CITY OF ALBUQUERQUE

Planning Department
Alan Varela, Director

Mayor Timothy M. Keller

January 29, 2024

Andrea Rand
ISG
7100 International Dr, Ste 5550
Minneapolis, MN 55425

RE: U-Haul
8200 Jefferson Street NE
Conceptual Grading and Drainage Plan
Engineer's Stamp Date: No Stamp Date
Hydrology File: C17D146

Dear Ms. Rand:

PO Box 1293

Albuquerque

NM 87103

www.cabq.gov

Based upon the information provided in your submittal received 01/24/2024, the Conceptual Grading and Drainage Plan **is not** approved for action by the Development Facilitation Team (DFT) on Site Plan for Building Permit. The following comments need to be addressed for approval of the above referenced project:

1. Per the DPM, the following must be on the Grading Plan. Please note the Grading Plan must be a stand-alone construction document.
    a. Please provide a licensed New Mexico civil engineer's stamp with a signature and date.
    b. Please provide a Vicinity Map. Typically, this is the Zone Atlas. This can be downloaded in pdf format from the City of Albuquerque's website.
    c. Please provide the Benchmark information (location, description and elevation) for the survey contour information provided.
    d. Please provide the FIRM Map and flood plain note with effective date.
    e. Please provide a legal Description of the property.

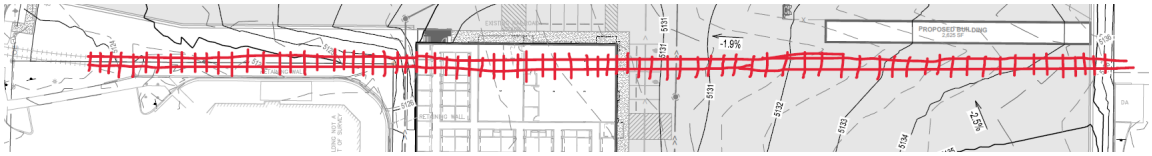
2. Please use the procedure for 40 acre and smaller basins as outlined in Development Process Manual (DPM) Article 6-2(a). Please provide both the existing conditions and proposed conditions for the 100 year-6 hour storm event.

3. Please follow the DPM Article 6-12 Stormwater Quality and Low-Impact Development for the sizing calculations. To calculate the required SWQV, multiply the impervious area (Square feet) draining to the BMP by 0.42 inches for new development sites divided by 12 to get the required volume in cubic feet. The calculations of both the required and the provided volume of each BMP must be shown on the Grading and Drainage Plan. Each BMP should be labeled on the Grading and Drainage Plan with the required SWQV and

associated water surface elevation and the 100-year water surface elevation. Landscaping of surface BMPs is also required to be noted on the Grading and Drainage Plan.

4. Please show the existing railroad spur that goes through the property along with the railroad easement.

5. The Site Plan shows a proposed building and site work over the existing railroad spur and railroad easement noted in Comment #4. Please provide a notarized letter from the owner of the existing rail road easement stating that construction can be done on their easement.



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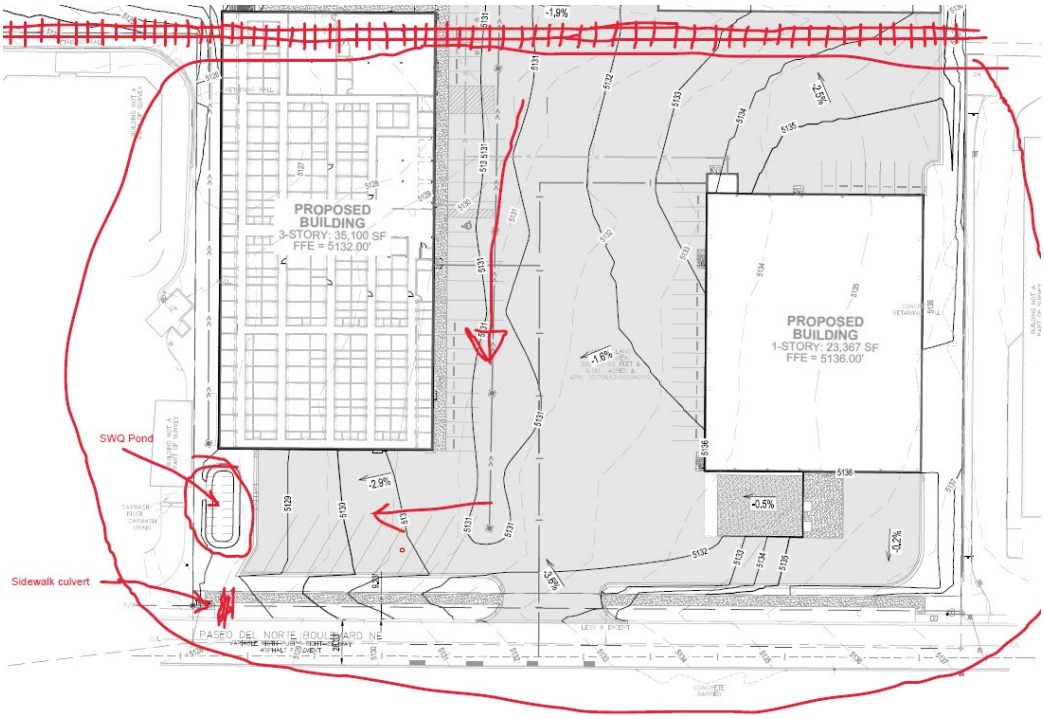
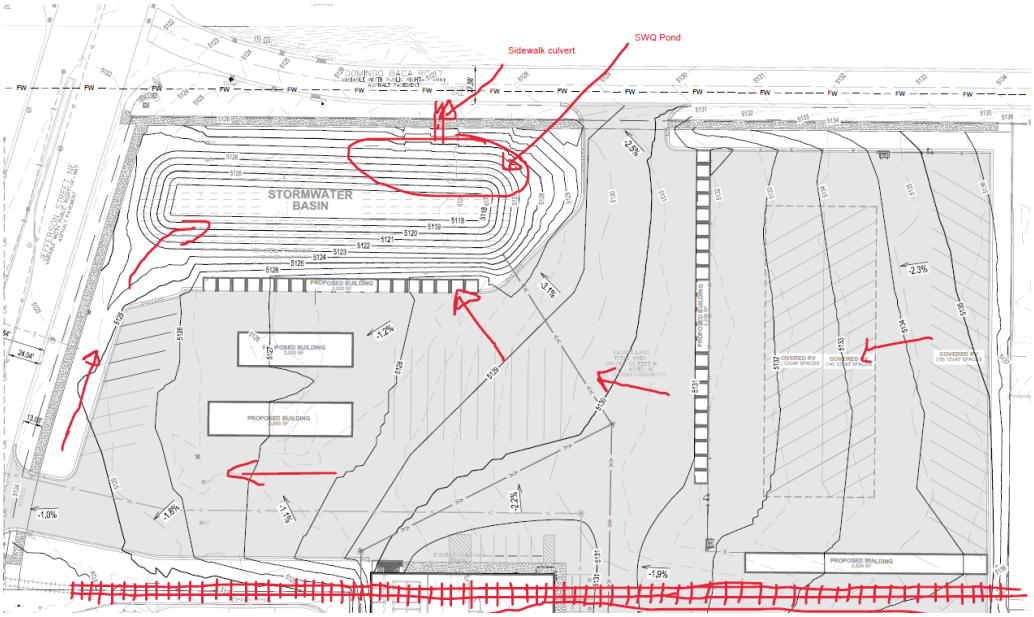
6. Since there is an existing railroad spur through the site as indicated in Comment #4, the site will have two separate drainage discharge points. The southern portion drains to a Stormwater Quality Pond with an emergency spillway as a sidewalk culvert to Paseo de Norte Access Rd.



The northern portion drains to a Stormwater Quality Pond with an emergency spillway as a sidewalk culvert to Domingo Baca Rd.



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7. Please provide the weir calculations, per DPM Article 6-16(A), for the curb cuts and sidewalk culverts. A coefficient of 2.7 is typically used for the weir equation $Q = CLH^{2/3}$.

8. A waterblock, 0.87' high, per COA Paving Detail No. 2426, is required at the driveway entrance.

9. Please note Paseo del Norte Access Road is within NMDOT jurisdiction. Since this project runoff goes into the New Mexico Department of Transportation's (NMDOT) Right of Way, written concurrence must be obtained from NMDOT D3 Drainage that this project can proceed. Please contact Tim Trujillo P.E (TimothyR.Trujillo@state.nm.us or 505-373-4987).

10. Add a note on the Grading Plan, "Prior to any work within the New Mexico Department of Transportation (NMDOT) Right-of-Way, an NMDOT permit will be required." Provide a copy of the issued permit prior to requesting Certificate of Occupancy.

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As a reminder, if the project total area of disturbance (including the staging area and any work within the adjacent Right-of-Way) is 1 acre or more, then an Erosion and Sediment Control (ESC) Plan and Owner's certified Notice of Intent (NOI) is required to be submitted to the Stormwater Quality Engineer (Doug Hughes, PE, jhughes@cabq.gov, 924-3420) 14 days prior to any earth disturbance.

If you have any questions, please contact me at 924-3995 or rbrissette@cabq.gov.

Sincerely,

Renée C. Brissette

Renée C. Brissette, P.E. CFM
Senior Engineer, Hydrology
Planning Department

City of Albuquerque

Planning Department
Development & Building Services Division

DRAINAGE AND TRANSPORTATION INFORMATION SHEET (DTIS)

Project Title: U-Haul Hydrology File # _____
Legal Description: TR OF LAND IN SE SW SE SEC 14 T11N R3E (AKA HARLEY TRACTWITHIN LOOP INDUSTRIAL DISTRICT UNIT NO. 1) EXCL S'LY PORTOUT TO R/W
City Address, UPC, OR Parcel: 8200 Jefferson St NE

Applicant/Agent: ISG Contact: Andrea Rand
Address: 7100 International Dr, Ste 5550, Minneapolis, MN 55425 Phone: 952-426-0699
Email: andrea.rand@isginc.com

Applicant/Owner: AMERCO Real Estate Contact: Cody Lane
Address: 2727 N Central Ave, Phoenix, AZ 85004 Phone: 505-453-3718
Email: cody_lane@uhaul.com

(Please note that a DFT SITE is one that needs Site Plan Approval & ADMIN SITE is one that does not need it.)

TYPE OF DEVELOPMENT: ☐ PLAT (#of lots) _____ ☐ RESIDENCE
☑ DFT SITE ☐ ADMIN SITE

RE-SUBMITTAL: ☐ YES ☑ NO

DEPARTMENT: ☐ TRANSPORTATION ☑ HYDROLOGY/DRAINAGE

Check all that apply under Both the Type of Submittal and the Type of Approval Sought:

TYPE OF SUBMITTAL:

- ☐ ENGINEER/ARCHITECT CERTIFICATION
- ☐ PAD CERTIFICATION
- ☑ CONCEPTUAL G&D PLAN
- ☐ GRADING & DRAINAGE PLAN
- ☑ DRAINAGE REPORT
- ☐ DRAINAGE MASTER PLAN
- ☐ CLOMR/LOMR
- ☐ TRAFFIC CIRCULATION LAYOUT (TCL) ADMINISTRATIVE
- ☐ TRAFFIC CIRCULATION LAYOUT FOR DFT APPROVAL
- ☐ TRAFFIC IMPACT STUDY (TIS)
- ☐ STREET LIGHT LAYOUT
- ☐ OTHER (SPECIFY)_____

TYPE OF APPROVAL SOUGHT:

- ☐ BUILDING PERMIT APPROVAL
- ☐ CERTIFICATE OF OCCUPANCY
- ☐ CONCEPTUAL TCL DFT APPROVAL
- ☐ PRELIMINARY PLAT APPROVAL
- ☐ FINAL PLAT APPROVAL
- ☐ SITE PLAN FOR BLDG PERMIT DFT APPROVAL
- ☐ SIA/RELEASE OF FINANCIAL GUARANTEE
- ☐ FOUNDATION PERMIT APPROVAL
- ☐ GRADING PERMIT APPROVAL
- ☐ SO-19 APPROVAL
- ☐ PAVING PERMIT APPROVAL
- ☐ GRADING PAD CERTIFICATION
- ☐ WORK ORDER APPROVAL
- ☐ CLOMR/LOMR
- ☐ OTHER (SPECIFY)_____

DATE SUBMITTED: 1/18/24

REV. 09/13/23

80% Stormwater Management Report

U-Haul
Albuquerque, New Mexico

Date: December 8, 2023

ISG Project #: 23-28816

ISG
Architecture
Engineering
Environmental
Planning
ISGInc.com

REPORT FOR:
Tiequan Chen, PE
Principal Engineer, Hydrology
City of Albuquerque
600 2nd Street NW
Albuquerque, NM 87102
tchen@cabp.gov

FROM:
Ryan Anderson, PE
Civil Engineer
ISG
7900 International Drive
Bloomington, MN 55425
952.426.0699

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APPENDICES

INTRODUCTION

This stormwater management report was prepared in conjunction with site plans to facilitate the construction of a U-Haul Storage Facility in Albuquerque. The project site is located at 8200 Jefferson Street NE, Albuquerque, New Mexico. The total area of the lot and the planned area of disturbance is approximately 8.88 acres. The proposed project scope will include the installation of underground utilities, grading, sidewalks, new buildings, and stormwater best management practices.

In concurrence with the production of site plans, hydrologic and hydraulic models were developed to generate the data presented within this report. Given that the project will disturb more than one acre of land, a NPDES Construction Stormwater Permit and approval from the City of Albuquerque and Bernalillo County will be required.

EXISTING SITE DRAINAGE CONDITIONS

The existing site contains a paved lot consisting of both concrete and asphalt. The site also includes an old railroad spur. The unpaved portion of the lot is vegetated with grass and shrubs. Given the existence of an artificial surface, this project is a redevelopment. A geotechnical evaluation was conducted by Terracon, who provided a report dated February 6, 2023. The report is available in Appendix A.

The geotechnical evaluation indicates that the site is primarily sands, with borings ranging in depth from 11.5 ft to 26.5 ft. The predominant soil on site is silty sand with depths ranging from less than 4 feet to more than 26.5 feet deep. Pockets of sandy silt were also found. Groundwater was not encountered during the investigation, nor did the geotechnical review find sinkholes or underground mining associated with this area of Albuquerque. Given the predominance of sands, the site was modeled using Hydrologic Soil Group A.

The existing site has slopes ranging from 0% to 33%, with the topography sloping west toward Jefferson St NE. All runoff from the site is conveyed via surface flow, either directly to Jefferson St NE or indirectly through the lot adjacent the south portion of the site, before discharging to City storm infrastructure. The existing drainage conditions are shown on the Existing Conditions Drainage Map in Appendix B and summarized in Table 1 below. The existing site is approximately 16.1% impervious, which is 1.43 ac.

Table 1: Existing Drainage Conditions

Drainage Area	Impervious Area (ac)	Pervious Area (ac)	Total Area (ac)	Weighted Curve Number (CN)	Drains To
EX-1	1.43	5.30	6.73	81	Offsite
EX-2	0.00	2.15	2.15	77	Offsite
Total	**1.43**	**7.45**	**8.88**	80	-

PROPOSED SITE DRAINAGE CONDITIONS

The proposed site will include seven buildings with footprints ranging in size from 2,000 square feet to 35,100 square feet, covered parking spaces, a parking lot, stormwater management facilities, and other associated site work. Within the redevelopment, there are 7.25 ac of new and reconstructed impervious surfaces, resulting in the proposed final impervious coverage of 81.7%. Taking existing impervious areas into account, the net increase in impervious area is 5.83 ac. The remaining lot will consist of pervious landscaped areas.

Runoff from the buildings and the majority of the parking lot will be conveyed via surface flow and storm sewer to infiltration basin 1, located in the northwest corner of the lot. A small portion of the parking lot will surface flow to infiltration basin 2 in the southwest corner of the lot. These basins will be constructed in native soils, as the soil borings indicate that the basin bottoms will be located below topsoil elevations. Native soils in these locations are silty sand and have an infiltration rate of 1.67 inches per hour, determined using the City of Albuquerque Design Manual.

Both rate control and water quality components are addressed via the onsite infiltration basins. The Proposed Conditions Drainage Map is provided in Appendix C, summarized in Table 2 below.

Table 2: Proposed Drainage Conditions

Drainage Area	Impervious Area (ac)	Pervious Area (ac)	Total Area (ac)	Weighted Curve Number (CN)	Drains To
DA-1	4.51	1.22	5.73	94	Infiltration Basin 1
DA-2	0.48	0.00	0.48	98	Infiltration Basin 1
DA-3	0.34	0.00	0.34	98	DA-2
DA-4	0.39	0.00	0.39	98	DA-3
DA-5	0.48	0.05	0.52	96	DA-4
DA-6	0.19	0.05	0.24	94	Infiltration Basin 2
DA-7	0.00	0.31	0.31	79	Offsite
DA-8	0.00	0.03	0.03	79	Offsite
DA-9	0.83	0.00	0.83	98	Infiltration Basin 1
Total	**7.22**	**1.66**	**8.88**	94	-

STORMWATER CALCULATIONS

Stormwater calculations were performed utilizing rainfall data from NOAA Atlas 14. Additional information used in the design of the stormwater management system includes survey data, aerial photos, soil data, and the City of Albuquerque Development Process Manual.

Drainage calculations were performed utilizing the HydroCAD 10.20-2g software. The model analyzed the existing and proposed conditions for the 2-, 10-, and 100-year 24-hour rainfall events with the SCS TR-55 method and MSE 3 rainfall distribution. This distribution was developed in conjunction with NOAA Atlas 14 rainfall data and peaks at 12 hours, meeting the City of Albuquerque stormwater modeling requirements. Time of concentrations for each drainage area were calculated using HydroCAD and Civil 3D. These calculations are included within the model reports in Appendices D and E for existing and proposed conditions, respectively.

Table 3: System Elevations + HWL Summary

	Infiltration Basin 1	Infiltration Basin 2
Bottom (ft)	5118.00	5126.00
Emergency Overflow Elevation (ft)	5123.97	5127.75
Top (ft)	5124.5	5128.00
2-Year 24-Hour Storm HWL (ft)	5120.08	5126.89
10-Year 24-Hour Storm HWL (ft)	5121.12	5127.35
100-Year 24-Hour Storm HWL (ft)	5122.46	5127.79

Freeboard and Drawdown Time

Sufficient freeboard exists within both infiltration basins to handle events larger than the 100-year, 24-hour storm. The lowest building finished floor elevation on-site is 5132.00 ft. During catastrophic storm events, the water from infiltration basin 1 will flow east to Jefferson Street out of the basin at the emergency overflow location at an elevation of 1523.97 ft. Water from infiltration basin 2 will surface flow west and offsite at an elevation of 5127.75 ft. This design exceeds one (1) foot of freeboard between the infiltration basin emergency overflows and the lowest proposed building finished floor elevation.

The proposed infiltration basins allow for water retained in the basin to infiltrate within 48 hours after the storm peak. To achieve a 48 hour drawdown time, the maximum allowable basin depth is 6.68 feet. Infiltration basin 1 is the deepest basin at six feet deep, ensuring the drawdown time is met.

Peak Flow Management

The redevelopment will have peak flow rates that do not exceed the rates of existing flows. Two infiltration basins provide rate control for the proposed site. The infiltration basins will retain all water directed towards them for storm events smaller than the 100-year storm event and as such, do not contribute to the overall discharge rate. A summary of existing and proposed flows is provided in Table 5.

Table 4: Sum of Peak Flows from Site

Rainfall Event (24-Hour Storm)	Existing (cfs)	Proposed (cfs)	Change (cfs)
2-Year (1.24”)	1.31	0.07	-1.24
10-Year (1.81”)	4.01	0.26	-3.75
100-Year (2.69”)	9.44	0.65	-8.79

Storm Sewer Sizing

Storm sewer was sized using the Rational method for the 10-year and 100-year storm events. All storm sewer intakes were sized using the 10-year and 100-year storm events to ensure they provide sufficient capacity. Storm sewer sizing and intake capacity calculations can be found in Appendix F. Additionally, the City of Albuquerque requires hydraulic grade line information for all pipes that are 18 inches in diameter or greater. A model of the

storm sewer was created using Autodesk Storm and Sanitary Analysis, and a results report containing hydraulic grade line information can be found in Appendix F.

Volume Control and Water Quality

In accordance with City regulations for redevelopments, the stormwater best management practices (BMPs) must provide treatment for the stormwater water quality volume (SWQV) which is the runoff from the 0.48" storm event. As per the City of Albuquerque Design Process Manual, the SWQV is the impervious area of the site multiplied by 0.26 inches. The two proposed infiltration basins will provide water quality volume for the redevelopment. These infiltration practices manage runoff through the 100-year 24-hour storm, which is almost 6 times the required water quality volume and therefore exceeds City of Albuquerque requirements. SWQV calculations can be found in Appendix F.

The bottom of proposed infiltration basin 1 sits at an elevation of 5118.00 ft and the bottom of proposed infiltration basin 2 sits at an elevation of 5126.00 ft. These are not anticipated to interfere with the groundwater table, since no groundwater was encountered during the geotechnical investigation. Therefore, adequate ground water separation will be achieved between the bottom of the basins and the assumed groundwater table.

STORMWATER MANAGEMENT

Erosion control measures will be implemented before, during, and after construction. Proposed temporary erosion control measures include installation of silt fence, a stabilized construction entrance, inlet protection devices, and a designated concrete washout area. Permanent erosion control will primarily be achieved via the establishment of vegetation and the presence of infiltration basins. Locations of the proposed BMPs, along with construction activity notes are provided on sheets C1-10 through C1-40 of the plans (provided separately). The general sequence of construction activities shall be:

1. Install temporary erosion control BMPs
2. Stripping topsoil, soil corrections, and rough grading
3. Footing excavation and construction
4. Installation of underground utilities
5. Subgrade preparation for parking lot
6. Construction of curb and gutter
7. Construction of pavement
8. Turf restoration and landscaping
9. Stabilization and establishment of turf
10. Removal of temporary erosion control BMPs

After construction and site stabilization are complete, the proposed infiltration basins will provide water quality and rate control management for the site.

CONCLUSION

The proposed project provides a stormwater management system that meets all NPDES and City of Albuquerque requirements.

Appendix A: Geotechnical Report

Terracon GeoReport

Geotechnical Engineering Report

Proposed U-Haul Storage Buildings
U-Haul Site #724081
8200 Jefferson Street NE
Albuquerque, New Mexico

February 6, 2023
Terracon Project No. 66215225 Revised

Prepared for:
AMERCO Real Estate/U-Haul Int'l
Phoenix, Arizona

Prepared by:
Terracon Consultants, Inc.
Albuquerque, New Mexico

February 6, 2023

AMERCO Real Estate/U-Haul Int'l
2727 N. Central Avenue, #5N
Phoenix, Arizona 85004

Attn: Ms. Sabrina Perez, M.ASCE
P: (602) 263-6502
E: Sabrina_Perez@uhaul.com

Re: Geotechnical Engineering Report Proposed U-Haul Storage Buildings
U-Haul Site #724081
8200 Jefferson Street NE
Albuquerque, New Mexico
Terracon Project No. 66215225 Revised

Dear Ms. Perez:

We have completed the Geotechnical Engineering services for the above referenced project. This study was performed in general accordance with Terracon Proposal No. P66215225 dated November 5, 2021. This report presents the findings of the subsurface exploration and provides geotechnical recommendations concerning earthwork and the design and construction of foundations, floor slabs, and pavements for the proposed project.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report, or if we may be of further service, please contact us.

Sincerely,
Terracon Consultants, Inc.

For Elliott M. Gordon, E.I.
Staff Engineer

Michael E. Anderson, P.E.
Principal

MICHAEL E. ANDERSON
NEW MEXICO
12132
PROFESSIONAL ENGINEER
2/6/2023

REPORT TOPICS

Note: This report was originally delivered in a web-based format. **Orange Bold** text in the report indicates a referenced section heading. The PDF version also includes hyperlinks which direct the reader to that section and clicking on the Terracon GeoReport logo will bring you back to this page. For more interactive features, please view your project online at client.terracon.com.

ATTACHMENTS

EXECUTIVE SUMMARY

A geotechnical exploration has been performed for the proposed U-Haul Storage Buildings in Albuquerque, New Mexico. Terracon's geotechnical scope of work included the advancement of fourteen (14) soil borings to depths ranging from approximately 11-½ to 26-½ feet below existing site grades. The site generally appears suitable for the proposed construction based upon geotechnical conditions encountered in the borings and our current understand of the proposed development. The following geotechnical considerations were identified:

- Generally, the borings encountered consists of silty and clayey sands and sandy silts with variable amounts of gravel. Lean clay was encountered in B-05 from about 5 to 10 feet below site grade. Groundwater was not encountered at the time of drilling.

- Detailed grading plans were not available at the time this report was prepared; however, we anticipate that up to 1 to 2 feet of fill will be required to develop final site grade. Removal and recompaction will be required for any loose/soft soils. Prior to placing fill, low strength or unstable soils identified during proofrolling should be removed and replaced.

- Foundations for the 3-story storage buildings can bear on five (5) feet of structural fill. Foundation for showroom and 1-story storage building can bear on three (3) feet of structural fill. Self-storage units are anticipated to be slab-on-grade and can bear on two (2) foot of structural fill. Recompacted native soils are suitable for use as structural fill. When prepared as outlined in this report, the shallow foundations bearing on structural fill/recompacted native soils can be designed with a contact bearing pressure of 3,000 psf.

- Generally, loose to medium dense clayey/silty sand or medium stiff to very stiff silts are anticipated to be exposed at floor slab and pavement subgrade elevations. We recommend the floor slabs bear on at least three (3) feet of structural fill/recompacted native soils.

- Pavement sections can be developed on approved native soils provided they pass proofrolling and are moisture conditioned and compacted as recommended in the report.

- The 2018 International Building Code seismic site classification for this site is D.

Geotechnical Engineering Report

Proposed U-Haul Storage Buildings
U-Haul Site #724081
8200 Jefferson Street NE
Albuquerque, New Mexico

Terracon Project No. 66215225 Revised
February 6, 2023

INTRODUCTION

This report presents the results of our subsurface exploration and geotechnical engineering services performed for the proposed U-Haul Storage Buildings to be located at 8200 Jefferson Street NE in Albuquerque, New Mexico. The purpose of these services is to provide information and geotechnical engineering recommendations relative to:

- Subsurface soil conditions
- Groundwater conditions
- Site preparation and earthwork
- Lateral earth pressures
- Excavation considerations
- Foundation design and construction
- Floor slab design and construction
- Seismic site classification per IBC
- Pavement design and construction

The geotechnical engineering scope of services for this project included the advancement of fourteen (14) test borings to depths ranging from approximately 11-½ to 26-½ feet below existing site grades.

Maps showing the site and boring locations are shown in the **Site Location** and **Exploration Plan** sections, respectively. The results of the laboratory testing performed on soil samples obtained from the site during the field exploration are included on the boring logs in the **Exploration Results** section of this report.

SITE CONDITIONS

The following description of site conditions is derived from our site visit in association with the field exploration and our review of publicly available geologic and topographic maps.

Item	Description
Parcel Information	The project is located at 8200 Jefferson Street NE in Albuquerque, New Mexico. Approximately 9.2 acres See **Site Location**
Existing Improvements	Currently an undeveloped parcel. Evidence indicating of previous development of site consisting of asphalt concrete pavement, Portland cement concrete pavement/slabs, railroad spur, landscaping, and steel chain link perimeter fencing
Current Ground Cover	Asphalt, concrete, railroad spur, landscaping, soil, and vegetation
Existing Topography	Gently sloping down to the west and southwest
Subsurface Conditions	The site generally consists of clayey/silty sand and sandy silts with variable amounts of gravel.

We also collected photographs at the time of our field exploration program. Representative photos are provided in our **Photography Log**.

PROJECT DESCRIPTION

Our initial understanding of the project was provided in our proposal and was discussed in the project planning stage. A period of collaboration has transpired since the project was initiated, and our final understanding of the project conditions is as follows:

Item	Description
Information Provided	Project information was provided in emails received from AMERCO on November 3 and 4, 2021 and included the following: ■ Aerial photograph with proposed number and location of borings ■ AMERCO Geotechnical Requirements (2021-02-23) Updated 2018-02-01 ■ ROE/COI Information (TBD)
Planned Development	The project will consist of the following: ■ 1 to 3-story, at-grade buildings ■ Self-storage units ■ RV Canopies (column supported roof) ■ Asphalt and/or concrete paved parking areas and drives ■ Light poles ■ Covered parking ■ Utilities

Item	Description
Building Construction	■ Building: Load-bearing masonry walls, steel frame, and/or wood frame with slab-on-grade floor system ■ RV Canopies: Steel structures ■ Self-storage: Pre-manufactured metal/steel structures
Finished Floor Elevation	Within 1 to 2 feet existing site grade (assumed).
Maximum Loads	■ Columns: 150 to 200 kips ■ Walls: 5 to 10 kips per linear foot (klf) ■ Slabs: 150 to 350 pounds per square foot (psf) (assumed)
Grading/Slopes	Up to 1 to 2 feet of cut and fill will be required to develop final grade (assumed).
Below Grade Structures	No basements being incorporated into the design of the buildings. The project may or may not include below grade loading docks and/or elevator pits.
Free-Standing Retaining Walls	Retaining walls will not be constructed as part of site development to achieve final grades (assumed).
Pavements	Rigid (concrete) and flexible (asphalt) pavement sections should be considered. Traffic is assumed to include passenger cars and trucks, Recreational Vehicles (RV) and fire/emergency vehicles. Both rigid (concrete) and flexible (asphalt) pavement sections should be considered Expected design traffic is as follows: ■ Light Traffic Loads: Autos/light trucks - 50,000 total ESALs ■ Medium Traffic Loads: Truck/RV Drives - 110,00 total ESALs ■ Heavy Traffic Loads: Occasional Fire Apparatus Equipment and/or large trucks - 180,000 total ESALs The pavement design period is 20 years. Pavement design using a minimum reliability of 90 to 95% reliability
Estimated Start of Construction	2022

GEOTECHNICAL CHARACTERIZATION

Regional and Site Geology

The site occupies a position between the gently sloping piedmont surface on the east side of the Albuquerque-Belen basin and the Rio Grande flood plain. The piedmont surface extends from the Sandia Mountains to the Rio Grande. The Albuquerque-Belen basin is part of an

interconnected series of north-south aligned grabens and structural basins which have subsided between mountain and highland uplifts comprising the Rio Grande Rift. The complex structural basin was formed during the Tertiary Period, more than seven million years ago, when the Sandia-Manzano fault block was uplifted and tilted. The basin is approximately 100 miles long and varies from 20 to 40 miles wide. The sloping surface of the valley fill consists of a series of coalescing alluvial fans deposited unconformably on the formations of the Santa Fe Group. The Santa Fe Group consists of beds of unconsolidated to loosely consolidated sediments (detritus consisting of gravel, sand, silt, clay, and caliche) locally interbedded with volcanic rocks.

Based upon review of available literature/maps and our experience in the general area, underground mining and sinkhole activity are not associated with this area of Albuquerque, New Mexico.

Subsurface Profile

We have developed a general characterization of the subsurface soil and groundwater conditions based upon our review of the data and our understanding of the geologic setting and planned construction. The following table provides our geotechnical characterization.

The geotechnical characterization forms the basis of our geotechnical calculations and evaluation of site preparation, foundation options and pavement options. As noted in **General Comments**, the characterization is based upon widely spaced exploration points across the site, and variations are likely.

Stratum	Approximate Depth to Bottom of Stratum (feet)	Material Description	Consistency/Density
1	< ½	2" of Asphalt Concrete [1]	N/A
2	5 to 21-½ or deeper	Silt and Lean Clay. The sand and gravel content varied.	Medium Stiff to Very Stiff
3	26-½ or deeper	Sand. The clay, silt, and gravel content varied.	Loose to Medium Dense

1. Encountered only in Boring P-01 and P-02

Conditions encountered at each boring location are indicated on the individual boring logs shown in the **Exploration Results** section and are attached to this report. Stratification boundaries on the boring logs represent the approximate location of changes in native soil types; in situ, the transition between materials may be gradual.

Groundwater Conditions

The boreholes were observed while drilling and after completion for the presence and level of groundwater. The water levels observed in the boreholes can be found on the boring logs in **Exploration Results**, and are summarized below.

Groundwater was not observed in the borings while drilling, or for the short duration the borings could remain open. Groundwater level fluctuations occur due to seasonal variations in the amount of rainfall, runoff, and other factors not evident at the time the borings were performed. Therefore, groundwater levels during construction or at other times in the life of the structure may be higher or lower than the levels indicated on the boring logs. The possibility of groundwater level fluctuations should be considered when developing the design and construction plans for the project.

GEOTECHNICAL OVERVIEW

The site appears suitable for the proposed construction based upon geotechnical conditions encountered in the test borings. The site could be characterized by silty and clayey sand or sandy silt with variable amounts of gravel. Lean clay was encountered in B-05 from about 5 to 10 feet below site grade. Near surface soils which show moderate to high tendency for compression/collapse when elevated in moisture content will require particular attention in the design and construction.

Based on the geotechnical subsurface exploration, the laboratory test results, and our engineering analyses, the proposed buildings can be supported on a spread and continuous footing foundation system or a monolithic slab foundation bearing on a zone of structural fill/recompacted native soils. In addition, a slab-on-grade floor system supported on a zone of engineered fill/recompacted native soils can be used, provided some movement can be tolerated. The proposed retaining walls can be supported on a zone of engineered fill/recompacted native soils. On-site soils are suitable for use as engineered fill beneath foundations and floor slabs, and pavements. Any engineered fill required to raise the site to construction grade can be included in the recommended engineered fill zone. Foundation excavations are expected to be achieved with conventional earth moving equipment. Loose or caving soils may be encountered in shallow excavations such as foundation footings. If neat line excavation is to be used, the foundation dimensions must be accurately maintained. If accurate footing dimensions cannot be maintained during excavation, the use of form boards will be required.

Geotechnical engineering recommendations for foundation systems and other earth connected phases of the project are outlined below. The recommendations contained in this report are based upon the results of field and laboratory testing (which are presented in **Exploration Results**), engineering analyses, and our current understanding of the proposed project.

The **General Comments** section provides an understanding of the report limitations.

EARTHWORK

Earthwork will include clearing and grubbing, excavations, and razing abandoned utilities and pavements. The following sections provide recommendations for use in the preparation of specifications for the work. Recommendations include critical quality criteria as necessary to render the site in the state considered in our geotechnical engineering evaluation for foundations, floor slabs, and pavements.

Site Preparation

Prior to placing fill, existing asphalt, vegetation, structures, and root mat should be removed. Complete stripping of the topsoil should be performed in the proposed building and parking/driveway areas.

The subgrade should be proofrolled with an adequately loaded vehicle such as a fully loaded tandem axle dump truck. The proof-rolling should be performed under the direction of the Geotechnical Engineer. Areas excessively deflecting under the proof-roll should be delineated and subsequently addressed by the Geotechnical Engineer. Such areas should either be removed or modified by stabilizing with lime, fly ash, kiln dust, cement, or geotextiles. Excessively wet or dry material should either be removed, or moisture conditioned and recompacted.

