

STAFF REPORT FOR THE PLANNING COMMISSION MEETING OF JULY 28, 2021

FILE NO: LU-2021-0219

AGENDA ITEM: 13.B

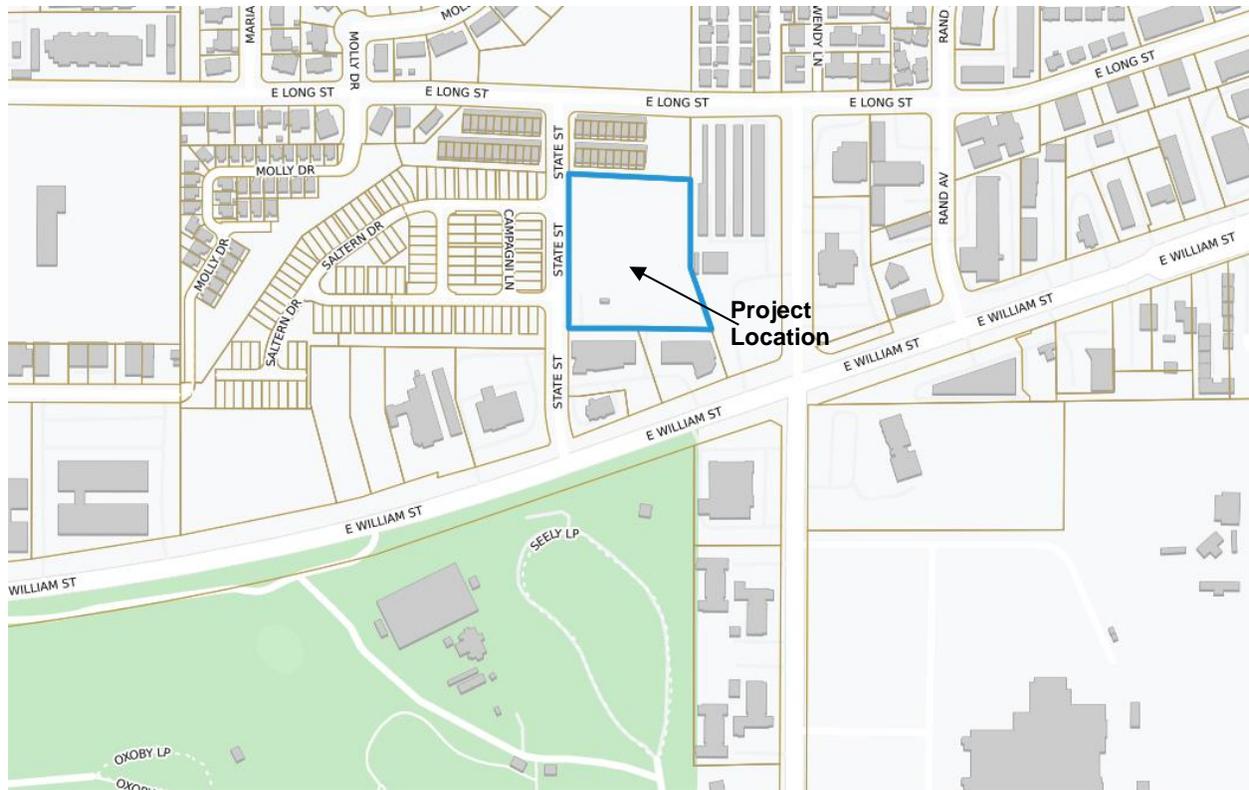
STAFF AUTHOR: Heather Ferris, Planning Manager

AGENDA TITLE: For Possible Action: Discussion and possible action regarding a request for a Special Use Permit to allow for the construction of a personal storage facility, adjacent to residential uses, that will exceed the 14 foot height limitation, on a property zoned General Commercial (GC), located on the east side of State Street, approximately 350 feet north of E William Street, APN 002-442-03. (Heather Ferris, hferris@carson.org)

Summary: Per Carson City Municipal Code (CCMC) 18.04.135, a personal storage facility is a permitted primary use in the GC zoning district subject to the Carson City Development Standards (CCDS) outlined in Division 1.10. Per CCDS Division 1.10, subsection 6, storage units that are adjacent to residential areas may not exceed 14 feet in height. The applicant is proposing a 35,280 square foot, 3-story, 45-foot-tall, personal storage facility with indoor access to each unit and an additional 8,000 square foot warehouse facility, 45 feet in height. A Special Use Permit is required to exceed the height limitation. The Planning Commission is authorized to approve a Special Use Permit.

RECOMMENDED MOTION: "I move to approve LU-2021-0219 based on the ability to make the required findings and subject to the conditions of approval included in the staff report."

VICINITY MAP:



RECOMMENDED CONDITIONS OF APPROVAL:

1. All development shall be substantially in accordance with the approved plans, except as otherwise modified by the conditions of approval.
2. All on and off-site improvements shall conform to City standards and requirements.
3. The use for which this permit is approved shall commence within twelve (12) months of the date of final approval. A single, one (1) year extension of time must be requested in writing to the Planning and Community Development Department thirty (30) days prior to the one (1) year expiration date. Should this permit not be initiated within one (1) year and no extension granted, the permit shall become null and void.
4. The applicant must sign and return the Notice of Decision for conditions of approval within ten (10) days of receipt of notification. If the Notice of Decision is not signed and returned within ten (10) days, then the item may be rescheduled for the next Planning Commission meeting for further consideration.
5. All exterior lighting must be directed downward. The design of the light standards must include cutoffs and shields, if necessary, to prevent spillover of light or glare onto adjacent properties. The applicant shall provide lighting details at the time of building permit.
6. The applicant shall provide a landscape and irrigation plan in compliance with Carson City Development Standards, Division 3- Landscaping. The plans shall include landscape berms and enhances landscaping along the northern and western property boundaries. A sight obscuring fence, a minimum of 6 feet in height shall be installed along the southern boundary of the property.
7. The approval of this Special Use Permit does not include an entitlement for the three future buildings shown on the plan. These buildings will be reviewed for compliance with applicable provisions of the municipal code if/when the applicant decides to proceed with this portion of the project.

LEGAL REQUIREMENTS: CCMC 18.02.050 (Review); 18.02.080 (Special Use Permit); 18.04.135 (General Commercial)

MASTER PLAN DESIGNATION: Mixed-Use Residential

ZONING DISTRICT: General Commercial

KEY ISSUES: Will the use be compatible with the surrounding neighborhood and be in keeping with the standards of the Carson City Municipal Code?

SURROUNDING ZONING AND LAND USE INFORMATION:

NORTH: Multi-family Apartment Planned Unit Development / attached single-family residences

EAST: General Commercial / personal storage

WEST: General Commercial Planned Unit Development / attached single-family residences

SOUTH: General Commercial / retail and office uses

ENVIRONMENTAL INFORMATION:

FLOOD ZONE: X-shaded

EARTHQUAKE FAULT: Zone II (Moderate); shown on-site.

SITE DEVELOPMENT INFORMATION:

LOT SIZE: 2.9 acres

STRUCTURE SIZE: Two structures proposed at 35,280 square feet and 8,000 square feet

PREVIOUS REVIEWS:

- CSM-19-062: On May 21, 2019 staff completed a conceptual map review for an open space subdivision to accommodate 37 attached single-family homes.
- U-97/98-54: On June 24, 1998 the Planning Commission approved a special use permit to allow Sierra Pacific Power Company to upgrade power lines, replace certain poles, retrofit insulators, and replacement of wires. The project involved several parcels along the 2.1 mile project area.
- MPR-96/97-31: On March 3, 1997 staff completed a Major Project Review involving APNs 022-442-03; -04; and -05. The project involved three buildings of retail space, including a fast-food restaurant consisting of approximately 18,153 square feet, a building of 16,200 square feet of medical office space, and a building of approximately 33,210 square feet of professional/business office space.

DISCUSSION:

The subject property is approximately 2.9 acres in size and is currently developed. The applicant is now seeking approval to develop a personal storage facility. The facility would consist of a 3-story personal storage building with a footprint of 35,280 square feet (105,840 square feet in total) and an 8,000 square foot warehouse building for the storage of portable storage containers. It should be noted, the three future personal storage buildings shown on the plan have not been reviewed for compliance with Division 1.10 of the Development Standards. These buildings will be reviewed for compliance with applicable provisions of the municipal code if/when the applicant decides to proceed with this portion of the project.

Per Carson City Municipal Code (CCMC) 18.04.135, a personal storage facility is a permitted primary use in the GC zoning district subject to the Carson City Development Standards (CCDS) outlined in Division 1.10. Per CCDS Division 1.10 subsection 6, storage units that are adjacent to residential areas may not exceed 14 feet in height. The project site is immediately adjacent to townhomes to the north and west, across State Street. The personal storage building and the warehouse facility are proposed to be a maximum of 45 feet in height; therefore, a Special Use Permit is required to exceed the height limitation. The Planning Commission is authorized to approve a Special Use Permit.

PUBLIC COMMENTS:

Public notices were mailed to 151 property owners within 600 feet of the subject site on July 13, 2021. As of the writing of this report no comments have been received. Any comments that are received after this report is completed will be submitted to the Planning Commission prior to or at the meeting on July 28, 2021 depending on the date of submission of the comments to the Planning Division.

OTHER CITY DEPARTMENTS OR OUTSIDE AGENCY COMMENTS:

Plans were routed to commenting agencies, and the following comments were received. Comments have been incorporated into the conditions of approval, as appropriate.

Engineering Division

The Engineering Division has no preference or objection to the special use request provided that the following conditions are met:

- New sidewalk must be installed along the frontage as shown. This sidewalk must terminate at a new ADA curb ramp at the adjacent driveway.
- The project must meet all Carson City Development Standards and Standard Details including but not limited to the following:
 - Adhering to the City's drainage manual, which was recently adopted. This manual changes the design storm and includes requirements for low impact development practices (LID).
 - The fire water line must have appropriate backflow prevention installed.

ENGINEERING DISCUSSION:

The Engineering Division has reviewed the application within our areas of purview relative to adopted standards and practices and to the provisions of CCMC 18.02.080, Conditional Uses. The Engineering Division offers the following discussion:

C.C.M.C. 18.02.080 (5a) - Master Plan

The request is not in conflict with any Engineering Master Plans.

C.C.M.C. 18.02.080 (5b) – Use, Peaceful Enjoyment, Economic Value, Compatibility

Development Engineering has no comment on this finding.

C.C.M.C. 18.02.080 (5c) - Traffic/Pedestrians

Local intersections: The site is in the middle of two intersections, State St and E William St and State St and E Long St. State St is a local street while E Long St is a minor collector and E William St is a Minor Arterial.

Parking and internal circulation: There is on street parking on State St as well as on-site parking is proposed as a parking lot. The entrance/exit to the site will be via State St.

Proposed and/or necessary improvements: No further analysis of these intersections was deemed necessary by the transportation department. Sidewalk will be installed along the parcel frontage.

C.C.M.C. 18.02.080 (5d) - Public Services

Sanitary Sewer: The existing sewer main is 8-inch asbestos concrete on the west side of the property. This main is approximately 10% full (d/D) and has sufficient capacity to serve the site.

Water: The existing water main is 8-inch steel on the west side of the property. It is not anticipated that there are any capacity issues at this location, however hydrant test results are out of date and new tests will be submitted as required per CCDS with the site improvement permit.

Storm Drain: There is currently a drainage channel on the southeastern corner of the property draining to a basin that drains to E William St. The project is installing a retention basin to mitigate the increase in runoff.

C.C.M.C. 18.02.080 (5e) – Title 18 Standards

Development Engineering has no comment on this finding.

C.C.M.C. 18.02.080 (5f) – Public health, Safety, Convenience, and Welfare

The project will meet engineering standards for health and safety if conditions are met.

Earthquake faults: There is a fault approximately 250 feet northwest of the property approximately 2 feet from property line with the slip rate of less than 0.2 mm/yr.

FEMA flood zones: The FEMA flood zone is Zone X (shaded).

Site slope: The site is urban land, so the slope is minimum.

Soils and Groundwater: The site is urban land so the soil and groundwater table is unknown.

C.C.M.C. 18.02.080 (5g) – Material Damage or Prejudice to Other Property
Development Engineering has no comment on this finding.

C.C.M.C. 18.02.080 (5h) – Adequate Information
The plans and reports provided were adequate for this analysis.

Fire Department

The project must comply with the international Fire Code and northern Nevada fire code amendments as adopted by Carson City.

Environmental Control

Per CCMC 12.19.090 a spill prevention plan is required for all hydraulic elevators. The applicant is required to provide details of measures that will be taken to prevent oil or grease reaching the storm sewer or sanitary sewer in the event of flooding or mechanical failure.

FINDINGS:

Staff's recommendation is based upon the findings as required by CCMC Section 18.02.080 (Special Use Permits) enumerated below and substantiated in the public record for the project.

1. *Will be consistent with the objectives of the Master Plan elements.*

The proposed project is a personal storage facility which is a permitted primary use in the General Commercial zoning district subject to meeting the requirements outlined in Division 1.10 of the Carson City Development Standards. The proposed use is consistent with the Master Plan. The subject property is in the Mixed-Use Residential (MUR) master plan designation. The mixed-use master plan designations are intended to encourage the development of commercial services, employment opportunities, housing, and services necessary for the day-to-day needs of area residents. The proposed use will provide additional storage services for area residents.

2. *Will not be detrimental to the use, peaceful enjoyment, economic value, or development of surrounding properties or the general neighborhood; and is compatible with and preserves the character and integrity of adjacent development and neighborhoods or includes improvements or modifications either on-site or within the public right-of-way to mitigate development related to adverse impacts such as noise, vibrations, fumes, odors, dust, glare or physical activity.*

Per Carson City Municipal Code (CCMC) 18.04.135, a personal storage facility is a permitted primary use in the GC zoning district subject to the Carson City Development Standards (CCDS) outlined in Division 1.10. Per CCDS Division 1.10 subsection 6, storage units that are adjacent to residential areas may not exceed 14 feet in height. The project site is immediately adjacent to townhomes to the north and west, across State Street. The personal storage building and the warehouse facility are proposed to be a maximum of 45 feet in height; therefore, a Special Use Permit is required to exceed the height limitation. The project will not be detrimental to the use, peaceful enjoyment, economic value, or development of surrounding properties or the general neighborhood. The proposed use is similar in nature to the existing personal storage facility located immediately west of the subject site. Per Division 1.10 of the Carson City Development Standards personal storage facilities located adjacent to residential uses are limited to the hours of operation from 7:00 AM to 7 PM. Any exterior lighting will be required to meet Division 1.3 of the Development Standards to ensure that lights are shielded and directed downward away from adjoining properties and the night sky. With the implementation of staff's recommended

conditions of approval and adherence to applicable sections of Division 1.10 of the development standards the proposed use will not result in additional impacts from noise, vibrations, fumes, odors, dust, glare, or physical activity.

3. Will have little or no detrimental effect on vehicular or pedestrian traffic.

The project will have little or no detrimental effect on vehicular or pedestrian traffic. The proposed project will have a single point of access off of State Street. As shown on the plans, a new sidewalk will be provided connecting pedestrian traffic to the north and south.

4. Will not overburden existing public services and facilities, including schools, police and fire protection, water, sanitary sewer, public roads, storm drainage, and other public improvements.

The proposed project will not overburden existing public services and facilities. The existing sewer main on the west side of the property is approximately 10% full and has sufficient capacity to serve the site. The existing water main on the west side of the property is anticipated to be adequate to serve the site; however, hydrant test results are out of date and new tests will be required per Carson City Development Standards at the time the site improvement permit is submitted. There is currently a storm drainage channel on the southeastern corner of the property draining to a basin that drains to E William Street. The project is installing a retention basin to mitigate the increase in runoff. The Fire Department currently serves this site. Building permits will be required. The Fire Department will review those permits for compliance with the Carson City Fire Code and northern Nevada Amendments (2018 IFC).

5. Meets the definition and specific standards set forth elsewhere in this Title for such particular use and meets the purpose statement of that district.

Per CCMC 18.04.135 a personal storage facility if a permitted primary use in the General Commercial zoning district subject to meeting the applicable provisions of Division 1.10 of the Carson City Development Standards. Per CCDS Division 1.10 subsection 6, storage units that are adjacent to residential areas may not exceed 14 feet in height. The project site is immediately adjacent to townhomes to the north and west, across State Street. The personal storage building and the warehouse facility are proposed to be a maximum of 45 feet in height; therefore, a Special Use Permit is required to exceed the height limitation. It should be noted, the two future personal storage buildings shown on the plan have not been reviewed for compliance with Division 1.10 of the Development Standards. These buildings will be reviewed for compliance with applicable provisions of the municipal code if/when the applicant decides to proceed with this portion of the project.

The development standards and how the project meets them are addressed below.

1.10- Personal storage and metal storage containers.

1. A minimum of 60% of the lot's street frontage(s) shall be developed with retail and/or office space in the neighborhood business, retail commercial and tourist commercial (NB, RC and TC) zoning districts only.

The subject parcel is zoned General Commercial (GC) and is not subject to this requirement.

2. A sight-obscuring entrance gate and perimeter opaque fence or wall shall be provided to screen views of individual storage units.

The proposed project is entirely enclosed with secured interior access to individual storage units. Therefore, the walls of the buildings will act as the perimeter fencing and the secure access building will act as the gate. The applicant will be enhancing the landscaping along the northern and western property boundary to provide for additional screening. Sight-obscuring perimeter fencing will be installed along the southern boundary of the project site.

3. The architectural and site design of the retail/office building, storage units, perimeter fencing, lighting, and landscaping is subject to approval by the director. A metal prefabricated exterior office/retail building is prohibited.

The buildings have been designed consistent with the architectural design standards outlined in CCDS 1.1.

4. No business activities other than storage shall be conducted within individual storage units.

No business activities other than storage are proposed in the buildings.

5. Outside storage is prohibited except as expressly permitted in Title 18 or the development standards. Storage containers may be utilized in industrial districts to house storage items within them. Temporary storage containers are allowed at construction sites for a maximum of 30 days, or as approved by the director after review of the individual construction schedule.

No outside storage is proposed.

6. Additionally, storage units adjacent to residential areas shall:
 - a. Not exceed 14 feet in height (1 story);

The proposed project is adjacent to residential areas to the north and west. As proposed, the storage buildings will be 45 feet in height, therefore requiring a Special Use Permit to exceed the 14-foot height limitation. The reason for this Special Use Permit is to allow the facility to exceed the 14-foot height limitation.

- b. Have a minimum 20 foot landscape buffer and a solid 6 foot masonry wall located between the storage units and residential uses;

Enhanced landscaping including landscaped berms will be provided along the northern and western property boundaries. As noted above, the proposed project is entirely enclosed with secured interior access to individual storage units. Therefore, the walls of the buildings will act as the perimeter fencing and the secure access building will act as the gate. Sight-obscuring perimeter fencing will be installed along the southern boundary of the project site.

- c. Have limited hours of operation 7:00 a.m. to 7:00 p.m. unless otherwise approved by the planning commission;

The applicant has not requested different hours. Therefore, a condition has been added to the Special Use Permit limiting hours to 7 AM- 7 PM.

- d. Have a monument style sign not exceeding 6 feet in height.

A sign is not part of this application; however, a sign permit is required prior to the installation of any signage. Signage will be reviewed for compliance with Title 18 at the time a sign permit application is submitted.

7. Shared use parking shall not exceed 5% of total parking.

Parking is not proposed to be shared.

8. Must meet the definition as defined in CCMC 18.03.

CCMC 18.03 defines "Personal storage" as a facility with enclosed storage space, divided into separate compartments, each no larger than 500 square feet in size, which is provided for use by individuals to store personal items or by business to store materials for operation of a business establishment but excludes workshops, hobby shops, manufacturing or commercial activity. Typical uses include mini-warehouse.

The proposed use is consistent with this definition.

In addition to the applicable provisions of Division 1.10, the use is required to meet the parking standards as outlined in Division 2 of the Carson City Development Standards. Personal storage is not specifically addressed in Division 2 of the Carson City Development Standards; however, the use most similar would be warehouse; therefore, the required parking is calculated based on the warehouse use. A warehouse use requires 1 parking space per 1,000 square feet of gross floor area plus 1 space per employee. Per Division 2 of the Development Standards the facility would require a total of 118 parking spaces. Carson City Development Standard Division 2.2.F allows the Community Development Director to consider an alternative parking requirement if the request is made in writing and supported with information from an accredited source such as the Institute of Transportation Engineers (ITE).

6. *Will not be detrimental to the public health, safety, convenience and welfare.*

The project will not be detrimental to the public health, safety, convenience and welfare. Per CCMC 18.04.135 a personal storage facility is a permitted primary use in the General Commercial zoning district subject to meeting the applicable provisions of Division 1.10 of the Carson City Development Standards. Per CCDS Division 1.10 subsection 6, storage units that are adjacent to residential areas may not exceed 14 feet in height. The project site is immediately adjacent to townhomes to the north and west, across State Street. The personal storage building and the warehouse facility are proposed to be a maximum of 45 feet in height; therefore, a Special Use Permit is required to exceed the height limitation.

7. *Will not result in material damage or prejudice to other property in the vicinity, as a result of proposed mitigation measures.*

Per CCMC 18.04.135 a personal storage facility is a permitted primary use in the General Commercial zoning district subject to meeting the applicable provisions of Division 1.10 of the Carson City Development Standards. Per CCDS Division 1.10 subsection 6, storage units that are adjacent to residential areas may not exceed 14 feet in height. The project site is immediately adjacent to townhomes to the north and west, across State Street. The personal storage building and the warehouse facility are proposed to be a maximum of 45 feet in height; therefore, a Special Use Permit is required to exceed the height limitation. The setbacks are consistent with the required setbacks for any three-story building constructed in the General Commercial zoning district and adjacent to residential zoning. The project will not result in material damage or

prejudice to other property in the vicinity.

Attachments:
Application LU-2021-0219

U-Haul Carson City

**Special Use Permit
Submittal**

LU-2021-0219

Carson City Planning Division
108 E. Proctor Street • Carson City NV 89701
Phone: (775) 887-2180 • E-mail: planning@carson.org

FOR OFFICE USE ONLY:

CCMC 18.02.080

SPECIAL USE PERMIT

FEE*: **\$2,450.00 MAJOR**
\$2,200.00 MINOR (Residential zoning districts)
+ noticing fee

*Due after application is deemed complete by staff

SUBMITTAL PACKET – 4 Complete Packets (1 Unbound Original and 3 Copies) including:

- Application Form
- Detailed Written Project Description
- Site Plan
- Building Elevation Drawings and Floor Plans
- Special Use Permit Findings
- Master Plan Policy Checklist
- Applicant's Acknowledgment Statement
- Documentation of Taxes Paid-to-Date
- Project Impact Reports (Engineering)

CD or USB DRIVE with complete application in PDF

Application Received and Reviewed By: _____

Submittal Deadline: Planning Commission application submittal schedule.

Note: Submittals must be of sufficient clarity and detail for all departments to adequately review the request. Additional information may be required.

FILE

APPLICANT PHONE #
Uhaul Of Northern Nevada 775-530-3208

MAILING ADDRESS, CITY, STATE, ZIP
10400 S Virginia St, Reno, NV 89521

EMAIL ADDRESS
joshua_tornbom@uhaul.com

PROPERTY OWNER PHONE #
Five Sac Self-Storage Corp 775-530-3208

MAILING ADDRESS, CITY, STATE, ZIP
207 East Clarendon Ave, Phoenix, AZ 85012

EMAIL ADDRESS
joshua_tornbom@uhaul.com

APPLICANT AGENT/REPRESENTATIVE PHONE #
Josh Tornbom 775-530-3208

MAILING ADDRESS, CITY STATE, ZIP
10400 S Virginia St, Reno, NV 89521

EMAIL ADDRESS

Project's Assessor Parcel Number(s): Street Address
002-442-03 0 State St

Project's Master Plan Designation Project's Current Zoning Nearest Major Cross Street(s)
GC State St / William St

Please provide a brief description of your proposed project and/or proposed use below. Provide additional pages to describe your request in more detail. The primary project objective is to construct a three story storage building and one story storage warehouse commercial development.

PROPERTY OWNER'S AFFIDAVIT

I, Stuart Shoen, being duly deposed, do hereby affirm that I am the record owner of the subject property, and that I have knowledge of and I agree to, the filing of this application.

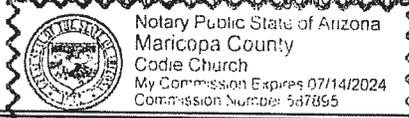
Signature [Signature] Address 207 E Clarendon Phoenix AZ 85012 Date 6/16/21

Use additional page(s) if necessary for additional owners.

STATE OF NEVADA Arizona
COUNTY Maricopa)

On June 16th, 2021, Stuart Shoen, personally appeared before me, a notary public, personally known (or proved) to me to be the person whose name is subscribed to the foregoing document and who acknowledged to me that he/she executed the foregoing document.

Notary Public [Signature]



NOTE: If your project is located within the Historic District or airport area, it may need to be scheduled before the Historic Resources Commission or the Airport Authority in addition to being scheduled for review by the Planning Commission. Planning staff can help you make this determination.

SPECIAL USE PERMIT PROJECT DESCRIPTION

Project: Carson City U-Haul

Parcel: 002-442-03

Zone: General Commercial (GC)

Land Use Category: Mixed-Use Residential (MUR)

The proposed project will consist of the development of the existing 2.9 acre site. The existing paved surface/parking lot at south end of site will be removed. The site will be graded with a detention area at the southeast corner. A new 8,000 s.f., 1 story warehouse with an exterior dock will be constructed for the purpose of storing u-box storage containers. A new 105,840 s.f., 3 story building with 35,280 s.f. footprint will be constructed to include indoor self storage units and accessory restrooms, mechanical areas, and an indoor dock area. Approximately 52,000 s.f. of the site will be paved with asphalt for parking/circulation area with 32 parking spaces proposed. A modification of the standard parking requirement is requested under a separate application submittal. Approximately 22% of the developed site will be landscaped.

U-HAUL CARSON CITY PRELIMINARY CIVIL PLANS FOR SPECIAL USE PERMIT

PRELIMINARY COVERAGE / EARTHWORK QUANTITIES

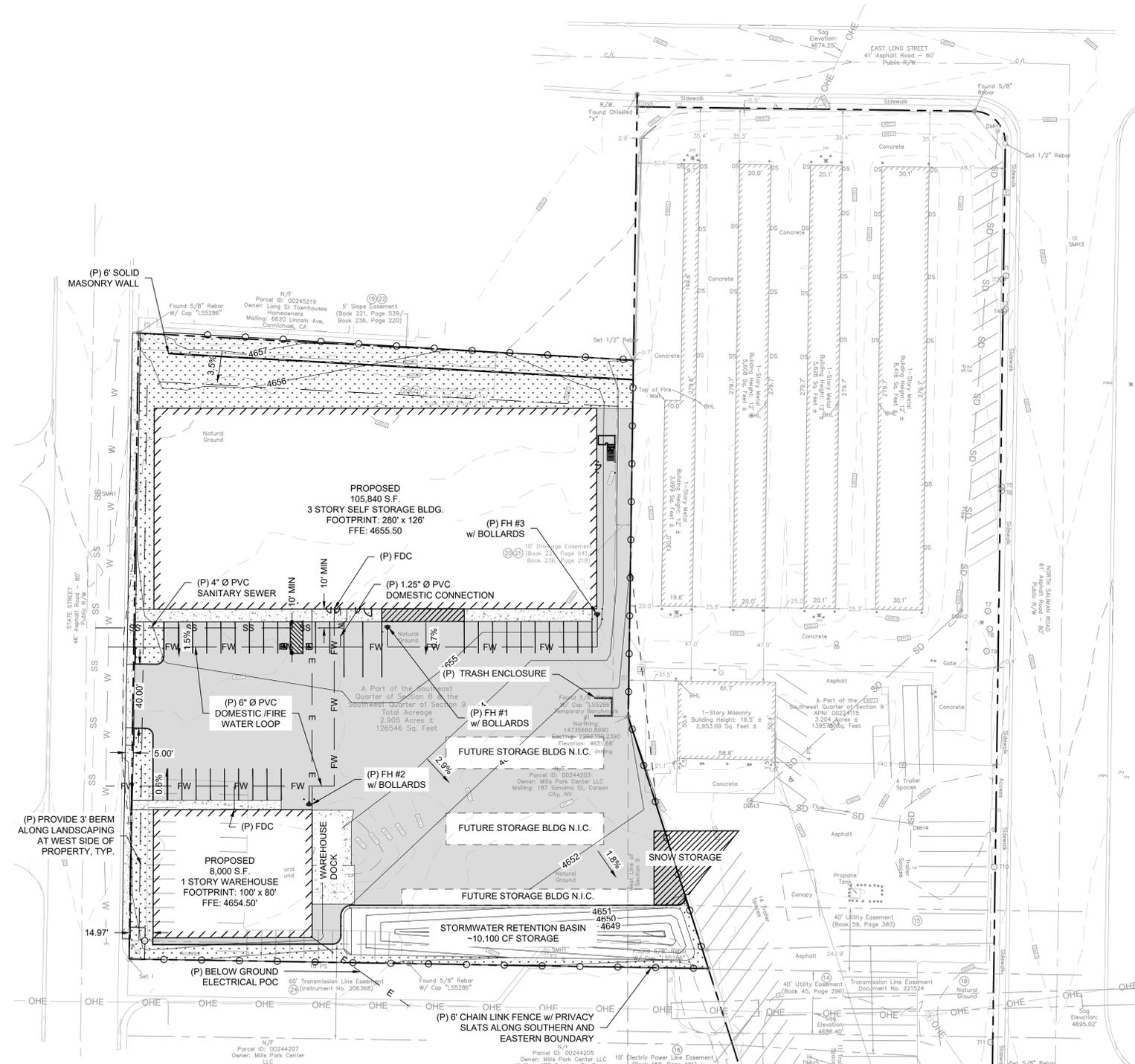
AREA OF DISTURBANCE	2.9	ACRE
BUILDING AREA	43,280	SF
IMPERVIOUS PAVEMENT AREA	64,030	SF
LANDSCAPING AREA	19,014	SF
CUT	-275	CY
FILL	+5,425	CY
NET	+5,150	CY (IMPORT)

LEGEND

---	SUBJECT PL
---	ADJACENT PL
---	SETBACK
---	EASEMENT
---	(E) ROAD CL
---	(P) ROAD CL
---	(E) MAJOR CONTOUR
---	(E) MINOR CONTOUR
---	(P) MAJOR CONTOUR
---	(P) MINOR CONTOUR
---	(E) FENCE
---	(P) FENCE
---	(E) SANITARY SEWER
---	(P) SANITARY SEWER
---	(E) STORM DRAIN
---	(P) STORM DRAIN
---	(E) WATER LINE
---	(P) WATER LINE
---	(E) GAS LINE
---	(P) GAS LINE
---	(E) RETAINING WALL
---	(P) RETAINING WALL
---	(E) FLOW LINE
---	(P) FLOW LINE
---	(E) AC
---	(P) AC
---	(E) PCC
---	(P) PCC
---	(E) STRUCTURE
---	(P) STRUCTURE

ABBREVIATIONS

AC	ASPHALT CONCRETE
APN	ASSESSOR'S PARCEL NO.
BSW/BOW	BACK OF WALK
CMF	CORRUGATED METAL PIPE
COTG	CLEAN OUT TO GRADE
CL	CENTER LINE
CY	CUBIC YARDS
(E)	EXISTING
EG	EXISTING GRADE
FDC	FIRE DEPT. CONNECTION
FFC	FRONT FACE OF CURB
FFE	FINISH FLOOR ELEVATION
FG	FINISH GRADE
FH	FIRE HYDRANT
FL	FLOW LINE
HDPE	HIGH DENSITY POLYETHYLENE
IE	INVERT ELEVATION
LF	LINEAR FEET
MDD	MAXIMUM DRY DENSITY
NDOT	NV DEPT. OF TRANSPORTATION
OHE	OVERHEAD ELECTRICAL
P	PROPOSED
PCC	PORTLAND CEMENT CONCRETE
PV	PRESSURE INDICATOR VALVE
POC	POINT OF CONNECTION
PUE	PUBLIC UTILITY EASEMENT
PVC	POLYVINYL CHLORIDE
ROW	RIGHT-OF-WAY
SD	STORM DRAIN
SDR	STD. DIMENSION RATIO
SF	SQUARE FEET
SS	SANITARY SEWER
TC	TOP OF CURB
TW	TOP OF WALL
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
YH	YARD HYDRANT



GENERAL NOTES

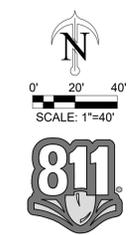
- THESE PLANS HAVE BEEN PREPARED IN ACCORDANCE WITH ACCEPTED ENGINEERING PROCEDURES AND GUIDELINES, AND ARE BELIEVED TO BE IN SUBSTANTIAL COMPLIANCE WITH APPLICABLE STATUTES, AND ORDINANCES OR STANDARDS SPECIFIED BY THE PERMITTING JURISDICTION. IN THE EVENT OF A CONFLICT BETWEEN ANY PORTION OF THESE PLANS AND PERMITTING STANDARDS, PROMPTLY NOTIFY ENGINEER, OR ADOPT THE MORE CONSERVATIVE STANDARD CONSISTENT WITH THE INTENT OF THE PLANS. IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, CONTRACTOR BEARS SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY.
- THE ENGINEER SHALL NOT BE RESPONSIBLE OR LIABLE FOR UNAUTHORIZED CHANGES TO OR USES OF THESE PLANS. ALL CHANGES TO THE PLANS MUST BE IN WRITING AND MUST BE APPROVED BY THE ENGINEER.
- IN THE EVENT ELECTRONIC FILES (CAD, ETC) ARE PROVIDED BY ROBISON ENGINEERING, AN IDENTIFICATION AGREEMENT IS IMPLIED BY THAT USE, AND IF THERE IS ANY CONFLICT BETWEEN ELECTRONIC DATA AND THE STAMPED/PERMIT PLAN SET, THE STAMPED DRAWINGS SHALL GOVERN AND DIRECT THE WORK. IT IS THE SOLE RESPONSIBILITY OF THE CLIENT TO ACQUIRE APPROVED PLANS FROM THE GOVERNING JURISDICTION.
- THIS MAP IS PREPARED TO ILLUSTRATE TOPOGRAPHY AND FEATURES FOR ARCHITECTURAL AND ENGINEERING PLANNING AND DESIGN ONLY. NO INFORMATION SHALL BE CONSTRUED TO REPRESENT A FORMAL SURVEY OF THE SUBJECT PROPERTY, OR TO RENDER ANY OPINION THEREON.
- REFER TO ARCH PLANS FOR ADDITIONAL INFORMATION ON BUILDING AND SITE FEATURES NOT DESCRIBED HEREIN.
- REFER TO ALTA BY BLEW AND ASSOCIATES SEPTEMBER 2020 FOR BASIS OF BEARINGS AND ELEVATIONS.

GRADING NOTES

- ALL EXCAVATION AND EMBANKMENT SHALL BE IN ACCORDANCE WITH CARSON CITY STANDARDS.
- ALL NATURAL VEGETATION OUTSIDE OF DISTURBANCE LIMITS TO BE PRESERVED; ADDITIONAL DISTURBANCE NOT PART OF PLANNED LANDSCAPING SHALL BE STABILIZED AND BROADCAST AND RAKED DURING OCTOBER-NOVEMBER, OR HYDROSEEDING IN COORDINATION WITH, AND SUBJECT TO APPROVAL BY PROPERTY OWNER.
- GROUNDWATER IS NOT EXPECTED TO BE ENCOUNTERED DURING GRADING ACTIVITIES. IN THE EVENT THAT GROUNDWATER IS ENCOUNTERED, CONTRACTOR SHALL DEWATER AND DISCHARGE ONSITE IN ACCORDANCE WITH LOCAL AND STATE REGULATIONS.
- THE INSPECTION AND TESTING OF SOILS AND ALL OTHER MATERIALS SHALL BE IN CONFORMANCE WITH ORANGE BOOK STANDARDS AND SITE SPECIFIC SOILS REPORT AS APPLICABLE. THIRD PARTY TESTING AGENCY SHALL BE NOTIFIED 24 HOURS PRIOR TO REQUIRED TESTING. ALSO, ON-LINE INSPECTION REQUEST TO SPWD TO BE SUBMITTED 24 HOURS PRIOR TO ALL INSPECTIONS.
- REFER TO STRUCTURAL PLANS FOR EARTHWORK REQUIREMENTS OF BUILDING PADS AND FOUNDATIONS. SLOPES NOT TO EXCEED 2% IN ANY DIRECTION IN ADA PARKING AREAS.
- REFER TO THE PRELIMINARY GEOTECHNICAL EVALUATION BY NINYO AND MOORE MAY 2021 FOR ADDITIONAL GRADING REQUIREMENTS.

UTILITY NOTES

- UTILITY INSTALLATION SHALL CONFORM TO STANDARDS ESTABLISHED BY THE UTILITY PROVIDER(S), INCLUDING TRENCHING DEPTH, FILL MATERIAL, LOCATION MARKERS, ETC.
- THE LOCATION OF UNDERGROUND UTILITIES SHOWN HEREON HAS BEEN DETERMINED FROM SURFACE EVIDENCE OF THEIR EXISTENCE OR FROM INFORMATION OBTAINED FROM THE UTILITY COMPANIES. THE ENGINEER ACCEPTS NO LIABILITY FOR THE EXISTENCE OR NON-EXISTENCE OF UTILITY LINES. CONTRACTORS AND OTHERS USING THIS MAP MUST CONFIRM THE LOCATION OF UNDERGROUND LINES OR STRUCTURES FROM THE UTILITY COMPANIES PRIOR TO COMMENCING ANY EXCAVATION OR ORDERING OF MATERIALS. COORDINATE WITH OWNER, ENGINEERS, CONSULTANTS, UTILITY COMPANIES PRIOR TO, DURING & AFTER CONSTRUCTION FOR ACTUAL CONSTRUCTION / INSTALLATION STANDARDS & CLARIFICATION.



Know what's below.
Call before you dig.

U-HAUL CARSON CITY
PRELIMINARY CIVIL PLANS

THESE PLANS AND A COPY OF THIS PLAN SHALL BE KEPT ON THE JOB SITE AT ALL TIMES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE GOVERNING JURISDICTION.

PREPARED FOR:
U-HAUL COMPANY
OF NORTHERN NEVADA

10400 S VIRGINIA ST
RENO, NV 89511

775-550-3208

848 VICTORIAN AVENUE
RENO, NV 89511
(775) 852-2251
www.robisoneng.com

DATE: PENDING

**PRELIMINARY
NOT FOR
CONSTRUCTION**

NO	DATE	BY	CHKD	DESCRIPTION
1				
2				
3				
4				
5				
6				
7				
8				

REFERENCES

NO	DATE	BY	CHKD	DESCRIPTION
P1	04/15/2021	RMS	RMS	MPR SUBMITTAL
P2	06/16/2021	RMS	RMS	SUP SUBMITTAL
P3	07/01/2021	RSALD	NER	SUP SUBMITTAL - REV1

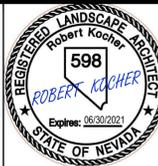
REVISIONS

NO	DATE	BY	CHKD	DESCRIPTION

APPROVALS

C1

SHEET 1 OF 1

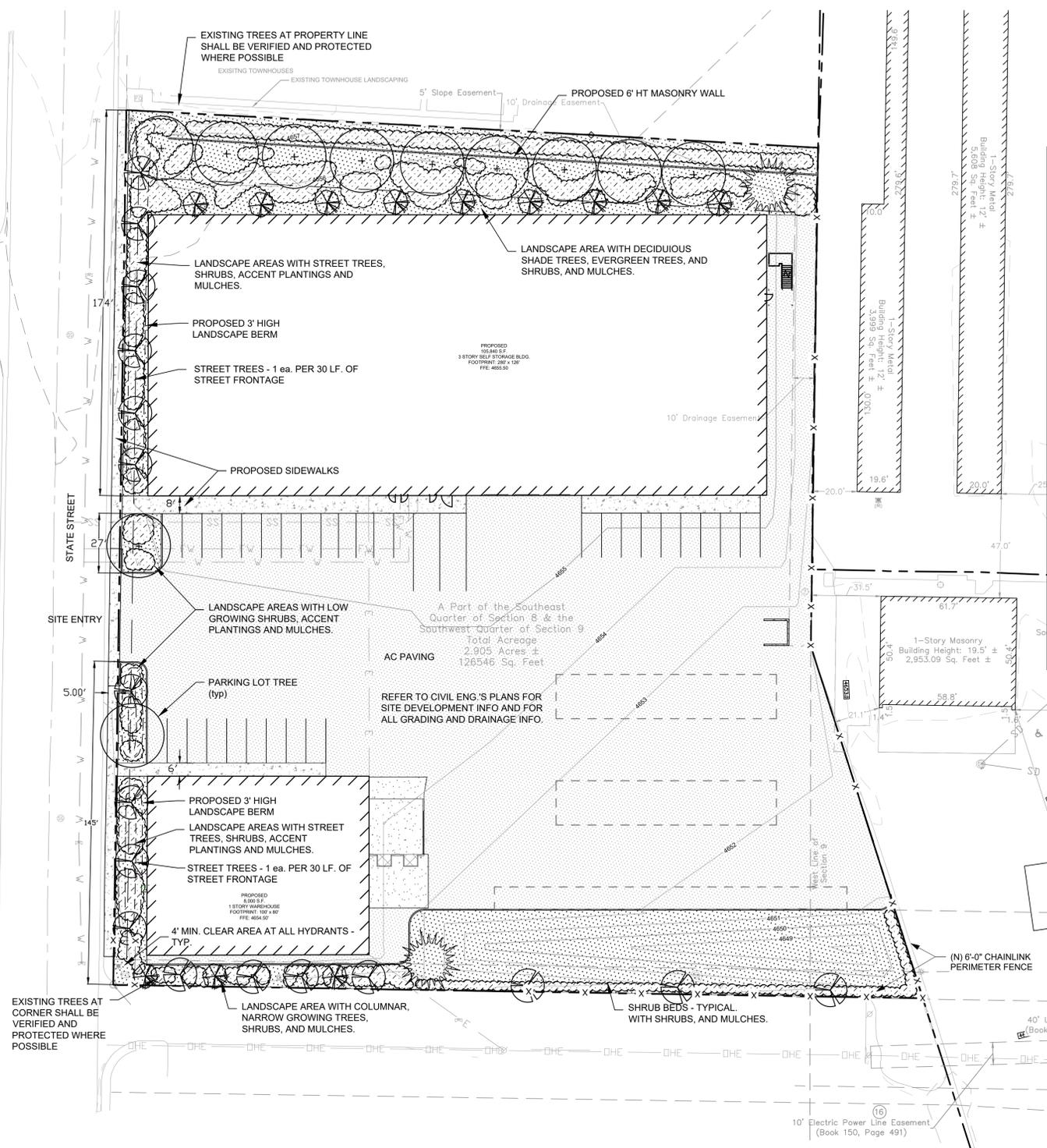
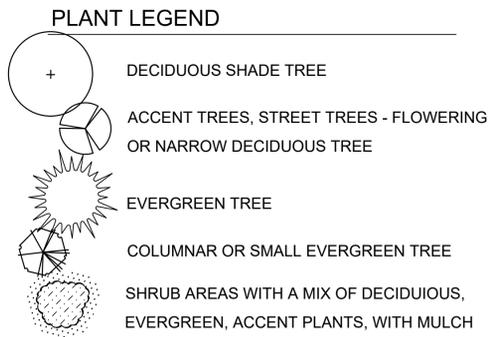


**CARSON CITY
LANDSCAPE DATA**

ZONING: GC - GENERAL COMMERCIAL
 PROJECT AREA: 2.9 ac. / 126,324 sf
 BUILDING AREA: 43,280 sf
 REQUIRED LANDSCAPE AREA: 20% = 16,609 sf
 (126,324 sf - 43,280 sf = 83,044 sf) 83,044 x .20 = 16,609
 PROVIDED LANDSCAPE AREA: 19,014 sf

TREES REQUIRED: 42 ea.
 1 TREE PER 400 SF OF REQ. LS AREA = 42 ea.
 (16,609 / 400 = 41.50)
 INCLUDES:
 1 TREE PER EVERY 10 REQ. PARKING SPACES
 1 TREE PER 30 LF STREET FRONTAGE
 TREES PROPOSED: 42 ea.

