RECON

An Employee-Owned Company

February 27, 2019

Mr. James Matthews
Senior Planning & Permitting Specialist
Bloomenergy
4353 N 1st Street
San Jose, CA 95134

Reference: Results of the Biological Survey for the Illumina Fuel Cell Project (RECON Number 7783-2)

Dear Mr. Matthews:

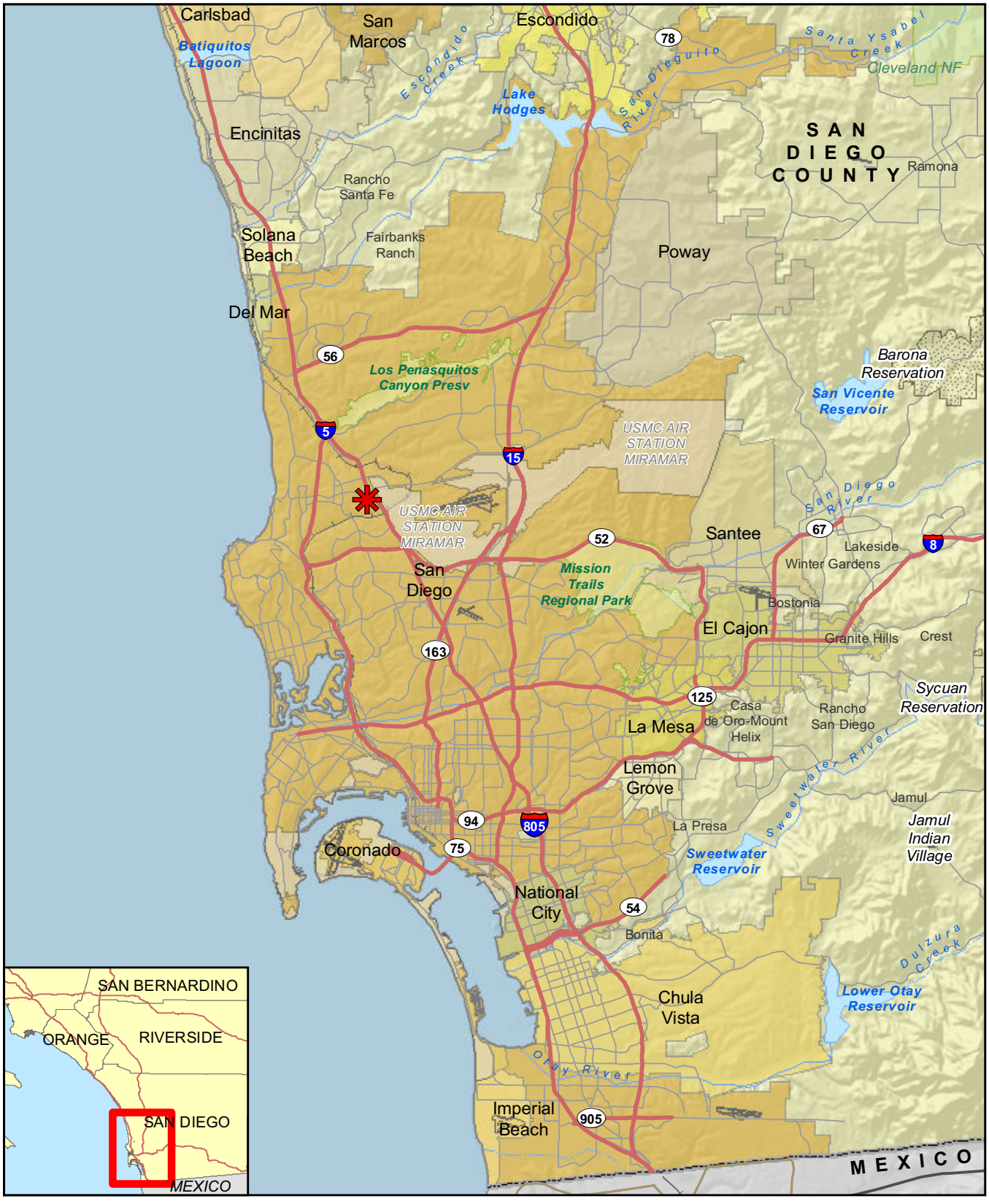
This letter report describes the results of RECON's biological survey of the fuel cell project (project site) conducted at the Illumina Campus Project (property) located in the city of San Diego, immediately northwest of Nobel Drive. The property is east of Interstate 5, west of the Interstate 805 (I-805), and north of State Route 52 (Figure 1). The property is found on the U.S. Geological Survey 7.5-minute topographical map series, Del Mar and La Jolla quadrangles 1975 within Township 15 South and Range 2 West (Figure 2) and is shown on the City of San Diego, Engineering and Development, City 800' Scale Map Numbers 258-1701 and 250-1701 (Figure 3). The property is predominately developed land consisting of parking lots and commercial buildings. An open space lot is located in the northwest corner of the property and a vernal pool preserve occurs within the southeast portion of the project site (Figure 4).

The property was previously surveyed by RECON in conjunction with the plan amendment for the Illumina campus in 2016. The on-site vegetation communities and land cover types included Diegan coastal sage scrub, disturbed coastal sage scrub, chamise chaparral, non-native grassland, urban/developed land, and San Diego mesa hardpan vernal pools. Additional information about the property may be found in the Results of the Biological Survey for the Illumina Campus Project (RECON 2016). The vernal pools occur within the non-native grassland within a fenced preserve area located in the southern portion of the property. San Diego fairy shrimp (*Branchinecta sandiegonensis*) are known to occur within these pools (State of California 2018a).

This report provides all the necessary biological data and background information required for environmental analysis according to guidelines set forth in the City of San Diego (City) Multiple Species Conservation Program (MSCP) Subarea Plan (1997) and the City Biological Resources Guidelines (2012). This report has also describes the project's compliance with City of San Diego Land Use Adjacency Guidelines and the avoidance and minimization measures provided in Section 5.2.1 in the City Vernal Pool Habitat Conservation Plan (VPHCP; City of San Diego 2017).

1.0 Project Description

Bloomenergy is proposing to install a 3.5-megawatt solid-oxide fuel cell "Energy Server" system at the rear of an existing building and existing parking structure at the Illumina campus. The fuel cell project is located at 5200 Illumina Way (Assessor Parcel Numbers 345-260-20-00 and 345-260-34-00) in the IP-1-1 zone, within the University Community Plan area, on a 42.6-acre property. The fuel cells will provide clean distribution generation (power) for the facility working in tandem with the existing electricity grid (also known as "grid-parallel"). Of the total property, the fuel cell project is 0.28 acre; thus, the survey effort was focused within this area.



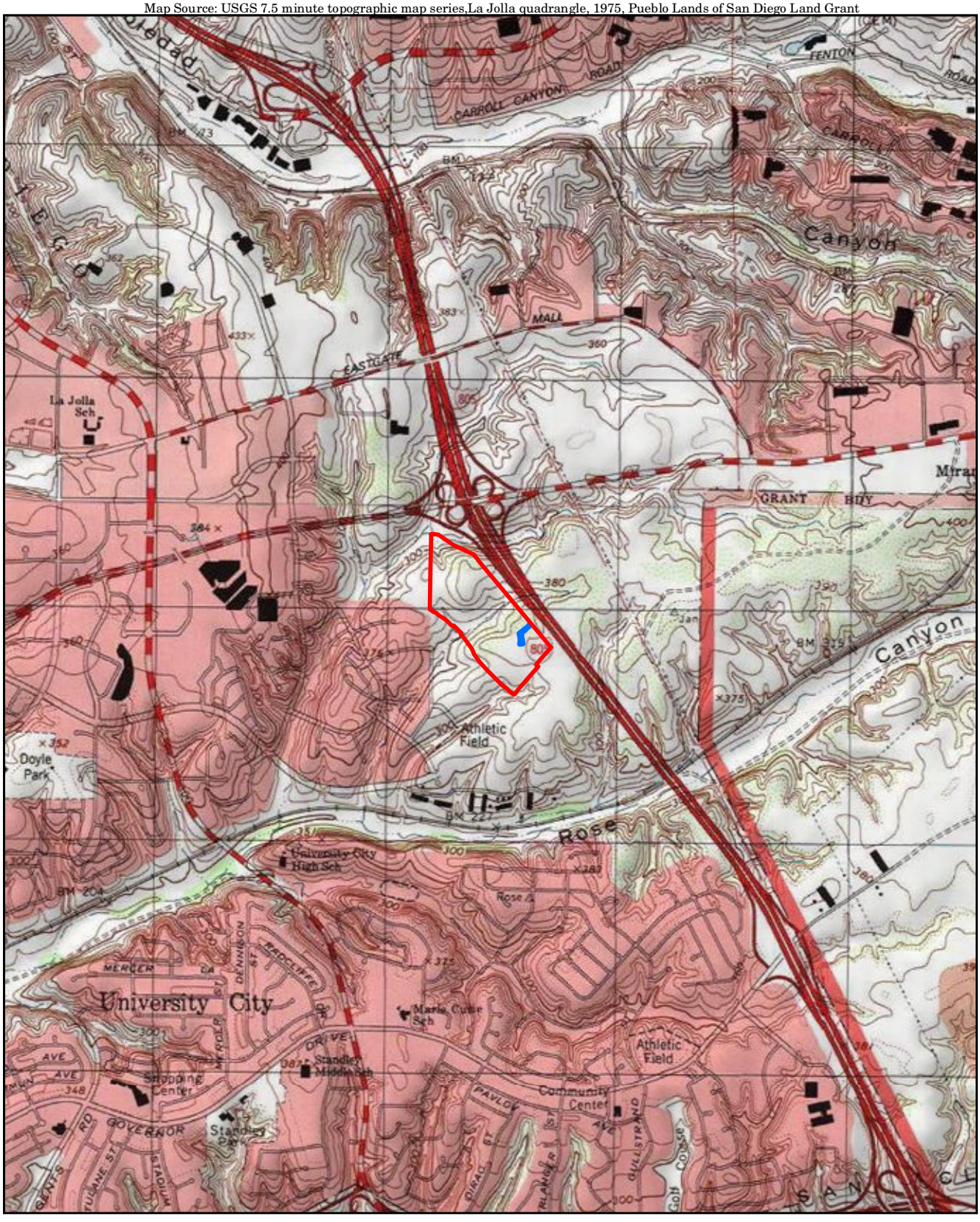
Project Location

FIGURE 1
Regional Location

RECON

M:\JOBS4\7783\common_gis\fig1.mxd 7/13/2015 fmm

Map Source: USGS 7.5 minute topographic map series,La Jolla quadrangle, 1975, Pueblo Lands of San Diego Land Grant



RECON

M:\JOBS4\7783\common_gis\fig2_bio_Fuel-Cell.mxd 1/24/2019 fmm

FIGURE 2

Project Location on USGS Map

Map Source: City of San Diego, Engineering and Development Department, City 800' Maps, Number 258-1701 and 250-1701

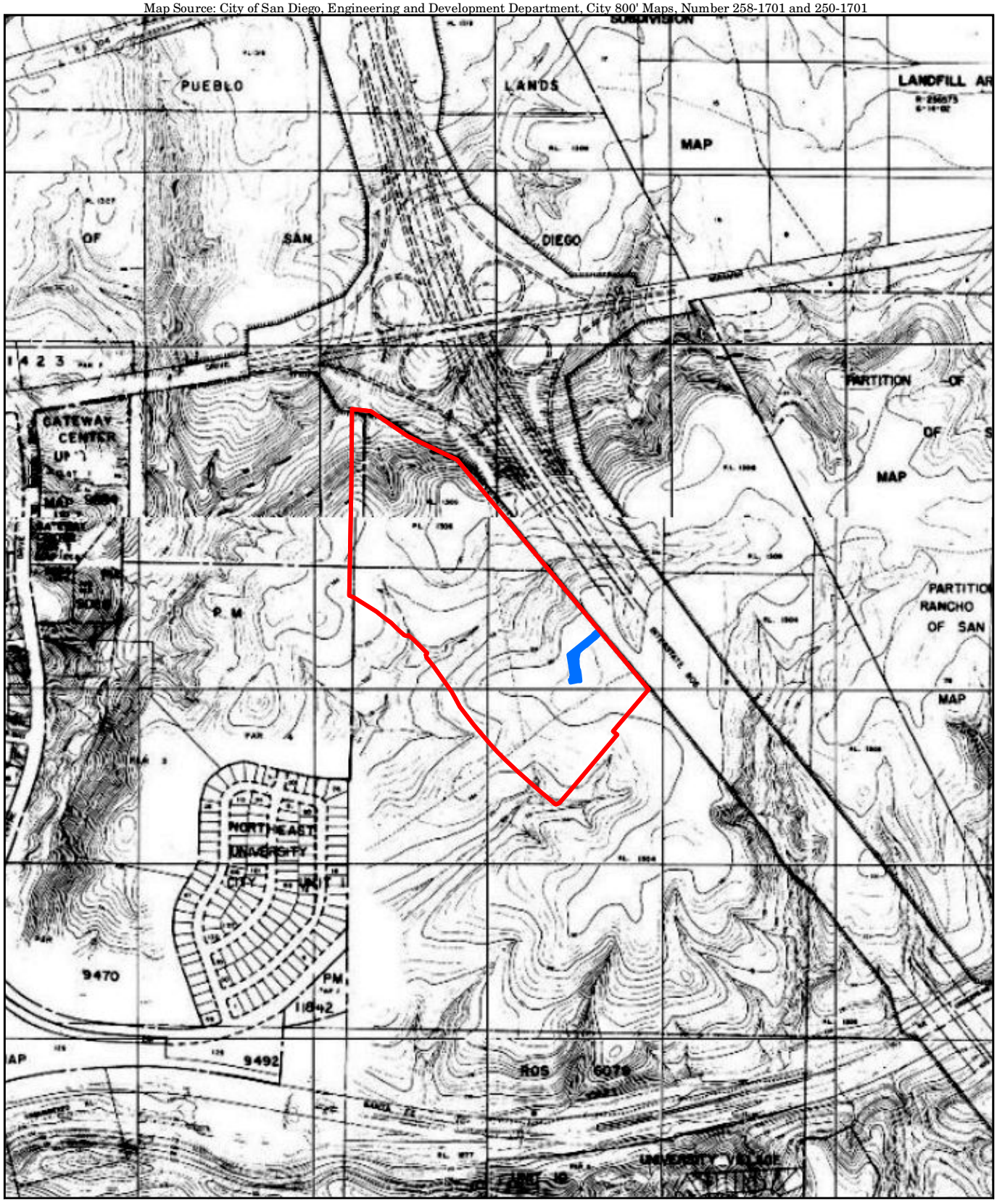


FIGURE 3

Project Location on City 800' Map

RECON

M:\JOBS4\7783\common_gis\fig3_bio_Fuel-Cell.mxd 1/24/2019 fmm

Image Source: Nearmap (flown September 2018)

RECON

FIGURE 4

Project Location on Aerial Photograph

M:\JOBS4\7783\common_gis\fig4_bio_Fuel-Cell.mxd 1/25/2019 fmm

2.0 Methods and Survey Limitations

A site visit was conducted on January 18, 2019, by RECON biologist Beth Procsal to document the existing conditions within the project site. The survey was conducted between 2:00 p.m. and 2:45 p.m., with the air temperature at 63 degrees Fahrenheit, and wind speed ranging from 3 to 8 miles per hour. Cloud cover during the survey was zero percent. Vegetation communities and land cover types were mapped on a 1-inch-equals-150-feet aerial photograph of the project site. Wildlife species were observed directly or detected from calls, tracks, scat, nests, or other signs. All plant species observed within the project site were also noted.