Fill Material Types

Fill required to achieve design grade should be classified as structural fill and general fill. Structural fill is material used below, or within five (5) feet of structures, pavements, or constructed slopes. General fill is material used to achieve grade outside of these areas. Earthen materials used for structural and general fill should meet the following material property requirements:

Soil Type [1]	USCS Classification	Acceptable Parameters (for Structural Fill)
Imported Granular Soils	GW, GP, GM, GC, SW, SP, SM, SC	Less than 35% Passing #200 sieve
On-Site Soils	ML, SC, SM, SW-SM	Material on-site is suitable for use as structural fill

1. Structural and general fill should consist of approved materials free of organic matter and debris. Frozen material should not be used, and fill should not be placed on a frozen subgrade. A sample of each material type should be submitted to the Geotechnical Engineer for evaluation prior to use on this site.

Fill Material Types

Fill Compaction Requirements

Structural and general fill should meet the following compaction requirements.

Item	Structural Fill	General Fill
Maximum Lift Thickness	8 inches or less in loose thickness when heavy, self-propelled compaction equipment is used 4 to 6 inches in loose thickness when hand-guided equipment (i.e., jumping jack or plate compactor) is used	Same as Structural fill
Minimum Compaction Requirements [1, 2, 3]	95% of max. above foundations, below floor slabs, and more than 1 foot below finished pavement subgrade	90% of max.
Water Content Range [1]	Granular: -3% to +3% of optimum	As required to achieve min. compaction requirements

1. Maximum density and optimum water content as determined by the modified Proctor test (ASTM D1557).
2. If the granular material is a coarse sand or gravel, or of a uniform size, or has a low fines content, compaction comparison to relative density may be more appropriate. In this case, granular materials should be compacted to at least 70% relative density (ASTM D4253 and D4254).

Utility Trench Backfill

For low permeability subgrades, utility trenches are a common source of water infiltration and migration. Utility trenches penetrating beneath the buildings should be effectively sealed to restrict water intrusion and flow through the trenches, which could migrate below the building. The trench backfill should be placed and compacted to comply with the water content and compaction recommendations for structural fill stated previously in this report.

Grading and Drainage

All grades must provide effective drainage away from the buildings during and after construction and should be maintained throughout the life of the structures. Water retained next to the buildings can result in soil movements greater than those discussed in this report. Greater movements can result in unacceptable differential floor slab and/or foundation movements, cracked slabs and walls, and roof leaks. The roof should have gutters/drains with downspouts that discharge onto splash blocks at a distance of at least five (5) feet from the buildings.

Exposed ground should be sloped and maintained at a minimum three (3) percent away from the buildings for at least five (5) feet beyond the perimeter of the buildings. Locally, flatter grades may be necessary to transition ADA access requirements for flatwork. After building construction and landscaping, final grades should be verified to document effective drainage has been achieved. Grades around the structures should also be periodically inspected and adjusted as necessary

as part of the structure's maintenance program. Where paving or flatwork abuts the structures a maintenance program should be established to effectively seal and maintain joints and prevent surface water infiltration.

Earthwork Construction Considerations

Shallow excavations, for the proposed structures, are anticipated to be accomplished with conventional construction equipment. Upon completion of filling and grading, care should be taken to maintain the subgrade water content prior to construction of floor slabs. Construction traffic over the completed subgrades should be avoided. The site should also be graded to prevent ponding of surface water on the prepared subgrades or in excavations. Water collecting over, or adjacent to, construction areas should be removed. If the subgrade freezes, desiccates, saturates, or is disturbed, the affected material should be removed, or the materials should be scarified, moisture conditioned, and recompacted, prior to floor slab construction.

As a minimum, excavations should be performed in accordance with OSHA 29 CFR, Part 1926, Subpart P, "Excavations" and its appendices, and in accordance with any applicable local, and/or state regulations.

Construction site safety is the sole responsibility of the contractor who controls the means, methods, and sequencing of construction operations. Under no circumstances shall the information provided herein be interpreted to mean Terracon is assuming responsibility for construction site safety, or the contractor's activities; such responsibility shall neither be implied nor inferred.

Construction Observation and Testing

The earthwork efforts should be monitored under the direction of the Geotechnical Engineer. Monitoring should include documentation of adequate removal of vegetation and topsoil, proof-rolling and mitigation of areas delineated by the proof-roll to require mitigation.

Each lift of compacted fill should be tested, evaluated, and reworked as necessary until approved by the Geotechnical Engineer prior to placement of additional lifts. Each lift of fill should be tested for density and water content at a frequency of at least one test for every 2,500 square feet of compacted fill in the building areas and 5,000 square feet in pavement areas. One density and water content test for every 50 linear feet of compacted utility trench backfill.

In areas of foundation excavations, the bearing subgrade should be evaluated under the direction of the Geotechnical Engineer. In the event that unanticipated conditions are encountered, the Geotechnical Engineer should prescribe mitigation options.

In addition to the documentation of the essential parameters necessary for construction, the continuation of the Geotechnical Engineer into the construction phase of the project provides the continuity to maintain the Geotechnical Engineer's evaluation of subsurface conditions, including assessing variations and associated design changes.

SHALLOW FOUNDATIONS

If the site has been prepared in accordance with the requirements noted in **Earthwork**, the following design parameters are applicable for the proposed spread footing foundations or monolithic slab foundation.

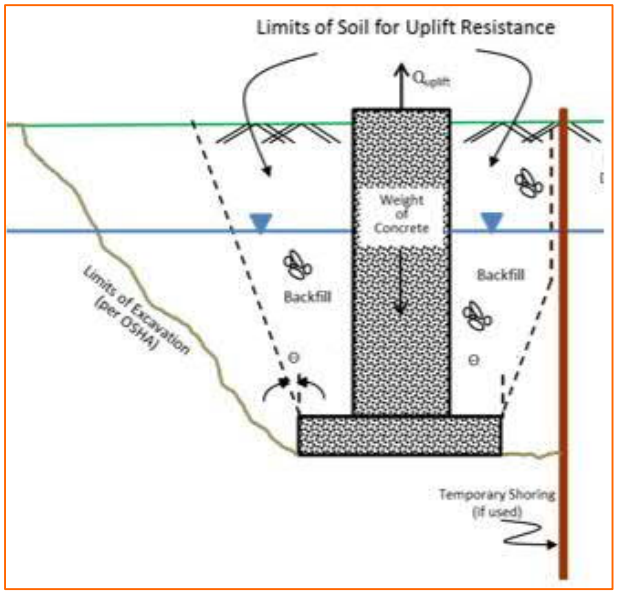
Design Parameters – Compressive Loads

Item	Description
Maximum Net Allowable Bearing pressure [1, 2]	Monolithic Slab ■ 3,000 psf (foundations bearing within structural fill) Spread/Continuous or Circular Footings ■ 3,000 psf (foundations bearing within structural fill)
Required Bearing Stratum [3]	1-story Showroom and Storage Building B ■ 3 feet of structural fill or recompacted native soils 3-story Storage Building A ■ 5 feet of structural fill or recompacted native soils RV Canopies and Self-storage Buildings ■ 2 feet of structural fill or recompacted native soils
Minimum Foundation Dimensions	Columns: 30 inches Continuous: 18 inches
Ultimate Passive Resistance [4] **(equivalent fluid pressures)**	390 pcf (granular backfill)
Ultimate Coefficient of Sliding Friction [5]	0.35 (granular backfill)
Minimum Embedment below Finished Grade [6]	Exterior footings: 18 inches Interior footings: 12 inches
Estimated Total Settlement from Structural Loads [2]	Less than about ¾ inch
Estimated Differential Settlement [2, 7]	About 2/3 of total settlement

Item	Description
1.	The maximum net allowable bearing pressure is the pressure in excess of the minimum surrounding overburden pressure at the footing base elevation. An appropriate factor of safety has been applied. Values assume that exterior grades are no steeper than 20% within 10 feet of structure.
2.	Values provided are for maximum loads noted in **Project Description**.
3.	Unsuitable or soft soils should be over-excavated and replaced per the recommendations presented in the **Earthwork**.
4.	Use of passive earth pressures require the sides of the excavation for the spread footing foundation to be nearly vertical and the concrete placed neat against these vertical faces or that the footing forms be removed, and compacted structural fill be placed against the vertical footing face.
5.	Can be used to compute sliding resistance where foundations are placed on suitable soil/materials. Should be neglected for foundations subject to net uplift conditions.
6.	Minimum embedment necessary to minimize the effects of frost and/or seasonal water content variations. For sloping ground, maintain depth below the lowest adjacent exterior grade within 5 horizontal feet of the structure. Actual depth to be determined by structural engineer to resist uplift and overturning loads
7.	Differential settlements are as measured over a span of 50 feet.

Design Parameters - Uplift Loads

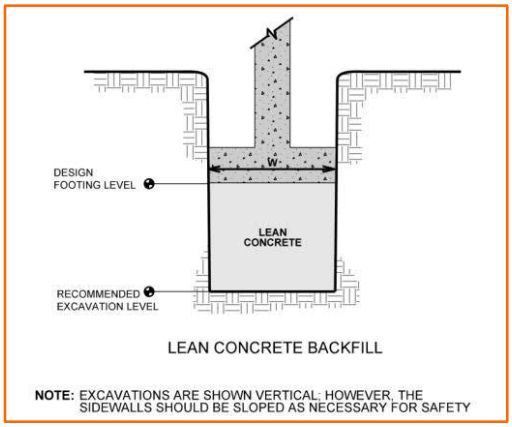
Uplift resistance of spread footings associated with the canopy can be developed from the effective weight of the footing and the overlying soils. As illustrated on the subsequent figure, the effective weight of the soil prism defined by diagonal planes extending up from the top of the perimeter of the foundation to the ground surface at an angle, θ, of 20 degrees from the vertical can be included in uplift resistance. The maximum allowable uplift capacity should be taken as a sum of the effective weight of soil plus the dead weight of the foundation, divided by an appropriate factor of safety. A maximum total unit weight of 100 pcf should be used for the backfill. This unit weight should be reduced to 40 pcf for portions of the backfill or natural soils below the groundwater elevation.



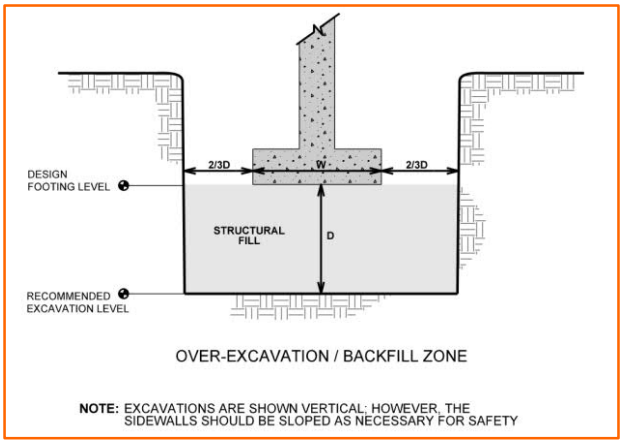
Foundation Construction Considerations

As noted in **Earthwork**, the footing excavations should be evaluated under the direction of the Geotechnical Engineer. Loose or caving soils may be encountered in shallow excavations such as foundation footings. If neat line excavation is to be used, the footings dimensions must be accurately maintained. If accurate footing dimensions cannot be maintained during excavation the use of form boards may be considered. The base of all foundation excavations should be free of water and loose soil, prior to placing concrete. Concrete should be placed soon after excavating to reduce bearing soil disturbance. Care should be taken to prevent wetting or drying of the bearing materials during construction. Excessively wet or dry material or any loose/disturbed material in the bottom of the footing excavations should be removed/reconditioned before foundation concrete is placed.

If unsuitable bearing soils are encountered at the base of the planned footing excavation, the excavation should be extended deeper to suitable soils, and the footings could bear directly on these soils at the lower level or on lean concrete backfill placed in the excavations. This is illustrated on the sketch below.



Over-excavation for structural fill placement below footings should be conducted as shown below. The over-excavation should be backfilled up to the footing base elevation, with recompacted native soils placed, as recommended in the **Earthwork** section.



SEISMIC CONSIDERATIONS

The seismic design requirements for buildings and other structures are based on Seismic Design Category. Site Classification is required to determine the Seismic Design Category for a structure. The Site Classification is based on the upper 100 feet of the site profile defined by a weighted average value of either shear wave velocity, standard penetration resistance, or undrained shear strength in accordance with Section 20.4 of ASCE 7-16.

Description	Value
2012/15 International Building Code Site Classification [1]	D [2]
Site Latitude	35.1758
Site Longitude	-106.5920
S_{DS} Spectral Acceleration for a Short Period [3]	0.427g
S_{D1} Spectral Acceleration for a 1-Second Period [3]	0.202g
S_{Ms} Spectral Acceleration for a Short Period [3]	0.64g
S_{M1} Spectral Acceleration for a 1-Second Period [3]	0.303g
F_a Site Coefficient for a Short Period [3]	1.446
F_v Site Coefficient for a 1-Second Period [3]	2.265

1. Seismic site classification in general accordance with the *2018 International Building Code*, which refers to ASCE 7-16.
2. The 2018 International Building Code (IBC) uses a site profile extending to a depth of 100 feet for seismic site classification. Borings at this site were extended to a maximum depth of 26-½ feet. The site properties below the boring depth to 100 feet were estimated based on our experience and knowledge of geologic conditions of the general area. Additional deeper borings or geophysical testing may be performed to confirm the conditions below the current boring depth.
3. These values were obtained using online seismic design maps and tools provided by the USGS (http://earthquake.usgs.gov/hazards/designmaps/).

Liquefaction Potential

Groundwater was not encountered on the site. Medium dense soils were typically encountered below a depth of about 10 feet below existing site grade. Based upon the lack of groundwater at the site, the relative density of the subsurface soils, seismicity in the area, and our experience in the area, it is our opinion that the liquefaction potential is non-existent.

FLOOR SLABS

Based upon the shallow subsurface soil conditions, a slab-on-grade floor system supported on a zone of structural fill can be used, provided some movement can be tolerated.

Design parameters for floor slabs assume the requirements for **Earthwork** have been followed. Specific attention should be given to positive drainage away from the structure and positive drainage of the aggregate base beneath the floor slab.

Floor Slab Design Parameters

Item	Description
Floor Slab Support [1]	Showroom and storage buildings A and B ■ 3 feet of structural fill/recompacted native soils Self-storage buildings ■ 2 feet of structural fill/recompacted native soils
Estimated Modulus of Subgrade Reaction [2]	200 pounds per square inch per inch (psi/in) for point loads

1. Floor slabs should be structurally independent of building footings or walls to reduce the possibility of floor slab cracking caused by differential movements between the slab and foundation.
2. Modulus of subgrade reaction is an estimated value based upon our experience with the subgrade condition, the requirements noted in **Earthwork**, and the floor slab support as noted in this table. It is provided for point loads. For large area loads the modulus of subgrade reaction would be lower.
3. Free-draining granular material should have less than 5 percent fines (material passing the #200 sieve). Other design considerations such as cold temperatures and condensation development could warrant more extensive design provisions.

The use of a vapor retarder should be considered beneath concrete slabs on grade covered with wood, tile, carpet, or other moisture sensitive or impervious coverings, or when the slab will support equipment sensitive to moisture. When conditions warrant the use of a vapor retarder, the slab designer should refer to ACI 302 and/or ACI 360 for procedures and cautions regarding the use and placement of a vapor retarder.

Saw-cut control joints should be placed in the slab to help control the location and extent of cracking. For additional recommendations refer to the ACI Design Manual. Joints or cracks should be sealed with a waterproof, non-extruding compressible compound specifically recommended for heavy duty concrete pavement and wet environments.

Where floor slabs are tied to perimeter walls or turn-down slabs to meet structural or other construction objectives, our experience indicates differential movement between the walls and slabs will likely be observed in adjacent slab expansion joints or floor slab cracks beyond the length of the structural dowels. The Structural Engineer should account for potential differential settlement through use of sufficient control joints, appropriate reinforcing, or other means.

Floor Slab Construction Considerations

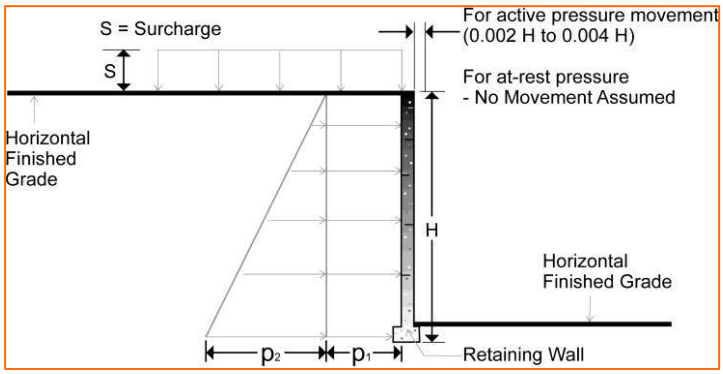
Finished subgrade within and for at least 10 feet beyond the floor slab should be protected from traffic, rutting, or other disturbance and maintained in a relatively moist condition until floor slabs are constructed. If the subgrade should become damaged or desiccated prior to construction of floor slabs, the affected material should be removed, and structural fill should be added to replace the resulting excavation. Final conditioning of the finished subgrade should be performed immediately prior to placement of the floor slab support course.

The Geotechnical Engineer should approve the condition of the floor slab subgrades immediately prior to placement of the floor slab support course, reinforcing steel and concrete. Attention should be paid to high traffic areas that were rutted and disturbed earlier, and to areas where backfilled trenches are located.

LATERAL EARTH PRESSURES

Design Parameters

Structures with unbalanced backfill levels on opposite sides should be designed for earth pressures at least equal to values indicated in the following table. Earth pressures will be influenced by structural design of the walls, conditions of wall restraint, methods of construction and/or compaction and the strength of the materials being restrained. Two wall restraint conditions are shown. Active earth pressure is commonly used for design of free-standing cantilever retaining walls and assumes wall movement. The "at-rest" condition assumes no wall movement and is commonly used for basement walls, loading dock walls, or other walls restrained at the top. The recommended design lateral earth pressures do not include a factor of safety and do not provide for possible hydrostatic pressure on the walls (unless stated).



Lateral Earth Pressure Design Parameters			
Earth Pressure Condition [1]	**Coefficient for Backfill Type** [2]	**Surcharge Pressure** [3, 4, 5] **p_1 (psf)**	**Effective Fluid Pressures (psf)** [2, 4, 5]
			Unsaturated [6]
Active (Ka)	Granular - 0.31	(0.31)S	(37)H
At-Rest (Ko)	Granular - 0.41	(0.41)S	(49)H
Passive (Kp)	Granular - 3.25	---	(390)H

1. For active earth pressure, wall must rotate about base, with top lateral movements 0.002 H to 0.004 H, where H is wall height. For passive earth pressure, wall must move horizontally to mobilize resistance.
2. Uniform, horizontal backfill, compacted to at least 95 percent of the ASTM D 1557 maximum dry density, rendering a maximum unit weight of 120 pcf.
3. Uniform surcharge, where S is surcharge pressure.
4. Loading from heavy compaction equipment is not included.
5. No safety factor is included in these values.

Backfill placed against structures should consist of granular soils or low plasticity cohesive soils. For the granular values to be valid, the granular backfill must extend out and up from the base of the wall at an angle of at least 45 and 60 degrees from vertical for the active and passive cases, respectively.

PAVEMENTS

General Pavement Comments

Pavement designs are provided for the traffic conditions and pavement life conditions as noted in **Project Description** and in the following sections of this report. A critical aspect of pavement performance is site preparation. Pavement designs, noted in this section, must be applied to the site, which has been prepared as recommended in the **Earthwork** section.

Pavement Design Parameters

Design of Asphaltic Cement Concrete (ACC) pavements are based on the procedures outlined in the National Asphalt Pavement Association (NAPA) Information Series 109 (IS-109). Design of Portland Cement Concrete (PCC) pavements are based upon American Concrete Institute (ACI) 330R-01; Guide for Design and Construction of Concrete Parking Lots.

The design of pavement thickness was based on the following:

- A soil characterization of medium based on the sands encountered at the site
- 90% reliability of asphalt
- A design life of 20 years
- Light Duty Traffic 50,000 ESALs: Traffic Class III
- Medium Duty Traffic 110,000 ESALs: Traffic Class III
- Heavy Duty Traffic: 180,000 ESALs: Traffic Class III/IV
- Modulus of subgrade reaction of 200 pci

Pavement Section Thicknesses

The following table provides options for ACC and PCC Sections:

Asphaltic Concrete Design			
Layer	**Thickness (inches)**		
	Light Duty [1]	**Med. Duty** [1]	**Heavy Duty** [1]
ACC [2]	3	4-½	5
Aggregate Base [3]	6	6	6

1. See **Project Description** for more specifics regarding Light Duty and Medium Duty traffic.
2. All materials should meet the current City of Albuquerque (COA) or Department of Transportation (NMDOT) Standard Specifications for Highway and Bridge Construction.
   - Asphaltic Surface - NMDOT Type SP-III Asphaltic Cement Concrete: Section 423
   - Base Course - NDMOT Type I, Class I: Section 303
3. A minimum 1.5-inch surface course should be used on ACC pavements.

Portland Cement Concrete Design			
Layer	Thickness (inches)		
	Light Duty [1]	Med. Duty [1]	Heavy Duty [3]
PCC [2]	5	5-½	6

1. See **Project Description** for more specifics regarding traffic classifications.
2. All materials should meet the current City of Albuquerque (COA) or New Mexico Department of Transportation (NMDOT) Standard Specifications for Highway and Bridge Construction.
   - Concrete Pavement - NMDOT Portland Cement Concrete Type C: Section 509
3. In areas of anticipated heavy traffic, moving vans, fire trucks, delivery trucks, or concentrated loads (e.g., dumpster pads), and areas with repeated turning or maneuvering of heavy vehicles.

Pavement Design Considerations

The estimated pavement sections provided in this report are minimums for the assumed design criteria, and as such, periodic maintenance should be expected. Areas for parking of heavy vehicles, concentrated turn areas, and start/stop maneuvers could require thicker pavement sections. Edge restraints (i.e., concrete curbs or aggregate shoulders) should be planned along curves and areas of maneuvering vehicles. A maintenance program including surface sealing, joint cleaning and sealing, and timely repair of cracks and deteriorated areas will increase the pavement's service life. As an option, thicker sections could be constructed to decrease future maintenance.

Concrete for rigid pavements should have a minimum 28-day compressive strength of 4,000 psi and be placed with a maximum slump of 4 inches. Proper joint spacing will also be required to prevent excessive slab curling and shrinkage cracking. Joints should be sealed to prevent entry of foreign material and dowelled where necessary for load transfer.

Where practical, we recommend early-entry cutting of crack-control joints in PCC pavements. Cutting of the concrete in its "green" state typically reduces the potential for micro-cracking of the pavements prior to the crack control joints being formed, compared to cutting the joints after the concrete has fully set. Micro-cracking of pavements may lead to crack formation in locations other than the sawed joints, and/or reduction of fatigue life of the pavement.

Pavement design methods are intended to provide structural sections with adequate thickness over a subgrade such that wheel loads are reduced to a level the subgrade can support. The support characteristics of the subgrade for pavement design do not account for shrink/swell movements of a potentially expansive clay subgrade. Thus, the pavement may be adequate from a structural standpoint, yet still experience cracking and deformation due to shrink/swell related movement of the subgrade. It is, therefore, important to minimize moisture changes in the subgrade to reduce shrink/swell movements.

Openings in pavements, such as decorative landscaped areas, are sources for water infiltration into surrounding pavement systems. Water can collect in the islands and migrate into the surrounding subgrade soils thereby degrading support of the pavement. This is especially applicable for islands with raised concrete curbs, irrigated foliage, and low permeability near-surface soils. The civil design for the pavements with these conditions should include features to restrict or to collect and discharge excess water from the islands. Examples of features are edge drains connected to the storm water collection system, longitudinal subdrains, or other suitable outlet and impermeable barriers preventing lateral migration of water such as a cutoff wall installed to a depth below the pavement structure.

Dishing in parking lots surfaced with ACC is usually observed in frequently used parking stalls (such as near the front of buildings) and occurs under the wheel footprint in these stalls. The use of higher-grade asphaltic cement, or surfacing these areas with PCC, should be considered. The dishing is exacerbated by factors such as irrigated islands or planter areas, sheet surface drainage to the front of structures, and placing the ACC directly on a compacted clay subgrade.

Rigid PCC pavements will perform better than ACC in areas where short radii turning, and braking are expected (i.e., entrance/exit aprons) due to better resistance to rutting and shoving. In addition, PCC pavement will perform better in areas subject to large or sustained loads. An adequate number of longitudinal and transverse control joints should be placed in the rigid pavement in accordance with ACI and/or AASHTO requirements. Expansion (isolation) joints must be full depth and should only be used to isolate fixed objects abutting or within the paved area.

PCC pavement details for joint spacing, joint reinforcement, and joint sealing should be prepared in accordance with American Concrete Institute (ACI 330R-01 and ACI 325R.9-91). PCC pavements should be provided with mechanically reinforced joints (doweled or keyed) in accordance with ACI 330R-01.

Pavement Drainage

Pavements should be sloped to provide rapid drainage of surface water. Water allowed to pond on or adjacent to the pavements could saturate the subgrade and contribute to premature pavement deterioration. In addition, the pavement subgrade should be graded to provide positive drainage within the granular base section. Appropriate sub-drainage or connection to a suitable daylight outlet should be provided to remove water from the granular subbase.

We recommend at least 6 inches of free-draining granular material should be placed beneath the pavements. The use of a free draining granular base will also reduce the potential for frost action. We recommend pavement subgrades be crowned at least 2 percent, to promote the flow of water

towards the subdrains, and to reduce the potential for ponding of water on the subgrade. The design recommendations for the subdrains are provided in the following table:

Pavement Maintenance

The pavement sections represent minimum recommended thicknesses and, as such, periodic maintenance should be anticipated. Therefore, preventive maintenance should be planned and provided for through an on-going pavement management program. Maintenance activities are intended to slow the rate of pavement deterioration and to preserve the pavement investment. Maintenance consists of both localized maintenance (e.g., crack, and joint sealing and patching) and global maintenance (e.g., surface sealing). Preventive maintenance is usually the priority when implementing a pavement maintenance program. Additional engineering observation is recommended to determine the type and extent of a cost-effective program. Even with periodic maintenance, some movements and related cracking may still occur, and repairs may be required.

Pavement performance is affected by its surroundings. In addition to providing preventive maintenance, the civil engineer should consider the following recommendations in the design and layout of pavements:

- Final grade adjacent to paved areas should slope down from the edges at a minimum 2%.
- Subgrade and pavement surfaces should have a minimum 2% slope to promote proper surface drainage.
- Install below pavement drainage systems surrounding areas anticipated for frequent wetting.
- Install joint sealant and seal cracks immediately.
- Seal all landscaped areas in or adjacent to pavements to reduce moisture migration to subgrade soils.
- Place compacted, low permeability backfill against the exterior side of curb and gutter.
- Place curb, gutter and/or sidewalk directly on clay subgrade soils rather than on unbound granular base course materials.

CORROSIVITY

Laboratory test results indicate that on-site soils have soluble sulfate concentrations ranging from 8 to 210 mg/kg, pH values ranging from 8.28 to 8.92, and minimum resistivity values ranging from 1,080 to 8,860-ohm centimeters. These values should be used to determine potential corrosive characteristics of the on-site soils with respect to contact with the various underground materials which will be used for project construction.

Criteria published by the Cast Iron Pipe Research Institute indicates that the near surface subgrade soils generally have a moderate corrosive potential to cause corrosion to buried ferrous materials. Review of data published by the National Association of Corrosion Engineers indicates

that the resistivity values concentrations place the soils in the moderate to high corrosion category. If there is concern regarding pipe corrosion, the use of PVC or poly-wrap should be considered.

Results of soluble sulfate testing indicate that ASTM Type I/II or II Portland cement is suitable for all concrete on and below grade. Foundation concrete should be designed for low sulfate exposure in accordance with the provisions of the ACI Design Manual, Section 318, Chapter 4.

- Use of Type I or I/II modified cement for sulfate resistance
- Cement should have a tricalcium aluminate content of not more than 8 percent.
- Concrete mixture should contain at least 20 percent Class F fly ash.
- Provide air-entrainment of 4 to 7 percent by volume.
- Lower the water to cement ratio to 0.4 to 0.45.

GENERAL COMMENTS

As the project progresses, we address assumptions by incorporating information provided by the design team, if any. Revised project information that reflects actual conditions important to our services is reflected in the final report. The design team should collaborate with Terracon to confirm these assumptions and to prepare the final design plans and specifications. This facilitates the incorporation of our opinions related to implementation of our geotechnical recommendations. Any information conveyed prior to the final report is for informational purposes only and should not be considered or used for decision-making purposes.

Our analysis and opinions are based upon our understanding of the project, the geotechnical conditions in the area, and the data obtained from our site exploration. Natural variations will occur between exploration point locations or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. Terracon should be retained as the Geotechnical Engineer, where noted in the final report, to provide observation and testing services during pertinent construction phases. If variations appear, we can provide further evaluation and supplemental recommendations. If variations are noted in the absence of our observation and testing services on-site, we should be immediately notified so that we can provide evaluation and supplemental recommendations.

Our scope of services does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials, or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

Our services and any correspondence or collaboration through this system are intended for the sole benefit and exclusive use of our client for specific application to the project discussed and are accomplished in accordance with generally accepted geotechnical engineering practices with no third-party beneficiaries intended. Any third-party access to services or correspondence is

solely for information purposes to support the services provided by Terracon to our client. Reliance upon the services and any work product is limited to our client and is not intended for third parties. Any use or reliance of the provided information by third parties is done solely at their own risk. No warranties, either express or implied, are intended or made.

Site characteristics as provided are for design purposes and not to estimate excavation cost. Any use of our report in that regard is done at the sole risk of the excavating cost estimator as there may be variations on the site that are not apparent in the data that could significantly impact excavation cost. Any parties charged with estimating excavation costs should seek their own site characterization for specific purposes to obtain the specific level of detail necessary for costing. Site safety, and cost estimating including, excavation support, and dewatering requirements/design are the responsibility of others. If changes in the nature, design, or location of the project are planned, our conclusions and recommendations shall not be considered valid unless we review the changes and either verify or modify our conclusions in writing.

ATTACHMENTS

EXPLORATION AND TESTING PROCEDURES

Field Exploration

Borings Numbers	Boring Depth (feet)	Location
B-01 thru B-14	21-½ to 26-½	Building areas
P-01 and P-02	11-½	Pavement and parking areas

Boring Layout and Elevations: Unless otherwise noted, Terracon personnel provide the boring layout. Coordinates are obtained with a handheld GPS unit (estimated horizontal accuracy of about ±10 feet). If elevations and a more precise boring layout are desired, we recommend borings be surveyed following completion of fieldwork.

Subsurface Exploration Procedures: We advance the borings with a truck-mounted, CME 55 drill rig using continuous flight, hollow-stem augers. Three samples are obtained in the upper 10 feet of each boring and at intervals of 5 feet thereafter. In the split-barrel sampling procedure, a standard 2-inch outer diameter split-barrel sampling spoon is driven into the ground by a 140-pound automatic hammer falling a distance of 30 inches. The number of blows required to advance the sampling spoon the last 12 inches of a normal 18-inch penetration is recorded as the Standard Penetration Test (SPT) resistance value. The SPT resistance values, also referred to as N-values, are indicated on the boring logs at the test depths. A 3-inch O.D. split-barrel sampling spoon with 2.5-inch I.D. ring lined sampler was used for sampling in the upper five (5) feet. Ring-lined, split-barrel sampling procedures are similar to standard split spoon sampling procedure; however, blow counts are typically recorded for 6-inch intervals for a total of 12 inches of penetration. We observe and record groundwater levels during drilling and sampling. For safety purposes, all borings are backfilled with auger cuttings after their completion. Pavements are patched with cold-mix asphalt and/or pre-mixed concrete, as appropriate.

The sampling depths, penetration distances, and other sampling information are recorded on the field boring logs. The samples are placed in appropriate containers and taken to our soil laboratory for testing and classification by a geotechnical engineer. Our exploration team prepares field boring logs as part of the drilling operations. These field logs include visual classifications of the materials encountered during drilling and our interpretation of the subsurface conditions between samples. Final boring logs are prepared from the field logs. The final boring logs represent the geotechnical engineer's interpretation of the field logs and include modifications based on observations and tests of the samples in our laboratory.

Laboratory Testing

The project engineer reviews the field data and assigns various laboratory tests to better understand the engineering properties of the various soil strata as necessary for this project. Procedural standards noted below are for reference to methodology in general. In some cases, variations to methods are applied because of local practice or professional judgment. Standards noted below include reference to other, related standards. Such references are not necessarily applicable to describe the specific test performed.

- ASTM D2216 Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
- ASTM D4318 Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
- ASTM D422 Standard Test Method for Particle-Size Analysis of Soils
- ASTM D2166/D2166M Standard Test Method for Unconfined Compressive Strength of Cohesive Soil
- ASTM D2850 Standard Test Method for Unconsolidated-Undrained Triaxial Compression Test on Cohesive Soils
- ASTM D2435/D2435M Standard Test Methods for One-Dimensional Consolidation Properties of Soils Using Incremental Loading
- ASTM G187 Standard Test Method for Measurement of Soil Resistivity Using the Two-Electrode Soil Box Method
- EPA Method 300.0 Determination of Inorganic Anions by Ion Chromatography
- EPA Method 9040C Ph Electronic Measurement

The laboratory testing program often includes examination of soil samples by an engineer. Based on the material's texture and plasticity, we describe and classify the soil samples in accordance with the Unified Soil Classification System.

