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REPORT

Data Adequacy Responses for Willow Rock Supplemental AFC

Willow Rock Energy Storage Center (21-AFC-02)

Submitted by:

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May 2024

Forward

On March 1, 2024, GEM A-CAES, LLC. (Applicant) docketed the Supplemental Application for Certification (SAFC) Volume 1 for the Willow Rock Energy Storage Center (WRESC; 21-AFC-02). On April 23, 2024, the California Energy Commission (CEC) Staff issued *"Staff Data Adequacy Recommendation (Incomplete)"* in response to the SAFC.

This document is the Applicant's response to the CEC's Staff recommendation. The responses are presented within a table that is based on CEC Staff's data adequacy worksheets and the Staff Recommendation. For responses that required additional studies, expanded explanations, and updates to figures, illustrations, and tables, the supplemental information is included as attachments to this document. Due to seasonality and site access constraints for biological surveys and engagement with stakeholders on requests such as the Staff's recommendation that a level of service based traffic study be provided by the Applicant, these actions are currently in process.

To address CEC Staff's request to review higher resolution images, WSP on behalf of the Applicant has uploaded high resolution figures and images using the CEC's *Kiteworks* secure file transfer system. If a Data Adequacy (DA) requested an enhanced image or figure, the DA response includes a reference to the date that each file was updated and corresponding reference number. For DA's that requested information from studies that are currently in progress, the response acknowledges the request and its status.

As demonstrated herein, the Applicant is committed to providing CEC Staff additional information as requested in their recommendation. Based on the recommendation and the Applicant's responses, the SAFC meets the substantive requirements set forth in Appendix B regulations. The Applicant believes there is adequate information for CEC Staff to move forward with environmental analysis in parallel as the project moves through local, state, and federal regulatory reviews.

Siting Regulations	Information	Application Page Number and Section Number	Information Required To Make AFC Conform With Regulations	Data Adequacy (DA) Response
EXECUTIVE SUMMARY				
Appendix B (a) (1) (E)	In an appendix to the application, a list of current assessor's parcel numbers and owners' names and addresses for all parcels within 500 feet of the proposed transmission line and other linear facilities, and within 1000 feet of the proposed powerplant and related facilities. Provide the direct mailing addresses for the owners and occupants of properties contiguous to the proposed power plant, related facilities, transmission lines, or other linear facilities as shown on the latest equalized assessment roll. Provide a map showing the parcels in the notice area.	Appendix 1B	Several parcels are missing owners' names. Please provide a list of current assessor's parcel numbers and owners' names. Provide the direct mailing addresses for the occupants of properties contiguous to the proposed power plant, related facilities, transmission lines, or other linear facilities as shown on the latest equalized assessment roll.	**Response ES-1:** On March 1, 2024, the Applicant submitted the "Willow Rock Energy Storage Center (21-AFC-02): Application for Confidential Designation for Supplemental AFC Appendices 1B and 1D, Property Owners List and List of Site-Related Property Owners and Relationship to Project Owner". TN#: 254787. By letter dated May 17, 2024, the Executive Director approved the Application for Confidential Designation. TN #: 256447. **Attachment ES-1** of this DA Response 1 presents a revised list of current landowners within the above referenced notice area. The Applicant will file **Attachment ES-1** with a repeated application for confidential designation.
PROJECT DESCRIPTION				
Appendix B (b) (1) (A)	Maps at a scale of 1:24,000 (1" = 2000'), (or appropriate map scale agreed to by staff) along with an identification of the dedicated leaseholds by section, township, range, county, and county assessor's parcel number, showing the proposed final locations and layout of the power plant and all related facilities;	Figures 1-4 to 1-5, pp. 1-7 to 1-8; Figures 2-1 to 2-2, pp. 2-5 to 2-6; Figures 2-3 to 2-4, pp. 2-8 to 2-9	Please provide these maps for the transmission line.	**Response PD-1:** Concurrent with this filing, updated figures at a scale of 1:24,000 that illustrate the identified leaseholds by section, township, range, county, and county assessor's parcel number, showing the proposed final locations and layout of the power plant and all related facilities were submitted through *Kiteworks* under the reference PD-1.
Appendix B (b) (1) (B)	Scale plan and elevation drawings depicting the relative size and location of the power plant and all related facilities to establish the accuracy of the photo simulations required in sections (a)(1)(D) and (g)(6)(F);	Figures 2-3 to 2-6, pp. 2-8 to 2-11	Please provide to-scale, legible, high resolution image files via Kiteworks of the figures. The submitted versions of the figures are poor quality with illegible plan notes and scales.	**Response PD-2:** Concurrent with this filing, enhanced versions of Figures 2-3 through 2-6 were submitted through *Kiteworks* under the reference PD-2.

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Appendix B (b) (2) (A)	Maps at a scale of 1:24,000 (or appropriate map scale agreed to by staff) of each proposed transmission line route, showing the settled areas, parks, recreational areas, scenic areas, and existing transmission lines within one mile of the proposed route(s);	Figure 6-2, p. 6-19	Provide maps at a scale of 1:24,000 (or appropriate map scale agreed to by staff) of each proposed transmission line route, showing the settled areas, parks, recreational areas, scenic areas, and existing transmission lines within one mile of the proposed route(s).	**Response PD-3:** Concurrent with this filing, enhanced figures at a scale of 1:24,000 that illustrate each proposed transmission line route, showing the settled areas, parks, recreational areas, scenic areas, and existing transmission lines within one mile of the proposed route(s) were submitted through *Kiteworks* under the reference PD-3.
Appendix B (b) (2) (B)	A full-page color photographic reproduction depicting a representative above ground section of the transmission line route prior to construction and a full-page color photographic simulation of that section of the transmission line route after construction.	Appendix 5.13A, KOP 5	Provided images are half page. Please provide full page images depicting a representative above ground section of the transmission line route prior to construction and a full-page color photographic simulation of that section of the transmission line route after construction.	**Response PD-4:** Concurrent with this filing, enhanced images from KOP 5 depicting a representative above ground section of the transmission line route prior to construction and a full-page color photographic simulation of that section of the transmission line route after construction were submitted through *Kiteworks* under the reference PD-4.
Appendix B(b) (2) ©	A detailed description of the design, construction, and operation of any electric transmission facilities, such as power lines, substations, switchyards, or other transmission equipment, which will be constructed or modified to transmit electrical power from the proposed power plant to the load centers to be served by the facility. Such description shall include the width of rights-of-way and the physical and electrical characteristics of electrical transmission facilities such as towers, conductors, and insulators.	Section 2.1.20, pp. 2-30 Section 3.0 pp. 3-1 to 3-13	Please resubmit legible Electrical overall one-line diagram (Figure 3.5). Please provide a one-line diagram of the proposed substation or switchyard with breaker configuration and their ratings.	**Response PD-5:** Concurrent with this filing, an enhanced version of the electrical overall one-line diagram (Figure 3-5) was submitted through *Kiteworks* under the reference PD-5. *Please note that Figure 3.5 does not exist within the SAFC. The figure referenced in this DA is Figure 3.3.*

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BIOLOGICAL RESOURCES				
Appendix B (g) (13) (B) (ii)	Provide an aerial map of the isopleth graphic depicting modeled nitrogen deposition rates. The geographical extent of the nitrogen deposition map(s) should include the entire plume and a radius of 6 (six) miles from the source, specifically identifying acres of sensitive habitat(s) within each isopleth Modeling parameters and files shall be provided.		Please provide a discussion of why nitrogen deposition is not applicable to this project, including a description of potential habitat(s) sensitive to nitrogen deposition within 6 miles.	**Response BIO-1:** A nitrogen deposition analysis was not provided with the Supplemental AFC as there is no continuous source of combustion emissions during operation. The only potential source of combustion emissions from the Project is associated with the emergency generators, which would operate less than 50 hours per year. To assist CEC Staff with its analysis, the Applicant prepared **Attachment BIO-1**, which provides a technical memorandum on modeled deposition rates and an isopleth graphic based on extremely conservative assumptions regarding the WRESC. Specifically, the analysis assumes maximum potential emissions for the WRESC of up to 200 hours per year, rather than 50 hours per year. Even with this conservative assumption, the analysis demonstrates that there are no impacts to significant sensitive habitats from nitrogen deposition.
Appendix B(g) (13) (B) (iii)	An aerial photo depicting state and federal jurisdictional features including state waters and wetlands delineated on maps at a scale of (1:2,400) showing any potential jurisdictional features delineated out to 250 feet from the edge of disturbance if wetlands occur within 250 feet of the project site and/or related facilities that would be included with the U.S. Army Corps of Engineers Section 404 Permitapplication, Regional Water Quality Control Board (RWQCB) application, or California Department of Fish and Wildlife Section 1600 et seq. permit requirements. For projects proposed to be located within the coastal zone, also provide aerial photographs	Pp. 5.2-3 through 5.2-8Section 5.2.1.1Figure 5.2-1a and 5.2-1b	Please provide a revised Figure 5.2-1b and Figure-8 at a scale of 1:2400.Please provide a revised delineation that includes the full width (lateral extent) of the active floodplain (stream flow) in a high flood event for episodic streams in the Mojave Desert. Use the following references to help identify episodicstreams: A Review of Stream Processes and Forms in Dryland Watersheds (Kris Vyverberg 1020) and Methods to Describe and Delineate	**Response BIO-2:** **Part 1**: Concurrent with this filing, revised Figure 5.2-1a and Figure 5.2-1b at a scale of 1:2400 was submitted through *Kiteworks* under the reference BIO-2. (*Please note there is not a Figure-8, it is understood that this is a reference to the corresponding page number*) **Part 2**: Delineations were performed consistent with USACE Arid Southwest and conform with requirements of RWQCB and CDFW. The Applicant will provide additional documentation that demonstrates that the methodologies were adhered to and are in alignment with Vyverberg. This forthcoming information will be provided within 30 days of the completion of the seasonal biological protocol surveys in June 2024.

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	or maps as described above that identify wetlands as defined by the Coastal Act and under the jurisdiction of the California Coastal Commission.		Episodic Stream Processes on Arid Landscapes for Permitting Utility-Scale Solar Power Plants and Appendix G: The MESA Field Guide, Mapping Episodic Stream (Brady Roland and Kris Vyverberg 2013). For more guidance on mapping state waters review data request set 1 (TN244203) provided 7-26-2022 for the old project location on the delineation of state waters (p. 8).Please provide a hydrologic analysis/data from a hydrologic study and/or FEMA floodplain mapping to confirm the number and lateral extent of streams within the project area including buffers.	**Part 3**: The 2023 wetland delineation was conducted during a year of above average rainfall following an extensive drought of more than 7 years. The surveys conducted in 2024 will follow a second year of above average rainfall. The information collected during the 2024 delineation will provide conclusive evidence of the limits of active floodplain. An updated wetland delineation will be prepared and submitted to the CEC.
Appendix B (g) (13) (C) (iii)	Perform nitrogen deposition modeling including the complete citation for references used in determining deposition rates and location. Specify the amount of total annual nitrogen deposition in kilograms of nitrogen per hectare per year (kg N/ha/yr) in special status species habitats and vegetation types for wet and dry deposition. Describe habitat and species potentially affected.		Please provide a discussion of why nitrogen deposition is not applicable to this project, including a description of potential habitat(s) sensitive to nitrogen deposition within 6 miles of the project site.	**Response BIO-3:** Please see response to BIO-1, above. **Attachment BIO-1** provides a technical memorandum prepared by WSP and Atmospheric Dynamics, Inc. on modeled nitrogen deposition rates. The technical memorandum is inclusive of an isopleth graphic.

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Appendix B(g) (13) (D) (i)	Current biological resources surveys conducted using appropriate field survey protocols (include references) during the appropriate season(s). State and federal agencies with jurisdiction shall be consulted for field survey protocol guidance prior to surveys if a protocol exists.	Pp. 5.2-3 through 5.2-8 Pp. 5.2-14 through 5.2-33 Section 5.2.1.5 through 5.2.1.7 Confidential Technical Reports	Please revise Mohave ground squirrel surveys; consult with CEC biology staff and the Califiornia Department of Fish and Wildlife on the placement and number of grids and cameras used for the new project location including gen-tie and all options and inaccessible areas. Please revise Swainson's hawk (SWHA) surveys out to 5 miles around the WRESC location following the Swainson's Hawk Survey Protocols, impact Avoidance, and Minimization Measures for Renewable Energy Projects in the Antelope Valley of Los Angeles and Kern Counties, California guidance document to adequately determine the potential need for SWHA foraging habitat mitigation.Please conduct additional surveys for Crotch's bumble bee in areas that were inaccessible to determine the potential for presence, need for take and mitigation.	**Response BIO-4:** Consistent with the CEC's regulations, current biological resources surveys conducted using appropriate field survey protocols were submitted with the SAFC. The Applicant understands that additional surveys for the Mohave Ground Squirrel, Swainson's Hawk, and Crotch's Bumble Bee have been requested. The Applicant will provide the aforementioned studies following completion of the surveys. The Applicant anticipates this will be provided as part of a data response during discovery. For properties that are inaccessible due to lack of authorization to access the property, the Applicant will continue working to obtain access. WSP met with CDFW and CEC Staff to discuss survey protocols for the original Willow Rock Project site on March 9, 2023. The protocols and any alterations to those protocols were discussed and approved during the March 9, 2023, meeting. The 2024 additional protocol level surveys for the WRESC site utilized the same methodology that was previously reviewed and approved by CEC Staff and CDFW. Prior to conducting protocol surveys in 2024, CDFW and CEC Staff were contacted and provided the new survey areas. The additional survey areas and survey protocols were further discussed during a conference call between WSP, CEC, and CDFW on May 2, 2024. **Mohave Ground Squirrel**: The Applicant's consultant, WSP and their subconsultant Dipodomys Ecological Consulting, LLC, who assisted in completing the 2023 protocol surveys for Mohave Ground Squirrel, are conducting the 2024 protocol surveys. WSP and Dipodomys Ecological Consulting, LLC have had ongoing discussions about the project with CDFW. Most recently the Mohave Ground Squirrel protocol

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				was discussed during the May 2, 2024, meeting between WSP, CEC, and CDFW. Since the May 2, 2024, meeting, Dipodomys Ecological Consulting, LLC has been in contact with CDFW to ensure that the proper protocol is being used for Mohave Ground Squirrel. During the May 2, 2024, meeting, CDFW requested a map identifying all areas previously or currently being surveyed for the Mohave Ground Squirrel. During the 2023 survey season, Mohave Ground Squirrel surveys were completed within the boundaries of the original WRESC project site, the updated WRESC project site, and several additional work areas, that have subsequently been eliminated from consideration by the project. The survey map requested by CDFW was prepared by WSP and submitted to CEC and CDFW on May 17, 2024. **Swainson's Hawk:** During the May 2, 2024, meeting between WSP, CDFW, and CEC, the meeting's participants discussed Swainson's Hawk protocols. As a result of there being a known Swainson's hawk nest within 5 miles of the project site, WSP is completing surveys within a half-mile buffer as allowed under the current Swainson's Hawk survey protocol. During the May 2, 2024, meeting, CDFW and CEC agreed that this protocol method is acceptable. During the May 2, 2024, meeting, CDFW and CEC requested the performance of a 5-mile buffer survey to identify any additional Swainson's Hawk nests to the north or south of the project site. The request only extended to the north and south as there is no current access to Edwards Air Force Base to the east and the known recorded occurrence of an active nest is to the west. WSP agreed to complete the 5-mile buffer assessment

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				concurrently with the remaining protocol-level surveys for Swainson's Hawk. **Crotch's Bumble Bee:** Crotch's Bumble Bee surveys are currently being conducted in 2024 in areas that were not previously accessible or were added to the project following the 2023 surveys. Surveys completed in 2023 predated CDFW's June 2023 protocol, as the protocol came out after the surveys were completed. However, WSP did use the same protocol identified in the High-Speed Rail project, which is very similar to the CDFW June 2023 protocol.
Appendix B (g) (13) (H)	Submit copies of any preliminary correspondence between the project applicant and state and federal resource agencies regarding whether federal or state permits from other agencies such as the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, the U.S. Army Corps of Engineers, the CDFW, and the RWQCB will be required for the proposed project.	Supplemental AFC Cover Letter and Data Adequacy Worksheets (TN 254774), P. 31	Please provide names, agencies, dates, and times, and what was discussed during the teleconference calls.	**Response to BIO-5:** The following details the correspondence between the Applicant and its consultants and the applicable regulatory bodies and agencies: **Wetlands and other waterbodies:** Based on the Wetland Delineation Report, all drainage features identified within the project survey area will be avoided and therefore, no regulatory agency permits are needed for impacts to the drainage features. Since there is no access to flowing water within the project site, the National Marine Fisheries Service were also not contacted. **Protected Species: Attachment BIO-5** presents email correspondence between the Applicant's consultant Panorama Environmental and the United States Fish and Wildlife Service. The following details project level discussions between the Applicant and its consultants and the agency tasked with the related species: On March 29, 2021, the project and CDFW representatives discussed the applicable Swainson's

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				Hawk protocol. It was determined that a half-mile buffer survey area was the appropriate methodology. On March 9, 2023, WSP and CDFW representatives discussed protocol-level surveys for the 2023 survey season. They discussed protocol surveys for Mohave Ground Squirrel, Crotch's Bumble Bee, Swainson's Hawk, Desert Tortoise, sensitive plant surveys, and Burrowing Owl. On March 30, 2023, the 2023 Survey Methods Memo that was prepared for CDFW to memorialize the survey methods for Mohave Ground Squirrel, Crotch's Bumble Bee, and Swainson's Hawk, including survey areas and resumes of the biologists that were conducting the surveys. On April 10, 2023, the project and CDFW discussed further Mohave Ground Squirrel methods following the visual survey of the project site. On May 16, 2023, CFDW confirmed that they had completed their review of protocol survey results and that there were no additional questions. On March 26, 2024, WSP contacted CDFW's new contact for the Project to discuss the additional surveys to be completed in 2024 for those areas that were not covered in 2023. Concurrently, the CEC requested additional information, including survey locations. On March 29, 2024, WSP provided answers to the CEC's questions and provided a map for the areas that were scheduled for 2024 protocol surveys. On April 24, 2024, the Applicant's consultant WSP contacted CDFW to confirm the agency's concurrence with the survey methods and locations. CDFW then

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				requested a meeting to discuss the 2024 protocol survey methods. On May 2, 2024, WSP, CDFW, and CEC representatives discussed the following survey methods: 1) Perform a 5-mile search for Swainson's Hawk nests (*not part of the protocol survey*) 2) Prepare a map of Mohave Ground Squirrel survey areas completed to date and 2024 trapping locations.
Appendix B (i) (1) (A)	Tables that identify laws, regulations, ordinances, standards, adopted local, regional, state, and federal land use plans, leases, and permits applicable to the proposed project, and a discussion of the applicability of, and conformance with each. The table or matrix shall explicitly reference pages in the application wherein conformance, with each law or standard during both construction and operation of the facility is discussed; and	P. 5.2-48 Section 5.2.5 Table 5.2-8	Please revise Table 5.2-8 to reference pages in the AFC where conformance with each applicable law or standard during both construction and operation is discussed. If there are no pages to reference provide the information needed to satisfy the requirement.	**Response BIO-6:** Revised Table 5.2-8 is presented as **Attachment BIO-6**.
CULTURAL RESOURCES				
Appendix B(g) (1)	...provide a discussion of the existing site conditions, the expected direct, indirect, and cumulative impacts due to the construction, operation and maintenance of the project, the measures proposed to mitigate adverse environmental impacts of the project, the effectiveness of the proposed measures, and any monitoring plans proposed to verify the effectiveness of the mitigation. Describe the approach, list or projection or a combination, used to develop the cumulative setting for the proposed project. Include any reference materials used such as general plan or other adopted local, regional, or statewide plan.	Subsection 5.0.1, pp. 5.0-4 to 5.0-7, Figure 5.0-2; Subsection 5.3.1, pp. 5.3-3 to 5.3-9; Subsection 5.3.2.2, pp. 5.3-12 to 5.3-19; Subsection 5.3.3.1, pp. 5.3-21 to 5.3-26.	Provide CEQA significance evaluations, supported by testing plans and test excavations, of all archaeological resources in the project's direct impact areas. Test excavation of known cultural resources after CEQA review is not valid mitigation. Submit a report of significance evaluations suitable for public disclosure and a detailed report under request for confidential filing.	**Response CUL-1:** In accordance with a clarification provided by CEC Staff on May 17, 2024, no additional information is needed at this time for data adequacy purposes. Updated significance evaluations and analysis will be presented alongside the revised Phase I Technical Report during CEC's discovery phase.

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Appendix B (g) (2) (C)	The results of new cultural resource and tribal resource surveys or surveys less than 5 years old shall be provided if survey records of the area potentially affected by the project are more than 5 years old. Surveys to identify new cultural resources and tribal cultural resources must be completed by (or under the direction of) individuals who meet the Secretary of the Interior's Professional Standards for the technical area addressed. New pedestrian archaeological surveys shall be conducted inclusive of the project site and project linear facility routes, extending to no less than 200 feet around the project site, substations and staging areas, and to no less than 50 feet to either side of the right-of-way of project linear facility routes. New historic architecture field surveys in rural areas shall be conducted inclusive of the project site and the project linear facility routes, extending no less than 0.5 mile out from the proposed plant site and from the routes of all above-ground linear facilities. New historic architecture field surveys in urban and suburban areas shall be conducted inclusive of the project site, extending no less than one parcel's distance from all proposed plant site boundaries. New historic architecture field reconnaissance ("windshield survey") in urban and suburban areas shall be conducted along the routes of all linear facilities to identify, inventory, and characterize structures and districts that appear to be older than 45 years or that are exceptionally significant, whatever their age.	Section 5.3, pp. 5.3-1 to 5.3-33; Confidential Appendix 5.3B, pp. iv, 33–35, 62–90, Appendix C, Figure C.2 a–b,	Concerning Confidential Appendix 5.3B: Provide paleoenvironmental setting per ARMR, p. 8 Add a discussion of the Serrano Indians to the Ethnographic Context; their ancestral lands are closer to the project site than the Tataviam Provide archaeological survey coverage maps per ARMR, p. 10 A significant amount of the project area remains unexamined by cultural resources specialists. Obtain access to all properties within your archaeological study area, survey them for the presence/absence of cultural resources, and provide a supplemental report of methods and findings. The unsurveyed properties are described in Confidential Appendix 5.3B, pp. 63, 65, and 73. Provide bibliographic entries for these text citations: Kern County Gazette 1876; Kern-Antelope Historical Society 1936, 2018; Mayer and Laudenslayer 1988; Norwood and Kilanowski 1991; San	**Response CUL-2:** The Applicant continues to pursue landowner permission for surveys of parcels within the preferred route that were not included as part of the SAFC. In accordance with clarification provided by CEC Staff on May 17, 2024, no additional information is needed at this time for data adequacy purposes. If permission to access is granted, fieldwork will be completed for the outstanding parcels, survey coverage maps will be updated and provided in a revision to the Phase I Technical Report. The revised report will include additional paleoenvironmental context and a Serrano section of ethnographic context. Updates to the bibliographic references will also be completed as part of the revised Phase I Technical Report.

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	A technical report of the results of the new surveys, conforming to the Archaeological Resource Management Report format (CA Office of Historic Preservation Feb 1990), which is incorporated by reference in its entirety, shall be separately provided and submitted (under confidential cover if archaeological resource or other sensitive resource locations are included). Information included in the technical report shall also be provided in the application, except that confidential information (archaeological sites or other sensitive resources, or areas of religious significance) shall be submitted under a request for confidentiality pursuant to California Code of Regulations, title 20, section 2501 et seq. At a minimum, the technical report shall include:		Bernardino Museum n.d.; USGS 1963	
Appendix B (g) (2) I (iv)	A map at a scale of 1:24,000 (U.S. Geological Survey topographic quadrangle) depicting the locations of all previously known and newly identified cultural and tribal cultural resources compiled through the research required by Appendix B (g)(2)(B) and Appendix B (g)(2)(C)(ii); and	Confidential Appendix 5.3B, Appendix A, Figures A4-1 to A4-8, Appendix C, Figures C1-1 to C1-7	The maps provided separate previously recorded and newly recorded cultural and tribal cultural resources into separate map series. In addition, although the maps use the specified base imagery, they are not at the correct scale. Please provide maps at the specified scale (1:24,000, or 1 inch = 2,000 feet) that depict all previously known and newly identified cultural and tribal cultural resources.	**Response CUL-3:** In accordance with clarification provided by CEC Staff on May 17, 2024, no additional information is needed at this time for data adequacy purposes. Revised mapping will be submitted along with any revisions to the Phase I Technical Report as a Data Response during discovery.

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PUBLIC HEALTH				
Appendix B (g) (9) (D)	A map showing sensitive receptors within the area exposed to the substances identified in subsection (g)(9)(A).	Table 5.9-1, and Appendix 5.9A, Table 5.9A-1	Table 5.9-1 and Table 5.9A-1 list the sensitive receptors within the Project Area, but there is no map.	**Response PH-1:** A map of sensitive receptors is provided as **Attachment PH-1**.
SOCIOECONOMICS				
Appendix B (g) (7) (A) (iii)	Existing and projected unemployment rates;	Section 5.10.2.3, Table 5.10-5, pp. 5.10-7 – 5.10-8	Provide the projected unemployment rates.	**Response SOC-1:** Based on a trendline from the unemployment rates for the past 5 years in Kern County, the unemployment rate in 2024 is projected to be 7.8% and 7.3% in 2025.
Appendix B (g) (7) (A) (vi)	Capacities, service standards, existing and expected use levels, and planned expansion of utilities (gas, water, and waste) and public services, including fire protection, law enforcement, emergency response, medical facilities, other assessment districts, school districts, parks and recreation facilities, libraries, and other public facilities. For projects outside metropolitan areas with a population of 500,000 or more, information for each school district shall include current enrollment and yearly expected enrollment by grade level groupings, excluding project-related changes for the duration of the project schedule.	Section 5.10.2.5, 5.10.2.6.2, 5.10.2.6.1, 5.10.2.6.3, 5.10.2.7; Table 5.10-7, pp. 5.10-10 to 5.10- 11	Provide the capacities, service standards, existing and expected use levels, and planned expansion of parks and recreation facilities, libraries, and other public facilities.	**Response SOC-2:** Section 5.10.2 of the SAFC discusses the existing conditions, the “Affected Environment,” including subsections on population, housing, economy and employment, fiscal resources, education, public services and facilities, utilities, electricity and gas, and water. The Kern County General Plan outlines several key points regarding public service facilities, including capacities, service standards, existing and expected use levels, and planned expansion. It emphasizes the goal of providing adequate and cost-effective public services and facilities for residents and businesses. It aims to ensure that new urban development proposals and land use changes are compared to the required public services and facilities needed for the proposed projects. The General Plan indicates that recreational facilities and parks will be provided on an as-needed

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				basis, suggesting a responsive approach to usage demands. Regarding planned expansion, the planning and development of recreational facilities are often managed by special districts with their own master plans, making it difficult to designate future facility locations in advance. The County will retroactively designate new facilities with appropriate map codes as they are developed. Public or private recreational facilities developed in non-standard map code areas, if permitted, are considered consistent with the General Plan. Additionally, the Kern County Zoning Ordinance allows for the establishment of public facilities like parks, schools, and libraries in various zones upon approval of a conditional use permit. Overall, the General Plan aims to ensure that Kern County residents and businesses have access to adequate and cost-effective public services and facilities. It seeks to provide a balanced system of parks and recreational facilities to meet the diverse needs of the county, clearly define responsibility for providing these facilities, and offer a variety of safe, equitable, and balanced recreation programs for all residents and visitors. The City of Rosamond maintains two public parks that are operated by the Rosamond Community Service District. The Kern County Library is comprised of 24 brick and mortar locations and an online E-Library. The Wanda Kirk Library in Rosamond, CA is managed by Kern County Library and is complete with meeting rooms, internet, study rooms, and research areas. The Kern County Library maintains a collection of approximately 1,015,160 volumes. The Hummel Community Center in Rosamond, CA consists of multiple areas for public involvement. For example,

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				Room 1 has an approved capacity of 104 people and a banquet capacity of 50 people. Room 2 at the center maintains similar capacities. Minimal use of the public facilities is anticipated during construction and based on an anticipated operational workforce of approximately 40 individuals, a less than significant or minimal impact on access to public facilities is expected to occur.
Appendix B (g) (7) (B)	A discussion of the socioeconomic impacts caused by the construction and operation of the project (note year of estimate, model, if used, and appropriate sources), including:	Section 5.10.3.2.4, p. 5.10- 19	Provide the year of estimate used.	**Response SOC-3:** All Project expenditures as well as the economic model results are expressed in year 2023 dollars.
Appendix B (g) (7) (B) (v)	The potential impacts, including additional costs and ability to meet local service standards, on utilities (gas, water, and waste) and public services, including fire, law enforcement, emergency response, medical facilities, other assessment districts, and school districts. Include response times to hospitals and for police protection, fire projection, emergency services, parks and recreation facilities, libraries, and other public facilities. For projects outside metropolitan areas with a population of 500,000 or more, information on schools shall include project-related enrollment changes by grade level groupings and associated facility and staffing impacts by school district during the construction and operating phases;	Sections 5.10.3.2.3, 5.10.3.2.7, 5.10.3.2.8, 5.10.3.3.6, 5.10.3.3.7, 5.10.3.3.8, p. 5.10-19, p. 5.10-21	Provide the potential impacts, including additional costs and the ability to meet local service standards, for parks and recreation facilities, libraries, and other public facilities.	**Response SOC-4:** The Kern County General Plan emphasizes that public funds available for services are significantly less than needed, leading to financial constraints for new projects and challenges in funding new facilities or maintaining existing ones. Therefore, there will be a greater reliance on private capital and user fees to provide public facilities, potentially affecting accessibility and affordability for the community. The WRESC is not expected to create potentially significant effects associated with the ability to meet local service standards, for parks and recreation facilities, libraries, and other public facilities. Moreover, as set forth in the SAFC, the project is expected to have beneficial effects by contributing to the tax base during both construction and operations. In some areas, the costs of providing services exceed the available revenue, resulting in reduced service levels and deteriorating public facilities. This suggests that new urban development may further strain the capacity to meet local service standards and accelerate

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				the decline of public infrastructure. Furthermore, the Kern County General Plan points out that finding suitable sites for public facilities will become increasingly difficult due to competition with incompatible uses and rising costs, meaning new projects could face significant obstacles in securing locations for necessary public amenities, potentially leading to delays, increased expenses, or inadequate provision of services. Overall, the General Plan outlines the challenges in meeting local service standards and the additional costs that may arise from implementing new projects. WRESC and the revenue generated through its construction and operations will benefit Kern County and its surrounding communities by providing much needed user fees and taxes that will go to enhancing public services.
Appendix B (g) (7) (B) (vi)	An estimate of applicable school impact fees;		Provide an estimate of the applicable school impact fees.	**Response SOC-5:** The estimated school impact fee will be applied at a rate of $0.78 per square foot of covered and enclosed space of commercial/industrial construction. WRESC will include a 5,000 square foot office and control room and 1,600 square feet warehouse and maintenance area. The combined building area of 6,600 square foot covered or enclosed space will result in an estimated $5,148 school impact fee.
Appendix B (g) (7) (B) (viii)	An estimate of the expenditures for locally purchased materials for the construction and operation phases of the project;	Section 5.10.3.2.4, p. 5.10-17	Provide an estimate of the expenditures for locally purchased materials for the operation phase of the project.	**Response SOC-6:** The Applicant's A-CAES facility is the first of its kind and operations and maintenance expenditures beyond its labor costs remain speculative. The Applicant anticipates that chemicals and consumable products will be sourced from vendors located both within California and outside the state.

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Appendix B (g) (7) (B) (x)	An estimate of sales taxes generated during construction and separately during an operational year of the project;	Section 5.10.3.2.5, p. 5.10- 19	Provide an estimate of the sales taxes generated during an operational year of the project.	**Response SOC-7:** Project operations will generate other employment opportunities and spending in Kern County through local expenditures for materials, such as office supplies, and services. The Applicant anticipates payroll to be approximately $4.17 million annually. The Applicant's A-CAES facility is the first of its kind and operations and maintenance expenditures beyond its labor costs remain speculative.
TRAFFIC AND TRANSPORTATION				
Appendix B (g) (5) (A)	A regional transportation setting, on topographic maps (scale of 1:250,000), identifying the project location and major transportation facilities. Include a reference to the transportation element of any applicable local or regional plan.	Figure 5.12-1 and Figure 5.12- 2, pp 5.12-4 to 5.12-5	Although truck route maps are provided on Figures 5.12-1 and 5.12-2, Section 5.12 excludes a figure identifying the project location and major transportation facilities in the vicinity of the project site. A regional transportation setting map should be provided.	**Response TRAN-1:** On May 22, 2024, a figure (**Figure: TRAN-1**) illustrating the regional transportation setting was uploaded using the *KiteWorks* platform under the reference TRAN-1.
Appendix B (g) (5) (B)	If the proposed project including any linear facility is to be located within four miles of an airport, a planned or proposed airport runway, or an airport runway under construction, discuss the project's compliance with the applicable sections of the current Federal Aviation Regulation Part 77 – Safe, Efficient Use, and Preservation of the Navigable Airspace, specifically any potential to obstruct or impede air navigation generated by the project during construction or operation; such as, a thermal plume, a visible water vapor plume, glare, electrical interference, or surface	Section 5.12.1.1.6, pp. 5.12-2 to 5.12-3 Section 5.12.2.6, p. 5.12-13 Section 5.6.2.2.5, pp. 5.6-11 to 5.6-1. Section 5.6.2.2.6, p. 5.6-12 Appendix 5.6C	A portion of the WRESC gen-tie line passes along Mojave-Tropico Road within approximately 0.9 mile west of the closest runway edge at Rosamond Sky Park. FAA Section 77.9 (b)(1) requires notification to the FAA for, "Any construction or alteration that exceeds an imaginary surface extending outward and upward at any of the following slopes: 100 to 1 for horizontal distance of 20,000 feet from the nearest point of the nearest runway with	**Response TRAN-2:** **Part 1**: On May 23, 2024, the Applicant filed Federal Aviation Administration (FAA) Form 7560-1 through the agency's online portal. Correspondence related to the submittal of FAA form 7560-1 is provided as **Attachment TRAN-2**. **Part 2**: On May 23, 2024, the Applicant submitted an application package for approval to the DOD's Military Aviation and Installation Assurance Siting Clearinghouse. Correspondence related to the submittal of the DOD Clearinghouse form is also provided as **Attachment TRAN-2**.

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	structure height. The discussion should include:		its longest runway more than 3,200 feet in actual length, excluding heliports." The imaginary surface for a transmission line pole at approximately 0.9 mile west would be 48 feet tall. Determine which transmission poles would require a Notice of Construction and file a FAA Form 7460-1 to receive a no hazard determination from the FAA for each of them. File FAA determinations to the project docket upon receipt. The U.S. Department of Defense (DOD) has established a Military Aviation and Installation Assurance Siting Clearinghouse (Clearinghouse) to protect the Department's mission capabilities from incompatible energy development. The DOD conducts both formal and informal project reviews and encourages developers to request an informal review early in the process. The goal of the informal review process is to identify areas of potential impacts and refer proponents to the appropriate DOD stakeholders for further discussion before the project is submitted to the Federal	**Conclusion**: Applicant will file FAA and DOD determinations to the project docket upon receipt.

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			Aviation Administration's (FAA's Obstruction Evaluation/Airport Airspace Analysis (OEAA) process. https://www.dodclearinghouse.osd.mil /Project- Review/ https://www.dodclearinghouse.osd.mil/ Project-Review/. As noted in Appendix 5.6C, the project is near Edwards Air Force Base. To appropriately notify DOD through their federal channels, undertake and document an informal DOD Clearinghouse process prior to submission of FAA Airspace Analysis. The DOD Siting Clearinghouse – Informal Review Request Form is available at Informal Review Request Form is available at: https://www.dodclearinghouse.osd.mil/Portals/1 34/DOD_Siting_Clearinghouse_ Informal_Request _Form_2023.pdf. In accordance with Public Resources Code, section 25519.5, file information received from DOD to the project docket upon receipt.	
Appendix B (g) (5) (B) (ii)	A thermal plume analysis that describes the plume's velocity;	N/A	WRESC would have five air powered turbine generators with air exhaust stacks, two emergency diesel-fired engines	**Response TRAN-3:** The Applicant did not prepare a thermal plume analysis because the use of emergency combustion engines will be minimal and infrequent, there isn't a wet cooling

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			and fin fan coolers which would result in thermal plumes. Please provide a thermal plume analysis which describes the plumes velocity and provides the exhaust parameters to ensure thermal plumes would not impact aviation activities.	system, and there is not an airport within three miles of the project area. The nearest airport is approximately 3.75 miles to the southwest of WRESC. Section 5.1 of the SAFC presents an analysis of air quality. During operations, the WRESC will not routinely operate combustion units or emit regulated pollutants to the atmosphere. Regulated emission of air pollutants will only occur from the stationary internal combustion engines for maintenance and readiness testing or in the emergency event of a fire or power outage. Only two of the 2.5 MW engines are required to support critical loads. The third engine is redundant and only one engine is assumed to operate at any given time for purposes of maintenance and readiness testing. The Applicant is in the process of preparing the thermal plume analysis and will provide it to the CEC within 30 days of completion.
Appendix B (g) (5) (B) (iv)	Copies of FAA Form 7460-1, Notice of Proposed Construction or Alteration, that were submitted or approved for any project component requiring notice.	Section 5.6.2.2.5, pp. 5.6-11 to 5.6-12	FAA Form 7460-1 has not been filed for the project's transmission poles. See discussion under siting regulations Appendix B (g) (5) (B)	**Response TRAN-4:** **Attachment TRAN-2** provides Aeronautical Study Numbers for the Project and the latitude and longitudes associated with pole locations.
Appendix B (g) (5) (C)	An evaluation of the project's potential impacts related to vehicle miles traveled (VMT) that may include:	Section 5.12.2.1, pp. 5.12-8 to 5.12-9 Section 5.12.2.2.2 VMT Impacts, pp 5.12-11 to 5.12-12	A VMT analysis is provided for the construction phase, in addition to a VMT screening evaluation for Cumulative conditions. However, Section 5.12.2.1 does not adequately document the basis for the 27.7 VMT per capita significance threshold.	**Response TRAN-5:** In absence of guidance from Kern County, the Applicant used VMT per capita rather than VMT per worker as it is a more conservative analysis.

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Appendix B (g) (5) (C) (i)	The local jurisdiction's thresholds of significance;	Section 5.12.2.1, pp. 5.12-8 to 5.12-9	Section 5.12.2.1 should specify if Kern Council of Governments (COG) has adopted VMT analysis guidelines and significance criteria. If not, it is appropriate to defer to the guidelines provided in the Technical Advisory on Evaluating Transportation Impacts in CEQA (OPR Technical Advisory, December 2018, California Governor's Office of Planning and Research). The OPR Technical Advisory recommends a significance threshold set at 85% of existing VMT per worker to evaluate VMT impacts for non-residential land use projects.	**Response TRAN-6:** **Attachment TRAN-6** presents an updated VMT analysis using the OPR Technical Advisory recommendation. The Applicant's consultant WSP met with Kern COG staff on May 29, 2024 and confirmed that the agency has not adopted VMT analysis guidelines and significance criteria.
Appendix B (g) (5) (C) (ii)	Methodologies (such as local VMT Evaluation Tool);	Section 5.12.2.1, pp. 5.12-8 to 5.12-9	The 27.7 VMT per capita threshold is not consistent with OPR guidance. The OPR Technical Advisory recommends a significance threshold set at 85% of existing VMT per worker to evaluate VMT impacts for non-residential land use projects.	**Response TRAN-7:** **Attachment TRAN-6** presents an updated VMT analysis using the OPR Technical Advisory recommendation.
Appendix B (g) (5) (C) (iii)	VMT heat maps; and		Section 5.12.2.1 excludes discussion of VMT heat maps, which if available, would be provided by Kern COG. If Kern COG does not provide readily-available heat maps, Section	**Response TRAN-8:** The Applicant's consultant WSP met with Kern COG staff on May 29, 2024 and confirmed that the agency has not adopted VMT analysis guidelines. As a result, Kern COG does not maintain VMT heat maps.

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			5.12.2.1 should clarify that heat maps are not available for this region.	
Appendix B (g) (5) (C) (iv)	Transportation demand management plans and any documents supporting the project applicant's CEQA determination.	Section 5.12.2.2.2, pp. 5.12-11 to 5.12-12	The VMT impact analysis documented in Section 5.12.2.2.2 should be re-evaluated with a VMT significance threshold that is consistent with the recommended threshold per the OPR Technical Advisory. If the conclusion of a less-than-significant VMT impact remains the same, then mitigation measures such as transportation demand management (TDM) plans are not necessary. However, if the revised VMT analysis concludes that the VMT impact is significant, then a corresponding TDM plan should be prepared to adequately address potential VMT impacts.	**Response TRAN-9:** As described in **Attachment TRAN 6**, VMT was re-analyzed on a per worker basis and the results demonstrated that impacts to transportation and traffic are anticipated to be less than significant and no mitigation beyond what is presented in the SAFC is proposed.
Appendix B (g) (5) (D)	An identification, on topographic maps at a scale of 1:24,000, and a description of existing and planned roads, rail lines, (including light rail), bike trails, airports, bus routes serving the project vicinity, pipelines, and canals in the project area affected by or serving the proposed facility. For each road identified, include the following, where applicable:		Provide a map of the regional transportation setting that includes all existing roads, railroad corridors and new roads planned as part of the project's construction.	**Response TRAN-10:** Concurrent with this filing, a map (**Figure TRAN-1**) of the regional transportation setting that includes all existing roads, railroad corridors, and new roads planned as part of the project's construction was submitted through *Kiteworks* under the reference TRAN-1.

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Appendix B (g) (5) (D) (i)	Road classification and design capacity;		Road classification and design capacity information is not included.	**Response TRAN-11:** The State of California passed Senate Bill (SB) 743 in 2013 that mandated that jurisdictions can no longer use automobile delay in transportation analysis under the California Environmental Quality Act (CEQA). Automobile delay is commonly measured by Level of Service (LOS). SB 743 required that the State's jurisdictions replace their methodologies from analyzing impacts to traffic and transportation from LOS to Vehicle Miles Traveled (VMT) by 2021.For these reasons, the Applicant performed a VMT analysis which does not include the requested road classification and design capacity information. We understand the CEC's request is asking that the Applicant prepare an analysis using LOS methodology. The Applicant is working with applicable municipalities on updating information related to the analysis of transportation facilities and infrastructure. This additional LOS information will further assist the CEC in understanding impacts to traffic and transportation. Within 30 days of receipt of the results of the additional traffic analyses, the requested information will be provided to the CEC for review.
Appendix B (g) (5) (D) (ii)	Current daily average and peak traffic counts;		Current daily average and peak traffic counts are not included.	**Response TRAN-12:** As described in Response TRAN-11, the Applicant is working with applicable municipalities on updating information related to the analysis of transportation facilities and infrastructure. This additional information will assist the CEC with understanding the Project's impact on the affected roadways. Within 30 days of receipt of the results of the additional analyses, the requested information will be provided to the CEC for review.

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Appendix B (g) (5) (D) (iii)	Current and projected levels of service before project development, during construction, and during project operation;		Current and projected levels of service before project development, during construction, and during project operation are not included. An intersection and roadway level of service analysis consistent with Kern County/Kern COG transportation impact study guidelines should be provided for the construction phase, which assumes up to 1,498 workers traveling during weekday AM and PM peak hours.	**Response TRAN-13:** As described in Response TRAN-11, the Applicant is working with applicable municipalities on updating information related to the analysis of transportation facilities and infrastructure. Within 30 days of receipt of the results of the additional analyses, the requested information will be provided to the CEC for review.
Appendix B (g) (5) (D) (v)	Estimated percentage of current traffic flows for passenger vehicles and trucks; and		Estimated percentage of current traffic flows for passenger vehicles and trucks are not provided.	**Response TRAN-14:** As described in Response TRAN-11, the Applicant is working with applicable municipalities on updating information related to the analysis of transportation facilities and infrastructure. Within 30 days of receipt of the results of the additional traffic analyses, the requested information will be provided to the CEC for review.
Appendix B (g) (5) (D) (vi)	An identification of any road features affecting public safety.		An identification of any road features affecting public safety is not included. Furthermore, an evaluation of emergency vehicle access within the project site should be provided to confirm that on-site emergency vehicle access is adequate.	**Response TRAN-15:** **Part 1**: As described in Response TRAN-11 the additional traffic study will address road features and public safety. **Part 2**: Within the project site itself, emergency vehicle access will be designed to the applicable LORS.

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Appendix B (g) (5) (E)	An assessment of the construction and operation impacts of the proposed project on the transportation facilities identified in (g)(5)(D). Also include anticipated project specific traffic, estimated changes to daily average and peak traffic counts, levels of service, and traffic/truck mix, and the impact of construction of any facilities identified in (g)(5)(D). Include:	Section 2.12.2.2.1, pp. 5.12-9 to 5.12-10	Analysis assumptions state that all construction workers are expected to arrive to the project site during the AM peak hour and depart during the PM peak hour. Furthermore, the analysis assumes that all workers drive alone to the site. Table 5.12-2 assumes 749 workers arrive to the site during the AM peak hour and 749 workers depart the site during the PM peak hour, which suggests a total of 749 workers for the construction phase. This conflicts with the information in Figure 5.12-3 and Section 5.12.2.2.2, which estimates 1,498 total workers during the construction phase. Which is the correct number: 749 workers or 1,498 workers? If the number of construction workers is expected to reach 1,498, then the trip generation analysis summarized in Section 5.12.2.2.1 should be updated accordingly.	**Response TRAN-16:** **Attachment TRAN-6** provides a clarification on the number of workers and worker trips during the construction phase.
Appendix B (g) (5) (E) (i)	Estimated on enocera@vnf.com e-way trip lengths for workers, deliveries, and truck haul trips generated by the construction of the project.	Table 5.12-2, p. 5.12-9	For construction traffic, a qualitative analysis of VMT impacts is often appropriate. Please include heavy-duty truck trips converted to passenger car equivalent (PCE) for general onsite construction activities as well as for the offsite fill removal option, as	**Response TRAN-17:** **Attachment TRAN-6** provides a clarification on the number of workers during the construction phase.

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			required under CEQA Guidelines section 15064.3 subdivision (b).	
Appendix B (g) (5) (E) (ii)	Description of public roadways and intersections temporarily or permanently altered by construction and operation including the duration of activities.	Section 5.12.1.1.1, p. 5.12-2	Provide a description of roadways and intersections temporarily or permanently altered by construction or operation of the project.	**Response TRAN-18:** The WRESC access to the facility will be on Dawn Road. Dawn Road will be improved to support construction activities.
Appendix B (i) (1) (A)	Tables that identify laws, regulations, ordinances, standards, adopted local, regional, state, and federal land use plans, leases, and permits applicable to the proposed project, and a discussion of the applicability of, and conformance with each. The table or matrix shall explicitly reference pages in the application wherein conformance, with each law or standard during both construction and operation of the facility is discussed; and	Section 5.12.5, pp. 5.12-14 to 5.12-1	The laws, ordinances, regulations, and standards are listed but do not include a table or matrix that explicitly references pages in the application where conformance with each during both construction and operation is discussed.	**Response TRAN-19:** **Attachment TRAN-6** provides an updated table showing the laws, ordinances, and standards.
TRANSMISSION SYSTEM SAFETY AND NUISANCE				
Appendix B (g) (18) (A)	The locations and a description of the existing switchyards and overhead and underground transmission lines that would be affected by the proposed project.	Subsection 3.2.1 to 3.2.2 Subsection 3.4.1 to 3.4.3 Pp. 3.9 to 3.13	Please resubmit legible Electrical overall one-line diagram (Figure 3.5) Please provide gen-tie conductor type, size, and current carrying capacity	**Response TSSN-1:** **Part 1**: Concurrent with this filing, Figure 3.5 (electrical one-line diagram) was submitted through *Kiteworks* under the reference of TSSN-1. *Please note that Figure 3.5 does not exist within the SAFC. The figure referenced in this DA is Figure 3.3.* **Part 2**: **Attachment TSSN-1** provides specifications on the gen-tie conductor type, size, and current carrying capacity. The overhead conductor is expected to be a double bundled 1590 thousand circulate mils (kcmil) “Falcon” aluminum conductor steel reinforced (ACSR). The conductor has a maximum current carrying capacity of 1,474 amperes (amps) per phase. The

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				underground portion of the transmission line is expected to consist of 2000 kcmil solid copper conductor with a carrying capacity of approximately 797 amps per phase. Each conductor would be encased in high density polyethylene (HDPE) pipe and placed in an underground duct bank as depicted on the one-line diagram.
Appendix B (g) (18) (B)	An estimate of the existing electric and magnetic fields from the facilities listed in (A) above and the future electric and magnetic fields that would be created by the proposed project, calculated at the property boundary of the site and at the edge of the rights of way for any transmission line. Also provide an estimate of the radio and television interference that could result from the project.	Subsection 3.2.1 to 3.2.2 Subsection 3.4.1 to 3.4.3 Pp. 3.9 to 3.13	Please provide the expected Electro Magnetic Field and Electric Field values, below the gen-tie.	**Response TSSN-2:** The estimated electromagnetic field and electric field values below the gen tie are provided in **Attachment TSSN-2**.
Appendix B (i) (1) (A)	Tables that identify laws, regulations, ordinances, standards, adopted local, regional, state, and federal land use plans, leases, and permits applicable to the proposed project, and a discussion of the applicability of, and conformance with each. The table or matrix shall explicitly reference pages in the application wherein conformance, with each law or standard during both construction and operation of the facility is discussed; and	Appendix 2A Subsection 3.5.1.to 3.5.6	Please discuss CPUC GO 95, 128,131-D and NESC standards in reference to the project design and construction process, such as grounding, capacitor banks, surge and lightning arrestors at the substation, voltage stability, volt-ampere reactive (VAR) support, etc. If there are any potential consequences, then the applicant shall propose mitigation measures.	**Response TSSN-3:** The Rev 1 version of the WRESC Electrical Engineering Design Criteria dated May 22, 2024, is provided as **Attachment TSSN-3**.

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TRANSMISSION SYSTEM DESIGN				
Appendix B (b) (2) (C)	A detailed description of the design, construction, and operation of any electric transmission facilities, such as power lines, substations, switchyards, or other transmission equipment, which will be constructed or modified to transmit electrical power from the proposed power plant to the load centers to be served by the facility. Such description shall include the width of rights of way and the physical and electrical characteristics of electrical transmission facilities such as towers, conductors, and insulators.	Section 3.1-3.3 Page 3-1 to 3-8 Figure 3-1a, 3-1b, 3-1c Figure 3-2, 3-3	Please resubmit Figure 3-1a, 3-1b, 3-1c, 3-2 and, 3-3. These figures submitted are	**Response TSD-1:** Concurrent with this filing, Figures 3-1a, 3-1b, 3-1c, 3-2 and, 3-3 were submitted through *Kiteworks* under the reference of TSD-1.
Appendix B (b) (2) (E)	A completed System Impact Study or signed System Impact Study Agreement with the California Independent System Operator and proof of payment. When not connecting to the California Independent System Operator controlled grid, provide the executed System Impact Study agreement and proof of payment to the interconnecting utility. If the interconnection and operation of the proposed project will likely impact an transmission system that is not controlled by the interconnecting utility (or California Independent System Operator), provide evidence of a System Impact Study or agreement and proof of payment (when applicable) with/to the impacted transmission owner or provide evidence that there are no system impacts requiring mitigation.	Section 3.3 Page 3-8 Phase II Interconnection Study	Please submit the 2022 Generator Reassessment Report and the most recent updated Generator Reassessment Report from California ISO.	**Response TSD-2:** This information was docketed on May 2, 2024, under a repeated request for confidential designation. Please refer to “WRESC Repeated Application for Confidential Designation for Transmission Interconnection Documents” (TN # 256147).

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VISUAL RESOURCES				
Appendix B (g) (6) (C) (v)	The KOP photograph and the photo-realistic simulation are to be capable of 11” x 17” color print by a printer capable at a minimum 600 dots per inch output resolution.		See below.	**Response VIS-1:** The KOP photograph and the photo-realistic simulation have been sized to 11” x 17” as requested. The KOP photographs and the photo-realistic simulations were uploaded to the *Kiteworks* concurrent with this filing under the reference VIS-1.
Appendix B (g) (6) (C) (vi)	Provide a copy of the KOP photograph(s) and photo-realistic simulation(s) in an electronic file.		Provide an electronic file via Kiteworks or flash drive supplying a copy of all electronic images; KOPs (existing condition photos, photo realistic simulations, landscape photographs, KOP location map, etc.) for cartography insertion into Staff Assessment visual resources section.	**Response VIS-2:** Concurrent with this filing, all electronic images and KOPs were submitted through *Kiteworks* under the reference VIS-2.
WATER RESOURCES				
Cal. Code Regs. Tit. 20 § 1704, (a) (3) (A)	Descriptions of all significant assumptions, methodologies, and computational methods used in arriving at conclusions in the document.		Descriptions of all significant assumptions, methodologies, and computational methods used not provided.	**Response WA-1:** Section 5.15 of the SAFC describes the hydrological environmental and regulatory settings, addresses potential impacts of the project on hydrology and water quality, and discusses mitigation measures to reduce impacts, where applicable. The information in this section is based on multiple online sources and published documents, as well as the technical documents prepared for the project including the Preliminary Drainage Memo (Kiewit, 2023) located in SAFC Appendix 15.5B. Additionally, a detailed hydrology analysis has subsequently been performed

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				by Kiewit as part of the Preliminary Hydrology and Hydraulics Analysis and AVEK issued a project water eligibility letter (AVEK, 2024). The AVEK eligibility letter is provided as **Attachment WA-1**.
Cal. Code Regs. Tit. 20 § 1704, (a) (3) (B)	Descriptions, including methodologies and findings, of all major studies or research efforts undertaken and relied upon to provide information for the document; and a description of ongoing research of significance to the project (including expected completion dates; and		Descriptions not provided.	**Response WA-2:** See Data Response above, **WA-1**. Also, a description of major studies and research efforts undertaken include the following: ▪ Kiewit's 2023 Preliminary Drainage Memo (Appendix 5.15B of the Supplemental AFC) ▪ Kiewit's 2024 Preliminary Hydrology and Hydraulics Analysis (**Attachment WA-2**) ▪ Alternatives evaluation for water supply (Section 6 of the Supplemental AFC)
Cal. Code Regs. Tit. 20 § 1704, (a) (3) (C)	A list of all literature relied upon or referenced in the documents, along with brief discussions of the relevance of each such reference;	Subsection 5.15.7, p. 5.15- 23	Brief discussions of the relevance of each such reference not provided.	**Response WA-3:** References are included in Section 5.15.7 and discussed throughout the Supplemental AFC. A brief discussion of the relevance of each such reference is noted below: ▪ Kiewit's 2023 Preliminary Drainage Memo (Appendix 5.15B of the Supplemental AFC) ▪ Antelope Valley East Kern Water Agency (AVEK). 2021. *2020 Urban Water Management Plan*: provides information regarding AVEK's water supply, water management strategy, water quality, and water availability for near- and long-term needs. ▪ California Statewide Groundwater Elevation Monitoring (CASGEM), 2023: provides historical

Siting Regulations	Information	Application Page Number and Section Number	Information Required To Make AFC Conform With Regulations	Data Adequacy (DA) Response
				groundwater elevation data and groundwater flow direction. ▪ California Department of Water Resources (DWR), DWR Well Records: provides information on groundwater wells within the project vicinity. ▪ California Department of Water Resources (DWR), 2004. South Lahontan Hydrologic Region Fremont Valley Groundwater Basin, updated 2/27/2004: provides background information and hydrogeology of the groundwater basin. ▪ California Department of Water Resources (DWR), 2020.Sustainable Groundwater Management Act 2019 Basin Prioritization Process and Results: provides information pertaining to the status of the Fremont Valley groundwater basin. ▪ Kern County Planning and Natural Resources Department, 2023, Draft Environmental Impact Report, Mojave Micro Mill Project, PSGMS Holdings Corp (Pacific Steel Group): provides information on cumulative project effects. ▪ Regional Water Quality Control Board (RWQCB), 2015. *Lahontan Region Water Quality Control Plan (Basin Plan)*: provides information on applicable regulations and classification of nearby waterbodies. ▪ State Water Resources Control Board (SWRCB), 2023. Groundwater Ambient Monitoring and Assessment Database, 2023: provides groundwater data from wells within the project area. ▪ U.S. Geological Survey (USGS), 1977. Ground Water in the Koehn Lake Area Kern County,

Siting Regulations	Information	Application Page Number and Section Number	Information Required To Make AFC Conform With Regulations	Data Adequacy (DA) Response
				California. Prepared by J.H. Koehler. Water-Resources Investigations 77-66. December 1977: provides background information on hydrogeology of the groundwater basin. ▪ U.S. Geological Survey (USGS), 2023. National Ground-Water Monitoring Network: provides well data for the project vicinity. ▪ U.S. Geological Survey (USGS) Soledad Mountain Quadrangle, California – Kern County 7.5-minute Series: provides topographic data for the project vicinity. ▪ Western Regional Climate Center Mojave Station. 2023: provides climatic data for the project vicinity. ▪ Woodard and Curran, 2018. Fremont Valley Basin Groundwater Management Plan, December 2018 provides background information and data on the Fremont Valley Groundwater Basin, including groundwater flow direction and availability. ▪ AVEK Eligibility Letter (**Attachment WA-1**): The letter indicates that the property is eligible to receive imported water supply from AVEK Water Agency.
Appendix B (g) (14) (B) (iv)	Flood control facilities (existing and proposed); and	Subsection 5.15.1.4, p. 5.15-9, 5.15.2.4, p. 5.15-17	Existing and proposed flood control facilities not provided.	**Response WA-4:** There are no existing flood control facilities. Proposed flood control and stormwater management facilities include the placement of a berm to divert run-on around the project site. Onsite stormwater management system is designed to have zero discharge. Flood control facilities are discussed in the

Siting Regulations	Information	Application Page Number and Section Number	Information Required To Make AFC Conform With Regulations	Data Adequacy (DA) Response
				Preliminary Hydrology and Hydraulics Study provided as **Attachment WA-2**.
Appendix B (g) (14) (C) (v)	For all water supplies intended for industrial uses to be provided from public or private water purveyors, a letter of intent or will-serve letter indicating that the purveyor is willing to serve the project, has adequate supplies available for the life of the project, and any conditions or restrictions under which water will be provided. If a will-serve letter or letter of intent cannot be provided, identify the most likely water purveyor and discuss the necessary assurances from the water purveyor to serve the project;	Subsection 5.15.1.5, p. 5.15-11.	A letter of intent or will-serve letter not provided.	**Response WA-5:** AVEK does not provide a letter of intent or will-serve letter to any of its retail customers. As noted in Section 5.15.1.5, AVEK will provide the quantity and quality of water that the Project requires. **Attachment WA-1** presents a letter from AVEK Water Agency confirming that the WRESC is within AVEK's service territory and indicating that the site is eligible to receive water from AVEK Water Agency given its location. Water service is subject to AVEK's Rules and Regulations for Distribution of Water and contingent upon execution of a Water Service Agreement with the Agency, payment of applicable capacity fees, and construction of a new turnout.
Appendix B (g) (14) (C) (vii)	Provide water mass balance and heat balance diagrams for both average and maximum flows that include all process or ancillary water supplies and wastewater streams. Highlight any water conservation measures on the diagram and the amount that they reduce water demand; and	Subsection 2.1.14, pp. 2-21 to 2-23, 5.15.1.5.1, p.5.15- 11, Appendix 2D	Heat balance diagram not provided. Water conservation measures not shown.	**Response WA-6:** On March 3, 2024, the Applicant filed the "Willow Rock Energy Storage Center Application for Confidentiality for Heat and Mass Balance Diagram," TN # 254786. On March 14, 2023, the Executive Director approved the Application for Confidentiality, TN #: 256366. The Applicant will provide an updated Heat and Mass Balance Diagram (**Attachment WA-6**) under a Repeated Application for Confidential Designation. The most impactful water conservation measure is covering the hydrostatically compensating surface water reservoir. Under normal circumstances (*as detailed in Supplemental AFC Section 5.15.1.5.2 & 5.15.1.5.3*) the project generates a surplus of water.

Siting Regulations	Information	Application Page Number and Section Number	Information Required To Make AFC Conform With Regulations	Data Adequacy (DA) Response
Appendix B (g) (14) (D) (i)	Monthly and seasonal precipitation and stormwater runoff and drainage patterns for the proposed site and surrounding area that may be affected by the project's construction and operation;	Appendix 5.15B	Monthly and seasonal precipitation and stormwater runoff and drainage patterns for the proposed site and surrounding area not provided.	**Response WA-7:** Monthly and seasonal precipitation and stormwater runoff and drainage patterns for the proposed site and surrounding area are discussed in the Preliminary Hydrology and Hydraulics Study provided as **Attachment WA-2**.
Appendix B (g) (14) (D) (ii)	Drainage facilities and the design criteria used for the plant site and ancillary facilities, including but not limited to capacity of designed system, design storm, and estimated runoff;	Appendix 5.15B		**Response WA-8:** Drainage facilities and the design criteria used for the plant site and ancillary facilities, including but not limited to capacity of designed system, design storm, and estimated runoff for the proposed site and surrounding area are discussed in the Preliminary Hydrology and Hydraulics Study presented as **Attachment WA-2**.
Appendix B (g) (14) (D) (iii)	All assumptions and calculations used to calculate runoff and to estimate changes in flow rates between pre- and post-construction; and	Appendix 5.15B		**Response WA-9:** The Preliminary Hydrology and Hydraulics Study provided as **Attachment WA-2** discusses all assumptions and calculations used to calculate runoff and to estimate changes in flow rates between pre- and post-construction.
Appendix B (g) (14) (D) (iv)	A copy of applicable regional and local requirements regulating the drainage systems, and a discussion of how the project's drainage design complies with these requirements.	Appendix 5.15B		**Response WA-10:** As noted in Section 5.15.2.3, the site grading and drainage plans will be designed to comply with all applicable LORS to avoid potential flood-related impacts. The Preliminary Hydrology and Hydraulics Study provided as **Attachment WA-2** discusses the applicable requirements and standards for the design of WRESC's drainage system.
Appendix B (g) (14) (E)	An impacts analysis of the proposed project on water resources and a discussion of conformance with water-related LORS and policy. This discussion shall include:	Subsection 5.15.4, p. 5.15- 19.	Impacts analysis not provided.	**Response WA-11:** As a retail customer of AVEK, the Project will not substantially conflict with or obstruct implementation of a water quality control plan or sustainable groundwater

Siting Regulations	Information	Application Page Number and Section Number	Information Required To Make AFC Conform With Regulations	Data Adequacy (DA) Response
				management. As noted in 5.15.1.5, AVEK will provide the quantity and quality of water that the Project requires. As described in AVEK's 2020 Urban Water Management Plan (UWMP), AVEK's water reliability goal is to provide a level of regional water reliability that supports customers' water needs. The foundational strategy of this goal is to continue to develop groundwater banking programs to help increase the reliability of the Antelope Valley region's water supplies by storing excess State Water Project (SWP) water during wet periods and recovering it for delivery to customers during dry or high-demand periods or during a disruption in deliveries from the SWP. As described in AVEK's UWMP and noted in Section 5.15.1.5, AVEK can meet all water demands in normal, single-dry, and multiple-dry years by utilizing its current water supply portfolio of State Water Project supplies and groundwater. Additional recovery of imported water from AVEK groundwater banks would be available to meet demand over multiple dry years, and AVEK's groundwater and storage are reliable in all water year types. As noted in 5.15.3, existing land uses surrounding the WRESC Site include open space and rural residential. Mojave Micro Mill is a proposed steel mill about 1 mile north of the WRESC Site on the east side of Sierra Highway. The Mojave Micro Mill project will consume 69 AF over a 2-year construction period and 1,018 AF per year during the operation period. In 2023, Kern County Planning and Natural Resources Department listed AVEK as the water supplier for the Mojave Micro Mill project and noted to have sufficient water supplies available to serve the Mojave Micro Mill project and its member agencies now and over a 20-year planning horizon.

Siting Regulations	Information	Application Page Number and Section Number	Information Required To Make AFC Conform With Regulations	Data Adequacy (DA) Response
				Local and regional standards and regulations have been developed to address regional impacts to water resources such as the cumulative water quality impacts associated with stormwater discharges and water usage. During the construction phase, AVEK will supply water to the Project and have minimal effect on groundwater annual yield or levels. During the operation phase, a surplus of water will be available for to use as make-up process water and limited potable water is needed (less than 2.2 AF per year). Therefore, based on publicly available information from AVEK, there will be no significant cumulative impacts to local water supply, and the Applicant will comply with local and regional standards and regulations to ensure that the Project will not result in significant cumulative impacts. The table in **Attachment WA-11** has been modified to provide clarification regarding LORS.
Appendix B (g) (14) (E) (i)	The effects of project demand on the water supply and other users of this source, including, but not limited to, water availability for other uses during construction or after the power plant begins operation, consistency of the water use with applicable RWQCB basin plans or other applicable resource management plans, and any changes in the physical or chemical conditions of existing water supplies as a result of water use by the power plant;		Effects of project demand on the water supply and other users of this source not discussed.	**Response WA-12:** As noted in Section 5.15.3, local and regional standards and regulations have been developed to address regional impacts to water resources such as the cumulative water quality impacts associated with water usage. During the construction phase, AVEK will supply water to the project and have minimal effect on groundwater annual yield or levels. During the operations phase, a surplus of water will be available for use as make-up process water and limited potable water is needed (less than 2.2 AF per year). Therefore, there will be no significant cumulative impacts to local water supply, and the Applicant will comply with local and regional standards and regulations to ensure that the project will not result in significant cumulative impacts.

Siting Regulations	Information	Application Page Number and Section Number	Information Required To Make AFC Conform With Regulations	Data Adequacy (DA) Response
				As noted in Section 5.15.1.5, AVEK will provide the quantity and quality of water that the Project requires. AVEK can meet all water demands in normal, single-dry, and multiple-dry years by utilizing its current water supply portfolio of State Water Project supplies and groundwater (AVEK 2020 UWMP). Furthermore, AVEK's 2020 UWMP was prepared in compliance with California Water Code requirements for UWMPs. Preparation of the UWMP actively engaged stakeholders, cities, counties, water agencies, and the public to both seek and distribute information about water demand, water supply, and reliability to strengthen the region's ability to assess and plan for the region's water future. With continued growth expected in the incorporated and unincorporated areas of the greater Antelope Valley, AVEK has considered in their UWMP the past, current and projected water demand in its service area and compared its demands to current and projected water supplies. Therefore, based on publicly available information from AVEK, the project will cause minimal impacts or effects to water supply and other potential users of this water supply during construction and operation phases. Based on AVEK's 2020 UWMP, the proposed project is consistent with demographic forecasts with current land use and anticipated land use changes. Therefore, the 2020 UWMP accounts for the water demand associated with the proposed project and similar economic development and population growth in Kern County (refer to Section 4.2 of the 2020 UWMP for additional description of supply and demand modeled projections).

Siting Regulations	Information	Application Page Number and Section Number	Information Required To Make AFC Conform With Regulations	Data Adequacy (DA) Response
Appendix B (g) (14) (E) (ii)	If the project will pump groundwater, an estimation of aquifer drawdown based on a computer modeling study shall be conducted by a professional geologist and include the estimated drawdown on neighboring wells within 0.5 mile of the proposed well(s), any effects on the migration of groundwater contaminants, and the likelihood of any changes in existing physical or chemical conditions of groundwater resources shall be provided;	Subsection 5.15.1.5, p. 5.15-1.	Antelope Valley-East Kern Water Agency (AVEK) will provide water for the Project using groundwater. Information regarding water use impact on aquifer drawdown not provided.	**Response WA-13:** The Applicant is a retail customer of AVEK. AVEK is responsible for managing water supply within its service territory. WRESC will not use groundwater. Therefore, there will be no drawdown on wells within 0.5 miles of the project and no effects on the migration of groundwater contaminants from onsite groundwater pumping.
Appendix B (g) (14) (iii)	The effects of construction activities and plant operation on water quality and to what extent these effects could be mitigated by best management practices;	Subsection 5.15.1.3, p. 5.15-7.	Effect of Water Quality not discussed.	**Response WA-14:** Stormwater potential impacts are discussed in Sections 5.15.2.4 and 5.15.5.2.3. Process water quality is discussed Section 5.15.1.5.4. Process water will be contained in a closed system during plant operation and will not be discharged to the environment. Best management practices will be implemented as outlined in the stormwater pollution prevention plan during construction to minimize potential impacts. Compliance with local and regional standards and regulations will ensure the project will have less-than-significant impacts on water supply, wastewater collection and disposal, stormwater runoff and flooding, and stormwater quality.
Appendix B (g) (14) (iv)	If not using a zero liquid discharge project design for cooling and process waters, include the effects of the proposed wastewater disposal method on receiving waters, the feasibility of using pre-treatment techniques to reduce impacts, and beneficial uses of the receiving waters. Include an explanation why the zero liquid discharge process is “environmentally undesirable,” or “economically unsound;”	Subsection 5.15.1.6, p. 5.15-13.	Applicant says process will be zero waste discharge, but blowdown water from the reverse osmosis system will be discharged to on-site reservoir. Please resolve inconsistency.	**Response WA-15:** WRESC is designed to produce zero discharge. A small amount of blowdown water from the reverse osmosis system will be rejected. However, the rejected water will not be discharged, but will be sent to the zero-discharge, lined, evaporation pond to be evaporated. The evaporation pond is located along the southwest portion of the project site as shown on the grading plan and is separate from the stormwater retention pond and the hydrostatically compensating

Siting Regulations	Information	Application Page Number and Section Number	Information Required To Make AFC Conform With Regulations	Data Adequacy (DA) Response
				surface water reservoir. The evaporation pond will be managed so there is zero-discharge to the ground or offsite.
Appendix B (g) (14) (v)	If using fresh water, include a discussion of the cumulative impacts, alternative water supply sources and alternative cooling technologies considered as part of the project design. Include an explanation of why alternative water supplies and alternative cooling are "environmentally undesirable," or "economically unsound;"	Subsection 5.15.5, p. 5.15- 11.	Discussion of the cumulative impacts, alternative water supply sources and alternative cooling technologies not provided.	**Response WA-16:** Cumulative impacts are discussed under Section 5.15.3. Alternative water supply sources are discussed in Section 5.15.1.5 and Section 6.5.2. Existing land uses surrounding WRESC include open space and rural residential. Mojave Micro Mill is a proposed steel mill about 1 mile north of the WRESC Site on the east side of Sierra Highway. The Mojave Micro Mill project will consume 69 AF over a 2-year construction period and 1,018 AF per year during the operation period. AVEK is the retail water supplier for the Mojave Micro Mill project and according to the Kern County Planning and Natural Resources Department in 2023 maintains sufficient water supplies available to serve the Mojave Micro Mill project and its member agencies now and over a 20-year planning horizon. Local and regional standards and regulations have been developed to address regional impacts to water resources such as the cumulative water quality impacts associated with stormwater discharges and water usage. During the construction phase, AVEK will supply water to the Project and have minimal effect on groundwater annual yield or levels. During the operation phase, a surplus of water will be available for use as make-up process water and limited potable water is needed (less than 2.2 AF per year) as described in the water balance. Therefore, there will be no significant cumulative impacts to local water supply, and WRESC will comply with local and regional

Siting Regulations	Information	Application Page Number and Section Number	Information Required To Make AFC Conform With Regulations	Data Adequacy (DA) Response
				standards and regulations to ensure that the Project will not result in significant cumulative impacts. Because AVEK is the retailer service provider and because the project is within AVEK's service territory, alternative water supplies are not feasible. As noted in Section 5.15.1.5, onsite groundwater production will not occur during the Project's construction and operation phases. For the purposes of the SAFC, the use of recycled water was considered from the Palmdale and Lancaster water reclamation facilities (WRFs) as an alternative source. However, because of the distance of the WRFs to the WRESC, lack of existing pipeline, and current WRF permit restrictions (prohibiting sale of WRF water outside of Los Angeles County), recycled water from these facilities is not considered feasible (Antelope Valley Engineering, 2012; Board Order No. R6V-2009-0141). Recycled water from Rosamond Community Service District (RCSD) wastewater treatment plant was also considered. The RCSD is undergoing an update that includes tertiary treatment of wastewater to produce reclaimed water. Water from this source is not included with the preferred alternative because of current regulations that prohibit sale of RCSD water outside of its service territory. Section 6.5 further evaluates water supply source alternatives to AVEK. The evaluation included ocean water, reclaimed water, and groundwater wells. Alternative cooling water strategies were evaluated by WRESC. The cooling and thermal storage systems operate in a closed loop. Therefore, losses are minimal and make-up water demand will be small. During operations, the project is designed to have an overall surplus of water that will be managed by using the reservoir. The reservoir volume is balanced by

Siting Regulations	Information	Application Page Number and Section Number	Information Required To Make AFC Conform With Regulations	Data Adequacy (DA) Response
				controlling evaporation with the floating cover, the inflow of annual precipitation, and condensed water from compressed air.
Appendix B (g) (14) (vi)	The effects of the project on the 100-year flood plain, flooding potential of adjacent lands or water bodies, or other water inundation zones; and	Subsection 5.15.1.4, p. 5.15-9.	Effects of the project on flooding potential of adjacent lands, water bodies, or other water inundation zones not discussed.	**Response WA-17:** The Preliminary Hydrology and Hydraulics Analysis prepared by Kiewit and provided as **Attachment WA-2** discusses the effects of the project on flooding potential of adjacent lands, water bodies, or other water inundation zones.
Appendix B (g) (14) (vii)	All assumptions, evidence, references, and calculations used in the analysis to assess these effects.	NA	Assumptions, evidence, references, and calculations used in the analysis not provided.	**Response WA-18:** The Preliminary Hydrology and Hydraulics Analysis prepared by Kiewit and provided as **Attachment WA-2** presents the assumptions, evidence, references, and calculations used in the analysis**.**
Appendix B (i) (1) (A)	Tables that identify laws, regulations, ordinances, standards, adopted local, regional, state, and federal land use plans, leases, and permits applicable to the proposed project, and a discussion of the applicability of, and conformance with each. The table or matrix shall explicitly reference pages in the application wherein conformance, with each law or standard during both construction and operation of the facility is discussed; and	Subsection 5.15.5, p.5.15-19, Table 5.15-3.	Discussion of the applicability of, and conformance with each law, regulation, ordinance, standard, adopted local, regional, state, and federal land use plan, lease, and permit and explicitly reference pages in the application wherein conformance, with each law or standard during both construction and operation of the facility is discussed not provided.	**Response WA-19:** Table 5.15-3 presented as part of the Applicant's response to DA-WA-11 was modified in response to this request, including adding page numbers to the section. A copy of the updated tables is presented as **Attachment WA-11**.

Attachment ES-1

Landowner Information

(Submitted Under Request for Confidentiality)

Attachment BIO-1

Technical Memorandum on Nitrogen Deposition

TECHNICAL MEMORANDUM

DATE May 17, 2024

TO Hydrostor

CC Gregory Darvin (Atmospheric Dynamics, Inc.)

FROM Jeremy Paris and David Stein **EMAIL jeremy.paris@wsp.com**

DATA ADEQUACY REQUEST – NITROGEN DEPOSITION SUMMARY

Appendix B (g) (13) (B) (ii) Provide an aerial map of the isopleth graphic depicting modeled nitrogen deposition rates. The geographical extent of the nitrogen deposition map(s) should include the entire plume and a radius of 6 (six) miles from the source, specifically identifying acres of sensitive habitat(s) within each isopleth. Modeling parameters and files shall be provided.

Response: Air emissions from the project include nitrogen oxides (NO_x), Volatile Organic Compounds (VOCs) sulfur oxides (SO_x), and particulates (PM10 and PM2.5). Nitrogen oxide gases (NO, NO_2) convert to nitrate particulates in a form that is suitable for uptake by most plants. The effect of this nitrogen could be to promote plant growth that could potentially encourage non-native plant species at the expense of native species.

To assess nitrogen deposition on the surrounding environment, the AERMOD model, which was used in the air quality permitting analysis to evaluate the project's air quality impacts, was also used in the deposition analysis. AERMOD is a steady-state, mass-conserving, nonreactive (i.e., no chemistry) plume dispersion model, which is the preferred model for use in the regulatory environment. The ability of AERMOD to overestimate impacts was expanded by including several other assumptions with regards to nitrogen formation and deposition, in order to assess the worst-case potential for impacts from the WRESC project. These assumptions include:

- 100 percent conversion of oxides of nitrogen (NO_x) and ammonia (NH_3) into atmospherically derived nitrogen (ADN) within the engine stack(s) rather than allowing the conversion of NO_x and NH_3 to occur over distance and time within the atmosphere;
- Depositional rates and parameters were based upon nitric acid (HNO_3) which, of all the depositional species, has the most affinity for impacts to soils and vegetation and the most tendency to "stick" to what it is deposited upon;
- Maximum settling velocities to produce maximum deposition rates;
- Maximum potential emissions for the WRESC of up to 200 hours per year were used rather than actual emissions (50 hours per year) in the calculation of nitrogen deposition;
- And, once the plume leaves the engine stack, nitrogen immediately begins to deposit in the surrounding lands.

WSP USA Inc.
401 B Street, Suite 1650, San Diego, California, USA 92101 T: +1 619 338-9376

To produce conservative results (overestimates), modeling assumptions regarding the complex chemistry that occurs to produce nitrogen from NO_x, NH_3, and other pollutants were not used in this modeling analysis. What was used is the assumption that the pollutants leaving the stack(s) would already be in the form of depositional nitrogen (nitrate and ammonium ions). To do this, the emissions of NO_x and NH_3 (NH3 emissions were based on a 10 ppm slip) were adjusted for the molecular weight of nitrogen and then summed for each individual source the annual emissions based upon 200 hours per year of operation. Thus, all impacts would represent 100 percent conversion of combustion emissions into depositional nitrogen. This assumption leads to an exceedingly conservative estimation of nitrogen deposition, because areas with the highest nitrogen emissions do not necessarily experience the greatest deposition effects, which usually occur far from the original nitrogen source.

The AERMOD model calculates atmospheric deposition of nitrogen by calculating the wet and dry fluxes of total nitrogen. This deposition is accomplished by using a resistance model for the dry deposition part, and by assigning particle phase washout coefficients for the wet removal process from rainout. As discussed below, depositional parameters are input into the model in order to calculate the deposition of nitrogen. All depositional parameters were based on HNO_3.

In order to model gaseous deposition, the model requires seasonal land use characteristics and gas deposition resistance terms based on five seasonal categories. The seasonal categories are input into AERMOD on a month-by-month basis, corresponding to each seasonal change in land characteristics (lush vegetation, cropland, snow cover, limited growth) that are expected during the summer, fall, winter, and spring seasons. These seasonal categories were chosen to be reflective of the semi-arid climate of the high desert region as follows:

- December through May monthly periods were assigned seasonal category 5 which is transitional spring with partial green coverage or short annuals. This corresponds to the winter period where rainfall can produce limited plant growth in the high desert region.
- June through November were assigned seasonal category 3, which is late autumn after frost with no snow. This is the closest category to representing the period during summer and fall when plant growth is very limited or non-existent.

Additionally, land use data is input based on wind direction. For this area, land use category 8 (barren land, mostly desert) was selected for all wind directions between 0° and 360°. Nitric acid was chosen to represent total nitrogen deposition since nitric acid has the greatest potential for depositional effects.

For both wet and dry deposition, AERMOD requires the following additional inputs:

- The molecular diffusivity (D_a) for the pollutant being modeled [0.1628 square centimeters per second (cm^2/s)];
- The diffusivity in water (D_w) for the pollutant being modeled [2.98E-5 square centimeters per second (cm^2/s)];
- The cuticular resistance to uptake by lipids for individual leaves (rcl) for the pollutant [1.0E+5 seconds per centimeter (s/cm)]; and
- The Henry's Law constant (Henry) for the pollutant [8.0E-8 Pascal-cubic meters per mole ($Pa\text{-}m^3/mol$)].

In addition to the above inputs, the dry and wet deposition algorithm also requires surface roughness length (cm), friction velocity (meters per second), Monin-Obukhov length (meters), surface pressure, precipitation type, and

precipitation rate. For AERMOD, the five (5) years of hourly meteorology used in this analysis was the same meteorological data set that was used to assess the project's impacts on air quality and public health.

Results of the wet and dry nitrogen deposition modeling are summed by AERMOD to produce annual deposition rates in units of grams per square meter (g/m^2) for the entire 5-year meteorological period modeled, which are converted to kilograms per hectare per year (kg/ha/yr) for presentation in this report. As the critical habitats cover a variety of elevations and distances, the annual average deposition rates calculated for all receptors modeled in the critical habitat areas were used for comparison to threshold levels. The maximum project impact on total nitrogen deposition rates (wet + dry) would be 1.341 kg/ha/yr immediately adjacent to the facility. Since there was no identified critical habitat area within six miles of the project site, the deposition modeling utilized the entire modeling receptor grid. Across all receptors, the average deposition rates are on the order of 0.007 kg/ha-yr.

The results of the nitrogen depositional modeling analysis are presented in Figure 1.

An increase in nitrogen levels above 10 kgN/ha/yr are known to affect species composition in native plant communities. Higher nitrogen levels allow for non-native weedy species to grow quicker and outcompete native species for valuable nutrients, moisture, and sunlight.

Special Status Vegetation Communities potentially occurring within 10 miles of the project site include Southern Cottonwood Willow Riparian Forest, Southern Mixed Riparian Forest, Southern Riparian Forest, Southern Riparian Scrub, Southern Sycamore Alder Riparian Woodland, Southern Willow Scrub, Valley Needlegrass Grassland, Valley Oak Woodland, and Wildflower Fields (Biological Resources Assessment Report, WSP February 2024). However, there are no recorded occurrences of these sensitive plant communities within a 6-mile radius of the project site.

The sensitive vegetation communities most susceptible to impacts associated with Nitrogen Deposition are Valley Needlegrass Grasslands and Wildflower Fields. The closest recorded occurrence of Valley Needlegrass Grasslands and/or Wildflower Fields is approximately 7.3 miles to the south, which is well outside the 6-mile buffer recognized for impacts associated with Nitrogen Deposition.

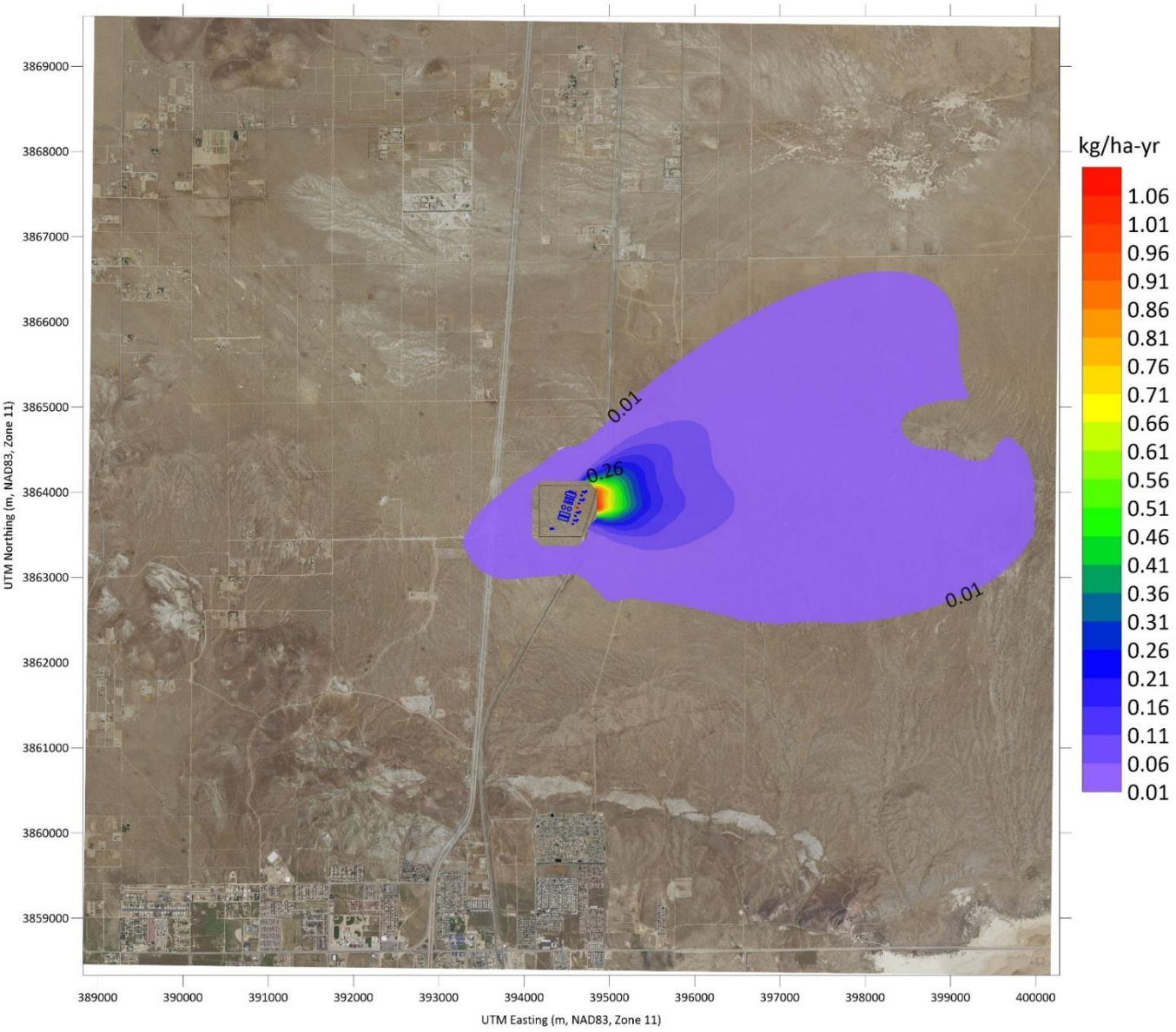
For Joshua Tree National Park, located in the Mojave Desert approximately 133 miles away, total nitrogen deposition from 2017-2019 ranged from 2.7 to 5.3 kg per hectare per year based on modeling data.

A threshold at which harmful effects from nitrogen deposition on plant communities has not been firmly established. However, a value of 5 kilograms per hectare per year (kg/ha/yr) is often used for comparing nitrogen deposition among plant communities. Research conducted in the South San Francisco Bay Area indicates that intensified annual grass invasions can occur in areas with nitrogen deposition levels of 11–20 kg/ha/yr, with limited invasions at levels of 4–5 kg/ha/yr (Weiss 2006a and Weiss 2007, as cited in CEC 2007). The maximum and average levels of nitrogen deposition from the project in the sensitive areas are far below the levels necessary to cause adverse effects.

Furthermore, the level of nitrogen deposition from the project emissions on plant-available nitrogen would actually be less than the calculated amount because the deposition will be distributed in small amounts during the year and not all of the nitrogen added to the soil during each deposition event is available for plant use because of losses associated with soil processes. Therefore, it is unlikely that there would be significant impacts to biological resources from nitrogen deposition.

The modeling files will be supplied to the CEC staff.

Figure 1
Total Annual Nitrogen Deposition
(Wet+Dry) Rates



Attachment BIO-5

Technical Memorandum on Nitrogen

Gmail

Aaron Lui <[redacted]>

Desert tortoise surveys for Hydrostor Willow Rock Energy Storage Center Project

Susanne Heim <[redacted]> Thu, Mar 7, 2024 at 11:19 AM
To: "Sanzenbacher, Peter M" <[redacted]>
Cc: "Woulfe, MaryBeth" <[redacted]>, "[redacted]" <[redacted]>, "[redacted]" <[redacted]>

Thank you so much Peter!

On Thu, Mar 7, 2024 at 11:17 AM Sanzenbacher, Peter M <[redacted]> wrote:

Hello Susanne,
Per our call today the Service reviewed this project in early 2022 when it was called the GEM Energy Storage Center. At that time we did not recommend protocol level desert tortoise surveys based on the location and our knowledge of tortoise occurrence in that area of Kern County. Regardless, it was good to see the desktop and field survey results confirming no live tortoises or sign at the project and surrounding buffer. The Service did work with CEC on recommendations for raven management, including specific measures and payment into the regional raven management fund, and we reviewed a draft raven management plan prepared by Golder and submitted to CEC.

In terms of the NEPA document and analysis, based on the timeline you provided in your email the existing tortoise survey would be sufficient and we would not recommend additional surveys at this time. If you have any new information or additional questions on biological resources and in particular listed species please reach out and we can discuss further.

Best,
Peter

--
[redacted]
Fish and Wildlife Biologist
Mojave Desert Division
U.S. Fish and Wildlife Service
Palm Springs Fish and Wildlife Office
[redacted]

http://www.fws.gov/carlsbad/

From: Susanne Heim [redacted]
Sent: Wednesday, March 6, 2024 4:42 PM
To: Woulfe, MaryBeth [redacted]
Cc: Aaron Lui [redacted]; Laurel Lees <[redacted]>
Subject: [EXTERNAL] Desert tortoise surveys for Hydrostor Willow Rock Energy Storage Center Project

Marybeth,

I just called you regarding the Hydrostor Willow Rock Energy Storage Center Project. A focused desert tortoise survey was conducted for the project in the spring of 2023. The result of that survey as well as the project area/location and a description of the project are provided in the Desert Tortoise Survey Report available here: https://efiling.energy.ca.gov/GetDocument.aspx?tn=254815&DocumentContentId=90459
While the project is within the range of desert tortoise, no sign of desert tortoise was observed during focused surveys and no tortoise have occurred in the area for several years.

We are anticipating that the NEPA process will be initiated in the next couple months and we wanted to discuss FWS requirements for timing of desert tortoise surveys and what is required at the time of the NEPA documentation.

No other federally listed species have potential to occur in the project area. The full biological resource assessment report is available here: https://efiling.energy.ca.gov/GetDocument.aspx?tn=254816&DocumentContentId=90465

We would be interested in scheduling a brief call to discuss the survey results and requirements to support the NEPA process and Section 7 compliance.

Thank you.

--

[redacted]

--

[redacted]

Attachment BIO-6

Revised Table 5.2-8

Revised Table 5.2-8. Laws, Ordinances, Regulations, and Standards for Biological Resources

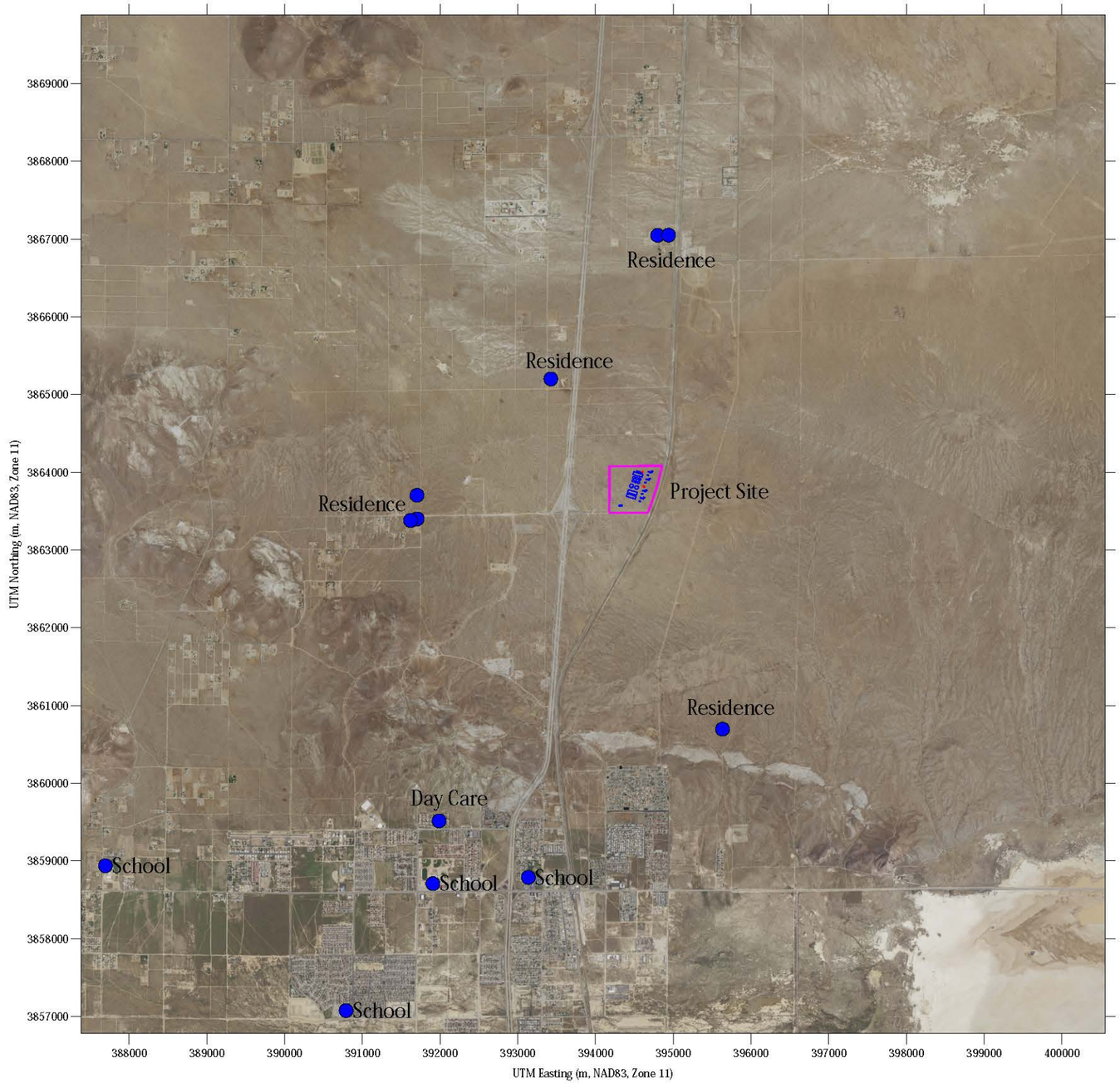
LORS	Requirements/Applicability	Administering Agency	Conformance
Federal			
Federal Endangered Species Act (16 USC 1531 et seq.)	Designates and protects federally listed threatened and endangered plants and animals and their critical habitat. Applicants for projects that could result in adverse impacts on any federally listed species are required to consult with and mitigate potential impacts in consultation with the USFWS.	USFWS	P. 5.2-49
Migratory Bird Treaty Act (16 USC 703 to 711)	Protects all migratory birds, including nests and eggs.	USFWS	5.2-38
Bald and Golden Eagle Protection Act (16 USC 668)	Specifically protects bald and golden eagles from harm or trade in parts of these species.	USFWS	5.2-38
State			
California Endangered Species Act (California Fish and Game Code Section 2050 et seq.)	Species listed under this act cannot be “taken” or harmed, except under specific permit. Take in the context of California Endangered Species Act means to hunt, pursue, kill, or capture, as well as any other actions that may result in an adverse impact when attempting to take a listed species.	CEC, CDFW	5.2-38
California Fish and Game Code Section 3511	This section of the code describes bird species, primarily raptors that are Fully Protected. Fully Protected birds may not be taken or possessed, except under specific permit requirements.	CDFW	5.2-38
California Fish and Game Code Section 3503	This section of the code states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto.	CDFW	Conformance is similar to avoidance measures and clearance surveys associated with MBTA recommendations in 5.2-38.

LORS	Requirements/Applicability	Administering Agency	Conformance
California Fish and Game Code Section 3503.5	It is unlawful to take, possess, or destroy any birds in the orders Falconiformes or Strigiformes (birds of prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto.	CDFW	Conformance is similar to avoidance measures and clearance surveys associated with MBTA recommendations in 5.2-38.

Attachment PH-1

Sensitive Receptors Map

Sensitive Receptor Map
(No Berm) Operations



CONSULTANT		
wsp	YYYY-MM-DD	2024-05-23
	DESIGNED	-
	PREPARED	MK
	REVIEWED	JP
	APPROVED	VG/LL

CLIENT
GEM A-CAES LLC

REFERENCE(S)
1. SENSITIVE RECEPTOR FIGURE - GOOGLE EARTH IMAGERY MARCH 2024

PROJECT
WILLOW ROCK ENERGY STORAGE CENTER
SUPPLEMENTAL AFC

TITLE
SENSITIVE RECEPTORS (NO BERM) OPERATIONS

PROJECT NO.	PHASE	REV.	FIGURE
31406639.003	01	1	XX-SR

Attachment TRAN-2

Confirmation Documents Associated with FAA Notice Form 7460-1 Submittal

&

DAD Clearinghouse Confirmation

Federal Aviation Administration

« OE/AAA

Project Submission Success
Project Name: GEM A-000860955-24

Project GEM A-000860955-24 has been submitted successfully to the FAA.

Your filing is assigned Aeronautical Study Number (ASN):

2024-AWP-6185-OE
2024-AWP-6186-OE
2024-AWP-6187-OE
2024-AWP-6188-OE
2024-AWP-6189-OE
2024-AWP-6190-OE
2024-AWP-6191-OE
2024-AWP-6192-OE
2024-AWP-6193-OE
2024-AWP-6194-OE
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2024-AWP-6200-OE
2024-AWP-6201-OE
2024-AWP-6202-OE
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2024-AWP-6204-OE
2024-AWP-6205-OE
2024-AWP-6206-OE
2024-AWP-6207-OE
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2024-AWP-6209-OE
2024-AWP-6210-OE
2024-AWP-6211-OE
2024-AWP-6212-OE
2024-AWP-6213-OE
2024-AWP-6214-OE
2024-AWP-6215-OE
2024-AWP-6216-OE
2024-AWP-6217-OE
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2024-AWP-6219-OE
2024-AWP-6220-OE
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2024-AWP-6251-OE
2024-AWP-6252-OE
2024-AWP-6253-OE
2024-AWP-6254-OE

Please refer to the assigned ASN on all future inquiries regarding this filing.

Federal Aviation Administration

« OE/AAA

Notice of Proposed Construction or Alteration - Off Airport

Add a New Case (Off Airport) - Desk Reference Guide V_2018.2.1

Add a New Case (Off Airport) for Wind Turbines - Met Towers (with WT Farm) - WT-Barge Crane - Desk Reference Guide V_2018.2.1

Project Name: GEM A-000860955-24

Project Summary : GEM A-000860955-24

Structure	City, State	Lat/Long	Map	Actions	7460-2 Received	Latest Letter
93 Accepted 2024-AWP-6185-OE	Rosamond, CA	34° 52' 8.95" N 118° 14' 49.01" W	Show Map	Clone Upload a PDF Add 7460-2		None
95 Accepted 2024-AWP-6186-OE	Rosamond, CA	34° 52' 15.34" N 118° 14' 41.41" W	Show Map	Clone Upload a PDF Add 7460-2		None
96 Accepted 2024-AWP-6187-OE	Rosamond, CA	34° 52' 15.32" N 118° 14' 33.53" W	Show Map	Clone Upload a PDF Add 7460-2		None
97 Accepted 2024-AWP-6188-OE	Rosamond, CA	34° 52' 15.30" N 118° 14' 25.43" W	Show Map	Clone Upload a PDF Add 7460-2		None
98 Accepted 2024-AWP-6189-OE	Rosamond, CA	34° 52' 15.27" N 118° 14' 16.54" W	Show Map	Clone Upload a PDF Add 7460-2		None
99 Accepted 2024-AWP-6190-OE	Rosamond, CA	34° 52' 15.25" N 118° 14' 7.41" W	Show Map	Clone Upload a PDF Add 7460-2		None
100 Accepted 2024-AWP-6191-OE	Rosamond, CA	34° 52' 15.22" N 118° 13' 59.81" W	Show Map	Clone Upload a PDF Add 7460-2		None
101 Accepted 2024-AWP-6192-OE	Rosamond, CA	34° 52' 15.20" N 118° 13' 52.49" W	Show Map	Clone Upload a PDF Add 7460-2		None
102 Accepted 2024-AWP-6193-OE	Rosamond, CA	34° 52' 15.19" N 118° 13' 45.75" W	Show Map	Clone Upload a PDF Add 7460-2		None
103 Accepted 2024-AWP-6194-OE	Rosamond, CA	34° 52' 15.76" N 118° 13' 44.56" W	Show Map	Clone Upload a PDF Add 7460-2		None
104 Accepted 2024-AWP-6195-OE	Rosamond, CA	34° 52' 21.97" N 118° 13' 44.38" W	Show Map	Clone Upload a PDF Add 7460-2		None
105 Accepted 2024-AWP-6196-OE	Rosamond, CA	34° 52' 28.85" N 118° 13' 44.28" W	Show Map	Clone Upload a PDF Add 7460-2		None
106 Accepted 2024-AWP-6197-OE	Rosamond, CA	34° 52' 30.56" N 118° 13' 44.34" W	Show Map	Clone Upload a PDF Add 7460-2		None
107 Accepted 2024-AWP-6198-OE	Rosamond, CA	34° 52' 32.52" N 118° 13' 39.11" W	Show Map	Clone Upload a PDF Add 7460-2		None
108 Accepted 2024-AWP-6199-OE	Rosamond, CA	34° 52' 35.44" N 118° 13' 35.14" W	Show Map	Clone Upload a PDF Add 7460-2		None
109 Accepted 2024-AWP-6200-OE	Rosamond, CA	34° 52' 39.01" N 118° 13' 31.75" W	Show Map	Clone Upload a PDF Add 7460-2		None
110 Accepted 2024-AWP-6201-OE	Rosamond, CA	34° 52' 43.52" N 118° 13' 29.36" W	Show Map	Clone Upload a PDF Add 7460-2		None
111 Accepted 2024-AWP-6202-OE	Rosamond, CA	34° 52' 48.43" N 118° 13' 28.40" W	Show Map	Clone Upload a PDF Add 7460-2		None
112 Accepted 2024-AWP-6203-OE	Rosamond, CA	34° 52' 53.03" N 118° 13' 29.64" W	Show Map	Clone Upload a PDF Add 7460-2		None
113 Accepted 2024-AWP-6204-OE	Rosamond, CA	34° 53' 0.08" N 118° 13' 32.27" W	Show Map	Clone Upload a PDF Add 7460-2		None
114 Accepted 2024-AWP-6205-OE	Rosamond, CA	34° 53' 1.71" N 118° 13' 30.90" W	Show Map	Clone Upload a PDF Add 7460-2		None
115 Accepted 2024-AWP-6206-OE	Rosamond, CA	34° 53' 7.88" N 118° 13' 27.60" W	Show Map	Clone Upload a PDF Add 7460-2		None
116 Accepted 2024-AWP-6207-OE	Rosamond, CA	34° 53' 13.15" N 118° 13' 24.77" W	Show Map	Clone Upload a PDF Add 7460-2		None
117 Accepted 2024-AWP-6208-OE	Rosamond, CA	34° 53' 18.39" N 118° 13' 21.96" W	Show Map	Clone Upload a PDF Add 7460-2		None
118 Accepted 2024-AWP-6209-OE	Rosamond, CA	34° 53' 23.58" N 118° 13' 19.17" W	Show Map	Clone Upload a PDF Add 7460-2		None

119 Accepted 2024-AWP-6210-OE	Rosamond, CA	34° 53' 28.82" N 118° 13' 16.36" W	Show Map	Clone Upload a PDF Add 7460-2	None
120 Accepted 2024-AWP-6211-OE	Rosamond, CA	34° 53' 34.02" N 118° 13' 13.57" W	Show Map	Clone Upload a PDF Add 7460-2	None
121 Accepted 2024-AWP-6212-OE	Rosamond, CA	34° 53' 40.26" N 118° 13' 12.63" W	Show Map	Clone Upload a PDF Add 7460-2	None
122 Accepted 2024-AWP-6213-OE	Rosamond, CA	34° 53' 46.62" N 118° 13' 9.10" W	Show Map	Clone Upload a PDF Add 7460-2	None
123 Accepted 2024-AWP-6214-OE	Rosamond, CA	34° 53' 52.25" N 118° 13' 5.97" W	Show Map	Clone Upload a PDF Add 7460-2	None
124 Accepted 2024-AWP-6215-OE	Rosamond, CA	34° 53' 56.98" N 118° 13' 3.34" W	Show Map	Clone Upload a PDF Add 7460-2	None
125 Accepted 2024-AWP-6216-OE	Rosamond, CA	34° 54' 1.09" N 118° 13' 1.15" W	Show Map	Clone Upload a PDF Add 7460-2	None
126 Accepted 2024-AWP-6217-OE	Rosamond, CA	34° 54' 6.65" N 118° 12' 58.20" W	Show Map	Clone Upload a PDF Add 7460-2	None
127 Accepted 2024-AWP-6218-OE	Rosamond, CA	34° 54' 13.02" N 118° 12' 54.76" W	Show Map	Clone Upload a PDF Add 7460-2	None
128 Accepted 2024-AWP-6219-OE	Rosamond, CA	34° 54' 18.15" N 118° 12' 52.15" W	Show Map	Clone Upload a PDF Add 7460-2	None
129 Accepted 2024-AWP-6220-OE	Rosamond, CA	34° 54' 21.96" N 118° 12' 52.06" W	Show Map	Clone Upload a PDF Add 7460-2	None
130 Accepted 2024-AWP-6221-OE	Rosamond, CA	34° 54' 25.85" N 118° 12' 51.99" W	Show Map	Clone Upload a PDF Add 7460-2	None
131 Accepted 2024-AWP-6222-OE	Rosamond, CA	34° 54' 25.86" N 118° 12' 44.13" W	Show Map	Clone Upload a PDF Add 7460-2	None
132 Accepted 2024-AWP-6223-OE	Rosamond, CA	34° 54' 25.87" N 118° 12' 35.67" W	Show Map	Clone Upload a PDF Add 7460-2	None
133 Accepted 2024-AWP-6224-OE	Rosamond, CA	34° 54' 25.88" N 118° 12' 28.02" W	Show Map	Clone Upload a PDF Add 7460-2	None
134 Accepted 2024-AWP-6225-OE	Rosamond, CA	34° 54' 25.89" N 118° 12' 21.45" W	Show Map	Clone Upload a PDF Add 7460-2	None
135 Accepted 2024-AWP-6226-OE	Rosamond, CA	34° 54' 25.90" N 118° 12' 14.85" W	Show Map	Clone Upload a PDF Add 7460-2	None
136 Accepted 2024-AWP-6227-OE	Rosamond, CA	34° 54' 25.97" N 118° 12' 8.08" W	Show Map	Clone Upload a PDF Add 7460-2	None
137 Accepted 2024-AWP-6228-OE	Rosamond, CA	34° 54' 26.11" N 118° 12' 0.97" W	Show Map	Clone Upload a PDF Add 7460-2	None
138 Accepted 2024-AWP-6229-OE	Rosamond, CA	34° 54' 26.26" N 118° 11' 53.51" W	Show Map	Clone Upload a PDF Add 7460-2	None
139 Accepted 2024-AWP-6230-OE	Rosamond, CA	34° 54' 26.41" N 118° 11' 46.13" W	Show Map	Clone Upload a PDF Add 7460-2	None
140 Accepted 2024-AWP-6231-OE	Rosamond, CA	34° 54' 26.55" N 118° 11' 39.43" W	Show Map	Clone Upload a PDF Add 7460-2	None
141 Accepted 2024-AWP-6232-OE	Rosamond, CA	34° 54' 26.66" N 118° 11' 33.81" W	Show Map	Clone Upload a PDF Add 7460-2	None
142 Accepted 2024-AWP-6233-OE	Rosamond, CA	34° 54' 26.78" N 118° 11' 28.41" W	Show Map	Clone Upload a PDF Add 7460-2	None
143 Accepted 2024-AWP-6234-OE	Rosamond, CA	34° 54' 26.89" N 118° 11' 22.90" W	Show Map	Clone Upload a PDF Add 7460-2	None
144 Accepted 2024-AWP-6235-OE	Rosamond, CA	34° 54' 26.97" N 118° 11' 19.09" W	Show Map	Clone Upload a PDF Add 7460-2	None
145 Accepted 2024-AWP-6236-OE	Rosamond, CA	34° 54' 27.11" N 118° 11' 12.26" W	Show Map	Clone Upload a PDF Add 7460-2	None
146 Accepted 2024-AWP-6237-OE	Rosamond, CA	34° 54' 27.22" N 118° 11' 6.81" W	Show Map	Clone Upload a PDF Add 7460-2	None
147 Accepted 2024-AWP-6238-OE	Rosamond, CA	34° 54' 27.37" N 118° 11' 0.07" W	Show Map	Clone Upload a PDF Add 7460-2	None
148 Accepted 2024-AWP-6239-OE	Rosamond, CA	34° 54' 27.52" N 118° 10' 53.27" W	Show Map	Clone Upload a PDF Add 7460-2	None
149 Accepted 2024-AWP-6240-OE	Rosamond, CA	34° 54' 27.63" N 118° 10' 48.17" W	Show Map	Clone Upload a PDF Add 7460-2	None
150 Accepted 2024-AWP-6241-OE	Rosamond, CA	34° 54' 27.79" N 118° 10' 40.97" W	Show Map	Clone Upload a PDF Add 7460-2	None

151 Accepted 2024-AWP-6242-OE	Rosamond, CA	34° 54' 27.96" N 118° 10' 33.19" W	Show Map	Clone Upload a PDF Add 7460-2	None
152 Accepted 2024-AWP-6243-OE	Rosamond, CA	34° 54' 34.75" N 118° 10' 33.33" W	Show Map	Clone Upload a PDF Add 7460-2	None
153 Accepted 2024-AWP-6244-OE	Rosamond, CA	34° 54' 40.43" N 118° 10' 33.45" W	Show Map	Clone Upload a PDF Add 7460-2	None
154 Accepted 2024-AWP-6245-OE	Rosamond, CA	34° 54' 48.34" N 118° 10' 33.62" W	Show Map	Clone Upload a PDF Add 7460-2	None
155 Accepted 2024-AWP-6246-OE	Rosamond, CA	34° 54' 54.48" N 118° 10' 33.74" W	Show Map	Clone Upload a PDF Add 7460-2	None
156 Accepted 2024-AWP-6247-OE	Rosamond, CA	34° 54' 54.65" N 118° 10' 25.45" W	Show Map	Clone Upload a PDF Add 7460-2	None
157 Accepted 2024-AWP-6248-OE	Rosamond, CA	34° 54' 54.75" N 118° 10' 20.12" W	Show Map	Clone Upload a PDF Add 7460-2	None
158 Accepted 2024-AWP-6249-OE	Rosamond, CA	34° 54' 54.89" N 118° 10' 13.16" W	Show Map	Clone Upload a PDF Add 7460-2	None
159 Accepted 2024-AWP-6250-OE	Rosamond, CA	34° 54' 55.03" N 118° 10' 6.29" W	Show Map	Clone Upload a PDF Add 7460-2	None
160 Accepted 2024-AWP-6251-OE	Rosamond, CA	34° 54' 55.15" N 118° 10' 0.25" W	Show Map	Clone Upload a PDF Add 7460-2	None
161 Accepted 2024-AWP-6252-OE	Rosamond, CA	34° 54' 55.30" N 118° 9' 52.57" W	Show Map	Clone Upload a PDF Add 7460-2	None
162 Accepted 2024-AWP-6253-OE	Rosamond, CA	34° 54' 55.41" N 118° 9' 47.08" W	Show Map	Clone Upload a PDF Add 7460-2	None
163 Accepted 2024-AWP-6254-OE	Rosamond, CA	34° 54' 55.55" N 118° 9' 39.93" W	Show Map	Clone Upload a PDF Add 7460-2	None

Mapping - Desk Reference Guide V_2018.2.0 Attaching Documents - Desk Reference Guide V_2018.2.0

Upload a PDF to the Project

Draft: Cases that have been saved by the user but have not been submitted to the FAA.