SHRUBS REQUIRED: 252 ea.
 (6 SHRUBS PER 400 SF OF REQ. LS AREA) = 252 ea.
 (16,609 / 400 = 42 x 6 = 249)
 SHRUBS PROPOSED: 249 ea.



PLAN IS CONCEPTUAL. PLANT QUANTITIES INDICATED ARE PER CITY OF CARSON CITY CODE REQUIREMENTS. PLANT LOCATIONS AND SPECIES SELECTION SHALL BE DETERMINED UPON DEVELOPMENT OF THE FINAL CONSTRUCTION DOCUMENTS. EXISTING TREES ON SITE THAT ARE OUTSIDE OF CONSTRUCTION LIMITS AND CAN BE PROTECTED DURING CONSTRUCTION SHALL REMAIN.

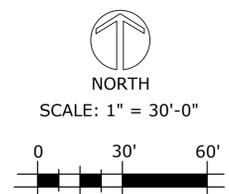
GENERAL NOTES

- 1) ALL PLANTING AND IRRIGATION SHALL BE INSTALLED PER LOCAL GOVERNING CODES.
- 2) FINAL PLANT SELECTION AND LAYOUT WILL BE BASED ON SOUND HORTICULTURAL PRACTICES RELATING TO MICRO-CLIMATE, SOIL, AND WATER REGIMES. ALL TREES WILL BE STAKED SO AS TO REMAIN UPRIGHT AND PLUMB FOLLOWING INSTALLATION. PLANT SIZE AND QUALITY AT TIME OF PLANTING WILL BE PER THE AMERICAN STANDARD FOR NURSERY STOCK (ANSI Z60.1).
- 3) ALL SHRUB BEDS WILL RECEIVE MULCH AS SPECIFIED ON FINAL LANDSCAPE PLANS.
- 4) ALL LANDSCAPING WILL BE AUTOMATICALLY IRRIGATED - PLANTINGS WILL BE DRIP IRRIGATED. A REDUCED-PRESSURE-TYPE BACKFLOW PREVENTER WILL BE PROVIDED ON THE IRRIGATION SYSTEM AS REQUIRED PER CODE.

TREE SELECTION SHALL BE GUIDED BY THE APPROVED CARSON CITY TREE LIST FOR COMMERCIAL PROJECTS

TREE PLANTINGS MAY CONSIST OF THE MINIMUM SIZES:
 50% 2" CALIPER DECIDUOUS
 50% 1" CALIPER DECIDUOUS
 6' HEIGHT EVERGREEN

SHRUB PLANTINGS SHALL BE 5-GALLON SIZE
 50% OF THE SHRUBS SHALL BE SPECIES THAT WILL ATTRACT POLLINATORS

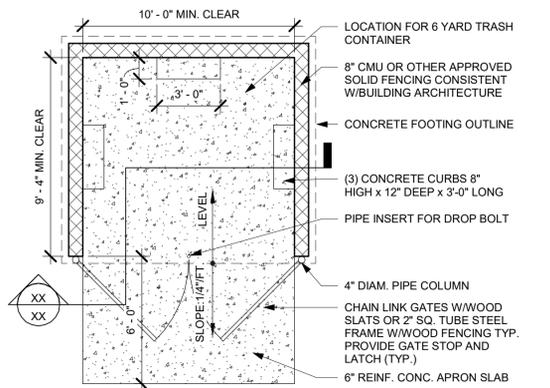


June 2021
 Rev. June 28, 2021

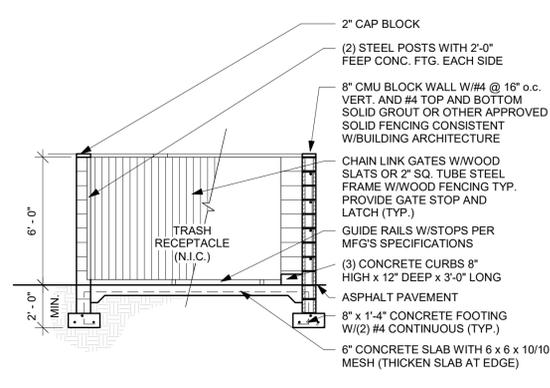
Atomic Landscape Design, llc.
 775-742-1637
 RENO, NV. 89523

**U-HAUL on STATE STREET
 CARSON CITY
 PRELIMINARY LANDSCAPE PLAN**

PREPARED FOR:
 U-HAUL NORTHERN NEVADA



4 TRASH ENCLOSURE TYP. - PLAN
1/4" = 1'-0"



5 TRASH ENCLOSURE TYP. - SECT.
1/4" = 1'-0"

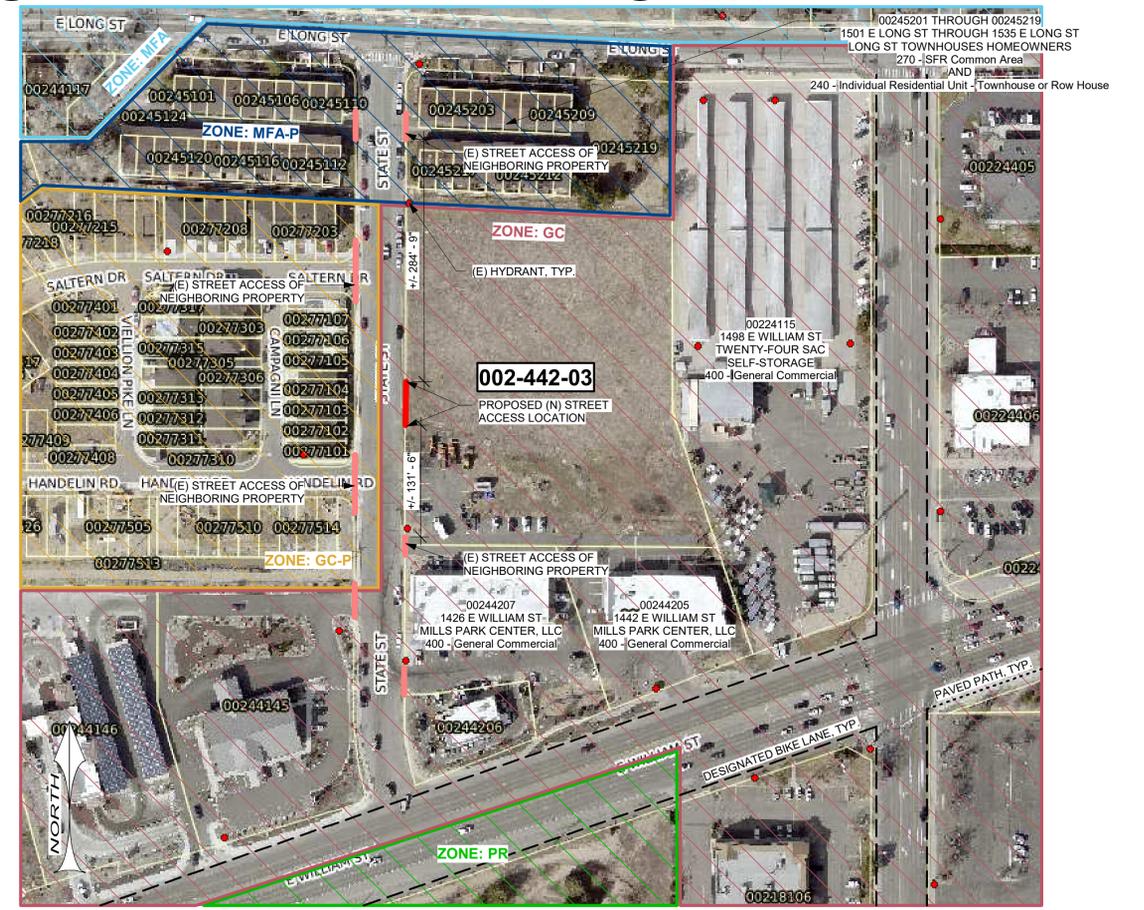
ACCESSIBLE PARKING
TOTAL PARKING SPACES PROVIDED: 25 TO 50
REQUIRED MINIMUM NUMBER OF ACCESSIBLE SPACES: 2
VAN ACCESSIBLE PARKING SPACES: 1 PER 6
REQUIRED NUMBER OF VAN ACCESSIBLE PARKING SPACES: 1
TOTAL (VAN) ACCESSIBLE PARKING SPACES PROVIDED: 2

PARKING
INDUSTRIAL USE, STORAGE BUILDING
1 SPACE FOR EACH 1,000 S.F. OF GROSS FLOOR AREA, PLUS 1 SPACE FOR EACH EMPLOYEE
STORAGE BUILDING: 105,840 S.F. / 1,000 S.F. = 105.84 = 106 SPACES
WAREHOUSE BUILDING: 8,000 S.F. / 1,000 S.F. = 8 SPACES
EMPLOYEE ESTIMATE = 4 SPACES
TOTAL REQUIRED PER CODE: 118
PROPOSED PARKING SPACES: 32
PROPOSED TO REQUEST MODIFICATION OF PARKING REQUIREMENTS - SEE VARIANCE APPLICATION

ADJACENT ROADWAY FUNCTIONAL CLASSIFICATION
E LONG ST.: MINOR COLLECTOR
E WILLIAM ST.: MINOR ARTERIAL
STATE ST.: LOCAL

GENERAL
PARCEL: 002-442-03
ZONE: GC
LAND USE CATEGORY: MUR
SITE AREA: 2.9 ACRES (126,324 S.F.)
FEMA FLOOD HAZARD ZONE: ZONE X, 0.2 PCT ANNUAL CHANCE FLOOD HAZARD
PROPOSED STORAGE BUILDING S.F.: 105,840 S.F.
BUILDING TYPE: II-B
STORAGE BUILDING OCCUPANCY: STORAGE
STORAGE BUILDING OCCUPANT LOAD: 212
PROPOSED WAREHOUSE BUILDING SQFT: 8,000 S.F.
BUILDING TYPE: II-B
STORAGE BUILDING OCCUPANCY: STORAGE
WAREHOUSE BUILDING OCCUPANT LOAD: 16

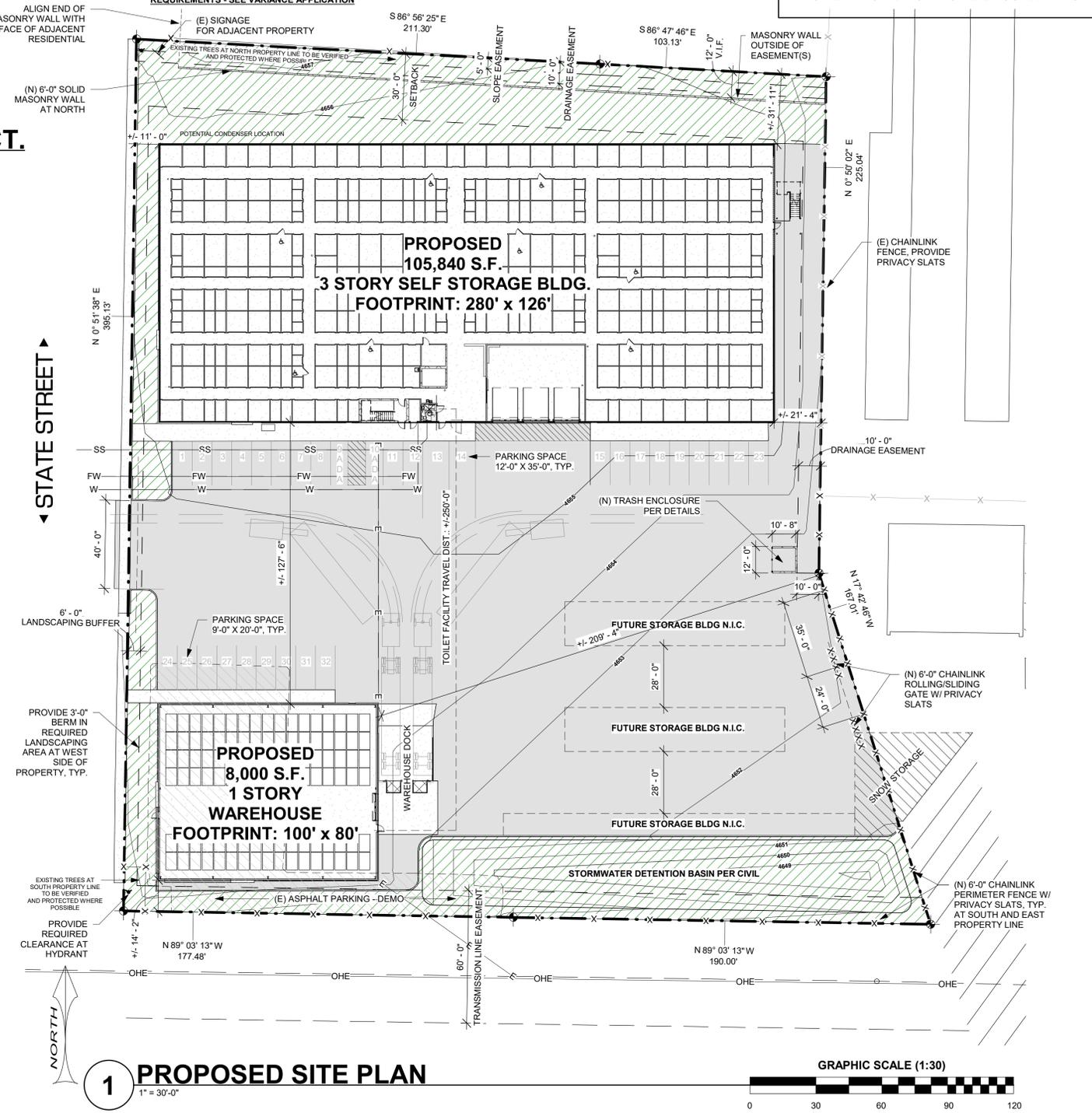
SITE PLAN NOTES
APN: 002-442-03
OWNER: FIVE SAC SELF-STORAGE CORP.
1. THERE IS AN AVAILABLE PUBLIC WATER SYSTEM.
2. THIS IS NOT A LEGAL SURVEY. PROPERTY DESCRIPTION INFORMATION ON THIS SHEET FOR GENERAL USE ONLY.
3. PROVIDE POSITIVE DRAINAGE AWAY FROM PERIMETER OF BUILDING. MINIMUM SLOPE 2% FOR 10' MIN. AWAY FROM BLDG.
4. SLOPE ALL CONCRETE 1% UNLESS NOTED OTHERWISE.
5. CONNECT UTILITY EXTENSIONS TO EXISTING UTILITIES. CONTRACTOR TO VERIFY LOCATIONS OF EXTENSIONS.
6. LIMITS OF CONSTRUCTION, STORAGE AREA, & VEGETATION OF CONCERN TO BE COORDINATED W/OWNER OR ARCHITECT
7. FOR REMAINING SITE INFORMATION REFER TO CIVIL DRAWINGS



2 ENLARGED VICINITY MAP / EXISTING SITE
1" = 100'-0" GRAPHIC SCALE (1:100)



3 VICINITY MAP
N.T.S.



1 PROPOSED SITE PLAN
1" = 30'-0" GRAPHIC SCALE (1:30)

CIVIL SUP SHEETS
BY ROBISON ENGINEERING COMPANY, INC.
C1 PRELIMINARY CIVIL PLANS
SITE, UTILITY, AND GRADING
LANDSCAPE SUP SHEETS
BY ATOMIC LANDSCAPE DESIGN, LLC.
1/1 PRELIMINARY LANDSCAPE PLAN

Architectural SUP Set Sheet List	
Sheet Number	Sheet Name
SUP A1.1	SUP SITE PLAN
SUP A2.1	SUP STORAGE BLDG. / WH FLOOR PLANS
SUP A2.2	SUP STORAGE BLDG. FLOOR PLANS
SUP A3.1	SUP STORAGE BLDG. ELEVATIONS
SUP A3.2	SUP STORAGE BLDG. ELEVATIONS
SUP A3.3	SUP WAREHOUSE ELEVATIONS
SUP A3.4	SUP WAREHOUSE ELEVATIONS

U-HAUL CARSON CITY SPECIAL USE PERMIT SET
0 STATE ST. CARSON CITY, NV 89701
APN: 002-442-03
APPLICANT:
JOSH TORNBOM
U-HAUL
10400 SOUTH VIRGINIA ST.
RENO, NV 89511
P: (775) 530-3208
JOSH_TORNBOM@UHAUL.COM
PLANS PREPARED BY:
JAMES MOLDER
CONCEPT ARCHITECTURE, LLC.
1005 TERMINAL WAY SUITE 245
RENO, NV 89502
P: (775) 247-7889
JMOLDER@CONCEPTARCHITECTURE.COM
PROPERTY OWNER:
FIVE SAC SELF-STORAGE CORP.
207 EAST CLARENDON AVE.
PHOENIX, AZ, 85012

SPECIAL USE PERMIT APPLICATION
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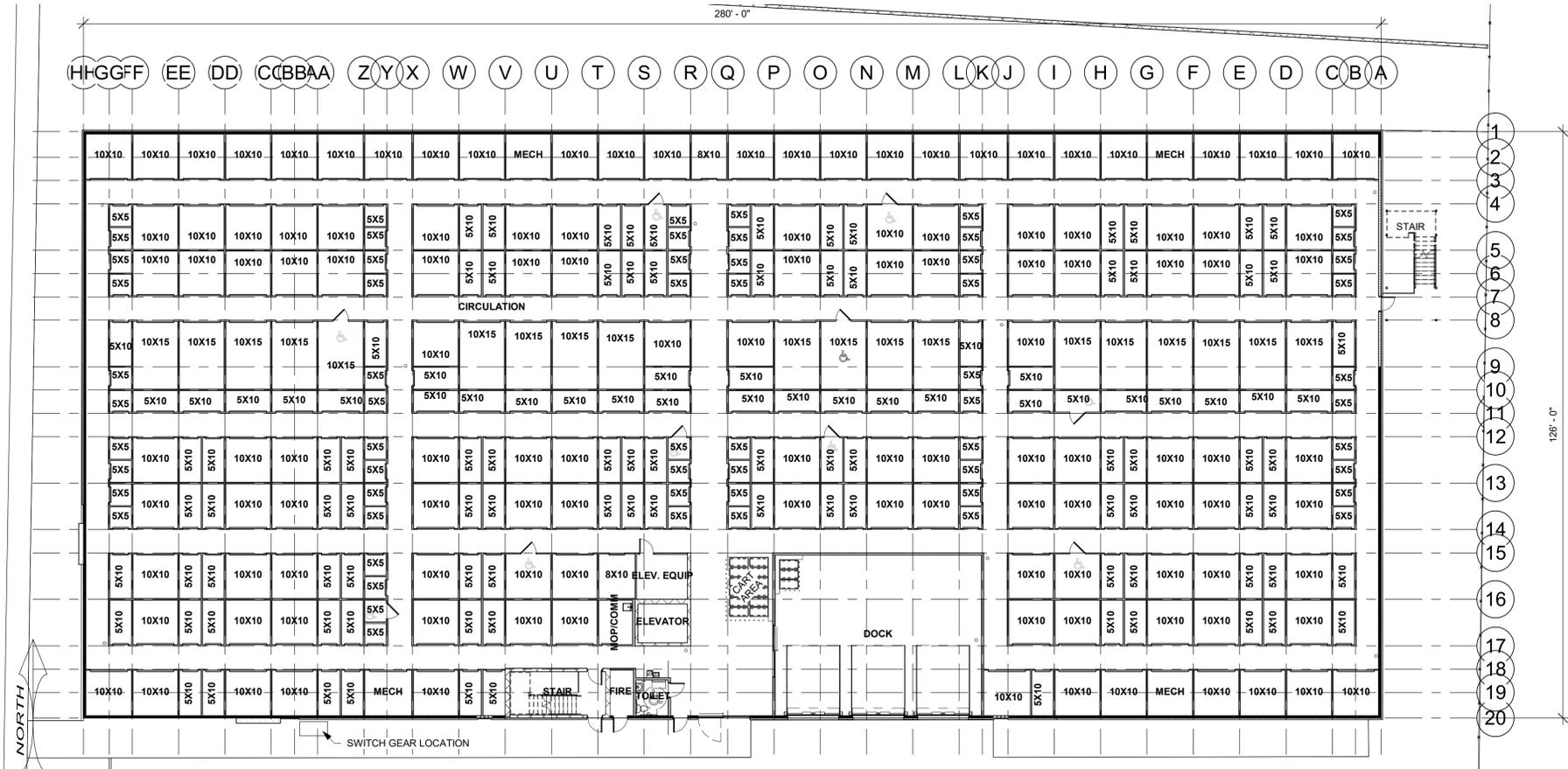
CONCEPT ARCHITECTURE, LLC
5615 W. CABIN ROAD - SUITE 1A - EVERETT, WA 98204
1005 TERMINAL WAY - SUITE 245 - RENO, NV 89502
WA-REG57787586 NV-7752477865

U-HAUL CARSON CITY
0 STATE ST. CARSON CITY, NV 89701

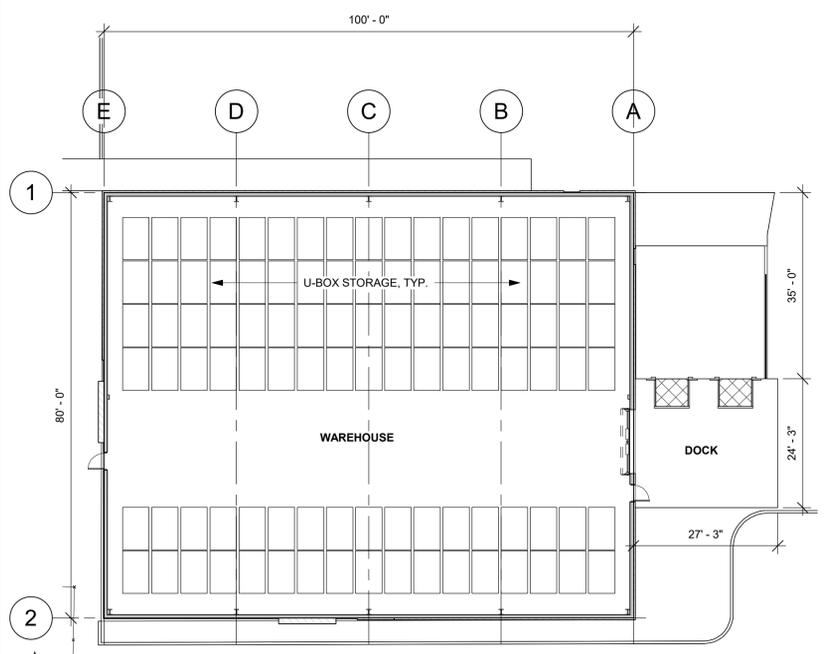
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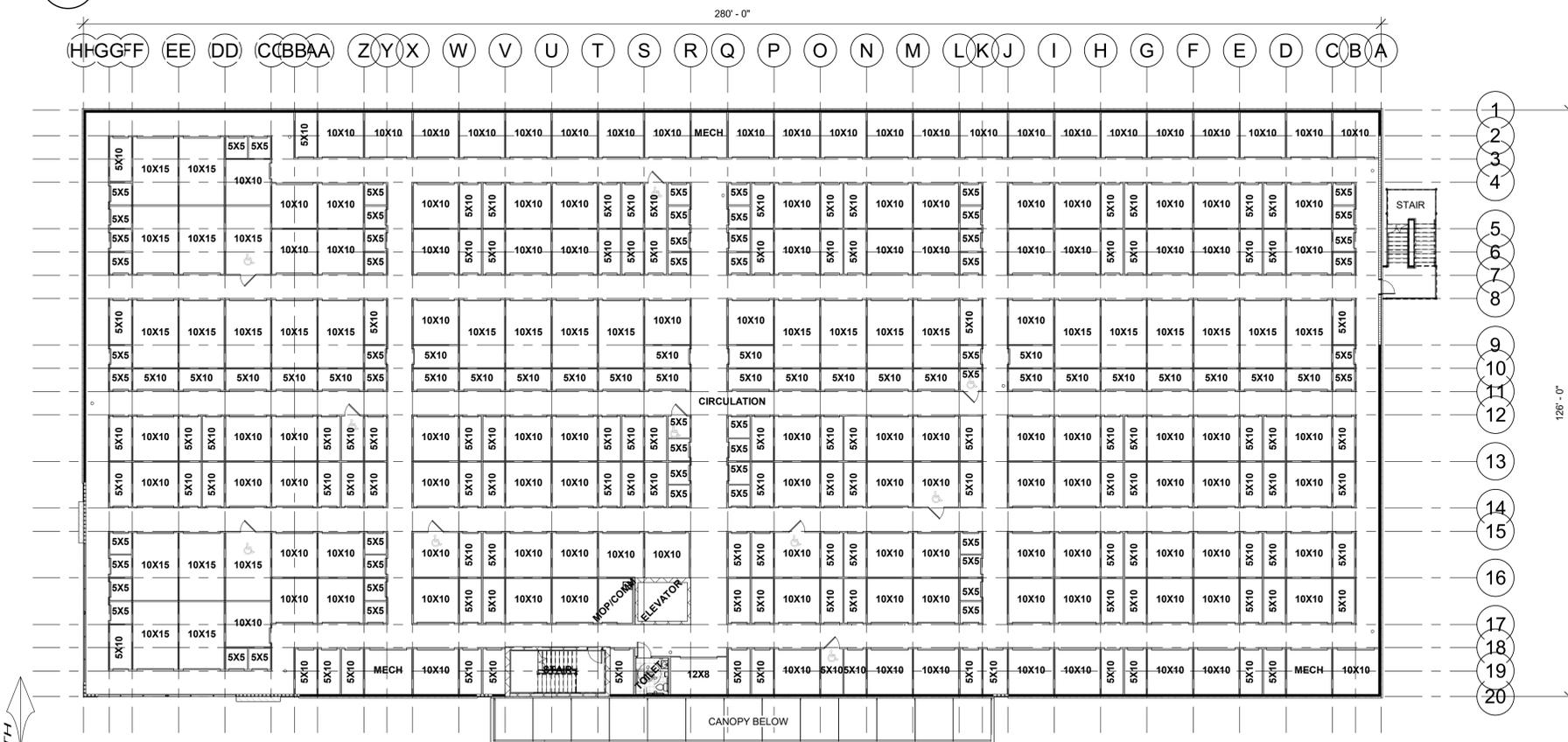
CONCEPTARCHITECTURE.COM



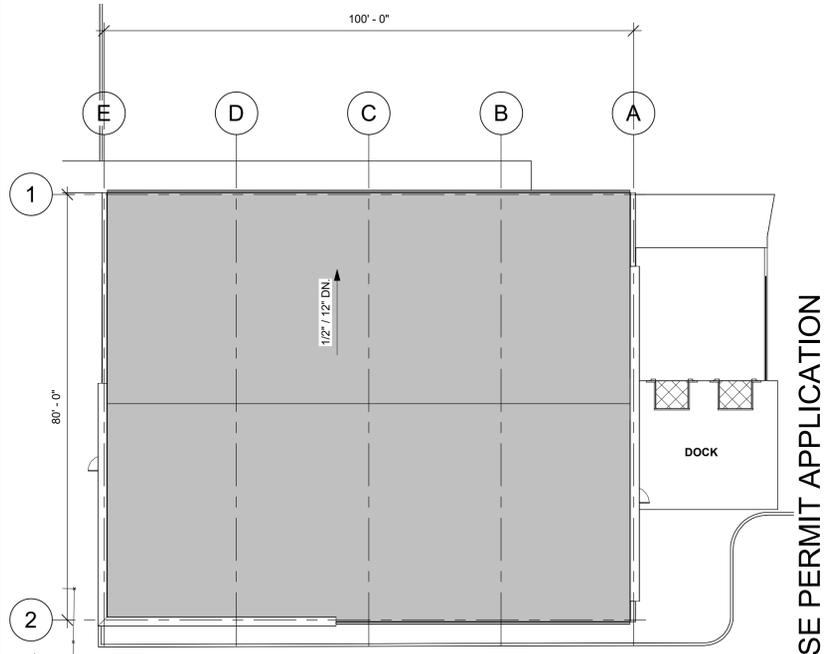
1 STORAGE BUILDING 1ST FLOOR PLAN SUP
1/16" = 1'-0"



3 WAREHOUSE 1ST LEVEL SUP
1/16" = 1'-0"



2 STORAGE BUILDING 2ND FLOOR PLAN SUP
1/16" = 1'-0"



4 WAREHOUSE ROOF SUP
1/16" = 1'-0"
NOTE: NO ROOF EQUIPMENT PROPOSED

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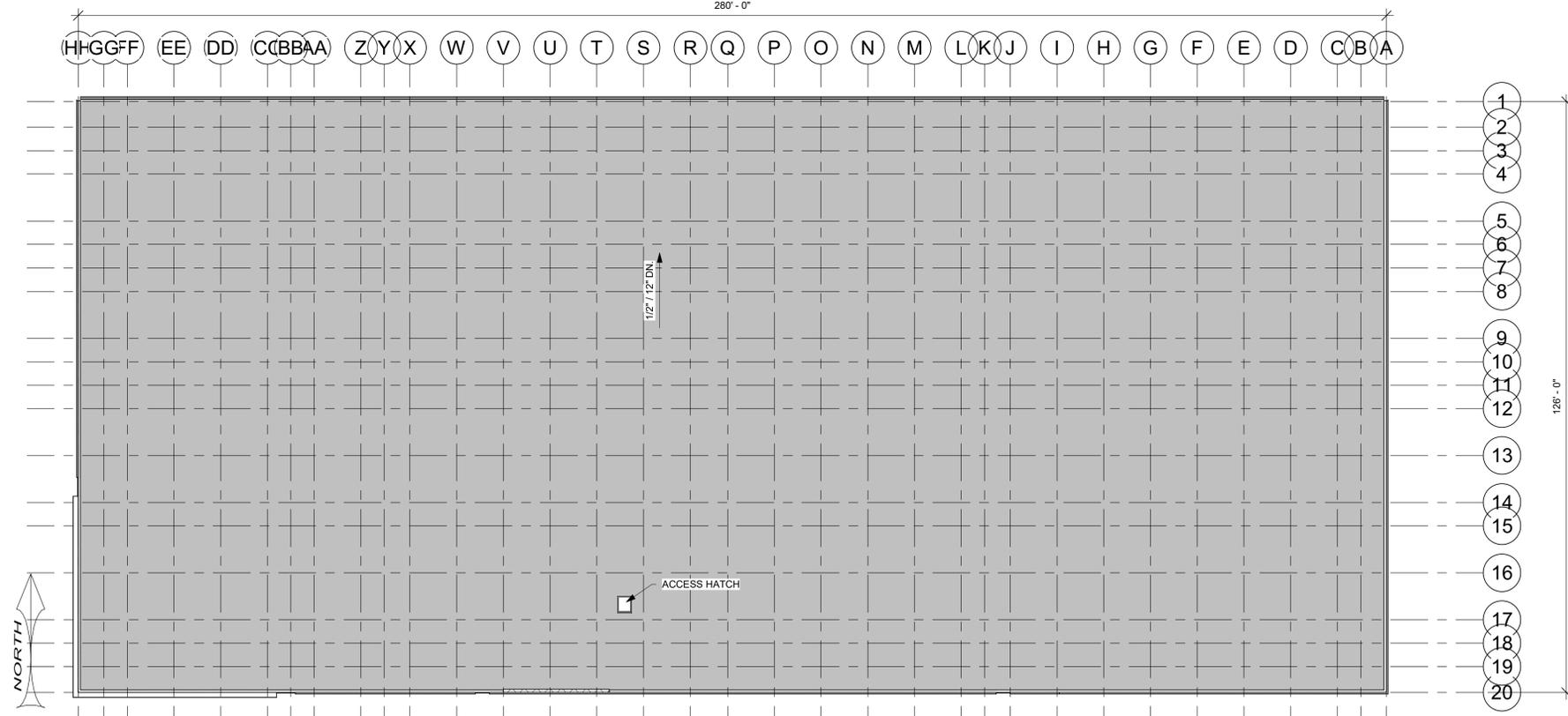
U-HAUL CARSON CITY

0 STATE ST. CARSON CITY, NV 89701

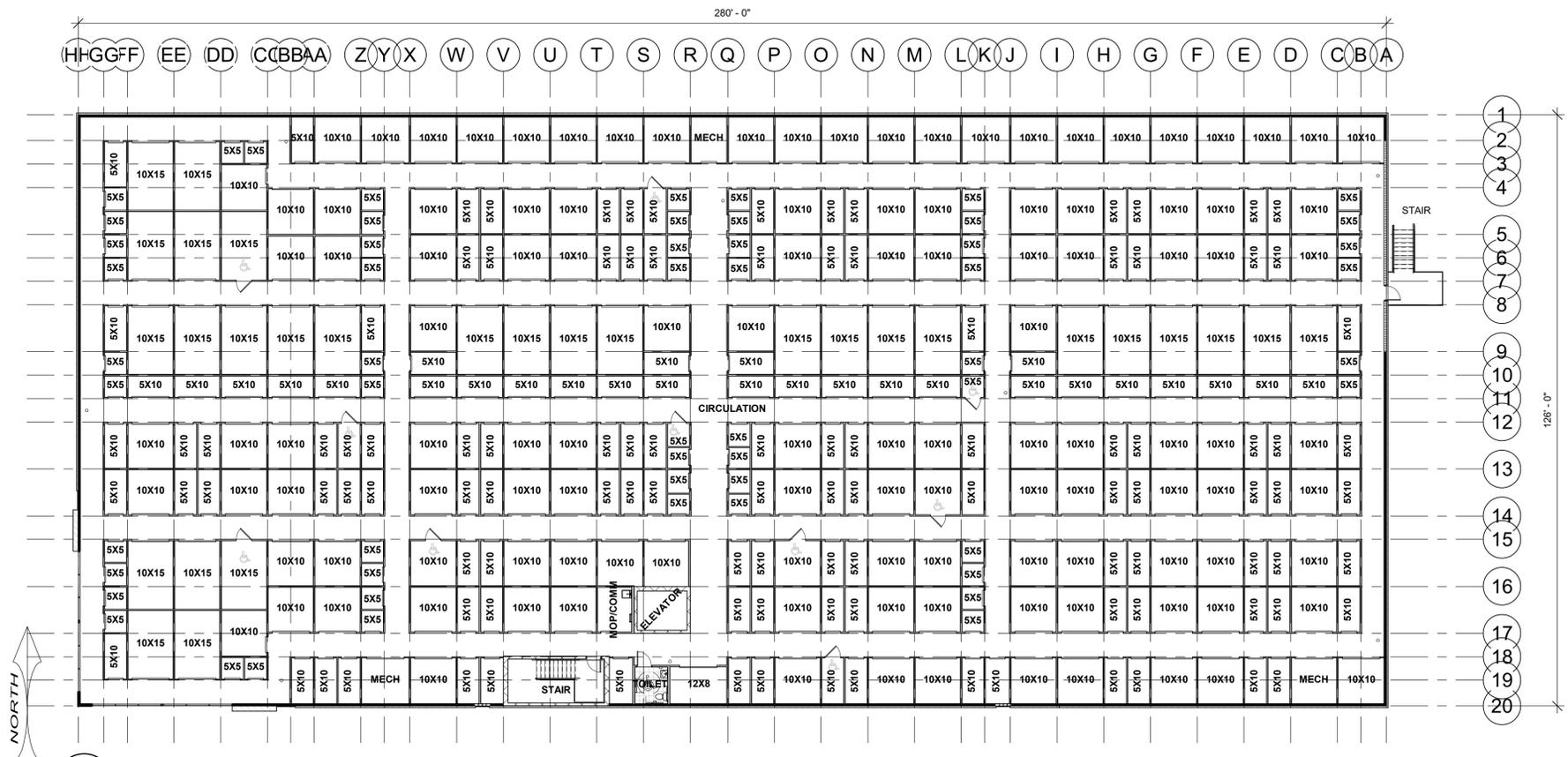
CONCEPT ARCHITECTURE, LLC

2615 W. CASINO ROAD - SUITE 1A - EVERETT, WA 98204
1005 TERMINAL WAY - SUITE 245 - RENO, NV 89502
WA - REG 57787 86 NV - 7726477868





2 STORAGE BUILDING ROOF PLAN SUP NOTE: NO ROOF EQUIPMENT PROPOSED
 1/16" = 1'-0"



1 STORAGE BUILDING 3RD FLOOR PLAN SUP
 1/16" = 1'-0"

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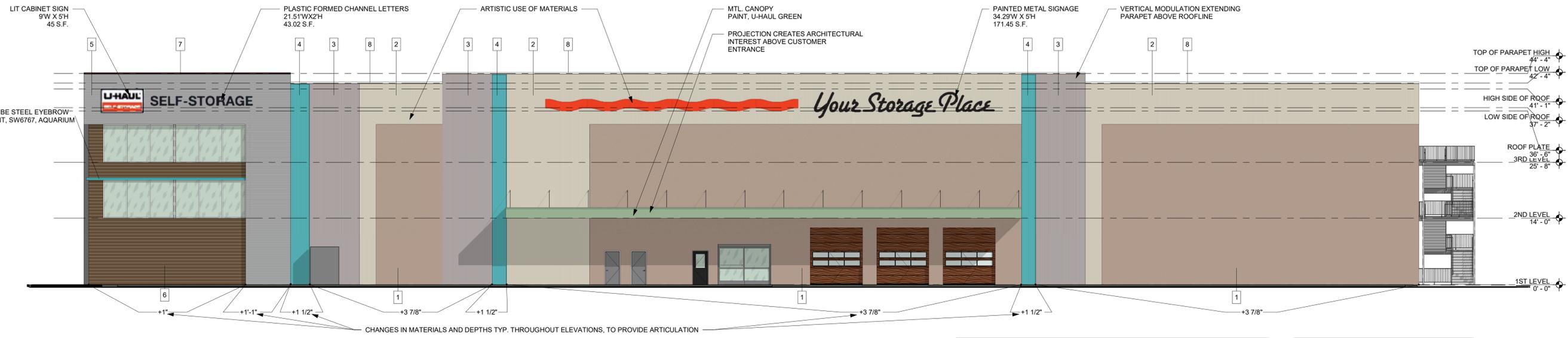
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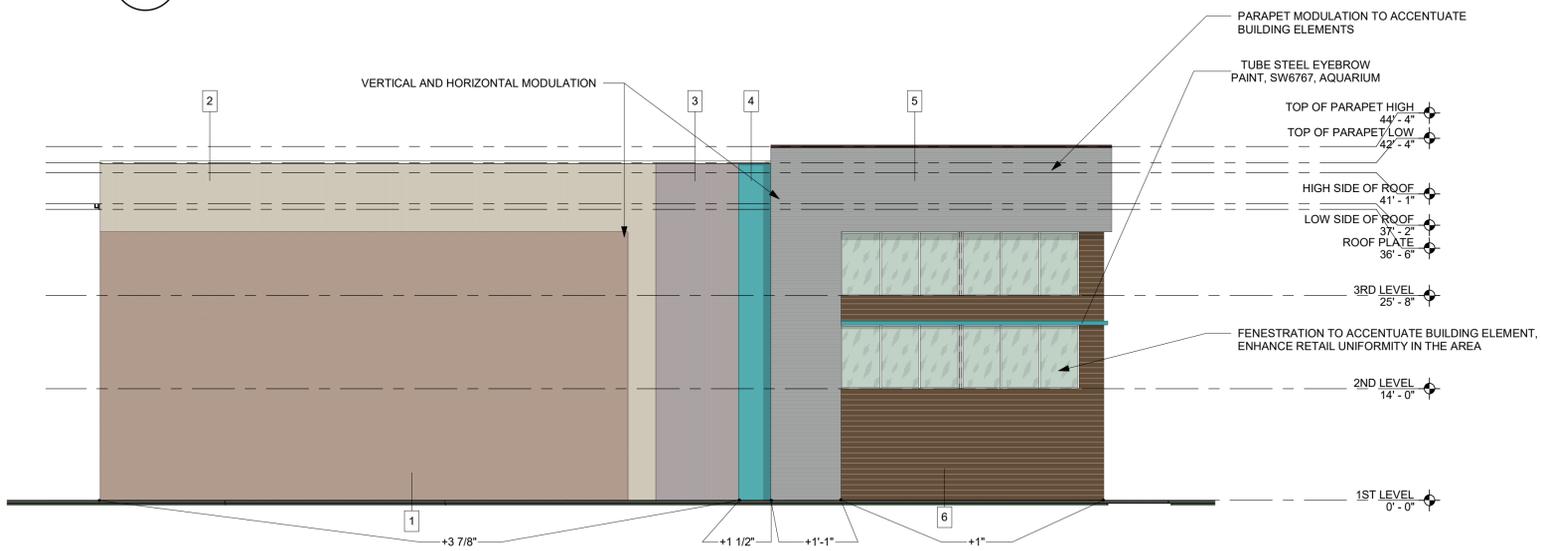
CONCEPT ARCHITECTURE, LLC

