Appendix F2 Geologic Evaluation Report Open Space

Appendices

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26 October 2018 (Revised 20 September, 2019)

Mr. Steve Ganch
Crestmore Redevelopment, LLC
1745 Shea Center Drive, Suite 190
Highlands Ranch, CO 80129

Subject: Preliminary Geologic Evaluation Report
Agua Mansa Open Space
City of Jurupa Valley, California
Langan Project No.: 721013502

Dear Mr. Ganch,

Langan Engineering and Environmental Services Inc. (Langan), is pleased to submit this letter report summarizing our geotechnical evaluation of the Agua Mansa Open Space/Recreational Park development area at the former Riverside Cement Plant. This evaluation is based on desktop studies and a recent engineering geologic mapping effort, completed on 10 through 12 September 2018, per Task G of our proposal dated 15 August 2018, and preliminary rockfall analyses.

In addition to our geologic mapping, we reviewed the following documents:

Site topographic survey and sections, title Encumbrance Map, Vacant Commercial Property, Jurupa valley, California-Topographic Information (sheet 2), prepared by DRC Engineering, Inc. dated 02 March 2016.

Park Development Plan, prepared by MIG, dated June 2018.

Park Site Conceptual Rough Grading Plan, prepared by Langan, dated 11 September 2018.

History of the Riverside Cement Company, 1906-2006, An Integral Part of the "Greatest Generation". By Marion Wells, 2006.

Preliminary Geotechnical Investigation Report for Agua Mansa Commerce Park, 1500 Rubidoux Boulevard, Jurupa Valley, California, prepared by Langan, dated 28 April 2017.

Paragenesis of the Mineral Assemblage at Crestmore, Riverside County, California, by John W. Daly, 1931.

The proposed Open Space District ("District") is located within the former Riverside Cement Plant, currently owned by Martin Marietta in the City of Jurupa Valley, Riverside County, California (Figure 1, Site Vicinity Map). The District is part of the proposed Agua Mansa Specific Plan

("Specific Plan") that encompasses the entire Former Riverside Cement Plant. The District is approximately 71 acres and is bounded by the Union Pacific Railroad on the west, North Riverside and Jurupa Canal ("Canal") on the south and the Specific Plan's Industrial Park District on the north.

PROPOSED PROJECT

The Open Space District analyzed in this report is not proposed for development but will be remediated pursuant to a Response Plan approved by the California Department of Toxic Substances Control (DTSC) and will remain undeveloped Open Space. However, due to the unique nature of the Open Space District, a recreational area with trails and gathering areas could be developed in the future. We understand that development of a recreational area will be subject to a separate review and approval by the City of Jurupa Valley in accordance with the Specific Plan.

PURPOSE

The purpose of our geologic evaluation was to assess the slope conditions throughout the Open Space District (E.G. Crestmore Lake and Commercial Quarry) and to make recommendation for site modifications and improvements for:

- A) Leaving the Open Space District in its current undeveloped state, and
- B) Development of limited recreational uses within the District.

It is our understanding that the Environmental Impact Report for the Specific Plan will not include a detailed analysis of the development of recreational uses within the District; however, if a recreational area is proposed in the future, the analysis and recommendations included in this report can be utilized in a CEQA analysis at that time.

SCOPE OF SERVICES

We have completed the following tasks in accordance with our proposal dated 15 August 2018:

- Review of the referenced documents
- Review of historical aerial photos
- Review of published geologic and fault data
- Geologic reconnaissance and mapping;
- Geologic analyses using Colorado Rockfall Simulation Program (CRSP) to preliminarily assess rockfall extent, propagation, and run out distances from identified rockfall areas; and
- Summarized our findings and conclusion in this letter report.

ENGINEERING GEOLOGIC MAPPING

Previous activities consisting of geologic mapping, mineralogical reports and studies were performed at the Project Site, and are summarized in the Langan 2017 Preliminary Geotechnical Report. Site specific studies include Langan's Preliminary Geotechnical Report (2017), Tentative Parcel Map (2018), Langan's Crestmore Mine FEM Report (2017).

The purpose of the geologic mapping was to obtain a higher level understanding of soil and rock exposures as they relate to rockfall hazards and the risk to the potential public use within the two proposed options, including Alternative A – open space with no redevelopment activities and limited site maintenance activities, or Alternative B – Development of a recreational area. Mapping was performed to the extent of evaluating potential geologic hazards, and identifying potential alternatives in the event that proposed facilities would be adversely impacted by existing Site conditions. Due to the steep terrain and other safety concerns, geologic mapping via rappelling and working in high risk areas was not performed. The results of our mapping are presented on Figure 3, Engineering Geologic Map.

On 10 through 12 September 2018, our geologists performed geologic mapping throughout the quarry to document the geologic conditions and approximate slope inclinations; identify surficial deposits, delineate in the field the proposed cut and fill areas, and identify erosional features on quarry slopes. Our observations were recorded on a topographic map prepared by DRC, dated 2 March 2016, at a scale of 1"= 50'.

A total of eight transects were identified and characterized for rockfall analysis. Geologic nomenclature for mapping rock exposures generally follow that of the American Geophysical Institute or AGI (2007) and Brown (1981). Soil classification followed the American Society of Testing Materials (ASTM) and the Unified Soil Classification System (USCS). Geologic units were consolidated into the same units described in Langan (2017) and also follow those in the geologic map of the Fontana 7.5min Quad (USGS, OFR 03-418) by D.M. Morton.

SITE CONDITIONS

The approximate location of the Project Site is shown on Figure 1, Site Vicinity Map. The Project Site is situated on the abandoned Crestmore and Commercial Quarry in Jurupa Valley, Riverside County, California. The Project Site is an area of approximately 70.9 acres bound by Rubidoux Boulevard to the east, the canal to the south, and the boundary to the north are defined by the former Riverside Cement Plant Property and east by industrial development. The Union Pacific Railroad (UPRR) tracks run along the western portion of the Site. The proposed series of trails, resting spots, viewpoints and other park structures are generally coincident with former haul roads and mostly confined to outer boundaries of the closed quarries, with some proposed trails depicted extending up to vistas within the Project Site interior (Figure 2).

The steeper areas of the Project Site bound the main quarry pit, a north-south orientated excavation, flanked by slopes with gradients ranging between 33 degrees to sub-vertical. The main pit is currently filled with water. Man-made ponds with earthen embankment dams

delineate the northern boundary of the main quarry area. Prior grading activities during quarry operations created abundant over-steepened slopes due to excavations and stockpiling of quarry spoils; the spoils are mapped as 'af' on our Engineering Geologic Map (Figure 3).

Ground surface elevations vary between approximately 840 feet above mean sea level (msl) to approximately 1,000 feet msl in the northern portion of the Site. The majority of the property resides at an elevation between 900 and 960 feet msl. Significant areas with ground surface elevations outside of this range include the Wet Weather Quarry to the northeast of the Project Site (excavated to approximately 840 feet msl), the fill in the vicinity of Agua Mansa Road (filled to approximately 980 feet msl), and the fill in the northern portion of Project Site (filled to approximately 1000 feet above msl). The topography exhibits more relief to the center of the Project Site in the vicinity of the Crestmore/Chino Mine (now Crestmore Lake), where ground surface elevations range from approximately 800 to 1200 feet msl.

Based on a monitoring well identified along the southern portion of the Project Site during the recent site investigation, the groundwater elevation is approximately 810 feet msl along Agua Mansa Road to the south of the Site.

According to Site documents, surface mining at the Crestmore Quarry was terminated in 1927 and underground mining at the Crestmore Mine started in 1930. The Block Caving method was used in underground mining from 1930 to 1954, and the Room and Pillar Underground Mining Method was used from 1955 to 1986. Underground mining was ceased and the Crestmore Mine and Crestmore/Chino Quarry were allowed to flood in the mid-1980's, resulting in Crestmore Lake at the western center of the Site.

AERIAL PHOTOGRAPH REVIEW

We reviewed 12 pairs of stereographic photographs of the Project Site that spanned the time period of 1939 to 2004. We used standard aerial photograph analysis techniques to identify surface features indicative of slope instability, such as scarps, erosion channeling, vegetation scars and breaks in slope. The photograph review also attempts to reconstruct the Site history with respect to Site grading activities. However, photos predating all quarry operations were not available; consequently, we were not able to review the original, pre-quarry Site conditions. The photographs reviewed are listed in the references.

The entire Riverside Cement Plant property has been used for mining, quarrying, and/or cement manufacturing since the early 1900s. The improvements include various facilities, heavy machinery, and support buildings related to the cement manufacturing and limestone quarrying and mining operations. Mining or quarrying operations began in 1906 and continued through the 1970s and into the mid-1980s with the exception of a 13 year period between 1929 and 1942.

The four quarries are designated as the Wet Weather, the Crestmore/Chino, Commercial, and the Lone Star Quarries, while the underground mine is designated as the Crestmore Mine. The Crestmore/Chino and Commercial quarries are on site, while the others are located on the parcel north of the Site (Figure 3). The upper Crestmore/Chino Quarry occupied a high point at the

extreme southwest corner of the property, whereas the lower Chino Quarry is to the north and partially filled with water. The Crestmore/Chino Quarry had additional underground workings (adits and drifts) that extended down to final working elevation of -200ft msl. The lower Crestmore/Chino Quarry flooded in the 1980's, likely form intercepting fracture flow from the east, causing the Wet Weather Quarry to dry up. All the quarries are open, with the exception of the Lonestar quarry, which was backfilled. Water levels in the Crestmore/Chino Quarry fluctuate as much as 10 feet. Blasting operations ceased in 1986 and the mine was shut down in 2006. Currently, the lower Crestmore/Chino Quarry is partially filled with water. As of late 2016, the cement manufacturing facilities were in the process of decommissioning.

SITE GEOLOGY

The Site is located in the eastern end of the Jurupa Mountains on the south side of the San Bernardino Valley. The Santa Ana River drains the San Bernardino Valley towards the southwest and is located approximately one-half mile east of the Site.

The Site is within the Peninsular Ranges Province of Southern California, dominated by granitic rocks of Mesozoic age that intruded pre-existing sedimentary strata. Tertiary strata were deposited west of the eroded granitic rocks, and as the area was uplifted; some of these strata formed upland coastal plains. The Site is located east of the coastal plains in an area dominated by granitic rocks that are mainly quartz diorite.

Based on our review of referenced documents, we understand that the area was developed for mining activities due to the two steeply dipping limestone formations approximately 200 to 300 feet thick in the southern portion and south of the Site. The limestone formations are roughly parallel with an upper and lower formation, the upper formation known as Sky Blue Hill and the lower formation known as Chino Limestone (Wells, 2006 and Morton & Miller, 2006). A review of regional geologic mapping and aerial photographs indicates that the underlying geologic materials in the Site include late to middle Pleistocene age, Eolian Deposits (Qoed) consisting of slightly to moderately consolidated, fine to medium sand with lesser amounts of silty sand and gravelly well sorted to poorly sorted sand.