Waiting: Wind Turbine/Met Tower (w/WT Farm) cases that have not been submitted to the FAA and are waiting for an action from the user, either to verify the map or attach specific documents

Accepted: Cases that have been submitted to the FAA.

Add Letter: Cases that have been reviewed by the FAA and require additional information from the user.

Work in Progress: Cases that are being evaluated by the FAA.

Interim: Cases that have been reviewed by the FAA and require resolution from the user.

Determined: Cases that have a completed aeronautical study and an FAA determination.

Terminated: Cases that are no longer valid.

Please allow the FAA a minimum of 45 days to complete a study.

Case Transfer:

- **Use the check box(es) to select the case(s) you want to transfer.**
- **Select the "Transfer Cases button" to open the "Manage Transfer Cases" screen.**

Note: Drafts and cases in Add and Terminated status can not be transferred.

Click here to contact the appropriate representative.

Paris, Jeremy

From: OSD Pentagon OUSD A-S Mailbox ASD EIE-RP-SC <osd.pentagon.ousd-a-s.mbx.asd-eie-rp-sc@mail.mil>
Sent: Thursday, May 23, 2024 12:50 PM
To: Paris, Jeremy
Cc: Erin Ekblad; OSD Pentagon OUSD A-S Mailbox ASD EIE-RP-SC
Subject: RE: WRESC - DOD Siting Clearinghouse Informal Consultation Form and Submittal Package

Good afternoon Mr. Paris,

Your Informal Review request for the Willow Rock Energy Storage project has been received. We will begin processing the request shortly.

Thank you for the opportunity to review the project.

Very Respectfully,

The Clearinghouse
Military Aviation and Installation Assurance Siting Clearinghouse
Office of the Assistant Secretary of Defense (Energy, Installations and Environment)
Email: osd.pentagon.ousd-a-s.mbx.asd-eie-rp-sc@mail.mil

From: Paris, Jeremy [redacted]
Sent: Thursday, May 23, 2024 2:53 PM
To: OSD Pentagon OUSD A-S Mailbox ASD EIE-RP-SC <osd.pentagon.ousd-a-s.mbx.asd-eie-rp-sc@mail.mil>
Cc: Erin Ekblad [redacted]
Subject: WRESC - DOD Siting Clearinghouse Informal Consultation Form and Submittal Package

To Whom It May Concern,

WSP on behalf of Hydrostor, Inc. (dba GEM A-CAES, LLC.) is submitting the attached application package for the Willow Rock Energy Storage Center (WRESC) in Kern County, CA for your consideration. Please do not hesitate to ask if you have any questions or concerns.

Sincerely,

Jeremy Paris

Jeremy Paris
Vice President
Environmental Planner
Earth & Environment – West Region

[redacted]

401 B Street, Suite 1650
San Diego, CA 92101

-LAEmHhHzdJzBlTWfa4Hgs7pbKl

Attachment TRAN-6

Technical Memorandum – Additional Information

Date: May 30, 2024

To: California Energy Commission

From: WSP

Subject: Supplemental Application for Certification (SAFC)
Willow Rock Energy Storage Center
Traffic and Transportation Addendum

Enclosure:

Introduction

The purpose of this memorandum is to provide additional information to ***5.12 Traffic and Transportation*** section of the Supplemental Application for Certification (SAFC). This document was prepared in response to the California Energy Commission (CEC) Staff Data Adequacy Recommendation on Section 5.12 of the SAFC. The Applicant prepared as part of the SAFC a Vehicle Miles Traveled (VMT) analysis based on a per capita basis. The per capita basis was used as it represents a more conservative approach to analyzing impacts to traffic and transportation. At the request of CEC staff, this memorandum presents a VMT analysis based on workers.

Construction Traffic Generation

The estimated number of construction vehicles per day for each month in the construction schedule are illustrated in **Figure 1**. Truck volumes have been converted to passenger car equivalents (PCE) using a factor of 2.0, which is appropriate for heavy trucks on surface streets according to the Highway Capacity Manual. The peak Project-related trips are expected to occur in month 34 with an estimated construction traffic of 815 PCE per day.

Table 1: Project Trip Generation During Peak Construction

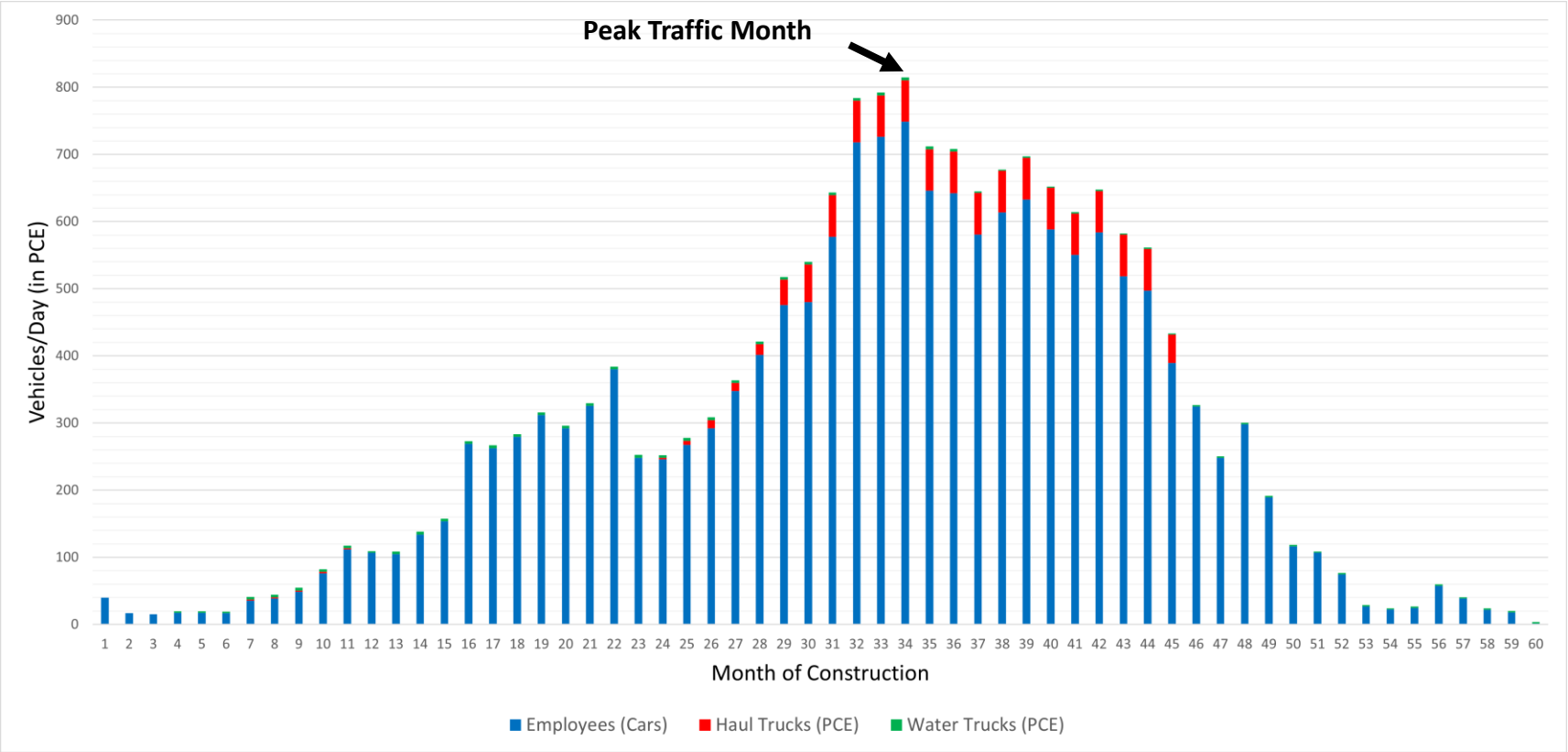
Table 1 summarizes the construction-related trip generation during the peak of construction.

Table 1: Project Trip Generation During Peak Construction

Vehicle Type	AM Peak Hour			PM Peak Hour			Daily		
	Entry	Exit	Total	Entry	Exit	Total	Entry	Exit	Total
Workers (cars)	749	0	749	0	749	749	749	749	1,498
Water Trucks (in vehicles)	1	1	2	1	1	2	2	2	4
Haul Trucks (in vehicles)	4	4	8	4	4	8	31	31	62
Total Construction Traffic (in PCE)	759	10	769	10	759	769	815	815	1,630

PCE = passenger car equivalent

Figure 1: Construction Traffic by Month



VMT Analysis

CEQA Guidelines Section 15064.3 establishes VMT as the appropriate measure to identify transportation impacts. VMT is a measure of total travel that accounts for the number and length of trips in a region over a period.

At this time, the Kern Council of Governments (KernCOG) and Kern County have not adopted VMT analysis guidelines or developed VMT thresholds for CEQA impact determination. In addition, VMT heat maps are not published by KernCOG for this region and are not available for this analysis. Therefore, at the request of CEC staff the guidelines provided by the California Governor's Office of Planning and Research (OPR) were used in this VMT analysis. The OPR guidelines state that VMT associated with heavy-duty truck trips should not be included in the evaluation of transportation impacts. Therefore, the VMT analysis conducted for this project includes only worker (employee) trips and does not include construction equipment and haul truck trips. VMT for this project is calculated by multiplying the number of Project trips by the travel length of each trip. The Technical Advisory on Evaluating Transportation Impacts in CEQA (OPR, December 2018) recommends a significance threshold set at 85% of existing VMT per worker in the region for non-residential land use projects. The Project would have a significant transportation impact if the VMT per employee from the Project is greater than 85% of the average existing VMT per worker for the region in which it is located.

VMT Threshold

According to the latest California Public Road Data published by the Highway Performance Monitoring System, the average regional daily VMT in Kern County is 25,366,210 (State of California 2024) in the year 2022. According to the Annual Average Labor Force Data published by the California Employment Development Department (EDD), Kern County had 361,700 people employed in year 2022. The VMT per employee for Kern County in 2022 was calculated to be 70.13, and therefore the threshold for examining of a potentially significant VMT impact is set at 59.61 (85% of 70.13).

Impact Assessment

It is anticipated that 15 percent of the workers (total 113 out of 749) in the construction phase would be considered nonspecialized workers and would be recruited locally. The remaining 85 percent (total 637 out of 749), considered specialized workers, would be recruited from outside the area and would stay in hotels in nearby cities.

The residences of the nonspecialized workers are assumed to follow the residential distribution of persons currently employed in the Rosamond Census Designated Place (CDP). U.S. census data was used to determine the residential locations of workers in the Rosamond area and are summarized in **Table 2.**

Table 2: Residential Locations of Nonspecialized Workers

Residential Location	Percentage of Workers)
Rosamond CDP, CA	36%
Lancaster, CA	17%
Palmdale, CA	8%
Los Angeles, CA	3%
Mojave CDP, CA	2%
Santa Clarita, CA	2%
California City, CA	2%
Golden Hills CDP, CA	1%
Quartz Hill CDP, CA	1%
Tehachapi, CA	1%
Other Locations	27%
Total	**100%**

Source: U.S. Census Bureau, OnTheMap Application
https://onthemap.ces.census.gov/
CA = California; CDP = census-designated place

The specialized workforce would presumably stay in hotels in nearby Rosamond, Mojave, Lancaster, and Palmdale. Since it is unknown in which hotels the specialized workers would be lodged, an assumption of their spatial distribution was made based on the spatial distribution of hotels in the area. **Table 3** summarizes the distribution of specialized workers based on the information obtained from Google Maps.

Table 3: Residential Distribution of Specialized Workers

Hotel Location	Number of Hotels (approximate)	Distribution of Workers
Rosamond CDP, CA	4	8%
Lancaster, CA	21	41%
Palmdale, CA	16	31%
Mojave CDP, CA	10	20%

CA = California; CDP = census-designated place

As mentioned previously, VMT is calculated by multiplying the number of Project trips by the average length of each trip. **Table 4** summarizes the daily VMT calculation for the nonspecialized worker trips and **Table 5** summarizes the daily VMT calculation for the specialized worker trips.

Table 4: Daily Vehicle Miles Traveled Calculations of Nonspecialized Workers

Residential Location	Share	Non-specialized Workers	Average Distance Round Trip (miles)	Vehicle Miles Traveled
Rosamond CDP, CA	36%	41	8	328
Lancaster, CA	17%	19	34	646
Palmdale, CA	8%	9	50	450
Los Angeles, CA	3%	3	170	510
Mojave CDP, CA	2%	2	20	40
Santa Clarita, CA	2%	2	118	236
California City, CA	2%	2	50	100
Golden Hills CDP, CA	1%	1	66	66
Quartz Hill CDP, CA	1%	1	46	46
Tehachapi, CA	1%	1	60	60
Other Locations	27%	31	200	6200
Total	**100%**	**112**		**8,682**

CA = California; CDP = census-designated place

Table 5: Daily Vehicle Miles Traveled Calculations of Specialized Workers

Hotel Location	Share	Specialized Workers	Average Distance Round Trip (miles)	Vehicle Miles Traveled
Rosamond CDP, CA	8%	50	8	400
Lancaster, CA	41%	262	34	8,908
Palmdale, CA	31%	200	50	10,000
Mojave CDP, CA	20%	125	20	2,500
Total		**637**		**21,808**

CA = California; CDP = census-designated place

The total daily VMT for construction workers was calculated to be 30,490 (8,682+21,808). The total number of works is calculated to be 749 (112+637). This results in a VMT per employee of 40.71. This figure is below the threshold of 59.61 VMT per employee. Therefore, the proposed Project would have a less-than-significant impact during construction. **Table 6** summarizes the impact determination for the Project.

Table 6: Impact Determination

VMT Metric	Base Year (2022)	Threshold (85%)	Project	Impact?
VMT per Employee	70.13	59.61	40.71	No

Note that the determination of VMT impacts does not include VMT from Project trucks. As mentioned previously, truck VMT is excluded from consideration under SB 743.

Laws, Ordinances, Regulations, and Standards

GEM would ensure compliance with LORS of all applicable federal, state, local, and administering agencies pertaining to traffic and transportation issues.

Federal Laws, Ordinances, Regulations, and Standards

- Title 49 CFR 172, 173, and 173 provide standards for labels, placards, and markings on hazardous materials shipments by truck (Part 172), standards for packaging hazardous materials (Parts 173), and for transporting hazardous materials in tank cars (Part 179). The administering agencies for the above authority are the CHP and U.S. Department of Transportation. (See Section 5.12.2.4 of the SAFC).
- 49 CFR 350-399 and Appendices A-G, Federal Motor Carrier Safety Regulations, address safety considerations for the transport of goods, materials, and substances over public highways. (See Section 5.12.2.4 of the SAFC).
- 14 CFR 77.13(2) (i) requires an applicant to notify the FAA of the construction of structures within 20,000 feet of the nearest point of the nearest runway of an airport with at least one runway longer than 3,200 feet. (See Section 5.12.2.5 of the SAFC).

State Laws, Ordinances, Regulations, and Standards

- CVC Sections 13369, 15275, and 15278 (California Law 2021) address the licensing of drivers and classifications of licenses required to operate particular types of vehicles. (See Section 5.12.2.4 and 5.12.2.5 of the SAFC).
- CVC Section 32100.5 addresses the transportation of hazardous materials that pose an inhalation hazard. (See Section 5.12.2.4 of the SAFC).
- CVC, 13 CCR 1160, et seq. provides the CHP with authority to adopt regulations for the transportation of hazardous materials in California. The CHP can issue permits and specify the route for hazardous material delivery. (See Section 5.12.2.4 of the SAFC).
- California Streets and Highway Code (S&HC), Sections 660, 670, 1450, 1460 et seq. 1470, and 1480, regulate ROW encroachment and granting of permits for encroachments on state and county roads. (See Section 5.12.1.2 of the SAFC).
- S&HC Sections 117 and 660–711 and CVC Sections 35780 et seq., require permits to transport oversized loads on county roads. S&HC Sections 117 and 660 to 711 require permits for any construction, maintenance, or repair involving encroachment on state highway ROWs. CVC Section

35780 requires approval for a permit to transport oversized or excessive loads over state highways. (See Section 5.12.1.2 of the SAFC).

- Caltrans weight and load limitations for state highways apply to all state and local roadways. The weight and load limitations are specified in CVC Sections 35550 to 35559. The following provisions, from the CVC, apply to all roadways and are therefore applicable to this Project. (See Section 5.12.1.2 of the SAFC).
- General provisions: The gross weight imposed upon the highway by the wheels on any axle of a vehicle shall not exceed 20,000 pounds and the gross weight upon any one wheel, or wheels, supporting one end of an axle, and resting upon the roadway, shall not exceed 10,500 pounds.
- The maximum wheel load is the lesser of the following: (a) the load limit established by the tire manufacturer, or (b) a load of 620 pounds per lateral inch of tire width, as determined by the manufacturer's rated tire width.
- Vehicles with trailers or semi-trailers: The gross weight imposed upon the highway by the wheels on any one axle of a vehicle shall not exceed 18,000 pounds and the gross weight upon any one wheel, or wheels, supporting one end of an axle and resting upon the roadway, shall not exceed 9,500 pounds, except that the gross weight imposed upon the highway by the wheels on any front steering axle of a motor vehicle shall not exceed 12,500 pounds.

Local State Laws, Ordinances, Regulations, and Standards

This section reviews compliance with all relevant local LORS without regard to their applicability as a matter of law. These LORS include the following:

- No stopping zones: There are no stopping zones on the north side of Rosamond Boulevard, beginning at the northwest curb return with Eagle Way, thence westerly for a distance of 425 feet; on the north side of Rosamond Boulevard, beginning at the northwest curb return with Eagle Way, thence westerly for a distance of 547 feet to the true point of beginning, thence westerly for a distance of 861 feet; and on the north side of Rosamond Boulevard, beginning at the northeast curb return with 30th Street West, thence easterly for a distance of 215 feet (Kern County 2021). (Not analyzed in the SAFC).
- Parking limitations: In the absence of the posting of a stricter limitation, it shall be unlawful for any vehicle, as defined in the CVC, to remain parked or standing upon any public street or alley within the unincorporated area of the county, with the exception of state highways, for a period of 72 or more consecutive hours. (See Section 5.12.1 of the SAFC).
- The Kern County General Plan contains policies, goals, and implementation measures that are more general in nature and are not specific to development such as the Project. Therefore, they are not listed below, but all policies, goals, and implementation measures in the Kern County General Plan are incorporated by reference. The design LOS for Kern County is LOS C. The minimum LOS for conformance with the Kern County General Plan is LOS D. (Not analyzed in the SAFC).

  Circulation Element:

  - To satisfy the trip reduction and travel demand requirements of the Kern Council of Government's Congestion Management Program

- To coordinate congestion management and air quality requirements and avoid multiple and conflicting requirements
- Kern County will plan for a reduction of environmental effects without accepting a lower quality of life in the process
- Maintain a minimum LOS D for all roads throughout the county
- Provide for Kern County's heavy truck transportation in the safest way possible
- Reduce potential overweight trucks
- Use state Highway System improvements to prevent truck traffic in neighborhoods

- The Project is subject to the provisions of the Willow Springs Specific Plan. The Willow Springs Specific Plan was adopted in April 2008 and contains goals, policies, and standards that are compatible with those in the Kern County General Plan but are unique to the specific needs of the Willow Springs Area. The transportation-related policies and measures contained in the Willow Springs Specific Plan that are applicable to the Project are outlined below (Kern County 2008). Note that only applicable goals, policies, and standards are included here; those goals, policies, and standards that are not applicable are not included. (Not analyzed in the SAFC).

  Circulation Element:

  Goals

  - Goal 5 To maintain public safety within the plan area by providing a more direct and efficient circulation system for law enforcement and fire protection vehicles.
  - Goal 7 To provide an adequate circulation system which will support the proposed land uses.

  Policies

  - Policy 7 Require the widening of impacted roadways to handle increased traffic generated by new development.
  - Policy 8 Encourage resourceful air quality improvement and reduction methods.

  Mitigation/Implementation Measures

  - Measure 9 A traffic study in accordance with the requirements of Kern County and Caltrans, as appropriate, shall be submitted for all discretionary Projects. Study shall demonstrate consistency with the Willow Springs Specific Plan.
  - Measure 13 The Traffic Impact Fee Program implements Mitigation Measure 10 of the Willow Springs Final Environmental Impact Report.

- Regional Transportation Plan: The latest RTP was prepared by the Kern COG and was adopted on July 21, 2022. The 2022 RTP is a long-term blueprint that establishes a set of regional transportation goals, policies, and actions intended to guide development of the planned multimodal transportation systems in Kern County for the next 20 years or more. The plan was developed through a continuing, comprehensive, and cooperative planning process, and provides for effective coordination between local, regional, state, and federal agencies. Included in the 2022 RTP is the Sustainable Communities

Strategy (SCS), which is required by California's Sustainable Communities and Climate Protection Act of SB 375. (General provision).

- The intent of the SCS is to achieve the state's emissions reduction targets for automobiles and light trucks. The SCS will also provide opportunities for a stronger economy, healthier environment, and improved quality of life for community members in Kern County. The RTP and SCS seek to improve economic vitality, improve air quality, improve the health of communities, improve transportation and public safety, promote the conservation of natural resources and undeveloped land, increase access to community services, increase regional and local energy independence, and increase opportunities to help shape community's future. (General provision).
- The 2018 RTP and SCS financial plan identifies how much money is available to support the region's transportation investments. The plan includes a core revenue forecast of existing local, state, and federal sources along with funding sources that may be considered reasonably available over the time horizon of the RTP and SCS. These new sources include adjustments to state and federal gas tax rates based on historical trends and recommendations from two national commissions (National Surface Transportation Policy and Revenue Study Commission and National Surface Transportation Infrastructure Financing Commission), leveraging of local sales tax measures, local transportation impact fees, potential national freight program/freight fees, future state bonding programs, and mileage-based user fees (Kern COG 2022). (General provision).
- The Kern County ALUCP establishes procedures and criteria to assist Kern County and affected incorporated cities in addressing compatibility issues between airports and surrounding land uses. (General provision).

Attachment TSSN-1

GEN-TIE Specifications

Study Summary

CYMCAP Version	8.1 Revision 1
Study:	HYDROSTER
Execution:	Hydroster HDD Bundled
Date:	8/25/2023 10:28:44 AM

General Simulation Data

Steady State Option	Unequally Loaded
Consider Electrical interaction between circuits	No
Induced currents in metallic layers as a fraction of conductor current (applied to all single phase circuits) :	0.0
Conductor Resistances Computation Option:	IEC-228

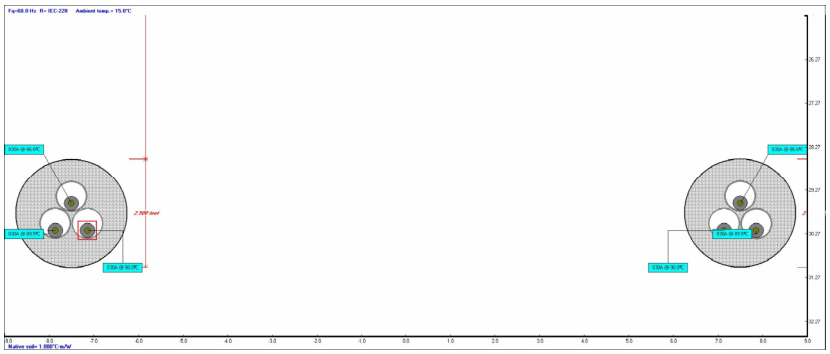
Standard Settings Options

General guidance	Custom
Factor on RAC due to magnetic armour	CIGREGuidance
Factor on RAC due to magnetic duct	CIGREGuidance
Factor on λ_1 due to magnetic armour	CYMCAPGuidance
Factor on λ_1 due to magnetic duct	CIGREGuidance
Factor on λ_2 due to λ'_1	CYMCAPGuidance
λ''_1 computation	CIGREGuidance
$\lambda_2$pipe computation	CYMCAPGuidance
Wd computation	CIGREGuidance
T_2 computation	CIGREGuidance
T_4 computation	CYMCAPGuidance

Installation Type:Multiple Ductbanks/Backfills

Ambient Soil Temperature at Installation Depth	[°C]	15.0
Native Soil Thermal Resistivity	[K.m/W]	1.0
Consider Non-Isothermal Earth Surface		No

Layer Name	X [ft]	Y [ft]	Width [ft]	Height [ft]	Thermal Resistivity [K.m/W]
NSTD DB1	-7.5	29.8	2.274	2.274	1.5
NSTD DB2	7.5	29.8	2.274	2.274	1.5



Results Summary

Cable No.	Cable ID	Circuit No.	Feeder ID	Cable Phase	Cable Frequency	Daily Load Factor	X coordinate [ft]	Y coordinate [ft]	Conductor temperature [°C]	Ampacity [A]
1	OSTER 230KV 2000	1		A	60.0	1.0	-7.86	30.2	89.5	829.9
2	OSTER 230KV 2000	1		B	60.0	1.0	-7.14	30.2	90.0	829.9
3	OSTER 230KV 2000	1		C	60.0	1.0	-7.5	29.58	86.6	829.9
4	OSTER 230KV 2000	2		A	60.0	1.0	7.86	30.2	89.5	830.0
5	OSTER 230KV 2000	2		B	60.0	1.0	7.14	30.2	90.0	830.0
6	OSTER 230KV 2000	2		C	60.0	1.0	7.5	29.58	86.6	830.0

Study Summary

CYMCAP Version	8.1 Revision 1
Study:	HYDROSTER
Execution:	Hydroster Duct Bank
Date:	8/25/2023 10:21:49 AM

General Simulation Data

Steady State Option	Equally Loaded
Consider Electrical interaction between circuits	No
Induced currents in metallic layers as a fraction of conductor current (applied to all single phase circuits) :	0.0
Conductor Resistances Computation Option:	IEC-228

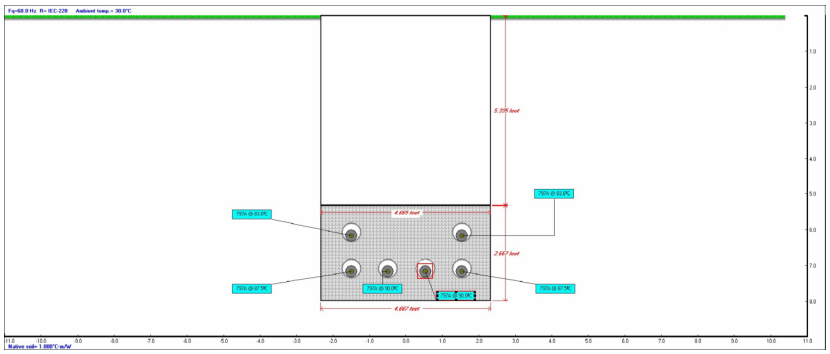
Standard Settings Options

General guidance	Custom
Factor on RAC due to magnetic armour	CIGREGuidance
Factor on RAC due to magnetic duct	CIGREGuidance
Factor on λ_1 due to magnetic armour	CYMCAPGuidance
Factor on λ_1 due to magnetic duct	CIGREGuidance
Factor on λ_2 due to λ'_1	CYMCAPGuidance
λ''_1 computation	CIGREGuidance
$\lambda_2$pipe computation	CYMCAPGuidance
Wd computation	CIGREGuidance
T_2 computation	CIGREGuidance
T_4 computation	CYMCAPGuidance

Installation Type:Multiple Ductbanks/Backfills

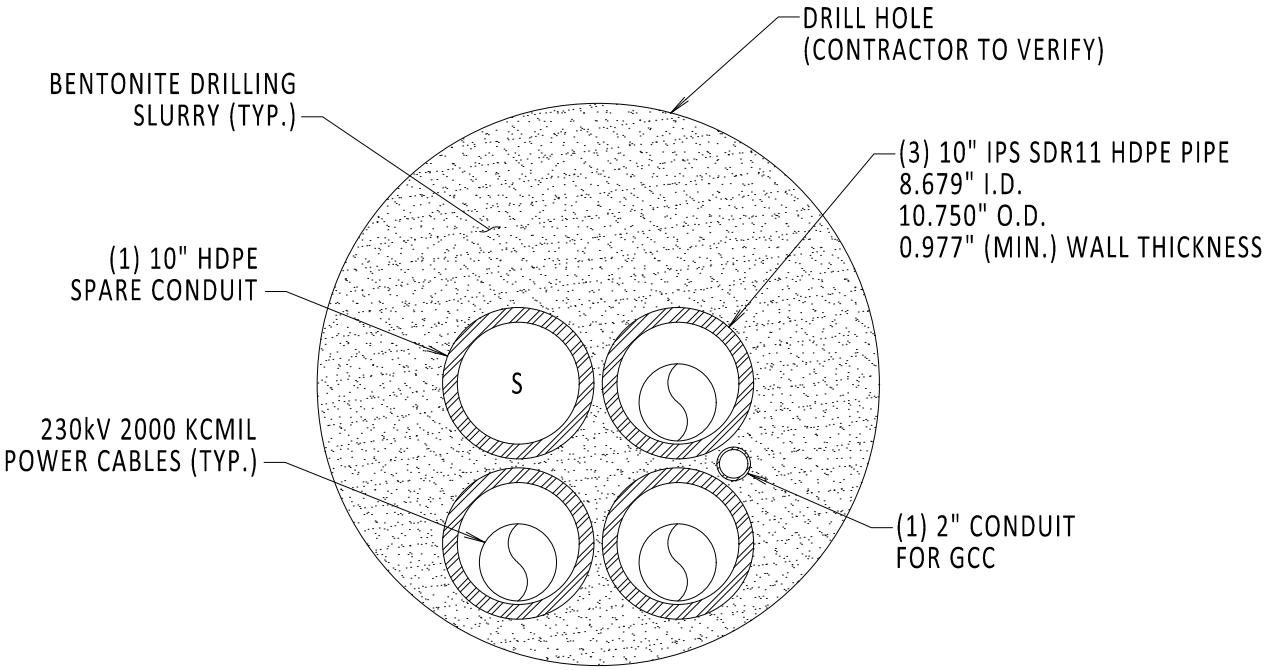
Ambient Soil Temperature at Installation Depth	[°C]	30.0
Native Soil Thermal Resistivity	[K.m/W]	1.0
Consider Non-Isothermal Earth Surface		No

Layer Name	X [ft]	Y [ft]	Width [ft]	Height [ft]	Thermal Resistivity [K.m/W]
NSTD DB1	0.0	6.667	4.667	2.667	0.75
Backfill	0.0	2.667	4.666	5.333	1.0



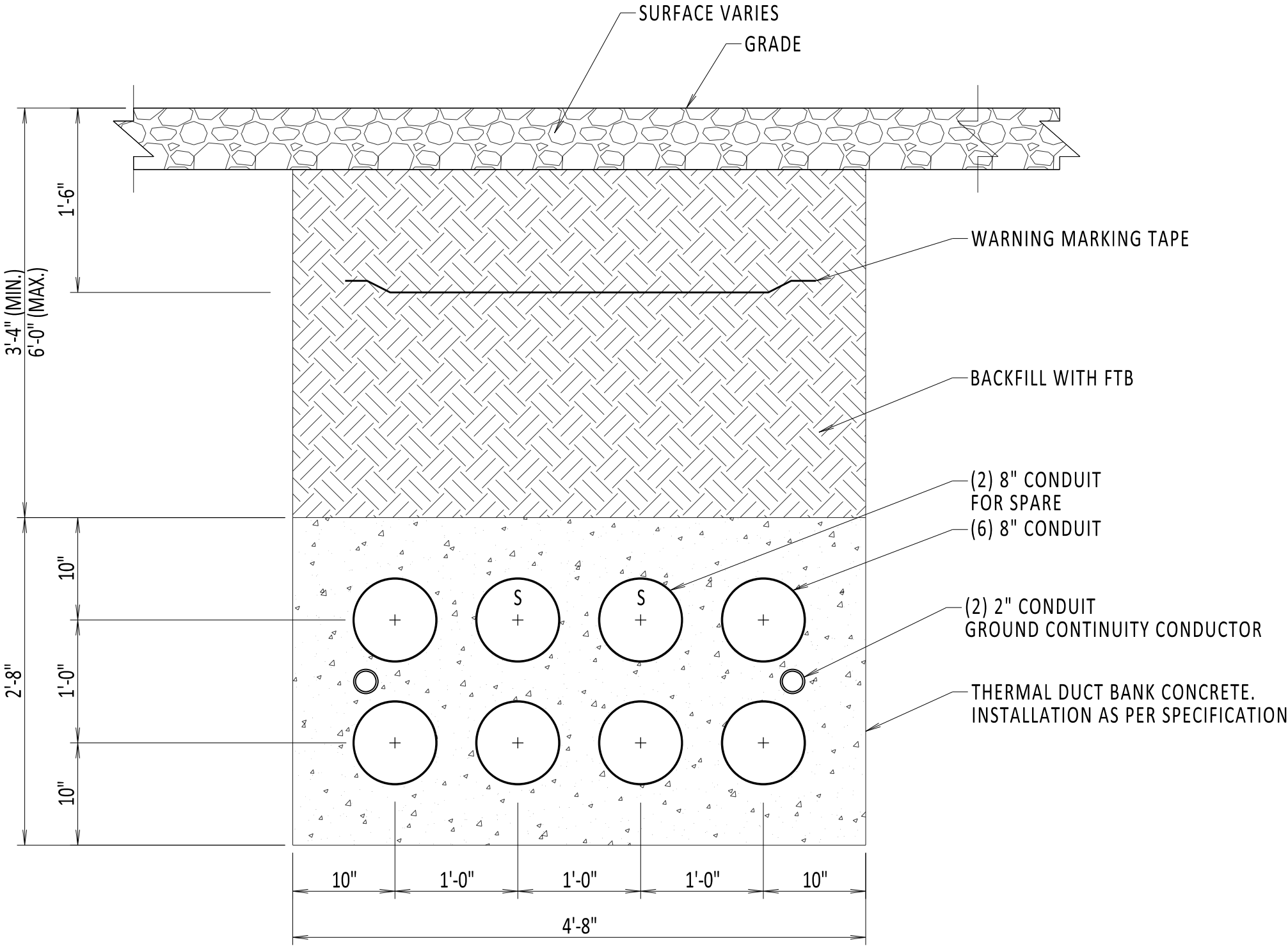
Results Summary

Cable No.	Cable ID	Circuit No.	Feeder ID	Cable Phase	Cable Frequency	Daily Load Factor	X coordinate [ft]	Y coordinate [ft]	Conductor temperature [°C]	Ampacity [A]
1	OSTER 230KV 2000	1		A	60.0	1.0	-1.5	7.16	87.5	796.8
2	OSTER 230KV 2000	1		B	60.0	1.0	-0.5	7.16	90.0	796.8
3	OSTER 230KV 2000	1		C	60.0	1.0	-1.5	6.16	83.6	796.8
4	OSTER 230KV 2000	2		A	60.0	1.0	1.54	7.16	87.5	796.8
5	OSTER 230KV 2000	2		B	60.0	1.0	1.54	6.16	83.6	796.8
6	OSTER 230KV 2000	2		C	60.0	1.0	0.54	7.16	90.0	796.8



HDD SLICK BORE DESIGN

SCALE 1" = 1'-0"



DUCT BANK

SCALE: 1" = 1'-0"

Attachment TSSN-2

Electro Magnetic Field & Electric Field Values

Electromagnetic Fields Calculation

Introduction

Electrical and magnetic fields are invisible lines of force that surround any electrical device under voltage and current. Power lines, electrical wiring, and electrical equipment all produce EMF. The term “EMF” usually refers to electric and magnetic fields at extremely low frequencies such as those associated with the use of electric power which is 60 Hertz in USA. Overhead power lines generate electric and magnetic fields at power frequency.

Summary

Provided is an EMF study for the 230kV OHL transmission line for 5 different structure configurations. All Data used for this study come from anticipated values based on the bid design and information from the client.

All calculations are performed by PLS-CADD based on the EPRI Red Book methods. The method used comes from section 7.4, Calculation of Magnetic Fields and Appendices 7.1, Calculation of Field Ellipse Parameters and 7.6, Electric Field Calculations for 3D Geometry of the third edition of the EPRI Red Book

Scope of Work

The scope of work is computing the EMF parameters caused by the transmission line voltage and current at the center of the transmission line. The EMF parameters included in the study are:

- Electric Field (kV/m)
- Magnetic Induction (Gauss)

Study Data and Assumptions:

Design inputs include tower type, cable types, voltage level, line current, Right of Way, Terrain, and wire height above ground. It is assumed that there will be four different types of tower configurations tested.

Tower Type

- Structure type 1: Alternating Delta configuration Tangent structure
- Structure type 2: Alternating Delta configuration Running Angle structure
- Structure type 3: Vertical configuration Deadend structure
- Structure type 4: Vertical configuration Tangent structure

In the included report there are 5 cases that cover the expected tower to tower configurations. The first configuration tested is a line of delta tangent structures. This section shows what the expected EMF will be on sections of line that contain delta tangent structure to delta tangent structure. The second configuration tested is the transition from a delta tangent structure to a delta running angle structure back to a delta tangent structure. The third configuration tested is a delta tangent structure to a vertical deadend structure back to a delta tangent structure. The fourth configuration tested is a line of vertical tangent structures. The fifth configuration tested is the transition from a vertical tangent structure to a vertical deadend back to a vertical tangent structure.

The transition from a delta tangent structure to a vertical tangent structure was not tested because all sections where the vertical tangent structure is used will have deadend structures at both ends.
The transition between a delta running angle structure and a vertical tangent structure is not tested because sections of vertical tangent structures will not utilize any running angle structures.
The transition between alternating running angle structures and vertical deadend structures was not tested because a vertical deadend structure would be utilized in places where there is a high angle between dead end structures.

Cable Types
The conductor utilized for this study is vertically bundled 1590 kcmil 54/19 "Falcon" ACSR. This conductor was selected as being the best conductor for the job by a conductor selection study prepared by Kiewit.

The shield wire utilized for this study is AFL's 48 count AC-65/65/724. This OPGW was selected for this project by both Kiewit and the owner.

Voltage Level
This line is designed to operate at 230kV rms. To allow for an overvoltage 5% OVL was selected. The client also requested an additional case of 10% OVL to be included in at the end of the report.

Line Current
A maximum line current was selected to be 1474 amps. This value is higher than the maximum current ever expected on the line under normal line conditions to give a more conservative EMF calculation for preliminary work.

Right of Way (ROW)
The right of way selected for this study is 120 feet measured from edge of ROW to edge of ROW. This value was supplied by the client.

Terrain
A completely flat terrain was selected to have a common reference across all cases. While changes in elevation through the right of way will occur in the real world, the expected route for this project is flat perpendicular to the line, giving a good approximation for the final field strength across the line.

Wire Height Above Ground
In all cases, the conductor and shield wire were sagged to pass the California Public Utilities Commission General Order 95. This order requires all energized parts above 20 kV to be a minimum of 30 feet from all surfaces in urban districts. It was decided that this category would be applied to the entire line because of the expected terrain of the project.

All the conductors are sagged to be 30 feet above ground level at the maximum operating temperature of 250 °F under the condition of maximum creep. This will cause the highest EMF at ground level. Kiewit acknowledges that wind coming across the conductor will cause the EMF at the edge of the right of way to increase or decrease, but over the lifetime of the line, the winds will average out to be the normal condition.

Site Condition

The entire line is in the state of California near Rosamond. The terrain surrounding this is a part of the Mojave Desert Province and is relatively flat with gradual elevation changes. The temperature of the site varies from 23°F to 105°F.

Methodology

The study is done by using PLS-CADD. PLS-CADD utilizes methods described in the third edition of the EPRI Red Book. The electric and physical inputs utilized in this study are shown below:

- All tables and readings shown in the reports are shown from 3.28 feet above the flat ground.
- The over voltage percent is 5% or 10% depending on the report.
- The point interval used is 5 feet to generate all charts.
- The calculation occurred at the lowest point for each span.
- The field lines shown on the 3D view represent 1.0 kV/m field lines.

Calculation Assumptions and Limitations

The conclusions of this report, entitled "Transmission Line Magnetic Field & Electric Field Calc" are intended for use in preliminary work only and are not intended for final documentation. The assumptions in the document are based on conditions and information existing at the time the scope work was conducted and do not take into account any subsequent changes. The line current and wire height above ground shown in the reports were chosen to provide a conservative approach and return EMF results in the higher range. The report relates solely to the specific project that it was created for. The report is not to be used or relied on for any variation or extension of the project or any other project or purpose, and any unauthorized use or reliance is at the recipient's own risk.

This report is intended solely for use by the client. While the report may be provided to applicable authorities having jurisdiction and others for whom the client is responsible, this report may not be relied upon by any other party without the express written consent of Kiewit.

Results are for the proposed line and does not include the unknown information for any crossing or parallel lines.

The structures shown in this study are not the final structures that will be used. The approximate phase spacing is subject to change.

Acceptable Limits

No Federal EMF exposure limits have been set. The individual states with exposure limits are shown in the table below. The table shows the magnetic fields in units of microteslas (µT) where the calculation results are in milligauss (mG). To convert from microteslas to milligauss, the microteslas value need to multiplied by 10.

State	Area where limits applies		Field	Limit
Florida	Edge of right-of-way		Electric	2 kV m^{-1}
		230 kV lines	Magnetic	15 µT
		500 kV lines		20 µT
	Anywhere	69-230 kV lines	Electric	8 kV m^{-1}
		500 kV lines		10 kV m^{-1}
Minnesota	Anywhere		Electric	8 kV m^{-1}
Montana	Edge of right-of-way	May be waved by landowner	Electric	1 kV m^{-1}
	Road crossings		Electric	7 kV m^{-1}
New Jersey	Edge of right-of-way		Electric	3 kV m^{-1}
New York	Edge of right-of-way		Electric	1.6 kV m^{-1}
			Magnetic	20 µT
	Public road crossings		Electric	7 kV m^{-1}
	Private road crossings		Electric	11 kV m^{-1}
	Anywhere		Electric	11.8 kV m^{-1}
Oregon	Accessible or inhabited areas		Electric	9 kV m^{-1}

The lowest electric field value at the edge of the right-of-way allowed for the different states shown in the table above is 1 kV/m. The highest electric field at the edge of the right-of-way for the proposed transmission line is 0.863 kV/m. For states show requirements for the electric field anywhere within the right-of-way, the lowest value shown is 8 kV/m. The highest electrical field calculated within the total right-of-way for the proposed transmission line is 3.886 kV/m

Of the two states that list requirements for magnetic field limits at the edge of the right-of-way, the lowest limit is 15 µT, or 150 mG. The highest magnetic field calculated at the edge of the right-of-way for the proposed project is 71.518 mG.

There are no numeric standards that limit amount of EMF exposure set by the state of California.

Study Results

See Attached report titled "Transmission Line Magnetic Field & Electric Field Calc". A summary of the report results are shown in the tables below.

5% Overload Factor

MF (mG)			EF (kV/m)			Structure # Type	Structure Config.	Span (ft)
Left	Center	Right	Left	Center	Right			
48.804	179.850	58.228	0.786	2.755	0.671	1 Tangent	Delta	450 (Back)

48.804	179.849	58.228	0.786	2.756	0.671	1 Tangent	Delta	450 (Ahead)
49.268	181.246	58.507	0.788	2.770	0.669	1 Tangent	Delta	600 (Back)
49.268	181.246	58.507	0.788	2.769	0.668	1 Tangent	Delta	600 (Ahead)
49.560	181.694	58.636	0.787	2.758	0.667	1 Tangent	Delta	900 (Back)
49.560	181.694	58.636	0.787	2.758	0.667	1 Tangent	Delta	900 (Ahead)
61.810	189.847	51.797	0.726	2.671	0.863	2 RA	Delta	450 (Back)
57.189	181.190	48.527	0.651	2.819	0.767	2 RA	Delta	450 (Ahead)
62.155	190.778	52.214	0.724	2.680	0.863	2 RA	Delta	600 (Back)
57.530	181.951	48.704	0.650	2.825	0.765	2 RA	Delta	600 (Ahead)
62.412	191.742	52.552	0.722	2.675	0.862	2 RA	Delta	900 (Back)
57.766	182.745	48.881	0.649	2.817	0.763	2 RA	Delta	900 (Ahead)
45.147	161.538	51.032	0.356	3.406	0.345	3 DE	Vertical	450 (Back)
45.554	166.495	51.441	0.356	3.492	0.336	3 DE	Vertical	450 (Ahead)
45.567	164.564	51.121	0.346	3.495	0.322	3 DE	Vertical	600 (Back)
46.000	169.919	51.547	0.345	3.595	0.313	3 DE	Vertical	600 (Ahead)
45.338	162.764	51.036	0.361	3.412	0.342	3 DE	Vertical	900 (Back)
45.735	167.711	51.436	0.360	3.507	0.334	3 DE	Vertical	900 (Ahead)
47.203	177.057	71.251	0.062	3.526	0.269	4 Tangent	Vertical	450 (Back)
47.203	177.057	71.251	0.062	3.526	0.269	4 Tangent	Vertical	450 (Ahead)
47.507	177.244	71.426	0.063	3.537	0.276	4 Tangent	Vertical	600 (Back)
47.507	177.244	71.426	0.063	3.537	0.276	4 Tangent	Vertical	600 (Ahead)
47.703	177.357	71.518	0.070	3.528	0.262	4 Tangent	Vertical	900 (Back)
47.703	177.357	71.518	0.070	3.528	0.262	4 Tangent	Vertical	900 (Ahead)
48.545	175.936	59.540	0.043	3.766	0.133	5 DE	Vertical	450 (Back)
48.920	180.655	59.852	0.044	3.875	0.125	5 DE	Vertical	450 (Ahead)
48.849	176.003	59.742	0.049	3.779	0.144	5 DE	Vertical	600 (Back)
49.223	180.735	60.049	0.049	3.886	0.135	5 DE	Vertical	600 (Ahead)
49.052	176.117	59.871	0.048	3.774	0.131	5 DE	Vertical	900 (Back)
49.429	180.933	60.185	0.050	3.879	0.121	5 DE	Vertical	900 (Ahead)

10% Overload Factor

MF (mG)			EF (kV/m)			Structure # Type	Structure Config.	Span (ft)
Left	Center	Right	Left	Center	Right			
48.804	179.850	58.228	0.824	2.887	0.703	1 Tangent	Delta	450 (Back)
48.804	179.849	58.228	0.824	2.887	0.703	1 Tangent	Delta	450 (Ahead)
49.268	181.246	58.507	0.825	2.901	0.700	1 Tangent	Delta	600 (Back)
49.268	181.246	58.507	0.825	2.901	0.700	1 Tangent	Delta	600 (Ahead)
49.560	181.694	58.636	0.824	2.889	0.699	1 Tangent	Delta	900 (Back)
49.560	181.694	58.636	0.824	2.889	0.699	1 Tangent	Delta	900 (Ahead)
61.810	189.847	51.797	0.760	2.798	0.904	2 RA	Delta	450 (Back)
57.189	181.190	48.527	0.682	2.953	0.803	2 RA	Delta	450 (Ahead)

62.155	190.778	52.214	0.758	2.808	0.904	2 RA	Delta	600 (Back)
57.530	181.951	48.704	0.680	2.959	0.801	2 RA	Delta	600 (Ahead)
62.412	191.742	52.552	0.757	2.803	0.903	2 RA	Delta	900 (Back)
57.766	182.745	48.881	0.680	2.951	0.799	2 RA	Delta	900 (Ahead)
45.147	161.538	51.032	0.373	3.568	0.362	3 DE	Vertical	450 (Back)
45.554	166.495	51.441	0.373	3.659	0.352	3 DE	Vertical	450 (Ahead)
45.567	164.564	51.121	0.363	3.662	0.338	3 DE	Vertical	600 (Back)
46.000	169.919	51.547	0.361	3.766	0.327	3 DE	Vertical	600 (Ahead)
45.338	162.764	51.036	0.378	3.574	0.358	3 DE	Vertical	900 (Back)
45.735	167.711	51.436	0.377	3.674	0.350	3 DE	Vertical	900 (Ahead)
47.203	177.057	71.251	0.065	3.694	0.282	4 Tangent	Vertical	450 (Back)
47.203	177.057	71.251	0.065	3.694	0.282	4 Tangent	Vertical	450 (Ahead)
47.507	177.244	71.426	0.066	3.705	0.289	4 Tangent	Vertical	600 (Back)
47.507	177.244	71.426	0.066	3.705	0.289	4 Tangent	Vertical	600 (Ahead)
47.703	177.357	71.518	0.074	3.696	0.274	4 Tangent	Vertical	900 (Back)
47.703	177.357	71.518	0.074	3.696	0.274	4 Tangent	Vertical	900 (Ahead)
48.545	175.936	59.540	0.045	3.945	0.139	5 DE	Vertical	450 (Back)
48.920	180.655	59.852	0.046	4.059	0.131	5 DE	Vertical	450 (Ahead)
48.849	176.033	59.742	0.051	3.959	0.151	5 DE	Vertical	600 (Back)
49.223	180.735	60.049	0.051	4.071	0.141	5 DE	Vertical	600 (Ahead)
49.052	176.117	59.871	0.050	3.953	0.137	5 DE	Vertical	900 (Back)
49.429	180.933	60.185	0.053	4.064	0.127	5 DE	Vertical	900 (Ahead)

PROJECT NAME: Hydrostor Willow Rock Energy Storage Center

KIEWIT PROJECT NO. 20054627

CALC NO. 20054627-OHX-001-Preliminary Report

TITLE: Transmission Line Magnetic Field & Electric Field Calc

ASSUMPTIONS:

#	Description	Verified By	Initials	Date
1	Maximum current per phase of 1474 Amps	Farzad Raoof	RF	05/21/2024
2	Maximum voltage of 230 with a 5% overvoltage percent	Farzad Raoof	RF	05/21/2024
3	Conductor is double bundled 1590 kcmil "Falcon" ACSR displayed at 250°F (MOT), Creep	Farzad Raoof	RF	05/21/2024
4	Shield Wire is AFL's OPGW 48 ct Fiber AlumaCore AC-65/65/724 displayed at 60°F, Creep	Farzad Raoof	RF	05/21/2024
5	All charts show the MF & EF at the midspan at 3.28 feet above flat ground	Farzad Raoof	RF	05/21/2024
6	The back structure and ahead structure are modeled as a tangent structure	Farzad Raoof	RF	05/21/2024

REFERENCES:

Attached

1) Initial Structure Design
2) Initial PLS-CADD Lite EMF Report with a 5% OLF
3) Initial PLS-CADD Lite EMF Report with a 10% OLF for reference

Not Attached

1) Initial PLS CADD Lite backup file
2)
3)

DESIGN BASIS:

1) PLS-CADD is the software used to calculate EMF Values
2) Height above ground of the points which EMF values are calculated and shown in charts is 1 meter (3.28 feet)
3) Tables show the field strength on a completely flat terrain
4) No maximum Magnetic Field or Electric Field identified for this study
5) The maximum MF & EF occurs when the conductor is closest to ground and is not dependent on how long a span is.
6) The minimum distance any live part can be to the ground is 30 feet per client standards. Due to this the mid span sag is modeled as being 30 feet above ground.
7) Additional PLS outputs showing 10% over voltage factor displayed in the references
8) The calculation is preformed at the location that the conductor is closest to ground

REVISION HISTORY:

Rev. A Issued For Information
Rev. B
Rev. 0

Rev.	Prepared By	Initials	Date	Checked By	Initials	Date	Approved By	Initials	Date
A	Matthew Boushka	MJB	05/21/2024	Farzad Raoof	RF	05/21/2024	Farzad Raoof	RF	05/21/2024
B									
0									

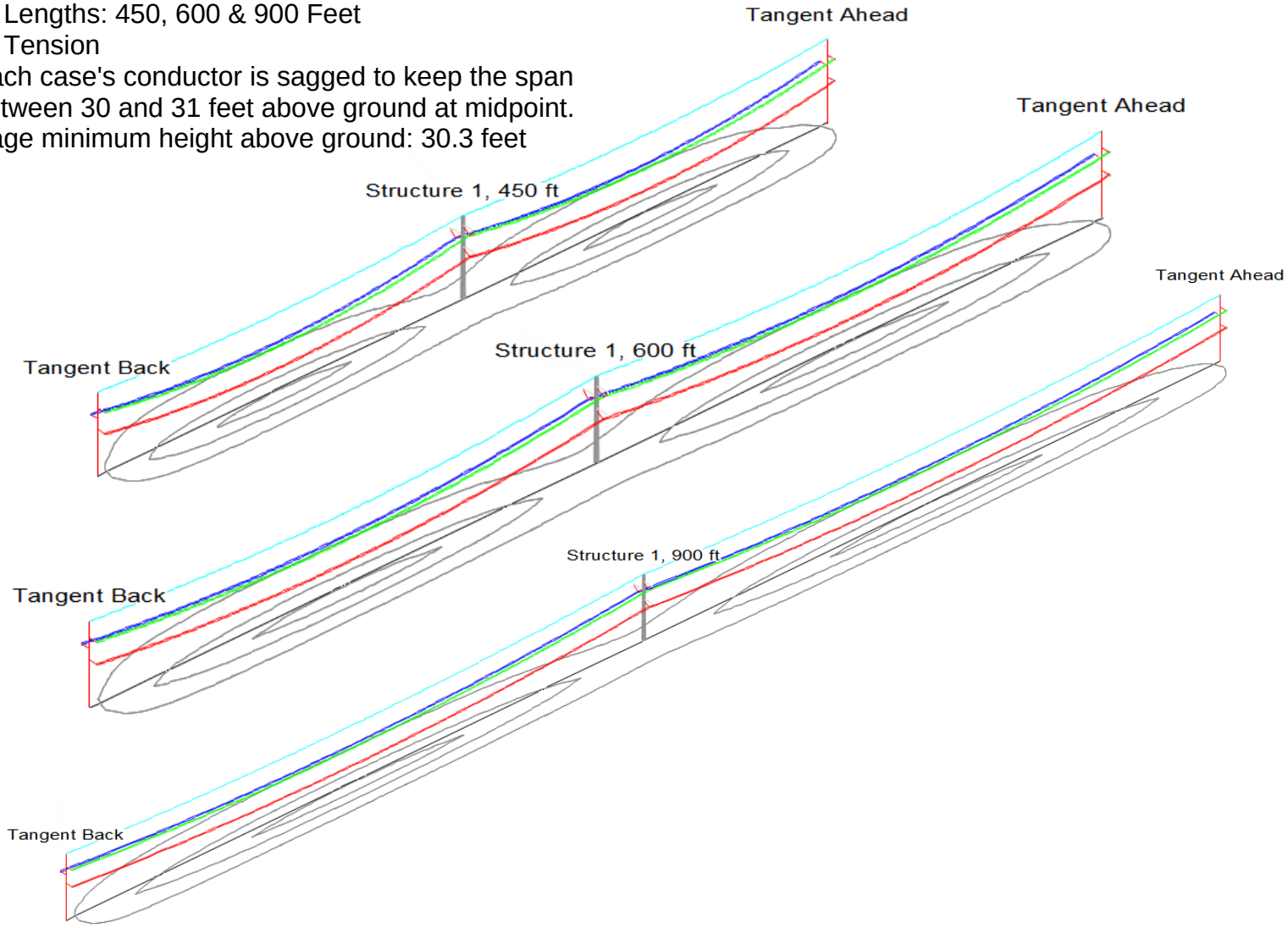
EMF DATA FOR EACH STRUCTURE TYPE

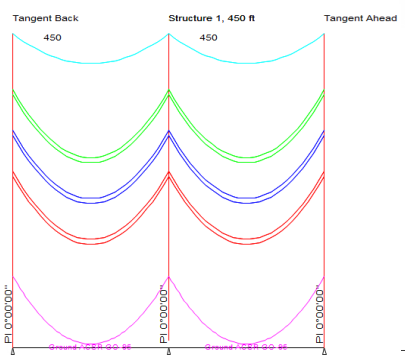
Structure Type 1

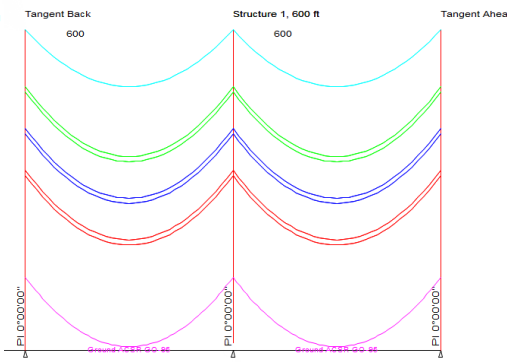
Transmission Line Magnetic Field & Electric Field Calc

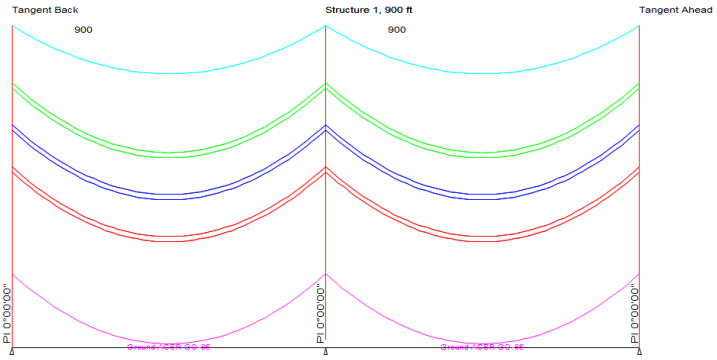
Structure Type 1 Calculation

Span Lengths: 450, 600 & 900 Feet
Span Tension
Each case's conductor is sagged to keep the span between 30 and 31 feet above ground at midpoint.
Average minimum height above ground: 30.3 feet





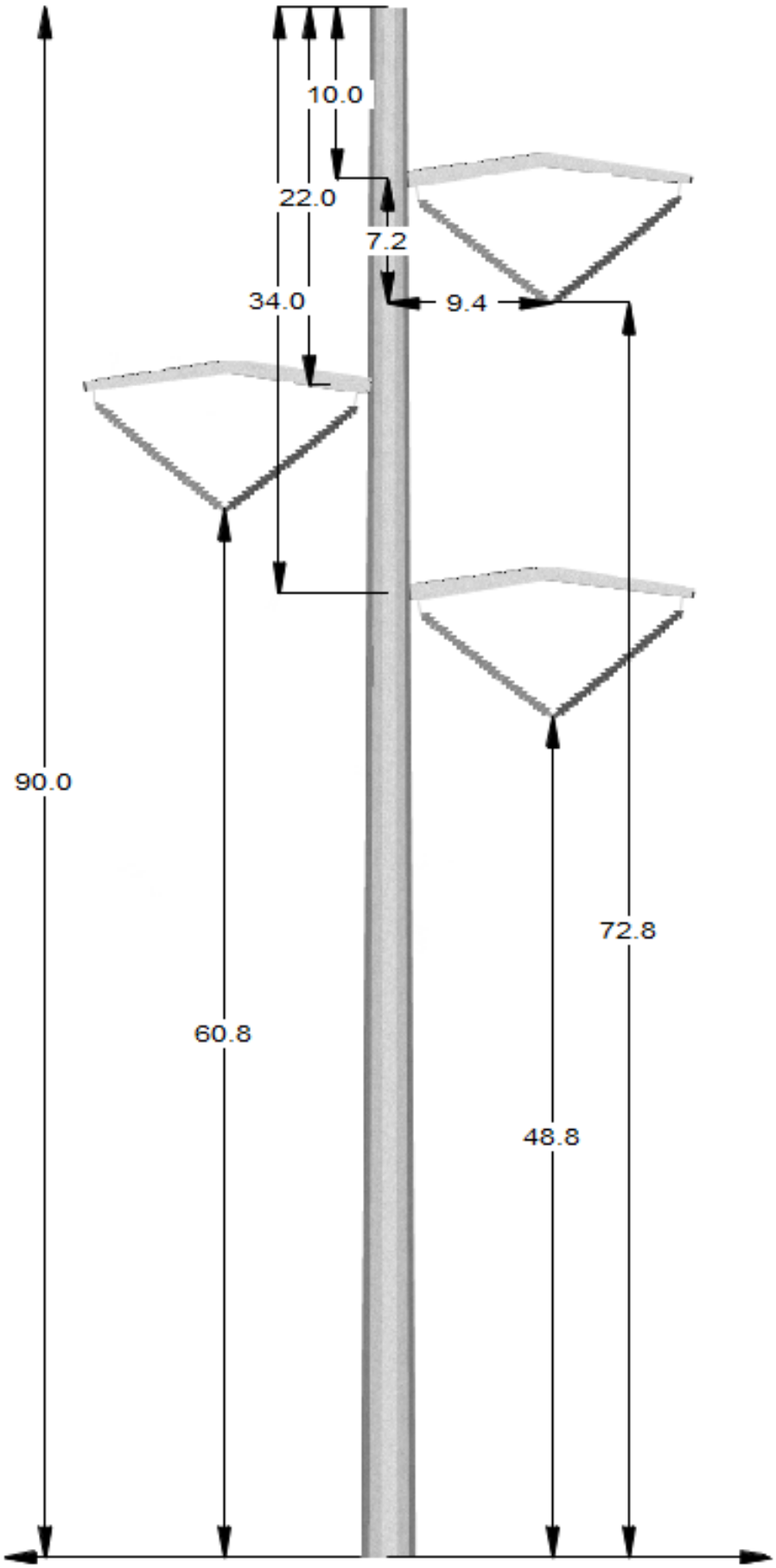




Kiewit

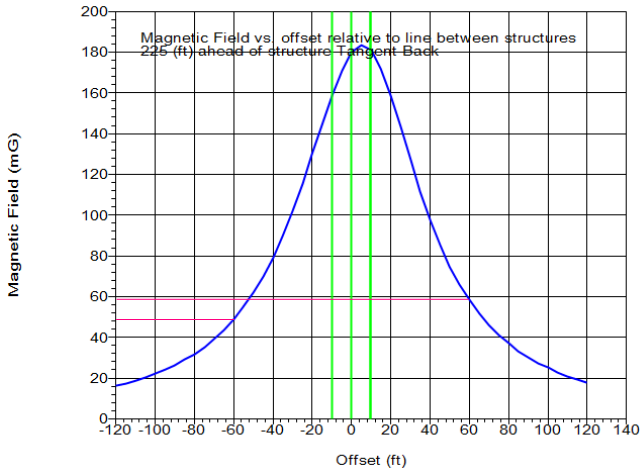
Transmission Line Magnetic Field & Electric Field Calc

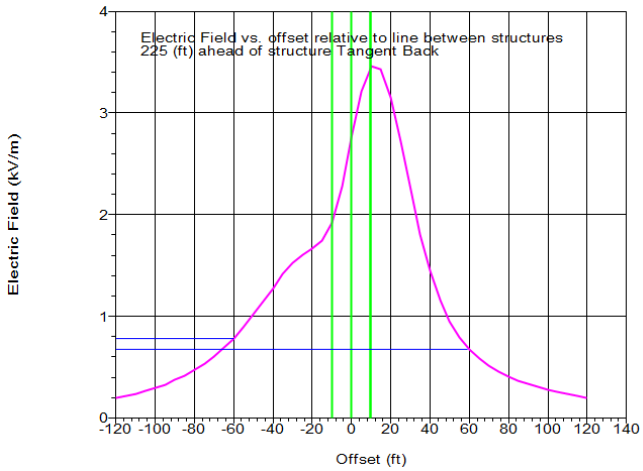
Structure Type 1 Calculation



Transmission Line Magnetic Field & Electric Field Calc

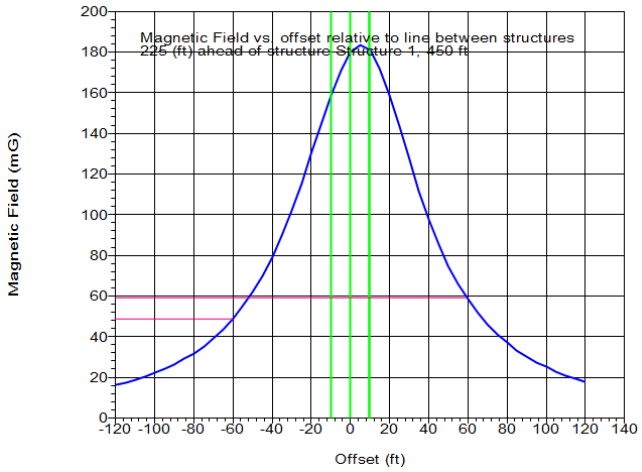
Structure Type 1 Calculation, 450 foot span

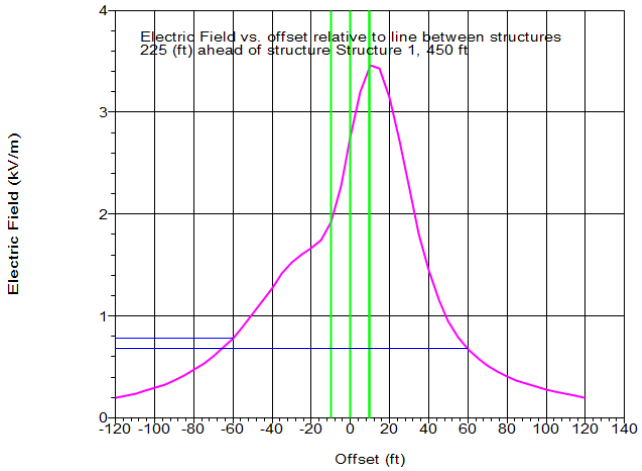




Magnetic Field
Left of 120 ft ROW: 48.804 mG
Center of ROW: 179.850 mG
Right of 120 ft ROW: 58.228 mG

Electric Field
Left of 120 ft ROW: .786 kV/m
Center of ROW: 2.756 kV/m
Right of 120 ft ROW: .671 kV/m



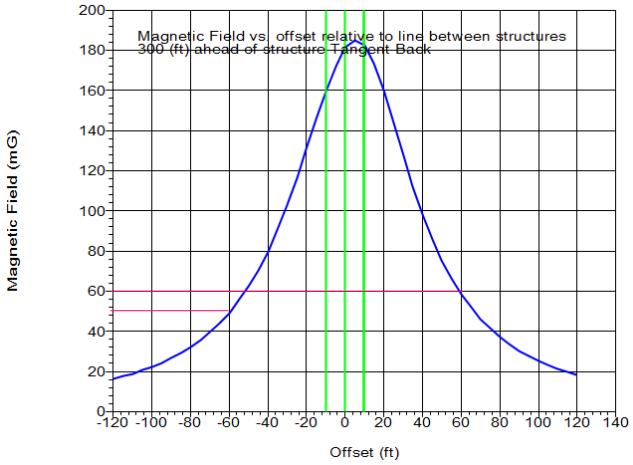


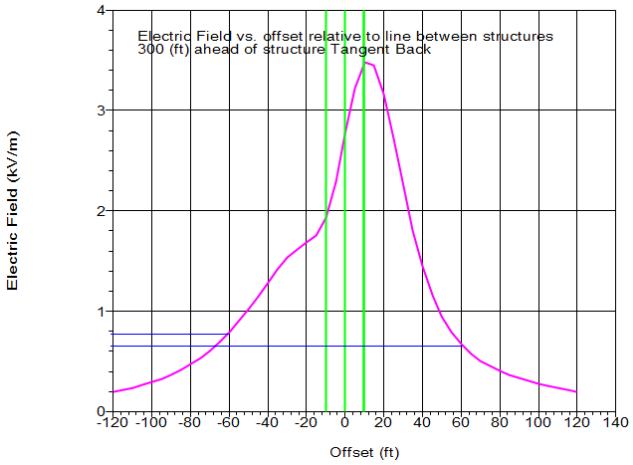
Magnetic Field
Left of 120 ft ROW: 48.804 mG
Center of ROW: 179.849 mG
Right of 120 ft ROW: 58.228 mG

Electric Field
Left of 120 ft ROW: 0.786 kV/m
Center of ROW: 2.755 kV/m
Right of 120 ft ROW: .671 kV/m

Transmission Line Magnetic Field & Electric Field Calc

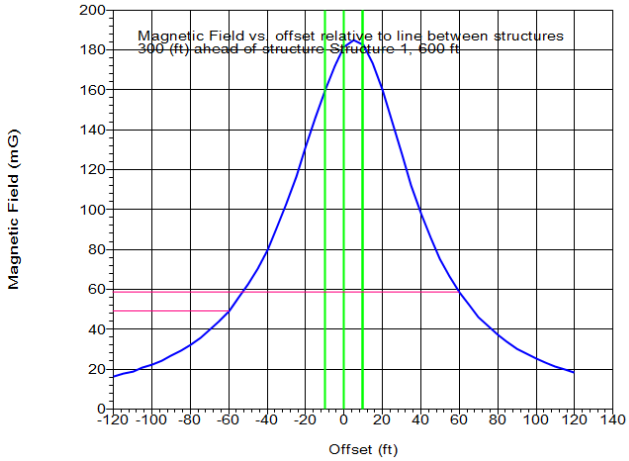
Structure Type 1 Calculation, 600 foot span

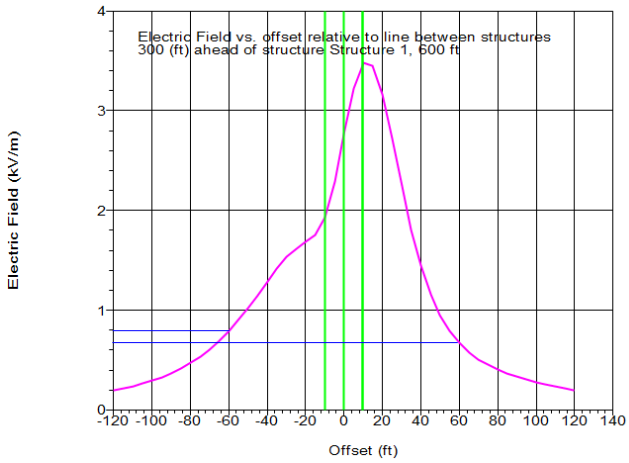




Magnetic Field
Left of 120 ft ROW: 49.268 mG
Center of ROW: 181.246 mG
Right of 120 ft ROW: 58.507 mG

Electric Field
Left of 120 ft ROW: .788 kV/m
Center of ROW: 2.770 kV/m
Right of 120 ft ROW: .669 kV/m



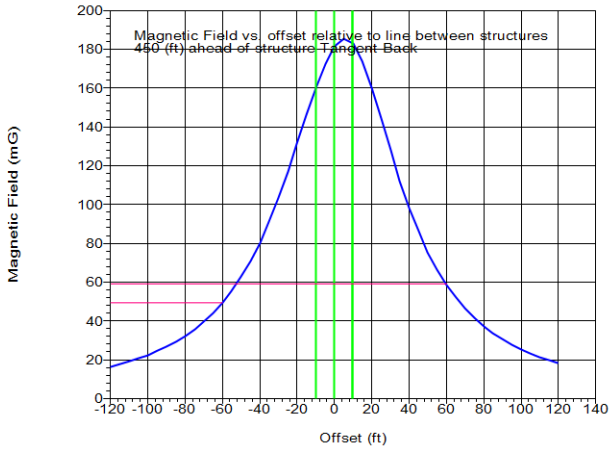


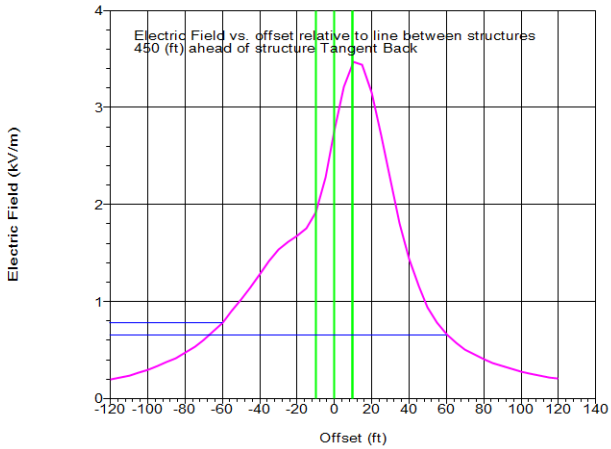
Magnetic Field
Left of 120 ft ROW: 49.268 mG
Center of ROW: 181.246 mG
Right of 120 ft ROW: 58.507 mG

Electric Field
Left of 120 ft ROW: .788 kV/m
Center of ROW: 2.769 kV/m
Right of 120 ft ROW: .668 kV/m

Transmission Line Magnetic Field & Electric Field Calc

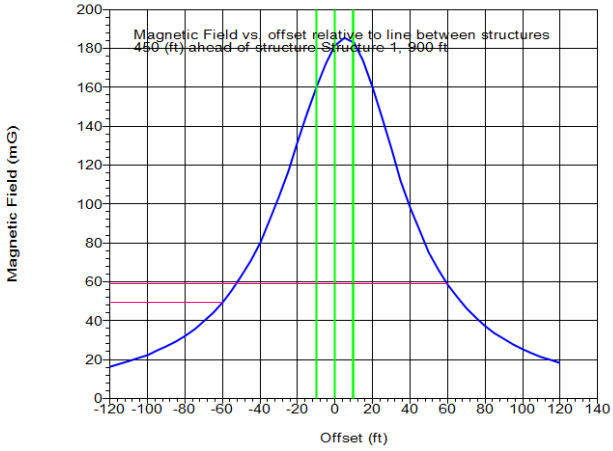
Structure Type 1 Calculation, 900 foot span

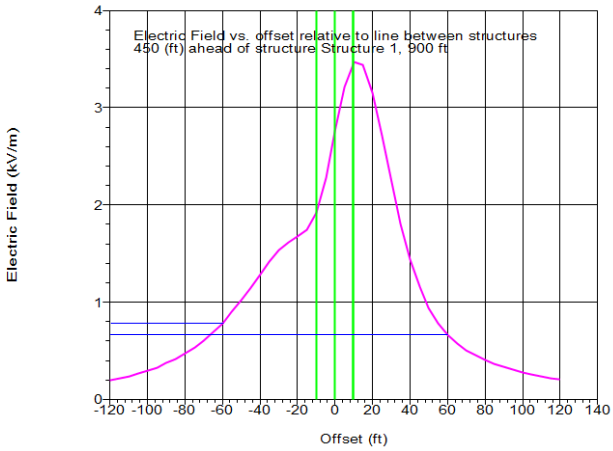




Magnetic Field
Left of 120 ft ROW: 49.560 mG
Center of ROW: 181.694 mG
Right of 120 ft ROW: 58.636 mG

Electric Field
Left of 120 ft ROW: .787 kV/m
Center of ROW: 2.758 kV/m
Right of 120 ft ROW: .667 kV/m





Magnetic Field
Left of 120 ft ROW: 49.559 mG
Center of ROW: 181.693 mG
Right of 120 ft ROW: 58.636 mG

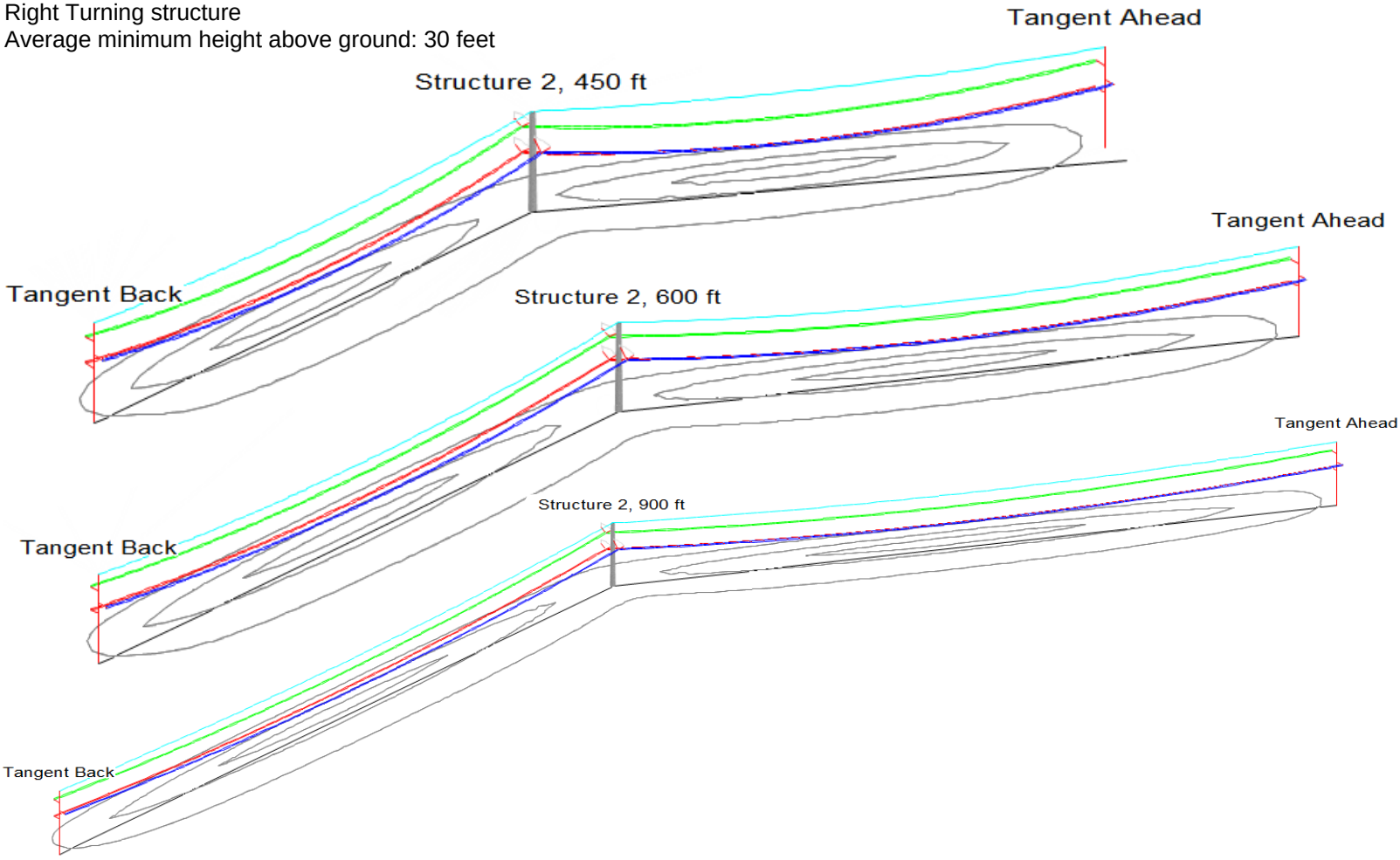
Electric Field
Left of 120 ft ROW: .787 kV/m
Center of ROW: 2.758 kV/m
Right of 120 ft ROW: .667 kV/m

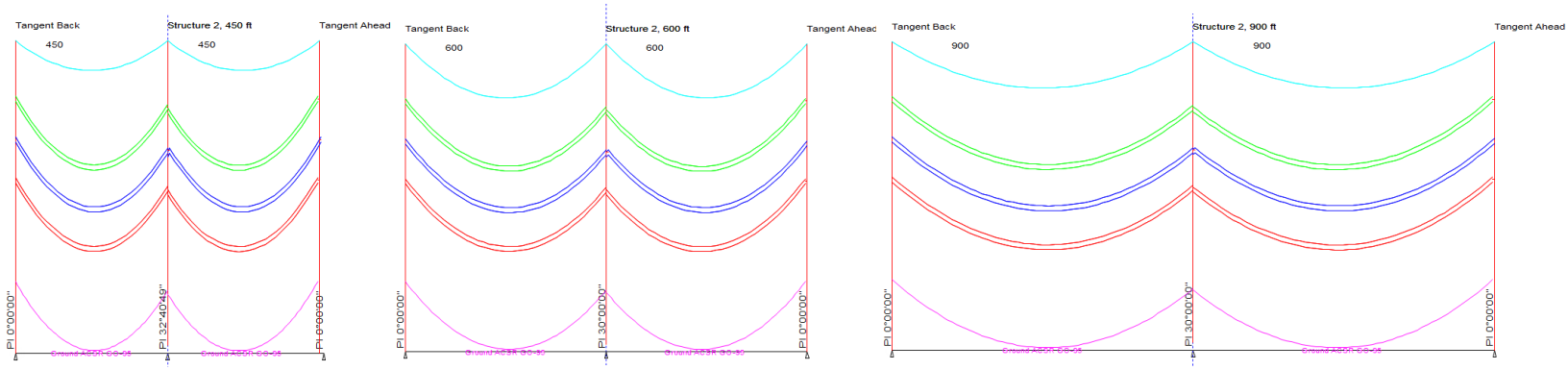
Structure Type 2

Transmission Line Magnetic Field & Electric Field Calc

Structure Type 2 Calculation

Span Lengths: 450, 600 & 900 Feet
Span Tension
Each case's conductor is sagged to keep the span between 30 and 31 feet above ground at midpoint.
Line angle of 30 degrees
Right Turning structure
Average minimum height above ground: 30 feet





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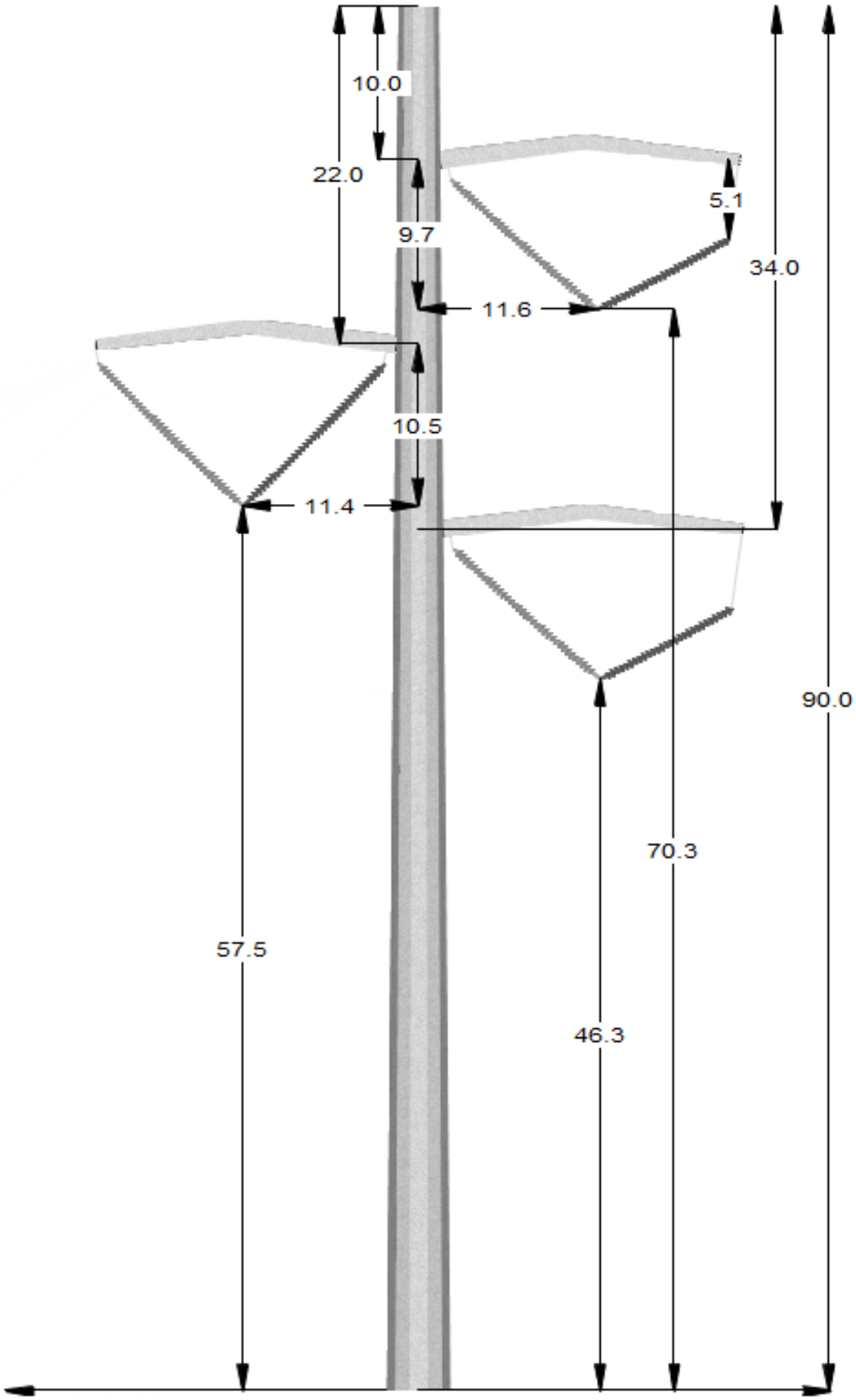
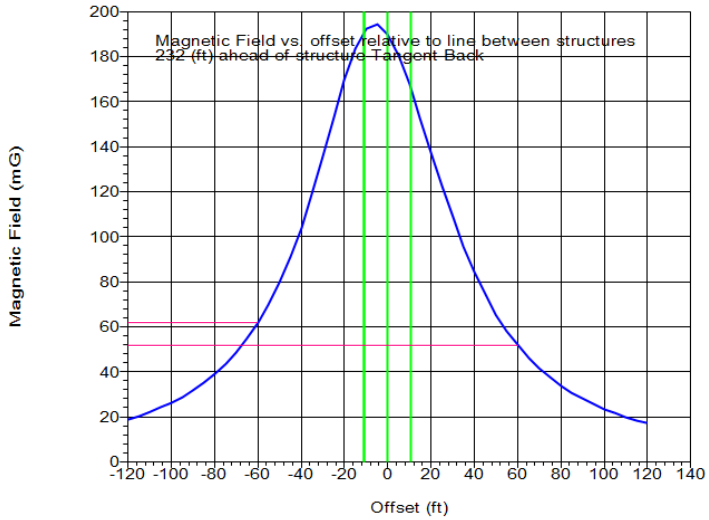
Transmission Line Magnetic Field & Electric Field Calc

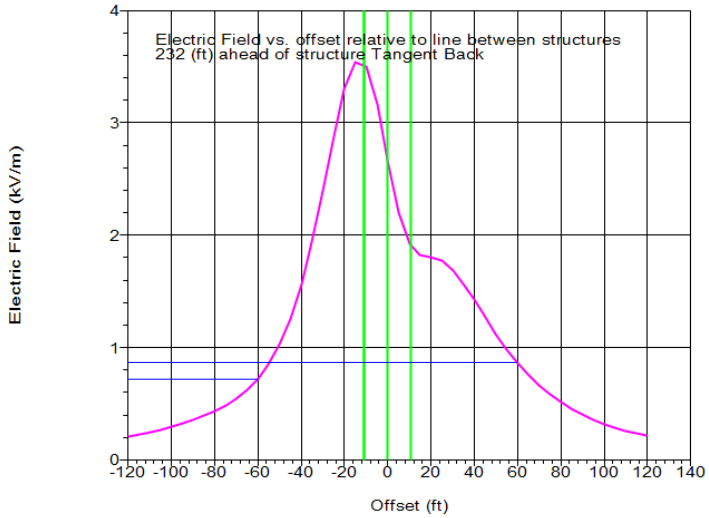
Structure Type 2 Calculation



Transmission Line Magnetic Field & Electric Field Calc

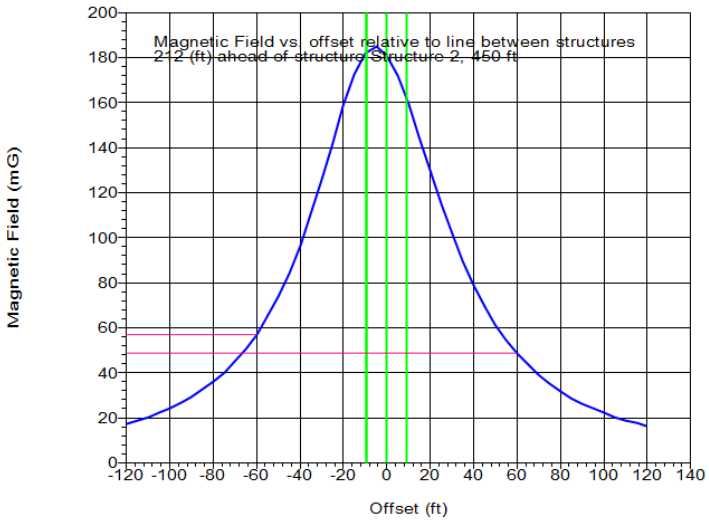
Structure Type 2 Calculation, 450 foot span

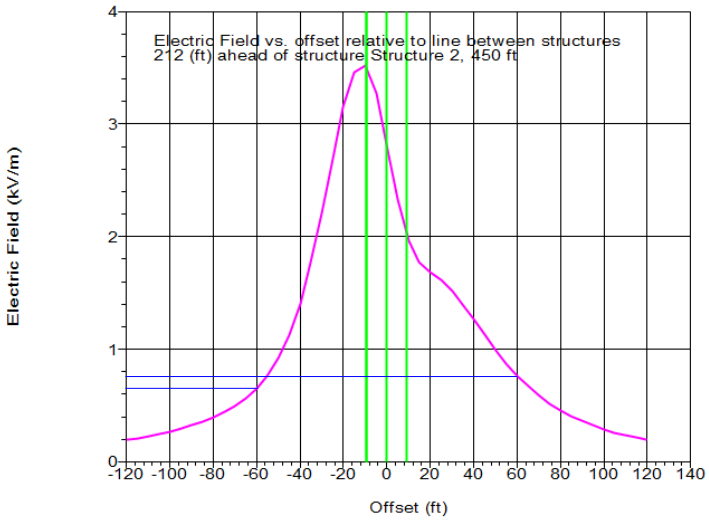




Magnetic Field
Left of 120 ft ROW: 61.810 mG
Center of ROW: 189.847 mG
Right of 120 ft ROW: 51.797 mG

Electric Field
Left of 120 ft ROW: .726 kV/m
Center of ROW: 2.671 kV/m
Right of 120 ft ROW: .863 kV/m



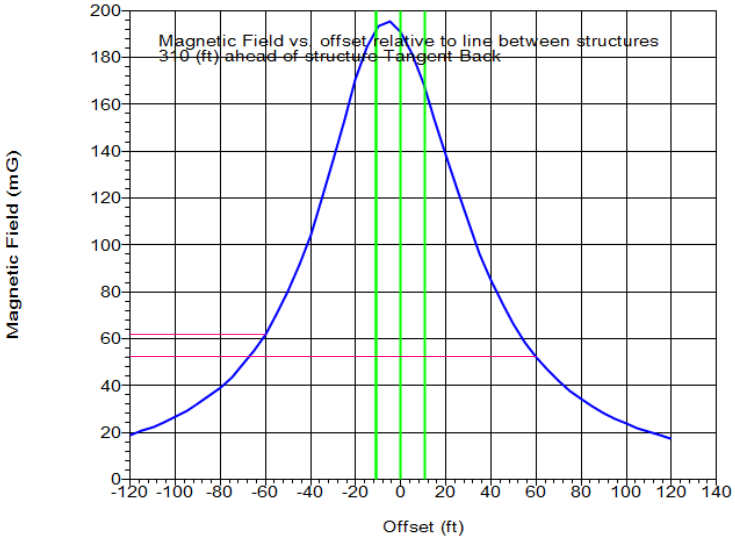


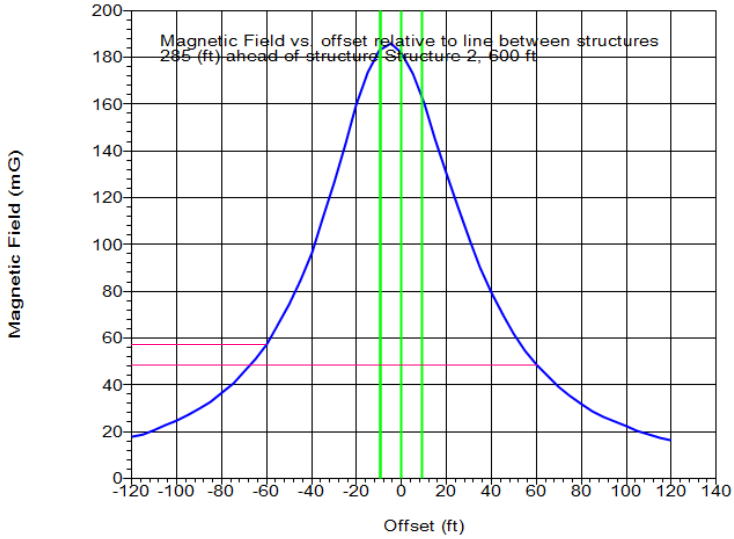
Magnetic Field
Left of 120 ft ROW: 57.189 mG
Center of ROW: 181.190 mG
Right of 120 ft ROW: 48.527 mG

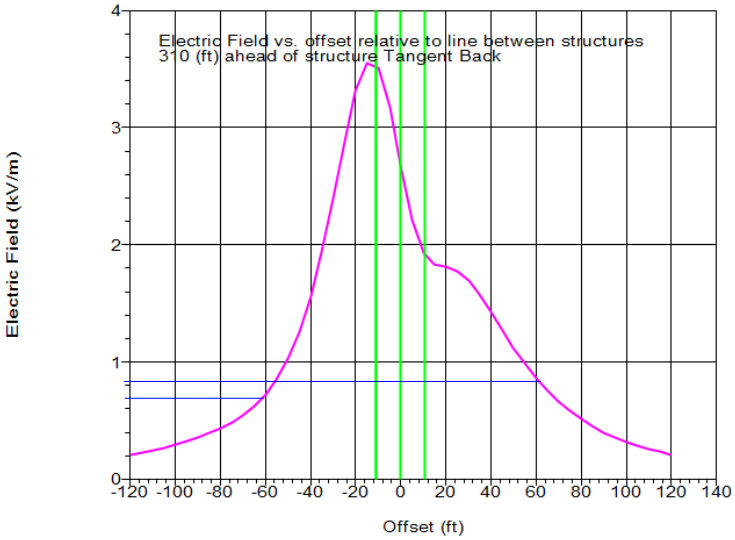
Electric Field
Left of 120 ft ROW: .651 kV/m
Center of ROW: 2.819 kV/m
Right of 120 ft ROW: .767 kV/m

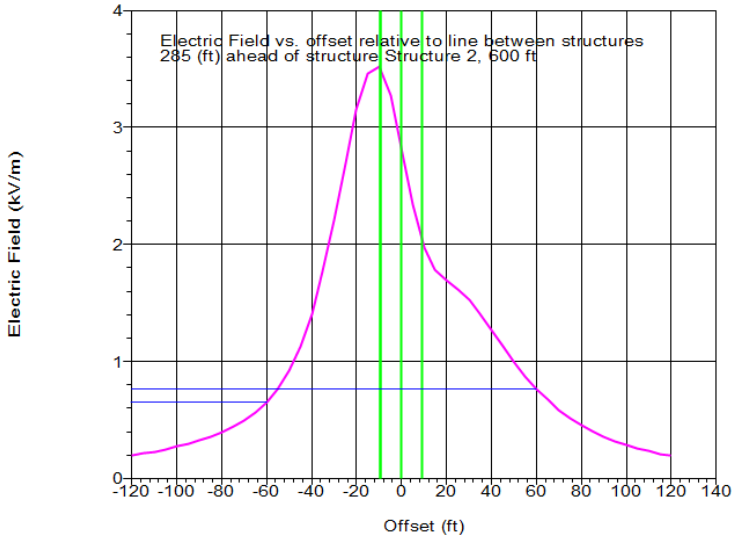
Transmission Line Magnetic Field & Electric Field Calc

Structure Type 2 Calculation, 600 foot span









Magnetic Field
Left of 120 ft ROW: 62.155 mG
Center of ROW: 190.778 mG
Right of 120 ft ROW: 52.214 mG

Electric Field
Left of 120 ft ROW: .724 kV/m
Center of ROW: 2.680 kV/m
Right of 120 ft ROW: .863 kV/m

Magnetic Field
Left of 120 ft ROW: 57.530 mG
Center of ROW: 181.951 mG
Right of 120 ft ROW: 48.704 mG

Electric Field
Left of 120 ft ROW: .650 kV/m
Center of ROW: 2.825 kV/m
Right of 120 ft ROW: .765 kV/m

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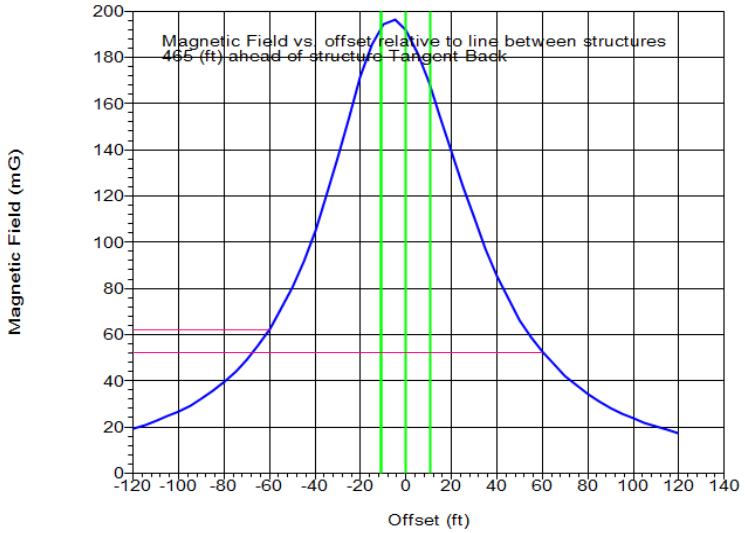
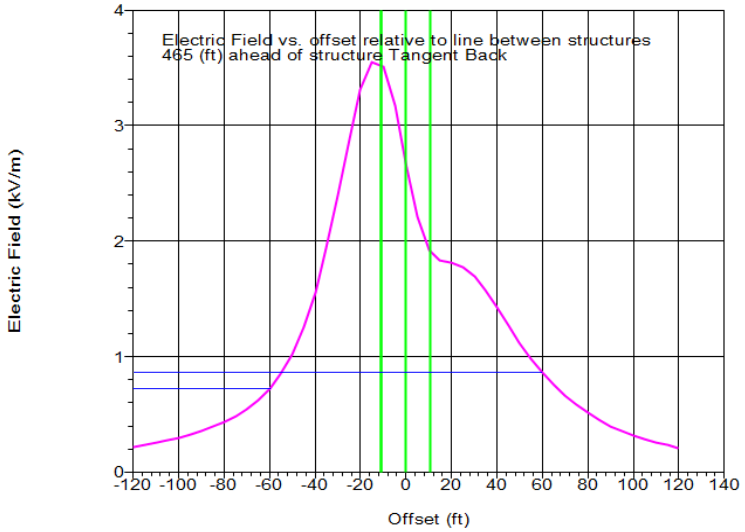
Transmission Line Magnetic Field & Electric Field Calc

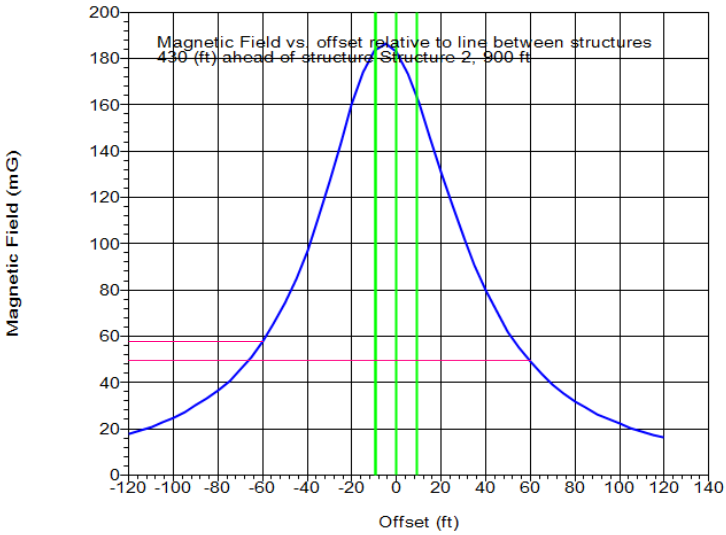
Structure Type 2 Calculation, 900 foot span

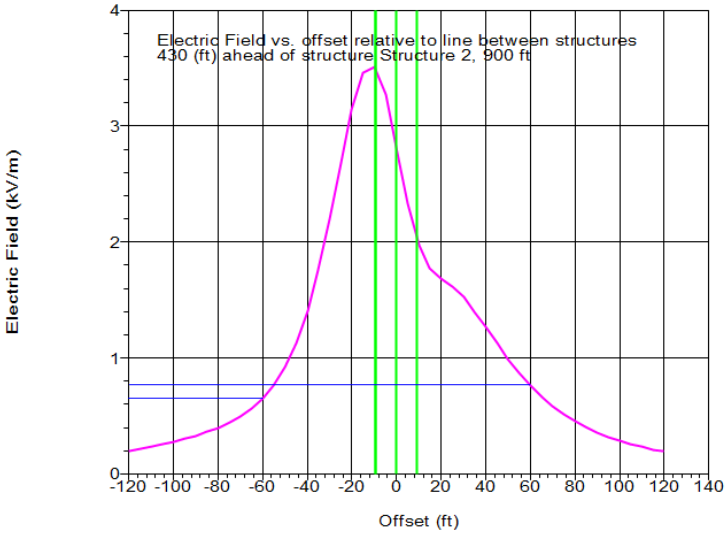




Magnetic Field
Left of 120 ft ROW: 62.412 mG
Center of ROW: 191.742 mG
Right of 120 ft ROW: 52.552 mG

Electric Field
Left of 120 ft ROW: .722 kV/m
Center of ROW: 2.675 kV/m
Right of 120 ft ROW: .862 kV/m





Magnetic Field
Left of 120 ft ROW: 57.766 mG
Center of ROW: 182.745 mG
Right of 120 ft ROW: 48.881 mG

Electric Field
Left of 120 ft ROW: .649 kV/m
Center of ROW: 2.817 kV/m
Right of 120 ft ROW: .763 kV/m

Structure Type 3

Transmission Line Magnetic Field & Electric Field Calc

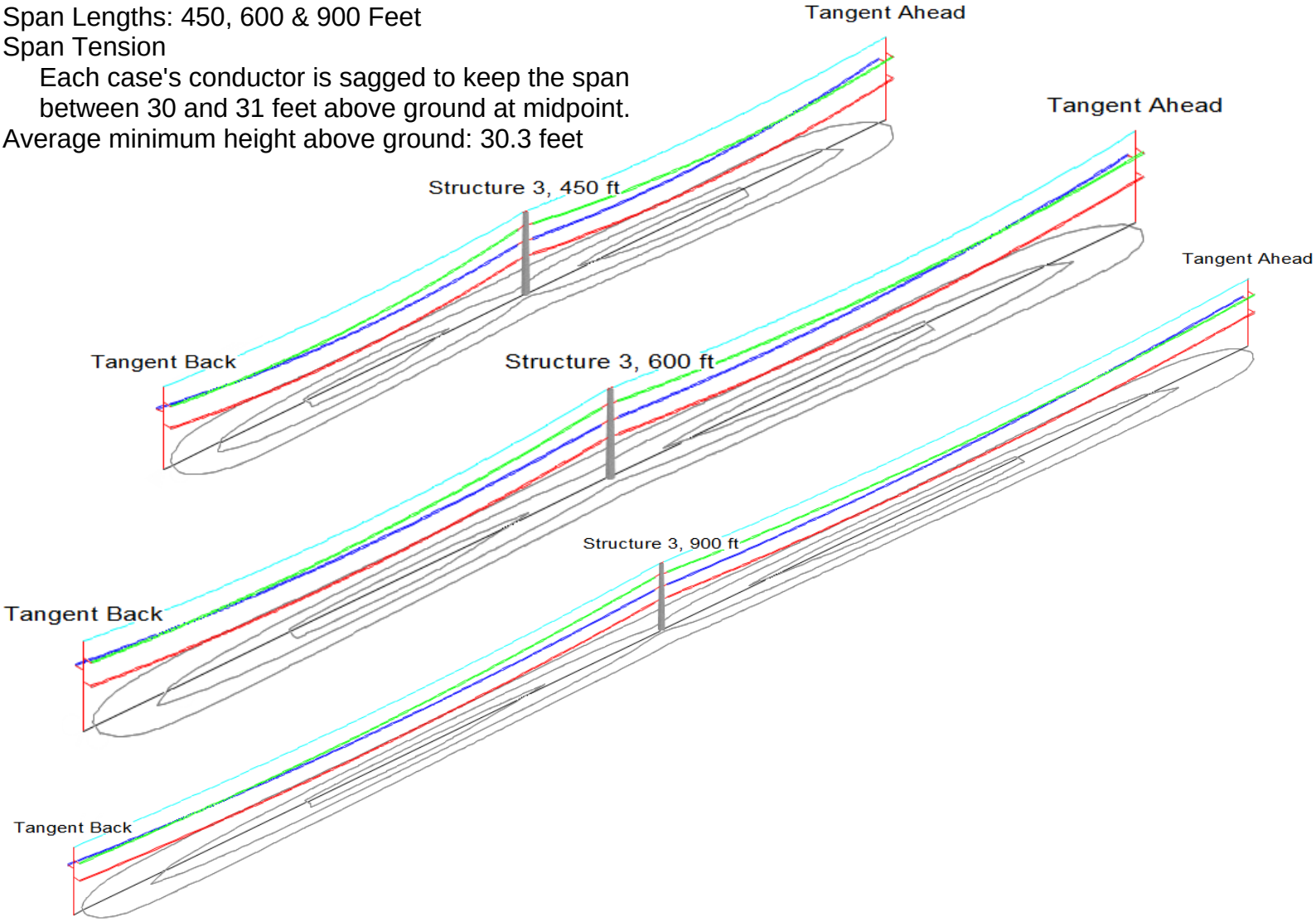
Structure Type 3 Calculation

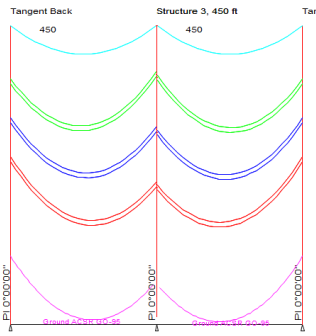
Span Lengths: 450, 600 & 900 Feet

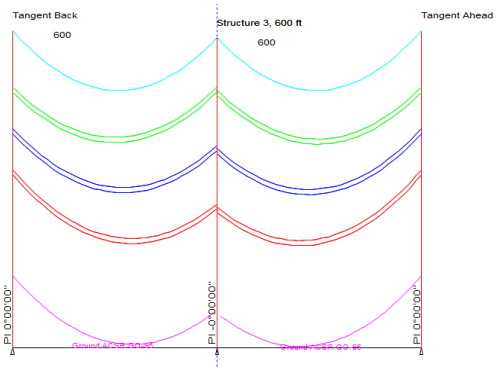
Span Tension

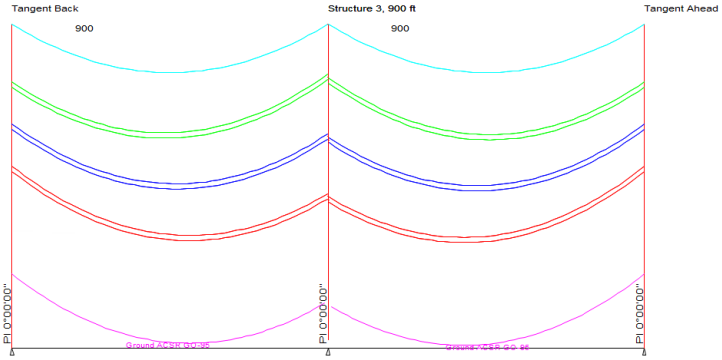
Each case's conductor is sagged to keep the span between 30 and 31 feet above ground at midpoint.

