Special Use Permit

Osage Corner Lift Station

Submitted to Washoe County

March 9, 2026

Prepared for

Lifestyle Homes TND LLC

4790 Caughlin Pkwy #519

Reno, NV 89519

Prepared by

WOOD RODGERS

DEVELOPING INNOVATIVE DESIGN SOLUTIONS

1361 Corporate Blvd • Reno, NV 89502 • Tel: 775.823.4068

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Section 1

Washoe County Development Application

Your entire application is a public record. If you have a concern about releasing personal information, please contact Planning and Building staff at 775.328.6100.

Project Information	**Staff Assigned Case No.:**
Project Name: Osage Corner Lift Station	
Project Description: A Special Use Permit to allow a Utility Services use (sewer lift station) in the Medium Density Suburban (MD) zone in support of an adjacent single family detached development.	
Project Address: 10600 Osage Road	
Project Area (acres or square feet): ±750 square feet	
Project Location (with point of reference to major cross streets **AND** area locator): East of Osage Road, approximately 1¼ miles east of the Red Rock Road/Osage Road intersection	

Assessor's Parcel No.(s):	Parcel Acreage:	Assessor's Parcel No.(s):	Parcel Acreage:
086-350-37	8.56		

Indicate any previous Washoe County approvals associated with this application:
Case No.(s).

Applicant Information (attach additional sheets if necessary)

Property Owner:		**Professional Consultant:**	
Name: Lifestyle Homes TND LLC		Name: Wood Rodgers, Inc	
Address: [redacted]		Address: [redacted]	
Reno, NV	Zip: 89519	Reno, NV	Zip: 89502
Phone: [redacted]	Fax:	Phone: [redacted]	Fax:
Email: [redacted]		Email: [redacted]	
Cell:	Other:	Cell:	Other:
Contact Person: Robert Lissner		Contact Person: Eric Hasty	
Applicant/Developer:		**Other Persons to be Contacted:**	
Name: Same as Property Owner		Name:	
Address:		Address:	
	Zip:		Zip:
Phone:	Fax:	Phone:	Fax:
Email:		Email:	
Cell:	Other:	Cell:	Other:
Contact Person:		Contact Person:	

For Office Use Only

Date Received:	Initial:	Planning Area:	
County Commission District:		Master Plan Designation(s):	
CAB(s):		Regulatory Zoning(s):	

Special Use Permit Application
Supplemental Information

(All required information may be separately attached)

1. What is the project being requested?

   The proposed project is a sewer lift station necessary for the development of the adjacent Osage Corner subdivision (WTM26-002).

2. Provide a site plan with all existing and proposed structures (e.g. new structures, roadway improvements, utilities, sanitation, water supply, drainage, parking, signs, etc.)

   A site plan is attached.

3. What is the intended phasing schedule for the construction and completion of the project?

   The proposed project will be completed in one phase and is intended to be completed before the Osage Corner development requires its use.

4. What physical characteristics of your location and/or premises are especially suited to deal with the impacts and the intensity of your proposed use?

   As part of the Osage Corner development, Echo Avenue will be extended to Osage Road. The placement of the lift station near the future extension is the ideal location where gravity flow of sewage stops and can be pumped into the sewer infrastructure located within Echo Avenue

5. What are the anticipated beneficial aspects or affects your project will have on adjacent properties and the community?

   The lift station will provide sewer service for the proposed Osage Corner development and allow the future residents of this development to connect into the public sanitary sewer infrastructure instead of requiring septic tanks.

6. What are the anticipated negative impacts or affect your project will have on adjacent properties? How will you mitigate these impacts?

   The above ground components of a sewer lift station require the area to be fenced for security and safety. The fence and equipment will be screened with solid fencing and landscape. To mitigate these impacts, the fence will have vertical slats and additional landscaping will be installed around the perimeter. These measures will provide visual relief from the harsh view of the lift station components.

7. Provide specific information on landscaping, parking, type of signs and lighting, and all other code requirements pertinent to the type of use being purposed. Show and indicate these requirements on submitted drawings with the application.

   No signs and lighting will be necessary and no parking is needed. Landscaping will be provided per WCDC screening method requirements.

8. Are there any restrictive covenants, recorded conditions, or deed restrictions (CC&Rs) that apply to the area subject to the special use permit request? (If so, please attach a copy.)

■ Yes	❑ No

9. Utilities:

a. Sewer Service	Reno Stead Wastewater Reclamation Facility
b. Electrical Service	NV Energy
c. Telephone Service	Charter/AT&T
d. LPG or Natural Gas Service	NV Energy
e. Solid Waste Disposal Service	Waste Management
f. Cable Television Service	Charter
g. Water Service	TMWA

For most uses, Washoe County Code, Chapter 110, Article 422, Water and Sewer Resource Requirements, requires the dedication of water rights to Washoe County. Please indicate the type and quantity of water rights you have available should dedication be required.

h. Permit #		acre-feet per year	
i. Certificate #		acre-feet per year	
j. Surface Claim #		acre-feet per year	
k. Other #		acre-feet per year	

Title of those rights (as filed with the State Engineer in the Division of Water Resources of the Department of Conservation and Natural Resources).

No water is required for the use.

10. Community Services (provided and nearest facility):

a. Fire Station	City of Reno Station 9
b. Health Care Facility	St Marys North Valleys Urgent Care
c. Elementary School	Desert Heights
d. Middle School	Cold Springs
e. High School	North Valleys
f. Parks	Silver Knolls Park
g. Library	North Valleys Library
h. Citifare Bus Stop	Echo Avenue and Moya Boulevard

Section 2

Project Description

Project Name:	Osage Corner Lift Station
APN Numbers:	086-350-37
Location:	Located ±1¼ miles east of the intersection of Red Rock Road and Osage Road
Master Plan:	Suburban Residential (SR)
Zoning:	Medium Density Suburban (MDS)
Request:	A Special Use Permit to allow for a sewer lift station to support the proposed residential lots within the accompanying tentative subdivision map for Osage Corner.

