,809	10,284	6,960	4,276	3,266	2,486	3,086	3,250	2,123	1,650	1,327	1,180
Ave. Value	254,005	122,596	60,767	39,885	22,253	13,756	11,659	9,504	6,101	4,639	3,726	3,208
Max. Value	699,974	474,948	213,008	185,019	84,227	44,890	28,334	24,446	12,303	8,420	5,487	5,290
Overall Avg.	46,008											

CONCLUSIONS AND RECOMMENDATIONS

Through the design life of the piles, galvanization is first consumed in the zones of external and atmospheric corrosion. Once the galvanization is consumed, the steel begins to corrode. The design life of the pile is, therefore, the sum of the time that it takes to consume the galvanization and the time that it takes to reduce the steel section down to a level that is no longer structurally stable.

Above-Grade Corrosion

Corrosion of the components above grade is related to humidity, chemical contaminants and pollutants in the air, and other factors. Considering the site's semi-rural location, we estimate the Corrosivity Category to be C2, based on ISO 9223.

Below-Grade Corrosion

Based on the provided data, site soils exhibit non-corrosive resistivity (averaging 46,008 ohm-cm), moderate concentration of sulfates, extremely high concentration of chlorides, moderately corrosive soil oxidation reduction (redox, average 234 mV), and pH values indicating strongly alkaline soils.

Soils with these combined properties are considered to be moderately corrosive to metals. The representative soils used for analysis were chosen based upon their similar soil chemistry as well as their mechanical properties (grain type, size, and relative amounts).

Higher resistivity contributes to the soil being less conductive and therefore less corrosive. The AGA Service Life of Galvanized Steel Article indicates that high chlorides (above 20 ppm) will shorten the extended service life, however, alkaline soils can outweigh this effect. Moderate soil oxidation reduction (100 - 200 mV) indicates that anaerobic bacterial corrosion is likely in undisturbed soils. Due to the presence of cemented soils and cobbles, pre-drilling of pile locations will be employed, thus, the pile will be installed in disturbed soil. Given the very low moisture climate and given that PV development does not involve irrigation or significant site grading, it is unlikely the disturbance will increase the corrosion rates.

Kleinfelder understands that the foundation designer will specify the required galvanization coating considering the allowable steel loss and the structural capacity of the pile. Corrosion rate of galvanization and bare steel was

evaluated for external and atmospheric corrosion. All piles will be exposed to both corrosion regimes therefore Kleinfelder presents only one corrosion rate based on the controlling exposure. The magnitude of corrosion loss should be anticipated on both sides of the flanges and web of the piles. The structural engineer should consider the potential corrosion loss when sizing the piles.

The estimated time to zinc depletion for hot- dipped galvanization that conforms to ASTM A123 (approximately 3 mil coating) is more than 40 years. After depletion of the galvanization coating, bare steel in contact with earth would expect to see metal loss similar to the following:

Table 3 – Estimated Corrosion Rates to Piles after Depletion of Galvanization

Time of Exposure (years)	Approximate Loss of Material per Exposed Face
	Bare Steel (mil)
10	9
20	12
25	14
30	15
35	17
40	18

Grounding of posts with buried, bare copper wire presents a risk to the galvanization from dissimilar metal corrosion. Dissimilar metal corrosion can occur if there is no shielding between the copper grounding wire and the grounded pile when in close proximity to each other. This dissimilar metal corrosion could accelerate the corrosion rate of the zinc in the vicinity of the copper wire. Providing special fasteners, at the connection between the galvanized post and bond wire that are designed to reduce corrosion, can alleviate the corrosion circuit. Alternately, electrical shielding of ground wires could be accomplished by insulating wires (i.e. THHN) that connect the grounded pile to the grounding trunk line, up to a distance of 10 feet.

LIMITATIONS

This work was performed in a manner consistent with that level of care and skill ordinarily exercised by other members of Kleinfelder's profession, practicing in the same locality, under similar conditions, and at the date the services are provided. Our conclusions, opinions, and recommendations are based on a limited number of observations and data. It is possible that conditions could vary between or beyond the data evaluated. Structural recommendations are not included in this corrosion evaluation. Kleinfelder makes no other representation, guarantee or warranty (express or implied), regarding the services, communication (oral or written), report, opinion, or instrument of service provided. This report may be used only by 325MK 8me LLC and the registered design professional in responsible charge and only for the purposes stated for this specific engagement within a reasonable time from its issuance, but in no event later than one year from the date of the report.

CLOSING

The opinions and statements included in this letter are subject to the limitations presented above. We appreciate the opportunity of providing our services for this project. If you have questions regarding this letter or, if we may be of further assistance, please contact the undersigned.

Sincerely,

KLEINFELDER, INC.