Floral nomenclature for common plants follows the Jepson Online Herbarium (Jepson Flora Project 2019), for ornamental plants Brenzel (2001), and for sensitive plants California Native Plant Society (CNPS; 2019). Vegetation community classifications follow Oberbauer et al. (2008), which is based on Holland's 1986 Preliminary Descriptions of the Terrestrial Natural Communities of California. Zoological nomenclature for birds is in accordance with the American Ornithological Society Checklist (Chesser et al. 2018) and Unitt (2004); for mammals with Baker et al. (2003); and for reptiles with Crother (2008). Determination of the potential occurrence for listed, sensitive, or noteworthy species is based upon known ranges and habitat preferences for the species (Jennings and Hayes 1994; Unitt 2004; CNPS 2019; Reiser 2001) and species occurrence records from the California Natural Diversity Database (State of California 2018a).

3.0 Survey Results

3.1 Vegetation Communities and Land Cover Types

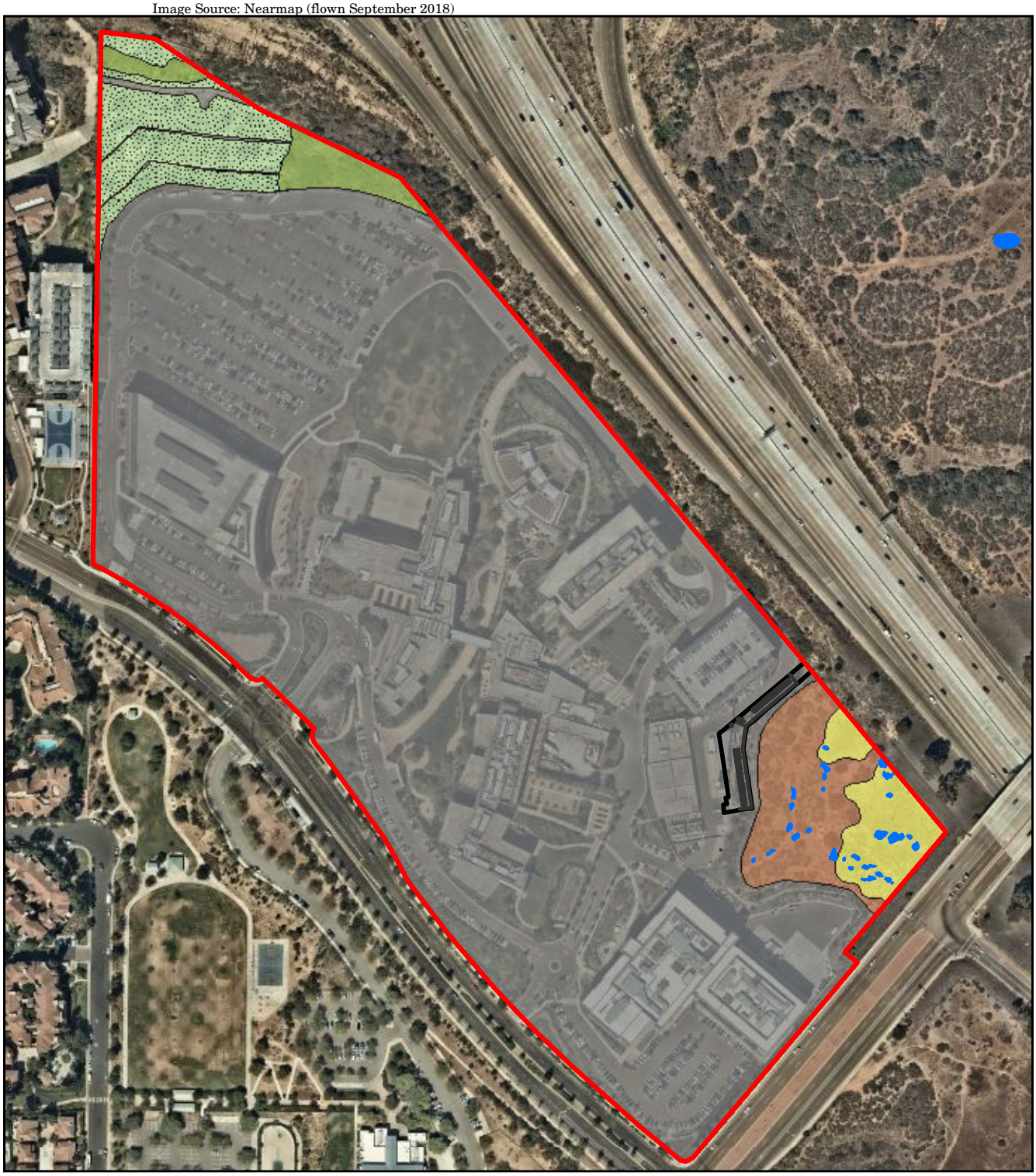
One land cover type occurs on-site: urban/developed (Table 1; Figure 5). All plant species observed during the general survey are presented in Attachment 1. Under the City Biology Guidelines, the environmentally sensitive lands (ESL) regulations define sensitive biological resources into four tiers of sensitivity. Upland vegetation communities classified as Tier I (rare uplands), Tier II (uncommon uplands), or Tier III (common uplands) are considered sensitive by the City. Tier IV (other uplands) vegetation communities are not considered sensitive (City of San Diego 2012).

Table 1
Vegetation Communities and Land Cover Types
(acres)

Vegetation and Land Cover Types	ESL Tier	Entire Project	Project Site/ BMZ 1
Diegan coastal sage scrub	II	0.67	0.00
Disturbed Diegan coastal sage scrub	II	1.84	0.00
Chamise chaparral	IIIA	1.57	0.00
Non-native grassland	IIIB	0.90	0.00
Urban/Developed land	IV	37.49	0.12
San Diego Mesa Hardpan Vernal Pools	-	0.13	0.00
TOTAL		**42.6**	**0.12**

Urban/Developed land is considered a Tier IV (other uplands) land cover type by the City's Biology Guidelines and consists of the current commercial buildings, parking lots, and ornamental plantings. The ornamental vegetation is dominated by freeway iceplant (*Carpobrotus edulis*), Torrey pine (*Pinus torreyana torreyana*), and dwarf coyote brush (*Baccharis pilularis pilularis*) which have been planted within and along the edges of the existing parking lot and manufactured slope. Scattered native shrub species were also planted on the slope adjacent to the vernal pool preserve area and include coyote brush (*Baccharis pilularis*), toyon (*Heteromeles arbutifolia*), California sagebrush (*Artemisia californica*), and lemonade berry (*Rhus integrifolia*).

Image Source: Nearmap (flown September 2018)



0 Feet 300

Property Boundary

Fuel Cell Project Site

Vegetation Communities

- Chamise Chaparral
- Diegan Coastal Sage Scrub
- Disturbed Diegan Coastal Sage Scrub
- Non-native Grassland
- Urban/Developed
- San Diego Mesa Hardpan Vernal Pools

RECON

M:\JOBS4\7783\common_gis\fig5_bio_Fuel-Cell.mxd 2/25/2019 fmm

FIGURE 5

Existing Biological Resources

3.2 Wildlife

The wildlife species observed on-site are typical for occurrence in scrub habitats and urban/disturbed areas in San Diego County. Three wildlife species detected within the project site include yellow-rumped warbler (*Setophaga* [=*Dendroica*] *coronata*), California towhee (*Melozone* [=*Pipilo*] *crissalis*), and mourning dove (*Zenaida macroura marginella*).

4.0 Sensitive Biological Resources

4.1 Sensitivity Criteria

For purposes of this report, species will be considered sensitive if they are (1) covered species under the MSCP or the City's VPHCP; (2) listed by state or federal agencies as threatened or endangered or are proposed for listing (State of California 2018b–e); (3) on California Rare Plant Rank 1B (considered endangered throughout its range) or California Rare Plant Rank 2 (considered endangered in California but more common elsewhere) of the CNPS Inventory of Rare and Endangered Vascular Plants of California (2019); or (4) designated by the City as a narrow endemic species (City of San Diego 2012). Noteworthy plant species are considered to be those that are on California Rare Plant Rank 3 (more information about the plant's distribution and rarity needed) and California Rare Plant Rank 4 (plants of limited distribution) of the CNPS Inventory (2019). Sensitive vegetation communities are those identified by the City (2012). The project is expected to comply with all the following state, federal, and local regulations.

State Regulations: Under Section 3503 of the California Fish and Game Code, 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. Section 3503.3 of the California Fish and Game Code prohibits take, possession, or destruction of any birds in the orders Falconiformes (raptors) or Strigiformes (owls), or of their nests and eggs (State of California 1991).

Federal Regulations: The Migratory Bird Treaty Act (MBTA) was established to provide protection to the breeding activities of migratory birds throughout the U.S. The MBTA protects migratory birds and their breeding activities from take and harassment. Pursuant to U.S. Department of the Interior Memorandum M-37050, the federal MBTA is no longer interpreted to cover incidental take of migratory birds (U.S. Department of the Interior 2017). Therefore, impacts that are incidental to implementation of an otherwise lawful project would not be considered significant.

City of San Diego Regulations: As stated in the City 2012 Biology Guidelines, a project site is considered to contain sensitive biological resources if:

- The site has been identified as part of the Multi-Habitat Planning Area (MHPA) by the City's MSCP Subarea Plan.

  MHPA lands are those that have been included within the City's MSCP Subarea Plan for habitat conservation. These lands have been determined to provide the necessary habitat quality, quantity, and connectivity to sustain the unique biodiversity of the San Diego region. MHPA lands are considered by the City to be a sensitive biological resource. The City's MHPA allows some development within the preserve based on the development area allowance (City of San Diego 2012).

- The site supports or could support (e.g. in different seasons/rainfall conditions, etc.) Tier I, II, or III-A & -B vegetation communities (such as grassland, chaparral, coastal sage scrub, etc.). The California Environmental Quality Act (CEQA) determination of significant impacts may be based on what was on the site (e.g., if illegal grading or vegetation removal occurred, etc.), as appropriate.

- The site contains, or comes within 100 feet of a natural or manufactured drainage (determine whether it is vegetated with wetland vegetation). The site occurs within the 100-year flood plain

established by the Federal Emergency Management Agency (FEMA) or the Flood Plain (FP)/ Flood Way (FW) zones.

- The site does not support a vegetation community identified in Tables 2a, 2b or 3 (Tier I, II, IIIA or IIIB) of the Biology Guidelines; however, wildlife species listed as threatened or endangered or other protected species may use the site (e.g., California least terns [*Sterna antillarum browni*] on dredge spoil, wildlife using agricultural land as a wildlife corridor, etc.).

Vernal Pools and MHPA: The VPHCP provides a regulatory framework to protect, enhance, and restore vernal pool resources in specific areas within the City's jurisdiction, while improving and streamlining the environmental permitting process for impacts to threatened and endangered species associated with vernal pools. The VPHCP is a conservation plan for vernal pools and seven threatened and endangered species that do not have federal coverage under the City's MSCP Subarea Plan, including five plant and two crustacean species. The VPHCP expands the City's existing MHPA established in the MSCP Subarea Plan to conserve additional lands with vernal pools that are occupied with the vernal pool covered species. Implementation of the VPHCP occurs through permanent protection of existing City-owned land for the conservation of vernal pools, conservation of private lands through the development entitlement process, the permanent management and monitoring of these lands, and annual reporting to the Wildlife Agencies that accounts for all take authorized, conservation achieved, and compliance and effectiveness monitoring (City of San Diego 2017).

The project site does not contain steep hillsides, coastal beaches, sensitive coastal bluffs, nor is it located within a Special Flood Hazard Area established by the Federal Emergency Management Agency (2015). The closest MHPA occurs approximately 10 feet east of the project site and occurs within an on-site vernal pool habitat preserve, as documented in the VPHCP (Figure 6).

Jurisdictional Resources: All wetland areas, including vernal pools, and non-wetland waters of the U.S. are considered sensitive. Wetlands and non-wetland waters are under the jurisdiction of the U.S. Army of Engineers. Streambeds and associated wetland vegetation are under the jurisdiction of the California Department of Fish and Wildlife (CDFW). The City defines wetlands as:

> Wetlands are areas which are characterized by any of the following conditions: (1) all areas persistently or periodically containing naturally occurring wetland vegetation communities characteristically dominated by hydrophytic vegetation; (2) areas that have hydric soils or wetland hydrology and lack naturally occurring wetland vegetation communities because human activities have removed the historic wetland vegetation; (3) areas lacking wetland vegetation communities, hydric soils, and wetland hydrology due to non-permitted filling of previously existing wetlands (City of San Diego 2012).

4.2 Sensitive Vegetation Communities

No sensitive vegetation communities were observed within the project site. The project site consists of urban/developed land, which is not considered sensitive.

4.3 Sensitive Plants

No sensitive plant species were observed on the project site. Although Torrey pines, a MSCP covered species and a CNPS rare plant ranking of 1B.2, are present within the project site, these trees are not naturally occurring and are not considered sensitive. The Torrey pines within the project site were planted and verified by examining historic aerials. An assessment of the potential for sensitive plant species to occur within one mile of the project site based on a CNDDB review is presented in Attachment 2.

Image Source: Nearmap (flown September 2018)

0 Feet 2,000

Property Boundary
Fuel Cell Project Site
City of San Diego MHPA

FIGURE 6

Project in Relation to MHPA Preserve Area

RECON

M:\JOBS4\7783\common_gis\fig6_bio_Fuel-Cell.mxd 2/21/2019 fmm

4.4 Sensitive Wildlife Species

No sensitive wildlife species were observed on the project site. None are expected to occur due to lack of native habitat.

Wildlife species known to occur in the project vicinity (i.e., within one mile of the project site) that are federally listed, threatened, endangered, or that have potential to occur based on species range are addressed in Attachment 3.

4.5 Wildlife Movement Corridor

Wildlife movement corridors are defined as areas that connect suitable wildlife habitat areas in a region otherwise fragmented by rugged terrain, changes in vegetation, or human disturbance. Natural features such as canyon drainages, ridgelines, or areas with vegetation cover provide corridors for wildlife travel. Wildlife movement corridors are important, because they provide access to mates, food, and water; allow the dispersal of individuals away from high population density areas; and facilitate the exchange of genetic traits between populations (Beier and Loe 1992). Wildlife movement corridors are considered sensitive by resource and conservation agencies.

The project site does not currently function as a significant wildlife movement corridor. The project site is surrounded by residential development, roads, and fencing, which ultimately restrict its use by wildlife. The site is not a significant MSCP regional corridor and does not provide a throughway for wildlife species into major areas of off-site habitats.

4.6 MHPA

MHPA occurs within the vernal pool preserve on-site and is within 10 feet from the project site. As stated in the MSCP Section 1.4.3 (City of San Diego 1997), land uses adjacent to the MHPA are to be managed to ensure minimal impacts to the MHPA. The MSCP establishes adjacency guidelines to be addressed on a project-by-project basis to minimize direct and indirect impacts and maintain the function of the MHPA. The guidelines listed in Section 1.4.3 of the MSCP (City of San Diego 1997) are outlined below with corresponding project action. The following City of San Diego's Land Use Adjacency Guidelines will be incorporated as project conditions of approval, which will preclude indirect impacts to the MHPA as a result of the project.

A. **Drainage** – All new and proposed parking lots and developed areas in and adjacent to the preserve must not drain directly into the MHPA. All developed and paved areas must prevent the release of toxins, chemicals, petroleum products, exotic plant materials and other elements that might degrade or harm the natural environment or ecosystem processes within the MHPA. This can be accomplished using a variety of methods including natural detention basins, grass swales, or mechanical trapping devices. These systems should be maintained approximately once a year, or as often as needed, to ensure proper functioning. Maintenance should include dredging out sediments if needed, removing exotic plant materials, and adding chemical-neutralizing compounds (e.g., clay compounds) when necessary and appropriate.

    - The project site is at a lower elevation than the MHPA and, therefore, will not drain into the MHPA.