SITE LOCATION

U-Haul 724XXX - Albuquerque, NM ■ Albuquerque, NM
February 6, 2023 ■ Terracon Project No. 66215225 REV

Terracon GeoReport

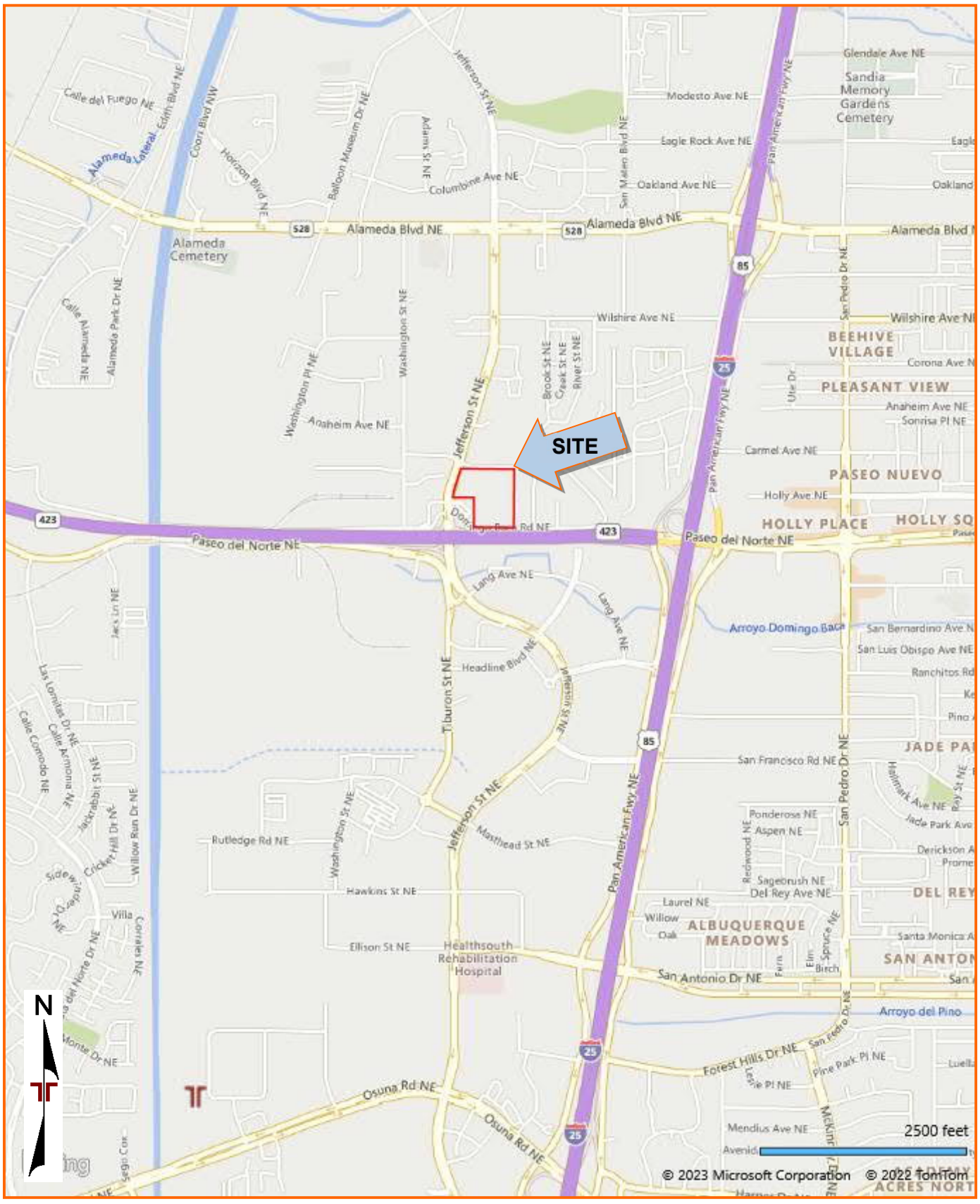


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

ROAD MAP PROVIDED BY MICROSOFT BING MAPS

EXPLORATION PLAN

U-Haul 724XXX - Albuquerque, NM ■ Albuquerque, NM
February 6, 2023 ■ Terracon Project No. 66215225 REV

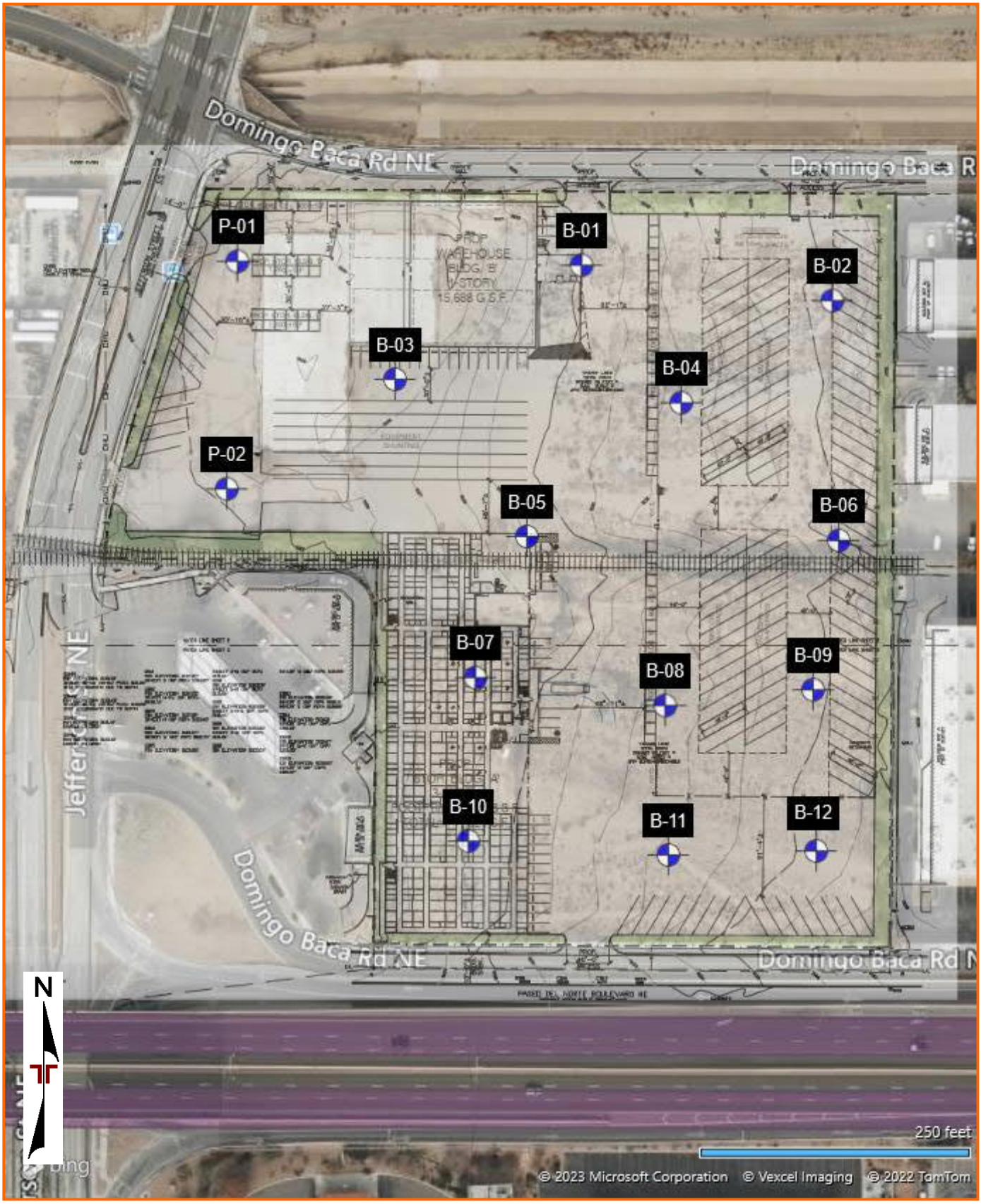


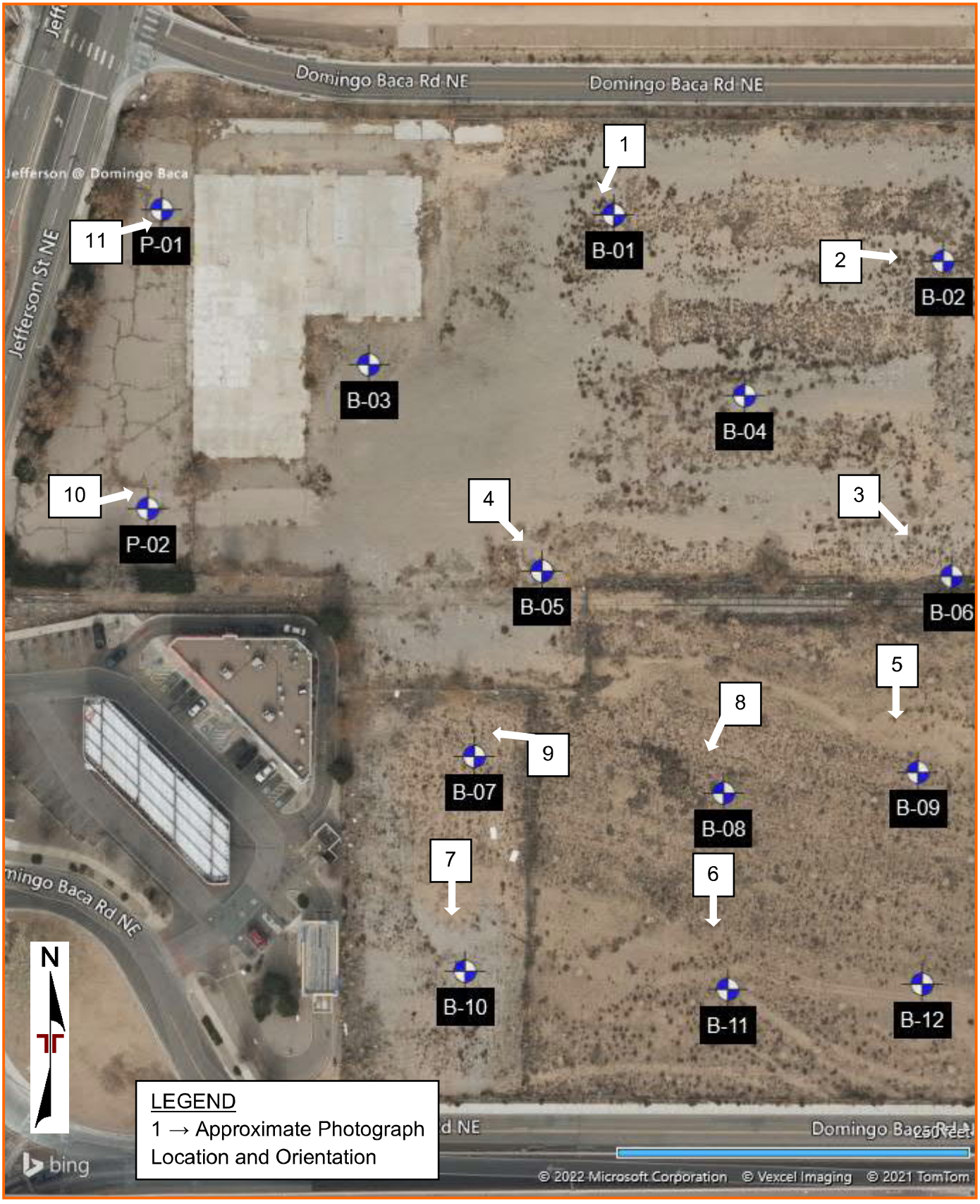
DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

AERIAL PHOTOGRAPHY PROVIDED BY MICROSOFT BING MAPS

EXPLORATION PLAN

U-Haul 724081, Domingo Baca Rd NE & Jefferson St NE ■ Albuquerque, NM

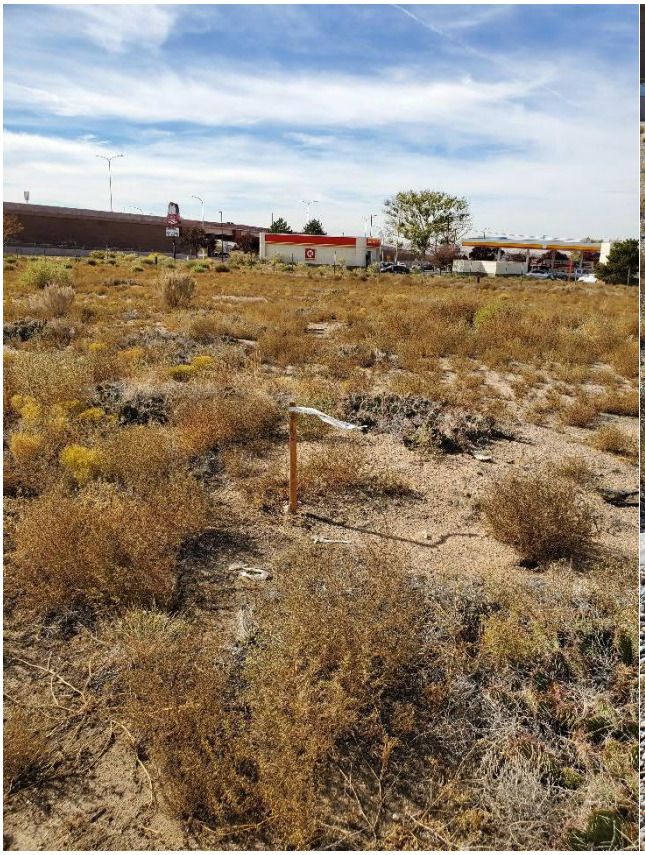
February 6, 2023 ■ Terracon Project No. 66215225 Revised



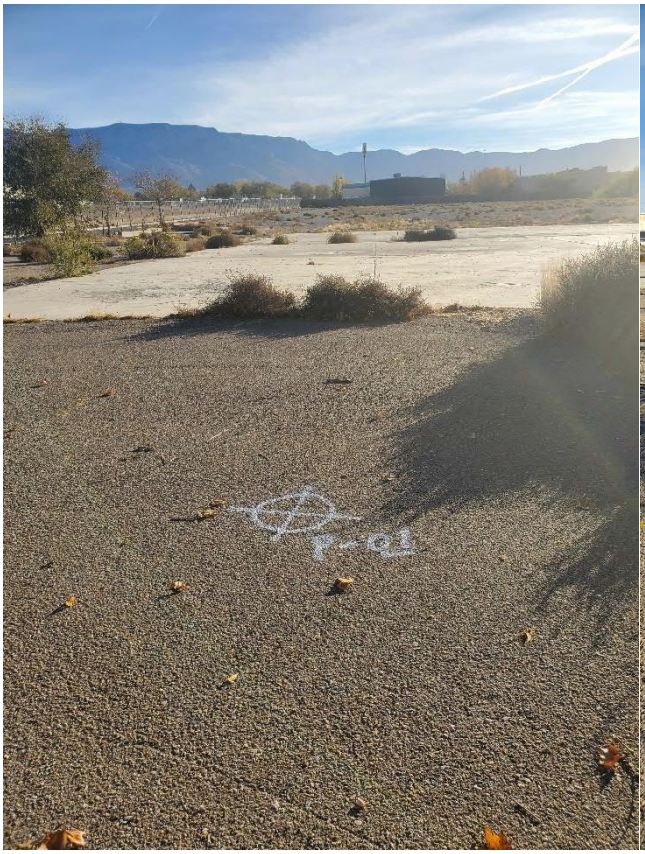
AERIAL PHOTOGRAPHY PROVIDED BY MICROSOFT BING MAPS

Photos 1-4 (clockwise): Boring Locations B-01, B-02, B-06, and B-05


Photos 5-8 (clockwise): Boring Locations B-09, B-11, B-10, and B-08



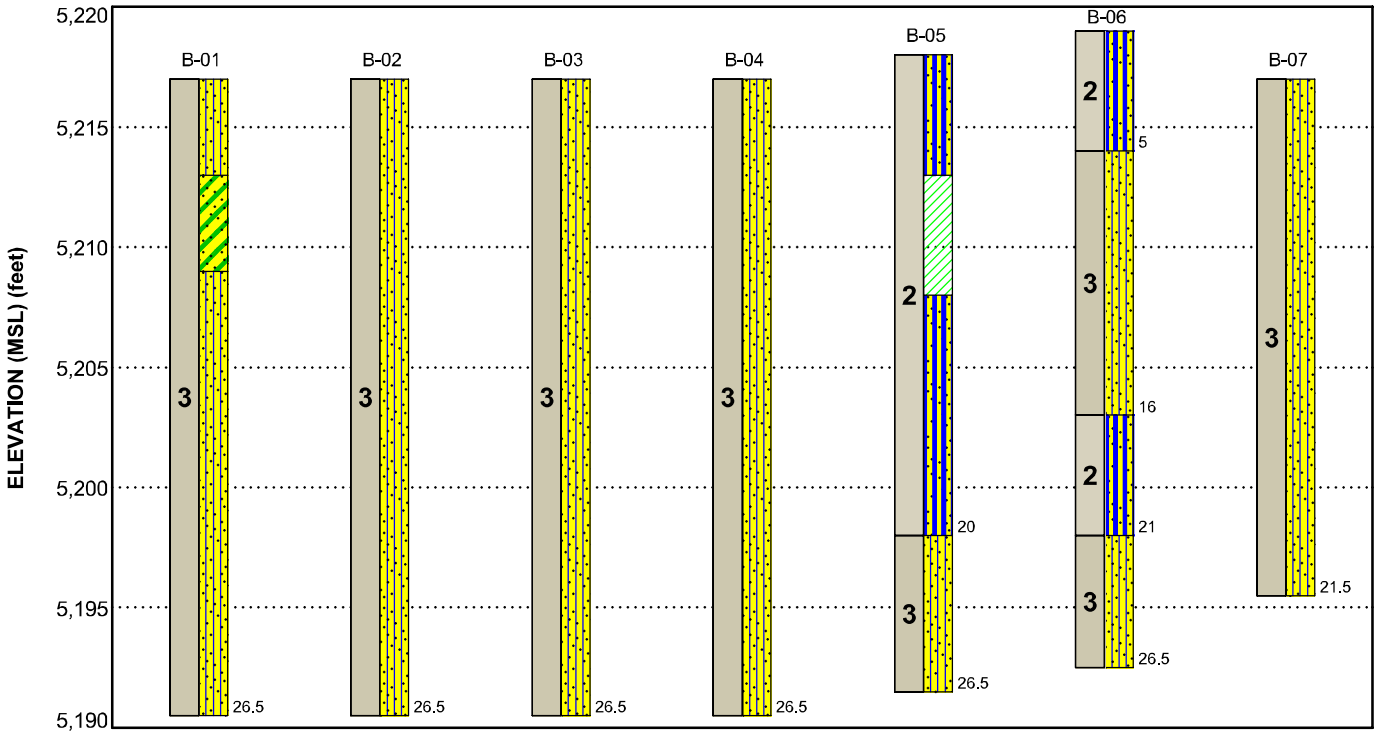

Photos 9-11 (clockwise): Boring Locations B-07, P-02, and P-01



EXPLORATION RESULTS

GEOMODEL

U-Haul Facility 724081 ■ Albuquerque, New Mexico
Terracon Project No. 66215225



This is not a cross section. This is intended to display the Geotechnical Model only. See individual logs for more detailed conditions.

Model Layer	Layer Name	General Description
1	**Asphalt Concrete**	Aspalt Concrete, up to 1 inch in thickness.
2	**Medium Stiff to Very Stiff Fine Grained Soils**	Clay and silt soils with variable amounts of sand and gravel with medium stiff to very stiff consistency.
3	**Loose to Medium Dense Coarse Grained Soils**	Sand soils with variable amounts of clay, silt, and gravel. Loose to medium dense relative density.

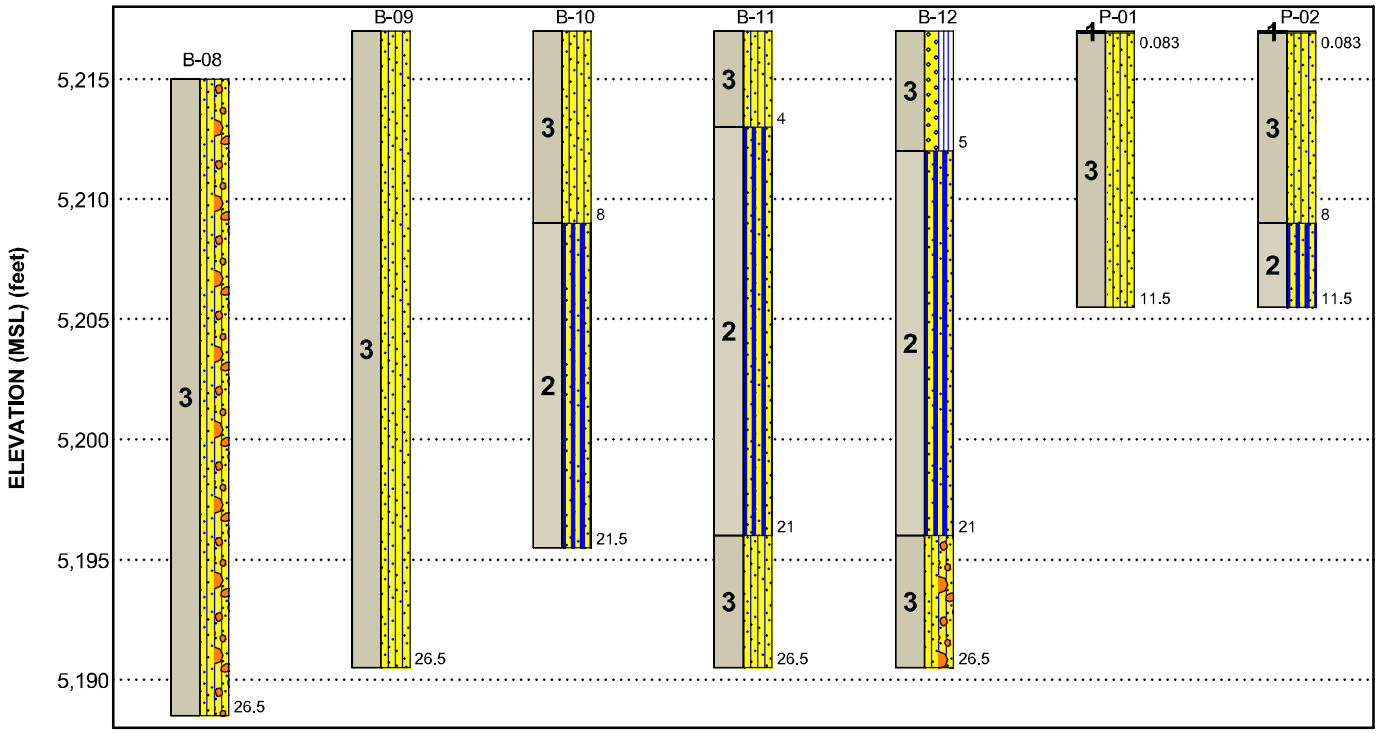
LEGEND

Silty Sand
Lean Clay
Clayey Sand
Sandy Silt

NOTES:
Layering shown on this figure has been developed by the geotechnical engineer for purposes of modeling the subsurface conditions as required for the subsequent geotechnical engineering for this project.
Numbers adjacent to soil column indicate depth below ground surface.

GEOMODEL

U-Haul Facility 724081 ■ Albuquerque, New Mexico
Terracon Project No. 66215225



This is not a cross section. This is intended to display the Geotechnical Model only. See individual logs for more detailed conditions.

Model Layer	Layer Name	General Description
1	**Asphalt Concrete**	Aspalt Concrete, up to 1 inch in thickness.
2	**Medium Stiff to Very Stiff Fine Grained Soils**	Clay and silt soils with variable amounts of sand and gravel with medium stiff to very stiff consistency.
3	**Loose to Medium Dense Coarse Grained Soils**	Sand soils with variable amounts of clay, silt, and gravel. Loose to medium dense relative density.

LEGEND

- Silty Sand with Gravel
- Silty Sand
- Sandy Silt
- Well-graded Sand with Silt
- Asphalt Concrete

NOTES:
Layering shown on this figure has been developed by the geotechnical engineer for purposes of modeling the subsurface conditions as required for the subsequent geotechnical engineering for this project.
Numbers adjacent to soil column indicate depth below ground surface.

BORING LOG NO. B-01

PROJECT: U-Haul Facility 724081

CLIENT: AMERCO Real Estate Company
Phoenix, Arizona

SITE: Paseo Del Norte and Jefferson St NE
Albuquerque, New Mexico

LOCATION See Exploration Plan

Latitude: 35.1765° Longitude: -106.5919°

Approximate Surface Elev.: 5217 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	SWELL (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
3		0										
			SILTY SAND (SM), trace gravel and cobble, light brown, moist, loose				2-4-3 N=7		3.2			
		4.0	5213+/-									
			CLAYEY SAND (SC), light brown, moist, loose	5			9-8		5.2	92	25-14-11	33
		8.0	5209+/-									
			SILTY SAND (SM), trace to with gravel, trace cobble, light brown, moist, medium dense	10			4-7-11 N=18		5.3			
				15			4-7-4 N=11		5.2			
				20			4-7-6 N=13		4.1			
				25			6-5-6 N=11		2.0			
		26.5	5190.5+/-									
			Boring Terminated at 26.5 Feet									

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
7" Hollow Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations measured in the field

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
6805 Academy Pkwy West NE
Albuquerque, NM

Boring Started: 11-19-2021 | Boring Completed: 11-19-2021

Drill Rig: CME 55 | Driller: Terracon ABQ

Project No.: 66215225

BORING LOG NO. B-02

PROJECT: U-Haul Facility 724081

CLIENT: AMERCO Real Estate Company
Phoenix, Arizona

SITE: Paseo Del Norte and Jefferson St NE
Albuquerque, New Mexico

LOCATION See Exploration Plan

Latitude: 35.1764° Longitude: -106.5911°

Approximate Surface Elev.: 5217 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	SWELL (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
3												
			SILTY SAND (SM), trace to with gravel, trace cobble, light brown, moist, loose to medium dense									
							10-12		3.9	102	NP	50
				5			2-2-2 N=4		2.5			
				10			6-7-5 N=12		5.0			
				15			6-8-6 N=14		3.0			
				20			10-15-10 N=25		2.6			
				25			6-11-7 N=18					
		26.5	5190.5+/-									
			Boring Terminated at 26.5 Feet									

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
7" Hollow Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations measured in the field

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
6805 Academy Pkwy West NE
Albuquerque, NM

Boring Started: 11-19-2021 | Boring Completed: 11-19-2021

Drill Rig: CME 55 | Driller: Terracon ABQ

Project No.: 66215225

BORING LOG NO. B-03

PROJECT: U-Haul Facility 724081

CLIENT: AMERCO Real Estate Company
Phoenix, Arizona

SITE: Paseo Del Norte and Jefferson St NE
Albuquerque, New Mexico

LOCATION See Exploration Plan

Latitude: 35.1762° Longitude: -106.5924°

Approximate Surface Elev.: 5217 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	SWELL (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
3		0										
							11-10		3.9	105		
				5			5-3-3 N=6		7.1		NP	40
				10			8-9-9 N=18		3.6			
				15			7-10-8 N=18		2.1			
				20			3-5-5 N=10		4.2			
				25			5-7-4 N=11		3.3			
		26.5	5190.5+/-									

SILTY SAND (SM), trace to with gravel, brown, moist, loose to medium dense

Boring Terminated at 26.5 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
7" Hollow Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations measured in the field

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
6805 Academy Pkwy West NE
Albuquerque, NM

Boring Started: 11-19-2021 | Boring Completed: 11-19-2021

Drill Rig: CME 55 | Driller: Terracon ABQ

Project No.: 66215225

BORING LOG NO. B-04

PROJECT: U-Haul Facility 724081

CLIENT: AMERCO Real Estate Company
Phoenix, Arizona

SITE: Paseo Del Norte and Jefferson St NE
Albuquerque, New Mexico

LOCATION See Exploration Plan

Latitude: 35.1761° Longitude: -106.5916°

Approximate Surface Elev.: 5217 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	SWELL (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
3			**SILTY SAND (SM)**, trace to with gravel, brown, moist, loose to medium dense				5-9	-0.34 @ 500psf	1.9	111		
				5			5-4-7 N=11		5.0		NP	27
				10			3-6-15 N=21		3.9			
				15			3-3-4 N=7		5.2			
				20			3-4-5 N=9		4.1			
				25			9-9-6 N=15		3.0			
		26.5	5190.5+/-									
			Boring Terminated at 26.5 Feet									

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
7" Hollow Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations measured in the field

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
6805 Academy Pkwy West NE
Albuquerque, NM

Boring Started: 11-19-2021 | Boring Completed: 11-19-2021

Drill Rig: CME 55 | Driller: Terracon ABQ

Project No.: 66215225

BORING LOG NO. B-05

PROJECT: U-Haul Facility 724081

CLIENT: AMERCO Real Estate Company
Phoenix, Arizona

SITE: Paseo Del Norte and Jefferson St NE
Albuquerque, New Mexico

LOCATION See Exploration Plan

Latitude: 35.1758° Longitude: -106.5920°

Approximate Surface Elev.: 5218 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	SWELL (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
			SANDY SILT (ML), trace gravel, brown, moist, stiff									
							4-7	-0.89 @ 500psf	5.0	86	NP	77
		5.0	5213+/-	5								
			LEAN CLAY (CL), brown, moist, stiff				4-5-5 N=10		8.3			
2		10.0	5208+/-	10								
			SANDY SILT (ML), trace gravel, brown, moist, soft to stiff				2-2-2 N=4		8.3			
				15			3-3-4 N=7		4.8			
		20.0	5198+/-	20								
3			**SILTY SAND (SM)**, with gravel, brown, moist, medium dense				5-7-6 N=13		5.6			
				25			4-7-5 N=12					
		26.5	5191.5+/-									
			Boring Terminated at 26.5 Feet									

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
7" Hollow Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations measured in the field

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
6805 Academy Pkwy West NE
Albuquerque, NM

Boring Started: 11-19-2021 | Boring Completed: 11-19-2021

Drill Rig: CME 55 | Driller: Terracon ABQ

Project No.: 66215225

BORING LOG NO. B-06

PROJECT: U-Haul Facility 724081

CLIENT: AMERCO Real Estate Company
Phoenix, Arizona

SITE: Paseo Del Norte and Jefferson St NE
Albuquerque, New Mexico

LOCATION See Exploration Plan

Latitude: 35.1758° Longitude: -106.5911°

Approximate Surface Elev.: 5219 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	SWELL (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
2			**SANDY SILT (ML)**, brown, moist, stiff									
							4-6-5 N=11		3.4			
		5.0	5214+/-	5								
3			**SILTY SAND (SM)**, trace gravel, brown, moist, medium dense				10-14		3.1	107	NP	48
				10			4-4-6 N=10		2.6			
		16.0	5203+/-	15			5-5-5 N=10		3.1			
2			**SANDY SILT (ML)**, trace gravel, brown, moist, stiff									
		21.0	5198+/-	20			5-6-7 N=13		3.7			
3			**SILTY SAND (SM)**, with gravel, brown, moist, medium dense									
		26.5	5192.5+/-	25			5-7-10 N=17					
			Boring Terminated at 26.5 Feet									

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
7" Hollow Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations measured in the field

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
6805 Academy Pkwy West NE
Albuquerque, NM

Boring Started: 11-19-2021 | Boring Completed: 11-19-2021

Drill Rig: CME 55 | Driller: Terracon ABQ

Project No.: 66215225

BORING LOG NO. B-07

PROJECT: U-Haul Facility 724081

CLIENT: AMERCO Real Estate Company
Phoenix, Arizona

SITE: Paseo Del Norte and Jefferson St NE
Albuquerque, New Mexico

LOCATION See Exploration Plan

Latitude: 35.1754° Longitude: -106.5922°

Approximate Surface Elev.: 5217 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	SWELL (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
3		0										
							12-16		2.3	112	NP	28
				5			4-6-3 N=9		6.8			
				10			8-11-8 N=19		2.1			
				15			3-5-5 N=10		5.5			
				20			4-6-9 N=15		3.3			
		21.5	5195.5+/-									

SILTY SAND (SM), trace to with gravel, brown, loose to medium dense

Boring Terminated at 21.5 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
7" Hollow Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations measured in the field

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
6805 Academy Pkwy West NE
Albuquerque, NM

Boring Started: 11-24-2021 | Boring Completed: 11-24-2021

Drill Rig: CME 55 | Driller: Terracon ABQ

Project No.: 66215225

BORING LOG NO. B-08

PROJECT: U-Haul Facility 724081

CLIENT: AMERCO Real Estate Company
Phoenix, Arizona

SITE: Paseo Del Norte and Jefferson St NE
Albuquerque, New Mexico

LOCATION See Exploration Plan

Latitude: 35.1753° Longitude: -106.5916°

Approximate Surface Elev.: 5215 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	SWELL (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
3												
			SILTY SAND WITH GRAVEL (SM), trace to with gravel, brown, moist, medium dense									
							25-25		1.6	120		
				5			8-12-16 N=28		2.5		NP	29
				10			13-8-6 N=14		4.1			
				15			9-8-10 N=18		3.6			
				20			10-10-12 N=22		3.6			
				25			8-9-6 N=15		1.7			
		26.5	5188.5+/-									
			Boring Terminated at 26.5 Feet									

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
7" Hollow Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations measured in the field

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
6805 Academy Pkwy West NE
Albuquerque, NM

Boring Started: 11-19-2021 | Boring Completed: 11-19-2021

Drill Rig: CME 55 | Driller: Terracon ABQ

Project No.: 66215225

BORING LOG NO. B-09

PROJECT: U-Haul Facility 724081

CLIENT: AMERCO Real Estate Company
Phoenix, Arizona

SITE: Paseo Del Norte and Jefferson St NE
Albuquerque, New Mexico

LOCATION See Exploration Plan

Latitude: 35.1754° Longitude: -106.5911°

Approximate Surface Elev.: 5217 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	SWELL (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
3												
			SILTY SAND (SM), trace to with gravel, brown, moist, loose to medium dense				9-12-15 N=27		2.1		NP	30
				5			8-8	-1.50 @ 500psf	4.8	102		
				10			17-11-10 N=21		4.5			
				15			8-8-7 N=15		2.8			
				20			10-8-7 N=15		2.2			
				25			5-8-10 N=18					
		26.5	5190.5+/-									
			Boring Terminated at 26.5 Feet									

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
7" Hollow Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations measured in the field

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
6805 Academy Pkwy West NE
Albuquerque, NM

Boring Started: 11-19-2021 | Boring Completed: 11-19-2021

Drill Rig: CME 55 | Driller: Terracon ABQ

Project No.: 66215225

BORING LOG NO. B-10

PROJECT: U-Haul Facility 724081

CLIENT: AMERCO Real Estate Company
Phoenix, Arizona

SITE: Paseo Del Norte and Jefferson St NE
Albuquerque, New Mexico

LOCATION See Exploration Plan

Latitude: 35.1750° Longitude: -106.5922°

Approximate Surface Elev.: 5217 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	SWELL (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
3			**SILTY SAND (SM)**, trace to with gravel, brown, moist, medium dense				10-8-5 N=13		1.7		NP	13
				5			6-11	-3.61 @ 500psf	5.6	92		
		8.0	5209+/-									
2			**SANDY SILT (ML)**, trace to with gravel, brown, moist, stiff to very stiff	10			3-7-8 N=15		4.3			
				15			4-5-6 N=11		4.0			
				20			7-8-11 N=19		3.0			
		21.5	5195.5+/-									
			Boring Terminated at 21.5 Feet									

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
7" Hollow Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations measured in the field

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
6805 Academy Pkwy West NE
Albuquerque, NM

Boring Started: 11-24-2021 | Boring Completed: 11-24-2021

Drill Rig: CME 55 | Driller: Terracon ABQ

Project No.: 66215225

BORING LOG NO. B-11

PROJECT: U-Haul Facility 724081

CLIENT: AMERCO Real Estate Company
Phoenix, Arizona

SITE: Paseo Del Norte and Jefferson St NE
Albuquerque, New Mexico

LOCATION See Exploration Plan

Latitude: 35.1750° Longitude: -106.5916°

Approximate Surface Elev.: 5217 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	SWELL (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
3		0										
			SILTY SAND (SM), light brown, medium dense				4-6-7 N=13					
		4.0	5213+/-									
2			**SANDY SILT (ML)**, light brown, stiff to very stiff	5			6-11	-6.80 @ 500psf	6.7	76	NP	59
				10			2-2-3 N=5		11.9			
				15			2-3-2 N=5		5.2			
				20			4-7-10 N=17		6.3			
3		21.0	5196+/-									
			SILTY SAND (SM), with gravel, light brown, medium dense	25			7-7-6 N=13		2.6			
		26.5	5190.5+/-									
			Boring Terminated at 26.5 Feet									