Average minimum height above ground: 30.3 feet









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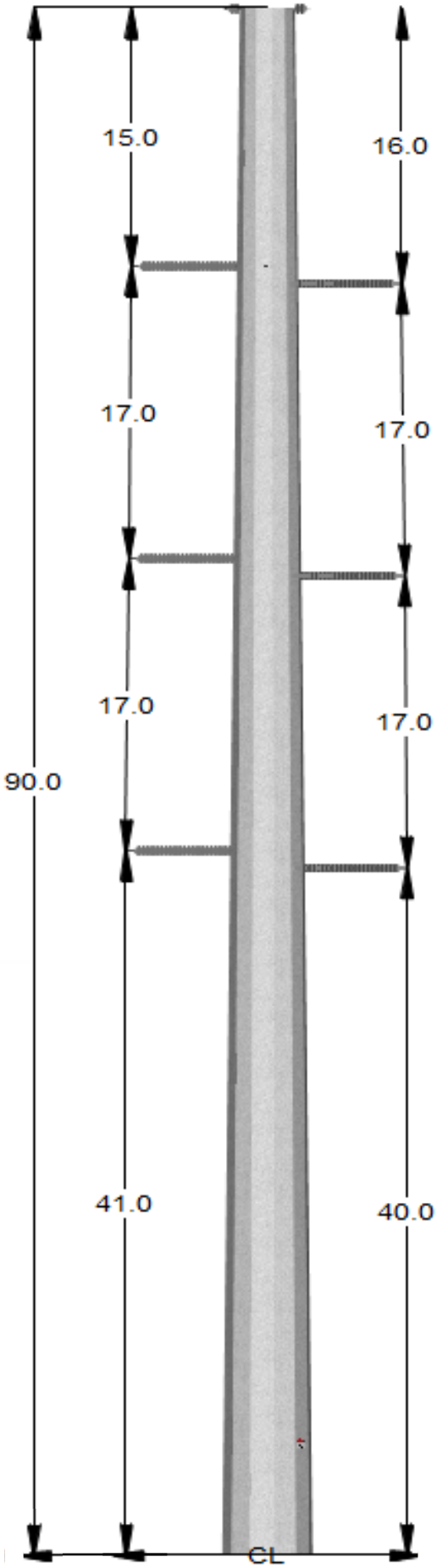
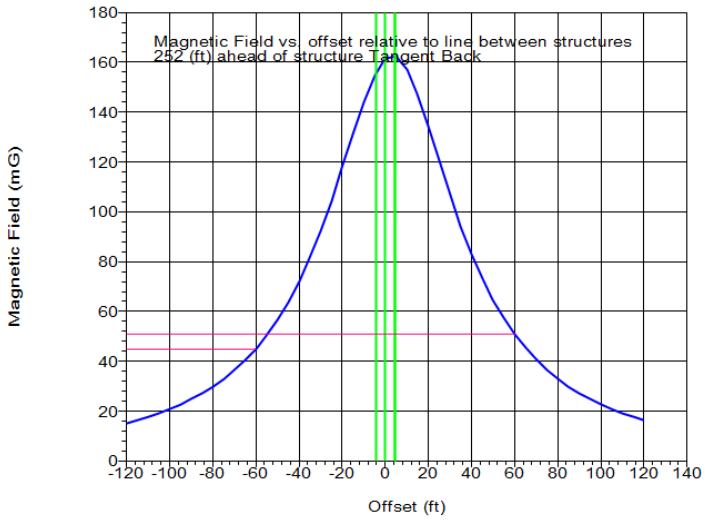
Transmission Line Magnetic Field & Electric Field Calc

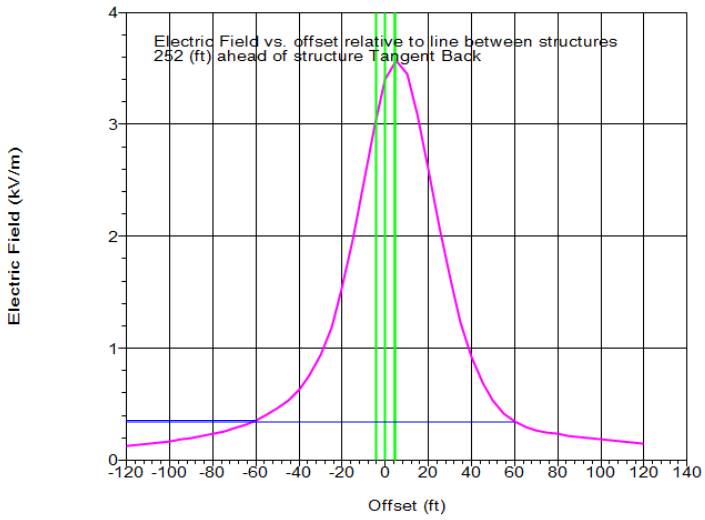
Structure Type 3 Calculation



Transmission Line Magnetic Field & Electric Field Calc

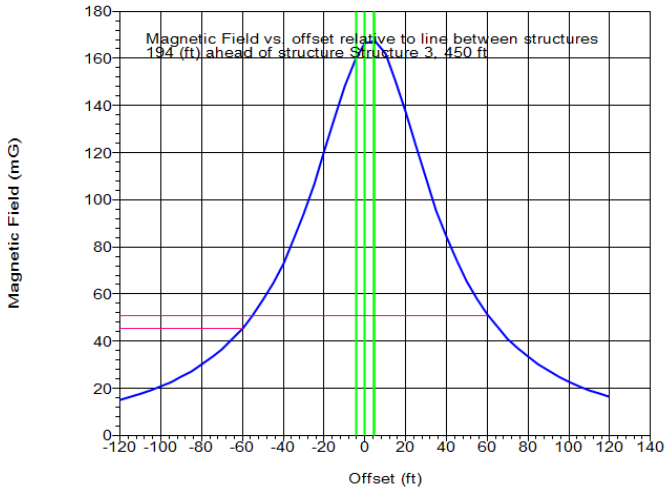
Structure Type 3 Calculation, 450 foot span

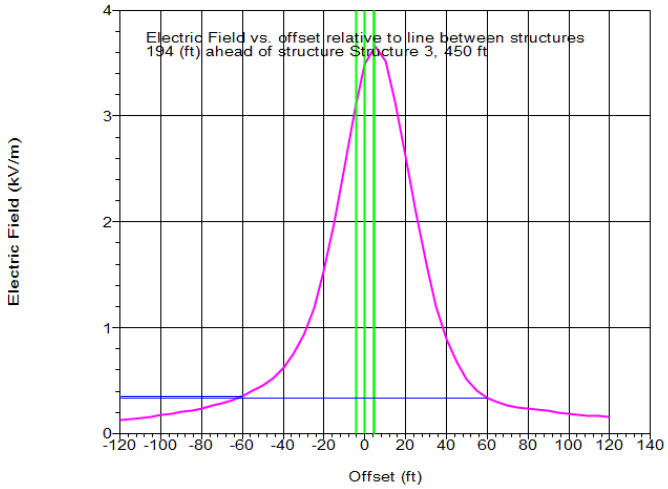




Magnetic Field
Left of 120 ft ROW: 45.147 mG
Center of ROW: 161.538 mG
Right of 120 ft ROW: 51.032 mG

Electric Field
Left of 120 ft ROW: .356 kV/m
Center of ROW: 3.406 kV/m
Right of 120 ft ROW: .345 kV/m



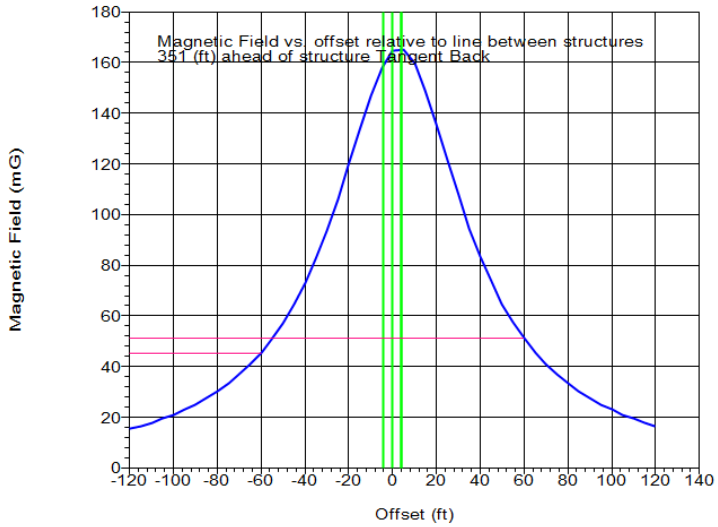


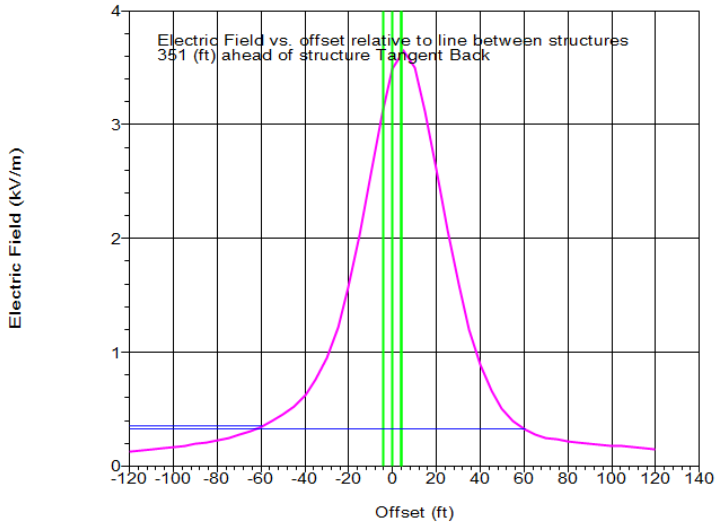
Magnetic Field
Left of 120 ft ROW: 45.554 mG
Center of ROW: 166.495 mG
Right of 120 ft ROW: 51.441 mG

Electric Field
Left of 120 ft ROW: .356 kV/m
Center of ROW: 3.492 kV/m
Right of 120 ft ROW: .336 kV/m

Transmission Line Magnetic Field & Electric Field Calc

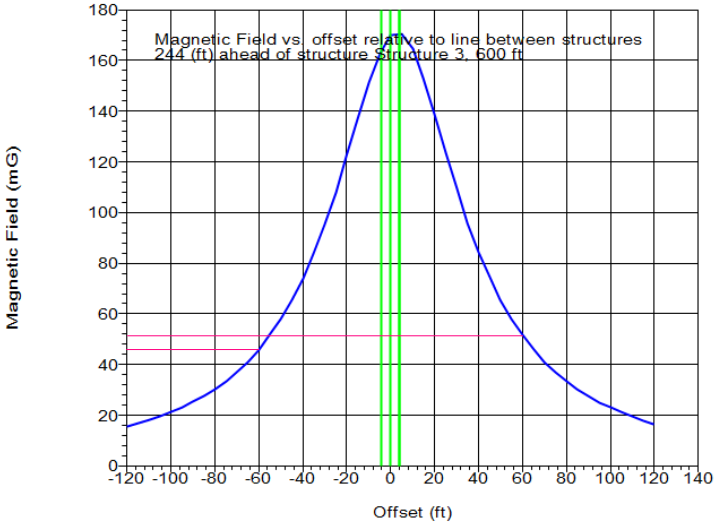
Structure Type 3 Calculation, 600 foot span

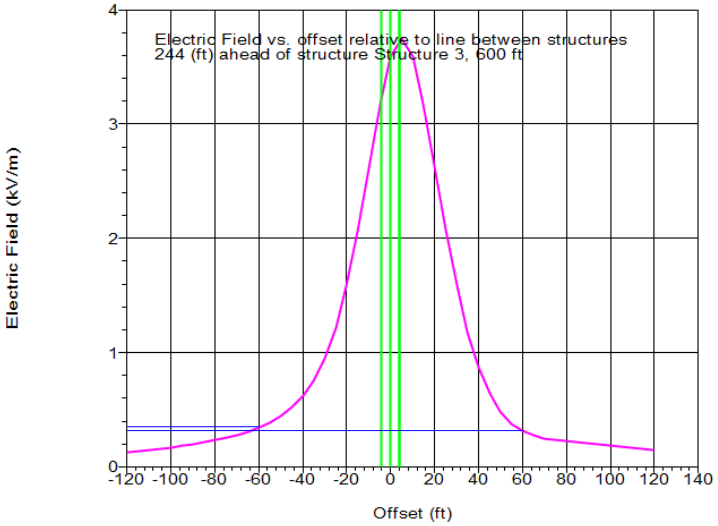




Magnetic Field
Left of 120 ft ROW: 45.567 mG
Center of ROW: 164.564 mG
Right of 120 ft ROW: 51.121 mG

Electric Field
Left of 120 ft ROW: .346 kV/m
Center of ROW: 3.495 kV/m
Right of 120 ft ROW: .322 kV/m



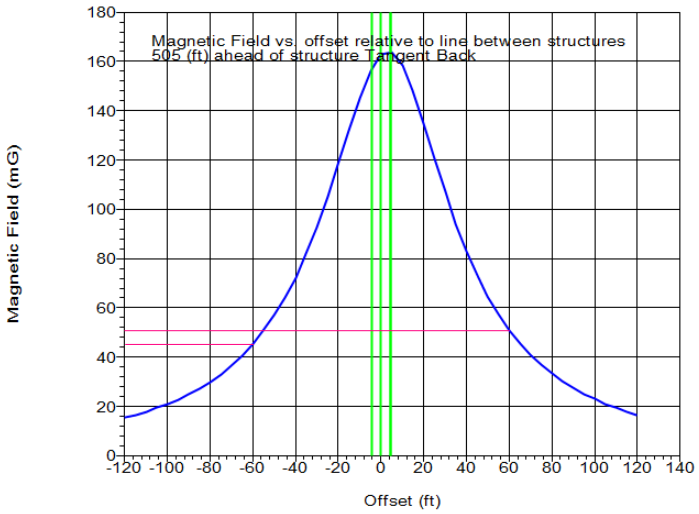


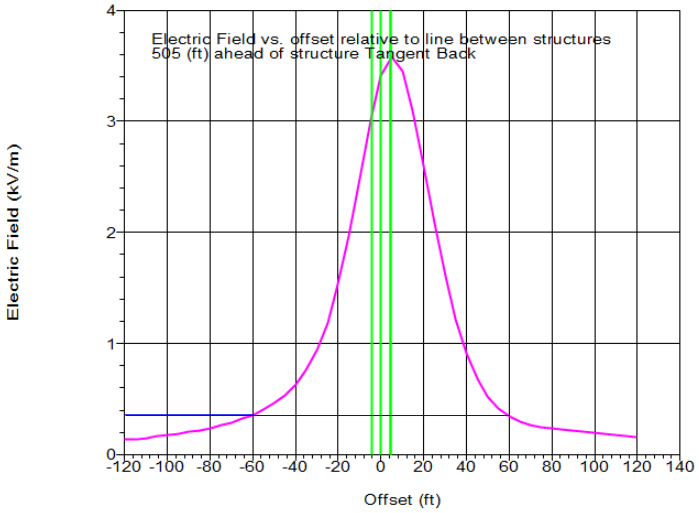
Magnetic Field
Left of 120 ft ROW: 46.000 mG
Center of ROW: 169.919 mG
Right of 120 ft ROW: 51.547 mG

Electric Field
Left of 120 ft ROW: .345 kV/m
Center of ROW: 3.595 kV/m
Right of 120 ft ROW: .313 kV/m

Transmission Line Magnetic Field & Electric Field Calc

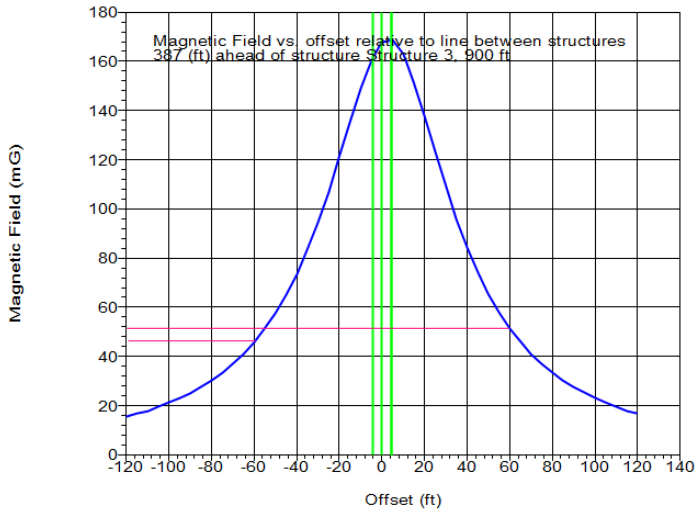
Structure Type 3 Calculation, 900 foot span

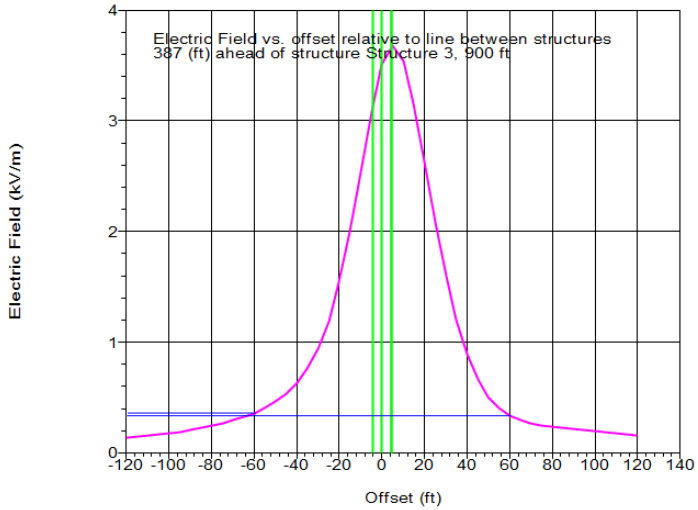




Magnetic Field
Left of 120 ft ROW: 45.338 mG
Center of ROW: 162.764 mG
Right of 120 ft ROW: 51.036 mG

Electric Field
Left of 120 ft ROW: .361 kV/m
Center of ROW: 3.412 kV/m
Right of 120 ft ROW: .342 kV/m





Magnetic Field
Left of 120 ft ROW: 45.735 mG
Center of ROW: 167.711 mG
Right of 120 ft ROW: 51.436 mG

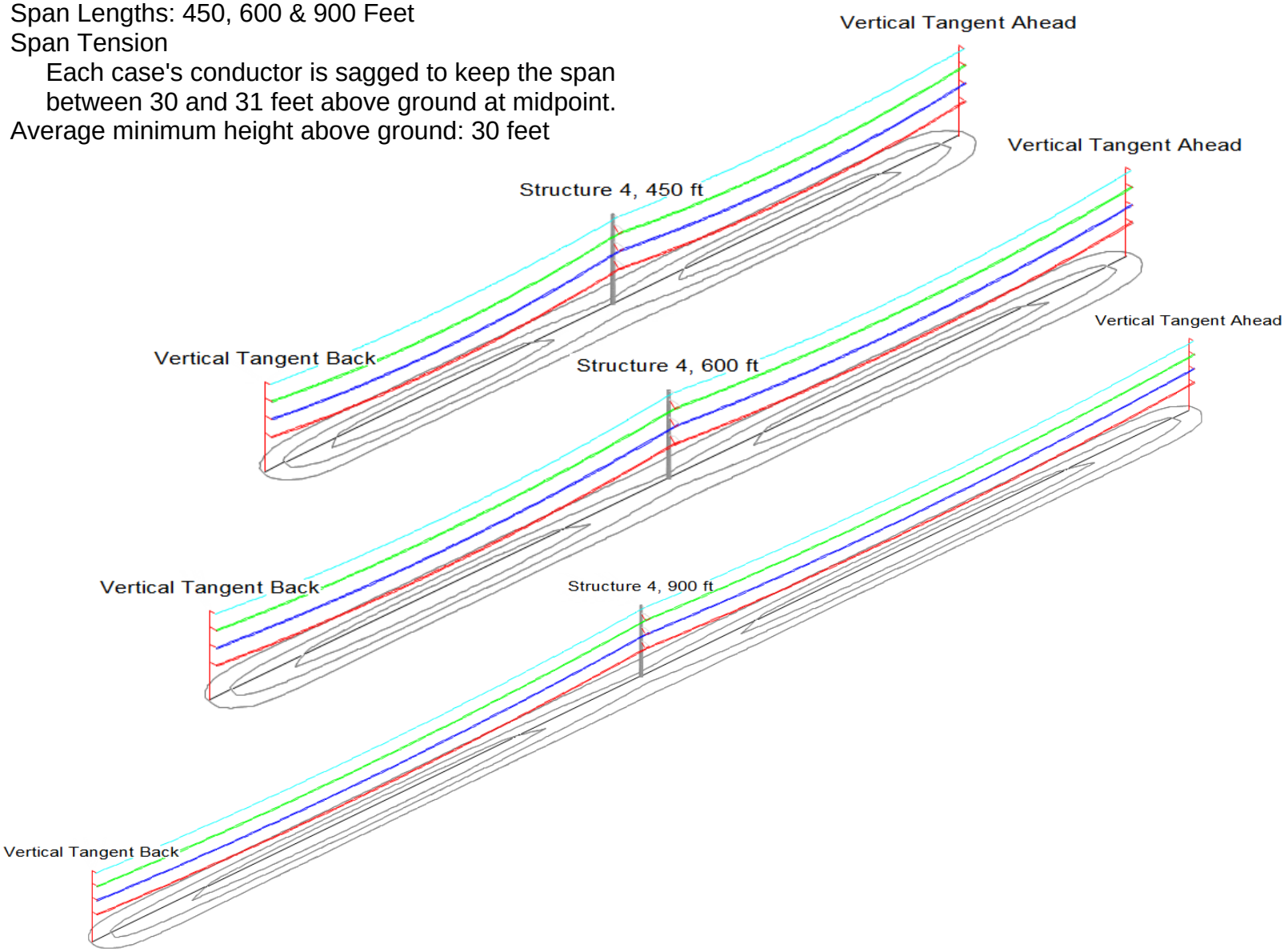
Electric Field
Left of 120 ft ROW: .360 kV/m
Center of ROW: 3.507 kV/m
Right of 120 ft ROW: .334 kV/m

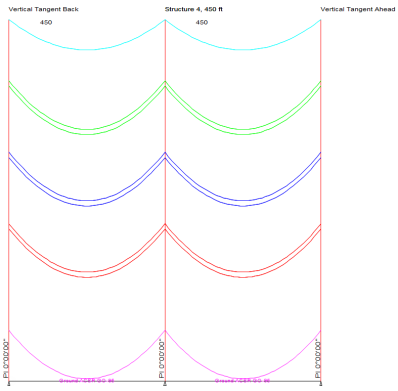
Structure Type 4

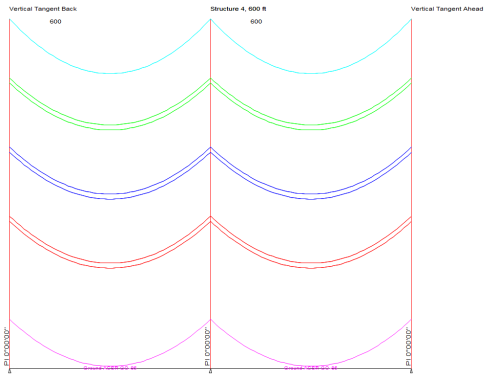
Transmission Line Magnetic Field & Electric Field Calc

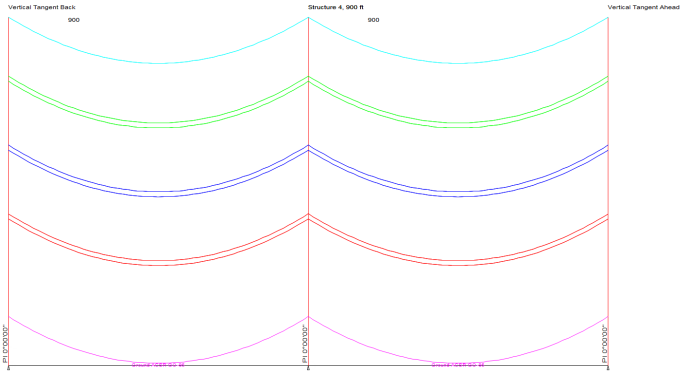
Structure Type 4 Calculation

Span Lengths: 450, 600 & 900 Feet
Span Tension
Each case's conductor is sagged to keep the span between 30 and 31 feet above ground at midpoint.
Average minimum height above ground: 30 feet









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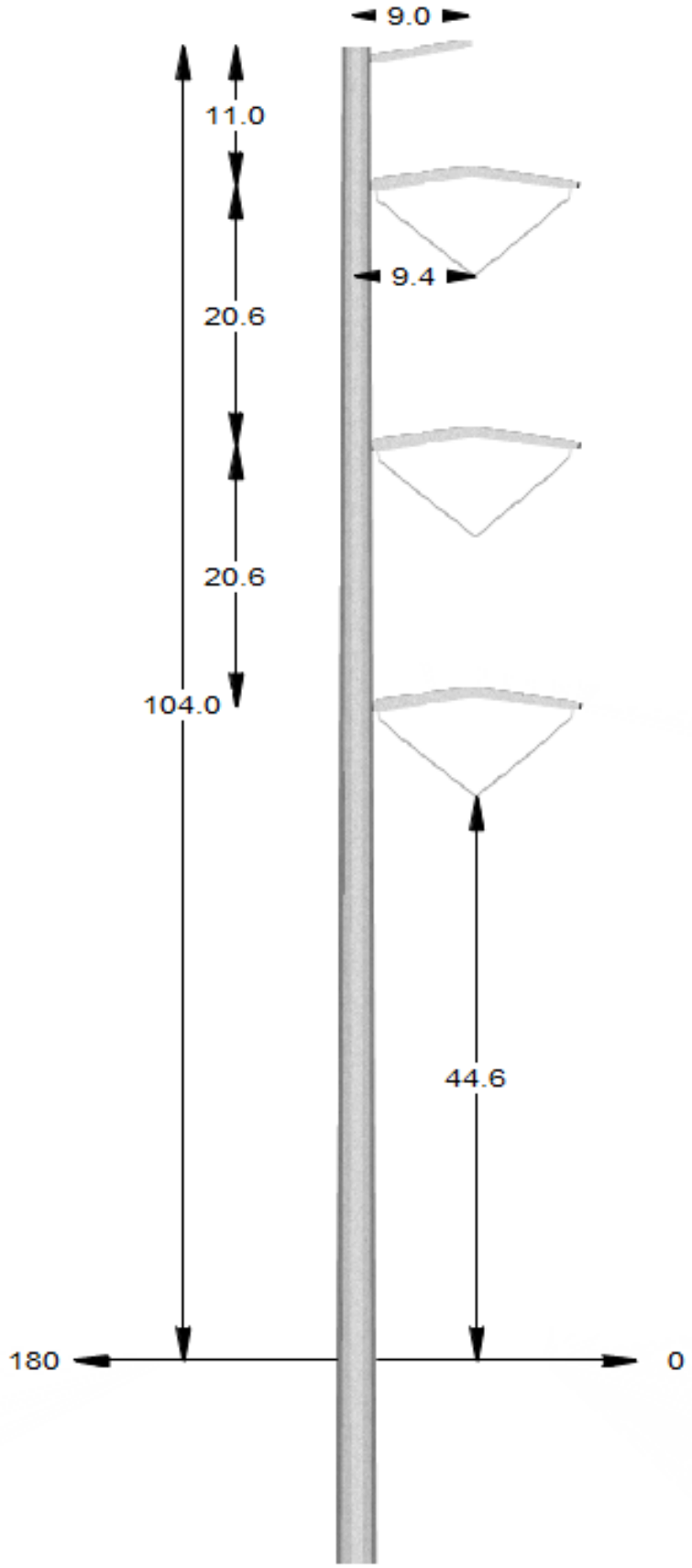
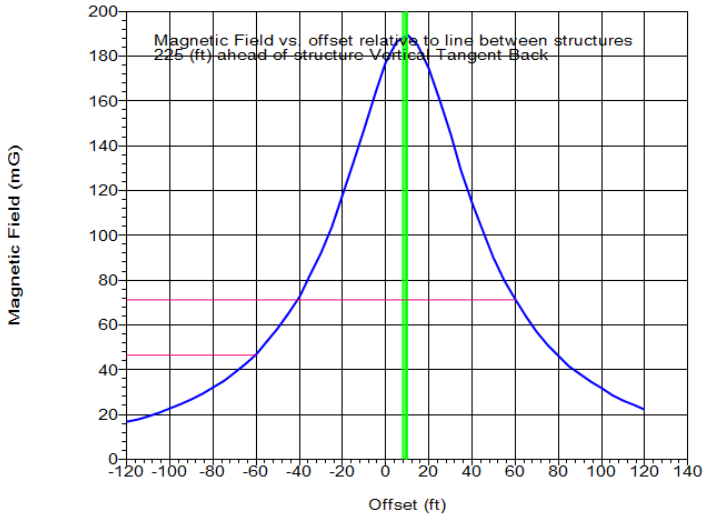
Transmission Line Magnetic Field & Electric Field Calc

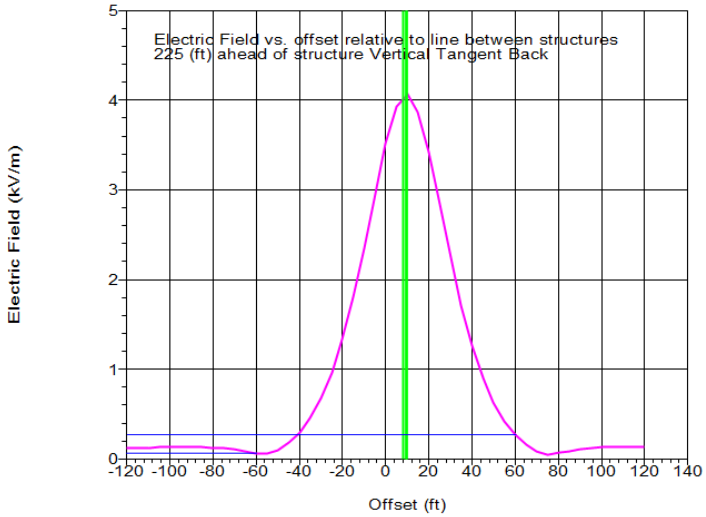
Structure Type 4 Calculation



Transmission Line Magnetic Field & Electric Field Calc

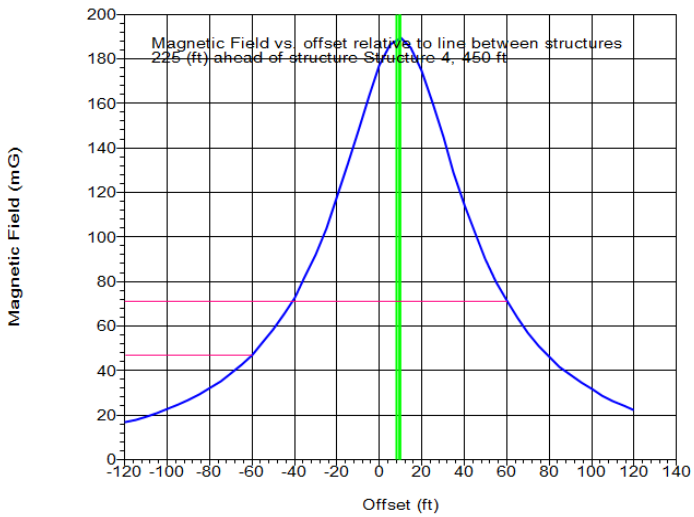
Structure Type 4 Calculation, 450 foot span

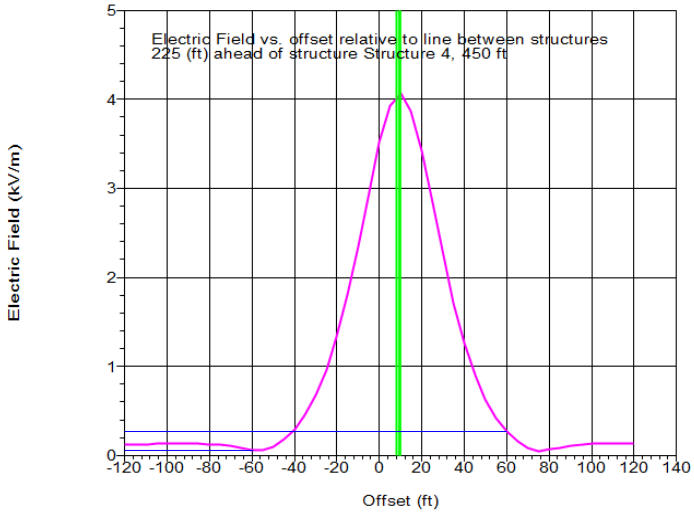




Magnetic Field
Left of 120 ft ROW: 47.203 mG
Center of ROW: 177.057 mG
Right of 120 ft ROW: 71.251 mG

Electric Field
Left of 120 ft ROW: .062 kV/m
Center of ROW: 3.526 kV/m
Right of 120 ft ROW: .269 kV/m



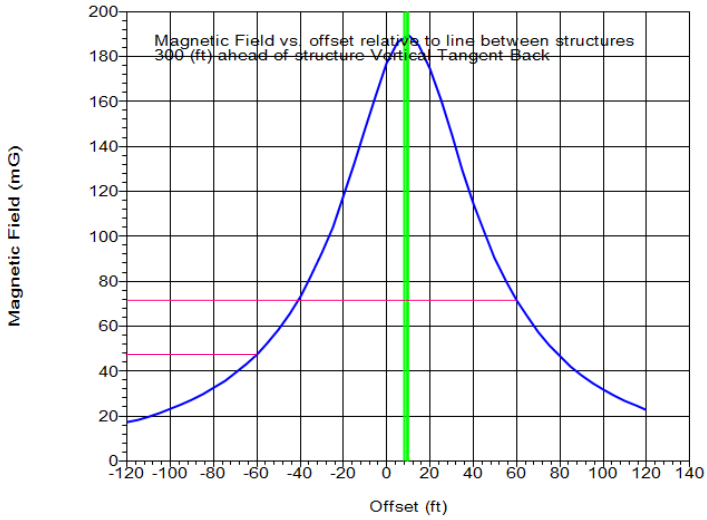


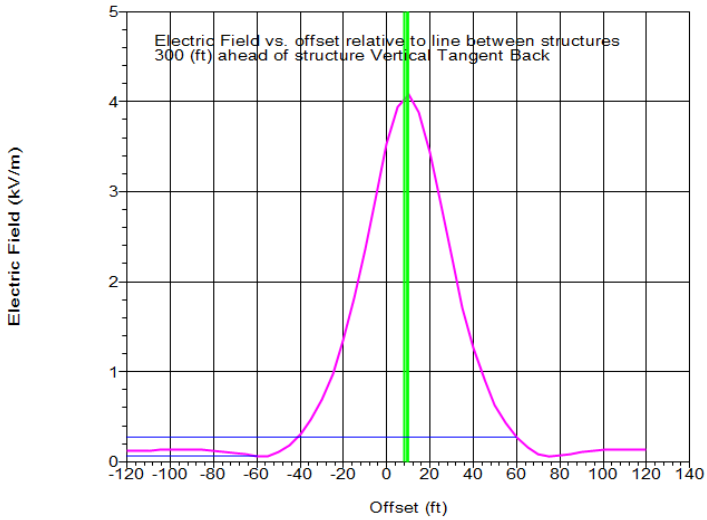
Magnetic Field
Left of 120 ft ROW: 47.203 mG
Center of ROW: 177.057 mG
Right of 120 ft ROW: 71.251 mG

Electric Field
Left of 120 ft ROW: .062 kV/m
Center of ROW: 3.526 kV/m
Right of 120 ft ROW: .269 kV/m

Transmission Line Magnetic Field & Electric Field Calc

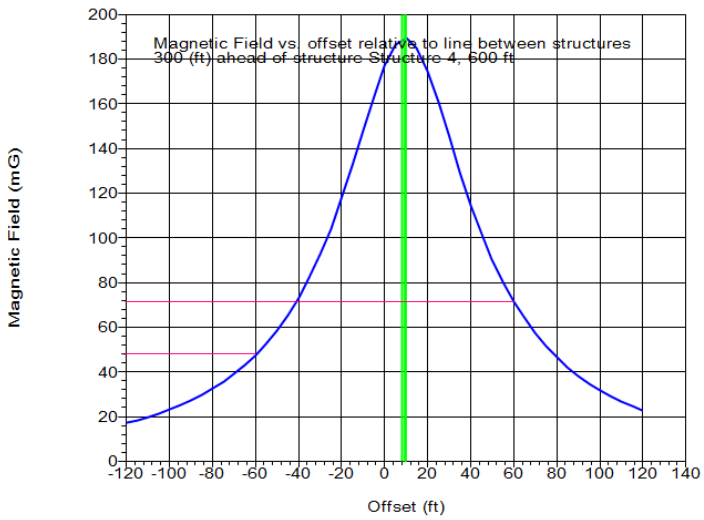
Structure Type 4 Calculation, 600 foot span

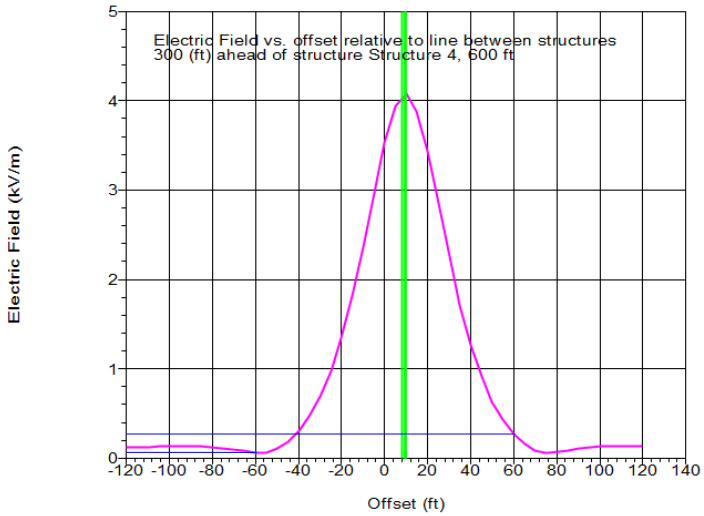




Magnetic Field
Left of 120 ft ROW: 47.507 mG
Center of ROW: 177.244 mG
Right of 120 ft ROW: 71.426 mG

Electric Field
Left of 120 ft ROW: .063 kV/m
Center of ROW: 3.537 kV/m
Right of 120 ft ROW: .276 kV/m



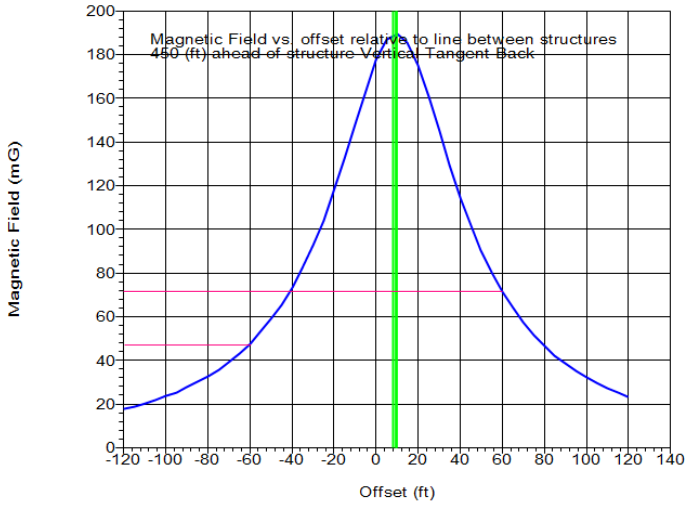


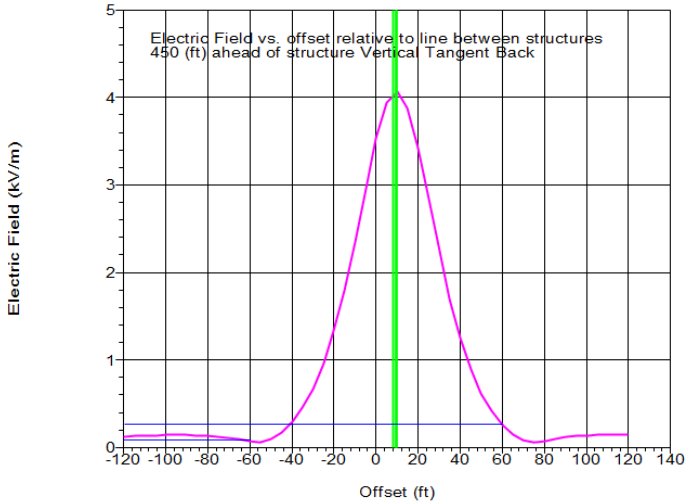
Magnetic Field
Left of 120 ft ROW: 47.507 mG
Center of ROW: 177.244 mG
Right of 120 ft ROW: 71.426 mG

Electric Field
Left of 120 ft ROW: .063 kV/m
Center of ROW: 3.537 kV/m
Right of 120 ft ROW: .276 kV/m

Transmission Line Magnetic Field & Electric Field Calc

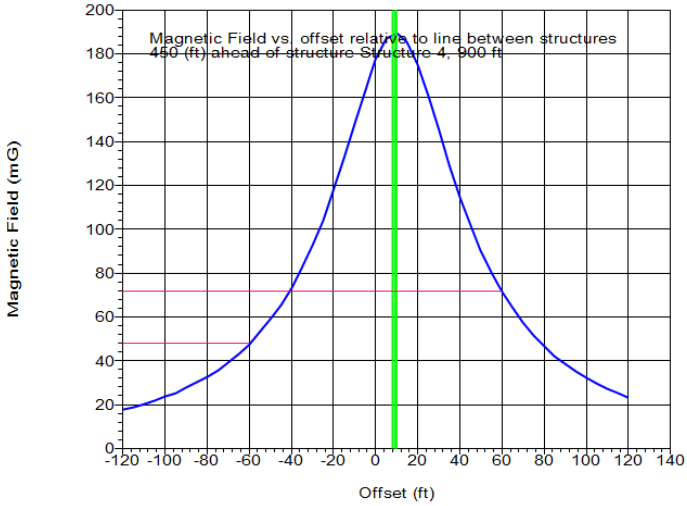
Structure Type 4 Calculation, 900 foot span

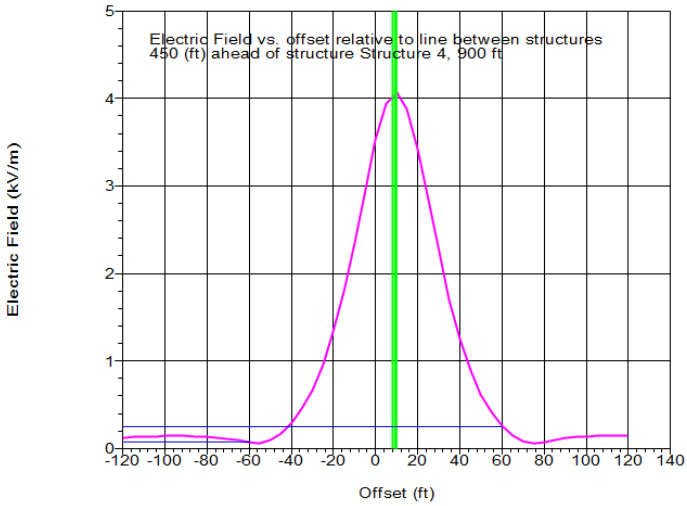




Magnetic Field
Left of 120 ft ROW: 47.703 mG
Center of ROW: 177.357 mG
Right of 120 ft ROW: 71.518 mG

Electric Field
Left of 120 ft ROW: .070 kV/m
Center of ROW: 3.528 kV/m
Right of 120 ft ROW: .262 kV/m





Magnetic Field
Left of 120 ft ROW: 47.703 mG
Center of ROW: 177.357 mG
Right of 120 ft ROW: 71.518 mG

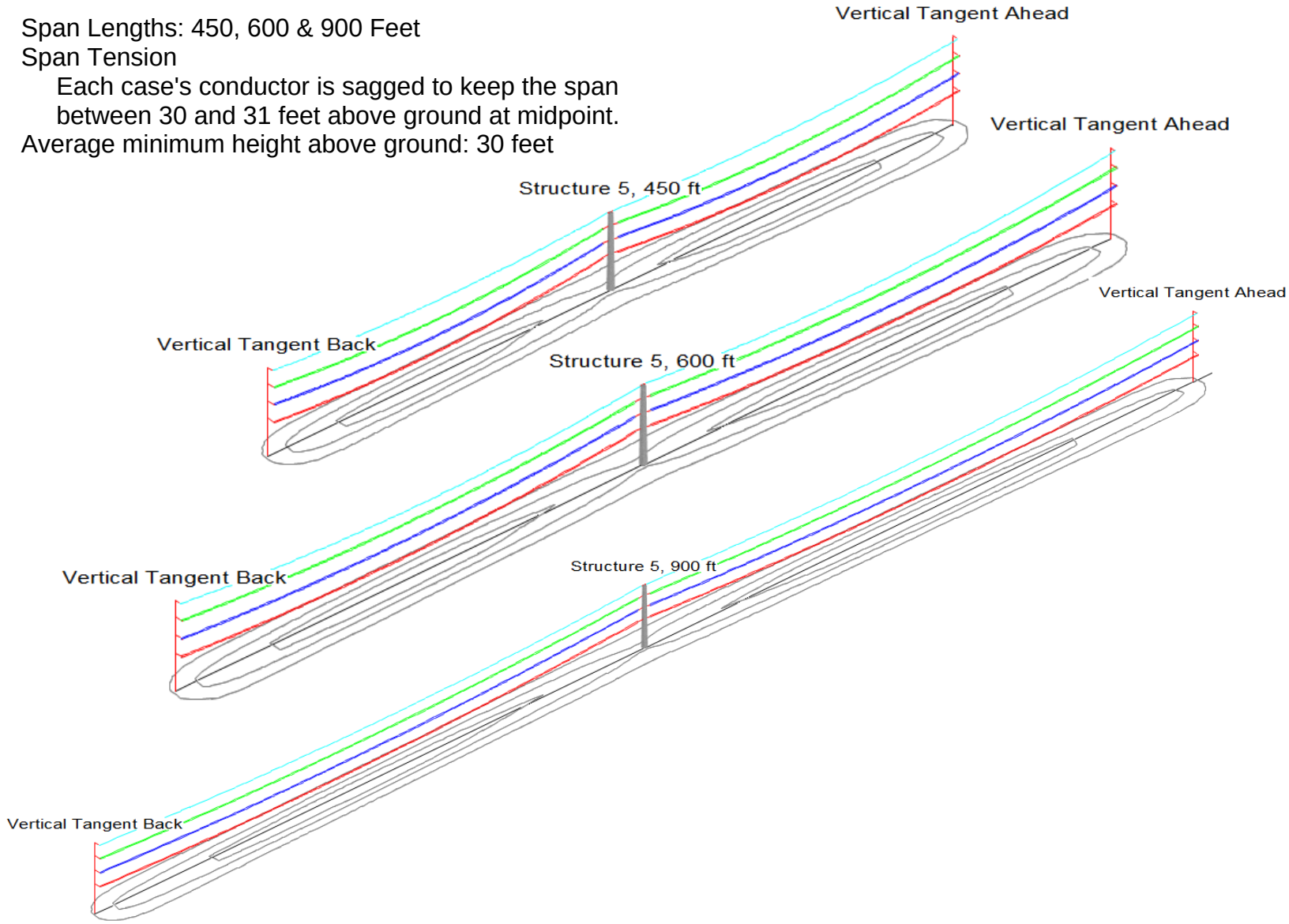
Electric Field
Left of 120 ft ROW: .070 kV/m
Center of ROW: 3.528 kV/m
Right of 120 ft ROW: .262 kV/m

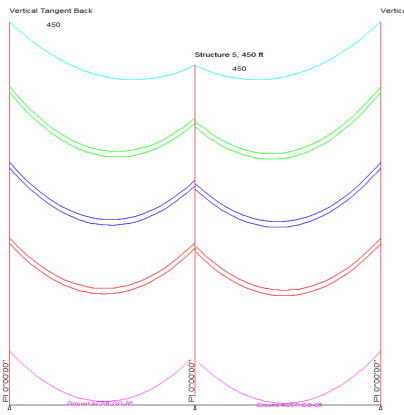
Structure Type 5

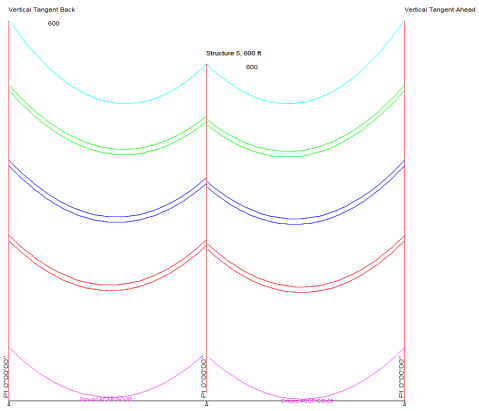
Transmission Line Magnetic Field & Electric Field Calc

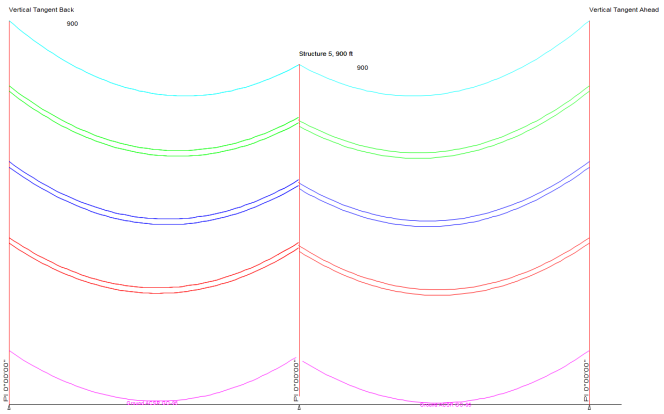
Structure Type 5 Calculation

Span Lengths: 450, 600 & 900 Feet
Span Tension
Each case's conductor is sagged to keep the span between 30 and 31 feet above ground at midpoint.
Average minimum height above ground: 30 feet









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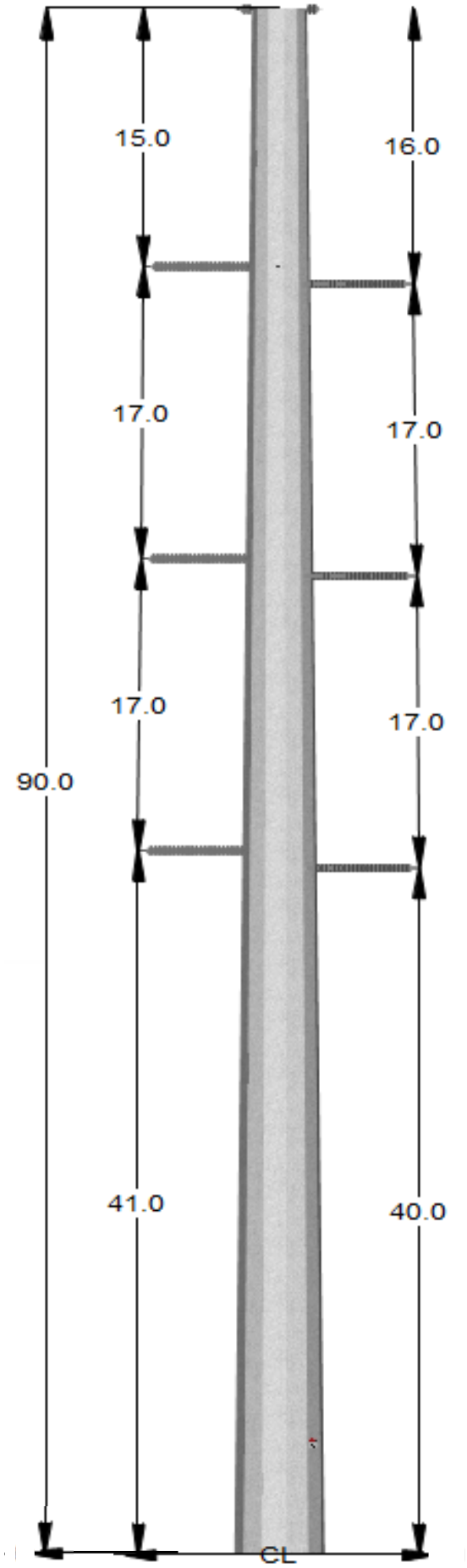
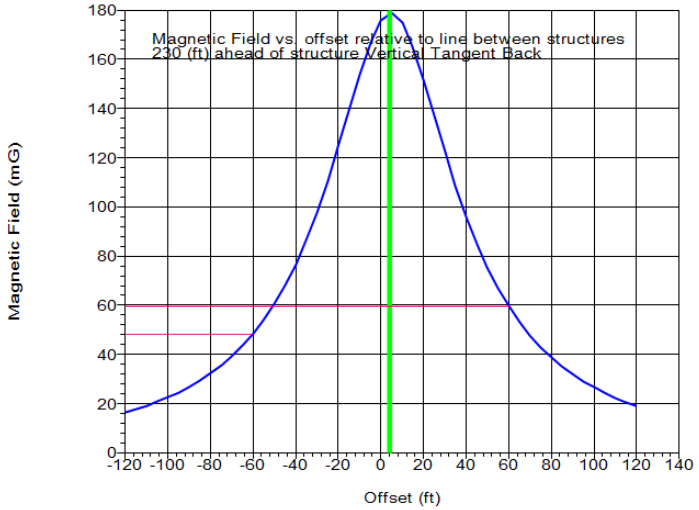
Transmission Line Magnetic Field & Electric Field Calc

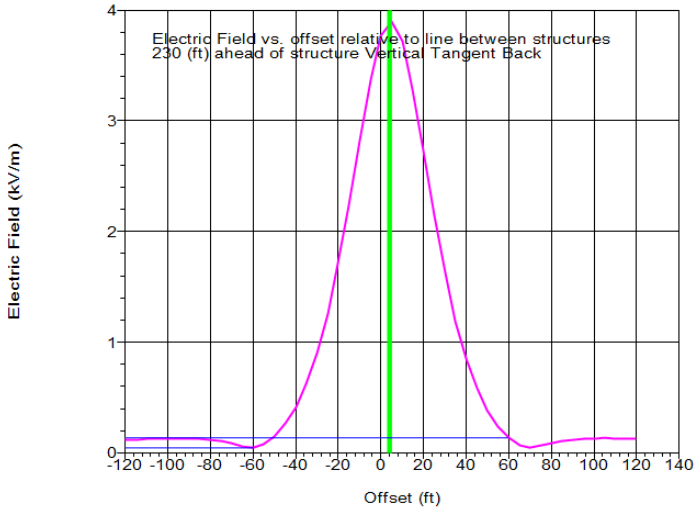
Structure Type 5 Calculation



Transmission Line Magnetic Field & Electric Field Calc

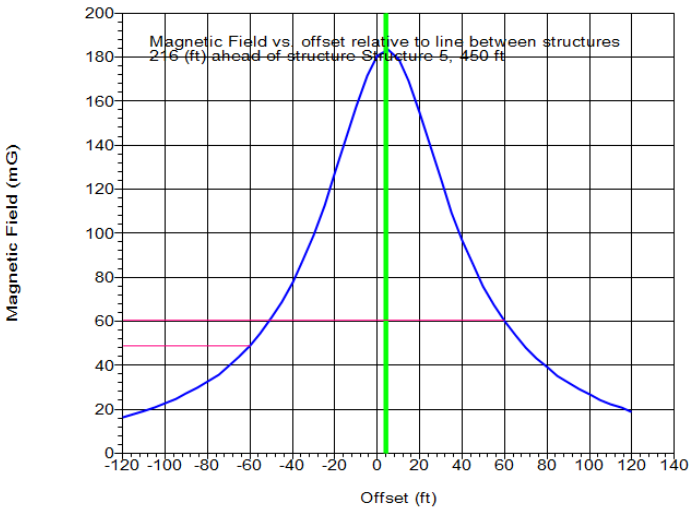
Structure Type 5 Calculation, 450 foot span

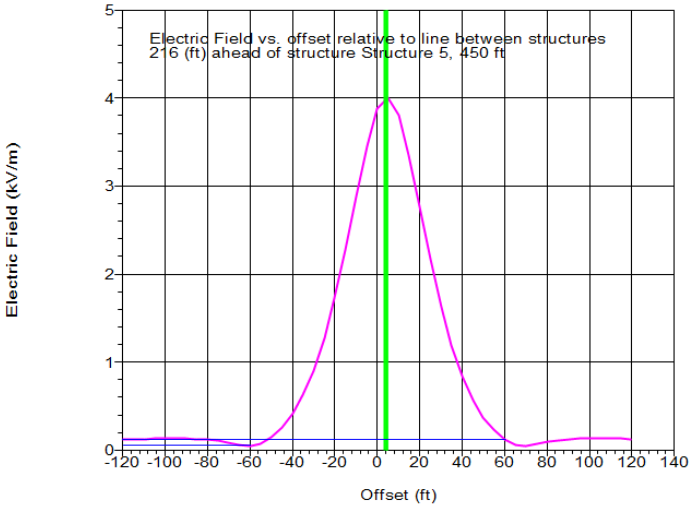




Magnetic Field
Left of 120 ft ROW: 48.545 mG
Center of ROW: 175.936 mG
Right of 120 ft ROW: 59.540 mG

Electric Field
Left of 120 ft ROW: .043 kV/m
Center of ROW: 3.766 kV/m
Right of 120 ft ROW: .133 kV/m



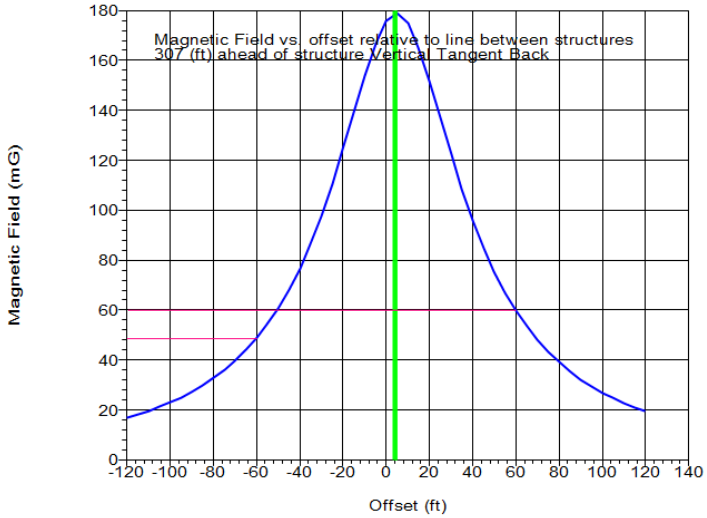


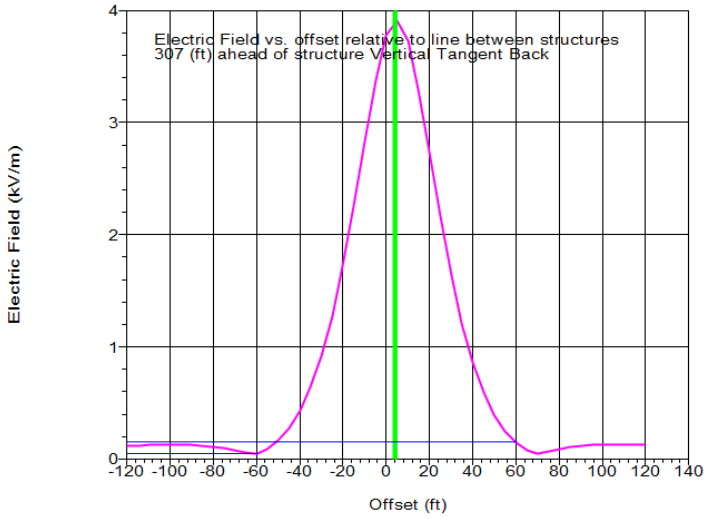
Magnetic Field
Left of 120 ft ROW: 48.920 mG
Center of ROW: 180.655 mG
Right of 120 ft ROW: 59.852 mG

Electric Field
Left of 120 ft ROW: .044 kV/m
Center of ROW: 3.875 kV/m
Right of 120 ft ROW: .125 kV/m

Transmission Line Magnetic Field & Electric Field Calc

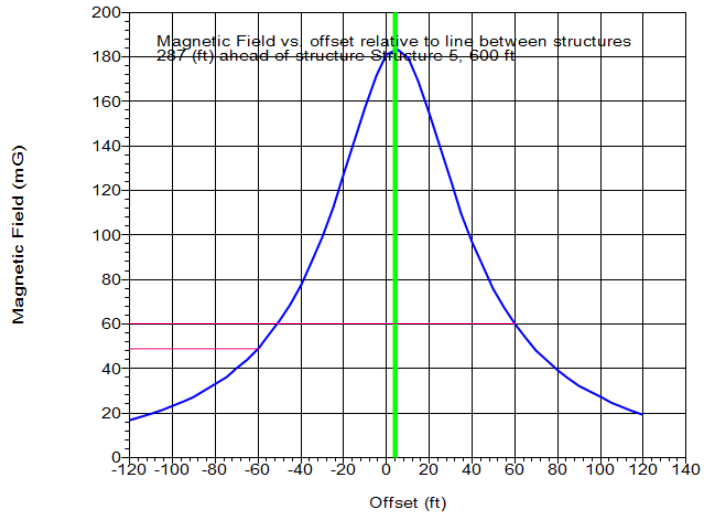
Structure Type 5 Calculation, 600 foot span

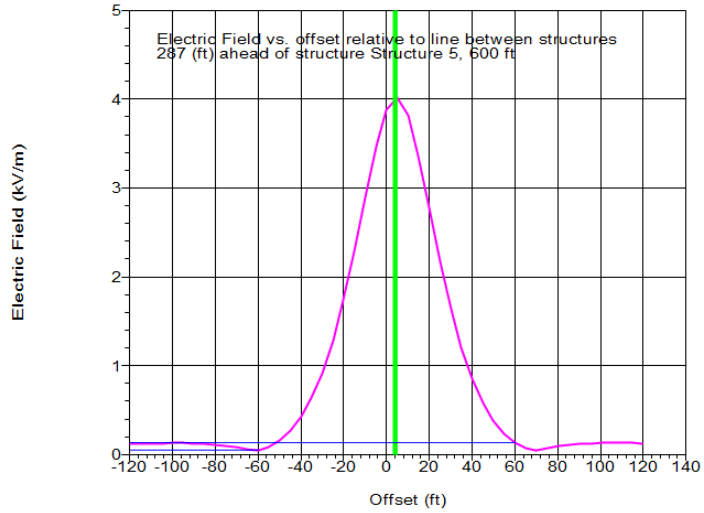




Magnetic Field
Left of 120 ft ROW: 48.849 mG
Center of ROW: 176.003 mG
Right of 120 ft ROW: 59.742 mG

Electric Field
Left of 120 ft ROW: .049 kV/m
Center of ROW: 3.779 kV/m
Right of 120 ft ROW: .144 kV/m



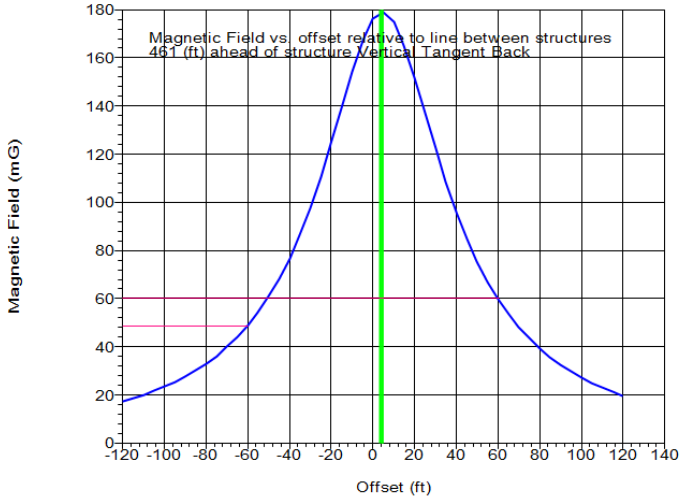


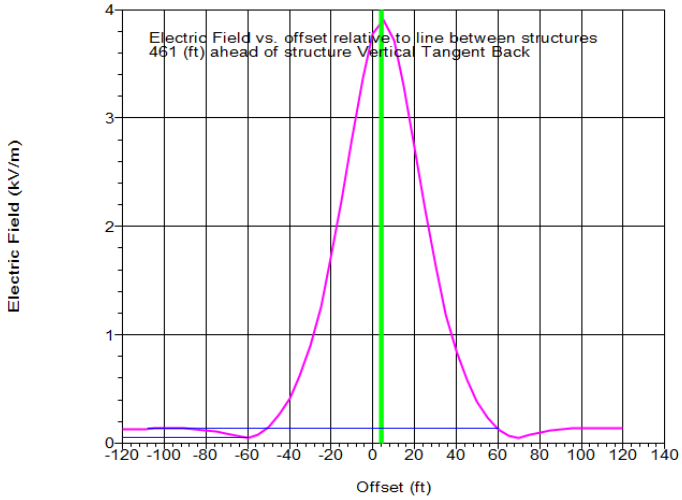
Magnetic Field
Left of 120 ft ROW: 49.223 mG
Center of ROW: 180.735 mG
Right of 120 ft ROW: 60.049 mG

Electric Field
Left of 120 ft ROW: .049 kV/m
Center of ROW: 3.886 kV/m
Right of 120 ft ROW: .135 kV/m

Transmission Line Magnetic Field & Electric Field Calc

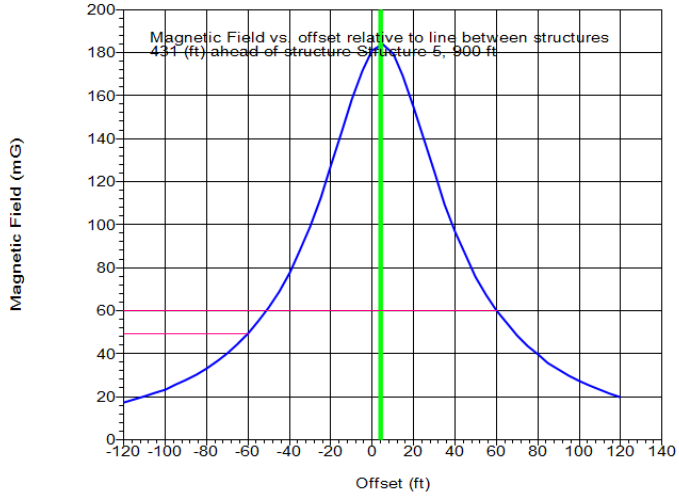
Structure Type 5 Calculation, 900 foot span

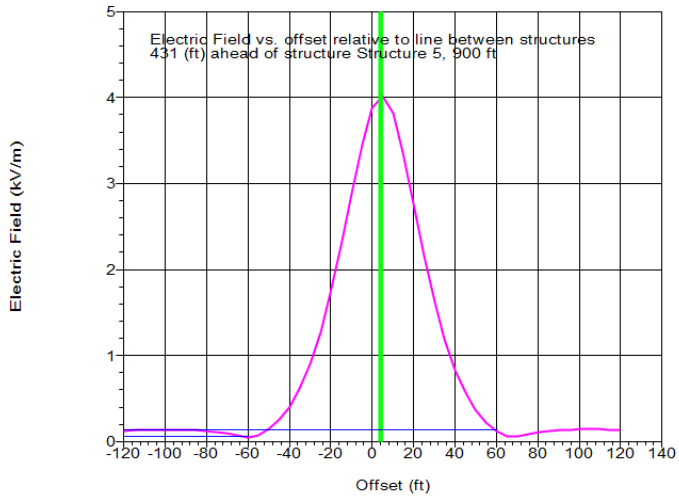




Magnetic Field
Left of 120 ft ROW: 49.052 mG
Center of ROW: 176.117 mG
Right of 120 ft ROW: 59.871 mG

Electric Field
Left of 120 ft ROW: .048 kV/m
Center of ROW: 3.774 kV/m
Right of 120 ft ROW: .131 kV/m





Magnetic Field
Left of 120 ft ROW: 49.429 mG
Center of ROW: 180.933 mG
Right of 120 ft ROW: 60.185 mG

Electric Field
Left of 120 ft ROW: .050 kV/m
Center of ROW: 3.879 kV/m
Right of 120 ft ROW: .121 kV/m

REFERENCES

TRANSMISSION STRUCTURES

Hydrostor Willow Rock Energy Storage Center
EMF Calculation

LOADING TABLE (KIPS)

DESCRIPTION	LOAD	CASE 1	CASE 2	CASE 3	CASE 4	CASE 5	CASE 6	CASE 7	CASE 8	CASE 9	CASE 10	CASE 11	CASE 12	CASE 13	CASE 14	CASE 15	CASE 16	CASE 17	CASE 18
OPGW	T1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	V1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	L1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1272 ACSS "BITTERN"	T3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	V3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	L3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND ON STRUCTURE (PSF)	WIND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

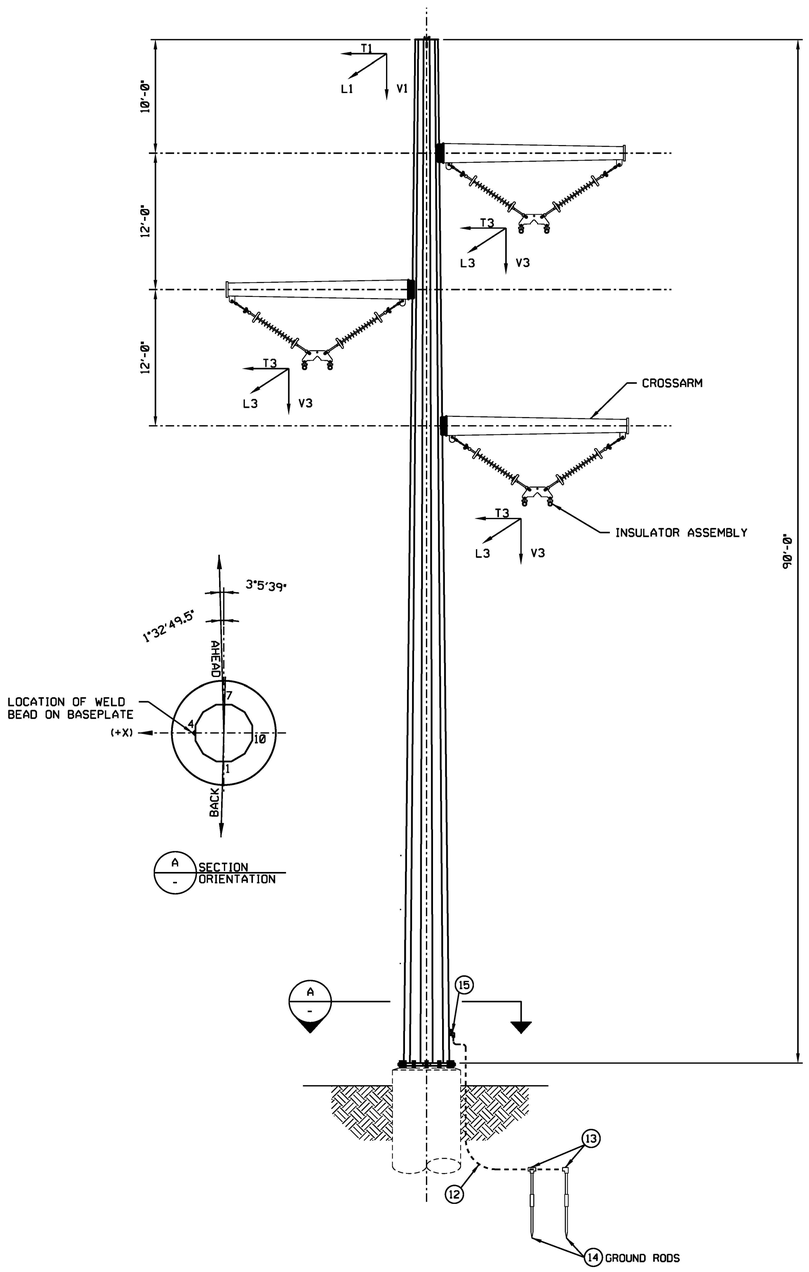
MECHANICAL LOADING CRITERIA

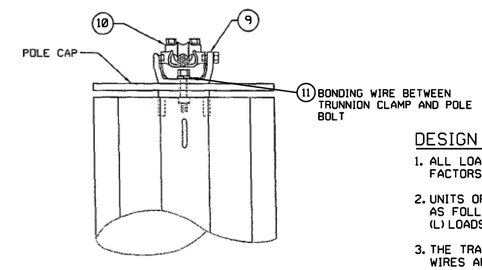
1 - NESC RULE 250B - LIGHT LOADING (INTACT): 9 PSF WIND, 0" ICE, 30 DEG F, INITIAL
LOAD FACTOR: TRANSVERSE=2.5, LONGITUDINAL=1.65, VERTICAL=1.5
2 - NESC RULE 250B - LIGHT LOADING (UPLIFT): 9 PSF WIND, 0" ICE, 30 DEG F, INITIAL
LOAD FACTOR: TRANSVERSE=2.5, LONGITUDINAL=1.65, VERTICAL=1
3 - NESC RULE 250B - LIGHT LOADING (DEADEND): 9 PSF WIND, 0" ICE, 30 DEG F, INITIAL
LOAD FACTOR: TRANSVERSE=2.5, LONGITUDINAL=1.65, VERTICAL=1.5
4 - NESC RULE 250C - EXTREME WIND (INTACT): 18.5 PSF WIND, 0" ICE, 60 DEG F, INITIAL
LOAD FACTOR: 1.0
5 - NESC RULE 250C - EXTREME WIND (DEADEND): 18.5 PSF WIND, 0" ICE, 60 DEG F, INITIAL
LOAD FACTOR: 1.0
6 - NESC RULE 261A - EXTREME WIND (WITHOUT CONDUCTORS): 18.5 PSF WIND, 0" ICE, 60 DEG F
LOAD FACTOR: 1.0
7 - ASCE 74/RUS 1724E-200 RESIDUAL STATIC LOAD (RSL): 0 PSF WIND, 0" ICE, 60 DEG F, INITIAL
LOAD FACTOR: TRANSVERSE=2.5, LONGITUDINAL=1.65, VERTICAL=1.5
8 - ASCE 7-10 EXTREME WIND: 31 PSF WIND, 0" ICE, 60 DEG F, INITIAL
LOAD FACTOR: 1.0
9 - GO-95 LIGHT LOADING (INTACT): 8 PSF WIND, 0" ICE, 25 DEG F, INITIAL
SAFETY FACTOR: 1.5
10 -GO-95 LIGHT LOADING (DEADEND): 8 PSF WIND, 0" ICE, 25 DEG F, INITIAL
SAFETY FACTOR: 1.5
11 - EVERYDAY/PRE-CAMBER: 0 PSF WIND, 0" ICE, 60 DEG F, INITIAL
LOAD FACTOR: 1.0
12 -SDG&E CASE 1 GO-95 LIGHT LOADING (INTACT): 9 PSF WIND, 0" ICE, 25 DEG F, INITIAL
SAFETY FACTOR: 1.5
13 -SDG&E CASE 1A FTZ VERY HIGH: 20 PSF WIND, 0" ICE, 60 DEG F, FINAL
SAFETY FACTOR: 1.5
14 -SDG&E CASE 2A TERMINAL DEADEND: 9 PSF WIND, 0" ICE, 25 DEG F, INITIAL
SAFETY FACTOR: 1.5
15 -SDG&E CASE 2B BROKEN PHASE: 9 PSF WIND, 0" ICE, 25 DEG F, FINAL
SAFETY FACTOR: 1.25
16 -SDG&E CASE 3 CAMBER: 0 PSF WIND, 0" ICE, 60 DEG F, FINAL
SAFETY FACTOR: 1.0
17 -SDG&E CASE 5 STRINGING WIRE: 13 PSF WIND, 0" ICE, 25 DEG F, INITIAL
SAFETY FACTOR: 1.25
CONDUCTORS STRUNG AT 30 DEGREES HORIZONTAL
VERTICAL LOAD OF 1500 LBS
18 -SDG&E ARM DESIGN: 9 PSF WIND, 0" ICE, 25 DEG F, INITIAL
SAFETY FACTOR: 1.25
CONDUCTORS STRUNG AT 30 DEGREES HORIZONTAL
VERTICAL LOAD OF 1500 LBS

BILL OF MATERIALS

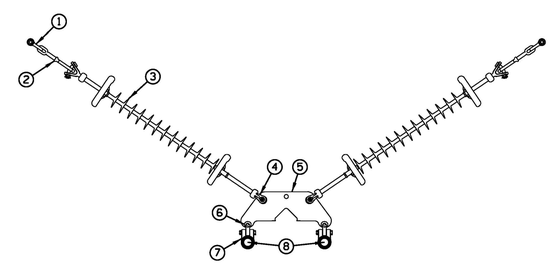
ITEM NO	ITEM DESCRIPTION	MANUFACTURER	CATALOG NO.	PROVIDED BY	MIN QTY	UNITS
1	ANCHOR SHACKLE, 30K	-	-	-	6	EA
2	LINK, CHAIN, 1/2" x 2-1/4", 30K	-	-	-	6	EA
3	INSULATOR, POLYMER, Y-CLEVIS BALL WITH CORONA RING, 30K	-	-	-	6	EA
4	Y-CLEVIS, SOCKET, 30K	-	-	-	6	EA
5	PLATE, V-STRING YOKE, 40K	-	-	-	3	EA
6	EYE, Y-CLEVIS, 30K	-	-	-	6	EA
7	CLAMP, SUSPENSION, AL. ALLOY	-	-	-	6	EA
8	ARMOR RODS, ALUMINUM	-	-	-	6	EA
9	BRACKET, TRUNNION	-	-	-	1	EA
10	OPGW TRUNNION CLAMP	-	-	-	1	EA
11	OPGW BONDING WIRE ASSEMBLY	-	-	-	1	EA
12	GROUNDING WIRE, #2 COPPERWELD	-	-	-	20	FT
13	GROUND ROD CLAMP	-	-	-	2	EA
14	GROUNDING ROD, COPPERWELD, 5/8" X 8'	-	-	-	2	EA
15	COMP. TERM. FOR #2 CU TO 2 HOLE NEMA	-	-	-	1	EA

- ALTERNATE MATERIALS MAY BE SUBMITTED FOR REVIEW AND APPROVAL
- QUANTITIES ARE FOR INFORMATION ONLY





OPGW SUSPENSION CLAMP ASSEMBLY
230kV STEEL POLE
(NOT TO SCALE)



INSULATOR ASSEMBLY
POLYMER V-STRING INSULATOR
230kV STEEL STRUCTURE
(NOT TO SCALE)

DESIGN NOTES

1. ALL LOADS ARE ULTIMATE LOADS AND INCLUDE OVERLOAD FACTORS AND WEIGHT OF INSULATORS, AND HARDWARE.
2. UNITS OF ENTRIES ON THE STRUCTURE LOADING TABLE ARE AS FOLLOWS: TRANSVERSE (T), VERTICAL (V), AND LONGITUDINAL (L) LOADS - KIPS; WIND PRESSURE (W) - LBS PER SQ FT.
3. THE TRANSVERSE LOADS (T) INCLUDE WIND REACTIONS ON THE WIRES AND THE TRANSVERSE LOAD DUE TO THE LINE ANGLE.
4. ALL STEEL POLES SHALL BE GALVANIZED STEEL.
5. THE POLE SHALL BE PRECAMBERED IF DEFLECTION EXCEEDS 1.5% OF THE STRUCTURE HEIGHT ABOVE GROUND UNDER LOAD CASE 11 & 16.
6. POLE CAP FOR TRUNNION CLAMP PER SDG&E DWG 17180.
7. CLIMBING AND WORKING STEPS PER SDG&E DWG 17105.
8. POLE GROUNDING PER SDG&E DWG 17135.
9. LOAD CASE 15 BREAKS TWO WIRES:
   (1) OPGW
   (1) TOP 230kV TRANSMISSION PHASE A
10. LOAD FOR CASE 15 SHALL BE APPLIED AT TIP OF CROSSARM.
11. THIS DRAWING SHOWS DESIGN LOADING, DIMENSIONS AND CONFIGURATIONS FOR INFORMATION. REFERENCE FABRICATOR'S CALCULATIONS, AND DRAWINGS FOR FINAL STRUCTURE DESIGN AND DETAILS.

230KV TRANSMISSION LINE
SINGLE CIRCUIT STRUCTURE 1

Kiewit

DRAWING NUMBER
SGL CKT STR1

LOADING TABLE (KIPS)

DESCRIPTION	LOAD	CASE 1	CASE 2	CASE 3	CASE 4	CASE 5	CASE 6	CASE 7	CASE 8	CASE 9	CASE 10	CASE 11	CASE 12	CASE 13	CASE 14	CASE 15	CASE 16	CASE 17	CASE 18
OPGW	T1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	V1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	L1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1272 ACSS "BITTERN"	T3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	V3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	L3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND ON STRUCTURE (PSF)	WIND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

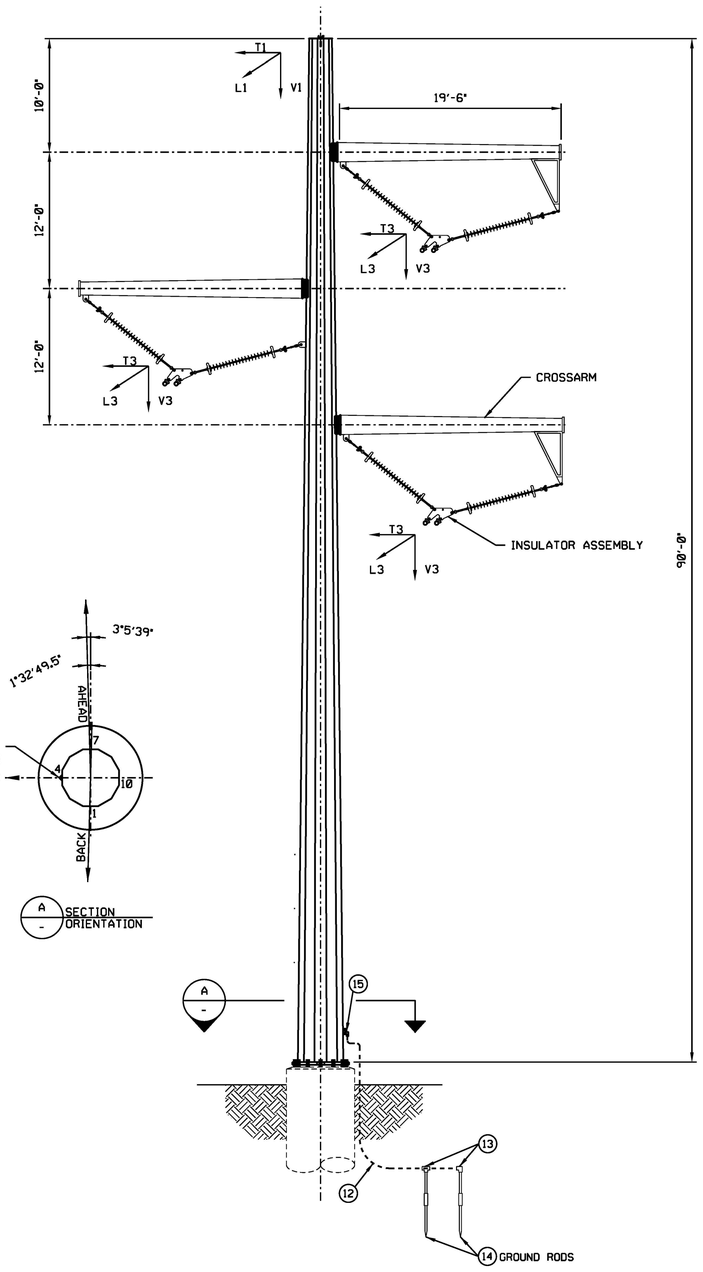
MECHANICAL LOADING CRITERIA

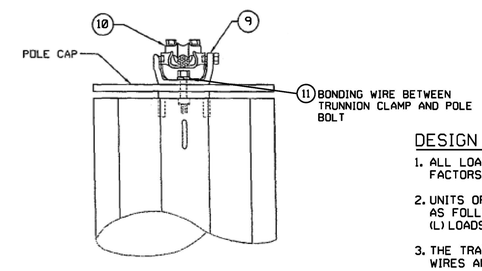
1 - NESC RULE 250B - LIGHT LOADING (INTACT): 9 PSF WIND, 0" ICE, 30 DEG F, INITIAL
LOAD FACTOR: TRANSVERSE=2.5, LONGITUDINAL=1.65, VERTICAL=1.5
2 - NESC RULE 250B - LIGHT LOADING (UPLIFT): 9 PSF WIND, 0" ICE, 30 DEG F, INITIAL
LOAD FACTOR: TRANSVERSE=2.5, LONGITUDINAL=1.65, VERTICAL=1
3 - NESC RULE 250B - LIGHT LOADING (DEADEND): 9 PSF WIND, 0" ICE, 30 DEG F, INITIAL
LOAD FACTOR: TRANSVERSE=2.5, LONGITUDINAL=1.65, VERTICAL=1.5
4 - NESC RULE 250C - EXTREME WIND (INTACT): 18.5 PSF WIND, 0" ICE, 60 DEG F, INITIAL
LOAD FACTOR: 1.0
5 - NESC RULE 250C - EXTREME WIND (DEADEND): 18.5 PSF WIND, 0" ICE, 60 DEG F, INITIAL
LOAD FACTOR: 1.0
6 - NESC RULE 261A - EXTREME WIND (WITHOUT CONDUCTORS): 18.5 PSF WIND, 0" ICE, 60 DEG F
LOAD FACTOR: 1.0
7 - ASCE 74/RUS 1724E-200 RESIDUAL STATIC LOAD (RSL): 0 PSF WIND, 0" ICE, 60 DEG F, INITIAL
LOAD FACTOR: TRANSVERSE=2.5, LONGITUDINAL=1.65, VERTICAL=1.5
8 - ASCE 7-10 EXTREME WIND: 31 PSF WIND, 0" ICE, 60 DEG F, INITIAL
LOAD FACTOR: 1.0
9 - GO-95 LIGHT LOADING (INTACT): 8 PSF WIND, 0" ICE, 25 DEG F, INITIAL
SAFETY FACTOR: 1.5
10 -GO-95 LIGHT LOADING (DEADEND): 8 PSF WIND, 0" ICE, 25 DEG F, INITIAL
SAFETY FACTOR: 1.5
11 - EVERYDAY/PRE-CAMBER: 0 PSF WIND, 0" ICE, 60 DEG F, INITIAL
LOAD FACTOR: 1.0
12 -SDG&E CASE 1 GO-95 LIGHT LOADING (INTACT): 9 PSF WIND, 0" ICE, 25 DEG F, INITIAL
SAFETY FACTOR: 1.5
13 -SDG&E CASE 1A FTZ VERY HIGH: 20 PSF WIND, 0" ICE, 60 DEG F, FINAL
SAFETY FACTOR: 1.5
14 -SDG&E CASE 2A TERMINAL DEADEND: 9 PSF WIND, 0" ICE, 25 DEG F, INITIAL
SAFETY FACTOR: 1.5
15 -SDG&E CASE 2B BROKEN PHASE: 9 PSF WIND, 0" ICE, 25 DEG F, FINAL
SAFETY FACTOR: 1.25
16 -SDG&E CASE 3 CAMBER: 0 PSF WIND, 0" ICE, 60 DEG F, FINAL
SAFETY FACTOR: 1.0
17 -SDG&E CASE 5 STRINGING WIRE: 13 PSF WIND, 0" ICE, 25 DEG F, INITIAL
SAFETY FACTOR: 1.25
CONDUCTORS STRUNG AT 30 DEGREES HORIZONTAL
VERTICAL LOAD OF 1500 LBS
18 -SDG&E ARM DESIGN: 9 PSF WIND, 0" ICE, 25 DEG F, INITIAL
SAFETY FACTOR: 1.25
CONDUCTORS STRUNG AT 30 DEGREES HORIZONTAL
VERTICAL LOAD OF 1500 LBS

BILL OF MATERIALS

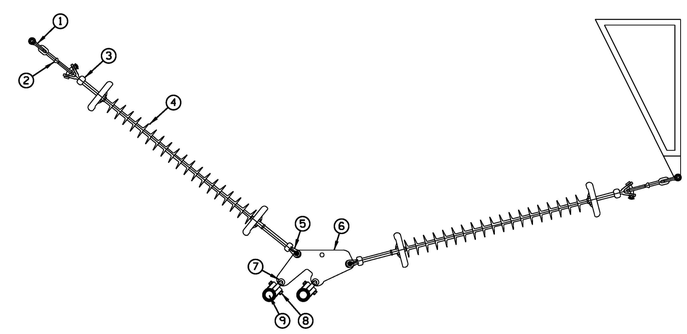
ITEM NO	ITEM DESCRIPTION	MANUFACTURER	CATALOG NO.	PROVIDED BY	MIN QTY	UNITS
1	ANCHOR SHACKLE, 30K	-	-	-	6	EA
2	LINK, CHAIN, 1/2" x 2-1/4", 30K	-	-	-	6	EA
3	Y-CLEVIS, BALL, 50K, ANSI CLASS 52-8/11	-	-	-	6	EA
4	INSULATOR, POLYMER, Y-CLEVIS BALL WITH CORONA RING, 30K	-	-	-	6	EA
5	Y-CLEVIS, SOCKET, 30K	-	-	-	6	EA
6	PLATE, V-STRING YOKE, 40K	-	-	-	3	EA
7	EYE, Y-CLEVIS, 30K	-	-	-	6	EA
8	CLAMP, SUSPENSION, AL. ALLOY	-	-	-	6	EA
9	ARMOR RODS, ALUMINUM	-	-	-	6	EA
10	BRACKET, TRUNNION	-	-	-	1	EA
11	OPGW TRUNNION CLAMP	-	-	-	1	EA
12	OPGW BONDING WIRE ASSEMBLY	-	-	-	1	EA
13	GROUNDING WIRE, #2 COPPERWELD	-	-	-	20	FT
14	GROUND ROD CLAMP	-	-	-	2	EA
15	GROUNDING ROD, COPPERWELD, 5/8" X 8'	-	-	-	2	EA
16	COMP. TERM. FOR #2 CU TO 2 HOLE NEMA	-	-	-	1	EA

- ALTERNATE MATERIALS MAY BE SUBMITTED FOR REVIEW AND APPROVAL
- QUANTITIES ARE FOR INFORMATION ONLY





OPGW SUSPENSION CLAMP ASSEMBLY
230kV STEEL POLE
(NOT TO SCALE)



INSULATOR ASSEMBLY
POLYMER V-STRING INSULATOR
230kV STEEL STRUCTURE
(NOT TO SCALE)

DESIGN NOTES

1. ALL LOADS ARE ULTIMATE LOADS AND INCLUDE OVERLOAD FACTORS AND WEIGHT OF INSULATORS, AND HARDWARE.
2. UNITS OF ENTRIES ON THE STRUCTURE LOADING TABLE ARE AS FOLLOWS: TRANSVERSE (T), VERTICAL (V), AND LONGITUDINAL (L) LOADS - KIPS; WIND PRESSURE (W) - LBS PER SQ FT.
3. THE TRANSVERSE LOADS (T) INCLUDE WIND REACTIONS ON THE WIRES AND THE TRANSVERSE LOAD DUE TO THE LINE ANGLE.
4. ALL STEEL POLES SHALL BE GALVANIZED STEEL.
5. THE POLE SHALL BE PRECAMBERED IF DEFLECTION EXCEEDS 1.5% OF THE STRUCTURE HEIGHT ABOVE GROUND UNDER LOAD CASE 11 & 16.
6. POLE CAP FOR TRUNNION CLAMP PER SDG&E DWG 17180.
7. CLIMBING AND WORKING STEPS PER SDG&E DWG 17105.
8. POLE GROUNDING PER SDG&E DWG 17135.
9. LOAD CASE 15 BREAKS TWO WIRES:
   (1) OPGW
   (1) TOP 230kV TRANSMISSION PHASE A
10. LOAD FOR CASE 15 SHALL BE APPLIED AT TIP OF CROSSARM.
11. THIS DRAWING SHOWS DESIGN LOADING, DIMENSIONS AND CONFIGURATIONS FOR INFORMATION. REFERENCE FABRICATOR'S CALCULATIONS, AND DRAWINGS FOR FINAL STRUCTURE DESIGN AND DETAILS.

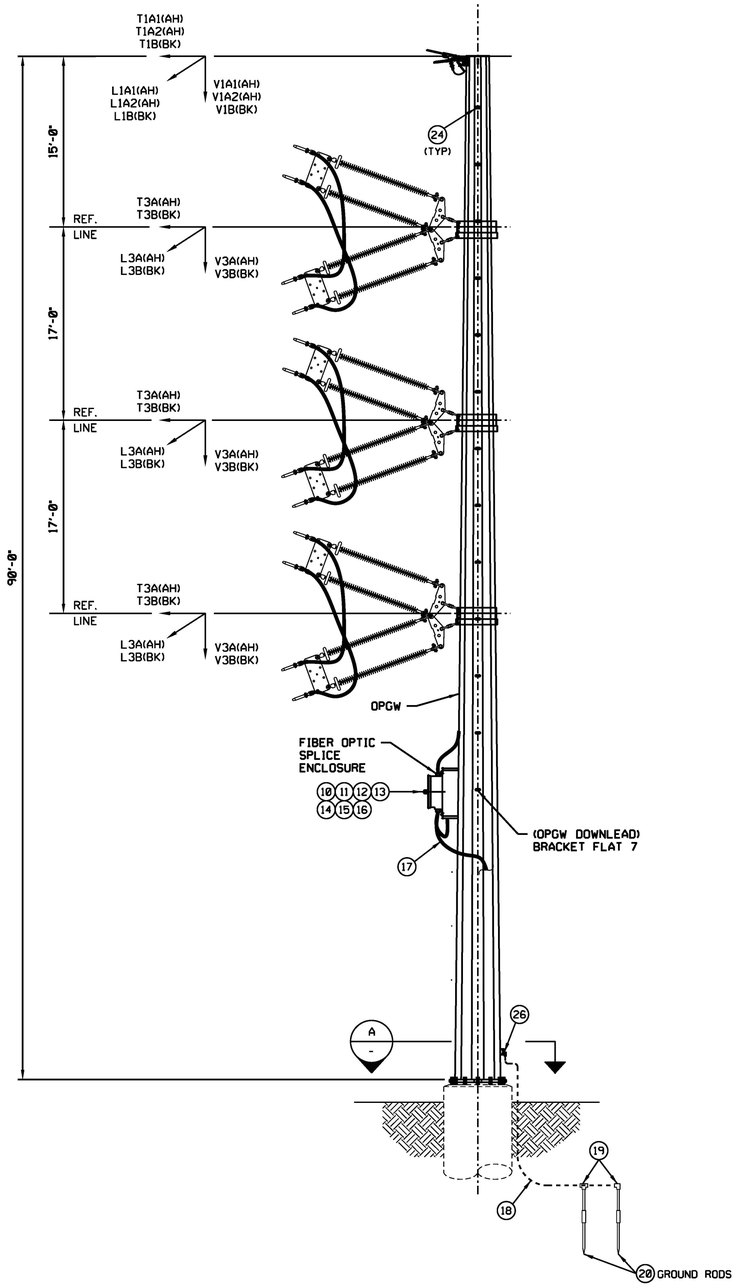
230KV TRANSMISSION LINE
SINGLE CIRCUIT STRUCTURE 2

Kiewit

DRAWING NUMBER
SGL CKT STR2

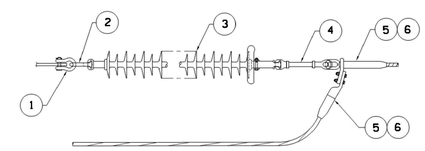
LOADING TABLE (KIPS)

DESCRIPTION	LOAD	CASE 1	CASE 2	CASE 3	CASE 4	CASE 5	CASE 6	CASE 7	CASE 8	CASE 9	CASE 10	CASE 11	CASE 12	CASE 13	CASE 14	CASE 15	CASE 16	CASE 17	CASE 18
OPGW BACK	T1B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	V1B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	L1B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1/2" EHS SHIELD WIRE AHEAD (LOADS SHOWN APPLY TO EACH SHIELD WIRE)	T1A1,2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	V1A1,2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	L1A1,2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1272 ACSS "BITTERN" BACK	T3B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	V3B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	L3B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1272 ACSS "BITTERN" AHEAD	T3A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	V3A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	L3A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WIND ON STRUCTURE (PSF)	WIND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

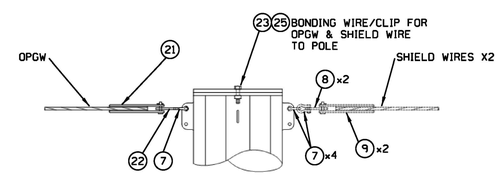


MECHANICAL LOADING CRITERIA

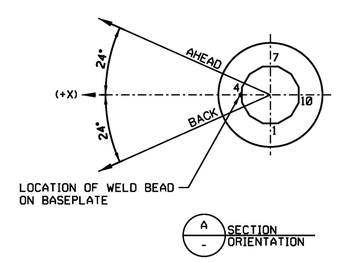
1 - NESC RULE 250B - LIGHT LOADING (INTACT): 9 PSF WIND, 0° ICE, 30 DEG F, INITIAL
LOAD FACTOR: TRANSVERSE=2.5, LONGITUDINAL=1.65, VERTICAL=1.5
2 - NESC RULE 250B - LIGHT LOADING (UPLIFT): 9 PSF WIND, 0° ICE, 30 DEG F, INITIAL
LOAD FACTOR: TRANSVERSE=2.5, LONGITUDINAL=1.65, VERTICAL=1
3 - NESC RULE 250B - LIGHT LOADING (DEADEND): 9 PSF WIND, 0° ICE, 30 DEG F, INITIAL
LOAD FACTOR: TRANSVERSE=2.5, LONGITUDINAL=1.65, VERTICAL=1.5
4 - NESC RULE 250C - EXTREME WIND (INTACT): 18.5 PSF WIND, 0° ICE, 60 DEG F, INITIAL
LOAD FACTOR: 1.0
5 - NESC RULE 250C - EXTREME WIND (DEADEND): 18.5 PSF WIND, 0° ICE, 60 DEG F, INITIAL
LOAD FACTOR: 1.0
6 - NESC RULE 261A - EXTREME WIND (WITHOUT CONDUCTORS): 18.5 PSF WIND, 0° ICE, 60 DEG F
LOAD FACTOR: 1.0
7 - ASCE 74/RUS 1724E-200 RESIDUAL STATIC LOAD (RSL): 0 PSF WIND, 0° ICE, 60 DEG F, INITIAL
LOAD FACTOR: TRANSVERSE=2.5, LONGITUDINAL=1.65, VERTICAL=1.5
8 - ASCE 7-10 EXTREME WIND: 31 PSF WIND, 0° ICE, 60 DEG F, INITIAL
LOAD FACTOR: 1.0
9 - GO-95 LIGHT LOADING (INTACT): 8 PSF WIND, 0° ICE, 25 DEG F, INITIAL
SAFETY FACTOR: 1.5
10 - GO-95 LIGHT LOADING (DEADEND): 8 PSF WIND, 0° ICE, 25 DEG F, INITIAL
SAFETY FACTOR: 1.5
11 - EVERYDAY/PRE-CAMBER: 0 PSF WIND, 0° ICE, 60 DEG F, INITIAL
LOAD FACTOR: 1.0
12 - SDG&E CASE 1 GO-95 LIGHT LOADING (INTACT): 9 PSF WIND, 0° ICE, 25 DEG F, INITIAL
SAFETY FACTOR: 1.5
13 - SDG&E CASE 1A FTZ VERY HIGH: 20 PSF WIND, 0° ICE, 60 DEG F, FINAL
SAFETY FACTOR: 1.5
14 - SDG&E CASE 2A TERMINAL DEADEND: 9 PSF WIND, 0° ICE, 25 DEG F, INITIAL
SAFETY FACTOR: 1.5
15 - SDG&E CASE 2B BROKEN PHASE: 9 PSF WIND, 0° ICE, 25 DEG F, FINAL
SAFETY FACTOR: 1.25
16 - SDG&E CASE 3 CAMBER: 0 PSF WIND, 0° ICE, 60 DEG F, FINAL
SAFETY FACTOR: 1.0
17 - SDG&E CASE 5 STRINGING WIRE: 13 PSF WIND, 0° ICE, 25 DEG F, INITIAL
SAFETY FACTOR: 1.25
CONDUCTORS STRUNG AT 30 DEGREES HORIZONTAL
VERTICAL LOAD OF 1500 LBS
18 - SDG&E ARM DESIGN: 9 PSF WIND, 0° ICE, 25 DEG F, INITIAL
SAFETY FACTOR: 1.25
CONDUCTORS STRUNG AT 30 DEGREES HORIZONTAL
VERTICAL LOAD OF 1500 LBS



INSULATOR ASSEMBLY
POLYMER DEADEND INSULATOR SINGLE CONDUCTOR-ACSR 230KV STEEL STRUCTURE
(NOT TO SCALE)



SHIELD WIRE/OPGW ASSEMBLY
OHGW DEADEND ASSEMBLY
OPGW DEADEND ASSEMBLY
(NOT TO SCALE)



BILL OF MATERIALS

ITEM NO	ITEM DESCRIPTION	MANUFACTURER	CATALOG NO.	PROVIDED BY	MIN QTY	UNITS
1	ANCHOR SHACKLE, 50K	-	-	-	12	EA
2	BALL, OVAL-EYE, 30K	-	-	-	12	EA
3	INSULATOR, SUSPENSION, POLYMER, 102.5-104" LONG, BALL (HOT END) AND SOCKET, WITH CORONA RING, 30K	-	-	-	12	EA
4	Y-CLEVIS, SOCKET, HOTLINE, 30K	-	-	-	12	EA
5	DEADEND, COMPRESSION	-	-	-	12	EA
6	JOINT COMPOUND, 16 OZ. TUBE	-	-	-	4	EA
7	SHACKLE, ANCHOR, 30K	-	-	-	5	EA
8	EXTENSION STRAP, 2-1/2" x 5/8" x 4" LG., GALV. STEEL, 40K	-	-	-	2	EA
9	CLAMP, QUADRANT STRAIN, DUCTILE IRON	-	-	-	2	EA
10	OPGW SPLICE ENCLOSURE	-	-	-	1	EA
11	OPGW COIL BRACKET	-	-	-	1	EA
12	OPGW CONNECTOR KIT	-	-	-	1	EA
13	ADSS CONNECTOR	-	-	-	1	EA
14	POLE BAND MOUNTING BRACKET	-	-	-	2	EA
15	POLE BAND FOR COIL BRACKET	-	-	-	2	EA
16	SPLICE PROTECTOR SLEEVE	-	-	-	5	EA
17	ADSS	-	-	-		
18	GROUNDING WIRE, #2 COPPERWELD	-	-	-	20	FT
19	GROUND ROD CLAMP	-	-	-	2	EA
20	GROUNDING ROD, COPPERWELD, 5/8" X 8'	-	-	-	2	EA
21	OPGW BOLTED DEAD-END	-	-	-	1	EA
22	DEAD END LINK PLATE	-	-	-	1	EA
23	OPGW BONDING WIRE ASSEMBLY	-	-	-	1	EA
24	DOWNLEAD CLAMP, OPGW	-	-	-	15	EA
25	BONDING CLIP FOR SHIELD WIRE FOR 1/2" BOLT	-	-	-	1	EA
26	COMP. TERM. FOR #2 CU TO 2 HOLE NEMA	-	-	-	1	EA

- ALTERNATE MATERIALS MAY BE SUBMITTED FOR REVIEW AND APPROVAL
- QUANTITIES ARE FOR INFORMATION ONLY

DESIGN NOTES

1. ALL LOADS ARE ULTIMATE LOADS AND INCLUDE OVERLOAD FACTORS AND WEIGHT OF INSULATORS, AND HARDWARE.
2. UNITS OF ENTRIES ON THE STRUCTURE LOADING TABLE ARE AS FOLLOWS: TRANSVERSE (T), VERTICAL (V), AND LONGITUDINAL (L) LOADS - KIPS; WIND PRESSURE (W) - LBS PER SQ FT.
3. THE TRANSVERSE LOADS (T) INCLUDE WIND REACTIONS ON THE WIRES AND THE TRANSVERSE LOAD DUE TO THE LINE ANGLE.
4. ALL STEEL POLES SHALL BE GALVANIZED STEEL.
5. THE POLE SHALL BE PRECAMBERED IF DEFLECTION EXCEEDS 1.5% OF THE STRUCTURE HEIGHT ABOVE GROUND UNDER LOAD CASE 11 & 16.
6. POLE CAP FOR TRUNNION CLAMP PER SDG&E DWG 17180.
7. CLIMBING AND WORKING STEPS PER SDG&E DWG 17105.
8. POLE GROUNDING PER SDG&E DWG 17135.
9. LOAD CASE 15 BREAKS TWO WIRES:
   (1) OPGW
   (1) TOP 230kV TRANSMISSION PHASE A
10. LOAD FOR CASE 15 SHALL BE APPLIED AT TIP OF CROSSARM.
11. THIS DRAWING SHOWS DESIGN LOADING, DIMENSIONS AND CONFIGURATIONS FOR INFORMATION. REFERENCE FABRICATOR'S CALCULATIONS, AND DRAWINGS FOR FINAL STRUCTURE DESIGN AND DETAILS.

230KV TRANSMISSION LINE
SINGLE CIRCUIT STRUCTURE 3

Kiewit

DRAWING NUMBER
SGL CKT STR3

No Assembly drawings have been created for structure 4.

PLS-CADD REPORT

Hydrostor Willow Rock Energy Storage Center
EMF Calculation

PLS-Cadd with 5% OLF on Voltage

Hydrostor Willow Rock Energy Storage Center
EMF Calculation

PLS-CADD Version 19.01x64 11:45:41 AM Tuesday, May 21, 2024
Kiewit
Project Name: 'X:\PD\Users\Matthew Boushka\EMF Calcs R0\EMF Calcs.don'
Line Title: 'Test Structures'

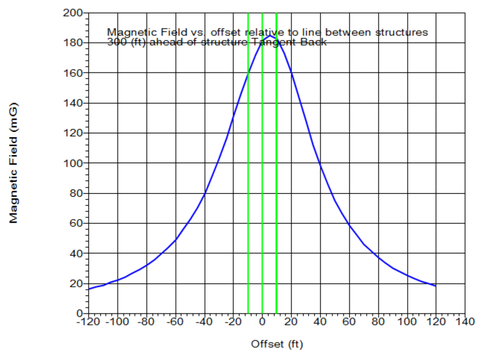
3D EMF Calculation Notes:
1) Calculations based on the EPRI Red Book methods (3rd Edition, 2005 - 7.4 Calculation of Magnetic Fields and Appendices 7.1 Calculation of Field Ellipse Parameters and 7.6 Electric Field Calculations for 3D Geometry).
2) All wire positions are modeled at the specified weather case and wind direction. Height above ground determined by the modeled ground TIN.
3) Only the effects of wires are being analyzed. The effects of structures are not included unless enabled as noted below.
4) Ground return is being ignored for magnetic field calculations.

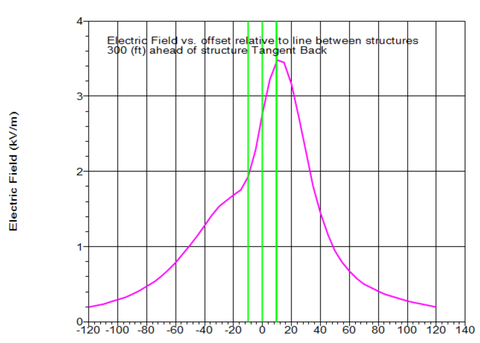
Meter height above ground:	3.28	(ft)
Maximum wire distance:	500.00	(ft)
Maximum cable segment size:	9.80	(ft)
Cross section offset +/-:	120.00	(ft)
Result interval:	5.00	(ft)
Overvoltage Percentage:	5%	
Electric field limit:	0.00	(kV/m)
Magnetic field limit:	0.00	(mG)
Space potential limit:	0.00	(kV)
Contour Map Spacing:	15	(ft)
Analyzing spans between these structures:	Structure 1, 600 ft - Structure 5, 900 ft	

One or more sections have wind from both directions which is not supported. A wind direction of left is being used for those sections.