B. **Toxics** – Land uses, such as recreation and agriculture, which use chemicals or generate by-products such as manure that are potentially toxic or impactive to wildlife, sensitive species, habitat, or water quality, need to incorporate measures to reduce impacts caused by the application and/or drainage of such materials into the MHPA. Such measures should include drainage/detention basins, swales, or holding areas with non-invasive grasses or wetland-type native vegetation to filter out the

toxic materials. Regular maintenance should be provided. Where applicable, this requirement should be incorporated into leases on publicly owned property as leases come up for renewal.

- The project hardscape is below the grade of the MHPA and accordingly will not drain into the MHPA. Project construction limits are denoted on the plans and will be outside of the MHPA line.

C. **Lighting** – Lighting of all developed areas adjacent to the MHPA should be directed away from the MHPA. Where necessary, development should provide adequate shielding with non-invasive plant materials (preferably native), berming, and/or other methods to protect the MHPA and sensitive species from night lighting.

- The one existing light standard in the project area will be relocated approximately 18 feet further from the MHPA and be oriented to direct light as it currently is, away from the MHPA. Lighting for the project would be shielded and/or directed away from the MHPA. Lighting for the project would be responsive to the species in the area as well as the overall rural surroundings. Understanding that some species rely on darkness for shelter, feeding patterns, migrating, etc., the areas adjacent to any MHPA would be especially sensitive to light exposure in order to retain native characteristics. Placement and use of lighting associated with the project would accommodate the habits of nocturnal species that prefer to move and forage in darkness.

D. **Barriers** – New development adjacent to the MHPA may be required to provide barriers (e.g., non-invasive vegetation, rocks/boulders, fences, walls, and/or signage) along the MHPA boundaries to direct public access to appropriate locations and reduce domestic animal predation.

- The fuel cell project will occur in an already developed area. A metal fence currently surrounds the vernal pool preserve and the on-site MHPA and has openings to allow movement of small mammals. The location of this fence is shown on plan sheets G0.3, G0.4, G0.5 and G1.1.

E. **Invasives** – No invasive non-native plant species shall be introduced into areas adjacent to the MHPA.

- The intent of the project is not to provide any new landscaping. The existing landscaping around the edges of the project will be replaced in kind. The replacement landscaping will not include any invasive species or prohibited plant species listed in the City of San Diego Landscape Standards Manual (City of San Diego 2009). Therefore, no invasive or prohibited plant species would be introduced into the MHPA.

F. **Brush Management** – New residential development located adjacent to and topographically above the MHPA (e.g., along canyon edges) must be set back from slope edges to incorporate Zone 1 brush management areas on the development pad and outside of the MHPA. Zones 2 and 3 will be combined into one zone (Zone 2) and may be located in the MHPA upon granting of an easement to the City (or other acceptable agency) except where narrow wildlife corridors require it to be located outside of the MHPA. Zone 2 will be increased by 30 feet, except in areas with a low fire hazard severity rating where no Zone 2 would be required. Brush management zones will not be greater in size that is currently required by the City's regulations. The amount of woody vegetation clearing shall not exceed 50 percent of the vegetation existing when the initial clearing is done. Vegetation clearing shall be done consistent with City standards and shall avoid/minimize impacts to covered species to the maximum extent possible. For all new development, regardless of the ownership, the brush management in the Zone 2 area will be the responsibility of a homeowners association or other private party.

- Brush management zone 1 planting will be completed in compliance with the Landscape Regulations Section 142.0412 as part of the City of Municipal Code. Brush management zone 1 is located completely within the development footprint and brush management zone 2 widths have been modified to avoid any encroachment into the MHPA.

G. **Noise** – Due to the site's location adjacent to or within the MHPA where the Qualified Biologist has identified potential nesting habitat for listed avian species, construction noise that exceeds the maximum levels allowed shall be avoided during the breeding seasons for coastal California gnatcatcher (March 1 to August 15). If construction is proposed during the above breeding season for the species, U.S. Fish and Wildlife Service (USFWS) protocol surveys shall be required in order to determine species presence/absence. If protocol surveys are not conducted in suitable habitat during the breeding season for the aforementioned listed species, presence shall be assumed with implementation of noise attenuation and biological monitoring. When applicable (i.e., habitat is occupied or if presence of the covered species is assumed), adequate noise reduction measures (including but not limited to establishment of a buffer, waiting until fledging are independent of the nest, construction of a noise wall, etc.) shall be incorporated.

- Although there is chamise chaparral habitat within the adjacent MHPA in the southeastern corner of the property, it is isolated from large stands of suitable coastal sage scrub and chaparral habitats and immediately surrounded by development. Based on these constraints, the potential to support coastal California gnatcatcher within the on-site MHPA is low and this species is not anticipated to nest within the on-site MHPA; and thus, no expected direct or indirect noise impacts for this species. A benefit of the project design is that the MHPA is at a higher elevation than the entire project site; therefore, it is not anticipated that the MHPA will be indirectly impacted by excessive noise.

H. **Grading/Land Development** – Manufactured slopes associated with site development shall be included within the development footprint for projects within or adjacent to the MHPA.

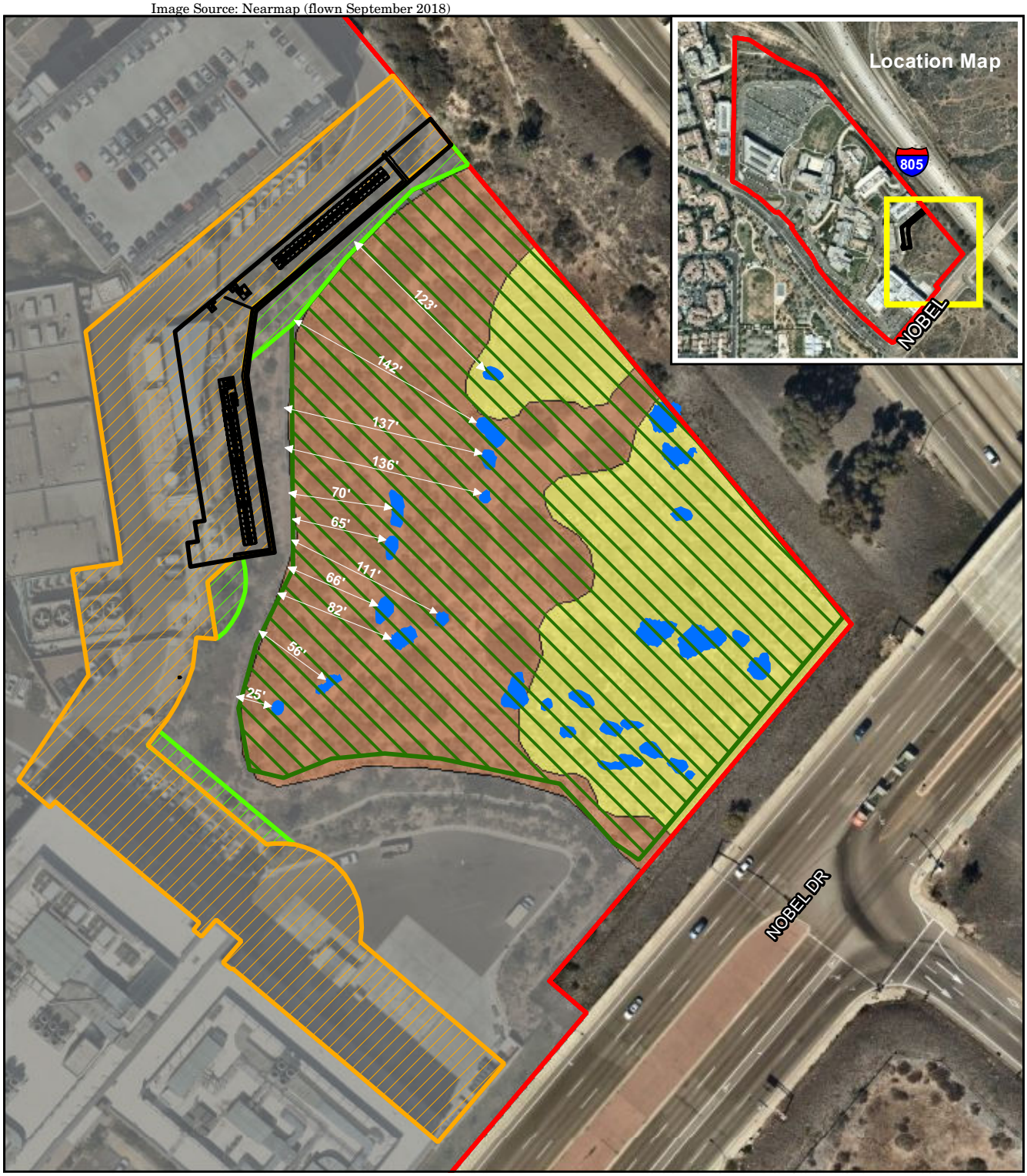
- Construction limits shown on the plans are outside the MHPA limits.

5.0 Direct Impacts

5.1 Vegetation Communities and Land Cover Types

The project construction will directly impact 0.28 acre of urban/developed land. New development projects require Brush Management Zones (BMZ) 1 and 2, consistent with the City's Municipal Code Brush Management requirements, Section 142.0412 (City of San Diego 2018 and City of San Diego 2017). BMZ 2 impacts are considered impact neutral pursuant to the City's Land Development Code (City of San Diego 2018) and Biology Guidelines (City of San Diego 2012) and do not require mitigation. In accordance with the VPHCP, BMZ 2 is not permitted within the MHPA containing vernal pools without approval from the Wildlife Agencies (City of San Diego 2017). Therefore, a modified BMZ 2 has been employed for the project. These impacts are summarized in Table 2 and shown on Figure 7.

Image Source: Nearmap (flown September 2018)



Project Boundary
Conservation Easement
Fuel Cell Project Site
Brush Management Zone 1
Brush Management Zone 2

Vegetation Communities

Chamise Chaparral
Non-native Grassland
Urban/Developed
San Diego Mesa Hardpan Vernal Pools

FIGURE 7

Impacts to Biological Resources

RECON

M:\JOBS4\7783\common_gis\fig7_bio_Fuel-Cell.mxd 2/26/2019 fmm

Table 2
Impacts to Vegetation Communities and Land Cover Types

Land Cover Type	ESL Tier	Existing on Entire Property (acres)	Fuel Cell Impacts[1] (acres)	BMZ 2 Impacts[2] (acres)
Diegan coastal sage scrub	II	0.67	0.00	0.00
Disturbed Diegan coastal sage scrub	II	1.84	0.00	0.00
Chamise chaparral	IIIA	1.57	0.00	0.00
Non-native grassland	IIIB	0.90	0.00	0.00
Urban/Developed Land	IV	37.49	0.28	0.12
San Diego Mesa Hardpan Vernal Pools	-	0.13	0.00	0.00
TOTAL		**42.6**	**0.28**	**0.12**

[1]BMZ 1 is included in the Fuel Cell Impacts as they are also considered permanent impacts.
[2]BMZ 2 impacts are considered impact neutral and do not contribute towards mitigation.

Tier IV uplands are not considered sensitive by the City. Therefore, impacts to 0.28 acre of urban/developed land would not be significant. Additionally, the project would not result in a substantial adverse impact on any Tier I Habitats, Tier II Habitats, Tier IIIA Habitats, or Tier IIIB Habitats, as identified in the Biology Guidelines of the Land Development Manual, or other sensitive natural community identified in local or regional plans, policies, and regulations (City of San Diego 2012).

5.2 Wildlife

General wildlife. The project may result in direct impacts to small mammals and reptiles with low mobility. Large mammal species and most birds will be able to move out of the way during grading. These impacts to general wildlife are considered less than significant and therefore would not require mitigation.

Nesting birds. The ornamental trees on-site are generally small in size and are considered to have low potential to support nesting raptor species. Although they may provide habitat for smaller, migratory birds; there is a less likelihood for nesting birds to use the ornamental vegetation as there are large areas of native habitat available within the property, which are more suitable to support nesting birds. The native habitats within the property also provide foraging opportunities for nesting birds and are large enough to support breeding territories. Additionally, there is a vast amount of suitable native habitat east of I-805 and south of Nobel Drive. No direct impacts are expected to occur to nesting birds as there will be no impacts to the Diegan coastal sage scrub habitats, chamise chaparral, non-native grassland, and San Diego mesa hardpan vernal pools within the property.

6.0 Indirect Impacts

The proposed project would avoid indirect impacts through implementation of the appropriate avoidance and minimization measures in accordance with VPHCP (City of San Diego 2017), including temporary silt fencing, monitoring by a biologist during and post-construction, worker training, and fugitive dust control. As such, indirect impacts to covered species would be below a level of significance. Through implementation of the avoidance and minimization measures, as identified in the Mitigation Framework of the VPHCP, the proposed project would not result in a significant indirect impact on any sensitive vernal pool habitat or species. Additionally, the preserve containing the vernal pools and their watershed is fenced and buffers ranging from 25 and 142 feet are present between the project site and the vernal pools (see Figure 7). The implementation of the project would not adversely affect the existing vernal pools on-site.

6.1 Indirect Impacts to the MHPA

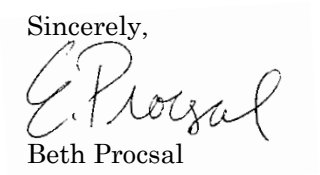
The closest MHPA is approximately 10 feet from the project site (see Figure 6). Compliance with the City of San Diego's Land Use Adjacency Guidelines as described above will preclude indirect project impacts to the MHPA.

7.0 Mitigation

Mitigation is required for project impacts that are considered significant under CEQA (City of San Diego 2011). Implementation of the City of San Diego's Land Use Adjacency Guidelines and VPHCP directives have been incorporated into the design of the project, as conditions of approval, to avoid all direct and indirect impacts. No significant direct or indirect impacts to biological resources have been identified for the proposed project; therefore, no mitigation is required.

If you have any questions, please do not hesitate to contact me.

Sincerely,



Beth Procsal
Associate Biologist

EAP:jg

Attachments

8.0 References Cited

Baker, R. J., Lisa C. Bradley, Robert D. Bradley, Jerry W. Dragoo, Mark D. Engstrom, Robert S. Hoffman, Cheri A. Jones, Fiona Reid, Dale W. Rice, and Clyde Jones
2003 Revised Checklist of North American Mammals North of Mexico. Occasional Papers, Museum of Texas Tech University No. 229. December.

Beier, P., and S. Loe
1992 A Checklist for Evaluating Impacts to Wildlife Movement Corridors. Wildlife Society Bulletin. 20:434-440.

Brenzel, K. N.
2001 Sunset Western Garden Book. Sunset Publishing. Menlo Park, California.

California, State of
1991 Fish and Game Code of California.

2018a Natural Diversity Data Base. RareFind Version 5. Department of Fish and Game.

2018b State and Federally Listed Endangered, Threatened, and Rare Plants of California. Natural Diversity Database. Department of Fish and Game. August.

2018c Special Vascular Plants, Bryophytes, and Lichens List. Natural Diversity Database. Department of Fish and Game. November.

2018d State and Federally Listed Endangered, Threatened, and Rare Animals of California. Natural Diversity Database. Department of Fish and Game. August.

2018e Special Animals. Natural Diversity Database. Department of Fish and Game. November.

California Native Plant Society (CNPS)
2019 Inventory of Rare and Endangered Plants (online edition, v8-03 0.39). California Native Plant Society, Sacramento, CA. Accessed from http://www.rareplants.cnps.org.

Chesser, R. T., K. J. Burns, C. Cicero, J. L. Dunn, A. W. Kratter, I. J. Lovette, P. C. Rasmussen, J. V. Remsen, Jr., D. F. Stotz, B. M. Winger, and K. Winker
2018 Check-list of North American Birds (online). American Ornithological Society. http://checklist.aou.org/taxa.