Christopher Strout, PE, NACE CP3, #69107
Engineering Supervisor



Marc Moncilovich
Geotechnical Project Manager



Christopher Strout, NV PE #023421

CORROSION RATE REFERENCES

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- Daflou, E., Rakanta, E., Batis, G, "Corrosion Protection Methods of Structural Steel Against Atmospheric Corrosion", Section of Materials Science and Technology, National Technical University of Athens, Greece. Retrieved September 2017.
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Financials

325MK 8ME, LLC
Income Statement
January 1, 2025 - December 31, 2025

Financial Row	Amount
Ordinary Income/Expense	
Income	
40000 - Revenue	
40005 - PPA Revenue	\$21,490,211.82
Total - 40000 - Revenue	\$21,490,211.82
Total - Income	\$21,490,211.82
Cost Of Sales	
50000 - Cost Of Operations	
50005 - Maintenance Agreement - Operations & Maintenance	\$1,297,733.80
50010 - Maintenance Agreement - Additional O&M	\$317,394.37
50020 - Utilities	\$304,605.03
50021 - Road/Ground Maintenance	\$72,100.00
50022 - Regulatory Compliance	\$68,131.25
50023 - Utilities - Telecommunications	\$104,484.59
50025 - Environmental	\$98,700.73
50030 - Taxes	\$5,007,616.54
50035 - Insurance	\$457,902.74
50050 - Spare Parts	\$75,104.52
50055 - Vegetation Management	\$546.18
50065 - Power Factors	\$88,053.90
50070 - REC Fees	\$7,410.86
50075 - Operational Costs - Other	\$43,560.37
50200 - Ground Lease	
50201 - Lease Expense - General	\$2,219,321.49
Total - 50200 - Ground Lease	\$2,219,321.49
Total - 50000 - Cost Of Operations	\$10,162,666.37
Total - Cost Of Sales	\$10,162,666.37
Gross Profit	\$11,327,545.45
Expense	
60000 - General And Administrative Expenses	
60015 - Consulting	\$2,500.00
60020 - Legal	\$216,929.23
60030 - Tax Consulting	\$18,015.00
60050 - Business License And Permits	\$1,140.25
60055 - Letter of Credit Fees	\$416,866.46
60083 - Software - Other	\$2,400.36
Total - 60000 - General And Administrative Expenses	\$657,851.30
70000 - Depreciation, Amortization And Accretion Expense	
70005 - Depreciation Expense	\$11,393,071.10
70015 - Accretion Expense	\$570,030.36
Total - 70000 - Depreciation, Amortization And Accretion Expense	\$11,963,101.46
Total - Expense	\$12,620,952.76
Net Ordinary Income	(\$1,293,407.31)
Other Income and Expenses	
Other Expense	
90000 - Other Expense	
91000 - Interest Expense	
91010 - Related Party	\$38,754.79
Total - 91000 - Interest Expense	\$38,754.79
92000 - Income Tax Expense (Benefit)	
92010 - Income Tax Expense - State	\$49,669.28
Total - 92000 - Income Tax Expense (Benefit)	\$49,669.28
Total - 90000 - Other Expense	\$88,424.07
Total - Other Expense	\$88,424.07
Net Other Income	(\$88,424.07)
Net Income	(\$1,381,831.38)

325MK 8ME, LLC
Balance Sheet
As of December 31, 2025

Financial Row	Amount
ASSETS	
Current Assets	
Bank	
10000 - Cash and cash equivalents_Non-Restricted	
10500 - CEI VII	
10849 - CEIVII_325MK8ME_Const Comp_BofA_8734	\$1,292,687.31
11847 - CEIVII_325MK8MEProject_BofA_9968	\$128,235.85
Total - 10500 - CEI VII	\$1,420,923.16
Total - 10000 - Cash and cash equivalents_Non-Restricted	\$1,420,923.16
Total Bank	\$1,420,923.16
Accounts Receivable	
12000 - Accounts Receivable	
12005 - PPA Receivables	\$1,031,618.66
Total - 12000 - Accounts Receivable	\$1,031,618.66
Total Accounts Receivable	\$1,031,618.66
Other Current Asset	
13000 - Other Current Assets	
13300 - Prepaid Expenses	
13305 - Prepaid Expenses - General	\$106,352.40
13310 - Prepaid Insurance	\$73,891.21
13315 - Prepaid Taxes	\$1,237,350.28
Total - 13300 - Prepaid Expenses	\$1,417,593.89
Total - 13000 - Other Current Assets	\$1,417,593.89
Total Other Current Asset	\$1,417,593.89
Total Current Assets	\$3,870,135.71
Fixed Assets	
15000 - Fixed Assets	
15200 - Solar Energy Systems	
15205 - Solar Energy Systems - General	\$390,731,025.17
Total - 15200 - Solar Energy Systems	\$390,731,025.17
17060 - Fixed Assets - Accumulated Depreciation	(\$42,707,606.03)
Total - 15000 - Fixed Assets	\$348,023,419.14
16000 - Inventory	
16001 - Modules	\$66,831.50
16003 - Transformers	\$145,000.00
16004 - Other	\$144,615.76
Total - 16000 - Inventory	\$356,447.26
Total Fixed Assets	\$348,379,866.40
Other Assets	
17100 - Asset Retirement Obligation Asset	
17105 - Asset Retirement Obligation Asset - General	\$5,647,401.97
17110 - Asset Retirement Obligation Asset - Accumulated Amortization	(\$581,716.68)
Total - 17100 - Asset Retirement Obligation Asset	\$5,065,685.29
17900 - Deposits	
17905 - Refundable Deposits	\$100,000.00
Total - 17900 - Deposits	\$100,000.00
18300 - Other Non-Current Assets	
18316 - Operating Lease ROU Asset	\$50,548,338.28
Total - 18300 - Other Non-Current Assets	\$50,548,338.28
Total Other Assets	\$55,714,023.57
Total ASSETS	\$407,964,025.68
Liabilities & Equity	
Current Liabilities	
Accounts Payable	
20000 - Accounts Payable	\$46,637.17
Total Accounts Payable	\$46,637.17