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 1005 TERMINAL WAY, SUITE 245 - RENO, NV 89502
 WA - 425.877.8678 NV - 775.847.7885





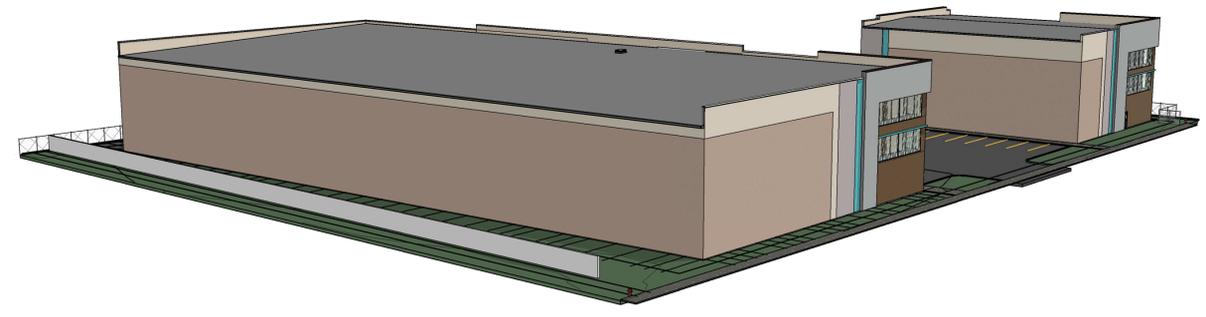
1 SOUTH ELEVATION - SUP
3/32" = 1'-0"



2 WEST ELEVATION - SUP
3/32" = 1'-0"

EXTERIOR METAL PANELS	
Material: Mark	Material: Comments
1	ATAS ISOLEREN IM INSULATED MTL PANEL PROFILE: IM (EMBOSSED STUCCO) PANEL DEPTH: 3" ORIENTATION: VERTICAL COLOR: SURREY BEIGE TEXTURE: TROWELED EMBOSSED
2	ATAS ISOLEREN ML INSULATED MTL PANEL PROFILE: ML (RIBBED) PANEL DEPTH: 3" ORIENTATION: VERTICAL COLOR: ALMOND TEXTURE: SMOOTH
3	ATAS ISOLEREN ML INSULATED MTL PANEL PROFILE: ML (RIBBED) PANEL DEPTH: 3" ORIENTATION: VERTICAL COLOR: ASH GRAY TEXTURE: SMOOTH
4	ATAS METAFOR MTL PANEL PROFILE: METAFOR PANEL DEPTH: 5/8" ORIENTATION: VERTICAL COLOR: SW6767, AQUARIUM TEXTURE: SMOOTH
5	ATAS RIGID WALL II MTL PANEL, PROFILES: ALTERNATING MFN160 / MFN 121 PANEL DEPTH: 15/16" ORIENTATION: HORIZONTAL COLOR: SILVERSMITH TEXTURE: SMOOTH
6	ATAS VERSA-SEAM MTL PANEL PROFILE: 8", 1/2" REVEAL PANEL DEPTH: 1" ORIENTATION: HORIZONTAL COLOR: WALNUT TEXTURE: WOOD GRAIN EMBOSSED

COPING	
Mark	Description
7	<varies> ATAS RAPID-LOK COPING COLOR: CHOCOLATE BROWN
8	ATAS RAPID-LOK COPING COLOR: BONE WHITE



3 SUP 3-D VIEW 1 (NW)
FOR REFERENCE ONLY



4 SUP 3-D VIEW 2 (SE)
FOR REFERENCE ONLY

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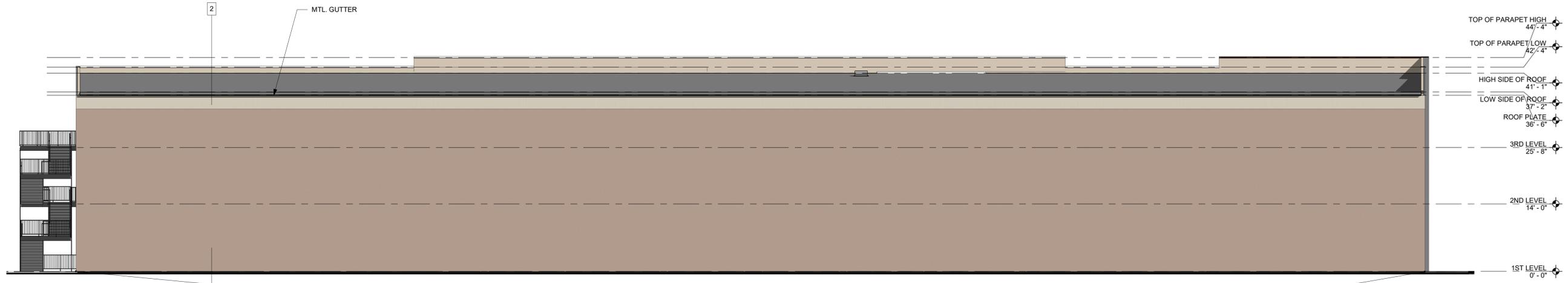
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 1005 TERMINAL WAY - SUITE 245 - RENO, NV 89502
 WA - 253-778-7878 | NV - 775-247-7885

U-HAUL CARSON CITY
 0 STATE ST. CARSON CITY, NV 89701

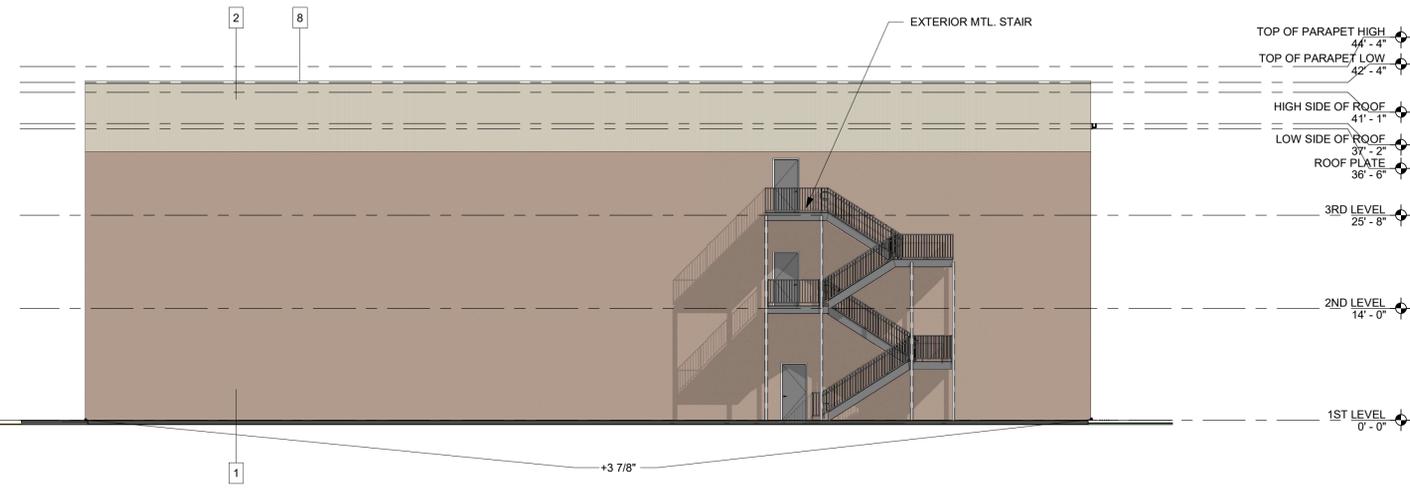
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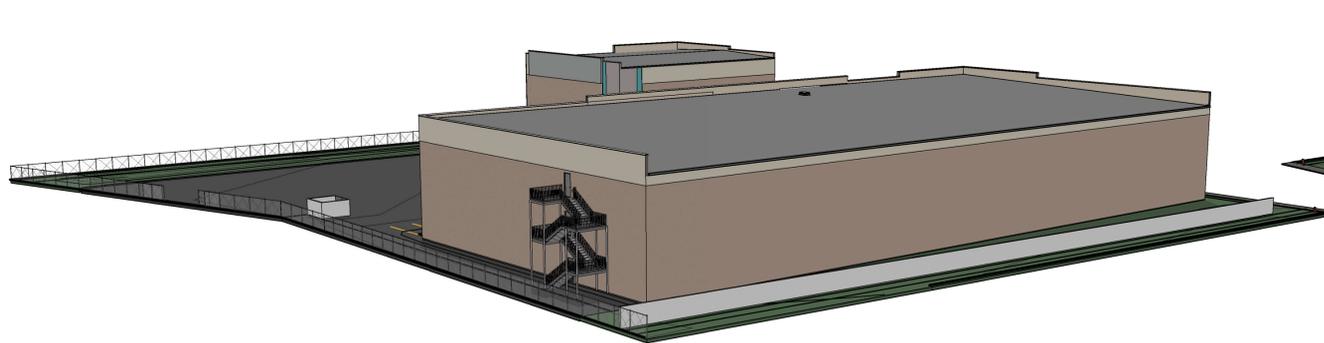
1 NORTH ELEVATION - SUP
3/32" = 1'-0"



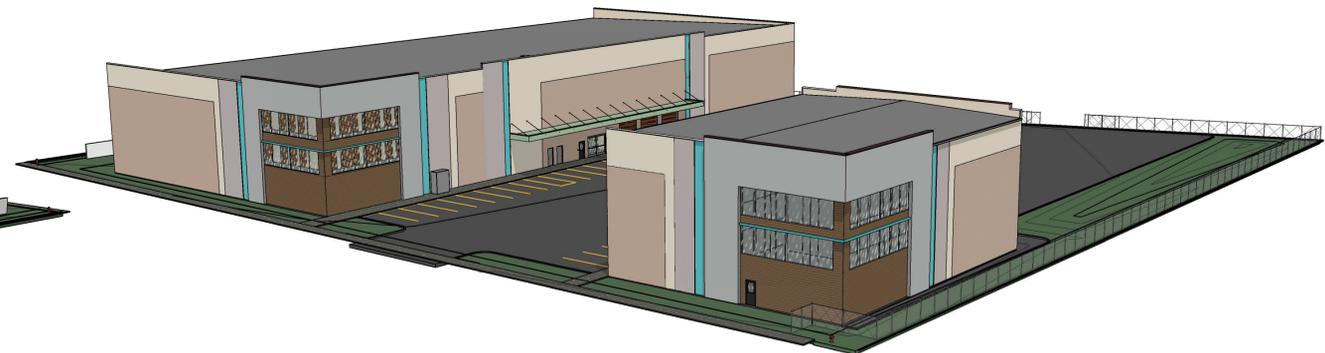
2 EAST ELEVATION - SUP
3/32" = 1'-0"

EXTERIOR METAL PANELS	
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2	ATAS ISOLEREN ML INSULATED MTL PANEL PROFILE: ML (RIBBED) PANEL DEPTH: 3" ORIENTATION: VERTICAL COLOR: ALMOND TEXTURE: SMOOTH
3	ATAS ISOLEREN ML INSULATED MTL PANEL PROFILE: ML (RIBBED) PANEL DEPTH: 3" ORIENTATION: VERTICAL COLOR: ASH GRAY TEXTURE: SMOOTH
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5	ATAS RIGID WALL II MTL PANEL, PROFILES: ALTERNATING MFN160 / MFN 121 PANEL DEPTH: 15/16" ORIENTATION: HORIZONTAL COLOR: SILVERSMITH TEXTURE: SMOOTH
6	ATAS VERSA-SEAM MTL PANEL PROFILE: 8", 1/2" REVEAL PANEL DEPTH: 1" ORIENTATION: HORIZONTAL COLOR: WALNUT TEXTURE: WOOD GRAIN EMBOSSED

COPING	
Mark	Description
	<varies>
7	ATAS RAPID-LOK COPING COLOR: CHOCOLATE BROWN
8	ATAS RAPID-LOK COPING COLOR: BONE WHITE



3 SUP 3-D VIEW (NE)
FOR REFERENCE ONLY



4 SUP 3-D VIEW 4 (SW)
FOR REFERENCE ONLY

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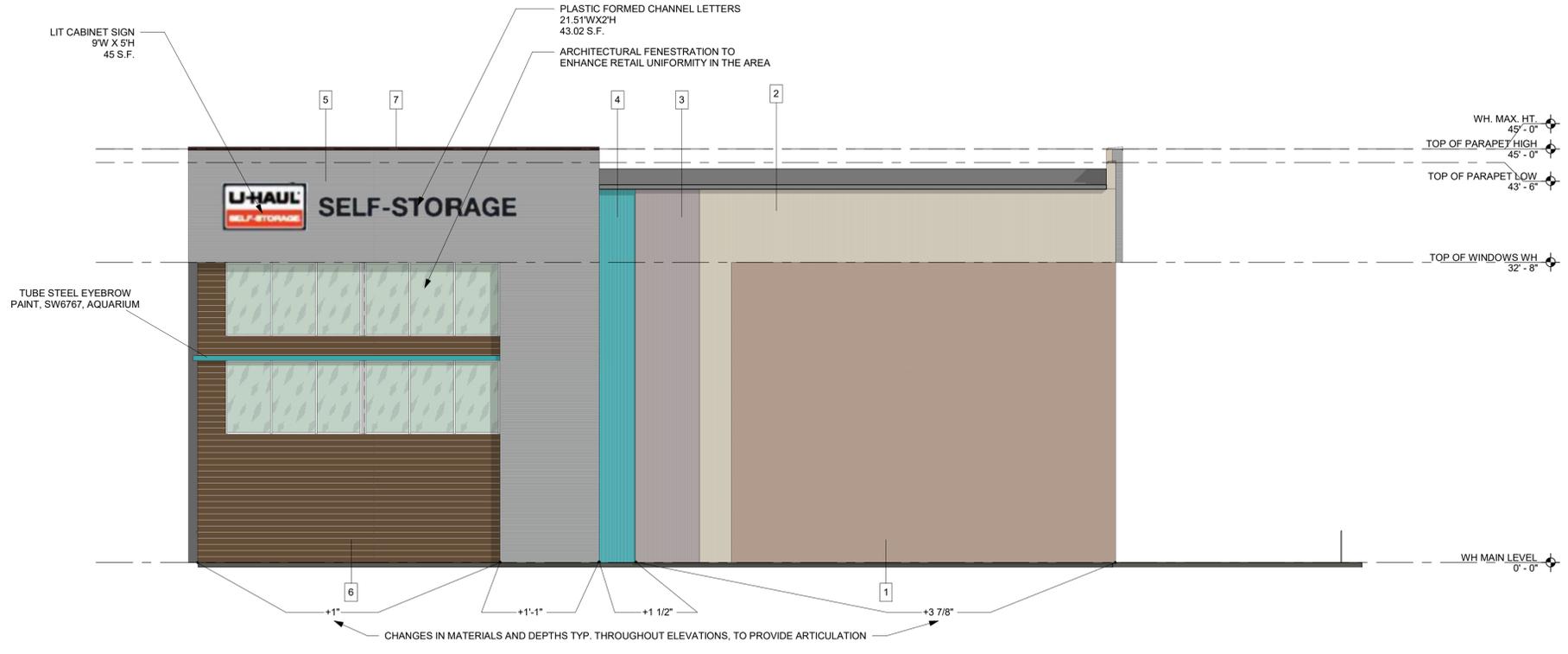
U-HAUL CARSON CITY

0 STATE ST. CARSON CITY, NV 89701

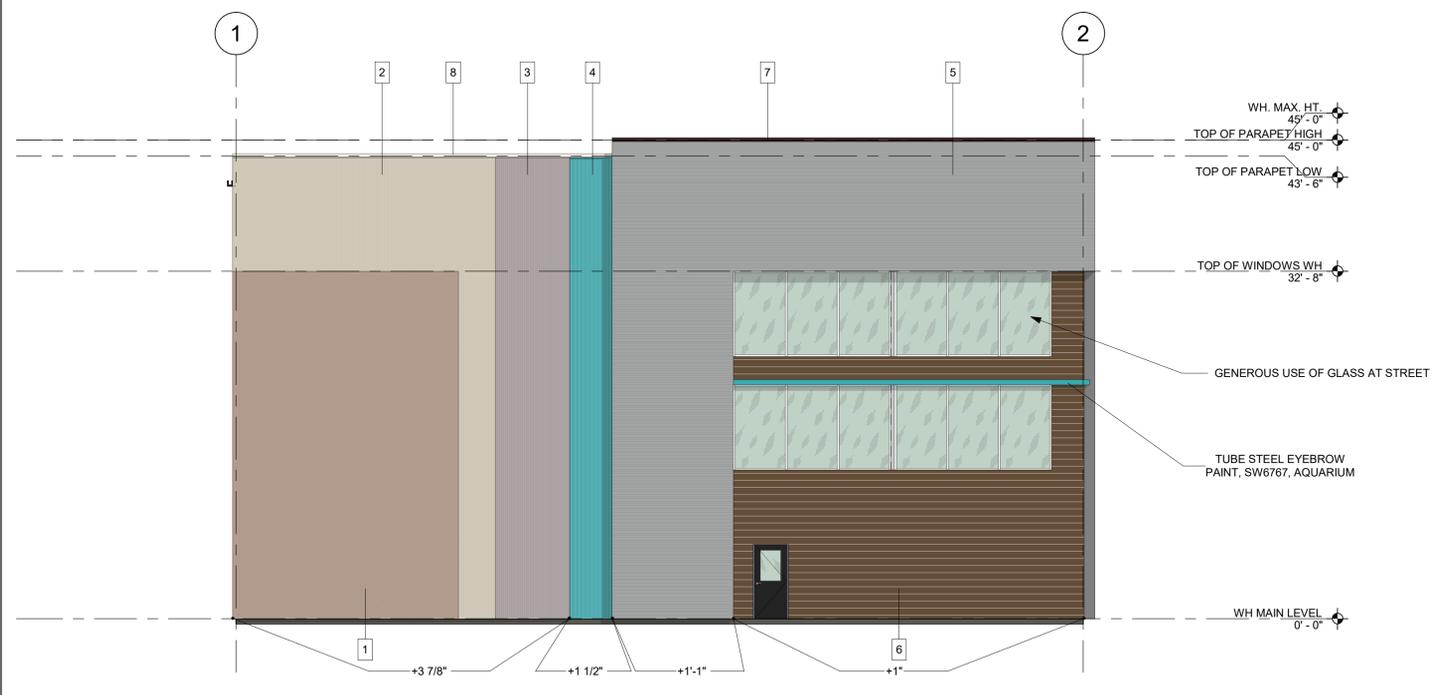
CONCEPT ARCHITECTURE, LLC

2615 W. CABIN ROAD - SUITE 1A - EVERETT, WA 98204
1005 TERMINAL WAY - SUITE 245 - RENO, NV 89502
WA - 253-787-8616 NV - 725-247-7885





1 SOUTH ELEVATION SUP
1/8" = 1'-0"



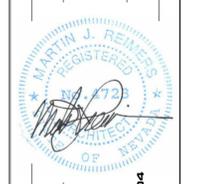
2 WEST ELEVATION SUP
1/8" = 1'-0"

EXTERIOR METAL PANELS	
Material: Mark	Material: Comments
1	ATAS ISOLEREN IM INSULATED MTL PANEL PROFILE: IM (EMBOSSSED STUCCO) PANEL DEPTH: 3" ORIENTATION: VERTICAL COLOR: SURREY BEIGE TEXTURE: TROWELED EMBOSSSED
2	ATAS ISOLEREN ML INSULATED MTL PANEL PROFILE: ML (RIBBED) PANEL DEPTH: 3" ORIENTATION: VERTICAL COLOR: ALMOND TEXTURE: SMOOTH
3	ATAS ISOLEREN ML INSULATED MTL PANEL PROFILE: ML (RIBBED) PANEL DEPTH: 3" ORIENTATION: VERTICAL COLOR: ASH GRAY TEXTURE: SMOOTH
4	ATAS METAFOR MTL PANEL PROFILE: METAFOR PANEL DEPTH: 5/8" ORIENTATION: VERTICAL COLOR: SW6767, AQUARIUM TEXTURE: SMOOTH
5	ATAS RIGID WALL II MTL PANEL, PROFILES: ALTERNATING MFN160 / MFN 121 PANEL DEPTH: 15/16" ORIENTATION: HORIZONTAL COLOR: SILVERSMITH TEXTURE: SMOOTH
6	ATAS VERSA-SEAM MTL PANEL PROFILE: 8", 1/2" REVEAL PANEL DEPTH: 1" ORIENTATION: HORIZONTAL COLOR: WALNUT TEXTURE: WOOD GRAIN EMBOSSSED

COPING	
Mark	Description
7	ATAS RAPID-LOK COPING COLOR: CHOCOLATE BROWN
8	ATAS RAPID-LOK COPING COLOR: BONE WHITE

SPECIAL USE PERMIT APPLICATION

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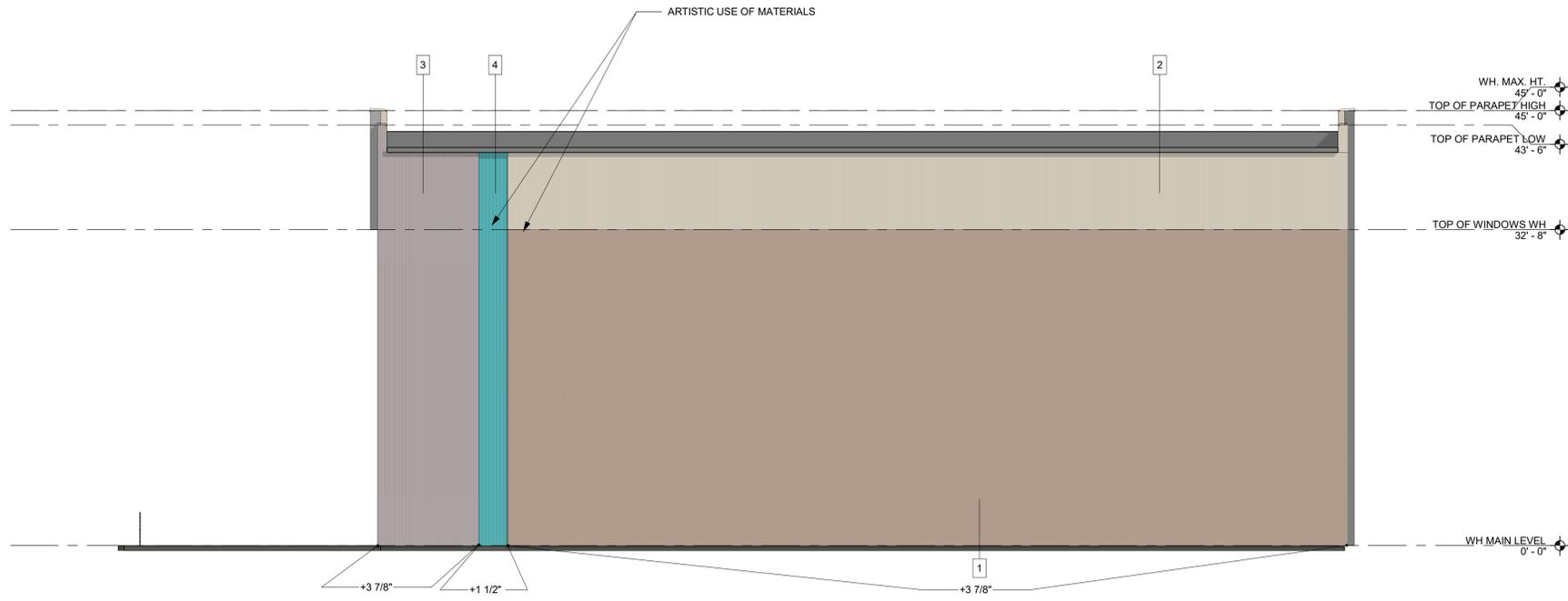


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WA - 425.837.7487 | NV - 775.247.7685

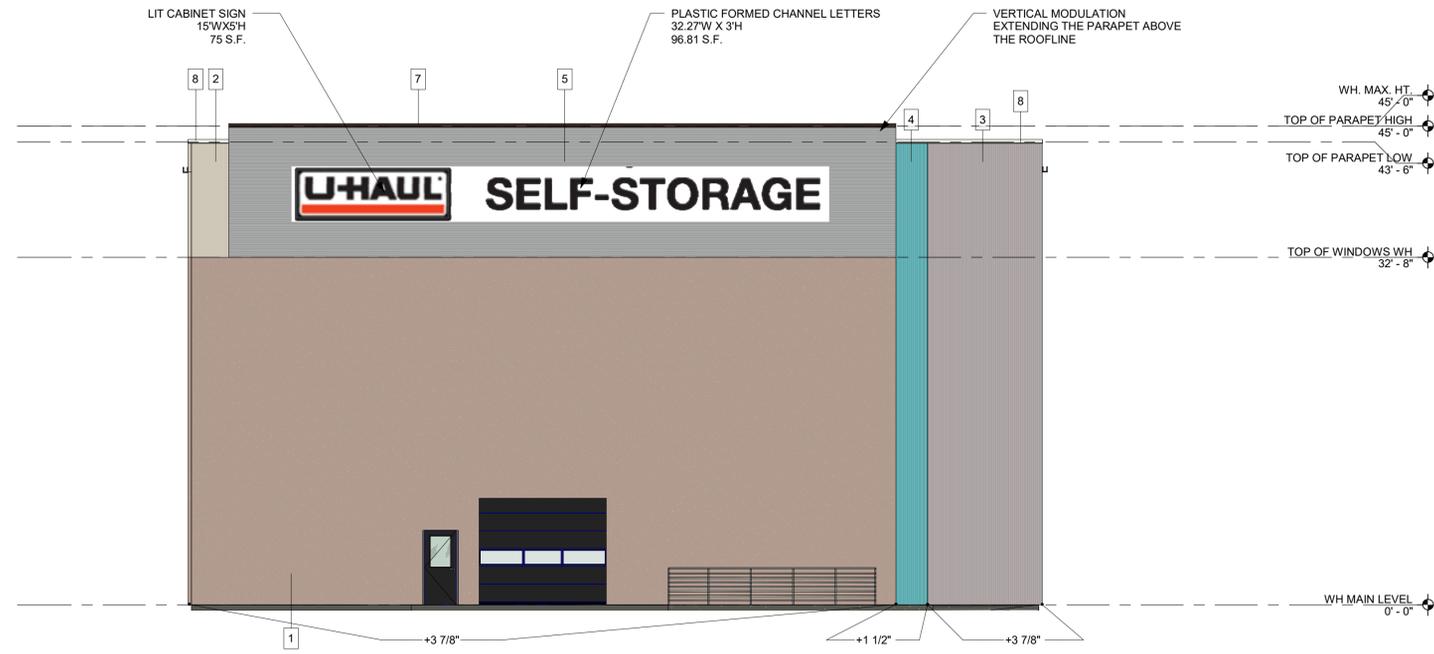
U-HAUL CARSON CITY
0 STATE ST. CARSON CITY, NV 89701

REVISIONS	
DATE	DESCRIPTION

DRAWN: KJE
 DATE: 6/16/2021 9:14:31 AM
 SHEET: SUP A3.3
 CONCEPTARCHITECTURE.COM



1 NORTH ELEVATION SUP
1/8" = 1'-0"



2 EAST ELEVATION SUP
1/8" = 1'-0"

EXTERIOR METAL PANELS	
Material: Mark	Material: Comments
1	ATAS ISOLEREN IM INSULATED MTL PANEL PROFILE: IM (EMBOSSED STUCCO) PANEL DEPTH: 3" ORIENTATION: VERTICAL COLOR: SURREY BEIGE TEXTURE: TROWELED EMBOSSED
2	ATAS ISOLEREN ML INSULATED MTL PANEL PROFILE: ML (RIBBED) PANEL DEPTH: 3" ORIENTATION: VERTICAL COLOR: ALMOND TEXTURE: SMOOTH
3	ATAS ISOLEREN ML INSULATED MTL PANEL PROFILE: ML (RIBBED) PANEL DEPTH: 3" ORIENTATION: VERTICAL COLOR: ASH GRAY TEXTURE: SMOOTH
4	ATAS METAFOR MTL PANEL PROFILE: METAFOR PANEL DEPTH: 5/8" ORIENTATION: VERTICAL COLOR: SW6767, AQUARIUM TEXTURE: SMOOTH
5	ATAS RIGID WALL II MTL PANEL, PROFILES: ALTERNATING MFN160 / MFN 121 PANEL DEPTH: 15/16" ORIENTATION: HORIZONTAL COLOR: SILVERSMITH TEXTURE: SMOOTH
6	ATAS VERSA-SEAM MTL PANEL PROFILE: 8", 1/2" REVEAL PANEL DEPTH: 1" ORIENTATION: HORIZONTAL COLOR: WALNUT TEXTURE: WOOD GRAIN EMBOSSED

COPING	
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7	ATAS RAPID-LOK COPING COLOR: CHOCOLATE BROWN
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SPECIAL USE PERMIT APPLICATION

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 WA - 25357-7487 OR NV - 775-247-7885

U-HAUL CARSON CITY
 0 STATE ST. CARSON CITY, NV 89701

REVISIONS	
NO.	DESCRIPTION

DRAWN	DATE	SHEET	CONCEPTARCHITECTURE.COM
KJE	6/16/2021 9:14:32 AM	SUP A3.4	

SPECIAL USE PERMIT APPLICATION FINDINGS

Project: Carson City U-Haul

Parcel: 002-442-03

Zone: General Commercial (GC)

Land Use Category: Mixed-Use Residential (MUR)

Proposed development of existing 2.9 acre site to include new 105,840 S.F., 3 story self-storage building with 35,280 S.F. footprint and new 8,000 S.F., 1 story warehouse.

1. Will be consistent with the objectives of the Master Plan elements.

The proposed project will further and be in keeping with the following Master Plan goals as outlined in the Master Plan Policy Development Checklist:

Chapter 3: Balanced Land Use Pattern

Is or does the proposed development:

Meet the provisions of the Growth Management Ordinance (1.1d, Municipal Code 18.12)?

Yes - The proposed project will be designed to ensure that any impacts on City resources/services will be manageable. Water use will be under the maximum average daily water usage threshold for commercial and industrial permits. Connections will be made to available existing utilities (e.g. existing water main on west side of property, existing sewer main on west side of property, existing electrical lines on south side of property). A water main analysis will be submitted with final plans for building permit to show that adequate pressure is available. A sewer main analysis will be submitted to show that adequate volume is available. A technical drainage study will be submitted to ensure detention is adequate.

Use sustainable building materials and construction techniques to promote water and energy conservation (1.1e, f)?

Yes - The proposed project will comply with all provisions of the International Energy Conservation Code. Exterior wall insulation requirements will typically be achieved with insulated metal wall panels. The performance of these panels is enhanced due to the system's built in thermal breaks. These panels are also a high quality material with a long life cycle relative to other exterior finishes. Low flow plumbing fixtures will be used. LED lighting will be used, and occupancy sensors will be used with lighting.

Site landscaping will incorporate water conserving irrigation features.

Located in a priority infill development area (1.2a)?

Yes - The proposed project is located in a master plan mixed-use district adjacent to a major gateway corridor (Hwy 50 / E. William St.) Therefore it is in a moderate priority area for infill and

redevelopment.

Provide pathway connections and easements consistent with the adopted Unified Pathways Master Plan and maintain access to adjacent public lands (1.4a)?

N/A - The proposed project will not be adjacent to public lands.

Protect existing site features, as appropriate, including mature trees or other character-defining features (1.4c)?

N/A - The existing site is not located at the Urban Interface.

At adjacent county boundaries or adjacent to public lands, coordinated with the applicable agency with regards to compatibility, access and amenities (1.5a, b)?

N/A - The existing site is not adjacent to the boundary of an adjacent county or public lands.

In identified Mixed-Use areas, promote mixed-use development patterns as appropriate for the surrounding context consistent with the land use descriptions of the applicable Mixed-Use designation, and meet the intent of the Mixed-Use Evaluation Criteria (2.1b, 2.2b, 2.3b, Land Use Districts, Appendix C)?

Yes - The proposed project is located in a Mixed-Use Residential (MUR) area. As a non-residential self storage facility the project would be categorized as a secondary use within this area. However the project would provide a service (self-storage) that would be compatible with and complementary to the primary use of medium to high-density residential housing types.

Meet adopted standards (e.g. setbacks) for transitions between nonresidential and residential zoning districts (2.1d)?

Yes - The proposed project will be a commercial use, and the adjacent property to the north of the site is a residential use (townhomes). Per City standards, proposed buildings will be set back minimum 30 feet from the north property line.

Protect environmentally sensitive areas through proper setbacks, dedication, or other mechanisms (3.1b)?

N/A - There are not environmentally sensitive areas on or adjacent to the existing site.

Sited outside the primary floodplain and away from geologic hazard areas or follows the required setbacks or other mitigation measures (3.3d, e)?

Yes - The existing site is located in FEMA Flood Hazard Zone X and requires no mitigation measures.

Provide for levels of services (i.e. water, sewer, road improvements, sidewalks, etc.) consistent

with the Land Use designation and adequate for the proposed development (Land Use table descriptions)?

Yes - services adequate to the proposed development will be provided. Sidewalk and landscaping will be provided along the property frontage as required.

If located within an identified Specific Plan Area (SPA), meet the applicable policies of that SPA (Land Use Map, Chapter 8)?

N/A - The existing site is not located within a Specific Plan Area

Chapter 4: Equitable Distribution of Recreational Opportunities

Is or does the proposed development:

Provide park facilities commensurate with the demand created and consistent with the City's adopted standards (4.1b)?

N/A - The proposed project is not a residential development and will not increase demand for park facilities.

Consistent with the Open Space Master Plan and Carson River Master Plan (4.3a)?

N/A - The existing site does not fall in an open space area / opportunity area per the Open Space Master Plan.

Chapter 5: Economic Vitality

Is or does the proposed development:

Encourage a citywide housing mix consistent with the labor force and non-labor force populations (5.1j)

N/A - The proposed project is not a residential development.

Encourage the development of regional retail centers (5.2a)

Yes - While the proposed use (self-storage) is not retail, the proposed project will provide a service/amenity (self-storage) to residents.

Encourage reuse or redevelopment of underused retail spaces (5.2b)?

N/A - There is no existing development at the site.

Support heritage tourism activities, particularly those associated with historic resources, cultural institutions and the State Capitol (5.4a)?

N/A - There are no cultural or historic resources at the site.

Promote revitalization of the Downtown core (5.6a)?

N/A - The site is not in the Downtown core area.

Incorporate additional housing in and around Downtown, including lofts, condominiums, duplexes, live-work units (5.6c)?

N/A - The site is not in the Downtown area.

Chapter 6: Livable Neighborhoods and Activity Centers

Is or does the proposed development:

Use durable, long-lasting building materials (6.1a)?

Yes - The exterior facade of the proposed project will incorporate a mix of metal panels and insulated metal panels. The panel materials and finishes will be high quality with a long life cycle relative to other exterior finishes. Typical material will be steel, which is recyclable.

Promote variety and visual interest through the incorporation of varied building styles and colors, garage orientation and other features (6.1b)?

Yes - The building design for the proposed project will incorporate artistic changes in color, texture, and materials throughout the facade.

Provide variety and visual interest through the incorporation of well-articulated building facades, clearly identified entrances and pedestrian connections, landscaping and other features consistent with the Development Standards (6.1c)?

Yes - The building design for the proposed project will include vertical modulation such as parapets, and horizontal articulation through changes in facade depth, to create architectural interest. Public building entrances will incorporate projections/awnings to ensure entrance is easily identifiable. Appropriate landscaping will be provided where required per City standards - e.g. 1 street tree per 30 linear feet of street frontage.

Provide appropriate height, density and setback transitions and connectivity to surrounding development to ensure compatibility with surrounding development for infill projects or adjacent to existing rural neighborhoods (6.2a, 9.3b 9.4a)?

Yes - The proposed project will adhere to all City standards/requirements with regards to height, density, and setback transitions, and will be designed to buffer between the adjacent residential properties to the north and west, and the adjacent commercial properties to the south and east, as appropriate. Proposed buildings will be set back a minimum of 30 feet from the adjacent residential-use property at the north property line and screened with landscaping including

deciduous and evergreen trees, to minimize any impact on the existing neighborhood. Proposed buildings will be set back a minimum of 10 feet from the State St. frontage property line and sidewalks with a landscaping strip w/ street trees consistent with City standards will be provided to improve roadway safety and appearance. Building entrances/activity will be oriented to the interior of the site, with the main storage building acting as a screen to block any noise, activity, etc. from impacting adjacent residences. Architectural design and use of materials will be distinctive, but also consistent with commercial properties to the east and south of the site (For example, large windows will be provided in the storage building as well as the warehouse at the west facade along State St. to be uniform with the design of retail uses adjacent to site at south).

If located in an identified Mixed-Use Activity Center area, contain the appropriate mix, size and density of land uses consistent with the Mixed-Use district policies (7.1a, b)?

N/A - The site is not in a Mixed-Use Activity Center area.

If located Downtown:

Integrate an appropriate mix and density of uses (8.1a, e)?

N/A - The site is not in the Downtown area.

Include buildings at the appropriate scale for the applicable Downtown Character Area (8.1b)?

N/A - The site is not in the Downtown area.

Incorporate appropriate public spaces, plazas and other amenities (8.1d)?

N/A - The site is not in the Downtown area.

Incorporate a mix of housing models and densities appropriate for the project location and size (9.1a)?

N/A - The proposed project is not a residential development.

Chapter 7: A Connected City

Is or does the proposed development:

Promote transit-supportive development patterns (e.g. mixed-use, pedestrian-oriented, higher density) along major travel corridors to facilitate future transit (11.2b)?

Yes - The proposed project will be consistent with the pattern of mixed-use development of the surrounding area (*i.e.* residential properties to the north and west, commercial properties to the east and south). The project will incorporate pedestrian-friendly improvements to the State St. frontage such as a new sidewalk. Finally, the storage building will be multi-story and warehouse

height will allow for vertical storage of u-boxes. This vertical development will increase density and reduce sprawl.

Maintain and enhance roadway connections and networks consistent with the Transportation Master Plan (11.2c)?

Yes - Sidewalk and landscaping with street trees, shrubs, accent plantings, and mulches will be provided along the State St. frontage and will connect with existing pedestrian networks to the north and south.

Provide appropriate pathways through the development and to surrounding lands, including parks and public lands, consistent with the Unified Pathways Master Plan (12.1a, c)?

N/A - The site does not connect with a pathway.

2. Will not be detrimental to the use, peaceful enjoyment, economic value, or development of surrounding properties or the general neighborhood; and is compatible with and preserves the character and integrity of adjacent development and neighborhoods or includes improvements or modifications either on-site or within the public right-of-way to mitigate development related to adverse impacts such as noise, vibrations, fumes, odors, dust, glare or physical activity.

a. Describe the general types of land uses and zoning designations adjoining your property:

The proposed project will be consistent with the existing neighborhood character/the surrounding pattern of mixed-use development.

Adjacent uses include:

General commercial/retail with GC zoning, Mixed-Use Residential land use, to the south (*e.g.* office/shipping, restaurant/fast food, dry cleaners, etc.)

General commercial/self storage with GC zoning, Mixed-Use Residential land use, to the east (*e.g.* existing U-Haul outdoor self-storage, trailer rental, etc.). The proposed project will be highly similar to this existing use, but storage areas will be enclosed/indoor.

Residential/townhomes with MFA-P zoning, High Density Residential land use, to the north

Residential/townhomes with GC-P zoning, Mixed-Use Residential land use, to the west

b. Explain why your project is similar to existing development in the neighborhood, and why it will not hurt property values or cause problems, such as noise, dust, odors, vibration, fumes, glare, or physical activity, etc. with neighboring property owners. Have other properties in your area obtained approval of a similar request? How will your project differ in appearance from your neighbors? Your response should consider the proposed physical appearance of your

proposal, as well as comparing your use to others in the area.

The proposed use will be an extension of an pre-existing use (self-storage) at an adjacent property (existing U-Haul to the east). Impacts to adjacent properties such as noise, dust, odors, vibration, fumes, glare, and/or physical activity will be no greater than those of this existing use (and, steps will be taken to further reduce impacts at the new property as described below). As the proposed use is already a part of the existing area's composition, no effect on property values is anticipated.

With regard to appearance, architectural design and use of materials will be distinctive, but also consistent with commercial properties to the east and south of the site (For example, large windows will be provided at the west facade to be uniform with design of retail uses adjacent to site at south).

c. Provide a statement explaining how your project will not be detrimental to the use, peaceful enjoyment or development of surrounding properties and the general neighborhood.

The design of the proposed self storage building and warehouse will confine the majority of activity to the interior of the buildings, where it will not be observable from adjacent properties.

The buildings will be set back from property lines as required, and screened with landscaping as appropriate, to reduce visual impact on adjacent properties.

The parking lot location and the orientation of the buildings will focus any activity towards the interior of the site, away from adjacent properties at the perimeter. This will also allow the buildings themselves to screen/block any noise, etc. from impacting adjacent properties.

d. If outdoor lighting is to be a part of the project, please indicate how it will be shielded from adjoining property and the type of lighting (wattage/height/placement) provided.