The northwest end of the Site is mapped as underlain by late Holocene age, young Alluvial Fan Deposits (Qyf) consisting of unconsolidated to slightly consolidated, coarse-grained sand to boulder size material and having slightly dissected to essentially undissected surfaces. The south end is mapped as underlain by three units consisting of artificial fill, tonalite and mixed tonalite, marble and schist. The Artificial Fill (Qaf) consists of sand, gravel and bedrock excavated from pits, quarries and excavations from historical mining operations. The Tonalite (Kt) is Cretaceous age, medium to coarse grained, foliated biotite-hornblende tonalite. The mixed tonalite, marble, and schist are Cretaceous and Paleozoic age and consist of biotite-hornblende tonalite that is finely mixed with both schist and calcite marble (Morton & Miller, 2006). Cross sections of the Crestmore and Commercial Mines, completed during active mining operations, indicate up to

200 feet of dunal sands, alluvial fan deposits, and fill, infilling bedrock swales and creating topographic highs throughout the Site (Woodford et. al., 1941). The regional geology is depicted on Figure 4 (Regional Geologic Map).

Observations made during the geologic mapping activities are shown on Figure 3, Engineering Geologic Map. During our mapping activities, we observed a light gray to white colored dust residue covering portions of the upper Chino Quarry and flat areas. The residue has the appearance of hardened cement slurry, is one to three inches thick, and crumbles with light hammer blows. We understand this is being addressed, as required, in accordance with the Environmental Site Assessment Workplan (Langan, September 2018), under the guidance of the Department of Toxic Substances and Control (DTSC).

Shears and faults were observed primarily in cuts and borrow pits within or surrounding the upper Chino Quarry. The shears and faults were observed within tonalite, were commonly associated with secondary intrusive bodies (i.e. dikes) and were less than two feet in width. One small high angle fault was observed and had as much as two feet of offset of a mafic body (garnet).

The majority of the exposed rock in the trail network is tonalite and quartz monzonite porphyry. There are lesser amounts of limestone with secondary alteration and intermixing with both tonalite and schist. Structural attitudes of joints and bedding were measured in areas where CRSP transects were selected or where exposures presented ideal sets. Three prominent joint sets were identified in exposed bedrock slopes. Orthogonal blocks were commonly observed. Dike swarms were observed with in the tonalite, especially on the west side of upper Chino Quarry near the railroad tracks.

Old aeolian deposits (dune sand and equivalent) surround the southern and eastern perimeter of the Site and trail network. Where exposed, it lies unconformably on top of the tonalite. While potentially erodible, it does stand in a near vertical as observed in the commercial quarry, and at an estimated 1:1 inclination (horizontal to vertical) along several proposed trail path segments. In places, it is cemented with caliche and shows some low angle bedding.

Lesser amounts of fill (as haul road spoil, general soil and rock waste, and discrete boulder piles) were observed around the Site.

DISCUSSION

Rockfall hazards for Option A, leaving the Open Space District as an undeveloped area with controlled access were not considered, since no improvements are proposed under this alternative and the planned use does not include human occupation of the Open Space.

However, rockfall hazards in the Open Space were evaluated for the Alternative B Option, since recreational use could allow users to be exposed to hazards at the Open Space. Based upon the planned recreational park improvements, rockfall hazards were analyzed using the Colorado Rockfall Simulation Program (CRSP). A total of eight transects were identified in the field as candidates for rockfall analyses. These transects were on slopes identified in the field as

possessing either a potential high or medium rockfall hazard. The majority of the disturbed slopes were surrounding the upper Chino Quarry, as that represents the focus of proposed trails, resting areas, viewpoints and other park facilities.

The results of the rockfall analyses indicate that three sections of proposed trail will potentially be impacted by rockfall, with runout anticipated to extend beyond the proposed trail alignment. Accumulations of rockfall in some flat areas have small (1-foot maximum dimension) scattered fragments strewn about, while others have large boulders (>5 feet maximum dimension). It is unclear as to whether the larger boulders were placed there intentionally, fell off of haul trucks or actually rolled off of a slope. Talus observed at the base of tonalite-based cuts tends to by highly weathered, and fill break down readily into coarse sand.

The proposed improvements were color-coded based on the potential to be impacted by geologic hazards (Planned Facility Mitigation Zone Map, Figure 5). Identified constraints potentially impacting the proposed facilities include limited rockfall areas and erosion of weak surficial materials. Red designates the areas at highest risk for rockfall or erosion, yellow designates areas with moderate impact risk, and green designates the lowest risk areas. The designations and ranking criteria are explained in Table 1. Additionally, Table 1 provides potential mitigating alternatives.

Rockfall hazard ranking was based on a system customized to the Project Site, based on a simple High, Medium, and Low designation. Ranking is based on a number of factors that include the characteristics of the rock source, rockfall pathway or transect, the evidence for rockfall accumulation at the toe of slope, and the rockfall triggering mechanism. The run-out length is based on the results of the CRSP analyses.

The field observations and CRSP runs have been combined to determine the overall hazard designation.

TABLE 1

Summary of Hazard Ranking

Relative Ranking- Recommended Response	CRSP Transect Description	Potential Hazard and/or Impact	CRSP Runs and Results
Highly Constrained- Move path or engineering modifications needed.	Long and steep slope (>45° or 1:1). Also vertical face showing block or toppling failure mode. Hard, smooth surface with minimal benches	Evidence of recent rock fragments similar to source (not as result of mining operation). Significant runout towards or onto future path network and eastern edge of Dog Park.	Transect B2-1, with runout impacting up to 15 feet from toe of slope. B2-2, with up to 14 feet of run-out. Likely to fail under static conditions.
Moderately Constrained- Moderate impact from rockfall or erosion; no trail movement required, moderate grading may be needed, to be determined on case-by-case basis during final design.	Steep to moderate slope (>20° or 3:1). Slightly rough surface, benches within transect	Potential runout onto trails. Some evidence of falls and/or talus	Transect C3-1, with run-out extending five feet beyond trail. May fail under seismic conditions, surface water runoff and/or erosion
No modifications necessary	Gentle to moderate slopes (<20° or 5:1). Short transect length.	No evidence of active rock fragments or accumulation. Not proximal to trails	Earthquake or disturbance due to grading

Transect B2-1 was determined to have a rockfall hazard impacting up to 15 feet beyond the toe of slope; this would impact the eastern perimeter of the proposed Dog Park. This area is designated as Area A on Figure 5. Transect B-2 was determined to be susceptible to rockfall, with transect B2-2 showing rockfall runout up to 14 feet beyond the limits of the proposed trail in the CRSP run. This transect was also determined to have an abundant number of rocks impacting the trail. The stretch of trail is depicted as extending along the toe of a steep cut face with talus deposits; the trail climbs steeply to the top of the cut. The CRSP results for this transect appear to reflect the conditions observed in the field. This area is designated as Area B on Figure 5.

Transect C3-1 was given a moderate risk for rockfall. Although the CRSP run showed rockfall runout up to five feet beyond the trail alignment, field observations indicated that this area would have a moderate potential for rockfall. The CRSP run also indicated a small boulder field reaching and extending beyond the trail alignment. While in the field, we observed occasional boulders two to three feet in diameter on the slope surface. This area is designated as Area C on Figure 5.

An area designated as Area D was observed to be within an area susceptible to erosion, with the trail extending down in and out of a drainage swale that is underlain by highly erodible earth materials.

Area E was not determined to have rockfall runout impacting the trail or lookout during the CRSP analyses, but observations during mapping documented boulders within surficial materials on the slope. Boulders within the surficial materials were noted to be up to six feet in diameter. However, it is unclear if source of the boulders is a result of previous haul road activity upslope, or are detached from upslope outcrops. The rockfall analysis determined that any rockfall would not encroach on the trail or overlook.

The proposed trail alignment is proposed along a narrow bench between the crest of a slope and an oversteepened slope above a quarry pit, designated as Area F. The materials exposed in the slope are composed of erodible surficial materials. In our opinion, this area has a high susceptibility to slumping of weak surficial materials toward the quarry pit, which can undermine and damage the proposed trail.

The locations of the transects are depicted on Figure 5. The CRSP profiles are included in Appendix A.

We reviewed the 2006 Quaternary Fault and Fold Database (USGS), the 2010 California Fault Activity Map (CGS) and UCERF 3 seismic catalogs (USGS, SCEC). No active fault traces were found extending through the Project Site, and the Project Site is not within a regulatory Earthquake Zone of Required Investigation.

CONCLUSIONS AND RECOMMENDATIONS

In general, we conclude that both alternatives can be constructed, with:

- Alternative A – Leaving the area in its current, undeveloped state, no additional geologic hazards compared with current conditions have been identified and no mitigation is required, while

- Alternative B – Development of limited recreational uses, has a few areas requiring modification or engineering consideration. Adverse impacts from geologic hazards are primarily due to rockfall and damage to proposed trails due to underlying weak and highly erodible surficial materials. If recreational uses are proposed in the future, the following mitigation measures will have to be incorporated into the CEQA analysis for that specific project and incorporated into the approvals for that proposed use.

Mitigating Alternative B Impacts

Rockfall is common throughout the Project Site, but mainly concentrated in areas that have been disturbed by blasting, quarry operations and Project Site grading. Rock slopes that have been left oversteepened by quarrying activities are particularly susceptible.

Based on observations made during our geologic and hazard mapping of the Project Site under Alternative B, a portion of the Dog Park and a few isolated sections of the trail network appear to have a moderate to high risk for adverse impacts from rockfall. The risk can be mitigated either by moving the trails (avoidance) or building simple berms (catchments).

Other proposed park facilities do not appear to be at risk of rockfall impact.

Site grading will alleviate potential slope instability in areas subject to erosion. The residue observed in areas of the Project Site may also provide some protection from erosion.

We anticipate most rockfall at the Project Site will likely be due to earthquake ground shaking. Concentrations of water or runoff may contribute as well, especially in the softer surficial deposits, as observed in washouts along proposed trail alignments.

Recommendations to address identified potential impacts to proposed improvements include:

Area A

In order to avoid rockfall impacts to the Dog Park, we recommend either establishing a minimum 15 foot setback from the toe of slope, or placing a rockfall fence along the perimeter of the proposed Dog Park. Rockfall fence parameters can be provided during the design-level phase of the project.

Area B

We recommend fill be placed to elevate the trail, providing a continuous and gradual rise from the flat area at the bottom of the hill to the top of the cut. The fill would provide a rockfall catchment, and elevate trail patrons above the rockfall hazard. Grading quantities for the fill berm can be established during final design.

Area C

If a moderate rockfall risk is unacceptable, then we recommend light scaling to remove larger boulders that may loosen and roll downslope. A mid-slope bench could also be graded further to provide a more substantial bench to intercept rocks rolling from the top of slope.