Other Current Liability	
20100 - Accrued Expense	\$2,033,022.65
21000 - Other Current Liabilities	
21200 - Interest Payable	\$2,967.12
21305 - Operating Lease Liability - Current	\$304,912.46
21500 - Intercompany Payable	
21569 - Moapa Southern Paiute Solar, LLC	\$28,580.59
21686 - ESM Solar CEI, LLC	(\$65,659.27)
21700 - ESM Solar InvestCo, LLC	\$200,000.00
21720 - Ark I CEI HoldCo, LLC	(\$110,018.66)
Total - 21500 - Intercompany Payable	\$52,902.66
Total - 21000 - Other Current Liabilities	\$360,782.24
Total Other Current Liability	\$2,393,804.89
Total Current Liabilities	\$2,440,442.06
Long Term Liabilities	
28000 - Other Long Term Liabilities	
28010 - Asset Retirement Obligation Liability	\$7,808,511.58
28016 - Operating Lease Liability - Non-Current	\$55,562,776.75
Total - 28000 - Other Long Term Liabilities	\$63,371,288.33
Total Long Term Liabilities	\$63,371,288.33
Equity	
32000 - Member's Equity	
32005 - Member's Contributions	\$434,810,858.50
32010 - Member's Return of Capital	(\$36,582,247.71)
32015 - Member's Distributions	(\$39,501,233.87)
32020 - Income (Loss) Allocation	(\$15,222,633.96)
Total - 32000 - Member's Equity	\$343,504,742.96
Retained Earnings	\$29,383.71
Net Income	(\$1,381,831.38)
Total Equity	\$342,152,295.29
Total Liabilities & Equity	\$407,964,025.68

Nevada Department of Taxation



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Guidance Letter 14-001

Date: September 17, 2014

To: Centrally-assessed Section, Division of Assessment Standards; County Assessors

From: Terry E. Rubald, Deputy Executive Director, Department of Taxation 

CC: Christopher G. Nielsen, Executive Director, Department of Taxation

Subject: Taxability of real property located on tribal lands held in trust by the U.S. Government

SUMMARY:

This Guidance Letter is intended to clarify that real property located on lands held in trust by the U.S. Government on behalf of Indian tribes, is not taxable for purposes of property tax. This includes property owned by third parties unrelated to an Indian tribe. In the past, real and personal property owned by third parties, but located on trust lands, had been considered subject to property taxation in Nevada pursuant to NRS 361.045. Due to recent decisions by Federal courts, however, any permanent improvements owned by any person or company and located on trust lands, are not taxable property by the State of Nevada and its subdivisions. Personal property owned by unrelated third parties and located on trust lands, however, may continue to be considered taxable property by the State and its subdivisions. Possessory interests in property of any Indian tribe, band or community held in trust by the United States, continue to be exempt pursuant to NRS 361.157(2)(e).

AUTHORITY:

NRS 360.215(6): The Department shall continually supervise assessment procedures which are carried on in the several counties of the State and advise county assessors in the application of such procedures.

NRS 360.215(7) The Department shall carry on a continuing program to maintain and study the assessment of public utilities and all other property assessed by the Department to the end that the assessment is equalized with the property assessable by county assessors.

DISCUSSION:

NRS 361.045 provides that, except as otherwise provided by law, all property of every kind and nature whatever within this state shall be subject to taxation. Recently however, the 9th Circuit, U.S. Court of Appeals, ruled in *Confederated Tribes of the Chehalis Reservation v. Thurston County Board of Equalization et al* (July 30, 2013) that state and local governments lack the power to tax permanent improvements built on non-reservation land owned by the United States and held in trust for an Indian