Site Background

The project site is currently undeveloped, vacant land. A common open space tentative subdivision map application (WTM26-002) has been submitted concurrently with this application, which details the proposed 131-lot single family detached development known as Osage Corner.

The sewer lift station associated with this request is a necessary utility service for the Osage Corner development. As required by the Washoe County Development Code, the use type *Utility Services* requires a Special Use Permit in the MDS zone.

Location

The project site is within unincorporated Washoe County, in the North Valleys area. The lift station is proposed to be placed on a portion of Washoe County Assessor Parcel Number (APN) 086-350-37. The site is generally located ±1¼ miles east of the intersection of Red Rock Road and Osage Road, within the North Valleys Area Plan.

Washoe County Master Plan and Zoning

According to Washoe County mapping, the current master plan designation is Suburban Residential (SR) which conforms with the current respected zoning designation of Medium Density Suburban (MDS), *(Refer to Section 3 of the submittal packet for Zoning and Master Plan Maps).* The proposed land use is conforming with the current zoning designations and is allowed within MDS zoning district with the approval of a Special Use Permit (SUP).

Land Use Compatibility

The site is surrounded by an existing single-family residential neighborhood to the west and existing industrial/commercial developments to the east. The area to the north and south of the lift station is currently vacant and is part of the proposed Osage Corner development. Upon completion of the proposed Tentative Map, the site will be in the proposed common area and will be surrounded by single-family detached homes on the north, south, and western boundaries. The lift station will serve the future surrounding lots.

Site Characteristics

The project site is generally undisturbed and characterized by natural vegetation consisting of native shrubs, sagebrush, and grasses. (*Refer to Site Aerial in Section 3 of this submittal packet).* The site will be accessed by the

future extension of Echo Avenue, which is proposed as part of the tentative subdivision map request, and Black Dog Drive, a planned internal roadway within the Osage Corner development.

Project Request

The request is summarized as follows:

- A **Special Use Permit (SUP)** to allow a Utility Services use (sewer lift station) in the MDS zone in support of an adjacent single family detached development.

A sewer lift station is a necessary component of infrastructure when gravity flow of sewage is not possible. For the Osage Corner development, the lift station will pump to the existing 12-inch collection main stubbed out from Echo Avenue. The sewer facilities within Echo Avenue are owned by the City of Reno and flow to the Reno Stead Water Reclamation Facility as described in the *Preliminary Sanitary Sewer Report* included in *Section 3* of this application.

The proposed lift station will be approximately ±750 square feet and is located in a common area along the future extension of Echo Avenue. The lift station has components placed above and below ground and will be fenced for security and safety. The fence will have vertical slats for screening purposes, and additional landscaping along the perimeter, which will help blend the above ground portions with the surrounding development and soften the appearance.

Findings

Prior to approving an application for a development, the Planning Commission, Board of Adjustment or a hearing examiner shall find that all of the following are true:

SPECIAL USE PERMIT FINDINGS

1) ***Consistency.*** *The proposed use is consistent with the action programs, policies, standards and maps of the Master Plan and the applicable area plan;*

   Response: The proposed project is a utility service necessary for the development of the associated single-family detached subdivision within the Medium Density Suburban (MDS) zoning designation (WTM26-002). This designation is consistent with the current Master Plan designation of Suburban Residential and meets all applicable goals and policies of the Washoe County Master Plan and the North Valleys area plan. Specific responses on how the project furthers guiding principles or policies identified in the Master Plan can be found below:

   PFS Principle 3. Provide adequate service to developments and maintain a communicative, transparent planning process

   Policy 3.1 Identify barriers to service delivery goals to meet Washoe County's minimum service standards for potable water, wastewater, storm water and flood, schools, and transportation as depicted in the Regional Plan List of Facilities and Service Standards.
   Response: The proposed project provides wastewater services for the associated Osage Corner development in compliance with the Regional Plan List of Facilities and Service Standards.

2) ***Improvement.*** *Adequate utilities, roadway improvements, sanitation, water supply, drainage, and other necessary facilities have been provided, the proposed improvements are properly related to existing and proposed roadways, and an adequate public facilities determination has been made in accordance with Division Seven;*

   Response: The proposed project provides wastewater infrastructure for the associated Osage Corner development. The sewer lift station will be located along the future extension of Echo Avenue, which is where the existing public sewer infrastructure is stubbed out. The lift station is required for the proposed development to be served by sanitary sewer.

3) ***Site Suitability.*** *The site is physically suitable for the type of development and for the intensity of development; and*

   Response: The project site is generally flat and is an appropriate location for the sewer lift station due to its proximity to the existing public sewer infrastructure stubbed out in Echo Avenue. The site of the lift station is proposed to be within the common area with adequate separation from the adjacent proposed lots. The site will be adequality screened and site access for maintenance will be from Echo Avenue and the proposed Black Dog Drive. The common area will provide adequate separation from the nearest proposed residence (±75 feet) and will allow for the addition of screening with a solid fence and additional landscaping to help soften the appearance.