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
7" Hollow Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations measured in the field

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
6805 Academy Pkwy West NE
Albuquerque, NM

Boring Started: 11-24-2021 | Boring Completed: 11-24-2021

Drill Rig: CME 55 | Driller: Terracon ABQ

Project No.: 66215225

BORING LOG NO. B-12

PROJECT: U-Haul Facility 724081

CLIENT: AMERCO Real Estate Company
Phoenix, Arizona

SITE: Paseo Del Norte and Jefferson St NE
Albuquerque, New Mexico

LOCATION See Exploration Plan

Latitude: 35.1750° Longitude: -106.5911°

Approximate Surface Elev.: 5217 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	SWELL (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
3			**WELL GRADED SAND WITH SILT (SW-SM)**, light brown, dry, medium dense									
							8-15		1.0	111	NP	6
		5.0	5212+/-									
2			**SANDY SILT (ML)**, light brown, moist, medium stiff to stiff	5			3-3-3 N=6		5.3			
				10			3-2-3 N=5		12.4			
				15			2-3-3 N=6		6.9			
		21.0	5196+/-	20			6-9-6 N=15		5.5			
3			**SILTY SAND WITH GRAVEL (SM)**, with gravel, light brown, medium dense									
				25			7-13-15 N=28					
		26.5	5190.5+/-									
			Boring Terminated at 26.5 Feet									

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
7" Hollow Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations measured in the field

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
6805 Academy Pkwy West NE
Albuquerque, NM

Boring Started: 11-24-2021 | Boring Completed: 11-24-2021

Drill Rig: CME 55 | Driller: Terracon ABQ

Project No.: 66215225

BORING LOG NO. P-01

PROJECT: U-Haul Facility 724081

CLIENT: AMERCO Real Estate Company
Phoenix, Arizona

SITE: Paseo Del Norte and Jefferson St NE
Albuquerque, New Mexico

LOCATION See Exploration Plan

Latitude: 35.1765° Longitude: -106.5929°

Approximate Surface Elev.: 5217 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	SWELL (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
1		0.1	5217+/-									
			ASPHALT CONCRETE									
3			**SILTY SAND (SM)**, brown with whitestreaks, loose to medium dense				7-10-10 N=20		9.2		NP	49
				5			4-8		6.6	97		
				10			4-4-4 N=8		5.5			
		11.5	5205.5+/-									
			Boring Terminated at 11.5 Feet									

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
7" Hollow Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations measured in the field

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
6805 Academy Pkwy West NE
Albuquerque, NM

Boring Started: 11-24-2021 | Boring Completed: 11-24-2021

Drill Rig: CME 55 | Driller: Terracon ABQ

Project No.: 66215225

BORING LOG NO. P-02

PROJECT: U-Haul Facility 724081

CLIENT: AMERCO Real Estate Company
Phoenix, Arizona

SITE: Paseo Del Norte and Jefferson St NE
Albuquerque, New Mexico

LOCATION See Exploration Plan

Latitude: 35.1759° Longitude: -106.5930°

Approximate Surface Elev.: 5217 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	SWELL (%)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
1		0.1	5217+/-									
		ASPHALT CONCRETE										
3		**SILTY SAND (SM)**, trace gravel, brown, loose to medium dense					6-27		4.4	107	NP	39
				5			4-4-4 N=8		4.8			
		8.0	5209+/-									
2		**SANDY SILT (ML)**, brown, very stiff		10			4-5-11 N=16		4.1			
		11.5	5205.5+/-									
		Boring Terminated at 11.5 Feet										

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
7" Hollow Stem Auger

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations measured in the field

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
6805 Academy Pkwy West NE
Albuquerque, NM

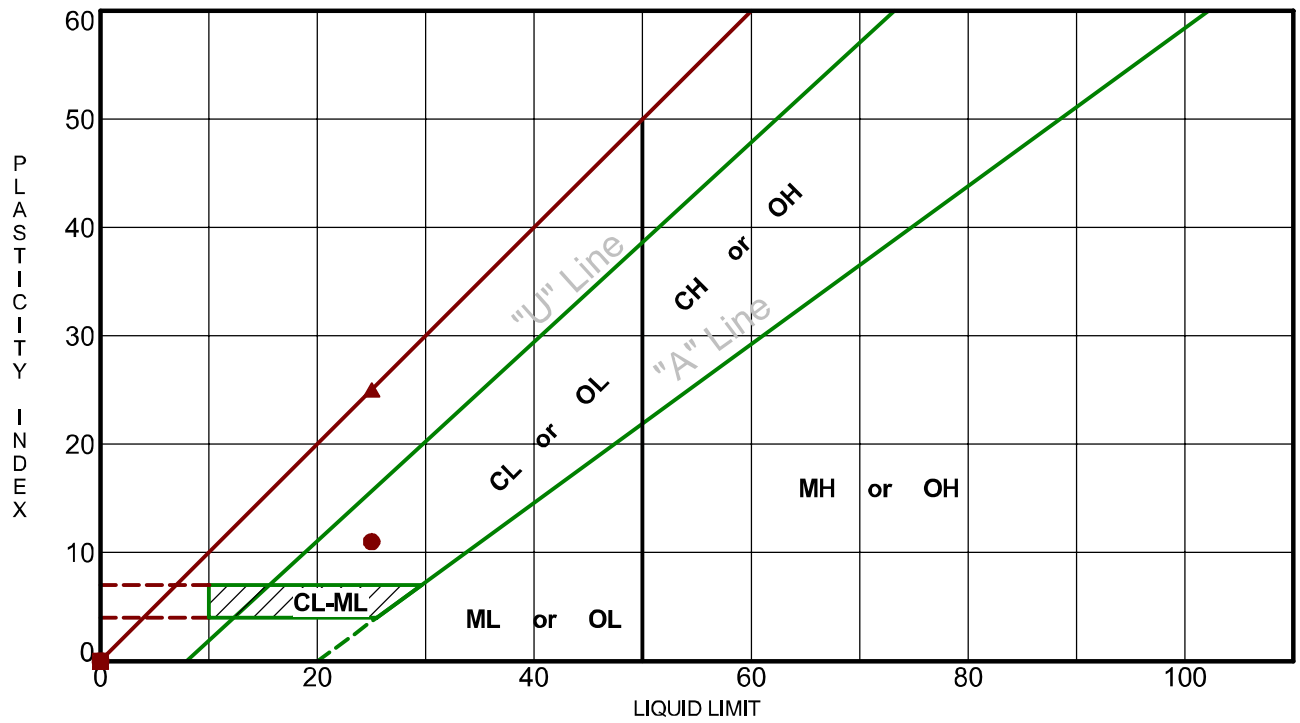
Boring Started: 11-24-2021 | Boring Completed: 11-24-2021

Drill Rig: CME 55 | Driller: Terracon ABQ

Project No.: 66215225

ATTERBERG LIMITS RESULTS

ASTM D4318



Boring ID		Depth	LL	PL	PI	Fines	USCS	Description
●	B-01	5 - 6	25	14	11	32.7	SC	CLAYEY SAND
⊠	B-02	2.5 - 3.5	NP	NP	NP	49.7	SM	SILTY SAND
▲	B-03	5 - 6.5	25	NP	25	39.6	SM	SILTY SAND
★	B-04	5 - 6.5	NP	NP	NP	27.2	SM	SILTY SAND with GRAVEL
⊙	B-05	2.5 - 3.5	NP	NP	NP	77.1	ML	SILT with SAND
✿	B-06	5 - 6	NP	NP	NP	47.7	SM	SILTY SAND
○	B-07	2.5 - 3.5	NP	NP	NP	27.9	SM	SILTY SAND
△	B-08	5 - 6.5	NP	NP	NP	28.6	SM	SILTY SAND with GRAVEL
⊗	B-09	2.5 - 4	NP	NP	NP	30.3	SM	SILTY SAND
⊕	B-10	2.5 - 4	NP	NP	NP	13.2	SM	SILTY SAND
□	B-11	5 - 6	NP	NP	NP	59.0	ML	SANDY SILT
◒	B-12	2.5 - 3.5	NP	NP	NP	5.6	SW-SM	WELL-GRADED SAND with SILT
◕	P-01	2.5 - 4	NP	NP	NP	49.1	SM	SILTY SAND
☆	P-02	2.5 - 3.5	NP	NP	NP	39.3	SM	SILTY SAND

PROJECT: U-Haul Facility 724081

PROJECT NUMBER: 66215225

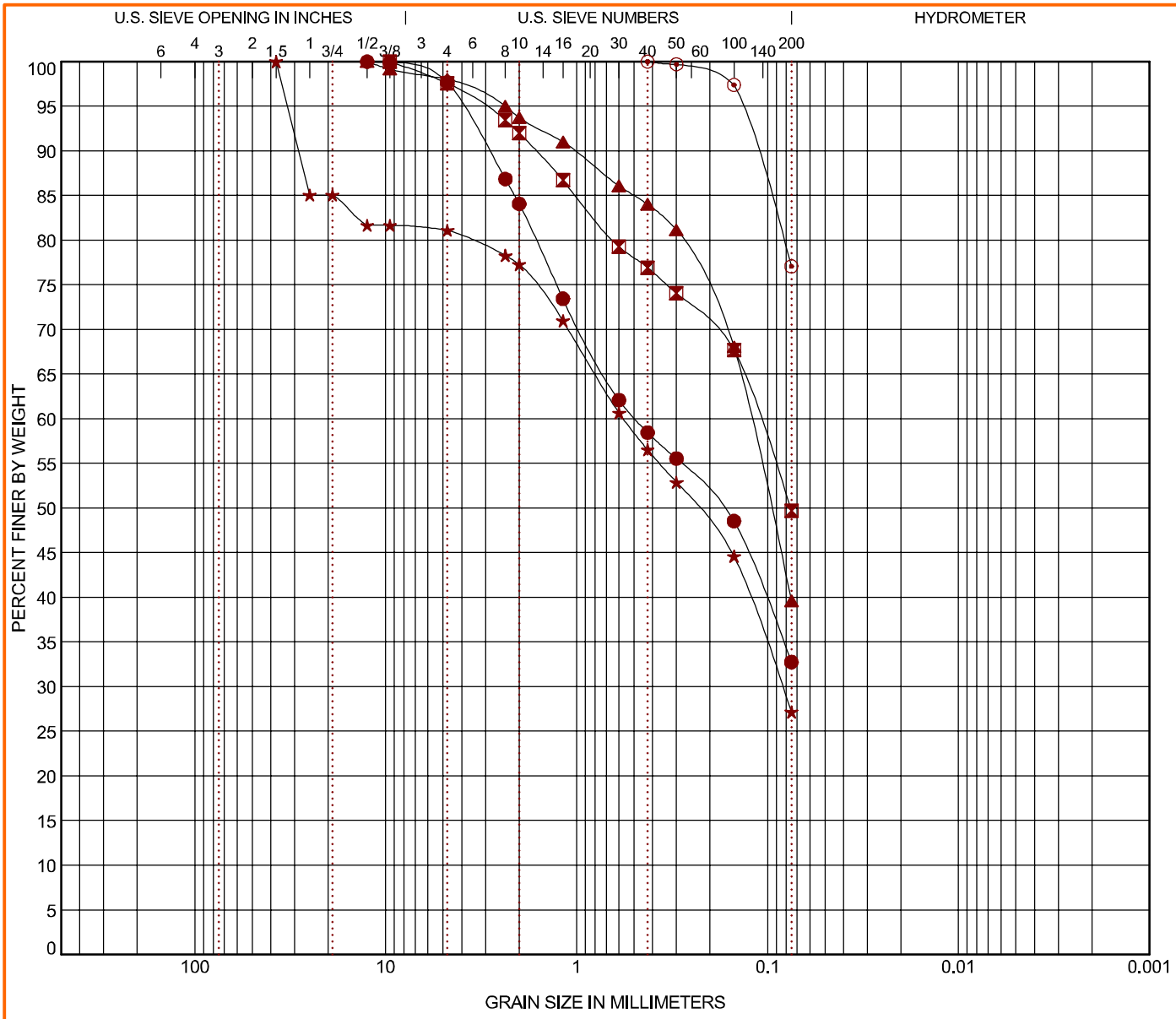
SITE: Paseo Del Norte and Jefferson St NE
Albuquerque, New Mexico

Terracon
6805 Academy Pkwy West NE
Albuquerque, NM

CLIENT: AMERCO Real Estate Company
Phoenix, Arizona

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Boring ID		Depth	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
●	B-01	5 - 6	CLAYEY SAND (SC)	5.2	25	14	11		
⊠	B-02	2.5 - 3.5	SILTY SAND (SM)	3.9	NP	NP	NP		
▲	B-03	5 - 6.5	SILTY SAND (SM)	7.1	25	NP	25		
★	B-04	5 - 6.5	SILTY SAND with GRAVEL (SM)	5.0	NP	NP	NP		
⊙	B-05	2.5 - 3.5	SILT with SAND (ML)	5.0	NP	NP	NP		

Boring ID		Depth	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
●	B-01	5 - 6	12.5	0.492			0.0	2.3	64.9		32.7	
⊠	B-02	2.5 - 3.5	9.5	0.112			0.0	2.4	47.9		49.7	
▲	B-03	5 - 6.5	12.5	0.123			0.0	2.0	58.4		39.6	
★	B-04	5 - 6.5	37.5	0.568	0.084		0.0	18.9	54.0		27.2	
⊙	B-05	2.5 - 3.5	0.425				0.0	0.0	22.9		77.1	

PROJECT: U-Haul Facility 724081

PROJECT NUMBER: 66215225

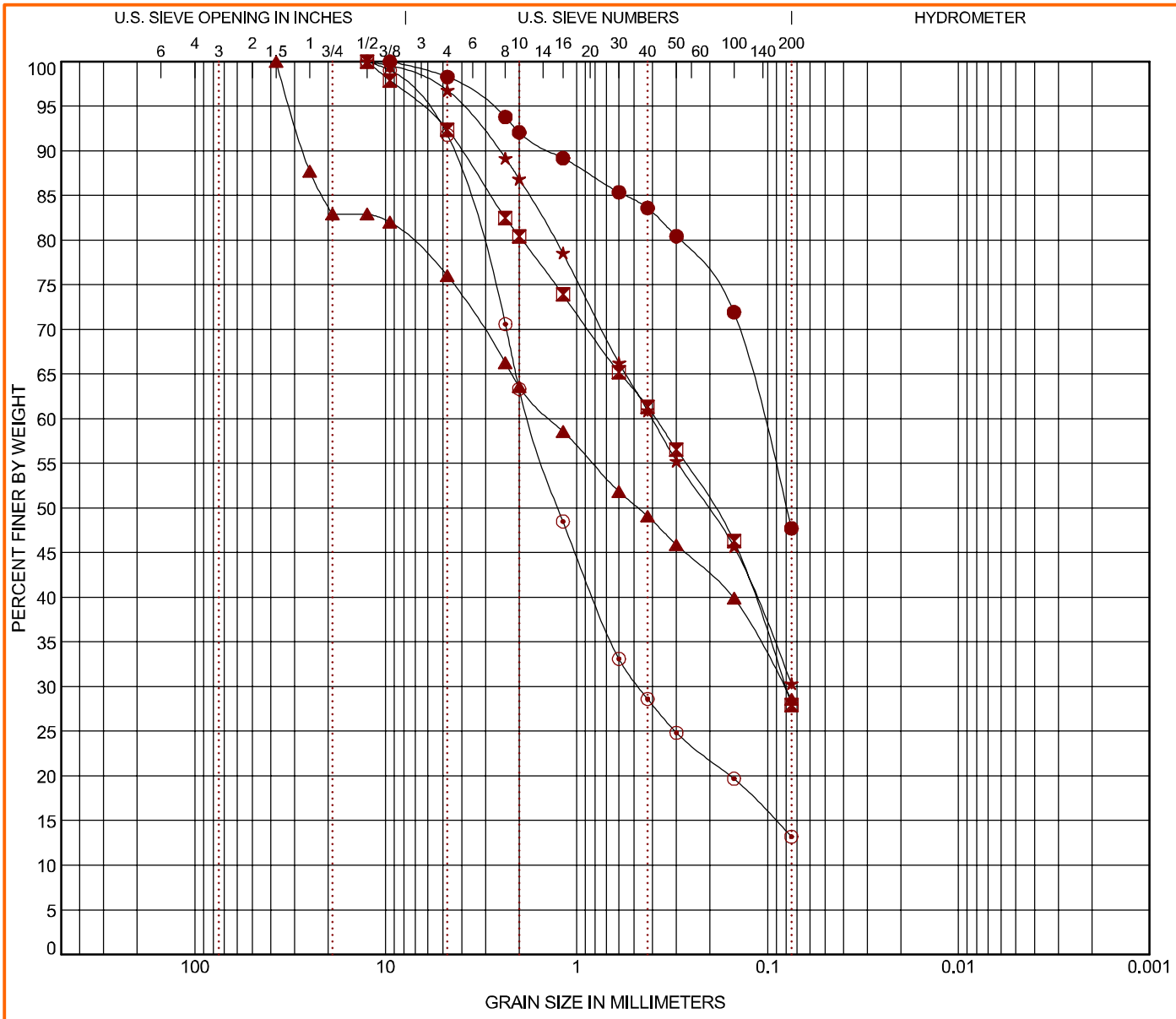
SITE: Paseo Del Norte and Jefferson St NE
Albuquerque, New Mexico

Terracon
6805 Academy Pkwy West NE
Albuquerque, NM

CLIENT: AMERCO Real Estate Company
Phoenix, Arizona

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Boring ID		Depth	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
●	B-06	5 - 6	SILTY SAND (SM)	3.1	NP	NP	NP		
⊠	B-07	2.5 - 3.5	SILTY SAND (SM)	2.3	NP	NP	NP		
▲	B-08	5 - 6.5	SILTY SAND with GRAVEL (SM)	2.5	NP	NP	NP		
★	B-09	2.5 - 4	SILTY SAND (SM)	2.1	NP	NP	NP		
⊙	B-10	2.5 - 4	SILTY SAND (SM)	1.7	NP	NP	NP		

Boring ID		Depth	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
●	B-06	5 - 6	9.5	0.107			0.0	1.7	50.6		47.7	
⊠	B-07	2.5 - 3.5	12.5	0.385	0.081		0.0	7.6	64.5		27.9	
▲	B-08	5 - 6.5	37.5	1.37	0.082		0.0	24.0	47.5		28.6	
★	B-09	2.5 - 4	12.5	0.402			0.0	3.2	66.5		30.3	
⊙	B-10	2.5 - 4	12.5	1.776	0.473		0.0	8.2	78.6		13.2	

PROJECT: U-Haul Facility 724081

PROJECT NUMBER: 66215225

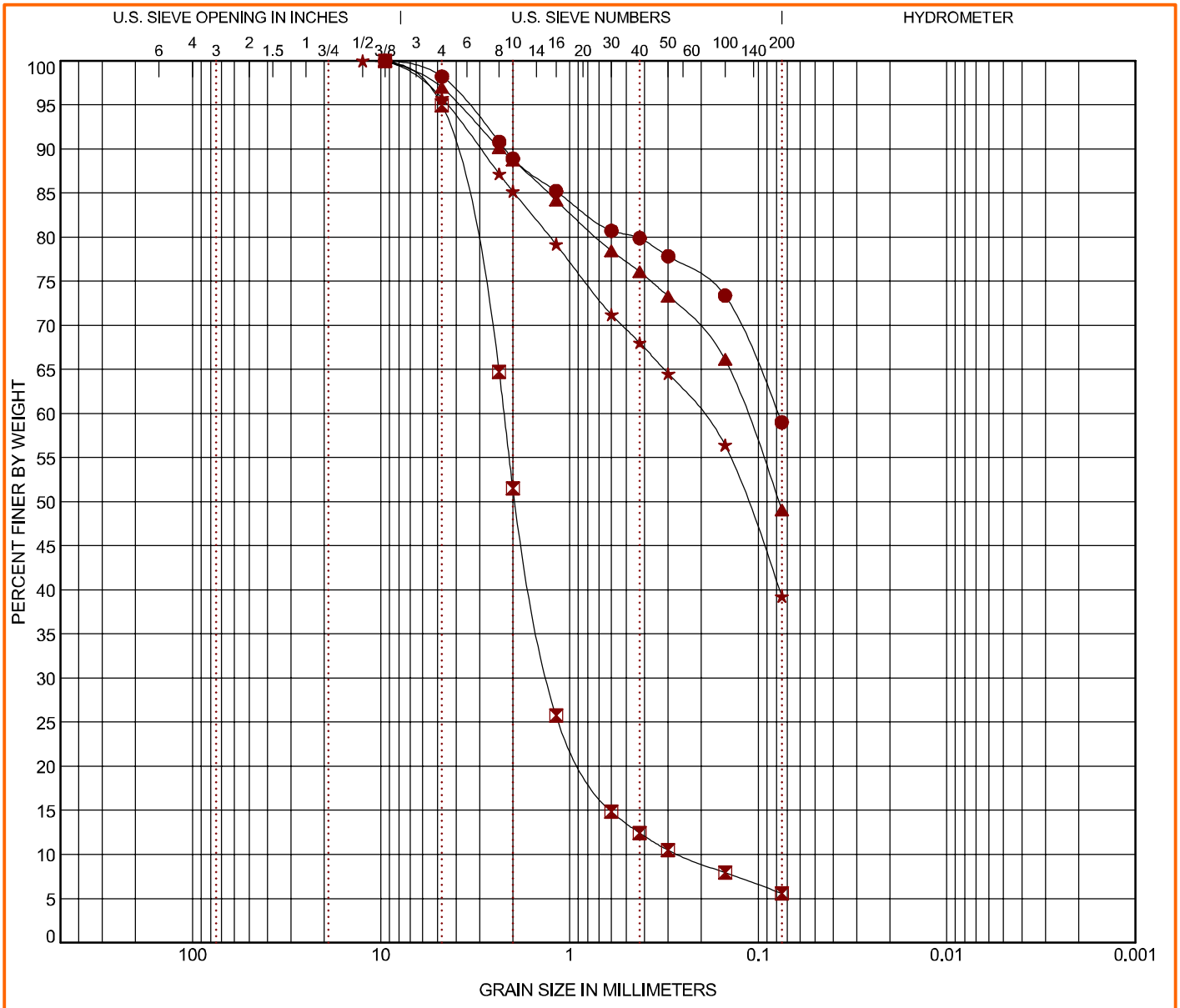
SITE: Paseo Del Norte and Jefferson St NE
Albuquerque, New Mexico

Terracon
6805 Academy Pkwy West NE
Albuquerque, NM

CLIENT: AMERCO Real Estate Company
Phoenix, Arizona

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Boring ID		Depth	USCS Classification	WC (%)	LL	PL	PI	Cc	Cu
●	B-11	5 - 6	SANDY SILT (ML)	6.7	NP	NP	NP		
⊠	B-12	2.5 - 3.5	WELL-GRADED SAND with SILT (SW-SM)	1.0	NP	NP	NP	2.82	8.41
▲	P-01	2.5 - 4	SILTY SAND (SM)	9.2	NP	NP	NP		
★	P-02	2.5 - 3.5	SILTY SAND (SM)	4.4	NP	NP	NP		

Boring ID		Depth	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Silt	%Fines	%Clay
●	B-11	5 - 6	9.5	0.079			0.0	1.8	39.2		59.0	
⊠	B-12	2.5 - 3.5	9.5	2.224	1.287	0.265	0.0	5.0	89.4		5.6	
▲	P-01	2.5 - 4	9.5	0.117			0.0	3.0	47.9		49.1	
★	P-02	2.5 - 3.5	12.5	0.204			0.0	4.2	56.5		39.3	

PROJECT: U-Haul Facility 724081

PROJECT NUMBER: 66215225

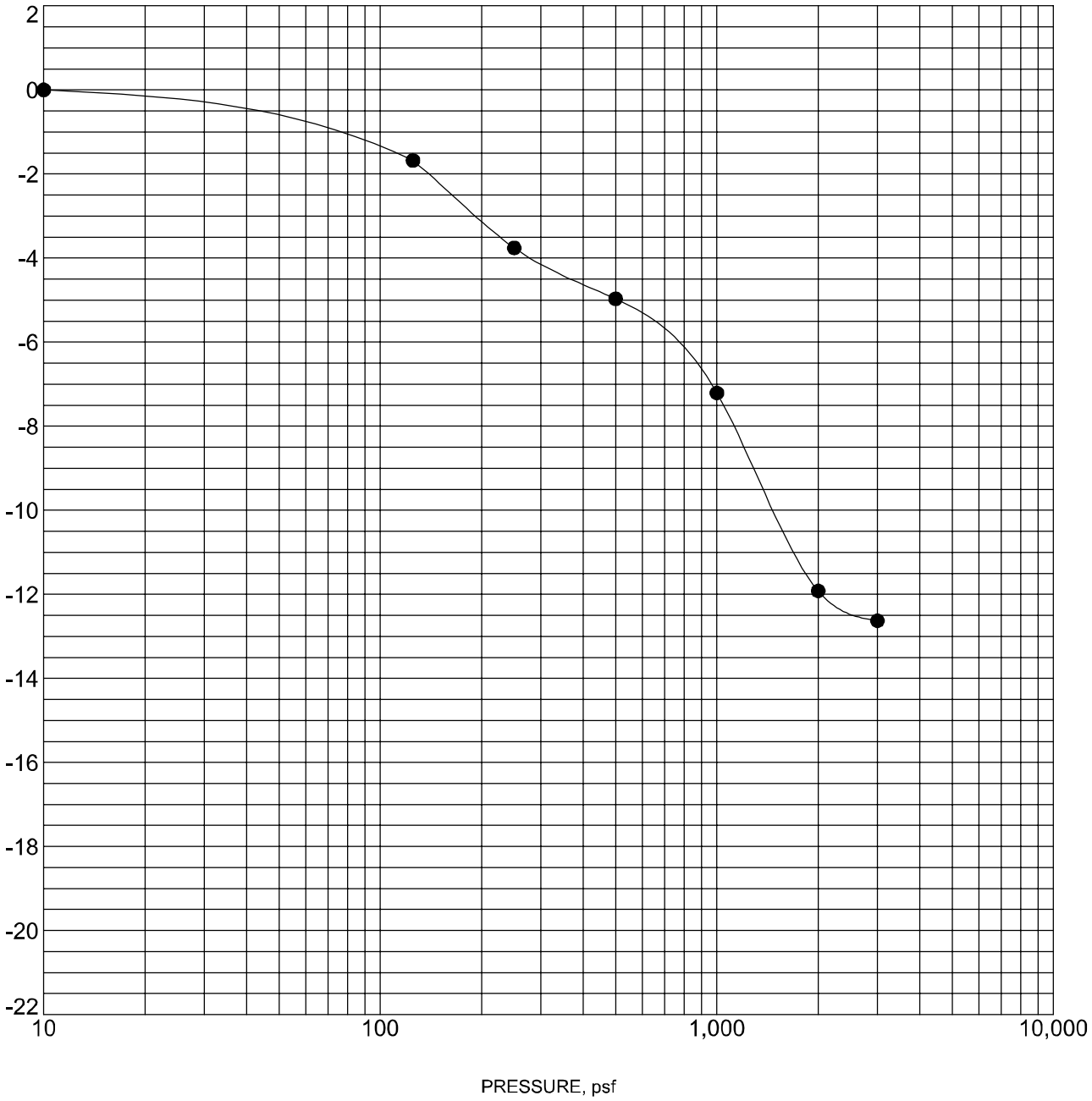
SITE: Paseo Del Norte and Jefferson St NE
Albuquerque, New Mexico

Terracon
6805 Academy Pkwy West NE
Albuquerque, NM

CLIENT: AMERCO Real Estate Company
Phoenix, Arizona

SWELL CONSOLIDATION TEST

ASTM D4546



Specimen Identification			Classification	γ_d, pcf	WC, %
●	B-01	5 - 6 ft	CLAYEY SAND(SC)	92	5.2

NOTES: Sample not inundated with water.

PROJECT: U-Haul Facility 724081

SITE: Paseo Del Norte and Jefferson St NE
Albuquerque, New Mexico

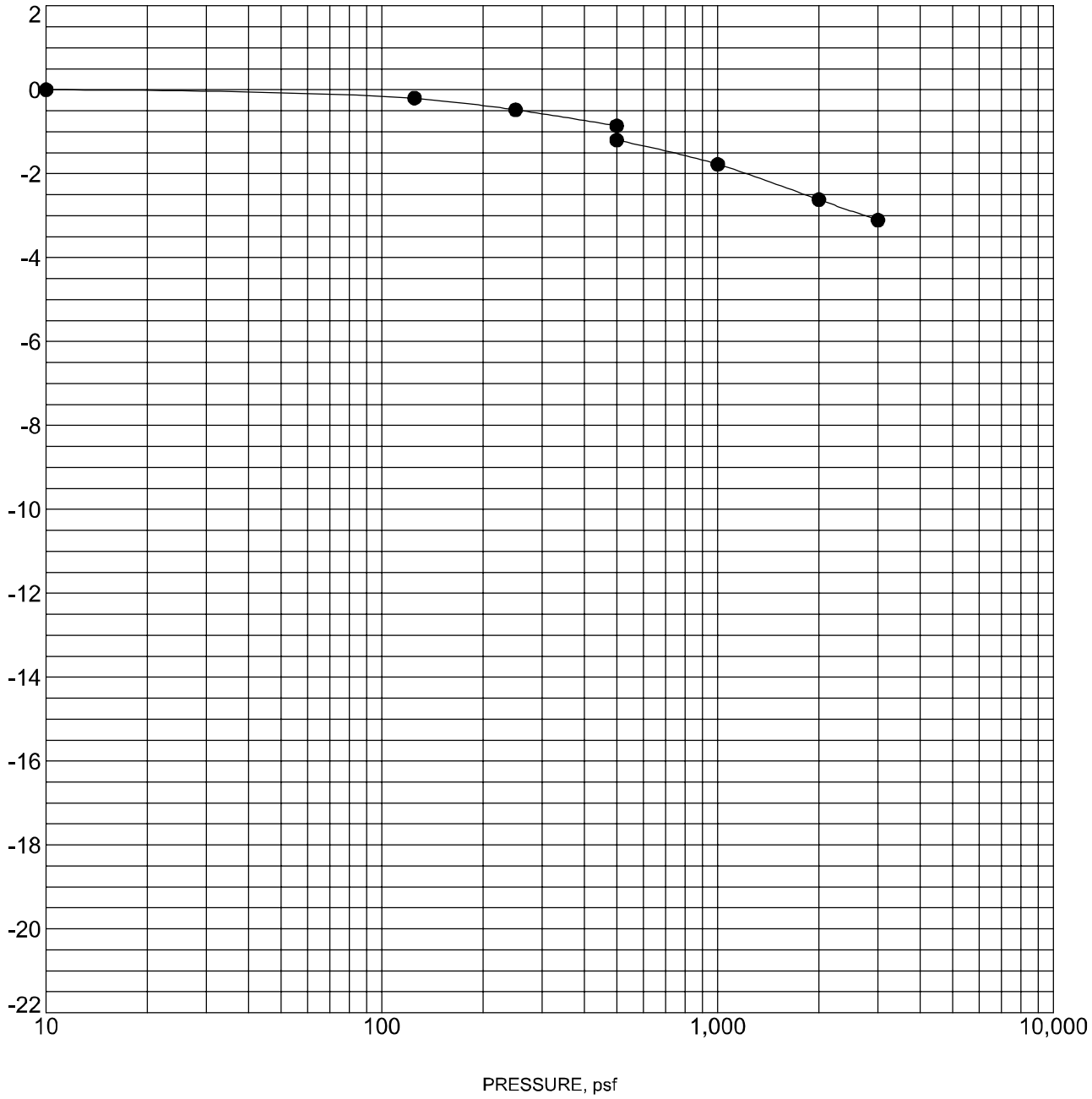
Terracon
6805 Academy Pkwy West NE
Albuquerque, NM

PROJECT NUMBER: 66215225

CLIENT: AMERCO Real Estate Company
Phoenix, Arizona

SWELL CONSOLIDATION TEST

ASTM D4546



Specimen Identification		Classification	γ_d, pcf	WC, %
●	B-04 2.5 - 3.5 ft	SILTY SAND(SM)	111	1.9

NOTES: Sample inundated with water at 500 pounds per square foot (psf).

PROJECT: U-Haul Facility 724081

SITE: Paseo Del Norte and Jefferson St NE
Albuquerque, New Mexico

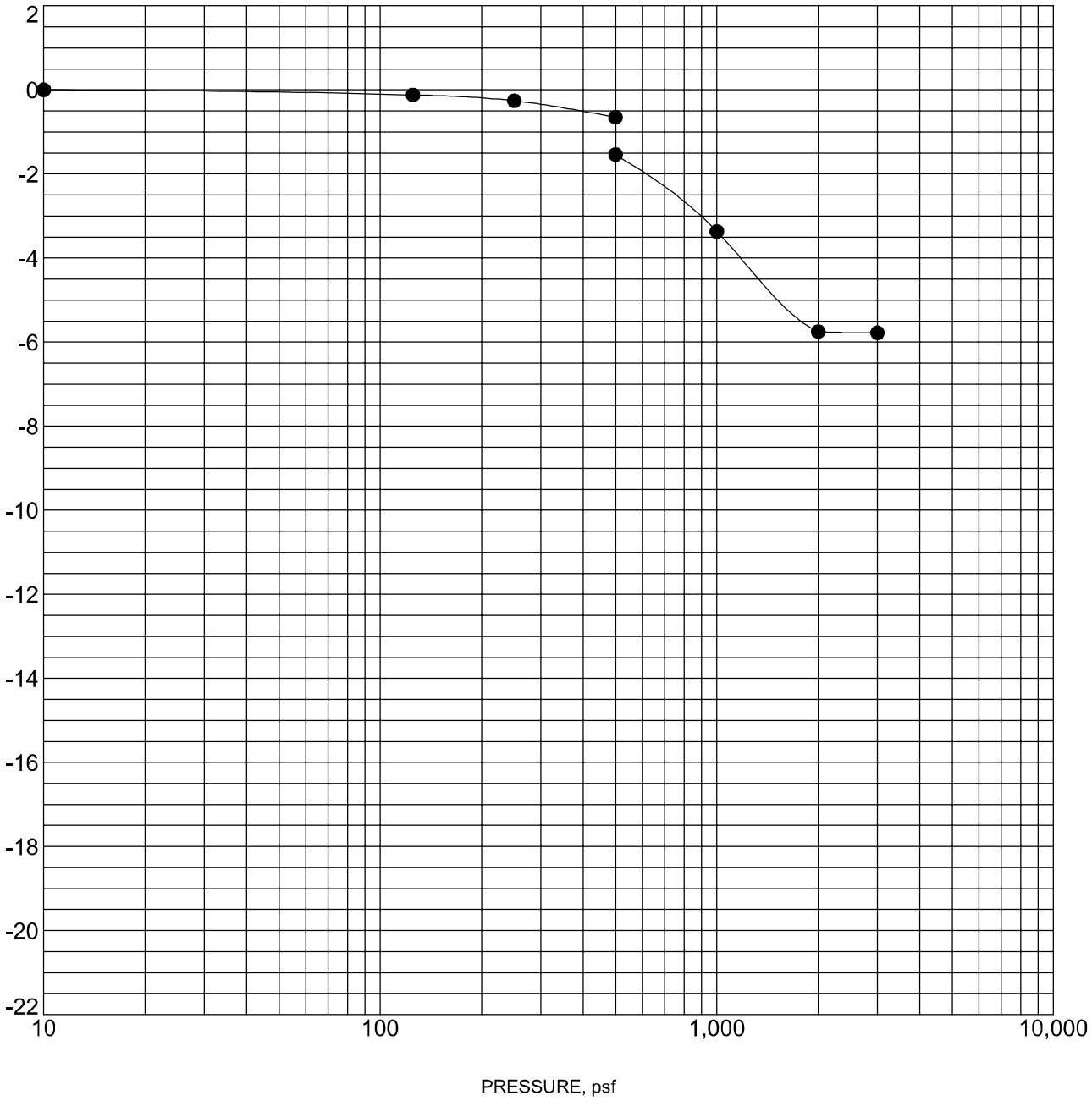
Terracon
6805 Academy Pkwy West NE
Albuquerque, NM

PROJECT NUMBER: 66215225

CLIENT: AMERCO Real Estate Company
Phoenix, Arizona

SWELL CONSOLIDATION TEST

ASTM D4546



Specimen Identification		Classification	γ_d, pcf	WC, %
● B-05 2.5 - 3.5 ft		SILT with SAND(ML)	86	5.0

NOTES: Sample inundated with water at 500 pounds per square foot (psf).