Area D

We understand this area will receive fill in the future, resulting in more even Project Site grades. This may mitigate future potential erosion issues in this section of trail. Otherwise, on-going maintenance will be likely to repair washed-out portions of trail. This is not regarded as a hazard, more of a maintenance issue.

Area E

We recommend that signage be posted to encourage trail patrons to remain on the designated trails, and not venture toward the slope where a moderate rockfall potential exists.

Area F

We recommend that the trail be relocated to the existing haul truck access road alignment. The exact location, dimensions and extent of the above recommended mitigations should be assessed in the final design analysis for the Project Site.

Surface Fault Rupture

Although faults and shears were observed in outcrops at the Project Site, these were determined to be old, inactive faults confined within bedrock bodies. We conclude that there are no active faults extending through the Project Site.

Grading quantities for areas warranting mitigation with fill can be determined during final design.

LIMITATIONS

The conclusions of our Project Site evaluation are preliminary and are based on our professional experience, observations made during our recent Project Site visit and limited review of Project Site documents. No subsurface investigations were performed as a part of our Project Site assessment.

We trust the foregoing is sufficient for your needs. Should you have any questions regarding this summary or any aspect of our services to-date, please contact us.

Sincerely,

Langan Engineering and Environmental Services, Inc.

Rory Johnston, P.E., G.E.
Principal

Marina Mascorro, C.E.G.
Senior Project Geologist

09_20_2019_Open Spac_Geotechnical Evaluation Letter

GE 2198

Attachments:

Figure 1 – Site Vicinity Map
Figure 2 – Site Plan Proposed Open Space Improvements
Figure 3 – Engineering Geologic Map
Figure 4 – Regional Geologic Map
Figure 5 – Planned Facility Mitigation Zone Map
Appendix A – CRSP Analysis Results

REFERENCES

Daly, John Warlaumont (1931) The geology and mineralogy of the limestone deposits at Crestmore, Riverside County, California. Master's thesis, California Institute of Technology.http://resolver.caltech.edu/CaltechTHESIS:01082010-081608834

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Woodford et. al., 1941. A. O. Woodford, R. A. Crippen, K. B. Garner; Section across Commercial quarry, Crestmore, California. 1941, American Mineralogist; 26 (6): 351–381

List of Aerial Photographs Reviewed

Flight	Frame	Date	Scale	Type
EAG_RV_04	1027 and 1028	5-Feb-04	21,000	Color Stereo
NAPP_3C	12504-66	5-Jun-02	40,000	Red Green
AMI_SBD_83	11703	2-May-83	36,000	Black & White
TG_7700	19-11 through 19-13	31-Jan-77	24,000	Black & White Stereo
AMI_SBD_69	4695	30-Sep-69	36,000	Black & White
AXL_1968	11JJ-6, 7, and 8	26-May-68	20,000	Black & White Stereo
AXM_1967	3HH-225, 226, and 227	31-Dec-66	20,000	Black & White Stereo
UNIVERSE_112_1	16	17-Oct-66	24,000	Black & White
RCFC	1, 2, and 3	23-Jun-63	12,000	Black & White Stereo
PAI_LAOC_63	205V-47	2-Apr-63	48,000	Black & White
C_24244	1-200 and -199	31-Dec-61	24,000	Black & White Stereo
AXL_1959	15W-119	23-Jun-59	20,000	Black & White
AXM_1959	15W-118	31-Dec-58	20,000	Black & White
AXM_1953B	16K-195, 196, and 197	31-Dec-52	20,000	Black & White Stereo
AXL_1953B	31K-133 and 132	21-Oct-52	20,000	Black & White Stereo
C_5846	18 through 21, 8, and 6.	24-May-39	18,000	Black & White Stereo
AXM_1938A	41-65, 62-19, 62-20, and 62-22	23-May-38	20,000	Black & White Stereo
C_5029	125, 127, and 128	3-Mar-38	30,000	Black & White Stereo
AXL_1938	41-37, 41-39, 62-19, 62-20, 62-21, 62-25, and 62-26.	31-Dec-37	20,000	Black & White Stereo
C_1740	A-423 through A-425, B-6 through B-11, B-17 through B-23, and B-31through B35.	17-Sep-31	12,000	Black & White Stereo

FIGURES

VICINITY MAP
N.T.S.

Reference: 2018 Microsoft Corporation, 2018 Digital Globe, CNES (2018) Distribution Airbus,2018 HERE, Bing.

N

0 600 Feet

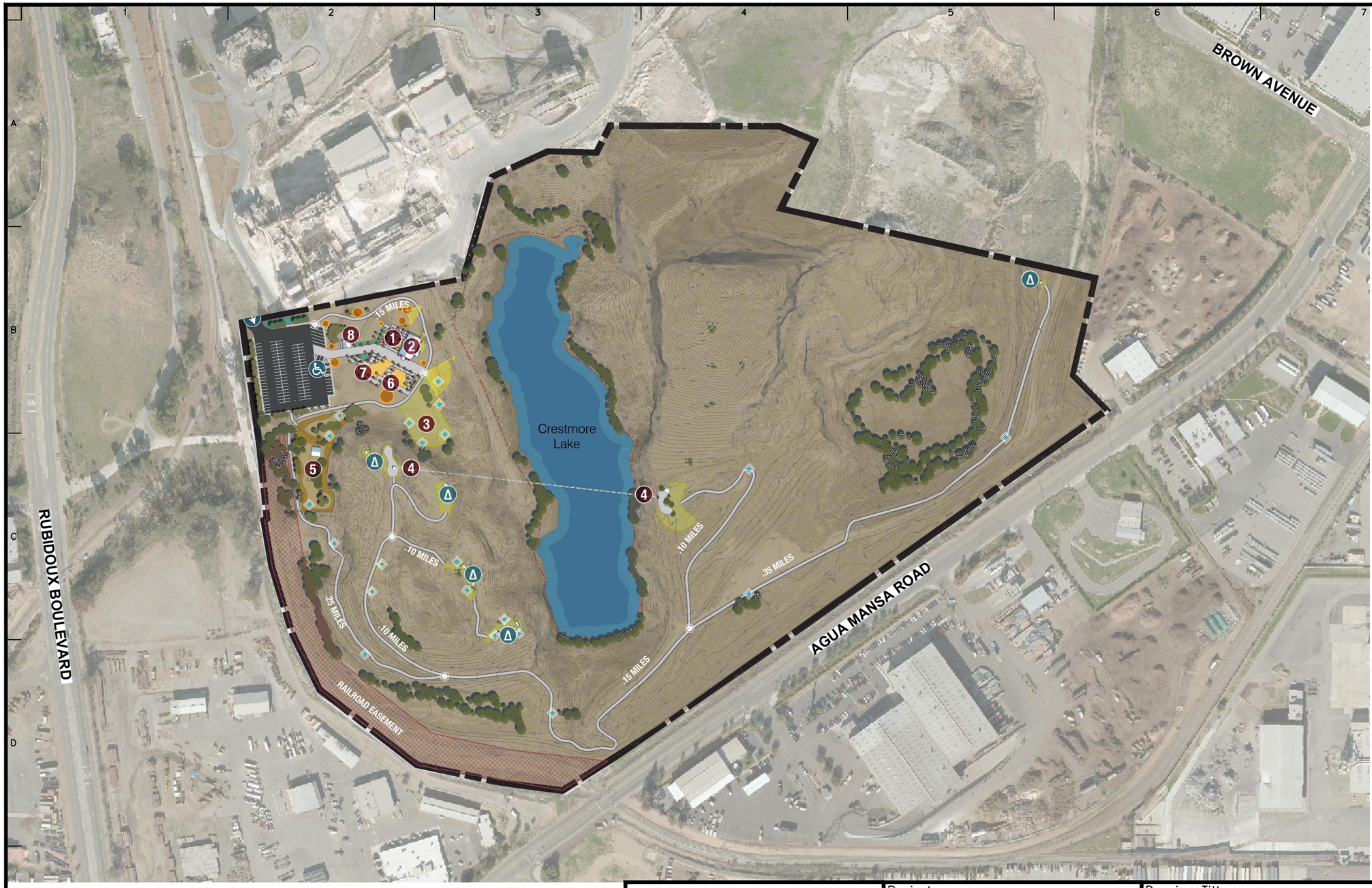
Approximate scale

LANGAN
32 Executive Park, Suite 130, Irvine, CA 92614
T: 949.255.8640 F: 949.255.8641 www.langan.com
NEW JERSEY NEW YORK CONNECTICUT PENNSYLVANIA WASHINGTON DC VIRGINIA WEST VIRGINIA OHIO FLORIDA TEXAS NORTH DAKOTA CALIFORNIA
ABU DHABI ATHENS DOHA DUBAI ISTANBUL LONDON PANAMA
Langan Engineering & Environmental Services, Inc.

Project
AGUA MANSA RECREATIONAL PARK/OPEN SPACE
JURUPA VALLEY
RIVERSIDE COUNTY CALIFORNIA

Figure Title
SITE VICINITY MAP

Project No.	Figure No.
721013502	1
Date: 20 SEPTEMBER 2018	
Scale: #	
Drawn By: ##	



MAP LEGEND

- SHARED USE PATH (6 - 10' WIDE) PEDESTRIAN / BIKING
- ZIPLINE
- TOPOGRAPHY (5' INTERVALS)
- PARK BOUNDARY
- DETAILED AREA
- RAILROAD EASEMENT
- PROPOSED FENCE (RESTRICTED ACCESS)

PROGRAM AREAS

- ENTRANCE
- VIEWPOINT
- ACCESSIBLE PARKING SPACES
- BUILDING / SHADE STRUCTURE
- SHADED BENCH RESTING POINT
- 1 SHADE GROVE ENTRY PLAZA
- 2 PROPOSED INTERPRETIVE STRUCTURE
- 3 GATHERING AREA
- 4 ZIPLINE
- 5 FENCED OFF-LEASH DOG AREA
- 6 PLAY GROUNDS
- 7 NON-TRADITIONAL PLAY AREA
- 8 RESTROOM

CORE AREA

- KEY FRAMED VIEWS
- SALVAGED/REMNANT MECHANICAL OR CONCRETE RELICS
- RESTING/SITTING
- PLAY AREA
- BIOREMEDIATION AREA

Note: Historic quarry locations per Daly (1931).

N

0 300 Feet

Approximate scale

REFERENCE: BASE MAP FROM A ELECTRONIC FILE TITLED "JURUPA ILLUSTRATIVE 092118 (2) AND © 2018 MICROSOFT CORPORATION, BING.