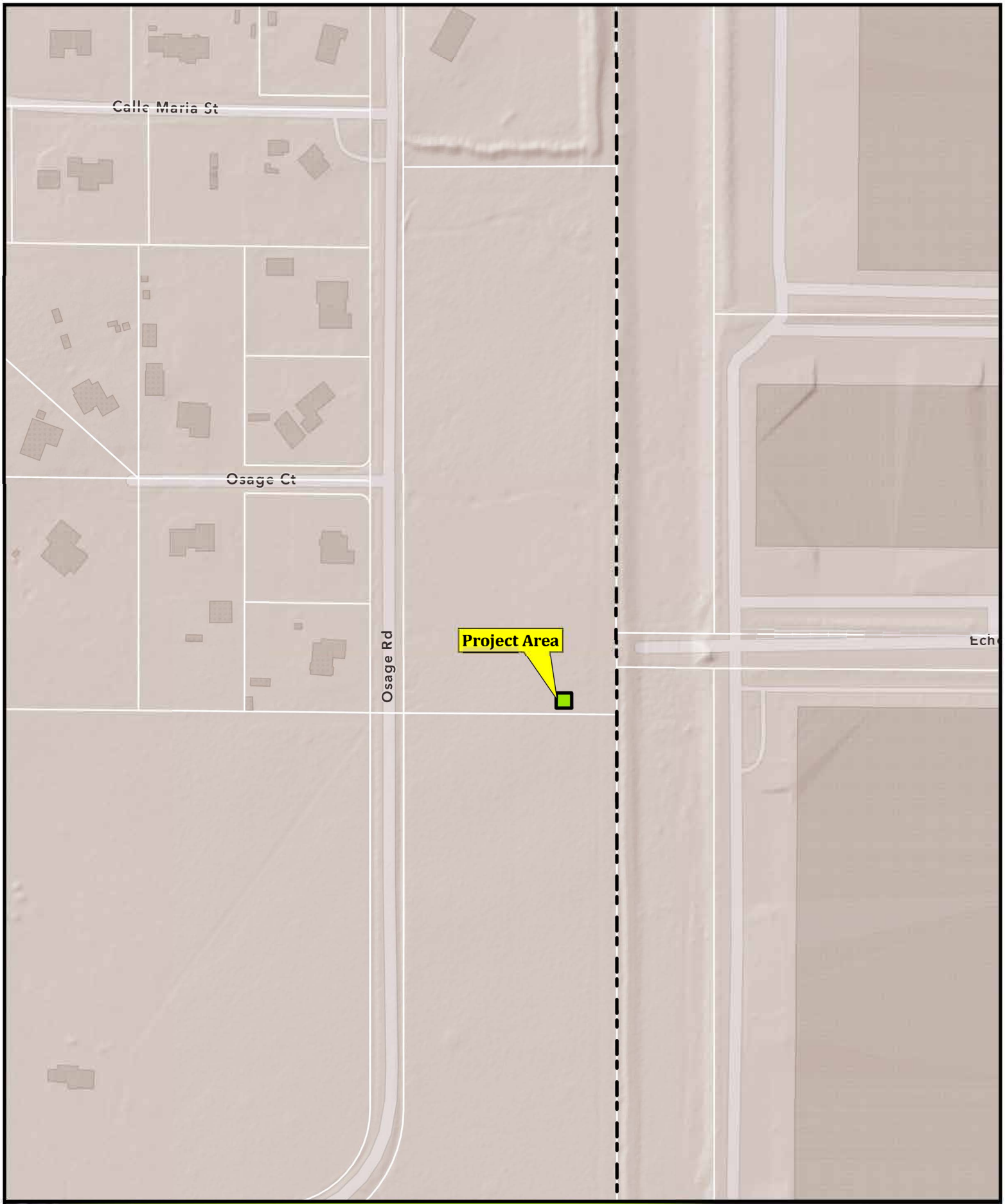
4) ***Issuance Not Detrimental.*** *Issuance of the permit will not be significantly detrimental to the public health, safety or welfare; injurious to the property or improvements of adjacent properties; or detrimental to the character of the surrounding area.*

Response: The proposed project is a necessary utility for the adjacent Osage Corner development and will be adequately screened with a solid fence and landscaping. The site is ±75 feet from the rear lot of the nearest proposed residence and located within the common area of the proposed subdivision. Further, site access is proposed in an area that will not impact future residents while allowing maintenance vehicles to properly access the site. The lift station will allow for the future residents to be served by sewer ensuring proper treatment at the Reno Stead Water Reclamation Facility. It is not anticipated that the proposed project will be significantly detrimental to the public health, safety or welfare; injurious to the property or improvements of adjacent properties; or detrimental to the character of the surrounding area.

5) ***Effect on a Military Installation.*** *Issuance of the permit will not have a detrimental effect on the safety, security, location, purpose or mission of the military installation.*

Response: It is not anticipated that the proposed project will have a detrimental effect on the safety, security, location, purpose or mission of the military installation.