PROJECT: U-Haul Facility 724081

PROJECT NUMBER: 66215225

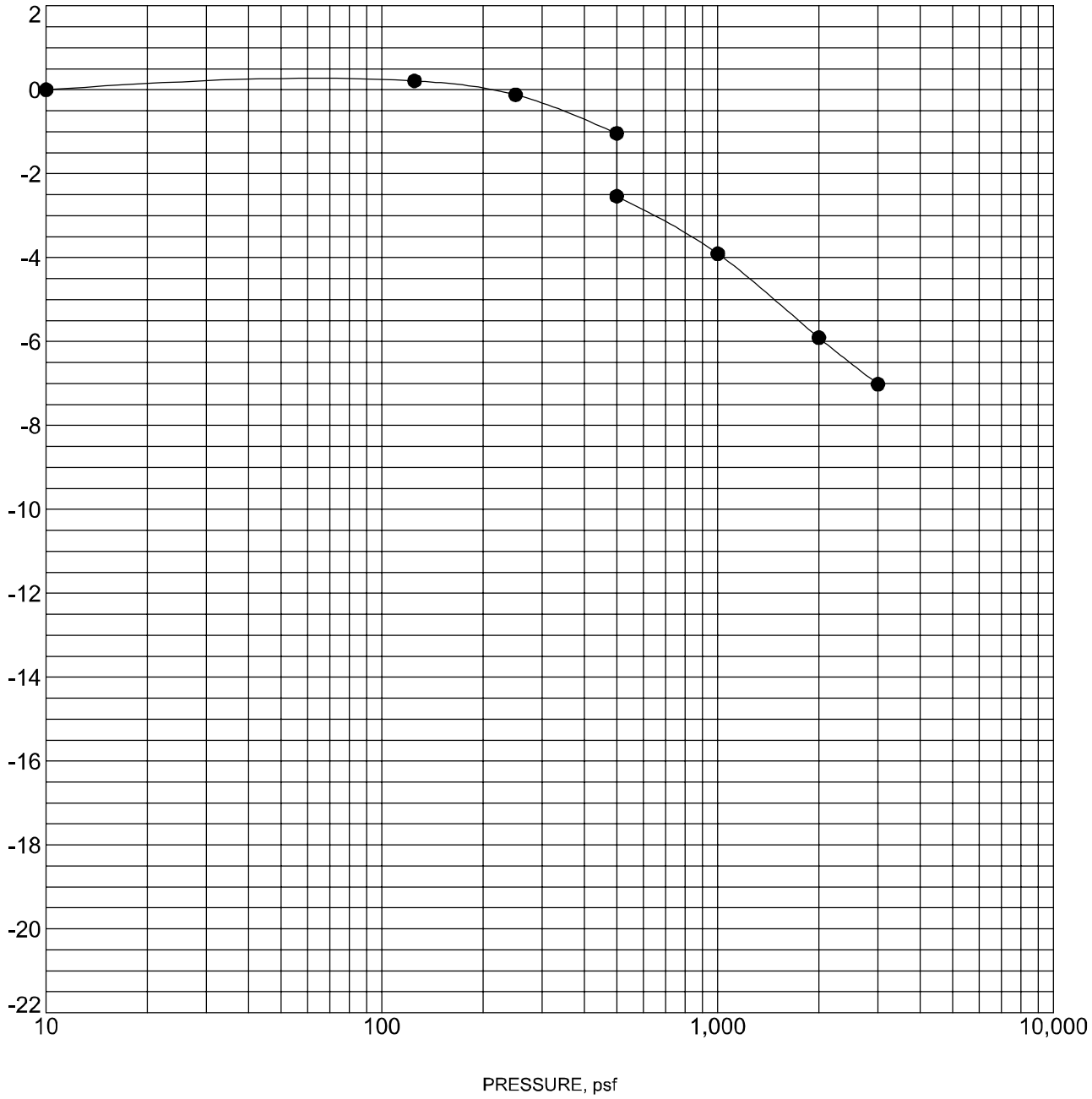
SITE: Paseo Del Norte and Jefferson St NE
Albuquerque, New Mexico

Terracon
6805 Academy Pkwy West NE
Albuquerque, NM

CLIENT: AMERCO Real Estate Company
Phoenix, Arizona

SWELL CONSOLIDATION TEST

ASTM D4546



Specimen Identification			Classification	γ_d, pcf	WC, %
●	B-09	5 - 6 ft	SILTY SAND(SM)	102	4.8

NOTES: Sample inundated with water at 500 pounds per square foot (psf).

PROJECT: U-Haul Facility 724081

SITE: Paseo Del Norte and Jefferson St NE
Albuquerque, New Mexico

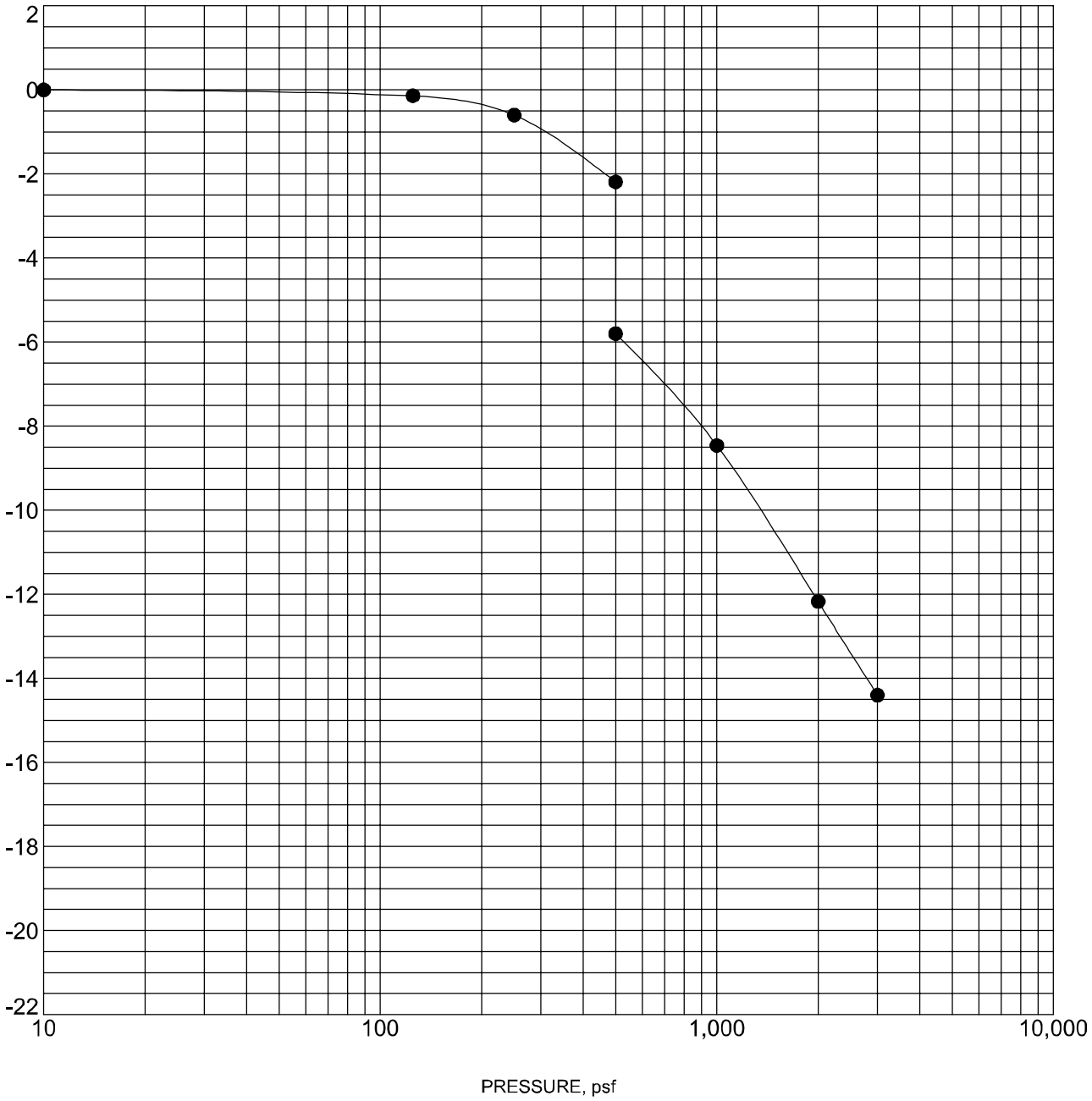
Terracon
6805 Academy Pkwy West NE
Albuquerque, NM

PROJECT NUMBER: 66215225

CLIENT: AMERCO Real Estate Company
Phoenix, Arizona

SWELL CONSOLIDATION TEST

ASTM D4546



Specimen Identification			Classification	γ_d, pcf	WC, %
●	B-10	5 - 6 ft	SILTY SAND(SM)	102	4.8

NOTES: Sample inundated with water at 500 pounds per square foot (psf).

PROJECT: U-Haul Facility 724081

SITE: Paseo Del Norte and Jefferson St NE
Albuquerque, New Mexico

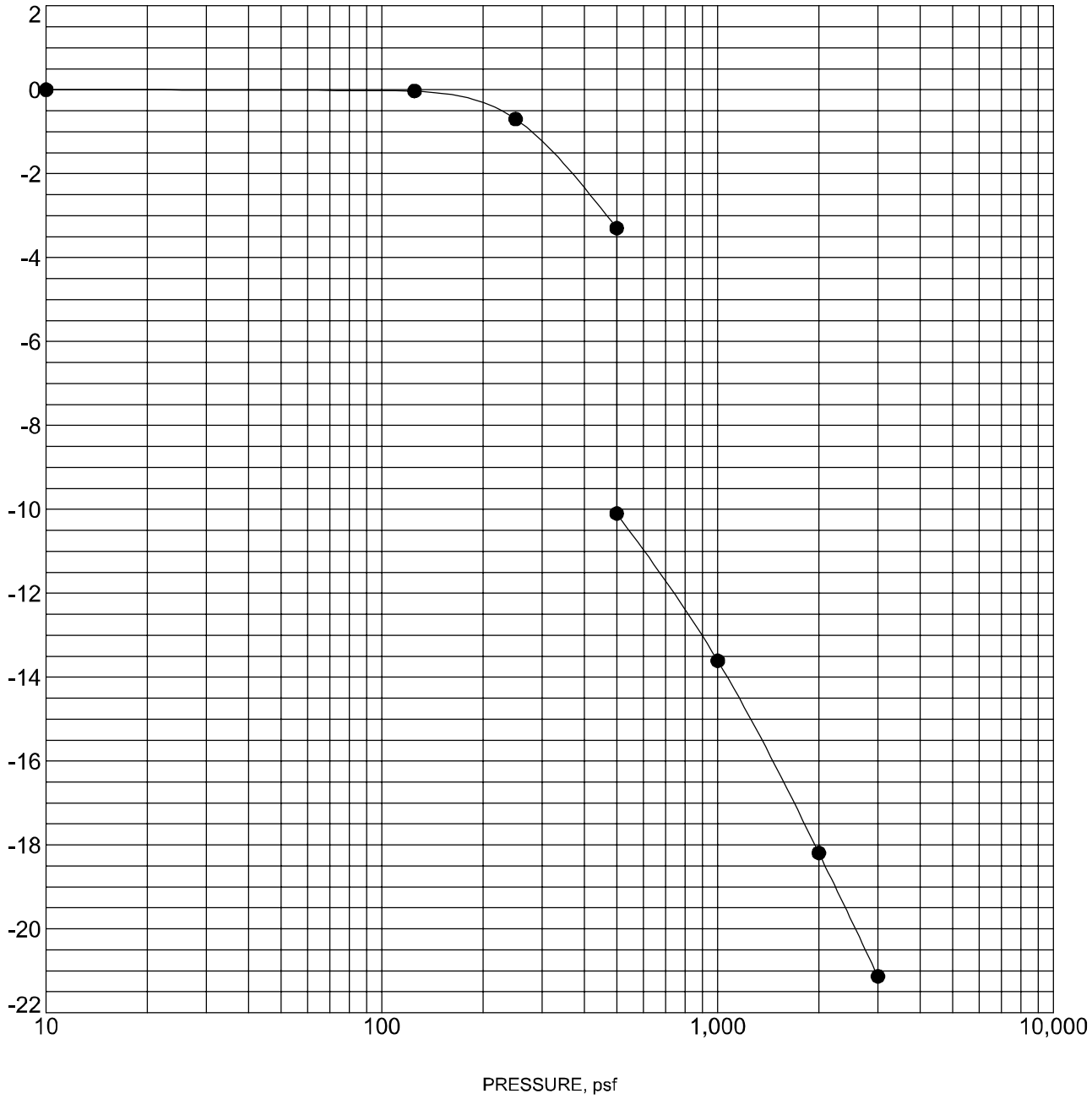
Terracon
6805 Academy Pkwy West NE
Albuquerque, NM

PROJECT NUMBER: 66215225

CLIENT: AMERCO Real Estate Company
Phoenix, Arizona

SWELL CONSOLIDATION TEST

ASTM D4546



Specimen Identification			Classification	γ_d, pcf	WC, %
●	B-11	5 - 6 ft	SANDY SILT(ML)	76	6.7

NOTES: Sample inundated with water at 500 pounds per square foot (psf).

PROJECT: U-Haul Facility 724081

SITE: Paseo Del Norte and Jefferson St NE
Albuquerque, New Mexico

Terracon
6805 Academy Pkwy West NE
Albuquerque, NM

PROJECT NUMBER: 66215225

CLIENT: AMERCO Real Estate Company
Phoenix, Arizona

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: clients.hallenvironmental.com

December 15, 2021

Mike Anderson

Terracon
6805 Academy Parkway West NE
Albuquerque, NM 87109
TEL: (505) 797-4287
FAX: (505) 797-4288

RE: UHAUL OrderNo.: 2112278

Dear Mike Anderson:

Hall Environmental Analysis Laboratory received 4 sample(s) on 12/3/2021 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Terracon
Client Sample ID: B-01@2.5
Project: UHAUL
Collection Date: 12/3/2021
Lab ID: 2112278-001 **Matrix:** SOIL **Received Date:** 12/3/2021 12:00:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst:	**LRN**
Chloride	16	7.5		mg/Kg	5	12/9/2021 2:37:47 PM	64406
Sulfate	53	7.5		mg/Kg	5	12/9/2021 2:37:47 PM	64406
RESISTIVITY AND EC SOIL						Analyst:	**MRA**
Resistivity	2120	100		Ohms * c	1	12/6/2021 4:00:00 PM	64318
SM4500H+B/EPA 9040C						Analyst:	**JRR**
pH	8.92			pH Units	1	12/8/2021 1:34:00 PM	R84370

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix interference		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Terracon
Client Sample ID: B-05@5
Project: UHAUL
Collection Date: 12/3/2021
Lab ID: 2112278-002 **Matrix:** SOIL **Received Date:** 12/3/2021 12:00:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **LRN**	
Chloride	ND	7.5		mg/Kg	5	12/9/2021 3:51:52 PM	64406
Sulfate	210	7.5		mg/Kg	5	12/9/2021 3:51:52 PM	64406
RESISTIVITY AND EC SOIL						Analyst: **MRA**	
Resistivity	1240	100		Ohms * c	1	12/6/2021 4:00:00 PM	64318
SM4500H+B/EPA 9040C						Analyst: **JRR**	
pH	8.32			pH Units	1	12/8/2021 1:34:00 PM	R84370

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix interference		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Terracon
Client Sample ID: B-06@2.5
Project: UHAUL
Collection Date: 12/3/2021
Lab ID: 2112278-003 **Matrix:** SOIL **Received Date:** 12/3/2021 12:00:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst:	**LRN**
Chloride	71	7.5		mg/Kg	5	12/9/2021 4:16:34 PM	64406
Sulfate	200	7.5		mg/Kg	5	12/9/2021 4:16:34 PM	64406
RESISTIVITY AND EC SOIL						Analyst:	**MRA**
Resistivity	1080	100		Ohms * c	1	12/6/2021 4:00:00 PM	64318
SM4500H+B/EPA 9040C						Analyst:	**JRR**
pH	8.28			pH Units	1	12/8/2021 1:34:00 PM	R84370

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix interference		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Terracon
Client Sample ID: B-11@2.5
Project: UHAUL
Collection Date: 12/3/2021
Lab ID: 2112278-004 **Matrix:** SOIL **Received Date:** 12/3/2021 12:00:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst:	**LRN**
Chloride	ND	7.5		mg/Kg	5	12/9/2021 4:41:18 PM	64406
Sulfate	8.7	7.5		mg/Kg	5	12/9/2021 4:41:18 PM	64406
RESISTIVITY AND EC SOIL						Analyst:	**MRA**
Resistivity	8860	100		Ohms * c	1	12/6/2021 4:00:00 PM	64318
SM4500H+B/EPA 9040C						Analyst:	**JRR**
pH	8.90			pH Units	1	12/8/2021 1:34:00 PM	R84370

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix interference		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2112278**

15-Dec-21

Client: Terracon

Project: UHAUL

Sample ID: **MB-64406**	SampType: **mblk**	TestCode: **EPA Method 300.0: Anions**
Client ID: **PBS**	Batch ID: **64406**	RunNo: **84430**
Prep Date: **12/9/2021**	Analysis Date: **12/9/2021**	SeqNo: **2965973** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								
Sulfate	ND	1.5								

Sample ID: **LCS-64406**	SampType: **lcs**	TestCode: **EPA Method 300.0: Anions**
Client ID: **LCSS**	Batch ID: **64406**	RunNo: **84430**
Prep Date: **12/9/2021**	Analysis Date: **12/9/2021**	SeqNo: **2965974** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	92.8	90	110			
Sulfate	28	1.5	30.00	0	93.7	90	110			

Sample ID: **2112278-001AMS**	SampType: **ms**	TestCode: **EPA Method 300.0: Anions**
Client ID: **B-01@2.5**	Batch ID: **64406**	RunNo: **84430**
Prep Date: **12/9/2021**	Analysis Date: **12/9/2021**	SeqNo: **2965983** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	31	7.5	15.00	15.64	101	57.5	166			
Sulfate	84	7.5	30.00	52.54	106	48.4	135			

Sample ID: **2112278-001AMSD**	SampType: **msd**	TestCode: **EPA Method 300.0: Anions**
Client ID: **B-01@2.5**	Batch ID: **64406**	RunNo: **84430**
Prep Date: **12/9/2021**	Analysis Date: **12/9/2021**	SeqNo: **2965984** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	30	7.5	15.00	15.64	95.8	57.5	166	2.51	20	
Sulfate	83	7.5	30.00	52.54	102	48.4	135	1.43	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix interference
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2112278**

15-Dec-21

Client: Terracon

Project: UHAUL

Sample ID: **2112278-004ADUP**	SampType: **DUP**	TestCode: **SM4500H+B/EPA 9040C**
Client ID: **B-11@2.5**	Batch ID: **R84370**	RunNo: **84370**
Prep Date:	Analysis Date: **12/8/2021**	SeqNo: **2963934** Units: **pH Units**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	8.98									

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix interference
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2112278**

15-Dec-21

Client: Terracon

Project: UHAUL

Sample ID: **2112278-001ADUP**	SampType: **DUP**	TestCode: **Resistivity and eC Soil**
Client ID: **B-01@2.5**	Batch ID: **64318**	RunNo: **84329**
Prep Date: **12/6/2021**	Analysis Date: **12/6/2021**	SeqNo: **2962331** Units: **Ohms * cm**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Resistivity	2090	100						1.26	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
PQL	Practical Quanitative Limit
S	% Recovery outside of range due to dilution or matrix interference
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

SUMMARY OF LABORATORY RESULTS

Borehole No.	Depth (ft.)	USCS Soil Class.	In-Situ Properties		Classification				Swell/Consolidation Testing	Corrosivity				Remarks
			Dry Density (pcf)	Water Content (%)	Passing #200 Sieve (%)	Atterberg Limits			Consolidation (%)	pH	Resistivity (ohm-cm)	Sulfates (ppm)	Chlorides (ppm)	
						LL	PL	PI						
B-01	2.5 - 4.0	SM		3						8.9	2120	53	16	2
B-01	5.0 - 6.0	SC	92	5	33	25	14	11						1
B-01	10.0 - 11.5	SM		5										2
B-01	15.0 - 16.5	SM		5										2
B-01	20.0 - 21.5	SM		4										2
B-01	25.0 - 26.5	SM		2										2
B-02	2.5 - 3.5	SM	102	4	50	NP	NP	NP						1
B-02	5.0 - 6.5	SM		2										2
B-02	10.0 - 11.5	SM		5										2
B-02	15.0 - 16.5	SM		3										2
B-02	20.0 - 21.5	SM		3										2
B-03	2.5 - 3.5	SM	105	4										1, 2
B-03	5.0 - 6.5	SM		7	40	25	NP	25						
B-03	10.0 - 11.5	SM		4										2
B-03	15.0 - 16.5	SM		2										2
B-03	20.0 - 21.5	SM		4										2
B-03	25.0 - 26.5	SM		3										2
B-04	2.5 - 3.5	SM	111	2					-0.34 at 500 psf					1, 2
B-04	5.0 - 6.5	SM		5	27	NP	NP	NP						
B-04	10.0 - 11.5	SM		4										2
B-04	15.0 - 16.5	SM		5										2
B-04	20.0 - 21.5	SM		4										2
B-04	25.0 - 26.5	SM		3										2
B-05	2.5 - 3.5	ML	86	5	77	NP	NP	NP	-0.89 at 500 psf					1
B-05	5.0 - 6.5	CL		8						8.3	1240	210	ND	2

REMARKS

1. Dry Density and/or moisture determined from one or more rings of a multi-ring sample.
2. Visual Classification.
3. Submerged to approximate saturation.
4. Expansion Index in accordance with ASTM D4829-95.
5. Air-Dried Sample

PROJECT: U-Haul Facility 724081

SITE: Paseo Del Norte and Jefferson St NE
Albuquerque, New Mexico

Terracon
6805 Academy Pkwy West NE
Albuquerque, NM
PH. 505-797-4287 FAX. 505-797-4288

PROJECT NUMBER: 66215225

CLIENT: AMERCO Real Estate Company
Phoenix, Arizona

SUMMARY OF LABORATORY RESULTS

Borehole No.	Depth (ft.)	USCS Soil Class.	In-Situ Properties		Classification				Swell/Consolidation Testing	Corrosivity				Remarks
			Dry Density (pcf)	Water Content (%)	Passing #200 Sieve (%)	Atterberg Limits			Consolidation (%)	pH	Resistivity (ohm-cm)	Sulfates (ppm)	Chlorides (ppm)	
						LL	PL	PI						
B-05	10.0 - 11.5	ML		8										2
B-05	15.0 - 16.5	ML		5										2
B-05	20.0 - 21.5	SM		6										2
B-06	2.5 - 4.0	ML		3						8.3	1080	200	71	2
B-06	5.0 - 6.0	SM	107	3	48	NP	NP	NP						1
B-06	10.0 - 11.5	SM		3										2
B-06	15.0 - 16.5	ML		3										2
B-06	20.0 - 21.5	ML		4										2
B-07	2.5 - 3.5	SM	112	2	28	NP	NP	NP						1
B-07	5.0 - 6.5	SM		7										2
B-07	10.0 - 11.5	SM		2										2
B-07	15.0 - 16.5	SM		5										2
B-07	20.0 - 21.5	SM		3										2
B-08	2.5 - 3.5	SM	120	2										1, 2
B-08	5.0 - 6.5	SM		2	29	NP	NP	NP						
B-08	10.0 - 11.5	SM		4										2
B-08	15.0 - 16.5	SM		4										2
B-08	20.0 - 21.5	SM		4										2
B-08	25.0 - 26.5	SM		2										2
B-09	2.5 - 4.0	SM		2	30	NP	NP	NP						
B-09	5.0 - 6.0	SM	102	5					-1.50 at 500 psf					1, 2
B-09	10.0 - 11.5	SM		4										2
B-09	15.0 - 16.5	SM		3										2
B-09	20.0 - 21.5	SM		2										2
B-10	2.5 - 4.0	SM		2	13	NP	NP	NP						

REMARKS

1. Dry Density and/or moisture determined from one or more rings of a multi-ring sample.
2. Visual Classification.
3. Submerged to approximate saturation.
4. Expansion Index in accordance with ASTM D4829-95.
5. Air-Dried Sample

PROJECT: U-Haul Facility 724081

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Terracon
6805 Academy Pkwy West NE
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PROJECT NUMBER: 66215225

CLIENT: AMERCO Real Estate Company
Phoenix, Arizona

SUMMARY OF LABORATORY RESULTS

Borehole No.	Depth (ft.)	USCS Soil Class.	In-Situ Properties		Classification				Swell/Consolidation Testing	Corrosivity				Remarks
			Dry Density (pcf)	Water Content (%)	Passing #200 Sieve (%)	Atterberg Limits			Consolidation (%)	pH	Resistivity (ohm-cm)	Sulfates (ppm)	Chlorides (ppm)	
						LL	PL	PI						
B-10	5.0 - 6.0	SM	92	6					-3.61 at 500 psf					1, 2
B-10	10.0 - 11.5	ML		4										2
B-10	15.0 - 16.5	ML		4										2
B-10	20.0 - 21.5	ML		3										2
B-11	2.5 - 4.0	SM								8.9	8860	8.7	ND	2
B-11	5.0 - 6.0	ML	76	7	59	NP	NP	NP	-6.80 at 500 psf					1
B-11	10.0 - 11.5	ML		12										2
B-11	15.0 - 16.5	ML		5										2
B-11	20.0 - 21.5	ML		6										2
B-11	25.0 - 26.5	SM		3										2
B-12	2.5 - 3.5	SW-SM	111	1	6	NP	NP	NP						1
B-12	5.0 - 6.5	ML		5										2
B-12	10.0 - 11.5	ML		12										2
B-12	15.0 - 16.5	ML		7										2
B-12	20.0 - 21.5	ML		6										2
P-01	2.5 - 4.0	SM		9	49	NP	NP	NP						
P-01	5.0 - 6.0	SM	97	7										1, 2
P-01	10.0 - 11.5	SM		6										2
P-02	2.5 - 3.5	SM	107	4	39	NP	NP	NP						1
P-02	5.0 - 6.5	SM		5										2
P-02	10.0 - 11.5	ML		4										2

REMARKS

1. Dry Density and/or moisture determined from one or more rings of a multi-ring sample.
2. Visual Classification.
3. Submerged to approximate saturation.
4. Expansion Index in accordance with ASTM D4829-95.
5. Air-Dried Sample

PROJECT: U-Haul Facility 724081

SITE: Paseo Del Norte and Jefferson St NE
Albuquerque, New Mexico

Terracon
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Albuquerque, NM
PH. 505-797-4287 FAX. 505-797-4288

PROJECT NUMBER: 66215225

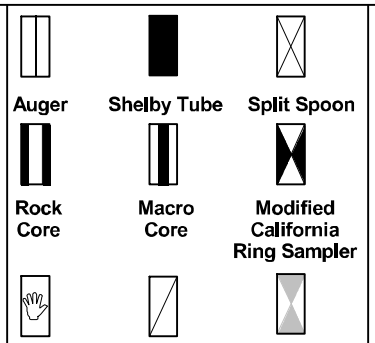
CLIENT: AMERCO Real Estate Company
Phoenix, Arizona

SUPPORTING INFORMATION

GENERAL NOTES

DESCRIPTION OF SYMBOLS AND ABBREVIATIONS

SAMPLING



WATER LEVEL

Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.

FIELD TESTS

(HP)	Hand Penetrometer
(T)	Torvane
(b/f)	Standard Penetration Test (blows per foot)
N	N value
(PID)	Photo-Ionization Detector
(OVA)	Organic Vapor Analyzer

DESCRIPTIVE SOIL CLASSIFICATION

Soil classification is based on the Unified Soil Classification System. Coarse Grained Soils have more than 50% of their dry weight retained on a #200 sieve; their principal descriptors are: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are principally described as clays if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse-grained soils are defined on the basis of their in-place relative density and fine-grained soils on the basis of their consistency.

LOCATION AND ELEVATION NOTES

Unless otherwise noted, Latitude and Longitude are approximately determined using a hand-held GPS device. The accuracy of such devices is variable. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

STRENGTH TERMS

RELATIVE DENSITY OF COARSE-GRAINED SOILS (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance Includes gravels, sands and silts.			CONSISTENCY OF FINE-GRAINED SOILS (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance			
Descriptive Term (Density)	**Standard Penetration or N-Value Blows/Ft.**	**Ring Sampler Blows/Ft.**	**Descriptive Term (Consistency)**	**Unconfined Compressive Strength, Qu, psf**	**Standard Penetration or N-Value Blows/Ft.**	**Ring Sampler Blows/Ft.**
Very Loose	0 - 3	0 - 6	Very Soft	less than 500	0 - 1	< 3
Loose	4 - 9	7 - 18	Soft	500 to 1,000	2 - 4	3 - 4
Medium Dense	10 - 29	19 - 58	Medium-Stiff	1,000 to 2,000	4 - 8	5 - 9
Dense	30 - 50	59 - 98	Stiff	2,000 to 4,000	8 - 15	10 - 18
Very Dense	> 50	≥ 99	Very Stiff	4,000 to 8,000	15 - 30	19 - 42
			Hard	> 8,000	> 30	> 42

RELATIVE PROPORTIONS OF SAND AND GRAVEL

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 15
With	15 - 29
Modifier	> 30

GRAIN SIZE TERMINOLOGY

Major Component of Sample	Particle Size
Boulders	Over 12 in. (300 mm)
Cobbles	12 in. to 3 in. (300mm to 75mm)
Gravel	3 in. to #4 sieve (75mm to 4.75 mm)
Sand	#4 to #200 sieve (4.75mm to 0.075mm
Silt or Clay	Passing #200 sieve (0.075mm)

RELATIVE PROPORTIONS OF FINES

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 5
With	5 - 12
Modifier	> 12

PLASTICITY DESCRIPTION

Term	Plasticity Index
Non-plastic	0
Low	1 - 10
Medium	11 - 30
High	> 30

Terracon

UNIFIED SOIL CLASSIFICATION SYSTEM

Proposed U-Haul Storage Buildings ■ Albuquerque, New Mexico

January 12, 2022 ■ Terracon Project No. 66215225

Terracon GeoReport

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests [A]					Soil Classification	
					Group Symbol	Group Name [B]
Coarse-Grained Soils: More than 50% retained on No. 200 sieve	**Gravels:** More than 50% of coarse fraction retained on No. 4 sieve	**Clean Gravels:** Less than 5% fines [C]	$Cu \geq 4$ and $1 \leq Cc \leq 3$ [E]		GW	Well-graded gravel [F]
			$Cu < 4$ and/or $1 > Cc > 3$ [E]		GP	Poorly graded gravel [F]
		Gravels with Fines: More than 12% fines [C]	Fines classify as ML or MH		GM	Silty gravel [F, G, H]
			Fines classify as CL or CH		GC	Clayey gravel [F, G, H]
	Sands: 50% or more of coarse fraction passes No. 4 sieve	**Clean Sands:** Less than 5% fines [D]	$Cu \geq 6$ and $1 \leq Cc \leq 3$ [E]		SW	Well-graded sand [I]
			$Cu < 6$ and/or $1 > Cc > 3$ [E]		SP	Poorly graded sand [I]
		Sands with Fines: More than 12% fines [D]	Fines classify as ML or MH		SM	Silty sand [G, H, I]
			Fines classify as CL or CH		SC	Clayey sand [G, H, I]
Fine-Grained Soils: 50% or more passes the No. 200 sieve	**Silts and Clays:** Liquid limit less than 50	**Inorganic:**	PI > 7 and plots on or above "A"		CL	Lean clay [K, L, M]
			PI < 4 or plots below "A" line [J]		ML	Silt [K, L, M]
		Organic:	Liquid limit - oven dried / Liquid limit - not dried	< 0.75	OL	Organic clay [K, L, M, N] / Organic silt [K, L, M, O]
	Silts and Clays: Liquid limit 50 or more	**Inorganic:**	PI plots on or above "A" line		CH	Fat clay [K, L, M]
			PI plots below "A" line		MH	Elastic Silt [K, L, M]
		Organic:	Liquid limit - oven dried / Liquid limit - not dried	< 0.75	OH	Organic clay [K, L, M, P] / Organic silt [K, L, M, Q]
Highly organic soils:	Primarily organic matter, dark in color, and organic odor				PT	Peat

[A] Based on the material passing the 3-inch (75-mm) sieve

[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

[C] Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

[D] Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay

[E] $Cu = D_{60}/D_{10}$ $\quad Cc = \dfrac{(D_{30})^2}{D_{10} \times D_{60}}$

[F] If soil contains ≥ 15% sand, add "with sand" to group name.

[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

[H] If fines are organic, add "with organic fines" to group name.

[I] If soil contains ≥ 15% gravel, add "with gravel" to group name.

[J] If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

[L] If soil contains ≥ 30% plus No. 200 predominantly sand, add "sandy" to group name.