Section Data for 3D EMF Results:

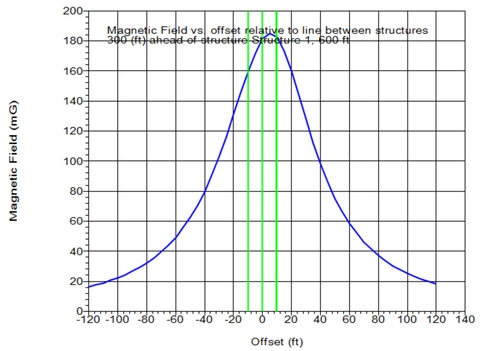
Section Number	Section Note	Voltage Ph-Ph (kV)	Current (Amps)	Cable Filename	Cable Description	Conductors Per Phase	Bundle Diameter (in)	Cable Radius (in)	Weather Case	Condition	Wind Dir.	WC Temperature (deg F)	Effective Radius (in)
1		0.0	0.0	AC-65-65-724.wir	AFL OPGW 48 Fiber AlumaCore AC-65/65/724	1	0.000	0.362	60°F	Creep RS	Left	60.000	0.362
2		0.0	0.0	AC-65-65-724.wir	AFL OPGW 48 Fiber AlumaCore AC-65/65/724	1	0.000	0.362	60°F	Creep RS	Left	60.000	0.362
3		0.0	0.0	AC-65-65-724.wir	AFL OPGW 48 Fiber AlumaCore AC-65/65/724	1	0.000	0.362	60°F	Creep RS	Left	60.000	0.362
4		0.0	0.0	AC-65-65-724.wir	AFL OPGW 48 Fiber AlumaCore AC-65/65/724	1	0.000	0.362	60°F	Creep RS	Left	60.000	0.362
5		0.0	0.0	AC-65-65-724 - Long.wir	AFL OPGW 48 Fiber AlumaCore AC-65/65/724	1	0.000	0.362	60°F	Creep RS	Left	60.000	0.362
6		0.0	0.0	AC-65-65-724.wir	AFL OPGW 48 Fiber AlumaCore AC-65/65/724	1	0.000	0.362	60°F	Creep RS	Left	60.000	0.362
7		0.0	0.0	AC-65-65-724 - Long.wir	AFL OPGW 48 Fiber AlumaCore AC-65/65/724	1	0.000	0.362	60°F	Creep RS	Left	60.000	0.362
8		0.0	0.0	AC-65-65-724.wir	AFL OPGW 48 Fiber AlumaCore AC-65/65/724	1	0.000	0.362	60°F	Creep RS	Left	60.000	0.362
9		0.0	0.0	AC-65-65-724 - Long.wir	AFL OPGW 48 Fiber AlumaCore AC-65/65/724	1	0.000	0.362	60°F	Creep RS	Left	60.000	0.362
10		0.0	0.0	AC-65-65-724.wir	AFL OPGW 48 Fiber AlumaCore AC-65/65/724	1	0.000	0.362	60°F	Creep RS	Left	60.000	0.362
11		0.0	0.0	AC-65-65-724.wir	AFL OPGW 48 Fiber AlumaCore AC-65/65/724	1	0.000	0.362	60°F	Creep RS	Left	60.000	0.362
12		0.0	0.0	AC-65-65-724 - Long.wir	AFL OPGW 48 Fiber AlumaCore AC-65/65/724	1	0.000	0.362	60°F	Creep RS	Left	60.000	0.362
13		0.0	0.0	AC-65-65-724.wir	AFL OPGW 48 Fiber AlumaCore AC-65/65/724	1	0.000	0.362	60°F	Creep RS	Left	60.000	0.362
14		0.0	0.0	AC-65-65-724.wir	AFL OPGW 48 Fiber AlumaCore AC-65/65/724	1	0.000	0.362	60°F	Creep RS	Left	60.000	0.362
15		0.0	0.0	AC-65-65-724 - Long.wir	AFL OPGW 48 Fiber AlumaCore AC-65/65/724	1	0.000	0.362	60°F	Creep RS	Left	60.000	0.362
16		241.5	1474.0	FALCON ACSR (S1-600).wir 1590.0 kcmil 54/19 Falcon/ACSR/GA2 - General Cable	[Chart A19/C54/0.8875] Conductor Type 13	2	18.000	0.773	Maximum Operating ACSR (250 °F)	Creep RS	Left	250.000	3.729
17		241.5	1474.0	FALCON ACSR (S2-600).wir 1590.0 kcmil 54/19 Falcon/ACSR/GA2 - General Cable	[Chart A19/C54/0.8875] Conductor Type 13	2	18.000	0.773	Maximum Operating ACSR (250 °F)	Creep RS	Left	250.000	3.729
18		241.5	1474.0	FALCON ACSR (S3-600).wir 1590.0 kcmil 54/19 Falcon/ACSR/GA2 - General Cable	[Chart A19/C54/0.8875] Conductor Type 13	2	18.000	0.773	Maximum Operating ACSR (250 °F)	Creep RS	Left	250.000	3.729
19		241.5	1474.0	FALCON ACSR (S1-450).wir 1590.0 kcmil 54/19 Falcon/ACSR/GA2 - General Cable	[Chart A19/C54/0.8875] Conductor Type 13	2	18.000	0.773	Maximum Operating ACSR (250 °F)	Creep RS	Left	250.000	3.729
20		241.5	1474.0	FALCON ACSR (S1-900).wir 1590.0 kcmil 54/19 Falcon/ACSR/GA2 - General Cable	[Chart A19/C54/0.8875] Conductor Type 13	2	18.000	0.773	Maximum Operating ACSR (250 °F)	Creep RS	Left	250.000	3.729
21		241.5	1474.0	FALCON ACSR (S2-450).wir 1590.0 kcmil 54/19 Falcon/ACSR/GA2 - General Cable	[Chart A19/C54/0.8875] Conductor Type 13	2	18.000	0.773	Maximum Operating ACSR (250 °F)	Creep RS	Left	250.000	3.729
22		241.5	1474.0	FALCON ACSR (S2-900).wir 1590.0 kcmil 54/19 Falcon/ACSR/GA2 - General Cable	[Chart A19/C54/0.8875] Conductor Type 13	2	18.000	0.773	Maximum Operating ACSR (250 °F)	Creep RS	Left	250.000	3.729
23		241.5	1474.0	FALCON ACSR (S3-450).wir 1590.0 kcmil 54/19 Falcon/ACSR/GA2 - General Cable	[Chart A19/C54/0.8875] Conductor Type 13	2	18.000	0.773	Maximum Operating ACSR (250 °F)	Creep RS	Left	250.000	3.729
24		241.5	1474.0	FALCON ACSR (S3-900).wir 1590.0 kcmil 54/19 Falcon/ACSR/GA2 - General Cable	[Chart A19/C54/0.8875] Conductor Type 13	2	18.000	0.773	Maximum Operating ACSR (250 °F)	Creep RS	Left	250.000	3.729
25		241.5	1474.0	FALCON ACSR (S4-450).wir 1590.0 kcmil 54/19 Falcon/ACSR/GA2 - General Cable	[Chart A19/C54/0.8875] Conductor Type 13	2	18.000	0.773	Maximum Operating ACSR (250 °F)	Creep RS	Left	250.000	3.729
26		241.5	1474.0	FALCON ACSR (S4-600).wir 1590.0 kcmil 54/19 Falcon/ACSR/GA2 - General Cable	[Chart A19/C54/0.8875] Conductor Type 13	2	18.000	0.773	Maximum Operating ACSR (250 °F)	Creep RS	Left	250.000	3.729
27		241.5	1474.0	FALCON ACSR (S4-900).wir 1590.0 kcmil 54/19 Falcon/ACSR/GA2 - General Cable	[Chart A19/C54/0.8875] Conductor Type 13	2	18.000	0.773	Maximum Operating ACSR (250 °F)	Creep RS	Left	250.000	3.729
28		241.5	1474.0	FALCON ACSR (S5-450).wir 1590.0 kcmil 54/19 Falcon/ACSR/GA2 - General Cable	[Chart A19/C54/0.8875] Conductor Type 13	2	18.000	0.773	Maximum Operating ACSR (250 °F)	Creep RS	Left	250.000	3.729
29		241.5	1474.0	FALCON ACSR (S5-600).wir 1590.0 kcmil 54/19 Falcon/ACSR/GA2 - General Cable	[Chart A19/C54/0.8875] Conductor Type 13	2	18.000	0.773	Maximum Operating ACSR (250 °F)	Creep RS	Left	250.000	3.729
30		241.5	1474.0	FALCON ACSR (S5-900).wir 1590.0 kcmil 54/19 Falcon/ACSR/GA2 - General Cable	[Chart A19/C54/0.8875] Conductor Type 13	2	18.000	0.773	Maximum Operating ACSR (250 °F)	Creep RS	Left	250.000	3.729
31		0.0	0.0	AC-65-65-724.wir	AFL OPGW 48 Fiber AlumaCore AC-65/65/724	1	0.000	0.362	60°F	Creep RS	Left	60.000	0.362
32		0.0	0.0	AC-65-65-724.wir	AFL OPGW 48 Fiber AlumaCore AC-65/65/724	1	0.000	0.362	60°F	Creep RS	Left	60.000	0.362
33		0.0	0.0	AC-65-65-724 - Long.wir	AFL OPGW 48 Fiber AlumaCore AC-65/65/724	1	0.000	0.362	60°F	Creep RS	Left	60.000	0.362
34		0.0	0.0	AC-65-65-724.wir	AFL OPGW 48 Fiber AlumaCore AC-65/65/724	1	0.000	0.362	60°F	Creep RS	Left	60.000	0.362
35		0.0	0.0	AC-65-65-724.wir	AFL OPGW 48 Fiber AlumaCore AC-65/65/724	1	0.000	0.362	60°F	Creep RS	Left	60.000	0.362
36		0.0	0.0	AC-65-65-724 - Long.wir	AFL OPGW 48 Fiber AlumaCore AC-65/65/724	1	0.000	0.362	60°F	Creep RS	Left	60.000	0.362
37		241.5	1474.0	FALCON ACSR (S3-600).wir 1590.0 kcmil 54/19 Falcon/ACSR/GA2 - General Cable	[Chart A19/C54/0.8875] Conductor Type 13	2	18.000	0.773	Maximum Operating ACSR (250 °F)	Creep RS	Left	250.000	3.729
38		241.5	1474.0	FALCON ACSR (S3-450).wir 1590.0 kcmil 54/19 Falcon/ACSR/GA2 - General Cable	[Chart A19/C54/0.8875] Conductor Type 13	2	18.000	0.773	Maximum Operating ACSR (250 °F)	Creep RS	Left	250.000	3.729
39		241.5	1474.0	FALCON ACSR (S3-900).wir 1590.0 kcmil 54/19 Falcon/ACSR/GA2 - General Cable	[Chart A19/C54/0.8875] Conductor Type 13	2	18.000	0.773	Maximum Operating ACSR (250 °F)	Creep RS	Left	250.000	3.729
40		241.5	1474.0	FALCON ACSR (S5-450).wir 1590.0 kcmil 54/19 Falcon/ACSR/GA2 - General Cable	[Chart A19/C54/0.8875] Conductor Type 13	2	18.000	0.773	Maximum Operating ACSR (250 °F)	Creep RS	Left	250.000	3.729
41		241.5	1474.0	FALCON ACSR (S5-600).wir 1590.0 kcmil 54/19 Falcon/ACSR/GA2 - General Cable	[Chart A19/C54/0.8875] Conductor Type 13	2	18.000	0.773	Maximum Operating ACSR (250 °F)	Creep RS	Left	250.000	3.729
42		241.5	1474.0	FALCON ACSR (S5-900).wir 1590.0 kcmil 54/19 Falcon/ACSR/GA2 - General Cable	[Chart A19/C54/0.8875] Conductor Type 13	2	18.000	0.773	Maximum Operating ACSR (250 °F)	Creep RS	Left	250.000	3.729

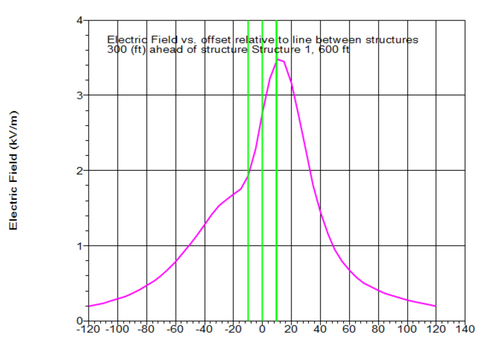




3D EMF Point Results Span from Tangent Back to Structure 1, 600 ft:

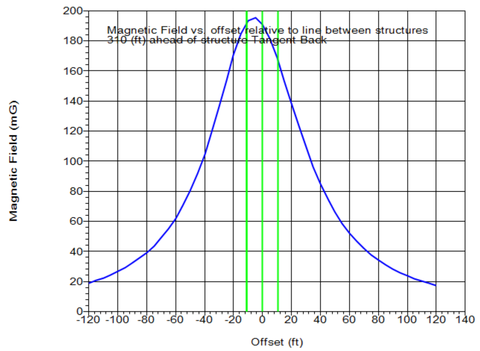
Measurement X (ft)	Y (ft)	Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	E Real (kV/m)	E Imaginary (kV/m)	E Angle (deg)	E Magnitude (kV/m)	E Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
880.0	700.0	1003.3	10.914	12.063	47.9	16.267	83.6	1.295	0.166	0.109	33.3	0.198	1.6	-0.165	-0.108	33.2	0.198
885.0	700.0	1003.3	11.805	12.972	47.7	17.540	83.5	1.396	0.179	0.124	34.7	0.218	1.7	-0.179	-0.124	34.7	0.218
890.0	700.0	1003.3	12.805	13.983	47.5	18.960	83.4	1.509	0.194	0.142	36.2	0.240	1.8	-0.194	-0.142	36.2	0.240
895.0	700.0	1003.3	13.929	15.109	47.3	20.550	83.2	1.635	0.211	0.163	37.8	0.266	1.8	-0.210	-0.163	37.7	0.266
900.0	700.0	1003.3	15.200	16.369	47.1	22.338	82.8	1.778	0.229	0.188	39.4	0.296	1.9	-0.229	-0.187	39.3	0.296
905.0	700.0	1003.3	16.642	17.783	46.9	24.355	82.4	1.938	0.249	0.217	41.0	0.331	2.0	-0.249	-0.217	41.0	0.330
910.0	700.0	1003.3	18.285	19.373	46.7	26.640	81.9	2.120	0.272	0.251	42.7	0.371	2.0	-0.272	-0.251	42.7	0.370
915.0	700.0	1003.3	20.168	21.169	46.4	29.238	81.2	2.327	0.297	0.292	44.5	0.417	2.1	-0.297	-0.292	44.5	0.416
920.0	700.0	1003.3	22.334	23.202	46.1	32.205	80.4	2.563	0.325	0.341	46.3	0.471	2.2	-0.325	-0.340	46.3	0.470
925.0	700.0	1003.3	24.841	25.509	45.8	35.606	79.4	2.833	0.355	0.398	48.3	0.534	2.3	-0.355	-0.397	48.2	0.533
930.0	700.0	1003.3	27.754	28.133	45.4	39.519	78.3	3.145	0.388	0.466	50.2	0.606	2.4	-0.387	-0.465	50.2	0.605
935.0	700.0	1003.3	31.158	31.119	45.0	44.037	77.0	3.504	0.422	0.547	52.3	0.691	2.5	-0.421	-0.545	52.3	0.689
940.0	700.0	1003.3	35.154	34.518	44.5	49.268	75.5	3.921	0.457	0.642	54.5	0.788	2.7	-0.456	-0.640	54.5	0.786
945.0	700.0	1003.3	39.864	38.380	43.9	55.337	73.8	4.404	0.490	0.752	56.9	0.898	2.9	-0.489	-0.750	56.9	0.895
950.0	700.0	1003.3	45.433	42.749	43.3	62.383	71.9	4.964	0.518	0.879	59.5	1.020	3.2	-0.516	-0.876	59.5	1.017
955.0	700.0	1003.3	52.026	47.650	42.5	70.550	69.8	5.614	0.535	1.021	62.4	1.153	3.7	-0.531	-1.017	62.4	1.148
960.0	700.0	1003.3	59.822	53.077	41.6	79.974	67.5	6.364	0.530	1.176	65.7	1.290	4.4	-0.524	-1.170	65.9	1.282
965.0	700.0	1003.3	68.995	58.962	40.5	90.757	65.0	7.222	0.491	1.333	69.8	1.421	5.5	-0.481	-1.326	70.1	1.411
970.0	700.0	1003.3	79.679	65.150	39.3	102.924	62.4	8.190	0.402	1.481	74.8	1.535	7.3	-0.379	-1.472	75.5	1.520
975.0	700.0	1003.3	91.908	71.369	37.8	116.364	59.8	9.260	0.262	1.599	80.7	1.620	10.1	-0.194	-1.586	83.0	1.598
980.0	700.0	1003.3	105.531	77.220	36.2	130.766	57.2	10.406	0.256	1.661	81.3	1.680	14.4	0.105	-1.646	-86.4	1.649
985.0	700.0	1003.3	120.108	82.211	34.4	145.549	54.7	11.582	0.622	1.644	69.3	1.758	19.2	0.540	-1.626	-71.6	1.714
990.0	700.0	1003.3	134.793	85.838	32.5	159.804	52.5	12.717	1.185	1.533	52.3	1.938	21.3	1.116	-1.512	-53.6	1.879
995.0	700.0	1003.3	148.248	87.706	30.6	172.249	50.8	13.707	1.865	1.328	35.5	2.289	18.0	1.796	-1.304	-36.0	2.220
1000.0	700.0	1003.3	158.654	87.631	28.9	181.246	49.6	14.423	2.562	1.051	22.3	2.770	12.8	2.491	-1.022	-22.3	2.693
1005.0	700.0	1003.3	164.024	85.678	27.6	185.053	48.9	14.726	3.138	0.735	13.2	3.223	8.7	3.065	-0.700	-12.9	3.144
1010.0	700.0	1003.3	162.941	82.125	26.7	182.468	48.9	14.520	3.454	0.426	7.0	3.480	6.3	3.382	-0.374	-6.3	3.403
1015.0	700.0	1003.3	155.402	77.372	26.5	173.598	49.4	13.814	3.443	0.194	3.2	3.449	5.2	3.380	-0.078	-1.3	3.381
1020.0	700.0	1003.3	142.972	71.855	26.7	160.013	50.2	12.733	3.152	0.227	4.1	3.160	5.0	3.101	0.168	3.1	3.105
1025.0	700.0	1003.3	127.988	65.974	27.3	143.992	51.4	11.459	2.694	0.378	8.0	2.720	5.4	2.656	0.355	7.6	2.679
1030.0	700.0	1003.3	112.543	60.055	28.1	127.564	52.8	10.151	2.188	0.497	12.8	2.244	6.2	2.161	0.485	12.6	2.214
1035.0	700.0	1003.3	97.989	54.335	29.0	112.045	54.3	8.916	1.715	0.571	18.4	1.808	7.1	1.695	0.563	18.4	1.787
1040.0	700.0	1003.3	84.975	48.968	30.0	98.075	55.8	7.805	1.311	0.607	24.8	1.445	8.0	1.297	0.602	24.9	1.430
1045.0	700.0	1003.3	73.681	44.040	30.9	85.839	57.4	6.831	0.986	0.614	31.9	1.161	8.6	0.975	0.611	32.1	1.151
1050.0	700.0	1003.3	64.035	39.582	31.7	75.281	58.9	5.991	0.732	0.602	39.4	0.947	8.9	0.724	0.599	39.6	0.940
1055.0	700.0	1003.3	55.860	35.594	32.5	66.236	60.4	5.271	0.537	0.576	47.0	0.788	8.7	0.532	0.574	47.2	0.782
1060.0	700.0	1003.3	48.948	32.049	33.2	58.507	61.9	4.656	0.391	0.543	54.3	0.669	8.2	0.386	0.541	54.5	0.665
1065.0	700.0	1003.3	43.101	28.913	33.9	51.901	63.3	4.130	0.280	0.506	61.0	0.578	7.5	0.277	0.505	61.3	0.576
1070.0	700.0	1003.3	38.142	26.145	34.4	46.243	64.6	3.680	0.198	0.468	67.1	0.508	6.7	0.195	0.467	67.3	0.506
1075.0	700.0	1003.3	33.920	23.703	34.9	41.381	65.9	3.293	0.136	0.431	72.4	0.452	5.9	0.134	0.430	72.7	0.450
1080.0	700.0	1003.3	30.309	21.548	35.4	37.188	67.2	2.959	0.090	0.395	77.1	0.405	5.1	0.088	0.395	77.4	0.404
1085.0	700.0	1003.3	27.206	19.645	35.8	33.557	68.4	2.670	0.056	0.362	81.2	0.366	4.4	0.054	0.361	81.5	0.365
1090.0	700.0	1003.3	24.527	17.961	36.2	30.400	69.5	2.419	0.031	0.331	84.6	0.333	3.9	0.028	0.331	85.1	0.332
1095.0	700.0	1003.3	22.202	16.467	36.6	27.642	70.6	2.200	0.014	0.303	87.4	0.303	3.4	0.009	0.303	88.2	0.303
1100.0	700.0	1003.3	20.175	15.139	36.9	25.223	71.7	2.007	0.010	0.277	88.0	0.278	3.0	-0.005	0.277	-89.0	0.277
1105.0	700.0	1003.3	18.399	13.955	37.2	23.092	72.7	1.838	0.017	0.254	86.3	0.255	2.7	-0.015	0.254	-86.6	0.254
1110.0	700.0	1003.3	16.836	12.897	37.5	21.208	73.7	1.688	0.023	0.233	84.3	0.234	2.4	-0.023	0.233	-84.4	0.234
1115.0	700.0	1003.3	15.455	11.949	37.7	19.535	74.6	1.555	0.029	0.214	82.4	0.216	2.1	-0.028	0.214	-82.5	0.216
1120.0	700.0	1003.3	14.229	11.096	37.9	18.044	75.5	1.436	0.032	0.197	80.7	0.200	1.9	-0.032	0.197	-80.7	0.200

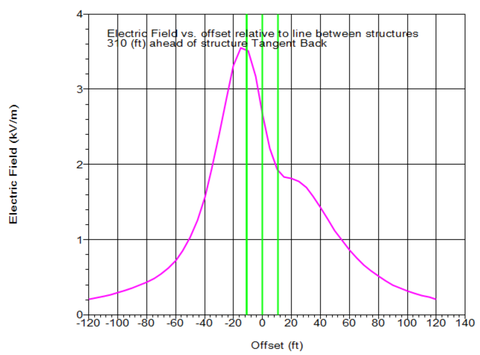




3D EMF Point Results Span from Structure 1, 600 ft to Tangent Ahead:

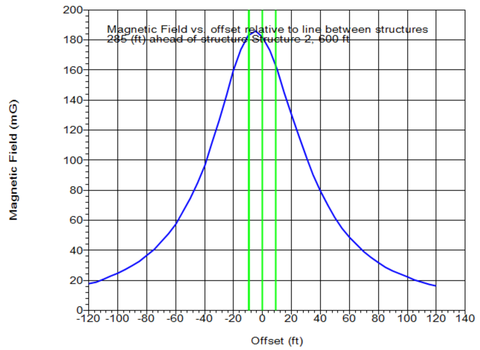
Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
880.0	1300.0	1003.3	10.914	12.063	47.9	16.267	83.6	1.295	0.166	0.109	33.3	0.198	1.6	-0.165	-0.108	33.2	0.198
885.0	1300.0	1003.3	11.805	12.972	47.7	17.540	83.5	1.396	0.179	0.124	34.7	0.218	1.7	-0.179	-0.124	34.7	0.218
890.0	1300.0	1003.3	12.805	13.982	47.5	18.960	83.4	1.509	0.194	0.142	36.2	0.240	1.8	-0.194	-0.142	36.2	0.240
895.0	1300.0	1003.3	13.929	15.109	47.3	20.550	83.2	1.635	0.211	0.163	37.7	0.266	1.8	-0.210	-0.163	37.7	0.266
900.0	1300.0	1003.3	15.200	16.369	47.1	22.338	82.8	1.778	0.229	0.188	39.3	0.296	1.9	-0.229	-0.187	39.3	0.296
905.0	1300.0	1003.3	16.642	17.782	46.9	24.355	82.4	1.938	0.249	0.217	41.0	0.331	2.0	-0.249	-0.217	41.0	0.330
910.0	1300.0	1003.3	18.286	19.373	46.7	26.640	81.9	2.120	0.272	0.251	42.7	0.371	2.0	-0.272	-0.251	42.7	0.370
915.0	1300.0	1003.3	20.168	21.169	46.4	29.238	81.2	2.327	0.297	0.292	44.5	0.417	2.1	-0.297	-0.292	44.5	0.416
920.0	1300.0	1003.3	22.335	23.202	46.1	32.205	80.4	2.563	0.325	0.341	46.3	0.471	2.2	-0.325	-0.340	46.3	0.470
925.0	1300.0	1003.3	24.841	25.509	45.8	35.606	79.4	2.833	0.355	0.398	48.2	0.533	2.3	-0.355	-0.397	48.2	0.533
930.0	1300.0	1003.3	27.754	28.132	45.4	39.519	78.3	3.145	0.388	0.466	50.2	0.606	2.4	-0.387	-0.465	50.2	0.605
935.0	1300.0	1003.3	31.158	31.118	45.0	44.036	77.0	3.504	0.422	0.547	52.3	0.691	2.5	-0.421	-0.545	52.3	0.689
940.0	1300.0	1003.3	35.154	34.518	44.5	49.268	75.5	3.921	0.457	0.641	54.5	0.788	2.7	-0.456	-0.640	54.5	0.786
945.0	1300.0	1003.3	39.865	38.380	43.9	55.337	73.8	4.404	0.490	0.752	56.9	0.898	2.9	-0.489	-0.750	56.9	0.895
950.0	1300.0	1003.3	45.433	42.748	43.3	62.383	71.9	4.964	0.518	0.879	59.5	1.020	3.2	-0.516	-0.876	59.5	1.017
955.0	1300.0	1003.3	52.026	47.650	42.5	70.549	69.8	5.614	0.535	1.021	62.4	1.153	3.7	-0.531	-1.017	62.4	1.148
960.0	1300.0	1003.3	59.822	53.076	41.6	79.974	67.5	6.364	0.530	1.175	65.7	1.289	4.4	-0.524	-1.170	65.9	1.282
965.0	1300.0	1003.3	68.996	58.962	40.5	90.757	65.0	7.222	0.491	1.333	69.8	1.421	5.5	-0.481	-1.326	70.1	1.411
970.0	1300.0	1003.3	79.680	65.150	39.3	102.924	62.4	8.190	0.402	1.481	74.8	1.535	7.3	-0.379	-1.472	75.5	1.520
975.0	1300.0	1003.3	91.908	71.369	37.8	116.364	59.8	9.260	0.262	1.598	80.7	1.620	10.1	-0.194	-1.586	83.0	1.598
980.0	1300.0	1003.3	105.531	77.220	36.2	130.766	57.2	10.406	0.255	1.661	81.3	1.680	14.4	0.105	-1.646	-86.4	1.649
985.0	1300.0	1003.3	120.108	82.211	34.4	145.549	54.7	11.582	0.621	1.644	69.3	1.758	19.2	0.540	-1.626	-71.6	1.714
990.0	1300.0	1003.3	134.793	85.838	32.5	159.804	52.5	12.717	1.185	1.533	52.3	1.937	21.2	1.116	-1.512	-53.6	1.879
995.0	1300.0	1003.3	148.248	87.706	30.6	172.249	50.8	13.707	1.864	1.328	35.5	2.289	18.0	1.796	-1.304	-36.0	2.220
1000.0	1300.0	1003.3	158.654	87.630	28.9	181.246	49.6	14.423	2.562	1.051	22.3	2.769	12.7	2.491	-1.022	-22.3	2.693
1005.0	1300.0	1003.3	164.024	85.678	27.6	185.053	48.9	14.726	3.138	0.735	13.2	3.223	8.7	3.065	-0.700	-12.9	3.144
1010.0	1300.0	1003.3	162.941	82.125	26.7	182.467	48.9	14.520	3.454	0.425	7.0	3.480	6.2	3.382	-0.374	-6.3	3.403
1015.0	1300.0	1003.3	155.401	77.372	26.5	173.597	49.4	13.814	3.443	0.194	3.2	3.449	5.1	3.380	-0.078	-1.3	3.381
1020.0	1300.0	1003.3	142.971	71.855	26.7	160.013	50.2	12.733	3.152	0.227	4.1	3.160	5.0	3.101	0.168	3.1	3.105
1025.0	1300.0	1003.3	127.988	65.974	27.3	143.991	51.4	11.458	2.694	0.378	8.0	2.720	5.4	2.656	0.355	7.6	2.679
1030.0	1300.0	1003.3	112.542	60.055	28.1	127.563	52.8	10.151	2.188	0.497	12.8	2.244	6.2	2.161	0.485	12.6	2.214
1035.0	1300.0	1003.3	97.988	54.335	29.0	112.045	54.3	8.916	1.715	0.571	18.4	1.808	7.1	1.695	0.563	18.4	1.787
1040.0	1300.0	1003.3	84.975	48.968	30.0	98.074	55.8	7.805	1.311	0.607	24.8	1.445	8.0	1.297	0.602	24.9	1.430
1045.0	1300.0	1003.3	73.680	44.040	30.9	85.839	57.4	6.831	0.986	0.614	31.9	1.161	8.6	0.975	0.611	32.1	1.151
1050.0	1300.0	1003.3	64.034	39.583	31.7	75.281	58.9	5.991	0.731	0.602	39.4	0.947	8.9	0.724	0.599	39.6	0.940
1055.0	1300.0	1003.3	55.859	35.594	32.5	66.236	60.4	5.271	0.537	0.576	47.0	0.788	8.7	0.532	0.574	47.2	0.782
1060.0	1300.0	1003.3	48.948	32.049	33.2	58.507	61.9	4.656	0.390	0.543	54.3	0.668	8.2	0.386	0.541	54.5	0.665
1065.0	1300.0	1003.3	43.101	28.913	33.9	51.901	63.3	4.130	0.280	0.506	61.0	0.578	7.5	0.277	0.505	61.3	0.576
1070.0	1300.0	1003.3	38.142	26.145	34.4	46.242	64.6	3.680	0.198	0.468	67.1	0.508	6.7	0.195	0.467	67.3	0.506
1075.0	1300.0	1003.3	33.920	23.703	34.9	41.381	65.9	3.293	0.136	0.431	72.4	0.452	5.8	0.134	0.430	72.7	0.450
1080.0	1300.0	1003.3	30.309	21.548	35.4	37.188	67.2	2.959	0.090	0.395	77.1	0.405	5.1	0.088	0.395	77.4	0.404
1085.0	1300.0	1003.3	27.206	19.645	35.8	33.557	68.4	2.670	0.056	0.362	81.2	0.366	4.4	0.054	0.361	81.5	0.365
1090.0	1300.0	1003.3	24.527	17.961	36.2	30.400	69.5	2.419	0.031	0.331	84.6	0.333	3.9	0.028	0.331	85.1	0.332
1095.0	1300.0	1003.3	22.202	16.467	36.6	27.642	70.6	2.200	0.014	0.303	87.4	0.303	3.4	0.009	0.303	88.2	0.303
1100.0	1300.0	1003.3	20.175	15.139	36.9	25.223	71.7	2.007	0.010	0.277	88.0	0.278	3.0	-0.005	0.277	-89.0	0.277
1105.0	1300.0	1003.3	18.399	13.955	37.2	23.092	72.7	1.838	0.017	0.254	86.3	0.255	2.7	-0.015	0.254	-86.6	0.254
1110.0	1300.0	1003.3	16.836	12.897	37.5	21.208	73.7	1.688	0.023	0.233	84.2	0.234	2.4	-0.023	0.233	-84.4	0.234
1115.0	1300.0	1003.3	15.455	11.949	37.7	19.535	74.6	1.555	0.029	0.214	82.4	0.216	2.1	-0.028	0.214	-82.5	0.216
1120.0	1300.0	1003.3	14.229	11.096	37.9	18.044	75.5	1.436	0.032	0.197	80.7	0.200	1.9	-0.032	0.197	-80.7	0.200

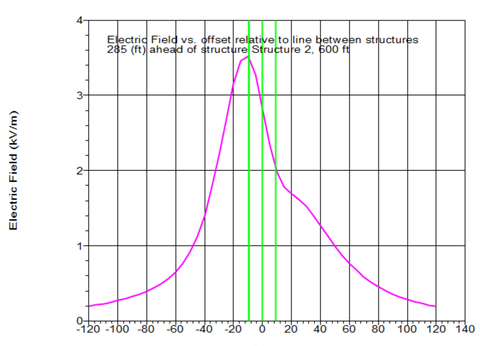




3D EMF Point Results Span from Tangent Back to Structure 2, 600 ft:

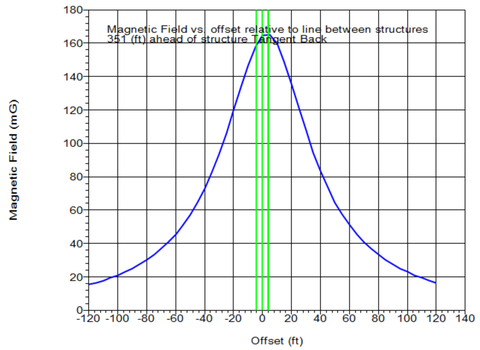
Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
1880.0	709.9	1003.3	14.593	12.119	39.7	18.969	82.1	1.509	0.030	0.209	81.7	0.211	1.9	-0.030	0.209	-81.8	0.211
1885.0	709.9	1003.3	15.870	13.058	39.4	20.552	81.1	1.635	0.026	0.227	83.4	0.229	2.1	-0.026	0.227	-83.6	0.229
1890.0	709.9	1003.3	17.312	14.102	39.2	22.329	80.1	1.777	0.020	0.248	85.3	0.249	2.4	-0.020	0.248	-85.5	0.248
1895.0	709.9	1003.3	18.945	15.267	38.9	24.331	79.1	1.936	0.013	0.270	87.2	0.271	2.6	-0.011	0.270	-87.6	0.271
1900.0	709.9	1003.3	20.805	16.570	38.5	26.597	78.0	2.117	0.009	0.295	88.3	0.296	3.0	0.000	0.295	89.9	0.295
1905.0	709.9	1003.3	22.930	18.032	38.2	29.171	76.8	2.321	0.019	0.323	86.6	0.324	3.4	0.016	0.323	87.2	0.323
1910.0	709.9	1003.3	25.373	19.676	37.8	32.108	75.6	2.555	0.039	0.353	83.7	0.356	3.8	0.036	0.353	84.1	0.355
1915.0	709.9	1003.3	28.193	21.529	37.4	35.473	74.3	2.823	0.066	0.387	80.3	0.392	4.4	0.064	0.386	80.6	0.392
1920.0	709.9	1003.3	31.466	23.623	36.9	39.347	72.9	3.131	0.104	0.423	76.2	0.435	5.0	0.101	0.422	76.5	0.434
1925.0	709.9	1003.3	35.283	25.993	36.4	43.824	71.5	3.487	0.153	0.461	71.6	0.486	5.8	0.151	0.461	71.9	0.485
1930.0	709.9	1003.3	39.757	28.678	35.8	49.021	70.0	3.901	0.220	0.502	66.3	0.548	6.6	0.217	0.501	66.5	0.546
1935.0	709.9	1003.3	45.024	31.721	35.2	55.076	68.4	4.383	0.309	0.543	60.3	0.625	7.4	0.306	0.542	60.6	0.622
1940.0	709.9	1003.3	51.250	35.166	34.5	62.155	66.7	4.946	0.429	0.583	53.7	0.724	8.1	0.424	0.582	53.9	0.720
1945.0	709.9	1003.3	58.628	39.058	33.7	70.447	65.0	5.606	0.587	0.619	46.5	0.854	8.6	0.582	0.618	46.7	0.848
1950.0	709.9	1003.3	67.375	43.435	32.8	80.163	63.1	6.379	0.797	0.647	39.1	1.027	8.7	0.789	0.645	39.3	1.020
1955.0	709.9	1003.3	77.716	48.322	31.9	91.514	61.2	7.282	1.071	0.661	31.7	1.258	8.5	1.060	0.658	31.8	1.248
1960.0	709.9	1003.3	89.837	53.720	30.9	104.673	59.2	8.330	1.420	0.654	24.7	1.563	7.9	1.405	0.649	24.8	1.547
1965.0	709.9	1003.3	103.795	59.590	29.9	119.684	57.2	9.524	1.849	0.614	18.4	1.948	7.0	1.827	0.607	18.4	1.926
1970.0	709.9	1003.3	119.349	65.841	28.9	136.305	55.2	10.847	2.344	0.534	12.8	2.404	6.1	2.314	0.522	12.7	2.372
1975.0	709.9	1003.3	135.714	72.305	28.0	153.774	53.2	12.237	2.859	0.406	8.1	2.888	5.4	2.818	0.382	7.7	2.844
1980.0	709.9	1003.3	151.320	78.729	27.5	170.576	51.3	13.574	3.302	0.243	4.2	3.311	5.0	3.247	0.182	3.2	3.252
1985.0	709.9	1003.3	163.851	84.768	27.4	184.479	49.8	14.680	3.545	0.206	3.3	3.551	5.4	3.478	-0.081	-1.3	3.479
1990.0	709.9	1003.3	170.900	89.999	27.8	193.150	48.6	15.370	3.478	0.451	7.4	3.507	6.7	3.403	-0.396	-6.6	3.426
1995.0	709.9	1003.3	171.092	93.957	28.8	195.193	47.9	15.533	3.078	0.781	14.2	3.176	9.7	3.002	-0.742	-13.9	3.093
2000.0	709.9	1003.3	164.745	96.204	30.3	190.778	47.9	15.182	2.435	1.118	24.7	2.680	14.7	2.361	-1.087	-24.7	2.599
2005.0	709.9	1003.3	153.492	96.421	32.1	181.264	48.5	14.425	1.700	1.419	39.9	2.214	20.7	1.626	-1.392	-40.6	2.140
2010.0	709.9	1003.3	139.357	94.502	34.1	168.377	49.6	13.399	1.011	1.644	58.4	1.930	22.7	0.931	-1.620	-60.1	1.869
2015.0	709.9	1003.3	124.099	90.616	36.1	153.662	51.2	12.228	0.472	1.771	75.1	1.833	18.4	0.358	-1.751	-78.4	1.787
2020.0	709.9	1003.3	109.003	85.175	38.0	138.334	53.2	11.008	0.244	1.796	82.3	1.813	12.8	-0.065	-1.779	87.9	1.780
2025.0	709.9	1003.3	94.890	78.731	39.7	123.299	55.3	9.812	0.390	1.735	77.3	1.778	8.7	-0.346	-1.720	78.6	1.755
2030.0	709.9	1003.3	82.206	71.841	41.2	109.174	57.4	8.688	0.530	1.611	71.8	1.696	6.1	-0.511	-1.600	72.3	1.679
2035.0	709.9	1003.3	71.114	64.963	42.4	96.319	59.5	7.665	0.603	1.453	67.5	1.573	4.6	-0.593	-1.444	67.7	1.561
2040.0	709.9	1003.3	61.588	58.414	43.5	84.883	61.6	6.755	0.625	1.282	64.0	1.426	3.7	-0.619	-1.275	64.1	1.418
2045.0	709.9	1003.3	53.495	52.375	44.4	74.866	63.5	5.958	0.614	1.115	61.1	1.273	3.1	-0.611	-1.110	61.2	1.266
2050.0	709.9	1003.3	46.659	46.927	45.2	66.175	65.2	5.266	0.585	0.960	58.7	1.124	2.8	-0.582	-0.956	58.7	1.119
2055.0	709.9	1003.3	40.892	42.078	45.8	58.675	66.8	4.669	0.546	0.822	56.4	0.986	2.5	-0.544	-0.818	56.4	0.983
2060.0	709.9	1003.3	36.023	37.798	46.4	52.214	68.2	4.155	0.503	0.701	54.3	0.863	2.4	-0.502	-0.699	54.3	0.860
2065.0	709.9	1003.3	31.898	34.039	46.9	46.649	69.4	3.712	0.461	0.598	52.4	0.755	2.2	-0.460	-0.596	52.3	0.753
2070.0	709.9	1003.3	28.390	30.742	47.3	41.846	70.5	3.330	0.420	0.510	50.5	0.661	2.1	-0.420	-0.508	50.5	0.659
2075.0	709.9	1003.3	25.393	27.852	47.6	37.690	71.4	2.999	0.383	0.436	48.7	0.580	2.1	-0.382	-0.435	48.7	0.579
2080.0	709.9	1003.3	22.818	25.314	48.0	34.080	72.2	2.712	0.349	0.373	46.9	0.511	2.0	-0.348	-0.372	46.9	0.510
2085.0	709.9	1003.3	20.596	23.081	48.3	30.934	72.9	2.462	0.318	0.320	45.3	0.451	1.9	-0.317	-0.320	45.2	0.450
2090.0	709.9	1003.3	18.667	21.112	48.5	28.181	73.5	2.243	0.290	0.276	43.6	0.400	1.9	-0.289	-0.275	43.6	0.400
2095.0	709.9	1003.3	16.985	19.371	48.8	25.762	74.0	2.050	0.265	0.238	42.0	0.356	1.8	-0.265	-0.238	42.0	0.356
2100.0	709.9	1003.3	15.511	17.825	49.0	23.629	74.4	1.880	0.242	0.207	40.4	0.319	1.8	-0.242	-0.206	40.4	0.318
2105.0	709.9	1003.3	14.213	16.449	49.2	21.739	74.7	1.730	0.223	0.180	38.9	0.286	1.7	-0.222	-0.179	38.9	0.286
2110.0	709.9	1003.3	13.066	15.220	49.4	20.059	74.9	1.596	0.205	0.157	37.4	0.258	1.7	-0.204	-0.156	37.4	0.257
2115.0	709.9	1003.3	12.047	14.120	49.5	18.561	75.1	1.477	0.189	0.137	36.0	0.233	1.6	-0.188	-0.137	36.0	0.233
2120.0	709.9	1003.3	11.139	13.130	49.7	17.218	75.2	1.370	0.174	0.120	34.6	0.212	1.6	-0.174	-0.120	34.6	0.211

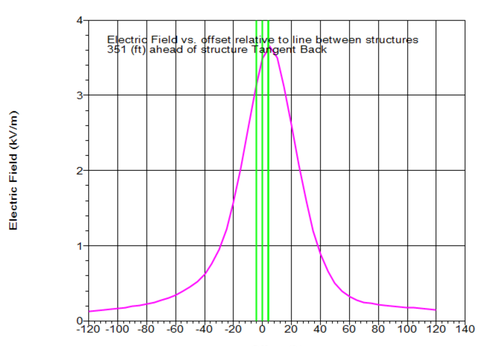




3D EMF Point Results Span from Structure 2, 600 ft to Tangent Ahead:

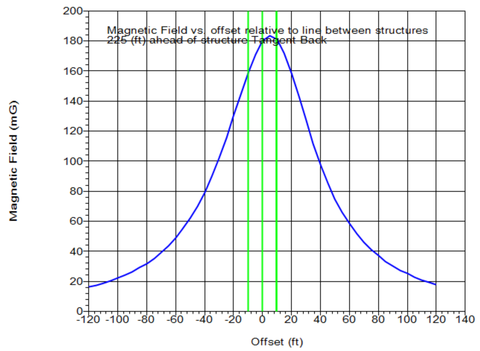
Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
2038.4	1306.5	1003.3	13.867	10.761	37.8	17.553	73.1	1.397	0.035	0.193	79.8	0.196	1.9	-0.034	0.194	-79.9	0.197
2042.7	1304.0	1003.3	15.075	11.602	37.6	19.023	72.3	1.514	0.031	0.210	81.5	0.213	2.1	-0.031	0.210	-81.7	0.213
2047.0	1301.5	1003.3	16.437	12.537	37.3	20.673	71.4	1.645	0.027	0.229	83.4	0.230	2.3	-0.026	0.229	-83.6	0.230
2051.4	1299.0	1003.3	17.978	13.581	37.1	22.531	70.5	1.793	0.020	0.249	85.4	0.250	2.6	-0.019	0.250	-85.7	0.250
2055.7	1296.5	1003.3	19.729	14.749	36.8	24.633	69.6	1.960	0.012	0.272	87.4	0.272	3.0	-0.009	0.272	-88.1	0.272
2060.0	1294.0	1003.3	21.728	16.060	36.5	27.019	68.6	2.150	0.011	0.297	87.9	0.297	3.4	0.004	0.297	89.1	0.297
2064.4	1291.5	1003.3	24.021	17.535	36.1	29.740	67.5	2.367	0.026	0.325	85.5	0.326	3.9	0.023	0.325	86.0	0.326
2068.7	1289.0	1003.3	26.665	19.198	35.8	32.857	66.5	2.615	0.049	0.355	82.1	0.358	4.4	0.047	0.355	82.5	0.358
2073.0	1286.5	1003.3	29.728	21.079	35.3	36.442	65.4	2.900	0.082	0.387	78.1	0.396	5.1	0.080	0.387	78.4	0.396
2077.4	1284.0	1003.3	33.293	23.209	34.9	40.584	64.2	3.230	0.126	0.422	73.4	0.441	5.9	0.124	0.422	73.7	0.440
2081.7	1281.5	1003.3	37.465	25.626	34.4	45.390	63.0	3.612	0.186	0.459	68.0	0.495	6.7	0.183	0.459	68.2	0.494
2086.0	1279.0	1003.3	42.368	28.368	33.8	50.988	61.8	4.057	0.266	0.496	61.8	0.562	7.6	0.262	0.496	62.1	0.561
2090.3	1276.5	1003.3	48.154	31.479	33.2	57.530	60.5	4.578	0.373	0.532	55.0	0.650	8.4	0.369	0.532	55.3	0.647
2094.7	1274.0	1003.3	55.001	35.000	32.5	65.193	59.1	5.188	0.516	0.565	47.6	0.765	8.9	0.511	0.564	47.8	0.761
2099.0	1271.5	1003.3	63.113	38.970	31.7	74.175	57.7	5.903	0.706	0.590	39.9	0.920	9.1	0.699	0.588	40.1	0.914
2103.3	1269.0	1003.3	72.704	43.417	30.8	84.681	56.3	6.739	0.956	0.602	32.2	1.130	8.8	0.947	0.600	32.4	1.121
2107.7	1266.5	1003.3	83.965	48.346	29.9	96.889	54.9	7.710	1.278	0.595	24.9	1.410	8.2	1.265	0.591	25.0	1.396
2112.0	1264.0	1003.3	96.990	53.729	29.0	110.877	53.5	8.823	1.681	0.559	18.4	1.771	7.2	1.662	0.553	18.4	1.751
2116.3	1261.5	1003.3	111.630	59.485	28.1	126.490	52.2	10.066	2.157	0.484	12.7	2.210	6.3	2.130	0.474	12.5	2.182
2120.7	1259.0	1003.3	127.274	65.464	27.2	143.123	51.0	11.389	2.671	0.366	7.8	2.696	5.5	2.633	0.344	7.4	2.656
2125.0	1256.5	1003.3	142.592	71.426	26.6	159.481	50.1	12.691	3.146	0.217	3.9	3.153	5.0	3.095	0.155	2.9	3.099
2129.3	1254.0	1003.3	155.463	77.040	26.4	173.505	49.4	13.807	3.460	0.204	3.4	3.466	5.2	3.396	-0.094	-1.6	3.397
2133.6	1251.5	1003.3	163.447	81.891	26.6	182.814	49.2	14.548	3.491	0.447	7.3	3.519	6.3	3.418	-0.395	-6.6	3.441
2138.0	1249.0	1003.3	164.828	85.525	27.4	185.695	49.6	14.777	3.186	0.764	13.5	3.276	8.7	3.111	-0.726	-13.1	3.195
2142.3	1246.5	1003.3	159.519	87.520	28.8	181.951	50.5	14.479	2.608	1.084	22.6	2.825	12.7	2.536	-1.052	-22.5	2.746
2146.6	1244.0	1003.3	148.959	87.587	30.5	172.801	52.0	13.751	1.899	1.363	35.7	2.338	17.9	1.830	-1.335	-36.1	2.266
2151.0	1241.5	1003.3	135.227	85.659	32.4	160.074	54.1	12.738	1.206	1.564	52.4	1.975	21.1	1.138	-1.539	-53.5	1.914
2155.3	1239.0	1003.3	120.240	81.936	34.3	145.503	56.6	11.579	0.633	1.667	69.2	1.783	19.2	0.552	-1.645	-71.5	1.735
2159.6	1236.5	1003.3	105.406	76.840	36.1	130.441	59.4	10.380	0.260	1.672	81.2	1.693	14.4	0.111	-1.654	-86.2	1.658
2164.0	1234.0	1003.3	91.598	70.897	37.7	115.829	62.3	9.217	0.261	1.599	80.7	1.620	10.2	-0.190	-1.584	83.1	1.595
2168.3	1231.5	1003.3	79.257	64.614	39.2	102.257	65.2	8.137	0.400	1.471	74.8	1.525	7.4	-0.376	-1.459	75.5	1.507
2172.6	1229.0	1003.3	68.521	58.393	40.4	90.027	68.0	7.164	0.489	1.316	69.6	1.404	5.6	-0.477	-1.306	69.9	1.391
2176.9	1226.5	1003.3	59.337	52.503	41.5	79.231	70.6	6.305	0.527	1.153	65.5	1.268	4.5	-0.520	-1.146	65.6	1.258
2181.3	1224.0	1003.3	51.558	47.094	42.4	69.829	73.1	5.557	0.530	0.996	62.0	1.129	3.8	-0.526	-0.990	62.0	1.121
2185.6	1221.5	1003.3	44.996	42.224	43.2	61.705	75.3	4.910	0.514	0.853	58.9	0.996	3.4	-0.511	-0.848	58.9	0.990
2189.9	1219.0	1003.3	39.465	37.896	43.8	54.714	77.3	4.354	0.486	0.726	56.2	0.874	3.0	-0.484	-0.722	56.2	0.869
2194.3	1216.5	1003.3	34.795	34.080	44.4	48.704	79.1	3.876	0.453	0.617	53.7	0.765	2.8	-0.451	-0.614	53.7	0.762
2198.6	1214.0	1003.3	30.838	30.727	44.9	43.533	80.7	3.464	0.418	0.523	51.4	0.670	2.6	-0.417	-0.521	51.3	0.667
2202.9	1211.5	1003.3	27.471	27.787	45.3	39.074	82.0	3.109	0.384	0.444	49.2	0.587	2.5	-0.383	-0.442	49.1	0.585
2207.3	1209.0	1003.3	24.591	25.208	45.7	35.216	83.1	2.802	0.352	0.378	47.1	0.516	2.4	-0.351	-0.376	47.0	0.515
2211.6	1206.5	1003.3	22.115	22.943	46.1	31.866	84.0	2.536	0.322	0.322	45.0	0.456	2.3	-0.321	-0.321	45.0	0.454
2215.9	1204.0	1003.3	19.976	20.950	46.4	28.947	84.8	2.304	0.295	0.276	43.1	0.403	2.2	-0.294	-0.274	43.0	0.402
2220.2	1201.5	1003.3	18.119	19.191	46.6	26.393	85.3	2.100	0.270	0.236	41.2	0.359	2.1	-0.269	-0.235	41.1	0.358
2224.6	1199.0	1003.3	16.498	17.634	46.9	24.148	85.7	1.922	0.248	0.203	39.4	0.320	2.1	-0.247	-0.202	39.3	0.319
2228.9	1196.5	1003.3	15.076	16.252	47.1	22.167	85.9	1.764	0.227	0.175	37.6	0.287	2.0	-0.227	-0.175	37.6	0.286
2233.2	1194.0	1003.3	13.823	15.021	47.4	20.413	86.0	1.624	0.209	0.152	35.9	0.258	1.9	-0.209	-0.151	35.9	0.258
2237.6	1191.5	1003.3	12.715	13.921	47.6	18.854	86.0	1.500	0.193	0.132	34.3	0.234	1.8	-0.193	-0.131	34.2	0.233
2241.9	1189.0	1003.3	11.730	12.936	47.8	17.462	85.9	1.390	0.178	0.115	32.7	0.212	1.8	-0.178	-0.114	32.7	0.211
2246.2	1186.5	1003.3	10.852	12.049	48.0	16.216	85.8	1.290	0.165	0.100	31.2	0.193	1.7	-0.165	-0.100	31.1	0.192

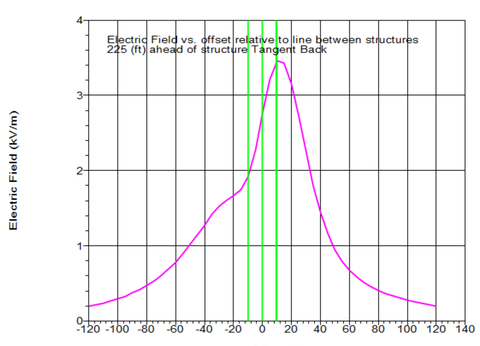




3D EMF Point Results Span from Tangent Back to Structure 3, 600 ft:

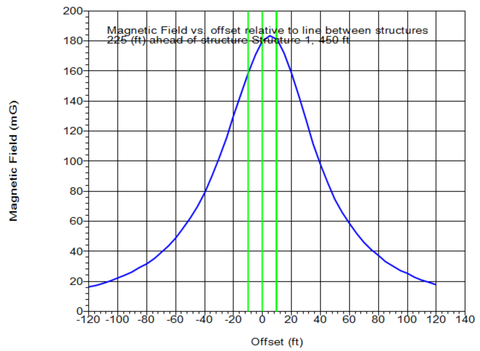
Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	E Real (kV/m)	E Imaginary (kV/m)	E Angle (deg)	E Magnitude (kV/m)	E Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
2880.0	750.8	1003.3	12.539	9.053	35.8	15.466	44.4	1.231	0.127	0.013	5.9	0.127	2.6	-0.128	-0.012	5.4	0.128
2885.0	750.8	1003.3	13.535	9.705	35.6	16.655	44.4	1.325	0.134	0.019	8.2	0.136	2.9	-0.135	-0.018	7.7	0.137
2890.0	750.8	1003.3	14.648	10.427	35.4	17.980	44.4	1.431	0.143	0.027	10.6	0.145	3.2	-0.144	-0.026	10.2	0.146
2895.0	750.8	1003.3	15.895	11.226	35.2	19.459	44.4	1.549	0.151	0.036	13.4	0.155	3.5	-0.152	-0.035	12.9	0.156
2900.0	750.8	1003.3	17.297	12.114	35.0	21.117	44.4	1.680	0.160	0.047	16.5	0.167	3.8	-0.161	-0.046	16.0	0.168
2905.0	750.8	1003.3	18.880	13.103	34.8	22.981	44.5	1.829	0.169	0.061	19.9	0.180	4.2	-0.170	-0.060	19.4	0.181
2910.0	750.8	1003.3	20.673	14.208	34.5	25.085	44.5	1.996	0.178	0.078	23.6	0.194	4.7	-0.179	-0.077	23.1	0.195
2915.0	750.8	1003.3	22.715	15.444	34.2	27.468	44.6	2.186	0.186	0.098	27.8	0.211	5.2	-0.188	-0.097	27.3	0.211
2920.0	750.8	1003.3	25.048	16.830	33.9	30.177	44.7	2.401	0.194	0.123	32.5	0.229	5.8	-0.195	-0.122	32.0	0.230
2925.0	750.8	1003.3	27.726	18.386	33.5	33.268	44.8	2.647	0.199	0.154	37.7	0.252	6.4	-0.201	-0.152	37.2	0.252
2930.0	750.8	1003.3	30.813	20.134	33.2	36.808	44.9	2.929	0.201	0.191	43.5	0.277	7.1	-0.203	-0.189	43.0	0.277
2935.0	750.8	1003.3	34.388	22.099	32.7	40.877	45.0	3.253	0.198	0.236	50.0	0.308	7.9	-0.200	-0.234	49.5	0.308
2940.0	750.8	1003.3	38.544	24.305	32.2	45.567	45.0	3.626	0.188	0.291	57.1	0.346	8.8	-0.189	-0.288	56.8	0.345
2945.0	750.8	1003.3	43.394	26.774	31.7	50.989	45.0	4.058	0.166	0.356	64.9	0.393	9.8	-0.166	-0.353	64.8	0.390
2950.0	750.8	1003.3	49.069	29.523	31.0	57.266	44.8	4.557	0.130	0.432	73.3	0.451	10.8	-0.125	-0.429	73.8	0.447
2955.0	750.8	1003.3	55.720	32.560	30.3	64.536	44.5	5.136	0.081	0.521	81.1	0.527	11.9	-0.058	-0.517	83.7	0.520
2960.0	750.8	1003.3	63.513	35.873	29.5	72.943	44.0	5.805	0.097	0.620	81.2	0.628	12.8	0.047	-0.616	-85.6	0.618
2965.0	750.8	1003.3	72.609	39.419	28.5	82.619	43.1	6.575	0.237	0.727	72.0	0.765	13.5	0.205	-0.722	-74.2	0.751
2970.0	750.8	1003.3	83.134	43.113	27.4	93.649	41.9	7.452	0.463	0.835	61.0	0.955	13.6	0.433	-0.829	-62.4	0.935
2975.0	750.8	1003.3	95.114	46.816	26.2	106.011	40.2	8.436	0.785	0.933	49.9	1.219	12.9	0.752	-0.926	-50.9	1.193
2980.0	750.8	1003.3	108.363	50.322	24.9	119.477	38.1	9.508	1.214	1.007	39.7	1.578	11.5	1.176	-0.998	-40.3	1.543
2985.0	750.8	1003.3	122.319	53.374	23.6	133.457	35.7	10.620	1.750	1.041	30.7	2.036	9.7	1.704	-1.031	-31.2	1.991
2990.0	750.8	1003.3	135.862	55.692	22.3	146.833	32.9	11.685	2.356	1.020	23.4	2.568	7.7	2.300	-1.009	-23.7	2.512
2995.0	750.8	1003.3	147.230	57.026	21.2	157.888	30.1	12.564	2.948	0.942	17.7	3.095	5.9	2.882	-0.930	-17.9	3.028
3000.0	750.8	1003.3	154.296	57.220	20.3	164.564	27.3	13.096	3.399	0.813	13.5	3.495	4.5	3.326	-0.801	-13.5	3.421
3005.0	750.8	1003.3	155.367	56.256	19.9	165.238	24.8	13.149	3.588	0.655	10.3	3.647	3.4	3.513	-0.642	-10.4	3.572
3010.0	750.8	1003.3	150.133	54.253	19.9	159.635	22.7	12.703	3.469	0.488	8.0	3.503	2.7	3.401	-0.475	-7.9	3.434
3015.0	750.8	1003.3	139.891	51.434	20.2	149.046	21.0	11.861	3.100	0.331	6.1	3.118	2.4	3.044	-0.315	-5.9	3.060
3020.0	750.8	1003.3	126.785	48.066	20.8	135.590	19.8	10.790	2.598	0.193	4.3	2.605	2.6	2.554	-0.173	-3.9	2.559
3025.0	750.8	1003.3	112.817	44.406	21.5	121.242	19.1	9.648	2.073	0.090	2.5	2.075	3.1	2.039	-0.053	-1.5	2.040
3030.0	750.8	1003.3	99.340	40.672	22.3	107.344	18.7	8.542	1.595	0.074	2.7	1.597	4.1	1.570	0.044	1.6	1.571
3035.0	750.8	1003.3	87.056	37.024	23.0	94.602	18.6	7.528	1.196	0.128	6.1	1.203	5.5	1.176	0.119	5.8	1.182
3040.0	750.8	1003.3	76.215	33.568	23.8	83.280	18.7	6.627	0.878	0.177	11.4	0.896	7.3	0.863	0.173	11.4	0.880
3045.0	750.8	1003.3	66.818	30.365	24.4	73.394	18.9	5.841	0.633	0.211	18.5	0.667	9.4	0.620	0.210	18.7	0.655
3050.0	750.8	1003.3	58.747	27.442	25.0	64.840	19.3	5.160	0.448	0.233	27.5	0.505	11.7	0.437	0.233	28.0	0.495
3055.0	750.8	1003.3	51.840	24.805	25.6	57.469	19.8	4.573	0.309	0.244	38.3	0.394	13.5	0.300	0.244	39.2	0.387
3060.0	750.8	1003.3	45.932	22.442	26.0	51.121	20.3	4.068	0.206	0.247	50.2	0.322	14.1	0.198	0.248	51.3	0.318
3065.0	750.8	1003.3	40.872	20.334	26.5	45.650	20.8	3.633	0.131	0.245	61.9	0.278	13.2	0.124	0.246	63.3	0.275
3070.0	750.8	1003.3	36.525	18.460	26.8	40.924	21.4	3.257	0.076	0.239	72.3	0.250	11.4	0.069	0.239	74.0	0.249
3075.0	750.8	1003.3	32.778	16.795	27.1	36.830	21.9	2.931	0.037	0.230	80.8	0.233	9.3	0.028	0.230	83.0	0.232
3080.0	750.8	1003.3	29.535	15.316	27.4	33.270	22.5	2.648	0.016	0.219	85.7	0.220	7.5	-0.001	0.220	-89.8	0.220
3085.0	750.8	1003.3	26.717	14.002	27.7	30.164	23.1	2.400	0.024	0.208	83.5	0.209	6.0	-0.022	0.209	-84.1	0.210
3090.0	750.8	1003.3	24.259	12.833	27.9	27.444	23.7	2.184	0.036	0.196	79.5	0.200	4.8	-0.037	0.197	-79.5	0.200
3095.0	750.8	1003.3	22.104	11.791	28.1	25.052	24.2	1.994	0.046	0.185	76.0	0.190	3.9	-0.047	0.185	-75.7	0.191
3100.0	750.8	1003.3	20.208	10.860	28.3	22.941	24.8	1.826	0.053	0.173	73.0	0.181	3.3	-0.054	0.174	-72.7	0.182
3105.0	750.8	1003.3	18.533	10.027	28.4	21.072	25.4	1.677	0.058	0.163	70.5	0.173	2.7	-0.059	0.163	-70.2	0.174
3110.0	750.8	1003.3	17.048	9.280	28.6	19.410	25.9	1.545	0.060	0.153	68.4	0.164	2.3	-0.062	0.153	-68.1	0.165
3115.0	750.8	1003.3	15.725	8.609	28.7	17.928	26.5	1.427	0.062	0.143	66.6	0.156	2.0	-0.063	0.143	-66.3	0.157
3120.0	750.8	1003.3	14.544	8.004	28.8	16.601	27.1	1.321	0.062	0.134	65.0	0.148	1.8	-0.063	0.134	-64.7	0.149

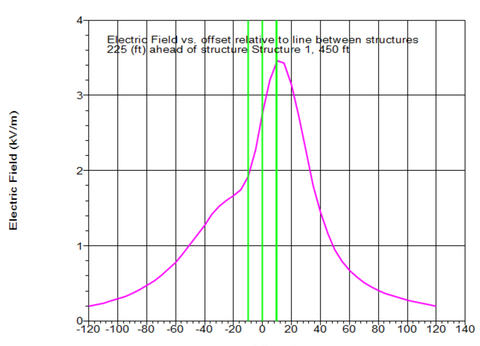




3D EMF Point Results Span from Tangent Back to Structure 1, 450 ft:

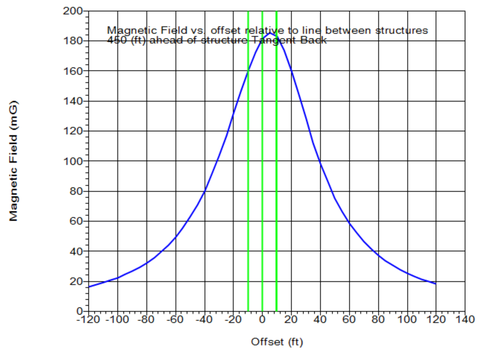
Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
3880.0	774.9	1003.3	10.503	12.160	49.2	16.068	81.0	1.279	0.164	0.110	33.7	0.197	1.6	-0.164	-0.109	33.7	0.197
3885.0	774.9	1003.3	11.378	13.077	49.0	17.334	81.2	1.379	0.178	0.125	35.1	0.217	1.6	-0.178	-0.125	35.0	0.217
3890.0	774.9	1003.3	12.360	14.095	48.8	18.746	81.4	1.492	0.193	0.143	36.5	0.240	1.7	-0.193	-0.143	36.5	0.240
3895.0	774.9	1003.3	13.467	15.227	48.5	20.327	81.5	1.618	0.210	0.164	38.0	0.266	1.7	-0.210	-0.163	37.9	0.266
3900.0	774.9	1003.3	14.719	16.491	48.2	22.104	81.6	1.759	0.228	0.188	39.5	0.296	1.8	-0.228	-0.188	39.5	0.296
3905.0	774.9	1003.3	16.141	17.906	48.0	24.107	81.6	1.918	0.249	0.217	41.1	0.331	1.9	-0.249	-0.217	41.0	0.330
3910.0	774.9	1003.3	17.765	19.495	47.7	26.375	81.5	2.099	0.272	0.252	42.7	0.371	2.0	-0.272	-0.251	42.7	0.370
3915.0	774.9	1003.3	19.627	21.285	47.3	28.953	81.2	2.304	0.298	0.292	44.5	0.417	2.0	-0.297	-0.291	44.4	0.416
3920.0	774.9	1003.3	21.773	23.308	47.0	31.896	80.7	2.538	0.326	0.340	46.2	0.471	2.1	-0.325	-0.339	46.2	0.470
3925.0	774.9	1003.3	24.257	25.600	46.5	35.267	80.1	2.806	0.356	0.397	48.1	0.533	2.2	-0.356	-0.396	48.1	0.532
3930.0	774.9	1003.3	27.150	28.200	46.1	39.145	79.2	3.115	0.389	0.465	50.0	0.606	2.3	-0.389	-0.463	50.0	0.605
3935.0	774.9	1003.3	30.533	31.154	45.6	43.621	78.1	3.471	0.424	0.544	52.1	0.690	2.5	-0.423	-0.543	52.1	0.688
3940.0	774.9	1003.3	34.508	34.511	45.0	48.804	76.8	3.884	0.459	0.638	54.3	0.786	2.6	-0.458	-0.636	54.3	0.784
3945.0	774.9	1003.3	39.199	38.319	44.3	54.817	75.2	4.362	0.492	0.748	56.6	0.895	2.9	-0.491	-0.745	56.6	0.893
3950.0	774.9	1003.3	44.750	42.620	43.6	61.798	73.3	4.918	0.520	0.874	59.2	1.017	3.2	-0.518	-0.870	59.2	1.013
3955.0	774.9	1003.3	51.327	47.438	42.7	69.892	71.1	5.562	0.537	1.015	62.1	1.148	3.7	-0.533	-1.011	62.2	1.143
3960.0	774.9	1003.3	59.109	52.768	41.8	79.236	68.7	6.305	0.532	1.168	65.5	1.283	4.4	-0.526	-1.162	65.6	1.276
3965.0	774.9	1003.3	68.271	58.543	40.6	89.934	66.1	7.157	0.493	1.324	69.6	1.413	5.5	-0.482	-1.317	69.9	1.402
3970.0	774.9	1003.3	78.943	64.612	39.3	102.014	63.3	8.118	0.403	1.470	74.7	1.525	7.3	-0.381	-1.461	75.4	1.509
3975.0	774.9	1003.3	91.158	70.711	37.8	115.369	60.5	9.181	0.263	1.586	80.6	1.608	10.2	-0.195	-1.574	82.9	1.586
3980.0	774.9	1003.3	104.759	76.450	36.1	129.689	57.7	10.320	0.255	1.648	81.2	1.667	14.5	0.103	-1.633	-86.4	1.636
3985.0	774.9	1003.3	119.297	81.347	34.3	144.393	55.0	11.490	0.619	1.631	69.2	1.744	19.3	0.537	-1.613	-71.6	1.700
3990.0	774.9	1003.3	133.921	84.906	32.4	158.568	52.7	12.618	1.180	1.520	52.2	1.925	21.3	1.111	-1.499	-53.5	1.866
3995.0	774.9	1003.3	147.292	86.732	30.5	170.930	50.8	13.602	1.857	1.317	35.4	2.276	18.0	1.788	-1.293	-35.9	2.207
4000.0	774.9	1003.3	157.607	86.637	28.8	179.850	49.5	14.312	2.551	1.041	22.2	2.756	12.7	2.480	-1.013	-22.2	2.679
4005.0	774.9	1003.3	162.918	84.681	27.5	183.611	48.8	14.611	3.124	0.728	13.1	3.208	8.7	3.051	-0.693	-12.8	3.128
4010.0	774.9	1003.3	161.849	81.133	26.6	181.046	48.7	14.407	3.438	0.421	7.0	3.464	6.2	3.367	-0.369	-6.3	3.387
4015.0	774.9	1003.3	154.419	76.390	26.3	172.281	49.1	13.710	3.429	0.192	3.2	3.435	5.2	3.366	-0.075	-1.3	3.367
4020.0	774.9	1003.3	142.175	70.886	26.5	158.866	49.9	12.642	3.140	0.228	4.2	3.148	5.0	3.089	0.170	3.2	3.093
4025.0	774.9	1003.3	127.407	65.021	27.0	143.040	50.9	11.383	2.686	0.379	8.0	2.712	5.4	2.647	0.356	7.7	2.671
4030.0	774.9	1003.3	112.166	59.124	27.8	126.795	52.1	10.090	2.183	0.497	12.8	2.239	6.2	2.155	0.485	12.7	2.209
4035.0	774.9	1003.3	97.783	53.431	28.7	111.429	53.4	8.867	1.713	0.571	18.4	1.805	7.1	1.693	0.564	18.4	1.784
4040.0	774.9	1003.3	84.898	48.097	29.5	97.576	54.9	7.765	1.311	0.607	24.9	1.445	8.0	1.297	0.602	24.9	1.430
4045.0	774.9	1003.3	73.694	43.207	30.4	85.426	56.3	6.798	0.987	0.615	31.9	1.162	8.6	0.976	0.611	32.0	1.152
4050.0	774.9	1003.3	64.107	38.790	31.2	74.929	57.8	5.963	0.734	0.602	39.4	0.949	8.8	0.726	0.599	39.5	0.942
4055.0	774.9	1003.3	55.966	34.845	31.9	65.927	59.2	5.246	0.540	0.576	46.9	0.790	8.6	0.534	0.574	47.1	0.785
4060.0	774.9	1003.3	49.071	31.345	32.6	58.228	60.6	4.634	0.394	0.543	54.0	0.671	8.1	0.389	0.542	54.3	0.667
4065.0	774.9	1003.3	43.229	28.253	33.2	51.642	62.1	4.110	0.284	0.506	60.7	0.580	7.4	0.280	0.505	61.0	0.578
4070.0	774.9	1003.3	38.265	25.528	33.7	45.998	63.4	3.660	0.202	0.468	66.7	0.510	6.6	0.199	0.467	67.0	0.508
4075.0	774.9	1003.3	34.032	23.128	34.2	41.147	64.7	3.274	0.140	0.431	72.0	0.453	5.7	0.138	0.430	72.2	0.452
4080.0	774.9	1003.3	30.407	21.013	34.6	36.962	66.0	2.941	0.094	0.395	76.6	0.406	5.0	0.092	0.395	76.9	0.405
4085.0	774.9	1003.3	27.289	19.147	35.1	33.336	67.3	2.653	0.060	0.362	80.6	0.367	4.4	0.058	0.361	80.9	0.366
4090.0	774.9	1003.3	24.593	17.498	35.4	30.182	68.5	2.402	0.035	0.331	84.0	0.333	3.8	0.032	0.331	84.4	0.332
4095.0	774.9	1003.3	22.251	16.036	35.8	27.427	69.7	2.183	0.017	0.303	86.8	0.303	3.3	0.013	0.302	87.5	0.303
4100.0	774.9	1003.3	20.206	14.738	36.1	25.010	70.8	1.990	0.008	0.277	88.3	0.277	2.9	-0.001	0.277	-89.9	0.277
4105.0	774.9	1003.3	18.414	13.582	36.4	22.881	71.9	1.821	0.013	0.254	87.1	0.254	2.6	-0.011	0.253	-87.5	0.254
4110.0	774.9	1003.3	16.835	12.549	36.7	20.998	72.9	1.671	0.020	0.233	85.2	0.233	2.3	-0.019	0.232	-85.4	0.233
4115.0	774.9	1003.3	15.439	11.624	37.0	19.326	73.9	1.538	0.025	0.213	83.4	0.215	2.1	-0.024	0.213	-83.5	0.215
4120.0	774.9	1003.3	14.200	10.793	37.2	17.836	74.9	1.419	0.029	0.196	81.7	0.198	1.9	-0.028	0.196	-81.8	0.198

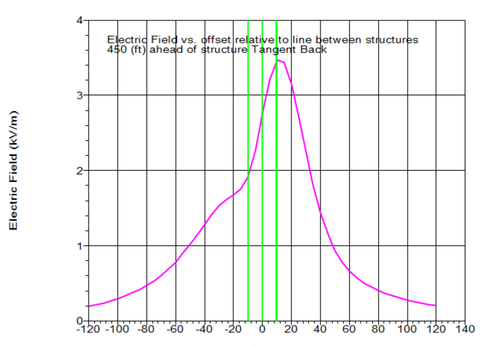




3D EMF Point Results Span from Structure 1, 450 ft to Tangent Ahead:

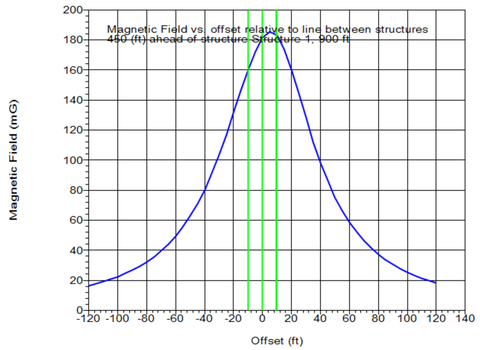
Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
3880.0	1224.9	1003.3	10.503	12.160	49.2	16.068	81.0	1.279	0.164	0.109	33.7	0.197	1.6	-0.164	-0.109	33.7	0.197
3885.0	1224.9	1003.3	11.378	13.077	49.0	17.334	81.2	1.379	0.178	0.125	35.0	0.217	1.6	-0.178	-0.125	35.0	0.217
3890.0	1224.9	1003.3	12.360	14.094	48.8	18.747	81.4	1.492	0.193	0.143	36.5	0.240	1.7	-0.193	-0.143	36.5	0.240
3895.0	1224.9	1003.3	13.467	15.227	48.5	20.328	81.5	1.618	0.210	0.164	37.9	0.266	1.7	-0.210	-0.163	37.9	0.266
3900.0	1224.9	1003.3	14.719	16.490	48.2	22.104	81.6	1.759	0.229	0.188	39.5	0.296	1.8	-0.228	-0.188	39.5	0.296
3905.0	1224.9	1003.3	16.142	17.905	48.0	24.107	81.6	1.918	0.249	0.217	41.1	0.331	1.9	-0.249	-0.217	41.0	0.330
3910.0	1224.9	1003.3	17.766	19.495	47.7	26.375	81.5	2.099	0.272	0.251	42.7	0.371	1.9	-0.272	-0.251	42.7	0.370
3915.0	1224.9	1003.3	19.628	21.285	47.3	28.953	81.2	2.304	0.298	0.292	44.4	0.417	2.0	-0.297	-0.291	44.4	0.416
3920.0	1224.9	1003.3	21.773	23.308	46.9	31.896	80.7	2.538	0.326	0.340	46.2	0.471	2.1	-0.325	-0.339	46.2	0.470
3925.0	1224.9	1003.3	24.258	25.599	46.5	35.267	80.1	2.806	0.356	0.397	48.1	0.533	2.2	-0.356	-0.396	48.1	0.532
3930.0	1224.9	1003.3	27.150	28.199	46.1	39.145	79.2	3.115	0.389	0.464	50.0	0.606	2.3	-0.389	-0.463	50.0	0.605
3935.0	1224.9	1003.3	30.533	31.154	45.6	43.621	78.1	3.471	0.424	0.544	52.1	0.690	2.5	-0.423	-0.543	52.1	0.688
3940.0	1224.9	1003.3	34.509	34.511	45.0	48.804	76.8	3.884	0.459	0.638	54.3	0.786	2.6	-0.458	-0.636	54.3	0.784
3945.0	1224.9	1003.3	39.200	38.318	44.3	54.817	75.2	4.362	0.492	0.748	56.6	0.895	2.9	-0.491	-0.745	56.6	0.893
3950.0	1224.9	1003.3	44.750	42.619	43.6	61.798	73.3	4.918	0.520	0.874	59.2	1.017	3.2	-0.518	-0.870	59.2	1.013
3955.0	1224.9	1003.3	51.327	47.438	42.7	69.891	71.1	5.562	0.537	1.015	62.1	1.148	3.7	-0.533	-1.011	62.2	1.143
3960.0	1224.9	1003.3	59.110	52.767	41.8	79.236	68.7	6.305	0.532	1.167	65.5	1.283	4.4	-0.526	-1.162	65.6	1.276
3965.0	1224.9	1003.3	68.271	58.542	40.6	89.934	66.1	7.157	0.493	1.324	69.6	1.413	5.5	-0.482	-1.317	69.9	1.402
3970.0	1224.9	1003.3	78.944	64.611	39.3	102.014	63.3	8.118	0.403	1.470	74.7	1.524	7.3	-0.381	-1.461	75.4	1.509
3975.0	1224.9	1003.3	91.159	70.710	37.8	115.368	60.5	9.181	0.263	1.586	80.6	1.608	10.2	-0.195	-1.574	82.9	1.586
3980.0	1224.9	1003.3	104.759	76.450	36.1	129.688	57.7	10.320	0.254	1.648	81.2	1.667	14.5	0.103	-1.633	-86.4	1.636
3985.0	1224.9	1003.3	119.298	81.347	34.3	144.392	55.0	11.490	0.619	1.631	69.2	1.744	19.3	0.537	-1.613	-71.6	1.700
3990.0	1224.9	1003.3	133.921	84.905	32.4	158.568	52.7	12.618	1.180	1.520	52.2	1.924	21.3	1.111	-1.499	-53.5	1.866
3995.0	1224.9	1003.3	147.291	86.731	30.5	170.930	50.8	13.602	1.857	1.317	35.4	2.276	17.9	1.788	-1.293	-35.9	2.207
4000.0	1224.9	1003.3	157.606	86.637	28.8	179.849	49.5	14.312	2.551	1.041	22.2	2.755	12.7	2.480	-1.013	-22.2	2.679
4005.0	1224.9	1003.3	162.917	84.681	27.5	183.610	48.8	14.611	3.124	0.728	13.1	3.208	8.6	3.051	-0.693	-12.8	3.128
4010.0	1224.9	1003.3	161.848	81.133	26.6	181.045	48.7	14.407	3.438	0.420	7.0	3.464	6.2	3.367	-0.369	-6.3	3.387
4015.0	1224.9	1003.3	154.418	76.390	26.3	172.280	49.1	13.710	3.429	0.191	3.2	3.434	5.1	3.366	-0.075	-1.3	3.367
4020.0	1224.9	1003.3	142.173	70.886	26.5	158.865	49.9	12.642	3.140	0.228	4.2	3.148	5.0	3.089	0.170	3.2	3.093
4025.0	1224.9	1003.3	127.406	65.022	27.0	143.038	50.9	11.383	2.686	0.379	8.0	2.712	5.4	2.647	0.356	7.7	2.671
4030.0	1224.9	1003.3	112.165	59.124	27.8	126.794	52.1	10.090	2.183	0.497	12.8	2.239	6.2	2.155	0.485	12.7	2.209
4035.0	1224.9	1003.3	97.782	53.431	28.7	111.428	53.4	8.867	1.713	0.571	18.4	1.805	7.1	1.693	0.564	18.4	1.784
4040.0	1224.9	1003.3	84.897	48.098	29.5	97.575	54.9	7.765	1.311	0.607	24.9	1.445	7.9	1.297	0.602	24.9	1.430
4045.0	1224.9	1003.3	73.693	43.207	30.4	85.425	56.3	6.798	0.986	0.615	31.9	1.162	8.6	0.976	0.611	32.0	1.152
4050.0	1224.9	1003.3	64.106	38.791	31.2	74.929	57.8	5.963	0.733	0.602	39.4	0.949	8.8	0.726	0.599	39.5	0.942
4055.0	1224.9	1003.3	55.965	34.845	31.9	65.926	59.2	5.246	0.540	0.576	46.9	0.790	8.6	0.534	0.574	47.1	0.785
4060.0	1224.9	1003.3	49.071	31.345	32.6	58.228	60.6	4.634	0.394	0.543	54.1	0.671	8.1	0.389	0.542	54.3	0.667
4065.0	1224.9	1003.3	43.228	28.253	33.2	51.642	62.1	4.110	0.284	0.506	60.7	0.580	7.4	0.280	0.505	61.0	0.578
4070.0	1224.9	1003.3	38.264	25.528	33.7	45.998	63.4	3.660	0.202	0.468	66.7	0.510	6.6	0.199	0.467	67.0	0.508
4075.0	1224.9	1003.3	34.032	23.128	34.2	41.147	64.7	3.274	0.140	0.431	72.0	0.453	5.7	0.138	0.430	72.2	0.452
4080.0	1224.9	1003.3	30.407	21.013	34.6	36.962	66.0	2.941	0.094	0.395	76.6	0.406	5.0	0.092	0.395	76.9	0.405
4085.0	1224.9	1003.3	27.289	19.147	35.1	33.336	67.3	2.653	0.060	0.362	80.6	0.367	4.3	0.058	0.361	80.9	0.366
4090.0	1224.9	1003.3	24.593	17.498	35.4	30.182	68.5	2.402	0.035	0.331	84.0	0.333	3.8	0.032	0.331	84.4	0.332
4095.0	1224.9	1003.3	22.250	16.037	35.8	27.427	69.7	2.183	0.017	0.303	86.8	0.303	3.3	0.013	0.302	87.5	0.303
4100.0	1224.9	1003.3	20.206	14.738	36.1	25.010	70.8	1.990	0.008	0.277	88.3	0.277	2.9	-0.001	0.277	-89.9	0.277
4105.0	1224.9	1003.3	18.414	13.582	36.4	22.881	71.9	1.821	0.013	0.254	87.1	0.254	2.6	-0.011	0.253	-87.5	0.254
4110.0	1224.9	1003.3	16.835	12.549	36.7	20.998	72.9	1.671	0.020	0.233	85.2	0.233	2.3	-0.019	0.232	-85.4	0.233
4115.0	1224.9	1003.3	15.439	11.624	37.0	19.326	73.9	1.538	0.025	0.213	83.4	0.215	2.1	-0.024	0.213	-83.5	0.215
4120.0	1224.9	1003.3	14.200	10.793	37.2	17.836	74.9	1.419	0.029	0.196	81.7	0.198	1.9	-0.028	0.196	-81.8	0.198

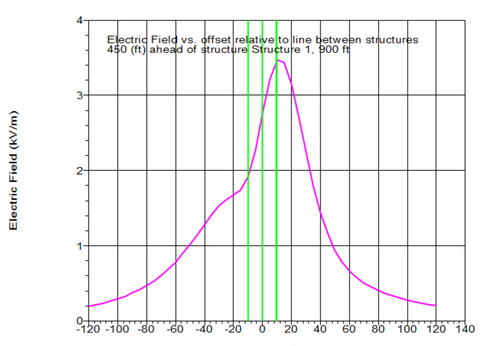




3D EMF Point Results Span from Tangent Back to Structure 1, 900 ft:

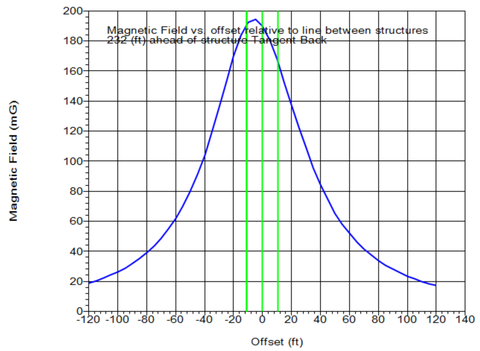
Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
4880.0	549.9	1003.3	11.262	11.904	46.6	16.387	85.4	1.304	0.169	0.104	31.7	0.199	1.7	-0.169	-0.104	31.6	0.199
4885.0	549.9	1003.3	12.164	12.809	46.5	17.665	85.0	1.406	0.183	0.120	33.2	0.219	1.8	-0.183	-0.120	33.2	0.218
4890.0	549.9	1003.3	13.174	13.816	46.4	19.090	84.5	1.519	0.198	0.137	34.8	0.241	1.9	-0.198	-0.137	34.7	0.241
4895.0	549.9	1003.3	14.309	14.940	46.2	20.688	83.9	1.646	0.215	0.158	36.4	0.267	1.9	-0.215	-0.158	36.4	0.267
4900.0	549.9	1003.3	15.591	16.200	46.1	22.484	83.3	1.789	0.234	0.183	38.1	0.297	2.0	-0.233	-0.183	38.0	0.296
4905.0	549.9	1003.3	17.044	17.615	45.9	24.511	82.5	1.950	0.254	0.212	39.8	0.331	2.0	-0.254	-0.211	39.8	0.331
4910.0	549.9	1003.3	18.699	19.209	45.8	26.807	81.7	2.133	0.277	0.246	41.6	0.371	2.1	-0.277	-0.246	41.6	0.370
4915.0	549.9	1003.3	20.592	21.011	45.6	29.419	80.8	2.341	0.303	0.287	43.4	0.417	2.2	-0.302	-0.286	43.4	0.416
4920.0	549.9	1003.3	22.769	23.053	45.4	32.402	79.7	2.578	0.331	0.335	45.4	0.471	2.3	-0.330	-0.334	45.3	0.470
4925.0	549.9	1003.3	25.286	25.374	45.1	35.822	78.6	2.851	0.361	0.392	47.3	0.533	2.4	-0.361	-0.391	47.3	0.532
4930.0	549.9	1003.3	28.208	28.016	44.8	39.757	77.3	3.164	0.394	0.460	49.4	0.606	2.5	-0.394	-0.459	49.4	0.605
4935.0	549.9	1003.3	31.620	31.026	44.5	44.300	75.9	3.525	0.429	0.540	51.5	0.690	2.6	-0.428	-0.539	51.5	0.689
4940.0	549.9	1003.3	35.622	34.456	44.0	49.560	74.3	3.944	0.465	0.635	53.8	0.787	2.7	-0.464	-0.633	53.8	0.785
4945.0	549.9	1003.3	40.335	38.355	43.6	55.660	72.6	4.429	0.498	0.746	56.2	0.897	3.0	-0.497	-0.743	56.2	0.894
4950.0	549.9	1003.3	45.903	42.769	43.0	62.740	70.7	4.993	0.527	0.872	58.9	1.019	3.3	-0.525	-0.869	58.9	1.015
4955.0	549.9	1003.3	52.490	47.724	42.3	70.942	68.7	5.645	0.544	1.015	61.8	1.151	3.7	-0.540	-1.011	61.9	1.146
4960.0	549.9	1003.3	60.273	53.211	41.4	80.400	66.5	6.398	0.539	1.169	65.2	1.288	4.4	-0.534	-1.164	65.4	1.280
4965.0	549.9	1003.3	69.425	59.162	40.4	91.214	64.2	7.259	0.501	1.327	69.3	1.419	5.5	-0.490	-1.320	69.6	1.408
4970.0	549.9	1003.3	80.079	65.418	39.2	103.404	61.8	8.229	0.412	1.475	74.4	1.531	7.3	-0.389	-1.466	75.1	1.517
4975.0	549.9	1003.3	92.270	71.703	37.9	116.855	59.3	9.299	0.270	1.593	80.4	1.615	10.2	-0.204	-1.581	82.7	1.594
4980.0	549.9	1003.3	105.851	77.612	36.2	131.256	56.8	10.445	0.252	1.655	81.3	1.674	14.4	0.095	-1.640	-86.7	1.643
4985.0	549.9	1003.3	120.386	82.649	34.5	146.026	54.5	11.620	0.613	1.639	69.5	1.750	19.4	0.530	-1.621	-71.9	1.705
4990.0	549.9	1003.3	135.039	86.310	32.6	160.265	52.5	12.754	1.176	1.528	52.4	1.928	21.4	1.106	-1.507	-53.7	1.869
4995.0	549.9	1003.3	148.478	88.199	30.7	172.699	50.8	13.743	1.855	1.323	35.5	2.278	18.1	1.786	-1.299	-36.0	2.209
5000.0	549.9	1003.3	158.884	88.139	29.0	181.694	49.6	14.459	2.552	1.046	22.3	2.758	12.8	2.481	-1.017	-22.3	2.681
5005.0	549.9	1003.3	164.260	86.200	27.7	185.504	49.0	14.762	3.127	0.730	13.1	3.211	8.7	3.054	-0.695	-12.8	3.132
5010.0	549.9	1003.3	163.171	82.662	26.9	182.915	49.1	14.556	3.442	0.421	7.0	3.468	6.3	3.371	-0.369	-6.3	3.391
5015.0	549.9	1003.3	155.600	77.926	26.6	174.022	49.6	13.848	3.432	0.192	3.2	3.438	5.2	3.369	-0.073	-1.2	3.370
5020.0	549.9	1003.3	143.111	72.426	26.8	160.394	50.6	12.764	3.141	0.232	4.2	3.149	5.0	3.090	0.174	3.2	3.095
5025.0	549.9	1003.3	128.052	66.560	27.5	144.318	51.9	11.484	2.683	0.384	8.1	2.711	5.5	2.645	0.361	7.8	2.670
5030.0	549.9	1003.3	112.531	60.649	28.3	127.834	53.4	10.173	2.178	0.503	13.0	2.235	6.3	2.150	0.491	12.9	2.206
5035.0	549.9	1003.3	97.912	54.932	29.3	112.269	55.0	8.934	1.705	0.577	18.7	1.800	7.2	1.685	0.570	18.7	1.779
5040.0	549.9	1003.3	84.849	49.560	30.3	98.263	56.6	7.819	1.301	0.613	25.2	1.438	8.1	1.287	0.608	25.3	1.424
5045.0	549.9	1003.3	73.520	44.621	31.3	86.002	58.3	6.844	0.975	0.620	32.4	1.156	8.8	0.965	0.617	32.6	1.146
5050.0	549.9	1003.3	63.855	40.147	32.2	75.427	59.9	6.002	0.722	0.607	40.1	0.943	9.1	0.714	0.605	40.3	0.936
5055.0	549.9	1003.3	55.671	36.137	33.0	66.371	61.4	5.282	0.528	0.581	47.8	0.785	8.9	0.522	0.579	48.0	0.780
5060.0	549.9	1003.3	48.759	32.569	33.7	58.636	62.9	4.666	0.381	0.547	55.2	0.667	8.4	0.377	0.546	55.4	0.663
5065.0	549.9	1003.3	42.917	29.408	34.4	52.026	64.3	4.140	0.271	0.510	62.0	0.578	7.6	0.268	0.509	62.3	0.575
5070.0	549.9	1003.3	37.967	26.614	35.0	46.366	65.6	3.690	0.189	0.472	68.2	0.509	6.8	0.186	0.471	68.5	0.507
5075.0	549.9	1003.3	33.757	24.146	35.6	41.504	66.9	3.303	0.128	0.435	73.6	0.453	5.9	0.125	0.434	73.9	0.452
5080.0	549.9	1003.3	30.159	21.966	36.1	37.311	68.1	2.969	0.083	0.399	78.3	0.407	5.2	0.080	0.398	78.7	0.406
5085.0	549.9	1003.3	27.071	20.038	36.5	33.680	69.2	2.680	0.049	0.365	82.4	0.369	4.5	0.046	0.365	82.8	0.368
5090.0	549.9	1003.3	24.406	18.329	36.9	30.522	70.3	2.429	0.025	0.334	85.8	0.335	3.9	0.021	0.334	86.4	0.335
5095.0	549.9	1003.3	22.096	16.813	37.3	27.765	71.3	2.209	0.011	0.306	88.0	0.306	3.4	0.002	0.306	89.6	0.306
5100.0	549.9	1003.3	20.083	15.463	37.6	25.346	72.3	2.017	0.014	0.280	87.1	0.281	3.0	-0.012	0.280	-87.6	0.280
5105.0	549.9	1003.3	18.321	14.259	37.9	23.216	73.2	1.847	0.023	0.257	84.9	0.258	2.7	-0.022	0.257	-85.2	0.258
5110.0	549.9	1003.3	16.771	13.182	38.2	21.332	74.1	1.698	0.030	0.236	82.9	0.238	2.4	-0.029	0.236	-83.0	0.237
5115.0	549.9	1003.3	15.403	12.216	38.4	19.659	74.9	1.564	0.035	0.217	80.9	0.219	2.2	-0.034	0.216	-81.0	0.219
5120.0	549.9	1003.3	14.189	11.348	38.7	18.169	75.7	1.446	0.038	0.199	79.2	0.203	2.0	-0.038	0.199	-79.2	0.203

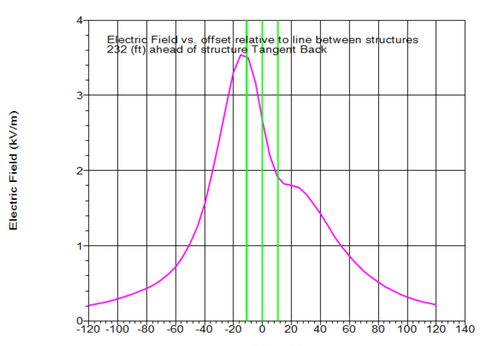




3D EMF Point Results Span from Structure 1, 900 ft to Tangent Ahead:

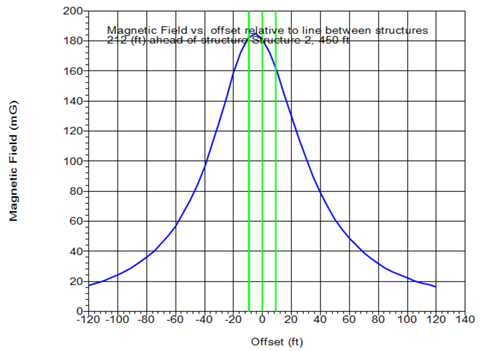
Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
4880.0	1449.9	1003.3	11.262	11.904	46.6	16.387	85.4	1.304	0.169	0.104	31.7	0.199	1.7	-0.169	-0.104	31.6	0.199
4885.0	1449.9	1003.3	12.164	12.809	46.5	17.664	85.0	1.406	0.183	0.120	33.2	0.219	1.8	-0.183	-0.120	33.2	0.218
4890.0	1449.9	1003.3	13.174	13.816	46.4	19.090	84.5	1.519	0.198	0.137	34.8	0.241	1.9	-0.198	-0.137	34.7	0.241
4895.0	1449.9	1003.3	14.309	14.940	46.2	20.688	83.9	1.646	0.215	0.158	36.4	0.267	1.9	-0.215	-0.158	36.4	0.267
4900.0	1449.9	1003.3	15.591	16.200	46.1	22.484	83.3	1.789	0.234	0.183	38.1	0.297	2.0	-0.233	-0.183	38.0	0.296
4905.0	1449.9	1003.3	17.044	17.614	45.9	24.511	82.5	1.950	0.254	0.212	39.8	0.331	2.0	-0.254	-0.211	39.8	0.331
4910.0	1449.9	1003.3	18.699	19.209	45.8	26.807	81.7	2.133	0.277	0.246	41.6	0.371	2.1	-0.277	-0.246	41.6	0.370
4915.0	1449.9	1003.3	20.592	21.011	45.6	29.419	80.8	2.341	0.303	0.287	43.4	0.417	2.2	-0.302	-0.286	43.4	0.416
4920.0	1449.9	1003.3	22.770	23.053	45.4	32.402	79.7	2.578	0.331	0.335	45.4	0.471	2.3	-0.330	-0.334	45.3	0.470
4925.0	1449.9	1003.3	25.286	25.374	45.1	35.822	78.6	2.851	0.361	0.392	47.3	0.533	2.4	-0.361	-0.391	47.3	0.532
4930.0	1449.9	1003.3	28.209	28.016	44.8	39.757	77.3	3.164	0.394	0.460	49.4	0.606	2.5	-0.394	-0.459	49.4	0.605
4935.0	1449.9	1003.3	31.621	31.026	44.5	44.300	75.9	3.525	0.429	0.540	51.5	0.690	2.6	-0.428	-0.539	51.5	0.689
4940.0	1449.9	1003.3	35.622	34.456	44.0	49.559	74.3	3.944	0.465	0.635	53.8	0.787	2.7	-0.464	-0.633	53.8	0.785
4945.0	1449.9	1003.3	40.335	38.355	43.6	55.660	72.6	4.429	0.498	0.746	56.2	0.897	3.0	-0.497	-0.743	56.2	0.894
4950.0	1449.9	1003.3	45.903	42.769	43.0	62.740	70.7	4.993	0.527	0.872	58.9	1.019	3.3	-0.525	-0.869	58.9	1.015
4955.0	1449.9	1003.3	52.490	47.724	42.3	70.942	68.7	5.645	0.544	1.015	61.8	1.151	3.7	-0.540	-1.011	61.9	1.146
4960.0	1449.9	1003.3	60.273	53.211	41.4	80.400	66.5	6.398	0.539	1.169	65.2	1.288	4.4	-0.534	-1.164	65.4	1.280
4965.0	1449.9	1003.3	69.425	59.162	40.4	91.214	64.2	7.259	0.501	1.327	69.3	1.419	5.5	-0.490	-1.320	69.6	1.408
4970.0	1449.9	1003.3	80.079	65.418	39.2	103.403	61.8	8.229	0.412	1.475	74.4	1.531	7.3	-0.389	-1.466	75.1	1.517
4975.0	1449.9	1003.3	92.270	71.702	37.9	116.855	59.3	9.299	0.270	1.593	80.4	1.615	10.2	-0.204	-1.581	82.7	1.594
4980.0	1449.9	1003.3	105.851	77.612	36.2	131.255	56.8	10.445	0.252	1.655	81.3	1.674	14.4	0.095	-1.640	-86.7	1.643
4985.0	1449.9	1003.3	120.386	82.649	34.5	146.026	54.5	11.620	0.613	1.639	69.5	1.750	19.3	0.530	-1.621	-71.9	1.705
4990.0	1449.9	1003.3	135.039	86.309	32.6	160.265	52.5	12.753	1.175	1.528	52.4	1.928	21.4	1.106	-1.507	-53.7	1.869
4995.0	1449.9	1003.3	148.478	88.199	30.7	172.698	50.8	13.743	1.855	1.323	35.5	2.278	18.1	1.786	-1.299	-36.0	2.209
5000.0	1449.9	1003.3	158.883	88.139	29.0	181.693	49.6	14.459	2.552	1.046	22.3	2.758	12.8	2.481	-1.017	-22.3	2.681
5005.0	1449.9	1003.3	164.259	86.200	27.7	185.504	49.0	14.762	3.127	0.730	13.1	3.211	8.7	3.054	-0.695	-12.8	3.132
5010.0	1449.9	1003.3	163.171	82.662	26.9	182.914	49.1	14.556	3.442	0.421	7.0	3.468	6.3	3.371	-0.369	-6.3	3.391
5015.0	1449.9	1003.3	155.599	77.926	26.6	174.022	49.6	13.848	3.432	0.192	3.2	3.438	5.2	3.369	-0.073	-1.2	3.370
5020.0	1449.9	1003.3	143.110	72.426	26.8	160.394	50.6	12.764	3.141	0.231	4.2	3.149	5.0	3.090	0.174	3.2	3.095
5025.0	1449.9	1003.3	128.052	66.560	27.5	144.317	51.9	11.484	2.683	0.384	8.1	2.711	5.5	2.645	0.361	7.8	2.670
5030.0	1449.9	1003.3	112.531	60.649	28.3	127.834	53.4	10.173	2.178	0.503	13.0	2.235	6.3	2.150	0.491	12.9	2.206
5035.0	1449.9	1003.3	97.912	54.931	29.3	112.268	55.0	8.934	1.705	0.577	18.7	1.800	7.2	1.685	0.570	18.7	1.779
5040.0	1449.9	1003.3	84.848	49.560	30.3	98.262	56.6	7.819	1.301	0.613	25.2	1.438	8.1	1.287	0.608	25.3	1.424
5045.0	1449.9	1003.3	73.520	44.621	31.3	86.001	58.3	6.844	0.975	0.620	32.4	1.156	8.8	0.965	0.617	32.6	1.146
5050.0	1449.9	1003.3	63.854	40.147	32.2	75.427	59.9	6.002	0.722	0.607	40.1	0.943	9.1	0.714	0.605	40.3	0.936
5055.0	1449.9	1003.3	55.671	36.137	33.0	66.371	61.4	5.282	0.528	0.581	47.8	0.785	8.9	0.522	0.579	48.0	0.780
5060.0	1449.9	1003.3	48.759	32.569	33.7	58.636	62.9	4.666	0.381	0.547	55.2	0.667	8.4	0.377	0.546	55.4	0.663
5065.0	1449.9	1003.3	42.917	29.408	34.4	52.026	64.3	4.140	0.271	0.510	62.0	0.578	7.6	0.268	0.509	62.3	0.575
5070.0	1449.9	1003.3	37.967	26.614	35.0	46.366	65.6	3.690	0.189	0.472	68.2	0.509	6.8	0.186	0.471	68.5	0.507
5075.0	1449.9	1003.3	33.757	24.146	35.6	41.503	66.9	3.303	0.128	0.435	73.6	0.453	5.9	0.125	0.434	73.9	0.452
5080.0	1449.9	1003.3	30.159	21.966	36.1	37.310	68.1	2.969	0.082	0.399	78.3	0.407	5.2	0.080	0.398	78.7	0.406
5085.0	1449.9	1003.3	27.071	20.038	36.5	33.680	69.2	2.680	0.049	0.365	82.4	0.369	4.5	0.046	0.365	82.8	0.368
5090.0	1449.9	1003.3	24.406	18.329	36.9	30.522	70.3	2.429	0.025	0.334	85.8	0.335	3.9	0.021	0.334	86.4	0.335
5095.0	1449.9	1003.3	22.095	16.813	37.3	27.765	71.3	2.209	0.011	0.306	88.0	0.306	3.4	0.002	0.306	89.6	0.306
5100.0	1449.9	1003.3	20.083	15.463	37.6	25.346	72.3	2.017	0.014	0.280	87.1	0.281	3.0	-0.012	0.280	-87.6	0.280
5105.0	1449.9	1003.3	18.321	14.259	37.9	23.216	73.2	1.847	0.023	0.257	84.9	0.258	2.7	-0.022	0.257	-85.2	0.258
5110.0	1449.9	1003.3	16.771	13.182	38.2	21.332	74.1	1.698	0.030	0.236	82.9	0.238	2.4	-0.029	0.236	-83.0	0.237
5115.0	1449.9	1003.3	15.403	12.216	38.4	19.659	74.9	1.564	0.035	0.217	80.9	0.219	2.2	-0.034	0.216	-81.0	0.219
5120.0	1449.9	1003.3	14.189	11.348	38.7	18.168	75.7	1.446	0.038	0.199	79.2	0.203	2.0	-0.038	0.199	-79.2	0.203

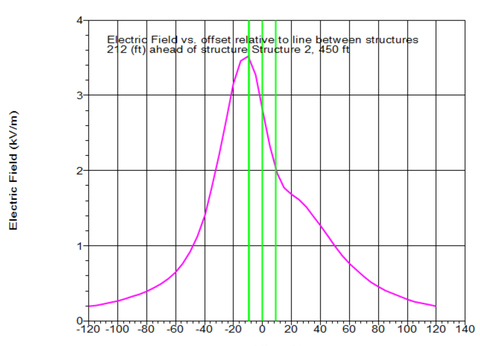




3D EMF Point Results Span from Tangent Back to Structure 2, 450 ft:

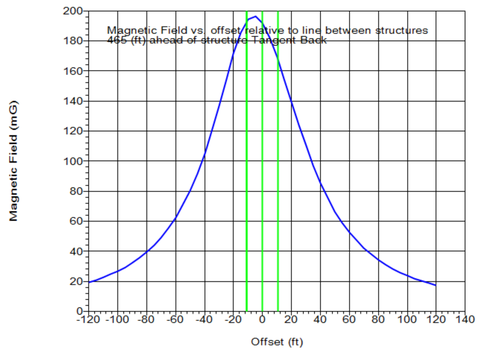
Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
5880.0	782.4	1003.3	14.471	11.784	39.2	18.662	81.2	1.485	0.026	0.208	82.8	0.209	1.9	-0.026	0.208	-82.8	0.209
5885.0	782.4	1003.3	15.761	12.705	38.9	20.244	80.2	1.611	0.022	0.226	84.4	0.227	2.1	-0.022	0.226	-84.5	0.227
5890.0	782.4	1003.3	17.216	13.730	38.6	22.020	79.2	1.752	0.016	0.247	86.2	0.247	2.3	-0.015	0.247	-86.4	0.247
5895.0	782.4	1003.3	18.864	14.873	38.3	24.022	78.1	1.912	0.010	0.269	87.9	0.270	2.6	-0.007	0.269	-88.5	0.269
5900.0	782.4	1003.3	20.739	16.153	37.9	26.287	77.0	2.092	0.010	0.295	88.1	0.295	2.9	0.004	0.294	89.1	0.295
5905.0	782.4	1003.3	22.881	17.589	37.5	28.860	75.8	2.297	0.023	0.322	86.0	0.323	3.3	0.020	0.322	86.5	0.323
5910.0	782.4	1003.3	25.341	19.205	37.2	31.796	74.5	2.530	0.043	0.353	83.1	0.355	3.8	0.041	0.353	83.4	0.355
5915.0	782.4	1003.3	28.178	21.028	36.7	35.159	73.2	2.798	0.070	0.386	79.7	0.393	4.3	0.068	0.386	80.0	0.392
5920.0	782.4	1003.3	31.467	23.090	36.3	39.030	71.8	3.106	0.107	0.422	75.7	0.436	5.0	0.105	0.422	76.0	0.435
5925.0	782.4	1003.3	35.300	25.425	35.8	43.504	70.3	3.462	0.157	0.461	71.2	0.487	5.7	0.155	0.461	71.4	0.486
5930.0	782.4	1003.3	39.788	28.075	35.2	48.695	68.8	3.875	0.224	0.502	66.0	0.549	6.5	0.221	0.501	66.2	0.547
5935.0	782.4	1003.3	45.065	31.081	34.6	54.743	67.2	4.356	0.313	0.543	60.1	0.627	7.3	0.309	0.542	60.3	0.624
5940.0	782.4	1003.3	51.294	34.489	33.9	61.810	65.6	4.919	0.432	0.583	53.5	0.726	8.0	0.427	0.582	53.7	0.722
5945.0	782.4	1003.3	58.666	38.344	33.2	70.085	63.9	5.577	0.590	0.620	46.4	0.855	8.5	0.584	0.618	46.6	0.850
5950.0	782.4	1003.3	67.394	42.685	32.3	79.775	62.1	6.348	0.799	0.648	39.0	1.028	8.7	0.791	0.646	39.2	1.021
5955.0	782.4	1003.3	77.698	47.540	31.5	91.088	60.2	7.249	1.072	0.662	31.7	1.259	8.4	1.061	0.659	31.8	1.249
5960.0	782.4	1003.3	89.759	52.909	30.5	104.193	58.4	8.291	1.419	0.654	24.7	1.563	7.8	1.404	0.649	24.8	1.547
5965.0	782.4	1003.3	103.631	58.757	29.6	119.130	56.5	9.480	1.847	0.615	18.4	1.947	7.0	1.826	0.608	18.4	1.924
5970.0	782.4	1003.3	119.075	64.992	28.6	135.657	54.6	10.795	2.341	0.535	12.9	2.402	6.1	2.311	0.523	12.7	2.369
5975.0	782.4	1003.3	135.313	71.446	27.8	153.017	52.7	12.177	2.855	0.407	8.1	2.884	5.4	2.813	0.384	7.8	2.839
5980.0	782.4	1003.3	150.796	77.865	27.3	169.713	51.0	13.505	3.296	0.244	4.2	3.305	5.0	3.241	0.184	3.2	3.246
5985.0	782.4	1003.3	163.239	83.901	27.2	183.538	49.5	14.605	3.538	0.204	3.3	3.544	5.3	3.471	-0.078	-1.3	3.472
5990.0	782.4	1003.3	170.258	89.128	27.6	192.176	48.4	15.293	3.471	0.448	7.3	3.499	6.7	3.396	-0.392	-6.6	3.418
5995.0	782.4	1003.3	170.474	93.082	28.6	194.231	47.8	15.456	3.071	0.775	14.2	3.167	9.7	2.995	-0.737	-13.8	3.084
6000.0	782.4	1003.3	164.178	95.327	30.1	189.847	47.8	15.108	2.429	1.112	24.6	2.671	14.7	2.354	-1.080	-24.6	2.590
6005.0	782.4	1003.3	152.971	95.549	32.0	180.360	48.5	14.353	1.694	1.411	39.8	2.205	20.7	1.620	-1.383	-40.5	2.130
6010.0	782.4	1003.3	138.856	93.654	34.0	167.487	49.8	13.328	1.007	1.635	58.4	1.920	22.8	0.926	-1.611	-60.1	1.858
6015.0	782.4	1003.3	123.592	89.813	36.0	152.779	51.6	12.158	0.468	1.762	75.1	1.823	18.5	0.354	-1.741	-78.5	1.776
6020.0	782.4	1003.3	108.470	84.444	37.9	137.465	53.7	10.939	0.245	1.787	82.2	1.804	12.8	-0.069	-1.769	87.8	1.770
6025.0	782.4	1003.3	94.326	78.093	39.6	122.458	56.0	9.745	0.393	1.725	77.2	1.770	8.7	-0.349	-1.711	78.5	1.746
6030.0	782.4	1003.3	81.613	71.308	41.1	108.377	58.3	8.624	0.534	1.603	71.6	1.689	6.2	-0.515	-1.591	72.1	1.672
6035.0	782.4	1003.3	70.500	64.540	42.5	95.580	60.6	7.606	0.607	1.445	67.2	1.568	4.6	-0.597	-1.436	67.4	1.555
6040.0	782.4	1003.3	60.961	58.096	43.6	84.210	62.7	6.701	0.629	1.276	63.8	1.422	3.7	-0.623	-1.269	63.8	1.413
6045.0	782.4	1003.3	52.865	52.154	44.6	74.261	64.7	5.910	0.618	1.109	60.9	1.270	3.1	-0.614	-1.104	60.9	1.263
6050.0	782.4	1003.3	46.033	46.790	45.5	65.638	66.4	5.223	0.588	0.955	58.4	1.122	2.8	-0.586	-0.951	58.4	1.117
6055.0	782.4	1003.3	40.276	42.013	46.2	58.200	68.0	4.631	0.549	0.818	56.1	0.985	2.5	-0.547	-0.815	56.1	0.982
6060.0	782.4	1003.3	35.420	37.793	46.9	51.797	69.3	4.122	0.506	0.698	54.1	0.863	2.3	-0.505	-0.696	54.0	0.860
6065.0	782.4	1003.3	31.312	34.082	47.4	46.282	70.4	3.683	0.464	0.596	52.1	0.755	2.2	-0.463	-0.594	52.1	0.753
6070.0	782.4	1003.3	27.823	30.823	47.9	41.524	71.3	3.304	0.423	0.509	50.3	0.662	2.1	-0.422	-0.507	50.2	0.660
6075.0	782.4	1003.3	24.846	27.962	48.4	37.406	72.0	2.977	0.385	0.435	48.5	0.581	2.0	-0.385	-0.434	48.4	0.580
6080.0	782.4	1003.3	22.292	25.447	48.8	33.830	72.6	2.692	0.350	0.373	46.8	0.512	2.0	-0.350	-0.372	46.7	0.511
6085.0	782.4	1003.3	20.090	23.230	49.1	30.712	73.0	2.444	0.319	0.320	45.1	0.452	1.9	-0.319	-0.320	45.1	0.451
6090.0	782.4	1003.3	18.182	21.272	49.5	27.984	73.2	2.227	0.291	0.276	43.5	0.401	1.8	-0.291	-0.275	43.5	0.400
6095.0	782.4	1003.3	16.521	19.537	49.8	25.586	73.4	2.036	0.266	0.239	42.0	0.357	1.8	-0.265	-0.238	41.9	0.357
6100.0	782.4	1003.3	15.067	17.995	50.1	23.470	73.5	1.868	0.243	0.207	40.5	0.320	1.7	-0.243	-0.207	40.4	0.319
6105.0	782.4	1003.3	13.789	16.621	50.3	21.596	73.5	1.719	0.223	0.180	39.0	0.287	1.7	-0.223	-0.180	38.9	0.286
6110.0	782.4	1003.3	12.661	15.391	50.6	19.929	73.5	1.586	0.205	0.158	37.6	0.258	1.6	-0.205	-0.157	37.5	0.258
6115.0	782.4	1003.3	11.660	14.287	50.8	18.441	73.4	1.467	0.189	0.138	36.2	0.234	1.6	-0.188	-0.138	36.1	0.233
6120.0	782.4	1003.3	10.769	13.293	51.0	17.108	73.2	1.361	0.174	0.121	34.9	0.212	1.5	-0.174	-0.121	34.8	0.212

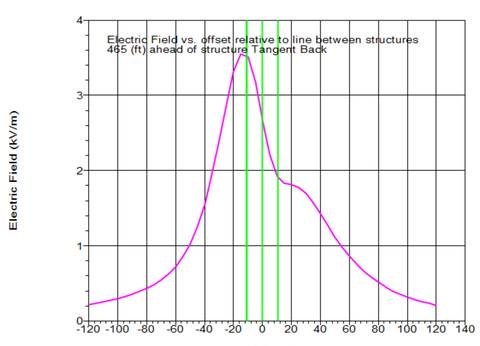




3D EMF Point Results Span from Structure 2, 450 ft to Tangent Ahead:

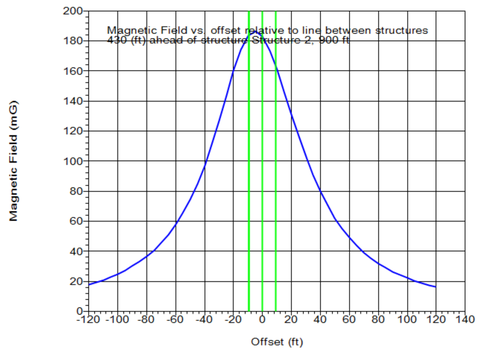
Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
6002.1	1243.7	1003.3	13.713	10.375	37.1	17.195	72.6	1.368	0.032	0.192	80.6	0.194	1.9	-0.031	0.192	-80.8	0.195
6006.5	1241.2	1003.3	14.934	11.197	36.9	18.666	71.7	1.485	0.028	0.209	82.3	0.211	2.1	-0.028	0.209	-82.5	0.211
6010.8	1238.7	1003.3	16.311	12.113	36.6	20.317	70.8	1.617	0.023	0.228	84.1	0.229	2.3	-0.023	0.228	-84.3	0.229
6015.1	1236.2	1003.3	17.867	13.136	36.3	22.176	69.8	1.765	0.017	0.248	86.1	0.249	2.6	-0.015	0.249	-86.4	0.249
6019.5	1233.7	1003.3	19.636	14.280	36.0	24.280	68.8	1.932	0.010	0.271	87.9	0.271	2.9	-0.006	0.271	-88.8	0.271
6023.8	1231.2	1003.3	21.654	15.566	35.7	26.668	67.7	2.122	0.012	0.296	87.6	0.297	3.3	0.008	0.297	88.5	0.297
6028.1	1228.7	1003.3	23.967	17.013	35.4	29.392	66.6	2.339	0.028	0.324	85.1	0.325	3.8	0.026	0.324	85.5	0.325
6032.4	1226.2	1003.3	26.632	18.647	35.0	32.511	65.5	2.587	0.052	0.354	81.7	0.358	4.4	0.050	0.355	82.0	0.358
6036.8	1223.7	1003.3	29.716	20.496	34.6	36.099	64.3	2.873	0.084	0.387	77.7	0.396	5.0	0.082	0.387	78.0	0.396
6041.1	1221.2	1003.3	33.303	22.593	34.2	40.243	63.1	3.202	0.128	0.422	73.1	0.441	5.8	0.126	0.422	73.3	0.441
6045.4	1218.7	1003.3	37.495	24.974	33.7	45.051	61.9	3.585	0.188	0.459	67.8	0.496	6.6	0.185	0.459	68.0	0.495
6049.8	1216.2	1003.3	42.416	27.680	33.1	50.649	60.6	4.031	0.267	0.496	61.7	0.563	7.5	0.264	0.496	62.0	0.562
6054.1	1213.7	1003.3	48.216	30.754	32.5	57.189	59.3	4.551	0.374	0.532	54.9	0.651	8.3	0.370	0.532	55.2	0.649
6058.4	1211.2	1003.3	55.071	34.238	31.9	64.846	57.9	5.160	0.517	0.565	47.6	0.766	8.8	0.512	0.565	47.8	0.762
6062.8	1208.7	1003.3	63.181	38.173	31.1	73.817	56.6	5.874	0.706	0.591	39.9	0.921	9.0	0.700	0.590	40.1	0.915
6067.1	1206.2	1003.3	72.756	42.586	30.3	84.303	55.2	6.709	0.956	0.603	32.3	1.130	8.8	0.947	0.602	32.5	1.122
6071.4	1203.7	1003.3	83.984	47.486	29.5	96.479	53.9	7.678	1.277	0.596	25.0	1.410	8.1	1.264	0.594	25.1	1.397
6075.8	1201.2	1003.3	96.953	52.844	28.6	110.419	52.6	8.787	1.679	0.560	18.5	1.770	7.2	1.660	0.555	18.5	1.751
6080.1	1198.7	1003.3	111.514	58.583	27.7	125.966	51.4	10.024	2.154	0.486	12.7	2.208	6.3	2.128	0.477	12.6	2.180
6084.4	1196.2	1003.3	127.062	64.550	26.9	142.519	50.3	11.341	2.668	0.368	7.9	2.693	5.5	2.631	0.348	7.5	2.654
6088.7	1193.7	1003.3	142.282	70.506	26.4	158.793	49.5	12.636	3.143	0.219	4.0	3.150	5.0	3.092	0.160	3.0	3.096
6093.1	1191.2	1003.3	155.076	76.118	26.1	172.750	49.0	13.747	3.457	0.201	3.3	3.462	5.2	3.394	-0.087	-1.5	3.395
6097.4	1188.7	1003.3	163.023	80.971	26.4	182.025	48.9	14.485	3.488	0.442	7.2	3.516	6.2	3.416	-0.387	-6.5	3.438
6101.7	1186.2	1003.3	164.413	84.614	27.2	184.909	49.3	14.715	3.183	0.757	13.4	3.272	8.7	3.109	-0.716	-13.0	3.191
6106.1	1183.7	1003.3	159.141	86.627	28.6	181.190	50.3	14.419	2.605	1.076	22.4	2.819	12.7	2.534	-1.041	-22.3	2.740
6110.4	1181.2	1003.3	148.616	86.727	30.3	172.071	51.9	13.693	1.897	1.353	35.5	2.330	17.9	1.829	-1.322	-35.9	2.257
6114.7	1178.7	1003.3	134.900	84.857	32.2	159.370	54.1	12.682	1.204	1.553	52.2	1.965	21.2	1.136	-1.526	-53.3	1.902
6119.1	1176.2	1003.3	119.906	81.220	34.1	144.825	56.7	11.525	0.630	1.656	69.2	1.772	19.3	0.550	-1.632	-71.4	1.722
6123.4	1173.7	1003.3	105.048	76.233	36.0	129.794	59.7	10.329	0.259	1.662	81.1	1.682	14.6	0.108	-1.641	-86.2	1.645
6127.7	1171.2	1003.3	91.208	70.415	37.7	115.227	62.8	9.169	0.265	1.589	80.6	1.611	10.3	-0.193	-1.572	83.0	1.584
6132.0	1168.7	1003.3	78.836	64.264	39.2	101.710	65.9	8.094	0.405	1.463	74.5	1.518	7.5	-0.380	-1.449	75.3	1.498
6136.4	1166.2	1003.3	68.074	58.172	40.5	89.544	69.0	7.126	0.494	1.309	69.3	1.399	5.7	-0.481	-1.298	69.7	1.384
6140.7	1163.7	1003.3	58.873	52.400	41.7	78.815	71.8	6.272	0.532	1.148	65.1	1.265	4.5	-0.524	-1.139	65.3	1.253
6145.0	1161.2	1003.3	51.083	47.095	42.7	69.479	74.4	5.529	0.536	0.992	61.6	1.128	3.8	-0.531	-0.985	61.7	1.119
6149.4	1158.7	1003.3	44.517	42.314	43.5	61.419	76.7	4.888	0.519	0.850	58.6	0.996	3.4	-0.515	-0.844	58.6	0.989
6153.7	1156.2	1003.3	38.989	38.060	44.3	54.486	78.6	4.336	0.491	0.724	55.9	0.875	3.0	-0.488	-0.719	55.9	0.869
6158.0	1153.7	1003.3	34.325	34.303	45.0	48.527	80.3	3.862	0.457	0.616	53.4	0.767	2.8	-0.455	-0.612	53.3	0.762
6162.4	1151.2	1003.3	30.378	30.997	45.6	43.401	81.6	3.454	0.422	0.523	51.1	0.672	2.6	-0.420	-0.520	51.0	0.668
6166.7	1148.7	1003.3	27.023	28.094	46.1	38.980	82.6	3.102	0.388	0.445	48.9	0.590	2.5	-0.386	-0.442	48.8	0.587
6171.0	1146.2	1003.3	24.157	25.542	46.6	35.156	83.3	2.798	0.355	0.379	46.8	0.519	2.3	-0.354	-0.376	46.7	0.517
6175.3	1143.7	1003.3	21.697	23.297	47.0	31.836	83.7	2.533	0.325	0.323	44.8	0.459	2.2	-0.324	-0.321	44.8	0.456
6179.7	1141.2	1003.3	19.574	21.318	47.4	28.942	83.9	2.303	0.297	0.277	43.0	0.406	2.1	-0.297	-0.275	42.9	0.405
6184.0	1138.7	1003.3	17.733	19.568	47.8	26.408	83.9	2.101	0.272	0.238	41.1	0.362	2.1	-0.272	-0.236	41.1	0.360
6188.3	1136.2	1003.3	16.129	18.016	48.2	24.181	83.7	1.924	0.250	0.205	39.4	0.323	2.0	-0.249	-0.204	39.3	0.322
6192.7	1133.7	1003.3	14.724	16.635	48.5	22.215	83.3	1.768	0.229	0.177	37.7	0.290	1.9	-0.229	-0.176	37.6	0.289
6197.0	1131.2	1003.3	13.487	15.403	48.8	20.474	82.9	1.629	0.211	0.154	36.1	0.261	1.8	-0.210	-0.153	36.0	0.260
6201.3	1128.7	1003.3	12.395	14.300	49.1	18.925	82.5	1.506	0.194	0.134	34.6	0.236	1.7	-0.194	-0.133	34.5	0.235
6205.7	1126.2	1003.3	11.426	13.310	49.4	17.542	81.9	1.396	0.179	0.117	33.1	0.214	1.7	-0.179	-0.116	33.0	0.213
6210.0	1123.7	1003.3	10.563	12.417	49.6	16.302	81.4	1.297	0.166	0.102	31.7	0.195	1.6	-0.165	-0.102	31.6	0.194

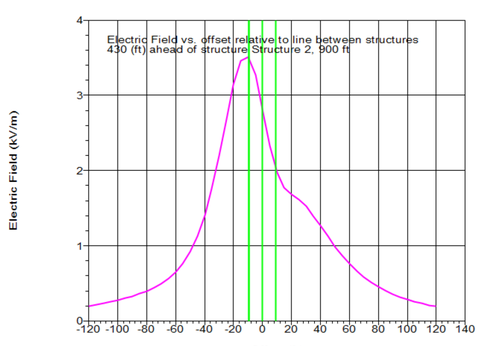




3D EMF Point Results Span from Tangent Back to Structure 2, 900 ft:

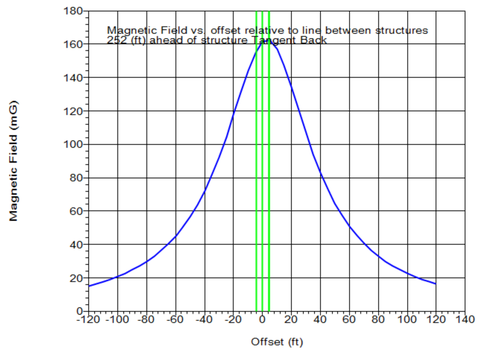
Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
6880.0	564.9	1003.3	14.625	12.394	40.3	19.170	82.6	1.526	0.036	0.211	80.3	0.214	2.0	-0.036	0.211	-80.3	0.214
6885.0	564.9	1003.3	15.892	13.347	40.0	20.753	81.7	1.652	0.032	0.230	82.0	0.232	2.2	-0.032	0.230	-82.1	0.232
6890.0	564.9	1003.3	17.323	14.408	39.8	22.531	80.7	1.793	0.027	0.250	83.9	0.252	2.4	-0.026	0.250	-84.1	0.252
6895.0	564.9	1003.3	18.945	15.590	39.5	24.535	79.7	1.952	0.019	0.273	85.9	0.274	2.7	-0.018	0.273	-86.3	0.274
6900.0	564.9	1003.3	20.792	16.912	39.1	26.802	78.7	2.133	0.011	0.298	87.8	0.298	3.0	-0.007	0.298	-88.7	0.298
6905.0	564.9	1003.3	22.906	18.394	38.8	29.378	77.6	2.338	0.014	0.326	87.6	0.326	3.4	0.008	0.326	88.5	0.326
6910.0	564.9	1003.3	25.337	20.060	38.4	32.317	76.4	2.572	0.032	0.357	84.9	0.358	3.9	0.029	0.356	85.4	0.358
6915.0	564.9	1003.3	28.146	21.937	37.9	35.685	75.2	2.840	0.059	0.390	81.5	0.395	4.4	0.056	0.390	81.8	0.394
6920.0	564.9	1003.3	31.409	24.056	37.4	39.563	73.9	3.148	0.095	0.427	77.4	0.437	5.1	0.093	0.426	77.7	0.436
6925.0	564.9	1003.3	35.218	26.453	36.9	44.046	72.5	3.505	0.145	0.465	72.7	0.487	5.8	0.142	0.465	73.0	0.486
6930.0	564.9	1003.3	39.686	29.165	36.3	49.251	71.0	3.919	0.211	0.506	67.4	0.548	6.7	0.208	0.506	67.7	0.547
6935.0	564.9	1003.3	44.953	32.237	35.6	55.317	69.4	4.402	0.300	0.548	61.3	0.625	7.5	0.296	0.547	61.6	0.622
6940.0	564.9	1003.3	51.185	35.711	34.9	62.412	67.7	4.967	0.419	0.589	54.6	0.722	8.2	0.414	0.588	54.8	0.719
6945.0	564.9	1003.3	58.579	39.633	34.1	70.726	65.9	5.628	0.577	0.626	47.3	0.851	8.8	0.571	0.624	47.5	0.846
6950.0	564.9	1003.3	67.355	44.038	33.2	80.473	64.0	6.404	0.787	0.654	39.7	1.023	8.9	0.779	0.652	39.9	1.016
6955.0	564.9	1003.3	77.742	48.951	32.2	91.869	62.0	7.311	1.061	0.669	32.2	1.254	8.7	1.050	0.665	32.4	1.243
6960.0	564.9	1003.3	89.932	54.372	31.2	105.091	59.9	8.363	1.410	0.661	25.1	1.558	8.0	1.395	0.656	25.2	1.542
6965.0	564.9	1003.3	103.985	60.264	30.1	120.185	57.8	9.564	1.840	0.622	18.7	1.943	7.1	1.819	0.615	18.7	1.920
6970.0	564.9	1003.3	119.662	66.531	29.1	136.914	55.6	10.895	2.338	0.542	13.1	2.400	6.2	2.308	0.530	12.9	2.368
6975.0	564.9	1003.3	136.169	73.009	28.2	154.507	53.5	12.295	2.856	0.414	8.2	2.885	5.5	2.814	0.390	7.9	2.841
6980.0	564.9	1003.3	151.916	79.445	27.6	171.435	51.5	13.642	3.301	0.250	4.3	3.310	5.1	3.246	0.189	3.3	3.251
6985.0	564.9	1003.3	164.556	85.494	27.5	185.440	49.9	14.757	3.546	0.204	3.3	3.551	5.4	3.478	-0.075	-1.2	3.479
6990.0	564.9	1003.3	171.654	90.735	27.9	194.160	48.7	15.451	3.478	0.447	7.3	3.507	6.8	3.403	-0.391	-6.6	3.426
6995.0	564.9	1003.3	171.828	94.703	28.9	196.198	48.0	15.613	3.077	0.777	14.2	3.174	9.8	3.000	-0.738	-13.8	3.090
7000.0	564.9	1003.3	165.422	96.956	30.4	191.742	47.9	15.258	2.432	1.116	24.6	2.675	14.8	2.357	-1.084	-24.7	2.594
7005.0	564.9	1003.3	154.101	97.169	32.2	182.179	48.4	14.497	1.693	1.417	39.9	2.208	20.8	1.619	-1.390	-40.7	2.134
7010.0	564.9	1003.3	139.913	95.231	34.2	169.247	49.5	13.468	1.003	1.643	58.6	1.925	22.9	0.921	-1.619	-60.4	1.863
7015.0	564.9	1003.3	124.625	91.303	36.2	154.492	51.0	12.294	0.464	1.770	75.3	1.830	18.5	0.346	-1.750	-78.8	1.784
7020.0	564.9	1003.3	109.516	85.799	38.1	139.123	52.8	11.071	0.249	1.795	82.1	1.812	12.8	-0.077	-1.778	87.5	1.779
7025.0	564.9	1003.3	95.401	79.275	39.7	124.040	54.7	9.871	0.401	1.732	77.0	1.778	8.7	-0.358	-1.718	78.2	1.755
7030.0	564.9	1003.3	82.720	72.294	41.2	109.859	56.7	8.742	0.542	1.608	71.4	1.697	6.1	-0.523	-1.597	71.9	1.680
7035.0	564.9	1003.3	71.629	65.322	42.4	96.942	58.7	7.714	0.614	1.449	67.0	1.573	4.6	-0.605	-1.440	67.2	1.562
7040.0	564.9	1003.3	62.102	58.684	43.4	85.443	60.7	6.799	0.635	1.277	63.5	1.427	3.7	-0.630	-1.271	63.6	1.418
7045.0	564.9	1003.3	54.006	52.563	44.2	75.363	62.5	5.997	0.624	1.109	60.6	1.273	3.2	-0.620	-1.104	60.7	1.267
7050.0	564.9	1003.3	47.163	47.043	44.9	66.614	64.2	5.301	0.593	0.954	58.1	1.123	2.8	-0.591	-0.950	58.1	1.119
7055.0	564.9	1003.3	41.388	42.132	45.5	59.060	65.8	4.700	0.554	0.816	55.8	0.986	2.6	-0.552	-0.813	55.8	0.982
7060.0	564.9	1003.3	36.508	37.801	46.0	52.552	67.2	4.182	0.510	0.695	53.7	0.862	2.4	-0.509	-0.693	53.7	0.860
7065.0	564.9	1003.3	32.371	33.999	46.4	46.945	68.5	3.736	0.467	0.592	51.7	0.754	2.3	-0.467	-0.590	51.7	0.752
7070.0	564.9	1003.3	28.850	30.668	46.7	42.105	69.7	3.351	0.426	0.504	49.8	0.660	2.2	-0.426	-0.503	49.7	0.659
7075.0	564.9	1003.3	25.839	27.749	47.0	37.917	70.8	3.017	0.388	0.430	47.9	0.579	2.1	-0.388	-0.429	47.9	0.578
7080.0	564.9	1003.3	23.251	25.189	47.3	34.280	71.8	2.728	0.354	0.367	46.1	0.510	2.1	-0.353	-0.367	46.1	0.509
7085.0	564.9	1003.3	21.015	22.940	47.5	31.110	72.7	2.476	0.322	0.315	44.3	0.451	2.0	-0.322	-0.314	44.3	0.450
7090.0	564.9	1003.3	19.073	20.958	47.7	28.337	73.5	2.255	0.294	0.271	42.6	0.400	2.0	-0.294	-0.270	42.6	0.399
7095.0	564.9	1003.3	17.377	19.206	47.9	25.901	74.2	2.061	0.269	0.233	41.0	0.356	1.9	-0.269	-0.233	40.9	0.355
7100.0	564.9	1003.3	15.890	17.654	48.0	23.752	74.8	1.890	0.246	0.202	39.3	0.318	1.9	-0.246	-0.201	39.3	0.318
7105.0	564.9	1003.3	14.580	16.274	48.1	21.849	75.4	1.739	0.226	0.175	37.7	0.286	1.8	-0.226	-0.175	37.7	0.285
7110.0	564.9	1003.3	13.420	15.043	48.3	20.158	75.9	1.604	0.208	0.152	36.2	0.258	1.8	-0.208	-0.152	36.2	0.257
7115.0	564.9	1003.3	12.389	13.941	48.4	18.650	76.3	1.484	0.192	0.133	34.7	0.233	1.7	-0.192	-0.132	34.7	0.233
7120.0	564.9	1003.3	11.469	12.952	48.5	17.300	76.7	1.377	0.177	0.116	33.2	0.212	1.7	-0.177	-0.116	33.2	0.212

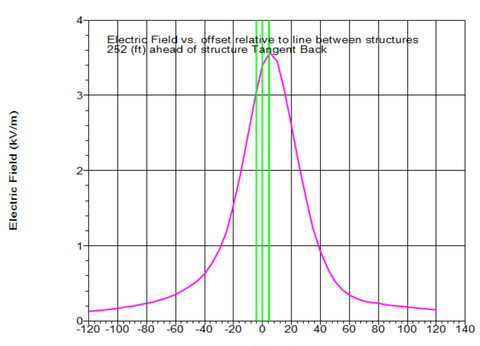




3D EMF Point Results Span from Structure 2, 900 ft to Tangent Ahead:

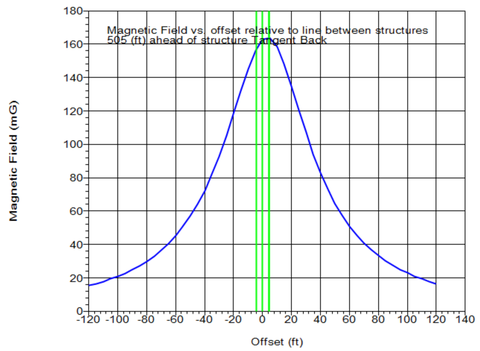
Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
7110.9	1432.1	1003.3	13.918	11.077	38.5	17.788	73.3	1.416	0.040	0.196	78.4	0.201	1.9	-0.040	0.196	-78.5	0.201
7115.2	1429.6	1003.3	15.114	11.932	38.3	19.256	72.5	1.532	0.037	0.213	80.2	0.217	2.1	-0.037	0.213	-80.3	0.217
7119.6	1427.1	1003.3	16.463	12.883	38.0	20.904	71.7	1.664	0.032	0.232	82.1	0.234	2.4	-0.032	0.232	-82.2	0.234
7123.9	1424.6	1003.3	17.990	13.944	37.8	22.761	70.9	1.811	0.026	0.253	84.1	0.254	2.6	-0.025	0.253	-84.4	0.254
7128.2	1422.1	1003.3	19.727	15.130	37.5	24.861	70.1	1.978	0.018	0.276	86.3	0.276	3.0	-0.016	0.276	-86.8	0.276
7132.6	1419.6	1003.3	21.712	16.461	37.2	27.246	69.2	2.168	0.011	0.301	88.0	0.301	3.4	-0.003	0.301	-89.5	0.301
7136.9	1417.1	1003.3	23.990	17.957	36.8	29.966	68.2	2.385	0.020	0.329	86.6	0.330	3.9	0.015	0.329	87.4	0.329
7141.2	1414.6	1003.3	26.619	19.643	36.4	33.082	67.2	2.633	0.042	0.359	83.3	0.362	4.5	0.039	0.359	83.8	0.361
7145.5	1412.1	1003.3	29.667	21.548	36.0	36.666	66.2	2.918	0.074	0.392	79.3	0.399	5.1	0.072	0.392	79.6	0.398
7149.9	1409.6	1003.3	33.218	23.704	35.5	40.809	65.1	3.247	0.118	0.427	74.6	0.443	5.9	0.115	0.427	74.9	0.442
7154.2	1407.1	1003.3	37.378	26.148	35.0	45.616	63.9	3.630	0.177	0.464	69.1	0.497	6.8	0.174	0.464	69.4	0.495
7158.5	1404.6	1003.3	42.272	28.919	34.4	51.217	62.7	4.076	0.256	0.502	62.9	0.563	7.7	0.253	0.501	63.2	0.561
7162.9	1402.1	1003.3	48.054	32.058	33.7	57.766	61.4	4.597	0.363	0.538	56.0	0.649	8.5	0.359	0.537	56.3	0.646
7167.2	1399.6	1003.3	54.903	35.609	33.0	65.440	60.0	5.208	0.506	0.571	48.5	0.763	9.1	0.501	0.570	48.7	0.759
7171.5	1397.1	1003.3	63.027	39.608	32.1	74.439	58.6	5.924	0.696	0.597	40.6	0.917	9.3	0.689	0.595	40.8	0.910
7175.9	1394.6	1003.3	72.644	44.082	31.3	84.973	57.2	6.762	0.946	0.610	32.8	1.126	9.0	0.936	0.607	33.0	1.116
7180.2	1392.1	1003.3	83.949	49.036	30.3	97.221	55.7	7.737	1.269	0.603	25.4	1.405	8.3	1.255	0.598	25.5	1.390
7184.5	1389.6	1003.3	97.039	54.442	29.3	111.268	54.2	8.854	1.672	0.567	18.7	1.765	7.4	1.652	0.560	18.7	1.745
7188.8	1387.1	1003.3	111.769	60.218	28.3	126.958	52.8	10.103	2.148	0.492	12.9	2.204	6.4	2.121	0.481	12.8	2.175
7193.2	1384.6	1003.3	127.521	66.213	27.4	143.687	51.5	11.434	2.664	0.373	8.0	2.690	5.6	2.626	0.350	7.6	2.649
7197.5	1382.1	1003.3	142.954	72.189	26.8	160.147	50.5	12.744	3.140	0.222	4.1	3.148	5.1	3.089	0.161	3.0	3.093
7201.8	1379.6	1003.3	155.923	77.814	26.5	174.261	49.8	13.867	3.455	0.202	3.3	3.461	5.2	3.391	-0.090	-1.5	3.392
7206.2	1377.1	1003.3	163.960	82.674	26.8	183.624	49.5	14.612	3.486	0.444	7.3	3.514	6.3	3.413	-0.392	-6.6	3.435
7210.5	1374.6	1003.3	165.342	86.312	27.6	186.515	49.8	14.842	3.180	0.762	13.5	3.270	8.7	3.105	-0.725	-13.1	3.188
7214.8	1372.1	1003.3	159.996	88.302	28.9	182.745	50.7	14.542	2.600	1.083	22.6	2.817	12.8	2.527	-1.053	-22.6	2.738
7219.2	1369.6	1003.3	149.385	88.346	30.6	173.554	52.2	13.811	1.889	1.363	35.8	2.330	18.0	1.820	-1.336	-36.3	2.258
7223.5	1367.1	1003.3	135.612	86.374	32.5	160.783	54.1	12.795	1.195	1.564	52.6	1.968	21.2	1.125	-1.541	-53.9	1.908
7227.8	1364.6	1003.3	120.602	82.583	34.4	146.167	56.5	11.632	0.622	1.666	69.5	1.778	19.2	0.538	-1.646	-71.9	1.732
7232.1	1362.1	1003.3	105.761	77.396	36.2	131.055	59.1	10.429	0.255	1.671	81.3	1.690	14.4	0.097	-1.654	-86.7	1.657
7236.5	1359.6	1003.3	91.956	71.348	37.8	116.390	61.9	9.262	0.271	1.595	80.4	1.618	10.2	-0.204	-1.582	82.6	1.595
7240.8	1357.1	1003.3	79.624	64.956	39.2	102.758	64.6	8.177	0.412	1.467	74.3	1.523	7.4	-0.389	-1.456	75.0	1.507
7245.1	1354.6	1003.3	68.897	58.628	40.4	90.466	67.2	7.199	0.500	1.310	69.1	1.402	5.7	-0.489	-1.302	69.4	1.391
7249.5	1352.1	1003.3	59.721	52.639	41.4	79.608	69.7	6.335	0.537	1.146	64.9	1.266	4.6	-0.531	-1.140	65.0	1.258
7253.8	1349.6	1003.3	51.946	47.142	42.2	70.148	72.1	5.582	0.540	0.989	61.4	1.127	3.9	-0.536	-0.984	61.4	1.121
7258.1	1347.1	1003.3	45.386	42.197	42.9	61.972	74.2	4.932	0.522	0.845	58.3	0.993	3.4	-0.520	-0.841	58.3	0.989
7262.5	1344.6	1003.3	39.854	37.806	43.5	54.933	76.2	4.371	0.493	0.718	55.5	0.871	3.1	-0.492	-0.715	55.5	0.868
7266.8	1342.1	1003.3	35.180	33.936	44.0	48.881	78.0	3.890	0.459	0.609	53.0	0.763	2.9	-0.458	-0.606	52.9	0.760
7271.1	1339.6	1003.3	31.217	30.541	44.4	43.672	79.7	3.475	0.424	0.515	50.5	0.667	2.7	-0.423	-0.514	50.5	0.666
7275.4	1337.1	1003.3	27.843	27.566	44.7	39.181	81.2	3.118	0.390	0.437	48.3	0.585	2.6	-0.389	-0.435	48.2	0.584
7279.8	1334.6	1003.3	24.954	24.960	45.0	35.295	82.5	2.809	0.357	0.370	46.1	0.514	2.5	-0.356	-0.369	46.0	0.513
7284.1	1332.1	1003.3	22.470	22.674	45.3	31.922	83.7	2.540	0.327	0.315	44.0	0.454	2.4	-0.326	-0.314	43.9	0.453
7288.4	1329.6	1003.3	20.321	20.664	45.5	28.982	84.7	2.306	0.299	0.268	41.9	0.402	2.3	-0.299	-0.268	41.9	0.401
7292.8	1327.1	1003.3	18.453	18.893	45.7	26.409	85.7	2.102	0.274	0.229	40.0	0.357	2.2	-0.273	-0.229	39.9	0.357
7297.1	1324.6	1003.3	16.821	17.327	45.8	24.149	86.5	1.922	0.251	0.197	38.1	0.319	2.2	-0.251	-0.196	38.0	0.318
7301.4	1322.1	1003.3	15.389	15.939	46.0	22.155	87.2	1.763	0.231	0.169	36.2	0.286	2.1	-0.230	-0.168	36.2	0.285
7305.8	1319.6	1003.3	14.126	14.704	46.1	20.390	87.8	1.623	0.212	0.146	34.5	0.257	2.0	-0.212	-0.145	34.4	0.257
7310.1	1317.1	1003.3	13.007	13.602	46.3	18.820	88.3	1.498	0.196	0.126	32.7	0.233	1.9	-0.196	-0.125	32.7	0.232
7314.4	1314.6	1003.3	12.012	12.616	46.4	17.420	88.7	1.386	0.181	0.109	31.1	0.211	1.9	-0.181	-0.109	31.0	0.211
7318.7	1312.1	1003.3	11.124	11.730	46.5	16.166	89.0	1.286	0.167	0.095	29.5	0.192	1.8	-0.167	-0.094	29.4	0.192

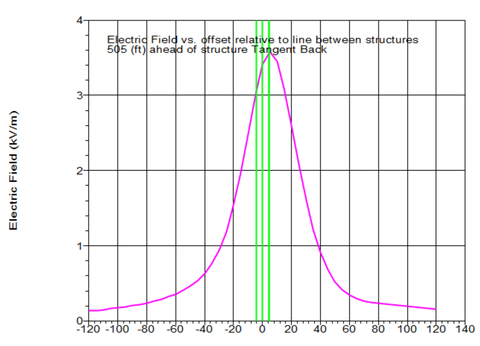




3D EMF Point Results Span from Tangent Back to Structure 3, 450 ft:

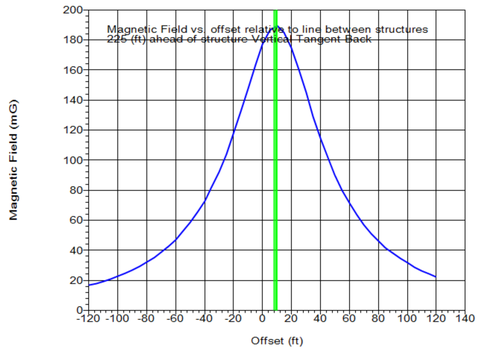
Measurement X (ft)	Y (ft)	Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
7880.0	802.1	1003.3	12.049	9.381	37.9	15.271	48.8	1.215	0.127	0.016	7.0	0.128	2.6	-0.128	-0.014	6.4	0.129
7885.0	802.1	1003.3	13.027	10.054	37.7	16.456	48.6	1.310	0.135	0.022	9.2	0.137	2.9	-0.137	-0.021	8.6	0.138
7890.0	802.1	1003.3	14.119	10.798	37.4	17.775	48.5	1.414	0.144	0.029	11.6	0.147	3.1	-0.145	-0.028	11.0	0.148
7895.0	802.1	1003.3	15.344	11.620	37.1	19.248	48.3	1.532	0.153	0.039	14.2	0.158	3.4	-0.154	-0.037	13.6	0.159
7900.0	802.1	1003.3	16.723	12.531	36.8	20.897	48.2	1.663	0.162	0.050	17.1	0.170	3.7	-0.164	-0.049	16.5	0.171
7905.0	802.1	1003.3	18.281	13.544	36.5	22.751	48.2	1.810	0.172	0.064	20.4	0.184	4.1	-0.174	-0.062	19.7	0.185
7910.0	802.1	1003.3	20.047	14.672	36.2	24.843	48.1	1.977	0.182	0.081	24.0	0.199	4.5	-0.184	-0.079	23.3	0.200
7915.0	802.1	1003.3	22.059	15.931	35.8	27.210	48.0	2.165	0.191	0.102	28.0	0.216	4.9	-0.193	-0.100	27.3	0.217
7920.0	802.1	1003.3	24.359	17.339	35.4	29.900	48.0	2.379	0.200	0.127	32.4	0.236	5.5	-0.202	-0.125	31.7	0.237
7925.0	802.1	1003.3	27.000	18.916	35.0	32.967	48.0	2.623	0.206	0.157	37.4	0.259	6.1	-0.208	-0.155	36.7	0.260
7930.0	802.1	1003.3	30.046	20.682	34.5	36.477	48.0	2.903	0.210	0.195	42.9	0.286	6.7	-0.212	-0.192	42.2	0.286
7935.0	802.1	1003.3	33.574	22.661	34.0	40.506	47.9	3.223	0.209	0.240	49.0	0.318	7.5	-0.211	-0.237	48.4	0.318
7940.0	802.1	1003.3	37.675	24.876	33.4	45.147	47.8	3.593	0.200	0.295	55.8	0.356	8.4	-0.202	-0.292	55.3	0.355
7945.0	802.1	1003.3	42.460	27.348	32.8	50.505	47.7	4.019	0.181	0.360	63.3	0.402	9.4	-0.181	-0.356	63.0	0.400
7950.0	802.1	1003.3	48.057	30.091	32.1	56.700	47.4	4.512	0.146	0.436	71.5	0.460	10.5	-0.143	-0.433	71.7	0.456
7955.0	802.1	1003.3	54.612	33.109	31.2	63.865	47.0	5.082	0.096	0.524	79.7	0.533	11.7	-0.079	-0.520	81.3	0.526
7960.0	802.1	1003.3	62.285	36.389	30.3	72.136	46.3	5.740	0.085	0.623	82.2	0.629	12.8	0.021	-0.619	-88.0	0.619
7965.0	802.1	1003.3	71.228	39.886	29.2	81.635	45.3	6.496	0.210	0.730	73.9	0.759	13.7	0.173	-0.724	-76.5	0.744
7970.0	802.1	1003.3	81.558	43.512	28.1	92.439	43.9	7.356	0.428	0.836	62.9	0.939	14.0	0.395	-0.830	-64.5	0.919
7975.0	802.1	1003.3	93.290	47.127	26.8	104.518	42.1	8.317	0.740	0.933	51.6	1.191	13.4	0.705	-0.925	-52.7	1.163
7980.0	802.1	1003.3	106.233	50.530	25.4	117.638	39.9	9.361	1.159	1.004	40.9	1.533	12.0	1.118	-0.995	-41.7	1.497
7985.0	802.1	1003.3	119.839	53.469	24.0	131.226	37.3	10.443	1.682	1.035	31.6	1.975	10.1	1.634	-1.024	-32.1	1.928
7990.0	802.1	1003.3	133.031	55.671	22.7	144.210	34.5	11.476	2.275	1.012	24.0	2.490	8.1	2.218	-1.000	-24.3	2.433
7995.0	802.1	1003.3	144.137	56.898	21.5	154.960	31.6	12.331	2.859	0.930	18.0	3.006	6.2	2.792	-0.917	-18.2	2.939
8000.0	802.1	1003.3	151.146	57.003	20.7	161.538	28.8	12.855	3.311	0.798	13.6	3.406	4.7	3.237	-0.784	-13.6	3.331
8005.0	802.1	1003.3	152.441	55.970	20.2	162.392	26.3	12.923	3.513	0.636	10.3	3.570	3.6	3.438	-0.621	-10.2	3.494
8010.0	802.1	1003.3	147.676	53.921	20.1	157.212	24.2	12.511	3.418	0.465	7.8	3.449	2.9	3.349	-0.450	-7.6	3.379
8015.0	802.1	1003.3	138.016	51.072	20.3	147.163	22.6	11.711	3.074	0.305	5.7	3.089	2.7	3.016	-0.287	-5.4	3.030
8020.0	802.1	1003.3	125.472	47.686	20.8	134.228	21.4	10.682	2.592	0.168	3.7	2.598	2.8	2.546	-0.142	-3.2	2.550
8025.0	802.1	1003.3	111.965	44.016	21.5	120.307	20.7	9.574	2.081	0.077	2.1	2.082	3.4	2.045	-0.020	-0.6	2.045
8030.0	802.1	1003.3	98.831	40.276	22.2	106.723	20.3	8.493	1.611	0.097	3.5	1.614	4.4	1.583	0.077	2.8	1.585
8035.0	802.1	1003.3	86.785	36.625	22.9	94.196	20.2	7.496	1.214	0.157	7.4	1.224	5.8	1.192	0.150	7.2	1.202
8040.0	802.1	1003.3	76.101	33.167	23.5	83.015	20.4	6.606	0.896	0.205	12.9	0.919	7.5	0.879	0.203	13.0	0.902
8045.0	802.1	1003.3	66.803	29.966	24.2	73.216	20.7	5.826	0.650	0.238	20.1	0.692	9.5	0.636	0.237	20.5	0.679
8050.0	802.1	1003.3	58.790	27.046	24.7	64.713	21.1	5.150	0.463	0.258	29.1	0.530	11.4	0.451	0.258	29.8	0.519
8055.0	802.1	1003.3	51.914	24.414	25.2	57.368	21.7	4.565	0.322	0.266	39.6	0.418	12.8	0.312	0.267	40.6	0.411
8060.0	802.1	1003.3	46.019	22.058	25.6	51.032	22.2	4.061	0.218	0.267	50.8	0.345	13.2	0.209	0.268	52.1	0.340
8065.0	802.1	1003.3	40.960	19.959	26.0	45.564	22.9	3.626	0.141	0.263	61.7	0.298	12.3	0.133	0.264	63.3	0.296
8070.0	802.1	1003.3	36.607	18.095	26.3	40.835	23.5	3.250	0.085	0.254	71.6	0.268	10.6	0.077	0.256	73.3	0.267
8075.0	802.1	1003.3	32.849	16.441	26.6	36.734	24.2	2.923	0.044	0.244	79.7	0.248	8.8	0.036	0.245	81.7	0.247
8080.0	802.1	1003.3	29.593	14.975	26.8	33.166	24.9	2.639	0.019	0.231	85.4	0.232	7.1	0.006	0.233	88.5	0.233
8085.0	802.1	1003.3	26.760	13.674	27.1	30.052	25.6	2.391	0.018	0.219	85.2	0.219	5.8	-0.016	0.220	-85.9	0.220
8090.0	802.1	1003.3	24.286	12.519	27.3	27.323	26.3	2.174	0.030	0.206	81.6	0.208	4.7	-0.031	0.207	-81.5	0.209
8095.0	802.1	1003.3	22.117	11.490	27.5	24.923	27.0	1.983	0.040	0.193	78.2	0.197	3.9	-0.042	0.194	-77.8	0.198
8100.0	802.1	1003.3	20.206	10.574	27.6	22.806	27.7	1.815	0.048	0.181	75.3	0.187	3.3	-0.049	0.182	-74.8	0.188
8105.0	802.1	1003.3	18.517	9.755	27.8	20.930	28.4	1.666	0.052	0.169	72.8	0.177	2.8	-0.054	0.170	-72.3	0.178
8110.0	802.1	1003.3	17.019	9.021	27.9	19.262	29.1	1.533	0.056	0.158	70.6	0.168	2.4	-0.057	0.159	-70.2	0.169
8115.0	802.1	1003.3	15.684	8.363	28.1	17.774	29.8	1.414	0.057	0.148	68.8	0.158	2.1	-0.059	0.148	-68.4	0.160
8120.0	802.1	1003.3	14.491	7.770	28.2	16.443	30.5	1.308	0.058	0.138	67.2	0.150	1.8	-0.059	0.139	-66.8	0.151

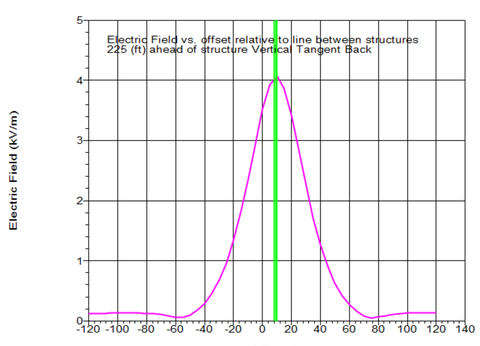




3D EMF Point Results Span from Tangent Back to Structure 3, 900 ft:

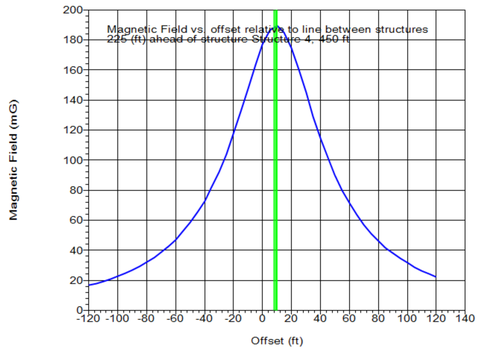
Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	E Real (kV/m)	E Imaginary (kV/m)	E Angle (deg)	E Magnitude (kV/m)	E Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
8880.0	605.4	1003.3	12.667	8.828	34.9	15.439	44.7	1.229	0.133	0.012	5.4	0.133	2.5	-0.134	-0.012	5.0	0.134
8885.0	605.4	1003.3	13.658	9.472	34.7	16.621	44.9	1.323	0.141	0.019	7.6	0.142	2.8	-0.142	-0.018	7.2	0.143
8890.0	605.4	1003.3	14.764	10.187	34.6	17.937	45.0	1.427	0.150	0.026	10.0	0.152	3.1	-0.151	-0.026	9.7	0.153
8895.0	605.4	1003.3	16.002	10.980	34.5	19.406	45.2	1.544	0.159	0.036	12.7	0.163	3.4	-0.160	-0.035	12.4	0.164
8900.0	605.4	1003.3	17.394	11.862	34.3	21.053	45.3	1.675	0.168	0.047	15.7	0.175	3.7	-0.169	-0.047	15.4	0.176
8905.0	605.4	1003.3	18.964	12.846	34.1	22.905	45.5	1.823	0.178	0.061	19.0	0.188	4.1	-0.179	-0.061	18.7	0.189
8910.0	605.4	1003.3	20.742	13.947	33.9	24.995	45.7	1.989	0.188	0.079	22.7	0.204	4.5	-0.189	-0.078	22.3	0.204
8915.0	605.4	1003.3	22.765	15.181	33.7	27.363	46.0	2.177	0.197	0.100	26.8	0.221	5.0	-0.198	-0.099	26.4	0.222
8920.0	605.4	1003.3	25.075	16.567	33.5	30.054	46.2	2.392	0.206	0.125	31.3	0.241	5.6	-0.207	-0.124	30.9	0.241
8925.0	605.4	1003.3	27.726	18.125	33.2	33.125	46.4	2.636	0.213	0.156	36.3	0.264	6.2	-0.214	-0.155	36.0	0.264
8930.0	605.4	1003.3	30.780	19.879	32.9	36.641	46.6	2.916	0.216	0.194	41.9	0.291	6.9	-0.217	-0.193	41.6	0.291
8935.0	605.4	1003.3	34.313	21.853	32.5	40.681	46.8	3.237	0.215	0.240	48.1	0.323	7.6	-0.216	-0.238	47.8	0.322
8940.0	605.4	1003.3	38.419	24.072	32.1	45.338	46.9	3.608	0.207	0.295	55.0	0.361	8.5	-0.207	-0.293	54.8	0.359
8945.0	605.4	1003.3	43.207	26.561	31.6	50.718	46.9	4.036	0.188	0.361	62.6	0.407	9.5	-0.187	-0.359	62.5	0.405
8950.0	605.4	1003.3	48.805	29.336	31.0	56.944	46.8	4.531	0.153	0.439	70.8	0.465	10.5	-0.148	-0.436	71.2	0.461
8955.0	605.4	1003.3	55.362	32.407	30.3	64.150	46.5	5.105	0.102	0.528	79.1	0.538	11.7	-0.085	-0.525	80.8	0.532
8960.0	605.4	1003.3	63.037	35.761	29.6	72.474	46.0	5.767	0.083	0.628	82.5	0.634	12.8	0.016	-0.625	-88.5	0.625
8965.0	605.4	1003.3	71.987	39.356	28.7	82.043	45.1	6.529	0.203	0.736	74.6	0.763	13.7	0.168	-0.731	-77.0	0.750
8970.0	605.4	1003.3	82.331	43.108	27.6	92.934	43.8	7.395	0.421	0.844	63.5	0.943	13.9	0.390	-0.838	-65.0	0.924
8975.0	605.4	1003.3	94.092	46.872	26.5	105.120	42.1	8.365	0.733	0.941	52.1	1.193	13.4	0.701	-0.934	-53.1	1.168
8980.0	605.4	1003.3	107.083	50.443	25.2	118.369	40.0	9.420	1.153	1.014	41.3	1.535	12.0	1.116	-1.005	-42.0	1.502
8985.0	605.4	1003.3	120.760	53.559	23.9	132.104	37.5	10.513	1.678	1.045	31.9	1.976	10.1	1.634	-1.034	-32.3	1.934
8990.0	605.4	1003.3	134.037	55.938	22.7	145.241	34.7	11.558	2.274	1.021	24.2	2.493	8.1	2.221	-1.010	-24.4	2.440
8995.0	605.4	1003.3	145.216	57.327	21.5	156.122	31.8	12.424	2.861	0.938	18.2	3.011	6.2	2.798	-0.926	-18.3	2.948
9000.0	605.4	1003.3	152.242	57.571	20.7	162.764	29.0	12.952	3.315	0.805	13.7	3.412	4.7	3.246	-0.792	-13.7	3.341
9005.0	605.4	1003.3	153.456	56.651	20.3	163.579	26.5	13.017	3.519	0.641	10.3	3.577	3.5	3.449	-0.628	-10.3	3.505
9010.0	605.4	1003.3	148.500	54.688	20.2	158.250	24.4	12.593	3.422	0.469	7.8	3.454	2.8	3.358	-0.455	-7.7	3.389
9015.0	605.4	1003.3	138.577	51.903	20.5	147.978	22.7	11.776	3.076	0.307	5.7	3.092	2.6	3.023	-0.290	-5.5	3.037
9020.0	605.4	1003.3	125.753	48.563	21.1	134.804	21.6	10.727	2.592	0.168	3.7	2.597	2.8	2.550	-0.144	-3.2	2.554
9025.0	605.4	1003.3	111.998	44.924	21.9	120.672	20.8	9.603	2.077	0.076	2.1	2.079	3.4	2.046	-0.022	-0.6	2.046
9030.0	605.4	1003.3	98.670	41.204	22.7	106.927	20.4	8.509	1.605	0.097	3.5	1.608	4.4	1.581	0.076	2.8	1.583
9035.0	605.4	1003.3	86.487	37.562	23.5	94.291	20.3	7.503	1.207	0.158	7.5	1.217	5.8	1.189	0.150	7.2	1.198
9040.0	605.4	1003.3	75.718	34.105	24.2	83.044	20.3	6.608	0.888	0.207	13.1	0.912	7.6	0.874	0.203	13.1	0.897
9045.0	605.4	1003.3	66.374	30.896	25.0	73.212	20.6	5.826	0.641	0.240	20.5	0.685	9.8	0.630	0.239	20.8	0.674
9050.0	605.4	1003.3	58.344	27.962	25.6	64.699	20.9	5.149	0.454	0.260	29.8	0.523	11.9	0.445	0.259	30.3	0.515
9055.0	605.4	1003.3	51.472	25.310	26.2	57.358	21.3	4.564	0.314	0.269	40.7	0.413	13.4	0.306	0.269	41.4	0.407
9060.0	605.4	1003.3	45.595	22.930	26.7	51.036	21.8	4.061	0.209	0.271	52.3	0.342	13.7	0.202	0.271	53.2	0.338
9065.0	605.4	1003.3	40.562	20.804	27.2	45.586	22.2	3.628	0.133	0.266	63.5	0.297	12.6	0.126	0.267	64.7	0.295
9070.0	605.4	1003.3	36.241	18.910	27.6	40.878	22.7	3.253	0.077	0.258	73.5	0.269	10.8	0.070	0.258	74.9	0.268
9075.0	605.4	1003.3	32.518	17.225	27.9	36.798	23.2	2.928	0.037	0.247	81.5	0.250	8.9	0.029	0.248	83.4	0.250
9080.0	605.4	1003.3	29.297	15.726	28.2	33.251	23.7	2.646	0.017	0.235	85.9	0.236	7.1	-0.001	0.236	-89.7	0.236
9085.0	605.4	1003.3	26.500	14.392	28.5	30.156	24.2	2.400	0.025	0.223	83.6	0.224	5.7	-0.023	0.223	-84.2	0.224
9090.0	605.4	1003.3	24.061	13.203	28.8	27.446	24.7	2.184	0.038	0.210	79.7	0.213	4.6	-0.038	0.210	-79.8	0.214
9095.0	605.4	1003.3	21.925	12.142	29.0	25.062	25.1	1.994	0.048	0.197	76.2	0.203	3.8	-0.049	0.198	-76.2	0.204
9100.0	605.4	1003.3	20.046	11.194	29.2	22.959	25.6	1.827	0.055	0.185	73.3	0.193	3.2	-0.056	0.185	-73.2	0.194
9105.0	605.4	1003.3	18.387	10.343	29.4	21.096	26.0	1.679	0.060	0.173	70.9	0.183	2.7	-0.061	0.174	-70.7	0.184
9110.0	605.4	1003.3	16.916	9.580	29.5	19.440	26.5	1.547	0.063	0.162	68.8	0.174	2.3	-0.064	0.163	-68.6	0.175
9115.0	605.4	1003.3	15.608	8.892	29.7	17.963	26.9	1.429	0.065	0.152	67.0	0.165	2.0	-0.065	0.152	-66.8	0.166
9120.0	605.4	1003.3	14.439	8.272	29.8	16.641	27.3	1.324	0.065	0.142	65.4	0.156	1.7	-0.066	0.143	-65.3	0.157

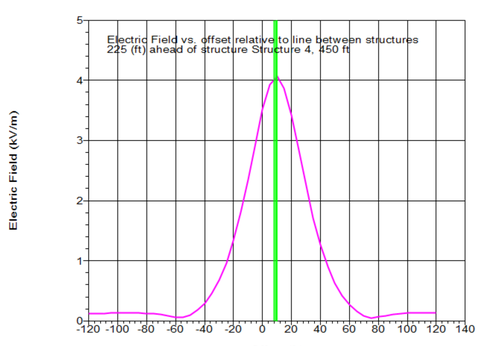




3D EMF Point Results Span from Vertical Tangent Back to Structure 4, 450 ft:

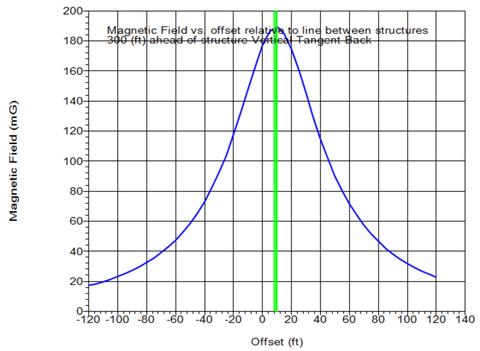
Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
9880.0	774.9	1003.3	14.688	8.030	28.7	16.740	8.4	1.332	0.103	0.062	31.1	0.120	0.6	-0.103	0.062	-31.0	0.120
9885.0	774.9	1003.3	15.827	8.614	28.6	18.020	8.7	1.434	0.107	0.063	30.5	0.124	0.7	-0.107	0.063	-30.5	0.124
9890.0	774.9	1003.3	17.090	9.255	28.4	19.435	8.9	1.547	0.111	0.063	29.8	0.127	0.8	-0.111	0.063	-29.8	0.127
9895.0	774.9	1003.3	18.494	9.960	28.3	21.006	9.2	1.672	0.114	0.063	29.0	0.131	1.0	-0.114	0.063	-29.0	0.131
9900.0	774.9	1003.3	20.059	10.736	28.2	22.751	9.4	1.811	0.117	0.063	28.1	0.133	1.1	-0.117	0.063	-28.1	0.133
9905.0	774.9	1003.3	21.809	11.592	28.0	24.698	9.7	1.965	0.120	0.061	27.1	0.134	1.3	-0.119	0.061	-27.0	0.134
9910.0	774.9	1003.3	23.772	12.537	27.8	26.876	10.0	2.139	0.121	0.058	25.8	0.134	1.6	-0.121	0.058	-25.7	0.134
9915.0	774.9	1003.3	25.982	13.581	27.6	29.318	10.2	2.333	0.120	0.054	24.2	0.132	2.1	-0.120	0.054	-24.1	0.131
9920.0	774.9	1003.3	28.478	14.737	27.4	32.065	10.5	2.552	0.117	0.048	22.2	0.126	2.8	-0.117	0.047	-22.1	0.126
9925.0	774.9	1003.3	31.306	16.018	27.1	35.166	10.8	2.798	0.111	0.039	19.6	0.117	3.9	-0.110	0.038	-19.2	0.116
9930.0	774.9	1003.3	34.523	17.436	26.8	38.676	11.1	3.078	0.100	0.028	15.8	0.104	6.2	-0.099	0.026	-14.8	0.102
9935.0	774.9	1003.3	38.195	19.006	26.5	42.662	11.4	3.395	0.083	0.016	11.0	0.084	11.9	-0.080	0.010	-7.1	0.081
9940.0	774.9	1003.3	42.402	20.743	26.1	47.203	11.7	3.756	0.059	0.019	17.7	0.062	31.2	-0.053	-0.011	11.8	0.054
9945.0	774.9	1003.3	47.238	22.660	25.6	52.392	12.0	4.169	0.035	0.042	50.1	0.055	83.2	-0.013	-0.038	70.7	0.040
9950.0	774.9	1003.3	52.816	24.770	25.1	58.336	12.2	4.642	0.060	0.075	51.2	0.096	24.6	0.044	-0.072	-58.7	0.084
9955.0	774.9	1003.3	59.268	27.079	24.6	65.161	12.3	5.185	0.135	0.117	40.8	0.179	10.8	0.124	-0.114	-42.6	0.168
9960.0	774.9	1003.3	66.744	29.588	23.9	73.008	12.3	5.810	0.246	0.167	34.2	0.298	6.5	0.236	-0.165	-34.9	0.287
9965.0	774.9	1003.3	75.411	32.288	23.2	82.032	12.3	6.528	0.400	0.228	29.6	0.461	4.9	0.389	-0.225	-30.0	0.450
9970.0	774.9	1003.3	85.441	35.151	22.4	92.389	12.0	7.352	0.611	0.297	25.9	0.679	4.1	0.598	-0.294	-26.1	0.666
9975.0	774.9	1003.3	96.983	38.131	21.5	104.210	11.6	8.293	0.893	0.373	22.7	0.968	3.6	0.877	-0.369	-22.8	0.952
9980.0	774.9	1003.3	110.109	41.151	20.5	117.547	10.8	9.354	1.261	0.453	19.7	1.340	3.3	1.242	-0.449	-19.9	1.320
9985.0	774.9	1003.3	124.707	44.103	19.5	132.276	9.8	10.526	1.726	0.530	17.1	1.805	3.1	1.700	-0.526	-17.2	1.780
9990.0	774.9	1003.3	140.311	46.849	18.5	147.925	8.4	11.772	2.280	0.599	14.7	2.358	2.7	2.246	-0.595	-14.8	2.324
9995.0	774.9	1003.3	155.862	49.221	17.5	163.449	6.6	13.007	2.886	0.652	12.7	2.959	2.3	2.841	-0.648	-12.8	2.914
10000.0	774.9	1003.3	169.538	51.049	16.8	177.057	4.5	14.090	3.459	0.686	11.2	3.526	1.9	3.402	-0.683	-11.4	3.470
10005.0	774.9	1003.3	178.919	52.178	16.3	186.372	2.2	14.831	3.871	0.704	10.3	3.934	1.5	3.804	-0.701	-10.4	3.868
10010.0	774.9	1003.3	181.818	52.502	16.1	189.246	0.2	15.060	4.002	0.707	10.0	4.064	1.4	3.931	-0.705	-10.2	3.994
10015.0	774.9	1003.3	177.458	51.991	16.3	184.917	2.7	14.715	3.808	0.700	10.4	3.872	1.6	3.742	-0.698	-10.6	3.807
10020.0	774.9	1003.3	166.984	50.694	16.9	174.509	4.9	13.887	3.353	0.679	11.5	3.421	2.0	3.298	-0.676	-11.6	3.367
10025.0	774.9	1003.3	152.729	48.729	17.7	160.314	6.9	12.757	2.765	0.640	13.0	2.838	2.4	2.722	-0.636	-13.2	2.796
10030.0	774.9	1003.3	137.036	46.257	18.7	144.633	8.6	11.510	2.164	0.583	15.1	2.241	2.8	2.132	-0.579	-15.2	2.209
10035.0	774.9	1003.3	121.569	43.452	19.7	129.101	10.0	10.274	1.626	0.512	17.5	1.704	3.1	1.602	-0.508	-17.6	1.680
10040.0	774.9	1003.3	107.246	40.472	20.7	114.629	10.9	9.122	1.181	0.433	20.2	1.258	3.3	1.162	-0.429	-20.3	1.239
10045.0	774.9	1003.3	94.443	37.453	21.6	101.598	11.6	8.085	0.830	0.354	23.1	0.903	3.6	0.816	-0.351	-23.3	0.888
10050.0	774.9	1003.3	83.221	34.494	22.5	90.087	12.0	7.169	0.564	0.279	26.3	0.629	4.1	0.552	-0.276	-26.6	0.617
10055.0	774.9	1003.3	73.486	31.664	23.3	80.018	12.2	6.368	0.366	0.212	30.1	0.423	5.0	0.355	-0.209	-30.5	0.412
10060.0	774.9	1003.3	65.080	29.005	24.0	71.251	12.3	5.670	0.221	0.154	34.9	0.269	6.9	0.210	-0.151	-35.7	0.259
10065.0	774.9	1003.3	57.831	26.541	24.7	63.630	12.2	5.064	0.117	0.105	41.8	0.157	12.1	0.105	-0.102	-44.1	0.147
10070.0	774.9	1003.3	51.573	24.277	25.2	57.001	12.1	4.536	0.050	0.065	52.6	0.082	30.7	0.030	-0.062	-64.1	0.069
10075.0	774.9	1003.3	46.160	22.212	25.7	51.226	11.9	4.076	0.039	0.034	41.6	0.052	84.2	-0.023	-0.030	52.0	0.038
10080.0	774.9	1003.3	41.464	20.336	26.1	46.182	11.6	3.675	0.065	0.015	13.2	0.067	23.4	-0.060	-0.004	3.9	0.060
10085.0	774.9	1003.3	37.377	18.638	26.5	41.766	11.3	3.324	0.088	0.020	12.8	0.090	9.6	-0.086	0.016	-10.4	0.087
10090.0	774.9	1003.3	33.806	17.103	26.8	37.887	11.0	3.015	0.103	0.033	17.5	0.108	5.3	-0.102	0.031	-16.8	0.107
10095.0	774.9	1003.3	30.677	15.718	27.1	34.469	10.8	2.743	0.113	0.043	20.9	0.121	3.4	-0.113	0.042	-20.6	0.120
10100.0	774.9	1003.3	27.923	14.467	27.4	31.448	10.5	2.503	0.119	0.051	23.3	0.129	2.5	-0.119	0.051	-23.1	0.129
10105.0	774.9	1003.3	25.492	13.337	27.6	28.770	10.2	2.289	0.121	0.057	25.1	0.134	1.9	-0.121	0.056	-25.0	0.134
10110.0	774.9	1003.3	23.337	12.316	27.8	26.387	9.9	2.100	0.122	0.061	26.5	0.136	1.5	-0.121	0.060	-26.5	0.136
10115.0	774.9	1003.3	21.421	11.392	28.0	24.262	9.6	1.931	0.120	0.063	27.7	0.136	1.2	-0.120	0.063	-27.7	0.136
10120.0	774.9	1003.3	19.713	10.555	28.2	22.361	9.3	1.779	0.118	0.064	28.7	0.134	1.0	-0.118	0.064	-28.6	0.134

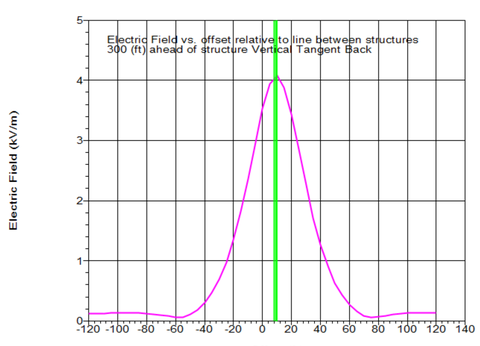




3D EMF Point Results Span from Structure 4, 450 ft to Vertical Tangent Ahead:

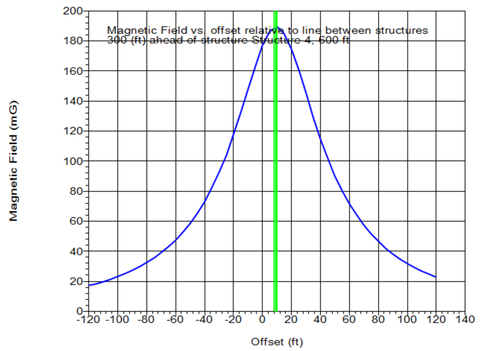
Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
9880.0	1225.1	1003.3	14.688	8.030	28.7	16.740	8.4	1.332	0.103	0.062	31.0	0.120	0.6	-0.103	0.062	-31.0	0.120
9885.0	1225.1	1003.3	15.827	8.614	28.6	18.020	8.7	1.434	0.107	0.063	30.4	0.124	0.7	-0.107	0.063	-30.5	0.124
9890.0	1225.1	1003.3	17.090	9.255	28.4	19.435	8.9	1.547	0.111	0.063	29.8	0.128	0.8	-0.111	0.063	-29.8	0.127
9895.0	1225.1	1003.3	18.494	9.960	28.3	21.006	9.2	1.672	0.114	0.063	29.0	0.131	1.0	-0.114	0.063	-29.0	0.131
9900.0	1225.1	1003.3	20.059	10.736	28.2	22.751	9.4	1.811	0.117	0.063	28.1	0.133	1.1	-0.117	0.063	-28.1	0.133
9905.0	1225.1	1003.3	21.809	11.592	28.0	24.698	9.7	1.965	0.120	0.061	27.1	0.134	1.3	-0.119	0.061	-27.0	0.134
9910.0	1225.1	1003.3	23.772	12.537	27.8	26.876	10.0	2.139	0.121	0.058	25.8	0.134	1.6	-0.121	0.058	-25.7	0.134
9915.0	1225.1	1003.3	25.982	13.581	27.6	29.318	10.2	2.333	0.120	0.054	24.2	0.132	2.1	-0.120	0.054	-24.1	0.131
9920.0	1225.1	1003.3	28.478	14.737	27.4	32.065	10.5	2.552	0.117	0.048	22.2	0.127	2.7	-0.117	0.047	-22.1	0.126
9925.0	1225.1	1003.3	31.306	16.018	27.1	35.166	10.8	2.798	0.111	0.039	19.5	0.118	3.9	-0.110	0.038	-19.2	0.116
9930.0	1225.1	1003.3	34.523	17.436	26.8	38.676	11.1	3.078	0.100	0.028	15.8	0.104	6.2	-0.099	0.026	-14.8	0.102
9935.0	1225.1	1003.3	38.195	19.006	26.5	42.662	11.4	3.395	0.083	0.016	11.0	0.085	11.9	-0.080	0.010	-7.1	0.081
9940.0	1225.1	1003.3	42.402	20.743	26.1	47.203	11.7	3.756	0.059	0.019	17.6	0.062	31.0	-0.053	-0.011	11.8	0.054
9945.0	1225.1	1003.3	47.238	22.660	25.6	52.392	12.0	4.169	0.035	0.042	50.1	0.055	83.4	-0.013	-0.038	70.7	0.040
9950.0	1225.1	1003.3	52.816	24.770	25.1	58.336	12.2	4.642	0.060	0.075	51.2	0.096	24.7	0.044	-0.072	-58.7	0.084
9955.0	1225.1	1003.3	59.268	27.079	24.6	65.161	12.3	5.185	0.135	0.117	40.8	0.178	10.8	0.124	-0.114	-42.6	0.168
9960.0	1225.1	1003.3	66.744	29.588	23.9	73.008	12.3	5.810	0.246	0.167	34.3	0.297	6.5	0.236	-0.165	-34.9	0.287
9965.0	1225.1	1003.3	75.411	32.288	23.2	82.032	12.3	6.528	0.400	0.228	29.6	0.460	4.9	0.389	-0.225	-30.0	0.450
9970.0	1225.1	1003.3	85.441	35.151	22.4	92.389	12.0	7.352	0.611	0.297	25.9	0.679	4.1	0.598	-0.294	-26.1	0.666
9975.0	1225.1	1003.3	96.983	38.131	21.5	104.210	11.6	8.293	0.893	0.373	22.7	0.967	3.6	0.877	-0.369	-22.8	0.952
9980.0	1225.1	1003.3	110.109	41.151	20.5	117.547	10.8	9.354	1.261	0.453	19.7	1.340	3.3	1.242	-0.449	-19.9	1.320
9985.0	1225.1	1003.3	124.707	44.103	19.5	132.276	9.8	10.526	1.726	0.530	17.1	1.805	3.1	1.700	-0.526	-17.2	1.780
9990.0	1225.1	1003.3	140.311	46.849	18.5	147.925	8.4	11.772	2.280	0.599	14.7	2.358	2.7	2.246	-0.595	-14.8	2.324
9995.0	1225.1	1003.3	155.862	49.221	17.5	163.449	6.6	13.007	2.886	0.652	12.7	2.959	2.3	2.841	-0.648	-12.8	2.914
10000.0	1225.1	1003.3	169.538	51.049	16.8	177.057	4.5	14.090	3.459	0.686	11.2	3.526	1.9	3.402	-0.683	-11.4	3.470
10005.0	1225.1	1003.3	178.919	52.178	16.3	186.372	2.2	14.831	3.871	0.704	10.3	3.934	1.5	3.804	-0.701	-10.4	3.868
10010.0	1225.1	1003.3	181.818	52.502	16.1	189.246	0.2	15.060	4.002	0.707	10.0	4.064	1.4	3.931	-0.705	-10.2	3.994
10015.0	1225.1	1003.3	177.458	51.991	16.3	184.917	2.7	14.715	3.808	0.700	10.4	3.872	1.6	3.742	-0.698	-10.6	3.807
10020.0	1225.1	1003.3	166.984	50.694	16.9	174.509	4.9	13.887	3.353	0.679	11.5	3.421	2.0	3.298	-0.676	-11.6	3.367
10025.0	1225.1	1003.3	152.729	48.729	17.7	160.314	6.9	12.757	2.765	0.640	13.0	2.838	2.4	2.722	-0.636	-13.2	2.796
10030.0	1225.1	1003.3	137.036	46.257	18.7	144.633	8.6	11.510	2.164	0.583	15.1	2.241	2.8	2.132	-0.579	-15.2	2.209
10035.0	1225.1	1003.3	121.569	43.452	19.7	129.101	10.0	10.274	1.626	0.512	17.5	1.704	3.1	1.602	-0.508	-17.6	1.680
10040.0	1225.1	1003.3	107.246	40.472	20.7	114.629	10.9	9.122	1.180	0.433	20.2	1.257	3.4	1.162	-0.429	-20.3	1.239
10045.0	1225.1	1003.3	94.443	37.453	21.6	101.598	11.6	8.085	0.830	0.354	23.1	0.903	3.6	0.816	-0.351	-23.3	0.888
10050.0	1225.1	1003.3	83.221	34.494	22.5	90.087	12.0	7.169	0.564	0.279	26.3	0.629	4.1	0.552	-0.276	-26.6	0.617
10055.0	1225.1	1003.3	73.486	31.664	23.3	80.018	12.2	6.368	0.365	0.212	30.1	0.422	5.0	0.355	-0.209	-30.5	0.412
10060.0	1225.1	1003.3	65.080	29.005	24.0	71.251	12.3	5.670	0.220	0.154	34.9	0.269	6.9	0.210	-0.151	-35.7	0.259
10065.0	1225.1	1003.3	57.831	26.541	24.7	63.630	12.2	5.064	0.117	0.105	41.9	0.157	12.1	0.105	-0.102	-44.1	0.147
10070.0	1225.1	1003.3	51.573	24.277	25.2	57.001	12.1	4.536	0.050	0.065	52.6	0.082	30.8	0.030	-0.062	-64.1	0.069
10075.0	1225.1	1003.3	46.160	22.212	25.7	51.226	11.9	4.076	0.039	0.034	41.5	0.052	83.8	-0.023	-0.030	52.0	0.038
10080.0	1225.1	1003.3	41.464	20.336	26.1	46.182	11.6	3.675	0.065	0.015	13.2	0.067	23.3	-0.060	-0.004	3.9	0.060
10085.0	1225.1	1003.3	37.377	18.638	26.5	41.766	11.3	3.324	0.088	0.020	12.8	0.090	9.6	-0.086	0.016	-10.4	0.087
10090.0	1225.1	1003.3	33.806	17.103	26.8	37.887	11.0	3.015	0.104	0.033	17.5	0.109	5.3	-0.102	0.031	-16.8	0.107
10095.0	1225.1	1003.3	30.677	15.718	27.1	34.469	10.8	2.743	0.113	0.043	20.8	0.121	3.4	-0.113	0.042	-20.6	0.120
10100.0	1225.1	1003.3	27.923	14.467	27.4	31.448	10.5	2.503	0.119	0.051	23.2	0.130	2.5	-0.119	0.051	-23.1	0.129
10105.0	1225.1	1003.3	25.492	13.337	27.6	28.770	10.2	2.289	0.122	0.057	25.1	0.134	1.9	-0.121	0.056	-25.0	0.134
10110.0	1225.1	1003.3	23.337	12.316	27.8	26.387	9.9	2.100	0.122	0.061	26.5	0.136	1.5	-0.121	0.060	-26.5	0.136
10115.0	1225.1	1003.3	21.421	11.392	28.0	24.262	9.6	1.931	0.120	0.063	27.7	0.136	1.2	-0.120	0.063	-27.7	0.136
10120.0	1225.1	1003.3	19.713	10.555	28.2	22.361	9.3	1.779	0.118	0.064	28.7	0.134	1.0	-0.118	0.064	-28.6	0.134

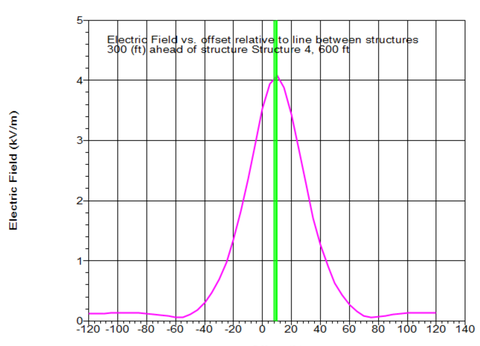




3D EMF Point Results Span from Vertical Tangent Back to Structure 4, 600 ft:

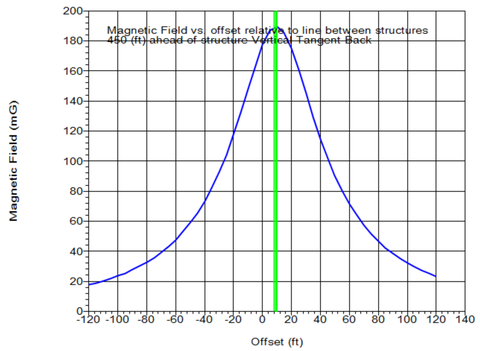
Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
10880.0	699.9	1003.3	15.099	8.241	28.6	17.202	8.3	1.369	0.104	0.060	29.8	0.120	0.7	-0.104	0.060	-29.8	0.120
10885.0	699.9	1003.3	16.238	8.823	28.5	18.480	8.6	1.471	0.108	0.060	29.1	0.124	0.8	-0.108	0.060	-29.1	0.124
10890.0	699.9	1003.3	17.499	9.461	28.4	19.893	8.8	1.583	0.112	0.061	28.4	0.128	0.9	-0.112	0.061	-28.4	0.127
10895.0	699.9	1003.3	18.899	10.162	28.3	21.458	9.1	1.708	0.116	0.060	27.5	0.130	1.1	-0.116	0.060	-27.5	0.130
10900.0	699.9	1003.3	20.460	10.933	28.1	23.198	9.3	1.846	0.119	0.059	26.5	0.132	1.3	-0.118	0.059	-26.5	0.132
10905.0	699.9	1003.3	22.203	11.783	28.0	25.136	9.6	2.000	0.121	0.057	25.3	0.133	1.5	-0.120	0.057	-25.3	0.133
10910.0	699.9	1003.3	24.158	12.721	27.8	27.302	9.9	2.173	0.121	0.054	23.9	0.133	1.9	-0.121	0.053	-23.8	0.132
10915.0	699.9	1003.3	26.357	13.757	27.6	29.731	10.2	2.366	0.121	0.049	22.0	0.130	2.4	-0.120	0.048	-21.9	0.130
10920.0	699.9	1003.3	28.839	14.904	27.3	32.463	10.5	2.583	0.117	0.042	19.7	0.125	3.3	-0.117	0.041	-19.4	0.124
10925.0	699.9	1003.3	31.652	16.173	27.1	35.544	10.8	2.829	0.111	0.033	16.5	0.115	4.7	-0.110	0.032	-16.0	0.114
10930.0	699.9	1003.3	34.850	17.579	26.8	39.033	11.1	3.106	0.099	0.021	12.2	0.102	7.6	-0.098	0.019	-10.7	0.100
10935.0	699.9	1003.3	38.500	19.136	26.4	42.994	11.4	3.421	0.082	0.013	9.0	0.083	14.7	-0.079	0.002	-1.1	0.079
10940.0	699.9	1003.3	42.683	20.859	26.0	47.507	11.7	3.780	0.058	0.025	23.8	0.063	37.2	-0.052	-0.020	21.4	0.056
10945.0	699.9	1003.3	47.492	22.761	25.6	52.664	11.9	4.191	0.035	0.052	56.0	0.062	67.4	-0.012	-0.048	76.5	0.049
10950.0	699.9	1003.3	53.040	24.855	25.1	58.575	12.1	4.661	0.062	0.086	54.1	0.106	24.5	0.046	-0.083	-61.1	0.095
10955.0	699.9	1003.3	59.460	27.149	24.5	65.364	12.3	5.202	0.138	0.128	43.0	0.188	11.5	0.127	-0.126	-44.8	0.178
10960.0	699.9	1003.3	66.902	29.643	23.9	73.176	12.3	5.823	0.249	0.180	35.9	0.307	7.1	0.239	-0.177	-36.6	0.297
10965.0	699.9	1003.3	75.537	32.329	23.2	82.165	12.2	6.538	0.404	0.241	30.9	0.470	5.3	0.393	-0.238	-31.2	0.460
10970.0	699.9	1003.3	85.538	35.181	22.4	92.490	12.0	7.360	0.615	0.311	26.8	0.689	4.4	0.602	-0.308	-27.1	0.676
10975.0	699.9	1003.3	97.058	38.152	21.5	104.287	11.5	8.299	0.897	0.388	23.4	0.977	3.9	0.882	-0.384	-23.6	0.962
10980.0	699.9	1003.3	110.173	41.167	20.5	117.613	10.8	9.359	1.266	0.468	20.3	1.350	3.5	1.247	-0.464	-20.4	1.330
10985.0	699.9	1003.3	124.776	44.118	19.5	132.346	9.8	10.532	1.731	0.545	17.5	1.815	3.2	1.706	-0.541	-17.6	1.790
10990.0	699.9	1003.3	140.404	46.865	18.5	148.019	8.4	11.779	2.287	0.614	15.0	2.368	2.8	2.253	-0.610	-15.1	2.334
10995.0	699.9	1003.3	155.998	49.243	17.5	163.585	6.6	13.018	2.893	0.667	13.0	2.969	2.4	2.849	-0.663	-13.1	2.925
11000.0	699.9	1003.3	169.726	51.075	16.7	177.244	4.5	14.105	3.467	0.701	11.4	3.537	2.0	3.410	-0.698	-11.6	3.480
11005.0	699.9	1003.3	179.151	52.207	16.2	186.603	2.2	14.849	3.879	0.717	10.5	3.945	1.6	3.813	-0.715	-10.6	3.879
11010.0	699.9	1003.3	182.064	52.533	16.1	189.492	0.2	15.079	4.011	0.721	10.2	4.075	1.5	3.940	-0.719	-10.3	4.005
11015.0	699.9	1003.3	177.683	52.021	16.3	185.142	2.6	14.733	3.816	0.714	10.6	3.882	1.7	3.751	-0.711	-10.7	3.818
11020.0	699.9	1003.3	167.162	50.720	16.9	174.687	4.9	13.901	3.360	0.693	11.7	3.431	2.0	3.305	-0.689	-11.8	3.377
11025.0	699.9	1003.3	152.856	48.750	17.7	160.442	6.9	12.768	2.771	0.654	13.3	2.847	2.5	2.728	-0.650	-13.4	2.805
11030.0	699.9	1003.3	137.123	46.274	18.6	144.721	8.6	11.516	2.169	0.597	15.4	2.250	2.9	2.137	-0.593	-15.5	2.218
11035.0	699.9	1003.3	121.636	43.467	19.7	129.169	9.9	10.279	1.630	0.526	17.9	1.712	3.2	1.606	-0.522	-18.0	1.688
11040.0	699.9	1003.3	107.311	40.490	20.7	114.696	10.9	9.127	1.184	0.447	20.7	1.265	3.5	1.165	-0.443	-20.8	1.247
11045.0	699.9	1003.3	94.522	37.476	21.6	101.680	11.6	8.091	0.833	0.367	23.8	0.910	3.9	0.818	-0.364	-24.0	0.896
11050.0	699.9	1003.3	83.324	34.526	22.5	90.194	12.0	7.177	0.566	0.291	27.2	0.637	4.4	0.554	-0.288	-27.5	0.624
11055.0	699.9	1003.3	73.619	31.708	23.3	80.157	12.2	6.379	0.367	0.223	31.3	0.430	5.4	0.357	-0.220	-31.7	0.419
11060.0	699.9	1003.3	65.245	29.064	24.0	71.426	12.3	5.684	0.222	0.164	36.5	0.276	7.6	0.212	-0.162	-37.4	0.266
11065.0	699.9	1003.3	58.028	26.614	24.6	63.840	12.2	5.080	0.118	0.115	44.2	0.165	13.1	0.106	-0.112	-46.5	0.154
11070.0	699.9	1003.3	51.802	24.366	25.2	57.247	12.0	4.556	0.050	0.074	55.7	0.090	30.9	0.031	-0.071	-66.6	0.077
11075.0	699.9	1003.3	46.419	22.316	25.7	51.504	11.8	4.099	0.039	0.042	47.1	0.057	79.6	-0.023	-0.038	58.9	0.044
11080.0	699.9	1003.3	41.750	20.455	26.1	46.491	11.6	3.700	0.065	0.019	16.1	0.068	27.5	-0.060	-0.012	10.9	0.061
11085.0	699.9	1003.3	37.686	18.771	26.5	42.102	11.3	3.350	0.088	0.015	9.9	0.089	11.5	-0.086	0.009	-6.0	0.086
11090.0	699.9	1003.3	34.137	17.249	26.8	38.248	11.0	3.044	0.104	0.027	14.6	0.108	6.3	-0.103	0.025	-13.6	0.106
11095.0	699.9	1003.3	31.025	15.875	27.1	34.851	10.7	2.773	0.114	0.038	18.4	0.120	4.0	-0.114	0.037	-18.0	0.119
11100.0	699.9	1003.3	28.287	14.635	27.4	31.848	10.4	2.534	0.120	0.047	21.2	0.129	2.8	-0.120	0.046	-21.0	0.128
11105.0	699.9	1003.3	25.868	13.514	27.6	29.185	10.1	2.322	0.123	0.053	23.2	0.134	2.2	-0.123	0.052	-23.1	0.133
11110.0	699.9	1003.3	23.724	12.501	27.8	26.816	9.8	2.134	0.123	0.057	24.9	0.136	1.7	-0.123	0.057	-24.8	0.136
11115.0	699.9	1003.3	21.816	11.584	28.0	24.701	9.5	1.966	0.122	0.060	26.2	0.136	1.4	-0.122	0.060	-26.1	0.136
11120.0	699.9	1003.3	20.114	10.753	28.1	22.808	9.2	1.815	0.120	0.062	27.3	0.135	1.2	-0.120	0.062	-27.3	0.135

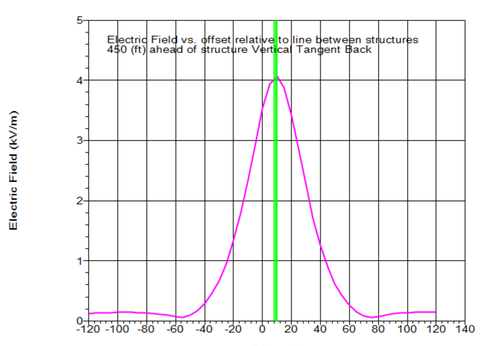




3D EMF Point Results Span from Structure 4, 600 ft to Vertical Tangent Ahead:

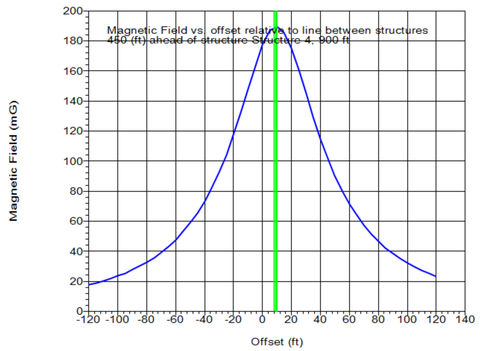
Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
10880.0	1300.1	1003.3	15.099	8.241	28.6	17.202	8.3	1.369	0.104	0.060	29.8	0.120	0.7	-0.104	0.060	-29.8	0.120
10885.0	1300.1	1003.3	16.238	8.823	28.5	18.480	8.6	1.471	0.108	0.060	29.1	0.124	0.8	-0.108	0.060	-29.1	0.124
10890.0	1300.1	1003.3	17.499	9.461	28.4	19.893	8.8	1.583	0.112	0.061	28.4	0.128	0.9	-0.112	0.061	-28.4	0.127
10895.0	1300.1	1003.3	18.899	10.162	28.3	21.458	9.1	1.708	0.116	0.060	27.5	0.130	1.1	-0.116	0.060	-27.5	0.130
10900.0	1300.1	1003.3	20.460	10.933	28.1	23.198	9.3	1.846	0.119	0.059	26.5	0.133	1.3	-0.118	0.059	-26.5	0.132
10905.0	1300.1	1003.3	22.203	11.783	28.0	25.136	9.6	2.000	0.121	0.057	25.3	0.134	1.5	-0.120	0.057	-25.3	0.133
10910.0	1300.1	1003.3	24.158	12.721	27.8	27.302	9.9	2.173	0.122	0.054	23.8	0.133	1.9	-0.121	0.053	-23.8	0.132
10915.0	1300.1	1003.3	26.357	13.757	27.6	29.731	10.2	2.366	0.121	0.049	22.0	0.130	2.4	-0.120	0.048	-21.9	0.130
10920.0	1300.1	1003.3	28.839	14.904	27.3	32.463	10.5	2.583	0.117	0.042	19.7	0.125	3.3	-0.117	0.041	-19.4	0.124
10925.0	1300.1	1003.3	31.652	16.173	27.1	35.544	10.8	2.829	0.111	0.033	16.5	0.115	4.7	-0.110	0.032	-16.0	0.114
10930.0	1300.1	1003.3	34.850	17.579	26.8	39.033	11.1	3.106	0.099	0.021	12.2	0.102	7.6	-0.098	0.019	-10.7	0.100
10935.0	1300.1	1003.3	38.500	19.136	26.4	42.994	11.4	3.421	0.082	0.013	9.0	0.083	14.7	-0.079	0.002	-1.1	0.079
10940.0	1300.1	1003.3	42.683	20.859	26.0	47.507	11.7	3.780	0.058	0.025	23.7	0.063	37.1	-0.052	-0.020	21.4	0.056
10945.0	1300.1	1003.3	47.492	22.761	25.6	52.664	11.9	4.191	0.035	0.051	56.0	0.062	67.4	-0.012	-0.048	76.5	0.049
10950.0	1300.1	1003.3	53.040	24.855	25.1	58.575	12.1	4.661	0.062	0.086	54.1	0.106	24.6	0.046	-0.083	-61.1	0.095
10955.0	1300.1	1003.3	59.460	27.149	24.5	65.364	12.3	5.202	0.138	0.128	43.0	0.188	11.5	0.127	-0.126	-44.8	0.178
10960.0	1300.1	1003.3	66.902	29.643	23.9	73.176	12.3	5.823	0.249	0.180	35.9	0.307	7.1	0.239	-0.177	-36.6	0.297
10965.0	1300.1	1003.3	75.537	32.329	23.2	82.165	12.2	6.538	0.404	0.241	30.9	0.470	5.3	0.393	-0.238	-31.2	0.460
10970.0	1300.1	1003.3	85.538	35.181	22.4	92.490	12.0	7.360	0.615	0.311	26.8	0.689	4.4	0.602	-0.308	-27.1	0.676
10975.0	1300.1	1003.3	97.058	38.152	21.5	104.287	11.5	8.299	0.897	0.388	23.4	0.977	3.9	0.882	-0.384	-23.6	0.962
10980.0	1300.1	1003.3	110.173	41.167	20.5	117.613	10.8	9.359	1.266	0.468	20.3	1.350	3.5	1.247	-0.464	-20.4	1.330
10985.0	1300.1	1003.3	124.776	44.118	19.5	132.346	9.8	10.532	1.731	0.545	17.5	1.815	3.2	1.706	-0.541	-17.6	1.790
10990.0	1300.1	1003.3	140.404	46.865	18.5	148.019	8.4	11.779	2.286	0.614	15.0	2.367	2.8	2.253	-0.610	-15.1	2.334
10995.0	1300.1	1003.3	155.998	49.243	17.5	163.585	6.6	13.018	2.893	0.667	13.0	2.969	2.4	2.849	-0.663	-13.1	2.925
11000.0	1300.1	1003.3	169.726	51.075	16.7	177.244	4.5	14.105	3.467	0.701	11.4	3.537	2.0	3.410	-0.698	-11.6	3.480
11005.0	1300.1	1003.3	179.151	52.207	16.2	186.603	2.2	14.849	3.879	0.717	10.5	3.945	1.6	3.813	-0.715	-10.6	3.879
11010.0	1300.1	1003.3	182.064	52.533	16.1	189.492	0.2	15.079	4.010	0.721	10.2	4.075	1.5	3.940	-0.719	-10.3	4.005
11015.0	1300.1	1003.3	177.683	52.021	16.3	185.142	2.6	14.733	3.816	0.714	10.6	3.882	1.7	3.751	-0.711	-10.7	3.818
11020.0	1300.1	1003.3	167.162	50.720	16.9	174.687	4.9	13.901	3.360	0.693	11.7	3.431	2.0	3.305	-0.689	-11.8	3.377
11025.0	1300.1	1003.3	152.856	48.750	17.7	160.442	6.9	12.768	2.771	0.654	13.3	2.847	2.5	2.728	-0.650	-13.4	2.805
11030.0	1300.1	1003.3	137.123	46.274	18.6	144.721	8.6	11.516	2.169	0.597	15.4	2.249	2.9	2.137	-0.593	-15.5	2.218
11035.0	1300.1	1003.3	121.636	43.467	19.7	129.169	9.9	10.279	1.630	0.526	17.9	1.712	3.2	1.606	-0.522	-18.0	1.688
11040.0	1300.1	1003.3	107.311	40.490	20.7	114.696	10.9	9.127	1.184	0.447	20.7	1.265	3.5	1.165	-0.443	-20.8	1.247
11045.0	1300.1	1003.3	94.522	37.476	21.6	101.680	11.6	8.091	0.833	0.367	23.8	0.910	3.9	0.818	-0.364	-24.0	0.896
11050.0	1300.1	1003.3	83.324	34.526	22.5	90.194	12.0	7.177	0.566	0.291	27.2	0.637	4.4	0.554	-0.288	-27.5	0.624
11055.0	1300.1	1003.3	73.619	31.708	23.3	80.157	12.2	6.379	0.367	0.223	31.3	0.430	5.4	0.357	-0.220	-31.7	0.419
11060.0	1300.1	1003.3	65.245	29.064	24.0	71.426	12.3	5.684	0.222	0.164	36.5	0.276	7.6	0.212	-0.162	-37.4	0.266
11065.0	1300.1	1003.3	58.028	26.614	24.6	63.840	12.2	5.080	0.118	0.115	44.2	0.165	13.1	0.106	-0.112	-46.5	0.154
11070.0	1300.1	1003.3	51.802	24.366	25.2	57.247	12.0	4.556	0.050	0.074	55.8	0.090	31.0	0.031	-0.071	-66.6	0.077
11075.0	1300.1	1003.3	46.419	22.316	25.7	51.504	11.8	4.099	0.039	0.042	47.1	0.057	79.4	-0.023	-0.038	58.9	0.044
11080.0	1300.1	1003.3	41.750	20.455	26.1	46.491	11.6	3.700	0.065	0.019	16.1	0.068	27.4	-0.060	-0.012	10.9	0.061
11085.0	1300.1	1003.3	37.686	18.771	26.5	42.102	11.3	3.350	0.088	0.015	9.9	0.090	11.5	-0.086	0.009	-6.0	0.086
11090.0	1300.1	1003.3	34.137	17.249	26.8	38.248	11.0	3.044	0.104	0.027	14.6	0.108	6.2	-0.103	0.025	-13.6	0.106
11095.0	1300.1	1003.3	31.025	15.875	27.1	34.851	10.7	2.773	0.114	0.038	18.4	0.121	4.0	-0.114	0.037	-18.0	0.119
11100.0	1300.1	1003.3	28.287	14.635	27.4	31.848	10.4	2.534	0.120	0.047	21.1	0.129	2.8	-0.120	0.046	-21.0	0.128
11105.0	1300.1	1003.3	25.868	13.514	27.6	29.185	10.1	2.322	0.123	0.053	23.2	0.134	2.1	-0.123	0.052	-23.1	0.133
11110.0	1300.1	1003.3	23.724	12.501	27.8	26.816	9.8	2.134	0.123	0.057	24.9	0.136	1.7	-0.123	0.057	-24.8	0.136
11115.0	1300.1	1003.3	21.816	11.584	28.0	24.701	9.5	1.966	0.122	0.060	26.2	0.136	1.4	-0.122	0.060	-26.1	0.136
11120.0	1300.1	1003.3	20.114	10.753	28.1	22.808	9.2	1.815	0.120	0.062	27.3	0.135	1.2	-0.120	0.062	-27.2	0.135

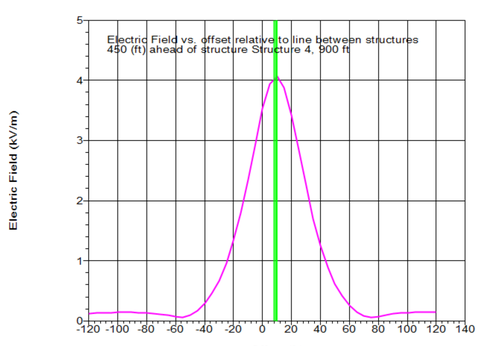




3D EMF Point Results Span from Vertical Tangent Back to Structure 4, 900 ft:

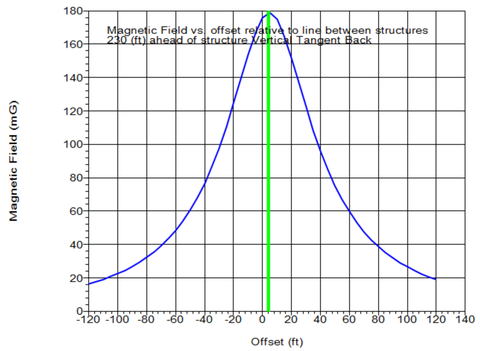
Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
11880.0	549.8	1003.3	15.423	8.402	28.6	17.563	8.2	1.398	0.111	0.065	30.5	0.128	0.7	-0.110	0.065	-30.5	0.128
11885.0	549.8	1003.3	16.557	8.980	28.5	18.836	8.5	1.499	0.115	0.066	29.9	0.132	0.7	-0.115	0.066	-29.9	0.132
11890.0	549.8	1003.3	17.813	9.614	28.4	20.242	8.7	1.611	0.119	0.067	29.3	0.136	0.8	-0.119	0.066	-29.2	0.136
11895.0	549.8	1003.3	19.208	10.309	28.2	21.800	9.0	1.735	0.123	0.066	28.5	0.139	1.0	-0.122	0.066	-28.4	0.139
11900.0	549.8	1003.3	20.761	11.075	28.1	23.530	9.2	1.872	0.126	0.066	27.5	0.142	1.2	-0.126	0.065	-27.5	0.142
11905.0	549.8	1003.3	22.496	11.918	27.9	25.458	9.5	2.026	0.128	0.064	26.5	0.143	1.4	-0.128	0.064	-26.4	0.143
11910.0	549.8	1003.3	24.441	12.848	27.7	27.612	9.8	2.197	0.129	0.061	25.2	0.143	1.7	-0.129	0.060	-25.1	0.143
11915.0	549.8	1003.3	26.628	13.876	27.5	30.027	10.1	2.389	0.129	0.056	23.6	0.141	2.1	-0.128	0.056	-23.5	0.140
11920.0	549.8	1003.3	29.097	15.013	27.3	32.742	10.4	2.606	0.126	0.050	21.5	0.135	2.8	-0.125	0.049	-21.3	0.135
11925.0	549.8	1003.3	31.895	16.273	27.0	35.806	10.7	2.849	0.120	0.041	18.8	0.126	3.9	-0.119	0.040	-18.4	0.125
11930.0	549.8	1003.3	35.076	17.668	26.7	39.274	11.0	3.125	0.109	0.029	15.0	0.113	6.1	-0.107	0.027	-14.1	0.111
11935.0	549.8	1003.3	38.707	19.214	26.4	43.214	11.3	3.439	0.092	0.017	10.3	0.093	11.3	-0.089	0.010	-6.6	0.090
11940.0	549.8	1003.3	42.869	20.924	26.0	47.703	11.6	3.796	0.068	0.019	15.8	0.070	27.4	-0.062	-0.011	10.2	0.063
11945.0	549.8	1003.3	47.655	22.814	25.6	52.835	11.9	4.204	0.040	0.043	46.9	0.059	83.2	-0.022	-0.039	59.8	0.045
11950.0	549.8	1003.3	53.179	24.895	25.1	58.718	12.1	4.673	0.055	0.076	54.5	0.094	30.1	0.034	-0.073	-64.8	0.081
11955.0	549.8	1003.3	59.573	27.176	24.5	65.479	12.2	5.211	0.127	0.119	43.1	0.174	12.6	0.115	-0.116	-45.3	0.163
11960.0	549.8	1003.3	66.990	29.659	23.9	73.262	12.3	5.830	0.237	0.170	35.7	0.292	7.4	0.226	-0.167	-36.5	0.282
11965.0	549.8	1003.3	75.600	32.334	23.2	82.225	12.2	6.543	0.392	0.231	30.6	0.455	5.3	0.380	-0.228	-31.0	0.444
11970.0	549.8	1003.3	85.579	35.178	22.3	92.527	12.0	7.363	0.602	0.301	26.6	0.673	4.4	0.590	-0.298	-26.8	0.661
11975.0	549.8	1003.3	97.083	38.142	21.4	104.307	11.5	8.300	0.885	0.378	23.1	0.962	3.8	0.869	-0.374	-23.3	0.947
11980.0	549.8	1003.3	110.190	41.154	20.5	117.625	10.8	9.360	1.254	0.458	20.1	1.335	3.5	1.235	-0.455	-20.2	1.316
11985.0	549.8	1003.3	124.799	44.104	19.5	132.363	9.7	10.533	1.720	0.536	17.3	1.802	3.2	1.695	-0.532	-17.4	1.776
11990.0	549.8	1003.3	140.447	46.854	18.4	148.056	8.3	11.782	2.277	0.606	14.9	2.356	2.8	2.243	-0.601	-15.0	2.322
11995.0	549.8	1003.3	156.076	49.235	17.5	163.657	6.6	13.023	2.885	0.659	12.9	2.959	2.4	2.840	-0.655	-13.0	2.915
12000.0	549.8	1003.3	169.845	51.072	16.7	177.357	4.5	14.114	3.460	0.694	11.3	3.528	2.0	3.403	-0.690	-11.5	3.472
12005.0	549.8	1003.3	179.304	52.207	16.2	186.750	2.2	14.861	3.873	0.711	10.4	3.938	1.6	3.806	-0.708	-10.5	3.872
12010.0	549.8	1003.3	182.228	52.534	16.1	189.650	0.2	15.092	4.005	0.714	10.1	4.068	1.5	3.935	-0.712	-10.3	3.999
12015.0	549.8	1003.3	177.830	52.020	16.3	185.283	2.6	14.744	3.810	0.707	10.5	3.875	1.7	3.744	-0.705	-10.7	3.810
12020.0	549.8	1003.3	167.273	50.715	16.9	174.792	4.9	13.910	3.353	0.686	11.6	3.422	2.0	3.298	-0.683	-11.7	3.368
12025.0	549.8	1003.3	152.926	48.741	17.7	160.506	6.9	12.773	2.762	0.647	13.2	2.837	2.5	2.720	-0.643	-13.3	2.795
12030.0	549.8	1003.3	137.162	46.262	18.6	144.753	8.6	11.519	2.159	0.589	15.3	2.238	2.8	2.127	-0.585	-15.4	2.206
12035.0	549.8	1003.3	121.657	43.453	19.7	129.185	9.9	10.280	1.619	0.517	17.7	1.699	3.2	1.595	-0.513	-17.8	1.675
12040.0	549.8	1003.3	107.330	40.477	20.7	114.709	10.9	9.128	1.172	0.438	20.5	1.251	3.5	1.154	-0.434	-20.6	1.233
12045.0	549.8	1003.3	94.550	37.468	21.6	101.703	11.6	8.093	0.821	0.358	23.5	0.896	3.8	0.806	-0.354	-23.7	0.881
12050.0	549.8	1003.3	83.369	34.525	22.5	90.235	12.0	7.181	0.554	0.282	27.0	0.622	4.4	0.542	-0.279	-27.2	0.609
12055.0	549.8	1003.3	73.686	31.716	23.3	80.222	12.2	6.384	0.356	0.214	31.0	0.415	5.5	0.345	-0.211	-31.5	0.404
12060.0	549.8	1003.3	65.338	29.082	24.0	71.518	12.2	5.691	0.211	0.155	36.3	0.262	7.9	0.200	-0.152	-37.3	0.251
12065.0	549.8	1003.3	58.147	26.644	24.6	63.960	12.2	5.090	0.108	0.106	44.3	0.151	14.5	0.095	-0.103	-47.2	0.140
12070.0	549.8	1003.3	51.946	24.408	25.2	57.395	12.0	4.567	0.045	0.066	55.4	0.080	38.9	0.020	-0.062	-72.2	0.065
12075.0	549.8	1003.3	46.586	22.371	25.7	51.679	11.8	4.113	0.046	0.034	36.6	0.057	66.3	-0.033	-0.029	41.2	0.044
12080.0	549.8	1003.3	41.939	20.523	26.1	46.692	11.5	3.716	0.075	0.015	11.7	0.076	20.4	-0.070	-0.003	2.5	0.070
12085.0	549.8	1003.3	37.896	18.851	26.4	42.326	11.2	3.368	0.098	0.021	12.4	0.100	9.0	-0.095	0.017	-10.2	0.097
12090.0	549.8	1003.3	34.366	17.341	26.8	38.493	10.9	3.063	0.113	0.034	17.0	0.118	5.2	-0.112	0.033	-16.3	0.117
12095.0	549.8	1003.3	31.270	15.977	27.1	35.116	10.6	2.794	0.123	0.045	20.3	0.131	3.4	-0.122	0.044	-20.0	0.130
12100.0	549.8	1003.3	28.547	14.746	27.3	32.130	10.3	2.557	0.128	0.054	22.7	0.139	2.5	-0.128	0.053	-22.6	0.139
12105.0	549.8	1003.3	26.141	13.635	27.5	29.483	10.0	2.346	0.131	0.060	24.5	0.144	1.9	-0.130	0.059	-24.4	0.143
12110.0	549.8	1003.3	24.008	12.630	27.7	27.127	9.7	2.159	0.131	0.064	26.0	0.146	1.5	-0.131	0.064	-25.9	0.145
12115.0	549.8	1003.3	22.110	11.720	27.9	25.024	9.4	1.991	0.129	0.066	27.2	0.145	1.3	-0.129	0.066	-27.1	0.145
12120.0	549.8	1003.3	20.416	10.895	28.1	23.141	9.1	1.842	0.127	0.068	28.2	0.144	1.1	-0.127	0.068	-28.2	0.144

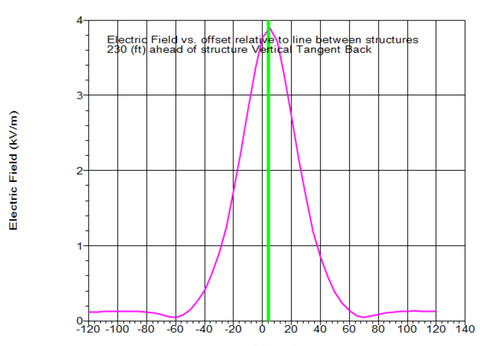




3D EMF Point Results Span from Structure 4, 900 ft to Vertical Tangent Ahead:

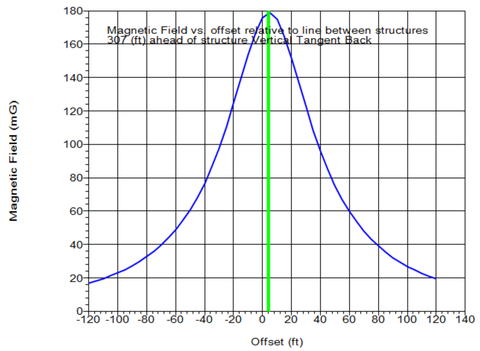
Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
11880.0	1450.2	1003.3	15.423	8.402	28.6	17.563	8.2	1.398	0.111	0.065	30.5	0.128	0.7	-0.110	0.065	-30.5	0.128
11885.0	1450.2	1003.3	16.557	8.980	28.5	18.836	8.5	1.499	0.115	0.066	29.9	0.132	0.7	-0.115	0.066	-29.9	0.132
11890.0	1450.2	1003.3	17.813	9.614	28.4	20.242	8.7	1.611	0.119	0.067	29.3	0.136	0.8	-0.119	0.066	-29.2	0.136
11895.0	1450.2	1003.3	19.208	10.309	28.2	21.800	9.0	1.735	0.123	0.066	28.5	0.139	1.0	-0.122	0.066	-28.4	0.139
11900.0	1450.2	1003.3	20.761	11.075	28.1	23.530	9.2	1.872	0.126	0.066	27.5	0.142	1.2	-0.126	0.065	-27.5	0.142
11905.0	1450.2	1003.3	22.496	11.918	27.9	25.458	9.5	2.026	0.128	0.064	26.5	0.143	1.4	-0.128	0.064	-26.4	0.143
11910.0	1450.2	1003.3	24.441	12.848	27.7	27.612	9.8	2.197	0.129	0.061	25.2	0.143	1.7	-0.129	0.060	-25.1	0.143
11915.0	1450.2	1003.3	26.628	13.876	27.5	30.027	10.1	2.389	0.129	0.056	23.6	0.141	2.1	-0.128	0.056	-23.5	0.140
11920.0	1450.2	1003.3	29.097	15.013	27.3	32.742	10.4	2.606	0.126	0.050	21.5	0.135	2.8	-0.125	0.049	-21.3	0.135
11925.0	1450.2	1003.3	31.895	16.273	27.0	35.806	10.7	2.849	0.120	0.041	18.8	0.126	3.9	-0.119	0.040	-18.4	0.125
11930.0	1450.2	1003.3	35.076	17.668	26.7	39.274	11.0	3.125	0.109	0.029	15.0	0.113	6.1	-0.107	0.027	-14.1	0.111
11935.0	1450.2	1003.3	38.707	19.214	26.4	43.214	11.3	3.439	0.092	0.017	10.3	0.093	11.3	-0.089	0.010	-6.6	0.090
11940.0	1450.2	1003.3	42.869	20.924	26.0	47.703	11.6	3.796	0.068	0.019	15.8	0.070	27.4	-0.062	-0.011	10.2	0.063
11945.0	1450.2	1003.3	47.655	22.814	25.6	52.835	11.9	4.204	0.040	0.043	46.9	0.059	83.1	-0.022	-0.039	59.8	0.045
11950.0	1450.2	1003.3	53.179	24.895	25.1	58.718	12.1	4.673	0.055	0.076	54.5	0.094	30.1	0.034	-0.073	-64.8	0.081
11955.0	1450.2	1003.3	59.573	27.176	24.5	65.479	12.2	5.211	0.127	0.119	43.1	0.174	12.6	0.115	-0.116	-45.3	0.163
11960.0	1450.2	1003.3	66.990	29.659	23.9	73.262	12.3	5.830	0.237	0.170	35.7	0.292	7.4	0.226	-0.167	-36.5	0.282
11965.0	1450.2	1003.3	75.600	32.334	23.2	82.225	12.2	6.543	0.392	0.231	30.6	0.455	5.3	0.380	-0.228	-31.0	0.444
11970.0	1450.2	1003.3	85.579	35.178	22.3	92.527	12.0	7.363	0.602	0.301	26.6	0.673	4.4	0.590	-0.298	-26.8	0.661
11975.0	1450.2	1003.3	97.083	38.142	21.4	104.307	11.5	8.300	0.885	0.378	23.1	0.962	3.8	0.869	-0.374	-23.3	0.947
11980.0	1450.2	1003.3	110.190	41.154	20.5	117.625	10.8	9.360	1.254	0.458	20.1	1.335	3.5	1.235	-0.455	-20.2	1.316
11985.0	1450.2	1003.3	124.799	44.104	19.5	132.363	9.7	10.533	1.720	0.536	17.3	1.802	3.2	1.695	-0.532	-17.4	1.776
11990.0	1450.2	1003.3	140.447	46.854	18.4	148.056	8.3	11.782	2.276	0.606	14.9	2.356	2.8	2.243	-0.601	-15.0	2.322
11995.0	1450.2	1003.3	156.076	49.235	17.5	163.657	6.6	13.023	2.885	0.659	12.9	2.959	2.4	2.840	-0.655	-13.0	2.915
12000.0	1450.2	1003.3	169.845	51.072	16.7	177.357	4.5	14.114	3.460	0.694	11.3	3.528	2.0	3.403	-0.690	-11.5	3.472
12005.0	1450.2	1003.3	179.304	52.207	16.2	186.750	2.2	14.861	3.873	0.711	10.4	3.938	1.6	3.806	-0.708	-10.5	3.872
12010.0	1450.2	1003.3	182.228	52.534	16.1	189.650	0.2	15.092	4.005	0.714	10.1	4.068	1.5	3.935	-0.712	-10.3	3.999
12015.0	1450.2	1003.3	177.830	52.020	16.3	185.283	2.6	14.744	3.810	0.707	10.5	3.875	1.7	3.744	-0.705	-10.7	3.810
12020.0	1450.2	1003.3	167.273	50.715	16.9	174.792	4.9	13.910	3.353	0.686	11.6	3.422	2.0	3.298	-0.683	-11.7	3.368
12025.0	1450.2	1003.3	152.926	48.741	17.7	160.506	6.9	12.773	2.762	0.647	13.2	2.837	2.5	2.720	-0.643	-13.3	2.795
12030.0	1450.2	1003.3	137.162	46.262	18.6	144.753	8.6	11.519	2.159	0.589	15.3	2.238	2.8	2.127	-0.585	-15.4	2.206
12035.0	1450.2	1003.3	121.657	43.453	19.7	129.185	9.9	10.280	1.619	0.517	17.7	1.699	3.2	1.595	-0.513	-17.8	1.675
12040.0	1450.2	1003.3	107.330	40.477	20.7	114.709	10.9	9.128	1.172	0.438	20.5	1.251	3.5	1.154	-0.434	-20.6	1.233
12045.0	1450.2	1003.3	94.550	37.468	21.6	101.703	11.6	8.093	0.821	0.358	23.5	0.896	3.8	0.806	-0.354	-23.7	0.881
12050.0	1450.2	1003.3	83.369	34.525	22.5	90.235	12.0	7.181	0.554	0.282	27.0	0.622	4.4	0.542	-0.279	-27.2	0.609
12055.0	1450.2	1003.3	73.686	31.716	23.3	80.222	12.2	6.384	0.356	0.214	31.0	0.415	5.5	0.345	-0.211	-31.5	0.404
12060.0	1450.2	1003.3	65.338	29.082	24.0	71.518	12.2	5.691	0.211	0.155	36.3	0.262	7.9	0.200	-0.152	-37.3	0.251
12065.0	1450.2	1003.3	58.147	26.644	24.6	63.960	12.2	5.090	0.108	0.106	44.3	0.151	14.5	0.095	-0.103	-47.2	0.140
12070.0	1450.2	1003.3	51.946	24.408	25.2	57.395	12.0	4.567	0.045	0.066	55.4	0.080	38.9	0.020	-0.062	-72.2	0.065
12075.0	1450.2	1003.3	46.586	22.371	25.7	51.679	11.8	4.113	0.046	0.034	36.6	0.057	66.2	-0.033	-0.029	41.2	0.044
12080.0	1450.2	1003.3	41.939	20.523	26.1	46.692	11.5	3.716	0.075	0.015	11.6	0.076	20.4	-0.070	-0.003	2.5	0.070
12085.0	1450.2	1003.3	37.896	18.851	26.4	42.326	11.2	3.368	0.098	0.021	12.4	0.100	9.0	-0.095	0.017	-10.2	0.097
12090.0	1450.2	1003.3	34.366	17.341	26.8	38.493	10.9	3.063	0.113	0.034	17.0	0.118	5.2	-0.112	0.033	-16.3	0.117
12095.0	1450.2	1003.3	31.270	15.977	27.1	35.116	10.6	2.794	0.123	0.045	20.3	0.131	3.4	-0.122	0.044	-20.0	0.130
12100.0	1450.2	1003.3	28.547	14.746	27.3	32.130	10.3	2.557	0.128	0.054	22.7	0.139	2.5	-0.128	0.053	-22.6	0.139
12105.0	1450.2	1003.3	26.141	13.635	27.5	29.483	10.0	2.346	0.131	0.060	24.5	0.144	1.9	-0.130	0.059	-24.4	0.143
12110.0	1450.2	1003.3	24.008	12.630	27.7	27.127	9.7	2.159	0.131	0.064	26.0	0.146	1.5	-0.131	0.064	-25.9	0.145
12115.0	1450.2	1003.3	22.110	11.720	27.9	25.024	9.4	1.991	0.129	0.066	27.2	0.145	1.3	-0.129	0.066	-27.1	0.145
12120.0	1450.2	1003.3	20.416	10.895	28.1	23.141	9.1	1.842	0.127	0.068	28.2	0.144	1.1	-0.127	0.068	-28.2	0.144

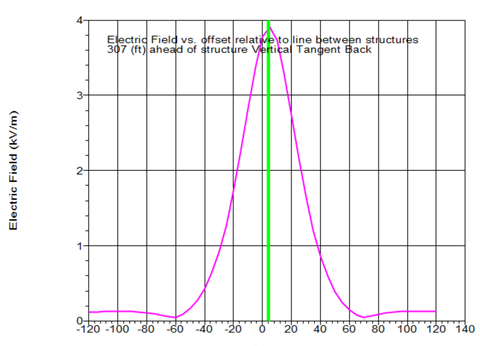




3D EMF Point Results Span from Vertical Tangent Back to Structure 5, 450 ft:

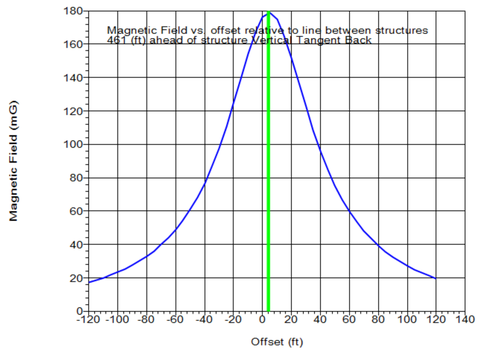
Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
12880.0	779.8	1003.3	14.364	7.872	28.7	16.380	8.0	1.303	0.100	0.064	32.5	0.118	0.6	-0.099	0.063	-32.6	0.117
12885.0	779.8	1003.3	15.529	8.472	28.6	17.689	8.2	1.408	0.104	0.065	32.0	0.122	0.6	-0.103	0.064	-32.1	0.121
12890.0	779.8	1003.3	16.824	9.133	28.5	19.143	8.5	1.523	0.107	0.066	31.4	0.126	0.7	-0.106	0.065	-31.5	0.125
12895.0	779.8	1003.3	18.271	9.863	28.4	20.763	8.7	1.652	0.110	0.066	30.8	0.128	0.8	-0.109	0.065	-30.8	0.127
12900.0	779.8	1003.3	19.891	10.669	28.2	22.572	8.9	1.796	0.113	0.065	30.0	0.130	1.0	-0.112	0.064	-30.0	0.129
12905.0	779.8	1003.3	21.710	11.563	28.0	24.597	9.2	1.957	0.114	0.063	29.1	0.131	1.2	-0.113	0.063	-29.1	0.129
12910.0	779.8	1003.3	23.761	12.555	27.9	26.874	9.5	2.139	0.114	0.060	27.9	0.129	1.5	-0.112	0.060	-27.9	0.127
12915.0	779.8	1003.3	26.081	13.656	27.6	29.439	9.8	2.343	0.112	0.056	26.5	0.125	1.9	-0.110	0.055	-26.5	0.123
12920.0	779.8	1003.3	28.714	14.880	27.4	32.340	10.0	2.574	0.106	0.049	24.7	0.117	2.5	-0.104	0.048	-24.6	0.114
12925.0	779.8	1003.3	31.713	16.242	27.1	35.631	10.3	2.835	0.097	0.039	22.2	0.104	3.9	-0.094	0.038	-21.8	0.101
12930.0	779.8	1003.3	35.144	17.758	26.8	39.375	10.6	3.133	0.081	0.027	18.4	0.086	7.0	-0.077	0.024	-17.1	0.081
12935.0	779.8	1003.3	39.081	19.443	26.5	43.650	10.9	3.474	0.059	0.016	14.6	0.061	17.6	-0.052	0.005	-6.0	0.053
12940.0	779.8	1003.3	43.616	21.314	26.0	48.545	11.1	3.863	0.035	0.025	35.0	0.043	65.7	-0.016	-0.019	49.6	0.024
12945.0	779.8	1003.3	48.855	23.386	25.6	54.164	11.4	4.310	0.053	0.053	45.2	0.075	24.0	0.037	-0.049	-53.0	0.062
12950.0	779.8	1003.3	54.927	25.669	25.0	60.629	11.5	4.825	0.121	0.091	37.0	0.151	9.1	0.112	-0.088	-38.2	0.143
12955.0	779.8	1003.3	61.974	28.170	24.4	68.076	11.6	5.417	0.224	0.139	31.8	0.264	5.3	0.217	-0.136	-32.1	0.256
12960.0	779.8	1003.3	70.157	30.882	23.8	76.653	11.6	6.100	0.370	0.197	28.0	0.419	4.0	0.362	-0.194	-28.2	0.411
12965.0	779.8	1003.3	79.640	33.784	23.0	86.509	11.4	6.884	0.569	0.264	24.9	0.628	3.5	0.560	-0.261	-25.0	0.618
12970.0	779.8	1003.3	90.563	36.833	22.1	97.767	11.0	7.780	0.837	0.341	22.1	0.904	3.2	0.826	-0.337	-22.2	0.892
12975.0	779.8	1003.3	102.993	39.953	21.2	110.471	10.4	8.791	1.189	0.422	19.6	1.262	3.0	1.174	-0.418	-19.6	1.246
12980.0	779.8	1003.3	116.818	43.035	20.2	124.493	9.4	9.907	1.634	0.504	17.1	1.710	2.9	1.613	-0.499	-17.2	1.689
12985.0	779.8	1003.3	131.591	45.931	19.2	139.377	8.1	11.091	2.166	0.578	14.9	2.242	2.6	2.137	-0.573	-15.0	2.213
12990.0	779.8	1003.3	146.308	48.459	18.3	154.125	6.4	12.265	2.749	0.638	13.1	2.822	2.3	2.710	-0.633	-13.2	2.783
12995.0	779.8	1003.3	159.257	50.428	17.6	167.050	4.4	13.293	3.301	0.679	11.6	3.370	1.9	3.249	-0.675	-11.7	3.319
13000.0	779.8	1003.3	168.180	51.661	17.1	175.936	2.2	14.001	3.700	0.701	10.7	3.766	1.6	3.639	-0.697	-10.8	3.705
13005.0	779.8	1003.3	171.033	52.037	16.9	178.774	0.2	14.226	3.830	0.707	10.5	3.895	1.5	3.766	-0.703	-10.6	3.831
13010.0	779.8	1003.3	167.071	51.516	17.1	174.833	2.6	13.913	3.648	0.698	10.8	3.714	1.6	3.588	-0.694	-11.0	3.655
13015.0	779.8	1003.3	157.319	50.153	17.7	165.120	4.8	13.140	3.214	0.673	11.8	3.284	2.0	3.164	-0.668	-11.9	3.234
13020.0	779.8	1003.3	143.934	48.081	18.5	151.752	6.7	12.076	2.649	0.628	13.3	2.723	2.3	2.611	-0.623	-13.4	2.685
13025.0	779.8	1003.3	129.115	45.481	19.4	136.892	8.4	10.893	2.070	0.565	15.3	2.146	2.6	2.042	-0.560	-15.3	2.118
13030.0	779.8	1003.3	114.456	42.546	20.4	122.108	9.6	9.717	1.551	0.488	17.5	1.626	2.9	1.531	-0.484	-17.5	1.605
13035.0	779.8	1003.3	100.851	39.451	21.4	108.292	10.5	8.618	1.122	0.406	19.9	1.193	3.0	1.107	-0.402	-20.0	1.178
13040.0	779.8	1003.3	88.676	36.338	22.3	95.833	11.1	7.626	0.785	0.325	22.5	0.849	3.2	0.773	-0.322	-22.6	0.838
13045.0	779.8	1003.3	78.004	33.312	23.1	84.819	11.5	6.750	0.529	0.250	25.3	0.585	3.5	0.520	-0.247	-25.4	0.576
13050.0	779.8	1003.3	68.752	30.440	23.9	75.189	11.6	5.983	0.340	0.184	28.4	0.386	4.1	0.332	-0.181	-28.6	0.378
13055.0	779.8	1003.3	60.771	27.763	24.6	66.812	11.6	5.317	0.202	0.128	32.3	0.239	5.7	0.194	-0.125	-32.7	0.231
13060.0	779.8	1003.3	53.897	25.300	25.1	59.540	11.5	4.738	0.105	0.082	37.9	0.133	10.4	0.095	-0.079	-39.6	0.123
13065.0	779.8	1003.3	47.974	23.052	25.7	53.225	11.3	4.236	0.044	0.045	45.9	0.063	31.1	0.024	-0.041	-59.4	0.048
13070.0	779.8	1003.3	42.859	21.015	26.1	47.734	11.1	3.799	0.040	0.020	26.6	0.045	48.2	-0.025	-0.012	24.8	0.028
13075.0	779.8	1003.3	38.430	19.176	26.5	42.949	10.9	3.418	0.066	0.018	15.5	0.068	13.2	-0.060	0.011	-10.6	0.061
13080.0	779.8	1003.3	34.582	17.519	26.9	38.766	10.6	3.085	0.087	0.031	19.9	0.092	5.8	-0.083	0.029	-19.0	0.088
13085.0	779.8	1003.3	31.226	16.030	27.2	35.101	10.3	2.793	0.101	0.043	23.2	0.109	3.4	-0.098	0.042	-22.9	0.107
13090.0	779.8	1003.3	28.290	14.691	27.4	31.877	10.0	2.537	0.109	0.052	25.5	0.121	2.3	-0.107	0.051	-25.4	0.119
13095.0	779.8	1003.3	25.711	13.488	27.7	29.034	9.7	2.310	0.114	0.058	27.1	0.128	1.7	-0.112	0.058	-27.1	0.126
13100.0	779.8	1003.3	23.437	12.405	27.9	26.517	9.5	2.110	0.116	0.063	28.4	0.132	1.3	-0.114	0.062	-28.4	0.130
13105.0	779.8	1003.3	21.425	11.429	28.1	24.283	9.2	1.932	0.116	0.065	29.5	0.133	1.1	-0.114	0.065	-29.5	0.131
13110.0	779.8	1003.3	19.639	10.550	28.2	22.293	8.9	1.774	0.114	0.067	30.4	0.132	0.9	-0.113	0.066	-30.4	0.131
13115.0	779.8	1003.3	18.048	9.755	28.4	20.516	8.7	1.633	0.111	0.067	31.1	0.130	0.8	-0.110	0.067	-31.1	0.129
13120.0	779.8	1003.3	16.626	9.036	28.5	18.923	8.4	1.506	0.108	0.067	31.7	0.127	0.7	-0.107	0.066	-31.8	0.126

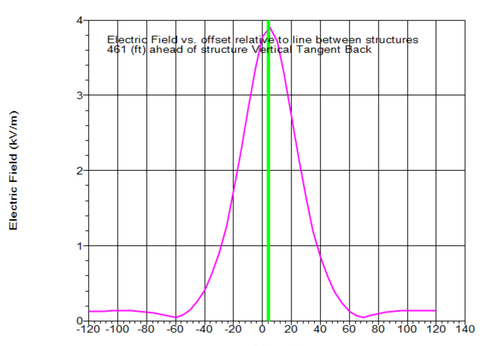




3D EMF Point Results Span from Vertical Tangent Back to Structure 5, 600 ft:

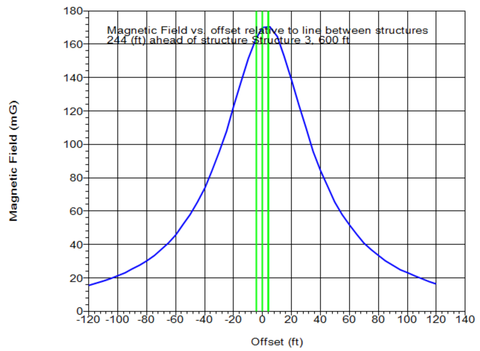
Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
13880.0	706.8	1003.3	14.797	8.093	28.7	16.866	7.9	1.342	0.101	0.060	30.9	0.117	0.7	-0.100	0.060	-30.9	0.117
13885.0	706.8	1003.3	15.961	8.691	28.6	18.173	8.1	1.446	0.104	0.061	30.3	0.121	0.7	-0.104	0.061	-30.3	0.120
13890.0	706.8	1003.3	17.254	9.349	28.4	19.624	8.3	1.562	0.108	0.061	29.6	0.124	0.9	-0.107	0.061	-29.6	0.123
13895.0	706.8	1003.3	18.697	10.074	28.3	21.238	8.6	1.690	0.110	0.061	28.8	0.126	1.0	-0.110	0.060	-28.8	0.125
13900.0	706.8	1003.3	20.311	10.875	28.2	23.040	8.9	1.833	0.113	0.059	27.8	0.127	1.2	-0.112	0.059	-27.9	0.126
13905.0	706.8	1003.3	22.123	11.763	28.0	25.056	9.1	1.994	0.114	0.057	26.7	0.127	1.5	-0.112	0.057	-26.7	0.126
13910.0	706.8	1003.3	24.165	12.746	27.8	27.320	9.4	2.174	0.113	0.053	25.3	0.125	1.9	-0.112	0.053	-25.2	0.123
13915.0	706.8	1003.3	26.472	13.838	27.6	29.871	9.7	2.377	0.110	0.048	23.5	0.120	2.5	-0.109	0.047	-23.4	0.118
13920.0	706.8	1003.3	29.090	15.051	27.4	32.753	10.0	2.606	0.104	0.040	21.1	0.112	3.5	-0.102	0.039	-20.8	0.110
13925.0	706.8	1003.3	32.072	16.401	27.1	36.022	10.3	2.867	0.094	0.030	17.7	0.099	5.5	-0.092	0.028	-16.9	0.096
13930.0	706.8	1003.3	35.481	17.903	26.8	39.742	10.6	3.163	0.078	0.018	13.0	0.081	10.5	-0.075	0.013	-9.9	0.076
13935.0	706.8	1003.3	39.393	19.573	26.4	43.988	10.8	3.500	0.056	0.016	15.5	0.058	27.7	-0.049	-0.006	7.4	0.050
13940.0	706.8	1003.3	43.899	21.427	26.0	48.849	11.1	3.887	0.034	0.036	46.7	0.049	91.2	-0.012	-0.031	69.4	0.034
13945.0	706.8	1003.3	49.107	23.481	25.6	54.432	11.3	4.332	0.056	0.066	49.8	0.087	24.4	0.042	-0.063	-56.7	0.076
13950.0	706.8	1003.3	55.143	25.746	25.0	60.857	11.5	4.843	0.126	0.106	40.1	0.165	10.3	0.117	-0.103	-41.4	0.156
13955.0	706.8	1003.3	62.152	28.228	24.4	68.262	11.6	5.432	0.231	0.155	33.9	0.278	6.2	0.223	-0.153	-34.4	0.270
13960.0	706.8	1003.3	70.296	30.921	23.7	76.796	11.6	6.111	0.377	0.214	29.6	0.433	4.6	0.369	-0.211	-29.8	0.425
13965.0	706.8	1003.3	79.740	33.806	23.0	86.610	11.4	6.892	0.577	0.283	26.1	0.642	3.9	0.567	-0.280	-26.3	0.633
13970.0	706.8	1003.3	90.628	36.840	22.1	97.829	11.0	7.785	0.845	0.360	23.1	0.919	3.5	0.834	-0.356	-23.1	0.907
13975.0	706.8	1003.3	103.029	39.948	21.2	110.502	10.3	8.793	1.198	0.442	20.2	1.277	3.2	1.182	-0.438	-20.3	1.261
13980.0	706.8	1003.3	116.837	43.021	20.2	124.506	9.4	9.908	1.643	0.523	17.7	1.725	3.0	1.622	-0.519	-17.7	1.703
13985.0	706.8	1003.3	131.608	45.910	19.2	139.386	8.1	11.092	2.176	0.597	15.4	2.257	2.7	2.147	-0.593	-15.4	2.227
13990.0	706.8	1003.3	146.340	48.436	18.3	154.147	6.4	12.267	2.759	0.657	13.4	2.836	2.3	2.720	-0.652	-13.5	2.797
13995.0	706.8	1003.3	159.313	50.404	17.6	167.096	4.4	13.297	3.311	0.697	11.9	3.384	1.9	3.260	-0.693	-12.0	3.333
14000.0	706.8	1003.3	168.258	51.637	17.1	176.003	2.2	14.006	3.710	0.719	11.0	3.779	1.6	3.650	-0.715	-11.1	3.719
14005.0	706.8	1003.3	171.116	52.012	16.9	178.847	0.2	14.232	3.841	0.724	10.7	3.908	1.5	3.777	-0.721	-10.8	3.845
14010.0	706.8	1003.3	167.137	51.489	17.1	174.889	2.6	13.917	3.659	0.715	11.1	3.728	1.6	3.599	-0.712	-11.2	3.669
14015.0	706.8	1003.3	157.355	50.124	17.7	165.146	4.8	13.142	3.224	0.690	12.1	3.297	2.0	3.175	-0.686	-12.2	3.248
14020.0	706.8	1003.3	143.941	48.050	18.5	151.749	6.7	12.076	2.658	0.646	13.7	2.736	2.4	2.621	-0.641	-13.8	2.698
14025.0	706.8	1003.3	129.106	45.451	19.4	136.873	8.3	10.892	2.079	0.583	15.7	2.159	2.7	2.051	-0.578	-15.7	2.131
14030.0	706.8	1003.3	114.449	42.520	20.4	122.092	9.6	9.716	1.559	0.507	18.0	1.639	3.0	1.538	-0.502	-18.1	1.618
14035.0	706.8	1003.3	100.860	39.433	21.4	108.295	10.5	8.618	1.129	0.424	20.6	1.206	3.2	1.114	-0.420	-20.7	1.190
14040.0	706.8	1003.3	88.715	36.332	22.3	95.866	11.1	7.629	0.791	0.343	23.4	0.862	3.5	0.780	-0.339	-23.5	0.850
14045.0	706.8	1003.3	78.079	33.321	23.1	84.892	11.4	6.755	0.535	0.267	26.5	0.598	3.9	0.526	-0.264	-26.6	0.588
14050.0	706.8	1003.3	68.866	30.466	23.9	75.304	11.6	5.993	0.345	0.199	30.0	0.398	4.7	0.337	-0.197	-30.3	0.390
14055.0	706.8	1003.3	60.925	27.808	24.5	66.971	11.6	5.329	0.207	0.142	34.5	0.251	6.6	0.199	-0.139	-35.1	0.243
14060.0	706.8	1003.3	54.090	25.363	25.1	59.742	11.5	4.754	0.109	0.095	41.1	0.144	11.8	0.099	-0.092	-42.9	0.135
14065.0	706.8	1003.3	48.203	23.135	25.6	53.467	11.3	4.255	0.046	0.057	51.1	0.073	31.8	0.028	-0.054	-62.7	0.060
14070.0	706.8	1003.3	43.121	21.115	26.1	48.014	11.1	3.821	0.038	0.028	36.3	0.048	72.9	-0.023	-0.023	45.3	0.032
14075.0	706.8	1003.3	38.721	19.293	26.5	43.262	10.8	3.443	0.064	0.014	12.5	0.065	19.7	-0.058	0.001	-1.0	0.058
14080.0	706.8	1003.3	34.899	17.652	26.8	39.109	10.5	3.112	0.085	0.023	15.2	0.088	8.2	-0.081	0.019	-13.4	0.084
14085.0	706.8	1003.3	31.566	16.177	27.1	35.470	10.2	2.823	0.099	0.035	19.5	0.105	4.6	-0.097	0.033	-18.9	0.102
14090.0	706.8	1003.3	28.648	14.851	27.4	32.269	9.9	2.568	0.108	0.045	22.4	0.117	3.0	-0.107	0.044	-22.2	0.115
14095.0	706.8	1003.3	26.085	13.659	27.6	29.445	9.6	2.343	0.114	0.052	24.5	0.125	2.2	-0.112	0.051	-24.5	0.123
14100.0	706.8	1003.3	23.825	12.586	27.8	26.945	9.4	2.144	0.116	0.057	26.1	0.129	1.7	-0.115	0.056	-26.1	0.128
14105.0	706.8	1003.3	21.823	11.619	28.0	24.724	9.1	1.967	0.116	0.060	27.4	0.130	1.3	-0.115	0.060	-27.4	0.129
14110.0	706.8	1003.3	20.046	10.746	28.2	22.745	8.8	1.810	0.114	0.062	28.5	0.130	1.1	-0.114	0.062	-28.5	0.129
14115.0	706.8	1003.3	18.461	9.958	28.3	20.976	8.6	1.669	0.112	0.063	29.4	0.129	0.9	-0.111	0.063	-29.4	0.128
14120.0	706.8	1003.3	17.044	9.244	28.5	19.389	8.3	1.543	0.109	0.063	30.1	0.126	0.8	-0.108	0.063	-30.1	0.125

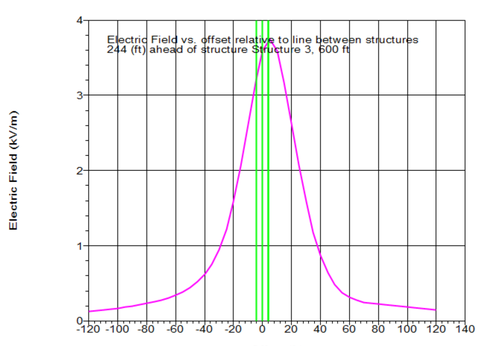




3D EMF Point Results Span from Vertical Tangent Back to Structure 5, 900 ft:

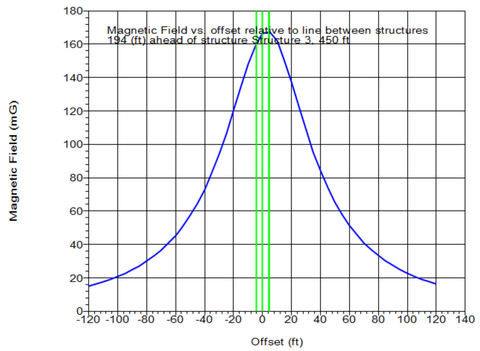
Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
14880.0	560.7	1003.3	15.137	8.263	28.6	17.245	7.8	1.372	0.106	0.066	31.7	0.125	0.6	-0.106	0.065	-31.7	0.124
14885.0	560.7	1003.3	16.296	8.857	28.5	18.547	8.0	1.476	0.110	0.067	31.2	0.129	0.7	-0.110	0.066	-31.2	0.128
14890.0	560.7	1003.3	17.585	9.510	28.4	19.991	8.2	1.591	0.114	0.067	30.5	0.132	0.8	-0.113	0.067	-30.6	0.131
14895.0	560.7	1003.3	19.021	10.230	28.3	21.598	8.5	1.719	0.117	0.067	29.8	0.135	0.9	-0.116	0.067	-29.8	0.134
14900.0	560.7	1003.3	20.628	11.025	28.1	23.389	8.7	1.861	0.119	0.066	29.0	0.136	1.1	-0.119	0.066	-29.0	0.136
14905.0	560.7	1003.3	22.431	11.905	28.0	25.394	9.0	2.021	0.121	0.064	28.0	0.137	1.3	-0.120	0.064	-28.0	0.136
14910.0	560.7	1003.3	24.461	12.880	27.8	27.645	9.3	2.200	0.120	0.061	26.7	0.135	1.6	-0.119	0.060	-26.7	0.134
14915.0	560.7	1003.3	26.757	13.963	27.6	30.181	9.6	2.402	0.118	0.056	25.2	0.130	2.1	-0.117	0.055	-25.1	0.129
14920.0	560.7	1003.3	29.360	15.167	27.3	33.046	9.9	2.630	0.113	0.048	23.2	0.122	2.8	-0.111	0.047	-23.0	0.121
14925.0	560.7	1003.3	32.326	16.506	27.0	36.296	10.2	2.888	0.103	0.038	20.4	0.110	4.3	-0.101	0.037	-19.9	0.107
14930.0	560.7	1003.3	35.717	17.995	26.7	39.994	10.5	3.183	0.088	0.026	16.3	0.091	7.7	-0.084	0.022	-14.8	0.087
14935.0	560.7	1003.3	39.609	19.653	26.4	44.216	10.8	3.519	0.065	0.015	13.0	0.067	18.6	-0.059	0.003	-3.1	0.059
14940.0	560.7	1003.3	44.092	21.493	26.0	49.052	11.0	3.903	0.039	0.027	35.1	0.048	70.2	-0.022	-0.021	43.8	0.031
14945.0	560.7	1003.3	49.275	23.533	25.5	54.607	11.3	4.345	0.049	0.057	49.0	0.075	29.7	0.031	-0.053	-60.1	0.061
14950.0	560.7	1003.3	55.285	25.784	25.0	61.002	11.4	4.854	0.116	0.096	39.5	0.151	10.9	0.106	-0.093	-41.3	0.141
14955.0	560.7	1003.3	62.267	28.251	24.4	68.377	11.5	5.441	0.220	0.144	33.3	0.263	6.1	0.211	-0.142	-33.9	0.254
14960.0	560.7	1003.3	70.384	30.932	23.7	76.881	11.5	6.118	0.365	0.203	29.1	0.418	4.5	0.356	-0.200	-29.3	0.409
14965.0	560.7	1003.3	79.802	33.805	23.0	86.667	11.3	6.897	0.565	0.272	25.7	0.627	3.8	0.555	-0.269	-25.8	0.616
14970.0	560.7	1003.3	90.670	36.828	22.1	97.863	11.0	7.788	0.834	0.349	22.7	0.904	3.4	0.821	-0.345	-22.8	0.891
14975.0	560.7	1003.3	103.058	39.928	21.2	110.522	10.3	8.795	1.187	0.431	20.0	1.263	3.2	1.170	-0.427	-20.1	1.246
14980.0	560.7	1003.3	116.864	42.997	20.2	124.523	9.4	9.909	1.633	0.513	17.4	1.712	2.9	1.611	-0.509	-17.5	1.689
14985.0	560.7	1003.3	131.647	45.885	19.2	139.414	8.1	11.094	2.167	0.588	15.2	2.245	2.7	2.137	-0.583	-15.3	2.215
14990.0	560.7	1003.3	146.404	48.411	18.3	154.201	6.4	12.271	2.752	0.648	13.2	2.827	2.3	2.711	-0.643	-13.3	2.787
14995.0	560.7	1003.3	159.411	50.381	17.5	167.183	4.4	13.304	3.306	0.689	11.8	3.377	1.9	3.253	-0.685	-11.9	3.325
15000.0	560.7	1003.3	168.384	51.615	17.0	176.117	2.2	14.015	3.706	0.710	10.9	3.774	1.6	3.644	-0.707	-11.0	3.712
15005.0	560.7	1003.3	171.251	51.990	16.9	178.969	0.2	14.242	3.837	0.716	10.6	3.903	1.4	3.772	-0.713	-10.7	3.838
15010.0	560.7	1003.3	167.254	51.465	17.1	174.994	2.6	13.926	3.654	0.707	11.0	3.722	1.6	3.594	-0.704	-11.1	3.662
15015.0	560.7	1003.3	157.438	50.097	17.7	165.216	4.8	13.147	3.218	0.682	12.0	3.289	2.0	3.168	-0.678	-12.1	3.239
15020.0	560.7	1003.3	143.987	48.020	18.4	151.784	6.7	12.079	2.651	0.637	13.5	2.726	2.4	2.612	-0.632	-13.6	2.687
15025.0	560.7	1003.3	129.127	45.420	19.4	136.882	8.3	10.893	2.070	0.573	15.5	2.148	2.7	2.041	-0.569	-15.6	2.119
15030.0	560.7	1003.3	114.458	42.490	20.4	122.090	9.5	9.716	1.549	0.497	17.8	1.626	2.9	1.527	-0.492	-17.9	1.605
15035.0	560.7	1003.3	100.872	39.408	21.3	108.297	10.4	8.618	1.118	0.414	20.3	1.192	3.2	1.102	-0.410	-20.4	1.176
15040.0	560.7	1003.3	88.741	36.314	22.3	95.883	11.0	7.630	0.780	0.332	23.1	0.848	3.4	0.768	-0.328	-23.2	0.835
15045.0	560.7	1003.3	78.127	33.313	23.1	84.932	11.4	6.759	0.524	0.256	26.0	0.583	3.8	0.514	-0.253	-26.2	0.572
15050.0	560.7	1003.3	68.939	30.470	23.8	75.373	11.5	5.998	0.334	0.189	29.5	0.384	4.6	0.325	-0.186	-29.8	0.374
15055.0	560.7	1003.3	61.026	27.825	24.5	67.070	11.5	5.337	0.196	0.132	33.9	0.237	6.6	0.187	-0.129	-34.6	0.227
15060.0	560.7	1003.3	54.219	25.394	25.1	59.871	11.4	4.764	0.099	0.085	40.6	0.131	12.7	0.088	-0.082	-43.0	0.120
15065.0	560.7	1003.3	48.358	23.180	25.6	53.627	11.2	4.267	0.041	0.048	49.2	0.063	39.8	0.017	-0.044	-68.8	0.047
15070.0	560.7	1003.3	43.301	21.175	26.1	48.201	11.0	3.836	0.045	0.022	25.4	0.050	47.4	-0.033	-0.014	22.4	0.036
15075.0	560.7	1003.3	38.924	19.366	26.5	43.476	10.7	3.460	0.072	0.018	13.7	0.074	13.7	-0.067	0.010	-8.5	0.068
15080.0	560.7	1003.3	35.123	17.738	26.8	39.348	10.4	3.131	0.093	0.031	18.2	0.098	6.2	-0.090	0.028	-17.2	0.095
15085.0	560.7	1003.3	31.808	16.275	27.1	35.730	10.1	2.843	0.108	0.043	21.8	0.116	3.7	-0.106	0.041	-21.4	0.113
15090.0	560.7	1003.3	28.907	14.960	27.4	32.549	9.8	2.590	0.116	0.052	24.2	0.128	2.5	-0.115	0.051	-24.1	0.126
15095.0	560.7	1003.3	26.359	13.778	27.6	29.742	9.6	2.367	0.121	0.059	26.0	0.135	1.9	-0.120	0.058	-26.0	0.133
15100.0	560.7	1003.3	24.111	12.714	27.8	27.257	9.3	2.169	0.123	0.064	27.4	0.139	1.5	-0.122	0.063	-27.4	0.137
15105.0	560.7	1003.3	22.121	11.755	28.0	25.050	9.0	1.993	0.123	0.067	28.6	0.140	1.2	-0.122	0.066	-28.5	0.139
15110.0	560.7	1003.3	20.353	10.890	28.1	23.083	8.7	1.837	0.121	0.068	29.5	0.139	1.0	-0.120	0.068	-29.5	0.138
15115.0	560.7	1003.3	18.776	10.108	28.3	21.324	8.4	1.697	0.118	0.069	30.3	0.137	0.8	-0.118	0.069	-30.3	0.136
15120.0	560.7	1003.3	17.366	9.399	28.4	19.746	8.2	1.571	0.115	0.069	31.0	0.134	0.7	-0.114	0.069	-31.0	0.133

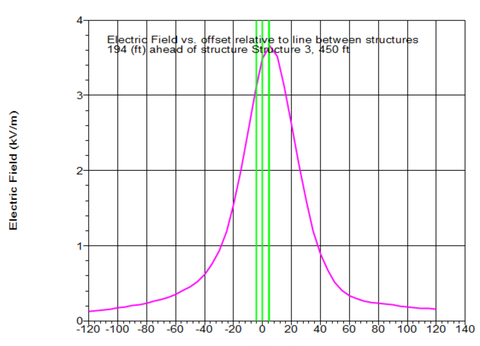




3D EMF Point Results Span from Structure 3, 600 ft to Tangent Ahead:

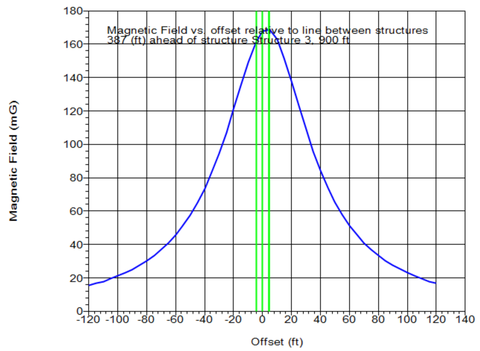
Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	E Real (kV/m)	E Imaginary (kV/m)	E Angle (deg)	E Magnitude (kV/m)	E Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
2880.0	1244.1	1003.3	12.616	9.059	35.7	15.532	43.7	1.236	0.130	0.009	3.9	0.130	2.5	-0.129	-0.009	3.9	0.129
2885.0	1244.1	1003.3	13.621	9.714	35.5	16.730	43.6	1.331	0.138	0.015	6.0	0.139	2.7	-0.137	-0.015	6.1	0.137
2890.0	1244.1	1003.3	14.743	10.438	35.3	18.064	43.6	1.438	0.146	0.022	8.4	0.148	3.0	-0.145	-0.022	8.6	0.147
2895.0	1244.1	1003.3	16.002	11.241	35.1	19.555	43.6	1.556	0.155	0.030	11.1	0.158	3.3	-0.154	-0.031	11.2	0.157
2900.0	1244.1	1003.3	17.417	12.134	34.9	21.227	43.6	1.689	0.165	0.041	14.0	0.170	3.7	-0.163	-0.041	14.2	0.168
2905.0	1244.1	1003.3	19.016	13.130	34.6	23.109	43.7	1.839	0.174	0.054	17.3	0.183	4.1	-0.173	-0.055	17.6	0.181
2910.0	1244.1	1003.3	20.830	14.242	34.4	25.233	43.8	2.008	0.184	0.071	21.0	0.197	4.6	-0.182	-0.071	21.3	0.195
2915.0	1244.1	1003.3	22.895	15.488	34.1	27.642	43.9	2.200	0.193	0.091	25.1	0.213	5.1	-0.191	-0.091	25.4	0.211
2920.0	1244.1	1003.3	25.257	16.886	33.8	30.382	44.0	2.418	0.201	0.115	29.8	0.232	5.7	-0.199	-0.115	30.1	0.230
2925.0	1244.1	1003.3	27.971	18.458	33.4	33.512	44.1	2.667	0.208	0.145	34.9	0.253	6.4	-0.205	-0.145	35.3	0.251
2930.0	1244.1	1003.3	31.103	20.226	33.0	37.101	44.2	2.952	0.211	0.182	40.7	0.279	7.2	-0.208	-0.182	41.1	0.276
2935.0	1244.1	1003.3	34.734	22.216	32.6	41.231	44.3	3.281	0.210	0.226	47.2	0.309	8.1	-0.206	-0.226	47.7	0.306
2940.0	1244.1	1003.3	38.962	24.453	32.1	46.000	44.3	3.661	0.201	0.281	54.4	0.345	9.1	-0.196	-0.280	55.1	0.342
2945.0	1244.1	1003.3	43.904	26.962	31.6	51.522	44.3	4.100	0.181	0.346	62.4	0.390	10.1	-0.174	-0.345	63.3	0.386
2950.0	1244.1	1003.3	49.698	29.762	30.9	57.928	44.2	4.610	0.145	0.423	71.1	0.447	11.2	-0.134	-0.421	72.4	0.442
2955.0	1244.1	1003.3	56.506	32.862	30.2	65.367	43.9	5.202	0.094	0.512	79.6	0.521	12.3	-0.067	-0.510	82.5	0.515
2960.0	1244.1	1003.3	64.504	36.251	29.3	73.993	43.3	5.888	0.089	0.614	81.7	0.620	13.3	0.037	-0.611	-86.5	0.612
2965.0	1244.1	1003.3	73.872	39.891	28.4	83.954	42.5	6.681	0.221	0.724	73.0	0.757	13.9	0.196	-0.720	-74.8	0.746
2970.0	1244.1	1003.3	84.755	43.695	27.3	95.356	41.3	7.588	0.449	0.835	61.8	0.948	13.8	0.427	-0.830	-62.8	0.934
2975.0	1244.1	1003.3	97.201	47.519	26.1	108.195	39.7	8.610	0.776	0.938	50.4	1.217	13.0	0.753	-0.932	-51.0	1.198
2980.0	1244.1	1003.3	111.039	51.153	24.7	122.255	37.6	9.729	1.217	1.017	39.9	1.586	11.5	1.190	-1.009	-40.3	1.560
2985.0	1244.1	1003.3	125.703	54.328	23.4	136.940	35.1	10.897	1.773	1.054	30.7	2.063	9.6	1.738	-1.044	-31.0	2.028
2990.0	1244.1	1003.3	140.016	56.745	22.1	151.078	32.3	12.022	2.406	1.036	23.3	2.619	7.6	2.361	-1.025	-23.5	2.574
2995.0	1244.1	1003.3	152.086	58.141	20.9	162.821	29.4	12.957	3.027	0.956	17.5	3.174	5.7	2.971	-0.945	-17.6	3.118
3000.0	1244.1	1003.3	159.587	58.349	20.1	169.919	26.6	13.522	3.499	0.825	13.3	3.595	4.2	3.435	-0.814	-13.3	3.530
3005.0	1244.1	1003.3	160.652	57.348	19.6	170.581	24.0	13.574	3.690	0.663	10.2	3.749	3.1	3.625	-0.652	-10.2	3.684
3010.0	1244.1	1003.3	154.957	55.265	19.6	164.517	21.9	13.092	3.554	0.493	7.9	3.588	2.4	3.496	-0.482	-7.9	3.529
3015.0	1244.1	1003.3	143.963	52.337	20.0	153.181	20.2	12.190	3.155	0.332	6.0	3.173	2.1	3.110	-0.320	-5.9	3.126
3020.0	1244.1	1003.3	130.035	48.846	20.6	138.907	19.0	11.054	2.623	0.192	4.2	2.630	2.3	2.590	-0.176	-3.9	2.596
3025.0	1244.1	1003.3	115.326	45.063	21.3	123.818	18.3	9.853	2.074	0.087	2.4	2.076	2.9	2.051	-0.054	-1.5	2.052
3030.0	1244.1	1003.3	101.247	41.215	22.1	109.314	17.9	8.699	1.581	0.074	2.7	1.583	4.1	1.566	0.044	1.6	1.567
3035.0	1244.1	1003.3	88.500	37.466	22.9	96.104	17.8	7.648	1.174	0.131	6.4	1.181	5.6	1.164	0.119	5.9	1.170
3040.0	1244.1	1003.3	77.313	33.923	23.7	84.428	17.9	6.719	0.852	0.181	12.0	0.871	7.7	0.846	0.174	11.6	0.863
3045.0	1244.1	1003.3	67.660	30.649	24.4	74.278	18.2	5.911	0.607	0.216	19.6	0.644	10.2	0.602	0.211	19.3	0.638
3050.0	1244.1	1003.3	59.399	27.669	25.0	65.527	18.6	5.214	0.422	0.238	29.4	0.485	12.7	0.419	0.234	29.2	0.480
3055.0	1244.1	1003.3	52.350	24.984	25.5	58.007	19.0	4.616	0.286	0.249	41.0	0.379	14.6	0.283	0.246	40.9	0.375
3060.0	1244.1	1003.3	46.337	22.584	26.0	51.547	19.5	4.102	0.185	0.252	53.6	0.313	15.0	0.183	0.249	53.6	0.309
3065.0	1244.1	1003.3	41.196	20.446	26.4	45.991	20.1	3.660	0.112	0.249	65.7	0.273	13.7	0.110	0.247	65.9	0.270
3070.0	1244.1	1003.3	36.788	18.548	26.8	41.199	20.7	3.279	0.060	0.242	76.0	0.249	11.4	0.057	0.240	76.7	0.247
3075.0	1244.1	1003.3	32.993	16.865	27.1	37.054	21.2	2.949	0.026	0.233	83.6	0.234	9.1	0.018	0.231	85.5	0.232
3080.0	1244.1	1003.3	29.714	15.372	27.4	33.454	21.8	2.662	0.020	0.222	84.8	0.223	7.2	-0.010	0.220	-87.5	0.221
3085.0	1244.1	1003.3	26.867	14.046	27.6	30.317	22.4	2.413	0.034	0.210	80.7	0.213	5.7	-0.030	0.209	-81.9	0.211
3090.0	1244.1	1003.3	24.385	12.867	27.8	27.572	23.0	2.194	0.047	0.198	76.8	0.204	4.6	-0.043	0.197	-77.6	0.202
3095.0	1244.1	1003.3	22.212	11.818	28.0	25.160	23.6	2.002	0.056	0.187	73.4	0.195	3.7	-0.053	0.186	-74.0	0.193
3100.0	1244.1	1003.3	20.301	10.882	28.2	23.033	24.1	1.833	0.062	0.175	70.6	0.186	3.1	-0.059	0.174	-71.2	0.184
3105.0	1244.1	1003.3	18.614	10.044	28.4	21.151	24.7	1.683	0.065	0.164	68.3	0.177	2.6	-0.063	0.163	-68.8	0.175
3110.0	1244.1	1003.3	17.118	9.294	28.5	19.478	25.3	1.550	0.067	0.154	66.4	0.168	2.2	-0.066	0.153	-66.8	0.167
3115.0	1244.1	1003.3	15.788	8.619	28.6	17.987	25.8	1.431	0.068	0.144	64.7	0.159	1.9	-0.067	0.143	-65.1	0.158
3120.0	1244.1	1003.3	14.599	8.012	28.8	16.653	26.4	1.325	0.068	0.135	63.3	0.151	1.6	-0.067	0.134	-63.6	0.150

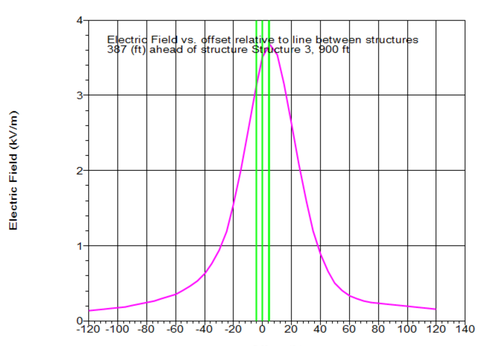




3D EMF Point Results Span from Structure 3, 450 ft to Tangent Ahead:

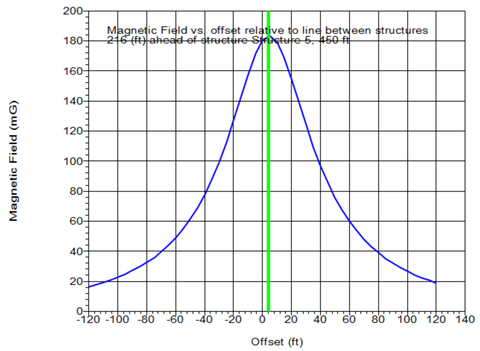
Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
7880.0	1194.3	1003.3	12.123	9.388	37.8	15.333	48.1	1.220	0.131	0.011	4.9	0.131	2.5	-0.129	-0.012	5.1	0.130
7885.0	1194.3	1003.3	13.108	10.064	37.5	16.526	47.9	1.315	0.139	0.017	7.0	0.140	2.7	-0.138	-0.017	7.2	0.139
7890.0	1194.3	1003.3	14.210	10.810	37.3	17.854	47.8	1.421	0.148	0.024	9.3	0.150	3.0	-0.147	-0.025	9.6	0.149
7895.0	1194.3	1003.3	15.445	11.636	37.0	19.338	47.6	1.539	0.158	0.033	11.8	0.161	3.3	-0.156	-0.034	12.2	0.160
7900.0	1194.3	1003.3	16.837	12.552	36.7	21.001	47.5	1.671	0.168	0.044	14.7	0.173	3.6	-0.166	-0.045	15.0	0.172
7905.0	1194.3	1003.3	18.410	13.571	36.4	22.871	47.4	1.820	0.178	0.057	17.8	0.187	4.0	-0.176	-0.058	18.2	0.185
7910.0	1194.3	1003.3	20.194	14.706	36.1	24.982	47.4	1.988	0.188	0.074	21.4	0.202	4.4	-0.186	-0.074	21.8	0.200
7915.0	1194.3	1003.3	22.228	15.975	35.7	27.373	47.3	2.178	0.199	0.094	25.3	0.220	4.9	-0.196	-0.094	25.7	0.218
7920.0	1194.3	1003.3	24.555	17.395	35.3	30.092	47.3	2.395	0.208	0.118	29.7	0.239	5.5	-0.205	-0.119	30.1	0.237
7925.0	1194.3	1003.3	27.230	18.987	34.9	33.196	47.3	2.642	0.216	0.149	34.6	0.262	6.1	-0.212	-0.149	35.1	0.259
7930.0	1194.3	1003.3	30.318	20.773	34.4	36.751	47.3	2.925	0.221	0.185	40.1	0.288	6.9	-0.217	-0.186	40.6	0.285
7935.0	1194.3	1003.3	33.898	22.776	33.9	40.839	47.2	3.250	0.221	0.230	46.2	0.319	7.7	-0.216	-0.231	46.8	0.316
7940.0	1194.3	1003.3	38.066	25.022	33.3	45.554	47.2	3.625	0.214	0.285	53.1	0.356	8.7	-0.208	-0.285	53.8	0.353
7945.0	1194.3	1003.3	42.936	27.532	32.7	51.006	47.0	4.059	0.196	0.350	60.7	0.401	9.7	-0.188	-0.349	61.7	0.397
7950.0	1194.3	1003.3	48.645	30.324	31.9	57.322	46.8	4.562	0.163	0.427	69.1	0.457	10.9	-0.151	-0.426	70.5	0.452
7955.0	1194.3	1003.3	55.346	33.404	31.1	64.645	46.4	5.144	0.112	0.517	77.8	0.529	12.1	-0.088	-0.515	80.3	0.523
7960.0	1194.3	1003.3	63.210	36.758	30.2	73.120	45.7	5.819	0.082	0.618	82.4	0.623	13.2	0.012	-0.615	-88.9	0.615
7965.0	1194.3	1003.3	72.405	40.344	29.1	82.886	44.7	6.596	0.193	0.727	75.1	0.752	14.0	0.165	-0.723	-77.1	0.742
7970.0	1194.3	1003.3	83.067	44.074	27.9	94.036	43.4	7.483	0.411	0.837	63.9	0.932	14.2	0.389	-0.832	-64.9	0.919
7975.0	1194.3	1003.3	95.230	47.805	26.7	106.555	41.6	8.479	0.728	0.938	52.2	1.187	13.5	0.706	-0.932	-52.8	1.169
7980.0	1194.3	1003.3	108.716	51.328	25.3	120.224	39.4	9.567	1.157	1.014	41.2	1.538	12.0	1.131	-1.006	-41.7	1.514
7985.0	1194.3	1003.3	122.972	54.380	23.9	134.459	36.8	10.700	1.697	1.048	31.7	1.995	10.0	1.665	-1.039	-32.0	1.962
7990.0	1194.3	1003.3	136.870	56.674	22.5	148.140	34.0	11.789	2.315	1.026	23.9	2.532	7.9	2.273	-1.016	-24.1	2.490
7995.0	1194.3	1003.3	148.622	57.957	21.3	159.522	31.0	12.694	2.925	0.944	17.9	3.074	5.9	2.874	-0.933	-18.0	3.021
8000.0	1194.3	1003.3	156.039	58.072	20.4	166.495	28.2	13.249	3.397	0.809	13.4	3.492	4.4	3.338	-0.798	-13.4	3.432
8005.0	1194.3	1003.3	157.347	57.004	19.9	167.354	25.6	13.318	3.604	0.642	10.1	3.661	3.2	3.543	-0.632	-10.1	3.599
8010.0	1194.3	1003.3	152.180	54.878	19.8	161.773	23.5	12.873	3.493	0.468	7.6	3.525	2.5	3.439	-0.457	-7.6	3.470
8015.0	1194.3	1003.3	141.846	51.926	20.1	151.051	21.8	12.020	3.123	0.304	5.6	3.138	2.3	3.080	-0.291	-5.4	3.094
8020.0	1194.3	1003.3	128.549	48.424	20.6	137.367	20.6	10.931	2.613	0.164	3.6	2.618	2.5	2.583	-0.144	-3.2	2.587
8025.0	1194.3	1003.3	114.355	44.638	21.3	122.758	19.9	9.769	2.080	0.072	2.0	2.081	3.2	2.059	-0.021	-0.6	2.059
8030.0	1194.3	1003.3	100.655	40.790	22.1	108.606	19.6	8.643	1.595	0.099	3.6	1.598	4.4	1.582	0.077	2.8	1.584
8035.0	1194.3	1003.3	88.170	37.043	22.8	95.636	19.5	7.610	1.190	0.162	7.7	1.201	5.9	1.182	0.151	7.3	1.192
8040.0	1194.3	1003.3	77.157	33.504	23.5	84.117	19.7	6.694	0.869	0.211	13.6	0.894	7.9	0.864	0.204	13.3	0.888
8045.0	1194.3	1003.3	67.613	30.235	24.1	74.065	20.0	5.894	0.622	0.244	21.4	0.668	10.3	0.619	0.239	21.1	0.664
8050.0	1194.3	1003.3	59.417	27.260	24.6	65.372	20.5	5.202	0.436	0.263	31.1	0.510	12.5	0.435	0.259	30.8	0.506
8055.0	1194.3	1003.3	52.405	24.584	25.1	57.885	21.0	4.606	0.298	0.272	42.4	0.403	14.0	0.297	0.269	42.1	0.400
8060.0	1194.3	1003.3	46.408	22.192	25.6	51.441	21.6	4.094	0.196	0.273	54.3	0.336	14.0	0.195	0.270	54.1	0.333
8065.0	1194.3	1003.3	41.271	20.065	25.9	45.890	22.2	3.652	0.122	0.267	65.6	0.294	12.7	0.121	0.265	65.5	0.291
8070.0	1194.3	1003.3	36.858	18.179	26.3	41.098	22.9	3.270	0.068	0.259	75.3	0.267	10.7	0.066	0.256	75.5	0.265
8075.0	1194.3	1003.3	33.055	16.508	26.5	36.948	23.6	2.940	0.031	0.247	82.8	0.249	8.7	0.026	0.245	83.9	0.247
8080.0	1194.3	1003.3	29.763	15.028	26.8	33.342	24.3	2.653	0.017	0.235	85.8	0.235	7.0	-0.002	0.233	-89.4	0.233
8085.0	1194.3	1003.3	26.903	13.716	27.0	30.198	25.0	2.403	0.029	0.222	82.6	0.224	5.6	-0.023	0.220	-84.1	0.221
8090.0	1194.3	1003.3	24.407	12.552	27.2	27.445	25.7	2.184	0.041	0.208	78.8	0.212	4.5	-0.037	0.207	-79.8	0.210
8095.0	1194.3	1003.3	22.220	11.517	27.4	25.027	26.4	1.992	0.051	0.195	75.5	0.202	3.7	-0.047	0.194	-76.3	0.200
8100.0	1194.3	1003.3	20.295	10.595	27.6	22.894	27.1	1.822	0.057	0.183	72.8	0.191	3.1	-0.054	0.182	-73.4	0.190
8105.0	1194.3	1003.3	18.594	9.772	27.7	21.005	27.8	1.672	0.061	0.171	70.4	0.181	2.6	-0.058	0.170	-71.0	0.180
8110.0	1194.3	1003.3	17.086	9.035	27.9	19.328	28.5	1.538	0.063	0.160	68.5	0.172	2.2	-0.061	0.159	-69.0	0.170
8115.0	1194.3	1003.3	15.744	8.373	28.0	17.832	29.2	1.419	0.064	0.149	66.8	0.162	1.9	-0.062	0.148	-67.3	0.161
8120.0	1194.3	1003.3	14.544	7.779	28.1	16.494	29.9	1.313	0.064	0.139	65.3	0.153	1.7	-0.062	0.139	-65.8	0.152

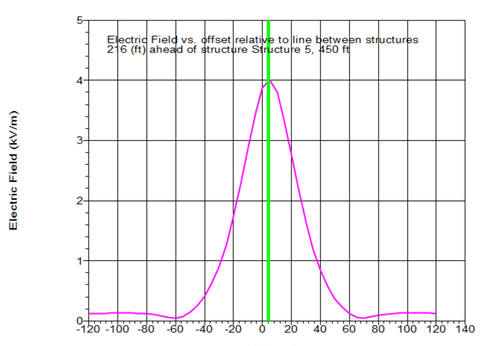




3D EMF Point Results Span from Structure 3, 900 ft to Tangent Ahead:

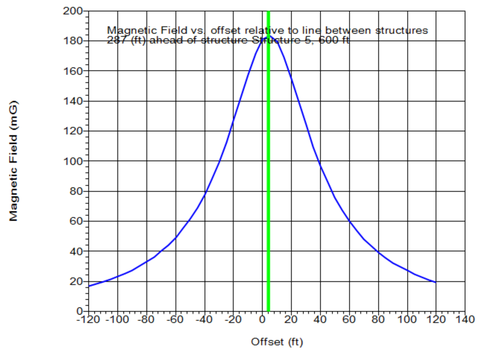
Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
8880.0	1387.4	1003.3	12.737	8.829	34.7	15.498	44.0	1.233	0.135	0.009	3.7	0.136	2.4	-0.135	-0.008	3.6	0.135
8885.0	1387.4	1003.3	13.735	9.477	34.6	16.687	44.1	1.328	0.144	0.015	5.8	0.145	2.7	-0.143	-0.015	5.8	0.144
8890.0	1387.4	1003.3	14.850	10.193	34.5	18.012	44.2	1.433	0.153	0.022	8.2	0.154	2.9	-0.152	-0.022	8.2	0.153
8895.0	1387.4	1003.3	16.099	10.990	34.3	19.492	44.4	1.551	0.162	0.031	10.8	0.165	3.2	-0.161	-0.031	10.9	0.164
8900.0	1387.4	1003.3	17.503	11.877	34.2	21.152	44.6	1.683	0.172	0.042	13.7	0.177	3.6	-0.171	-0.042	13.8	0.176
8905.0	1387.4	1003.3	19.088	12.867	34.0	23.020	44.8	1.832	0.183	0.056	17.0	0.191	4.0	-0.181	-0.056	17.1	0.190
8910.0	1387.4	1003.3	20.885	13.975	33.8	25.129	45.0	2.000	0.193	0.072	20.6	0.206	4.4	-0.191	-0.072	20.7	0.205
8915.0	1387.4	1003.3	22.930	15.217	33.6	27.520	45.2	2.190	0.203	0.093	24.6	0.223	5.0	-0.201	-0.093	24.7	0.222
8920.0	1387.4	1003.3	25.267	16.614	33.3	30.240	45.4	2.406	0.212	0.118	29.1	0.243	5.5	-0.210	-0.118	29.2	0.241
8925.0	1387.4	1003.3	27.951	18.186	33.1	33.347	45.7	2.654	0.220	0.149	34.1	0.265	6.2	-0.218	-0.148	34.3	0.263
8930.0	1387.4	1003.3	31.046	19.958	32.7	36.908	45.9	2.937	0.225	0.186	39.6	0.292	6.9	-0.222	-0.186	39.9	0.289
8935.0	1387.4	1003.3	34.633	21.955	32.4	41.005	46.1	3.263	0.225	0.232	45.9	0.323	7.8	-0.222	-0.231	46.2	0.320
8940.0	1387.4	1003.3	38.805	24.204	32.0	45.735	46.2	3.639	0.218	0.287	52.8	0.360	8.7	-0.214	-0.286	53.2	0.357
8945.0	1387.4	1003.3	43.678	26.729	31.5	51.208	46.3	4.075	0.200	0.353	60.5	0.405	9.7	-0.194	-0.352	61.1	0.402
8950.0	1387.4	1003.3	49.387	29.552	30.9	57.554	46.2	4.580	0.166	0.431	68.9	0.462	10.9	-0.157	-0.429	69.9	0.457
8955.0	1387.4	1003.3	56.089	32.681	30.2	64.916	45.9	5.166	0.115	0.521	77.6	0.534	12.0	-0.094	-0.519	79.8	0.528
8960.0	1387.4	1003.3	63.954	36.108	29.4	73.443	45.4	5.844	0.082	0.624	82.5	0.629	13.2	0.007	-0.620	-89.4	0.621
8965.0	1387.4	1003.3	73.155	39.792	28.5	83.277	44.5	6.627	0.191	0.734	75.4	0.758	14.0	0.160	-0.730	-77.7	0.747
8970.0	1387.4	1003.3	83.831	43.646	27.5	94.512	43.3	7.521	0.409	0.845	64.2	0.939	14.2	0.384	-0.840	-65.4	0.924
8975.0	1387.4	1003.3	96.021	47.527	26.3	107.139	41.6	8.526	0.727	0.947	52.5	1.194	13.6	0.702	-0.940	-53.3	1.173
8980.0	1387.4	1003.3	109.555	51.219	25.1	120.937	39.5	9.624	1.158	1.024	41.5	1.545	12.1	1.128	-1.015	-42.0	1.518
8985.0	1387.4	1003.3	123.882	54.451	23.7	135.320	37.0	10.768	1.701	1.058	31.9	2.003	10.1	1.664	-1.048	-32.2	1.967
8990.0	1387.4	1003.3	137.867	56.925	22.4	149.156	34.1	11.869	2.322	1.036	24.1	2.543	8.0	2.276	-1.025	-24.3	2.496
8995.0	1387.4	1003.3	149.694	58.373	21.3	160.673	31.2	12.786	2.935	0.953	18.0	3.086	6.1	2.880	-0.941	-18.1	3.029
9000.0	1387.4	1003.3	157.129	58.630	20.5	167.711	28.4	13.346	3.410	0.817	13.5	3.507	4.5	3.347	-0.805	-13.5	3.442
9005.0	1387.4	1003.3	158.353	57.676	20.0	168.530	25.8	13.411	3.618	0.649	10.2	3.675	3.3	3.553	-0.638	-10.2	3.610
9010.0	1387.4	1003.3	152.990	55.638	20.0	162.793	23.7	12.955	3.506	0.473	7.7	3.538	2.6	3.448	-0.461	-7.6	3.479
9015.0	1387.4	1003.3	142.384	52.752	20.3	151.842	22.0	12.083	3.133	0.308	5.6	3.148	2.4	3.087	-0.294	-5.4	3.101
9020.0	1387.4	1003.3	128.803	49.296	20.9	137.914	20.8	10.975	2.620	0.167	3.7	2.626	2.6	2.586	-0.146	-3.2	2.590
9025.0	1387.4	1003.3	114.359	45.543	21.7	123.094	20.0	9.795	2.084	0.074	2.0	2.085	3.3	2.059	-0.022	-0.6	2.059
9030.0	1387.4	1003.3	100.467	41.714	22.5	108.783	19.6	8.657	1.596	0.099	3.5	1.599	4.4	1.580	0.076	2.8	1.581
9035.0	1387.4	1003.3	87.849	37.977	23.4	95.706	19.5	7.616	1.189	0.161	7.7	1.200	6.0	1.178	0.151	7.3	1.188
9040.0	1387.4	1003.3	76.754	34.439	24.2	84.126	19.6	6.695	0.867	0.211	13.7	0.892	8.0	0.859	0.205	13.4	0.883
9045.0	1387.4	1003.3	67.168	31.163	24.9	74.045	19.8	5.892	0.619	0.244	21.5	0.666	10.4	0.613	0.240	21.4	0.659
9050.0	1387.4	1003.3	58.959	28.174	25.5	65.345	20.2	5.200	0.432	0.264	31.4	0.507	12.7	0.428	0.261	31.4	0.501
9055.0	1387.4	1003.3	51.953	25.478	26.1	57.864	20.6	4.605	0.294	0.273	42.9	0.401	14.3	0.290	0.271	43.0	0.397
9060.0	1387.4	1003.3	45.976	23.063	26.6	51.436	21.1	4.093	0.191	0.274	55.1	0.334	14.3	0.188	0.272	55.3	0.331
9065.0	1387.4	1003.3	40.868	20.908	27.1	45.906	21.5	3.653	0.117	0.269	66.6	0.294	12.9	0.113	0.268	67.0	0.291
9070.0	1387.4	1003.3	36.488	18.992	27.5	41.135	22.0	3.273	0.063	0.261	76.4	0.268	10.8	0.059	0.259	77.2	0.266
9075.0	1387.4	1003.3	32.720	17.289	27.9	37.007	22.5	2.945	0.027	0.250	83.7	0.251	8.7	0.019	0.248	85.6	0.249
9080.0	1387.4	1003.3	29.465	15.777	28.2	33.423	23.0	2.660	0.020	0.238	85.1	0.238	6.9	-0.009	0.236	-87.7	0.236
9085.0	1387.4	1003.3	26.641	14.432	28.4	30.299	23.5	2.411	0.034	0.225	81.3	0.227	5.5	-0.030	0.223	-82.4	0.225
9090.0	1387.4	1003.3	24.180	13.234	28.7	27.564	24.0	2.194	0.047	0.211	77.5	0.217	4.4	-0.044	0.211	-78.1	0.215
9095.0	1387.4	1003.3	22.026	12.166	28.9	25.162	24.5	2.002	0.056	0.199	74.2	0.206	3.6	-0.054	0.198	-74.6	0.205
9100.0	1387.4	1003.3	20.133	11.212	29.1	23.044	24.9	1.834	0.063	0.186	71.4	0.197	3.0	-0.061	0.185	-71.8	0.195
9105.0	1387.4	1003.3	18.462	10.357	29.3	21.169	25.4	1.685	0.067	0.175	69.1	0.187	2.5	-0.065	0.174	-69.4	0.186
9110.0	1387.4	1003.3	16.982	9.590	29.5	19.503	25.8	1.552	0.069	0.163	67.2	0.177	2.1	-0.068	0.163	-67.4	0.176
9115.0	1387.4	1003.3	15.665	8.900	29.6	18.017	26.2	1.434	0.070	0.153	65.5	0.168	1.9	-0.069	0.152	-65.7	0.167
9120.0	1387.4	1003.3	14.490	8.277	29.7	16.688	26.7	1.328	0.070	0.143	64.0	0.159	1.6	-0.069	0.143	-64.2	0.158

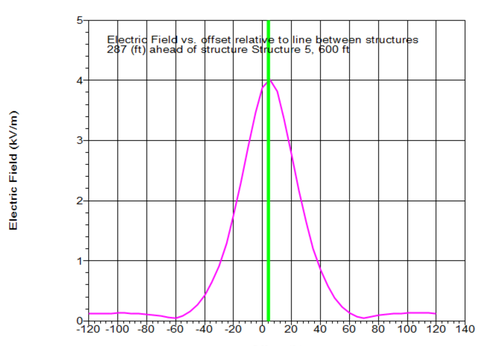




3D EMF Point Results Span from Structure 5, 450 ft to Vertical Tangent Ahead:

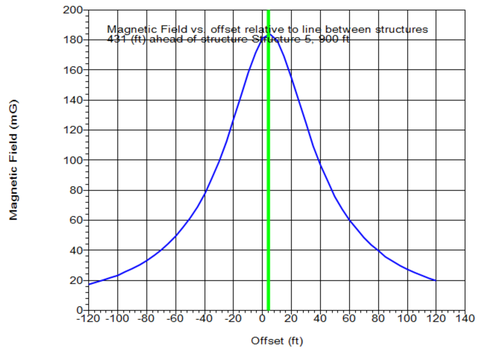
Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
12880.0	1215.9	1003.3	14.409	7.901	28.7	16.433	8.0	1.308	0.100	0.064	32.7	0.119	0.6	-0.101	0.065	-32.6	0.120
12885.0	1215.9	1003.3	15.579	8.505	28.6	17.749	8.2	1.412	0.104	0.066	32.2	0.123	0.6	-0.105	0.066	-32.1	0.124
12890.0	1215.9	1003.3	16.882	9.171	28.5	19.212	8.5	1.529	0.108	0.066	31.6	0.127	0.7	-0.109	0.067	-31.5	0.128
12895.0	1215.9	1003.3	18.337	9.906	28.4	20.842	8.7	1.659	0.111	0.067	30.9	0.130	0.8	-0.112	0.067	-30.9	0.131
12900.0	1215.9	1003.3	19.967	10.719	28.2	22.663	9.0	1.803	0.114	0.066	30.1	0.132	1.0	-0.115	0.066	-30.1	0.133
12905.0	1215.9	1003.3	21.800	11.621	28.1	24.704	9.2	1.966	0.116	0.065	29.2	0.133	1.2	-0.116	0.065	-29.1	0.133
12910.0	1215.9	1003.3	23.866	12.621	27.9	26.998	9.5	2.148	0.116	0.062	28.1	0.131	1.4	-0.117	0.062	-28.0	0.132
12915.0	1215.9	1003.3	26.205	13.734	27.7	29.586	9.8	2.354	0.114	0.057	26.8	0.127	1.8	-0.115	0.057	-26.6	0.128
12920.0	1215.9	1003.3	28.863	14.972	27.4	32.515	10.1	2.587	0.109	0.051	25.0	0.120	2.5	-0.109	0.050	-24.7	0.121
12925.0	1215.9	1003.3	31.893	16.350	27.1	35.840	10.4	2.852	0.100	0.041	22.5	0.108	3.7	-0.100	0.041	-22.1	0.108
12930.0	1215.9	1003.3	35.362	17.886	26.8	39.628	10.7	3.153	0.085	0.029	18.9	0.090	6.5	-0.084	0.027	-17.8	0.089
12935.0	1215.9	1003.3	39.347	19.596	26.5	43.957	11.0	3.498	0.063	0.016	14.6	0.065	15.7	-0.060	0.009	-8.3	0.061
12940.0	1215.9	1003.3	43.944	21.496	26.1	48.920	11.2	3.893	0.038	0.023	31.6	0.044	59.7	-0.025	-0.015	31.4	0.029
12945.0	1215.9	1003.3	49.264	23.604	25.6	54.627	11.5	4.347	0.049	0.051	46.2	0.071	27.0	0.027	-0.046	-59.4	0.053
12950.0	1215.9	1003.3	55.439	25.931	25.1	61.204	11.6	4.870	0.116	0.089	37.7	0.146	9.7	0.101	-0.085	-40.1	0.132
12955.0	1215.9	1003.3	62.622	28.484	24.5	68.796	11.7	5.475	0.219	0.138	32.1	0.259	5.5	0.206	-0.134	-33.0	0.245
12960.0	1215.9	1003.3	70.982	31.258	23.8	77.560	11.7	6.172	0.365	0.196	28.3	0.415	4.1	0.351	-0.192	-28.7	0.400
12965.0	1215.9	1003.3	80.698	34.232	23.0	87.658	11.5	6.976	0.567	0.265	25.1	0.626	3.5	0.551	-0.261	-25.4	0.609
12970.0	1215.9	1003.3	91.926	37.362	22.1	99.229	11.2	7.896	0.839	0.343	22.2	0.907	3.3	0.820	-0.339	-22.5	0.887
12975.0	1215.9	1003.3	104.752	40.573	21.2	112.335	10.5	8.939	1.199	0.427	19.6	1.273	3.1	1.175	-0.423	-19.8	1.249
12980.0	1215.9	1003.3	119.081	43.750	20.2	126.864	9.6	10.095	1.657	0.510	17.1	1.734	2.9	1.626	-0.506	-17.3	1.703
12985.0	1215.9	1003.3	134.465	46.739	19.2	142.356	8.2	11.328	2.208	0.587	14.9	2.285	2.7	2.168	-0.582	-15.0	2.245
12990.0	1215.9	1003.3	149.863	49.352	18.2	157.780	6.5	12.556	2.815	0.648	13.0	2.889	2.3	2.763	-0.644	-13.1	2.837
12995.0	1215.9	1003.3	163.456	51.385	17.5	171.343	4.5	13.635	3.392	0.690	11.5	3.461	2.0	3.327	-0.686	-11.7	3.397
13000.0	1215.9	1003.3	172.812	52.653	16.9	180.655	2.2	14.376	3.809	0.712	10.6	3.875	1.6	3.733	-0.709	-10.8	3.800
13005.0	1215.9	1003.3	175.716	53.027	16.8	183.543	0.3	14.606	3.941	0.717	10.3	4.006	1.5	3.862	-0.715	-10.5	3.927
13010.0	1215.9	1003.3	171.381	52.468	17.0	179.233	2.7	14.263	3.743	0.708	10.7	3.809	1.7	3.669	-0.705	-10.9	3.736
13015.0	1215.9	1003.3	160.967	51.036	17.6	168.864	4.9	13.438	3.281	0.682	11.7	3.351	2.0	3.219	-0.679	-11.9	3.290
13020.0	1215.9	1003.3	146.831	48.873	18.4	154.751	6.9	12.315	2.688	0.636	13.3	2.762	2.4	2.639	-0.632	-13.5	2.713
13025.0	1215.9	1003.3	131.324	46.171	19.4	139.204	8.5	11.077	2.087	0.571	15.3	2.163	2.7	2.049	-0.566	-15.4	2.126
13030.0	1215.9	1003.3	116.101	43.133	20.4	123.854	9.8	9.856	1.553	0.492	17.6	1.629	2.9	1.524	-0.487	-17.7	1.600
13035.0	1215.9	1003.3	102.062	39.940	21.4	109.598	10.7	8.722	1.115	0.407	20.1	1.187	3.1	1.093	-0.403	-20.3	1.165
13040.0	1215.9	1003.3	89.565	36.741	22.3	96.808	11.3	7.704	0.774	0.325	22.7	0.840	3.3	0.756	-0.321	-23.0	0.821
13045.0	1215.9	1003.3	78.657	33.639	23.2	85.549	11.6	6.808	0.518	0.248	25.6	0.574	3.6	0.502	-0.244	-25.9	0.559
13050.0	1215.9	1003.3	69.233	30.704	23.9	75.736	11.7	6.027	0.329	0.181	28.9	0.375	4.3	0.315	-0.177	-29.4	0.361
13055.0	1215.9	1003.3	61.127	27.976	24.6	67.224	11.7	5.350	0.192	0.125	32.9	0.229	6.0	0.179	-0.121	-34.0	0.216
13060.0	1215.9	1003.3	54.162	25.470	25.2	59.852	11.6	4.763	0.097	0.078	39.0	0.125	11.6	0.082	-0.074	-42.3	0.110
13065.0	1215.9	1003.3	48.172	23.188	25.7	53.462	11.4	4.254	0.040	0.042	46.6	0.058	37.9	0.013	-0.037	-71.1	0.039
13070.0	1215.9	1003.3	43.008	21.124	26.2	47.915	11.2	3.813	0.044	0.018	22.6	0.048	39.8	-0.036	-0.007	11.9	0.036
13075.0	1215.9	1003.3	38.542	19.263	26.6	43.087	10.9	3.429	0.071	0.020	15.9	0.073	11.5	-0.068	0.015	-12.5	0.070
13080.0	1215.9	1003.3	34.666	17.589	26.9	38.873	10.6	3.093	0.091	0.034	20.4	0.097	5.3	-0.090	0.032	-19.6	0.096
13085.0	1215.9	1003.3	31.290	16.086	27.2	35.183	10.3	2.800	0.104	0.045	23.6	0.114	3.2	-0.105	0.045	-23.2	0.114
13090.0	1215.9	1003.3	28.339	14.736	27.5	31.941	10.0	2.542	0.112	0.054	25.8	0.125	2.2	-0.113	0.054	-25.6	0.125
13095.0	1215.9	1003.3	25.748	13.524	27.7	29.084	9.8	2.314	0.116	0.060	27.4	0.131	1.7	-0.117	0.060	-27.2	0.132
13100.0	1215.9	1003.3	23.466	12.435	27.9	26.557	9.5	2.113	0.118	0.064	28.6	0.134	1.3	-0.119	0.064	-28.5	0.135
13105.0	1215.9	1003.3	21.448	11.454	28.1	24.314	9.2	1.935	0.117	0.067	29.7	0.135	1.1	-0.118	0.067	-29.6	0.136
13110.0	1215.9	1003.3	19.657	10.570	28.3	22.318	8.9	1.776	0.115	0.068	30.5	0.134	0.9	-0.116	0.068	-30.4	0.135
13115.0	1215.9	1003.3	18.062	9.772	28.4	20.536	8.7	1.634	0.112	0.068	31.2	0.131	0.8	-0.113	0.068	-31.2	0.132
13120.0	1215.9	1003.3	16.638	9.051	28.5	18.940	8.4	1.507	0.109	0.068	31.9	0.128	0.7	-0.110	0.068	-31.8	0.129

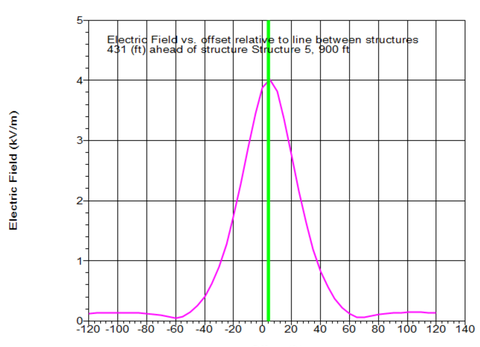




3D EMF Point Results Span from Structure 5, 600 ft to Vertical Tangent Ahead:

Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
13880.0	1287.5	1003.3	14.838	8.121	28.7	16.915	7.9	1.346	0.102	0.061	31.1	0.119	0.6	-0.102	0.061	-31.1	0.119
13885.0	1287.5	1003.3	16.008	8.722	28.6	18.230	8.1	1.451	0.105	0.062	30.5	0.122	0.7	-0.106	0.062	-30.5	0.123
13890.0	1287.5	1003.3	17.309	9.384	28.5	19.689	8.4	1.567	0.109	0.062	29.8	0.125	0.8	-0.109	0.063	-29.8	0.126
13895.0	1287.5	1003.3	18.760	10.115	28.3	21.313	8.6	1.696	0.112	0.062	29.1	0.128	1.0	-0.113	0.062	-29.0	0.129
13900.0	1287.5	1003.3	20.385	10.923	28.2	23.127	8.9	1.840	0.114	0.061	28.1	0.130	1.2	-0.115	0.061	-28.1	0.130
13905.0	1287.5	1003.3	22.210	11.818	28.0	25.159	9.1	2.002	0.116	0.059	27.0	0.130	1.4	-0.116	0.059	-26.9	0.130
13910.0	1287.5	1003.3	24.267	12.811	27.8	27.441	9.4	2.184	0.115	0.055	25.6	0.128	1.8	-0.116	0.055	-25.5	0.129
13915.0	1287.5	1003.3	26.594	13.914	27.6	30.014	9.7	2.388	0.113	0.050	23.9	0.124	2.4	-0.114	0.050	-23.7	0.124
13920.0	1287.5	1003.3	29.237	15.141	27.4	32.925	10.0	2.620	0.108	0.043	21.6	0.116	3.3	-0.108	0.042	-21.3	0.116
13925.0	1287.5	1003.3	32.249	16.508	27.1	36.229	10.3	2.883	0.098	0.032	18.3	0.103	5.1	-0.098	0.031	-17.7	0.103
13930.0	1287.5	1003.3	35.697	18.030	26.8	39.992	10.6	3.182	0.083	0.020	13.7	0.085	9.5	-0.082	0.017	-11.5	0.084
13935.0	1287.5	1003.3	39.658	19.724	26.4	44.292	10.9	3.525	0.061	0.015	13.6	0.062	23.8	-0.057	-0.003	2.6	0.057
13940.0	1287.5	1003.3	44.227	21.608	26.0	49.223	11.2	3.917	0.036	0.033	42.5	0.049	91.1	-0.021	-0.028	52.9	0.035
13945.0	1287.5	1003.3	49.515	23.698	25.6	54.894	11.4	4.368	0.051	0.064	51.1	0.082	27.7	0.032	-0.060	-62.1	0.068
13950.0	1287.5	1003.3	55.655	26.007	25.0	61.432	11.6	4.889	0.120	0.104	40.9	0.158	11.0	0.106	-0.100	-43.3	0.146
13955.0	1287.5	1003.3	62.801	28.541	24.4	68.982	11.7	5.489	0.224	0.153	34.4	0.271	6.4	0.211	-0.150	-35.3	0.259
13960.0	1287.5	1003.3	71.122	31.296	23.8	77.703	11.7	6.183	0.371	0.213	29.9	0.427	4.7	0.357	-0.210	-30.4	0.414
13965.0	1287.5	1003.3	80.799	34.253	23.0	87.760	11.5	6.984	0.573	0.283	26.3	0.639	3.9	0.557	-0.279	-26.6	0.624
13970.0	1287.5	1003.3	91.993	37.369	22.1	99.293	11.1	7.901	0.846	0.362	23.2	0.920	3.5	0.827	-0.358	-23.4	0.901
13975.0	1287.5	1003.3	104.791	40.567	21.2	112.370	10.5	8.942	1.206	0.446	20.3	1.285	3.3	1.183	-0.442	-20.5	1.263
13980.0	1287.5	1003.3	119.105	43.736	20.2	126.881	9.5	10.097	1.664	0.530	17.7	1.746	3.0	1.635	-0.525	-17.8	1.717
13985.0	1287.5	1003.3	134.488	46.720	19.2	142.372	8.2	11.330	2.215	0.606	15.3	2.297	2.8	2.177	-0.601	-15.4	2.259
13990.0	1287.5	1003.3	149.903	49.331	18.2	157.811	6.5	12.558	2.823	0.667	13.3	2.900	2.4	2.773	-0.663	-13.4	2.851
13995.0	1287.5	1003.3	163.523	51.363	17.4	171.400	4.5	13.640	3.400	0.708	11.8	3.473	2.0	3.337	-0.704	-11.9	3.411
14000.0	1287.5	1003.3	172.902	52.631	16.9	180.735	2.2	14.382	3.817	0.729	10.8	3.886	1.6	3.744	-0.726	-11.0	3.814
14005.0	1287.5	1003.3	175.810	53.004	16.8	183.627	0.3	14.613	3.949	0.734	10.5	4.017	1.5	3.872	-0.732	-10.7	3.941
14010.0	1287.5	1003.3	171.456	52.443	17.0	179.297	2.7	14.268	3.750	0.725	10.9	3.820	1.7	3.679	-0.722	-11.1	3.749
14015.0	1287.5	1003.3	161.007	51.008	17.6	168.893	4.9	13.440	3.288	0.699	12.0	3.362	2.0	3.228	-0.696	-12.2	3.303
14020.0	1287.5	1003.3	146.838	48.842	18.4	154.748	6.9	12.314	2.695	0.654	13.6	2.773	2.5	2.648	-0.649	-13.8	2.726
14025.0	1287.5	1003.3	131.312	46.140	19.4	139.183	8.5	11.076	2.093	0.588	15.7	2.174	2.8	2.057	-0.584	-15.8	2.138
14030.0	1287.5	1003.3	116.089	43.106	20.4	123.834	9.7	9.854	1.559	0.510	18.1	1.640	3.1	1.531	-0.505	-18.3	1.612
14035.0	1287.5	1003.3	102.067	39.921	21.4	109.597	10.6	8.721	1.121	0.425	20.8	1.198	3.3	1.099	-0.421	-20.9	1.177
14040.0	1287.5	1003.3	89.600	36.733	22.3	96.837	11.2	7.706	0.779	0.341	23.6	0.851	3.6	0.762	-0.337	-23.9	0.833
14045.0	1287.5	1003.3	78.728	33.646	23.1	85.617	11.6	6.813	0.522	0.264	26.8	0.585	4.0	0.508	-0.260	-27.2	0.570
14050.0	1287.5	1003.3	69.344	30.728	23.9	75.847	11.7	6.036	0.333	0.196	30.5	0.386	4.9	0.320	-0.192	-31.0	0.373
14055.0	1287.5	1003.3	61.278	28.018	24.6	67.379	11.7	5.362	0.196	0.138	35.2	0.240	7.0	0.183	-0.135	-36.3	0.227
14060.0	1287.5	1003.3	54.351	25.531	25.2	60.049	11.6	4.779	0.100	0.091	42.4	0.135	13.2	0.085	-0.087	-45.7	0.122
14065.0	1287.5	1003.3	48.397	23.268	25.7	53.700	11.4	4.273	0.041	0.053	52.2	0.067	38.8	0.016	-0.049	-72.2	0.051
14070.0	1287.5	1003.3	43.265	21.221	26.1	48.189	11.1	3.835	0.043	0.025	30.4	0.050	57.8	-0.033	-0.018	29.0	0.038
14075.0	1287.5	1003.3	38.828	19.377	26.5	43.395	10.8	3.453	0.069	0.015	12.1	0.071	16.6	-0.066	0.005	-4.6	0.067
14080.0	1287.5	1003.3	34.978	17.719	26.9	39.211	10.6	3.120	0.090	0.026	16.0	0.093	7.4	-0.089	0.023	-14.7	0.092
14085.0	1287.5	1003.3	31.625	16.230	27.2	35.547	10.3	2.829	0.103	0.038	20.1	0.110	4.2	-0.103	0.037	-19.6	0.110
14090.0	1287.5	1003.3	28.692	14.893	27.4	32.327	10.0	2.573	0.112	0.047	22.9	0.121	2.8	-0.112	0.047	-22.7	0.122
14095.0	1287.5	1003.3	26.117	13.692	27.7	29.489	9.7	2.347	0.116	0.054	24.9	0.128	2.1	-0.117	0.054	-24.8	0.129
14100.0	1287.5	1003.3	23.848	12.613	27.9	26.978	9.4	2.147	0.118	0.059	26.5	0.132	1.6	-0.119	0.059	-26.4	0.132
14105.0	1287.5	1003.3	21.840	11.640	28.1	24.749	9.1	1.969	0.118	0.062	27.7	0.133	1.3	-0.118	0.062	-27.6	0.134
14110.0	1287.5	1003.3	20.058	10.763	28.2	22.763	8.8	1.811	0.116	0.064	28.7	0.132	1.1	-0.117	0.064	-28.7	0.133
14115.0	1287.5	1003.3	18.469	9.972	28.4	20.989	8.6	1.670	0.113	0.064	29.6	0.130	0.9	-0.114	0.065	-29.5	0.131
14120.0	1287.5	1003.3	17.050	9.255	28.5	19.400	8.3	1.544	0.110	0.064	30.3	0.128	0.8	-0.111	0.065	-30.3	0.128





3D EMF Point Results Span from Structure 5, 900 ft to Vertical Tangent Ahead:

Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
14880.0	1430.7	1003.3	15.174	8.289	28.6	17.290	7.8	1.376	0.108	0.067	31.9	0.127	0.6	-0.108	0.067	-31.8	0.127
14885.0	1430.7	1003.3	16.340	8.886	28.5	18.600	8.0	1.480	0.112	0.068	31.3	0.131	0.7	-0.112	0.068	-31.3	0.131
14890.0	1430.7	1003.3	17.636	9.544	28.4	20.053	8.3	1.596	0.115	0.069	30.7	0.134	0.8	-0.116	0.069	-30.7	0.135
14895.0	1430.7	1003.3	19.081	10.269	28.3	21.669	8.5	1.724	0.119	0.069	30.0	0.137	0.9	-0.119	0.069	-29.9	0.138
14900.0	1430.7	1003.3	20.699	11.071	28.1	23.474	8.8	1.868	0.122	0.068	29.2	0.139	1.1	-0.122	0.068	-29.1	0.140
14905.0	1430.7	1003.3	22.515	11.959	28.0	25.494	9.0	2.029	0.123	0.066	28.2	0.140	1.3	-0.124	0.066	-28.1	0.140
14910.0	1430.7	1003.3	24.562	12.945	27.8	27.764	9.3	2.209	0.123	0.063	27.0	0.138	1.6	-0.124	0.063	-26.9	0.139
14915.0	1430.7	1003.3	26.877	14.039	27.6	30.323	9.6	2.413	0.121	0.058	25.5	0.134	2.0	-0.122	0.058	-25.3	0.135
14920.0	1430.7	1003.3	29.506	15.257	27.3	33.217	9.9	2.643	0.116	0.051	23.5	0.127	2.7	-0.117	0.050	-23.3	0.127
14925.0	1430.7	1003.3	32.503	16.613	27.1	36.502	10.2	2.905	0.107	0.041	20.8	0.115	4.0	-0.107	0.040	-20.4	0.114
14930.0	1430.7	1003.3	35.933	18.123	26.8	40.245	10.5	3.203	0.093	0.028	16.9	0.097	7.0	-0.091	0.026	-15.7	0.095
14935.0	1430.7	1003.3	39.875	19.805	26.4	44.523	10.8	3.543	0.071	0.016	12.8	0.073	16.1	-0.067	0.007	-5.8	0.068
14940.0	1430.7	1003.3	44.423	21.676	26.0	49.429	11.1	3.933	0.043	0.025	30.2	0.050	58.1	-0.032	-0.018	29.4	0.036
14945.0	1430.7	1003.3	49.688	23.753	25.5	55.073	11.4	4.383	0.045	0.054	50.1	0.070	35.5	0.020	-0.049	-67.7	0.053
14950.0	1430.7	1003.3	55.803	26.048	25.0	61.584	11.5	4.901	0.109	0.093	40.6	0.143	12.1	0.095	-0.089	-43.4	0.130
14955.0	1430.7	1003.3	62.924	28.569	24.4	69.105	11.7	5.499	0.212	0.142	33.9	0.255	6.5	0.199	-0.139	-34.9	0.243
14960.0	1430.7	1003.3	71.221	31.312	23.7	77.800	11.6	6.191	0.358	0.202	29.5	0.411	4.7	0.345	-0.198	-29.9	0.398
14965.0	1430.7	1003.3	80.876	34.258	23.0	87.833	11.5	6.990	0.559	0.272	25.9	0.622	3.9	0.545	-0.268	-26.2	0.607
14970.0	1430.7	1003.3	92.054	37.365	22.1	99.349	11.1	7.906	0.832	0.351	22.9	0.903	3.5	0.815	-0.347	-23.1	0.885
14975.0	1430.7	1003.3	104.846	40.558	21.1	112.417	10.5	8.946	1.192	0.435	20.1	1.269	3.2	1.171	-0.431	-20.2	1.247
14980.0	1430.7	1003.3	119.166	43.724	20.1	126.934	9.5	10.101	1.651	0.520	17.5	1.731	3.0	1.623	-0.515	-17.6	1.703
14985.0	1430.7	1003.3	134.573	46.708	19.1	142.448	8.2	11.336	2.204	0.596	15.1	2.284	2.7	2.167	-0.592	-15.3	2.247
14990.0	1430.7	1003.3	150.026	49.321	18.2	157.925	6.5	12.567	2.814	0.658	13.2	2.890	2.4	2.765	-0.654	-13.3	2.841
14995.0	1430.7	1003.3	163.693	51.357	17.4	171.560	4.5	13.652	3.393	0.700	11.7	3.464	2.0	3.331	-0.696	-11.8	3.403
15000.0	1430.7	1003.3	173.110	52.627	16.9	180.933	2.2	14.398	3.812	0.722	10.7	3.879	1.6	3.740	-0.719	-10.9	3.808
15005.0	1430.7	1003.3	176.029	53.001	16.8	183.835	0.3	14.629	3.944	0.727	10.4	4.011	1.5	3.869	-0.725	-10.6	3.936
15010.0	1430.7	1003.3	171.652	52.437	17.0	179.483	2.7	14.283	3.745	0.718	10.9	3.813	1.7	3.675	-0.715	-11.0	3.744
15015.0	1430.7	1003.3	161.157	50.998	17.6	169.034	4.9	13.451	3.281	0.692	11.9	3.353	2.0	3.222	-0.688	-12.1	3.295
15020.0	1430.7	1003.3	146.938	48.828	18.4	154.839	6.9	12.322	2.686	0.645	13.5	2.762	2.4	2.640	-0.641	-13.6	2.716
15025.0	1430.7	1003.3	131.374	46.123	19.3	139.235	8.5	11.080	2.082	0.579	15.5	2.161	2.8	2.047	-0.575	-15.7	2.126
15030.0	1430.7	1003.3	116.130	43.088	20.4	123.866	9.7	9.857	1.547	0.500	17.9	1.625	3.0	1.520	-0.496	-18.1	1.599
15035.0	1430.7	1003.3	102.103	39.905	21.3	109.624	10.6	8.724	1.108	0.415	20.5	1.183	3.2	1.087	-0.411	-20.7	1.162
15040.0	1430.7	1003.3	89.644	36.723	22.3	96.874	11.2	7.709	0.767	0.331	23.4	0.835	3.5	0.750	-0.327	-23.6	0.818
15045.0	1430.7	1003.3	78.790	33.644	23.1	85.672	11.5	6.818	0.510	0.254	26.5	0.569	3.9	0.495	-0.250	-26.8	0.555
15050.0	1430.7	1003.3	69.427	30.737	23.9	75.927	11.7	6.042	0.320	0.186	30.1	0.370	4.9	0.308	-0.182	-30.6	0.357
15055.0	1430.7	1003.3	61.386	28.039	24.5	67.487	11.6	5.370	0.184	0.128	34.8	0.225	7.2	0.171	-0.124	-36.0	0.212
15060.0	1430.7	1003.3	54.485	25.565	25.1	60.185	11.5	4.789	0.090	0.081	42.1	0.121	14.9	0.074	-0.077	-46.2	0.107
15065.0	1430.7	1003.3	48.556	23.316	25.6	53.863	11.3	4.286	0.038	0.044	49.1	0.059	50.8	0.005	-0.039	-82.8	0.039
15070.0	1430.7	1003.3	43.447	21.282	26.1	48.380	11.1	3.850	0.051	0.019	20.6	0.055	37.5	-0.043	-0.009	11.7	0.044
15075.0	1430.7	1003.3	39.032	19.451	26.5	43.611	10.8	3.470	0.079	0.020	14.2	0.081	11.8	-0.076	0.014	-10.6	0.077
15080.0	1430.7	1003.3	35.202	17.806	26.8	39.449	10.5	3.139	0.099	0.034	18.8	0.105	5.6	-0.098	0.032	-18.0	0.103
15085.0	1430.7	1003.3	31.866	16.328	27.1	35.806	10.2	2.849	0.112	0.046	22.2	0.121	3.4	-0.112	0.045	-21.9	0.121
15090.0	1430.7	1003.3	28.949	15.002	27.4	32.606	9.9	2.595	0.120	0.055	24.6	0.132	2.4	-0.120	0.055	-24.4	0.132
15095.0	1430.7	1003.3	26.389	13.811	27.6	29.784	9.6	2.370	0.124	0.061	26.3	0.139	1.8	-0.125	0.061	-26.2	0.139
15100.0	1430.7	1003.3	24.131	12.739	27.8	27.288	9.3	2.171	0.126	0.066	27.7	0.142	1.4	-0.126	0.066	-27.6	0.142
15105.0	1430.7	1003.3	22.134	11.775	28.0	25.072	9.0	1.995	0.125	0.069	28.8	0.143	1.2	-0.125	0.069	-28.7	0.143
15110.0	1430.7	1003.3	20.361	10.905	28.2	23.098	8.7	1.838	0.123	0.070	29.7	0.142	1.0	-0.123	0.070	-29.6	0.142
15115.0	1430.7	1003.3	18.780	10.120	28.3	21.333	8.5	1.698	0.120	0.071	30.4	0.139	0.8	-0.120	0.071	-30.4	0.140
15120.0	1430.7	1003.3	17.367	9.409	28.4	19.752	8.2	1.572	0.116	0.070	31.1	0.136	0.7	-0.117	0.070	-31.1	0.136

PLS-Cadd with 10% OLF on Voltage

Hydrostor Willow Rock Energy Storage Center
EMF Calculation

PLS-CADD Version 19.01x64 3:45:50 PM Tuesday, May 21, 2024
Kiewit
Project Name: 'X:\PD\Users\Matthew Boushka\EMF Calcs R0\EMF Calcs.don'
Line Title: 'Test Structures'

3D EMF Calculation Notes:
1) Calculations based on the EPRI Red Book methods (3rd Edition, 2005 - 7.4 Calculation of Magnetic Fields and Appendices 7.1 Calculation of Field Ellipse Parameters and 7.6 Electric Field Calculations for 3D Geometry).
2) All wire positions are modeled at the specified weather case and wind direction. Height above ground determined by the modeled ground TIN.
3) Only the effects of wires are being analyzed. The effects of structures are not included unless enabled as noted below.
4) Ground return is being ignored for magnetic field calculations.

Meter height above ground:	3.28 (ft)
Maximum wire distance:	500.00 (ft)
Maximum cable segment size:	9.80 (ft)
Cross section offset +/-:	60.00 (ft)
Result interval:	60.00 (ft)
Overvoltage Percentage:	10%
Electric field limit:	0.00 (kV/m)
Magnetic field limit:	0.00 (mG)
Space potential limit:	0.00 (kV)
Contour Map Spacing:	15 (ft)
Analyzing spans between these structures:	Structure 1, 600 ft - Structure 5, 900 ft

One or more sections have wind from both directions which is not supported. A wind direction of left is being used for those sections.

Section Data for 3D EMF Results:

Section Number	Section Note	Voltage Ph-Ph (kV)	Current (Amps)	Cable Filename	Cable Description	Conductors Per Phase	Bundle Diameter (in)	Cable Radius (in)	Weather Case	Condition	Wind Dir.	WC Temperature (deg F)	Effective Radius (in)
1		0.0	0.0	AC-65-65-724.wir	AFL OPGW 48 Fiber AlumaCore AC-65/65/724	1	0.000	0.362	60°F	Creep RS	Left	60.000	0.362
2		0.0	0.0	AC-65-65-724.wir	AFL OPGW 48 Fiber AlumaCore AC-65/65/724	1	0.000	0.362	60°F	Creep RS	Left	60.000	0.362
3		0.0	0.0	AC-65-65-724.wir	AFL OPGW 48 Fiber AlumaCore AC-65/65/724	1	0.000	0.362	60°F	Creep RS	Left	60.000	0.362
4		0.0	0.0	AC-65-65-724.wir	AFL OPGW 48 Fiber AlumaCore AC-65/65/724	1	0.000	0.362	60°F	Creep RS	Left	60.000	0.362
5		0.0	0.0	AC-65-65-724 - Long.wir	AFL OPGW 48 Fiber AlumaCore AC-65/65/724	1	0.000	0.362	60°F	Creep RS	Left	60.000	0.362
6		0.0	0.0	AC-65-65-724.wir	AFL OPGW 48 Fiber AlumaCore AC-65/65/724	1	0.000	0.362	60°F	Creep RS	Left	60.000	0.362
7		0.0	0.0	AC-65-65-724 - Long.wir	AFL OPGW 48 Fiber AlumaCore AC-65/65/724	1	0.000	0.362	60°F	Creep RS	Left	60.000	0.362
8		0.0	0.0	AC-65-65-724.wir	AFL OPGW 48 Fiber AlumaCore AC-65/65/724	1	0.000	0.362	60°F	Creep RS	Left	60.000	0.362
9		0.0	0.0	AC-65-65-724 - Long.wir	AFL OPGW 48 Fiber AlumaCore AC-65/65/724	1	0.000	0.362	60°F	Creep RS	Left	60.000	0.362
10		0.0	0.0	AC-65-65-724.wir	AFL OPGW 48 Fiber AlumaCore AC-65/65/724	1	0.000	0.362	60°F	Creep RS	Left	60.000	0.362
11		0.0	0.0	AC-65-65-724.wir	AFL OPGW 48 Fiber AlumaCore AC-65/65/724	1	0.000	0.362	60°F	Creep RS	Left	60.000	0.362
12		0.0	0.0	AC-65-65-724 - Long.wir	AFL OPGW 48 Fiber AlumaCore AC-65/65/724	1	0.000	0.362	60°F	Creep RS	Left	60.000	0.362
13		0.0	0.0	AC-65-65-724.wir	AFL OPGW 48 Fiber AlumaCore AC-65/65/724	1	0.000	0.362	60°F	Creep RS	Left	60.000	0.362
14		0.0	0.0	AC-65-65-724.wir	AFL OPGW 48 Fiber AlumaCore AC-65/65/724	1	0.000	0.362	60°F	Creep RS	Left	60.000	0.362
15		0.0	0.0	AC-65-65-724 - Long.wir	AFL OPGW 48 Fiber AlumaCore AC-65/65/724	1	0.000	0.362	60°F	Creep RS	Left	60.000	0.362
16		253.0	1474.0	FALCON ACSR (S1-600).wir 1590.0 kcmil 54/19 Falcon/ACSR/GA2 - General Cable	[Chart A19/C54/0.8875] Conductor Type 13	2	18.000	0.773	Maximum Operating ACSR (250 °F)	Creep RS	Left	250.000	3.729
17		253.0	1474.0	FALCON ACSR (S2-600).wir 1590.0 kcmil 54/19 Falcon/ACSR/GA2 - General Cable	[Chart A19/C54/0.8875] Conductor Type 13	2	18.000	0.773	Maximum Operating ACSR (250 °F)	Creep RS	Left	250.000	3.729
18		253.0	1474.0	FALCON ACSR (S3-600).wir 1590.0 kcmil 54/19 Falcon/ACSR/GA2 - General Cable	[Chart A19/C54/0.8875] Conductor Type 13	2	18.000	0.773	Maximum Operating ACSR (250 °F)	Creep RS	Left	250.000	3.729
19		253.0	1474.0	FALCON ACSR (S1-450).wir 1590.0 kcmil 54/19 Falcon/ACSR/GA2 - General Cable	[Chart A19/C54/0.8875] Conductor Type 13	2	18.000	0.773	Maximum Operating ACSR (250 °F)	Creep RS	Left	250.000	3.729
20		253.0	1474.0	FALCON ACSR (S1-900).wir 1590.0 kcmil 54/19 Falcon/ACSR/GA2 - General Cable	[Chart A19/C54/0.8875] Conductor Type 13	2	18.000	0.773	Maximum Operating ACSR (250 °F)	Creep RS	Left	250.000	3.729
21		253.0	1474.0	FALCON ACSR (S2-450).wir 1590.0 kcmil 54/19 Falcon/ACSR/GA2 - General Cable	[Chart A19/C54/0.8875] Conductor Type 13	2	18.000	0.773	Maximum Operating ACSR (250 °F)	Creep RS	Left	250.000	3.729
22		253.0	1474.0	FALCON ACSR (S2-900).wir 1590.0 kcmil 54/19 Falcon/ACSR/GA2 - General Cable	[Chart A19/C54/0.8875] Conductor Type 13	2	18.000	0.773	Maximum Operating ACSR (250 °F)	Creep RS	Left	250.000	3.729
23		253.0	1474.0	FALCON ACSR (S3-450).wir 1590.0 kcmil 54/19 Falcon/ACSR/GA2 - General Cable	[Chart A19/C54/0.8875] Conductor Type 13	2	18.000	0.773	Maximum Operating ACSR (250 °F)	Creep RS	Left	250.000	3.729
24		253.0	1474.0	FALCON ACSR (S3-900).wir 1590.0 kcmil 54/19 Falcon/ACSR/GA2 - General Cable	[Chart A19/C54/0.8875] Conductor Type 13	2	18.000	0.773	Maximum Operating ACSR (250 °F)	Creep RS	Left	250.000	3.729
25		253.0	1474.0	FALCON ACSR (S4-450).wir 1590.0 kcmil 54/19 Falcon/ACSR/GA2 - General Cable	[Chart A19/C54/0.8875] Conductor Type 13	2	18.000	0.773	Maximum Operating ACSR (250 °F)	Creep RS	Left	250.000	3.729
26		253.0	1474.0	FALCON ACSR (S4-600).wir 1590.0 kcmil 54/19 Falcon/ACSR/GA2 - General Cable	[Chart A19/C54/0.8875] Conductor Type 13	2	18.000	0.773	Maximum Operating ACSR (250 °F)	Creep RS	Left	250.000	3.729
27		253.0	1474.0	FALCON ACSR (S4-900).wir 1590.0 kcmil 54/19 Falcon/ACSR/GA2 - General Cable	[Chart A19/C54/0.8875] Conductor Type 13	2	18.000	0.773	Maximum Operating ACSR (250 °F)	Creep RS	Left	250.000	3.729
28		253.0	1474.0	FALCON ACSR (S5-450).wir 1590.0 kcmil 54/19 Falcon/ACSR/GA2 - General Cable	[Chart A19/C54/0.8875] Conductor Type 13	2	18.000	0.773	Maximum Operating ACSR (250 °F)	Creep RS	Left	250.000	3.729
29		253.0	1474.0	FALCON ACSR (S5-600).wir 1590.0 kcmil 54/19 Falcon/ACSR/GA2 - General Cable	[Chart A19/C54/0.8875] Conductor Type 13	2	18.000	0.773	Maximum Operating ACSR (250 °F)	Creep RS	Left	250.000	3.729
30		253.0	1474.0	FALCON ACSR (S5-900).wir 1590.0 kcmil 54/19 Falcon/ACSR/GA2 - General Cable	[Chart A19/C54/0.8875] Conductor Type 13	2	18.000	0.773	Maximum Operating ACSR (250 °F)	Creep RS	Left	250.000	3.729
31		0.0	0.0	AC-65-65-724.wir	AFL OPGW 48 Fiber AlumaCore AC-65/65/724	1	0.000	0.362	60°F	Creep RS	Left	60.000	0.362
32		0.0	0.0	AC-65-65-724.wir	AFL OPGW 48 Fiber AlumaCore AC-65/65/724	1	0.000	0.362	60°F	Creep RS	Left	60.000	0.362
33		0.0	0.0	AC-65-65-724 - Long.wir	AFL OPGW 48 Fiber AlumaCore AC-65/65/724	1	0.000	0.362	60°F	Creep RS	Left	60.000	0.362
34		0.0	0.0	AC-65-65-724.wir	AFL OPGW 48 Fiber AlumaCore AC-65/65/724	1	0.000	0.362	60°F	Creep RS	Left	60.000	0.362
35		0.0	0.0	AC-65-65-724.wir	AFL OPGW 48 Fiber AlumaCore AC-65/65/724	1	0.000	0.362	60°F	Creep RS	Left	60.000	0.362
36		0.0	0.0	AC-65-65-724 - Long.wir	AFL OPGW 48 Fiber AlumaCore AC-65/65/724	1	0.000	0.362	60°F	Creep RS	Left	60.000	0.362
37		253.0	1474.0	FALCON ACSR (S3-600).wir 1590.0 kcmil 54/19 Falcon/ACSR/GA2 - General Cable	[Chart A19/C54/0.8875] Conductor Type 13	2	18.000	0.773	Maximum Operating ACSR (250 °F)	Creep RS	Left	250.000	3.729
38		253.0	1474.0	FALCON ACSR (S3-450).wir 1590.0 kcmil 54/19 Falcon/ACSR/GA2 - General Cable	[Chart A19/C54/0.8875] Conductor Type 13	2	18.000	0.773	Maximum Operating ACSR (250 °F)	Creep RS	Left	250.000	3.729
39		253.0	1474.0	FALCON ACSR (S3-900).wir 1590.0 kcmil 54/19 Falcon/ACSR/GA2 - General Cable	[Chart A19/C54/0.8875] Conductor Type 13	2	18.000	0.773	Maximum Operating ACSR (250 °F)	Creep RS	Left	250.000	3.729
40		253.0	1474.0	FALCON ACSR (S5-450).wir 1590.0 kcmil 54/19 Falcon/ACSR/GA2 - General Cable	[Chart A19/C54/0.8875] Conductor Type 13	2	18.000	0.773	Maximum Operating ACSR (250 °F)	Creep RS	Left	250.000	3.729
41		253.0	1474.0	FALCON ACSR (S5-600).wir 1590.0 kcmil 54/19 Falcon/ACSR/GA2 - General Cable	[Chart A19/C54/0.8875] Conductor Type 13	2	18.000	0.773	Maximum Operating ACSR (250 °F)	Creep RS	Left	250.000	3.729
42		253.0	1474.0	FALCON ACSR (S5-900).wir 1590.0 kcmil 54/19 Falcon/ACSR/GA2 - General Cable	[Chart A19/C54/0.8875] Conductor Type 13	2	18.000	0.773	Maximum Operating ACSR (250 °F)	Creep RS	Left	250.000	3.729

Structure 1

3D EMF Point Results Span from Tangent Back to Structure 1, 450 ft:

Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
3940.0	774.9	1003.3	34.508	34.511	45.0	48.804	76.8	3.884	0.481	0.669	54.3	0.824	2.6	-0.480	-0.667	54.3	0.821
4000.0	774.9	1003.3	157.607	86.637	28.8	179.850	49.5	14.312	2.673	1.091	22.2	2.887	12.7	2.598	-1.061	-22.2	2.806
4060.0	774.9	1003.3	49.071	31.345	32.6	58.228	60.6	4.634	0.413	0.569	54.0	0.703	8.1	0.408	0.567	54.3	0.699

3D EMF Point Results Span from Structure 1, 450 ft to Tangent Ahead:

Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
3940.0	1224.9	1003.3	34.509	34.511	45.0	48.804	76.8	3.884	0.481	0.669	54.3	0.824	2.6	-0.480	-0.667	54.3	0.821
4000.0	1224.9	1003.3	157.606	86.637	28.8	179.849	49.5	14.312	2.673	1.091	22.2	2.887	12.7	2.598	-1.061	-22.2	2.806
4060.0	1224.9	1003.3	49.071	31.345	32.6	58.228	60.6	4.634	0.412	0.569	54.1	0.703	8.1	0.408	0.567	54.3	0.699

3D EMF Point Results Span from Tangent Back to Structure 1, 600 ft:

Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
940.0	700.0	1003.3	35.154	34.518	44.5	49.268	75.5	3.921	0.479	0.672	54.5	0.825	2.7	-0.478	-0.670	54.5	0.823
1000.0	700.0	1003.3	158.654	87.631	28.9	181.246	49.6	14.423	2.685	1.101	22.3	2.901	12.8	2.610	-1.071	-22.3	2.821
1060.0	700.0	1003.3	48.948	32.049	33.2	58.507	61.9	4.656	0.409	0.568	54.3	0.700	8.2	0.405	0.567	54.5	0.697

3D EMF Point Results Span from Structure 1, 600 ft to Tangent Ahead:

Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
940.0	1300.0	1003.3	35.154	34.518	44.5	49.268	75.5	3.921	0.479	0.672	54.5	0.825	2.7	-0.478	-0.670	54.5	0.823
1000.0	1300.0	1003.3	158.654	87.630	28.9	181.246	49.6	14.423	2.684	1.101	22.3	2.901	12.7	2.610	-1.071	-22.3	2.821
1060.0	1300.0	1003.3	48.948	32.049	33.2	58.507	61.9	4.656	0.409	0.568	54.3	0.700	8.2	0.405	0.567	54.5	0.697

3D EMF Point Results Span from Tangent Back to Structure 1, 900 ft:

Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
4940.0	549.9	1003.3	35.622	34.456	44.0	49.560	74.3	3.944	0.487	0.665	53.8	0.824	2.7	-0.486	-0.664	53.8	0.822
5000.0	549.9	1003.3	158.884	88.139	29.0	181.694	49.6	14.459	2.673	1.096	22.3	2.889	12.8	2.599	-1.066	-22.3	2.809
5060.0	549.9	1003.3	48.759	32.569	33.7	58.636	62.9	4.666	0.399	0.574	55.2	0.699	8.4	0.395	0.572	55.4	0.695

3D EMF Point Results Span from Structure 1, 900 ft to Tangent Ahead:

Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
4940.0	1449.9	1003.3	35.622	34.456	44.0	49.559	74.3	3.944	0.487	0.665	53.8	0.824	2.7	-0.486	-0.664	53.8	0.822
5000.0	1449.9	1003.3	158.883	88.139	29.0	181.693	49.6	14.459	2.673	1.096	22.3	2.889	12.8	2.599	-1.066	-22.3	2.809
5060.0	1449.9	1003.3	48.759	32.569	33.7	58.636	62.9	4.666	0.399	0.574	55.2	0.699	8.4	0.395	0.572	55.4	0.695

Strucutre 2

3D EMF Point Results Span from Tangent Back to Structure 2, 450 ft:

Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
5940.0	782.4	1003.3	51.294	34.489	33.9	61.810	65.6	4.919	0.452	0.611	53.5	0.760	8.0	0.447	0.610	53.7	0.756
6000.0	782.4	1003.3	164.178	95.327	30.1	189.847	47.8	15.108	2.545	1.165	24.6	2.798	14.7	2.466	-1.131	-24.6	2.713
6060.0	782.4	1003.3	35.420	37.793	46.9	51.797	69.3	4.122	0.531	0.732	54.1	0.904	2.3	-0.529	-0.729	54.0	0.901

3D EMF Point Results Span from Structure 2, 450 ft to Tangent Ahead:

Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
6054.1	1213.7	1003.3	48.216	30.754	32.5	57.189	59.3	4.551	0.392	0.558	54.9	0.682	8.3	0.388	0.558	55.2	0.679
6106.1	1183.7	1003.3	159.141	86.627	28.6	181.190	50.3	14.419	2.730	1.127	22.4	2.953	12.7	2.655	-1.091	-22.3	2.870
6158.0	1153.7	1003.3	34.325	34.303	45.0	48.527	80.3	3.862	0.479	0.645	53.4	0.803	2.8	-0.477	-0.641	53.3	0.799

3D EMF Point Results Span from Tangent Back to Structure 2, 600 ft:

Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
1940.0	709.9	1003.3	51.250	35.166	34.5	62.155	66.7	4.946	0.449	0.611	53.7	0.758	8.1	0.445	0.610	53.9	0.754
2000.0	709.9	1003.3	164.745	96.204	30.3	190.778	47.9	15.182	2.551	1.172	24.7	2.808	14.7	2.473	-1.139	-24.7	2.723
2060.0	709.9	1003.3	36.023	37.798	46.4	52.214	68.2	4.155	0.527	0.734	54.3	0.904	2.4	-0.526	-0.732	54.3	0.901

3D EMF Point Results Span from Structure 2, 600 ft to Tangent Ahead:

Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
2090.3	1276.5	1003.3	48.154	31.479	33.2	57.530	60.5	4.578	0.390	0.557	55.0	0.680	8.4	0.386	0.557	55.3	0.678
2142.3	1246.5	1003.3	159.519	87.520	28.8	181.951	50.5	14.479	2.732	1.136	22.6	2.959	12.7	2.657	-1.102	-22.5	2.876
2194.3	1216.5	1003.3	34.795	34.080	44.4	48.704	79.1	3.876	0.474	0.646	53.7	0.801	2.8	-0.472	-0.643	53.7	0.798

3D EMF Point Results Span from Tangent Back to Structure 2, 900 ft:

Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
6940.0	564.9	1003.3	51.185	35.711	34.9	62.412	67.7	4.967	0.439	0.617	54.6	0.757	8.2	0.434	0.615	54.8	0.753
7000.0	564.9	1003.3	165.422	96.956	30.4	191.742	47.9	15.258	2.548	1.169	24.6	2.803	14.8	2.469	-1.136	-24.7	2.718
7060.0	564.9	1003.3	36.508	37.801	46.0	52.552	67.2	4.182	0.535	0.728	53.7	0.903	2.4	-0.534	-0.726	53.7	0.901

3D EMF Point Results Span from Structure 2, 900 ft to Tangent Ahead:

Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
7162.9	1402.1	1003.3	48.054	32.058	33.7	57.766	61.4	4.597	0.380	0.564	56.0	0.680	8.5	0.376	0.563	56.3	0.677
7214.8	1372.1	1003.3	159.996	88.302	28.9	182.745	50.7	14.542	2.724	1.135	22.6	2.951	12.8	2.648	-1.103	-22.6	2.868
7266.8	1342.1	1003.3	35.180	33.936	44.0	48.881	78.0	3.890	0.481	0.638	53.0	0.799	2.9	-0.480	-0.635	52.9	0.796

Structure 3

3D EMF Point Results Span from Tangent Back to Structure 3, 450 ft:

Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
7940.0	802.1	1003.3	37.675	24.876	33.4	45.147	47.8	3.593	0.210	0.309	55.8	0.373	8.4	-0.212	-0.306	55.3	0.372
8000.0	802.1	1003.3	151.146	57.003	20.7	161.538	28.8	12.855	3.469	0.836	13.6	3.568	4.7	3.391	-0.822	-13.6	3.489
8060.0	802.1	1003.3	46.019	22.058	25.6	51.032	22.2	4.061	0.229	0.280	50.8	0.362	13.2	0.219	0.281	52.1	0.356

3D EMF Point Results Span from Structure 3, 450 ft to Tangent Ahead:

Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
7940.0	1194.3	1003.3	38.066	25.022	33.3	45.554	47.2	3.625	0.224	0.298	53.1	0.373	8.7	-0.218	-0.298	53.8	0.369
8000.0	1194.3	1003.3	156.039	58.072	20.4	166.495	28.2	13.249	3.559	0.847	13.4	3.659	4.4	3.497	-0.836	-13.4	3.596
8060.0	1194.3	1003.3	46.408	22.192	25.6	51.441	21.6	4.094	0.205	0.285	54.3	0.352	14.0	0.205	0.282	54.1	0.349

3D EMF Point Results Span from Tangent Back to Structure 3, 600 ft:

Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
2940.0	750.8	1003.3	38.544	24.305	32.2	45.567	45.0	3.626	0.197	0.304	57.1	0.363	8.8	-0.198	-0.302	56.8	0.361
3000.0	750.8	1003.3	154.296	57.220	20.3	164.564	27.3	13.096	3.561	0.852	13.5	3.662	4.5	3.484	-0.839	-13.5	3.583
3060.0	750.8	1003.3	45.932	22.442	26.0	51.121	20.3	4.068	0.216	0.259	50.2	0.338	14.1	0.208	0.260	51.3	0.333

3D EMF Point Results Span from Structure 3, 600 ft to Tangent Ahead:

Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
2940.0	1244.1	1003.3	38.962	24.453	32.1	46.000	44.3	3.661	0.210	0.294	54.4	0.361	9.1	-0.205	-0.293	55.1	0.358
3000.0	1244.1	1003.3	159.587	58.349	20.1	169.919	26.6	13.522	3.665	0.864	13.3	3.766	4.2	3.599	-0.853	-13.3	3.698
3060.0	1244.1	1003.3	46.337	22.584	26.0	51.547	19.5	4.102	0.194	0.264	53.6	0.327	15.0	0.192	0.261	53.6	0.324

3D EMF Point Results Span from Tangent Back to Structure 3, 900 ft:

Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
8940.0	605.4	1003.3	38.419	24.072	32.1	45.338	46.9	3.608	0.217	0.309	55.0	0.378	8.5	-0.217	-0.307	54.8	0.376
9000.0	605.4	1003.3	152.242	57.571	20.7	162.764	29.0	12.952	3.473	0.843	13.7	3.574	4.7	3.401	-0.830	-13.7	3.501
9060.0	605.4	1003.3	45.595	22.930	26.7	51.036	21.8	4.061	0.219	0.283	52.3	0.358	13.7	0.212	0.284	53.2	0.354

3D EMF Point Results Span from Structure 3, 900 ft to Tangent Ahead:

Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
8940.0	1387.4	1003.3	38.805	24.204	32.0	45.735	46.2	3.639	0.228	0.300	52.8	0.377	8.7	-0.224	-0.299	53.2	0.374
9000.0	1387.4	1003.3	157.129	58.630	20.5	167.711	28.4	13.346	3.573	0.856	13.5	3.674	4.5	3.506	-0.844	-13.5	3.606
9060.0	1387.4	1003.3	45.976	23.063	26.6	51.436	21.1	4.093	0.200	0.287	55.1	0.350	14.3	0.197	0.285	55.3	0.347

Structure 4

3D EMF Point Results Span from Vertical Tangent Back to Structure 4, 450 ft:

Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
9940.0	774.9	1003.3	42.402	20.743	26.1	47.203	11.7	3.756	0.062	0.020	17.7	0.065	31.2	-0.056	-0.012	11.8	0.057
10000.0	774.9	1003.3	169.538	51.049	16.8	177.057	4.5	14.090	3.623	0.719	11.2	3.694	1.9	3.564	-0.716	-11.4	3.635
10060.0	774.9	1003.3	65.080	29.005	24.0	71.251	12.3	5.670	0.231	0.161	34.9	0.282	6.9	0.220	-0.158	-35.7	0.271

3D EMF Point Results Span from Structure 4, 450 ft to Vertical Tangent Ahead:

Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
9940.0	1225.1	1003.3	42.402	20.743	26.1	47.203	11.7	3.756	0.062	0.020	17.6	0.065	31.0	-0.056	-0.012	11.8	0.057
10000.0	1225.1	1003.3	169.538	51.049	16.8	177.057	4.5	14.090	3.623	0.719	11.2	3.694	1.9	3.564	-0.716	-11.4	3.635
10060.0	1225.1	1003.3	65.080	29.005	24.0	71.251	12.3	5.670	0.231	0.161	34.9	0.282	6.9	0.220	-0.158	-35.7	0.271

3D EMF Point Results Span from Vertical Tangent Back to Structure 4, 600 ft:

Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
10940.0	699.9	1003.3	42.683	20.859	26.0	47.507	11.7	3.780	0.061	0.027	23.8	0.066	37.2	-0.054	-0.021	21.4	0.058
11000.0	699.9	1003.3	169.726	51.075	16.7	177.244	4.5	14.105	3.632	0.734	11.4	3.705	2.0	3.572	-0.731	-11.6	3.646
11060.0	699.9	1003.3	65.245	29.064	24.0	71.426	12.3	5.684	0.233	0.172	36.5	0.289	7.6	0.222	-0.169	-37.4	0.279

3D EMF Point Results Span from Structure 4, 600 ft to Vertical Tangent Ahead:

Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
10940.0	1300.1	1003.3	42.683	20.859	26.0	47.507	11.7	3.780	0.061	0.027	23.7	0.066	37.1	-0.054	-0.021	21.4	0.058
11000.0	1300.1	1003.3	169.726	51.075	16.7	177.244	4.5	14.105	3.632	0.734	11.4	3.705	2.0	3.572	-0.731	-11.6	3.646
11060.0	1300.1	1003.3	65.245	29.064	24.0	71.426	12.3	5.684	0.232	0.172	36.5	0.289	7.6	0.222	-0.169	-37.4	0.279

3D EMF Point Results Span from Vertical Tangent Back to Structure 4, 900 ft:

Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
11940.0	549.8	1003.3	42.869	20.924	26.0	47.703	11.6	3.796	0.071	0.020	15.8	0.074	27.4	-0.065	-0.012	10.2	0.066
12000.0	549.8	1003.3	169.845	51.072	16.7	177.357	4.5	14.114	3.624	0.727	11.3	3.696	2.0	3.565	-0.723	-11.5	3.637
12060.0	549.8	1003.3	65.338	29.082	24.0	71.518	12.2	5.691	0.221	0.163	36.3	0.274	7.9	0.209	-0.159	-37.3	0.263

3D EMF Point Results Span from Structure 4, 900 ft to Vertical Tangent Ahead:

Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
11940.0	1450.2	1003.3	42.869	20.924	26.0	47.703	11.6	3.796	0.071	0.020	15.8	0.074	27.4	-0.065	-0.012	10.2	0.066
12000.0	1450.2	1003.3	169.845	51.072	16.7	177.357	4.5	14.114	3.624	0.727	11.3	3.696	2.0	3.565	-0.723	-11.5	3.637
12060.0	1450.2	1003.3	65.338	29.082	24.0	71.518	12.2	5.691	0.221	0.163	36.3	0.274	7.9	0.209	-0.159	-37.3	0.263

Structure 5

3D EMF Point Results Span from Vertical Tangent Back to Structure 5, 450 ft:

Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
12940.0	779.8	1003.3	43.616	21.314	26.0	48.545	11.1	3.863	0.037	0.026	35.0	0.045	65.7	-0.016	-0.019	49.6	0.025
13000.0	779.8	1003.3	168.180	51.661	17.1	175.936	2.2	14.001	3.876	0.734	10.7	3.945	1.6	3.812	-0.731	-10.8	3.881
13060.0	779.8	1003.3	53.897	25.300	25.1	59.540	11.5	4.738	0.110	0.086	37.9	0.139	10.4	0.100	-0.082	-39.6	0.129

3D EMF Point Results Span from Structure 5, 450 ft to Vertical Tangent Ahead:

Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
12940.0	1215.9	1003.3	43.944	21.496	26.1	48.920	11.2	3.893	0.040	0.024	31.6	0.046	59.7	-0.026	-0.016	31.4	0.030
13000.0	1215.9	1003.3	172.812	52.653	16.9	180.655	2.2	14.376	3.990	0.745	10.6	4.059	1.6	3.911	-0.743	-10.8	3.981
13060.0	1215.9	1003.3	54.162	25.470	25.2	59.852	11.6	4.763	0.101	0.082	39.0	0.131	11.6	0.085	-0.078	-42.3	0.115

3D EMF Point Results Span from Vertical Tangent Back to Structure 5, 600 ft:

Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
13940.0	706.8	1003.3	43.899	21.427	26.0	48.849	11.1	3.887	0.035	0.037	46.7	0.051	91.2	-0.012	-0.033	69.4	0.035
14000.0	706.8	1003.3	168.258	51.637	17.1	176.003	2.2	14.006	3.887	0.753	11.0	3.959	1.6	3.824	-0.749	-11.1	3.896
14060.0	706.8	1003.3	54.090	25.363	25.1	59.742	11.5	4.754	0.114	0.099	41.1	0.151	11.8	0.104	-0.096	-42.9	0.141

3D EMF Point Results Span from Structure 5, 600 ft to Vertical Tangent Ahead:

Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
13940.0	1287.5	1003.3	44.227	21.608	26.0	49.223	11.2	3.917	0.038	0.035	42.5	0.051	91.1	-0.022	-0.029	52.9	0.036
14000.0	1287.5	1003.3	172.902	52.631	16.9	180.735	2.2	14.382	3.999	0.764	10.8	4.071	1.6	3.922	-0.761	-11.0	3.995
14060.0	1287.5	1003.3	54.351	25.531	25.2	60.049	11.6	4.779	0.104	0.095	42.4	0.141	13.2	0.089	-0.091	-45.7	0.128

3D EMF Point Results Span from Vertical Tangent Back to Structure 5, 900 ft:

Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
14940.0	560.7	1003.3	44.092	21.493	26.0	49.052	11.0	3.903	0.041	0.029	35.1	0.050	70.2	-0.024	-0.023	43.8	0.033
15000.0	560.7	1003.3	168.384	51.615	17.0	176.117	2.2	14.015	3.883	0.744	10.9	3.953	1.6	3.818	-0.741	-11.0	3.889
15060.0	560.7	1003.3	54.219	25.394	25.1	59.871	11.4	4.764	0.104	0.089	40.6	0.137	12.7	0.092	-0.086	-43.0	0.126

3D EMF Point Results Span from Structure 5, 900 ft to Vertical Tangent Ahead:

Measurement X (ft)	Measurement Y (ft)	Measurement Z (ft)	B Real (mG)	B Imaginary (mG)	B Angle (deg)	B Magnitude (mG)	B Polarization Axial Ratio %	H Magnitude (A/m)	EF Real (kV/m)	EF Imaginary (kV/m)	EF Angle (deg)	EF Magnitude (kV/m)	EF Polarization Axial Ratio %	Space Potential Real (kV)	Space Potential Imaginary (kV)	Space Potential Angle (deg)	Space Potential Magnitude (kV)
14940.0	1430.7	1003.3	44.423	21.676	26.0	49.429	11.1	3.933	0.046	0.026	30.2	0.053	58.1	-0.033	-0.019	29.4	0.038
15000.0	1430.7	1003.3	173.110	52.627	16.9	180.933	2.2	14.398	3.993	0.756	10.7	4.064	1.6	3.918	-0.753	-10.9	3.990
15060.0	1430.7	1003.3	54.485	25.565	25.1	60.185	11.5	4.789	0.094	0.085	42.1	0.127	14.9	0.077	-0.081	-46.2	0.112

Attachment TSSN-3

Rev 1. WRESC Electrical Engineering Design Criteria

HYDROSTOR A-CAES PROJECT
WILLOW ROCK ENERGY STORAGE CENTER
ELECTRICAL ENGINEERING DESIGN CRITERIA

01	22-May-2024	Issued for Information	MJM	TBL	JTL
00	23-Feb-2024	Issued for Information	RL	JTL	JTL
REV	DATE	DESCRIPTION	ORIG	CHK	APPR

KIEWIT ENGINEERING GROUP INC.