LANGAN

Langan Engineering and Environmental Services, Inc.
32 Executive Park, Suite 130
Irvine, CA 92614

T: 949.255.8640 F: 949.255.8641 www.langan.com

Project

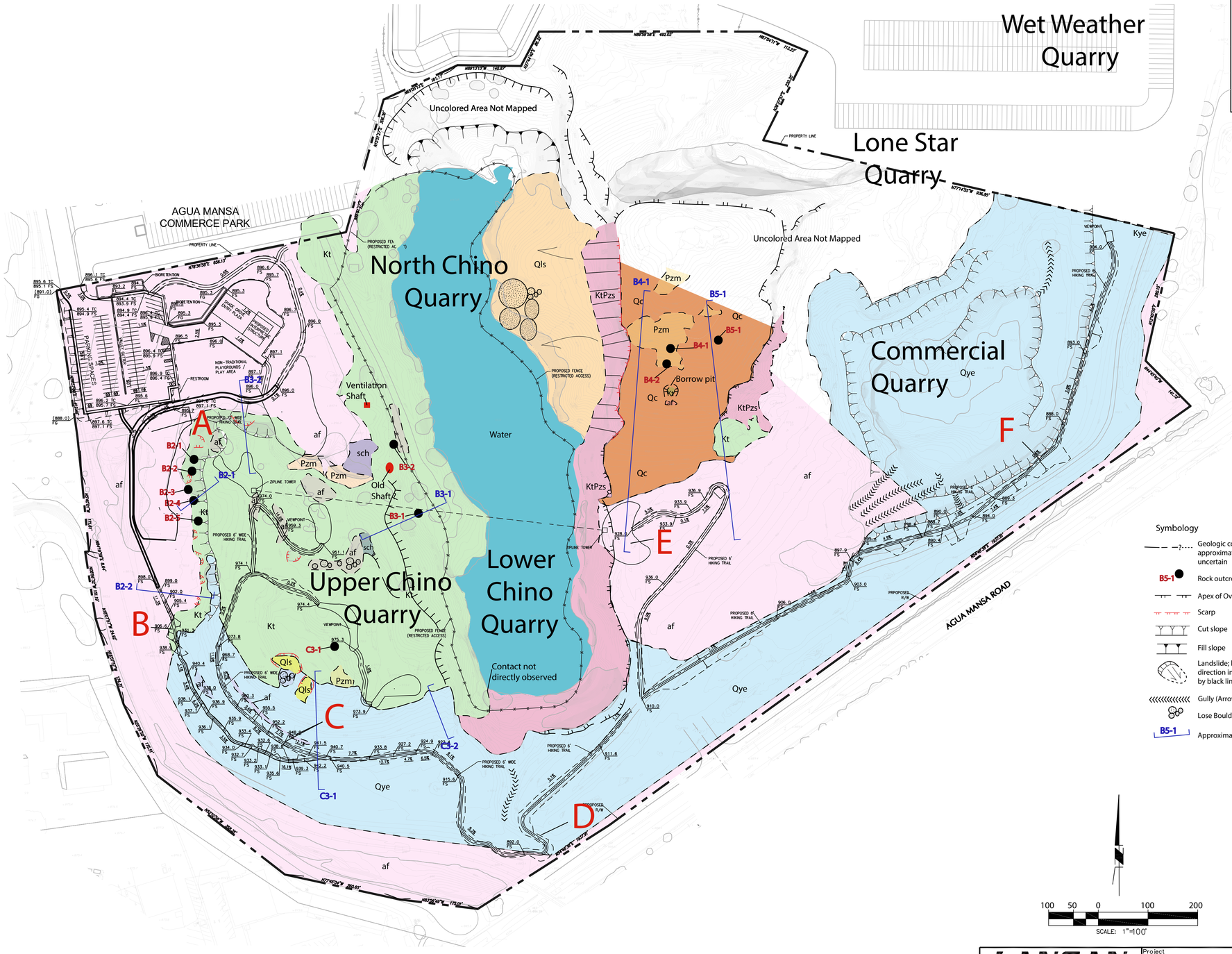
AGUA MANSA RECREATIONAL PARK/OPEN SPACE

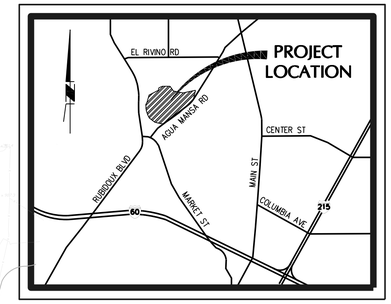
JURUPA VALLEY
RIVERSIDE COUNTY CALIFORNIA

Drawing Title

SITE PLAN PROPOSED OPEN SPACE IMPROVEMENTS

Project No. 721013502	Figure 2
Date 04 OCTOBER 2018	
Scale	
Drawn By CY / Checked By	
Submission Date	





VICINITY MAP

N.T.S.

LEGEND

Base Map and topography from Langan "Preliminary QMP exhibit" dated 11 September, 2018

PROPERTY LINE

See text for reference

Symbology

- Geologic contact; solid where certain, dashed where approximated, dotted where concealed, queried where uncertain
- B5-1 — Rock outcrop data collection location
- Apex of Oversteepened Slopes
- Scarp
- Cut slope
- Fill slope
- Landslide; head scarp area hatchured, arrows in direction in downslope movement, limits depicted by black line (dashed where approximated).
- Gully (Arrows point upstream)
- Lose Boulders
- B5-1 — Approximate Section Location for CRSP Anaysis

Geologic Units

- af — Artificial Fill- Man made/placed fill (>1 foot thick)
- Qls1 — Landslide deposit 1 surficial sloughing, 3 feet deep or less
- Qls2 — Landslide deposit 2 Slump or earthflow, greater than 3 feet deep
- Qc — Colluvium, Quaternary
- Qye — Old Aolean Deposits (fine grained, indurated dunal sands). ("?" indicates uncertain, obscured)
- Kt — Tonalite ("?" indicates uncertain, obscured)
- sch — Schist
- Pzm — Limestone
- KtPzs — Mixed tonalite, marble, and schist
- Kgm — Secondary Quartz Monzonite intrusives

100 50 0 100 200

SCALE: 1"=100'

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Project: JURUPA VALLEY ACTIVITY PARK
JURUPA VALLEY
RIVERSIDE COUNTY CALIFORNIA

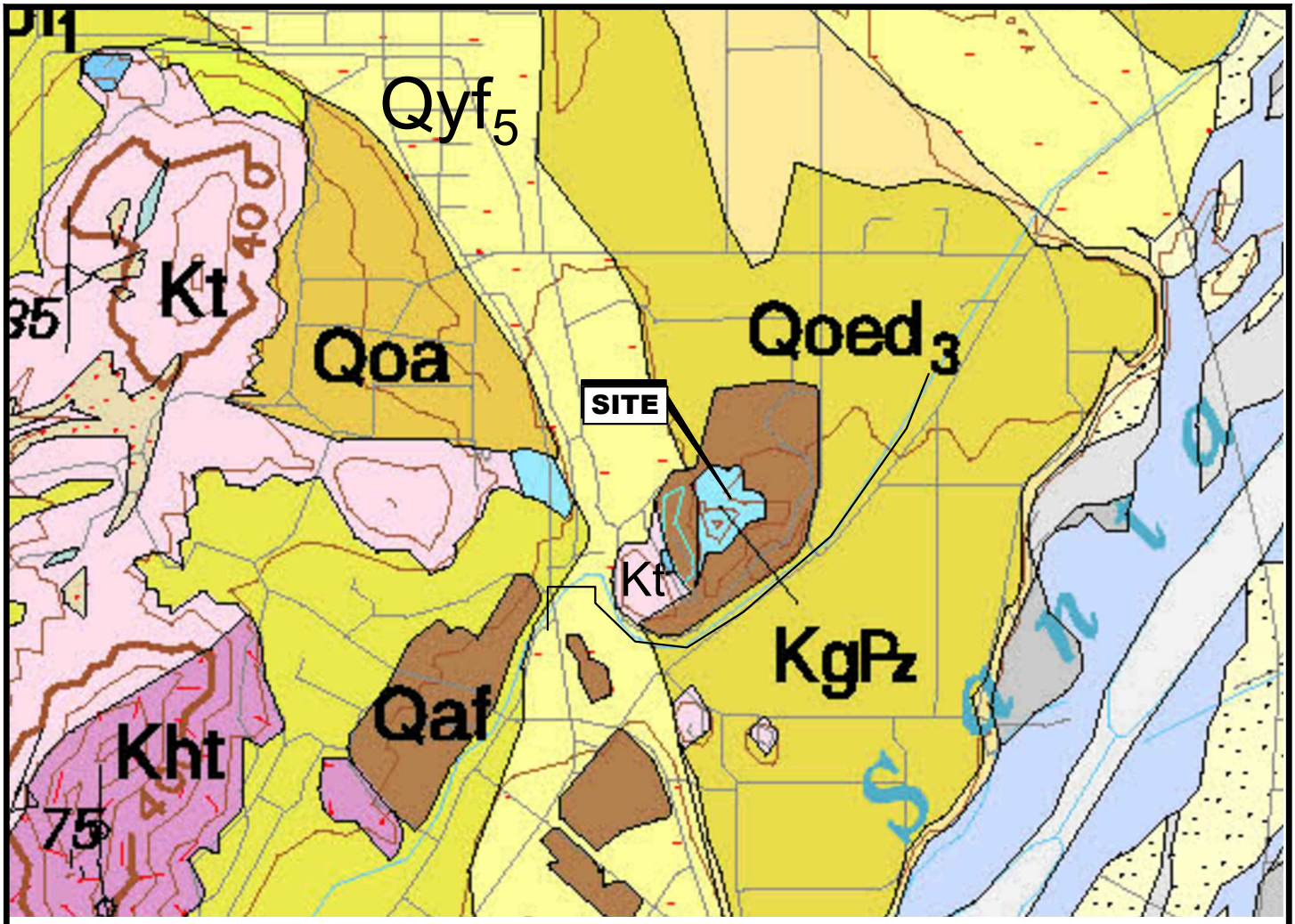
Drawing Title: Engineering Geologic Map

Project No. 721013502
Date 26 October 2018
Drawn By kdk
Checked By MM

Drawing No. 03
Sheet 1 of 1

LANGAN PROJECT NO. 721013502

Filename: \\langan.com\data\LAX\data\57\21013502\Project Data_Discipline\Engineering Geology\Geologic Map_721013502_kdk102520181.dwl Date: 10/26/2018 Time:11:05 User:kdkrug Style Table: Langan.stb Layout: Sheet 1



Base map: BACKGROUND GEOLOGIC MAP REFERENCED FROM, "GEOLOGIC MAP OF THE SAN BERNARDINO AND SANTA ANA 30' X 60' QUADRANGLE, CALIFORNIA" VERSION 1.0, 2006

EXPLANATION

- Qaf — Artificial Fill (Holocene)
- Kt — Generic Cretaceous rocks of the Peninsular Ranges Batholith (Cretaceous)
- KgPz — Generic Cretaceous rocks of the Peninsular Ranges Batholith (Jurassic)
- Qyf_5 — Generic Quaternary units common to all assemblages (Holocene)
- $Qoed_3$ — Generic Quaternary units common to all assemblages (Pleistocene)
- Qof_1 — Generic Quaternary units common to all assemblages (Pleistocene)
- Qof_{1a} — Generic Quaternary units common to all assemblages (Pleistocene)