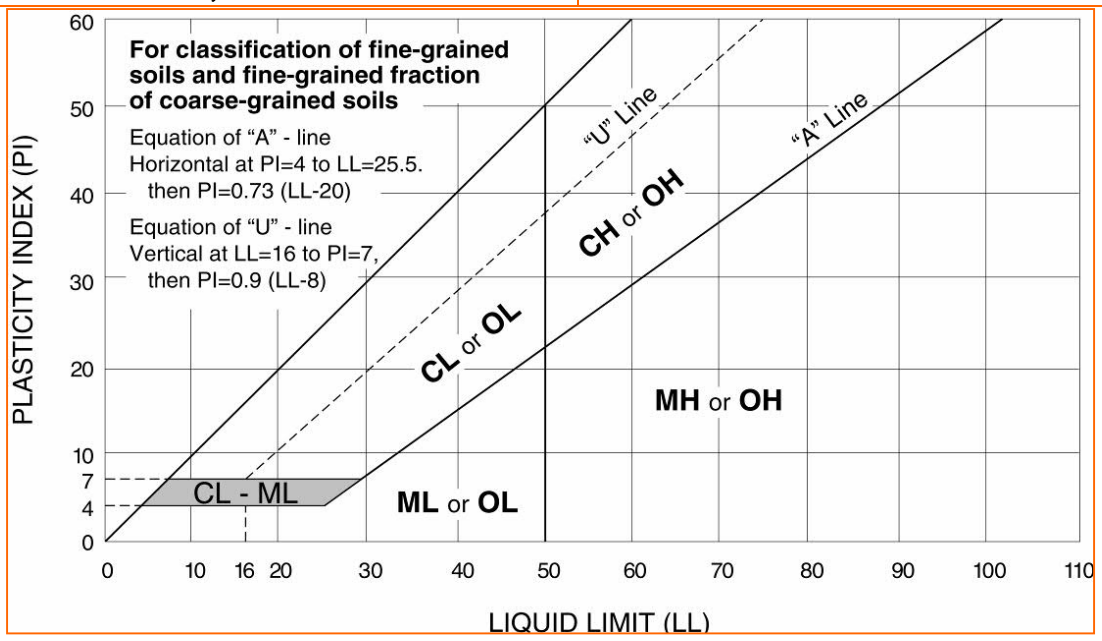
[M] If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.

[N] PI ≥ 4 and plots on or above "A" line.

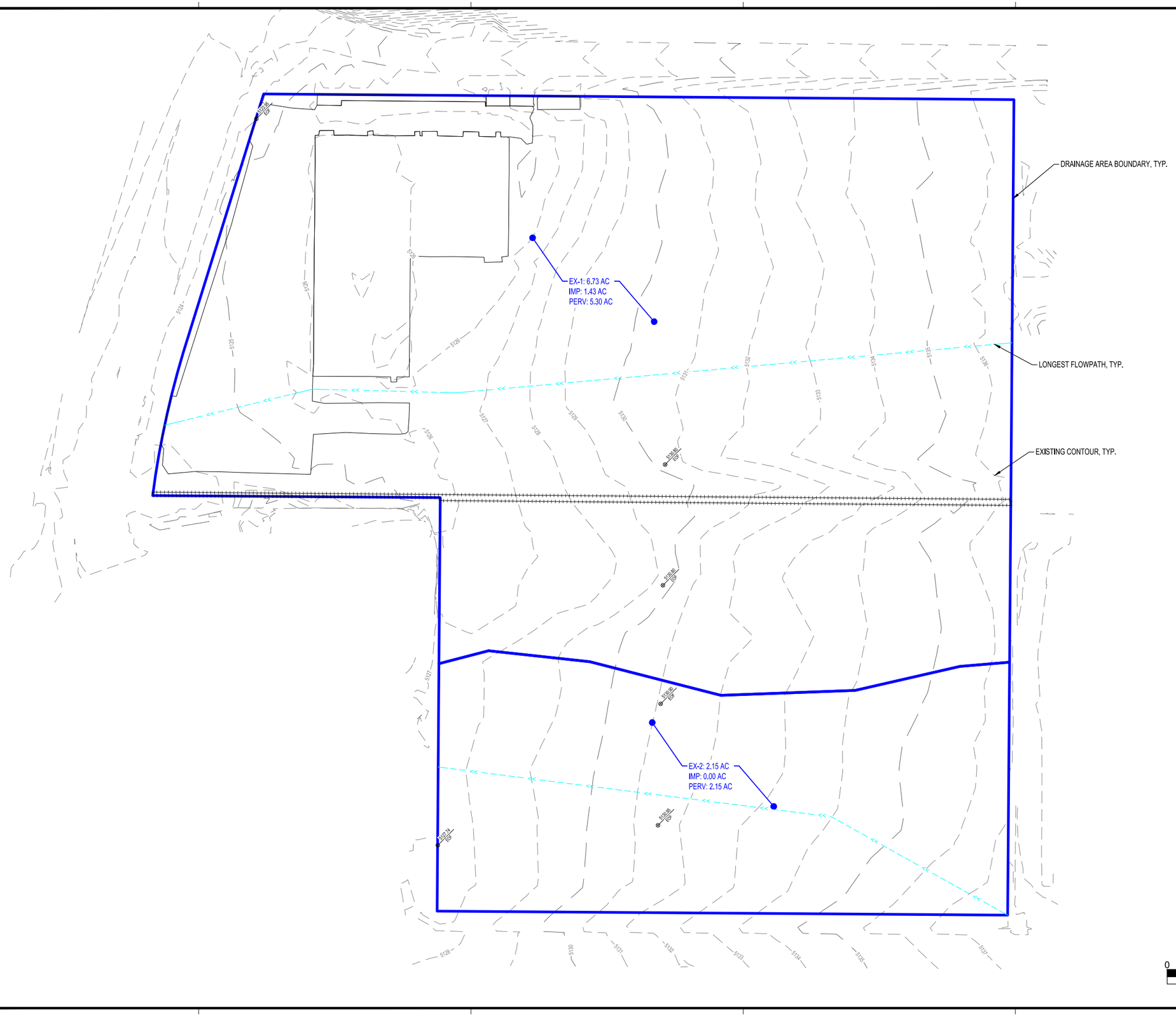
[O] PI < 4 or plots below "A" line.

[P] PI plots on or above "A" line.

[Q] PI plots below "A" line.



Appendix B: Existing Conditions Drainage Map



ISG

SHEET NOT VALID UNLESS THIS TEXT IS COLOR.

PROJECT

U-HAUL

ALBUQUERQUE NEW MEXICO

REVISION SCHEDULE

DATE	DESCRIPTION	BY

PROJECT NO.	23-28816
FILE NAME	28816 WATERSHEDS
DRAWN BY	RAM
DESIGNED BY	RAM
REVIEWED BY	###
ORIGINAL ISSUE DATE	########
CLIENT PROJECT NO.	#

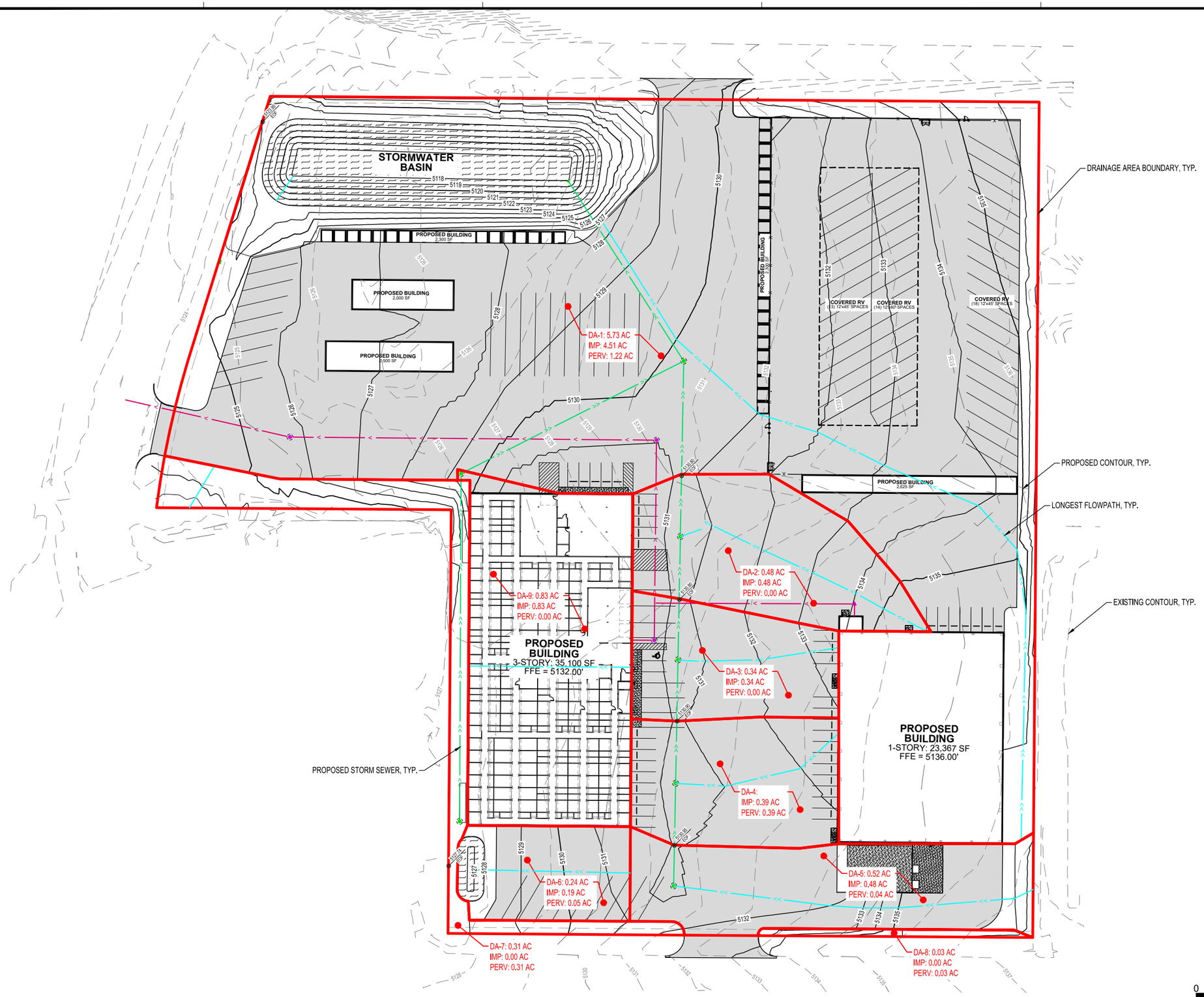
TITLE

EXISTING DRAINAGE AREAS

SHEET

B1

Appendix C: Proposed Conditions Drainage Map



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SHEET NOT VALID UNLESS THIS TEXT IS COLOR.

PROJECT

U-HAUL

ALBUQUERQUE NEW MEXICO

REVISION SCHEDULE

DATE	DESCRIPTION	BY

PROJECT NO.	23-28816
FILE NAME	28816 WATERSHEDS
DRAWN BY	RAM
DESIGNED BY	RAM
REVIEWED BY	###
ORIGINAL ISSUE DATE	########
CLIENT PROJECT NO.	#

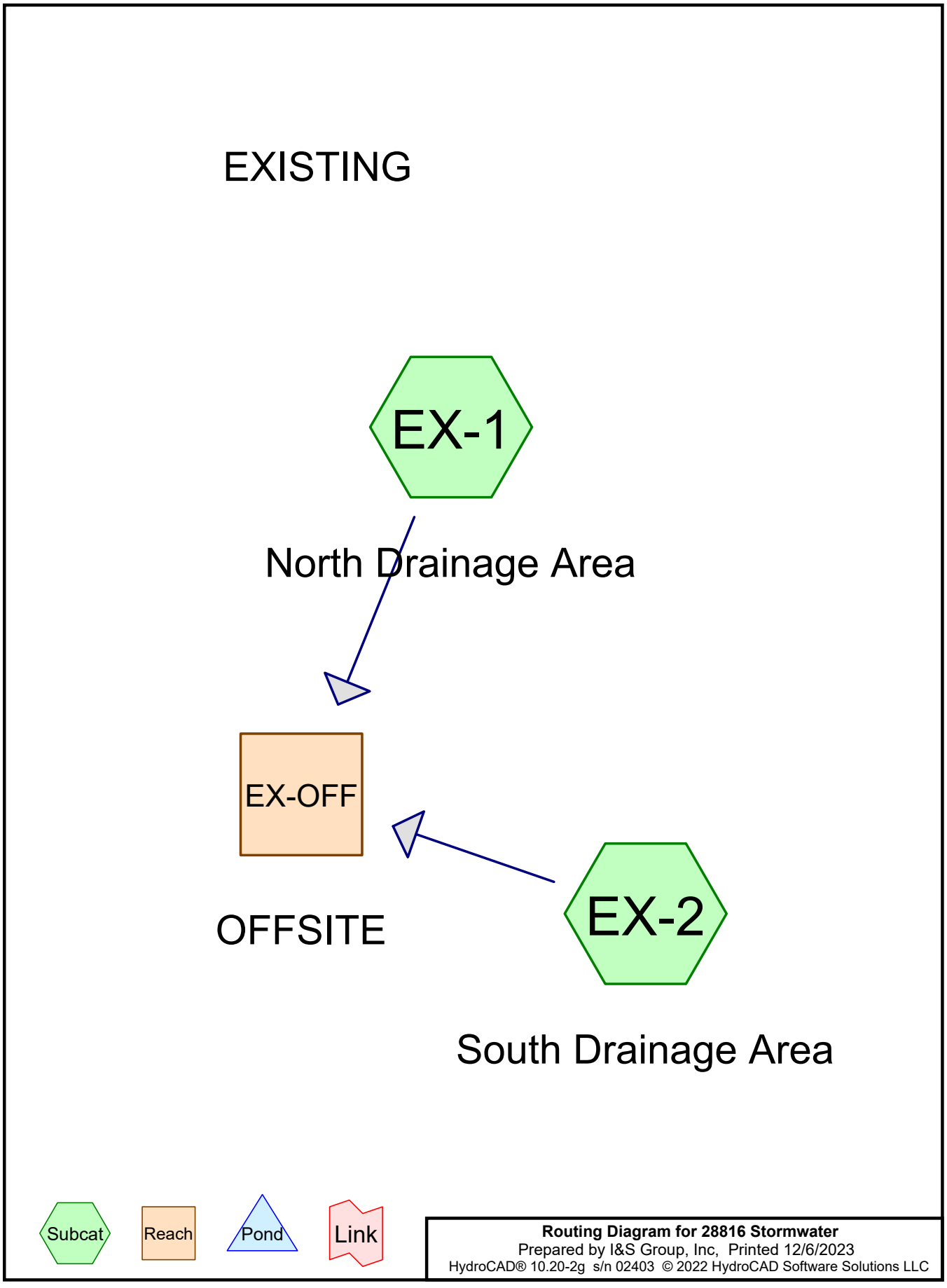
TITLE

PROPOSED DRAINAGE AREAS

SHEET

C1

Appendix D: Existing Site HydroCAD Report



Routing Diagram for 28816 Stormwater
Prepared by I&S Group, Inc, Printed 12/6/2023

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
7.455	79	Albuquerque Land Treatement B (EX-1, EX-2)
1.426	95	Concrete & Asphalt Paving, Buildings (EX-1)
8.881	**82**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
8.881	Other	EX-1, EX-2
8.881		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchr Numbers
0.000	0.000	0.000	0.000	7.455	7.455	Albuquerque Land Treatement B	
0.000	0.000	0.000	0.000	1.426	1.426	Concrete & Asphalt Paving, Buildings	
0.000	**0.000**	**0.000**	**0.000**	**8.881**	**8.881**	**TOTAL AREA**	

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment EX-1: North Drainage Area Runoff Area=293,153 sf 0.00% Impervious Runoff Depth=1.14"
Flow Length=708' Tc=25.6 min CN=82 Runoff=7.43 cfs 0.639 af

Subcatchment EX-2: South Drainage Area Runoff Area=93,694 sf 0.00% Impervious Runoff Depth=0.97"
Flow Length=647' Slope=0.0220 '/' Tc=24.7 min CN=79 Runoff=2.01 cfs 0.173 af

Reach EX-OFF: OFFSITE Inflow=9.44 cfs 0.812 af
Outflow=9.44 cfs 0.812 af

Total Runoff Area = 8.881 ac Runoff Volume = 0.812 af Average Runoff Depth = 1.10"
100.00% Pervious = 8.881 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment EX-1: North Drainage Area

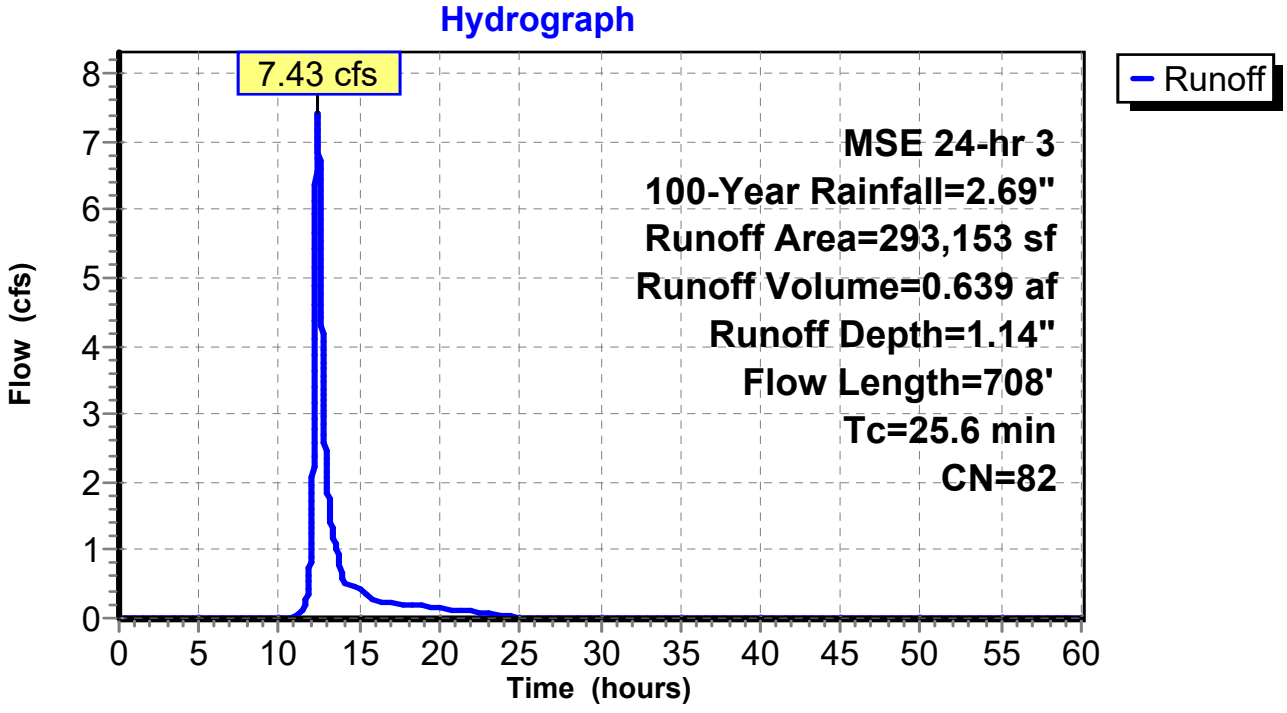
Runoff = 7.43 cfs @ 12.38 hrs, Volume= 0.639 af, Depth= 1.14"
Routed to Reach EX-OFF : OFFSITE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=2.69"

	Area (sf)	CN	Description
*	62,116	95	Concrete & Asphalt Paving, Buildings
*	231,037	79	Albuquerque Land Treatement B
	293,153	82	Weighted Average
	293,153		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.6	150	0.0230	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 1.24"
2.3	313	0.0230	2.27		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
1.9	119	0.0050	1.06		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.8	126	0.0190	2.80		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
25.6	708	Total			

Subcatchment EX-1: North Drainage Area



Summary for Subcatchment EX-2: South Drainage Area

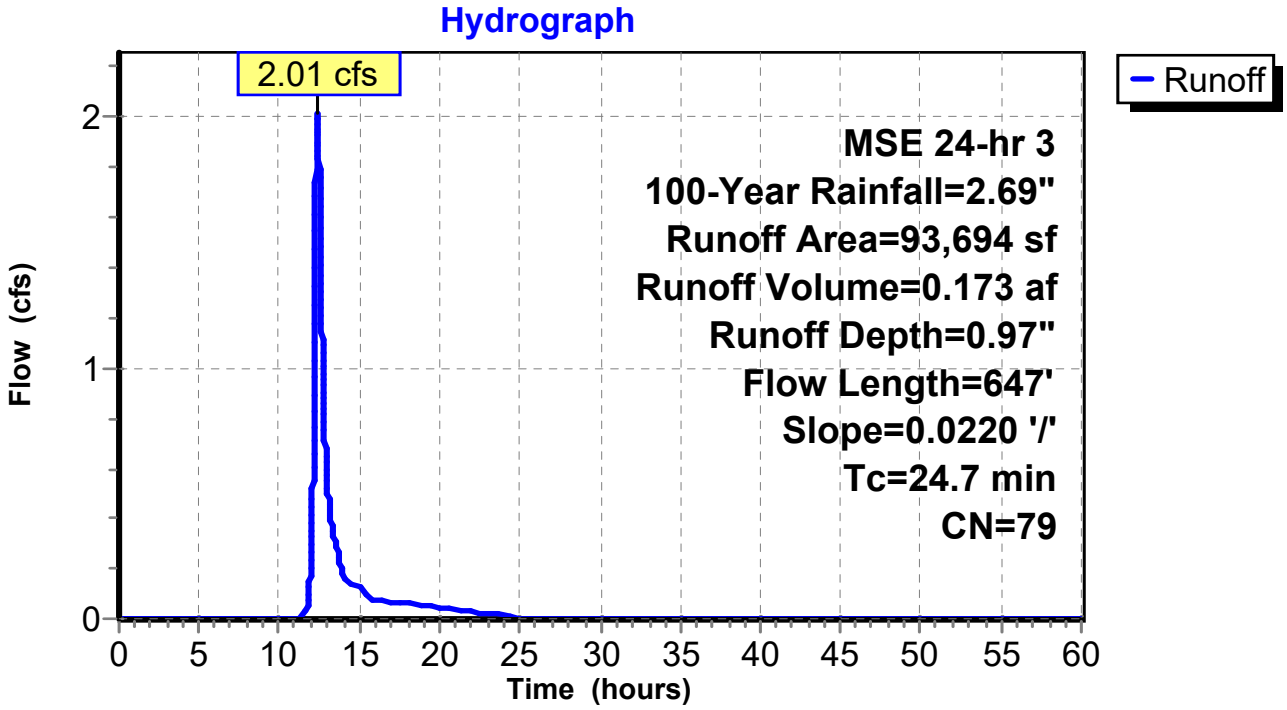
Runoff = 2.01 cfs @ 12.38 hrs, Volume= 0.173 af, Depth= 0.97"
Routed to Reach EX-OFF : OFFSITE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=2.69"

	Area (sf)	CN	Description
*	93,694	79	Albuquerque Land Treatement B
	93,694		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.0	150	0.0220	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 1.24"
3.7	497	0.0220	2.22		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
24.7	647	Total			

Subcatchment EX-2: South Drainage Area



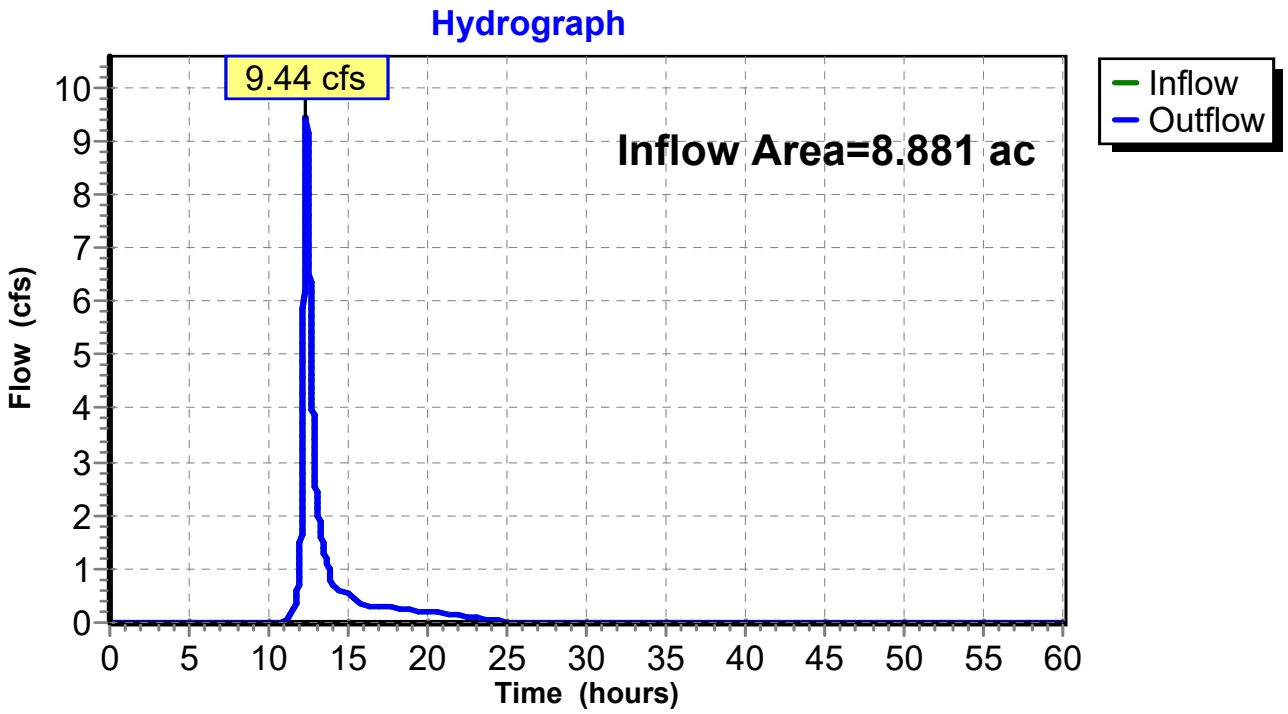
Summary for Reach EX-OFF: OFFSITE

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 8.881 ac, 0.00% Impervious, Inflow Depth = 1.10" for 100-Year event
Inflow = 9.44 cfs @ 12.38 hrs, Volume= 0.812 af
Outflow = 9.44 cfs @ 12.38 hrs, Volume= 0.812 af, Atten= 0%, Lag= 0.0 min

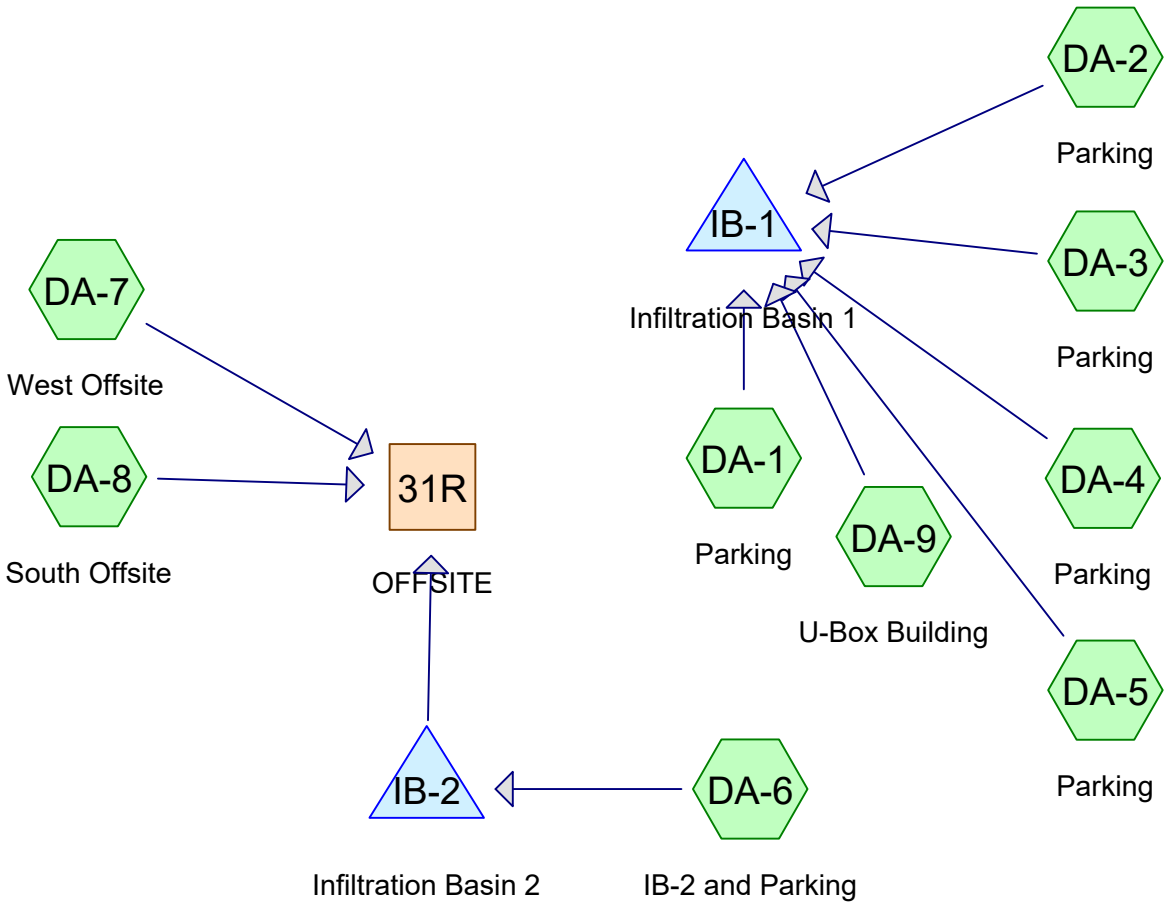
Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Reach EX-OFF: OFFSITE



Appendix E: Proposed Site HydroCAD Report

PROPOSED



Subcat Reach Pond Link

Routing Diagram for 28816 Stormwater
Prepared by I&S Group, Inc, Printed 12/6/2023

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.048	77	Alb. Land Use A (DA-6)
1.610	79	Alb. Land Use B (DA-1, DA-5, DA-7, DA-8)
7.223	98	Impervious (DA-1, DA-2, DA-3, DA-4, DA-5, DA-6, DA-9)
8.881	**94**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
8.881	Other	DA-1, DA-2, DA-3, DA-4, DA-5, DA-6, DA-7, DA-8, DA-9
8.881		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.000	0.048	0.048	Alb. Land Use A	DA-6
0.000	0.000	0.000	0.000	1.610	1.610	Alb. Land Use B	DA-1, DA-5, DA-7, DA-8
0.000	0.000	0.000	0.000	7.223	7.223	Impervious	DA-1, DA-2, DA-3, DA-4, DA-5, DA-6, DA-9
0.000	**0.000**	**0.000**	**0.000**	**8.881**	**8.881**	**TOTAL AREA**	

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment DA-1: Parking Runoff Area=249,545 sf 78.66% Impervious Runoff Depth=2.05"
Flow Length=724' Tc=21.3 min CN=94 Runoff=12.33 cfs 0.979 af

Subcatchment DA-2: Parking Runoff Area=21,078 sf 100.00% Impervious Runoff Depth=2.46"
Flow Length=221' Slope=0.0210 '/' Tc=5.0 min CN=98 Runoff=1.99 cfs 0.099 af

Subcatchment DA-3: Parking Runoff Area=14,710 sf 100.00% Impervious Runoff Depth=2.46"
Flow Length=131' Slope=0.0250 '/' Tc=5.0 min CN=98 Runoff=1.39 cfs 0.069 af

Subcatchment DA-4: Parking Runoff Area=17,137 sf 100.00% Impervious Runoff Depth=2.46"
Flow Length=145' Slope=0.0180 '/' Tc=5.0 min CN=98 Runoff=1.62 cfs 0.081 af

Subcatchment DA-5: Parking Runoff Area=22,696 sf 91.21% Impervious Runoff Depth=2.25"
Flow Length=297' Tc=5.8 min CN=96 Runoff=2.00 cfs 0.098 af

Subcatchment DA-6: IB-2 and Parking Runoff Area=10,490 sf 80.13% Impervious Runoff Depth=2.05"
Flow Length=126' Tc=5.0 min CN=94 Runoff=0.90 cfs 0.041 af

Subcatchment DA-7: West Offsite Runoff Area=13,626 sf 0.00% Impervious Runoff Depth=0.97"
Tc=5.0 min CN=79 Runoff=0.59 cfs 0.025 af

Subcatchment DA-8: South Offsite Runoff Area=1,262 sf 0.00% Impervious Runoff Depth=0.97"
Tc=5.0 min CN=79 Runoff=0.05 cfs 0.002 af

Subcatchment DA-9: U-Box Building Runoff Area=36,302 sf 100.00% Impervious Runoff Depth=2.46"
Flow Length=132' Slope=0.2000 '/' Tc=5.0 min CN=98 Runoff=3.43 cfs 0.171 af

Reach 31R: OFFSITE Inflow=0.65 cfs 0.031 af
Outflow=0.65 cfs 0.031 af

Pond IB-1: Infiltration Basin 1 Peak Elev=5,122.46' Storage=46,247 cf Inflow=17.41 cfs 1.497 af
Outflow=0.64 cfs 1.497 af

Pond IB-2: Infiltration Basin 2 Peak Elev=5,127.79' Storage=985 cf Inflow=0.90 cfs 0.041 af
Discarded=0.04 cfs 0.038 af Primary=0.09 cfs 0.004 af Outflow=0.12 cfs 0.041 af

Total Runoff Area = 8.881 ac Runoff Volume = 1.565 af Average Runoff Depth = 2.12"
18.67% Pervious = 1.658 ac 81.33% Impervious = 7.223 ac

Summary for Subcatchment DA-1: Parking

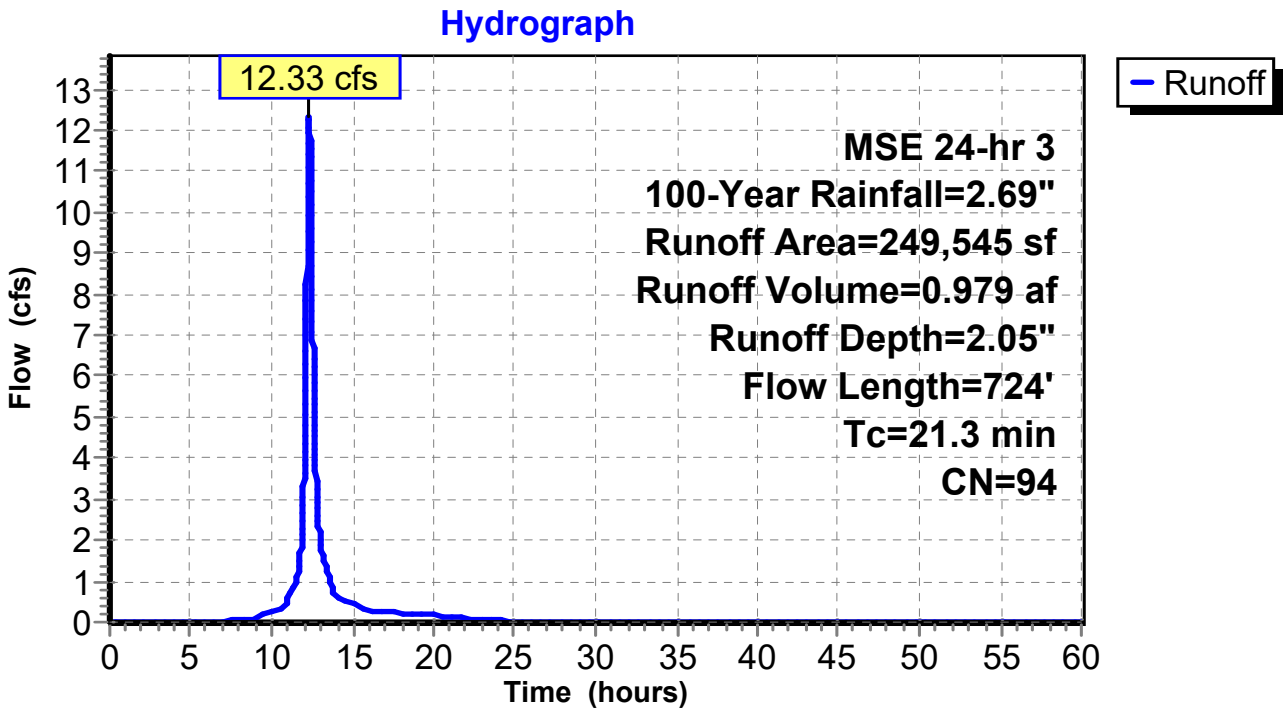
Runoff = 12.33 cfs @ 12.30 hrs, Volume= 0.979 af, Depth= 2.05"
Routed to Pond IB-1 : Infiltration Basin 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=2.69"