Crother, B. I., ed.
2008 Scientific and Standard English Names of Amphibians and Reptiles of North America North of Mexico, with Comments Regarding Confidence in our Understanding, Sixth Edition. Society for the Study of Amphibians and Reptiles Herpetological Circular 37.

Eriksen, C., and D. Belk
1999 Fairy Shrimps of California's Puddles, Pools, and Playas. Mad River Press, Eureka, CA.

Federal Emergency Management Agency (FEMA)
2015 Flood Map Service Center. Accessed from https://msc.fema.gov/portal/.

Holland, R. F.
1986 Preliminary Descriptions of the Terrestrial Natural Communities of California. Nongame-Heritage Program, California Department of Fish and Game. October.

Jennings, M. R., and M. P. Hayes
1994 Amphibian and Reptile Species of Special Concern in California. Final report submitted to the California Department of Fish and Game, Inland Fisheries Division, Rancho Cordova, CA. Contract number 8023.

Jepson Flora Project (eds.)
2019 Jepson eFlora, http://ucjeps.berkeley.edu/eflora/. January.

Oberbauer, T., M. Kelly, and J. Buegge
2008 Draft Vegetation Communities of San Diego County. March. Based on "Preliminary Descriptions of the Terrestrial Natural Communities of California," Robert F. Holland, Ph.D., October 1986.

Reiser, Craig H.
2001 Rare Plants of San Diego County. Aquafir Press. July.

RECON Environmental, Inc. (RECON)
2016 Results of the Biological Survey for the Illumina Campus Project. September.

Rick Engineering
2018 Exhibit A for the Illumina Campus Project. March 13.

San Diego, City of
1997 Multiple Species Conservation Plan. City of San Diego MSCP Subarea Plan. March.

2009 City of San Diego Landscape Standards Manual.

2011 Significance Determination Guidelines Under the California Environmental Quality Act. Planning and Development Review, Land Development Review Division, Environmental Analysis Section. July.

2012 Final Draft, City of San Diego Biology Guidelines for the Environmentally Sensitive Lands Regulations (ESL), the Open Space Residential (OR-1-2) Zone, and the California Environmental Quality Act (CEQA). June.

2017 Final City of San Diego Vernal Pool Habitat Conservation Plan Environmental Impact Report/ Environmental Impact Statement. October.

2018 Municipal Code, Chapter 142.0412.

San Diego Natural History Museum
2002 Butterflies of San Diego County, prepared by Micheal Klein. Revised September 2002. http://www.sdnhm.org/science/entomology/projects/checklist-of-butterflies-of-san-diego-county/.

Unitt, P. A.
2004 San Diego County Bird Atlas. San Diego Natural History Museum, Ibis Publishing Company. San Diego, California. October.

United States Department of Agriculture (USDA)
2013 Plants Database. Accessed from http://plants.usda.gov.

U.S. Department of the Interior
2017 Memorandum M-37050. The Migratory Bird Treaty Act Does Not Prohibit Incidental Take. December 22.

U.S. Geological Survey
1975 Del Mar and La Jolla Quadrangles 7.5-Minute Topographic Map.

ATTACHMENTS

ATTACHMENT 1

Plant Species Observed

Attachment 1 Plant Species Observed			
Scientific Name	Common Name	Habitat	Origin
GYMNOSPERMS			
PINACEAE	**PINE FAMILY**		
Pinus torreyana Parry ex Carrière ssp. *torreyana*	Torrey pine	DEV	N
ANGIOSPERMS: DICOTS			
AIZOACEAE	**FIG-MARIGOLD FAMILY**		
Carpobrotus edulis (L.) N.E. Br.	freeway iceplant	DEV	I
ANACARDIACEAE	**SUMAC OR CASHEW FAMILY**		
Malosma laurina Nutt. ex Abrams	laurel sumac	DEV	N
Rhus integrifolia (Nutt.) Benth. & Hook. f. ex Rothr.	lemonade berry	DEV, CC	N
ASTERACEAE	**SUNFLOWER FAMILY**		
Artemisia californica Less.	California sagebrush	DEV, CC	N
Baccharis pilularis DC.	chaparral broom, coyote brush	DEV	N
Baccharis sarothroides A. Gray	broom baccharis	DEV	N
Baccharis pilularis pilularis	'Pigeon Point'	DEV	N
Deinandra [=*Hemizonia*] *fasciculata* (DC.) Greene	fascicled tarweed, golden tarplant	CC	N
Stephanomeria cichoriacea A. Gray	silver rock-lettuce, chicoryleaf wire-lettuce, stephanomeria	CC	N
BORAGINACEAE	**BORAGE FAMILY**		
Cryptantha sp.	cryptantha	CC	N
Plagiobothrys sp.	popcornflower	CC	N
ERICACEAE	**HEATH FAMILY**		
Xylococcus bicolor Nutt.	mission manzanita	CC	N
FABACEAE (LEGUMINOSAE)	**LEGUME FAMILY**		
Acacia cyclops A. Cunn. ex G. Don	western coastal wattle	DEV	I
FAGACEAE	**OAK FAMILY**		
Quercus berberidifolia Liebm.	scrub oak	DEV	N
Quercus dumosa Nutt.	Nuttall's scrub oak	CC	N
GERANIACEAE	**GERANIUM FAMILY**		
Erodium botrys	long-beak filaree	CC	I

Attachment 1 Plant Species Observed			
Scientific Name	Common Name	Habitat	Origin
LAMIACEAE	**MINT FAMILY**		
Salvia mellifera Greene	black sage	DEV, CC	N
PLANTAGINACEAE	**PLANTAIN FAMILY**		
Plantago erecta E. Morris	dot-seed plantain	CC	N
POLYGONACEAE	**BUCKWHEAT FAMILY**		
Eriogonum fasciculatum Benth.	California buckwheat	DEV	N
ROSACEAE	**ROSE FAMILY**		
Adenostoma fasciculatum Hook. & Arn.	chamise, greasewood	CC	N
Heteromeles arbutifolia (Lindl.) M. Roem.	toyon, Christmas berry	DEV	N

Notes: Scientific and common names were primarily derived from the Jepson Online Interchange (Jepson Flora Project 2018). In instances where common names were not provided in this resource, common names were obtained from Rebman and Simpson (2006). Additional common names were obtained from the U.S. Department of Agriculture-maintained database (2013) or the Sunset Western Garden Book (Brenzel 2001) for ornamental/horticultural plants.

HABITATS
CC = Chamise chaparral
DEV = Developed Land

ORIGIN
N = Native to locality
I = Introduced species from outside locality

ATTACHMENT 2

Sensitive Plant Species Observed or
with the Potential for Occurrence

Attachment 2 Sensitive Plant Species Observed or with the Potential for Occurrence					
Species	State/Federal Status	CNPS List	City of San Diego	Habitat/Blooming Period	Comments
GYMNOSPERMS					
PINACEAE PINE FAMILY					
Pinus torreyana ssp. *torreyana* Torrey pine (native pop.)	–/–	1B.2	MSCP	Evergreen tree; closed-cone coniferous forest, chaparral; sandstone; elevation 250–525 feet. San Diego County endemic. There are approximately 7,000 native trees, most in Torrey Pines State Reserve, others on private property. This species is widely planted as an ornamental in the region.	Torrey Pines were **observed** within the urban/disturbed lands within the project site. Planted individuals occurring within the brush management zone 1 of the project site are not considered sensitive. This species has been known to occur within a one-mile buffer of the survey area (State of California 2018c).
ANGIOSPERMS: DICOTS					
CHENOPODIACEAE GOOSEFOOT FAMILY					
Aphanisma blitoides aphanisma	–/–	1B.2	NE, MSCP	Annual herb; coastal bluff scrub, coastal sage scrub; sandy soils; blooms March–June; elevation less than 1,000 feet.	This species has a low potential to occur within the project site due to the lack of suitable habitat and sandy soils. No individuals were observed within the survey area. This species has been known to occur within a one-mile buffer of the survey area (State of California 2018c).
APIACEAE CARROT FAMILY					
Eryngium aristulatum var. *parishii* San Diego button-celery	CE/FE	1B.1	NE, MSCP	Biennial/perennial herb; vernal pools, mesic areas of coastal sage scrub and grasslands, blooms April–June; elevation less than 2,000 feet. Known from San Diego and Riverside counties. Additional populations occur in Baja California, Mexico.	This species was not observed and not expected to occur due to the lack of suitable habitats. No individuals were observed within the project site. This species has been known to occur within a one-mile buffer of the survey area (State of California 2018b).

Attachment 2 Sensitive Plant Species Observed or with the Potential for Occurrence					
Species	State/Federal Status	CNPS List	City of San Diego	Habitat/Blooming Period	Comments
ASTERACEAE SUNFLOWER FAMILY					
Ambrosia pumila San Diego ambrosia	–/FE	1B.1	NE, MSCP	Perennial herb (rhizomatous); chaparral, coastal sage scrub, valley and foothill grasslands, creek beds, vernal pools, often in disturbed areas; blooms May–September; elevation less than 1,400 feet. Many occurrences extirpated in San Diego County.	This species has a low potential to occur within the project site due to the presence chamise chaparral nearby. No individuals were observed within the project site. This species has been known to occur within a one-mile buffer of the survey area (State of California 2018b).
Baccharis vanessae Encinitas baccharis [=Encinitas coyote brush]	CE/FT	1B.1	NE, MSCP	Perennial deciduous shrub; chaparral; maritime; sandstone; blooms August–November; elevation less than 2,500 feet. San Diego County endemic. Known from fewer than 20 occurrences. Extirpated from Encinitas area.	This species is not expected to occur as it is out of its known range.
Deinandra [=*Hemizonia*] *conjugens* Otay tarplant	CE/FT	1B.1	NE, MSCP	Annual; blooms May–June, elevation less than 1,000 feet.	This species is not expected to occur as it is out of its known range.
CACTACEAE CACTUS FAMILY					
Cylindropuntia californica var. *californica* [=*Opuntia parryi* var. *serpentina*] snake cholla	–/–	1B.1	NE, MSCP	Perennial stem succulent; chaparral, coastal sage scrub; blooms April–May; elevation 100–500 feet.	This species is not expected to occur as it is out of its known range.
CRASSULACEAE STONECROP FAMILY					
Dudleya brevifolia [=*D. blochmaniae* ssp. *brevifolia*] short-leaved dudleya [short-leaved live-forever]	CE/–	1B.1	NE, MSCP	Perennial herb; southern maritime chaparral, coastal sage scrub on Torrey sandstone; blooms in April; elevation less than 1,000 feet. San Diego County endemic. Known from fewer than five occurrences in the Del Mar and La Jolla areas.	This species is not expected to occur, as it is out of its known range.

Attachment 2 Sensitive Plant Species Observed or with the Potential for Occurrence					
Species	State/Federal Status	CNPS List	City of San Diego	Habitat/Blooming Period	Comments
Dudleya variegata variegated dudleya	–/–	1B.2	NE, MSCP	Perennial herb; openings in chaparral, coastal sage scrub, grasslands, vernal pools; blooms May–June; elevation less than 1,900 feet.	This species was not observed and not expected to occur within the project site. This species has been known to occur within a one-mile buffer of the survey area (State of California 2018c).
FABACEAE **LEGUME FAMILY**					
Astragalus tener var. *titi* coastal dunes milkvetch	CE/FE	1B.1	NE, MSCP	Annual herb; coastal bluff scrub, coastal dunes, sandy soils, mesic coastal prairie; blooms March–May; elevation less than 200 feet. California endemic. Known from fewer than 10 occurrences in San Diego (presumed extirpated), Los Angeles (presumed extirpated), and Monterey counties.	This species is not expected to occur as it is out of its known range.
LAMIACEAE **MINT FAMILY**					
Acanthomintha ilicifolia San Diego thornmint	CE/FT	1B.1	NE, MSCP	Annual herb; chaparral, coastal sage scrub, and grasslands; friable or broken clay soils; blooms April–June; elevation less than 3,200 feet.	This species was not observed and not expected to occur due to the lack of suitable habitats. No individuals were observed within the project site. This species has been known to occur within a one-mile buffer of the survey area (State of California 2018b).
Pogogyne abramsii San Diego mesa mint	CE/FE	1B.1	NE, MSCP	Annual herb; vernal pools; blooms April–July; elevation 300–700 feet. San Diego County endemic.	This species was not observed and not expected to occur due to the lack of suitable habitats. No individuals were observed within the project site. This species has been known to occur within a one-mile buffer of the survey area (State of California 2018b).

Attachment 2 Sensitive Plant Species Observed or with the Potential for Occurrence					
Species	State/Federal Status	CNPS List	City of San Diego	Habitat/Blooming Period	Comments
Pogogyne nudiuscula Otay mesa mint	CE/FE	1B.1	NE, MSCP	Annual herb; vernal pools; blooms May–July; elevation 300–820 feet. In California, known from approximately 10 occurrences in Otay Mesa in San Diego County. Additional populations occur in Baja California, Mexico.	This species is not expected to occur as it is out of its known range.
POLEMONIACEAE PHLOX FAMILY					
Navarretia fossalis spreading navarretia [=prostrate navarretia]	–/FT	1B.1	NE, MSCP	Annual herb; vernal pools, marshes and swamps, chenopod scrub; blooms April–June; elevation 100–4,300 feet.	This species was not observed and not expected to occur due to the lack of suitable habitats. No individuals were observed within the project site. This species has been known to occur within a one-mile buffer of the survey area (State of California 2018b).
ANGIOSPERMS: MONOCOTS					
AGAVACEAE AGAVE FAMILY					
Agave shawii var. *shawii* Shaw's agave	–/–	2B.1	NE, MSCP	Perennial leaf succulent; coastal bluff scrub, coastal sage scrub, maritime succulent scrub; blooms September–May; elevation less than 400 feet.	This species is not expected to occur as it is out of its known range.
POACEAE GRASS FAMILY					
Orcuttia californica California Orcutt grass	CE/FE	1B.1	NE, MSCP	Annual herb; vernal pools; blooms April–August; elevation 50–2,200 feet.	This species was not observed and not expected to occur due to the lack of suitable habitats. No individuals were observed within the project site. This species has been known to occur within a one-mile buffer of the survey area (State of California 2018b).

Attachment 2 Sensitive Plant Species Observed or with the Potential for Occurrence					
Species	State/Federal Status	CNPS List	City of San Diego	Habitat/Blooming Period	Comments

FEDERAL CANDIDATES AND LISTED PLANTS

FE = Federally listed endangered
FT = Federally listed threatened
FC = Federal candidate for listing as endangered or threatened

STATE LISTED PLANTS

CE = State listed endangered

CALIFORNIA NATIVE PLANT SOCIETY RARE PLANT RANKING

1B = Species rare, threatened, or endangered in California and elsewhere. These species are eligible for state listing.
2B = Species rare, threatened, or endangered in California but more common elsewhere. These species are eligible for state listing.
.1 = Species seriously threatened in California (over 80% of occurrences threatened; high degree and immediacy of threat).
.2 = Species fairly threatened in California (20-80% occurrences threatened; moderate degree and immediacy of threat).