Section 3

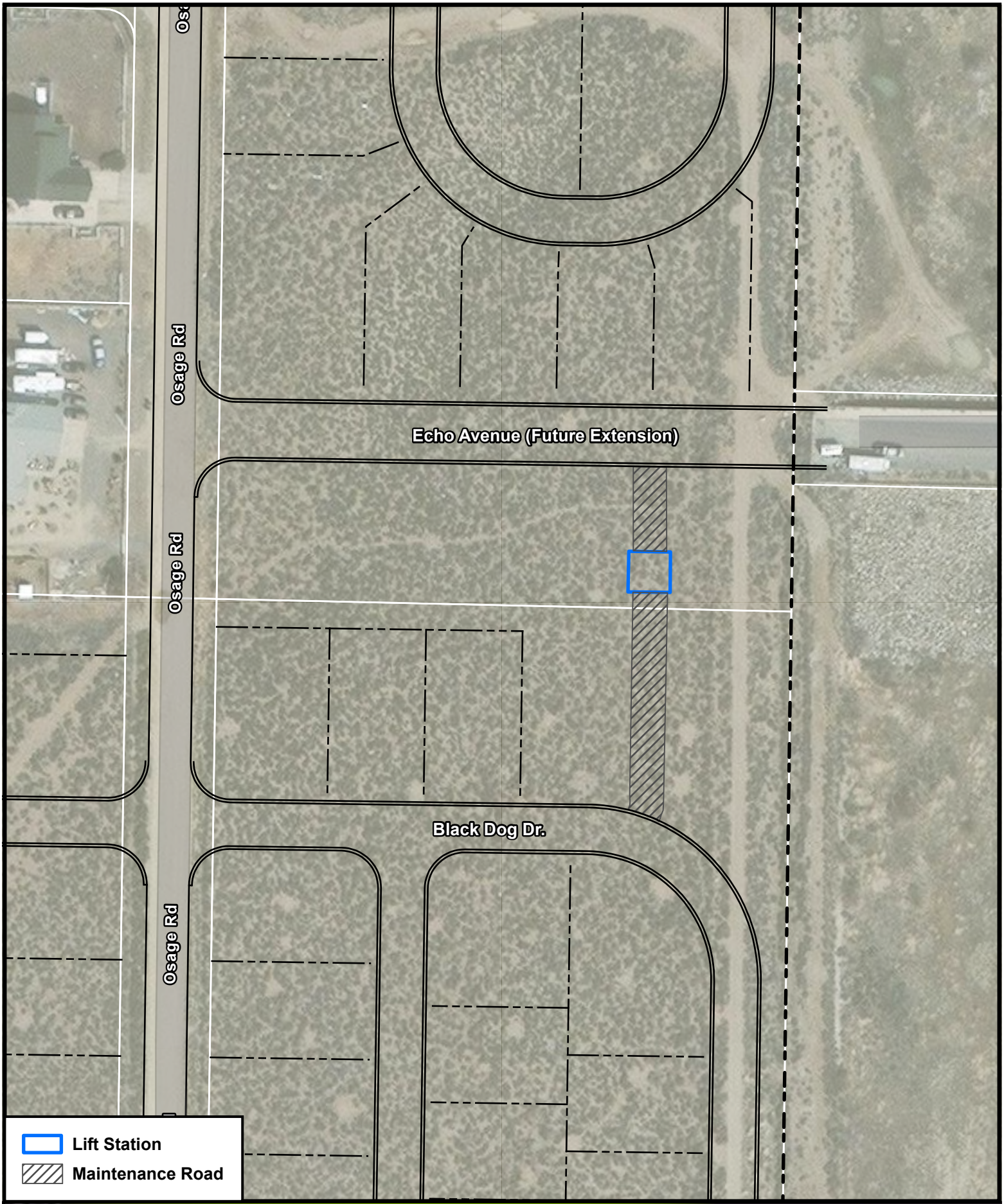


Vicinity Map

Osage Corner Lift Station

March 2026

WOOD RODGERS
BUILDING RELATIONSHIPS ONE PROJECT AT A TIME
1361 Corporate Boulevard
Reno, NV 89502
Tel: 775.823.4068
Fax: 775.823.4066



Aerial Map

Osage Corner Lift Station

March 2026

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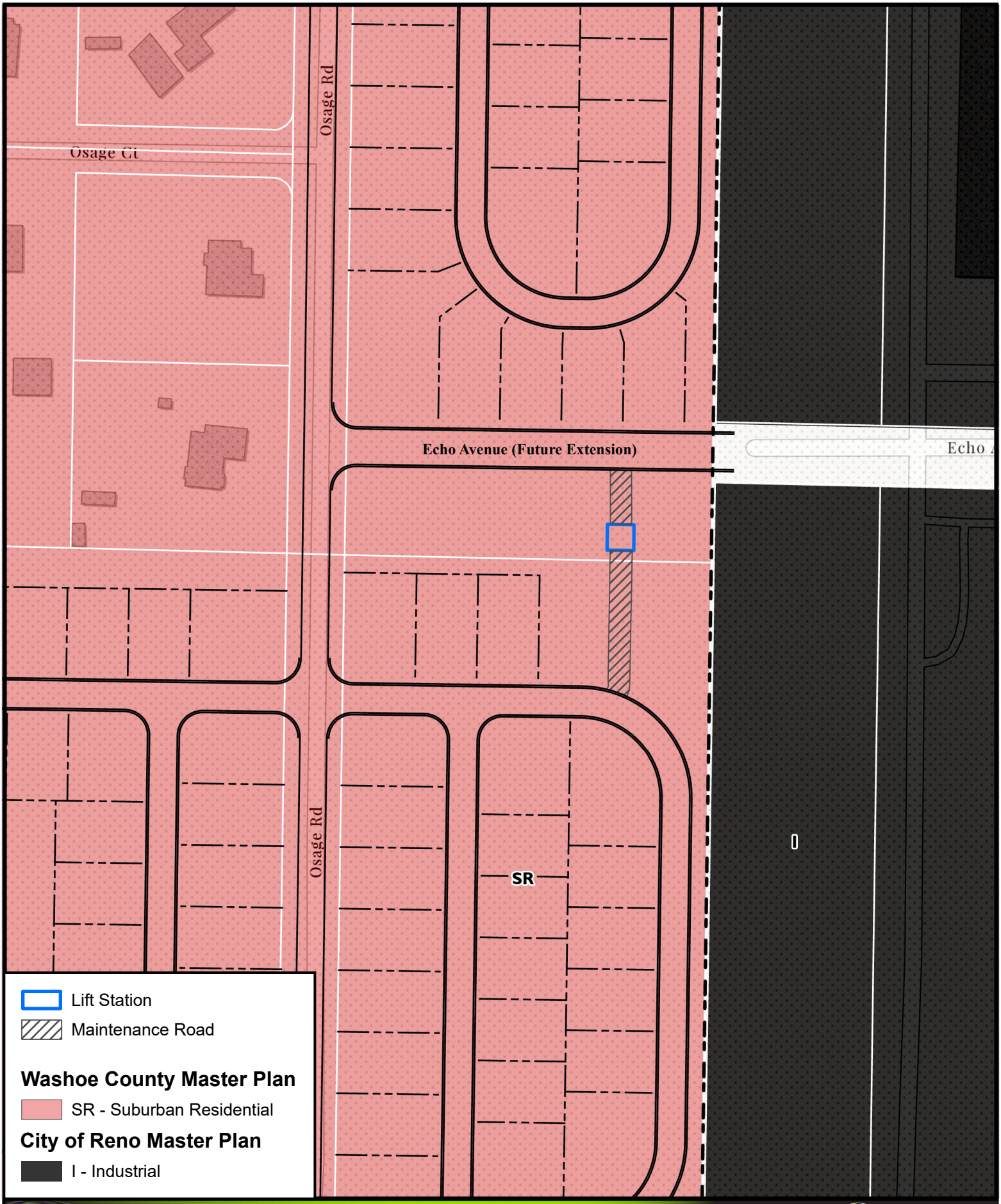
1361 Corporate Boulevard
Reno, NV 89502
Tel: 775.823.4068
Fax: 775.823.4066