	Area (sf)	CN	Description
*	196,290	98	Impervious
*	53,255	79	Alb. Land Use B
	249,545	94	Weighted Average
	53,255		21.34% Pervious Area
	196,290		78.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.7	100	0.0150	0.09		**Sheet Flow,** Grass: Short n= 0.150 P2= 1.24"
1.2	136	0.0150	1.84		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
2.3	442	0.0250	3.21		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.1	46	0.2080	6.84		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
21.3	724	Total			

Subcatchment DA-1: Parking



Summary for Subcatchment DA-2: Parking

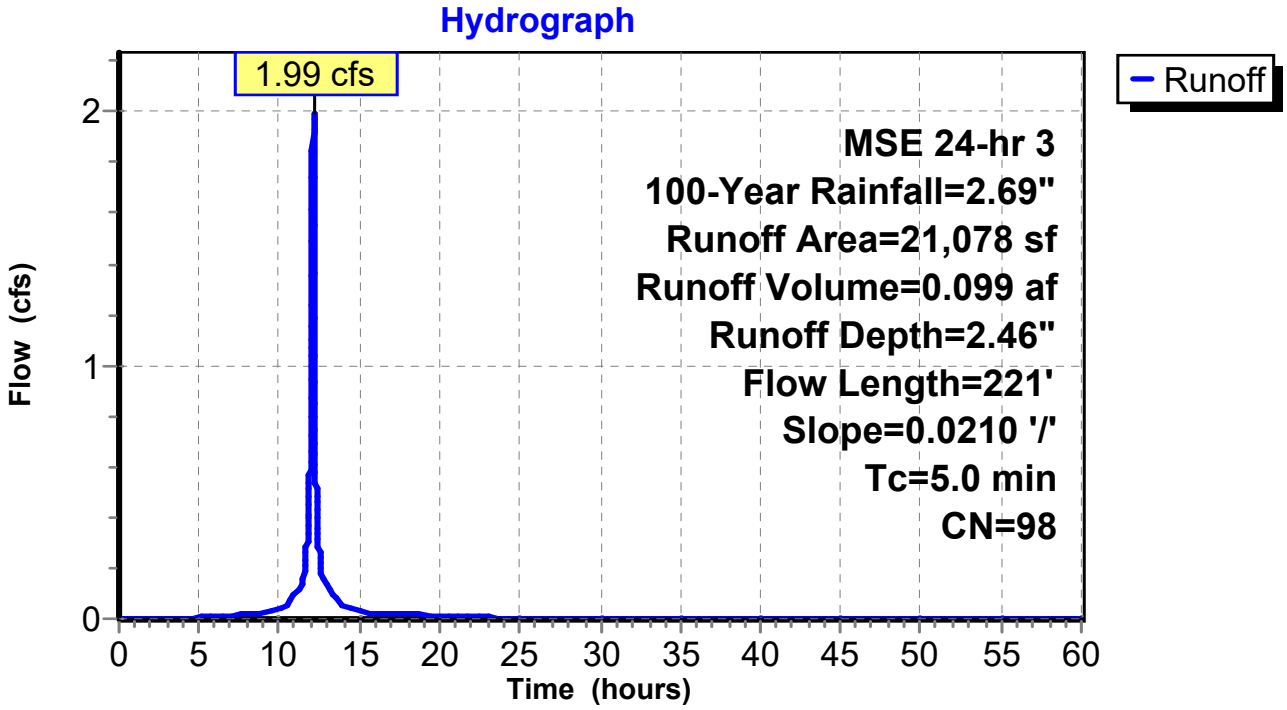
Runoff = 1.99 cfs @ 12.12 hrs, Volume= 0.099 af, Depth= 2.46"
Routed to Pond IB-1 : Infiltration Basin 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=2.69"

	Area (sf)	CN	Description
*	21,078	98	Impervious
	21,078		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	200	0.0210	1.00		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 1.24"
0.1	21	0.0210	2.94		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.4	221	Total, Increased to minimum Tc = 5.0 min			

Subcatchment DA-2: Parking



Summary for Subcatchment DA-3: Parking

Runoff = 1.39 cfs @ 12.12 hrs, Volume= 0.069 af, Depth= 2.46"
Routed to Pond IB-1 : Infiltration Basin 1

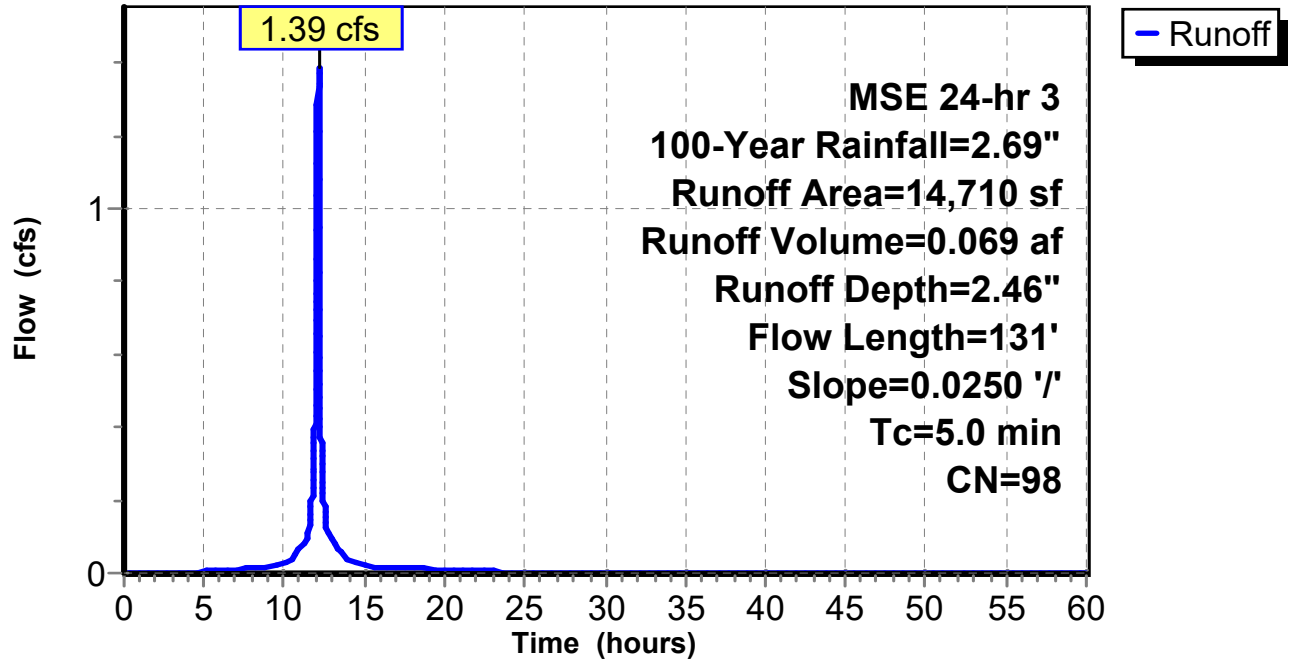
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=2.69"

	Area (sf)	CN	Description
*	14,710	98	Impervious
	14,710		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	131	0.0250	0.99		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 1.24"
2.2	131	Total, Increased to minimum Tc = 5.0 min			

Subcatchment DA-3: Parking

Hydrograph



Summary for Subcatchment DA-4: Parking

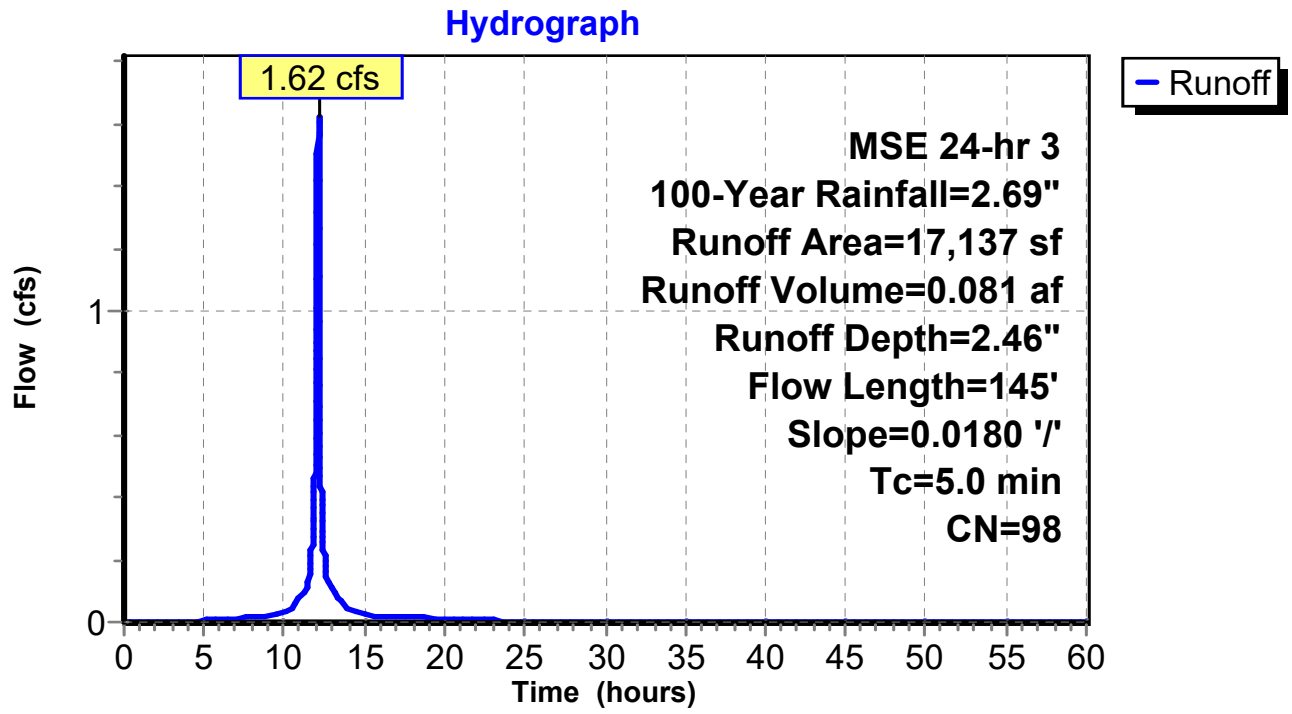
Runoff = 1.62 cfs @ 12.12 hrs, Volume= 0.081 af, Depth= 2.46"
Routed to Pond IB-1 : Infiltration Basin 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=2.69"

	Area (sf)	CN	Description
*	17,137	98	Impervious
	17,137		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	145	0.0180	0.88		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 1.24"
2.7	145	Total, Increased to minimum Tc = 5.0 min			

Subcatchment DA-4: Parking



Summary for Subcatchment DA-5: Parking

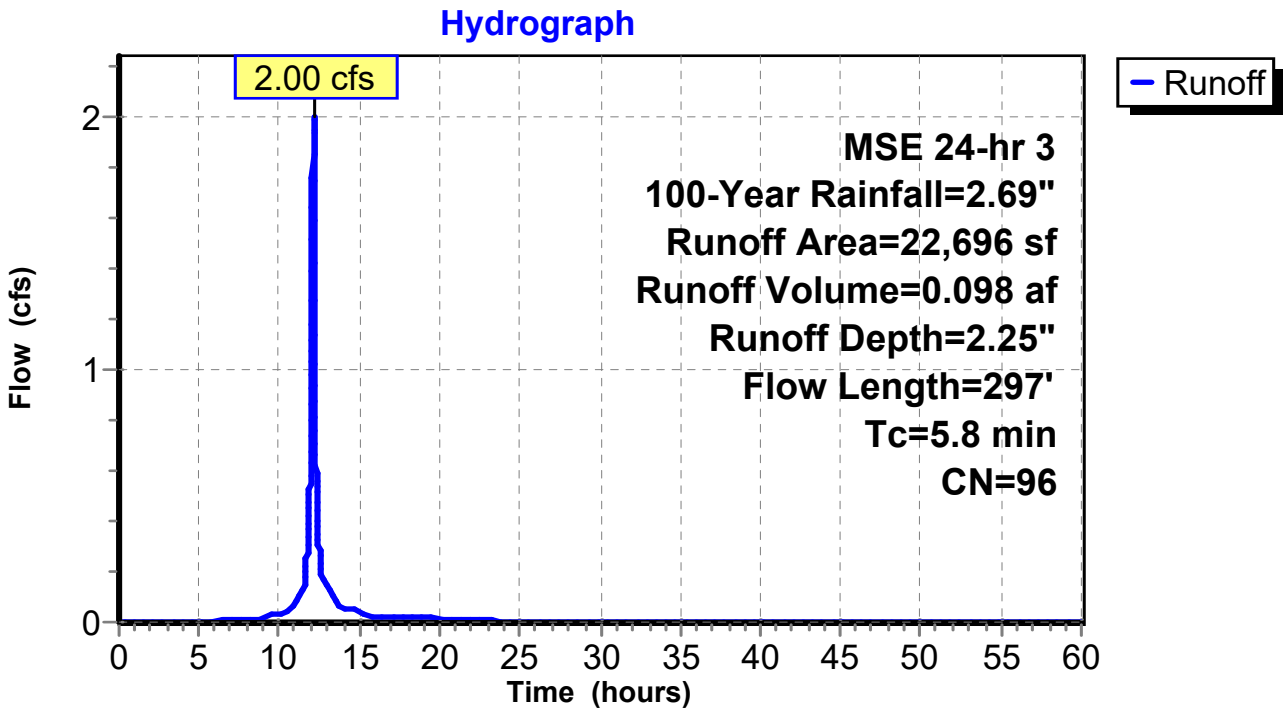
Runoff = 2.00 cfs @ 12.13 hrs, Volume= 0.098 af, Depth= 2.25"
Routed to Pond IB-1 : Infiltration Basin 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=2.69"

	Area (sf)	CN	Description
*	20,702	98	Impervious
*	1,994	79	Alb. Land Use B
	22,696	96	Weighted Average
	1,994		8.79% Pervious Area
	20,702		91.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	17	0.0930	0.14		**Sheet Flow,** Grass: Short n= 0.150 P2= 1.24"
2.4	94	0.0110	0.67		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 1.24"
0.1	30	0.0760	5.60		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.2	156	0.0120	2.22		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
5.8	297	Total			

Subcatchment DA-5: Parking



Summary for Subcatchment DA-6: IB-2 and Parking

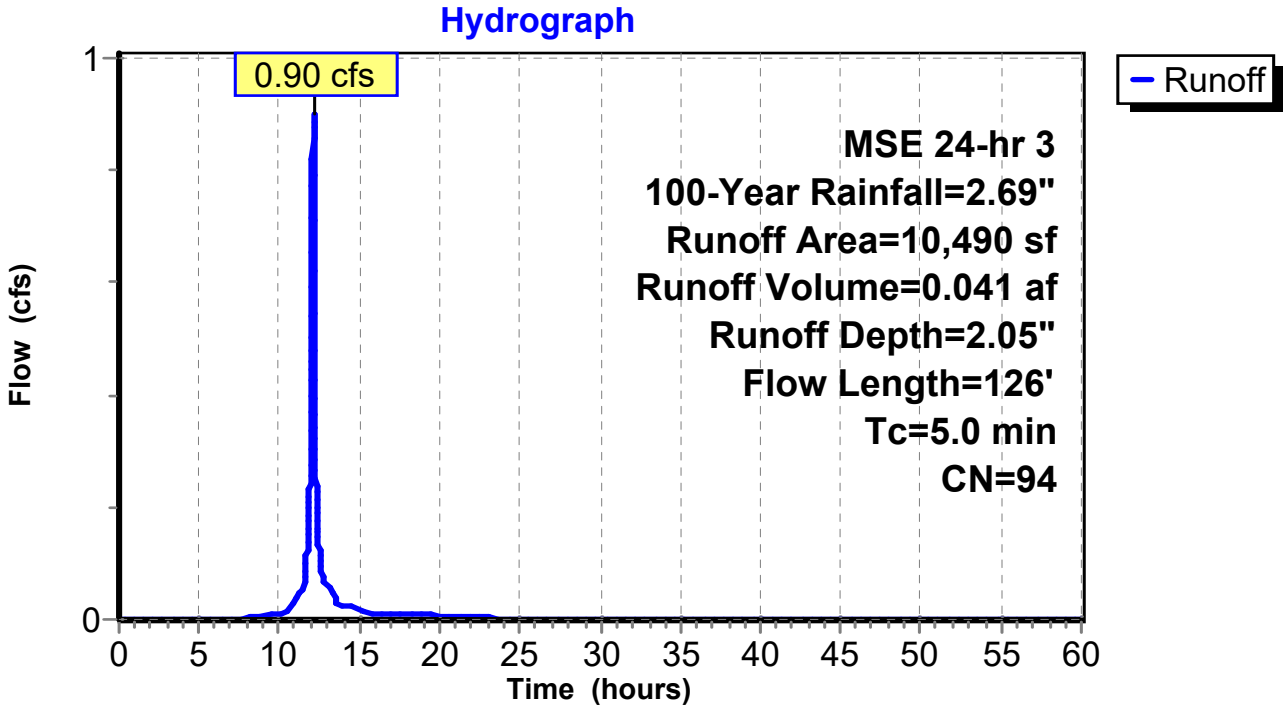
Runoff = 0.90 cfs @ 12.12 hrs, Volume= 0.041 af, Depth= 2.05"
Routed to Pond IB-2 : Infiltration Basin 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=2.69"

	Area (sf)	CN	Description
*	8,406	98	Impervious
*	2,084	77	Alb. Land Use A
	10,490	94	Weighted Average
	2,084		19.87% Pervious Area
	8,406		80.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0	109	0.0220	0.91		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 1.24"
0.1	9	0.0330	2.72		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.0	8	0.1270	5.35		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
2.1	126	Total, Increased to minimum Tc = 5.0 min			

Subcatchment DA-6: IB-2 and Parking



Summary for Subcatchment DA-7: West Offsite

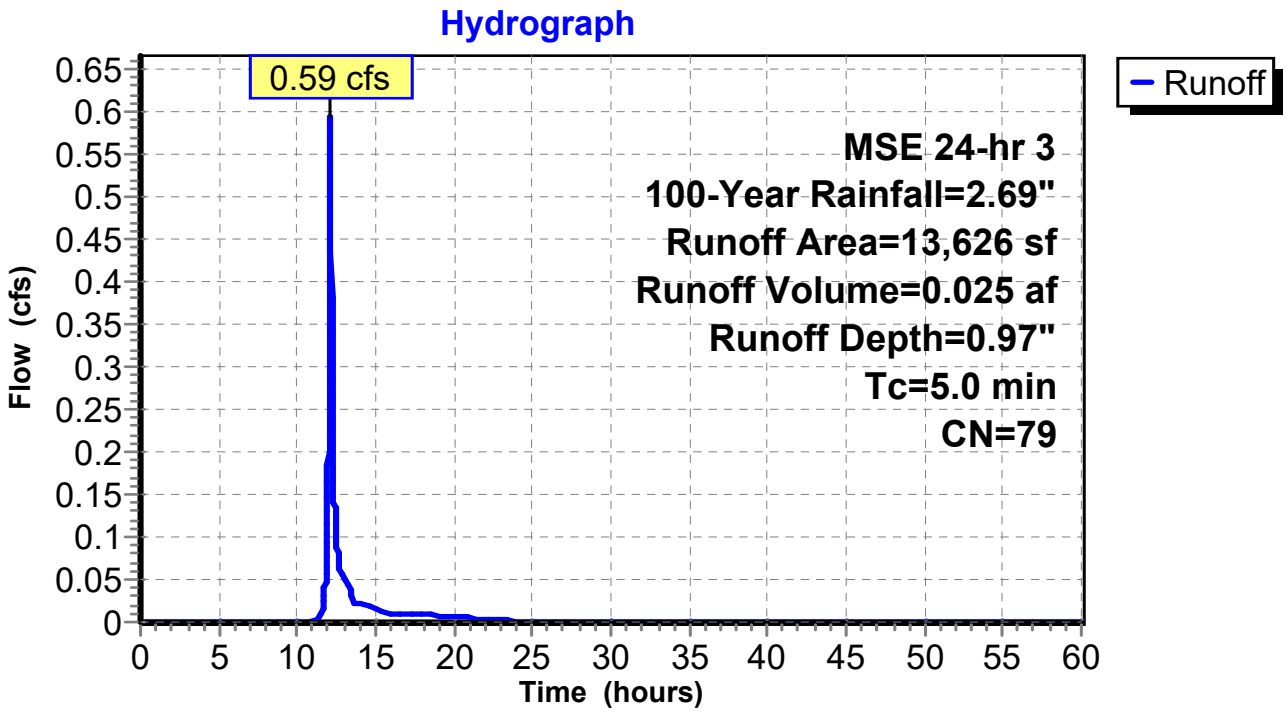
Runoff = 0.59 cfs @ 12.13 hrs, Volume= 0.025 af, Depth= 0.97"
Routed to Reach 31R : OFFSITE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=2.69"

	Area (sf)	CN	Description
*	13,626	79	Alb. Land Use B
	13,626		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0					**Direct Entry,**
1.0	0	Total, Increased to minimum Tc = 5.0 min			

Subcatchment DA-7: West Offsite



Summary for Subcatchment DA-8: South Offsite

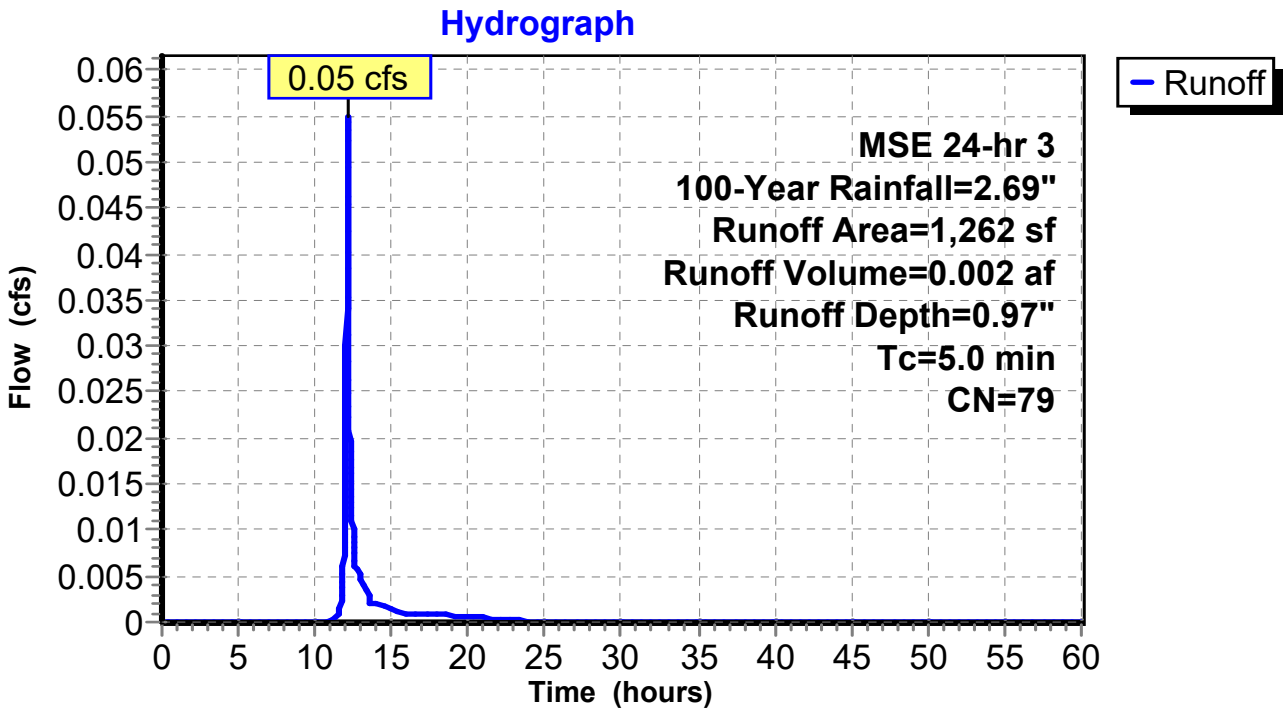
Runoff = 0.05 cfs @ 12.13 hrs, Volume= 0.002 af, Depth= 0.97"
Routed to Reach 31R : OFFSITE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=2.69"

	Area (sf)	CN	Description
*	1,262	79	Alb. Land Use B
	1,262		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0					**Direct Entry,**
1.0	0	Total, Increased to minimum Tc = 5.0 min			

Subcatchment DA-8: South Offsite



Summary for Subcatchment DA-9: U-Box Building

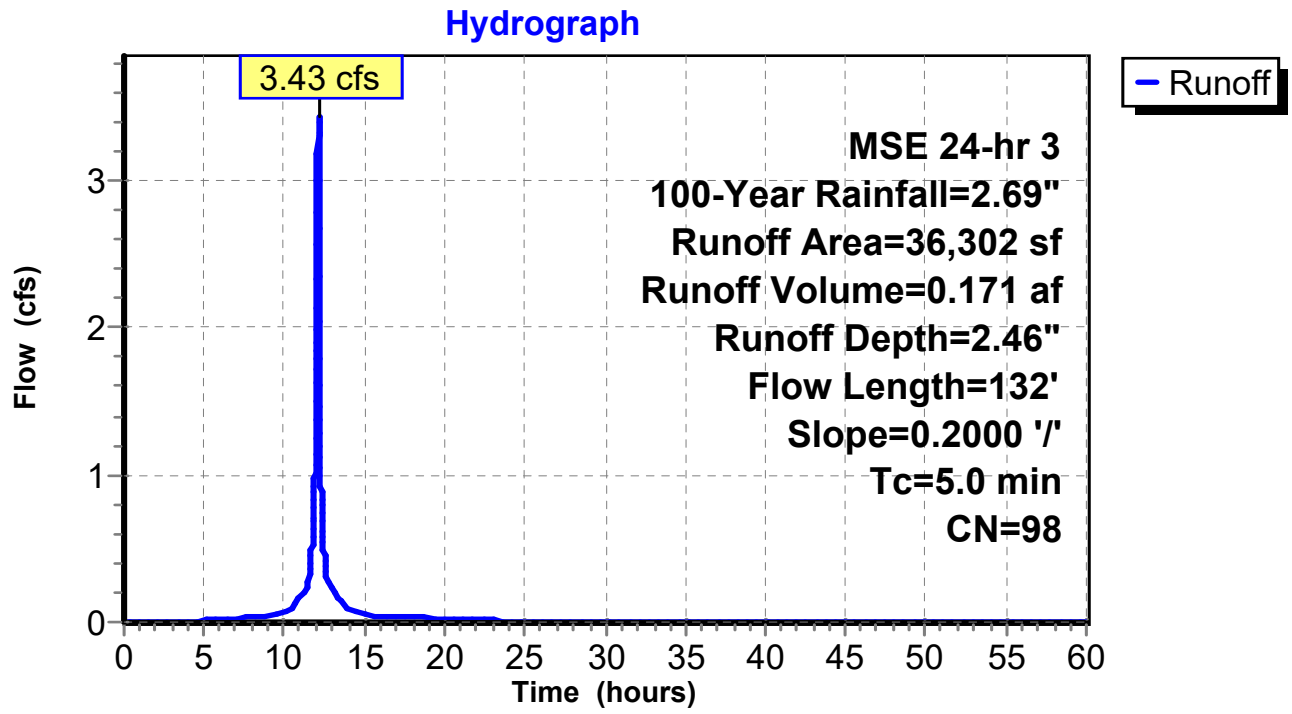
Runoff = 3.43 cfs @ 12.12 hrs, Volume= 0.171 af, Depth= 2.46"
Routed to Pond IB-1 : Infiltration Basin 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
MSE 24-hr 3 100-Year Rainfall=2.69"

	Area (sf)	CN	Description
*	36,302	98	Impervious
	36,302		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	132	0.2000	2.27		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 1.24"
1.0	132	Total, Increased to minimum Tc = 5.0 min			

Subcatchment DA-9: U-Box Building



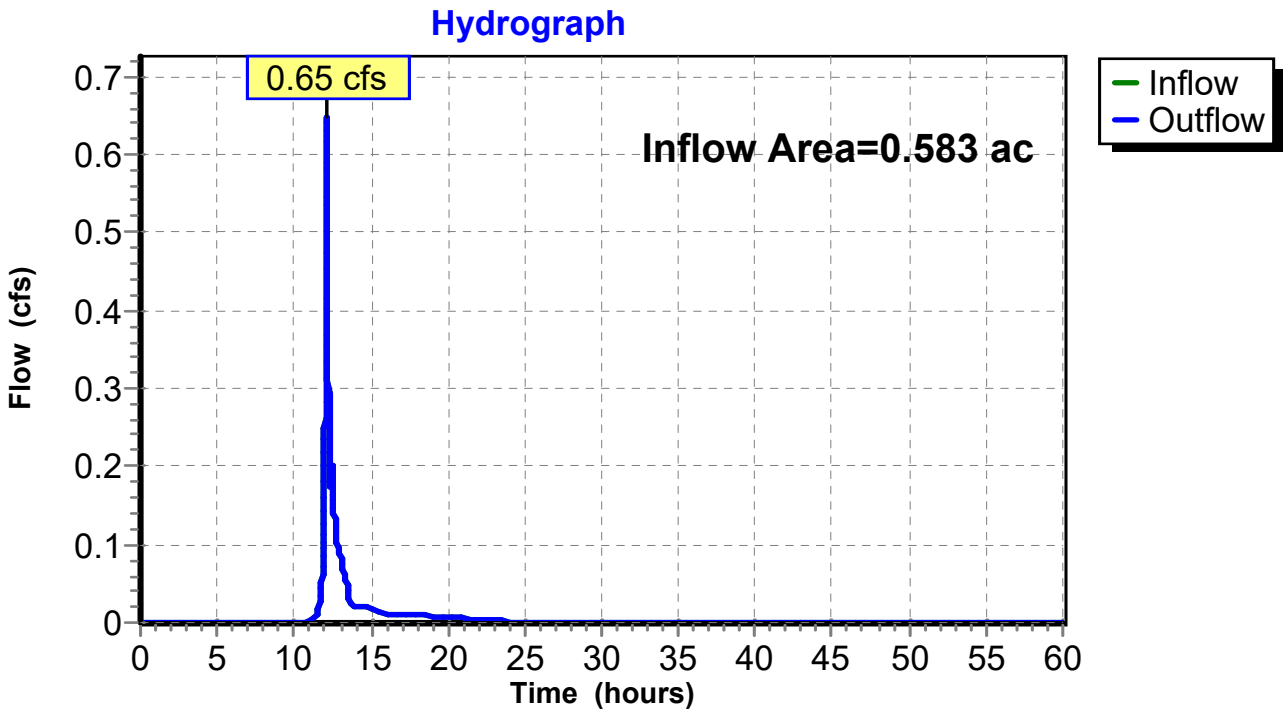
Summary for Reach 31R: OFFSITE

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.583 ac, 33.12% Impervious, Inflow Depth = 0.64" for 100-Year event
Inflow = 0.65 cfs @ 12.13 hrs, Volume= 0.031 af
Outflow = 0.65 cfs @ 12.13 hrs, Volume= 0.031 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Reach 31R: OFFSITE



Summary for Pond IB-1: Infiltration Basin 1

Inflow Area = 8.298 ac, 84.72% Impervious, Inflow Depth = 2.16" for 100-Year event
Inflow = 17.41 cfs @ 12.13 hrs, Volume= 1.497 af
Outflow = 0.64 cfs @ 15.11 hrs, Volume= 1.497 af, Atten= 96%, Lag= 178.4 min
Discarded = 0.64 cfs @ 15.11 hrs, Volume= 1.497 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 5,122.46' @ 15.11 hrs Surf.Area= 16,546 sf Storage= 46,247 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 825.2 min (1,605.9 - 780.7)

Volume	Invert	Avail.Storage	Storage Description
#1	5,118.00'	55,554 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

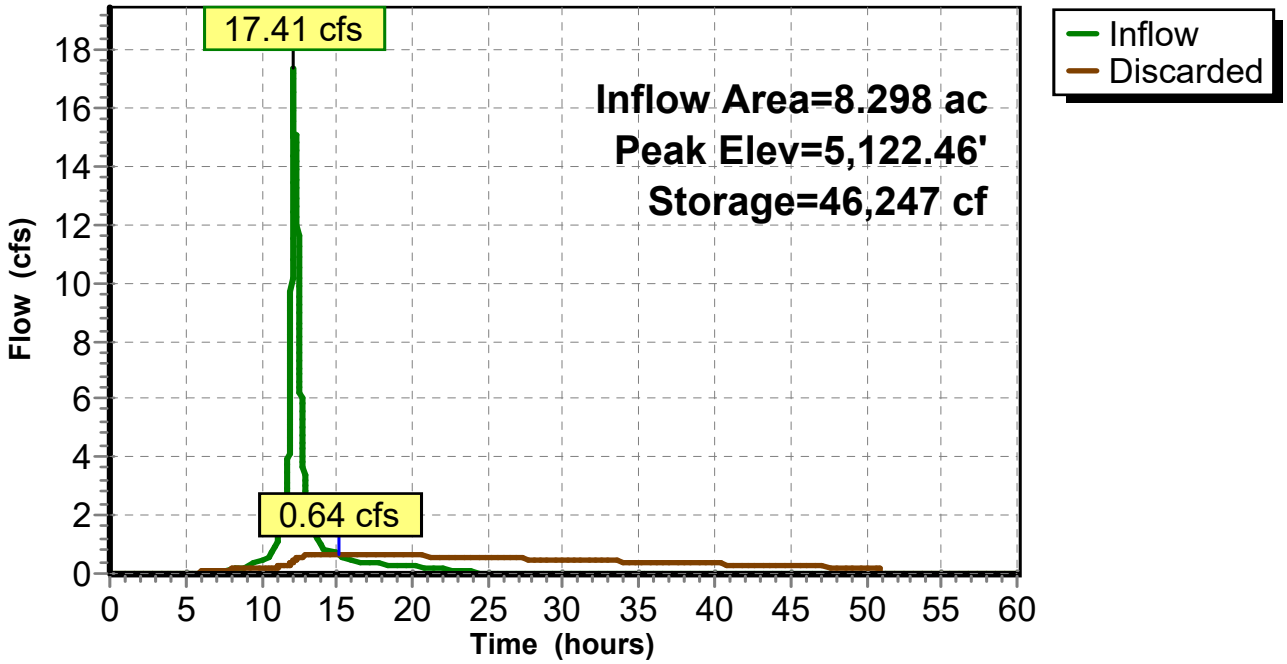
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
5,118.00	4,651	0	0
5,119.00	7,061	5,856	5,856
5,120.00	9,616	8,339	14,195
5,121.00	12,316	10,966	25,161
5,122.00	15,160	13,738	38,899
5,123.00	18,150	16,655	55,554