CITY OF SAN DIEGO

NE = Narrow endemic
MSCP = Multiple Species Conservation Program covered species

ATTACHMENT 3

Sensitive Wildlife Species Occurring
or with the Potential to Occur

Attachment 3 Sensitive Wildlife Species Occurring or with the Potential to Occur			
Species	Status	Habitat	Occurrence/Comments
INVERTEBRATES (Nomenclature from Eriksen and Belk 1999; San Diego Natural History Museum 2002)			
BRANCHINECTIDAE **FAIRY SHRIMP**			
San Diego fairy shrimp *Branchinecta sandiegonensis*	FE, MSCP, *	Vernal pools.	This species was not observed within the project site and not expected to occur due to the absence of vernal pool habitat. This species has been previously documented within the property (State of California 2018d).
NYMPHALIDAE **BRUSH-FOOTED BUTTERFLIES**			
Quino checkerspot *Euphydryas editha quino*	FE	Open, dry areas in foothills, mesas, lake margins. Larval host plant *Plantago erecta.* Adult emergence mid-January through April.	This species was not observed within the project site and not expected to occur due to the absence of suitable habitats. Although *Plantago erecta* was observed within the chamise chaparral, no direct impacts will occur within that habitat.
AMPHIBIANS (Nomenclature from Crother et al. 2008)			
PELOBATIDAE **SPADEFOOT TOADS**			
Western spadefoot *Spea hammondii*	CSC	Vernal pools, floodplains, and alkali flats within areas of open vegetation.	This species was not observed within the project site and not expected to occur due to the absence of vernal pool and other suitable habitats. This species has been previously documented within the property (State of California 2018e).
SCINCIDAE **SKINKS**			
Coronado skink *Eumeces skiltonianus interparietalis*	CSC	Grasslands, open woodlands and forest, broken chaparral. Rocky habitats near streams.	This species was not observed within the project site and not expected to occur due to the absence of suitable habitats. This species has been known to occur within a one-mile buffer of the project site (State of California 2018e).
CROTALIDAE **RATTLESNAKES**			
Red diamond rattlesnake *Crotalus ruber*	CSC	Desert scrub and riparian, coastal sage scrub, open chaparral, grassland, and agricultural fields.	This species was not observed and not expected to occur within the project site due to the lack of suitable habitats. This species has been known to occur within a one-mile buffer of the property (State of California 2018e).

Attachment 3 Sensitive Wildlife Species Occurring or with the Potential to Occur			
Species	Status	Habitat	Occurrence/Comments
BIRDS (Nomenclature from Chesser, et. al 2018 and Unitt 2004)			
ACCIPITRIDAE HAWKS, KITES, & EAGLES			
Cooper's hawk (nesting) *Accipiter cooperii*	WL, MSCP	Mature forest, open woodlands, wood edges, river groves. Parks and residential areas.	This species was not observed and there is low potential for this species to occur within the trees within the project site. The trees on-site are small and mature woodlands are not available for nesting raptors.
Northern harrier (nesting) *Circus cyaneus hudsonius*	CSC, MSCP	Coastal lowland, marshes, grassland, agricultural fields. Migrant and winter resident, rare summer resident.	This species was not observed and not expected to occur within the project site due to the lack of suitable habitats. This species has been known to occur within a one-mile buffer of the property (State of California 2018e).
White-tailed kite (nesting) *Elanus leucurus*	CFP, *	Nest in riparian woodland, oaks, sycamores. Forage in open, grassy areas. Year-round resident.	This species was not observed and not expected to occur within the project site due to the lack of absence of riparian and oak woodlands. This species has been known to occur within a one-mile buffer of the property (State of California 2018e).
SYLVIIDAE GNATCATCHERS			
Coastal California gnatcatcher *Polioptila californica californica*	FT, CSC, MSCP	Coastal sage scrub, maritime succulent scrub. Resident.	This species was not observed and not expected to occur within the project site. Although there are scattered native plant species within the BMZ 1 area, these individuals do not constitute as native habitat. This species has been known to occur within a one-mile buffer of the survey area (State of California 2018d).
EMBERIZIDAE EMBERIZIDS			
Grasshopper sparrow (nesting) *Ammodramus savannarum perpallidus*	CSC	Tall grass areas. Localized summer resident, rare in winter.	This species was not observed and not expected to occur within the project site due to the absence of tall grassy areas. This species has been known to occur within a one-mile buffer of the survey area (State of California 2018e).

Attachment 3 Sensitive Wildlife Species Occurring or with the Potential to Occur			
Species	Status	Habitat	Occurrence/Comments
MAMMALS (Nomenclature from Baker 2003)			
FELIDAE **CATS**			
Mountain lion *Puma concolor*	CFP, MSCP	Many habitats.	This species was not observed and not expected to occur within the project site as a majority of the property is fenced and not part of a major wildlife corridor. This species has been known to occur within a one-mile buffer of the property (State of California 2018e).
CERVIDAE **DEER**			
Southern mule deer *Odocoileus hemionus fuliginata*	MSCP	Many habitats.	This species was not observed and not expected to occur within the project site due to lack of suitable habitats. This species has been known to occur within a one-mile buffer of the property (State of California 2018e).

(I) = Introduced species

STATUS CODES

Listed/Proposed

FE = Listed as endangered by the federal government

FT = Listed as threatened by the federal government

Other

CFP = California fully protected species

CSC = California Department of Fish and Wildlife species of special concern

FC = Federal candidate for listing (taxa for which the U.S. Fish and Wildlife Service has on file sufficient information on biological vulnerability and threat(s) to support proposals to list as endangered or threatened; development and publication of proposed rules for these taxa are anticipated)

WL = California Department of Fish and Wildlife watch list species

MSCP = City and County of San Diego Multiple Species Conservation Program covered species

* = Taxa listed with an asterisk fall into one or more of the following categories:

- Taxa considered endangered or rare under Section 15380(d) of CEQA guidelines
- Taxa that are biologically rare, very restricted in distribution, or declining throughout their range
- Population(s) in California that may be peripheral to the major portion of a taxon's range but which are threatened with extirpation within California
- Taxa closely associated with a habitat that is declining in California at an alarming rate (e.g., wetlands, riparian, old growth forests, desert aquatic systems, native grasslands)

December 5, 2018
Kleinfelder Project No. 20180981.027A

Mr. André Ferouge
Bloom Energy
1299 Orleans Drive
Sunnyvale, California 94068
Andre.Ferouge@bloomenergy.com

SUBJECT: Geotechnical Addendum #1
Permanent Soil Nail Retaining Wall and
Conduit Duct Bank Location
Exterior Fuel Cell Installation For
ILM001.0 - Illumina, Inc.
5200 Illumina Way
San Diego, California

Dear Mr. Ferouge:

This addendum letter presents the results of our supplemental geotechnical evaluation for proposed permanent soil nail retaining walls at the Illumina Incorporated facility located at 5200 Illumina Way in San Diego, California. This letter includes a description of the site and proposed retaining wall, anticipated geologic conditions, and geotechnical recommendations for wall design and construction.

Geotechnical recommendations for project design were provided in our November 9, 2018 Geotechnical Report for the proposed project. That report provided recommendations for conventional CMU retaining walls with temporary excavation slopes. The wall type was subsequently revised to a permanent soil nail retaining wall due to property line and environmental constraints. This letter provides updated recommendations for soil nail retaining walls in addition to recommendations for installation of subsurface conduit duct banks adjacent to equipment foundations.

The geotechnical recommendations in this letter supplement the recommendations provided in our November 9, 2018 report and are subject to the same limitations presented therein.

PROJECT SCOPE AND UNDERSTANDING

The proposed retaining walls will be cut into the lower portion of an existing slope which is approximately 15 to 20 feet tall at an approximate 2 horizontal to 1 vertical inclination (2H:1V). The combined wall length retaining the slope is approximately 305 feet and the perpendicular returns at the ends of the wall are each approximately 25 feet long. The subject walls will be of variable height and setback from the easement line. Project plans indicate the maximum wall height will be approximately 12 feet and the minimum setback is approximately 12 feet from the easement line, with these two conditions coinciding in the northeastern corner. The wall will have a permanent back-slope height above wall varying from 4 feet at the highest wall location to about 15 feet at the lowest wall location.

SUPPLEMENTAL RECOMMENDATIONS

Based upon our review of subsurface explorations and geologic logging of the existing slopes at the site, the proposed construction is feasible from a geotechnical perspective provided the recommendations in this report are incorporated into the project design and construction. It is our opinion that a properly designed and constructed wall will not impact the adjacent property.

Permanent Soil Nail Retaining Walls

Soil nailing is a top-down construction technique that involves the systematic insertion of reinforcing elements consisting of steel rebar and cement grout. Maximum Reinforcing bars installed using drilling techniques are usually fully grouted and installed at a slight downward inclination with bars installed at regularly spaced points across the slope face. Typical inclinations and spacing are 15 degrees and 5 feet on-center, respectively. A rigid concrete facing such as shotcrete with isolated soil nail head plates is typically used for the initial temporary wall face and the subsequent thicker permanent wall face.

The design and construction of a soil nail wall should be performed by a structural engineer and contractor, respectively, with at least 5 years of experience with soil nail walls. Soil nail walls should be designed in accordance with the California Building Code and FHWA Geotechnical Engineering Circular No. 7, Soil Nail Walls – Reference Manual, dated February 2015.

Design considerations include wall layout, soil nail vertical and horizontal spacing, pattern on wall face, reinforcement inclination, reinforcement length and distribution, material properties, etc. Soil nail length, diameter and spacing typically control external and internal stability of the wall. These parameters can be adjusted during design until all external and internal stability requirements are met. The soil nail wall should be designed for external and internal failure modes, seismic considerations and aesthetic qualities. Global slope stability analyses performed by Kleinfelder to establish the minimum nail length are presented in a subsequent section of this letter.

The wall may be constructed vertical or with a batter of 1:12 (horizontal to vertical). The first row of soil nails should be placed no more than 2.5 feet below the original grade behind the wall for nail spacing of 5 feet. The first row of soil nails should be placed no more than 2.0 feet below the original grade behind the wall for nail spacing of 4 feet. The bottom row of soil nails should be placed no more than 2.5 feet above the bottom of excavation of the wall. The maximum incremental excavation height should be 5 feet for each row of anchors.

Our geotechnical investigation indicates the retained zone of this wall will consist of the very dense Eocene-age Scripps Formation with Pleistocene-age very old paralic deposits overlying this unit in the upper approximate 5 feet of the slope. We recommend the geotechnical strength parameters presented in Table 1 and the presumptive pullout resistance parameters in Table 2 be used for design of soil nail walls. The nominal bond stress may be reduced based on local experience of the designer and contractor. The allowable unit pullout is based on an assumed 6 inch diameter hole and should be adjusted for other diameters.

Table 1
Soil Parameters for Wall Design

Wall Height (ft)	Backfill Condition (H:V)	Unit Weight (pcf)	Friction Angle (degrees)	Cohesion (psf)
<15	2:1	125	36	0

Table 2
Summary of Recommended
Presumptive Design Pullout Resistance

Grouting Method	Bond Stress (τ) (psi)			Allowable Unit Pullout for 6-inch diameter Holes Resistance = $D\tau_n/FS_{PO}$ (kip per lineal foot)		
	Nominal	Static Factored (FS_{PO}=2.0)[2]	Seismic Factored (FS_{PO}=1.5)[2]	6" Nominal	6" Static	6" Seismic
Gravity Grouting (<50 psi) – Granular Soils-	**15**[1]	**7.5**	**10**	**3.4**	**1.7**	**2.3**

Note: [1]Value falls within range of acceptable values from FHWA FEC No. 7 for coarse-grained soils. Note that the actual bond stress will be dependent on the actual drilling method and should be confirmed during construction using verification testing.

We recommend that the soil nail wall be designed using an equivalent pseudo-static horizontal acceleration of 0.23g for seismic design, which is ½ of the peak ground acceleration. Although it is customary to ignore apparent cohesion in permanent design, the designer may consider a cohesion of 100 psf for the analysis of temporary excavation stages.

The wall should be designed with redundant measures of internal and external drainage control. Surface drainage should be provided by use of a concrete brow ditch along the top of the wall. Internal drainage control should consist of uniformly spaced composite drainage panels and provided with facial outlets at regular intervals (e.g., every 5 to 10 feet on-center). The soil nail wall reinforcement and anchor connections should be designed for corrosive soil conditions.

Lateral movement of the wall will depend on the type and relative stiffness of the system designed by the engineer, the construction method and care used by the installation contractor, and other factors beyond the scope of this study. Based on our literature review and experience with projects with similar requirements, the lateral movement of a properly designed and constructed permanent shoring system to similar depths and in similar subsurface conditions typically has been reported as ½ to 1 inch. We are not aware of any existing or proposed utilities in the immediate area behind the wall which may be impacted by this this minor movement.

Drilling for the soil nails should be achievable with conventional drilling methods in the very dense and slightly to moderately cemented Scripps Formation. Caving or excessive seepage in the drill holes is not anticipated. The excavated face of each lift is anticipated to be stable with the potential for minor sloughing. The potential for creep of the wall face due to clay soils is very low.

Inspection activities play a vital role in the production of high-quality soil nail walls because conformance to project plans and specifications should result in a soil nail wall that will perform its intended duty for its designed duration. Inspections usually involve evaluation and conformance of system components to material specification, construction methods to execution specifications, short-term performance specifications. Short-term performance specifications are checked with loads tests, which utilize hydraulic jacks and pumps to perform several load applications. Three common load tests for short-term performance are verification or ultimate load tests, proof tests and creep tests. Verification or ultimate load tests are conducted to verify the compliance of the soil nails with pullout capacity and strengths resulting from the contractor's installation method. Proof tests are intended to verify that the contractor's construction procedure has been consistent and that the nails have not been drilled and grouted in a soil zone not tested in the verification stage. Creep tests are performed to ensure that the nail design loads can be safely carried throughout the structure's service life.

Global Slope Stability

Global stability was performed on three sections of varying wall and slope height using Rocscience SLIDE version 7.0. The purpose of the global stability was to determine the minimum required soil nail lengths to meet overall global stability. The wall face was modeled as “infinite” strength to force failure surfaces to exit in front of the wall (since internal stability of the wall is assumed to be met based on the results of structural analysis done by others). The failure surfaces were queried for the minimum factor of safety for each condition (1.5 for static, 1.0 for seismic), and the length from the wall face to the farthest failure surface (assuming a 15-degree soil nail inclination), was measured. Based on the results for both static and global, the following table summarizes the minimum required soil nail lengths for each row to meet the minimum global stability factor of safety for each condition.

Table 4
Minimum Required Soil Nail Lengths Global Stability Section 1

Parameter	Design Value
Analyzed Wall Height (H)	12 feet
Analyzed Slope Height Above Wall	5 feet
Seismic Coeff (k_h)	½*PGA_m = 0.23
Target Factor of Safety for Static	1.5
Target Factor of Safety for Seismic	1.0
R1 Min. Length (static, seismic)	**14.6**, 13.5
R2 Min. Length (static, seismic)	**10.3**, 8.6
R3 Min. Length (static, seismic)	**4.8**, 3.2

Table 5
Minimum Required Soil Nail Lengths Overall Global Stability Section 2

Parameter	Design Value
Analyzed Wall Height (H)	9 feet
Analyzed Slope Height Above Wall	10 feet
Seismic Coeff (k_h)	½*PGA_m = 0.23
Target Factor of Safety for Static	1.5
Target Factor of Safety for Seismic	1.0
R2 Min. Length (static, seismic)	**11.8**, N/A
R3 Min. Length (static, seismic)	**5.3**, N/A

Table 6
Minimum Required Soil Nail Lengths Overall Global Stability Section 3

Parameter	Design Value
Analyzed Wall Height (H)	5 feet
Analyzed Slope Height Above Wall (ft)	15 feet
Seismic Coeff (k_h)	½*PGA_m = 0.23
Target Factor of Safety for Static	1.5
Target Factor of Safety for Seismic	1.0
R2 Min. Length (static, seismic)	N/A (Slope is globally stable)
R3 Min. Length (static, seismic)	N/A (Slope is globally stable)

Geotechnical parameters for slope stability analyses are presented in the preceding section of this letter. The results of the analyses are presented in Appendix A. Slope stability analyses require using geotechnical parameters selected form a wide range of possible values. There is a finite possibility that walls having calculated Safety Factors as indicated above could become unstable. In our opinion, the probability of slopes having a calculated Safety Factor greater than 1.5 (static) and 1.0 (seismic) becoming unstable is low.