PROJECT		DOCUMENT NUMBER	REVISION	STATUS
20044835	*Client*		-	*N/A*
	Kiewit		*0*	

Revision Control Sheet

REVISION	SECTION	CHANGE DESCRIPTION
0	*All*	*Issued for AFC*
1	*All*	*Issued for AFC – Updated for Information Request*

Table of Contents

1.0 ELECTRICAL ENGINEERING DESIGN CRITERIA

This document summarizes the codes, standards, criteria, and practices that will be generally used in the design and construction of electrical engineering systems. More specific project information will be developed prior to construction of the project to support detailed design, engineering, material procurement, and construction specifications as required by CEC.

1.1 CODES AND STANDARDS

The design specification of all work will be in accordance with the laws and regulations of the federal government, the State of California, local County, and City, as well as applicable industry standards. The current issue or revision of the documents at the time of the filing of this AFC will apply unless otherwise noted. If there are conflicts between the cited documents, the more conservative requirement shall apply.

The latest versions of the following codes and industry standards are applicable to the electrical aspects of the power facility:

- American National Standards Institute (ANSI)
- American Society for Testing and Materials (ASTM)
- Anti-Friction Bearing Manufacturers Association (AFBMA)
- Insulated Cable Engineers Association (ICEA)
- Institute of Electrical and Electronics Engineers (IEEE)
- Illuminating Engineering Society (IES)
- California Electrical Code (CEC)
- National Electrical Manufacturers Association (NEMA)
- National Electrical Safety Code (NESC)
- National Fire Protection Association (NFPA)
    - NFPA 70 – National Electrical Code
- Occupational Safety and Health Administration (OSHA)

In addition to these general codes and standards, specific standards will be used including but not limited to:

ANSI/IEEE C37.04	Ratings and Requirements for AC High-Voltage Circuit Breakers with Rated Maximum Voltage Above 1000V
ANSI/IEEE C37.06	AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis-Preferred Ratings and Related Required Capabilities for Voltages Above 100V
ANSI/IEEE C37.30	Standard Requirements for High-Voltage Switches
ANSI/IEEE C37.30.1	Standard Requirements for AC High-Voltage Air Switches Rated Above 1000V
ANSI/IEEE C37.13	Requirements for Instrument Transformers
ANSI/IEEE C62.11	Metal-Oxide Surge Arresters for AC Power Circuits (>1kV)
ANSI/IEEE 998	Guide for Direct Lightning Stroke Shielding of Substations
ANSI/IEEE 1818	Guide for the Design of Low-Voltage Auxiliary Systems for Electric Power Substations
ANSI/IEEE 485	Recommended Practice for Sizing Lead-Acid Batteries for Stationary Applications
ANSI/IEEE 80	Guide for Safety in AC Substation Grounding
ANSI/IEEE 81	Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Grounding System

When applicable during the design and construction phases of the project the following (at minimum) Laws, Ordinances, Regulations, and Standards shall be followed:

- GO-95, CPUC, “Rules for Overhead Electric Line Construction”
- National Electric Safety Code (NESC)
- GO-128, CPUC, “Rules for Construction of Underground Electric Supply and Communication Systems”

- GO-131-D, CPUC, “Rules for Planning and Construction of Electric Generation, Line, and Substation Facilities in California”

2.0 SUBSTATIONS AND TRANSFORMERS

2.1 SUBSTATION

The substation will be located on the eastern end of the Willow Rock site and will interconnect via a 230kV, primarily overhead line, to Whirlwind Substation. Underground segments may be required in certain areas along the route. The substation will be of the tubular IPS bus type with interconnecting conductors and will consist of high-voltage SF6-insulated dead-tank circuit breakers and no-load disconnect switches.

The high-voltage circuit breakers will be equipped with a no-load break, air-insulated, disconnect switches. Transformer circuit breakers and a unit disconnect will also be installed in each transformer/unit connection to allow for transformer protection and isolation when the corresponding transformer/unit is out of service. Tubular IPS bus type with interconnecting conductors will be used as the primary interconnection material within the switchyard. The IPS and conductors will be attached to post-insulator columns on structural steel supports. The main substation transforms power from/to 230kV to/from 13.8kV and to 4.16kV.

Current and voltage transformers will be located at points within the substation to provide for metering and relaying. Control, protection, and monitoring for the substation will be located in the substation protection and control building. Monitoring and alarms will be available to the supervisory control system operator workstations in the control module. All protection and circuit breaker control will be powered from the station battery-backed 125VDC system.

Each motor/generator substation will have transformers for the motors and generators. The HV (230kV) side will be fed to the MV (13.8kV) side connections for the generators and to 13.8kV switchgear for the motors.

The substation designs will meet the requirements of the National Electrical Safety Code—ANSI C2.

A grounding grid will be provided to control step and touch potentials in accordance with IEEE Standard 80, Safety in Substation Grounding. All equipment, structures, and fencing will be connected to the grounding grid of buried copper conductors and ground

rods, as required. The substation ground grid will be tied to the main distribution and plant ground grid.

Lightning protection will be provided by shield wires and/or lightning masts for any overhead lines. The lightning protection system will be designed in accordance with IEEE 998 guidelines. All faults will be detected, isolated, and cleared in a safe and coordinated manner as soon as practicable for the safety of equipment, personnel, and the public. Protective relaying will meet IEEE requirements and will be coordinated with PG&E's requirements.

There will be a 19-mile-long (approximately) tie-line to the utility substation 230-kilovolt (kV) bus for Willow Rock. The high-voltage circuit breaker will be provided with a breaker failure relay protection scheme. Breaker failure protection will be accomplished by protective and timing relays. The high-voltage breaker will have two redundant trip coils.

Interface with PG&E's supervisory control and data acquisition system will be provided. Interface will be at the interface terminal box and remote terminal unit. Communication between the facility switchyard and the control building to which it is connected will be included.

Revenue metering will be provided on the 230kV outgoing lines recording net power to or from the PG&E switchyard (bi-directional). The revenue meters will be located at the Whirlwind Substation.

2.2 TRANSFORMERS

All generators and motors will be rated for 13.8kV and connect to the 230kV switchyard through step-up/down transformers. The step-up/down transformers will be designed in accordance with ANSI/IEEE standards C57.12.00, C57.12.90, and C57.116. Grounding of the transformers will be suitable for generation and motor function as applicable.

Facility power will be supplied through unit auxiliary transformers. Two transformers with low impedance grounding resistors will be provided.

3.0 TRANSMISSION LINE

All new transmission lines shall be designed to General Order 95 Grade A Construction. GO 95 loading shall be GO95 Light since no part of the line exceeds 3000ft elevation above sea level. All Optical ground wire (OPGW) and shield wire shall be bonded to the pole or arm ground nut.

GO95 load factors are to be utilized in this design. GO95 defines strength factors for the purpose of material variation and ductility in Rule 43. Structural design shall adhere to these Strength

Reduction Factors where they apply. All tubular steel structures (TSPs) shall be designed in accordance with the latest revision of ASCE/SEI Standard 48, Design of Transmission Pole Structures. Minimum clearances for energized parts of overhead transmission line shall comply with GO 95 minimum design clearances.

Attachment WA-1

AVEK Eligibility Letter

ANTELOPE VALLEY - EAST KERN WATER AGENCY
AVEK
ESTABLISHED 1959
A PUBLIC AGENCY

January 18, 2024

Curt Hildebrand
333 Bay Street
Toronto, ON M5H 2R2

VIA EMAIL TO: curt.hildebrand@hydrostor.ca

Subject: Antelope Valley-East Kern Water Agency (AVEK) Water Supply and Service to Hydrostor (APN 431-022-13)

Mr. Hildebrand –

In response to your request to connect to the Agency's potable water line adjacent to APN 431-022-13 for service of a potable water supply to your business planned on said parcel, we can confirm that this parcel is located within the Agency's service area, and as a member of AVEK's tax base, this property is eligible to receive imported water supply from AVEK Water Agency.

Water service is subject to AVEK's Rules and Regulations for Distribution of Water and contingent upon execution of a Water Service Agreement with the Agency, payment of applicable capacity fees, and construction of a new turnout.

Please note that AVEK is considered an interruptible supply and shall not be relied upon to fulfill building permit requirements for fire safety or fire flows required by the Kern County Fire Department nor County Building and Safety Requirements. In an effort to reduce the potential for interruption to the Agency's imported water supply, AVEK has invested in the development of water banking projects, which improve the local reliability of the Agency's said water supply. The Agency has established a goal of storing sufficient surplus imported water supplies during wet years to meet our local water demands during three consecutive dry years.

Please feel free to contact me with any questions you may have.

Sincerely,

Justin Livesay
Engineering Manager

6500 WEST AVENUE N • PALMDALE, CALIFORNIA 93551
(661) 943-3201 • www.avek.org • info@avek.org

Attachment WA-2

Preliminary Hydrology and Hydraulic Analysis

PROJECT NAME: **Willow Rock Energy Storage Center**

KIEWIT PROJECT NUMBER: **20054627**

CALC NUMBER: **CIV-01**

TITLE: **Preliminary Hydrology & Hydraulic Analysis**

ASSUMPTIONS:

#	Description	Verified By	Initials	Date
1	Laydown / Construction Support areas hydrologically classified as "newly graded areas" (CN=77) and will not be paved / impervious.	R. Piles	RRP	5/28/24
2	All culverts and drainage structures located downstream of the project are sized correctly based on existing drainage conditions and are maintained / free of debris. This includes culverts under Sierra Highway and the adjacent railroad tracks. *Note that proposed stormwater discharges from the project will be less than or equal to existing (un-developed) rates and volumes.*	R. Piles	RRP	5/28/24
3	Drainage Sub-Basin A (north drainage area) was classified as Soil Class "D" (high runoff) whereas the rest of the analysis area is predominately Soil Class "A" (very low runoff). This is the reason why runoff volumes and flowrates are so high compared to the other drainage sub-basins.	R. Piles	RRP	5/28/24
4	Existing site conditions are classified as Desert Shrub (Good Condition; coverage >70%) based on photos and Google Street View imagery.	R. Piles	RRP	5/28/24
5	The areas designated as "Temporary Laydown / Construction Support Area" on the proposed drainage analysis exhibit may have a secondary/potential use as a berm consisting of stockpiled material excavated during construction of the reservoir located on-site. Either land use (no berm vs. berm) will not affect the drainage analysis as they will both be considered "newly graded areas" for runoff purposes.	R. Piles	RRP	5/28/24

REFERENCES:

Attached

1) NOAA Atlas 14 Point Precipitation Frequency Data (Appendix C)
2) Monthly Historical Rainfall Data (Appendix D)
3) FEMA Flood Hazard Map (Appendix E)
4) Web Soil Survey – Hydrologic Soil Group Map (Appendix F)

Not Attached

5) Kern County Hydrology Manual
6) Kern County Development Standards (including Engineering Bulletins 11-01 and 11-02)
7) Kern County, California, Code of Ordinances
8) NRCS/SCS Curve Number Method - Urban Hydrology for Small Watersheds (TR-55)

DESIGN BASIS:

1) Utilized SCS curve number method to determine the amount of runoff generated (volume and peak flowrate) from a rainfall event based on drainage area, rainfall depth, runoff curve number (based on soil group, land use, hydrologic condition), and time of concentration.
2) In the proposed (post-development) condition, runoff volume and peak flowrate released downstream shall be less than or equal to that of the existing (pre-development) site condition for all **Discharge Points**.

3) Utilized conservative design parameter of the 100-yr, 24-hr storm event (3.81” rainfall) vs. the Kern County design standard of the ISDD 10-yr, 5 day storm event of 3.40”.
4) Retention/Infiltration basins (sumps) will be utilized at three (3) locations to decrease the runoff volume discharged downstream to below pre-development conditions.
5) Upstream runoff will be re-routed around the project site utilizing properly sized trapezoidal ditches sized to handle up to the 100-yr, 24-hr duration runoff peak flowrate and routed to on-site retention/infiltration basins (sumps) to mitigate increases in runoff volume and flowrate.

RESULTS: See Appendix A “Existing and Proposed Conditions Drainage Exhibits” and Appendix B “Hydrology / Hydraulic Model Results”

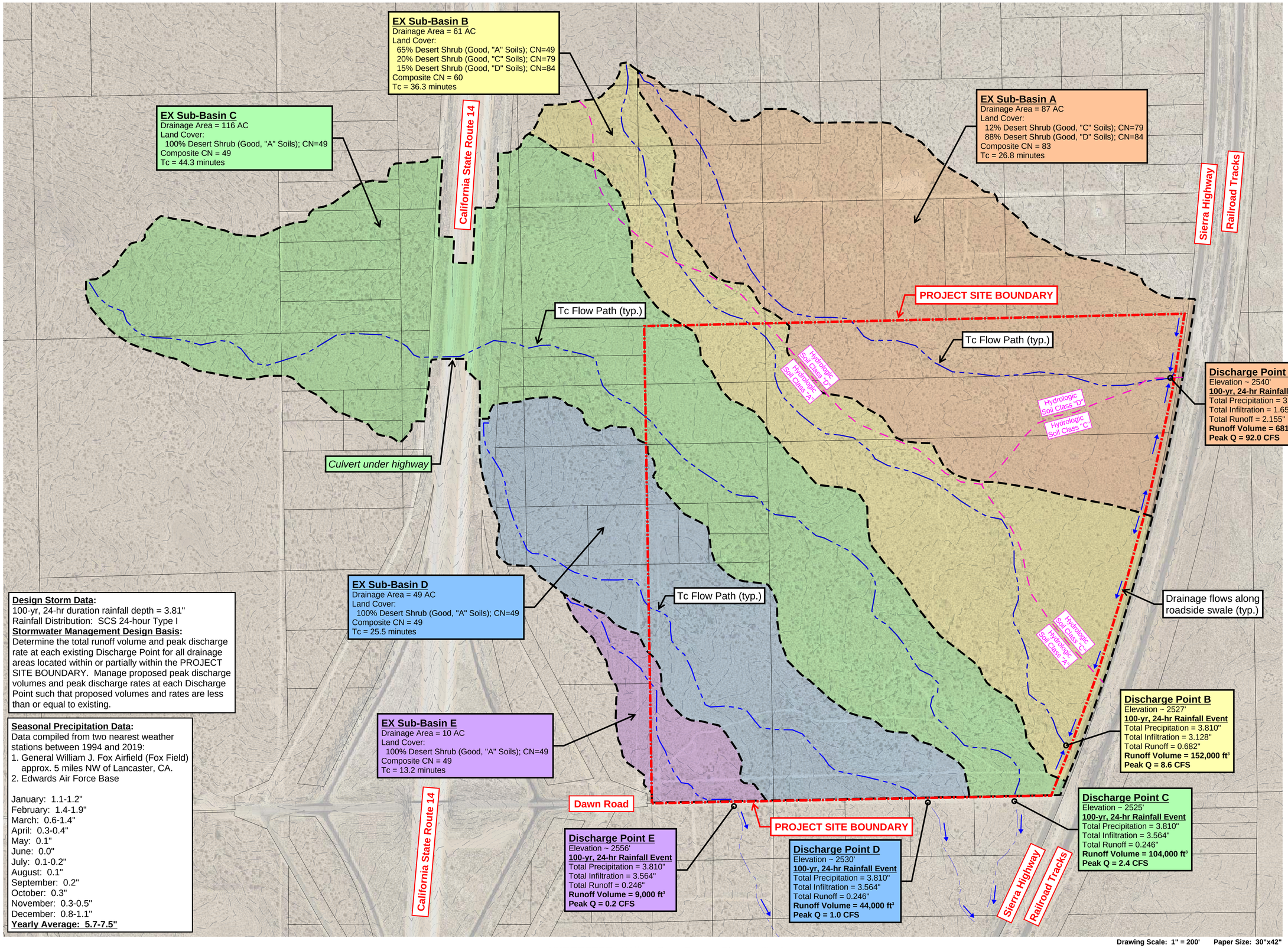
REVISION HISTORY:

Rev. A: Original Issue
Rev. B:

Rev.	Prepared By	Initials	Date	Checked By	Initials	Date	Approved By	Initials	Date
A	T. Johnston	TPJ	5/28/24	S. Johnson	SPJ	5/28/24	R. Piles	RRP	5/28/24
B									
C									

APPENDIX A

EXISTING & PROPOSED
DRAINAGE CONDITION EXHIBITS



Design Storm Data:
100-yr, 24-hr duration rainfall depth = 3.81"
Rainfall Distribution: SCS 24-hour Type I
Stormwater Management Design Basis:
Determine the total runoff volume and peak discharge rate at each existing Discharge Point for all drainage areas located within or partially within the PROJECT SITE BOUNDARY. Manage proposed peak discharge volumes and peak discharge rates at each Discharge Point such that proposed volumes and rates are less than or equal to existing.

Seasonal Precipitation Data:
Data compiled from two nearest weather stations between 1994 and 2019:
1. General William J. Fox Airfield (Fox Field) approx. 5 miles NW of Lancaster, CA.
2. Edwards Air Force Base

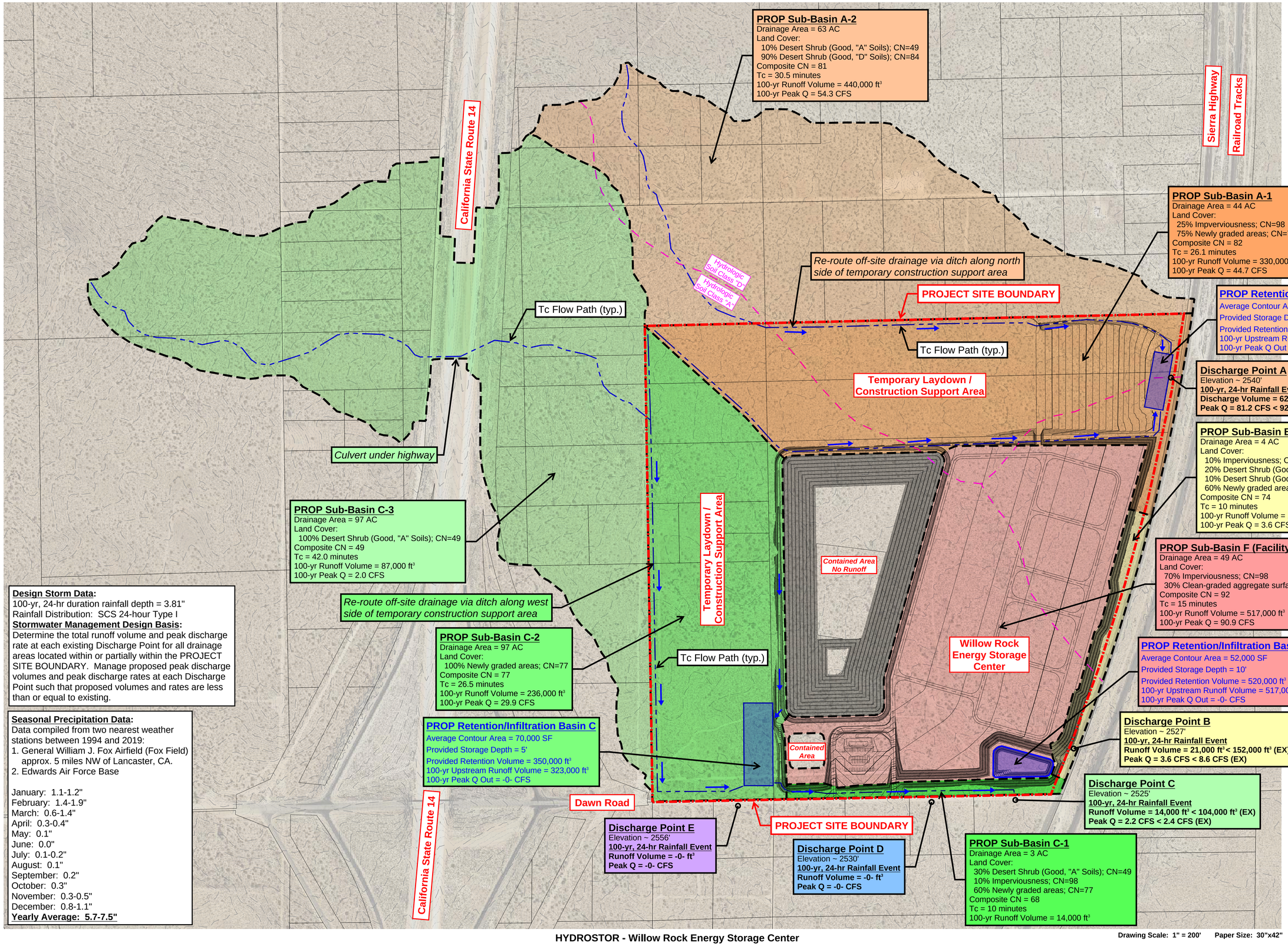
January: 1.1-1.2"
February: 1.4-1.9"
March: 0.6-1.4"
April: 0.3-0.4"
May: 0.1"
June: 0.0"
July: 0.1-0.2"
August: 0.1"
September: 0.2"
October: 0.3"
November: 0.3-0.5"
December: 0.8-1.1"
Yearly Average: 5.7-7.5"

Drawing Scale: 1" = 200' Paper Size: 30"x42"

HYDROSTOR - Willow Rock Energy Storage Center

Stormwater Drainage Analysis - EXISTING CONDITIONS

5/22/2024



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January: 1.1-1.2"
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Yearly Average: 5.7-7.5"

HYDROSTOR - Willow Rock Energy Storage Center

Drawing Scale: 1" = 200' **Paper Size: 30"x42"**

Stormwater Drainage Analysis - PROPOSED CONDITIONS

5/22/2024

APPENDIX B

HYDROLOGY / HYDRAULIC
MODEL RESULTS

Stormwater Drainage Analysis

Hydrostor Willow Rock Energy Storage Center

5/22/2024

Project Description

File Name	Hydrostor SSA Model.SPF
Description	Hydrostor Willow Rock

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	SCS TR-55
Time of Concentration (TOC) Method	SCS TR-55
Link Routing Method	Hydrodynamic
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	NO

Analysis Options

Start Analysis On	May 15, 2024	00:00:00
End Analysis On	May 17, 2024	00:00:00
Start Reporting On	May 15, 2024	00:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	10	seconds

Number of Elements

	Qty
Rain Gages	1
Subbasins	12
Nodes	11
Junctions	0
Outfalls	9
Flow Diversions	0
Inlets	0
Storage Nodes	2
Links	2
Channels	0
Pipes	0
Pumps	0
Orifices	0
Weirs	2
Outlets	0
Pollutants	0
Land Uses	0

Design Basis:

For the purposes of this stormwater drainage analysis, all existing and proposed runoff conditions for both off-site and on-site areas will be analyzed using the 100-yr, 24-hr duration storm event. For the site location, this equates to 3.81" of rainfall over a 24-hour period. This is a slightly more conservative approach than required in Kern County Engineering Bulletin 11-02 "Sump Volume Requirements" which states you must fully retain the runoff volume generated from impervious areas for the ISDD 5 day storm event, which corresponds to 3.40" of rainfall.

All runoff discharge points from the existing site condition (including upstream/off-site areas) have been identified in the ***Hydrostor Drainage Analysis - Existing*** exhibit. These existing discharge points (identified as Discharge Points A though E) identify the total runoff volumes and peak flowrates in the existing condition that will be the basis for what can be discharged downstream of the project site in the proposed condition. All proposed discharge volumes and peak flowrates leaving the site will be maintained at or below these existing values.

All runoff discharge points for the proposed site condition (including diverted upstream/off-site areas) have been identified in the ***Hydrostor Drainage Analysis - Proposed*** exhibit. The proposed discharge point locations are identical to the existing discharge points such that an existing vs. proposed analysis of total runoff volume and peak flowrates can be achieved. In the proposed scenario, with the installation of Retention/Infiltration Basins (sumps) in Sub-Basins A, C and F to retain additional runoff volumes generated by the project as well as re-routed upstream flows, all proposed Discharge Points have reduced runoff volumes and peak flowrates to downstream neighboring properties and the Sierra Highway R/W.

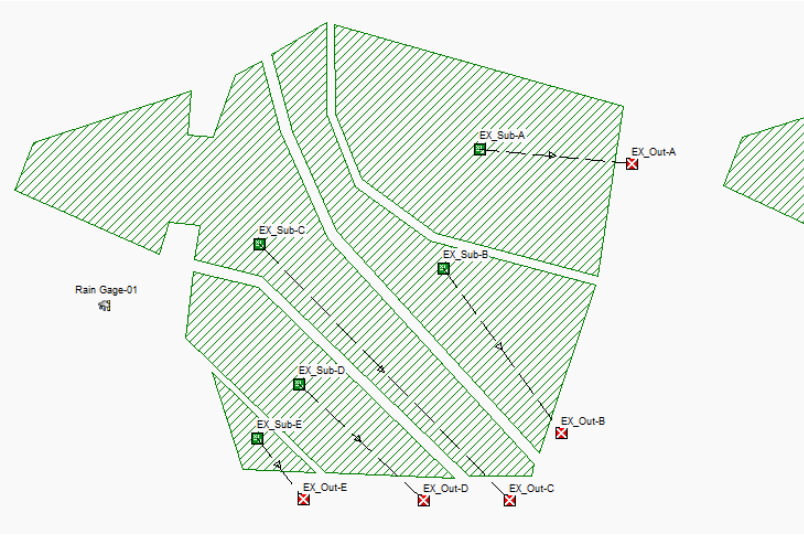
Main Facility (Sub-Basin F):

The runoff generated from the 49 acre main facility will be retained on-site in the southeast corner of the site utilizing a retention/infiltration basin (sump). All surface drainage generated within this area will be captured and routed utilizing a storm drainage network consisting of catch basins and gravity storm pipe. The system will be designed to handle flows generated from storm events up to and including the 100-yr event. No surface drainage from this sub-basin will be allowed to leave the site.

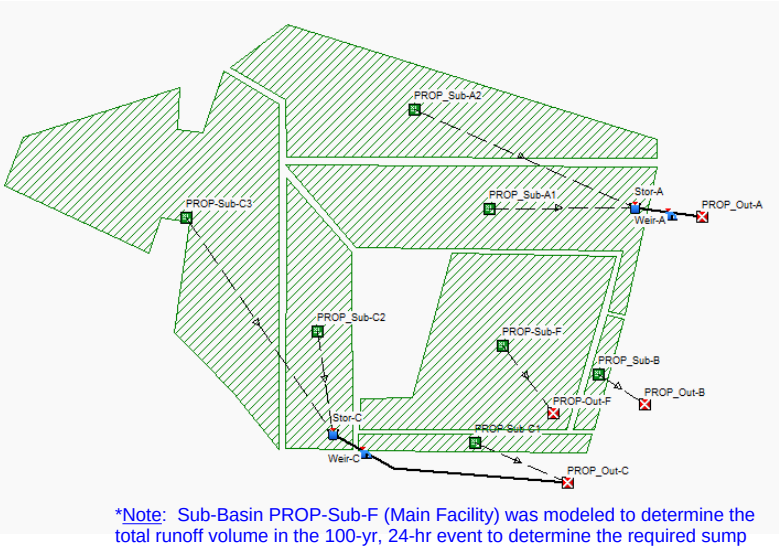
Rainfall Details

SN	Rain Gage ID	Data Source	Data Source ID	Rainfall Type	Rain Units	State	County	Return Period (years)	Rainfall Depth (inches)	Rainfall Distribution
1	Rain Gage-01	Time Series	TS 100-yr	Cumulative	inches	California	Kern (Mojave)	100	3.81	SCS Type I 24-hr

EXISTING Condition Model



PROPOSED Condition Model



*Note: Sub-Basin PROP-Sub-F (Main Facility) was modeled to determine the total runoff volume in the 100-yr, 24-hr event to determine the required sump volume to fully retain this volume. Outfall PROP-Out-F will be the total inflow into the retention/infiltration basin (sump) located in the southeast corner of the main facility. There will be no design outflow from this sump.

Subbasin Summary

SN	Subbasin ID	Area (ac)	Weighted Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	EX_Sub-A	87.00	83.40	3.81	2.16	187.49	91.94	0 00:26:45
2	EX_Sub-B	61.00	60.25	3.81	0.68	41.60	8.56	0 00:36:18
3	EX_Sub-C	116.00	49.00	3.81	0.25	28.54	2.35	0 00:44:15
4	EX_Sub-D	49.00	49.00	3.81	0.25	12.05	1.00	0 00:25:28
5	EX_Sub-E	10.00	49.00	3.81	0.25	2.46	0.20	0 00:13:11
6	PROP_Sub-A1	44.00	82.25	3.81	2.06	90.73	44.70	0 00:26:03
7	PROP_Sub-A2	63.00	80.50	3.81	1.92	121.21	54.26	0 00:30:28
8	PROP_Sub-B	4.00	73.70	3.81	1.44	5.75	3.58	0 00:10:00
9	PROP_Sub-C2	39.00	77.00	3.81	1.67	64.94	29.88	0 00:26:33
10	PROP-Sub-C1	3.00	70.70	3.81	1.25	3.74	2.20	0 00:10:00
11	PROP-Sub-C3	97.00	49.00	3.81	0.25	23.86	1.96	0 00:42:01
12	PROP-Sub-F	49.00	91.70	3.81	2.91	142.35	90.85	0 00:15:00

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft²)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	EX_Out-A	Outfall	2540.00					91.92	2540.00					
2	EX_Out-B	Outfall	2527.00					8.48	2527.00					
3	EX_Out-C	Outfall	2525.00					2.35	2525.00					
4	EX_Out-D	Outfall	2529.00					1.00	2529.00					
5	EX_Out-E	Outfall	2556.00					0.20	2556.00					
6	PROP_Out-A	Outfall	2540.00					81.16	2540.00					
7	PROP_Out-B	Outfall	2527.00					3.58	2527.00					
8	PROP_Out-C	Outfall	2525.00					2.20	2525.00					
9	PROP-Out-F	Outfall	2530.00					88.32	2530.00					
10	Stor-A	Storage Node	2537.00	2543.00	0.00		0.00	98.14	2542.62				0.00	0.00
11	Stor-C	Storage Node	2550.00	2556.00	0.00		0.00	29.83	2554.61				0.00	0.00

Subbasin Hydrology

Subbasin : EX_Sub-A

Input Data

Area (ac) 87.00
Weighted Curve Number 83.40
Rain Gage ID ..... Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Desert shrub range, Good	76.56	D	84.00
Desert shrub range, Good	10.44	C	79.00
Composite Area & Weighted CN	87.00		83.40

Time of Concentration

TOC Method : SCS TR-55

Sheet Flow Equation :

Tc = (0.007 * ((n * Lf)^0.8)) / ((P^0.5) * (Sf^0.4))

Where :

Tc = Time of Concentration (hr)
n = Manning's roughness
Lf = Flow Length (ft)
P = 2 yr, 24 hr Rainfall (inches)
Sf = Slope (ft/ft)

Shallow Concentrated Flow Equation :

V = 16.1345 * (Sf^0.5) (unpaved surface)
V = 20.3282 * (Sf^0.5) (paved surface)
V = 15.0 * (Sf^0.5) (grassed waterway surface)
V = 10.0 * (Sf^0.5) (nearly bare & untilled surface)
V = 9.0 * (Sf^0.5) (cultivated straight rows surface)
V = 7.0 * (Sf^0.5) (short grass pasture surface)
V = 5.0 * (Sf^0.5) (woodland surface)
V = 2.5 * (Sf^0.5) (forest w/heavy litter surface)
Tc = (Lf / V) / (3600 sec/hr)

Where:

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)

Channel Flow Equation :

V = (1.49 * (R^(2/3)) * (Sf^0.5)) / n
R = Aq / Wp
Tc = (Lf / V) / (3600 sec/hr)

Where :

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
R = Hydraulic Radius (ft)
Aq = Flow Area (ft^2)
Wp = Wetted Perimeter (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)
n = Manning's roughness

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.015	0.00	0.00
Flow Length (ft) :	100	0.00	0.00
Slope (%) :	5	0.00	0.00
2 yr, 24 hr Rainfall (in) :	1.31	0.00	0.00
Velocity (ft/sec) :	0.99	0.00	0.00
Computed Flow Time (min) :	1.68	0.00	0.00

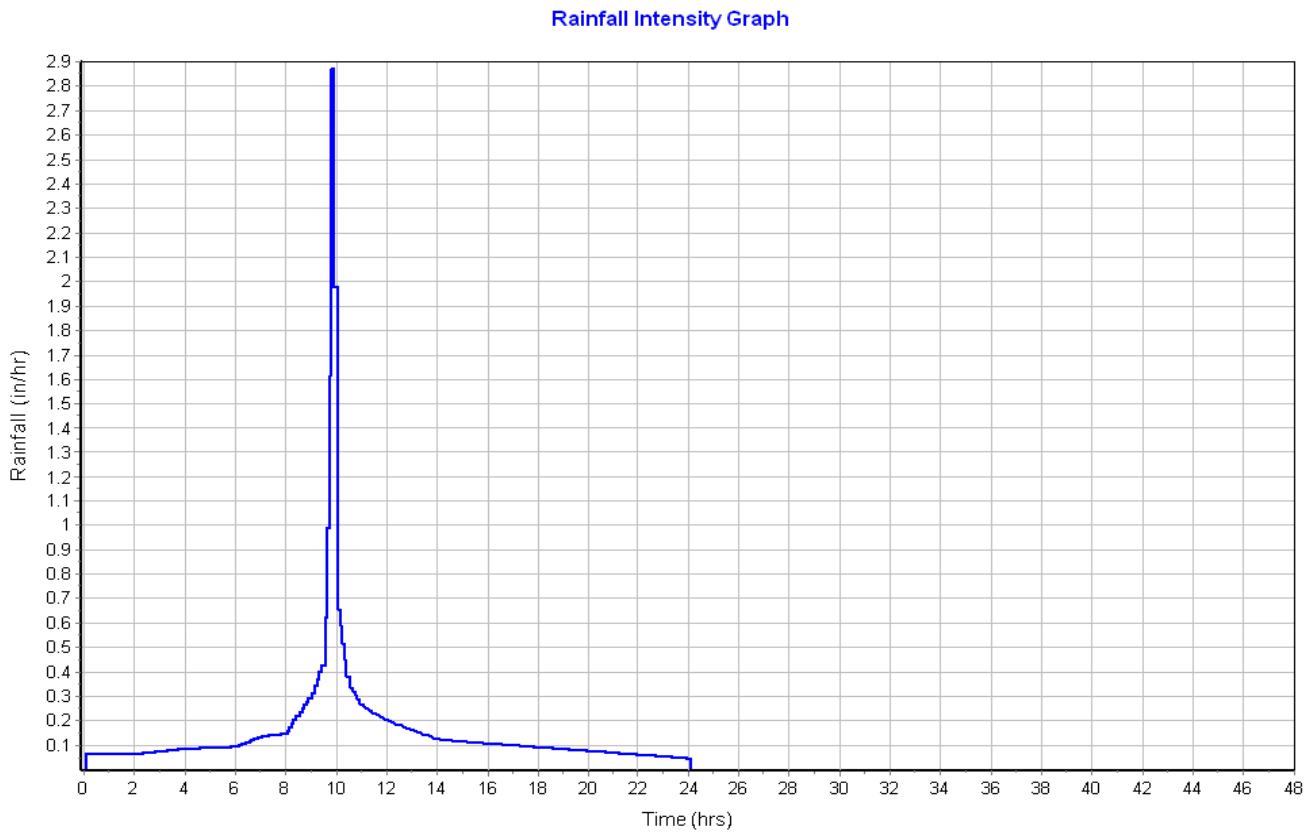
Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	3760	0.00	0.00
Slope (%) :	2.4	0.00	0.00
Surface Type :	Unpaved	Unpaved	Unpaved
Velocity (ft/sec) :	2.50	0.00	0.00
Computed Flow Time (min) :	25.07	0.00	0.00

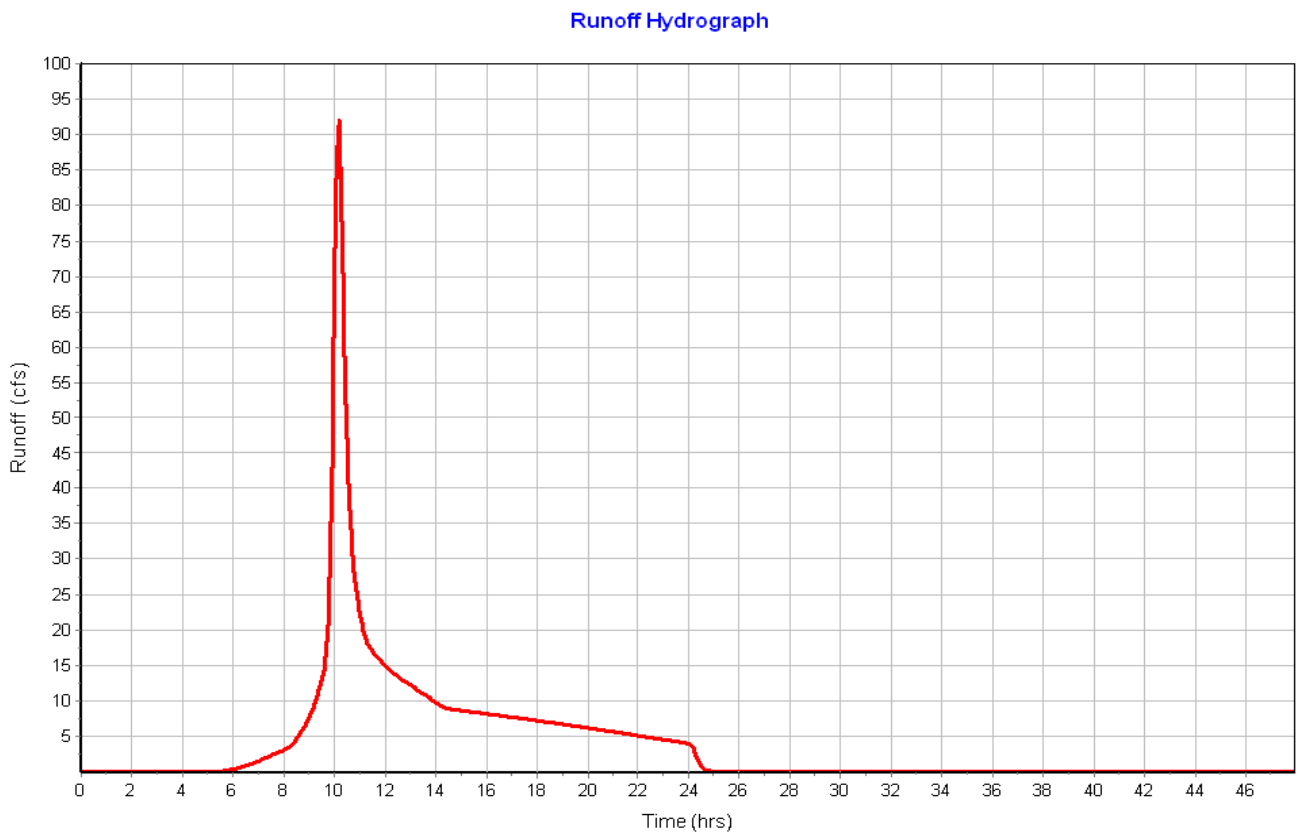
Total TOC (min) 26.75

Subbasin Runoff Results

Total Rainfall (in) 3.81
Total Runoff (in) 2.16
Peak Runoff (cfs) 91.94
Weighted Curve Number 83.40
Time of Concentration (days hh:mm:ss) 0 00:26:45

Subbasin : EX_Sub-A





Subbasin : EX_Sub-B

Input Data

Area (ac) 61.00
Weighted Curve Number 60.25
Rain Gage ID ..... Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Desert shrub range, Good	39.65	A	49.00
Desert shrub range, Good	12.20	C	79.00
Desert shrub range, Good	9.15	D	84.00
Composite Area & Weighted CN	61.00		60.25

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.015	0.00	0.00
Flow Length (ft) :	100	0.00	0.00
Slope (%) :	5	0.00	0.00
2 yr, 24 hr Rainfall (in) :	1.31	0.00	0.00
Velocity (ft/sec) :	0.99	0.00	0.00
Computed Flow Time (min) :	1.68	0.00	0.00

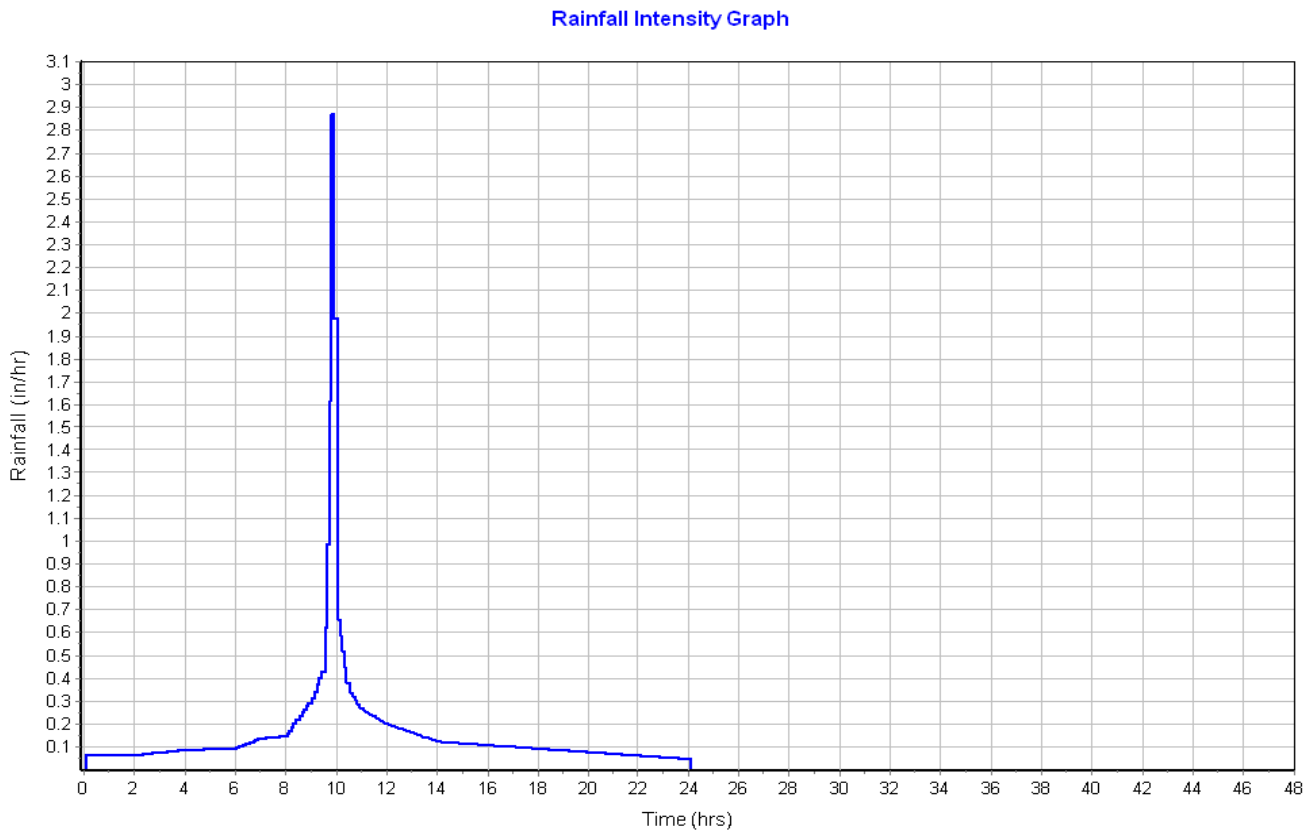
Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	4860	0.00	0.00
Slope (%) :	2.1	0.00	0.00
Surface Type :	Unpaved	Unpaved	Unpaved
Velocity (ft/sec) :	2.34	0.00	0.00
Computed Flow Time (min) :	34.62	0.00	0.00

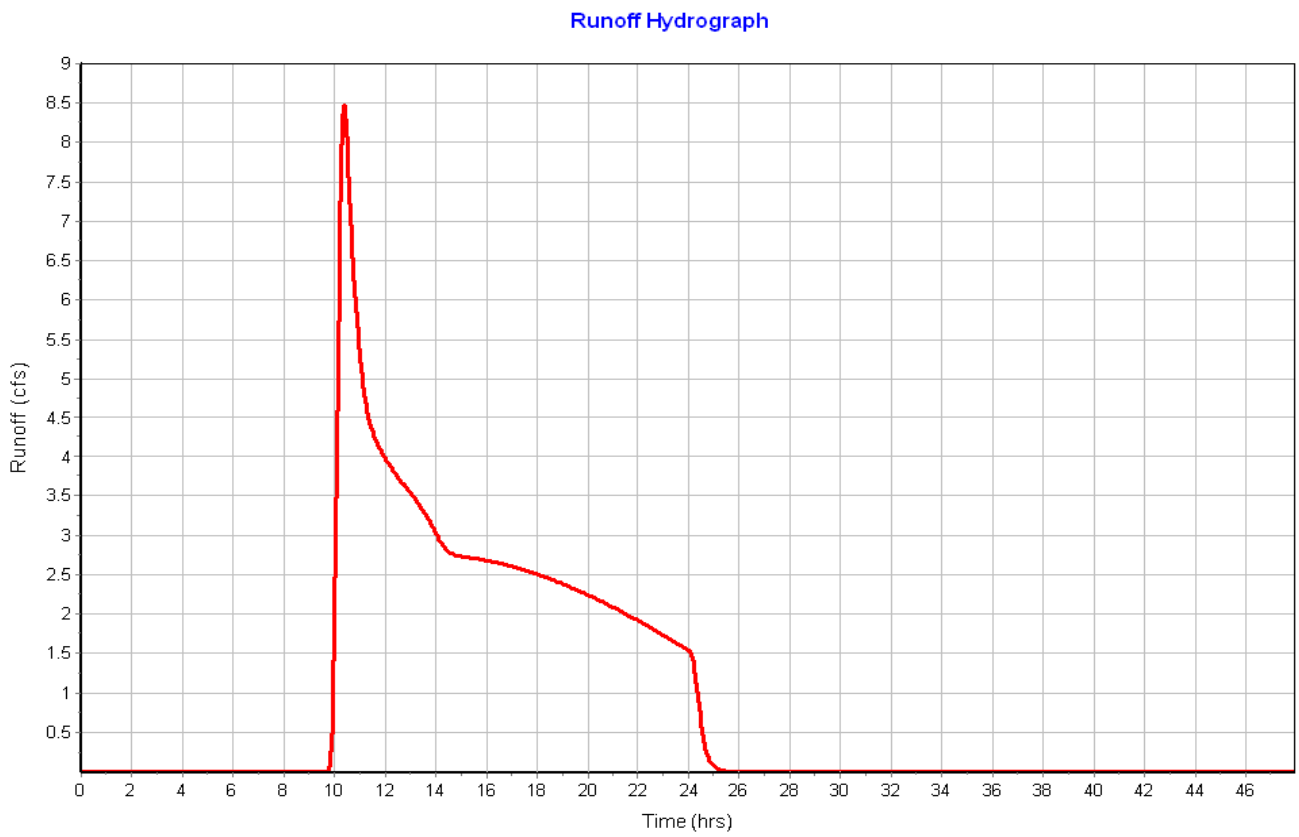
Total TOC (min) 36.30

Subbasin Runoff Results

Total Rainfall (in) 3.81
Total Runoff (in) 0.68
Peak Runoff (cfs) 8.56
Weighted Curve Number 60.25
Time of Concentration (days hh:mm:ss) 0 00:36:18

Subbasin : EX_Sub-B





Subbasin : EX_Sub-C

Input Data

Area (ac) 116.00
Weighted Curve Number 49.00
Rain Gage ID ..... Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Desert shrub range, Good	116.00	A	49.00
Composite Area & Weighted CN	116.00		49.00

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.015	0.00	0.00
Flow Length (ft) :	250	0.00	0.00
Slope (%) :	7.6	0.00	0.00
2 yr, 24 hr Rainfall (in) :	1.31	0.00	0.00
Velocity (ft/sec) :	1.41	0.00	0.00
Computed Flow Time (min) :	2.96	0.00	0.00

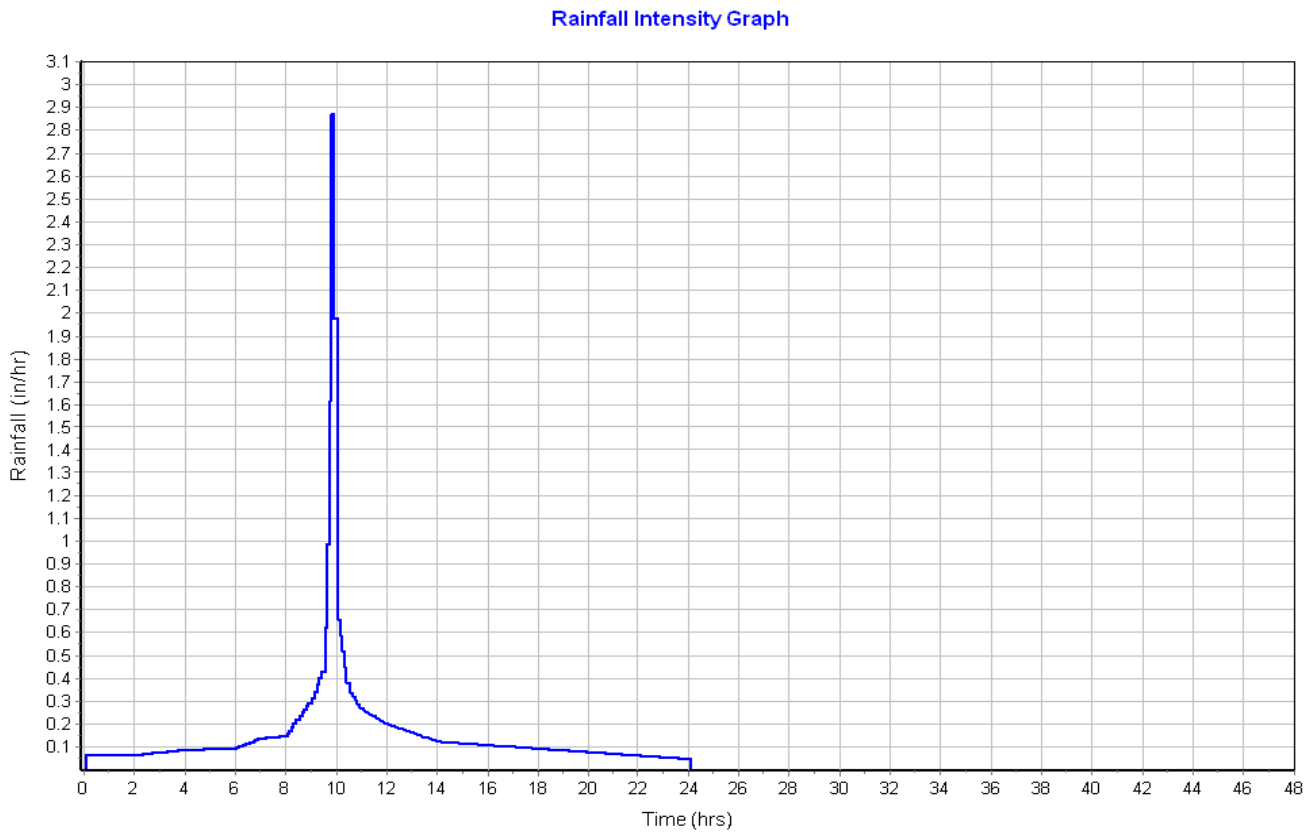
Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	6565	0.00	0.00
Slope (%) :	2.7	0.00	0.00
Surface Type :	Unpaved	Unpaved	Unpaved
Velocity (ft/sec) :	2.65	0.00	0.00
Computed Flow Time (min) :	41.29	0.00	0.00

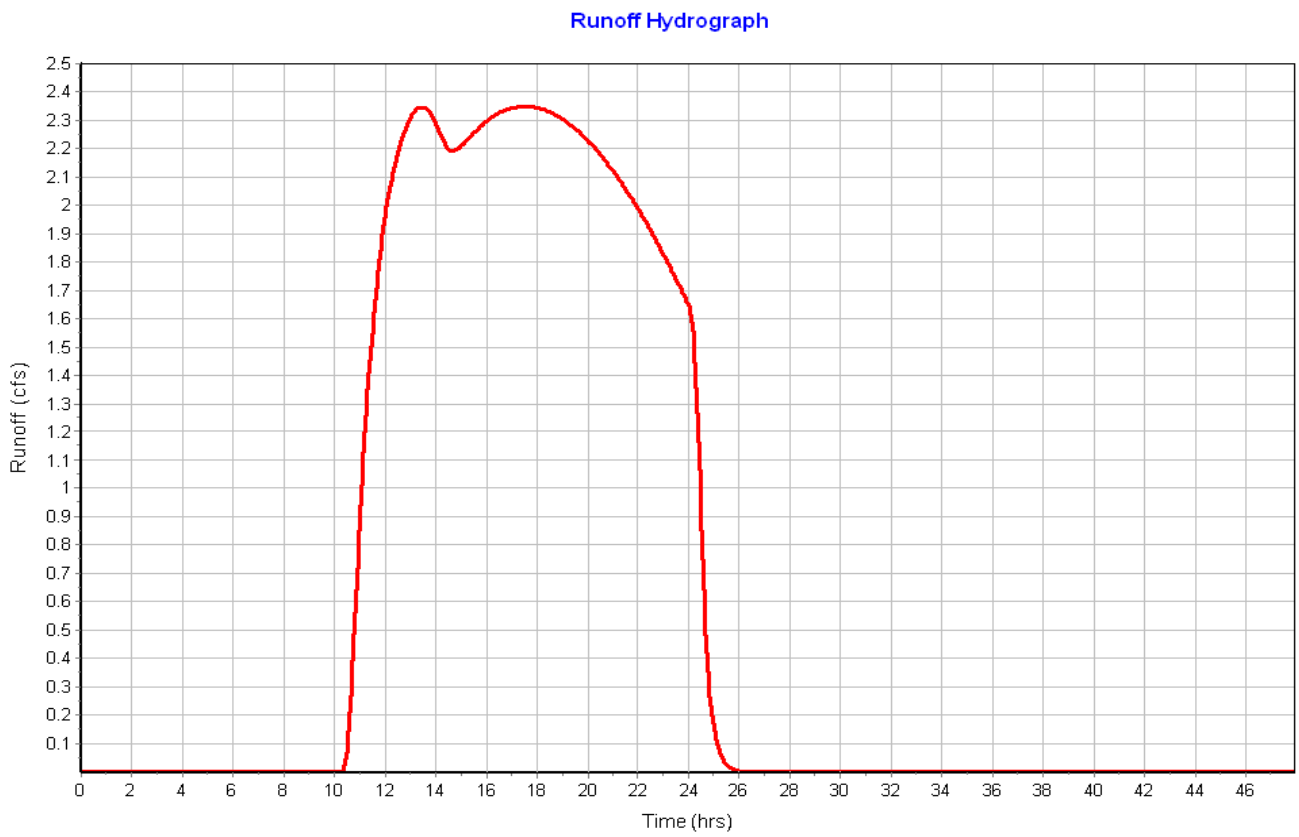
Total TOC (min) 44.25

Subbasin Runoff Results

Total Rainfall (in) 3.81
Total Runoff (in) 0.25
Peak Runoff (cfs) 2.35
Weighted Curve Number 49.00
Time of Concentration (days hh:mm:ss) 0 00:44:15

Subbasin : EX_Sub-C





Subbasin : EX_Sub-D

Input Data

Area (ac) 49.00
Weighted Curve Number 49.00
Rain Gage ID ..... Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Desert shrub range, Good	49.00	A	49.00
Composite Area & Weighted CN	49.00		49.00

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.015	0.00	0.00
Flow Length (ft) :	300	0.00	0.00
Slope (%) :	3.3	0.00	0.00
2 yr, 24 hr Rainfall (in) :	1.31	0.00	0.00
Velocity (ft/sec) :	1.05	0.00	0.00
Computed Flow Time (min) :	4.78	0.00	0.00

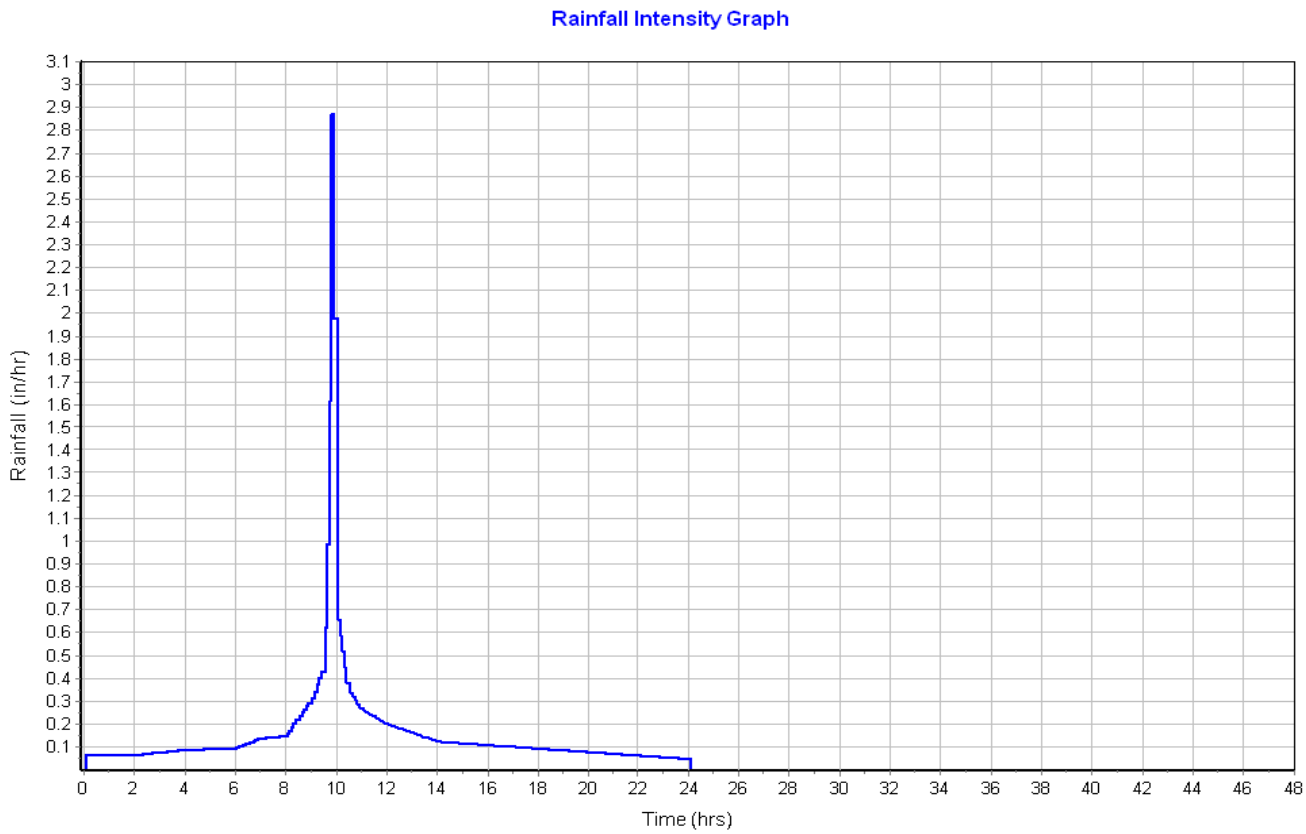
Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	3290	0.00	0.00
Slope (%) :	2.7	0.00	0.00
Surface Type :	Unpaved	Unpaved	Unpaved
Velocity (ft/sec) :	2.65	0.00	0.00
Computed Flow Time (min) :	20.69	0.00	0.00

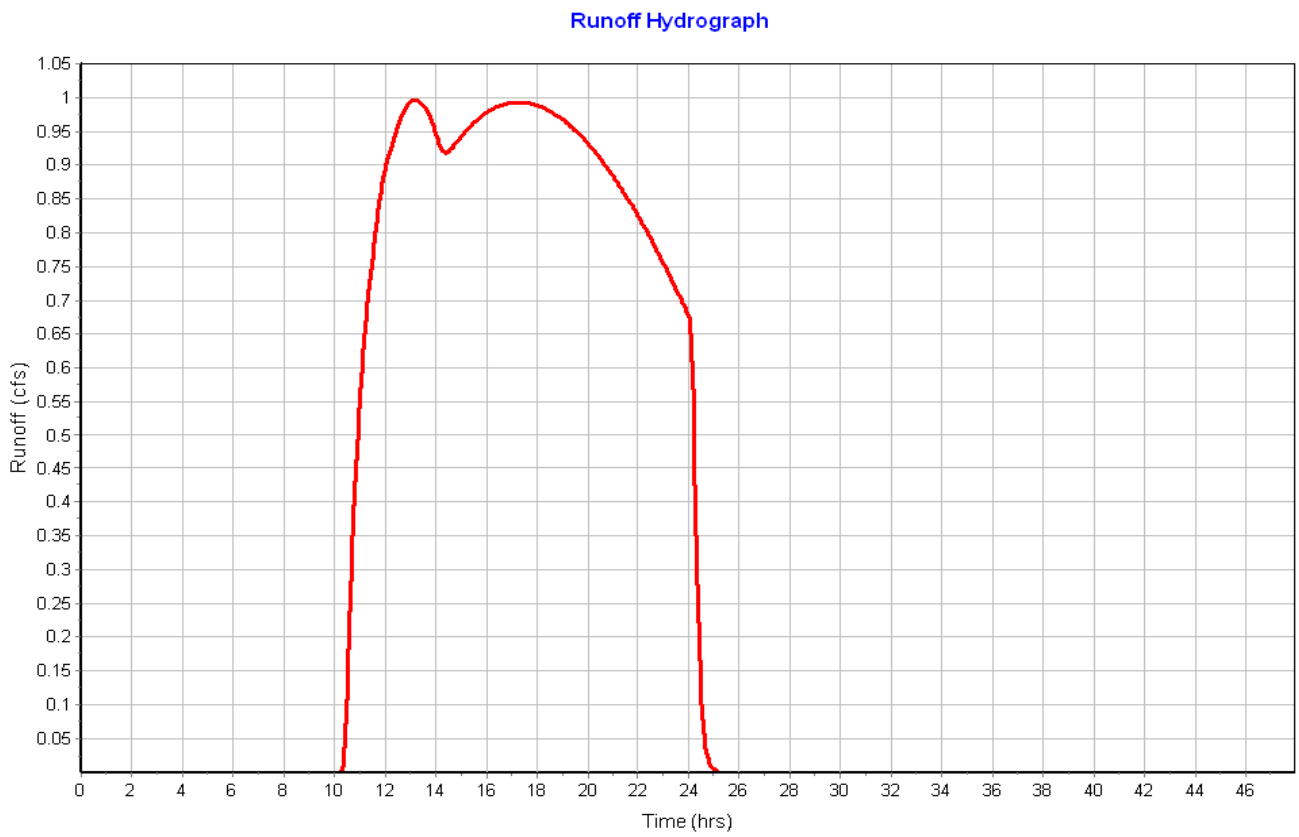
Total TOC (min) 25.48

Subbasin Runoff Results

Total Rainfall (in) 3.81
Total Runoff (in) 0.25
Peak Runoff (cfs) 1.00
Weighted Curve Number 49.00
Time of Concentration (days hh:mm:ss) 0 00:25:29

Subbasin : EX_Sub-D





Subbasin : EX_Sub-E

Input Data

Area (ac) 10.00
Weighted Curve Number 49.00
Rain Gage ID ..... Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Desert shrub range, Good	10.00	A	49.00
Composite Area & Weighted CN	10.00		49.00

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.015	0.00	0.00
Flow Length (ft) :	250	0.00	0.00
Slope (%) :	3.2	0.00	0.00
2 yr, 24 hr Rainfall (in) :	1.31	0.00	0.00
Velocity (ft/sec) :	1.00	0.00	0.00
Computed Flow Time (min) :	4.19	0.00	0.00

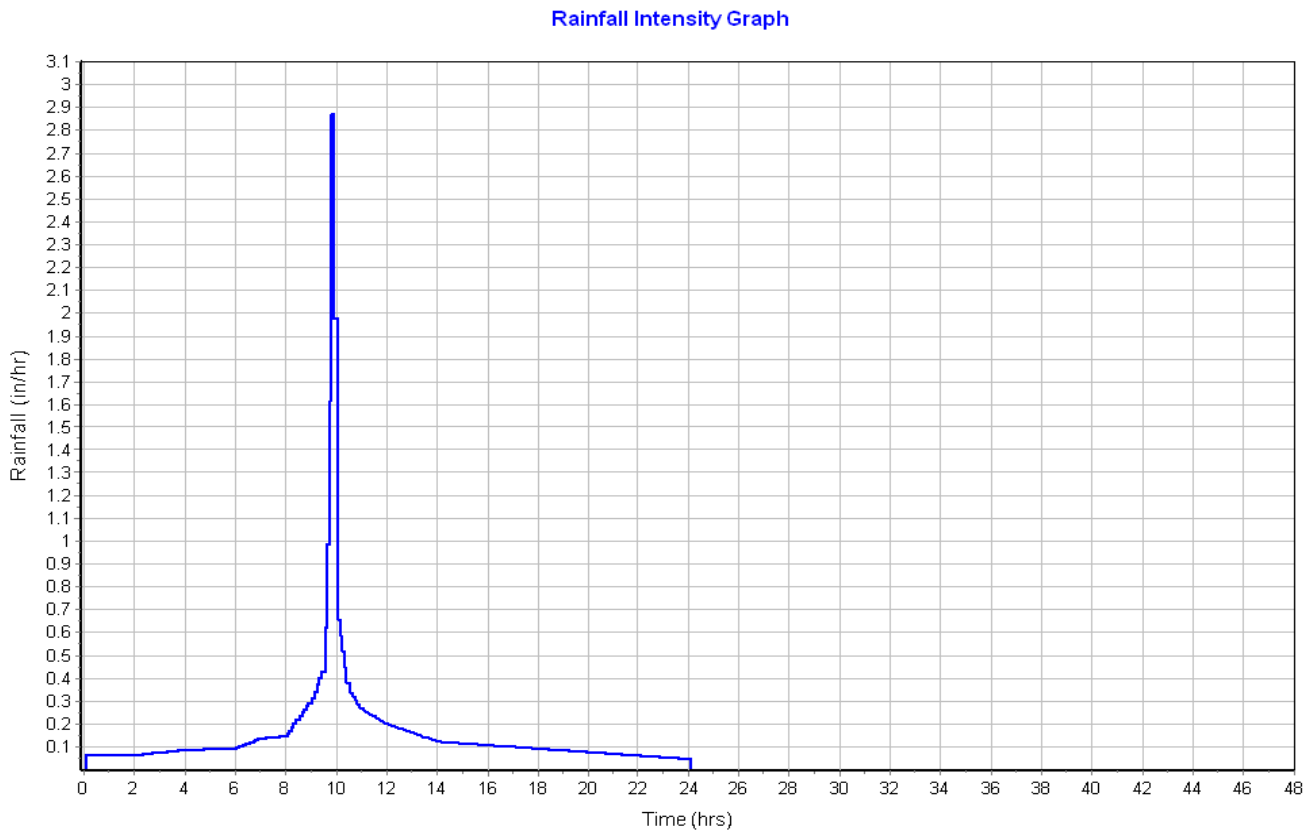
Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	1350	0.00	0.00
Slope (%) :	2.4	0.00	0.00
Surface Type :	Unpaved	Unpaved	Unpaved
Velocity (ft/sec) :	2.50	0.00	0.00
Computed Flow Time (min) :	9.00	0.00	0.00

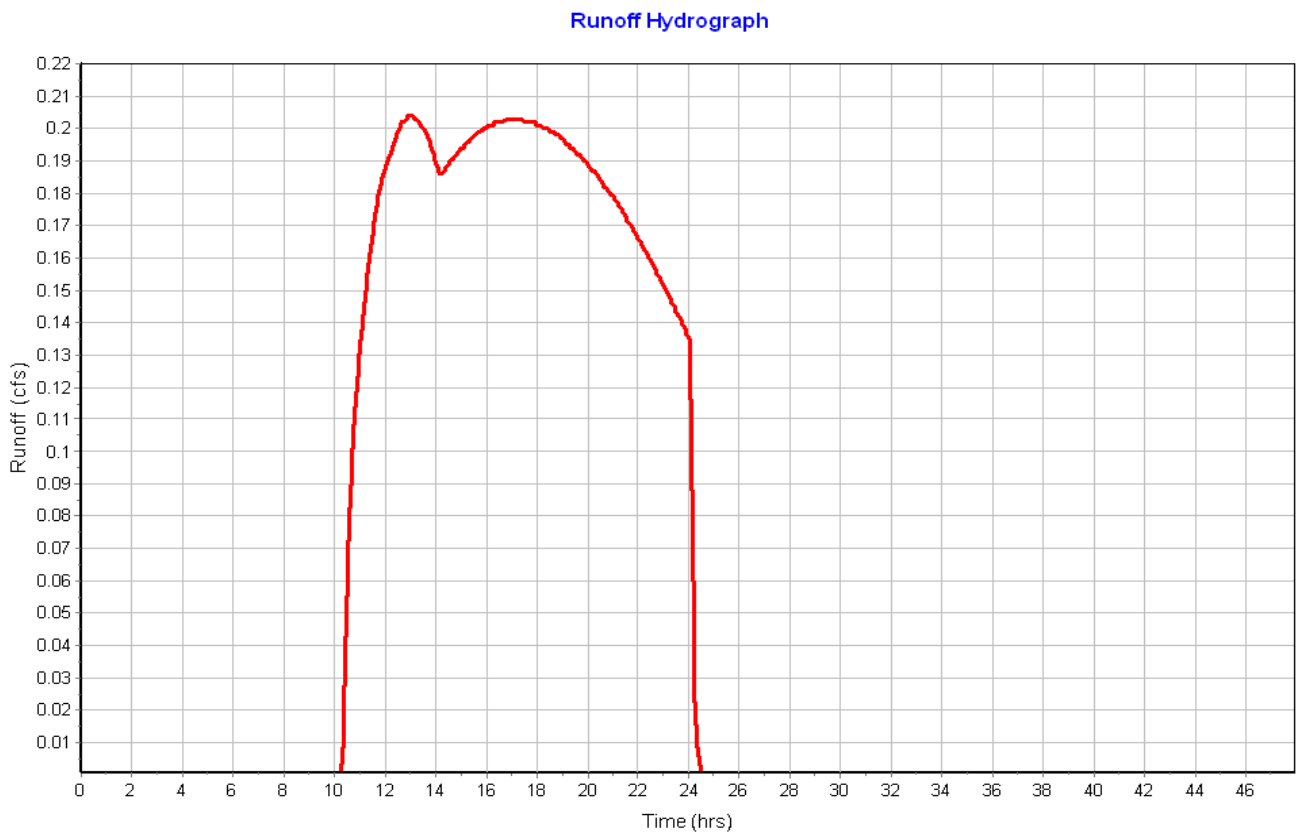
Total TOC (min) 13.19

Subbasin Runoff Results

Total Rainfall (in) 3.81
Total Runoff (in) 0.25
Peak Runoff (cfs) 0.20
Weighted Curve Number 49.00
Time of Concentration (days hh:mm:ss) 0 00:13:11

Subbasin : EX_Sub-E





Subbasin : PROP_Sub-A1

Input Data

Area (ac) 44.00
Weighted Curve Number 82.25
Rain Gage ID ..... Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved parking & roofs	11.00	A	98.00
Newly graded area	33.00	A	77.00
Composite Area & Weighted CN	44.00		82.25

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.015	0.00	0.00
Flow Length (ft) :	470	0.00	0.00
Slope (%) :	2.1	0.00	0.00
2 yr, 24 hr Rainfall (in) :	1.31	0.00	0.00
Velocity (ft/sec) :	0.95	0.00	0.00
Computed Flow Time (min) :	8.21	0.00	0.00

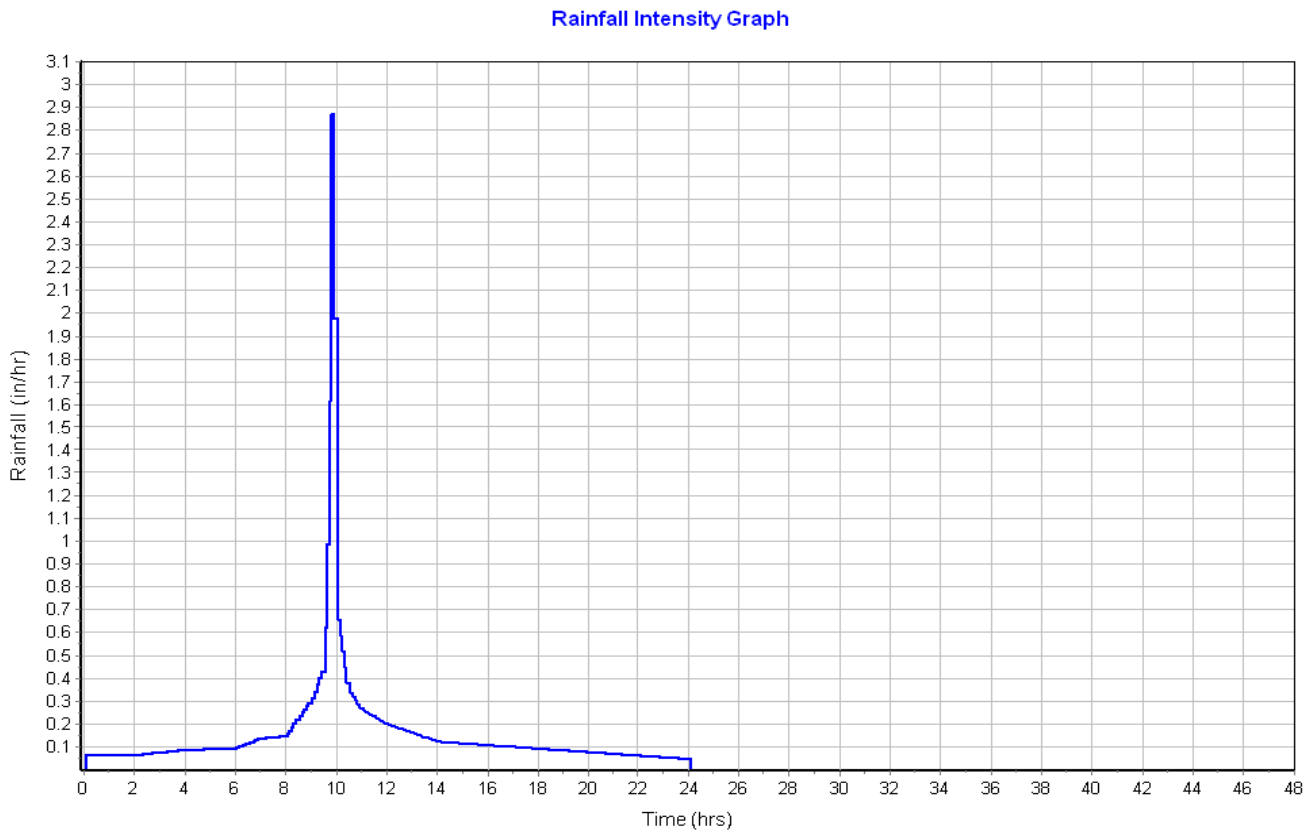
Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	2730	0.00	0.00
Slope (%) :	2.5	0.00	0.00
Surface Type :	Unpaved	Unpaved	Unpaved
Velocity (ft/sec) :	2.55	0.00	0.00
Computed Flow Time (min) :	17.84	0.00	0.00

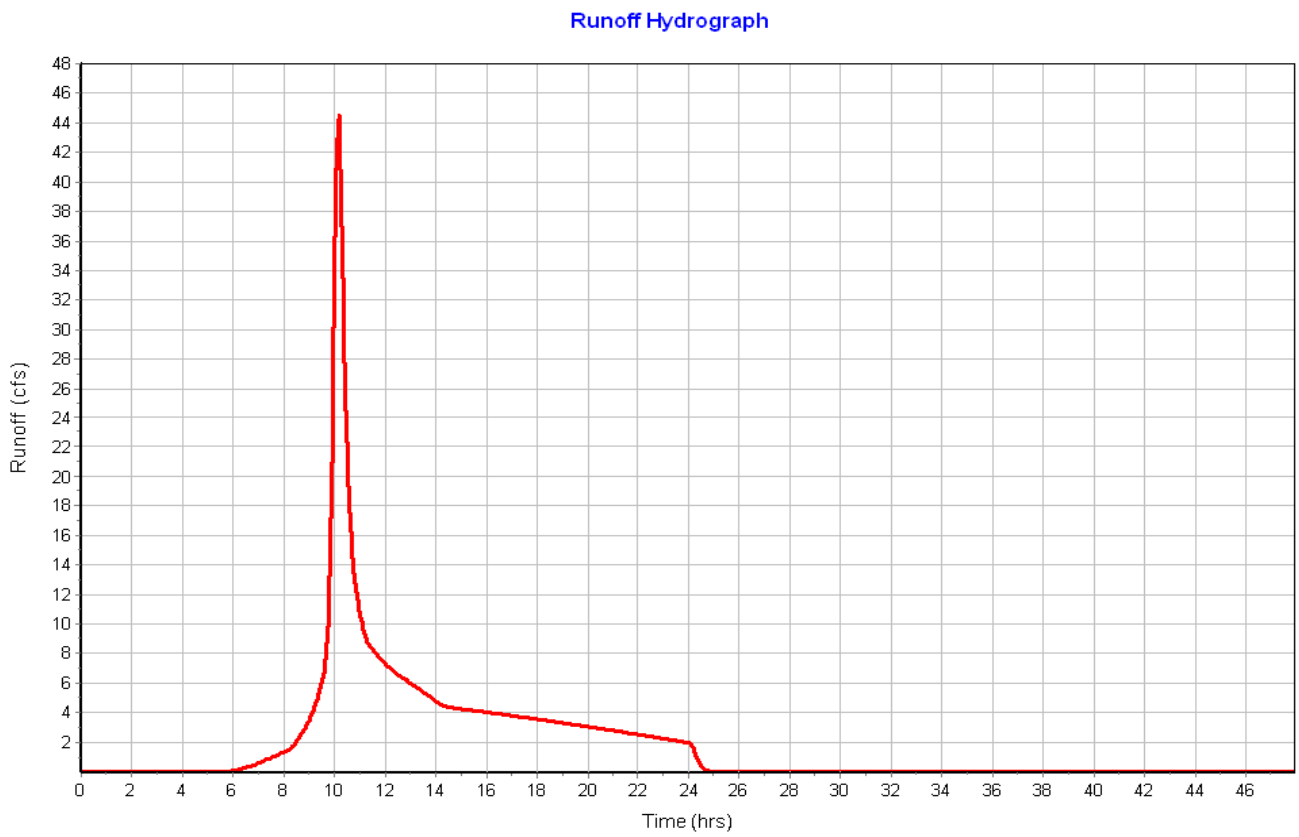
Total TOC (min) 26.05

Subbasin Runoff Results

Total Rainfall (in) 3.81
Total Runoff (in) 2.06
Peak Runoff (cfs) 44.70
Weighted Curve Number 82.25
Time of Concentration (days hh:mm:ss) 0 00:26:03

Subbasin : PROP_Sub-A1





Subbasin : PROP_Sub-A2

Input Data

Area (ac) 63.00
Weighted Curve Number 80.50
Rain Gage ID ..... Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Desert shrub range, Good	6.30	A	49.00
Desert shrub range, Good	56.70	D	84.00
Composite Area & Weighted CN	63.00		80.50

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.015	0.00	0.00
Flow Length (ft) :	100	0.00	0.00
Slope (%) :	5	0.00	0.00
2 yr, 24 hr Rainfall (in) :	1.31	0.00	0.00
Velocity (ft/sec) :	0.99	0.00	0.00
Computed Flow Time (min) :	1.68	0.00	0.00

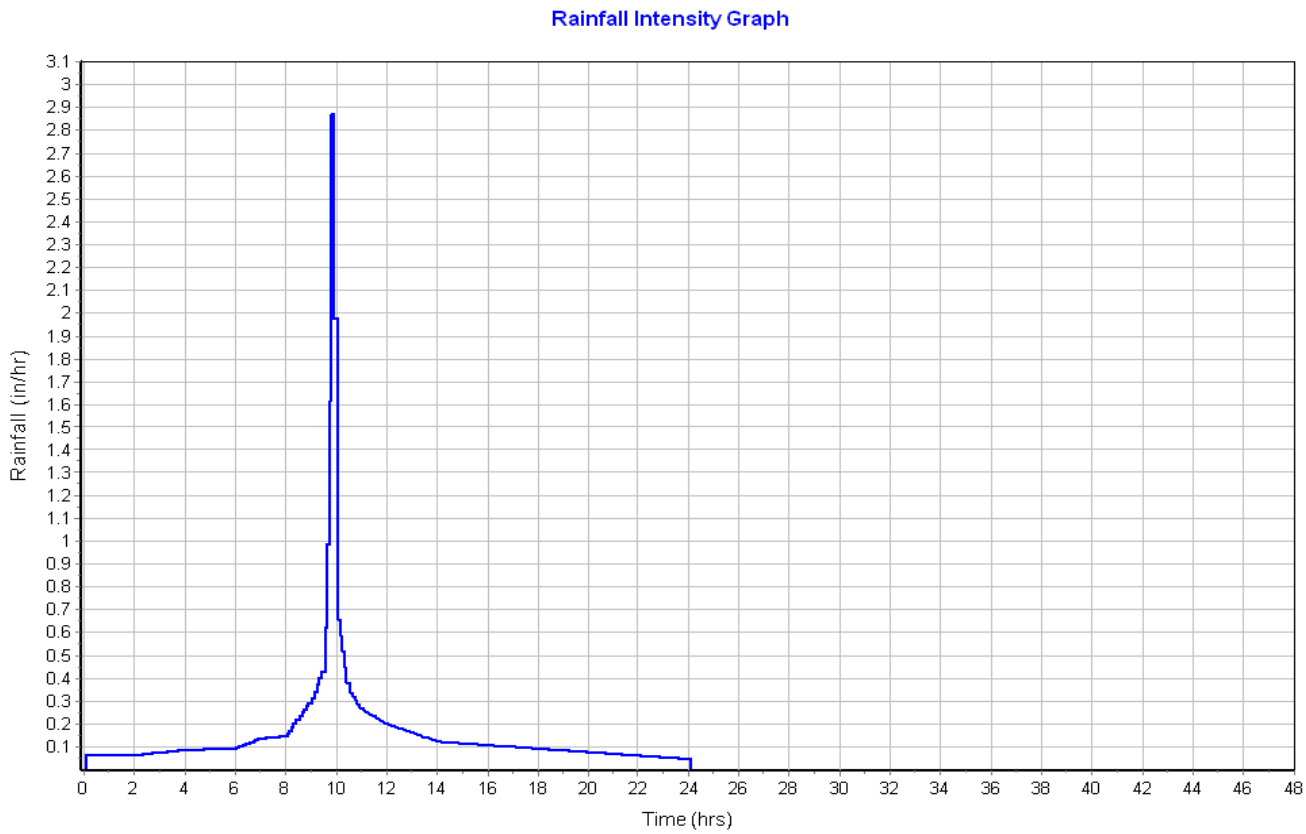
Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	4130	0.00	0.00
Slope (%) :	2.2	0.00	0.00
Surface Type :	Unpaved	Unpaved	Unpaved
Velocity (ft/sec) :	2.39	0.00	0.00
Computed Flow Time (min) :	28.80	0.00	0.00

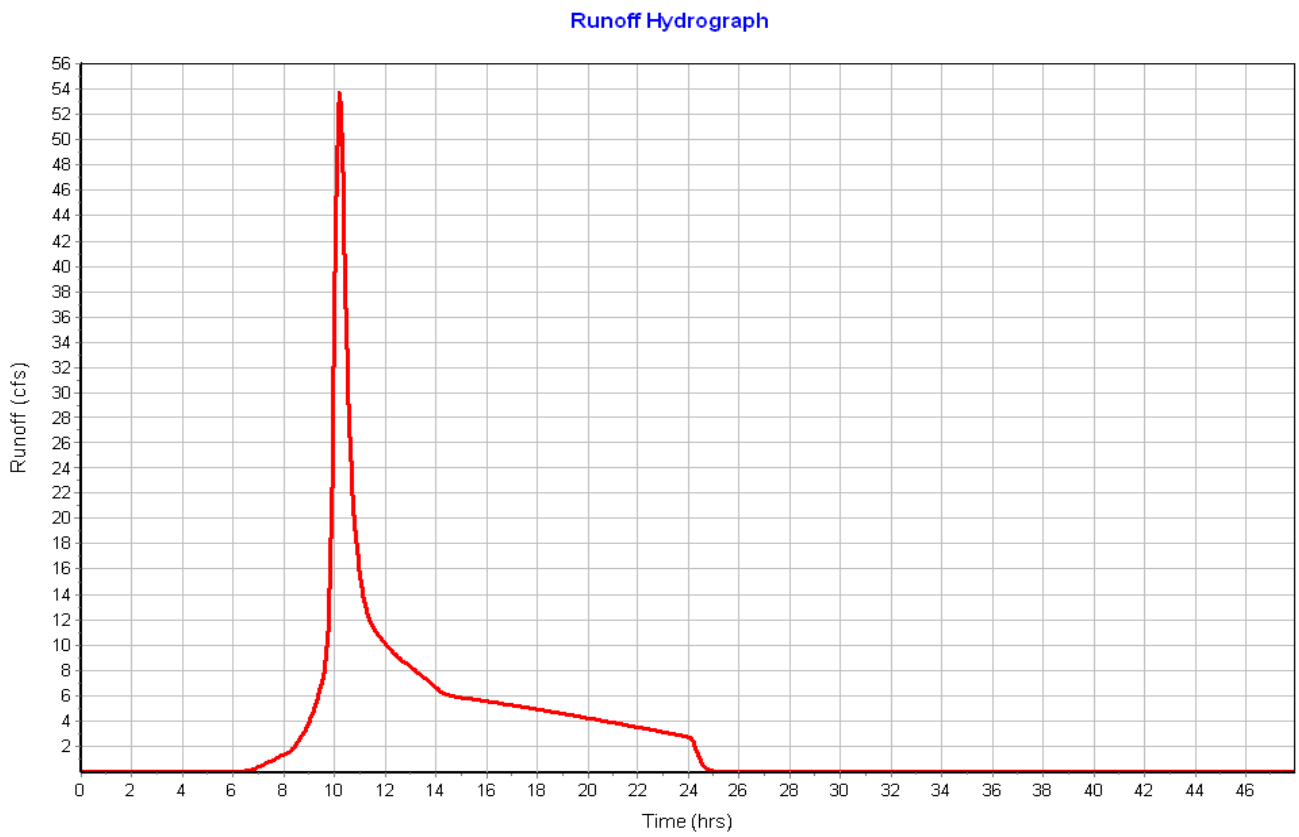
Total TOC (min) 30.48

Subbasin Runoff Results

Total Rainfall (in) 3.81
Total Runoff (in) 1.92
Peak Runoff (cfs) 54.26
Weighted Curve Number 80.50
Time of Concentration (days hh:mm:ss) 0 00:30:29

Subbasin : PROP_Sub-A2





Subbasin : PROP_Sub-B

Input Data

Area (ac) 4.00
Weighted Curve Number 73.70
Rain Gage ID ..... Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved parking & roofs	0.40	A	98.00
Desert shrub range, Good	0.80	A	49.00
Desert shrub range, Good	0.40	C	79.00
Newly graded area	2.40	A	77.00
Composite Area & Weighted CN	4.00		73.70

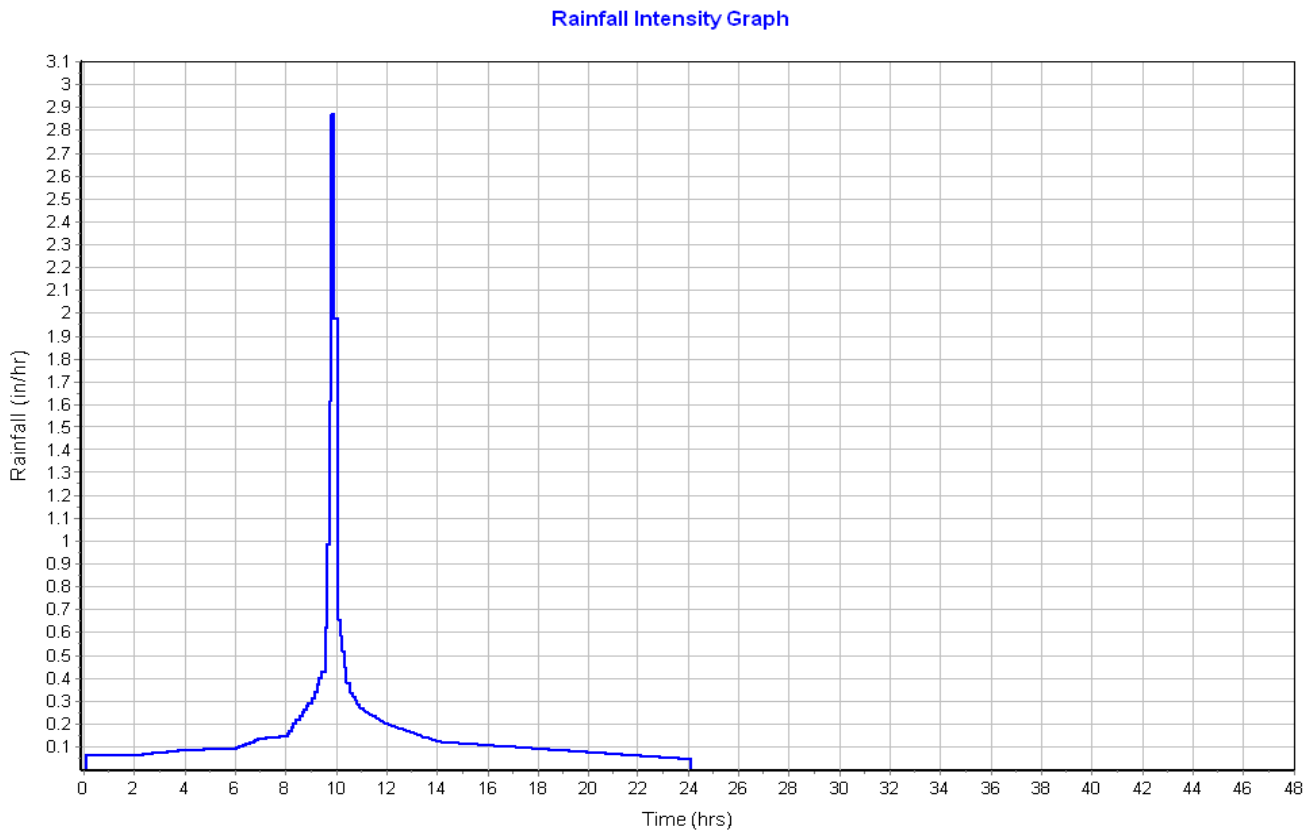
Time of Concentration

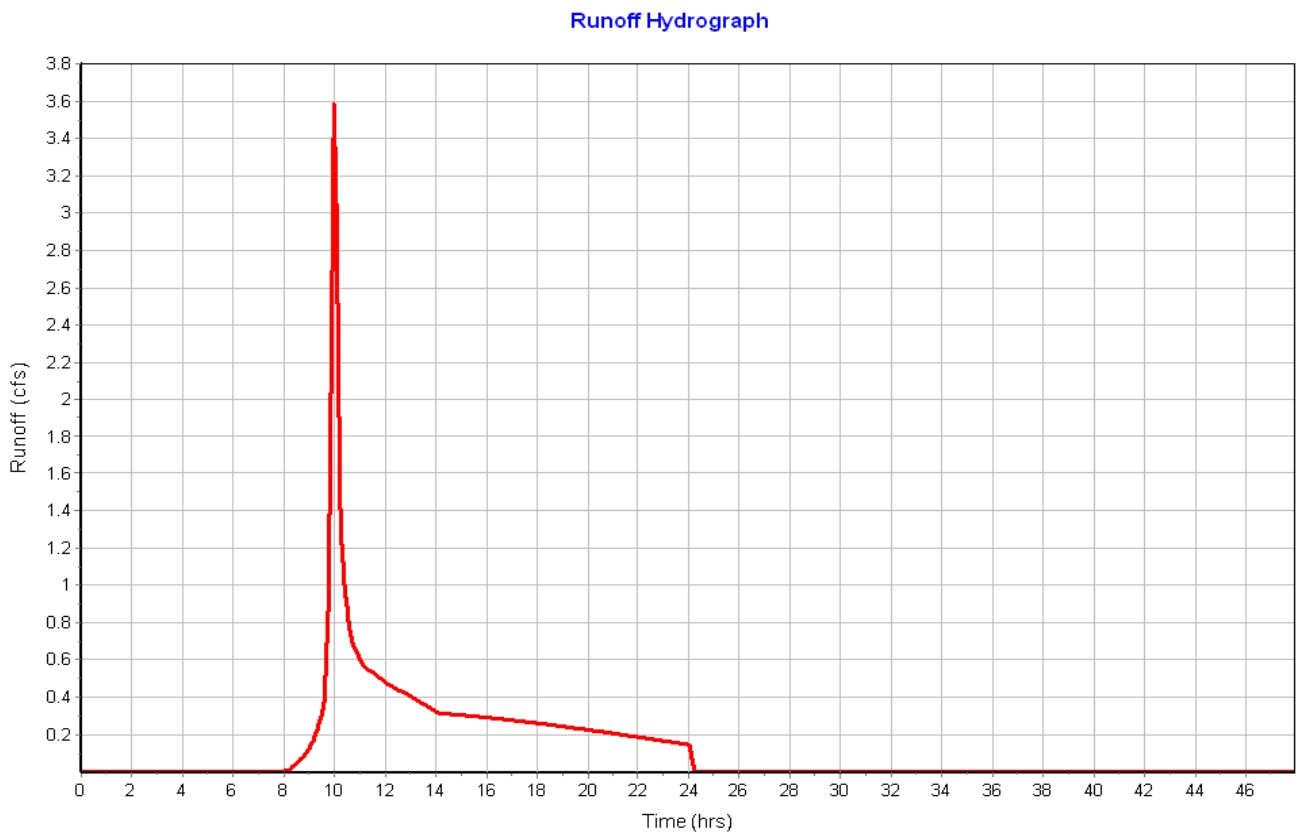
User-Defined TOC override (minutes): 10

Subbasin Runoff Results

Total Rainfall (in) 3.81
Total Runoff (in) 1.44
Peak Runoff (cfs) 3.58
Weighted Curve Number 73.70
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : PROP_Sub-B





Subbasin : PROP_Sub-C2

Input Data

Area (ac) 39.00
Weighted Curve Number 77.00
Rain Gage ID ..... Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Newly graded area	39.00	A	77.00
Composite Area & Weighted CN	39.00		77.00

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.015	0.00	0.00
Flow Length (ft) :	160	0.00	0.00
Slope (%) :	15.6	0.00	0.00
2 yr, 24 hr Rainfall (in) :	1.31	0.00	0.00
Velocity (ft/sec) :	1.72	0.00	0.00
Computed Flow Time (min) :	1.55	0.00	0.00

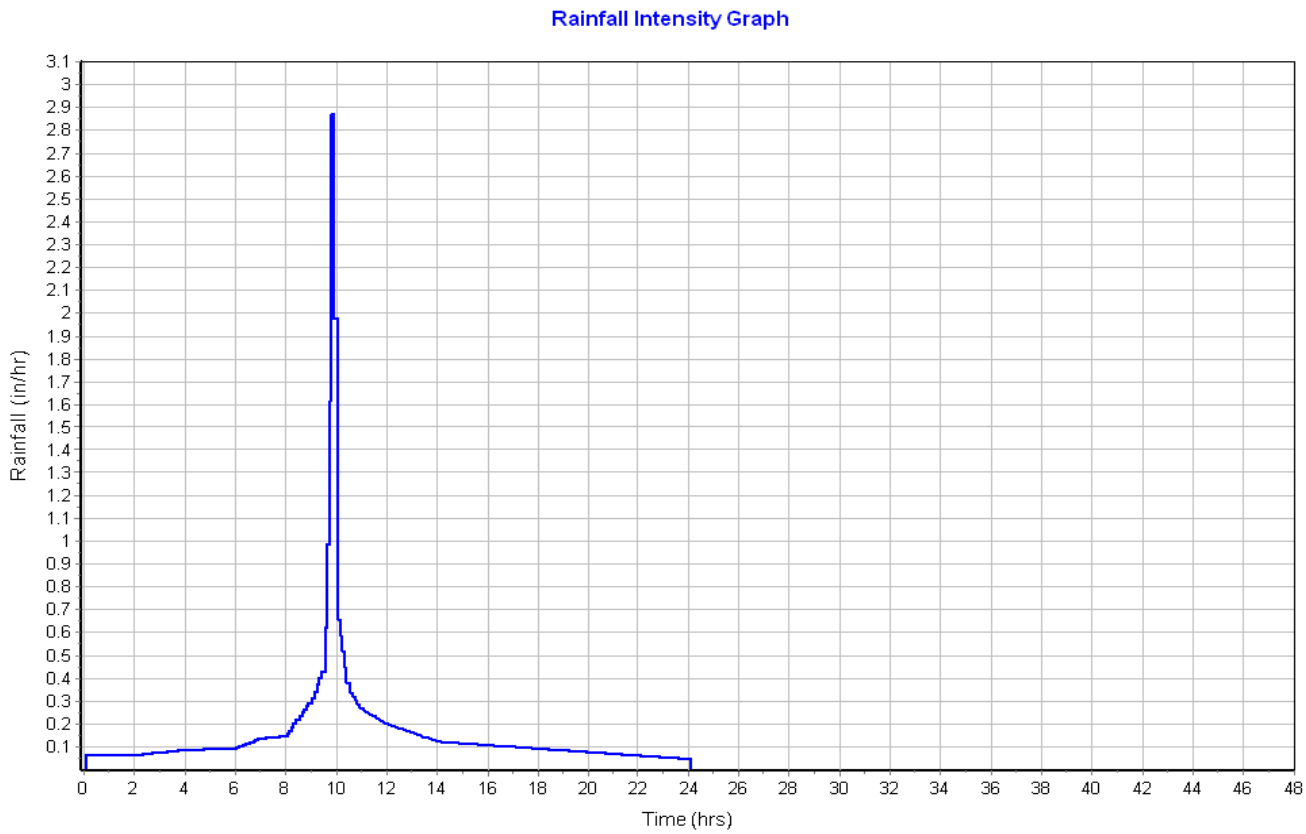
Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	2760	0.00	0.00
Slope (%) :	1.3	0.00	0.00
Surface Type :	Unpaved	Unpaved	Unpaved
Velocity (ft/sec) :	1.84	0.00	0.00
Computed Flow Time (min) :	25.00	0.00	0.00

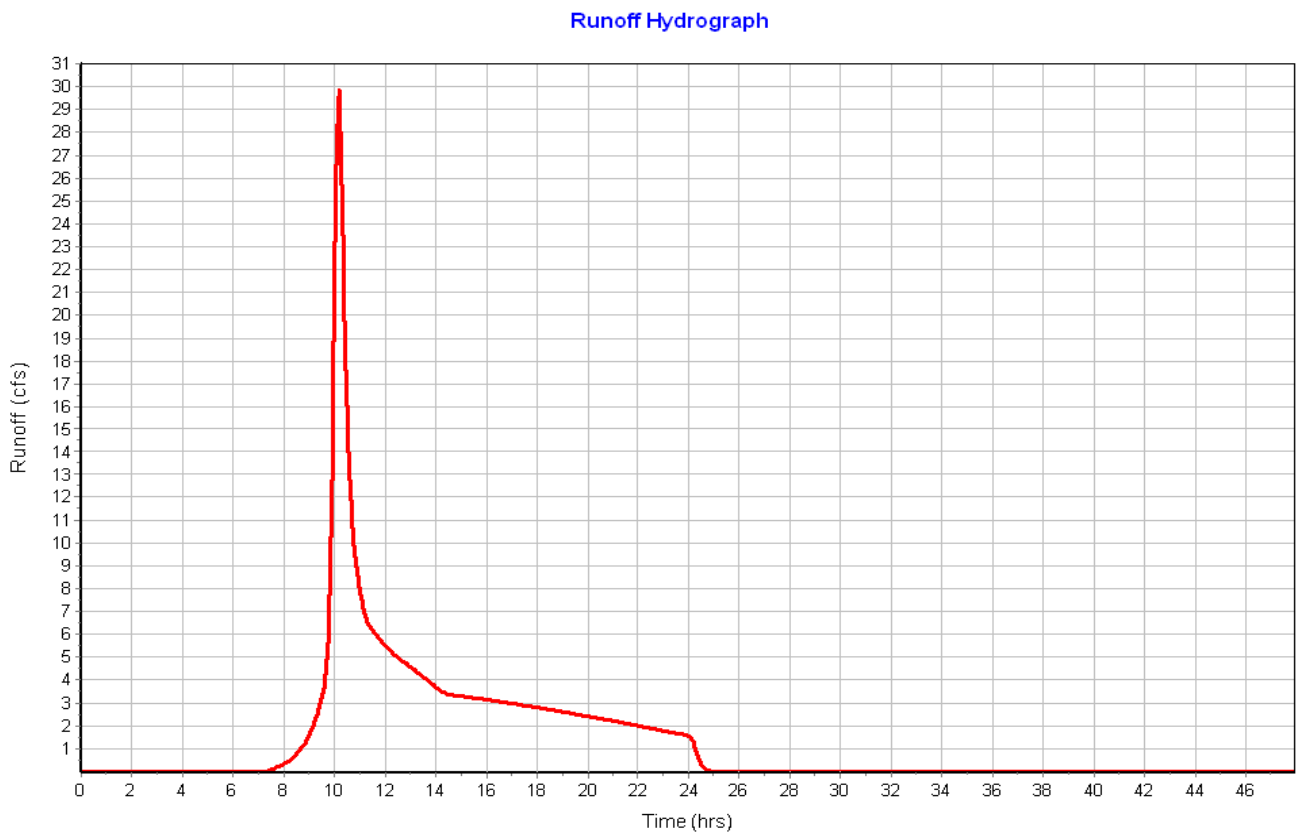
Total TOC (min) 26.55

Subbasin Runoff Results

Total Rainfall (in) 3.81
Total Runoff (in) 1.67
Peak Runoff (cfs) 29.88
Weighted Curve Number 77.00
Time of Concentration (days hh:mm:ss) 0 00:26:33