Device	Routing	Invert	Outlet Devices
#1	Discarded	5,118.00'	**1.670 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.64 cfs @ 15.11 hrs HW=5,122.46' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.64 cfs)

Pond IB-1: Infiltration Basin 1

Hydrograph



Summary for Pond IB-2: Infiltration Basin 2

Inflow Area = 0.241 ac, 80.13% Impervious, Inflow Depth = 2.05" for 100-Year event
Inflow = 0.90 cfs @ 12.12 hrs, Volume= 0.041 af
Outflow = 0.12 cfs @ 12.49 hrs, Volume= 0.041 af, Atten= 86%, Lag= 21.8 min
Discarded = 0.04 cfs @ 12.49 hrs, Volume= 0.038 af
Primary = 0.09 cfs @ 12.49 hrs, Volume= 0.004 af
Routed to Reach 31R : OFFSITE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 5,127.79' @ 12.49 hrs Surf.Area= 948 sf Storage= 985 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 284.9 min (1,063.1 - 778.2)

Volume	Invert	Avail.Storage	Storage Description
#1	5,126.00'	1,199 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
5,126.00	198	0	0
5,127.00	575	387	387
5,128.00	1,050	813	1,199

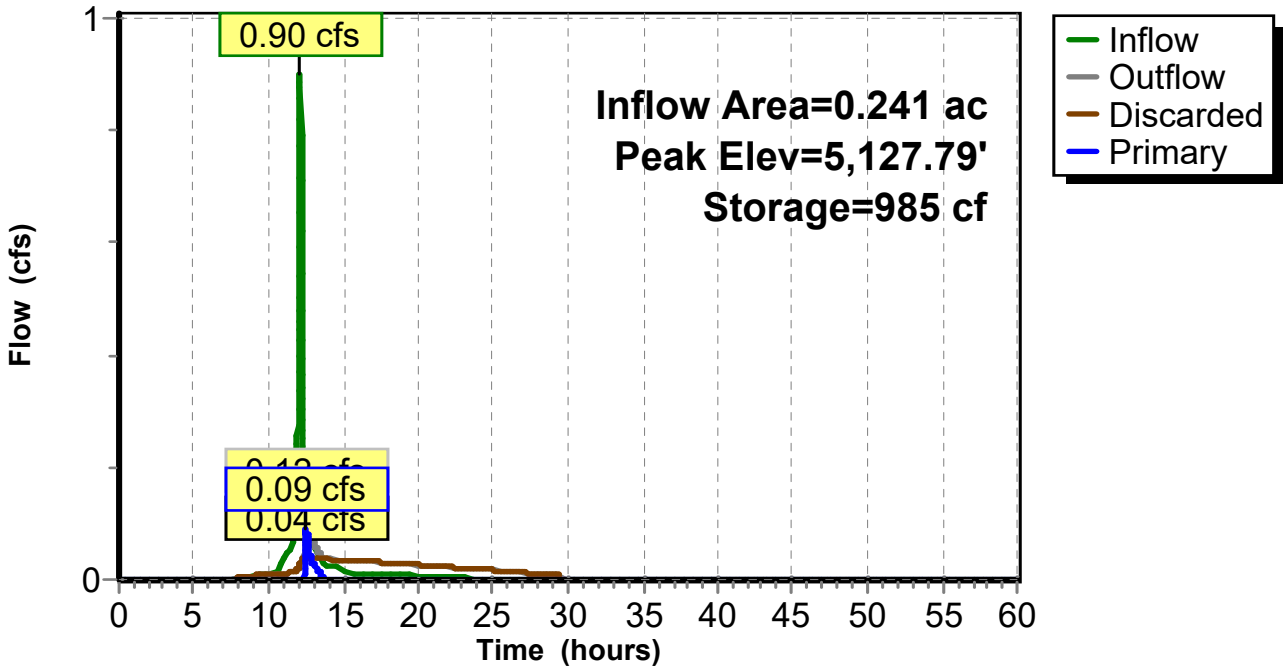
Device	Routing	Invert	Outlet Devices
#1	Discarded	5,126.00'	**1.670 in/hr Exfiltration over Surface area**
#2	Primary	5,127.75'	**5.0' long + 20.0 '/' SideZ x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.04 cfs @ 12.49 hrs HW=5,127.79' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.09 cfs @ 12.49 hrs HW=5,127.79' TW=0.00' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 0.09 cfs @ 0.43 fps)

Pond IB-2: Infiltration Basin 2

Hydrograph



Appendix F: Supporting Calculations

NOAA Atlas 14, Volume 1, Version 5
Location name: Albuquerque, New Mexico, USA*
Latitude: 35.1758°, Longitude: -106.5918°
Elevation: m/ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

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

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

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

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.169** (0.143-0.200)	**0.218** (0.184-0.259)	**0.294** (0.248-0.348)	**0.352** (0.295-0.416)	**0.433** (0.362-0.511)	**0.496** (0.413-0.587)	**0.564** (0.465-0.665)	**0.634** (0.521-0.748)	**0.731** (0.594-0.863)	**0.808** (0.653-0.953)
10-min	**0.257** (0.217-0.304)	**0.333** (0.280-0.394)	**0.447** (0.377-0.530)	**0.536** (0.449-0.633)	**0.658** (0.550-0.778)	**0.755** (0.629-0.893)	**0.858** (0.708-1.01)	**0.966** (0.792-1.14)	**1.11** (0.905-1.31)	**1.23** (0.994-1.45)
15-min	**0.318** (0.269-0.377)	**0.412** (0.347-0.488)	**0.554** (0.467-0.657)	**0.664** (0.557-0.785)	**0.816** (0.682-0.965)	**0.937** (0.780-1.11)	**1.06** (0.877-1.25)	**1.20** (0.982-1.41)	**1.38** (1.12-1.63)	**1.53** (1.23-1.80)
30-min	**0.428** (0.363-0.508)	**0.554** (0.467-0.657)	**0.746** (0.629-0.884)	**0.895** (0.750-1.06)	**1.10** (0.919-1.30)	**1.26** (1.05-1.49)	**1.43** (1.18-1.69)	**1.61** (1.32-1.90)	**1.86** (1.51-2.19)	**2.05** (1.66-2.42)
60-min	**0.530** (0.449-0.628)	**0.686** (0.578-0.813)	**0.923** (0.778-1.09)	**1.11** (0.928-1.31)	**1.36** (1.14-1.61)	**1.56** (1.30-1.85)	**1.77** (1.46-2.09)	**2.00** (1.64-2.35)	**2.30** (1.87-2.71)	**2.54** (2.05-3.00)
2-hr	**0.640** (0.530-0.792)	**0.821** (0.680-1.02)	**1.09** (0.898-1.34)	**1.30** (1.07-1.60)	**1.60** (1.31-1.96)	**1.84** (1.50-2.25)	**2.10** (1.69-2.56)	**2.36** (1.90-2.88)	**2.74** (2.17-3.34)	**3.05** (2.40-3.71)
3-hr	**0.685** (0.571-0.839)	**0.871** (0.724-1.07)	**1.14** (0.952-1.40)	**1.36** (1.13-1.66)	**1.66** (1.37-2.03)	**1.91** (1.56-2.32)	**2.17** (1.76-2.63)	**2.44** (1.97-2.96)	**2.83** (2.26-3.42)	**3.14** (2.49-3.81)
6-hr	**0.800** (0.674-0.973)	**1.01** (0.852-1.23)	**1.31** (1.10-1.58)	**1.54** (1.29-1.86)	**1.86** (1.55-2.24)	**2.11** (1.75-2.54)	**2.37** (1.96-2.86)	**2.65** (2.17-3.18)	**3.03** (2.46-3.64)	**3.34** (2.69-4.01)
12-hr	**0.881** (0.753-1.04)	**1.11** (0.947-1.31)	**1.41** (1.20-1.66)	**1.65** (1.40-1.94)	**1.97** (1.67-2.31)	**2.22** (1.87-2.60)	**2.48** (2.08-2.90)	**2.74** (2.28-3.21)	**3.10** (2.56-3.66)	**3.40** (2.78-4.06)
24-hr	**0.990** (0.856-1.15)	**1.24** (1.07-1.44)	**1.56** (1.35-1.81)	**1.81** (1.56-2.10)	**2.15** (1.85-2.49)	**2.41** (2.06-2.79)	**2.69** (2.29-3.11)	**2.96** (2.52-3.43)	**3.34** (2.81-3.86)	**3.64** (3.05-4.21)
2-day	**1.04** (0.900-1.19)	**1.30** (1.13-1.49)	**1.63** (1.42-1.87)	**1.89** (1.64-2.17)	**2.25** (1.94-2.57)	**2.52** (2.16-2.88)	**2.80** (2.39-3.20)	**3.08** (2.62-3.54)	**3.46** (2.93-3.98)	**3.76** (3.16-4.33)
3-day	**1.15** (1.02-1.28)	**1.43** (1.28-1.59)	**1.77** (1.58-1.97)	**2.03** (1.82-2.27)	**2.39** (2.13-2.67)	**2.66** (2.36-2.97)	**2.94** (2.60-3.28)	**3.22** (2.84-3.59)	**3.59** (3.15-4.01)	**3.88** (3.38-4.35)
4-day	**1.25** (1.15-1.37)	**1.55** (1.42-1.69)	**1.90** (1.74-2.07)	**2.17** (1.99-2.36)	**2.54** (2.32-2.76)	**2.81** (2.57-3.06)	**3.09** (2.81-3.36)	**3.37** (3.05-3.65)	**3.73** (3.37-4.05)	**4.00** (3.60-4.36)
7-day	**1.43** (1.31-1.55)	**1.77** (1.63-1.92)	**2.15** (1.98-2.33)	**2.44** (2.25-2.64)	**2.82** (2.60-3.04)	**3.10** (2.86-3.34)	**3.38** (3.11-3.64)	**3.65** (3.35-3.93)	**3.99** (3.66-4.30)	**4.23** (3.87-4.57)
10-day	**1.58** (1.45-1.71)	**1.95** (1.80-2.12)	**2.38** (2.20-2.58)	**2.72** (2.51-2.93)	**3.16** (2.91-3.40)	**3.49** (3.21-3.75)	**3.81** (3.50-4.10)	**4.13** (3.79-4.45)	**4.54** (4.15-4.89)	**4.84** (4.41-5.22)
20-day	**1.96** (1.80-2.13)	**2.43** (2.24-2.64)	**2.94** (2.71-3.19)	**3.33** (3.07-3.60)	**3.81** (3.52-4.12)	**4.16** (3.83-4.50)	**4.50** (4.14-4.85)	**4.81** (4.42-5.18)	**5.19** (4.77-5.60)	**5.46** (5.01-5.89)
30-day	**2.34** (2.15-2.52)	**2.89** (2.66-3.12)	**3.47** (3.20-3.73)	**3.89** (3.58-4.18)	**4.41** (4.07-4.73)	**4.78** (4.40-5.12)	**5.12** (4.72-5.49)	**5.44** (5.00-5.83)	**5.81** (5.34-6.23)	**6.06** (5.57-6.50)
45-day	**2.85** (2.64-3.08)	**3.53** (3.26-3.80)	**4.19** (3.88-4.50)	**4.65** (4.31-5.00)	**5.21** (4.83-5.59)	**5.58** (5.18-5.98)	**5.91** (5.49-6.32)	**6.19** (5.76-6.61)	**6.48** (6.05-6.92)	**6.64** (6.22-7.07)
60-day	**3.28** (3.04-3.55)	**4.06** (3.76-4.38)	**4.82** (4.47-5.19)	**5.36** (4.97-5.76)	**6.00** (5.58-6.45)	**6.43** (5.98-6.91)	**6.82** (6.35-7.33)	**7.16** (6.67-7.69)	**7.52** (7.02-8.07)	**7.73** (7.24-8.28)

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

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

Please refer to NOAA Atlas 14 document for more information.

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PF graphical

U-Haul | Albuqerque, NM

EXISTING DRAINAGE AREAS Updated 10-06-2023

Drainage Area	Total Area		Impervious Area		Pervious Area		% Imp	Flows To
	SF	AC	SF	AC	SF	AC		
EX-1	293152	6.73	62116	1.43	231036	5.30	21.2%	West Offsite to Jefferson
EX-2	93694	2.15	0	0.00	93694	2.15	0.0%	West Offsite
Total	386846	8.88	62116	1.43	324730	7.45	16.1%	-

PROPOSED DRAINAGE AREAS Updated 12-05-2023

Drainage Area	Total Area		Impervious Area		Pervious Area		% Imp	Flows To
	SF	AC	SF	AC	SF	AC		
DA-1	249545	5.73	196290	4.51	53255	1.22	78.7%	Infiltration Basin 1
DA-2	21078	0.48	21078	0.48	0	0.00	100.0%	Infiltration Basin 1
DA-3	14710	0.34	14710	0.34	0	0.00	100.0%	DA-2
DA-4	17137	0.39	17137	0.39	0	0.00	100.0%	DA-3
DA-5	22696	0.52	20702	0.48	1994	0.05	91.2%	DA-4
DA-6	10490	0.24	8406	0.19	2084	0.05	80.1%	Infiltration Basin 2
DA-7	13626	0.31	0	0.00	13626	0.31	0.0%	West Offsite
DA-8	1262	0.03	0	0.00	1262	0.03	0.0%	South Offsite
DA-9	36302	0.83	36302	0.83	0	0.00	100.0%	Infiltration Basin 1
Total	386846	8.88	314625	7.22	72221	1.66	81.3%	-

PROPOSED IMPERVIOUS AREA Updated 12-06-2023

Impervious Area		Wtrshd SWQV Req		Wtrshd SWQV Provided	
SF	AC	CF	AC-FT	CF	AC-FT
314625	7.22	6817	0.16	65209	1.50

SITE AREAS Updated 11-21-2023

	Total Area		Impervious Area		Pervious Area		% Imp
	SF	AC	SF	AC	SF	AC	
Existing	386846	8.88	62116.22	1.43	324730	7.45	16.1%
Proposed	386846	8.88	314625	7.22	72221	1.66	81.3%

U-Haul
ALBUQUERQUE
NM
PROJECT NUMBER: 28816
DATE: 12/06/2023

STORM SEWER SIZING

Storm Sewer Designations				Stormwater Runoff						Storm Sewer Properties			Storm Sewer Capacity			
Drainage Area	Storm Sewer Designation	Upstream Structure	Downstream Structure	Area [ac]	Runoff Coefficient	Recurrence Interval [year]	Time of Concentration [min]	Intensity [in/hr]	Runoff [cfs]	Slope (S) [ft/ft]	Material	Diameter (d) [in]	Required Flow Rate [cfs]	Provided Flow Rate [cfs]	Capacity [%]	Maximum Velocity [fps]
DA-X	P-87	ST-69	ST-68	0.00	0.98	10	5.0	4.22	0.00	0.0050	HDPE	24	10.44	16.00	65%	5.09
DA-2	P-88	ST-70	ST-69	0.48	0.98	10	5.0	4.22	2.00	0.0050	HDPE	24	6.99	16.00	44%	5.09
DA-3	P-89	ST-71	ST-70	0.34	0.98	10	5.0	4.22	1.40	0.0050	HDPE	18	4.99	7.43	67%	4.20
DA-4	P-90	ST-72	ST-71	0.39	0.98	10	5.0	4.22	1.63	0.0060	HDPE	15	3.59	5.00	72%	4.08
DA-5	P-91	ST-73	ST-72	0.52	0.89	10	5.0	4.22	1.97	0.0050	HDPE	15	1.97	4.57	43%	3.72
DA-9	P-83	ST-63	ST-69	0.83	0.98	10	5.0	4.22	3.45	0.0050	HDPE	18	3.45	7.43	46%	4.20
DA-X	P-87	ST-69	ST-68	0.00	0.98	100	5.0	6.77	0.00	0.0050	HDPE	24	16.75	16.00	105%	5.09
DA-2	P-88	ST-70	ST-69	0.48	0.98	100	5.0	6.77	3.21	0.0050	HDPE	24	11.21	16.00	70%	5.09
DA-3	P-89	ST-71	ST-70	0.34	0.98	100	5.0	6.77	2.24	0.0050	HDPE	18	8.00	7.43	108%	4.20
DA-4	P-90	ST-72	ST-71	0.39	0.98	100	5.0	6.77	2.61	0.0060	HDPE	15	5.76	5.00	115%	4.08
DA-5	P-91	ST-73	ST-72	0.52	0.89	100	5.0	6.77	3.15	0.0050	HDPE	15	3.15	4.57	69%	3.72
DA-9	P-83	ST-63	ST-69	0.83	0.98	100	5.0	6.77	5.53	0.0050	HDPE	18	5.53	7.43	74%	4.20

Reference Equations	
Runoff	(Drainage Coefficient)(Intensity)(Area)
Required Flow Rate	Peak Runoff + Upstream Runoff
Maximum Velocity	$\left(\frac{1.486}{n}\right)\left(\frac{A}{WP}\right)^{2/3}\sqrt{S} = \left(\frac{1.486}{n}\right)\left(\frac{d}{4}\right)^{2/3}\sqrt{S}$
Provided Flow Rate	$VA = \left(\frac{1.486}{n}\right)\left(\frac{\pi d^{8/3}}{4^{5/3}}\right)\sqrt{S}$
Capacity	$\frac{\text{Required Pipe Flow}}{\text{Provided Pipe Flow}}$

Manning's Roughness (n)	
RCP	0.013
PVC	0.011
HDPE	0.013
CMP	0.025

Recurrence Interval [year]	Time of Concentration [min]	Storm Intensities* [in/hr]
10	5	4.22
10	10	3.22
10	15	2.66
10	30	1.79
100	5	6.77
100	10	5.15
100	15	4.26
100	30	2.86

**From NOAA Atlas 14*

U-Haul
ALBUQUERQUE
NM
PROJECT NUMBER: 28816
DATE: 12/06/2023

INTAKE CAPACITY

Intake Information					Discharge to Intake						Intake Capacity			
Drainage Area Designation	Structure Designation	Intake Location Condition	Structure Casting State or Manufacturer	Storm Structure Casting Type	Drainage Area [ac]	Runoff Coefficient	Intensity [cfs]	Runoff [cfs]	Intercepted Flow [cfs]	Total Flow to Intake (Q) [cfs]	On-Grade Intake Efficiency (E)	Allowable Depth Over Sag Intake [ft]	Intake Capacity [cfs]	Intake Sufficiency
DA-2	ST-70	Sag	Nyloplast	2499CGS	0.48	0.98	4.22	2.00	0.00	2.00	N/A	0.50	4.60	Sufficient
DA-3	ST-71	Sag	Nyloplast	1899CGS	0.34	0.98	4.22	1.40	0.00	1.40	N/A	0.50	2.76	Sufficient
DA-4	ST-72	Sag	Nyloplast	1899CGS	0.39	0.98	4.22	1.63	0.00	1.63	N/A	0.50	2.76	Sufficient
DA-5	ST-73	Sag	Nyloplast	2499CGS	0.52	0.89	4.22	1.97	0.00	1.97	N/A	0.50	4.60	Sufficient
DA-2	ST-70	Sag	Nyloplast	2499CGS	0.48	0.98	4.22	3.21	0.00	3.21	N/A	0.50	4.60	Sufficient
DA-3	ST-71	Sag	Nyloplast	1899CGS	0.34	0.98	4.22	2.24	0.00	2.24	N/A	0.50	2.76	Sufficient
DA-4	ST-72	Sag	Nyloplast	1899CGS	0.39	0.98	4.22	2.61	0.00	2.61	N/A	0.50	2.76	Sufficient
DA-5	ST-73	Sag	Nyloplast	2499CGS	0.52	0.89	4.22	3.15	0.00	3.15	N/A	0.50	4.60	Sufficient

Reference Equations	
Runoff	(Drainage Coefficient)(Intensity*)(Area)
*See associated storm sewer sizing for intensity information	

On-Grade Curb & Gutter Intakes	
Ratio of Frontal Flow to Gutter Flow (E_0) =	$1-\left(1-\frac{\text{Width}}{T}\right)^{2.67}$
Frontal Flow Interception Efficiency (R_f)* =	$1 - 0.09(V - V_0)$
*R_f cannot exceed 1. If V is less than V_0 (splash-over velocity), $R_f = 1$	
Side Flow Interception Efficiency (R_s) =	$\frac{1}{1+\frac{0.15V^{1.8}}{S_X \text{Length}^{2.3}}}$
Grate Efficiency (E) =	$R_f E_0 + R_s(1 - E_0)$

On-Grade Curb Opening	
Length of Opening for Total Interception (L_T) =	$0.6Q^{0.42}S_L^{0.3}\left(\frac{1}{nS_X}\right)^{0.6}$
Opening Efficiency (E) =	$1-\left(1-\frac{L}{L_T}\right)^{1.8}$

Sag Intakes	
Intake Capacity (Weir) =	$C_w P d^{1.5}$
Intake Capacity (Orifice) =	$C_o A(2gd)^{0.5}$
C_w and C_o are determined by the state DOT or manufacturer	
d is the average depth across the grate, accounting for grate depression	

Sag Curb Opening	
Intake Capacity (Weir) =	$C_w(L + 1.8W)d^{1.5}$
Intake Capacity (Orifice) =	$C_o hL(2gd)^{0.5}$
d is the allowable head over the opening	

Inlet Sufficiency Decription	
N/A	On-grade inlets will not intercept the entirety of directed flow
N/A*	On-sag inlets with insufficient head/low EOF routes will allow flow to bypass similar to an on-grade intake
Sufficient	The intake has capacity to convey the flows at the allowable head
Insufficient	The intake does not have capacity to convey the flows at the allowable head

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Reported Condition
					(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	(ft)		(min)	
1	P-83	Pipe	ST-63	ST-69	202.10	5125.51	5124.50	0.5000	18.000	0.0120	2.63	8.04	0.33	3.47	1.10	0.77	0.00	Calculated
2	P-84	Pipe	ST-64	ST-63	281.76	5127.10	5125.70	0.5000	18.000	0.0120	2.72	8.02	0.34	3.17	0.75	0.52	0.00	Calculated
3	P-87	Pipe	ST-69	Out-1P-87	173.61	5124.47	5123.60	0.5000	24.000	0.0120	7.88	17.35	0.45	3.99	1.17	0.60	0.00	Calculated
4	P-88	Pipe	ST-70	ST-69	142.11	5125.38	5124.67	0.5000	24.000	0.0120	7.81	17.32	0.45	3.97	1.14	0.60	0.00	Calculated
5	P-89	Pipe	ST-71	ST-70	100.00	5126.08	5125.58	0.5000	18.000	0.0120	3.98	8.05	0.49	3.41	1.01	0.70	0.00	Calculated
6	P-90	Pipe	ST-72	ST-71	100.00	5126.88	5126.28	0.6000	15.000	0.0120	2.90	5.42	0.53	3.01	0.95	0.78	0.00	Calculated
7	P-91	Pipe	ST-73	ST-72	83.17	5127.50	5127.08	0.5000	15.000	0.0120	1.61	4.97	0.32	2.48	0.76	0.61	0.00	Calculated
8	Weir-01	Weir	Out-1P-87	Out-01		5118.00	0.00				0.00							

Pipe Results

SN	Element ID	Peak Flow (cfs)	Time of Peak Flow Occurrence (days hh:mm)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Travel Time (min)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Froude Number	Reported Condition
1	P-83	2.63	0 12:02	8.04	0.33	3.47	0.97	1.10	0.77	0.00		Calculated
2	P-84	2.72	0 12:00	8.02	0.34	3.17	1.48	0.75	0.52	0.00		Calculated
3	P-87	7.88	0 12:02	17.35	0.45	3.99	0.73	1.17	0.60	0.00		Calculated
4	P-88	7.81	0 00:00	17.32	0.45	3.97	0.60	1.14	0.60	0.00		Calculated
5	P-89	3.98	0 12:00	8.05	0.49	3.41	0.49	1.01	0.70	0.00		Calculated
6	P-90	2.90	0 12:00	5.42	0.53	3.01	0.55	0.95	0.78	0.00		Calculated
7	P-91	1.61	0 12:00	4.97	0.32	2.48	0.56	0.76	0.61	0.00		Calculated

PAVEMENT LEGEND

SYMBOL	DESCRIPTION
	BITUMINOUS PAVEMENT
	HEAVY DUTY BITUMINOUS PAVEMENT
	HEAVY DUTY CONCRETE PAVEMENT
	AGGREGATE SURFACING

DOMINGO BACA ROAD
VARIABLE WIDTH PUBLIC RIGHT-OF-WAY
ASPHALT PAVEMENT

JEFFERSON STREET NE
VARIABLE WIDTH PUBLIC RIGHT-OF-WAY
ASPHALT PAVEMENT

EXISTING PROPERTY LINE
PROPOSED PROPERTY LINE
5' BUILDING SETBACK

STORMWATER BASIN

PROPOSED BUILDING
2,300 SF

U-HAUL PARKING

SHUNTING LANES

PROPOSED BUILDING
2,000 SF

PROPOSED BUILDING
2,500 SF

PROPOSED BUILDING
2,500 SF

COVERED RV
(13) 12'x40' SPACES

COVERED RV
(14) 12'x40' SPACES

COVERED RV
(18) 12'x40' SPACES

PROPOSED BUILDING
2,625 SF

PROPOSED BUILDING
3-STORY: 35,100 SF
FFE = 5132.00'

PROPOSED BUILDING
1-STORY: 23,367 SF
FFE = 5136.00'

BUILDING NOT A PART OF SURVEY

EXISTING FIRE HYDRANT

PASEO DEL NORTE BOULEVARD NE
VARIABLE WIDTH PUBLIC RIGHT-OF-WAY
ASPHALT PAVEMENT

EXISTING FIRE HYDRANT

5' BUILDING SETBACK
EXISTING PROPERTY LINE
PROPOSED PROPERTY LINE

N

0 40 80
SCALE IN FEET

SHEET NOTES:

REVISIONS:

NO.	DATE	INITIALS	NOTES
1			
2			
3			
4			
5			
6			
7			
8			

PROFESSIONAL SEAL:

ISG

PROJECT

U-HAUL

ALBUQUERQUE NEW MEXICO

SITE ADDRESS:
U-Haul Moving & Storage
8200 JEFFERSON ST

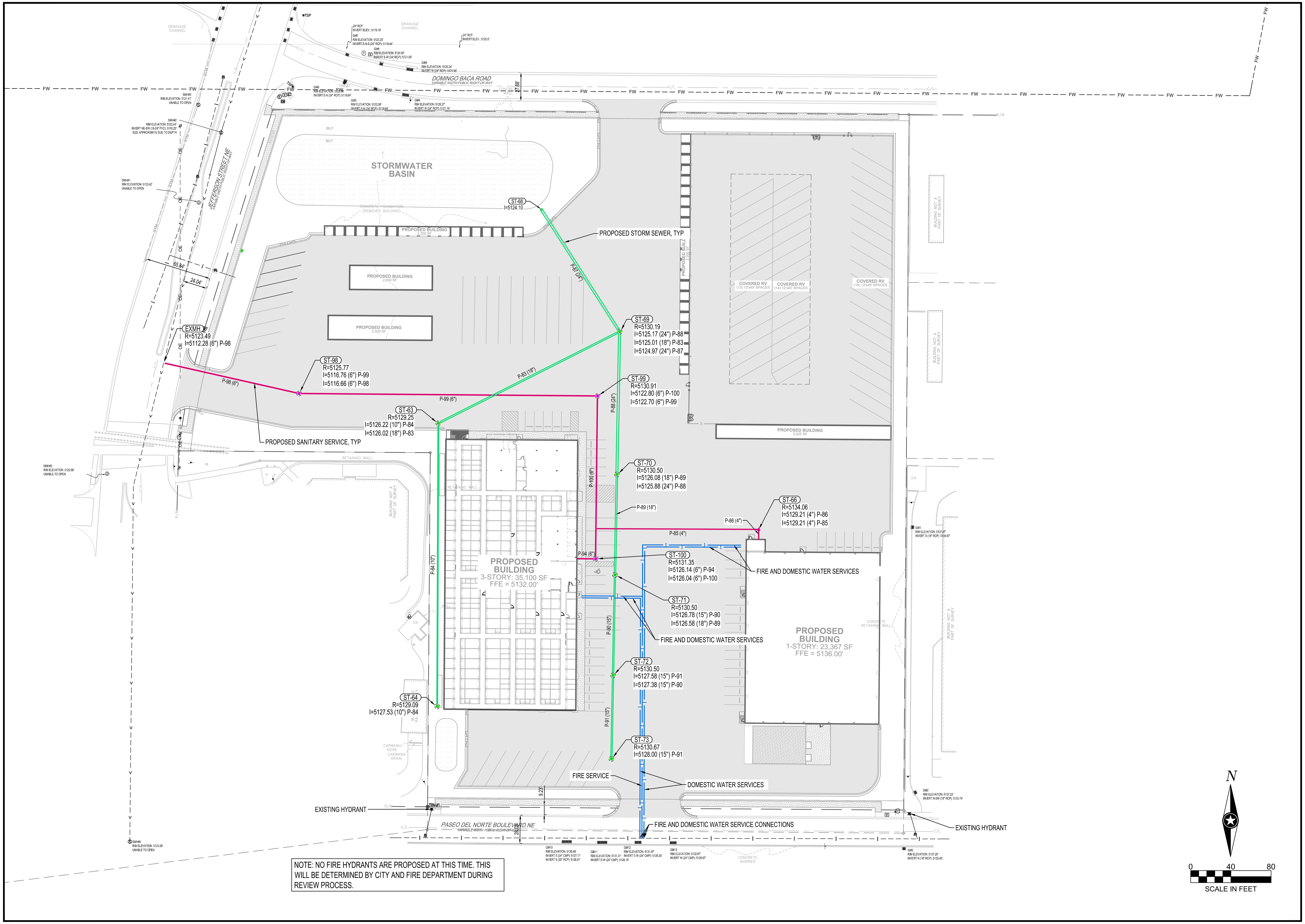
SHEET CONTENTS:

SITE PLAN

824071

DRAWN:	GBV	C3-10
CHECKED:	ARA	
DATE:	--/--/--	

SITE



SHEET NOTES:

REVISIONS:

NO	DATE	INITIALS	NOTES
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PROFESSIONAL SEAL:

ISG

PROJECT

U-HAUL

ALBUQUERQUE NEW MEXICO

SITE ADDRESS:
U-Haul Moving & Storage
8200 JEFFERSON ST

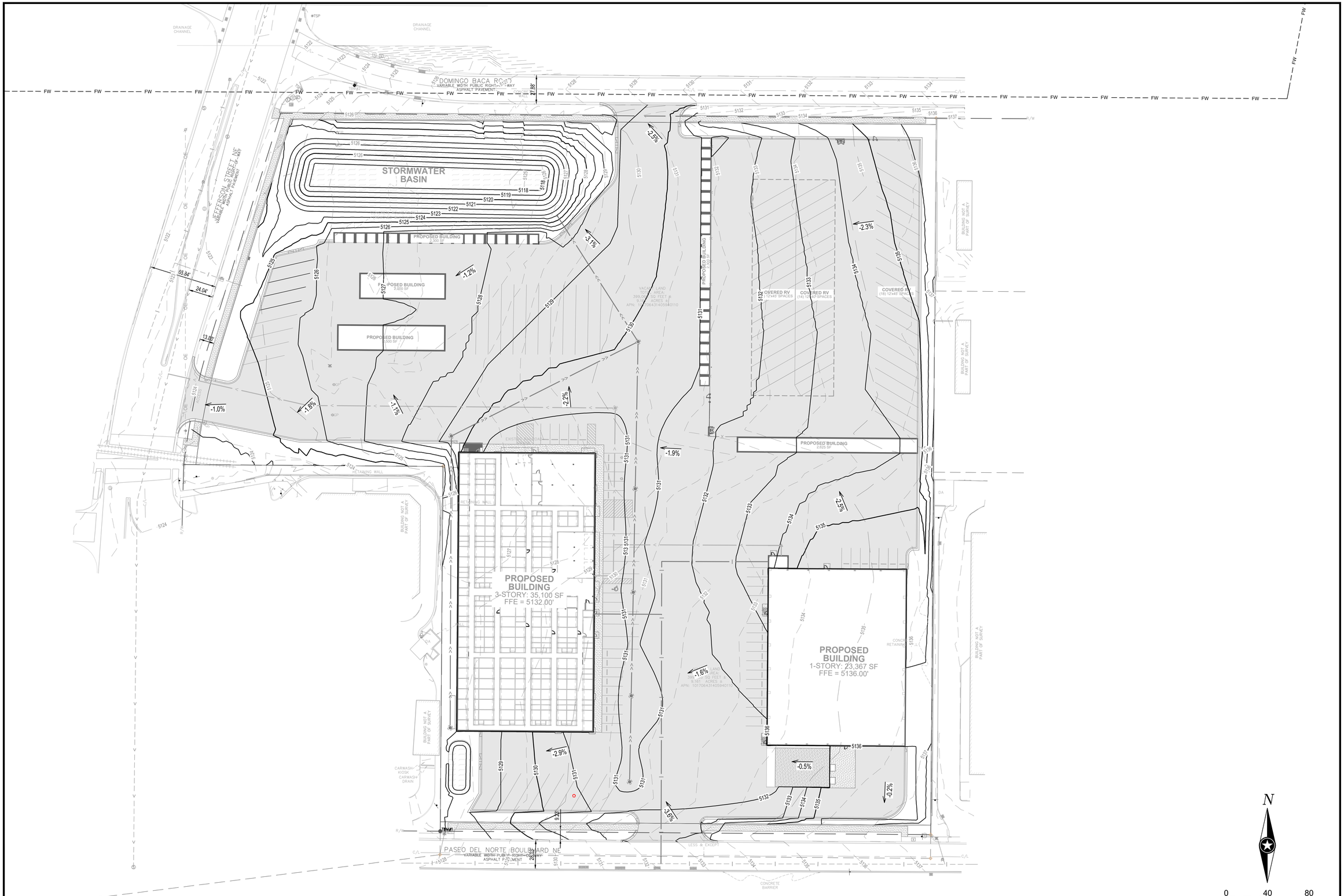
SHEET CONTENTS:

UTILITY PLAN

824071

DRAWN:	GBV	
CHECKED:	ARA	C3-20
DATE:	--/--/--	

UTILITY



SHEET NOTES:

REVISIONS:

NO.	DATE	INITIALS	NOTES
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4	.	.	
5	.	.	
6	.	.	
7	.	.	
8	.	.	

PROFESSIONAL SEAL:

ISG

PROJECT

U-HAUL

ALBUQUERQUE NEW MEXICO

SITE ADDRESS:
U-Haul Moving & Storage
8200 JEFFERSON ST

SHEET CONTENTS:

GRADING PLAN

824071

DRAWN:	GBV	**C4-10**
CHECKED:	ARA	
DATE:	--/--/--	

GRADING