Lighting will be shielded to prevent disturbing adjacent residential uses. For example provided fixtures will typically be forward throw distribution type to reduce spill.

Examples of proposed site lighting would include LED pole mounted fixtures and LED wall pack fixtures.

e. Describe the proposed landscaping, including screening and arterial landscape areas (if required by the zoning code). Include a site plan with existing and proposed landscape shown on the plan which complies with City ordinance requirements.

Landscaping will be provided as required along the west property line / State St. frontage and will include street trees (1 per 30 L.F. of street frontage), shrubs, accent plantings, and mulches. Landscaping will be provided at the north property line with focus on screening the site from surrounding residences and will include deciduous shade trees, evergreen trees, shrubs, and mulches. Landscaping will be provided at the south property line with focus on supporting and

screening drainage/retention facilities and will include shrub beds, columnar trees, and mulches.

f. Explain any short-range and long-range benefit to the people of Carson City that will occur if your project is approved.

The proposed project will be consistent with master plan goals. The proposed use (self-storage) will complement the surrounding mix of medium and high density residences as occupants will have nearby storage facilities.

3. Will have little or no detrimental effect on vehicular or pedestrian traffic.

The proposed project will provide a new sidewalk, connecting pedestrian traffic to the north and south. The proposed project will have a single access point on State St.

4. Will not overburden existing public services and facilities, including schools, police and fire protection, water, sanitary sewer, public roads, storm drainage and other public improvements.

a. How will your project affect the school district? Will your project add to the student population or will it provide a service to the student population?

N/A - The proposed project will not affect the school district or student population.

b. How will your project affect police and fire protection?

The proposed project will be designed to have minimal impact on police and fire department resources.

The design of the storage building (multi story with interior storage) will provide secure, monitored access to storage areas to discourage illegal activity. Lighting will be provided in all parking/pedestrian areas for visibility.

The buildings will incorporate fire sprinklers and site design will allow for fire access as needed. Additional hydrants will be provided as required.

c. Is the water supply serving your project adequate to meet your needs without degrading supply and quality to others in the area? Is there adequate water pressure? Are the lines in need of replacement? Is your project served by a well? Contact the Development Engineering Division at (775) 887-2300 for assistance with this item, if applicable.

The proposed project will be served by an existing water main (8 inch steel). A water main analysis will be submitted at the permit submittal phase that confirms that there is adequate pressure to meet minimum requirements.

d. If your project will result in the covering of land area with paving or a compacted surface,

how will drainage be accommodated? Contact the Development Engineering Division at (775) 887-2300 for assistance with this item, if applicable.

The proposed project will incorporate a drainage retention area as detailed by the Civil Engineer.

e. Is there adequate capacity in the sewage disposal trunk line that you will connect to in order to serve your project, or is your site on a septic system? Contact the Development Engineering Division at (775) 887-2300 for assistance with this item, if applicable.

The proposed project will be served by an existing sewer main (8 inch asbestos concrete). The main is currently approx. 20% full. A sewer main analysis will be submitted at the permit submittal phase that confirms that there is adequate capacity to meet project needs.

f. What kind of road improvements are proposed or needed to accommodate your project? Contact the Development Engineering Division at (775) 887-2300 for assistance with this item, if applicable.

The proposed project will provide State St. frontage improvements to include curb, gutter, sidewalk, and landscape strip with street trees.

g. Indicate the source of the information that you are providing to support your conclusions and statements made in this application (private engineer, Development Engineering, Public Works, Transportation, title report or other sources).

Sources to include Major Plan Review comments, Civil Engineer, Landscape Architect, Traffic Engineer, etc.

5. Meets the definition and specific standards set forth elsewhere in Carson City Municipal Code, Title 18 for such particular use and meets the purpose statement of that district.

The proposed project is located in the General Commercial (GC) zone/district and meets the requirements for this use. The purpose of the GC district is to preserve a commercial district including service facilities. The use of the proposed project (self storage) falls under the GC primary permitted uses of "Personal storage within an enclosed building" and "warehouse." The existing site complies with the site development standards found in 18.04.195 and the project will comply with the setback requirements set by that table.

6. Will not be detrimental to the public health, safety, convenience and welfare.

The proposed project will not be detrimental to the public health, safety, convenience, and welfare. The design will comply with all applicable codes and regulations.

7. Will not result in material damage or prejudice to other property in the vicinity, as a result of proposed mitigation measures.

The proposed project will not result in material damage or prejudice to any other property in the vicinity. The design of the project will take into account any deleterious effects - for example, drainage/runoff due to impervious surface - and will take steps to mitigate them as required by all codes/standards/etc. - for example, by providing adequate retention for drainage.

Master Plan Policy Checklist

Special Use Permits & Major Project Reviews & Administrative Permits

PURPOSE

The purpose of a development checklist is to provide a list of questions that address whether a development proposal is in conformance with the goals and objectives of the 2006 Carson City Master Plan that are related to non-residential and multi-family residential development. This checklist is designed for developers, staff, and decision-makers and is intended to be used as a guide only.

Development Name: U-Haul Carson City

Reviewed By: Concept Architecture (James Molder)

Date of Review: 06-16-2021

DEVELOPMENT CHECKLIST

The following five themes are those themes that appear in the Carson City Master Plan and which reflect the community's vision at a broad policy level. Each theme looks at how a proposed development can help achieve the goals of the Carson City Master Plan. A check mark indicates that the proposed development meets the applicable Master Plan policy. The Policy Number is indicated at the end of each policy statement summary. Refer to the Comprehensive Master Plan for complete policy language.

CHAPTER 3: A BALANCED LAND USE PATTERN



The Carson City Master Plan seeks to establish a balance of land uses within the community by providing employment opportunities, a diverse choice of housing, recreational opportunities, and retail services.

Is or does the proposed development:

- Meet the provisions of the Growth Management Ordinance (1.1d, Municipal Code 18.12)?
- Use sustainable building materials and construction techniques to promote water and energy conservation (1.1e, f)?
- Located in a priority infill development area (1.2a)?
- Provide pathway connections and easements consistent with the adopted Unified Pathways Master Plan and maintain access to adjacent public lands (1.4a)?

- Protect existing site features, as appropriate, including mature trees or other character-defining features (1.4c)?
- At adjacent county boundaries or adjacent to public lands, coordinated with the applicable agency with regards to compatibility, access and amenities (1.5a, b)?
- In identified Mixed-Use areas, promote mixed-use development patterns as appropriate for the surrounding context consistent with the land use descriptions of the applicable Mixed-Use designation, and meet the intent of the Mixed-Use Evaluation Criteria (2.1b, 2.2b, 2.3b, Land Use Districts, Appendix C)?
- Meet adopted standards (e.g. setbacks) for transitions between non-residential and residential zoning districts (2.1d)?
- Protect environmentally sensitive areas through proper setbacks, dedication, or other mechanisms (3.1b)?
- Sited outside the primary floodplain and away from geologic hazard areas or follows the required setbacks or other mitigation measures (3.3d, e)?
- Provide for levels of services (i.e. water, sewer, road improvements, sidewalks, etc.) consistent with the Land Use designation and adequate for the proposed development (Land Use table descriptions)?
- If located within an identified Specific Plan Area (SPA), meet the applicable policies of that SPA (Land Use Map, Chapter 8)?

CHAPTER 4: EQUITABLE DISTRIBUTION OF RECREATIONAL OPPORTUNITIES



The Carson City Master Plan seeks to continue providing a diverse range of park and recreational opportunities to include facilities and programming for all ages and varying interests to serve both existing and future neighborhoods.

Is or does the proposed development:

- Provide park facilities commensurate with the demand created and consistent with the City's adopted standards (4.1b)?
- Consistent with the Open Space Master Plan and Carson River Master Plan (4.3a)?

CHAPTER 5: ECONOMIC VITALITY



The Carson City Master Plan seeks to maintain its strong diversified economic base by promoting principles which focus on retaining and enhancing the strong employment base, include a broader range of retail services in targeted areas, and include the roles of technology, tourism, recreational amenities, and other economic strengths vital to a successful community.

Is or does the proposed development:

- Encourage a citywide housing mix consistent with the labor force and non-labor force populations (5.1j)
- Encourage the development of regional retail centers (5.2a)
- Encourage reuse or redevelopment of underused retail spaces (5.2b)?
- Support heritage tourism activities, particularly those associated with historic resources, cultural institutions and the State Capitol (5.4a)?
- Promote revitalization of the Downtown core (5.6a)?
- Incorporate additional housing in and around Downtown, including lofts, condominiums, duplexes, live-work units (5.6c)?

CHAPTER 6: LIVABLE NEIGHBORHOODS AND ACTIVITY CENTERS



The Carson City Master Plan seeks to promote safe, attractive and diverse neighborhoods, compact mixed-use activity centers, and a vibrant, pedestrian-friendly Downtown.

Is or does the proposed development:

- Use durable, long-lasting building materials (6.1a)?
- Promote variety and visual interest through the incorporation of varied building styles and colors, garage orientation and other features (6.1b)?
- Provide variety and visual interest through the incorporation of well-articulated building facades, clearly identified entrances and pedestrian connections, landscaping and other features consistent with the Development Standards (6.1c)?
- Provide appropriate height, density and setback transitions and connectivity to surrounding development to ensure compatibility with surrounding development for infill projects or adjacent to existing rural neighborhoods (6.2a, 9.3b 9.4a)?
- If located in an identified Mixed-Use Activity Center area, contain the appropriate mix, size and density of land uses consistent with the Mixed-Use district policies (7.1a, b)?
- If located Downtown:
 - Integrate an appropriate mix and density of uses (8.1a, e)?
 - Include buildings at the appropriate scale for the applicable Downtown Character Area (8.1b)?
 - Incorporate appropriate public spaces, plazas and other amenities (8.1d)?
- Incorporate a mix of housing models and densities appropriate for the project location and size (9.1a)?

CHAPTER 7: A CONNECTED CITY



The Carson City Master Plan seeks promote a sense of community by linking its many neighborhoods, employment areas, activity centers, parks, recreational

amenities and schools with an extensive system of interconnected roadways, multi-use pathways, bicycle facilities, and sidewalks.

Is or does the proposed development:

- Promote transit-supportive development patterns (e.g. mixed-use, pedestrian-oriented, higher density) along major travel corridors to facilitate future transit (11.2b)?
- Maintain and enhance roadway connections and networks consistent with the Transportation Master Plan (11.2c)?
- Provide appropriate pathways through the development and to surrounding lands, including parks and public lands, consistent with the Unified Pathways Master Plan (12.1a, c)?

If there is any additional information that would provide a clearer picture of your proposal that you would like to add for presentation to the Planning Commission, please be sure to include it in your detailed description.

Please type and sign the statement on the following page at the end of your findings response.

ACKNOWLEDGMENT OF APPLICANT

I certify that the forgoing statements are true and correct to the best of my knowledge and belief. I agree to fully comply with all conditions as established by the Planning Commission. I am aware that this permit becomes null and void if the use is not initiated within one-year of the date of the Planning Commission's approval; and I understand that this permit may be revoked for violation of any of the conditions of approval. I further understand that approval of this application does not exempt me from all City code requirements.


Applicant's Signature

Josh Tornbom
Print Name

6/17/2021
Date

No Personal Exemptions

No Billing Information

Payment History					
	Fiscal Year	Total Due	Total Paid	Amount Unpaid	Date Paid
+	(2020 - 2021)	\$5,203.02	\$5,203.02	\$0.00	10/16/2020
+	(2019 - 2020)	\$5,022.23	\$5,022.23	\$0.00	2/27/2020
+	(2018 - 2019)	\$4,792.23	\$4,792.23	\$0.00	2/6/2019
+	(2017 - 2018)	\$4,599.08	\$4,599.08	\$0.00	2/5/2018
+	(2016 - 2017)	\$4,483.25	\$4,483.25	\$0.00	2/14/2017
+	(2015 - 2016)	\$4,484.02	\$4,484.02	\$0.00	2/8/2016
+	(2014 - 2015)	\$4,509.39	\$4,509.39	\$0.00	2/10/2015
+	(2013 - 2014)	\$4,534.92	\$4,534.92	\$0.00	1/7/2014
+	(2012 - 2013)	\$5,668.54	\$5,668.54	\$0.00	12/27/2012
+	(2011 - 2012)	\$5,510.92	\$5,510.92	\$0.00	12/13/2011
+	(2010 - 2011)	\$5,256.35	\$5,256.35	\$0.00	8/16/2010
+	(2009 - 2010)	\$4,926.29	\$4,926.29	\$0.00	8/6/2009
+	(2008 - 2009)	\$4,569.83	\$4,569.83	\$0.00	12/31/2008
+	(2007 - 2008)	\$4,231.32	\$4,231.32	\$0.00	10/5/2007
+	(2006 - 2007)	\$3,947.13	\$3,947.13	\$0.00	12/26/2006
+	(2005 - 2006)	\$3,695.82	\$3,695.82	\$0.00	8/11/2005
+	(2004 - 2005)	\$3,506.47	\$3,506.47	\$0.00	1/12/2005
+	(2003 - 2004)	\$3,488.56	\$3,488.56	\$0.00	3/9/2004
+	(2002 - 2003)	\$3,425.43	\$3,425.43	\$0.00	3/6/2003
+	(2001 - 2002)	\$3,423.17	\$3,423.17	\$0.00	8/9/2001
+	(2000 - 2001)	\$3,382.59	\$3,382.59	\$0.00	8/10/2000
+	(1999 - 2000)	\$3,331.39	\$3,331.39	\$0.00	1/5/2000
+	(1998 - 1999)	\$3,309.37	\$3,309.37	\$0.00	8/17/1998
+	(1997 - 1998)	\$3,396.78	\$3,396.78	\$0.00	3/6/1998
+	(1996 - 1997)	\$3,425.12	\$3,425.12	\$0.00	2/19/1997

Collapse

Related Names	
<p>CURRENT OWNER FOR 2021 (2021 - 2022)</p> <p>Name FIVE SAC SELF-STORAGE CORP,</p> <p>Mailing Address</p> <p>Status Current</p> <p>Account</p>	<p>CURRENT MAIL TO FOR 2021 (2021 - 2022)</p> <p>Name FIVE SAC SELF-STORAGE CORP,</p> <p>Mailing Address 207 EAST CLARENDON AVE</p> <p>PHOENIX, AZ, 85012</p> <p>Status Current</p> <p>Account</p>

Structure 1 of 1

Robison Engineering Company, Inc
846 Victorian Avenue, Suite 20
Sparks, NV US
www.robisoneng.com
RENG Proj. Number: 1-866-01.003



PRELIMINARY DRAINAGE REPORT

For

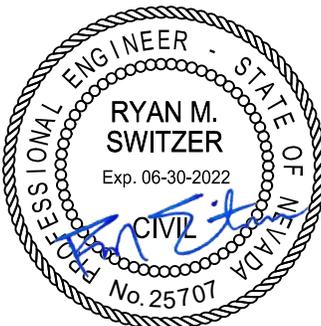
U-HAUL AT CARSON CITY – APN. 002-442-03 SPECIAL USE PERMIT

Prepared for:

U-HAUL COMPANY OF NORTHERN NEVADA
10400 South Virginia Street
Reno, Nevada 89511

Prepared by:

ROBISON ENGINEERING COMPANY
846 Victorian Avenue, Suite 20
Sparks, Nevada 89431



June 2021



INTRODUCTION

This report addresses the existing and anticipated drainage conditions for a proposed commercial development located on State Street in Carson City. The project is adjacent to the west boundary of an existing U-Haul storage facility at 1498 E William Street. The site is located in the southeast $\frac{1}{4}$ of section 8 and southwest $\frac{1}{4}$ of section 9, and northeast $\frac{1}{4}$ of section 17, township 15 north, range 20 east, Mount Diablo Meridian (APN:002-442-03) in the Carson City, Nevada. See the vicinity map below:

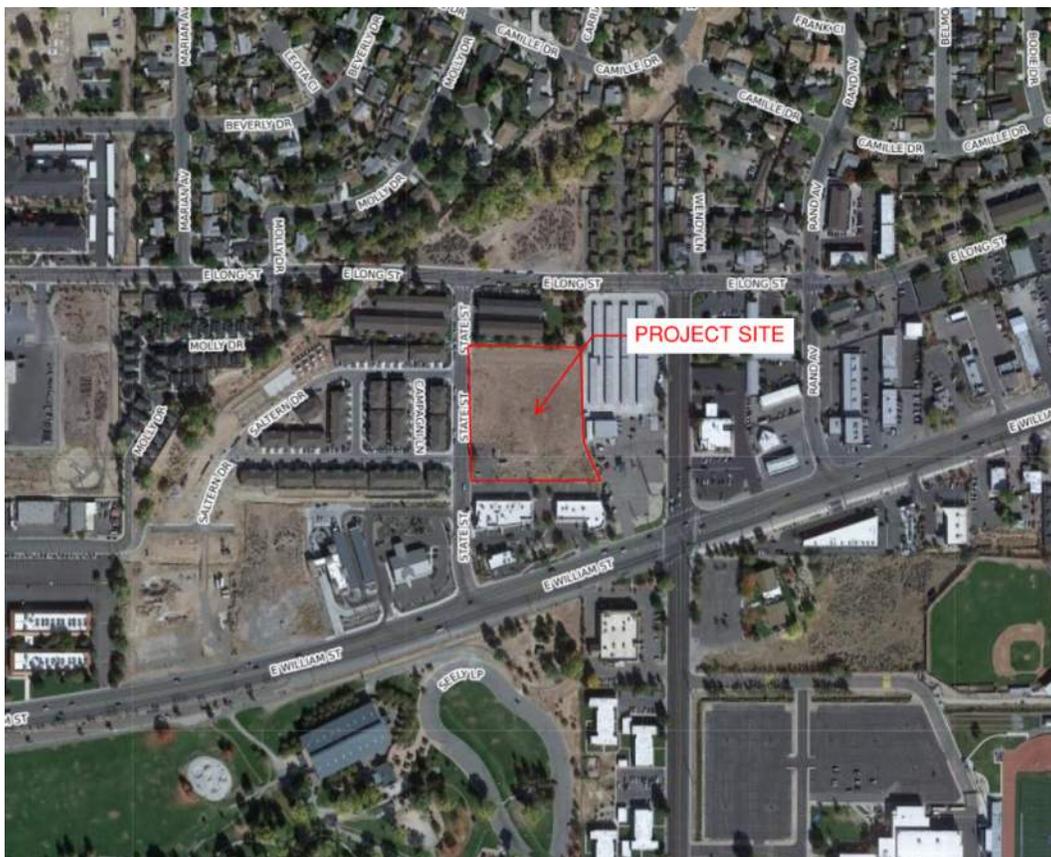


Figure 1 – Vicinity Map (imagery courtesy of Carson City GIS)

The site is accessed from State Street abutting the western property line. Multifamily residential properties border the north property boundary, and existing commercial developments border the east and south boundaries. The undeveloped property encompasses 2.9 acres zoned for general commercial purposes and the entirety of the lot is subject to this drainage study. Currently the site consists of undeveloped land light poor grass cover throughout, and an approximately 8,700 square-foot asphalt parking lot in the southwest corner.



The existing soils consist of loose to very dense, silty sand with interbedded layers of clayey sand up to approximately 3 inches thick in generally moist to wet condition. Approximate ground water depth ranges from 6.5 to 10.0 feet below the ground surface. The site has a consistent slope from north to south with approximately 5 feet of elevation change across the parcel (REF. 1).

The proposed development consists of site and utility improvements to accompany two indoor storage facilities. The primary three-story building will have a footprint of 35,250 square feet and the secondary single-story warehouse will have a footprint of 8,000 square feet. The purpose of this report is to analyze the existing and post developed stormwater runoff conditions for the site.

HISTORIC DRAINAGE SYSTEM

The site is located in the Western Mountains and High Plains region where rainfall averages less than 15 inches per year. The rainfall depth is determined by National Oceanic and Atmospheric Administration (NOAA) (REF. 2).

Offsite run-on is considered to be negligible as curb and gutter prevents water from entering the site at the west, drainage from adjacent developments to the north and east are managed onsite, and the south boundary slopes away from the site.

The existing site was analyzed for the 5-year return period and 100-year return period, 24-hour duration storm events in accordance with the Carson City Development Standards, Division 14 – Storm Drainage. The pre-developed site consists of one basin, referred to as Sub-Basin 1 herein. Refer to Appendix A for the pre-developed site conditions and Appendix B for the calculated site specific pre-developed flows.

PROPOSED DRAINAGE SYSTEM

The proposed development will contribute impermeable land cover and landscape improvements to be mitigated through stormwater management features described herein. Post development, the site will be designed to drain away from the proposed building structures and sheet flow from the northwest to the southeast to a proposed detention basin. Valley gutters or similar concentrated flow mitigation features will likely be required but were not a part of the preliminary site design or stormwater analysis.

A retention basin in the southeast corner of the site will mitigate the increase in stormwater runoff volume due to impervious infrastructure. No downstream infrastructure is available for connectivity of a detention basin or similar stormwater management feature. Percolation rate information was not available at the time



of authoring this report but should be included in the final design of the retention basin. The basin will include 1' of freeboard before excessive flows above the major design storm will be routed downstream from the site via an overflow flume.

The proposed site consists of one Sub-Basin, A. Sub-basin A consists of impermeable asphalt, two indoor storage buildings an associated truck loading dock attached to the warehouse building, as well as landscaped areas, best categorized as commercial land use (see Appendix A).

The 5-year frequency storm event was used to design and manage overall drainage areas within the project. The proposed stormwater infrastructure located within the site property limits will be maintained by the property owner. The 100-year frequency event was used to design retention basin and conveyance features in accordance with the Carson City Development Standards, Division 14 – Storm Drainage. The Soil Conservation Service (SCS) method was used to determine the retention requirements. Hydraulic analysis of the site should be completed with the final drainage study for the site (see Appendix B).

FLOOD HAZARD ZONE

Per FEMA Flood Hazard Map panel 3200010092G (REF. 3) the site is located in shaded Zone X. Shaded zone X is defined by the FEMA flood map as “0.2% annual chance flood hazard, areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile.” Based on this information, FEMA anticipates that there is minimal risk of the property flooding.

CONCLUSION

The development of the proposed site will not result in negative impacts to the surrounding areas or existing drainage facilities. The development conforms to standards of engineering practice to protect the proposed development and provide for improvement to runoff water quality by sediment capture and by landscape stabilization of native soils.

APPENDIX A – DRAINAGE PLAN

APPENDIX B – HYDROLOGIC CALCULATIONS

REFERENCES

- REF. 1 - Geotechnical Evaluation (dated May 11, 2021)
- REF. 2 - NOAA Precipitation Data
- REF. 3 - FEMA FIRM

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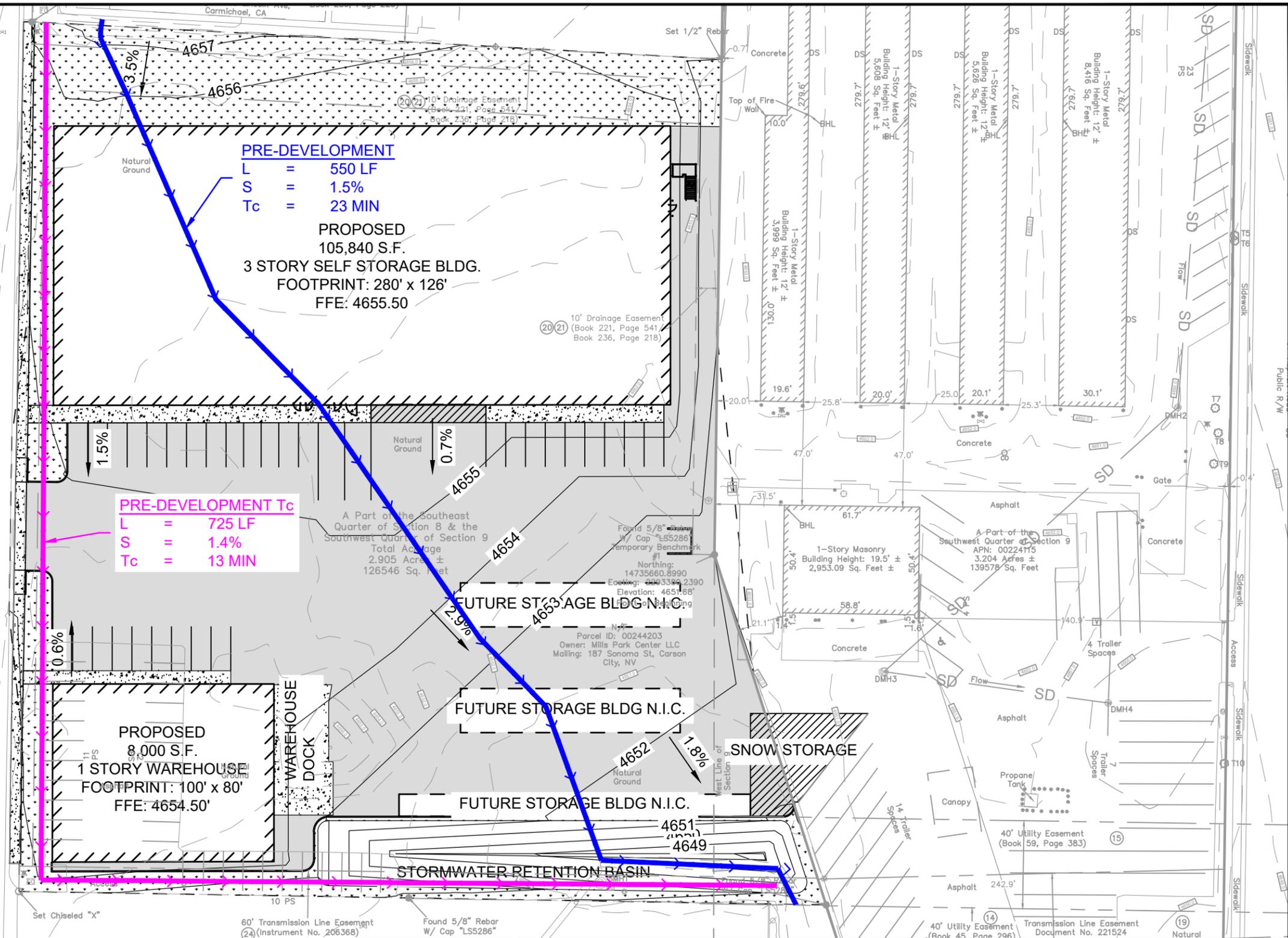
APPENDIX A DRAINAGE PLAN

PRE-DEVELOPMENT SUB-BASIN 1

A	=	2.9 AC
T _c	=	23 MIN
CN	=	81
Q ₅	=	1.31 CFS
Q ₁₀₀	=	4.27 CFS
V ₅	=	0.12 AC-FT
V ₁₀₀	=	0.37 AC-FT

POST-DEVELOPMENT SUB-BASIN A

A	=	2.9 AC
T _c	=	13 MIN
CN	=	92
Q ₅	=	4.07 CFS
Q ₁₀₀	=	8.63 CFS
V ₅	=	0.27 AC-FT
V ₁₀₀	=	0.60 AC-FT



PRE-DEVELOPMENT
 L = 550 LF
 S = 1.5%
 T_c = 23 MIN

PROPOSED
 105,840 S.F.
 3 STORY SELF STORAGE BLDG.
 FOOTPRINT: 280' x 126'
 FFE: 4655.50

PRE-DEVELOPMENT T_c
 L = 725 LF
 S = 1.4%
 T_c = 13 MIN

PROPOSED
 8,000 S.F.
 1 STORY WAREHOUSE
 FOOTPRINT: 100' x 80'
 FFE: 4654.50'

**PRELIMINARY
 NOT FOR
 CONSTRUCTION**

Robison Engineering
 COMPANY, INC.
 846 VICTORIAN AVENUE
 SPARKS, NV 89431
 www.robisoneng.com

PREPARED FOR:
U-HAUL OF NORTHERN NEVADA
 10400 S VIRGINIA ST
 RENO, NV 89521
 775-530-3208

North arrow pointing up and a graphic scale bar showing 0, 25, and 50 feet.
 INCH@FULL SCALE

**U-HAUL CARSON CITY
 PRELIMINARY DRAINAGE REPORT**

DRAINAGE PLAN

CARSON CITY NEVADA
 PROJECT NO: 1-866-05.001

P:\U-Haul_0866105_864081_CarsonCity8_DWG\Civilu-haul_carson_exhibits.dwg, 6/16/2021 2:49:24 PM, RSWITZER

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RENG Proj. Number: 1-866-01.003



APPENDIX B

HYDROLOGIC CALCULATIONS

U-HAUL AT CARSON CITY - HYDROLOGIC CALCULATIONS

TABLE 2 - PEAK DISCHARGE SUMMARY			
	PRE-DEVELOPMENT (CFS)	POST-DEVELOPMENT (CFS)	DIFFERENCE (CFS)
5-YR STORM	1.31	4.07	2.76
100-YR STORM	4.27	8.63	4.36

1. REFER TO RUNOFF HYDROGRAPHS FOR PEAK DISCHARGES

TABLE 3 - RUNOFF VOLUME SUMMARY				
	PRE-DEVELOPMENT (AC-FT)	POST-DEVELOPMENT (AC-FT)	DIFFERENCE (AC-FT)	DETENTION VOLUME (CF)
5-YR STORM	0.12	0.27	0.15	6,534
100-YR STORM	0.37	0.60	0.23	10,019

1. REFER TO RUNOFF HYDROGRAPHS FOR RUNOFF VOLUMES

TABLE 4 - DETENTION BASIN VOLUME CAPACITY		
ELEVATION	AREA (SF)	CUMULATIVE VOLUME (CF)
4,648.0	233	-
4,649.0	2,229	1,231
4,650.0	4,434	4,563
4,651.0	6,820	10,190



Project: U-Haul - Carson City
Location:
Present

By: RMS
Checked:

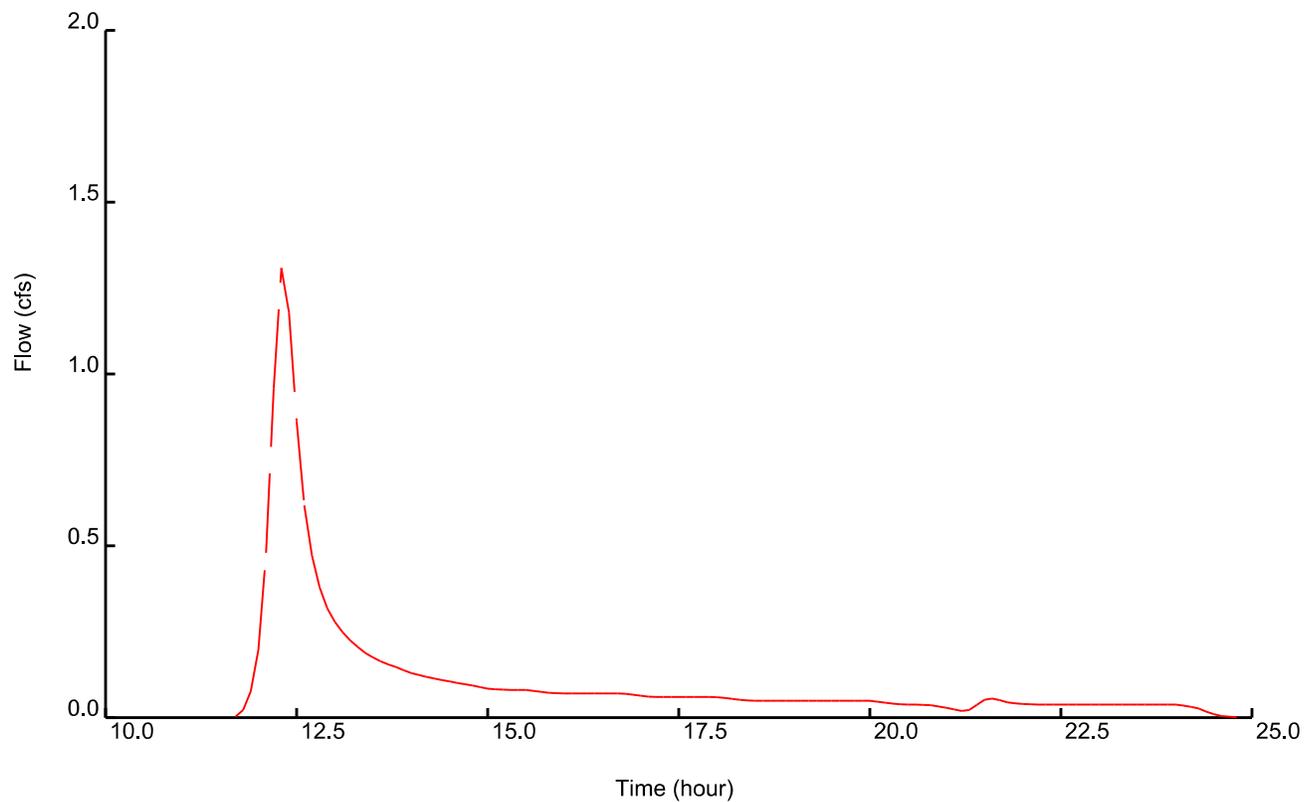
Date: 04/13/21
Date: 04/13/21

Curve Number : 68
Length of Flow : 550.00 ft
Average Land Slope : 1.50 %
Time of Concentration : 0.377 hrs, 22.6 mins

Runoff Hydrograph

Unit Hydrograph: SCS Curvilinear

Rainfall Distribution Type	TYPE II 24-HOUR	Antecedent Moisture Condition	Type II
Runoff Hydrograph	SCS Method	Peak Discharge (Qp)	1.3087 cfs
Return Period	5 YEAR	Time to Peak	12.30 hrs
Time Increment	0.10 hrs	Runoff Volume	0.12 acre-ft
Drainage Area	2.900 acre	Runoff Curve Number, CN	81.0
Basin Slope	0.00 %	Hydraulic length	0.00 ft
Tc Method	SCS	Time of Concentration	23.0 min
Base Flow	0.0000 cfs	Rainfall Depth	1.84 in
Storm Duration	24.00 hrs	Peak Rate Factor	484



Runoff Hydrograph - SCS Method

Hydrograph Table

Time (hr)	Flow (cfs)
11.70	0.003
11.80	0.023
11.90	0.077
12.00	0.198

12.10	0.480
12.20	0.958
12.30	1.309
12.40	1.180
12.50	0.864
12.60	0.618
12.70	0.473
12.80	0.380
12.90	0.319
13.00	0.279
13.10	0.250
13.20	0.226
13.30	0.206
13.40	0.188
13.50	0.175
13.60	0.164
13.70	0.155
13.80	0.147
13.90	0.138
14.00	0.130
14.10	0.124
14.20	0.119
14.30	0.115
14.40	0.110
14.50	0.106
14.60	0.102
14.70	0.097
14.80	0.093
14.90	0.089
15.00	0.085
15.10	0.083
15.20	0.082
15.30	0.081
15.40	0.081
15.50	0.081
15.60	0.079
15.70	0.076
15.80	0.073
15.90	0.072
16.00	0.071
16.10	0.071
16.20	0.071
16.30	0.071
16.40	0.071
16.50	0.071

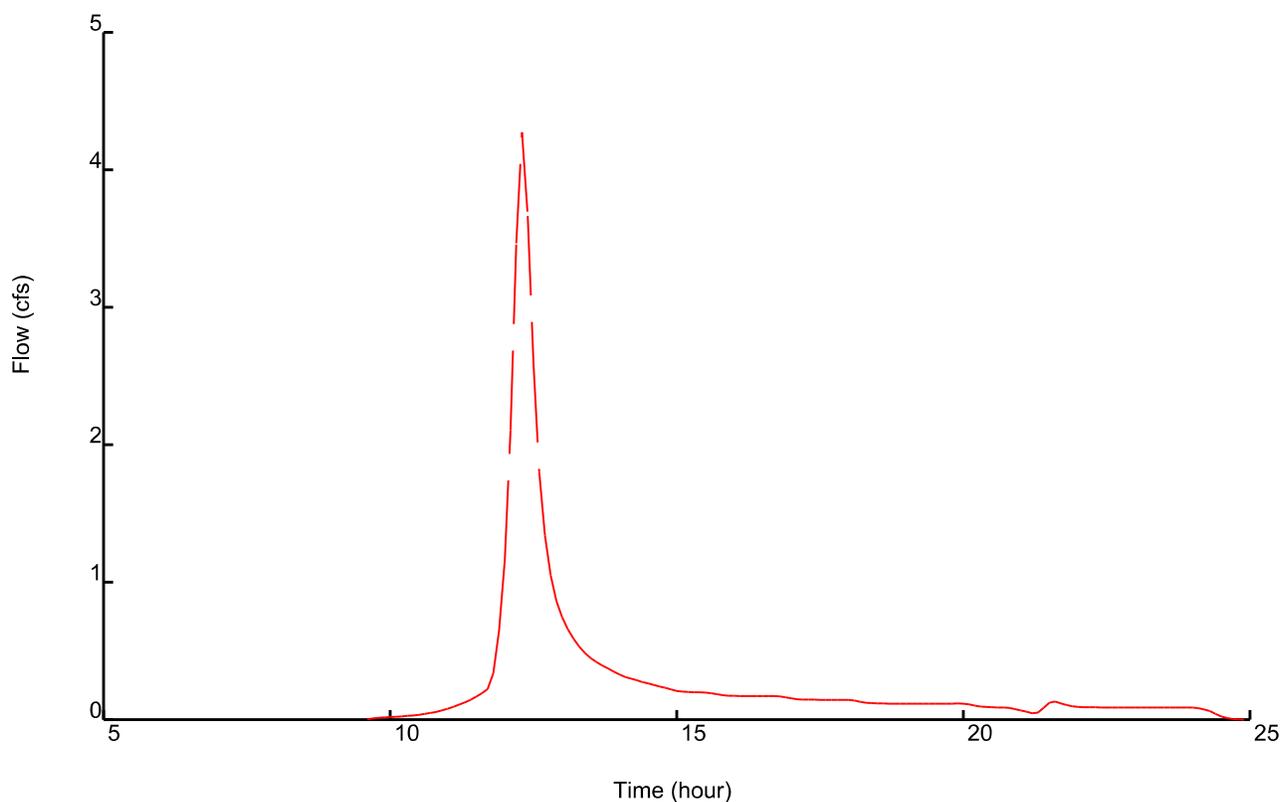
16.60	0.071
16.70	0.071
16.80	0.070
16.90	0.067
17.00	0.064
17.10	0.062
17.20	0.061
17.30	0.061
17.40	0.060
17.50	0.060
17.60	0.060
17.70	0.060
17.80	0.060
17.90	0.061
18.00	0.060
18.10	0.058
18.20	0.055
18.30	0.052
18.40	0.051
18.50	0.050
18.60	0.049
18.70	0.049
18.80	0.049
18.90	0.049
19.00	0.049
19.10	0.049
19.20	0.049
19.30	0.049
19.40	0.049
19.50	0.049
19.60	0.050
19.70	0.050
19.80	0.050
19.90	0.050
20.00	0.049
20.10	0.047
20.20	0.044
20.30	0.041
20.40	0.039
20.50	0.038
20.60	0.038
20.70	0.038
20.80	0.037
20.90	0.033
21.00	0.029

21.10	0.025
21.20	0.020
21.30	0.022
21.40	0.037
21.50	0.052
21.60	0.056
21.70	0.051
21.80	0.045
21.90	0.042
22.00	0.040
22.10	0.039
22.20	0.039
22.30	0.038
22.40	0.038
22.50	0.038
22.60	0.038
22.70	0.038
22.80	0.038
22.90	0.038
23.00	0.038
23.10	0.038
23.20	0.038
23.30	0.038
23.40	0.038
23.50	0.038
23.60	0.038
23.70	0.039
23.80	0.039
23.90	0.039
24.00	0.038
24.10	0.036
24.20	0.032
24.30	0.027
24.40	0.018
24.50	0.010
24.60	0.005
24.70	0.003
24.80	0.001

Runoff Hydrograph

Unit Hydrograph: SCS Curvilinear

Rainfall Distribution Type	TYPE II 24-HOUR	Antecedent Moisture Condition	Type II
Runoff Hydrograph	SCS Method	Peak Discharge (Qp)	4.2741 cfs
Return Period	5 YEAR	Time to Peak	12.30 hrs
Time Increment	0.10 hrs	Runoff Volume	0.37 acre-ft
Drainage Area	2.900 acre	Runoff Curve Number, CN	81.0
Basin Slope	0.00 %	Hydraulic length	0.00 ft
Tc Method	SCS	Time of Concentration	23.0 min
Base Flow	0.0000 cfs	Rainfall Depth	3.26 in
Storm Duration	24.00 hrs	Peak Rate Factor	484



Runoff Hydrograph - SCS Method

Hydrograph Table

Time (hr)	Flow (cfs)
9.60	0.003
9.70	0.010
9.80	0.015
9.90	0.017

10.00	0.019
10.10	0.022
10.20	0.024
10.30	0.028
10.40	0.032
10.50	0.037
10.60	0.042
10.70	0.049
10.80	0.057
10.90	0.068
11.00	0.080
11.10	0.094
11.20	0.109
11.30	0.126
11.40	0.145
11.50	0.167
11.60	0.193
11.70	0.222
11.80	0.339
11.90	0.650
12.00	1.163
12.10	2.107
12.20	3.467
12.30	4.274
12.40	3.666
12.50	2.596
12.60	1.804
12.70	1.342
12.80	1.051
12.90	0.865
13.00	0.745
13.10	0.658
13.20	0.588
13.30	0.532
13.40	0.484
13.50	0.449
13.60	0.420
13.70	0.396
13.80	0.374
13.90	0.350
14.00	0.329
14.10	0.312
14.20	0.299
14.30	0.288
14.40	0.275