Subbasin : PROP_Sub-C2





Subbasin : PROP-Sub-C1

Input Data

Area (ac) 3.00
Weighted Curve Number 70.70
Rain Gage ID ..... Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved parking & roofs	0.30	A	98.00
Newly graded area	1.80	A	77.00
Desert shrub range, Good	0.90	A	49.00
Composite Area & Weighted CN	3.00		70.70

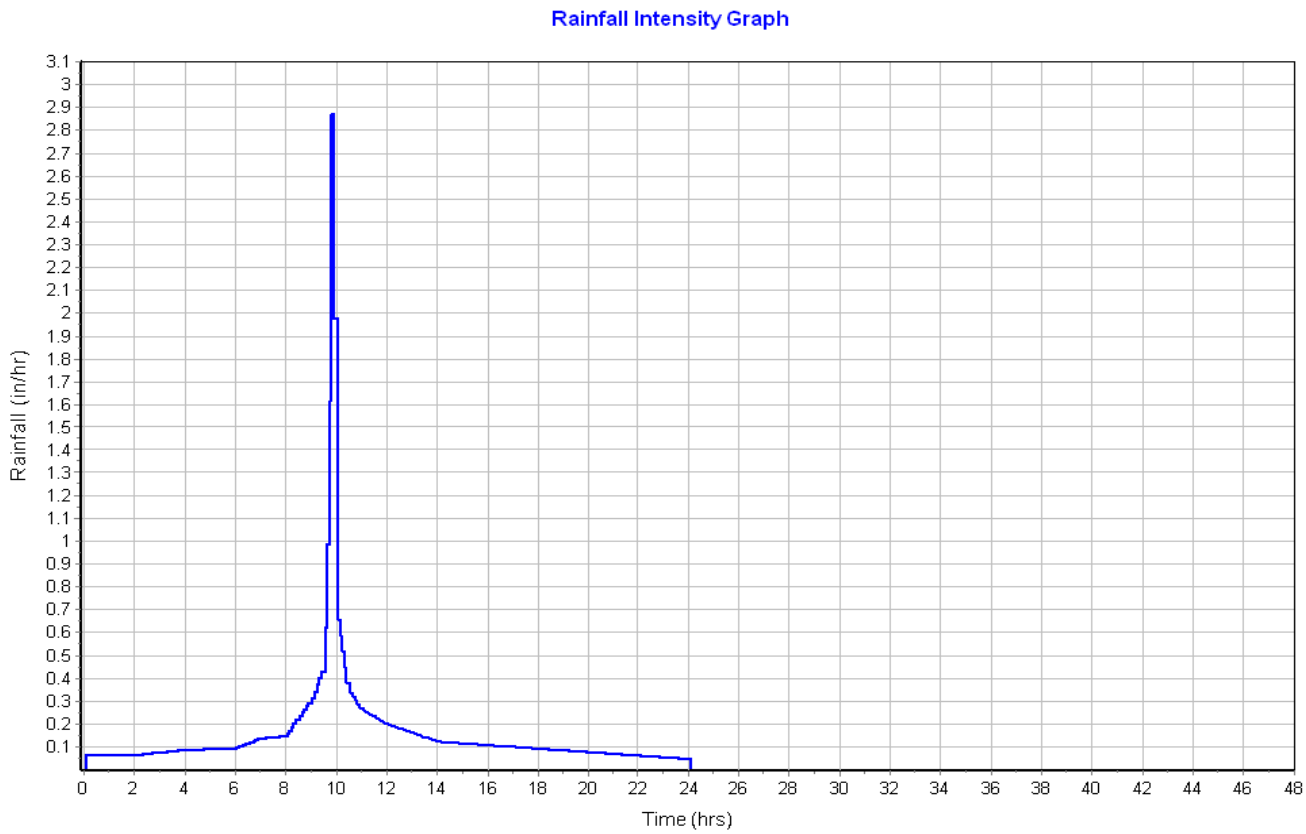
Time of Concentration

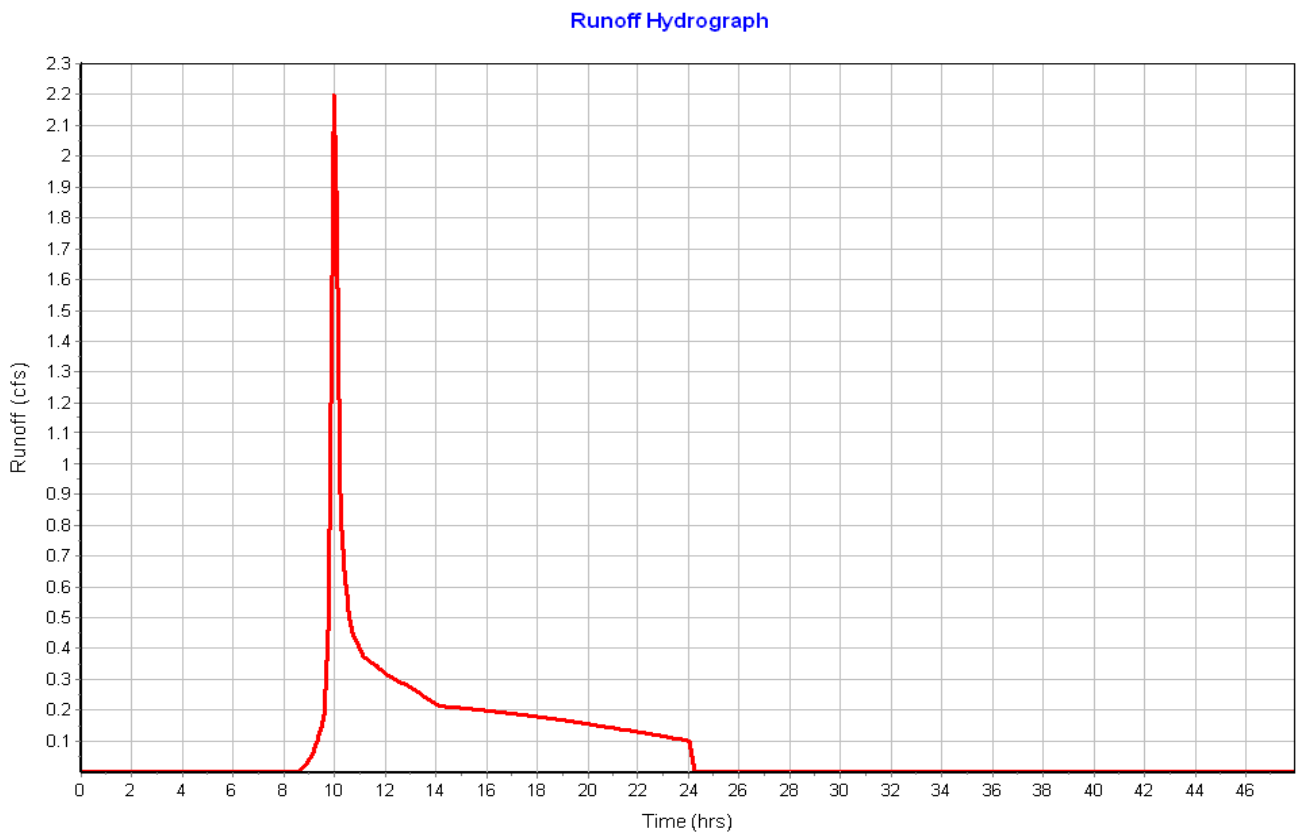
User-Defined TOC override (minutes): 10.00

Subbasin Runoff Results

Total Rainfall (in) 3.81
Total Runoff (in) 1.25
Peak Runoff (cfs) 2.20
Weighted Curve Number 70.70
Time of Concentration (days hh:mm:ss) 0 00:10:00

Subbasin : PROP-Sub-C1





Subbasin : PROP-Sub-C3

Input Data

Area (ac) 97.00
Weighted Curve Number 49.00
Rain Gage ID ..... Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Desert shrub range, Good	97.00	A	49.00
Composite Area & Weighted CN	97.00		49.00

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.015	0.00	0.00
Flow Length (ft) :	250	0.00	0.00
Slope (%) :	7.6	0.00	0.00
2 yr, 24 hr Rainfall (in) :	1.31	0.00	0.00
Velocity (ft/sec) :	1.41	0.00	0.00
Computed Flow Time (min) :	2.96	0.00	0.00

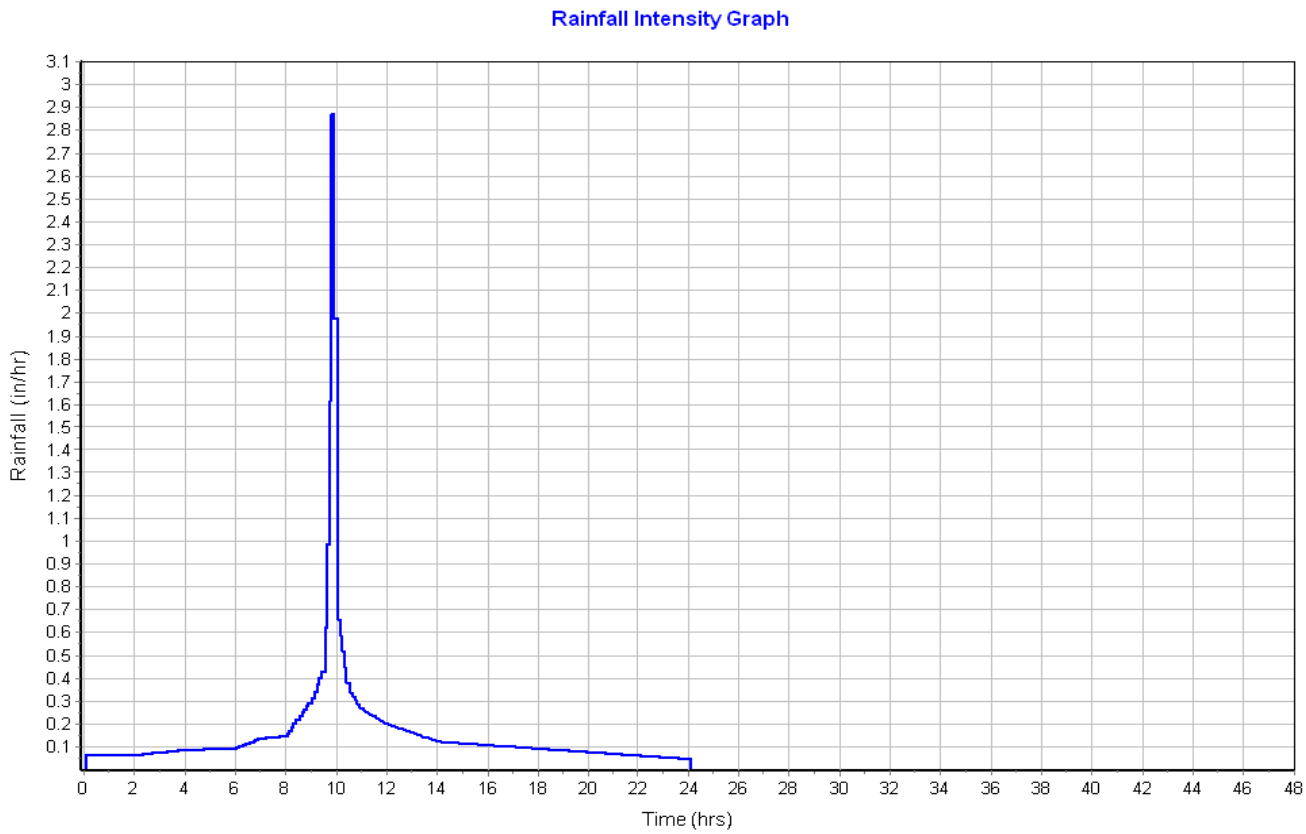
Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	5860	0.00	0.00
Slope (%) :	2.4	0.00	0.00
Surface Type :	Unpaved	Unpaved	Unpaved
Velocity (ft/sec) :	2.50	0.00	0.00
Computed Flow Time (min) :	39.07	0.00	0.00

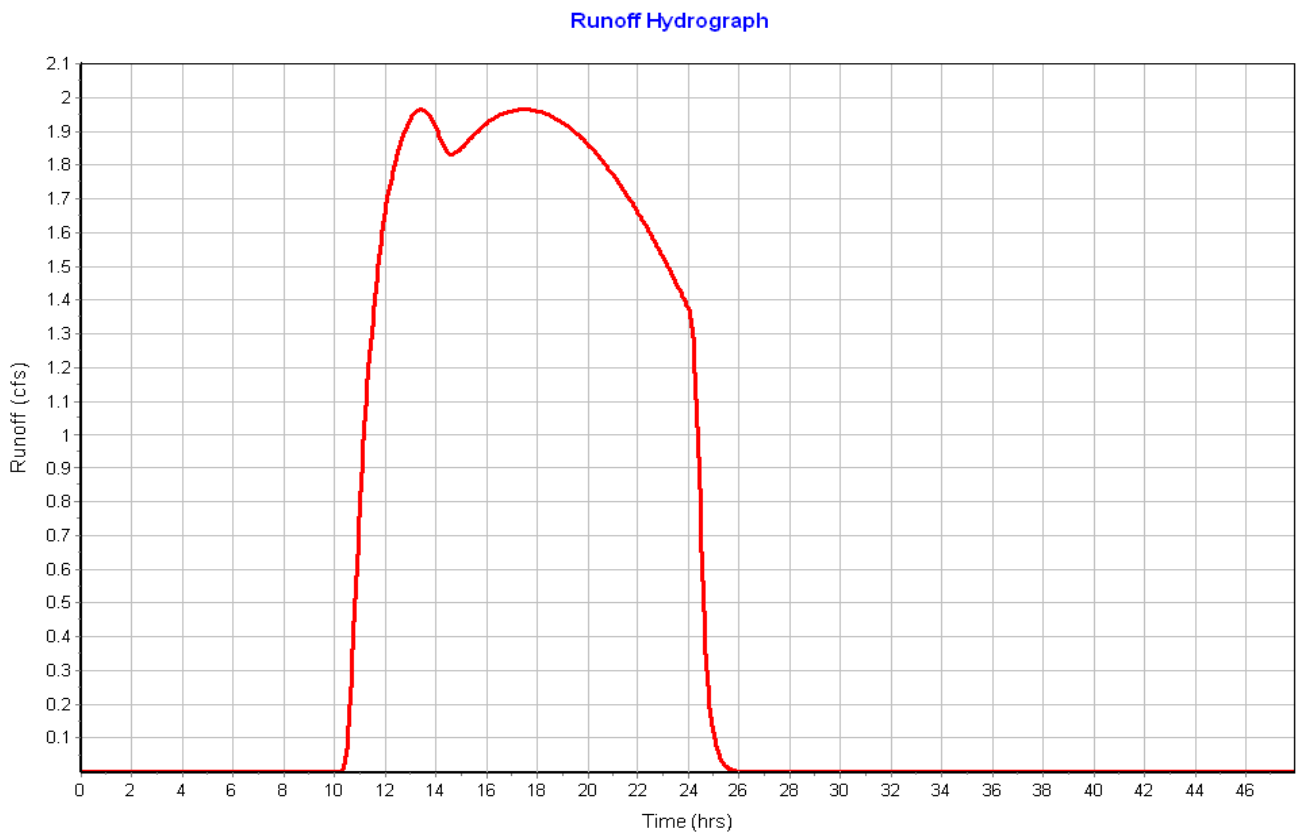
Total TOC (min) 42.03

Subbasin Runoff Results

Total Rainfall (in) 3.81
Total Runoff (in) 0.25
Peak Runoff (cfs) 1.96
Weighted Curve Number 49.00
Time of Concentration (days hh:mm:ss) 0 00:42:02

Subbasin : PROP-Sub-C3





Subbasin : PROP-Sub-F

Input Data

Area (ac) 49.00
Weighted Curve Number 91.70
Rain Gage ID ..... Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved parking & roofs	34.30	A	98.00
Newly graded area	14.70	A	77.00
Composite Area & Weighted CN	49.00		91.70

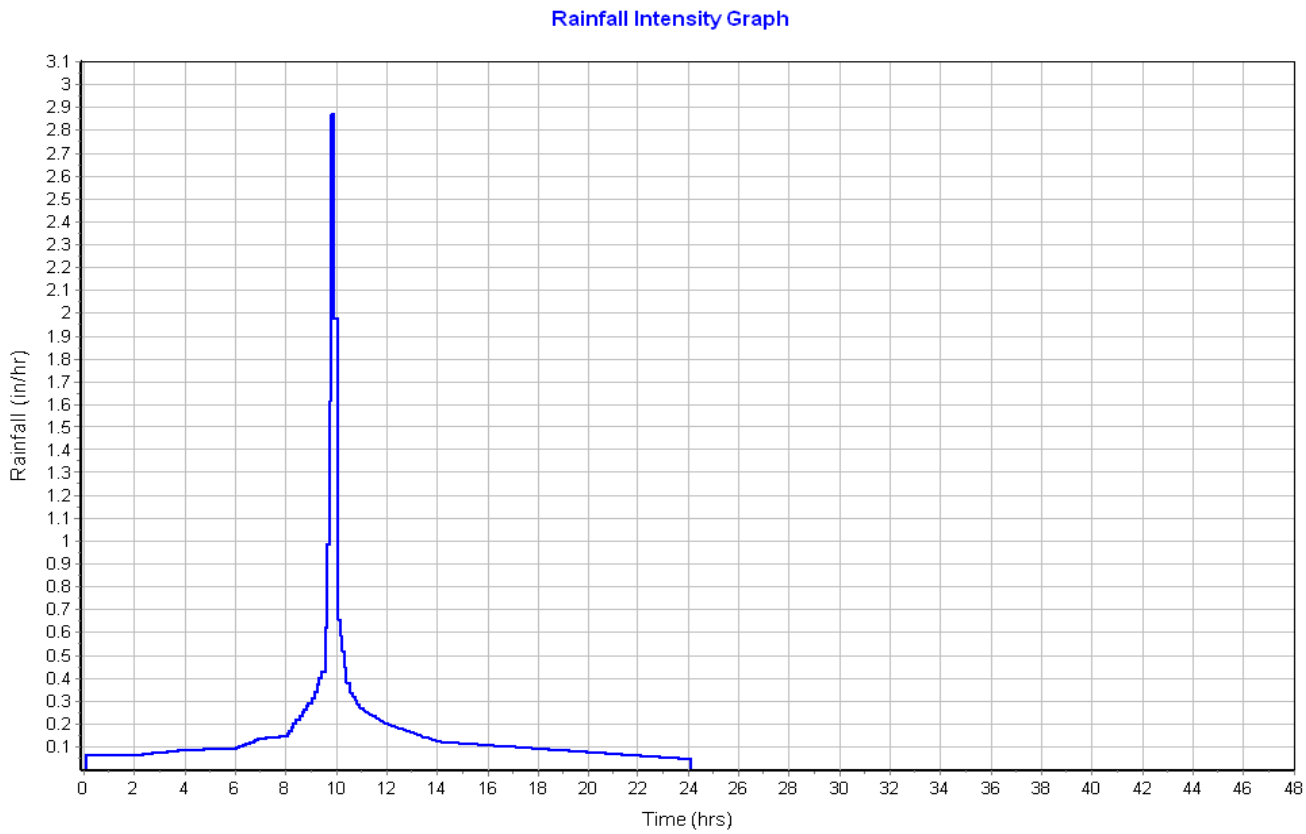
Time of Concentration

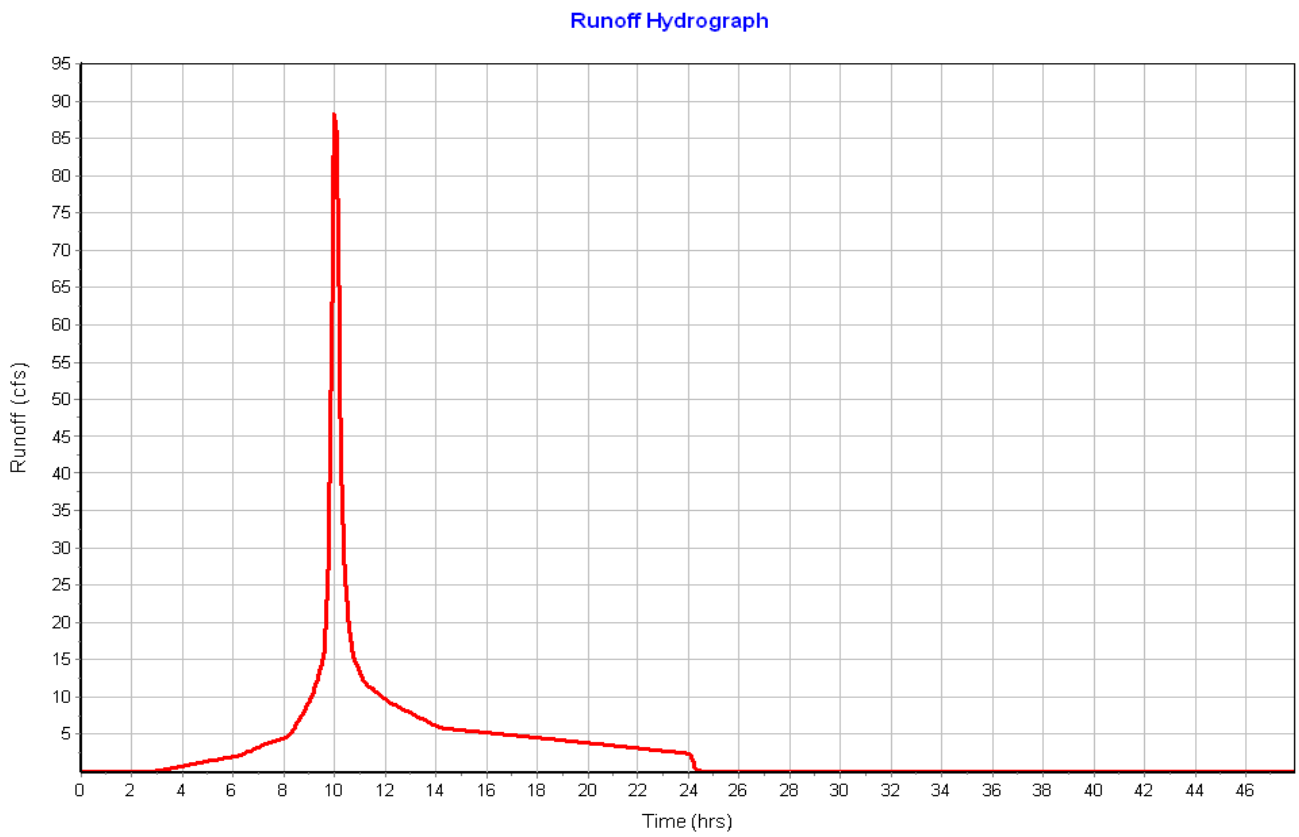
User-Defined TOC override (minutes): 15

Subbasin Runoff Results

Total Rainfall (in) 3.81
Total Runoff (in) 2.91
Peak Runoff (cfs) 90.85
Weighted Curve Number 91.70
Time of Concentration (days hh:mm:ss) 0 00:15:00

Subbasin : PROP-Sub-F





Storage Nodes

Storage Node : Stor-A

Input Data

Invert Elevation (ft) 2537.00
Max (Rim) Elevation (ft) 2543.00
Max (Rim) Offset (ft) 6.00
Initial Water Elevation (ft) 0.00
Initial Water Depth (ft) ..... -2537.00
Ponded Area (ft²) 0.00
Evaporation Loss 0.00

Storage Area Volume Curves

Storage Curve : Storage-A

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	30000	0.000
1	30000	30000.00
2	30000	60000.00
3	30000	90000.00
4	30000	120000.00
5	30000	150000.00
6	30000	180000.00

Storage Node : Stor-A (continued)

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	Weir-A	Trapezoidal	No	2542.00	5.00	50.00	1.00	3.33

Output Summary Results

Peak Inflow (cfs)	98.14
Peak Lateral Inflow (cfs)	98.14
Peak Outflow (cfs)	81.16
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	2542.62
Max HGL Depth Attained (ft)	5.62
Average HGL Elevation Attained (ft)	2541.04
Average HGL Depth Attained (ft)	4.04
Time of Max HGL Occurrence (days hh:mm)	0 10:24
Total Exfiltration Volume (1000-ft³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Storage Node : Stor-C

Input Data

Invert Elevation (ft)	2550.00
Max (Rim) Elevation (ft)	2556.00
Max (Rim) Offset (ft)	6.00
Initial Water Elevation (ft)	0.00
Initial Water Depth (ft)	-2550.00
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : Storage-C

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	70000	0.000
1	70000	70000.00
2	70000	140000.00
3	70000	210000.00
4	70000	280000.00
5	70000	350000.00
6	70000	420000.00

Storage Node : Stor-C (continued)

Outflow Weirs

SN	Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1	Weir-C	Trapezoidal	No	2555.00	5.00	20.00	1.00	3.33

Output Summary Results

Peak Inflow (cfs)	29.83
Peak Lateral Inflow (cfs)	29.83
Peak Outflow (cfs)	0.00
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	2554.61
Max HGL Depth Attained (ft)	4.61
Average HGL Elevation Attained (ft)	2553.16
Average HGL Depth Attained (ft)	3.16
Time of Max HGL Occurrence (days hh:mm)	1 02:05
Total Exfiltration Volume (1000-ft³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Wednesday, May 22 2024

North Ditch (Proposed Sub-Basin 0.5 A-1 + A-2 Runoff): 6' Ditch @ 2% Slope

Trapezoidal

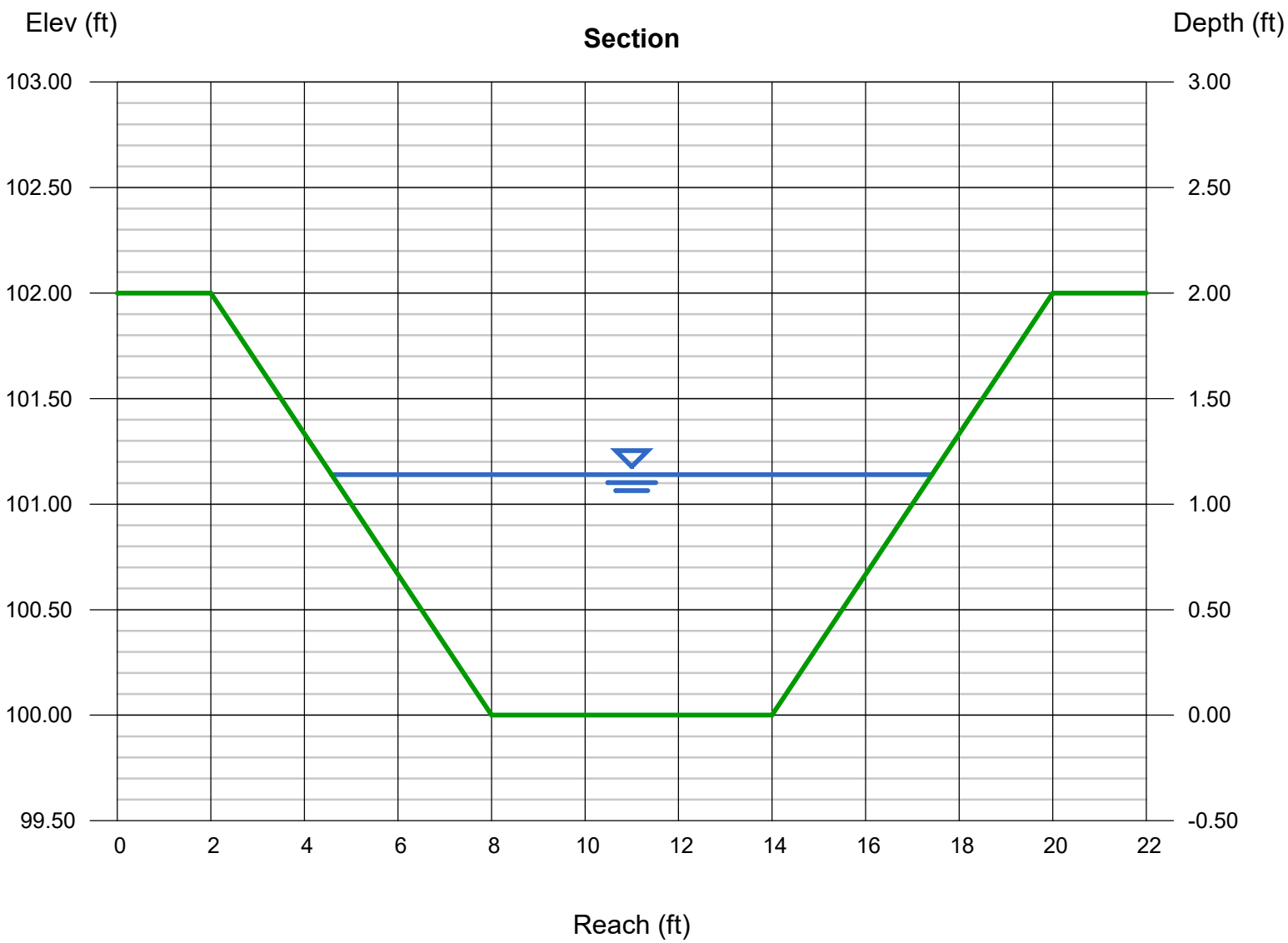
Bottom Width (ft)	=	6.00
Side Slopes (z:1)	=	3.00, 3.00
Total Depth (ft)	=	2.00
Invert Elev (ft)	=	100.00
Slope (%)	=	2.00
N-Value	=	0.025

Calculations

Compute by:		Known Q
Known Q (cfs)	=	78.00

Highlighted

Depth (ft)	=	1.14
Q (cfs)	=	78.00
Area (sqft)	=	10.74
Velocity (ft/s)	=	7.26
Wetted Perim (ft)	=	13.21
Crit Depth, Yc (ft)	=	1.38
Top Width (ft)	=	12.84
EGL (ft)	=	1.96



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Wednesday, May 22 2024

West Ditch (Proposed Sub-Basin C-2 + C-3 Runoff): 6' Ditch @ 1% Slope

Trapezoidal

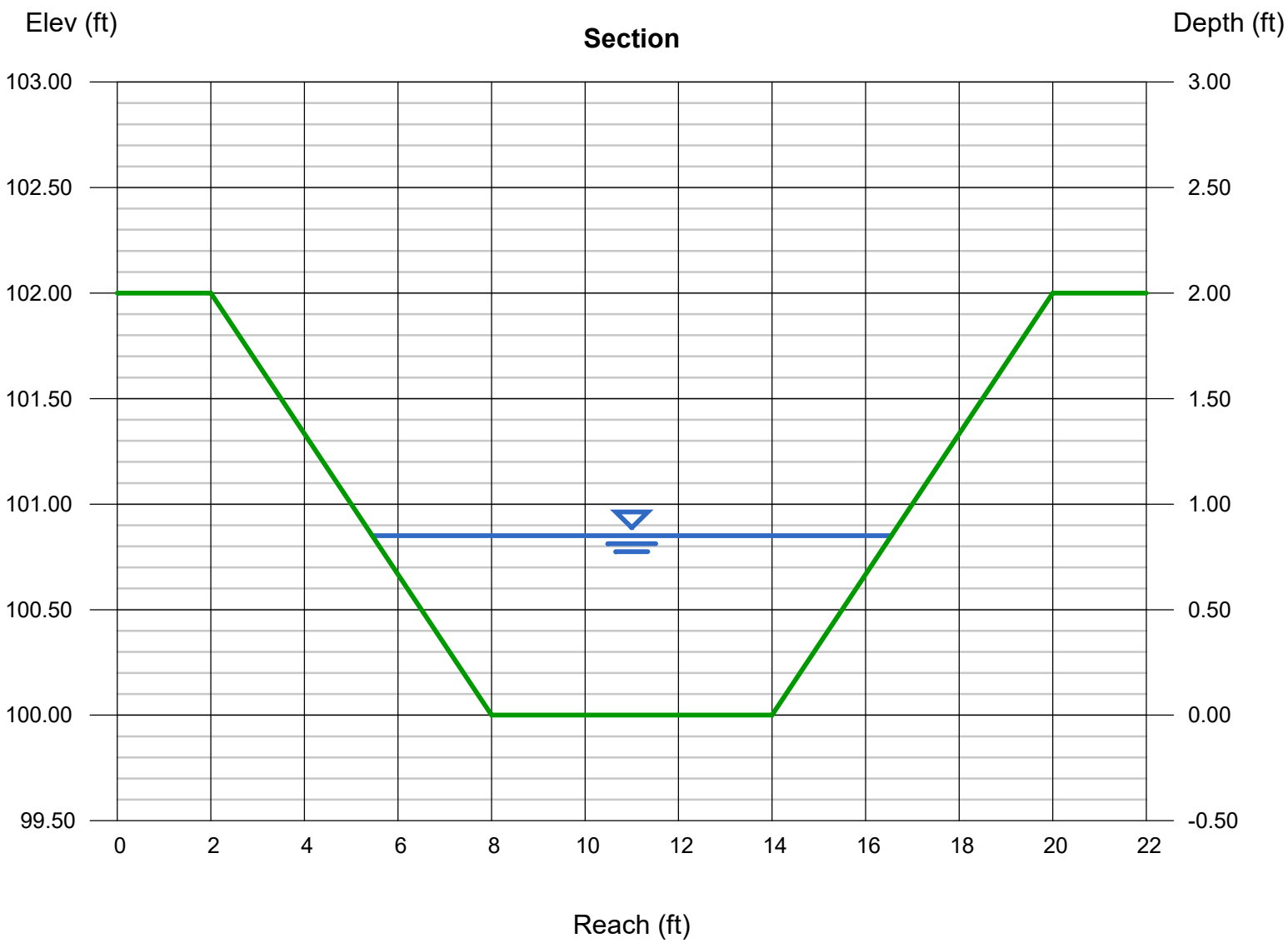
Bottom Width (ft)	=	6.00
Side Slopes (z:1)	=	3.00, 3.00
Total Depth (ft)	=	2.00
Invert Elev (ft)	=	100.00
Slope (%)	=	1.00
N-Value	=	0.025

Calculations

Compute by:		Known Q
Known Q (cfs)	=	32.00

Highlighted

Depth (ft)	=	0.85
Q (cfs)	=	32.00
Area (sqft)	=	7.27
Velocity (ft/s)	=	4.40
Wetted Perim (ft)	=	11.38
Crit Depth, Yc (ft)	=	0.83
Top Width (ft)	=	11.10
EGL (ft)	=	1.15



ALTERNATE FORMAT REPORT

Hydrostor Willow Rock

```
Autodesk® Storm and Sanitary Analysis 2016 - Version 12.0.42 (Build 0)
----------------------------------------------------------------------------------------

*******************
Project Description
*******************
File Name ................. Hydrostor SSA Model.SPF
Description ............... Hydrostor Willow Rock


****************
Analysis Options
****************
Flow Units ................ cfs
Subbasin Hydrograph Method. SCS TR-55
Time of Concentration...... SCS TR-55
Link Routing Method ....... Hydrodynamic
Storage Node Exfiltration.. None
Starting Date ............. MAY-15-2024 00:00:00
Ending Date ............... MAY-17-2024 00:00:00
Report Time Step .......... 00:05:00


*************
Element Count
*************
Number of rain gages ...... 1
Number of subbasins ....... 12
Number of nodes ........... 11
Number of links ........... 2


****************
Raingage Summary
****************
Gage                Data                Data       Recording
ID                  Source              Type        Interval
                                                          min
-------------------------------------------------------------
Rain Gage-01        TS 100-yr           CUMULATIVE      6.00


****************
Subbasin Summary
****************
Subbasin                 Total
                          Area
ID                       acres
------------------------------
EX_Sub-A                 87.00
EX_Sub-B                 61.00
EX_Sub-C                116.00
EX_Sub-D                 49.00
EX_Sub-E                 10.00
PROP_Sub-A1              44.00
PROP_Sub-A2              63.00
PROP_Sub-B                4.00
PROP_Sub-C2              39.00
PROP-Sub-C1               3.00
PROP-Sub-C3              97.00
PROP-Sub-F               49.00


************
Node Summary
************
```

Node ID	Element Type	Invert Elevation ft	Maximum Elev. ft	Ponded Area ft²	External Inflow
EX_Out-A	OUTFALL	2540.00	2540.00	0.00	
EX_Out-B	OUTFALL	2527.00	2527.00	0.00	
EX_Out-C	OUTFALL	2525.00	2525.00	0.00	
EX_Out-D	OUTFALL	2529.00	2529.00	0.00	
EX_Out-E	OUTFALL	2556.00	2556.00	0.00	
PROP_Out-A	OUTFALL	2540.00	2546.00	0.00	
PROP_Out-B	OUTFALL	2527.00	2527.00	0.00	
PROP_Out-C	OUTFALL	2525.00	2531.00	0.00	
PROP-Out-F	OUTFALL	2530.00	2530.00	0.00	
Stor-A	STORAGE	2537.00	2543.00	0.00	
Stor-C	STORAGE	2550.00	2556.00	0.00	

****
Link Summary
****

Link ID	From Node	To Node	Element Type	Length ft	Slope %	Manning's Roughness
Weir-A	Stor-A	PROP_Out-A	WEIR			
Weir-C	Stor-C	PROP_Out-C	WEIR			

********** Runoff Quantity Continuity **********	Volume acre-ft	Depth inches
Total Precipitation	198.583	3.831
Surface Runoff	2.013	0.039
Continuity Error (%)	-0.000	

********** Flow Routing Continuity **********	Volume acre-ft	Volume Mgallons
External Inflow	0.000	0.000
External Outflow	49.551	16.147
Initial Stored Volume	0.000	0.000
Final Stored Volume	10.844	3.534
Continuity Error (%)	0.000	

****
Composite Curve Number Computations Report
****

Subbasin EX_Sub-A

Soil/Surface Description	Area (acres)	Soil Group	CN
Desert shrub range, Good	76.56	D	84.00
Desert shrub range, Good	10.44	C	79.00
Composite Area & Weighted CN	87.00		83.40

Subbasin EX_Sub-B

Soil/Surface Description	Area (acres)	Soil Group	CN
Desert shrub range, Good	39.65	A	49.00
Desert shrub range, Good	12.20	C	79.00

Desert shrub range, Good	9.15	D	84.00
Composite Area & Weighted CN	61.00		60.25

Subbasin EX_Sub-C

Soil/Surface Description	Area (acres)	Soil Group	CN
Desert shrub range, Good	116.00	A	49.00
Composite Area & Weighted CN	116.00		49.00

Subbasin EX_Sub-D

Soil/Surface Description	Area (acres)	Soil Group	CN
Desert shrub range, Good	49.00	A	49.00
Composite Area & Weighted CN	49.00		49.00

Subbasin EX_Sub-E

Soil/Surface Description	Area (acres)	Soil Group	CN
Desert shrub range, Good	10.00	A	49.00
Composite Area & Weighted CN	10.00		49.00

Subbasin PROP_Sub-A1

Soil/Surface Description	Area (acres)	Soil Group	CN
Paved parking & roofs	11.00	A	98.00
Newly graded area	33.00	A	77.00
Composite Area & Weighted CN	44.00		82.25

Subbasin PROP_Sub-A2

Soil/Surface Description	Area (acres)	Soil Group	CN
Desert shrub range, Good	6.30	A	49.00
Desert shrub range, Good	56.70	D	84.00
Composite Area & Weighted CN	63.00		80.50

Subbasin PROP_Sub-B

Soil/Surface Description	Area (acres)	Soil Group	CN
Paved parking & roofs	0.40	A	98.00
Desert shrub range, Good	0.80	A	49.00
Desert shrub range, Good	0.40	C	79.00
Newly graded area	2.40	A	77.00
Composite Area & Weighted CN	4.00		73.70

Subbasin PROP_Sub-C2

Soil/Surface Description	Area (acres)	Soil Group	CN

Newly graded area	39.00	A	77.00
Composite Area & Weighted CN	39.00		77.00

Subbasin PROP-Sub-C1

Soil/Surface Description	Area (acres)	Soil Group	CN
Paved parking & roofs	0.30	A	98.00
Newly graded area	1.80	A	77.00
Desert shrub range, Good	0.90	A	49.00
Composite Area & Weighted CN	3.00		70.70

Subbasin PROP-Sub-C3

Soil/Surface Description	Area (acres)	Soil Group	CN
Desert shrub range, Good	97.00	A	49.00
Composite Area & Weighted CN	97.00		49.00

Subbasin PROP-Sub-F

Soil/Surface Description	Area (acres)	Soil Group	CN
Paved parking & roofs	34.30	A	98.00
Newly graded area	14.70	A	77.00
Composite Area & Weighted CN	49.00		91.70

****
SCS TR-55 Time of Concentration Computations Report
****

Sheet Flow Equation

```
Tc = (0.007 * ((n * Lf)^0.8)) / ((P^0.5) * (Sf^0.4))

Where:

Tc = Time of Concentration (hrs)
n  = Manning's Roughness
Lf = Flow Length (ft)
P  = 2 yr, 24 hr Rainfall (inches)
Sf = Slope (ft/ft)
```

Shallow Concentrated Flow Equation

```
V  = 16.1345 * (Sf^0.5) (unpaved surface)
V  = 20.3282 * (Sf^0.5) (paved surface)
V  = 15.0 * (Sf^0.5) (grassed waterway surface)
V  = 10.0 * (Sf^0.5) (nearly bare & untilled surface)
V  = 9.0 * (Sf^0.5) (cultivated straight rows surface)
V  = 7.0 * (Sf^0.5) (short grass pasture surface)
V  = 5.0 * (Sf^0.5) (woodland surface)
V  = 2.5 * (Sf^0.5) (forest w/heavy litter surface)
Tc = (Lf / V) / (3600 sec/hr)

Where:
```

```
          Tc = Time of Concentration (hrs)
          Lf = Flow Length (ft)
          V  = Velocity (ft/sec)
          Sf = Slope (ft/ft)

  Channel Flow Equation
  ---------------------

          V  = (1.49 * (R^(2/3)) * (Sf^0.5)) / n
          R  = Aq / Wp
          Tc = (Lf / V) / (3600 sec/hr)

          Where:

          Tc = Time of Concentration (hrs)
          Lf = Flow Length (ft)
          R  = Hydraulic Radius (ft)
          Aq = Flow Area (ft²)
          Wp = Wetted Perimeter (ft)
          V  = Velocity (ft/sec)
          Sf = Slope (ft/ft)
          n  = Manning's Roughness

  --------------------
  Subbasin EX_Sub-A
  --------------------

  Sheet Flow Computations
  -----------------------
                                                Subarea A           Subarea B           Subarea
C
          Manning's Roughness:                       0.01                0.00
0.00
          Flow Length (ft):                        100.00                0.00
0.00
          Slope (%):                                 5.00                0.00
0.00
          2 yr, 24 hr Rainfall (in):                 1.31                0.00
0.00
          Velocity (ft/sec):                         0.99                0.00
0.00
          Computed Flow Time (minutes):              1.68                0.00
0.00

  Shallow Concentrated Flow Computations
  --------------------------------------
                                                Subarea A           Subarea B           Subarea
C
          Flow Length (ft):                       3760.00                0.00
0.00
          Slope (%):                                 2.40                0.00
0.00
          Surface Type:                            Unpaved             Unpaved
Unpaved
          Velocity (ft/sec):                         2.50                0.00
0.00
          Computed Flow Time (minutes):             25.07                0.00
0.00

==============================================================================================
          Total TOC (minutes):                      26.75

==============================================================================================


  --------------------
  Subbasin EX_Sub-B
```

```
  --------------------

  Sheet Flow Computations
  -----------------------
                                                Subarea A           Subarea B           Subarea
C
          Manning's Roughness:                       0.01                0.00
0.00
          Flow Length (ft):                        100.00                0.00
0.00
          Slope (%):                                 5.00                0.00
0.00
          2 yr, 24 hr Rainfall (in):                 1.31                0.00
0.00
          Velocity (ft/sec):                         0.99                0.00
0.00
          Computed Flow Time (minutes):              1.68                0.00
0.00

  Shallow Concentrated Flow Computations
  --------------------------------------
                                                Subarea A           Subarea B           Subarea
C
          Flow Length (ft):                       4860.00                0.00
0.00
          Slope (%):                                 2.10                0.00
0.00
          Surface Type:                            Unpaved             Unpaved
Unpaved
          Velocity (ft/sec):                         2.34                0.00
0.00
          Computed Flow Time (minutes):             34.62                0.00
0.00

==============================================================================================
          Total TOC (minutes):                      36.30

==============================================================================================


  --------------------
  Subbasin EX_Sub-C
  --------------------

  Sheet Flow Computations
  -----------------------
                                                Subarea A           Subarea B           Subarea
C
          Manning's Roughness:                       0.01                0.00
0.00
          Flow Length (ft):                        250.00                0.00
0.00
          Slope (%):                                 7.60                0.00
0.00
          2 yr, 24 hr Rainfall (in):                 1.31                0.00
0.00
          Velocity (ft/sec):                         1.41                0.00
0.00
          Computed Flow Time (minutes):              2.96                0.00
0.00

  Shallow Concentrated Flow Computations
  --------------------------------------
                                                Subarea A           Subarea B           Subarea
C
          Flow Length (ft):                       6565.00                0.00
0.00
```

```
          Slope (%):                                  2.70                0.00
0.00
          Surface Type:                             Unpaved             Unpaved
Unpaved
          Velocity (ft/sec):                          2.65                0.00
0.00
          Computed Flow Time (minutes):              41.29                0.00
0.00

==============================================================================================
          Total TOC (minutes):                       44.25

==============================================================================================


  --------------------
  Subbasin EX_Sub-D
  --------------------

  Sheet Flow Computations
  -----------------------
                                                 Subarea A           Subarea B           Subarea
C
          Manning's Roughness:                        0.01                0.00
0.00
          Flow Length (ft):                         300.00                0.00
0.00
          Slope (%):                                  3.30                0.00
0.00
          2 yr, 24 hr Rainfall (in):                  1.31                0.00
0.00
          Velocity (ft/sec):                          1.05                0.00
0.00
          Computed Flow Time (minutes):               4.78                0.00
0.00

  Shallow Concentrated Flow Computations
  --------------------------------------
                                                 Subarea A           Subarea B           Subarea
C
          Flow Length (ft):                        3290.00                0.00
0.00
          Slope (%):                                  2.70                0.00
0.00
          Surface Type:                             Unpaved             Unpaved
Unpaved
          Velocity (ft/sec):                          2.65                0.00
0.00
          Computed Flow Time (minutes):              20.69                0.00
0.00

==============================================================================================
          Total TOC (minutes):                       25.48

==============================================================================================


  --------------------
  Subbasin EX_Sub-E
  --------------------

  Sheet Flow Computations
  -----------------------
                                                 Subarea A           Subarea B           Subarea
C
          Manning's Roughness:                        0.01                0.00
0.00
```

```
          Flow Length (ft):                          250.00                0.00
0.00
          Slope (%):                                   3.20                0.00
0.00
          2 yr, 24 hr Rainfall (in):                   1.31                0.00
0.00
          Velocity (ft/sec):                           1.00                0.00
0.00
          Computed Flow Time (minutes):                4.19                0.00
0.00

  Shallow Concentrated Flow Computations
  --------------------------------------
                                                Subarea A           Subarea B           Subarea
C
          Flow Length (ft):                         1350.00                0.00
0.00
          Slope (%):                                   2.40                0.00
0.00
          Surface Type:                             Unpaved             Unpaved
Unpaved
          Velocity (ft/sec):                           2.50                0.00
0.00
          Computed Flow Time (minutes):                9.00                0.00
0.00

==========================================================================================
          Total TOC (minutes):                        13.19

==========================================================================================


  ------------------------
  Subbasin PROP_Sub-A1
  ------------------------

  Sheet Flow Computations
  -----------------------
                                                Subarea A           Subarea B           Subarea
C
          Manning's Roughness:                         0.01                0.00
0.00
          Flow Length (ft):                          470.00                0.00
0.00
          Slope (%):                                   2.10                0.00
0.00
          2 yr, 24 hr Rainfall (in):                   1.31                0.00
0.00
          Velocity (ft/sec):                           0.95                0.00
0.00
          Computed Flow Time (minutes):                8.21                0.00
0.00

  Shallow Concentrated Flow Computations
  --------------------------------------
                                                Subarea A           Subarea B           Subarea
C
          Flow Length (ft):                         2730.00                0.00
0.00
          Slope (%):                                   2.50                0.00
0.00
          Surface Type:                             Unpaved             Unpaved
Unpaved
          Velocity (ft/sec):                           2.55                0.00
0.00
          Computed Flow Time (minutes):               17.84                0.00
0.00
```

```
==========================================================================================
          Total TOC (minutes):                        26.05
==========================================================================================


  ------------------------
  Subbasin PROP_Sub-A2
  ------------------------

  Sheet Flow Computations
  ------------------------
                                                Subarea A           Subarea B           Subarea
C
          Manning's Roughness:                       0.01                0.00
0.00
          Flow Length (ft):                        100.00                0.00
0.00
          Slope (%):                                 5.00                0.00
0.00
          2 yr, 24 hr Rainfall (in):                 1.31                0.00
0.00
          Velocity (ft/sec):                         0.99                0.00
0.00
          Computed Flow Time (minutes):              1.68                0.00
0.00

  Shallow Concentrated Flow Computations
  --------------------------------------
                                                Subarea A           Subarea B           Subarea
C
          Flow Length (ft):                       4130.00                0.00
0.00
          Slope (%):                                 2.20                0.00
0.00
          Surface Type:                            Unpaved             Unpaved
Unpaved
          Velocity (ft/sec):                         2.39                0.00
0.00
          Computed Flow Time (minutes):             28.80                0.00
0.00

==========================================================================================
          Total TOC (minutes):                        30.48
==========================================================================================


  -----------------------
  Subbasin PROP_Sub-B
  -----------------------

          User-Defined TOC override (minutes):     10.00

  ------------------------
  Subbasin PROP_Sub-C2
  ------------------------

  Sheet Flow Computations
  ------------------------
                                                Subarea A           Subarea B           Subarea
C
          Manning's Roughness:                       0.01                0.00
0.00
          Flow Length (ft):                        160.00                0.00
0.00
```

```
          Slope (%):                                15.60                0.00
0.00
          2 yr, 24 hr Rainfall (in):                 1.31                0.00
0.00
          Velocity (ft/sec):                         1.72                0.00
0.00
          Computed Flow Time (minutes):              1.55                0.00
0.00

  Shallow Concentrated Flow Computations
  --------------------------------------
                                                Subarea A           Subarea B           Subarea
C
          Flow Length (ft):                       2760.00                0.00
0.00
          Slope (%):                                 1.30                0.00
0.00
          Surface Type:                            Unpaved             Unpaved
Unpaved
          Velocity (ft/sec):                         1.84                0.00
0.00
          Computed Flow Time (minutes):             25.00                0.00
0.00

==========================================================================================
          Total TOC (minutes):                      26.55

==========================================================================================


  ------------------------
  Subbasin PROP-Sub-C1
  ------------------------

          User-Defined TOC override (minutes):     10.00

  ------------------------
  Subbasin PROP-Sub-C3
  ------------------------

  Sheet Flow Computations
  ------------------------
                                                Subarea A           Subarea B           Subarea
C
          Manning's Roughness:                       0.01                0.00
0.00
          Flow Length (ft):                        250.00                0.00
0.00
          Slope (%):                                 7.60                0.00
0.00
          2 yr, 24 hr Rainfall (in):                 1.31                0.00
0.00
          Velocity (ft/sec):                         1.41                0.00
0.00
          Computed Flow Time (minutes):              2.96                0.00
0.00

  Shallow Concentrated Flow Computations
  --------------------------------------
                                                Subarea A           Subarea B           Subarea
C
          Flow Length (ft):                       5860.00                0.00
0.00
          Slope (%):                                 2.40                0.00
0.00
          Surface Type:                            Unpaved             Unpaved
Unpaved
```

```
          Velocity (ft/sec):                          2.50                0.00
0.00
          Computed Flow Time (minutes):              39.07                0.00
0.00

==========================================================================================
          Total TOC (minutes):                       42.03

==========================================================================================


  ----------------------
  Subbasin PROP-Sub-F
  ----------------------

          User-Defined TOC override (minutes):     15.00

  ***********************
  Subbasin Runoff Summary
  ***********************
```

Subbasin ID	Total Precip in	Total Runoff in	Peak Runoff cfs	Weighted Curve Number	Time of Concentration days	hh:mm:ss
EX_Sub-A	3.81	2.15	91.94	83.400	0	00:26:45
EX_Sub-B	3.81	0.68	8.56	60.250	0	00:36:18
EX_Sub-C	3.81	0.25	2.35	49.000	0	00:44:15
EX_Sub-D	3.81	0.25	1.00	49.000	0	00:25:28
EX_Sub-E	3.81	0.25	0.20	49.000	0	00:13:11
PROP_Sub-A1	3.81	2.06	44.70	82.250	0	00:26:03
PROP_Sub-A2	3.81	1.92	54.26	80.500	0	00:30:28
PROP_Sub-B	3.81	1.44	3.58	73.700	0	00:10:00
PROP_Sub-C2	3.81	1.67	29.88	77.000	0	00:26:33
PROP-Sub-C1	3.81	1.25	2.20	70.700	0	00:10:00
PROP-Sub-C3	3.81	0.25	1.96	49.000	0	00:42:01
PROP-Sub-F	3.81	2.90	90.85	91.700	0	00:15:00

```
  ******************
  Node Depth Summary
  ******************
```

Node ID	Average Depth Attained ft	Maximum Depth Attained ft	Maximum HGL Attained ft	Time of Max Occurrence days	hh:mm	Total Flooded Volume acre-in	Total Time Flooded minutes	Retention Time hh:mm:ss
EX_Out-A	0.00	0.00	2540.00	0	00:00	0	0	0:00:00
EX_Out-B	0.00	0.00	2527.00	0	00:00	0	0	0:00:00
EX_Out-C	0.00	0.00	2525.00	0	00:00	0	0	0:00:00
EX_Out-D	0.00	0.00	2529.00	0	00:00	0	0	0:00:00
EX_Out-E	0.00	0.00	2556.00	0	00:00	0	0	0:00:00
PROP_Out-A	0.00	0.00	2540.00	0	00:00	0	0	0:00:00
PROP_Out-B	0.00	0.00	2527.00	0	00:00	0	0	0:00:00
PROP_Out-C	0.00	0.00	2525.00	0	00:00	0	0	0:00:00
PROP-Out-F	0.00	0.00	2530.00	0	00:00	0	0	0:00:00
Stor-A	4.04	5.62	2542.62	0	10:24	0	0	0:00:00
Stor-C	3.16	4.61	2554.61	1	02:05	0	0	0:00:00

```
  *****************
  Node Flow Summary
  *****************
```

Node ID	Element Type	Maximum Lateral Inflow cfs	Peak Inflow cfs	Time of Peak Inflow Occurrence days	hh:mm	Maximum Flooding Overflow cfs	Time of Peak Flooding Occurrence days	hh:mm
EX_Out-A	OUTFALL	91.92	91.92	0	10:15	0.00		
EX_Out-B	OUTFALL	8.48	8.48	0	10:30	0.00		
EX_Out-C	OUTFALL	2.35	2.35	0	17:30	0.00		
EX_Out-D	OUTFALL	1.00	1.00	0	13:15	0.00		
EX_Out-E	OUTFALL	0.20	0.20	0	13:01	0.00		
PROP_Out-A	OUTFALL	0.00	81.16	0	10:24	0.00		
PROP_Out-B	OUTFALL	3.58	3.58	0	10:05	0.00		
PROP_Out-C	OUTFALL	2.20	2.20	0	10:05	0.00		
PROP-Out-F	OUTFALL	88.32	88.32	0	10:05	0.00		
Stor-A	STORAGE	98.14	98.14	0	10:15	0.00		
Stor-C	STORAGE	29.83	29.83	0	10:15	0.00		

****
Storage Node Summary
****

Storage Node ID	Maximum Ponded Volume 1000 ft³	Maximum Ponded (%)	Time of Max Ponded days	hh:mm	Average Ponded Volume 1000 ft³	Average Ponded (%)	Maximum Storage Node Outflow cfs	Maximum Exfiltration Rate cfm	Time of Max. Exfiltration Rate hh:mm:ss	Total Exfiltrated Volume 1000 ft³
Stor-A	168.463	94	0	10:24	121.205	67	81.16	0.00	0:00:00	0.000
Stor-C	322.383	77	1	02:05	221.098	53	0.00	0.00	0:00:00	0.000

****
Outfall Loading Summary
****

Outfall Node ID	Flow Frequency (%)	Average Flow cfs	Peak Inflow cfs
EX_Out-A	41.74	9.44	91.92
EX_Out-B	33.38	2.62	8.48
EX_Out-C	32.89	1.82	2.35
EX_Out-D	30.97	0.82	1.00
EX_Out-E	29.60	0.17	0.20
PROP_Out-A	40.77	8.79	81.16
PROP_Out-B	34.25	0.35	3.58
PROP_Out-C	32.90	0.24	2.20
PROP-Out-F	45.78	6.53	88.32
System	35.81	30.78	202.63

****

Link Flow Summary
****

Link ID	Element Type	Time of Peak Flow Occurrence days hh:mm	Maximum Velocity Attained ft/sec	Length Factor	Peak Flow during Analysis cfs	Design Flow Capacity cfs	Ratio of Maximum /Design Flow	Ratio of Maximum Depth	Total Time minutes	Reported Condition
Weir-A	WEIR	0 10:24			81.16			0.62		
Weir-C	WEIR	0 00:00			0.00			0.00		

****
Highest Flow Instability Indexes
****
All links are stable.

Analysis began on: Tue May 21 16:31:44 2024
Analysis ended on: Tue May 21 16:31:46 2024
Total elapsed time: 00:00:02

APPENDIX C

NOAA ATLAS 14
POINT PRECIPITATION FREQUENCY DATA

NOAA Atlas 14, Volume 6, Version 2
Location name: Rosamond, California, USA*
Latitude: 34.9109°, Longitude: -118.1547°
Elevation: 2549 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.067 (0.055-0.082)	0.087 (0.072-0.107)	0.117 (0.096-0.144)	0.144 (0.117-0.178)	0.185 (0.146-0.237)	0.220 (0.170-0.288)	0.261 (0.196-0.349)	0.306 (0.224-0.422)	0.382 (0.268-0.549)	0.505 (0.342-0.751)
10-min	0.096 (0.079-0.117)	0.125 (0.103-0.153)	0.167 (0.137-0.206)	0.206 (0.168-0.255)	0.265 (0.209-0.339)	0.316 (0.244-0.413)	0.373 (0.281-0.501)	0.439 (0.321-0.606)	0.547 (0.384-0.786)	0.723 (0.491-1.08)
15-min	0.116 (0.095-0.142)	0.151 (0.124-0.185)	0.202 (0.166-0.249)	0.249 (0.203-0.309)	0.320 (0.252-0.410)	0.382 (0.295-0.500)	0.452 (0.340-0.606)	0.531 (0.389-0.732)	0.661 (0.465-0.951)	0.875 (0.594-1.30)
30-min	0.156 (0.129-0.191)	0.203 (0.167-0.249)	0.273 (0.224-0.336)	0.336 (0.274-0.417)	0.432 (0.340-0.554)	0.516 (0.398-0.675)	0.609 (0.459-0.817)	0.717 (0.525-0.988)	0.893 (0.627-1.28)	1.18 (0.801-1.76)
60-min	0.220 (0.181-0.270)	0.287 (0.236-0.352)	0.385 (0.316-0.473)	0.473 (0.386-0.587)	0.609 (0.480-0.781)	0.727 (0.561-0.951)	0.859 (0.647-1.15)	1.01 (0.740-1.39)	1.26 (0.884-1.81)	1.66 (1.13-2.48)
2-hr	0.337 (0.278-0.413)	0.430 (0.354-0.527)	0.561 (0.461-0.690)	0.675 (0.550-0.837)	0.842 (0.663-1.08)	0.981 (0.757-1.28)	1.13 (0.852-1.52)	1.30 (0.949-1.79)	1.54 (1.08-2.21)	1.74 (1.18-2.58)
3-hr	0.422 (0.348-0.517)	0.537 (0.442-0.659)	0.697 (0.572-0.857)	0.834 (0.679-1.03)	1.03 (0.812-1.32)	1.19 (0.919-1.56)	1.36 (1.02-1.82)	1.54 (1.13-2.13)	1.80 (1.27-2.60)	2.02 (1.37-3.00)
6-hr	0.573 (0.473-0.702)	0.740 (0.610-0.908)	0.965 (0.793-1.19)	1.15 (0.939-1.43)	1.42 (1.12-1.82)	1.62 (1.25-2.12)	1.84 (1.38-2.46)	2.06 (1.51-2.84)	2.38 (1.67-3.42)	2.62 (1.78-3.90)
12-hr	0.705 (0.581-0.864)	0.975 (0.803-1.20)	1.33 (1.09-1.63)	1.61 (1.32-2.00)	2.00 (1.58-2.57)	2.30 (1.77-3.01)	2.60 (1.96-3.49)	2.91 (2.13-4.01)	3.32 (2.33-4.77)	3.64 (2.47-5.41)
24-hr	0.888 (0.788-1.02)	1.31 (1.16-1.51)	1.86 (1.64-2.15)	2.30 (2.02-2.68)	2.90 (2.46-3.49)	3.35 (2.78-4.12)	3.81 (3.08-4.80)	4.27 (3.36-5.54)	4.89 (3.69-6.62)	5.37 (3.91-7.52)
2-day	1.10 (0.974-1.26)	1.59 (1.41-1.83)	2.24 (1.98-2.59)	2.78 (2.44-3.24)	3.53 (3.00-4.25)	4.12 (3.42-5.06)	4.72 (3.82-5.95)	5.35 (4.21-6.94)	6.22 (4.70-8.41)	6.90 (5.03-9.67)
3-day	1.24 (1.10-1.43)	1.77 (1.57-2.04)	2.49 (2.20-2.87)	3.09 (2.71-3.60)	3.93 (3.33-4.74)	4.60 (3.82-5.66)	5.30 (4.30-6.69)	6.05 (4.76-7.84)	7.09 (5.35-9.58)	7.92 (5.77-11.1)
4-day	1.33 (1.18-1.53)	1.89 (1.67-2.17)	2.64 (2.34-3.05)	3.28 (2.88-3.82)	4.18 (3.54-5.03)	4.89 (4.06-6.01)	5.64 (4.57-7.11)	6.43 (5.06-8.34)	7.55 (5.70-10.2)	8.45 (6.16-11.8)
7-day	1.47 (1.30-1.69)	2.07 (1.84-2.38)	2.89 (2.56-3.34)	3.58 (3.14-4.16)	4.53 (3.84-5.45)	5.28 (4.38-6.49)	6.06 (4.90-7.63)	6.87 (5.41-8.91)	8.00 (6.04-10.8)	8.89 (6.48-12.5)
10-day	1.52 (1.35-1.75)	2.15 (1.90-2.47)	2.99 (2.65-3.46)	3.70 (3.24-4.30)	4.67 (3.96-5.63)	5.44 (4.51-6.68)	6.22 (5.04-7.84)	7.03 (5.54-9.12)	8.16 (6.16-11.0)	9.03 (6.58-12.6)
20-day	1.80 (1.60-2.07)	2.56 (2.27-2.94)	3.58 (3.17-4.14)	4.44 (3.89-5.16)	5.62 (4.76-6.77)	6.55 (5.43-8.05)	7.50 (6.07-9.45)	8.48 (6.67-11.0)	9.82 (7.41-13.3)	10.9 (7.91-15.2)
30-day	2.06 (1.82-2.36)	2.93 (2.60-3.38)	4.13 (3.65-4.76)	5.12 (4.49-5.96)	6.51 (5.52-7.84)	7.60 (6.31-9.35)	8.72 (7.06-11.0)	9.88 (7.78-12.8)	11.5 (8.66-15.5)	12.7 (9.26-17.8)
45-day	2.48 (2.20-2.85)	3.54 (3.14-4.07)	4.98 (4.40-5.75)	6.20 (5.43-7.21)	7.90 (6.70-9.52)	9.26 (7.68-11.4)	10.6 (8.62-13.4)	12.1 (9.52-15.7)	14.1 (10.6-19.1)	15.6 (11.4-21.9)
60-day	2.77 (2.46-3.19)	3.94 (3.50-4.54)	5.55 (4.91-6.41)	6.91 (6.06-8.04)	8.83 (7.49-10.6)	10.4 (8.60-12.7)	12.0 (9.68-15.1)	13.6 (10.7-17.6)	15.9 (12.0-21.5)	17.7 (12.9-24.8)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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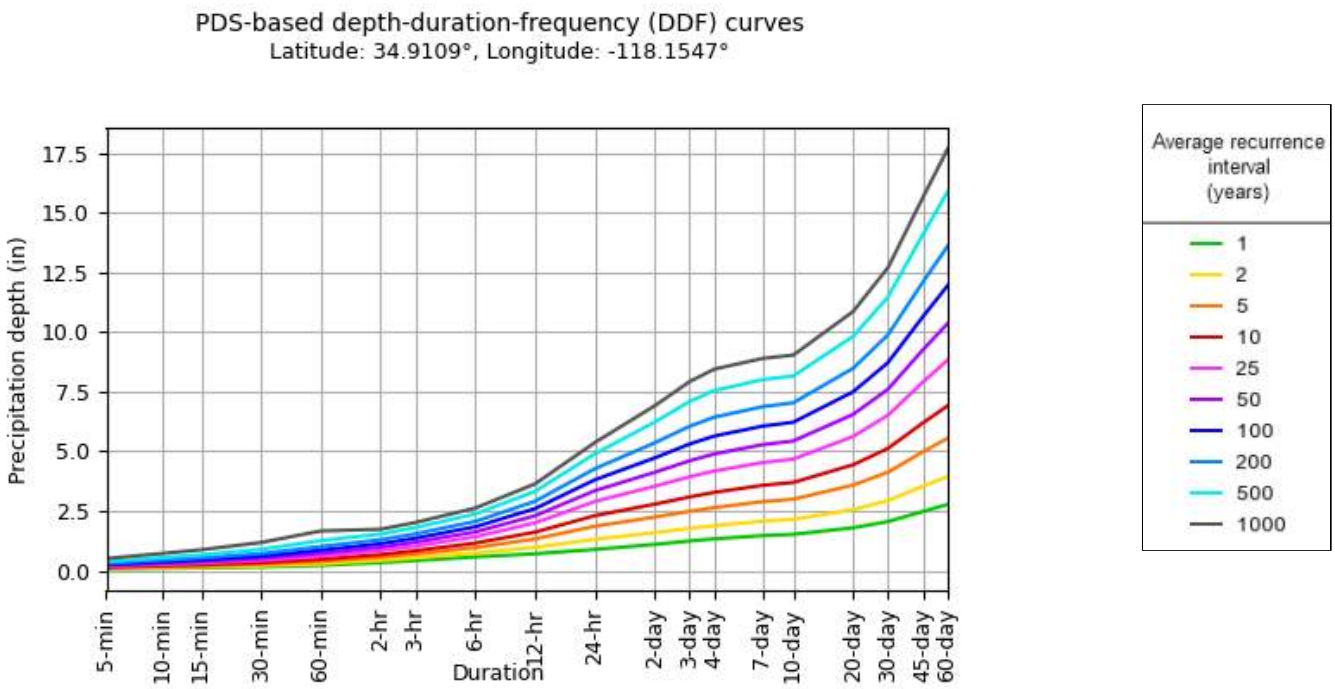
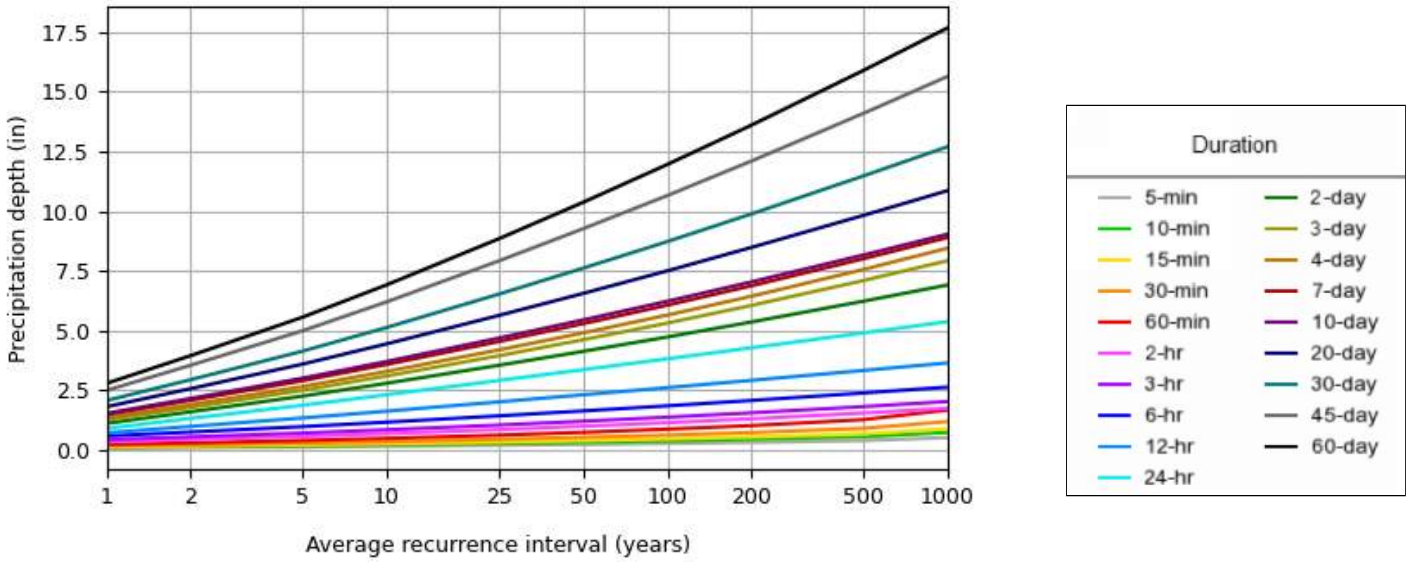
PF graphical





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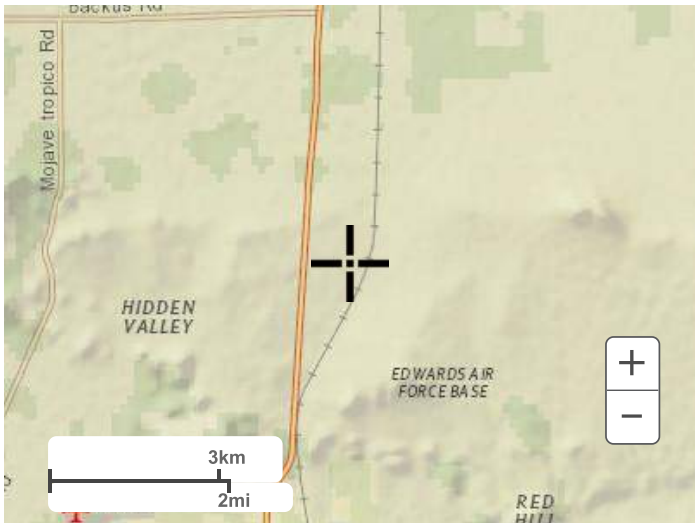
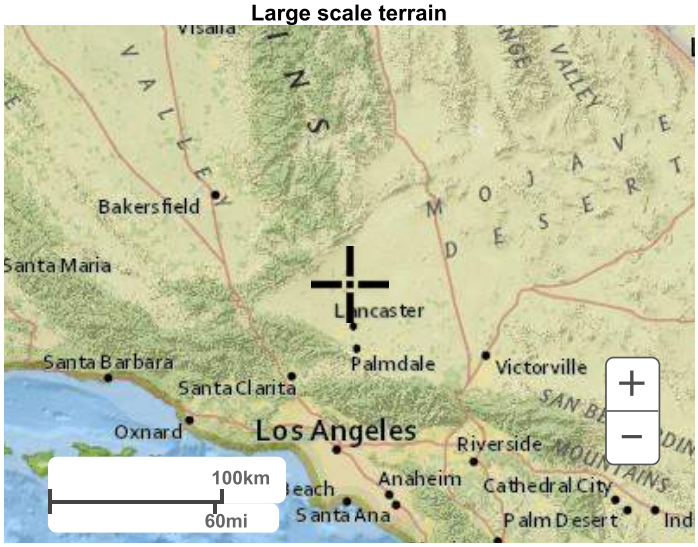
Maps & aerials

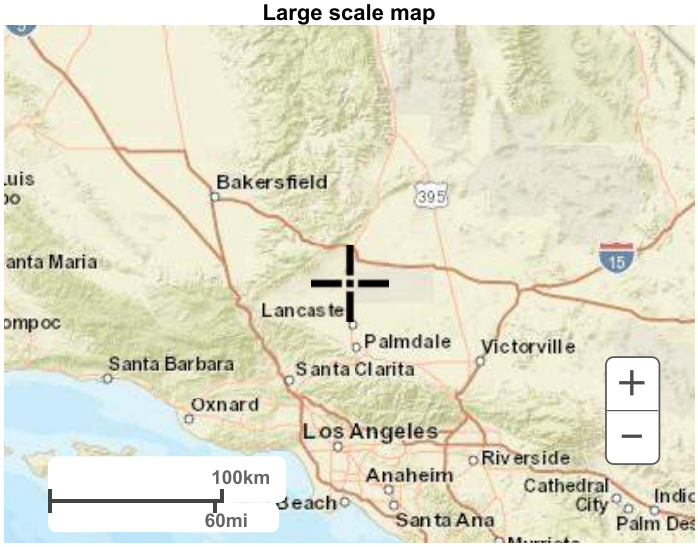
Small scale terrain



Large scale terrain



Large scale map



Large scale aerial

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Disclaimer

APPENDIX D

MONTHLY & YEARLY AVERAGE
HISTORICAL RAINFALL DATA

2021 ASHRAE Handbook - Foundamentals (IP)

LANCASTER FOX, CA, USA (WMO: 723816)

Lat:**34.741N** Long:**118.212W** Elev:**2338** StdP: **13.50** Time zone:**-8.00 (NAP)** Period:**94-19** WBAN:**03159** Climate zone:**3B**

Annual Heating, Humidification, and Ventilation Design Conditions

Coldest Month	Heating DB		Humidification DP/MCDB and HR						Coldest month WS/MCDB				MCWS/PCWD to 99.6% DB		WSF
			99.6%			99%			0.4%		1%				
	99.6%	99%	DP	HR	MCDB	DP	HR	MCDB	WS	MCDB	WS	MCDB	MCWS	PCWD	
12	21.3	24.9	-2.7	5.2	39.1	1.4	6.4	42.8	32.9	50.9	28.9	51.6	3.0	270	0.631

Annual Cooling, Dehumidification, and Enthalpy Design Conditions

Hottest Month	Hottest Month DB Range	Cooling DB/MCWB						Evaporation WB/MCDB						MCWS/PCWD to 0.4% DB	
		0.4%		1%		2%		0.4%		1%		2%			
		DB	MCWB	DB	MCWB	DB	MCWB	WB	MCDB	WB	MCDB	WB	MCDB	MCWS	PCWD
7	29.0	103.5	65.7	100.9	64.5	98.6	63.6	68.6	95.9	67.2	94.9	65.8	93.7	13.9	220

Dehumidification DP/MCDB and HR									Enthalpy/MCDB						Extreme Max WB
0.4%			1%			2%			0.4%		1%		2%		
DP	HR	MCDB	DP	HR	MCDB	DP	HR	MCDB	Enth	MCDB	Enth	MCDB	Enth	MCDB	
59.0	81.2	80.1	55.9	72.6	80.9	53.6	66.5	79.6	34.0	94.9	32.8	95.0	31.6	93.4	76.8

Extreme Annual Design Conditions

Extreme Annual WS				Extreme Annual Temperature				n-Year Return Period Values of Extreme Temperature							
				Mean		Standard deviation		n=5 years		n=10 years		n=20 years		n=50 years	
1%	2.5%	5%		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
30.2	27.1	25.0	DB	15.2	108.9	4.0	1.9	12.3	110.3	10.0	111.4	7.7	112.4	4.8	113.8
			WB	12.1	71.1	3.7	1.9	9.4	72.4	7.3	73.5	5.2	74.6	2.6	75.9

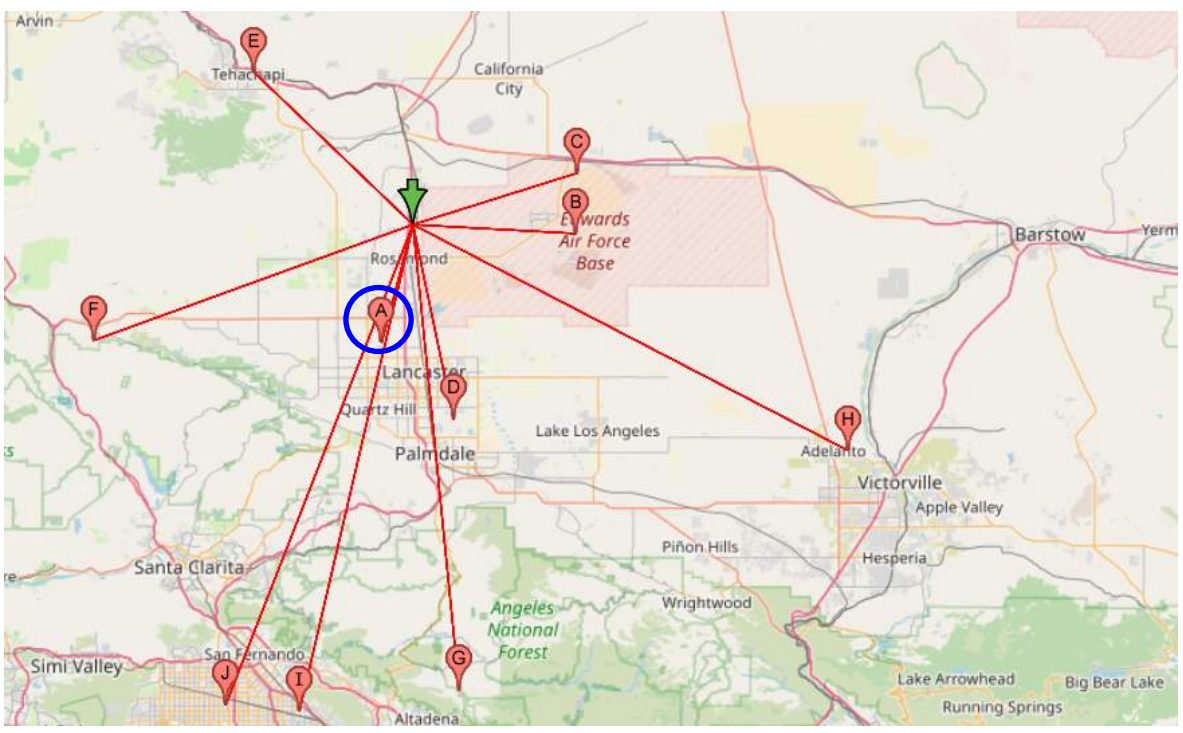
Monthly Climatic Design Conditions

			Annual	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Temperatures, Degree-Days and Degree-Hours		DBAvg	62.5	45.5	48.1	54.0	59.1	67.6	76.9	83.2	81.8	74.4	62.7	51.6	44.1
		DBStd	15.03	5.73	5.89	6.45	7.28	8.05	7.56	4.91	4.54	6.07	6.58	6.71	6.01
		HDD50	564	160	97	34	10	0	0	0	0	0	2	60	201
		HDD65	2883	604	475	343	204	69	9	0	0	7	122	402	648
		CDD50	5125	21	43	158	283	544	806	1030	987	731	396	109	17
		CDD65	1968	0	0	3	26	148	365	565	522	287	51	1	0
		CDH74	28071	1	14	177	567	1967	4829	7830	7312	4115	1155	104	0
		CDH80	15814	0	1	30	176	909	2744	4766	4462	2281	436	9	0
Wind		WSAvg	10.9	7.4	9.5	11.5	14.1	15.0	14.8	12.9	11.4	9.8	9.1	8.1	7.7
Precipitation		PrecAvg	7.5	1.2	1.9	1.4	0.4	0.1	0.0	0.1	0.1	0.2	0.3	0.5	1.1
		PrecMax	14.4	4.6	6.2	5.6	1.8	1.1	0.8	0.9	1.0	1.3	2.4	2.1	5.4
		PrecMin	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		PrecStd	3.6	1.1	2.1	1.5	0.5	0.3	0.2	0.2	0.2	0.4	0.5	0.6	1.4
Monthly Design Dry Bulb and Mean Coincident Wet Bulb Temperatures	0.4%	DB		70.3	75.8	84.3	90.2	98.1	105.5	107.6	105.9	101.1	93.0	81.3	70.1
		MCWB		49.8	51.1	55.0	58.5	62.5	65.0	67.7	67.5	64.6	60.2	53.9	51.4
	2%	DB		66.3	71.9	79.0	85.0	93.4	100.4	104.1	102.8	98.4	88.9	77.2	65.3
		MCWB		47.4	50.0	53.6	55.9	60.4	63.3	66.2	65.6	63.5	58.2	52.1	48.1
	5%	DB		63.2	67.3	74.9	80.9	89.6	97.3	101.1	100.3	95.6	85.0	72.7	61.5
		MCWB		46.7	48.3	52.0	54.4	59.3	62.4	65.0	64.3	62.3	56.5	50.8	46.0
	10%	DB		59.1	62.5	70.3	76.1	85.1	94.0	98.3	97.9	92.6	81.0	67.8	57.8
		MCWB		45.1	46.8	50.5	53.0	57.6	61.3	64.1	63.4	61.0	54.9	48.8	45.2
Monthly Design Wet Bulb and Mean Coincident Dry Bulb Temperatures	0.4%	WB		53.9	54.5	57.2	60.4	64.4	67.3	71.0	70.4	68.5	63.8	56.5	54.5
		MCDB		63.7	66.6	77.7	83.7	92.9	99.3	97.7	98.2	94.0	80.6	72.8	63.5
	2%	WB		51.4	52.0	55.1	57.9	62.3	65.6	69.1	68.2	66.4	60.5	54.2	51.8
		MCDB		59.6	66.1	73.9	80.2	89.7	95.8	96.1	96.4	91.5	82.1	70.4	60.3
	5%	WB		49.3	50.2	53.5	55.9	60.3	64.1	67.7	66.6	64.6	58.6	52.3	49.4
		MCDB		57.8	63.3	71.0	76.4	86.1	93.5	94.6	95.8	89.4	79.7	68.1	57.1
	10%	WB		47.2	48.5	51.7	54.1	58.8	62.4	66.2	65.0	62.7	56.7	50.6	46.8
		MCDB		56.5	59.9	67.3	73.1	82.6	90.4	93.1	94.5	87.6	76.5	65.3	55.4
Mean Daily Temperature Range		MDBR		26.7	25.4	26.9	26.6	26.5	28.3	29.0	31.3	32.6	32.2	30.0	26.5
	5% DB	MCDBR		34.6	36.3	36.6	35.6	33.5	32.8	33.1	34.7	37.1	39.2	38.2	33.1
		MCWBR		19.9	19.0	17.2	15.5	13.3	12.2	12.3	13.7	15.3	18.2	19.9	19.5
	5% WB	MCDBR		24.2	28.6	30.6	30.3	30.9	30.7	28.4	30.6	32.1	32.7	30.9	23.8
		MCWBR		15.0	15.7	15.0	13.8	12.6	12.0	11.2	13.2	15.3	18.2	19.9	19.5
Clear Sky Solar Irradiance		taub		0.292	0.302	0.320	0.347	0.361	0.355	0.382	0.362	0.347	0.332	0.299	0.292
		taud		2.504	2.491	2.432	2.358	2.342	2.373	2.342	2.374	2.412	2.434	2.509	2.523
		Ebn at noon		293	301	303	297	292	293	284	289	289	285	287	286
		Edn at noon		26	30	34	39	40	39	40	38	35	31	26	24
All-Sky Solar Radiation		RadAvg		977	1263	1723	2128	2403	2626	2504	2353	1996	1501	1118	891
		RadStd		75	139	98	101	119	116	103	60	46	84	48	67

Historical Trends

	DBAvg	Heating		Cooling			Degree-Days			
		99% DB	99% DP	1% DB	1% WB	1% DP	HDD10.0	HDD18.3	CDD10.0	CDD18.3
Station Only	N/A	N/A	-3.46	N/A	N/A	+2.12	N/A	N/A	N/A	N/A
Regional (0 neighbors)	+1.13	N/A	-3.20	+1.19	N/A	N/A	N/A	-207	+401	+191

CDDn	Cooling degree-days base n°F, °F-day	Lat	Latitude, °	Period	Years used to calculate the design conditions
CDHn	Cooling degree-hours base n°F, °F-hour	Long	Longitude, °	Sd	Standard deviation of daily average temperature, °F
DB	Dry bulb temperature, °F	MCDB	Mean coincident dry bulb temperature, °F	StdP	Standard pressure at station elevation, psi
DP	Dew point temperature, °F	MCDBR	Mean coincident dry bulb temp. range, °F	taub	Clear sky optical depth for beam irradiance
Ebn,noon	Clear sky beam normal and diffuse horizontal irradiances at solar noon, Btu/h/ft2	MCDP	Mean coincident dew point temperature, °F	taud	Clear sky optical depth for diffuse irradiance
Edh,noon		MCWB	Mean coincident wet bulb temperature, °F	Tavg	Average temperature, °F
Elev	Elevation, ft	MCWBR	Mean coincident wet bulb temp. range, °F	Time Zone	Hours ahead or behind UTC
Enth	Enthalpy, Btu/lb	MCWS	Mean coincident wind speed, mph	WB	Wet bulb temperature, °F
HDDn	Heating degree-days base n°F, °F-day	MDBR	Mean dry bulb temp. range, °F	Hours 8/4 & 55/69	Number of hours between 8 a.m. and 4 p.m with DB between 55 and 69 °F
PCWD	Prevailing coincident wind direction, °,0 = North, 90 = East	WS	Wind speed, mph	HR	Humidity ratio, grains of moisture per lb of dry air



2021 ASHRAE Handbook - Foundamentals (IP)

EDWARDS AFB, CA, USA (WMO: 723810)

Lat:**34.900N** Long:**117.867W** Elev:**2311** StdP: **13.51** Time zone:**-8.00 (NAP)** Period:**94-19** WBAN:**23114** Climate zone:**3B**

Annual Heating, Humidification, and Ventilation Design Conditions

Coldest Month	Heating DB		Humidification DP/MCDB and HR						Coldest month WS/MCDB				MCWS/PCWD to 99.6% DB		WSF
			99.6%			99%			0.4%		1%				
	99.6%	99%	DP	HR	MCDB	DP	HR	MCDB	WS	MCDB	WS	MCDB	MCWS	PCWD	
12	21.7	25.3	-6.1	4.3	39.7	-1.3	5.6	42.8	30.6	51.0	27.4	51.6	3.1	0	0.592

Annual Cooling, Dehumidification, and Enthalpy Design Conditions

Hottest Month	Hottest Month DB Range	Cooling DB/MCWB						Evaporation WB/MCDB						MCWS/PCWD to 0.4% DB	
		0.4%		1%		2%		0.4%		1%		2%			
		DB	MCWB	DB	MCWB	DB	MCWB	WB	MCDB	WB	MCDB	WB	MCDB	MCWS	PCWD
7	32.0	105.0	64.6	102.3	63.7	100.0	63.0	68.9	92.8	67.5	93.5	66.0	93.2	12.2	240

Dehumidification DP/MCDB and HR									Enthalpy/MCDB						Extreme Max WB
0.4%			1%			2%			0.4%		1%		2%		
DP	HR	MCDB	DP	HR	MCDB	DP	HR	MCDB	Enth	MCDB	Enth	MCDB	Enth	MCDB	
61.6	89.2	76.5	57.6	77.2	78.3	54.7	69.2	77.4	34.3	92.1	33.0	93.7	31.8	92.8	75.2

Extreme Annual Design Conditions

Extreme Annual WS				Extreme Annual Temperature				n-Year Return Period Values of Extreme Temperature							
				Mean		Standard deviation		n=5 years		n=10 years		n=20 years		n=50 years	
1%	2.5%	5%		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
28.2	25.7	23.5	DB	14.8	109.6	4.4	2.0	11.6	111.1	9.1	112.2	6.6	113.4	3.4	114.8
			WB	12.5	71.9	4.3	1.8	9.4	73.2	6.9	74.3	4.4	75.3	1.3	76.7

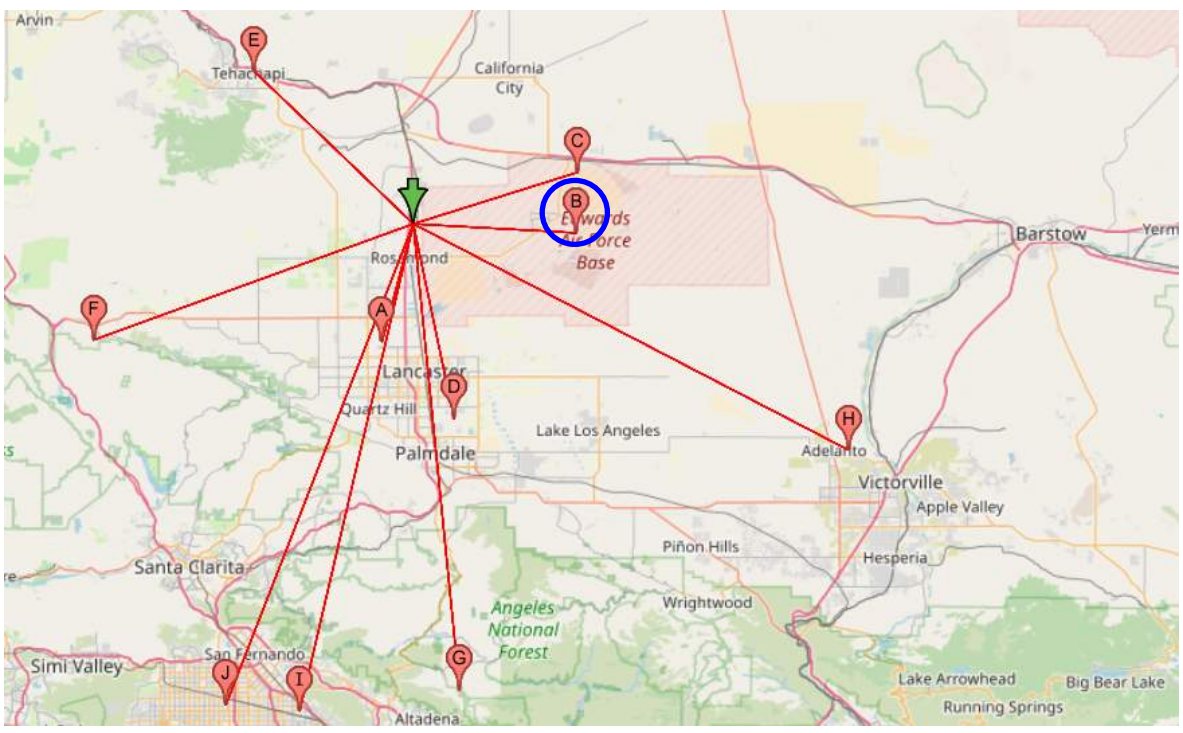
Monthly Climatic Design Conditions

			Annual	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Temperatures, Degree-Days and Degree-Hours		DBAvg	63.1	45.6	48.6	54.9	60.3	67.6	77.6	83.9	83.0	75.3	62.9	52.1	43.8
		DBStd	15.21	5.73	6.13	6.31	7.46	7.47	7.09	4.49	4.31	6.24	6.44	6.61	6.27
		HDD50	551	158	91	27	9	0	0	0	0	0	2	54	210
		HDD65	2787	602	460	317	177	61	6	0	0	7	114	387	656
		CDD50	5318	21	52	178	317	547	829	1051	1022	760	404	118	19
		CDD65	2076	0	0	3	35	142	385	586	557	317	50	1	0
		CDH74	30067	1	17	211	741	2086	5453	8260	7755	4298	1130	114	1
		CDH80	17657	0	2	36	252	983	3310	5267	4940	2429	428	10	0
Wind		WSAvg	10.0	7.0	9.1	10.4	12.7	13.5	13.1	11.7	10.7	9.0	8.2	7.1	7.1
Precipitation		PrecAvg	5.7	1.1	1.4	0.6	0.3	0.1	0.0	0.2	0.1	0.2	0.3	0.3	0.8
		PrecMax	13.0	5.9	6.0	2.3	1.0	0.9	0.5	0.9	0.4	1.3	2.0	1.1	3.6
		PrecMin	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		PrecStd	3.4	1.5	1.5	0.6	0.3	0.2	0.1	0.2	0.2	0.4	0.5	0.3	0.9
Monthly Design Dry Bulb and Mean Coincident Wet Bulb Temperatures	0.4%	DB		70.3	76.4	84.2	90.9	98.8	107.1	108.9	107.8	101.5	93.2	81.4	70.8
		MCWB		50.7	51.6	54.5	57.7	61.6	64.8	65.6	65.8	64.2	58.9	54.0	51.3
	2%	DB		66.1	72.3	79.6	86.5	93.8	102.7	105.4	104.2	98.8	89.1	77.4	64.9
		MCWB		47.9	50.3	53.0	55.7	59.2	62.4	64.9	64.6	63.3	58.0	52.0	48.1
	5%	DB		63.0	68.0	75.5	82.4	90.1	99.6	102.5	101.8	96.3	85.1	73.1	61.1
		MCWB		46.9	49.1	51.7	54.3	58.3	61.5	64.1	63.7	62.3	56.1	51.0	46.6
	10%	DB		59.1	63.3	71.6	78.1	85.9	96.2	99.9	99.4	93.2	81.1	68.1	57.1
		MCWB		46.0	47.3	50.8	53.1	57.2	60.7	63.5	62.9	61.0	54.9	49.0	45.1
Monthly Design Wet Bulb and Mean Coincident Dry Bulb Temperatures	0.4%	WB		55.7	55.4	57.1	60.2	63.8	67.8	71.4	70.4	69.3	64.0	57.3	55.5
		MCDB		62.5	66.5	73.4	84.1	93.5	100.2	91.0	93.6	90.7	80.7	68.4	61.6
	2%	WB		52.6	52.9	55.1	57.9	61.2	65.2	69.3	68.6	67.5	60.9	54.5	52.5
		MCDB		59.6	64.4	72.8	80.3	88.4	95.6	92.0	94.1	87.7	79.4	71.2	60.1
	5%	WB		50.3	50.9	53.5	56.1	59.6	63.5	67.7	66.9	65.7	58.7	52.6	50.1
		MCDB		57.1	63.4	71.3	77.6	85.9	93.8	94.2	95.1	87.2	79.2	68.3	57.1
	10%	WB		48.2	49.2	51.9	54.4	58.1	62.1	66.1	65.2	63.8	56.7	50.8	47.6
		MCDB		55.6	60.7	68.0	74.7	82.6	91.3	94.0	94.7	86.2	75.9	65.2	54.7
Mean Daily Temperature Range		MDBR		26.9	26.3	28.6	28.6	29.0	32.2	32.0	33.2	32.7	32.6	31.1	26.6
	5% DB	MCDBR		33.8	35.3	36.8	36.3	35.1	36.0	34.7	35.3	35.6	39.0	37.9	32.4
		MCWBR		19.2	17.6	16.2	14.7	12.6	11.5	11.0	12.1	13.4	17.4	20.2	18.9
	5% WB	MCDBR		23.3	27.7	31.2	31.9	32.9	33.8	29.0	30.6	29.2	31.4	31.7	23.5
		MCWBR		14.4	14.6	14.4	13.1	12.0	11.4	11.0	11.8	13.4	17.4	20.2	18.9
Clear Sky Solar Irradiance	taub			0.273	0.283	0.298	0.320	0.335	0.330	0.353	0.340	0.325	0.302	0.277	0.276
	taud			2.548	2.538	2.485	2.424	2.405	2.432	2.414	2.429	2.464	2.515	2.560	2.556
	Ebn at noon			301	309	311	306	301	300	293	296	297	297	296	293
	Edn at noon			25	28	32	36	37	36	37	36	33	29	24	23
All-Sky Solar Radiation	RadAvg			986	1284	1750	2166	2445	2661	2502	2348	2003	1512	1125	898
	RadStd			74	128	88	89	106	105	107	65	49	80	46	65

Historical Trends

	DBAvg	Heating		Cooling			Degree-Days			
		99% DB	99% DP	1% DB	1% WB	1% DP	HDD10.0	HDD18.3	CDD10.0	CDD18.3
Station Only	N/A	N/A	-5.47	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Regional (0 neighbors)	+1.10	N/A	-3.35	+1.15	N/A	N/A	N/A	-202	+392	+189

CDDn	Cooling degree-days base n°F, °F-day	Lat	Latitude, °	Period	Years used to calculate the design conditions
CDHn	Cooling degree-hours base n°F, °F-hour	Long	Longitude, °	Sd	Standard deviation of daily average temperature, °F
DB	Dry bulb temperature, °F	MCDB	Mean coincident dry bulb temperature, °F	StdP	Standard pressure at station elevation, psi
DP	Dew point temperature, °F	MCDBR	Mean coincident dry bulb temp. range, °F	taub	Clear sky optical depth for beam irradiance
Ebn,noon	Clear sky beam normal and diffuse horizontal irradiances at solar noon, Btu/h/ft2	MCDP	Mean coincident dew point temperature, °F	taud	Clear sky optical depth for diffuse irradiance
Edh,noon		MCWB	Mean coincident wet bulb temperature, °F	Tavg	Average temperature, °F
Elev	Elevation, ft	MCWBR	Mean coincident wet bulb temp. range, °F	Time Zone	Hours ahead or behind UTC
Enth	Enthalpy, Btu/lb	MCWS	Mean coincident wind speed, mph	WB	Wet bulb temperature, °F
HDDn	Heating degree-days base n°F, °F-day	MDBR	Mean dry bulb temp. range, °F	Hours 8/4 & 55/69	Number of hours between 8 a.m. and 4 p.m with DB between 55 and 69 °F
PCWD	Prevailing coincident wind direction, °,0 = North, 90 = East	WS	Wind speed, mph	HR	Humidity ratio, grains of moisture per lb of dry air



APPENDIX E

FEMA FLOOD HAZARD MAP

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures.** Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 11. The **horizontal datum** was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum.** For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, MD 20910-3282

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242,** or visit its website at http://www.ngs.noaa.gov/.

Base map information shown on this FIRM was derived from USDA -Farm Service Agency -Aerial Photography Field Office dated 2005 and from U.S. Geological Survey Digital Orthophoto Quadrangles produced at a scale of 1:12,000 from photography dated 1992 or later.

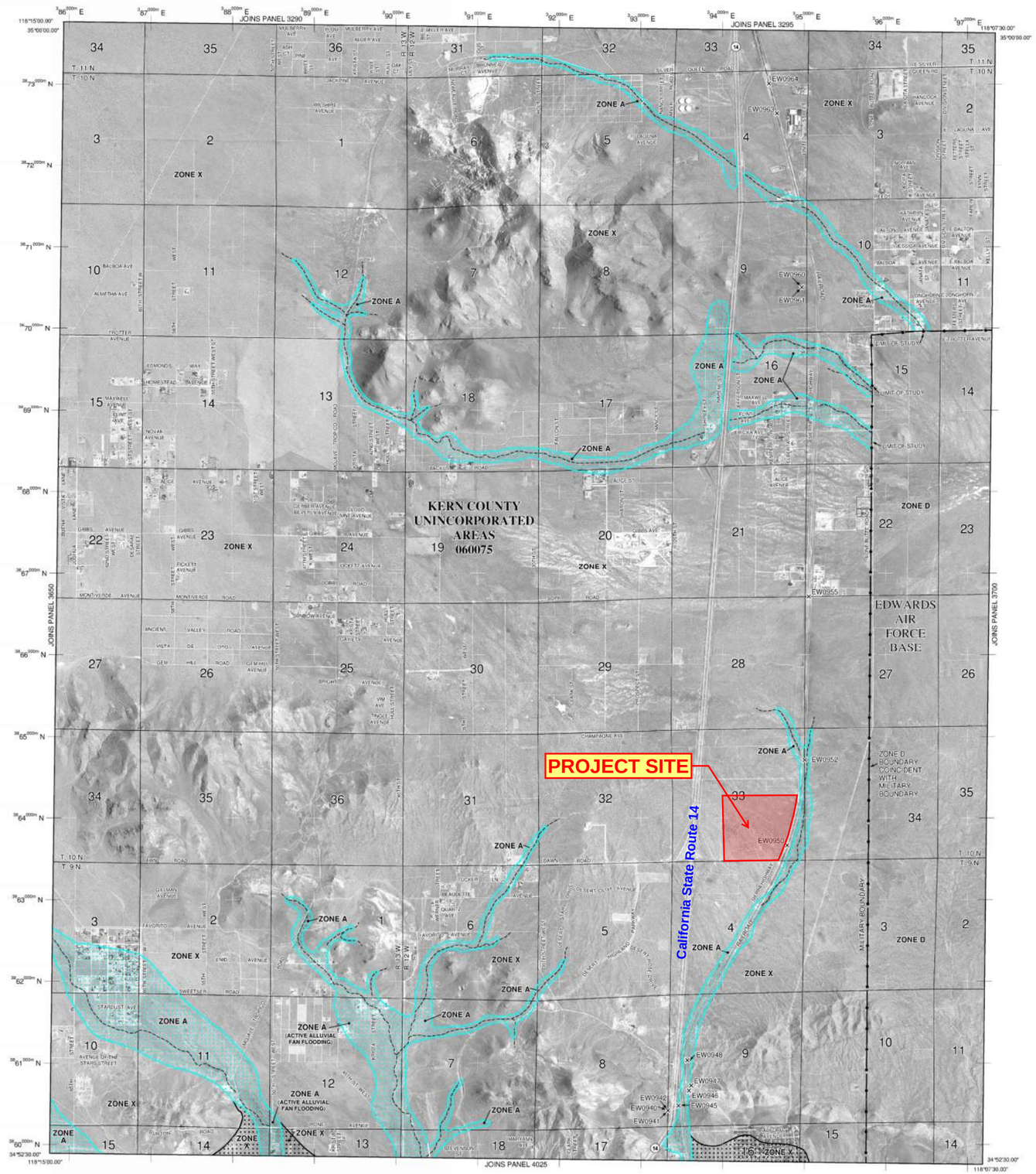
This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables *in the Flood Insurance Study report (which contains authoritative hydraulic data)* may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, *a Flood Insurance Study report,* and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://www.msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary
0.2% annual chance floodplain boundary
Floodway boundary
Zone D boundary
CBRS and OPA boundary
Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

~~ 513 ~~~~	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

(A)———(A)	Cross section line
(23)- - - - - - -(23)	Transect line
97°07'30", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
4275000mN	1000-meter Universal Transverse Mercator grid ticks, zone 11
6000000 M	5000-foot grid ticks: California State Plane coordinate system, V zone (FIPSZONE 0405), Lambert Conformal Conic
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5	River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
September 26, 2008
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 2000'

1000 0 2000 4000 FEET
600 0 600 1200 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 3675E

FIRM
FLOOD INSURANCE RATE MAP
KERN COUNTY, CALIFORNIA
AND INCORPORATED AREAS

PANEL 3675 OF 4125
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
KERN COUNTY	060075	3675	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06029C3675E

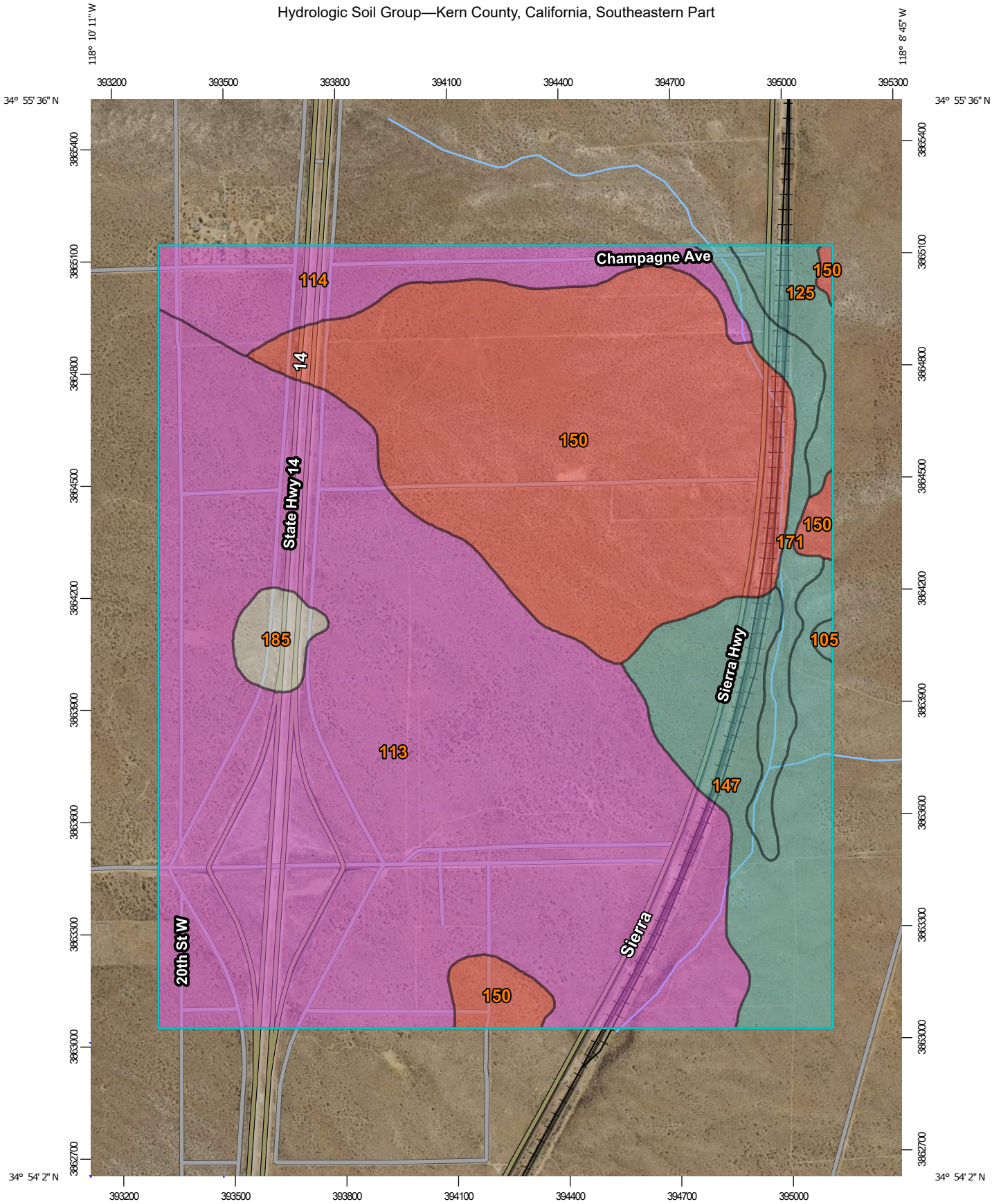
EFFECTIVE DATE
SEPTEMBER 26, 2008

Federal Emergency Management Agency

APPENDIX F

WEB SOIL SURVEY
HYDROLOGIC SOIL GROUP MAP

Hydrologic Soil Group—Kern County, California, Southeastern Part



Map Scale: 1:14,100 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 200 400 800 1200

Feet: 0 500 1000 2000 3000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Kern County, California, Southeastern Part
Survey Area Data: Version 14, Aug 30, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 14, 2022—Apr 23, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
105	Arujo sandy loam, 9 to 15 percent slopes	C	1.2	0.1%
113	Cajon sand, 5 to 15 percent slopes	A	486.2	51.6%
114	Cajon loamy sand, 0 to 5 percent slopes	A	56.0	5.9%
125	DeStazo sandy loam, 0 to 2 percent slopes	C	16.2	1.7%
147	Hi Vista sandy loam, 2 to 9 percent slopes	C	91.8	9.7%
150	Muroc sandy loam, 2 to 9 percent slopes	D	250.2	26.6%
171	Rosamond clay loam	C	28.0	3.0%
185	Torriorthents-Rock outcrop complex, very steep		12.2	1.3%
Totals for Area of Interest			**941.7**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Attachment WA-6

Rev. B Heat Mass Balance Diagram

(Confidential)

Attachment WA-11

LORS Revised Table 5.15-3

Updated Table 5.15-3: The following table has been modified from the Supplemental AFC to provide clarification regarding LORS.

Laws, Ordinances, Regulations, and Standards	Requirements	Lead Agency	Supplemental Application for Certification Section Explaining Conformance
Federal			
Clean Water Act/Water Pollution Control Act. 1972, amended by Water Quality Act of 1987 P.L. 100-4 (33 Federal Code 466 et seq.) National Pollution Discharge Elimination System (CWA, Section 402)	▪ Prohibits discharge of pollutants to receiving waters unless the discharge is in compliance and authorized via a National Pollution Discharge Elimination System permit. ▪ Applies to all point-source discharges. ▪ Applied(s) to nonpoint sources through municipal National Pollution Discharge Elimination System permits.	Lahontan Regional Water Quality Control Board	Section 5.15.5.2.2, pg 5.15-21; Section 5.15.5.2.3, pg 5.15-21; Section 5.15.5.2.4, pg 5.15-21
State			
Federal Clean Water Act (implemented by State of California)	Implements and enforces the federal National Pollution Discharge Elimination System permit program.	Lahontan Regional Water Quality Control Board	Section 5.15.1.7, pg 5.15-14 and 15; Section 5.15.5.2.3, pg 5.15-21
Porter-Cologne Water Quality Control Act	Controls discharge of wastewater to surface water and groundwater of California.	Lahontan Regional Water Quality Control Board	No discharge of wastewater to surface or groundwater will occur during construction and operations.
Local			
Kern County General Plan Policy 41 and Water Code Section 10910(b)	Development standards for stormwater quality control, waste supplies, and flood protection. Review of adequate water supply.	Kern County Engineering Department	Section 5.15.5.3, pg 5.15-22; Section 5.15.2.2, pg 5.15-21; and Appendix 15.B
	Kern County Development Specification, Division Four, Standards for Drainage, and the Kern County Hydrology Manual.	Kern County Planning Department	Appendix 15.B