Contact --Depositional or intrusive contact, dashed where approximate located, dotted where concealed

N

0 2000 Feet

Approximate scale

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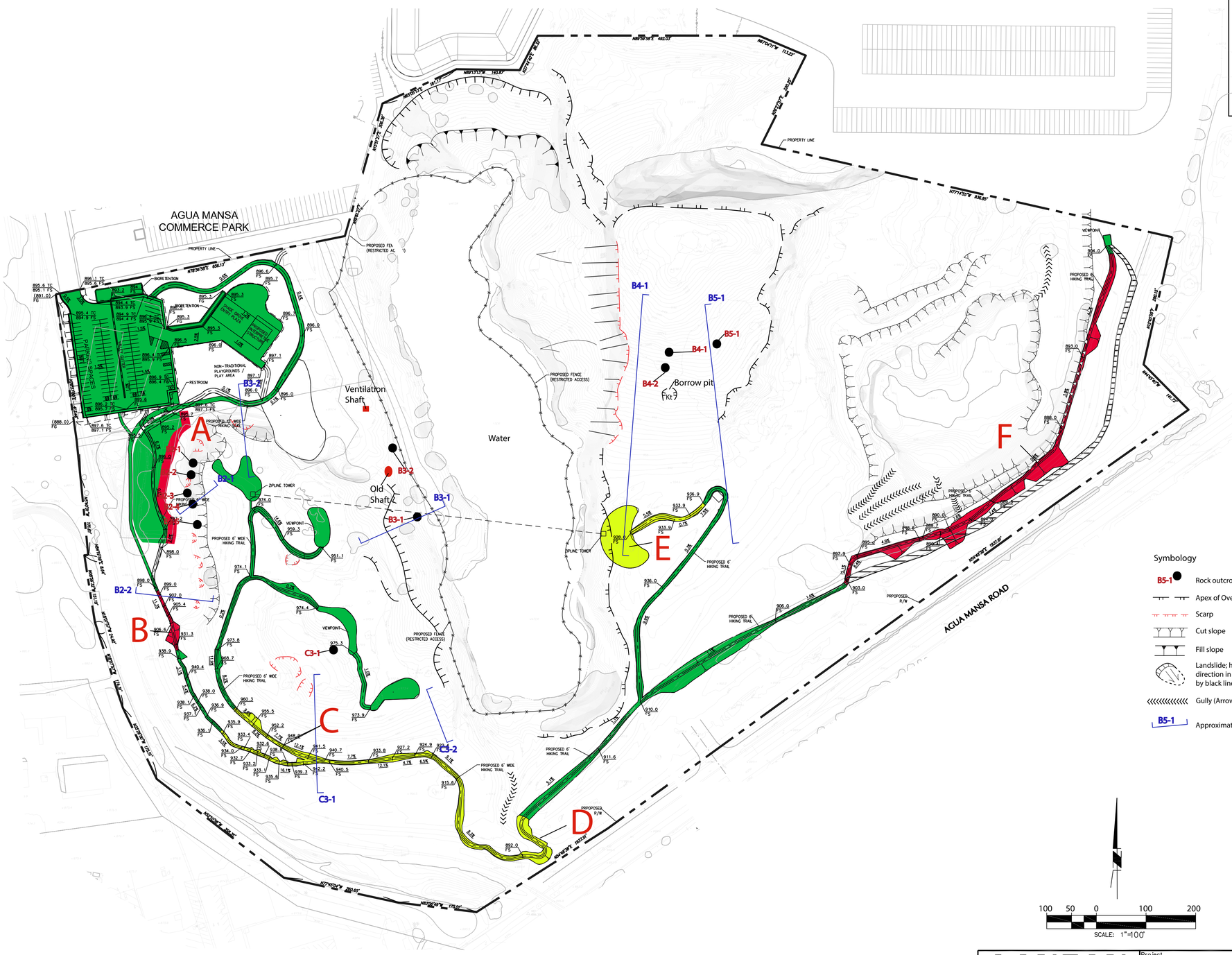
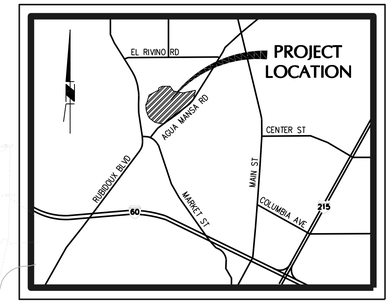
Project
AGUA MANSA RECREATIONAL PARK/OPEN SPACE
JURUPA VALLEY
RIVERSIDE COUNTY CALIFORNIA

Figure Title
REGIONAL GEOLOGIC MAP

Project No. 721013502
Date 20 SEPTEMBER 2018
Scale
Drawn By CY

Figure No. 4





VICINITY MAP

N.T.S.

LEGEND

Base Map and topography from Langan "Preliminary QMP exhibit" dated 11 September, 2018

PROPERTY LINE

See text for reference

Symbology

- B5-1 ● Rock outcrop data collection location
- Apex of Oversteepened Slopes
- Scarp
- Cut slope
- Fill slope
- Landslide; head scarp area hatchured, arrows in direction in downslope movement, limits depicted by black line (dashed where approximated).
- Gully (Arrows point upstream)
- B5-1 Approximate Section Location for CRSP Anaysis

Planned Trail and Viewpoint Mitigation Zonation

- No Modifications Neccesary
- Moderatly constrained, Moderate impact from rockfall & errosion.
- Highly constrained, Move trail or engineering modificatiosn needed.
- Reccomended Trail Relocation Path.

100 50 0 100 200

SCALE: 1"=100'

DRAFT

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RIVERSIDE COUNTY CALIFORNIA

Drawing Title: **Planned Facility Mitigation Zone Map**

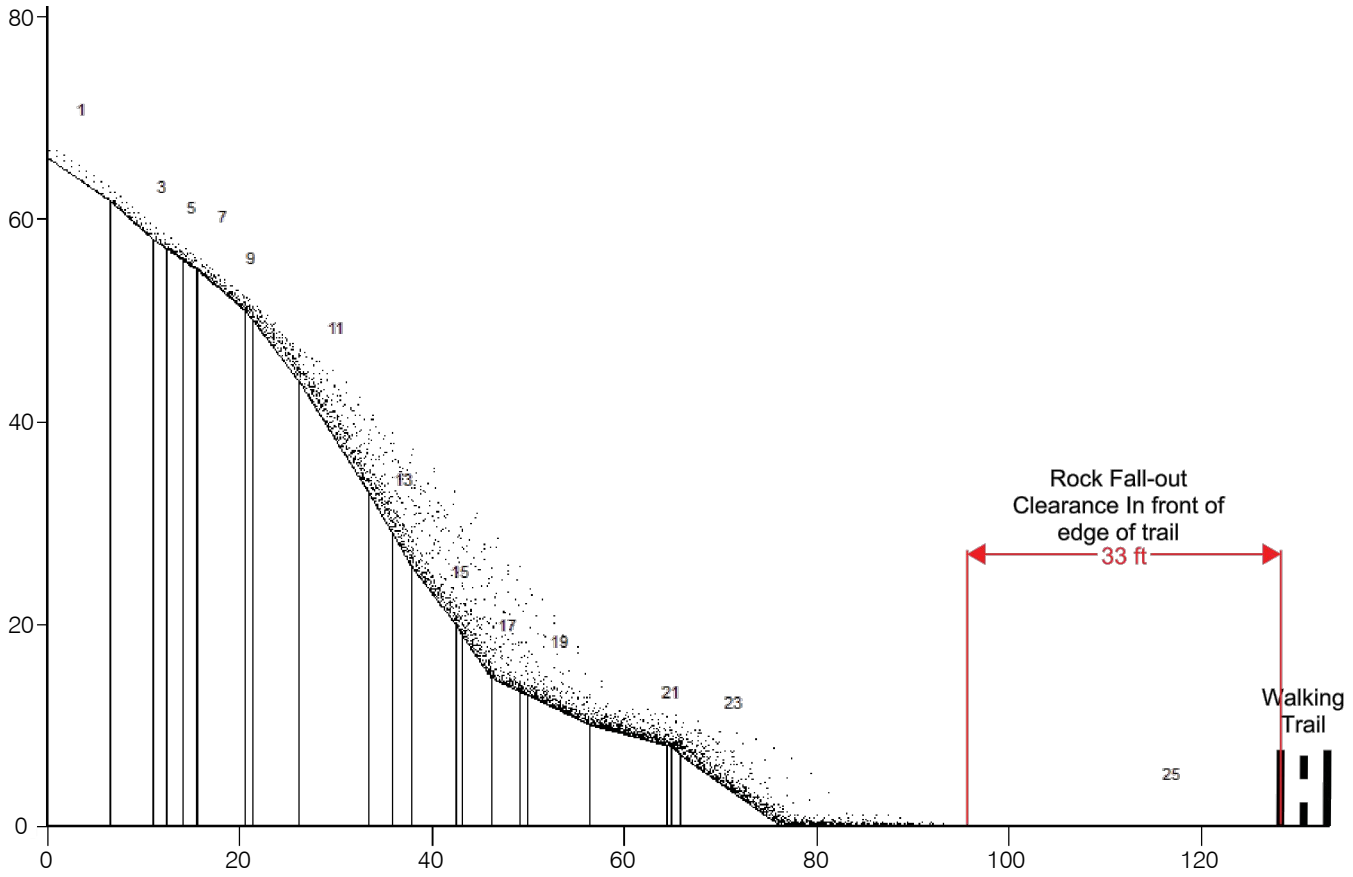
Project No. 721013502
Date 25 October 2018
Drawn By kdk
Checked By MM
Drawing No. 05
Sheet 1 of 1

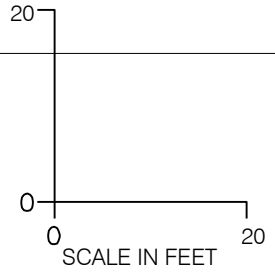
Filename: \\langan.com\data\LA\Vdata\721013502\Project Data_Discipline\Engineering Geology\Engineering Geologic Map_721013502_kdk10252018.ai
Date: 10/25/2018 Time: 16:10 User: kdkug Style Table: Langan.stb Layout: Sheet 1