14.50	0.264
14.60	0.253
14.70	0.242
14.80	0.232
14.90	0.220
15.00	0.210
15.10	0.205
15.20	0.202
15.30	0.200
15.40	0.200
15.50	0.198
15.60	0.193
15.70	0.185
15.80	0.179
15.90	0.175
16.00	0.174
16.10	0.173
16.20	0.173
16.30	0.172
16.40	0.172
16.50	0.173
16.60	0.173
16.70	0.173
16.80	0.171
16.90	0.163
17.00	0.155
17.10	0.150
17.20	0.148
17.30	0.146
17.40	0.146
17.50	0.146
17.60	0.145
17.70	0.145
17.80	0.146
17.90	0.146
18.00	0.144
18.10	0.139
18.20	0.131
18.30	0.125
18.40	0.121
18.50	0.119
18.60	0.118
18.70	0.118
18.80	0.118
18.90	0.117

19.00	0.117
19.10	0.117
19.20	0.118
19.30	0.118
19.40	0.118
19.50	0.118
19.60	0.118
19.70	0.118
19.80	0.118
19.90	0.118
20.00	0.117
20.10	0.112
20.20	0.104
20.30	0.097
20.40	0.093
20.50	0.091
20.60	0.090
20.70	0.089
20.80	0.087
20.90	0.079
21.00	0.069
21.10	0.058
21.20	0.048
21.30	0.053
21.40	0.088
21.50	0.123
21.60	0.132
21.70	0.120
21.80	0.107
21.90	0.098
22.00	0.094
22.10	0.092
22.20	0.091
22.30	0.090
22.40	0.090
22.50	0.090
22.60	0.090
22.70	0.090
22.80	0.090
22.90	0.090
23.00	0.090
23.10	0.090
23.20	0.090
23.30	0.090
23.40	0.090

23.50	0.090
23.60	0.090
23.70	0.090
23.80	0.090
23.90	0.090
24.00	0.089
24.10	0.083
24.20	0.075
24.30	0.063
24.40	0.043
24.50	0.024
24.60	0.013
24.70	0.007
24.80	0.003
24.90	0.002

Project: U-Haul - Carson City
Location:
Developed

By: RMS
Checked:

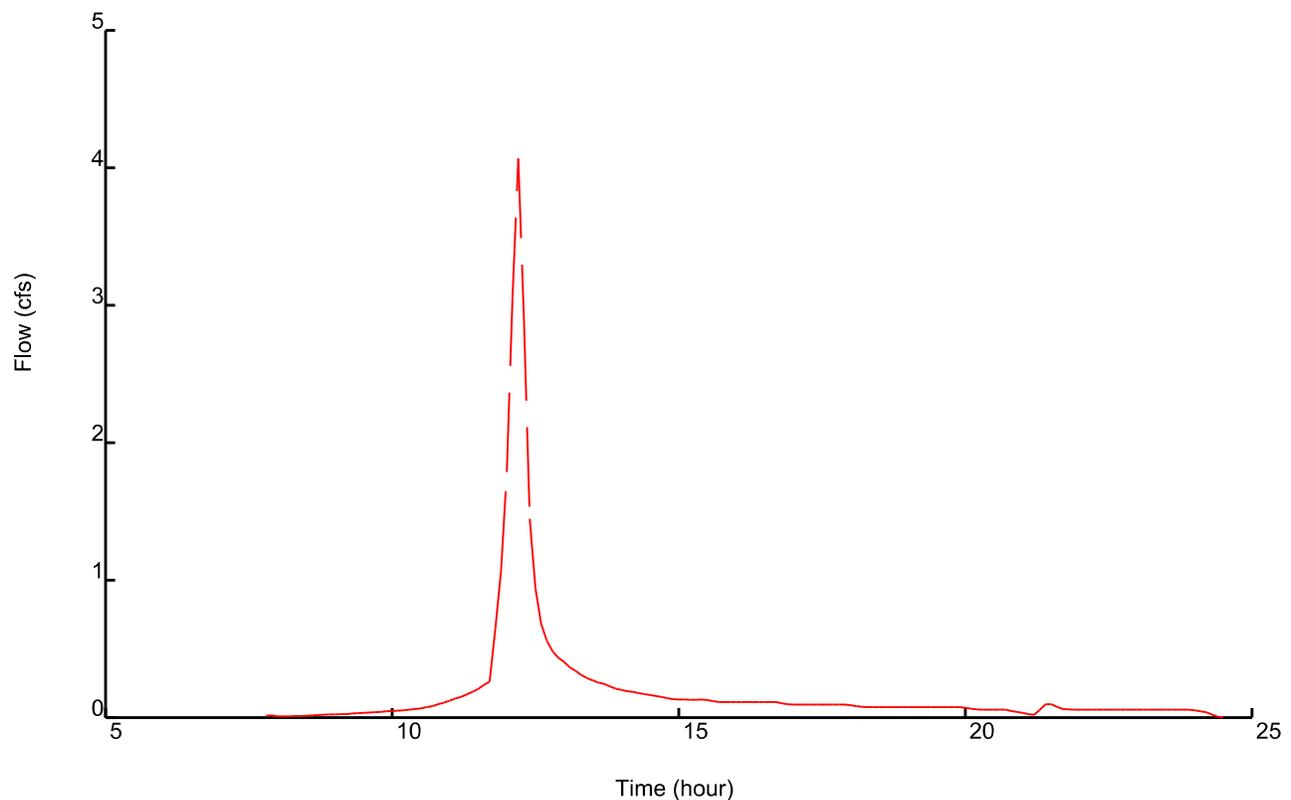
Date: 04/13/21
Date: 04/13/21

Curve Number : 92
Length of Flow : 725.00 ft
Average Land Slope : 1.40 %
Time of Concentration : 0.223 hrs, 13.4 mins

Runoff Hydrograph

Unit Hydrograph: SCS Curvilinear

Rainfall Distribution Type	TYPE II 24-HOUR	Antecedent Moisture Condition	Type II
Runoff Hydrograph	SCS Method	Peak Discharge (Qp)	4.0679 cfs
Return Period	5 YEAR	Time to Peak	12.20 hrs
Time Increment	0.10 hrs	Runoff Volume	0.27 acre-ft
Drainage Area	2.910 acre	Runoff Curve Number, CN	92.0
Basin Slope	0.00 %	Hydraulic length	0.00 ft
Tc Method	SCS	Time of Concentration	13.0 min
Base Flow	0.0000 cfs	Rainfall Depth	1.84 in
Storm Duration	24.00 hrs	Peak Rate Factor	484



Runoff Hydrograph - SCS Method

Hydrograph Table

Time (hr)	Flow (cfs)
7.80	0.014
7.90	0.017
8.00	0.011
8.10	0.010

8.20	0.010
8.30	0.012
8.40	0.014
8.50	0.016
8.60	0.018
8.70	0.020
8.80	0.022
8.90	0.023
9.00	0.025
9.10	0.026
9.20	0.027
9.30	0.031
9.40	0.034
9.50	0.036
9.60	0.038
9.70	0.040
9.80	0.044
9.90	0.047
10.00	0.050
10.10	0.052
10.20	0.054
10.30	0.059
10.40	0.063
10.50	0.069
10.60	0.077
10.70	0.084
10.80	0.098
10.90	0.111
11.00	0.123
11.10	0.139
11.20	0.151
11.30	0.170
11.40	0.189
11.50	0.209
11.60	0.239
11.70	0.262
11.80	0.647
11.90	1.070
12.00	1.788
12.10	3.060
12.20	4.068
12.30	2.885
12.40	1.448
12.50	0.942
12.60	0.682

12.70	0.559
12.80	0.483
12.90	0.437
13.00	0.406
13.10	0.366
13.20	0.341
13.30	0.311
13.40	0.287
13.50	0.272
13.60	0.255
13.70	0.245
13.80	0.227
13.90	0.212
14.00	0.203
14.10	0.194
14.20	0.189
14.30	0.180
14.40	0.172
14.50	0.166
14.60	0.157
14.70	0.152
14.80	0.143
14.90	0.135
15.00	0.133
15.10	0.132
15.20	0.132
15.30	0.132
15.40	0.132
15.50	0.128
15.60	0.121
15.70	0.116
15.80	0.114
15.90	0.114
16.00	0.114
16.10	0.114
16.20	0.114
16.30	0.114
16.40	0.114
16.50	0.114
16.60	0.114
16.70	0.114
16.80	0.106
16.90	0.099
17.00	0.096
17.10	0.096

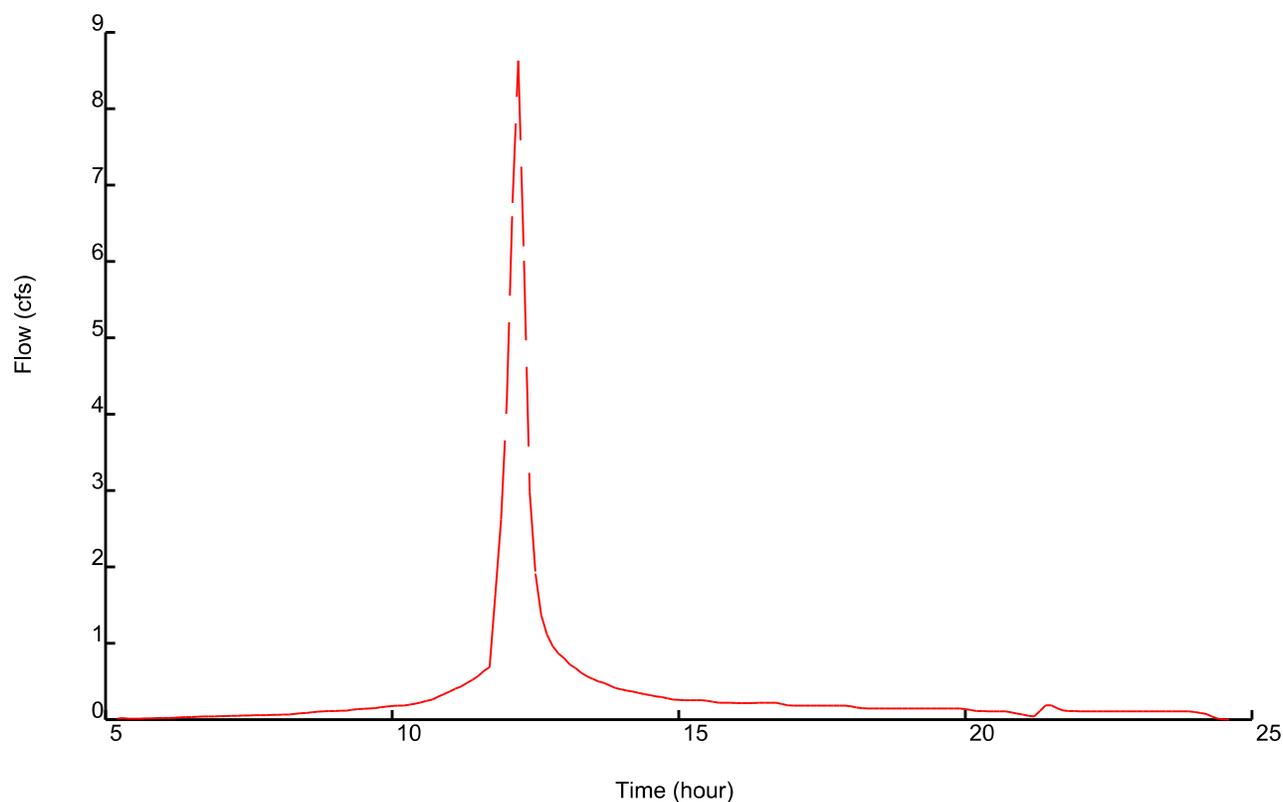
17.20	0.095
17.30	0.095
17.40	0.095
17.50	0.095
17.60	0.095
17.70	0.096
17.80	0.096
17.90	0.096
18.00	0.092
18.10	0.084
18.20	0.079
18.30	0.077
18.40	0.077
18.50	0.077
18.60	0.077
18.70	0.077
18.80	0.077
18.90	0.077
19.00	0.077
19.10	0.077
19.20	0.077
19.30	0.077
19.40	0.077
19.50	0.077
19.60	0.077
19.70	0.077
19.80	0.077
19.90	0.077
20.00	0.073
20.10	0.065
20.20	0.060
20.30	0.059
20.40	0.058
20.50	0.058
20.60	0.058
20.70	0.058
20.80	0.050
20.90	0.042
21.00	0.036
21.10	0.027
21.20	0.022
21.30	0.060
21.40	0.098
21.50	0.098
21.60	0.079

21.70	0.065
21.80	0.060
21.90	0.059
22.00	0.058
22.10	0.058
22.20	0.058
22.30	0.058
22.40	0.058
22.50	0.058
22.60	0.058
22.70	0.058
22.80	0.058
22.90	0.058
23.00	0.058
23.10	0.058
23.20	0.058
23.30	0.058
23.40	0.058
23.50	0.058
23.60	0.058
23.70	0.058
23.80	0.058
23.90	0.058
24.00	0.054
24.10	0.046
24.20	0.041
24.30	0.024
24.40	0.008
24.50	0.002

Runoff Hydrograph

Unit Hydrograph: SCS Curvilinear

Rainfall Distribution Type	TYPE II 24-HOUR	Antecedent Moisture Condition	Type II
Runoff Hydrograph	SCS Method	Peak Discharge (Qp)	8.6292 cfs
Return Period	100 YEAR	Time to Peak	12.20 hrs
Time Increment	0.10 hrs	Runoff Volume	0.60 acre-ft
Drainage Area	2.910 acre	Runoff Curve Number, CN	92.0
Basin Slope	0.00 %	Hydraulic length	0.00 ft
Tc Method	SCS	Time of Concentration	13.0 min
Base Flow	0.0000 cfs	Rainfall Depth	3.26 in
Storm Duration	24.00 hrs	Peak Rate Factor	484



Runoff Hydrograph - SCS Method

Hydrograph Table

Time (hr)	Flow (cfs)
5.20	0.016
5.30	0.021
5.40	0.016
5.50	0.016

5.60	0.016
5.70	0.018
5.80	0.019
5.90	0.021
6.00	0.022
6.10	0.024
6.20	0.025
6.30	0.030
6.40	0.034
6.50	0.037
6.60	0.039
6.70	0.042
6.80	0.044
6.90	0.046
7.00	0.048
7.10	0.049
7.20	0.051
7.30	0.053
7.40	0.055
7.50	0.057
7.60	0.059
7.70	0.060
7.80	0.062
7.90	0.064
8.00	0.065
8.10	0.067
8.20	0.068
8.30	0.076
8.40	0.083
8.50	0.090
8.60	0.099
8.70	0.106
8.80	0.110
8.90	0.113
9.00	0.116
9.10	0.118
9.20	0.121
9.30	0.130
9.40	0.140
9.50	0.145
9.60	0.149
9.70	0.152
9.80	0.163
9.90	0.174
10.00	0.179

10.10	0.183
10.20	0.187
10.30	0.199
10.40	0.211
10.50	0.226
10.60	0.249
10.70	0.265
10.80	0.302
10.90	0.337
11.00	0.368
11.10	0.407
11.20	0.435
11.30	0.482
11.40	0.524
11.50	0.571
11.60	0.640
11.70	0.689
11.80	1.638
11.90	2.620
12.00	4.163
12.10	6.768
12.20	8.629
12.30	6.008
12.40	2.980
12.50	1.913
12.60	1.373
12.70	1.119
12.80	0.962
12.90	0.870
13.00	0.806
13.10	0.725
13.20	0.675
13.30	0.615
13.40	0.567
13.50	0.537
13.60	0.503
13.70	0.483
13.80	0.446
13.90	0.415
14.00	0.398
14.10	0.380
14.20	0.370
14.30	0.352
14.40	0.336
14.50	0.324

14.60	0.307
14.70	0.297
14.80	0.279
14.90	0.264
15.00	0.259
15.10	0.257
15.20	0.257
15.30	0.257
15.40	0.257
15.50	0.249
15.60	0.234
15.70	0.225
15.80	0.222
15.90	0.221
16.00	0.221
16.10	0.221
16.20	0.221
16.30	0.221
16.40	0.221
16.50	0.221
16.60	0.221
16.70	0.221
16.80	0.206
16.90	0.191
17.00	0.186
17.10	0.185
17.20	0.185
17.30	0.184
17.40	0.184
17.50	0.184
17.60	0.184
17.70	0.185
17.80	0.185
17.90	0.185
18.00	0.177
18.10	0.162
18.20	0.152
18.30	0.149
18.40	0.148
18.50	0.148
18.60	0.148
18.70	0.148
18.80	0.148
18.90	0.148
19.00	0.148

19.10	0.148
19.20	0.148
19.30	0.148
19.40	0.148
19.50	0.148
19.60	0.148
19.70	0.148
19.80	0.148
19.90	0.148
20.00	0.141
20.10	0.126
20.20	0.116
20.30	0.113
20.40	0.112
20.50	0.111
20.60	0.111
20.70	0.111
20.80	0.096
20.90	0.081
21.00	0.069
21.10	0.052
21.20	0.042
21.30	0.115
21.40	0.188
21.50	0.189
21.60	0.151
21.70	0.124
21.80	0.116
21.90	0.113
22.00	0.112
22.10	0.111
22.20	0.111
22.30	0.111
22.40	0.111
22.50	0.111
22.60	0.111
22.70	0.111
22.80	0.111
22.90	0.111
23.00	0.112
23.10	0.112
23.20	0.112
23.30	0.112
23.40	0.112
23.50	0.112

23.60	0.112
23.70	0.112
23.80	0.112
23.90	0.112
24.00	0.104
24.10	0.089
24.20	0.079
24.30	0.045
24.40	0.014
24.50	0.005
24.60	0.001

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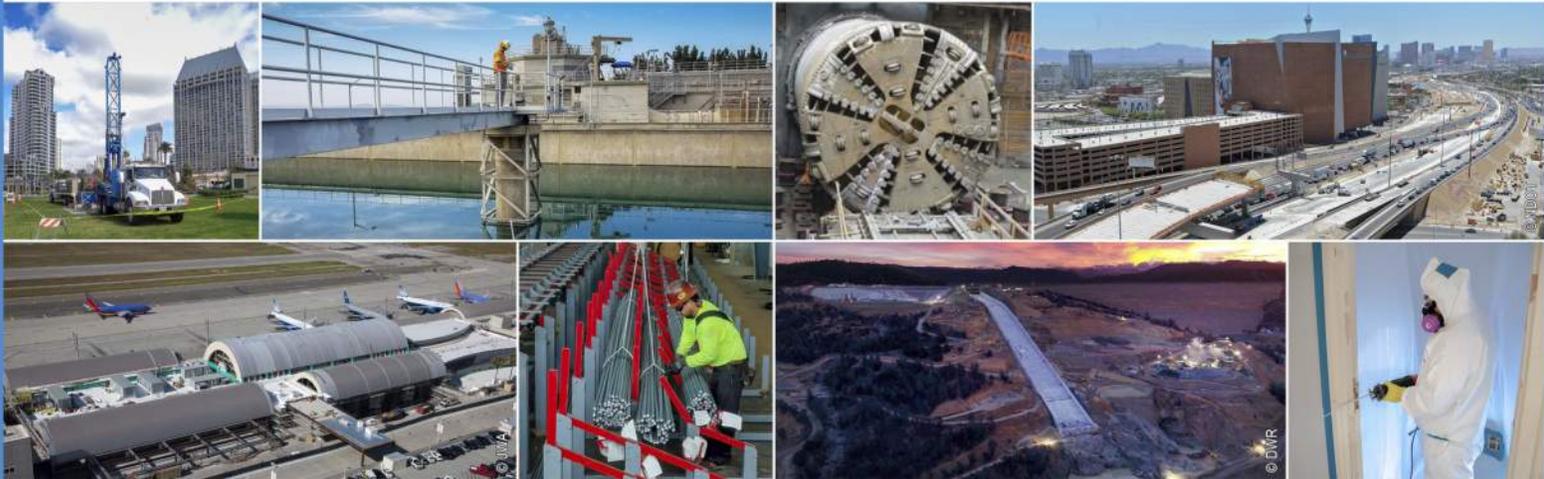
APPENDIX C

REFERENCES

Geotechnical Evaluation Proposed U-Haul Facility State Street Near East Long Street Carson City, Nevada

Amerco Real Estate Company/U-Haul International
2727 North Central Avenue, Suite 5N | Phoenix, Arizona 85004

May 11, 2021 | Project No. 304743001



Geotechnical | Environmental | Construction Inspection & Testing | Forensic Engineering & Expert Witness

Geophysics | Engineering Geology | Laboratory Testing | Industrial Hygiene | Occupational Safety | Air Quality | GIS

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants



Geotechnical Evaluation Proposed U-Haul Facility State Street Near East Long Street Carson City, Nevada

Ms. Sabrina Perez
Amerco Real Estate Company/U-Haul International
2727 North Central Avenue, Suite 5N | Phoenix, Arizona 85004

May 11, 2021 | Project No. 304743001

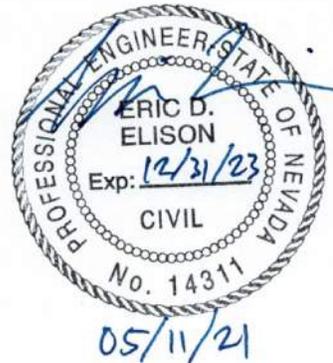
Handwritten signature of Robert E. Gambrell in blue ink.

Robert E. Gambrell, PE
Project Engineer

REG/EDE/ts

Handwritten signature of Eric Elison in blue ink.

Eric Elison, PE
Principal Engineer



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1 – Site Location
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A – Boring Logs
B – Laboratory Test Results

C – Chemical Test Results

D – General Drilled Shaft Recommendations

1 INTRODUCTION

In accordance with your request, Ninyo & Moore has performed a geotechnical evaluation for the proposed U-Haul Facility project to be constructed on the east side of State Street, south of East Long Street, in Carson City, Nevada. The approximate location of the site is indicated on Figure 1. The purposes of our geotechnical study were to evaluate subsurface soil conditions at the project site and to provide design and construction recommendations regarding geotechnical aspects of the project. This report presents the findings of our subsurface exploration, results of laboratory testing, conclusions regarding subsurface conditions at the subject site, and geotechnical recommendations for design and construction of this project.

Ninyo & Moore previously performed a fault study at the project site. The results of the fault study are provided in the referenced report (Ninyo & Moore, 2020).

2 EXECUTIVE SUMMARY

Based on the findings of this study, it is our opinion that there are no known geotechnical or geologic conditions that would preclude construction of the proposed project, provided the recommendations presented herein are implemented and appropriate construction practices are followed. The following is a summary of information related to the project and our findings, conclusions, and recommendations:

- The site is an approximately 2.9-acre parcel located on the east side of State Street, south of East Long Street, in Carson City, Nevada. The site is located just west of the existing U-Haul Facility 864081.
- At the time of our field activities, the project site was mostly undeveloped. A small existing parking lot is located in the southwest portion of the site. Boring B-4 was drilled in the small existing paved parking lot. The asphalt concrete was approximately 3 inches thick and was underlain by approximately 9 inches of aggregate base.
- Native soil was encountered to the total depths of our exploratory borings. The encountered native soil consisted primarily of loose to very dense, silty sand. Interbedded layers of clayey sand up to approximately 3 inches thick were also encountered. The encountered soils were generally moist to wet.
- Groundwater was encountered in our borings at depths ranging from approximately 6.5 to 10.0 feet below the ground surface.
- The findings of our study indicate that the native soils encountered in our exploratory borings should generally be suitable for use as structural fill material for the project. The excavated on-site soils may be used as structural fill and backfill provided they comply with the recommendations presented in Section 8.1.2.

- Based on the relatively high moisture contents of the in-situ soils, pumping and unstable subgrade conditions, including flowing sands, should be anticipated in project excavations.
- Review of published geologic data and our field observations do not indicate the presence of adverse on-site geologic hazards, such as faults and ground fissures, which may affect proposed site development.
- This site is located within a zone mapped with a moderate to high liquefaction potential (NBMG, 1979). However, based on the relatively dense nature of the soils encountered in our explorations, liquefaction is not considered to be a design concern.
- In accordance with International Building Code (IBC) guidelines, the site is classified as seismic Site Class D and is located in a zone where the modified peak ground acceleration (PGA_M) having a 2 percent probability of being exceeded in 50 years is 0.922g.
- Based on the results of the field and laboratory evaluations, it is our opinion that the proposed structures can be founded on spread footings and/or mat foundations. Alternatively, drilled shafts may also be utilized.
- An allowable bearing capacity of 2,500 pounds per square foot (psf) may be used for conventional spread footings with an embedment depth of 30 inches below adjacent finished grade and a width of 12 inches. The allowable bearing capacity may be increased by 400 psf for each additional 1 foot of width and 900 psf for each additional 1 foot of embedment up to 3,500 psf.
- If utilized, we recommend that drilled, cast-in-place, concrete shafts (piers), including shallow piers supporting light poles, covered parking canopies, etc., be designed as friction piers. The allowable skin friction used for design of drilled cast-in-place concrete shafts for this project will depend on the material type into which the shafts are installed. The allowable skin friction may be estimated as $0.5(D)(H)$ for silty sand soil from 3 to 10 feet and $0.7(D)(H)$ for silty sand soil from 10 to 20 feet. D is the depth in feet and H is the pile length in feet that the shaft is embedded into each material. Skin friction should be ignored in the upper 3 feet of the shafts. The weight of the concrete may be used in calculating uplift resistance.
- Lateral earth equivalent fluid pressures may be estimated using the values provided below.

Lateral Earth (Equivalent Fluid) Pressures				
Soil Condition	Active Pressure (pcf)		At-Rest Pressure (pcf)	
	Horizontal Backfill	3H:1V Backfill	Horizontal Backfill	3H:1V Backfill
Unsaturated	39	49	58	68

For passive resistance to lateral loads, we recommend a passive lateral earth pressure of 340 psf per foot of depth up to a value of 3,000 psf.

- For seismic active lateral earth pressures, an additional equivalent fluid pressure of 19 psf per foot should be added to the static active lateral earth pressure provided above for both horizontal and 3H:1V backfill.

- The results of our laboratory testing indicate that the on-site soils should be considered severely corrosive to ferrous metals. A corrosion specialist should be consulted for corrosion recommendations. The sulfate content of the soils presents a low potential for sulfate exposure to concrete.

3 SCOPE OF SERVICES

The scope of our services included the following:

- Review of pertinent background data listed in the References section of this report. The data reviewed included in-house geotechnical data, aerial photographs, published regional and local geologic maps, and soils data.
- Coordination and mobilization for subsurface exploration. Mark-out of existing utilities was conducted through Underground Service Alert (USA).
- Drilling, logging, and sampling of five exploratory test borings to depths up to approximately 51.5 feet. The purposes of the soil borings were to evaluate the subsurface soil conditions and to obtain soil samples for laboratory testing.
- Performance of laboratory tests to evaluate physical and engineering properties of the subsurface soils, including in-place moisture content and density, gradation, Atterberg limits, shear strength, expansion potential, pH, reduction-oxidation potential, electrical resistivity, water-soluble sodium content, water-soluble sulfate content, water-soluble sulfide content, water-soluble chloride content, and total salts.
- Compilation and analysis of the field and laboratory data.
- Preparation of this report presenting our findings, conclusions, and recommendations.

4 PROJECT DESCRIPTION

The project will include design and construction of a new U-Haul facility on a 2.9-acre parcel located on the east side of State Street, south of East Long Street, in Carson City, Nevada. The site is located just west of the existing U-Haul Facility 864081. The project will include construction of a one to three-story building with no below grade levels. Wall and column loads are anticipated to be on the order of 5 to 10 kips per foot and 100 to 150 kips, respectively. The project will also include areas of exterior concrete flatwork, and asphalt concrete paved parking and access areas. The approximate location of the project site is shown on Figure 1 and Figure 2.

5 GENERAL SITE CONDITIONS

At the time of our field activities, the project site was mostly undeveloped. A relatively small L-shaped asphalt concrete parking area, approximately 10,000 square-feet in size, is located in the southwest portion of the site. A chain-link fence extended near the north property line and on a portion of the east property line. The topography at the site is generally flat with a slight slope down to the southeast with a topographic relief up to approximately 5 feet across the site. We

understand that the proposed ground floor level of the proposed building will be at or within approximately 2 feet of existing site grade. The project site is generally bounded by State Street to the west, commercial properties to the south, an existing U-Haul Facility 864081 to the east, and an apartment complex to the north. Indications of an underground gas line was observed along the southern portion of the site. Indications of other utilities, including water, sewer, power, and communications lines, were observed in the site vicinity.

6 GEOLOGY

Based on our field observations, subsurface exploration, and review of referenced geologic and soils data, the subject site is underlain primarily by layers of unconsolidated Quaternary-age plain deposits and older alluvial deposits. Ninyo & Moore's findings regarding the geologic setting, potential geologic hazards, ground motions, and liquefaction potential at the subject site are provided in the following sections.

6.1 Geologic Setting

The project site is located in Eagle Valley, which lies in the west portion of the Basin and Range geomorphic province. Eagle Valley is a naturally formed structural basin as a result of block faulting, a fundamental characteristic of the Basin and Range geomorphic province. Eagle Valley extends roughly in a north-south direction and drains generally toward the southeast into the Carson River. Mountains bordering the alluvium-filled valley include the Carson Range to the west, Pine Nut Mountains to the east, Virgin Range to the north, and Prison Hill and Carson Valley to the south. The Quaternary-age plain deposits and older alluvial deposits are composed primarily of fine-grained soil and mixtures of sand and gravel. These and similar types of sediments are hundreds of feet thick in the site vicinity.

6.2 Geologic Hazards

Ninyo & Moore's geotechnical study included an evaluation of the possible presence of geologic hazards, such as faults and ground fissures, in the site area. This evaluation included visual observation of the site for indications of adverse geologic features and review of published geologic and soils maps and literature, and other data listed in the References section of this report. Referenced geologic data were also reviewed to evaluate seismic activity levels, and associated potential earthquake hazards, for faults in the site vicinity. It should be noted that the fault seismic activity levels provided in this section were obtained/interpreted primarily from United States Geological Survey (USGS, 2021) data.

Review of the United States Geologic Survey (USGS) Quaternary Fault and Fold Database (2020) indicates that the Carson City fault was previously mapped extending through the northwest

corner of the project site in a northeast-southwest direction. The Carson City fault is considered an active normal fault (a fault that has moved within the last 11,000 years). The distances from the project site to active faults in the project vicinity are presented in the following table.

Fault Name	Approximate Distance From Project Site To Fault (miles)
Carson City fault	On-Site
New Empire fault, Central zone	1.2
Kings Canyon fault	2.2

Ninyo & Moore previously performed a fault study at the project site. The complete results of the fault study are provided in the referenced report (Ninyo & Moore, 2020). In our prior fault study, the Carson City fault was not observed in our fault trench. Our findings are based on the absence of fault-related features, including subsurface deformation, off-set soil units, and subsurface disturbance. During our geologic field reconnaissance at the site, features indicative of previous ground movement were not observed, such as scarps, ground fissuring, crack in-filling, or juxtaposed soil units.

Based on observed surface and subsurface conditions in the area of trenching, as well as our review of the documents referenced in the fault study report, it is our opinion that fault rupture is not a design consideration for the proposed project.

6.3 Ground Motions

Using the referenced United States Geological Survey database (USGS, 2021), estimated maximum considered earthquake spectral response accelerations for short (0.2 second) and long (1.0 second) periods were obtained for the subject site, which is located at approximately 39.1730 degrees north latitude and -119.7525 degrees west longitude. Based on the soils encountered in our explorations, the International Building Code 2018 (ICC, 2018), and a review of available geologic information, Seismic Site Class D is appropriate for the subject site. The parameters presented in the following table are characteristic of the site for design purposes.

Table 2 – Seismic Design Criteria	
Site Coefficients and Spectral Response Acceleration Parameters	Values
Site Class	D
Site Coefficient at 0.2-second Period, F_a	1.0
Site Coefficient at 1.0-second Period, F_v	1.5
Mapped Spectral Response Acceleration at 0.2-second Period, S_s	2.425g
Mapped Spectral Response Acceleration at 1.0-second Period, S_1	0.862g
Spectral Response Acceleration at 0.2-second Period Adjusted for Site Class, S_{MS}	2.425g
Spectral Response Acceleration at 1.0-second Period Adjusted for Site Class, S_{M1}	1.293g
Design Spectral Response Acceleration at 0.2-second Period, S_{DS}	1.616g
Design Spectral Response Acceleration at 1.0-second Period, S_{D1}	0.862g
Site Amplification Factor, F_{PGA}	1.0
Peak Ground Acceleration, PGA	0.922g
Modified Peak Ground Acceleration, PGA_M	0.922g

6.4 Liquefaction Potential

Liquefaction is a phenomenon in which loose, saturated soils lose shear strength under short-term (dynamic) loading conditions. Ground shaking of sufficient duration results in the loss of grain-to-grain contact in potentially liquefiable soils due to a rapid increase in pore water pressure, causing the soil to behave as a fluid for a short period of time. To be potentially liquefiable, a soil is typically cohesionless with a grain-size distribution generally consisting of sand and silt. It is generally loose to medium dense and has relatively high moisture content, which is typical near or below the groundwater level. The potential for liquefaction decreases with increasing clay and gravel content, but increases as the ground acceleration and duration of shaking increase. Potentially liquefiable soils need to be subjected to sufficient magnitude and duration of ground shaking for liquefaction to occur.

This site is located within a zone mapped with a moderate to high liquefaction potential (NBMG, 1979). An in-depth evaluation of the potential for liquefaction at the site was outside the scope of this geotechnical evaluation. However, based on the density of soils encountered in our explorations, liquefaction is not considered to be a design concern.

7 FIELD EXPLORATION AND SUBSURFACE CONDITIONS

Ninyo & Moore's subsurface exploration at the project site was performed on April 6, 2021. This exploration consisted of drilling, logging, and sampling of five exploratory test borings (B-1 through B-5). The borings were drilled to depths of up to approximately 51.5 feet with a CME 75 drill rig utilizing 4-inch diameter solid-stem augers. The purpose of the borings was to evaluate subsurface conditions at the project site and to collect soil samples for laboratory testing. The elevations of the borings based on Mean Sea Level (MSL) were estimated from Google Earth (Google Earth Website, 2021) data. Accordingly, the boring elevations that are recorded on the boring logs in Appendix A should be considered approximate. The approximate locations of the borings are shown on Figure 2.

Laboratory tests were performed on representative soil samples collected from the borings to evaluate the in-place moisture and density content, gradation, Atterberg limits, shear strength, expansion potential, pH, reduction-oxidation potential, electrical resistivity, water-soluble sodium content, water-soluble sulfate content, water-soluble sulfide content, water-soluble chloride content, and total salts. The results of the in-place moisture content tests are provided on the boring logs in Appendix A. The other laboratory test results and descriptions of testing procedures utilized are presented in Appendix B and Appendix C.

7.1 Subsurface Soil Encountered

Native soil was encountered to the total depths of our exploratory borings. The encountered native soil consisted primarily of loose to very dense, silty sand. Interbedded layers of clayey sand up to approximately 3 inches thick were also encountered. The encountered soils were generally dry to wet.

Laboratory tests were performed on representative samples of native soil obtained from the exploratory borings. Results of these tests are summarized in the following table and presented in Appendix B.

Table 3 – Summary of Laboratory Test Results

Test Type	Test Results	Remarks
Atterberg Limits		
Liquid Limit	NP to 26	
Plastic Limit	NP to 21	
Plasticity Index	NP to 5	Low plasticity.
Direct Shear		
Peak Cohesion	0 and 312 psf	--
Peak Friction Angle	29 and 33 degrees	--
Expansion Index	0 and 5	Very low expansion potential.
pH	8.32 and 9.30	--
Oxidation-Reduction Potential	433 and 443 mV	--
Electrical Resistivity	1,740 and 1,800 Ohm-cm	Severely corrosive to normal grade steel.
Water-Soluble Sodium	436 and 477 mg/kg (ppm)	--
Water-Soluble Sulfate	7.77 and 41.3 mg/kg (ppm)	Low corrosivity potential to concrete.
Water-Soluble Sulfide	0.700 and 1.80 mg/kg (ppm)	--
Water-Soluble Chloride	23.7 and 38.9 mg/kg (ppm)	Low corrosivity potential to normal grade steel.
Total Salts (Solubility)	2,040 and 3,340 mg/kg (ppm)	Low solubility potential.

7.2 Groundwater

Groundwater was encountered in Borings B-1 through B-5 at depths of approximately 6.5 to 10.0 feet at the time of drilling. Groundwater levels are influenced by seasonal factors, variations in ground surface topography, precipitation, irrigation practices, soil/rock types, groundwater pumping, and other factors and are subject to fluctuations. These fluctuations may be due to variations in ground surface topography, subsurface geologic conditions, rainfall, irrigation, dewatering/pumping operations from nearby sites, and other factors. Evaluation of factors associated with groundwater fluctuations was beyond the scope of this study.

8 RECOMMENDATIONS

The following sections provide geotechnical recommendations for design and construction of proposed project improvements.

8.1 Earthwork

The following subsections provide recommendations for earthwork, including site grading, structural fill and backfill, import soil, temporary excavations, and temporary shoring.

8.1.1 Site Grading

Prior to grading, areas of proposed improvements should be cleared of any surface obstructions, debris, organics (including vegetation), and other deleterious material. Such materials generated from clearing operations should be removed and disposed of in non-structural areas or at a legal landfill.

We recommend that the full depth of any on-site undocumented fill (if encountered) and surficial loose and/or disturbed native soils be removed from proposed structure and improvement areas, including slab/pad foundations and concrete flatwork areas. These excavated soils may be processed and stockpiled for later use as structural fill or backfill, provided they comply with the recommendations presented in this report.

After the removals described above have been made, the exposed native soils should be scarified to approximately 6 inches, moisture-conditioned to approximately optimum moisture content, and compacted to 95 percent relative compaction, as evaluated by American Society for Testing and Materials (ASTM) Standard D 1557. The project's geotechnical consultant should observe excavation bottoms and areas to receive fill at the time of grading to assess the suitability of the exposed material and to evaluate if removals down to more competent soils are needed.

Surface preparations should extend 5 feet or more beyond the exterior edges of planned structure foundations and 2 feet or more beyond planned exterior concrete flatwork, pavement areas, and retaining/screen walls, or to a lateral distance that is equivalent to the depth of compacted structural fill, whichever is greater.

We understand that cuts and fills will be approximately 2 feet or less. Based on the density/consistency of the existing native soils at the site, some shrinkage should be anticipated when these soils are over-excavated, processed, and compacted. For planning purposes, an estimated shrinkage factor of approximately 15 percent may be used for on-site soils encountered in the upper 5 feet.

Areas of firm/loose and relatively moist to wet conditions should be anticipated, particularly during the winter and spring months. Unstable and pumping subgrade conditions should be expected during earthwork operations, particularly after rain and snowfall events. Subgrade

stabilization will be needed where unstable and pumping subgrade conditions are encountered. Stabilization methods may include the use of geogrids, geofabric, and/or angular rock up to approximately 6 inches in diameter. The geotechnical consultant should evaluate proposed subgrade stabilization methods prior to their implementation.

8.1.2 Structural Fill and Backfill

The following sections include recommendations regarding soil suitability, placement, and compaction of structural fill and backfill.

8.1.2.1 Soil Suitability

Based on the findings of our subsurface evaluation and laboratory test results, the native soils encountered at the site should generally be suitable for use as structural fill and backfill material. The excavated on-site soils may be used as structural fill and backfill provided they comply with the recommendations presented in this section. Any organically rich surficial soils encountered at the site will not be suitable for use as structural fill or backfill, and will need to be removed from the site or placed in non-structural areas, as appropriate.

Structural fill and backfill soil should not contain organic matter, debris, other deleterious matter, or rocks or hard chunks larger than approximately 4 inches in nominal diameter. These soils should have a low solubility potential of 1.0 percent or less, as evaluated by SM2540C for an extraction at a 1:5 (soil to water) ratio and corrected for dilution, and a very low to low expansion potential (Expansion Index, EI, less than 50, as evaluated by ASTM D 4829).

8.1.2.2 Placement and Compaction

Soils used as structural fill and backfill should be moisture-conditioned to approximately optimum moisture content and placed and compacted in uniform horizontal lifts to a relative compaction of 95 percent, as evaluated by the ASTM D 1557. The optimal lift thickness of fill will depend on the type of soil and compaction equipment used, but should generally not exceed approximately 8 inches in loose thickness. Placement and compaction of structural fill should be performed in accordance with applicable building codes.

Earthwork operations should be observed and compaction of structural fill and backfill materials should be tested by the project's geotechnical consultant. Typically, one field test should be performed per lift for each approximately 500 cubic yards of fill placement

in structural areas. Additional field tests may also be performed in structural and non-structural areas at the discretion of the geotechnical consultant.

8.1.3 Import Soil

Import soil should consist of coarse-grained material (50 percent or more retained on the No. 200 sieve). Import soil should have a low solubility potential of 1.0 percent or less, as evaluated by SM2540C for an extraction at a 1:5 (soil to water) ratio and corrected for dilution, a low sulfate content (less than 0.1 percent), and a very low to low expansion potential (EI less than 50, as evaluated by ASTM D 4829). Import soil should not contain organic matter, debris, other deleterious matter, or rocks or hard chunks larger than approximately 4 inches in nominal diameter. We further recommend that proposed import material be evaluated by the project's geotechnical consultant at the borrow source for its suitability prior to being imported to the project site. Import soil should be moisture-conditioned, placed, and compacted in accordance with the recommendations set forth in the previous section.

8.1.4 Temporary Excavations

Temporary slope surfaces should be kept moist to retard raveling and sloughing. Water should not be allowed to flow over the top of excavations in an uncontrolled manner. Stockpiled material and/or equipment should be kept back from the top of excavations a distance equivalent to the depth of the excavation or more. Workers should be protected from falling debris, sloughing, and raveling in accordance with Occupational Safety and Health Administration (OSHA) regulations (OSHA, 2016). Temporary excavations should be observed by the project's geotechnical consultant so that appropriate additional recommendations may be provided based on the actual field conditions. Temporary excavations are time sensitive and failures are possible.

Based on the soil conditions encountered at the site during our field explorations, we recommend that OSHA Soil "Type C" classification be used for excavations at the site. This corresponds to temporary slopes of 1.5H:1V (Horizontal to Vertical [H:V]). This side slope inclination is for excavations that are less than 20 feet deep. If material is stored or equipment is operated near an excavation, stronger shoring should be used to resist the extra pressure due to superimposed loads.