Master Plan

Osage Corner Lift Station

March 2026

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1361 Corporate Boulevard
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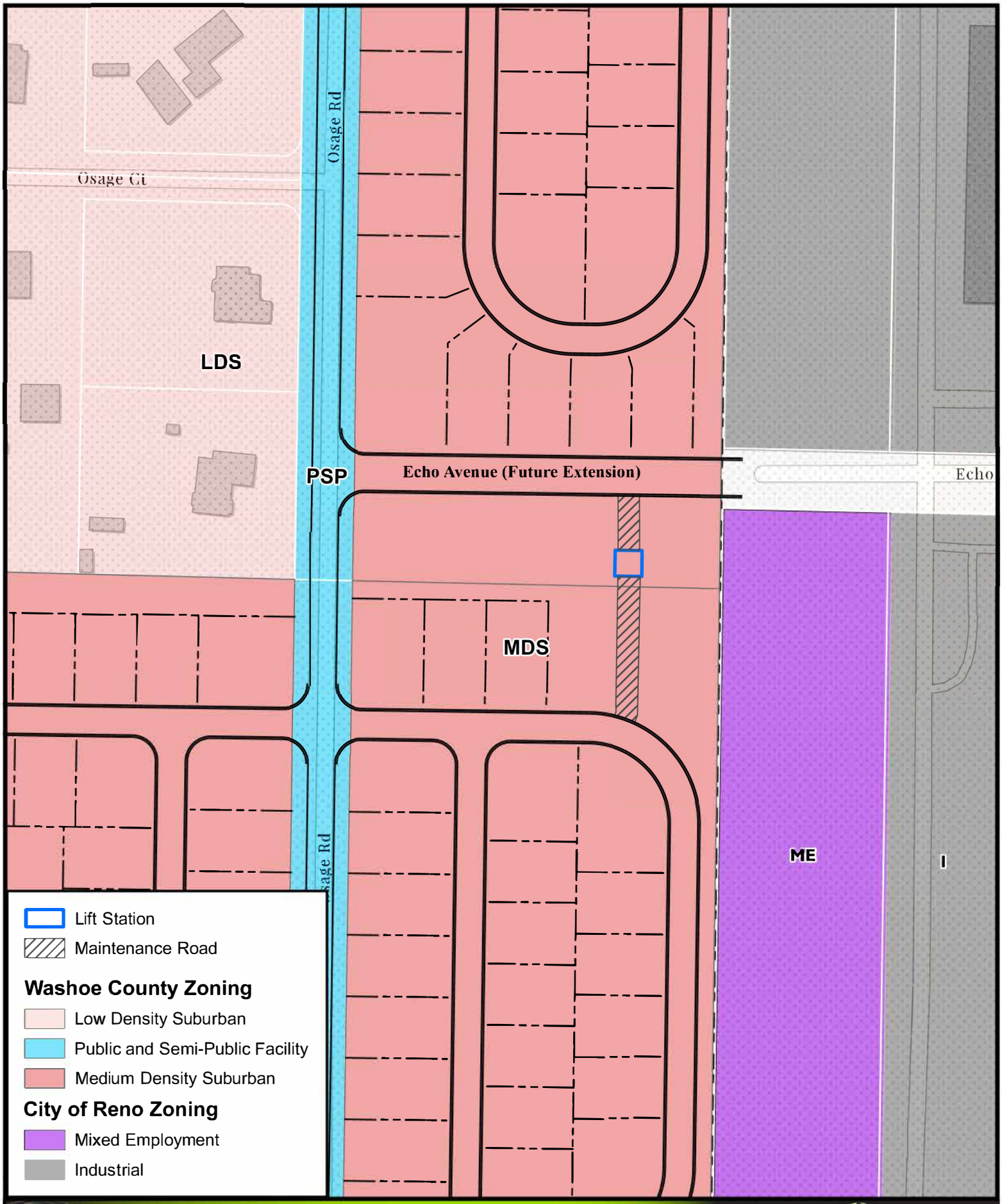
Fax: 775.823.4066



Zoning

Osage Corner Lift Station

March 2026

WOOD RODGERS
BUILDING RELATIONSHIPS ONE PROJECT AT A TIME
1361 Corporate Boulevard
Reno, NV 89502
Tel: 775.823.4068
Fax: 775.823.4066

(RS #569)
SILVER KNOLLS RANCHES

N ½ OF SE ¼ OF SECTION 25, T21N - R18E

T21N - R18E | T21N - R19E

25 | 30

086-350-12
1.67 ac.

PAR. 1-A
RS 5506

PAR. 1-B
RS 5506

086-350-49
9.616 ac.

086-350-50
11.381 ac.

086-350-23
1.82 ac.

086-350-13
1.3 ac.

086-350-14
1.3 ac.

086-350-15
1.41 ac.

086-350-16
1.0 ac.

086-350-22
3.0 ac.

PARCEL B

086-350-25
1.38 ac.

086-350-26
2.23 ac.

PAR.1
P.M.2700

PAR.2
P.M.2700

086-350-46
2.26 ac.

086-350-47
2.25 ac.

PAR.2
P.M.2616

PAR.1
P.M.1744

086-350-38
43926 sf

086-350-43
1.95 ac.

PAR.2
P.M.1744

086-350-39
43895 sf

086-350-37
8.56 ac.

PAR.3
P.M.2700

086-350-48
4.48 ac.

PAR.3
P.M.2616

086-350-44
1.94 ac.