LANGAN PROJECT NO. 721013502

APPENDIX A

CRSP Analysis Results





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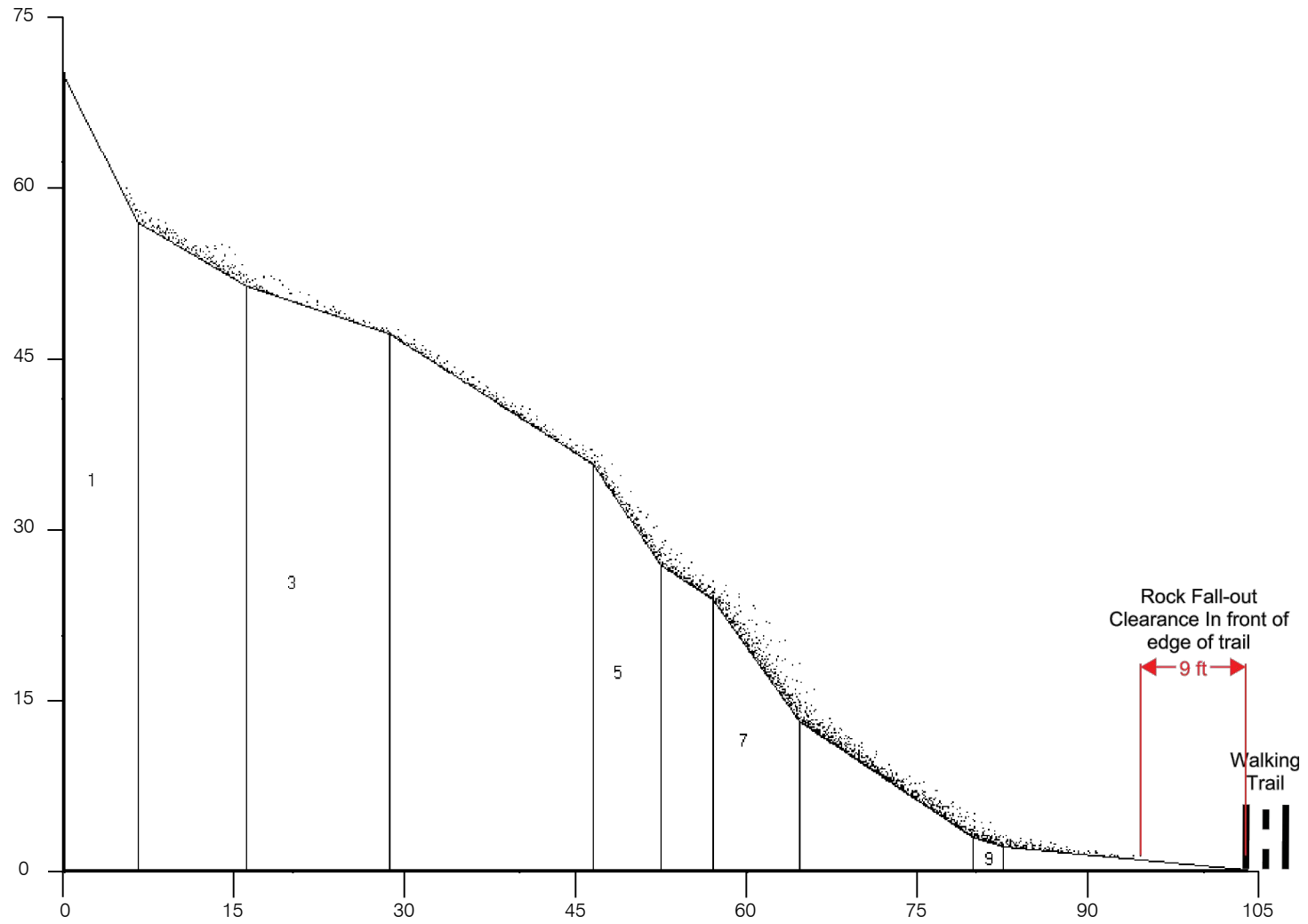
Drawing Title

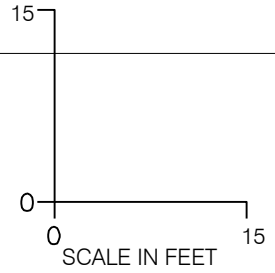
CRSP RUN A/B3-2

Project No.	721013902
Date	05 OCTOBER 2018
Scale	
Drawn By	CY
Checked By	X
Submission Date	

Drawing No.

A-1





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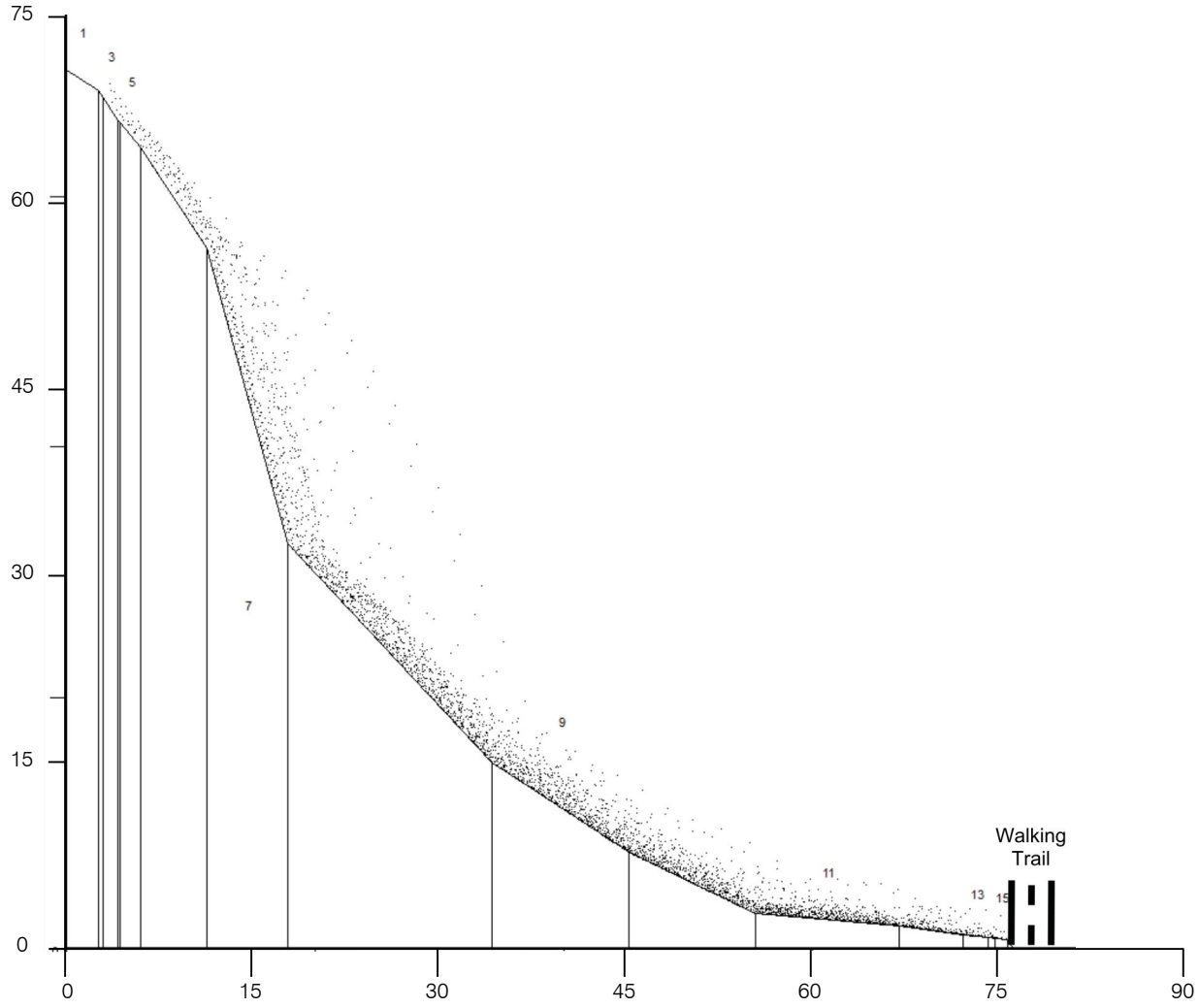
Drawing Title

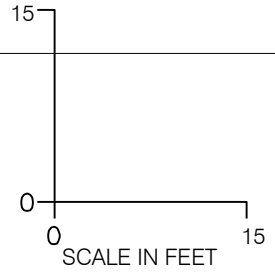
CRSP RUN B/B2-1

Project No.	721013502
Date	05 OCTOBER 2018
Scale	
Drawn By	CY
Checked By	X
Submission Date	

Drawing No.

A-2





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Drawing Title

CRSP RUN C/B2-2

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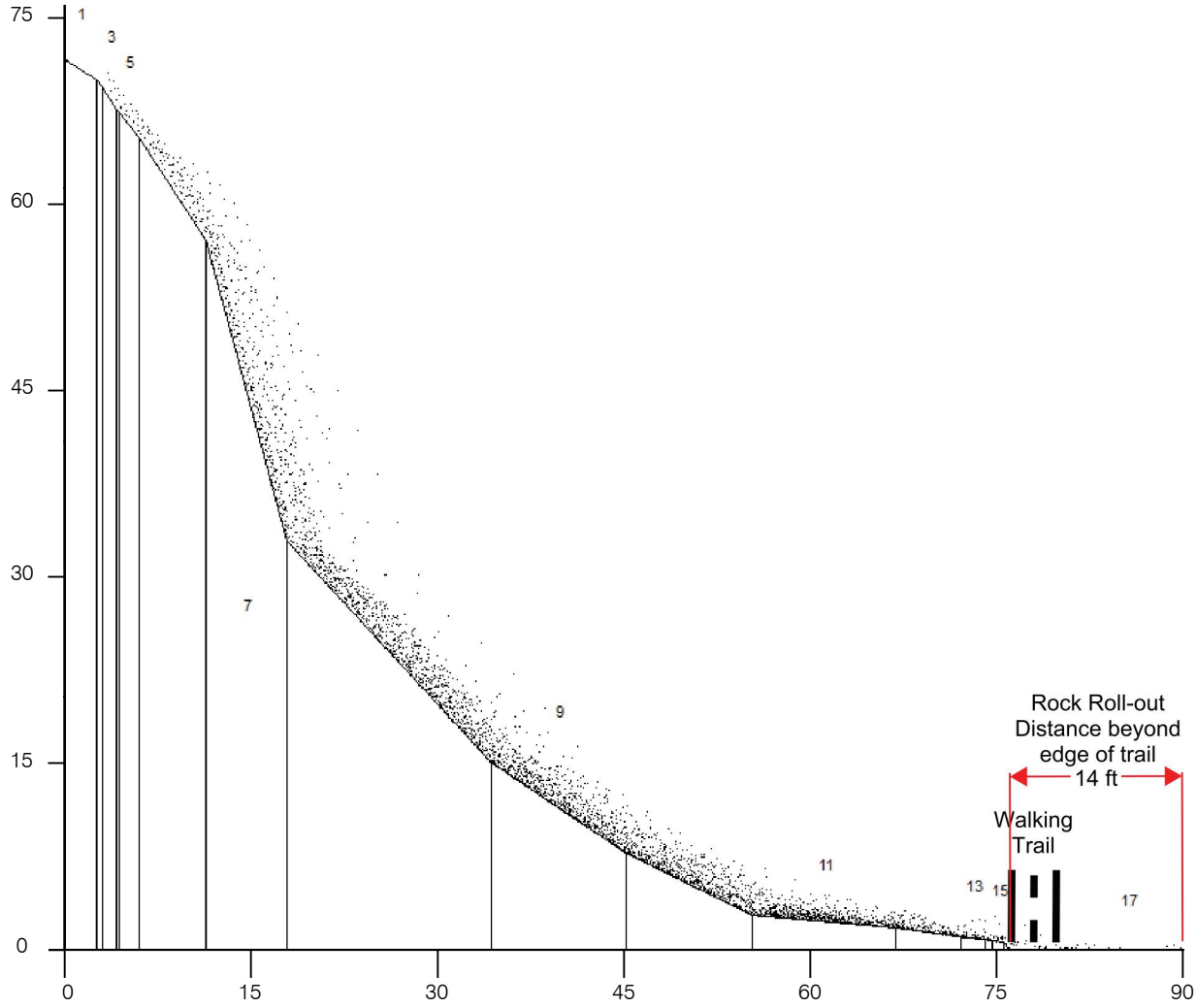
Drawing No.