Conduit Duct Bank Excavations

The Construction Consideration section within our November 9, 2018 report included the general statement that “Underground utilities that are 4 feet deep or shallower and that run parallel to shallow concrete slab foundations generally should be located no closer than 2 feet horizontally away from the perimeter edges of the slab.” Upon further review of the current plans and site constraints, conduit duct banks are proposed closer than 2 feet from foundations. It is our opinion that this is acceptable considering the anticipated soil conditions, foundation loads and provided that cement slurry is used as backfill within the trenches. Construction activities should be

sequenced so that trench excavations do not undermine the foundations and the trenches are backfilled prior to structural loads placed on the foundations.

CLOSURE

We trust this information meets your current needs. We appreciate the opportunity to be of professional service to you on this project. If you have any questions please do not hesitate to contact us at 925.484.1700.

Respectfully submitted,

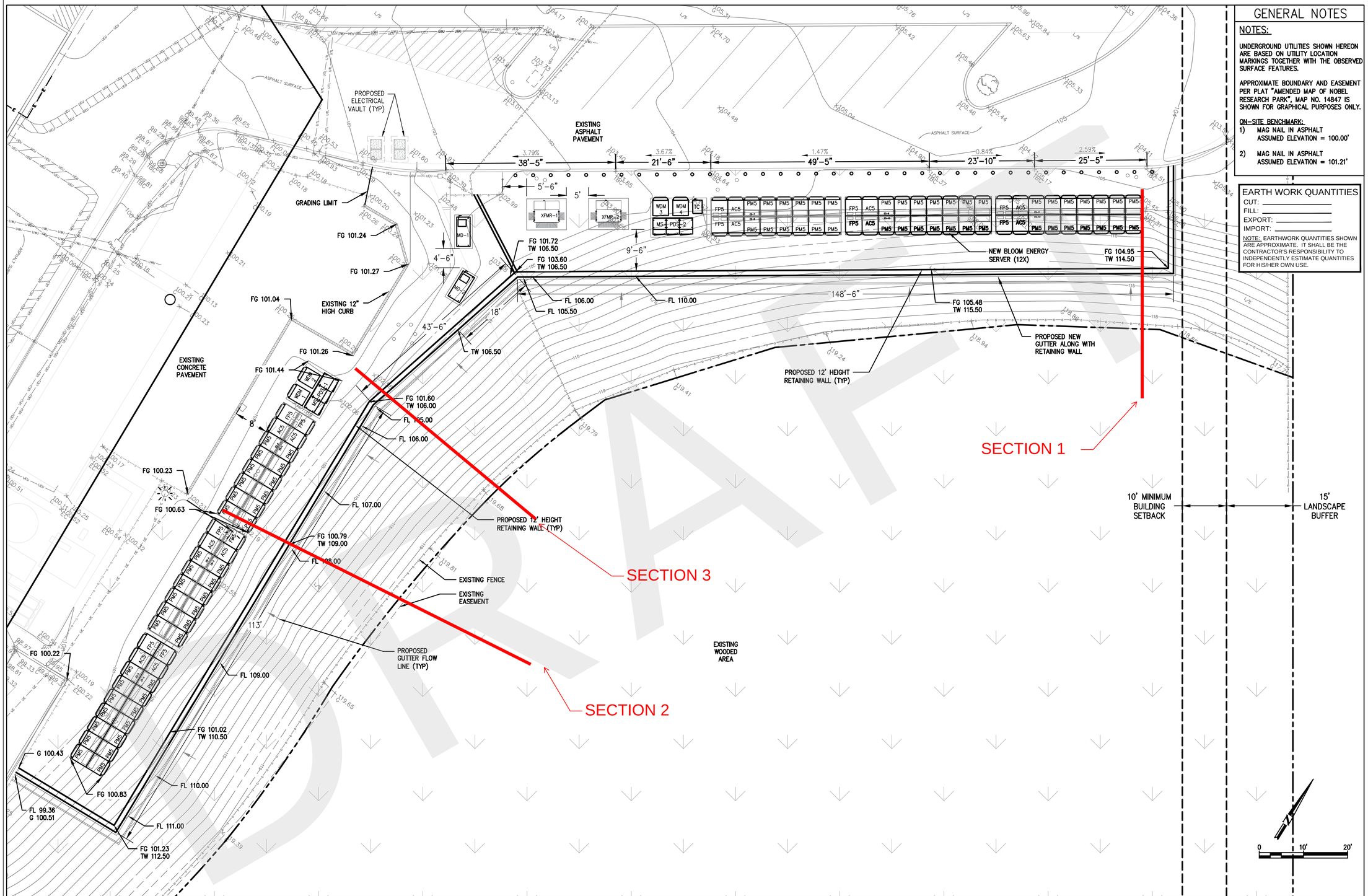
KLEINFELDER.

Kevin Crennan, PE, GE
Senior Geotechnical Engineer

Rebecca L. Money, PE, GE
Senior Geotechnical Engineer

Attachments: Preliminary Progress Grading Plan
Appendix A – Results of Global Slope Stability Analyses

PRELIMINARY PROGRESS GRADING PLAN



GENERAL NOTES

NOTES:

UNDERGROUND UTILITIES SHOWN HEREON ARE BASED ON UTILITY LOCATION MARKINGS TOGETHER WITH THE OBSERVED SURFACE FEATURES.

APPROXIMATE BOUNDARY AND EASEMENT PER PLAT "AMENDED MAP OF NOBEL RESEARCH PARK", MAP NO. 14847 IS SHOWN FOR GRAPHICAL PURPOSES ONLY.

ON-SITE BENCHMARK:

1) MAG NAIL IN ASPHALT
   ASSUMED ELEVATION = 100.00'

2) MAG NAIL IN ASPHALT
   ASSUMED ELEVATION = 101.21'

EARTH WORK QUANTITIES

CUT: _____

FILL: _____

EXPORT: _____

IMPORT: _____

NOTE: EARTHWORK QUANTITIES SHOWN ARE APPROXIMATE. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO INDEPENDENTLY ESTIMATE QUANTITIES FOR HIS/HER OWN USE.

DETAILED GRADING PLAN

SCALE: 1" = 10'

1 / C1.2

Bloom energy

1299 ORLEANS DRIVE
SUNNYVALE, CA 94089

GreenbergFarrow

1430 W. Peachtree St., Suite 200
Atlanta, CA 30309
t: 404 601 4000 f: 404 601 3980

ENGINEER OF RECORD
JOHN NOURZAD, P.E.
LICENSE #

PRELIMINARY NOT FOR CONSTRUCTION

CUSTOMER SITE

ILLUMINA INC.
5200 ILLUMINA WAY
SAN DIEGO, CA 92122

illumina

REVISION HISTORY		
REV	REVISION ISSUE	DATE
–	RELEASED PER ICN	10/04/2018

DESIGNED BY	REVIEWED BY
DRAWN BY LAKSHMI S	APPROVED BY

SHEET TITLE

GRADING PLAN

DRAWING NUMBER

C1.2

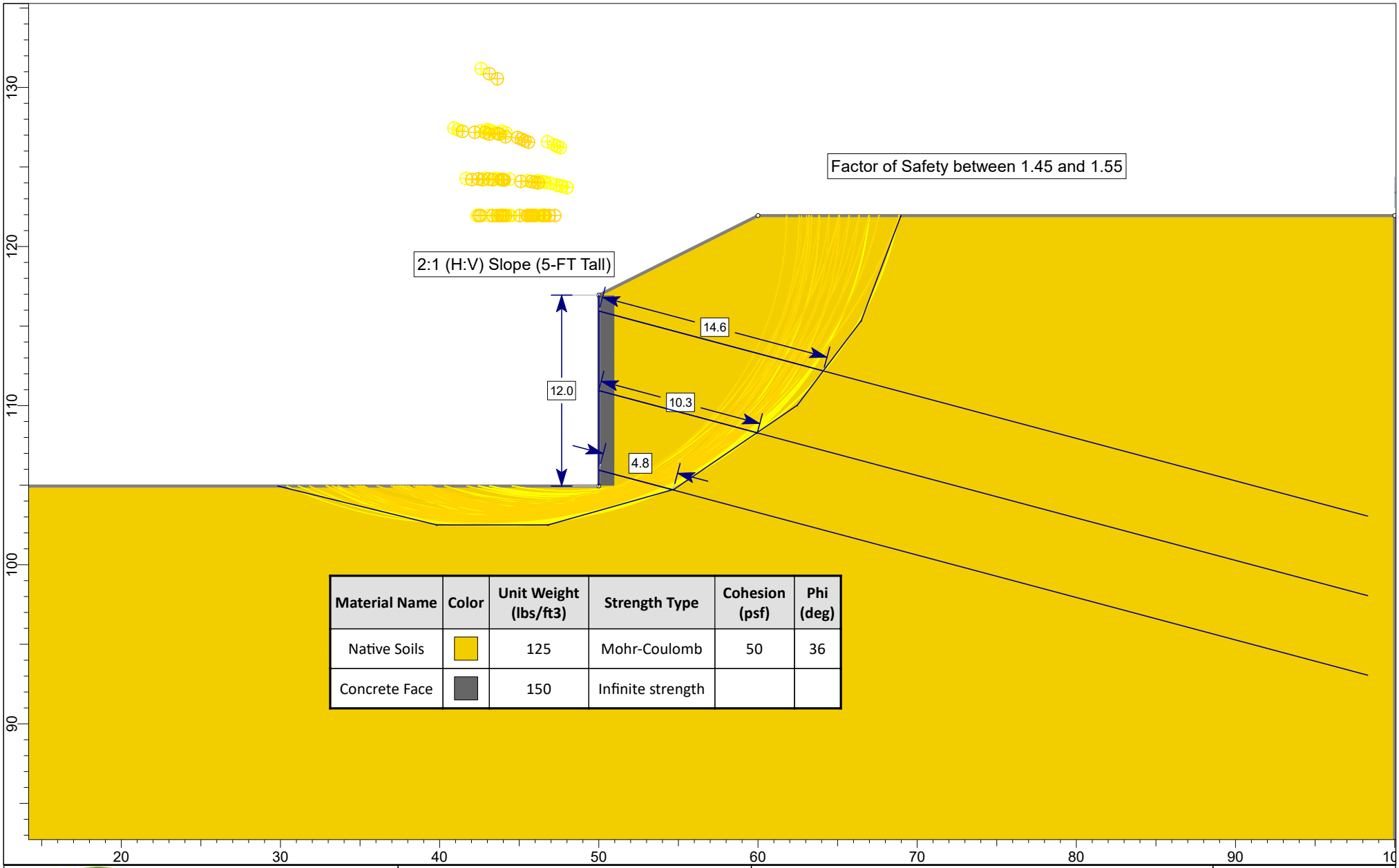
BLOOM DOCUMENT

DOC-1010970

THIS DRAWING IS 24" X 36" AT FULL SIZE

SITE ID: ILM001.0 | SHEET 06 OF 26

APPENDIX A
RESULTS OF GLOBAL SLOPE STABILITY ANALYSES

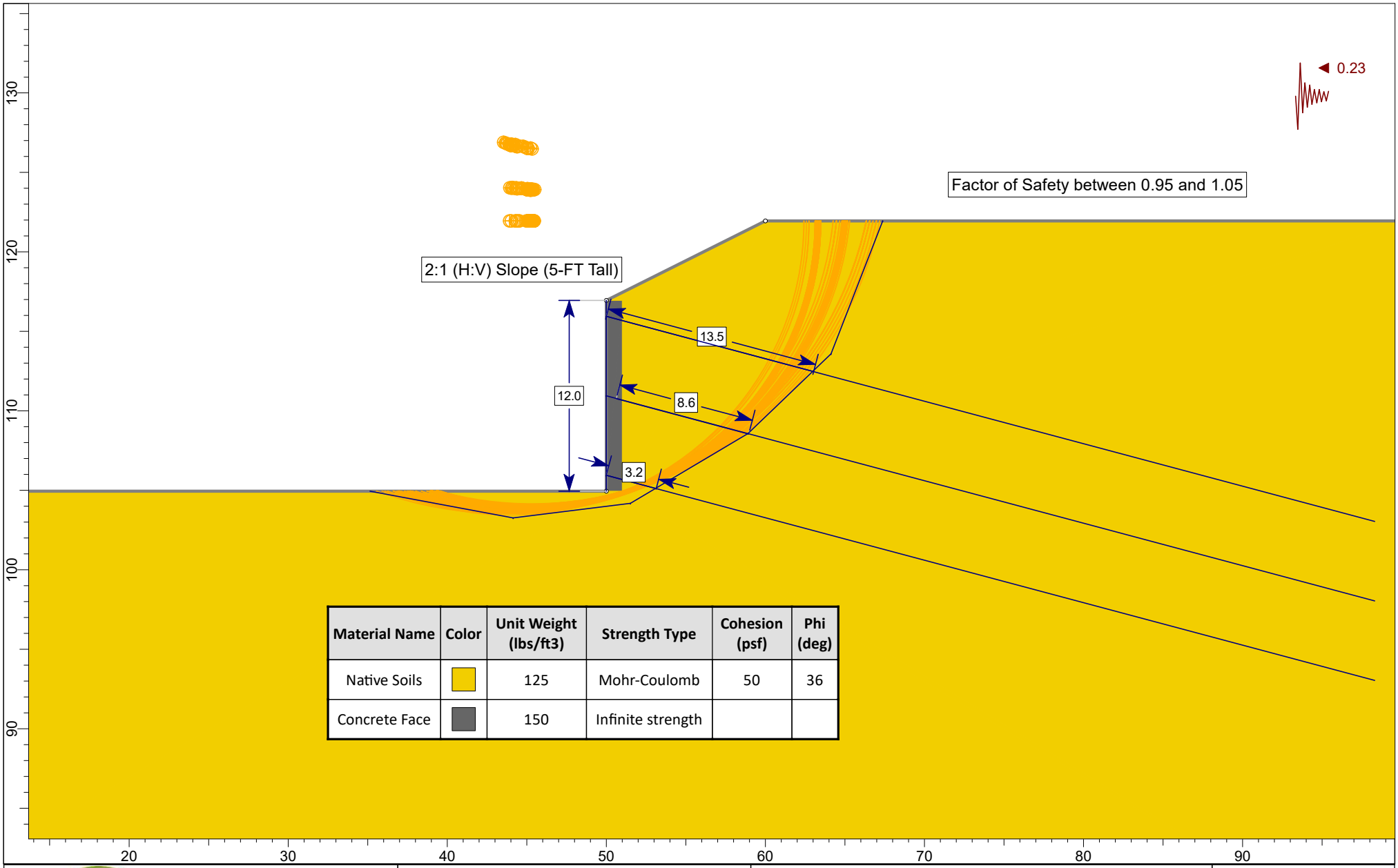


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Native Soils		125	Mohr-Coulomb	50	36
Concrete Face		150	Infinite strength		

KLEINFELDER
Bright People. Right Solutions.