PAR.3
P.M.1744

086-350-40
43787 sf

PAR.4
P.M.2616

086-350-45
1.01 ac.

086-350-10
1.92 ac.

086-350-09
1.92 ac.

086-350-08
1.92 ac.

086-350-07
1.92 ac.

086-350-06
2.22 ac.

086-350-01
1.92 ac.

086-350-02
1.92 ac.

086-350-03
1.92 ac.

086-350-04
1.92 ac.

086-350-05
2.22 ac.

LANE

WAGON HO

CALLE MARIA COURT

LITTLE CREEK ROAD

OSAGE COURT

ROAD

OSAGE

ECHO AVE.

8 | 11 | 12

Assessor's Map Number

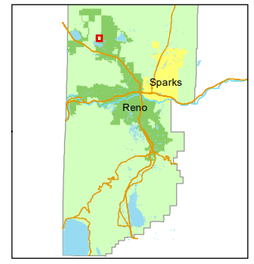
086-35

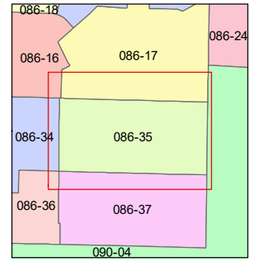
STATE OF NEVADA
WASHOE COUNTY
ASSESSOR'S OFFICE

1001 East Ninth Street, Building D
Reno, Nevada 89512
(775) 328-2231

Feet
0 50 100 150 200

1 inch = 200 feet





created by: KSB 6/27/2013

updated: JRA 4/29/22

area previously shown on map(s):

086-12

NOTE: This map was prepared for the use of the Washoe County Assessor for assessment and illustrative purposes only. It does not represent a survey of the premises. No liability is assumed as to the sufficiency or accuracy of the data delineated hereon.

Section 4

SHAW ENGINEERING

PRELIMINARY SANITARY SEWER REPORT:

OSAGE CORNER SUBDIVISION

PREPARED FOR

LIFESTYLE HOMES TND, LLC

JANUARY 2026

PRELIMINARY SANITARY SEWER REPORT

FOR

OSAGE CORNER SUBDIVISION

January 2026

2/2/2026

PREPARED FOR:

LIFESTYLE HOMES TND, LLC

4790 CAUGHLIN PARKWAY #519

RENO, NV 89509

SHAW ENGINEERING

PREPARED BY:

SHAW ENGINEERING, LTD.

20 VINE STREET

RENO, NEVADA 89503

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APPENDIX A

APPENDIX B

SECTION 1: Project Description

The purpose of this sanitary sewer report (Report) is to summarize the sewer analyses completed for the proposed Osage Corner Subdivision (Development) in accordance with the Washoe County (County) Community Services Department (CSD) 2017 Sewer Design Standards. Under current zoning, the project will consist of approximately 135 units. Additional units may be possible under future proposed zoning regulations. No phasing has been proposed and this analysis for the project has been completed assuming full buildout of the Development.

The Development is generally located southwest of the Reno-Stead Airport on three (3) parcels in Section 25, Township 21 North, Range 18 East, Reno, NV. Figure 1 shows the location of the Development. Parcel information for the proposed development was obtained from the Washoe County Assessor's Office and is listed below:

APN: 086-350-37 (8.56 acres)
APN: 086-370-09 (20.0 acres)
APN: 086-370-18 (13.20 acres)

APN 086-370-18 is currently developed with a single-family home. APN 086-350-37 and APN 086-370-09 are currently undeveloped. The Development is bordered by low density residential to the north and west and commercial/industrial properties to the east and south. Adjacent properties to the development are listed below:

North: APN: 086-350-22 (Existing Single-Family Home)
South: APN 090-040-43 (Existing Urban Outfitters)
East: APN: 090-040-30 and 090-040-19 (Existing Commercial/Industrial Developments)
West: Multiple Single-Family Homes (Existing)

The Development will construct approximately 5,400 linear feet of 8 –inch sanitary sewer collection mains within the project. The Development will also construct a sanitary sewer lift station which will pump to the existing 12-inch collection main stubbed out from Echo Avenue. The onsite sewer mains and lift station will be located within rights of way dedicated for public streets or within easements or property meeting Washoe County requirements. The wastewater generated by the Development will be domestic in nature and will not contain non-domestic waste such as commercial waste or industrial process waters.

The Development is located in unincorporated Washoe County but will contribute flows to the City of Reno sanitary sewer system located to the east of the Development site. The on-site collection system and lift station are being in accordance with Washoe County Community Services Department Design Standards. The improvements are proposed to be dedicated to the Washoe County upon completion of the project. The existing downstream sewer infrastructure is owned and maintained by the City of Reno and will be analyzed to meet City of Reno standards.

SECTION 2: Design Standards

Section 2.1.02 "Sewer Design Criteria" of the "Washoe County Community Services Department Gravity Sewer Collection Design Standards", was referenced to design the onsite sanitary sewer mains. The design criteria are summarized as follows:

Average Daily Flow (ADF)	270 gallons per day (GPD) per residence
Minimum Collection Main Size	8"
Minimum Flow Velocity	2.5 feet per second (fps) at half-full
Maximum Depth of Flow	80% inside diameter of pipe
Minimum Peaking Factor (PF)	3
Design Capacity	Peak Hour Flow (PHF)
Minimum Pipe Slope	Velocity is at least 2.5 (fps) when half-full
Mannings Value	0.012 for PVC, 0.012 for RCP, and 0.011 for HDPE

The design recommendations for the proposed force main and lift station are per the "Washoe County Community Services Department Lift Station Design Standards", summarized as follows:

Minimum Flow Velocity	2 feet per second (fps)
Maximum Flow Velocity	6 feet per second (fps)
Minimum Design Capacity	PHF to Wet Well

Chapter 4 of the City of Reno Public Works Design Manual was also referenced to determine the impact to offsite sewer infrastructure owned and operated by the City of Reno. The criteria are summarized as follows:

Per Capita Flow Rate	350 gallons per day (GPD) per capita (Peak)
Minimum Collection Main Size	8"
Minimum Flow Velocity	Not less than 2.5 feet per second (fps) or half-full
Maximum Depth of Flow	50% inside diameter of pipe

Minimum Peaking Factor (PF)	Incorporated into Per Capita Contributions
Design Capacity	Peak Hour Flow (PHF)
Minimum Pipe Slope	Velocity is at least 2.5 (fps) when half-full
Mannings Value	0.014

SECTION 3: Proposed Sanitary Sewer Facilities

SECTION 3.1 On-Site Sewer Network

The proposed onsite sanitary sewer facilities include 5,400 linear feet of 8-inch SDR 35 PVC sewer main, (40) 48-inch diameter Type 1A manholes, and a sanitary sewer lift station. Figure 2 depicts the proposed on-site collection system.