Based on the relatively high in-situ moisture contents and the shallow nature of the groundwater at this site, saturated and unstable soil conditions may be encountered, particularly in excavation bottoms. Dewatering should be anticipated for excavations greater than approximately 5 feet deep.

8.1.5 Temporary Shoring

Excavations that encounter soils with low cohesion may not stand open without shoring or bracing. Temporary excavations that encounter groundwater seepage or surface runoff may need shoring and/or stabilization. Excavations encountering seepage should be evaluated on a case-by-case basis.

For excavations in loose, low cohesion soils, we recommend that a temporary earth retention system be utilized. Temporary earth retention systems may include braced systems, such as trench boxes or shields with internal supports or cantilever systems (e.g., soldier piles and lagging); however, the risk of excessive lateral deflection may render a cantilevered shoring system inappropriate for the project.

For earth retention systems subjected to surcharge loads, the contractor should include the effect of these loads with respect to design lateral earth pressures. We recommend that an experienced structural engineer design the shoring system. The shoring parameters presented in this report should be considered as guidelines.

We anticipate that settlement of the ground surface will occur behind shoring systems during excavation. The amount of settlement will depend on the type of shoring system used, the contractor's workmanship, and soil conditions. We recommend that embankments, roadways, utilities, and other improvements in the vicinity of planned excavations be evaluated with regard to foundation support and tolerance to settlement. To reduce the potential for distress to these structures, we recommend that the shoring system be designed to limit the ground settlement behind it to ½-inch or less. Possible causes of settlement that should be addressed include settlement during excavation, construction vibrations, dewatering (if needed), and removal of the shoring system. We recommend that shoring installation be evaluated carefully by the contractor prior to construction and that ground vibration and settlement monitoring be performed during construction.

The contractor should evaluate the adequacy of the shoring parameters presented in this report, and make the appropriate modifications for their design. We recommend that the contractor take appropriate measures to protect the workers. OSHA requirements pertaining to workers' safety should be observed.

8.2 Structure Foundations

Based on the results of our field and laboratory evaluations, it is our opinion that the proposed structures can be supported on shallow spread footings, mat foundations, and/or drilled shaft

foundations. Foundations should be designed and constructed in accordance with the recommendations of a qualified structural engineer. The allowable bearing capacities provided in the following sections, which were developed considering a factor of safety of 2.5, may be increased by one-third for short duration loads, such as wind or seismic. Lateral resistances are presented in Section 8.4. Seismic parameters for design of structures at the site are provided in Table 2 in Section 5.3.

8.2.1 Spread Footings

Structure foundations consisting of conventional spread footings should extend 30 inches or more below the lowest adjacent finished grade (for frost protection) and bear on medium dense to very dense native soils or on adequately placed and compacted structural fill (reworked native or import soils). Continuous and isolated footings should have a width of 12 inches or more. Footings should be reinforced in accordance with the project structural engineer's recommendations. From a geotechnical standpoint, we recommend that footings be reinforced with two No. 4 or larger reinforcing bars, one placed near the top and one near the bottom of the footings. Additional reinforcement may be recommended by the structural engineer.

An allowable bearing capacity of 2,500 pounds per square foot (psf) may be used for conventional spread footings with an embedment depth of 30 inches below adjacent finished grade and a width of 12 inches. The allowable bearing capacity may be increased by 400 psf for each additional 1 foot of width and 900 psf for each additional 1 foot of embedment up to 3,500 psf.

8.2.2 Mat Foundations

Mat foundations may be used as an alternative to spread footings for some structures associated with the project. We recommend that mat foundations be established on at least 6 inches of aggregate base material placed on exposed native subgrade soils scarified and recompacted to at least 95 percent of the maximum dry density as determined by ASTM D 1557, or on adequately placed and compacted structural fill. Mat foundations should be embedded at least 30 inches (frost protection). Mat foundations established as recommended above may be designed for an allowable bearing capacity of 4,000 pounds per square foot (8 feet wide or more). The allowable bearing capacity, which was developed considering a factor of safety of 2.5, may be increased by one-third for short duration loads, such as wind or seismic.

Bending of the mat foundation from imposed foundation loads and resulting stresses within the mat foundation should be estimated using the subgrade modulus. The recommended vertical modulus of subgrade reaction, k_v1 , for use in design of a flexible mat foundation is 90 pounds per cubic inch (pci) applicable for a 12-inch-square loaded area. For actual mat foundation sizes, the subgrade modulus should be reduced using the following formula:

$$K_v = K_v1(B+1)/2B \text{ (Equation 1)}$$

Where, for a uniformly loaded mat:

K_v = vertical modulus of subgrade reaction for actual mat foundation width

K_v1 = vertical modulus of subgrade reaction for 1-foot-square loaded area = 90 pci

B = mat foundation width in feet

For point loads on the mat, the vertical modulus of subgrade reaction need not be reduced using the formula above for the entire width of the mat or slab. Instead, some equivalent width, which is related to the flexural stiffness of the mat relative to the underlying soil subgrade stiffness, may be estimated using the following formula:

$$B' = 14T \text{ (Equation 2)}$$

Where:

B' = equivalent foundation width in feet to be used in Equation 1 for B

T = thickness of mat in feet

8.2.3 Drilled Shafts

Based on our understanding, drilled shafts are also being considered for support of proposed structures for this project. Considering potential sidewall instability, flowing sands, and other construction difficulties caused by the relatively shallow groundwater and cohesionless nature of soils encountered in our borings, it is our opinion that drilled shafts may not be efficient or cost effective. If utilized, we anticipate shaft sizes ranging from 2 to 4 feet in diameter extending to depths ranging between 8 and 20 feet below the ground surface. Geotechnical recommendations for design and construction of drilled shafts are presented in the following sections of this report and in Appendix D.

8.2.3.1 Allowable Axial Capacity

Based on the results of the exploratory borings from this study and laboratory tests, we recommend that drilled, cast-in-place, concrete shafts (piers) be designed as friction

piers. Based on the relatively wet and cohesionless conditions of the encountered soils, end bearing should not be considered in the shaft design. The allowable skin friction used for design of drilled cast-in-place concrete shafts on this project will depend on the material type into which the shafts are installed. The allowable skin friction values may be estimated as shown in Table 4 below:

Table 4 – Formulas For Calculating Allowable Skin Friction

Depth	Material Type (USCS)	Allowable Skin Friction (psf)
3-10	SM	0.5(D)(H)
10-20	SM	0.7(D)(H)

Where D is the shaft diameter in feet and H is the pile length in feet that the shaft is embedded into each material.

The allowable axial capacity for drilled shafts was evaluated using the computer program Allpile Version 7.2i (CivilTech, 2005). Skin friction should be ignored in the upper 3 feet of the shafts. The estimated allowable capacity incorporates a factor of safety of 2. The weight of the concrete may be used in calculating uplift resistance

The shafts should be embedded to a depth of three shaft diameters or more below the adjacent grade. Caissons drilled for shafts which are less than 3 diameters deep should be considered shallow, circular, footings.

8.2.3.2 Axial Reduction Factors

We recommend that adjacent drilled shafts be constructed no closer than 3 diameters, center-to-center spacing. The axial capacities are for single isolated drilled shafts. Axial group reduction factors shall be applied based on the spacing of the adjacent shafts. The axial capacity should be multiplied by an axial group reduction factor of 0.76 for a shaft spacing of three diameters on center, to obtain the reduced allowable capacity for each shaft in the group. For a shaft spacing of four diameters or more, an axial reduction factor of 1.0 is recommended (i.e., no reduction is needed). When the two adjacent shafts being considered have slightly different diameters, the average diameter of the two shafts may be used when estimating the reduction factor. For intermediate spacing, the reduction factor value may be calculated by linear interpolation.

8.2.3.3 Lateral Shaft Parameters

Recommended soil parameters for use in the computer program AllPile to analyze lateral soil-pile interaction are presented in the following table:

Table 5 – Allpile Design Parameters								
Depth (ft)	Soil Type	γ (pcf)	ϕ (degrees)	c_u (ksf)	k (pci)	E50	Dr (%)	N-Value
0-6.5	SM	115	30	N/A	86.9*	N/A	48.43*	17
6.5-10	SM	115	30	N/A	91.8*	N/A	49.78*	17
10-20	SM	115	30	N/A	134.8*	N/A	60.29*	25

Notes:
 γ = Effective (Submerged) Unit Weight
 c_u = Undrained Shear Strength
E50 = Soil Strain at 50% Ultimate Stress
 ϕ = Angle of Internal Friction
k = Initial Stiffness
* = Allpile Default Value
Dr = Relative Density

For lateral loading, piles in a group may be considered to act individually when the center-to-center spacing is more than 5D (where, D is the diameter of the pile) in the direction normal to loading and more than 8D in the direction parallel to loading. The following table presents the lateral load group reduction factors (also known as P-multipliers or P_m) to be applied for various pile spacing for in-line loading:

Table 6 – Lateral Load Group Reduction Factors, P_m			
Center-to-Center Pile Spacing for In-Line Loading	P_m *		
	Row 1	Row 2	Row 3 and higher
3D	0.75	0.40	0.30
5D	1.00	0.85	0.70
7D	1.00	1.00	0.90

Note:
*Based on AASHTO LRFD Bridge Design Specifications, 6th Edition, 2012..

If the loading direction for a single row of piles is perpendicular to the row, a P_m of less than 1.00 should be used if the pile spacing is 5D or less. A P_m of 0.90, and 1.00 should be used for pile spacing of 3D and 5D, respectively.

8.2.3.4 Construction Considerations

Our evaluation of the excavation characteristics of the on-site materials is based on the results of our exploratory borings, site observations, and experience with similar materials. In our opinion, excavation of the near surface on-site materials for drilled shaft installation can generally be accomplished with heavy drilling equipment in good operating condition.

Due to the presence of layers of saturated cohesionless sand at the site, it will be appropriate to use casing while installing the shafts at some locations. The contractor should be prepared to use a temporary full-length casing.

The drilled shafts should be observed and evaluated to check that the design depth has been reached and that the shaft bottom subgrade has been suitably cleaned. This evaluation can typically be done from the ground surface. General construction considerations for drilled shafts are also summarized in Appendix D.

8.3 Settlement

Based on our evaluation of spread footing bearing capacity, we anticipate that settlement of foundations will be on the order of 1 inch or less. We estimate differential settlement of about 1/2-inch over a horizontal span of about 40 feet for spread footings. Differential settlement of mat foundations will depend upon the structural rigidity of the mat.

Drilled shaft settlements will depend on the loads, depths, and diameters of the shafts. Settlements of up to about 1/2 inch may be assumed for preliminary design.

8.4 Lateral Earth Pressures

Lateral earth equivalent fluid pressures may be estimated using the values provided below. The values shown are based on our observation of the on-site soils and assume static conditions, free-draining, compacted granular backfill, with an angle of internal friction angle (ϕ) of 30 degrees, a cohesion (C) of 0 psf, a unit weight of about 115 pcf, and the backfill inclinations shown. The values presented below assume that the anticipated slope extends for a distance of 10 feet, or three times the height generating the passive pressure, whichever is more. These values also assume that retaining walls will have a height of approximately 6 feet or less.

Lateral Earth (Equivalent Fluid) Pressures				
Soil Condition	Active Pressure (pcf)		At-Rest Pressure (pcf)	
	Horizontal Backfill	3H:1V Backfill	Horizontal Backfill	3H:1V Backfill
Unsaturated	39	49	58	68

In addition, for seismic active lateral earth pressures, an additional equivalent fluid pressure of 19 psf per foot should be added to the static active lateral earth pressure provided above for both horizontal and 3H:1V backfill. We recommend that the upper 12 inches of soil not protected by pavement or a concrete slab be neglected when calculating passive resistance.

For frictional resistance to lateral loads, we recommend that a coefficient of friction of 0.54 be used between soil and soil contacts and/or between soil and cast-against-grade concrete contacts. A coefficient of friction of 0.36 may be used between soil and formed concrete contacts. Passive and frictional resistances may be used in combination, provided the passive resistance does not exceed one-half of the total allowable resistance. The lateral bearing capacity may be increased by one-third when considering loads of short duration such as wind or seismic forces.

8.5 Concrete Slab-On-Grade Floors

Concrete slab-on-grade floors should be designed by the project's structural engineer based on anticipated loading conditions. Ninyo & Moore recommends that conventional concrete slab-on-grade floors for this project be founded on 6 inches of Aggregate base Course overlying 12 inches of adequately placed and compacted structural fill or dense to very dense native soils. Aggregate base underlying concrete slab-on-grade floors should be compacted to 95 percent of the laboratory maximum dry density (ASTM D 1557).

Floor slabs should be 4 inches or more in thickness and reinforced with No. 3 steel reinforcing bars placed at 18 inches on-center both ways. Reinforcement of the slab should be placed at mid-height. We recommend that "chairs" be utilized to aid in the placement of the reinforcement. Increased slab thickness and reinforcement may be recommended by the structural engineer. As a means to reduce shrinkage cracks, we recommend that conventional slab-on-grade floors be provided with control joints in accordance with the recommendations of a qualified structural engineer. Recommendations regarding concrete utilized in construction of floor slabs are provided in a subsequent section of this report.

As an alternative to slab reinforcement with steel reinforcing bars, post-tensioned slabs designed by a qualified structural engineer may be considered. Geotechnical recommendations for design of post-tensioned slabs-on-grade will be provided by Ninyo & Moore upon request.

Ninyo & Moore recommends that a moisture barrier be provided by a membrane placed beneath concrete slab-on-grade floors, particularly in areas where moisture-sensitive flooring is to be used. The membrane may overlie or underlie the previously described compacted base material. If the membrane overlies the base material, it should be covered with 2 inches of moist sand (not saturated) to reduce the potential for puncture during construction and to aid in concrete curing. The membrane should consist of visqueen 10 mils in thickness. If flooring systems, including the adhesives, are particularly sensitive to moisture vapor, a more robust membrane/moisture barrier should be considered, such as Stego Wrap, which is 15 mils in thickness with a permeance less than 0.02 grains per square foot per hour (perms) as evaluated by ASTM E-96. This membrane

should overlie compacted base material and be placed directly under the floor slab. A prepour planning meeting should also be considered to resolve water vapor emission and concrete curing considerations and to establish means for reducing slab curl.

8.6 Exterior Concrete Flatwork

Ground-supported concrete flatwork will be subject to soil-related movements resulting from frost heave/settlement. Thus, where these types of elements abut rigid building foundations or isolated/suspended structures, differential movements should be anticipated. We recommend that flexible joints be provided in this situation to allow for differential movement.

Exterior concrete flatwork, such as walkways, should be founded on 6 inches of Aggregate base Course overlying dense to very dense native granular soils, or 12 inches or more of compacted structural fill that meets the recommendations described in Section 8.1.4 of this report. The fill thickness may include 6 inches of scarified and re-compacted soils. Aggregate base Course should be compacted to 95 percent relative compaction, as evaluated by ASTM D 1557.

To reduce the potential for shrinkage cracks, the flatwork should be constructed with control joints spaced approximately 5 feet apart for walkways and approximately 10 feet on-center each way for larger slabs. Crack control joint spacing should be in accordance with recommendations of a qualified structural engineer. Reduced joint spacing may be recommended by the structural engineer.

Formation of shrinkage cracks in concrete slabs, and other cracks due to minor soil movement, may be further reduced by utilizing steel reinforcement, such as welded wire mesh. However, due to the inherent difficulty in positioning welded wire mesh in the middle of concrete flatwork, other crack control methods should be considered, such as placement in the concrete of No. 3 steel reinforcing bars at approximately 24 inches on-center each way. Reinforcement of the flatwork should be placed at approximately mid-height in the concrete utilizing “chairs.”

Exterior concrete flatwork, curbs, and gutters should be constructed in accordance with the recommendations of the project’s civil or structural engineer and governing agency requirements. Recommendations regarding concrete utilized in construction of proposed improvements are provided in Section 8.9.

8.7 Pavement Sections

The following sections provide asphalt concrete pavement sections for on-site parking and access areas for the subject project.

8.7.1 Pavement Sections for Parking and Access Areas

To form a basis for design of flexible pavement for on-site paved parking and access areas, we have assumed the following:

- A design Equivalent Single Axial Load (ESAL) value of 50,000 for light traffic; an ESAL value of 110,000 for medium traffic; and an ESAL value of 180,000 for heavy traffic areas are applicable.
- A reliability of 90 percent.
- A standard deviation of 0.45.
- An initial serviceability index of 4.2.
- A terminal serviceability index of 2.5.
- A subgrade resilient modulus (MR) of 14,200 pounds per square inch (psi) (based on soil classifications).

Using these values, structural numbers associated with the proposed parking and access areas were calculated using design procedures in accordance with the American Association of State Highway and Transportation Officials method of designing flexible pavement (AASHTO, 1993) requirements. The following table presents recommended structural pavement sections placed over structural fill for on-site parking and access areas.

Traffic Type	Design ESAL	Pavement ($a_{\text{asphalt}} = 0.35$)	Base ($a_{\text{base}} = 0.12$)	Subgrade	Structural Number Provided	Structural Number Needed
		Asphalt Concrete Thickness (Inches)	Type II Base Thickness (Inches)	Structural Fill Thickness (Inches)*		
Light	50,000	3.0	6.0	6.0	1.77	1.70
Medium	110,000	3.5	6.0	6.0	1.94	1.90
Heavy	180,000	4.0	6.0	6.0	2.12	2.10

Note: *Structural fill below pavement sections may include scarified and recompacted native soil.

For heavy truck traffic areas, garbage truck aprons, or other truck loading/unloading/turn areas, we recommend a rigid pavement section consisting of 6 inches of Portland Cement Concrete (PCC) for light and medium traffic areas, and 7 inches of PCC for heavy traffic areas. These rigid pavement sections should be underlain by at least 6 inches or more of properly compacted Type II Aggregate Base. Concrete pavement should be designed in accordance with the American Concrete Institute (ACI) specifications. The concrete should have an elastic modulus of at least 2,800,000 psi, a minimum 28-day unconfined compressive strength of 4,500 psi, and contain 5 percent (± 1 percent) air-entrainment.

8.7.2 Pavement Considerations

If the assumed traffic or design ESAL values are not considered appropriate, this office should be notified. In providing these recommendations for pavement sections, we have assumed that asphalt concrete will be mixed and placed in accordance with Section 401 of the referenced Uniform Standard Specifications (RTC, 2021). We have also assumed that Type II Aggregate Base will conform to Section 704.03.04 of the referenced Uniform Standard Specifications (RTC, 2021). Type II Aggregate Base materials should be placed and compacted to at least 95 percent relative compaction, as evaluated by ASTM D 1557, and in accordance with Section 302 of the referenced Uniform Standard Specifications (RTC, 2021).

We recommend that mix designs be made for the asphalt concrete and Portland cement concrete by an engineering company specializing in this type of work. In addition, paving operations should be observed and tested by a qualified testing laboratory.

Adequate surface drainage should be provided to reduce the potential for ponding and infiltration of water into the pavement and subgrade materials. We suggest that the paved areas have a surface gradient of 1 percent or more. In addition, surface runoff from surrounding areas should be intercepted, collected, and not permitted to flow onto the pavement or infiltrate the base and subgrade. We recommend that perimeter swales, edge drains, curbs and gutters, or combination of these drainage devices be constructed to reduce the adverse effects of surface water runoff.

8.8 Construction in Cold or Wet Weather

During construction, the site should be graded such that surface water can drain readily away from the structure and improvement areas. It is important to avoid ponding of water in or near excavations. Water that accumulates in excavations should be promptly pumped out or otherwise removed and these areas should be allowed to dry out before resuming construction. Berms, ditches, and similar means should be used to decrease stormwater entering the work area and to efficiently convey it to appropriate outlets off site.

Earthwork activities undertaken during the cold weather season may be difficult and should be done by an experienced contractor. Fill should not be placed on top of frozen soils. The frozen soils should be removed prior to placement of new engineered fill or other construction material. Frozen soil should not be used as structural fill or backfill. The frozen soil may be reused (provided it meets the selection criteria) once it has thawed completely. In addition, compaction of the soils may be more difficult due to the viscosity change in water at lower temperatures.

If construction proceeds during cold weather, foundations, slabs, or other concrete elements should not be placed on frozen subgrade soil. Frozen soil should either be removed from beneath concrete elements, or thawed and recompact. To limit the potential for soil freezing, the time between excavation and construction should be minimized. Blankets, straw, soil cover, or heating may be used to decrease the potential of soil freezing.

8.9 Concrete and Corrosion Considerations

The corrosion potential of on-site soils to concrete was evaluated in the laboratory using representative samples obtained from the exploratory borings. Results of these tests are presented in Appendix C. Recommendations regarding concrete to be utilized in construction of proposed improvements and for buried metal pipes are provided in the following sections.

8.9.1 Concrete

Chemical tests performed on selected samples of on-site soils indicated low sulfate contents. Based on review of the referenced American Concrete Institute manual (ACI, 2016), the tested soil is considered negligibly deleterious to concrete. However, we recommend that concrete in contact with on-site soils, along with subsurface walls up to 12 inches above finished grade, contain Type II cement. We also recommend that concrete in contact with on-site soil have a design compressive strength of 4,000 psi, and a water-cement ratio of 0.45 by weight. In addition, it is recommended that reinforcing bars in cast-against-grade concrete be covered by approximately 3 inches or more of concrete. Concrete should be placed with an approximate 4-inch slump and good densification procedures should be used during placement to reduce the potential for honeycombing. Concrete samples should be obtained, as indicated by ACI manual Section 318 (ACI, 2016), and the slump should be tested at the site by the project's geotechnical consultant. Structural concrete should be placed in accordance with American Concrete Institute (ACI, 2016) and project specifications.

8.9.2 Buried Metal Pipes

Ninyo & Moore recommends that corrosion reduction methods be implemented for this project for buried metal pipes. These corrosion reduction methods may include utilization of protective coatings, pipe sleeving, and/or appropriate cathodic protection as recommended by a qualified corrosion engineer. Where permitted by jurisdictional building codes, the use of plastic pipes for buried utilities should also be considered.

8.10 Moisture Infiltration Reduction and Surface Drainage

Infiltration of water into subsurface soils can lead to soil movement and associated distress, and chemically and physically related deterioration of concrete structures. To reduce the potential for infiltration of moisture into subsurface soils at the site, we recommend the following:

- Positive drainage should be established and maintained away from the proposed structures. Positive drainage may be established by providing a surface gradient of 2 percent away from structures for a distance of 10 feet measured perpendicular from structure perimeters, where possible.
- Adequate surface drainage should be provided to channel surface water away from on-site structures and to a suitable outlet such as a storm drain or the street. Adequate surface drainage may be enhanced by utilization of graded swales, area drains, and other drainage devices. Surface run-off should not be allowed to pond near structures.
- Building roof drains should have downspouts tightlined to an appropriate outlet, such as a storm drain or the street. If tightlining of the downspouts is not practicable, they should discharge 5 feet or more away from the building or onto concrete flatwork or asphalt that slopes away from the structure. Downspouts should not be allowed to discharge onto the ground surface adjacent to building foundations.
- Ninyo & Moore recommends that low-water use (drip irrigated) landscaping be utilized on site, particularly within 5 feet of the building and exterior site improvements, including areas of concrete flatwork and masonry block walls.

8.11 Observation and Testing

The geotechnical consultant should perform appropriate observation and testing services during fill placement, grading, and construction operations. These services should include observation of removal of soft, loose, undocumented fill, or otherwise unsuitable soils, evaluation of subgrade conditions where soil removals are performed, and performance of observation and testing services during placement and compaction of structural fill and backfill soils. The geotechnical consultant should also perform observation and testing services during placement of concrete, mortar, grout, asphalt concrete, and steel reinforcement

8.12 Plan Review

The recommendations presented in this report are based on preliminary design information for the proposed project, as provided by Amerco Real Estate Company/U-Haul International personnel, and on the findings of our geotechnical evaluation. When finished, project plans and specifications should be reviewed by the geotechnical consultant prior to submitting the plans and specifications for bid. Additional field exploration and laboratory testing may be needed upon review of the project design plans.

8.13 Pre-Construction Meeting

We recommend that a pre-construction meeting be held. The owner or the owner's representative, the civil engineer, the contractor, and the geotechnical consultant should be in attendance to discuss the plans and the project.

9 LIMITATIONS

The field evaluation, laboratory testing, and geotechnical analyses presented in this geotechnical report have been conducted in general accordance with current practice and the standard of care exercised by geotechnical consultants performing similar tasks in the project area. No warranty, expressed or implied, is made regarding the conclusions, recommendations, and opinions presented in this report. There is no evaluation detailed enough to reveal every subsurface condition. Variations may exist and conditions not observed or described in this report may be encountered during construction. Uncertainties relative to subsurface conditions can be reduced through additional subsurface exploration. Additional subsurface evaluation will be performed upon request. Our evaluation was limited to assessment of the geotechnical aspects of the project, and did not include evaluation of structural issues, environmental concerns, or the presence of hazardous materials.

This document is intended to be used only in its entirety. No portion of the document, by itself, is designed to completely represent any aspect of the project described herein. Ninyo & Moore should be contacted if the reader requires additional information or has questions regarding the content, interpretations presented, or completeness of this document.

This report is intended for design purposes only. It does not provide sufficient data to prepare an accurate bid by contractors. It is suggested that the bidders and their geotechnical consultant perform an independent evaluation of the subsurface conditions in the project areas. The independent evaluations may include, but not be limited to, review of other geotechnical reports

prepared for the adjacent areas, site reconnaissance, and additional exploration and laboratory testing.

Our conclusions, recommendations, and opinions are based on an analysis of the observed site conditions. If geotechnical conditions different from those described in this report are encountered, our office should be notified and additional recommendations, if warranted, will be provided upon request. The conditions of a site could change with time as a result of natural processes or the activities of man at the subject site or nearby sites. Changes to the applicable laws, regulations, codes, and standards of practice may occur due to government action or the broadening of knowledge. The findings of this report may, therefore, be invalidated over time, in part or in whole, by changes over which Ninyo & Moore has no control.

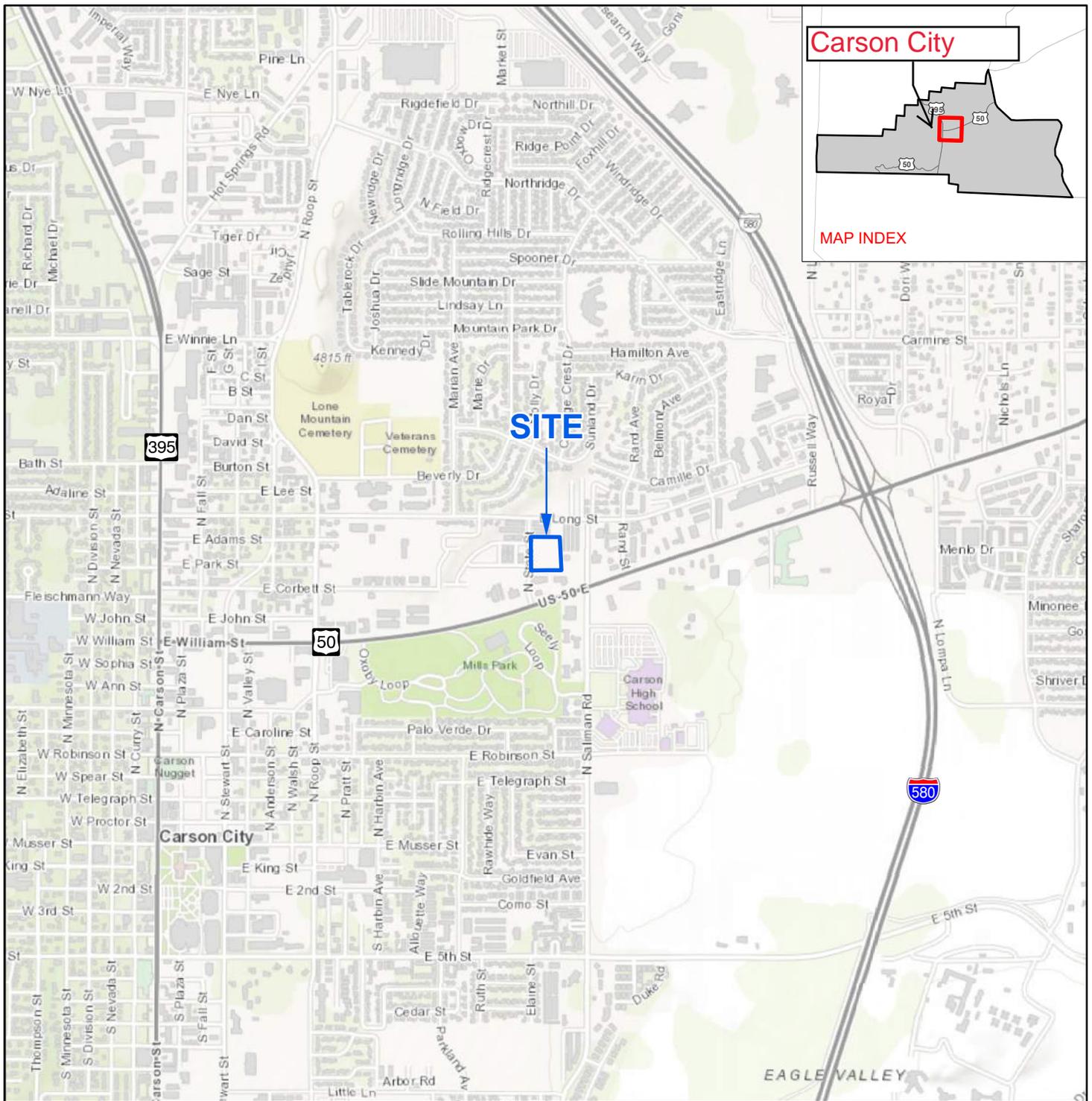
This report is intended exclusively for use by the client. Any use or reuse of the findings, conclusions, and/or recommendations of this report by parties other than the client is undertaken at said parties' sole risk.

10 REFERENCES

- Adams, K., and Sawyer, T.L., compilers, 1999, Fault number 1653, Carson City fault, in Quaternary fault and fold database of the United States: U.S. Geological Survey website, <https://earthquakes.usgs.gov/hazards/qfaults>: accessed on September 26, 2020.
- American Association of State Highway and Transportation Officials (AASHTO). 1993. AASHTO Guide for Design of Pavement Structures, American Association of State Highway and Transportation Officials, Washington, D.C.
- American Concrete Institute (ACI), 2016, ACI Manual of Concrete Practice.
- American Public Works Association (APWA) 2017, Manual of Standard Specifications, dated January.
- American Society for Testing and Materials (ASTM), 2019, Annual Book of ASTM Standards, West Conshohocken, Pennsylvania.
- American Society of Civil Engineers (ASCE), 2016, Minimum Design Loads for Building and Other Structures, Standard 7-16.
- Bingler, E.C., 1977, Geologic Map of the New Empire Quadrangle, Map 59, scale 1:24,000.
- CivilTech, 2005, Allpile Version 7.2i
- Google Earth Website, Aerial photographs of the Carson City area, Nevada: <http://earth.google.com> accessed on March 30, 2021.
- International Code Council, 2018, International Building Code (IBC).
- Nevada Bureau of Mines and Geology (NBMG), 1979, Earthquake Hazards Map, Carson City Quadrangle, Map 1Ai, scale 1:24,000, Dennis T. Trexler, John W. Bell.
- Nevada Bureau of Mines and Geology (NBMG), 1979, Earthquake Hazards Map, New Empire Quadrangle, Map 1Bi, scale 1:24,000, Dennis T. Trexler, John W. Bell.
- Ninyo & Moore, 2020, Proposed U-Haul Facility, Property No. 864051 (Abutting), State Street near East Long Street, Carson City, Nevada, Project No. 304676001: dated October 8.
- Ninyo & Moore proprietary in-house data.
- Occupational Safety and Health Administration (OSHA), 2016, OSHA Standards for the Construction Industry, 29 CFR Part 1926: dated January.
- Regional Transportation Commission (RTC), 2021, Uniform Standard Specifications, Latest Edition: https://rtcws.rtcnv.com/mpo/streets/v4_streets_specifications.cfm.
- Stewart, J.H., 1999, Geologic Map of the Carson City 30x60 Minute Quadrangle, Nevada, Map 118, Scale 1:100,000.
- Trexler, D.T., 1977, Geologic Map of the Carson City Area, Nevada, Map 1Ag, Scale 1:24,000.
- United States Department of Agriculture (USDA), 2020, Web Soil Survey, Soil Maps of the Carson City area, Natural Resources Conservation Service website: <https://websoilsurvey.sc.egov.usda.gov>.
- United States Geological Survey (USGS), 2021, Quaternary Faults and Fold Database of the United States: <http://earthquakes.usgs.gov/qfaults>.



FIGURES



1_304743001_SL.mxd 5/6/2021 JDL

NOTE: DIRECTIONS, DIMENSIONS AND LOCATIONS ARE APPROXIMATE. | SOURCE: ESRI WORLD TOPO, 2021

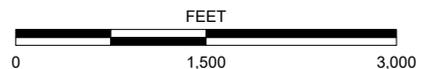


FIGURE 1

SITE LOCATION

PROPOSED UHAUL FACILITY
 STATE STREET NEAR EAST LONG STREET
 CARSON CITY, NEVADA

E LONG STREET

STATE STREET

LINCOLN HWY

B-1
TD=16.5

B-2
TD=16.5

B-3
TD=51.5

B-4
TD=16.3

B-5
TD=15.0

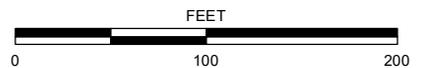
LEGEND



B-5
TD=15.0
BORING
TD=TOTAL DEPTH IN FEET



SITE BOUNDARY



NOTE: DIRECTIONS, DIMENSIONS AND LOCATIONS ARE APPROXIMATE. | SOURCE: GOOGLE, 2021

2_304743001_BL.mxd 5/6/2021_JDL

FIGURE 2

BORING LOCATIONS

PROPOSED UHAUL FACILITY
STATE STREET NEAR EAST LONG STREET
CARSON CITY, NEVADA



APPENDIX A

Boring Logs

APPENDIX A

BORING LOGS

Field Procedure for the Collection of Disturbed Soil Samples

Disturbed soil samples were obtained in the field using the following method.

Bulk Soil Samples

Bulk samples of representative earth materials were obtained from the exploratory borings. The samples were bagged and transported to the laboratory for testing.

The Standard Penetration Test (SPT) Sampler

Disturbed drive samples of earth materials were obtained by means of a Standard Penetration Test sampler. The sampler is composed of a split barrel with an external diameter of 2 inches and an unlined internal diameter of 1-3/8 inches. The sampler was driven into the ground with a 140 pound hammer free-falling from a height of 30 inches in general accordance with ASTM D 1586 and the blow counts were recorded. Soil samples were observed and removed from the sampler, bagged, sealed, and transported to the laboratory for testing.

Field Procedure for the Collection of Relatively Undisturbed Samples

Relatively undisturbed soil samples were obtained in the field using a modified split barrel drive sampler. The sampler, with an external diameter of 3.0 inches, was lined with 1-inch long, thin brass rings with inside diameters of 2.4 inches. The sample barrel was driven into the ground with the weight of a hammer in general accordance with ASTM D 3550. The driving weight was permitted to fall freely. The approximate length of the fall, the weight of the hammer, and the number of blows during driving are presented on the excavation logs as an index to the relative resistance of the materials sampled. The samples were removed from the sample barrel in the brass rings, sealed, and transported to the laboratory for testing.

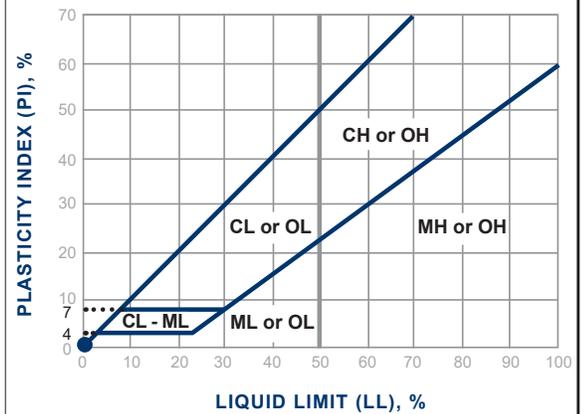
Soil Classification Chart Per ASTM D 2488

Primary Divisions		Secondary Divisions			
		Group Symbol	Group Name		
COARSE-GRAINED SOILS more than 50% retained on No. 200 sieve	GRAVEL more than 50% of coarse fraction retained on No. 4 sieve	CLEAN GRAVEL less than 5% fines	GW	well-graded GRAVEL	
			GP	poorly graded GRAVEL	
		GRAVEL with DUAL CLASSIFICATIONS 5% to 12% fines	GW-GM	well-graded GRAVEL with silt	
			GP-GM	poorly graded GRAVEL with silt	
			GW-GC	well-graded GRAVEL with clay	
			GP-GC	poorly graded GRAVEL with clay	
			GM	silty GRAVEL	
		GRAVEL with FINES more than 12% fines	GC	clayey GRAVEL	
			GC-GM	silty, clayey GRAVEL	
	SW		well-graded SAND		
	SP		poorly graded SAND		
	SAND 50% or more of coarse fraction passes No. 4 sieve	CLEAN SAND less than 5% fines	SW	well-graded SAND	
			SP	poorly graded SAND	
		SAND with DUAL CLASSIFICATIONS 5% to 12% fines	SW-SM	well-graded SAND with silt	
			SP-SM	poorly graded SAND with silt	
			SW-SC	well-graded SAND with clay	
			SP-SC	poorly graded SAND with clay	
			SM	silty SAND	
SAND with FINES more than 12% fines		SC	clayey SAND		
		SC-SM	silty, clayey SAND		
	CL	lean CLAY			
FINE-GRAINED SOILS 50% or more passes No. 200 sieve	SILT and CLAY liquid limit less than 50%	INORGANIC	ML	SILT	
			CL-ML	silty CLAY	
			OL (PI > 4)	organic CLAY	
		ORGANIC	OL (PI < 4)	organic SILT	
			CH	fat CLAY	
			MH	elastic SILT	
	SILT and CLAY liquid limit 50% or more	INORGANIC	OH (plots on or above "A"-line)	organic CLAY	
			OH (plots below "A"-line)	organic SILT	
			PT	Peat	
		Highly Organic Soils			

Grain Size

Description	Sieve Size	Grain Size	Approximate Size
Boulders	> 12"	> 12"	Larger than basketball-sized
Cobbles	3 - 12"	3 - 12"	Fist-sized to basketball-sized
Gravel	Coarse	3/4 - 3"	Thumb-sized to fist-sized
	Fine	#4 - 3/4"	Pea-sized to thumb-sized
Sand	Coarse	#10 - #4	Rock-salt-sized to pea-sized
	Medium	#40 - #10	Sugar-sized to rock-salt-sized
	Fine	#200 - #40	Flour-sized to sugar-sized
Fines	Passing #200	< 0.0029"	Flour-sized and smaller

Plasticity Chart



Apparent Density - Coarse-Grained Soil

Apparent Density	Spooling Cable or Cathead		Automatic Trip Hammer	
	SPT (blows/foot)	Modified Split Barrel (blows/foot)	SPT (blows/foot)	Modified Split Barrel (blows/foot)
Very Loose	≤ 4	≤ 8	≤ 3	≤ 5
Loose	5 - 10	9 - 21	4 - 7	6 - 14
Medium Dense	11 - 30	22 - 63	8 - 20	15 - 42
Dense	31 - 50	64 - 105	21 - 33	43 - 70
Very Dense	> 50	> 105	> 33	> 70

Consistency - Fine-Grained Soil

Consistency	Spooling Cable or Cathead		Automatic Trip Hammer	
	SPT (blows/foot)	Modified Split Barrel (blows/foot)	SPT (blows/foot)	Modified Split Barrel (blows/foot)
Very Soft	< 2	< 3	< 1	< 2
Soft	2 - 4	3 - 5	1 - 3	2 - 3
Firm	5 - 8	6 - 10	4 - 5	4 - 6
Stiff	9 - 15	11 - 20	6 - 10	7 - 13
Very Stiff	16 - 30	21 - 39	11 - 20	14 - 26
Hard	> 30	> 39	> 20	> 26

BORING LOG EXPLANATION SHEET

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	
	Bulk	Driven						
0	■							Bulk sample. Modified split-barrel drive sampler. No recovery with modified split-barrel drive sampler. Sample retained by others. Standard Penetration Test (SPT). No recovery with a SPT. Shelby tube sample. Distance pushed in inches/length of sample recovered in inches. No recovery with Shelby tube sampler. Continuous Push Sample. Seepage. Groundwater encountered during drilling. Groundwater measured after drilling.
5	X		XX/XX					
10	○			○				
15						■	SM	MAJOR MATERIAL TYPE (SOIL): Solid line denotes unit change.
20						- - -	CL	Dashed line denotes material change. Attitudes: Strike/Dip b: Bedding c: Contact j: Joint f: Fracture F: Fault cs: Clay Seam s: Shear bss: Basal Slide Surface sf: Shear Fracture sz: Shear Zone sbs: Shear Bedding Surface
20								The total depth line is a solid line that is drawn at the bottom of the boring.