Project No.: 20182232	Global Stability.slmd - Section 1, Static
Drawn by: Z. Jarecki	
Date:11/27/2018	
Checked by: D. Castle	**Illumina Fuel Cell**
Date: 11/27/2018	

Figure

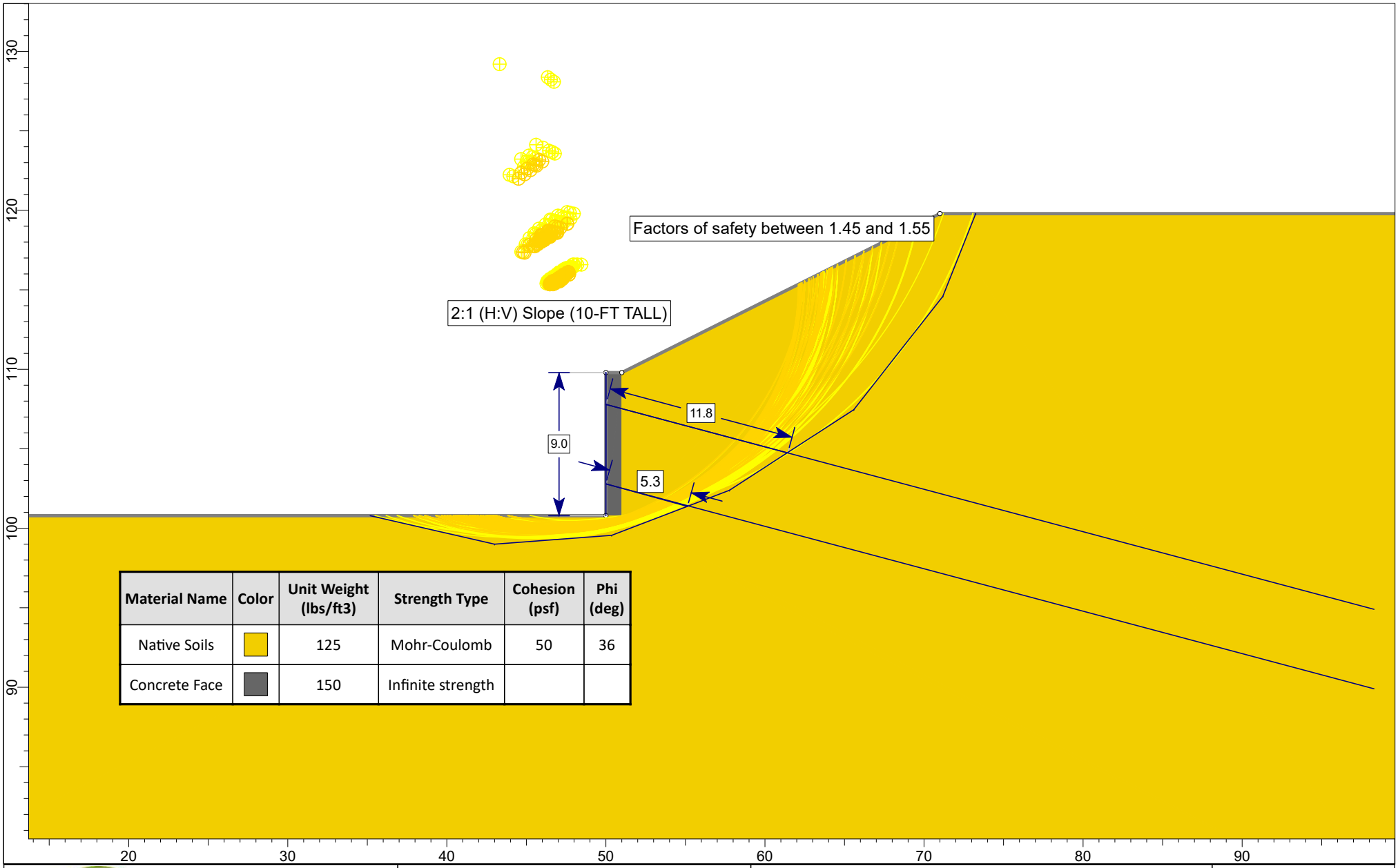


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Native Soils		125	Mohr-Coulomb	50	36
Concrete Face		150	Infinite strength		

KLEINFELDER
Bright People. Right Solutions.

Project No.: 20182232	Global Stability.slmd - Section 1, Seismic
Drawn by: Z. Jarecki	
Date:11/28/2018	
Checked by: D. Castle	**Illumina Fuel Cell**
Date: 11/28/2018	

Figure

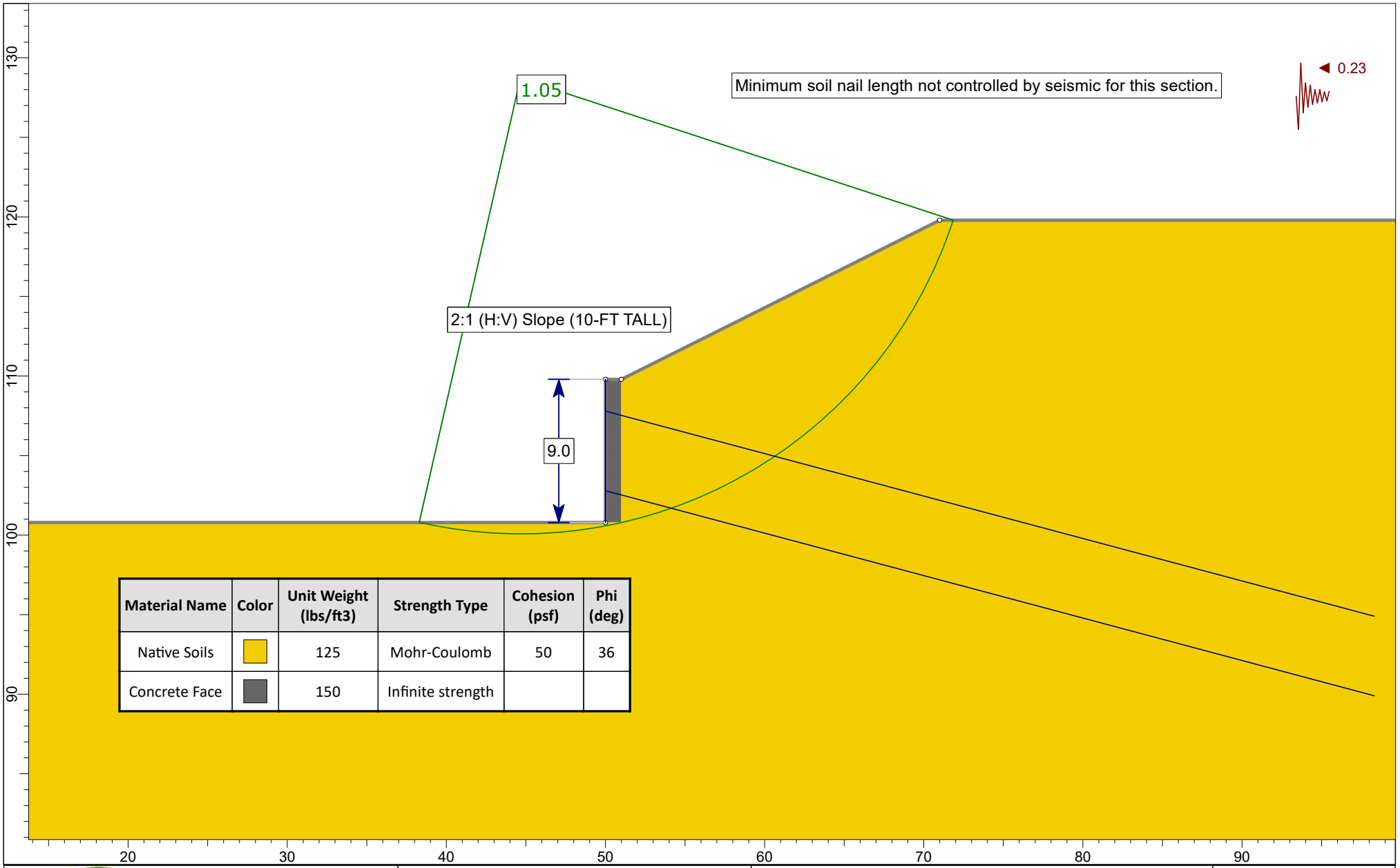


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Native Soils		125	Mohr-Coulomb	50	36
Concrete Face		150	Infinite strength		

KLEINFELDER
Bright People. Right Solutions.

Project No.: 20182232	Global Stability.slmd - Section 2, Static
Drawn by: Z. Jarecki	
Date:11/27/2018	
Checked by: D. Castle	**Illumina Fuel Cell**
Date: 11/27/2018	

Figure

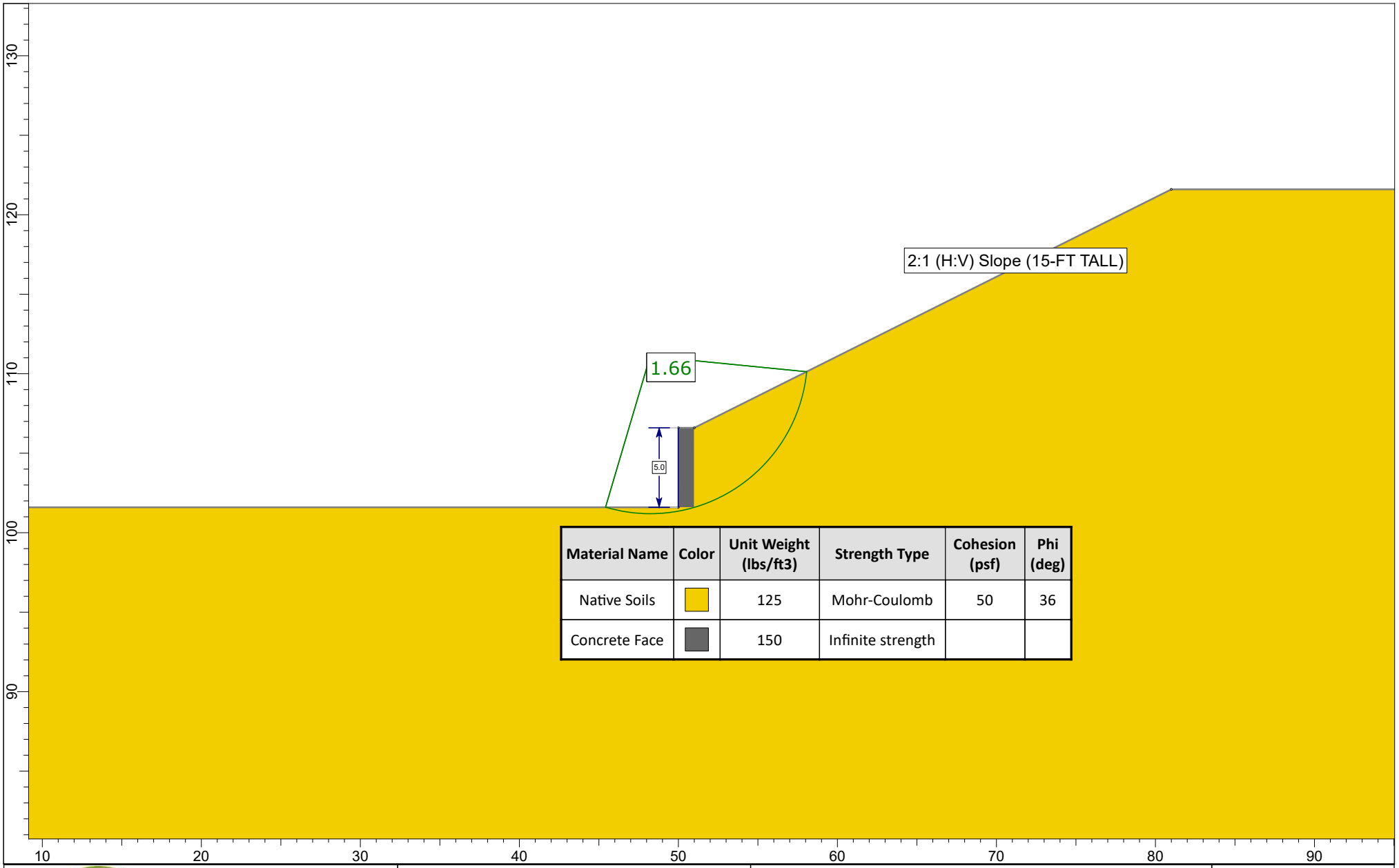


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Native Soils		125	Mohr-Coulomb	50	36
Concrete Face		150	Infinite strength		

KLEINFELDER
Bright People. Right Solutions.

Project No.: 20182232	Global Stability.slmd - Section 2, Seismic
Drawn by: Z. Jarecki	
Date:11/27/2018	
Checked by: D. Castle	**Illumina Fuel Cell**
Date: 11/27/2018	

Figure

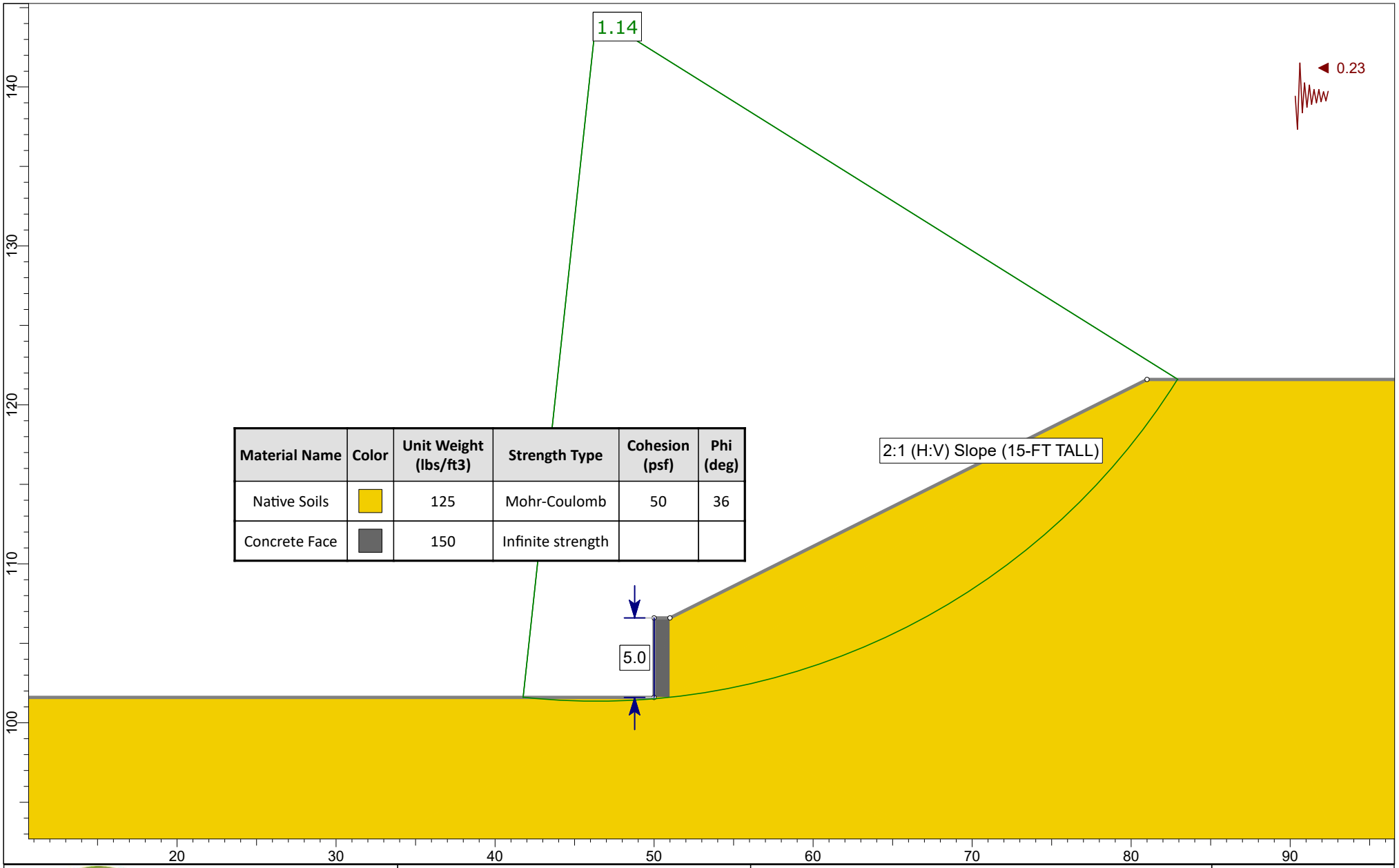


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Native Soils		125	Mohr-Coulomb	50	36
Concrete Face		150	Infinite strength		

KLEINFELDER
Bright People. Right Solutions.