A-3



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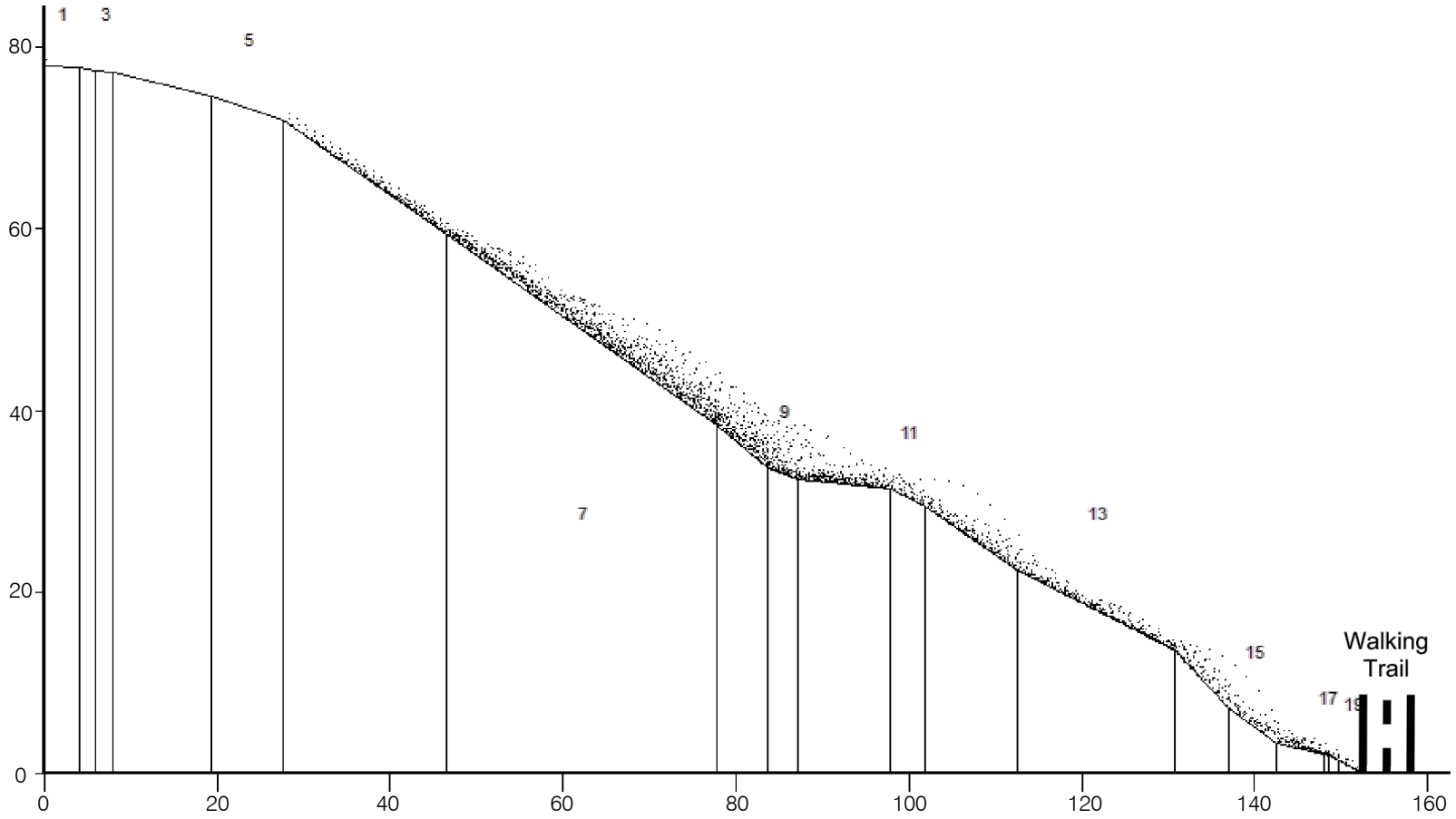
A-4



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CRSP RUN D/C3-1

Project No. 721013502	Drawing No. A-5
Date 05 OCTOBER 2018	
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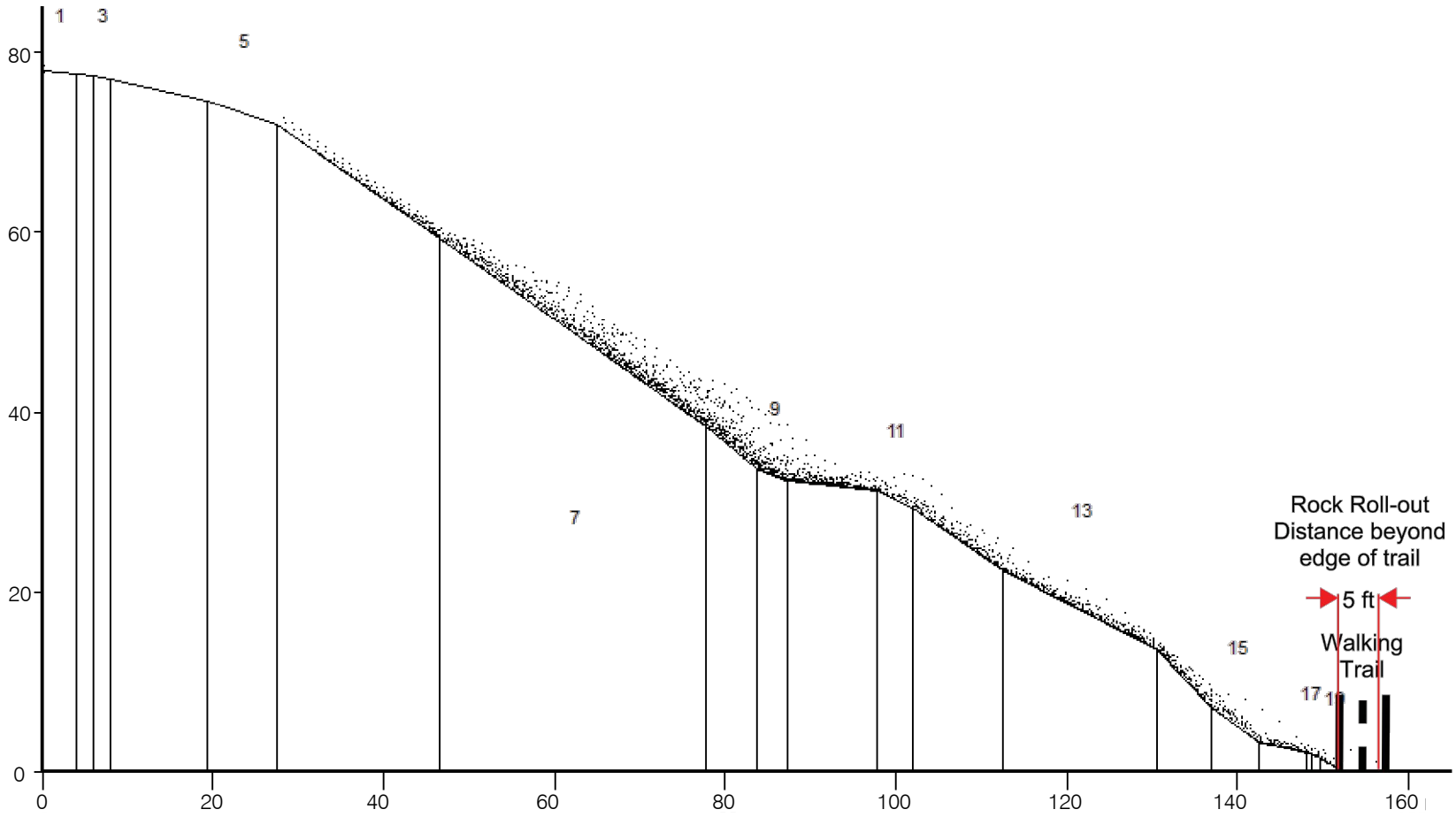
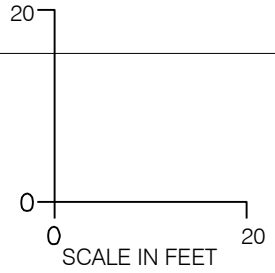
Submission Date	