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/6/2021</u> BORING NO. <u>B-1</u>	
	Bulk	Driven						GROUND ELEVATION <u>4,657' ± (MSL)</u>	SHEET <u>1</u> OF <u>1</u>
								METHOD OF DRILLING <u>CME 75 Solid-Stem Auger Drill Rig (4" Diameter)</u>	
								DRIVE WEIGHT <u>140 lbs. (Auto-Trip)</u> DROP <u>30"</u>	
								SAMPLED BY <u>EDE</u> LOGGED BY <u>EDE</u> REVIEWED BY <u>REG</u>	
DESCRIPTION/INTERPRETATION									
0							SM	NATIVE SOIL: Dark brown, moist, loose to medium dense, silty SAND; few gravel.	
			13/6" 16/6" 16/6"	6.3	118.0			Medium dense.	
5			16/6" 37/6" 50/4"	9.9	114.9			Brown; very dense.	
								Few interbedded layers of clayey sand up to 2 inches thick.	
								Wet.	
10			17/6" 35/6" 36/6"	16.1	116.7			Medium dense.	
15			6/6" 7/6" 11/6"					Reddish brown; few interbedded layers of clayey sand up to 2 inches thick.	
								Total Depth = 16.5 feet. Groundwater was measured at a depth of approximately 9 feet during drilling. Backfilled on 4/6/2021. NOTES: Groundwater may rise to a level higher than that measured in borehole due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.	
20									

FIGURE A- 1

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/6/2021</u> BORING NO. <u>B-2</u>	
	Bulk	Driven						GROUND ELEVATION <u>4,657' ± (MSL)</u>	SHEET <u>1</u> OF <u>1</u>
								METHOD OF DRILLING <u>CME 75 Solid-Stem Auger Drill Rig (4" Diameter)</u>	
								DRIVE WEIGHT <u>140 lbs. (Auto-Trip)</u> DROP <u>30"</u>	
								SAMPLED BY <u>EDE</u> LOGGED BY <u>EDE</u> REVIEWED BY <u>REG</u>	
DESCRIPTION/INTERPRETATION									
0							SM	NATIVE SOIL: Dark brown, dry to moist, loose to medium dense, silty SAND; trace gravel.	
			5/6" 6/6" 11/6"					Moist; medium dense.	
5			12/6" 17/6" 23/6"	16.1	109.6			Reddish brown; few gravel.	
								Few interbedded layers of clayey sand up to 2 inches thick.	
10			9/6" 12/6" 17/6"					Wet; dense.	
15			3/6" 12/6" 13/6"	15.1	120.7			Medium dense.	
20								Total Depth = 16.5 feet. Groundwater was measured at a depth of approximately 10 feet during drilling. Backfilled on 4/6/2021. NOTES: Groundwater may rise to a level higher than that measured in borehole due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.	

FIGURE A- 2

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED	BORING NO.				
	Bulk	Driven						4/6/2021	B-3				
								GROUND ELEVATION	SHEET	OF			
								4,655' ± (MSL)	1	3			
								METHOD OF DRILLING	CME 75 Solid-Stem Auger Drill Rig (Mud-Rotary)				
								DRIVE WEIGHT	140 lbs. (Auto-Trip)	DROP	30"		
								SAMPLED BY	EDE	LOGGED BY	EDE	REVIEWED BY	REG
								DESCRIPTION/INTERPRETATION					
0							SC-SM	NATIVE SOIL: Dark brown, moist, loose to medium dense, silty clayey SAND; trace gravel.					
			9/6" 20/6" 26/6"	11.1	115.5			Dense.					
5			12/6" 17/6" 22/6"	15.8	112.8								
10			7/6" 12/6" 12/6"	15.2	119.2		SM	Brown and reddish brown, wet, medium dense, silty SAND; few gravel.					
15			7/6" 10/6" 19/6"	17.7	115.5								
20													

FIGURE A- 3

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/6/2021</u> BORING NO. <u>B-3</u>	
	Bulk	Driven						GROUND ELEVATION <u>4,655' ± (MSL)</u>	SHEET <u>2</u> OF <u>3</u>
								METHOD OF DRILLING <u>CME 75 Solid-Stem Auger Drill Rig (Mud-Rotary)</u>	
								DRIVE WEIGHT <u>140 lbs. (Auto-Trip)</u> DROP <u>30"</u>	
								SAMPLED BY <u>EDE</u> LOGGED BY <u>EDE</u> REVIEWED BY <u>REG</u>	
DESCRIPTION/INTERPRETATION									
20			16/6" 50/6"	18.4	112.1		SM	NATIVE SOIL: (continued) Dark reddish brown, wet, very dense, silty SAND; trace gravel.	
25			28/6" 50/5"	17.0	116.7			Grayish brown.	
30			20/6" 44/6" 43/6"	19.0	111.9			Occasional interbedded layers of clayey sand up to 3 inches thick.	
35			28/6" 45/6" 50/4"	14.7	119.2			Clay layers grade out.	
40									

FIGURE A- 4

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED	BORING NO.				
	Bulk	Driven						4/6/2021	B-3				
								GROUND ELEVATION	SHEET	OF			
								METHOD OF DRILLING	CME 75 Solid-Stem Auger Drill Rig (Mud-Rotary)				
								DRIVE WEIGHT	140 lbs. (Auto-Trip)	DROP	30"		
								SAMPLED BY	EDE	LOGGED BY	EDE	REVIEWED BY	REG
								DESCRIPTION/INTERPRETATION					
40			20/6" 25/6" 49/6"	20.7	115.3		SM	<p>NATIVE SOIL: (continued) Dark reddish brown, wet, very dense, silty SAND; trace clay.</p> <p>With gravel.</p>					
45			15/6" 16/6" 18/6"	17.3	116.8			Brown; medium dense; occasional interbedded layers of clayey sand up to 3 inches thick.					
50			27/6" 38/6" 43/6"	17.0	114.2			Dark reddish brown; very dense.					
55								<p>Total Depth = 51.5 feet. Groundwater was measured at a depth of approximately 10 feet during drilling. Backfilled on 4/6/2021. NOTES: Groundwater may rise to a level higher than that measured in borehole due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.</p>					
60													

FIGURE A- 5

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/6/2021</u> BORING NO. <u>B-4</u>	
	Bulk	Driven						GROUND ELEVATION <u>4,657' ± (MSL)</u>	SHEET <u>1</u> OF <u>1</u>
								METHOD OF DRILLING <u>CME 75 Solid-Stem Auger Drill Rig (4" Diameter)</u>	
								DRIVE WEIGHT <u>140 lbs. (Auto-Trip)</u> DROP <u>30"</u>	
								SAMPLED BY <u>EDE</u> LOGGED BY <u>EDE</u> REVIEWED BY <u>REG</u>	
DESCRIPTION/INTERPRETATION									
0							SM	ASPHALT CONCRETE: Approximately 3 inches thick.	
							SM	AGGREGATE BASE: Approximately 9 inches thick. Dark brown, moist, medium dense, silty SAND with gravel.	
		8/6" 9/6" 16/6"	6.7	116.4				NATIVE SOIL: Dark brown, moist, medium dense, silty SAND with gravel. Few gravel.	
5		9/6" 13/6" 15/6"	14.8	116.3				Brown; wet; dense; trace gravel.	
								Very dense.	
10		6/6" 12/6" 50/5"	18.8	112.4					
15		14/6" 24/6" 50/4"	14.7	121.2					
20								Total Depth = 16.3 feet. Groundwater was measured at a depth of approximately 10 feet during drilling. Backfilled on 4/6/2021. NOTES: Groundwater may rise to a level higher than that measured in borehole due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.	

FIGURE A- 6

DEPTH (feet)	SAMPLES		BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED <u>4/6/2021</u> BORING NO. <u>B-5</u>	
	Bulk	Driven						GROUND ELEVATION <u>4,653' ± (MSL)</u>	SHEET <u>1</u> OF <u>1</u>
								METHOD OF DRILLING <u>CME 75 Solid-Stem Auger Drill Rig (4" Diameter)</u>	
								DRIVE WEIGHT <u>140 lbs. (Auto-Trip)</u> DROP <u>30"</u>	
								SAMPLED BY <u>EDE</u> LOGGED BY <u>EDE</u> REVIEWED BY <u>REG</u>	
DESCRIPTION/INTERPRETATION									
0							SM	NATIVE SOIL: Dark brown, moist, medium dense, silty SAND; trace gravel.	
			6/6" 8/6" 10/6"	11.7	117.3				
5			23/6" 33/6" 25/6"	12.1	119.2			Wet; dense.	
10			9/6" 21/6" 42/6"	11.0	126.0			Few gravel.	
15								Boring caved to 13.0 feet prior to last sample attempt.	
								Total Depth = 15.0 feet. Groundwater was measured at a depth of approximately 6.5 feet during drilling. Backfilled on 4/6/2021. NOTES: Groundwater may rise to a level higher than that measured in borehole due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.	
20									

FIGURE A- 7



APPENDIX B

Laboratory Test Results

APPENDIX B

LABORATORY TESTING

Classification

Soils were visually and texturally classified in accordance with the Unified Soil Classification System (USCS) in general accordance with ASTM D 2488. Soil classifications are indicated on the logs of the exploratory borings in Appendix A.

In Place Moisture and Density

The moisture content and dry density of relatively undisturbed samples obtained from the exploratory borings were evaluated in general accordance with ASTM D 2937. The test results are presented on the logs of the exploratory borings in Appendix A.

Gradation Analysis

Gradation analysis tests were performed on selected representative soil samples in general accordance with ASTM D 422. These test results were utilized in evaluating the soil classifications in accordance with the USCS. The grain-size distribution curves are shown on Figure B-1 through Figure B-3.

Atterberg Limits

Tests were performed on selected representative soil samples to evaluate the liquid limit, plastic limit, and plasticity index in general accordance with ASTM D 4318. These test results were utilized to evaluate soil classification in accordance with the USCS. The test results and classifications are shown on Figure B-4.

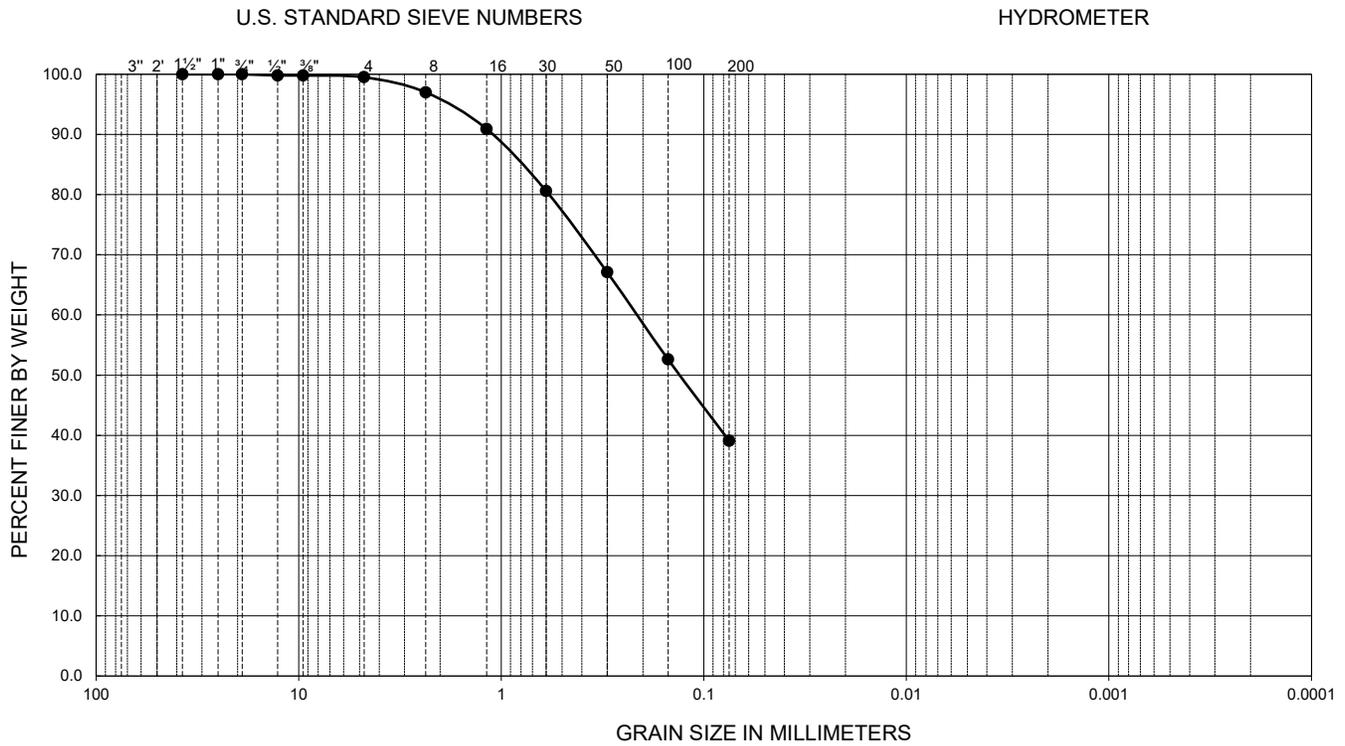
Expansion Index

The expansion index of selected materials was evaluated in general accordance with ASTM D 4829. Specimens were molded under a specified compactive energy at approximately 50 percent saturation. The prepared 1-inch thick by 4-inch diameter specimens were loaded with a surcharge of 144 pounds per square foot and were inundated with tap water. Readings of volumetric swell were made for a period of 24 hours. The results of these tests are presented on Figure B-5.

Direct Shear

Direct shear tests were performed on undisturbed samples in general accordance with ASTM D 3080 to evaluate the shear strength characteristics of selected materials. The samples were inundated during shearing to represent adverse field conditions. The results are shown on Figure B-6 and Figure B-7.

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D ₁₀	D ₃₀	D ₆₀	C _u	C _c	Passing No. 200 (%)	USCS
●	B-1	7.0-10.0	NP	NP	NP	--	--	0.21	--	--	39.1	SM

Material Percent by Weight			Soil Type
Gravel	Sand	Fines	Silty SAND
0.5	60.4	39.1	

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

"NP" INDICATES NON-PLASTIC

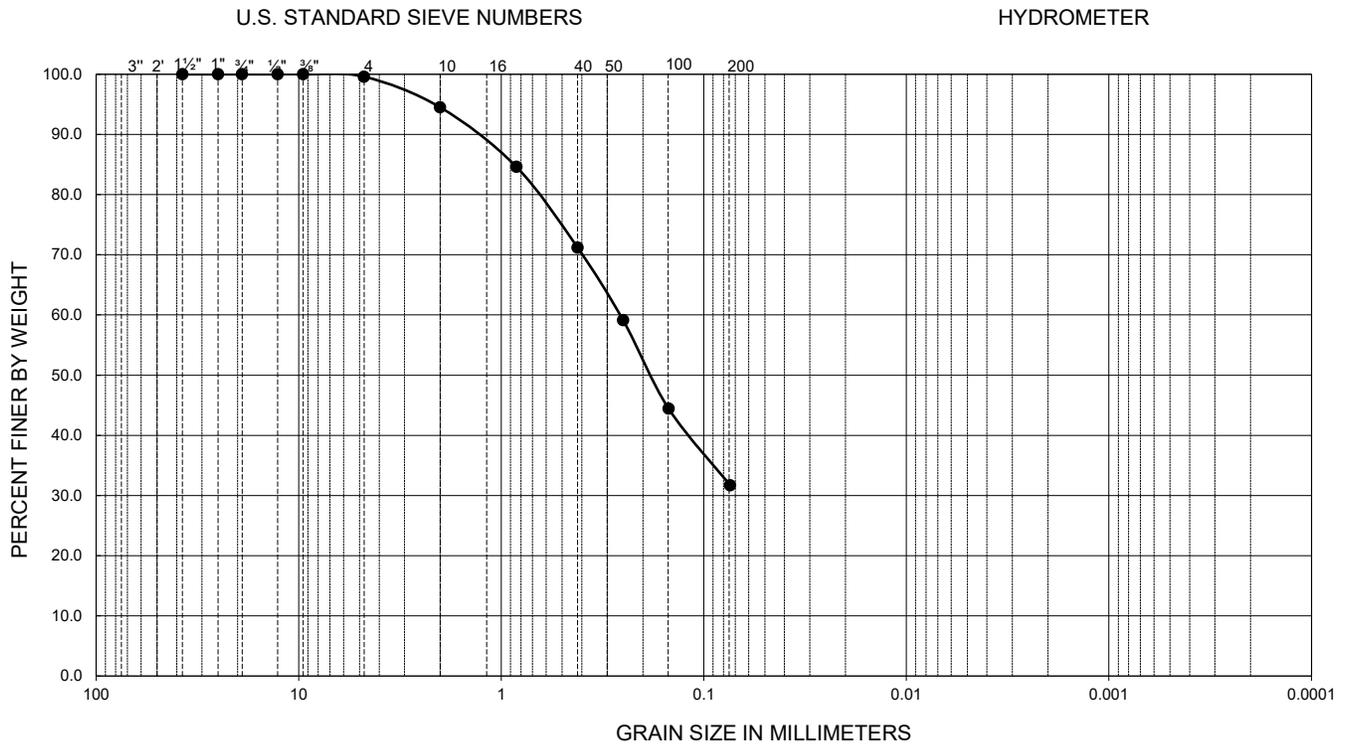
FIGURE B-1

GRADATION TEST RESULTS

PROPOSED U-HAUL FACILITY
STATE STREET NEAR EAST LONG STREET, CARSON CITY, NEVADA



GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D ₁₀	D ₃₀	D ₆₀	C _u	C _c	Passing No. 200 (%)	USCS
●	B-3	2.0-5.0	26	21	5	--	--	0.26	--	--	31.7	SC-SM

Material Percent by Weight			Soil Type
Gravel	Sand	Fines	Silty clayey SAND
0.4	67.9	31.7	

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

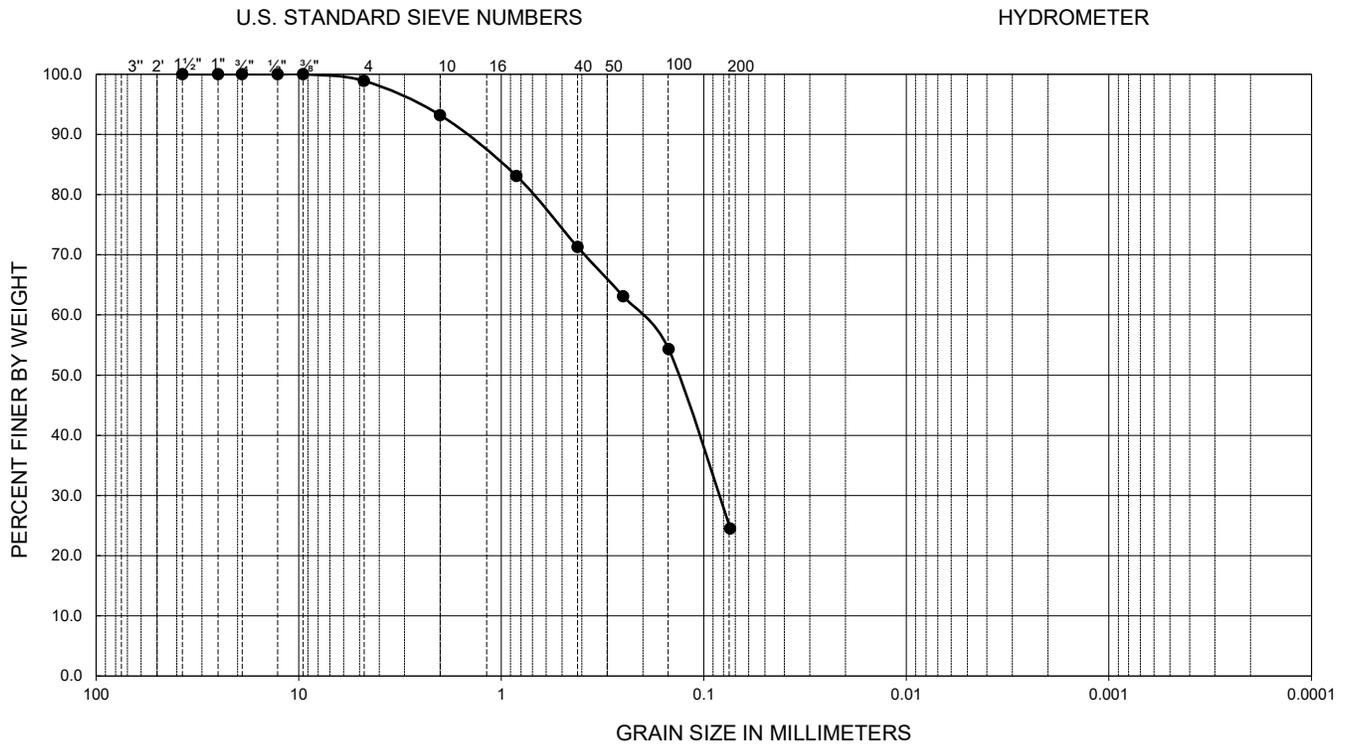
FIGURE B-2

GRADATION TEST RESULTS

PROPOSED U-HAUL FACILITY
STATE STREET NEAR EAST LONG STREET, CARSON CITY, NEVADA



GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D ₁₀	D ₃₀	D ₆₀	C _u	C _c	Passing No. 200 (%)	USCS
●	B-5	2.0-5.0	NP	NP	NP	--	0.08	0.21	--	--	24.5	SM

Material Percent by Weight			Soil Type
Gravel	Sand	Fines	Silty SAND
1.1	74.4	24.5	

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

"NP" INDICATES NON-PLASTIC

FIGURE B-3

GRADATION TEST RESULTS

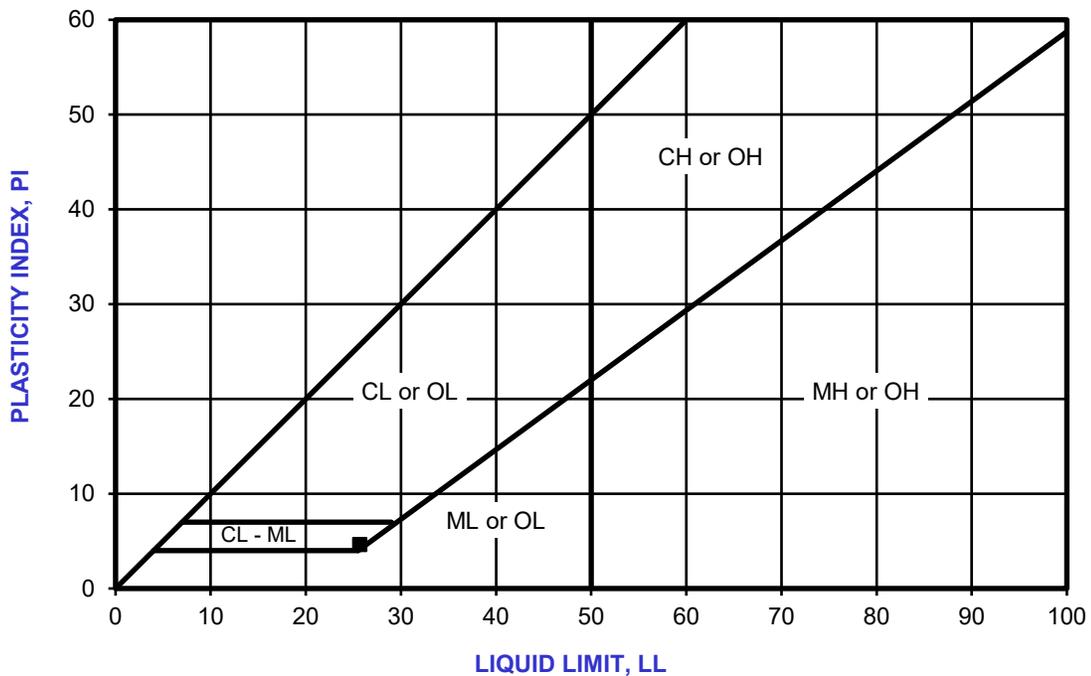
PROPOSED U-HAUL FACILITY
STATE STREET NEAR EAST LONG STREET, CARSON CITY, NEVADA



304743001 | 5/21

SYMBOL	LOCATION	DEPTH (ft)	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	USCS CLASSIFICATION (Fraction Finer Than No. 40 Sieve)	USCS
●	B-1	7.0-10.0	NP	NP	NP	ML	SM
■	B-3	2.0-5.0	26	21	5	CL-ML	SC-SM
◆	B-5	2.0-5.0	NP	NP	NP	ML	SM

NP - INDICATES NON-PLASTIC



PERFORMED IN GENERAL ACCORDANCE WITH D 4318

FIGURE B-4



ATTERBERG LIMITS TEST RESULTS

PROPOSED U-HAUL FACILITY
STATE STREET NEAR EAST LONG STREET, CARSON CITY, NEVADA

304743001 | 5/21

SAMPLE LOCATION	SAMPLE DEPTH (FT)	INITIAL MOISTURE (%)	COMPACTED DRY DENSITY (PCF)	FINAL MOISTURE (%)	VOLUMETRIC SWELL (IN)	EXPANSION INDEX	POTENTIAL EXPANSION
B-1	7.0-10.0	8.0	117.5	14.3	0.000	0	Very Low
B-4	2.0-5.0	9.0	113.7	13.4	0.005	5	Very Low

PERFORMED IN GENERAL ACCORDANCE WITH

UBC STANDARD 18-2

ASTM D 4829

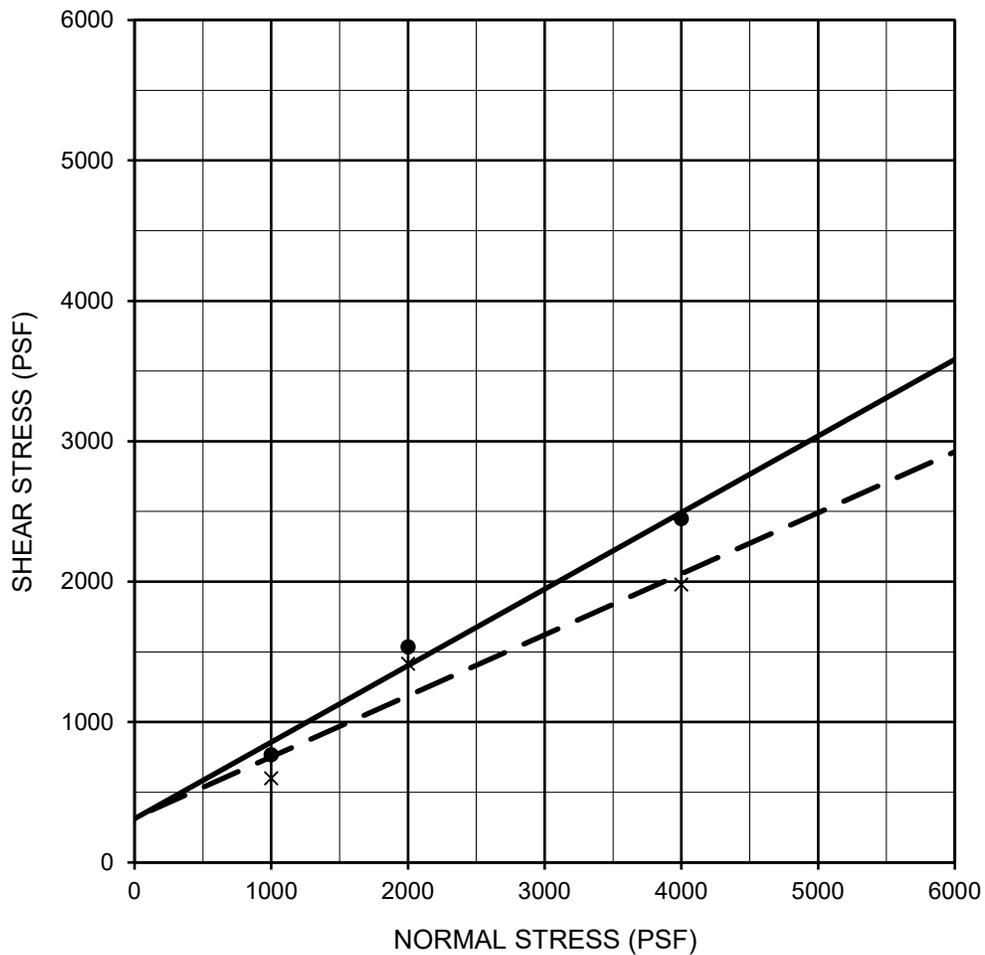
FIGURE B-5

EXPANSION INDEX TEST RESULTS

PROPOSED U-HAUL FACILITY
STATE STREET NEAR EAST LONG STREET, CARSON CITY, NEVADA



304743001 | 5/21



Description	Symbol	Sample Location	Depth (ft)	Shear Strength	Cohesion, c (psf)	Friction Angle, ϕ (degrees)	Soil Type
Silty clayey SAND	—●—	B-3	5.0-6.5	Peak	312	29	SC-SM
Silty clayey SAND	- - X - -	B-3	5.0-6.5	Ultimate	318	23	SC-SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 3080

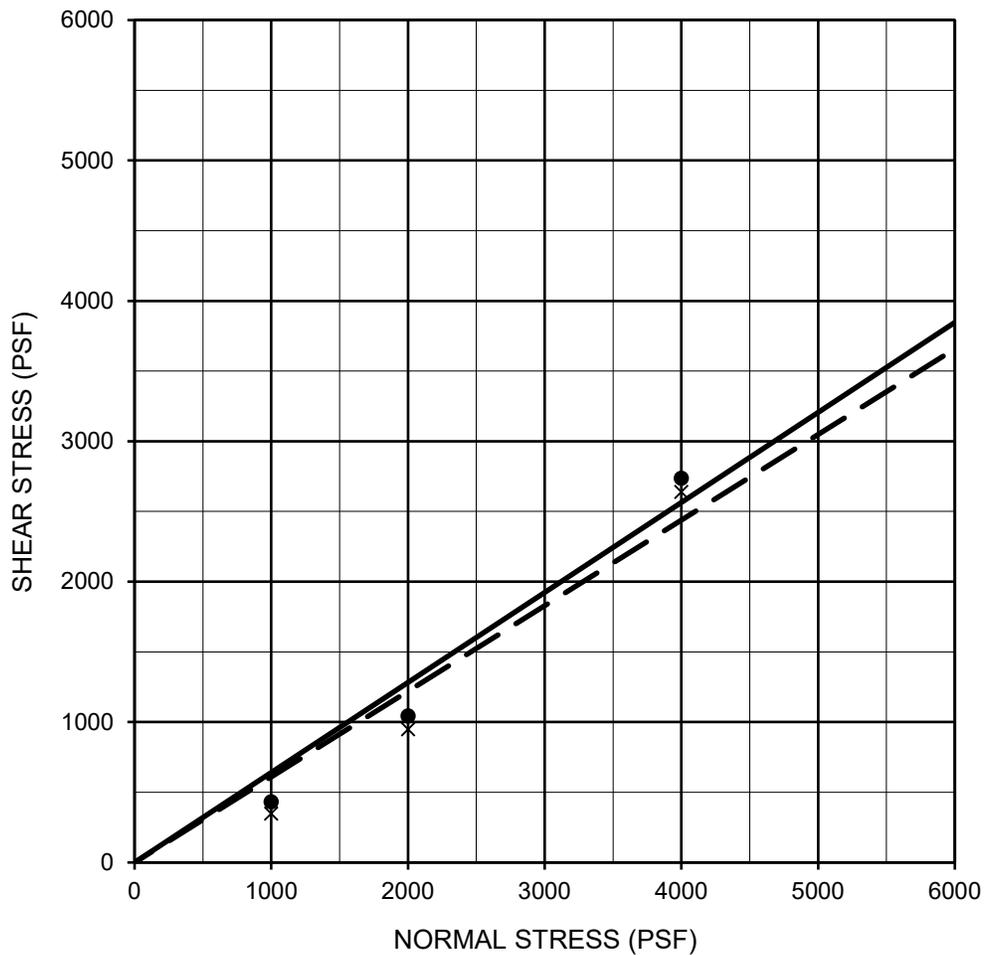
FIGURE B-6

DIRECT SHEAR TEST RESULTS

PROPOSED U-HAUL FACILITY
STATE STREET NEAR EAST LONG STREET, CARSON CITY, NEVADA



304743001 | 5/21



Description	Symbol	Sample Location	Depth (ft)	Shear Strength	Cohesion, c (psf)	Friction Angle, ϕ (degrees)	Soil Type
Silty SAND	—●—	B-5	2.0-3.5	Peak	0	33	SM
Silty SAND	- - X - -	B-5	2.0-3.5	Ultimate	0	31	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 3080

FIGURE B-7

DIRECT SHEAR TEST RESULTS

PROPOSED U-HAUL FACILITY
STATE STREET NEAR EAST LONG STREET, CARSON CITY, NEVADA

304743001 | 5/21





APPENDIX C

Chemical Test Results

APPENDIX C

CHEMICAL TEST RESULTS

The results of the chemical tests are provided in this appendix.



INORGANIC ANALYTICAL REPORT

Client: Ninyo & Moore
Project: Carson City U-Haul / 304743001
Lab Sample ID: 2104496-001
Client Sample ID: B-1 @ 2.0-5.0'
Collection Date: 4/6/2021 1200h
Received Date: 4/16/2021 1324h

Contact: Robert Gambrell

Analytical Results

TOTAL METALS

Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Sodium	mg/kg-dry	4/22/2021 1044h	4/23/2021 1255h	SW6010D	106	436	

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Kyle F. Gross

Laboratory Director

Jose Rocha

QA Officer



INORGANIC ANALYTICAL REPORT

Client: Ninyo & Moore
Project: Carson City U-Haul / 304743001
Lab Sample ID: 2104496-002
Client Sample ID: B-5 @ 2.0-5.0'
Collection Date: 4/6/2021 1200h
Received Date: 4/16/2021 1324h

Contact: Robert Gambrell

Analytical Results

TOTAL METALS

Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Sodium	mg/kg-dry	4/22/2021 1044h	4/23/2021 1258h	SW6010D	104	477	

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Kyle F. Gross

Laboratory Director

Jose Rocha

QA Officer



INORGANIC ANALYTICAL REPORT

Client: Ninyo & Moore **Contact:** Robert Gambrell
Project: Carson City U-Haul / 304743001
Lab Sample ID: 2104496-001
Client Sample ID: B-1 @ 2.0-5.0'
Collection Date: 4/6/2021 1200h
Received Date: 4/16/2021 1324h

Analytical Results

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 e-mail: awal@awal-labs.com

Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Chloride	mg/kg-dry		4/19/2021 1720h	SW9251	5.47	23.7	&
eH	mV		4/16/2021 1600h	SM2580B	0	443	H
pH @ 25° C	pH Units		4/16/2021 1425h	SW9045D	1.00	8.32	H
Resistivity	ohm-cm		4/19/2021 1330h	SM2510B	10.0	1,800	&
Sulfate	mg/kg-dry		4/23/2021 153h	E300.0	5.47	7.77	
Sulfide	mg/kg-dry		4/26/2021 700h	SM4500-S2-D	0.109	0.700	H&
Total Dissolved Solids	mg/kg		4/19/2021 1330h	SM2540C	100	2,040	H&@
Total Soluble Salts	mg/kg		4/19/2021 1330h	SM2540C	100	2,040	H&@

& - Analysis is performed on a 1:1 DI water extract for soils.

@ - High RPD due to suspected sample non-homogeneity or matrix interference.

H - Sample was received outside of the holding time.

web: www.awal-labs.com

Kyle F. Gross
 Laboratory Director

Jose Rocha
 QA Officer



INORGANIC ANALYTICAL REPORT

Client: Ninyo & Moore
Project: Carson City U-Haul / 304743001
Lab Sample ID: 2104496-002
Client Sample ID: B-5 @ 2.0-5.0'
Collection Date: 4/6/2021 1200h
Received Date: 4/16/2021 1324h

Contact: Robert Gambrell

Analytical Results

3440 South 700 West
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 Toll Free: (888) 263-8686
 Fax: (801) 263-8687
 e-mail: awal@awal-labs.com

 web: www.awal-labs.com

Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Chloride	mg/kg-dry		4/19/2021 1722h	SW9251	5.31	38.9	&
eH	mV		4/16/2021 1600h	SM2580B	0	433	H
pH @ 25° C	pH Units		4/16/2021 1425h	SW9045D	1.00	9.30	H
Resistivity	ohm-cm		4/19/2021 1330h	SM2510B	10.0	1,740	&
Sulfate	mg/kg-dry		4/23/2021 221h	E300.0	5.31	41.3	
Sulfide	mg/kg-dry		4/26/2021 700h	SM4500-S2-D	0.212	1.80	H&
Total Dissolved Solids	mg/kg		4/19/2021 1330h	SM2540C	100	3,340	H&
Total Soluble Salts	mg/kg		4/19/2021 1330h	SM2540C	100	3,340	H&

& - Analysis is performed on a 1:1 DI water extract for soils.

H - Sample was received outside of the holding time.

Kyle F. Gross
 Laboratory Director

Jose Rocha
 QA Officer



APPENDIX D

General Drilled Shaft Recommendations

APPENDIX D

General Drilled Shaft Recommendations

Ninyo & Moore recommends that the following regarding the installation of drilled shafts be incorporated into the project specifications.

1. All drilled shaft installation and concrete placement should be observed and documented by qualified geotechnical personnel.
2. Holes should be drilled or bored in such a manner as to provide a full-sized shaft diameter and length specified on the project drawings or in the specifications.
3. Concrete should be placed in the shaft by means of an “elephant trunk,” pump pipe or other approved means. Under no circumstances should concrete be allowed to free fall against shaft reinforcing.
4. If the bearing stratum is deemed as not capable of providing sufficient bearing support by the geotechnical consultant, the shaft length may need to be extended, or the end of the shaft may need to be enlarged.
5. When groundwater is encountered, tremie concrete placement methods, as described below, may be used.
 - a. Drilled shafts should be cleaned with a clean-out bucket or other approved method, immediately prior to concrete placement.
 - b. The tremie or pump pipe should have watertight joints.
 - c. During the initial concrete placement, the concrete tremie or pump pipe should be extended through the water to the bottom of the drilled shaft, prior to concrete placement.
 - d. During placement of concrete, the bottom of the pipe should be maintained below the top of the concrete at all times. If the seal is lost, the pipe should be reinserted and the operation restarted.
 - e. Sufficient embedment of the tremie or pump pipe in concrete should be maintained throughout concrete placement to reduce the potential for re-entry of water. The embedment depth should be 5 or more feet.
 - f. The first placed portion of concrete flow that comes to the top of the shaft should be wasted, as evaluated by the geotechnical consultant.
 - g. Under no circumstances should concrete be allowed to free fall through water.
8. The placement of concrete for each drilled shaft should be completed in one placement prior to commencing the placement of concrete in another.
9. Quantities of concrete placed for each drilled shaft should be provided to the representative of the Owner.
10. Concrete should have an ultimate compressive strength of not less than that provided for in the specifications and should be workable and plastic so that it may be placed without segregation.

11. Concrete should be cast-in-place against undisturbed earth in the holes in such a manner as to provide for the exclusion of appreciable amounts of foreign matter in the concrete. Concrete should not be dropped vertically into drilled shaft excavations more than 5 feet unless an approved tremie (elephant trunk) or other similar appropriate method is used to reduce the potential for concrete striking the sides of the excavation.