Project No.: 20182232	Global Stability.slmd - Section 3, Static
Drawn by: Z. Jarecki	
Date:11/27/2018	
Checked by: D. Castle	**Illumina Fuel Cell**
Date: 11/27/2018	

Figure



Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)
Native Soils		125	Mohr-Coulomb	50	36
Concrete Face		150	Infinite strength		

KLEINFELDER
Bright People. Right Solutions.

Project No.: 20182232	Global Stability.slmd - Section 3, Seismic
Drawn by: Z. Jarecki	
Date:11/27/2018	
Checked by: D. Castle	**Illumina Fuel Cell**
Date: 11/27/2018	

Figure

December 15, 2018
Kleinfelder Project No. 20180981.027A

Mr. André Ferouge
Bloom Energy
1299 Orleans Drive
Sunnyvale, California 94068
Andre.Ferouge@bloomenergy.com

SUBJECT: Geotechnical Addendum #2
Response to City of San Diego LDR Review Comments

PROJECT: Exterior Fuel Cell Installation For
ILM001.0 - Illumina, Inc.
5200 Illumina Way
San Diego, California 92122

CITY PROJECT #: 623196

Dear Mr. Ferouge:

This addendum letter presents our responses to Cycle 3 geotechnical review comments from City of San Diego LDR Geology dated December 21, 2018. Geotechnical recommendations for project design were provided in our November 9, 2018 Geotechnical Report for the proposed project and our November 29, 2018 Addendum No. 1 letter. The pertinent comments are repeated below along with our responses

Comment 1 only lists the references reviewed and does not require a response.

Comment 2 requests a site plan which will be provided by others.

Comment 3. Submit an addendum geotechnical report that provides the following.

Response. This Addendum provides responses to the subject City review comments.

Comment 4. Provide a site-specific geologic/geotechnical map that depicts geologic structure (bedding, joints, faults, etc.), distribution of geologic units, and location of cross sections. The map should be on the topographic base that shows the proposed development.

Response. The requested geologic/geotechnical map is attached as Figure 1. Note that the geologic structure is not indicated on the map as the both the Scripps Formation and the very old paralic deposits are generally horizontal with potential shallow dip on the order of 2 to 5 degrees. An accurate measurement could not be obtained for purposes of this study. There are also no faults or joints to plot.

Comment 5. Show the anticipated limits of remedial grading and limits of temporary slopes on the geologic/ geotechnical map.

Response. The anticipated limits of grading for the shallow removal and recompaction are shown on the attached geologic/ geotechnical map. As discussed in Addendum 1, temporary slopes are no longer part of the project since a near vertical permanent soil nail retaining wall is currently being designed. The wall will be constructed in sequenced top-down construction with approximate 5-foot vertical lifts.

Comment 6. Provide geologic/ geotechnical cross-sections representative of the site conditions and proposed development.

Response. Two geologic/ geotechnical cross-sections are attached as Figure 2 and represent areas with higher and lower wall heights.

Comment 7. Specifically address potential geologic hazards for the purpose of CEQA review.

Response. Pages 5 and 6 of our November 9, 2018 report included a section for geologic hazards such as Fault Surface Rupture, Liquefaction and Seismic Compression, Landslides and Flooding. These were included under the section heading of Geologic and Subsurface Conditions rather than a heading Geologic Hazards but should contain sufficient information for CEQA review.

Comment 8. Indicate if geologic structure is favorable or adverse with respect to the proposed development.

Response. The site is located with Geologic Hazard Category 54 within the 2008 City of San Diego Seismic Safety Study. Category 54 is defined as steeply sloping terrain, unfavorable or fault controlled geologic structure, Moderate risk. Based on review of site-specific geologic conditions, it is our opinion that the geologic structure is favorable with respect to the proposed development. The Scripps Formation and very old paralic deposits are nearly flat lying with bedding dips less than about 5 degrees. The massive and cemented formational materials at the site are suitable for temporary cuts, permanent slopes and retaining walls.

Comment 9. The project's geotechnical consultant must indicate if the proposed development will destabilize or result in settlement of adjacent property or the Right of Way.

Response. Confirming that the proposed development will not destabilize or result in settlement of adjacent property or the Right of Way. Note that the Supplemental Recommendation section in Addendum No. 1 starts with the following statement: "Based upon our review of subsurface explorations and geologic logging of the existing slopes at the site, the proposed construction is feasible from a geotechnical perspective provided the recommendations in this report are incorporated into the project design and construction. It is our opinion that a properly designed and constructed wall will not impact the adjacent property."

Comment 10. The project's geotechnical consultant should indicate if the site is suitable for the proposed project.

Response. It is Kleinfelder's professional opinion that the site is suitable for the proposed project from a geotechnical perspective.

KLEINFELDER 6700 Koll Center Parkway, Suite 120, Pleasanton, CA 94566 p | 925.484.1700 f | 925.484.5838

Comment 11. Storm Water Requirements for the proposed conceptual development will be evaluated by LDR-Engineering review. Priority Development Projects (PDPs) may require an investigation of storm water infiltration feasibility in accordance with the Storm Water Standards (including Appendix C and D). Check with your LDR-Engineering reviewer on requirements. LDR-Engineering may determine that LDR-Geology review of a storm water infiltration evaluation is required.

Response. A response to this comment will be provided by others.

The geotechnical recommendations in this addendum letter supplement the recommendations provided in our November 9, 2018 report and Addendum #1 and are subject to the same limitations presented therein.

CLOSURE

We trust this information meets your current needs. We appreciate the opportunity to be of professional service to you on this project. If you have any questions please do not hesitate to contact us at 925.484.1700.

Respectfully submitted,

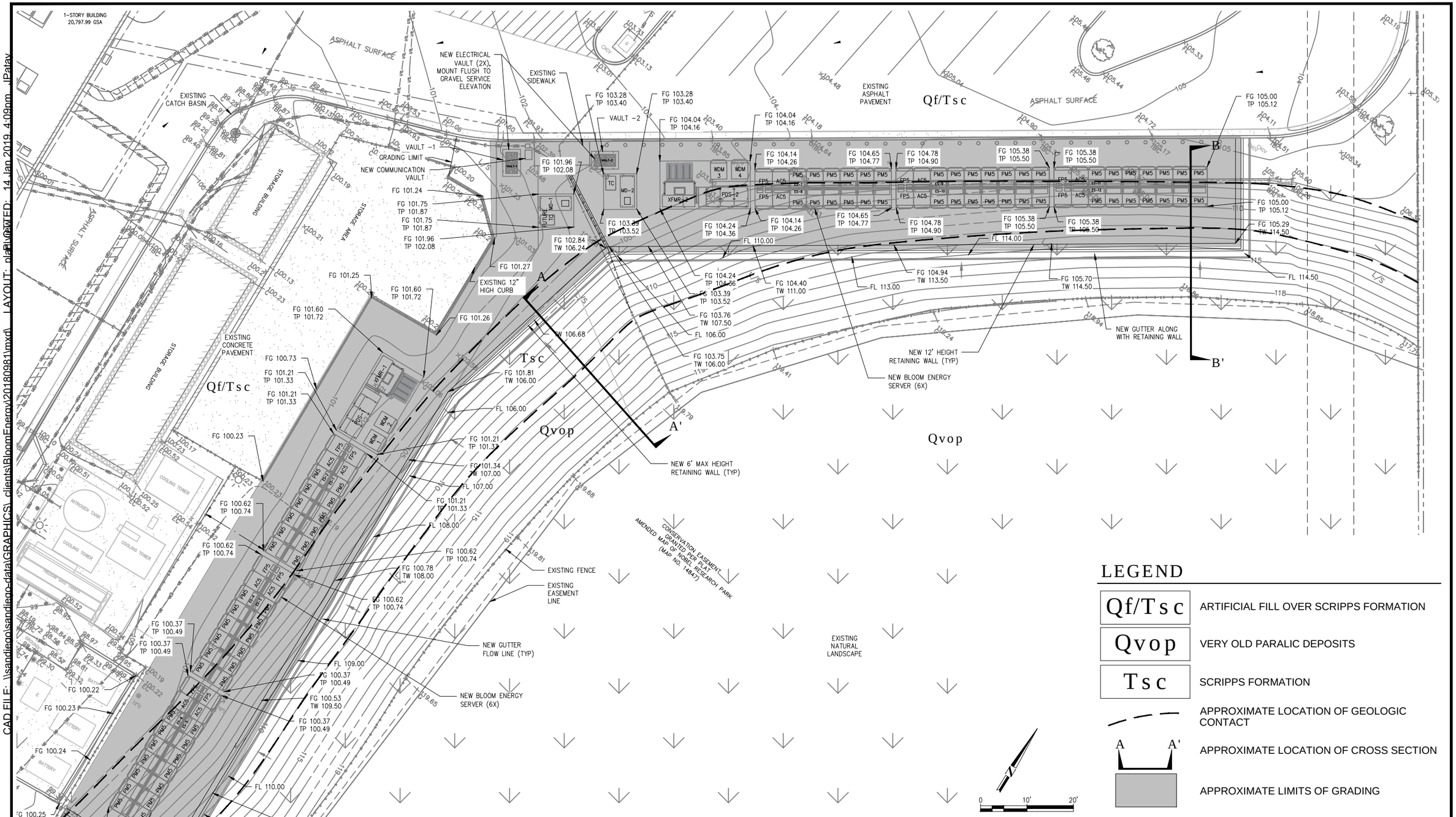
KLEINFELDER.

Kevin Crennan, PE, GE
Senior Geotechnical Engineer

Rebecca L. Money, PE, GE
Senior Geotechnical Engineer

Attachments:

Figure 1 Geologic / Geotechnical Map
Figure 2 Geologic Cross Sections A-A' and B-B'



LEGEND

Qf/Tsc	ARTIFICIAL FILL OVER SCRIPPS FORMATION
Qvop	VERY OLD PARALIC DEPOSITS
Tsc	SCRIPPS FORMATION
	APPROXIMATE LOCATION OF GEOLOGIC CONTACT
A A'	APPROXIMATE LOCATION OF CROSS SECTION
	APPROXIMATE LIMITS OF GRADING

KLEINFELDER
Bright People. Right Solutions.
www.kleinfelder.com

PROJECT NO.	20180981
DRAWN:	1/14/2019
DRAWN BY:	JP
CHECKED BY:	KC
FILE NAME:	20180981_Site1.dwg

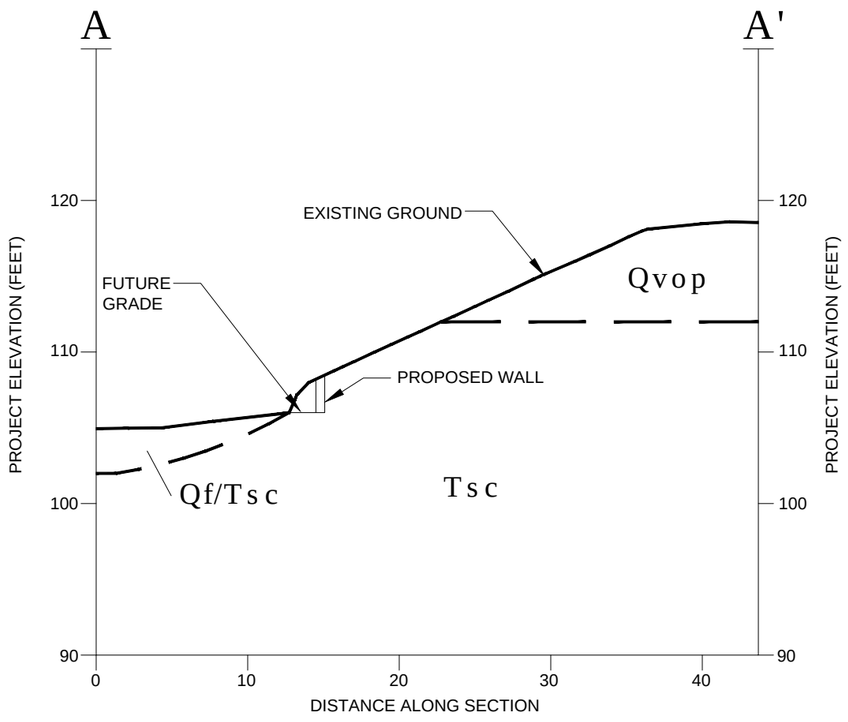
GEOLOGIC/GEOTECHNICAL MAP

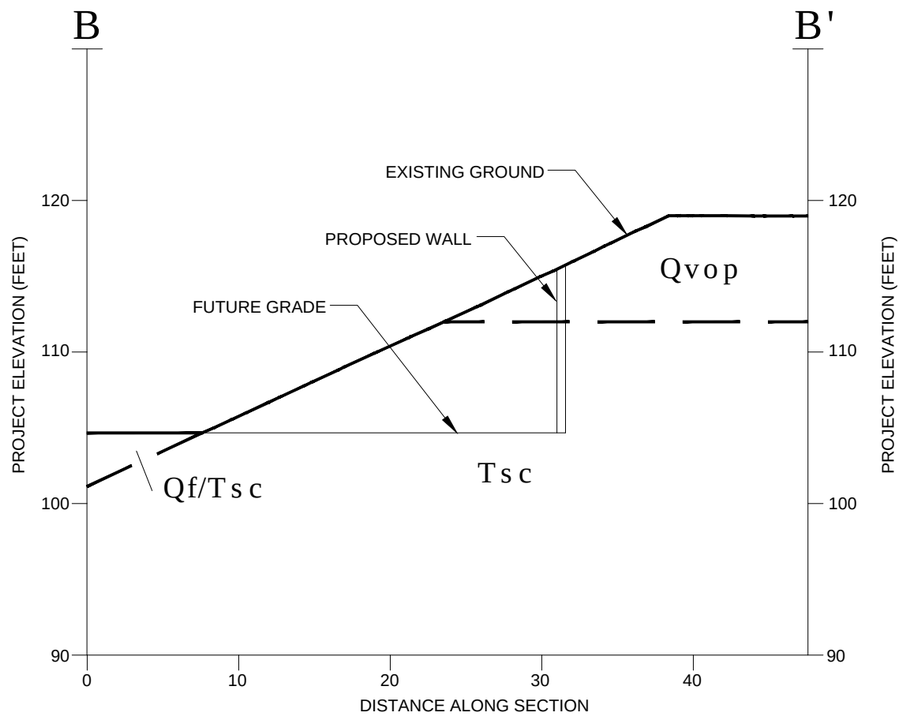
ILLUMINA DUEL CELL INSTALLATION
5200 ILLUMINA WAY
SAN DIEGO, CALIFORNIA

FIGURE
1

ATTACHED IMAGES:
ATTACHED XREFS:

CAD FILE: \\sandiegolsandiego-data\GRAPHICS_clients\BloomEnergy\20180981\mxd\ LAYOUT: plaPLOTTED: 14 Jan 2019 4:09pm JPalay





LEGEND

Qf/Tsc	ARTIFICIAL FILL OVER SCRIPPS FORMATION
Qvop	VERY OLD PARALIC DEPOSITS
Tsc	SCRIPPS FORMATION
	APPROXIMATE LOCATION OF GEOLOGIC CONTACT

ATTACHED IMAGES:
ATTACHED XREFS:

10 0 10
APPROXIMATE HORIZONTAL AND VERTICAL SCALE (feet)

KLEINFELDER
Bright People. Right Solutions.
www.kleinfelder.com

PROJECT NO.	20180981
DRAWN:	1/14/2019
DRAWN BY:	JP
CHECKED BY:	KC
FILE NAME:	20180981_Site1.dwg

GEOLOGIC CROSS SECTIONS
A-A' AND B-B'

ILLUMINA DUEL CELL INSTALLATION
5200 ILLUMINA WAY
SAN DIEGO, CALIFORNIA

FIGURE
2