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Date	05 OCTOBER 2018
Scale	
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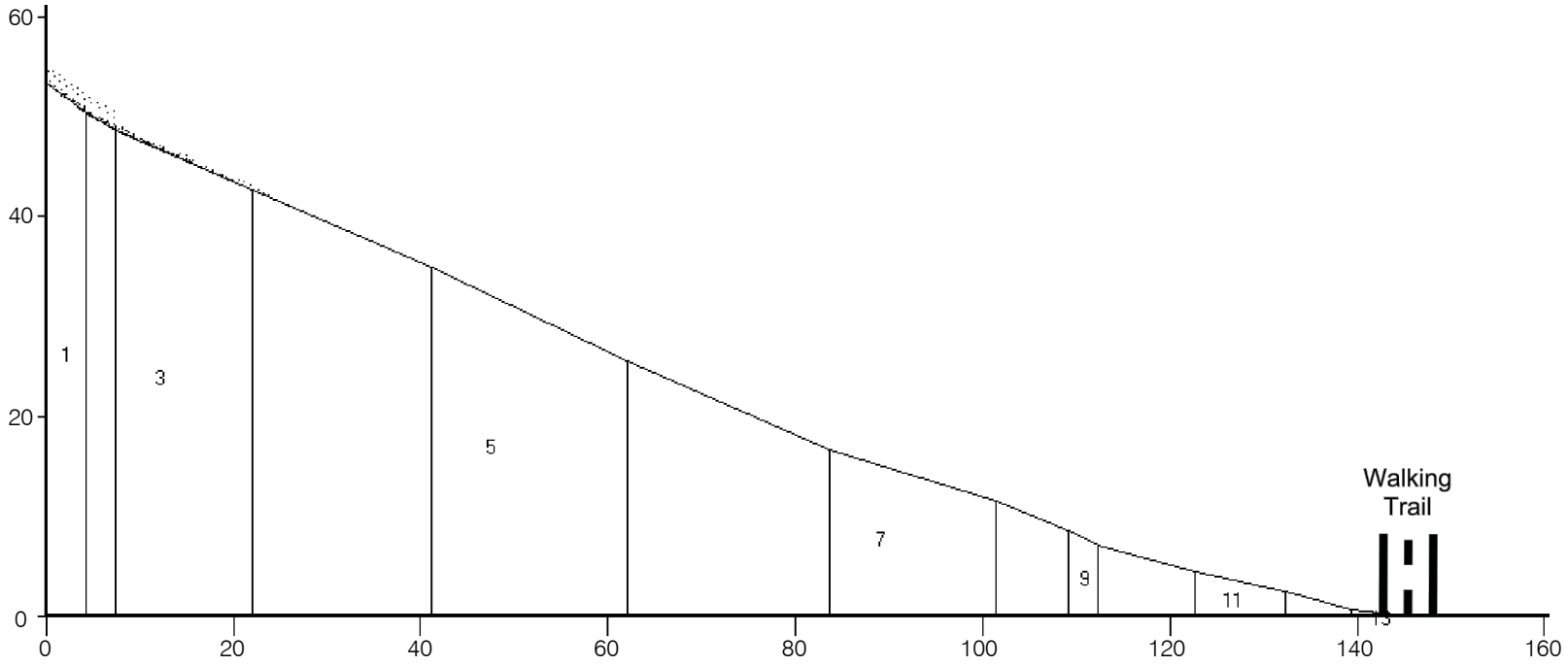
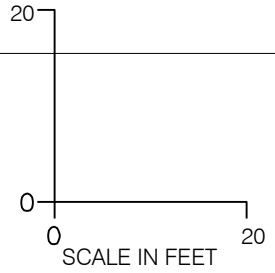
Checked By	X
Submission Date	
Drawing No.	A-6





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Drawing Title
CRSP RUN E/C3-2

Project No.	721013502
Date	05 OCTOBER 2018
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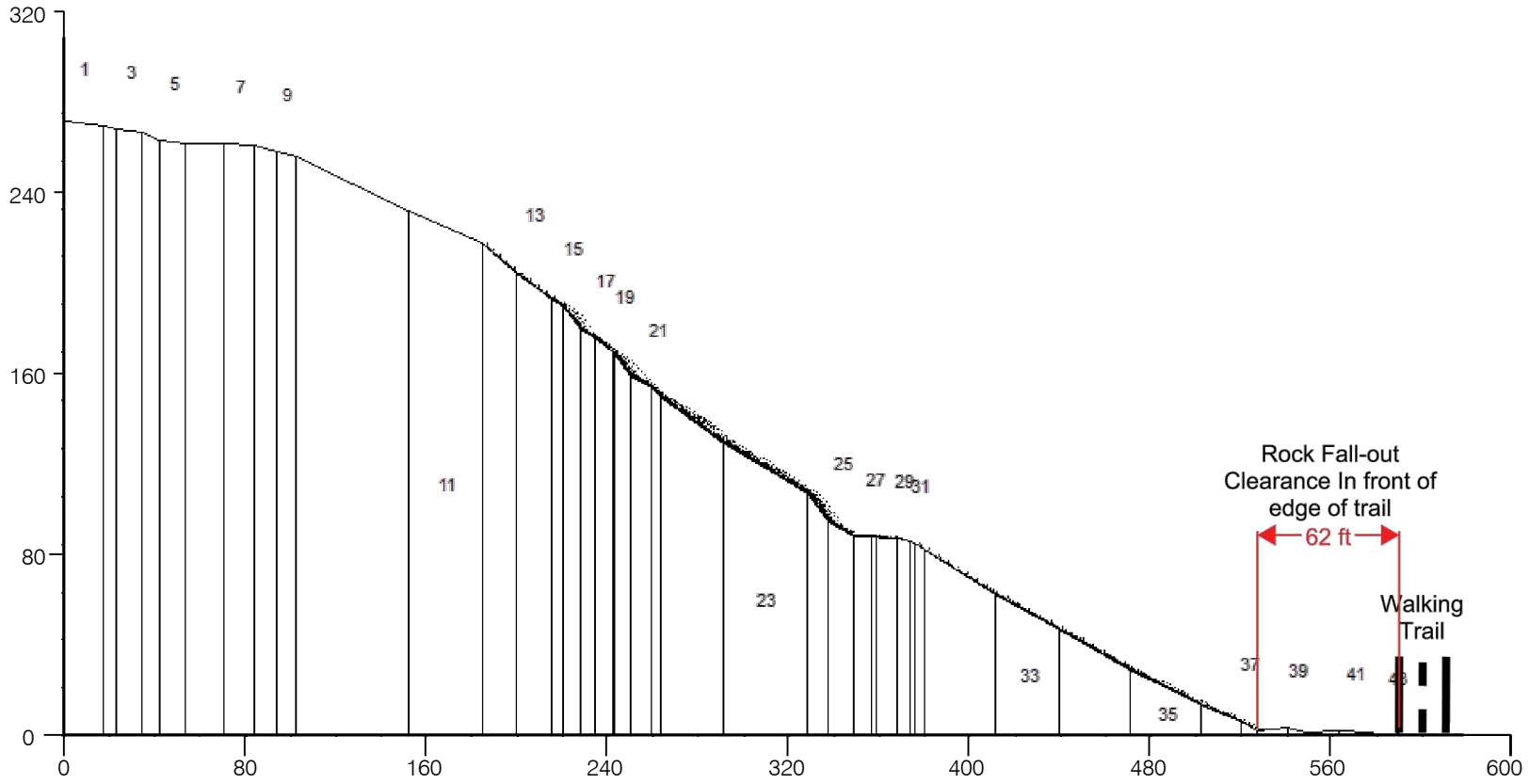
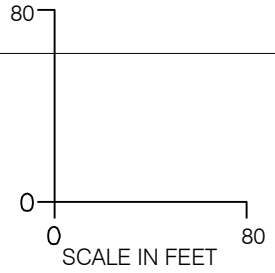
Drawing No.	A-7





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Drawing Title

CRSP RUN FB4-1 AND B5-1

Project No.	721013902
Date	05 OCTOBER 2018
Scale	
Drawn By	CY
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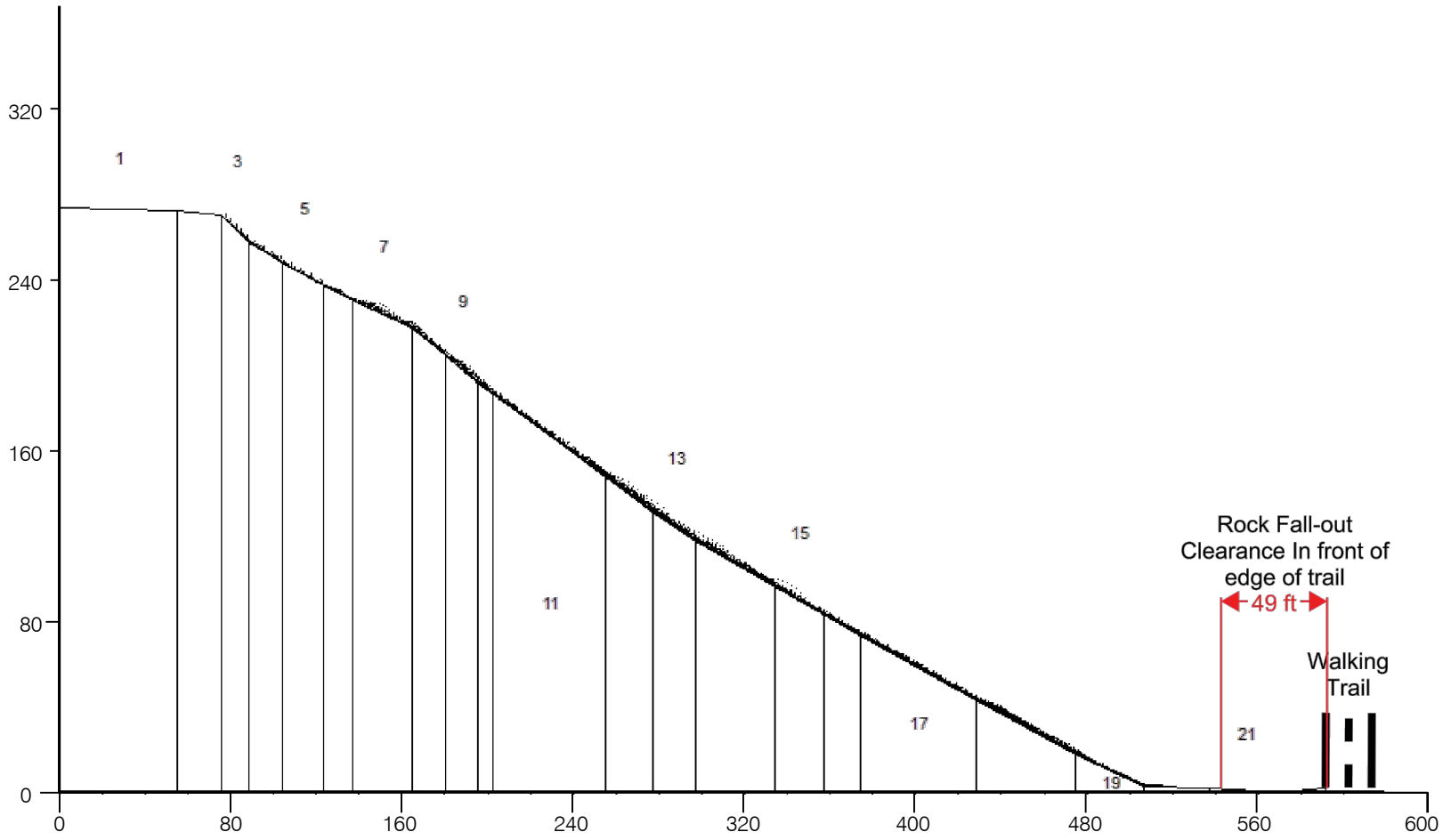
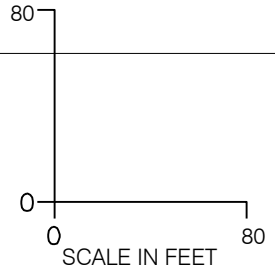
Drawing No.

A-8





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RIVERSIDE COUNTY CALIFORNIA

Drawing Title

CRSP RUN F'/B4-1 AND B5-1

Project No.	721013902
Date	05 OCTOBER 2018
Scale	
Drawn By	CY
Checked By	X
Submission Date	

Drawing No.

A-9