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Ninyo & Moore
Geotechnical & Environmental Sciences Consultants



POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Tryppaluk, 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

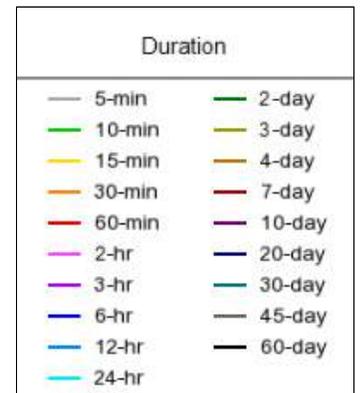
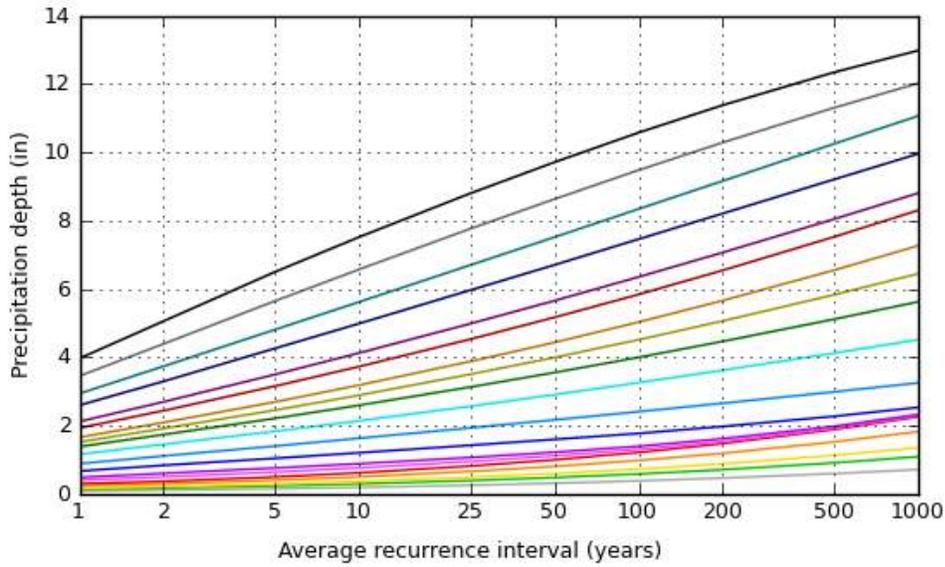
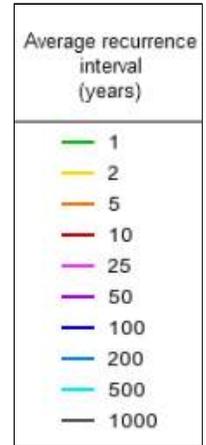
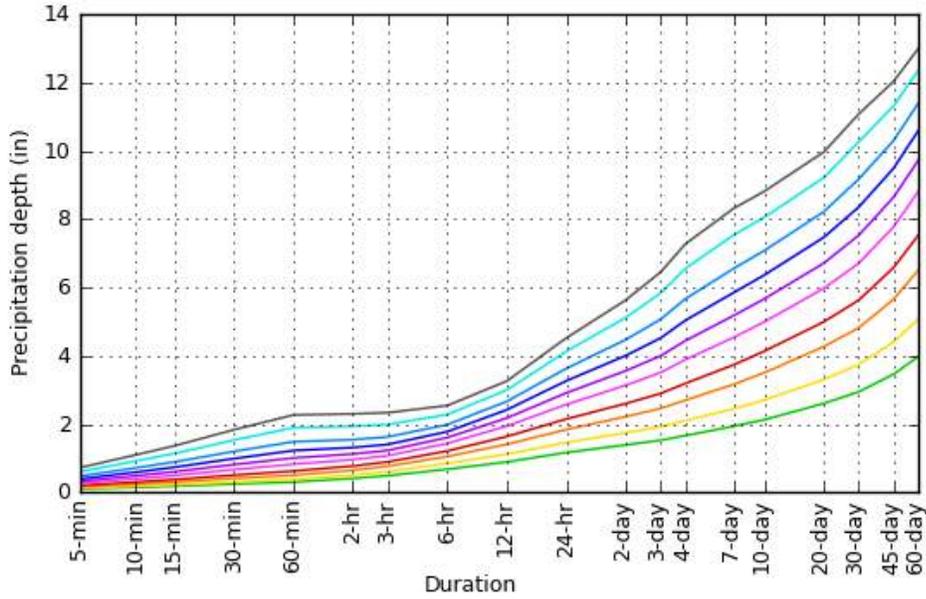
PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.096 (0.083-0.114)	0.120 (0.104-0.142)	0.160 (0.137-0.190)	0.198 (0.169-0.235)	0.261 (0.215-0.311)	0.319 (0.255-0.382)	0.389 (0.300-0.468)	0.471 (0.349-0.578)	0.602 (0.420-0.754)	0.720 (0.479-0.918)
10-min	0.146 (0.126-0.172)	0.182 (0.158-0.216)	0.243 (0.209-0.289)	0.302 (0.257-0.358)	0.398 (0.328-0.473)	0.486 (0.388-0.580)	0.591 (0.456-0.713)	0.716 (0.531-0.879)	0.916 (0.640-1.15)	1.10 (0.730-1.40)
15-min	0.181 (0.156-0.214)	0.226 (0.196-0.268)	0.302 (0.259-0.358)	0.374 (0.319-0.444)	0.494 (0.407-0.586)	0.603 (0.481-0.720)	0.733 (0.566-0.884)	0.888 (0.658-1.09)	1.14 (0.794-1.42)	1.36 (0.904-1.73)
30-min	0.244 (0.210-0.288)	0.304 (0.264-0.361)	0.407 (0.349-0.482)	0.505 (0.429-0.598)	0.665 (0.548-0.789)	0.812 (0.648-0.969)	0.987 (0.762-1.19)	1.20 (0.887-1.47)	1.53 (1.07-1.92)	1.83 (1.22-2.33)
60-min	0.302 (0.260-0.357)	0.376 (0.326-0.447)	0.503 (0.432-0.597)	0.624 (0.531-0.740)	0.823 (0.678-0.977)	1.00 (0.802-1.20)	1.22 (0.943-1.47)	1.48 (1.10-1.82)	1.89 (1.32-2.37)	2.26 (1.51-2.89)
2-hr	0.408 (0.363-0.468)	0.507 (0.450-0.581)	0.646 (0.570-0.739)	0.770 (0.672-0.880)	0.957 (0.813-1.10)	1.12 (0.933-1.30)	1.31 (1.06-1.54)	1.54 (1.20-1.83)	1.93 (1.45-2.40)	2.30 (1.66-2.92)
3-hr	0.488 (0.437-0.550)	0.609 (0.548-0.688)	0.765 (0.682-0.862)	0.891 (0.789-1.00)	1.07 (0.933-1.21)	1.23 (1.05-1.40)	1.40 (1.17-1.62)	1.62 (1.33-1.90)	1.99 (1.58-2.42)	2.33 (1.80-2.95)
6-hr	0.676 (0.606-0.755)	0.844 (0.758-0.947)	1.05 (0.937-1.17)	1.21 (1.08-1.36)	1.43 (1.25-1.61)	1.60 (1.38-1.82)	1.78 (1.51-2.03)	1.98 (1.65-2.30)	2.28 (1.85-2.68)	2.54 (2.01-3.04)
12-hr	0.890 (0.793-1.00)	1.12 (0.997-1.26)	1.41 (1.25-1.58)	1.64 (1.44-1.84)	1.94 (1.69-2.20)	2.17 (1.88-2.48)	2.42 (2.05-2.78)	2.66 (2.22-3.10)	2.99 (2.43-3.56)	3.26 (2.59-3.93)
24-hr	1.17 (1.06-1.28)	1.46 (1.33-1.61)	1.84 (1.67-2.03)	2.15 (1.95-2.37)	2.57 (2.32-2.84)	2.91 (2.61-3.21)	3.26 (2.90-3.62)	3.63 (3.19-4.04)	4.13 (3.58-4.63)	4.52 (3.87-5.12)
2-day	1.39 (1.25-1.56)	1.74 (1.57-1.96)	2.22 (1.99-2.49)	2.60 (2.33-2.92)	3.14 (2.78-3.53)	3.56 (3.14-4.01)	4.00 (3.50-4.54)	4.47 (3.87-5.11)	5.12 (4.36-5.91)	5.63 (4.73-6.57)
3-day	1.53 (1.37-1.72)	1.92 (1.72-2.16)	2.46 (2.19-2.77)	2.90 (2.58-3.26)	3.51 (3.10-3.97)	4.00 (3.51-4.53)	4.52 (3.93-5.15)	5.07 (4.36-5.80)	5.84 (4.93-6.74)	6.45 (5.37-7.53)
4-day	1.66 (1.48-1.87)	2.10 (1.87-2.37)	2.70 (2.40-3.05)	3.19 (2.83-3.61)	3.88 (3.42-4.40)	4.44 (3.88-5.05)	5.04 (4.35-5.75)	5.67 (4.84-6.49)	6.56 (5.50-7.58)	7.27 (6.01-8.49)
7-day	1.94 (1.73-2.18)	2.44 (2.18-2.76)	3.16 (2.81-3.57)	3.73 (3.32-4.22)	4.54 (4.01-5.14)	5.17 (4.53-5.88)	5.85 (5.08-6.67)	6.55 (5.64-7.50)	7.53 (6.38-8.71)	8.31 (6.94-9.70)
10-day	2.13 (1.89-2.40)	2.70 (2.41-3.05)	3.50 (3.11-3.95)	4.13 (3.66-4.66)	4.99 (4.39-5.63)	5.66 (4.95-6.41)	6.36 (5.52-7.21)	7.07 (6.08-8.05)	8.05 (6.83-9.27)	8.81 (7.39-10.2)
20-day	2.60 (2.33-2.91)	3.30 (2.96-3.70)	4.26 (3.82-4.76)	4.99 (4.46-5.57)	5.97 (5.31-6.67)	6.71 (5.93-7.51)	7.47 (6.55-8.39)	8.22 (7.16-9.27)	9.21 (7.93-10.5)	9.96 (8.49-11.5)
30-day	2.94 (2.65-3.28)	3.74 (3.36-4.17)	4.81 (4.33-5.36)	5.62 (5.04-6.26)	6.70 (5.98-7.46)	7.52 (6.66-8.39)	8.35 (7.34-9.35)	9.17 (7.99-10.3)	10.3 (8.84-11.7)	11.1 (9.47-12.7)
45-day	3.46 (3.12-3.83)	4.40 (3.96-4.87)	5.65 (5.09-6.24)	6.58 (5.91-7.26)	7.77 (6.95-8.59)	8.64 (7.70-9.57)	9.48 (8.43-10.5)	10.3 (9.11-11.5)	11.3 (9.92-12.7)	12.0 (10.5-13.6)
60-day	3.97 (3.57-4.41)	5.06 (4.55-5.62)	6.50 (5.84-7.20)	7.52 (6.75-8.32)	8.80 (7.88-9.74)	9.72 (8.67-10.8)	10.6 (9.41-11.8)	11.4 (10.1-12.7)	12.3 (10.9-13.8)	13.0 (11.4-14.6)

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

PDS-based depth-duration-frequency (DDF) curves
 Latitude: 39.1729°, Longitude: -119.7525°



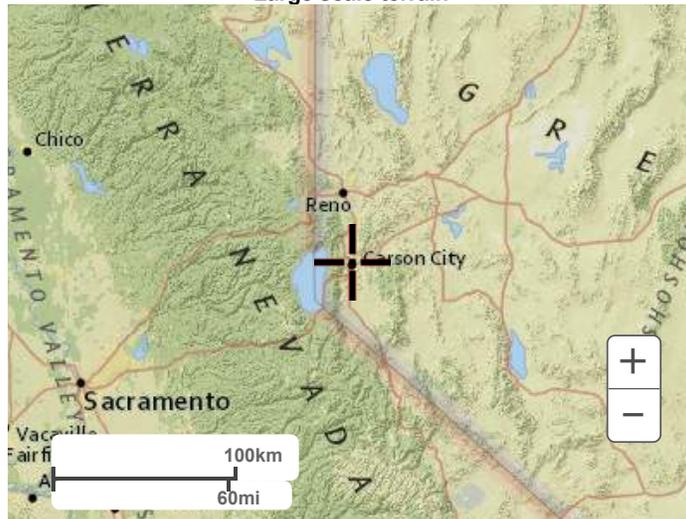
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Maps & aerials

Small scale terrain



Large scale terrain



Large scale map



Large scale aerial



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POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Tryppaluk, 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/hour)¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	1.15 (0.996-1.37)	1.44 (1.25-1.70)	1.92 (1.64-2.28)	2.38 (2.03-2.82)	3.13 (2.58-3.73)	3.83 (3.06-4.58)	4.67 (3.60-5.62)	5.65 (4.19-6.94)	7.22 (5.04-9.05)	8.64 (5.75-11.0)
10-min	0.876 (0.756-1.03)	1.09 (0.948-1.30)	1.46 (1.25-1.73)	1.81 (1.54-2.15)	2.39 (1.97-2.84)	2.92 (2.33-3.48)	3.55 (2.74-4.28)	4.30 (3.19-5.27)	5.50 (3.84-6.89)	6.58 (4.38-8.39)
15-min	0.724 (0.624-0.856)	0.904 (0.784-1.07)	1.21 (1.04-1.43)	1.50 (1.28-1.78)	1.98 (1.63-2.34)	2.41 (1.92-2.88)	2.93 (2.26-3.54)	3.55 (2.63-4.36)	4.54 (3.18-5.69)	5.44 (3.62-6.93)
30-min	0.488 (0.420-0.576)	0.608 (0.528-0.722)	0.814 (0.698-0.964)	1.01 (0.858-1.20)	1.33 (1.10-1.58)	1.62 (1.30-1.94)	1.97 (1.52-2.38)	2.39 (1.77-2.93)	3.06 (2.14-3.83)	3.66 (2.44-4.67)
60-min	0.302 (0.260-0.357)	0.376 (0.326-0.447)	0.503 (0.432-0.597)	0.624 (0.531-0.740)	0.823 (0.678-0.977)	1.00 (0.802-1.20)	1.22 (0.943-1.47)	1.48 (1.10-1.82)	1.89 (1.32-2.37)	2.26 (1.51-2.89)
2-hr	0.204 (0.182-0.234)	0.254 (0.225-0.290)	0.323 (0.285-0.370)	0.385 (0.336-0.440)	0.478 (0.406-0.549)	0.562 (0.466-0.652)	0.656 (0.530-0.770)	0.770 (0.602-0.917)	0.967 (0.722-1.20)	1.15 (0.829-1.46)
3-hr	0.163 (0.146-0.183)	0.203 (0.182-0.229)	0.255 (0.227-0.287)	0.297 (0.263-0.334)	0.357 (0.311-0.404)	0.409 (0.349-0.467)	0.467 (0.390-0.538)	0.540 (0.442-0.633)	0.661 (0.524-0.806)	0.777 (0.600-0.981)
6-hr	0.113 (0.101-0.126)	0.141 (0.127-0.158)	0.175 (0.156-0.196)	0.202 (0.180-0.226)	0.239 (0.209-0.269)	0.268 (0.231-0.303)	0.297 (0.252-0.340)	0.331 (0.275-0.383)	0.380 (0.308-0.448)	0.424 (0.336-0.508)
12-hr	0.074 (0.066-0.083)	0.093 (0.083-0.104)	0.117 (0.104-0.131)	0.136 (0.120-0.153)	0.161 (0.141-0.182)	0.180 (0.156-0.206)	0.200 (0.170-0.231)	0.221 (0.184-0.257)	0.249 (0.201-0.295)	0.270 (0.215-0.326)
24-hr	0.049 (0.044-0.054)	0.061 (0.055-0.067)	0.077 (0.070-0.085)	0.089 (0.081-0.099)	0.107 (0.097-0.118)	0.121 (0.109-0.134)	0.136 (0.121-0.151)	0.151 (0.133-0.168)	0.172 (0.149-0.193)	0.188 (0.161-0.213)
2-day	0.029 (0.026-0.032)	0.036 (0.033-0.041)	0.046 (0.041-0.052)	0.054 (0.048-0.061)	0.065 (0.058-0.073)	0.074 (0.065-0.084)	0.083 (0.073-0.095)	0.093 (0.081-0.107)	0.107 (0.091-0.123)	0.117 (0.098-0.137)
3-day	0.021 (0.019-0.024)	0.027 (0.024-0.030)	0.034 (0.030-0.038)	0.040 (0.036-0.045)	0.049 (0.043-0.055)	0.056 (0.049-0.063)	0.063 (0.055-0.071)	0.070 (0.061-0.081)	0.081 (0.068-0.094)	0.090 (0.075-0.105)
4-day	0.017 (0.015-0.020)	0.022 (0.019-0.025)	0.028 (0.025-0.032)	0.033 (0.029-0.038)	0.040 (0.036-0.046)	0.046 (0.040-0.053)	0.052 (0.045-0.060)	0.059 (0.050-0.068)	0.068 (0.057-0.079)	0.076 (0.063-0.088)
7-day	0.012 (0.010-0.013)	0.015 (0.013-0.016)	0.019 (0.017-0.021)	0.022 (0.020-0.025)	0.027 (0.024-0.031)	0.031 (0.027-0.035)	0.035 (0.030-0.040)	0.039 (0.034-0.045)	0.045 (0.038-0.052)	0.049 (0.041-0.058)
10-day	0.009 (0.008-0.010)	0.011 (0.010-0.013)	0.015 (0.013-0.016)	0.017 (0.015-0.019)	0.021 (0.018-0.023)	0.024 (0.021-0.027)	0.026 (0.023-0.030)	0.029 (0.025-0.034)	0.034 (0.028-0.039)	0.037 (0.031-0.043)
20-day	0.005 (0.005-0.006)	0.007 (0.006-0.008)	0.009 (0.008-0.010)	0.010 (0.009-0.012)	0.012 (0.011-0.014)	0.014 (0.012-0.016)	0.016 (0.014-0.017)	0.017 (0.015-0.019)	0.019 (0.017-0.022)	0.021 (0.018-0.024)
30-day	0.004 (0.004-0.005)	0.005 (0.005-0.006)	0.007 (0.006-0.007)	0.008 (0.007-0.009)	0.009 (0.008-0.010)	0.010 (0.009-0.012)	0.012 (0.010-0.013)	0.013 (0.011-0.014)	0.014 (0.012-0.016)	0.015 (0.013-0.018)
45-day	0.003 (0.003-0.004)	0.004 (0.004-0.005)	0.005 (0.005-0.006)	0.006 (0.005-0.007)	0.007 (0.006-0.008)	0.008 (0.007-0.009)	0.009 (0.008-0.010)	0.010 (0.008-0.011)	0.010 (0.009-0.012)	0.011 (0.010-0.013)
60-day	0.003 (0.002-0.003)	0.004 (0.003-0.004)	0.005 (0.004-0.005)	0.005 (0.005-0.006)	0.006 (0.005-0.007)	0.007 (0.006-0.007)	0.007 (0.007-0.008)	0.008 (0.007-0.009)	0.009 (0.008-0.010)	0.009 (0.008-0.010)

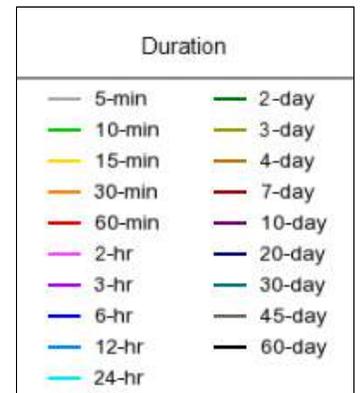
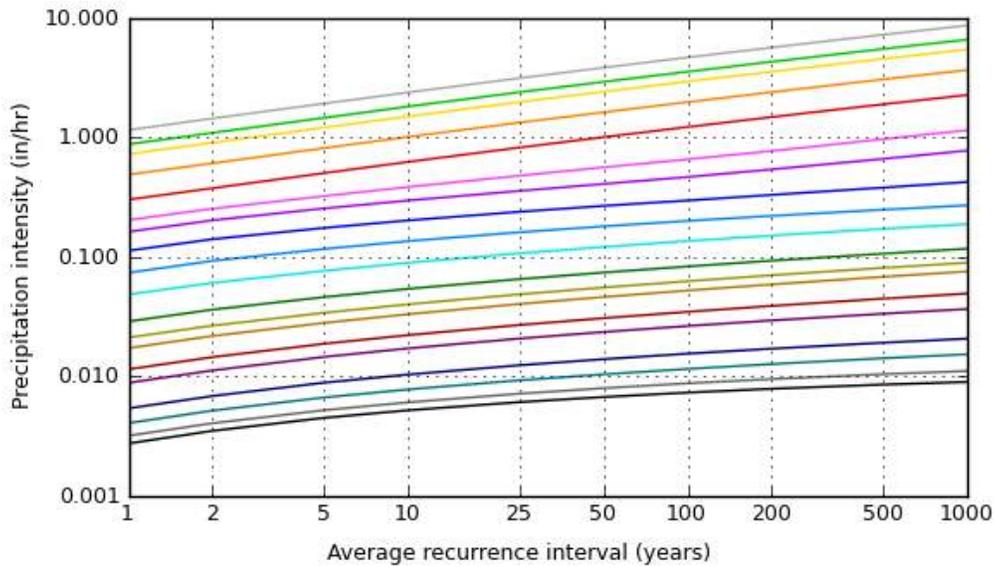
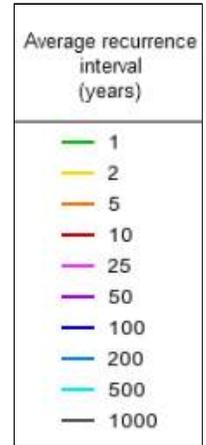
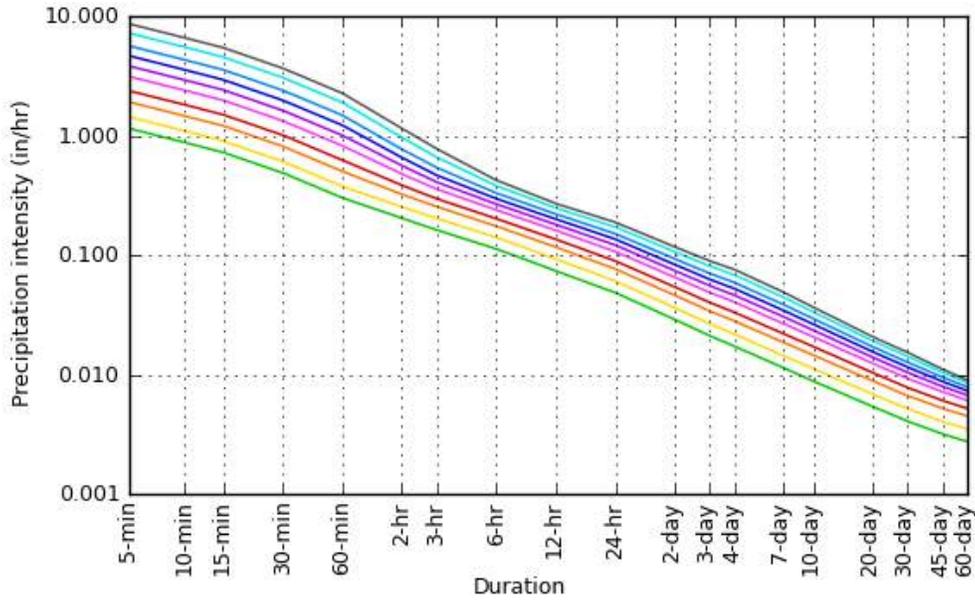
¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average 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

PDS-based intensity-duration-frequency (IDF) curves

Latitude: 39.1729°, Longitude: -119.7525°



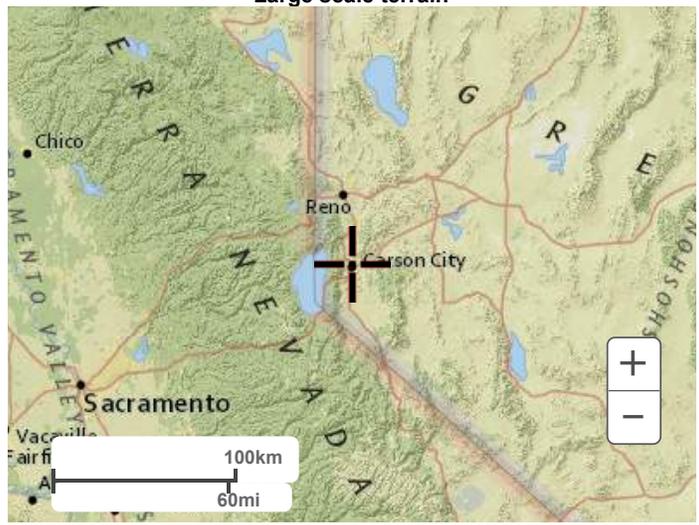
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Maps & aerials

Small scale terrain



Large scale terrain



Large scale map



Large scale aerial



[Back to Top](#)

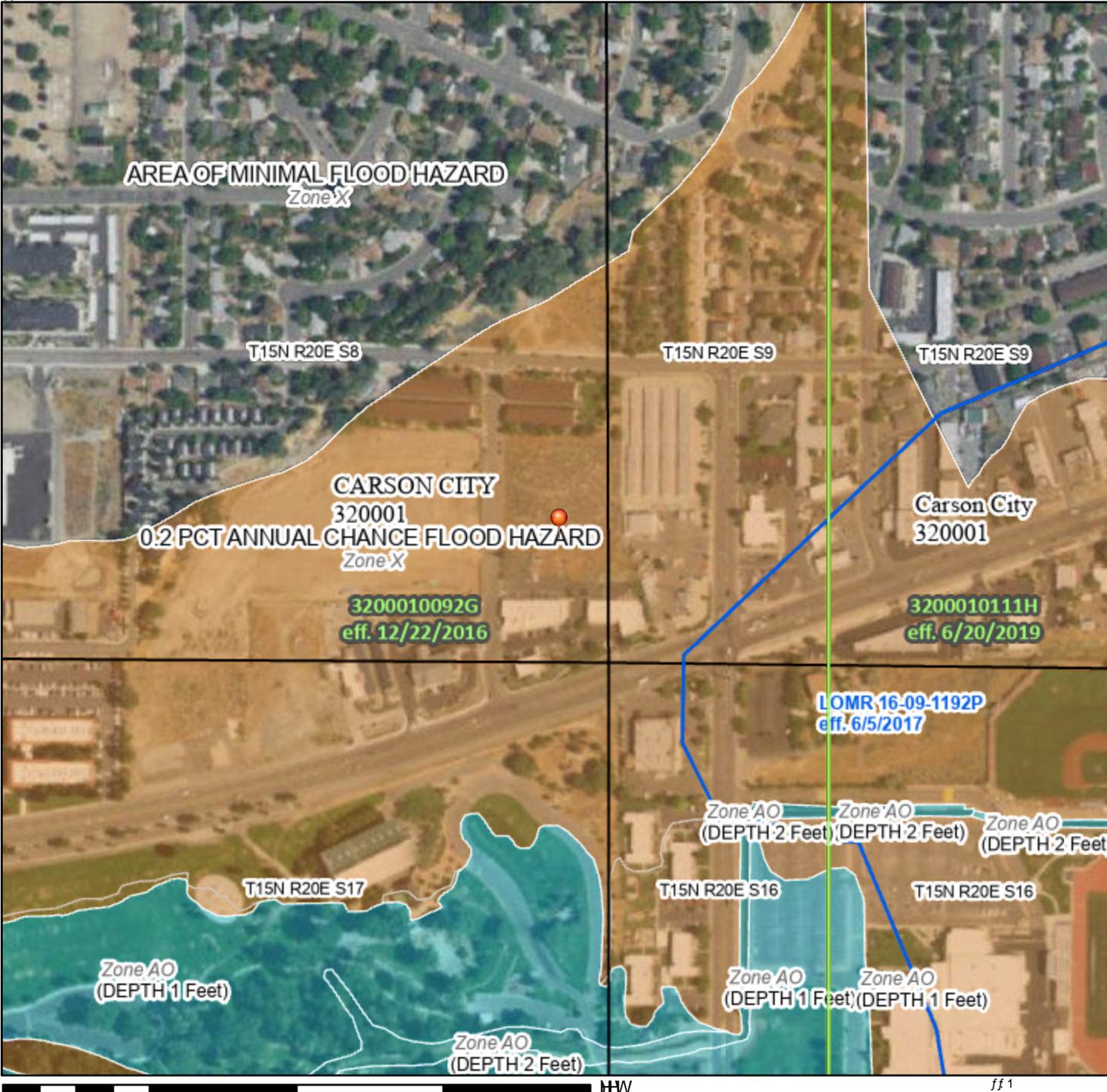
[US Department of Commerce](#)
[National Oceanic and Atmospheric Administration](#)
[National Weather Service](#)
[National Water Center](#)
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

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FHOG

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26.52 26.55	\$DOD &OHPJRRG EPUG \$JHD/ R DODD FROFHIO RRGZWKDHU DH G-BWKOHV WKOQRCHIRW RU ZWKGLD DUHD/R OHV WKOQRCHVDOUEOHFCH; XWXH&GQ.VLRO/\$DOD &OHPJRRG EPUG -FCH; \$JHZWK&GHPJRRG.LNGHWR HYH GH RVHV -FCH; \$JHZWKJRRG.LNGHWRHYH -FCH
26.56	\$JDR OQ.EO JRRG EPUG -FCH; (HFWLYH) \$JDR &GWHUEGJRRG EPUG -FCH
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26.56	&JRW &FWLRQ/ZWKSDOD &OHP DVHU &UIDFOHYDLRQ &DWD JDDJFW %DHJRRG OHYDLRQLQ % LEW R &VXG -XULVLFWLRQ%&OEU &DWD JDDJFW %DHLQ &JROH%DHLQ &JURD&L.FJ.DVXJ
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U&H&O&D&W&R&U&S&U&S&R&V

Robison Engineering Company, Inc
846 Victorian Avenue, Suite 20
Sparks, NV US
www.robisoneng.com
RENG Proj. Number: 1-866-01.003



PRELIMINARY SEWER REPORT

For

U-HAUL AT CARSON CITY – APN: 002-442-03

SPECIAL USE PERMIT

Prepared for:

U-HAUL COMPANY OF NORTHERN NEVADA

10400 South Virginia Street

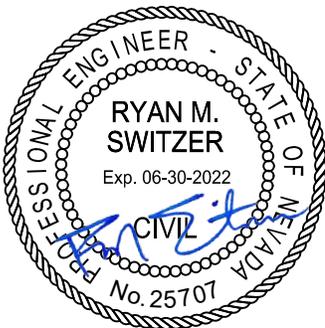
Reno, NV 89511

Prepared by:

ROBISON ENGINEERING COMPANY

846 Victorian Avenue, Suite 20

Sparks, Nevada 89431



June 2021



INTRODUCTION
SITE DESCRIPTION

This report addresses sanitary sewer impacts for a proposed commercial development located on State Street in Carson City. The project is adjacent to the west boundary of an existing U-Haul storage facility at 1498 E William Street. The site is located in the southeast ¼ of section 8 and southwest ¼ of section 9, and northeast ¼ of section 17, township 15 north, range 20 east, Mount Diablo Meridian (APN:002-442-03) in the Carson City, Nevada. See the vicinity map below:



Figure 1 – Vicinity Map (imagery courtesy of Carson City GIS)

The site is accessed from State Street abutting the western property line. Multifamily residential properties border the north property boundary, and existing commercial developments border the east and south boundaries. The undeveloped property encompasses



2.9 acres zoned for general commercial purposes and the entirety of the lot is subject to this study. Currently the site consists of undeveloped land light poor grass cover throughout, and an approximately 8,700 square-foot asphalt parking lot in the southwest corner.

The proposed development consists of site and utility improvements to accompany two indoor storage facilities. The primary three-story building will have a footprint of 35,250 square feet and the secondary single-story warehouse will have a footprint of 8,000 square feet. The purpose of this report is to analyze the existing and post developed stormwater runoff conditions for the site.

FLOOD ZONE

Per FEMA Flood Hazard Map panel 3200010092G the site is located in shaded Zone X. Shaded zone X is defined by the FEMA flood map as “0.2% annual chance flood hazard, areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile.” Based on this information, FEMA anticipates that there is minimal risk of the property flooding.

PROPOSED PROJECT DESCRIPTION

The proposed development consists of site and utility improvements to accompany a U-Haul indoor storage facility. The nearest existing sanitary sewer main runs along the center of State Street directly west of the site. The diameter was unknown at the time of authoring this report. A 6-inch diameter lateral is proposed to connect the storage building to the existing sewer main via a saddle tap.

SEWER SYSTEMS

DESIGN PARAMETERS AND ASSUMPTIONS

Design parameters and assumptions were based on occupational flow, with commercial development resulting in 10,000 gallons per acre per day peak flow.

EXISTING SEWER SYSTEM

Existing sewer main elevation information and pipe material data were unavailable at the time of authoring this report. However, minimum sanitary sewer main diameter in Carson City is 8-inches and minimum slope is 0.4 percent. Assuming the existing sewer main was installed with PVC and to these minimum design thresholds, the main has a capacity of 1.1 cfs. If the main was built more robustly with a 12-inch diameter PVC pipe at 2.0 percent slope, the capacity would increase to 7.3 cfs. See a summary of Manning’s equation calculation in Table 1 below:



TABLE 1 - EXISTING SEWER MAIN CAPACITY ANALYSIS		
MANNING'S EQUATION: $Q=(1.49/n)R^{2/3}AS^{1/2}$		
n	0.009 (PVC)	0.009 (PVC)
D (in)	8	12
S (%)	0.4	2.0
Q_{full} (cfs)	1.1	7.3
V_{full} (ft/s)	3.2	9.3

Prior to final design and permitting, actual existing main elevation information and pipe material data should be obtained to more accurately assess the existing system capacity.

PROPOSED SEWER SYSTEM

The proposed development is a commercial U-Haul storage facility. A peak design flow of 10,000 gallons per acre per day for commercial facilities was used for this analysis. This results in a peak effluent of 29,000 gallons per day (gpd), or 0.04 cubic feet per second (cfs), for the 2.9-acre site. A 6-inch diameter lateral is proposed to serve the future development. The site will ultimately discharge to the existing main located west of the property within State Street (see APPENDIX A).

As mentioned above the capacity in the existing main was calculated to be approximately between 1.1 and 7.3 cfs. With the addition of the proposed U-haul storage facility, a peak flow increase of 0.04 cfs can be expected. This would be an increase in flow of approximately 0.5 to 4 percent of the main’s capacity, a minor increase to the overall system.

CONCLUSIONS

Based on the above data, we conclude that the development will have minimal impact on the Carson City existing infrastructure and sewage treatment systems. It is anticipated that the normal, customary connection fees and impact fees will be required.

APPENDIX A – SEWER PLAN

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RENG Proj. Number: 1-866-05.001



PRELIMINARY WATER SUPPLY AND CONVEYANCE STUDY – REV 1

For

U-HAUL AT CARSON CITY – APN: 002-442-03

SPECIAL USE PERMIT



Prepared for:

U-HAUL COMPANY OF NORTHERN NEVADA
10400 SOUTH VIRGINIA ST.
Reno, NV 89521

Prepared by:

ROBISON ENGINEERING COMPANY
846 Victorian Avenue, Suite 20
Sparks, Nevada 89431

June 2021



INTRODUCTION

This report addresses the existing and anticipated water supply conveyance for a proposed commercial development located on State Street in Carson City. The project is adjacent to the west boundary of an existing U-Haul storage facility at 1498 E William Street. The site is located in the southeast $\frac{1}{4}$ of section 8 and southwest $\frac{1}{4}$ of section 9, and northeast $\frac{1}{4}$ of section 17, township 15 north, range 20 east, Mount Diablo Meridian (APN:002-442-03) in the Carson City, Nevada. See the vicinity map below:

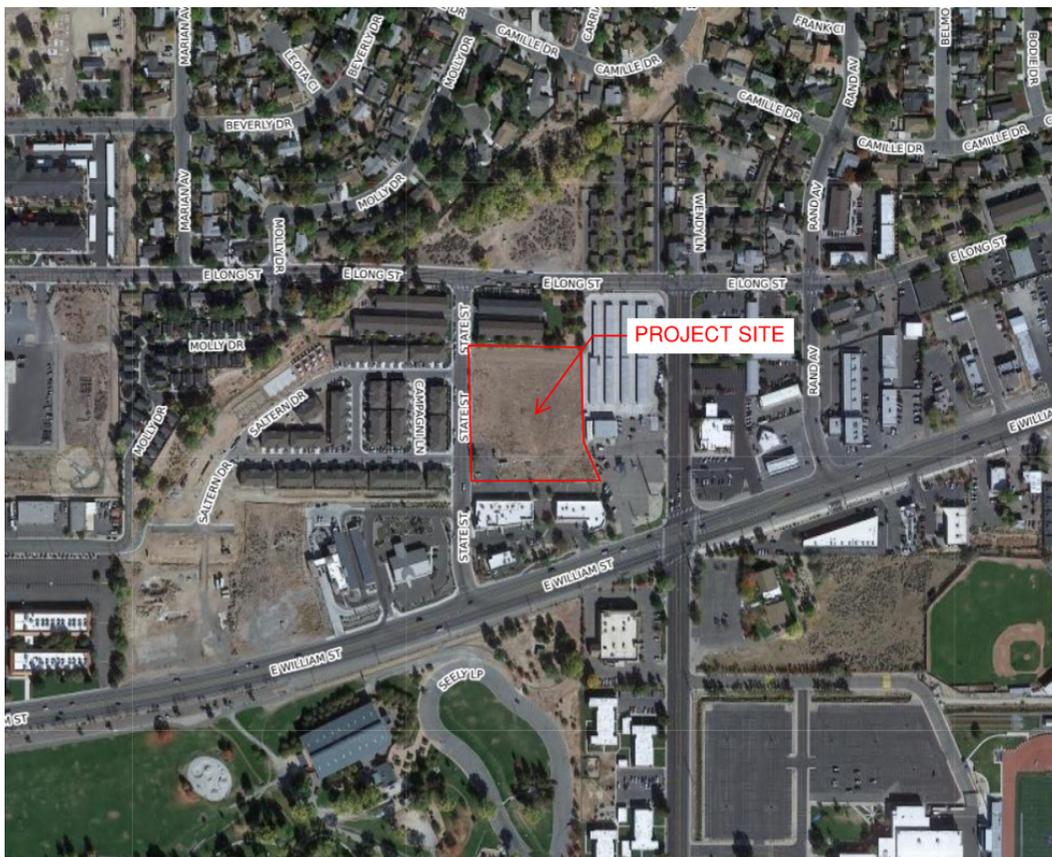


Figure 1 – Vicinity Map (imagery courtesy of Carson City GIS)

The site is accessed from State Street abutting the western property line. Multifamily residential properties border the north property boundary, and existing commercial developments border the east and south boundaries. The undeveloped property encompasses 2.9 acres zoned for general commercial purposes and the entirety of the lot is subject to this drainage study. Currently the site consists of undeveloped land light poor grass cover throughout, and an approximately 8,700 square-foot asphalt parking lot in the southwest corner.



The proposed development consists of site and utility improvements to accompany two indoor storage facilities. The primary three-story building will have a footprint of 35,250 square feet and the secondary single-story warehouse will have a footprint of 8,000 square feet. The purpose of this report is to analyze the existing and proposed water supply conditions for the site.

EXISTING SYSTEM

An existing water main is located within State Street along the west boundary of the site and is proposed to serve the development. Carson City is the current water purveyor and the existing static pressure of the water line is unknown. Per Carson City Development Standards, “water mains shall be designed to deliver a minimum of sixty (60) psi at the meter during peak demand periods and to provide adequate fire flow as required by the fire department.”

PROPOSED SYSTEM

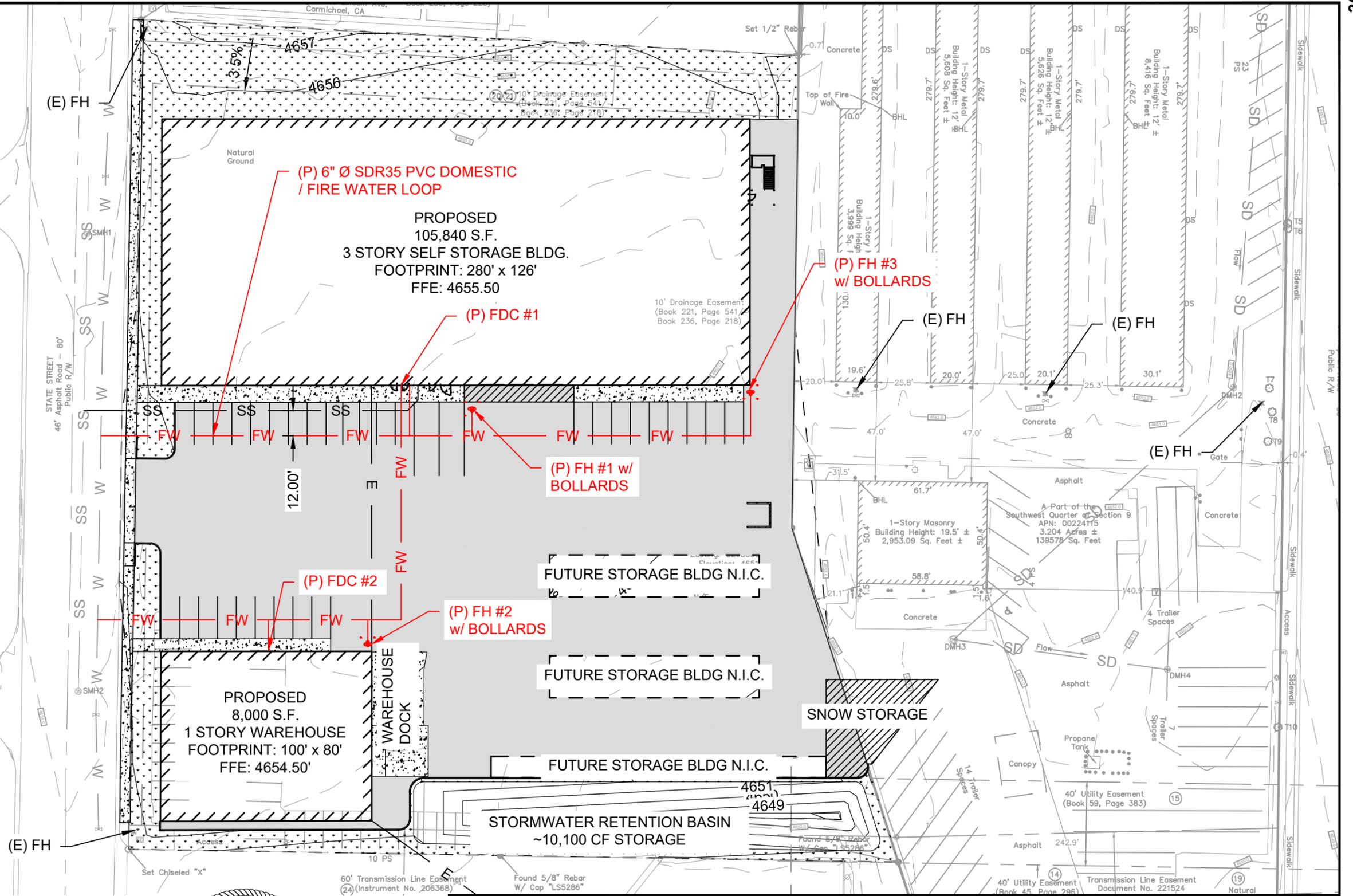
The proposed development includes tapping the existing water main for both domestic and fire water services at the new commercial buildings. A private 6-inch diameter loop, with three fire hydrants, two Fire Department Connections (FDCs), and one domestic service for the larger building is proposed to serve the development (see APPENDIX A). Domestic peak flow was calculated based on IFC Table P2903.6. Approximately seven (7) fixture units are proposed in the storage building equating to a domestic peak flow of 12 gallons per minute (gpm).

The more prominent water demand will be to supply fire water service for the three-story U-Haul storage facility that totals 105,840 square feet in area. The structure will have an occupancy classification of Storage Group S: S-2 Low-Hazard storage and is assumed to have a construction classification of Type II-B (classification to be confirmed with architect upon completion of building plans). Per International Fire Code (IFC) Table B105.1(2), a fire flow of 6,750 gpm with a flow duration of 4 hours is required. The proposed building shall be sprinkled allowing required flow to be reduced by 50 percent reducing the required fire flow to 3,375 gpm with a flow duration of 4 hours, requiring 3 fire hydrants per IFC Table C102.1. Flow may differ once building plans are completed and the sprinkler system is fully designed.

Backflow prevention devices shall be constructed at all connections to the public water system in accordance with Carson City Development Standards.

CONCLUSION

The development conforms to standards of engineering practice to protect the proposed development and the surrounding infrastructure. Water rights shall be obtained for the development and allocated as required.



**PRELIMINARY
NOT FOR
CONSTRUCTION**

Robison Engineering
COMPANY, INC.
846 VICTORIAN AVENUE
SPARKS, NV 89431
www.robisoneng.com

DRAWN: RMS
DATE: 06/16/2021

PREPARED FOR:
**U-HAUL OF
NORTHERN NEVADA**

10400 S VIRGINIA ST
RENO, NV 89521
775-530-3208

0 25' 50'
INCH@FULL SCALE

**U-HAUL CARSON CITY
PRELIMINARY WATER REPORT**

UTILITY PLAN

CARSON CITY NEVADA
PROJECT NO: 1-866-05.001