The design peak hour flow for the Development is calculated as follows:

PHF = ADF per residence x Number of Residences x PF
270 GPD x 135 x 3
109,350 GPD / 1440 minutes/day
76.0 GPM

Per the Washoe County design standards, the minimum pipe size for the onsite collection mains will be **8-inch SDR 35 PVC pipe** and **4-inch SDR 35 PVC pipe** for residential laterals. The main will be constructed with a slope able to maintain 2.5 feet per second (fps) at half-full capacity and will have a depth of flow to diameter ratio (d/D) of less than 0.75D.

Hydraulic calculations for the proposed and existing flows and the impact to offsite sanitary sewer infrastructure is discussed in Section 4.2.

SECTION 3.2 Proposed Force Main

The force main will be sized to convey the minimum lift station pump discharge rate, equal to the design peak hour flow, within the required velocity range and with minimal friction head loss through the pipe. Friction head loss was calculated using the Hazen-Williams equation:

$$h_f = 10.67 \cdot \frac{L \cdot Q^{1.852}}{C^{1.852} \cdot D^{4.87}}$$

Where L is the length of the main in feet, D is the inside diameter of the main in inches, Q is the flow rate in gallons per minute, and C is the Hazen-Williams roughness coefficient. Friction loss and flow velocities for 4" – 8" DR 17 HDPE pipe (C=140) of the approximate force main length, of 120 feet are calculated as follows:

Nominal Pipe Size (in)	4"	6"	8"
Inside Diameter (in)	3.9	5.8	7.6
Friction Head Loss (ft)	0.52	0.08	0.02
Flow Velocity (fps)	2.0	0.9	0.5

To limit head loss and comply with force main velocity requirements, the force main will be **4-inch DR 17 HPDE Pipe**.

SECTION 3.3 Proposed Lift Station

The final lift station design and hydraulic analysis report will be developed at a later date due to further coordination needed with Washoe County Community Services Department, which will be the owner and operator of the lift station. The lift station will be designed in accordance with the Washoe County wastewater lift station design standards to service the fully developed subdivision, including being capable of pumping the design peak hour flow, and sizing the wet well and collection system to provide adequate emergency storage. The lift station will be equipped with solids handling submersible centrifugal pumps. The pumps will be 5 HP minimum. The lift station will also be equipped with a valve and meter vault, motor control center, SCADA controls, and standby diesel generator.

SECTION 4: Existing Sanitary Sewer Facilities

Section 4.1 Point of Connection and Existing Facilities

The Development will connect into the existing 12-inch PVC stub located in Echo Avenue approximately 100-feet west of the SA Automotive Warehouse located at 6645 Echo Ave. From Echo Avenue, flows continue east to the 18-inch PVC interceptor located in Moya Boulevard where they turn south and flow to the City of Reno lift station located on the corner of Moya Boulevard and Lear Boulevard (Lear Lift Station). The Lear Lift Station pumps directly into the Reno Stead Wastewater Reclamation Facility (RSWRF). Figure 3 depicts the point of connection, the adjacent sanitary sewer connections, and the existing sanitary sewer system in the vicinity of the Development.

Section 4.2 Existing Sanitary System Analysis

The existing downstream sanitary sewer infrastructure is owned and maintained by the City of Reno. As such, City of Reno design standards were utilized to calculate and determine the ability of the offsite sanitary sewer infrastructure to convey the flows from the Development. The City of Reno design standards require the analysis of the existing sanitary sewer system from the point of connection to the nearest major sanitary sewer interceptor.

The existing section of 12-inch PVC main in Echo Avenue flows west to east away from the Development site toward Moya Boulevard. The Echo Avenue collection main services the four (4) existing industrial parcels. Average daily flows from each parcel were calculated from sewer billing information obtained for each parcel from the month of October 1, 2023 through December 31, 2024. The average daily flow rate calculated from the sewer billing data is summarized below in ***Table 1***:

TABLE 1: EXISTING FLOW DATA

APN	Address	Average Gallons Per Day
090-040-18	12995 Echo Court	651 gpd
090-040-19	6645 Echo Avenue	1,948 gpd
090-040-30	6650 Echo Avenue	2,651 gpd
090-040-31	6640 Echo Avenue	1,015 gpd

The current peak hour flow imposed on the existing offsite gravity sewer from the four (4) parcels is calculated as follows:

PHF = Total ADF x 3
(651+1948+2651+1015) GPD x 3
18,795 GPD x 1440 minutes/day
13.1 GPM

The combined peak hour flow in the existing offsite gravity sewer from existing facilities and the Development is therefore **89 GPM.** The existing and proposed flows are conveyed via 12-inch SDR 35 PVC pipe to the 18-inch SDR 35 PVC interceptor in Moya Boulevrad. Section lengths, rim elevations, and structure depth data was obtained from the City of Reno Sewer and Drainage System Web viewer. Using the combined peak flow rate and the web-viewer data, the pipe slopes and depth of flow to diameter of pipe (d/D) ratios were calculated for each section of pipe between the point of connection for the development and the 18-inch Moya Boulevard interceptor. ***Table 2*** summarizes the data for the offsite infrastructure:

TABLE 2: OFFSITE SANITARY SEWER INFRASTRUCTURE

Section Number	Upstream MH ID	Downstream MH ID	Approximate Length (feet)	Slope (feet/feet)	Combined Peak Flow d/D
1	220436101	204336100	352	0.0033	0.25
2	204336100	220436112	12	0.017	0.16
3	220436112	220437100	158	0.0019	0.28
4	220437100	220437011	220	0.0043	0.23
5	220437011	220437010	97	0.0060	0.21
6	220437010	220437009	65	0.0063	0.21
7	220437009	220437106	124	0.0015	0.30
8	220437106	220437008	227	0.0042	0.23
9	220437008	220437004	349	0.0035	0.24

As shown in table 2, the depth of flow to diameter (d/D) ratio of the existing plus proposed peak flows will meet City of Reno design standards. A flow depth calculation sheet for each pipe section is attached in Appendix B.

Section 4.3 Wastewater Treatment

The Development is located within the Reno-Stead Water Reclamation Facility (RSWRF) sewer shed. Per the City of Reno website, the RSWRF recently completed a capacity expansion from 2 million gallons per day to 4 million gallons per day, however, the discharge limits will not increase until the completion of the Advanced Water Purification Project being designed and constructed by the Truckee Meadows Water Authority. According to the RSWRF Flow Allocation table, the remaining capacity at the RSWRF is 171,809 GPD or 1041 Equivalent Residential Units which is adequate capacity to accommodate the Development.

SECTION 5: Conclusions

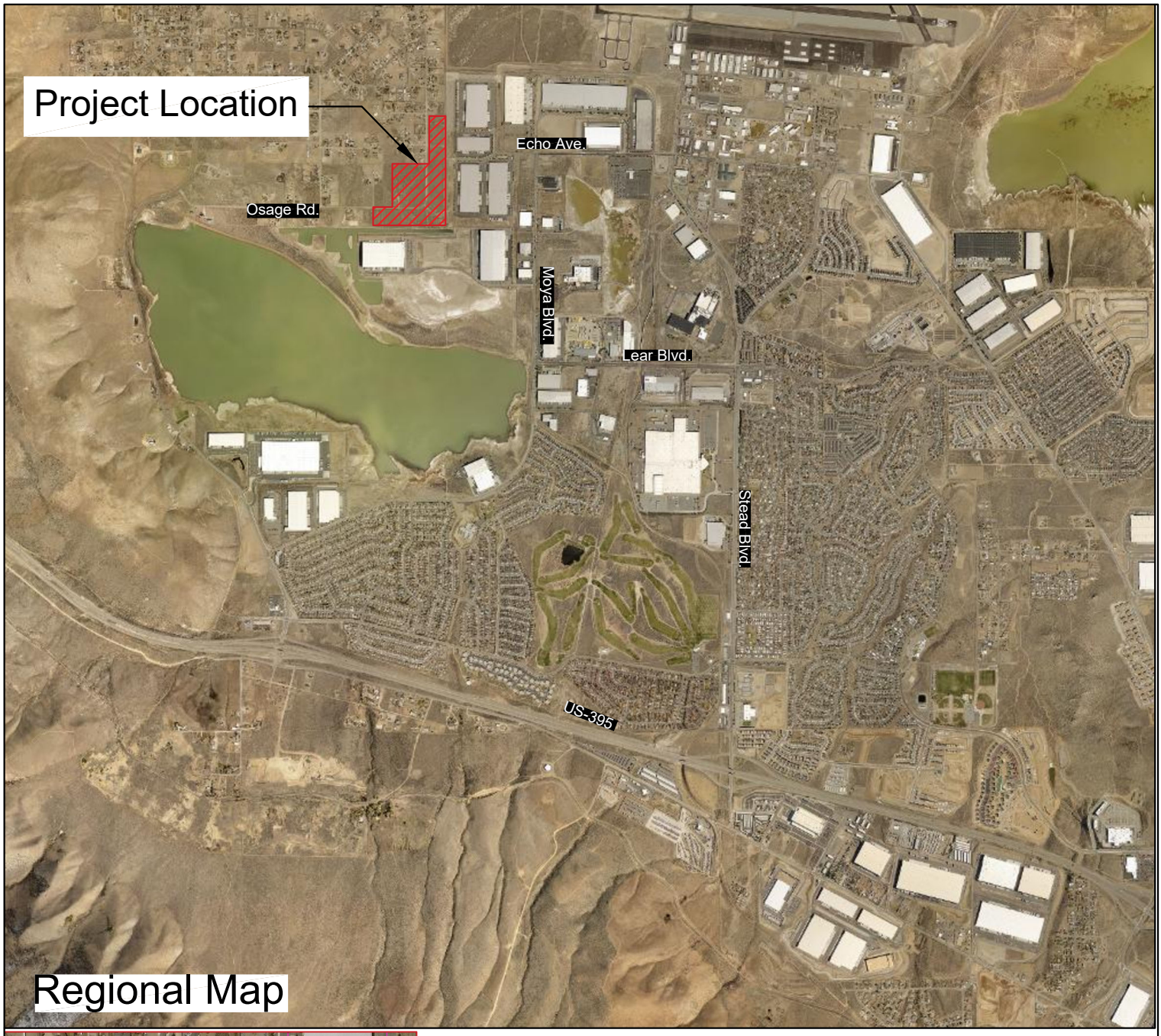
The Development currently consists of 135 residential units under the current zoning. The calculated maximum peak flow of 109,350 gpd (76.0 gpm). The proposed collection system to be constructed by the development will be designed and constructed in accordance with Washoe County Community Services Department Gravity Sewer Collection and Lift Station Design Standards.

The impact to the offsite sanitary sewer from the Development's peak flow was evaluated using the City of Reno Design standards. Through this analysis it was

determined that the existing 12-inch diameter collection main has adequate capacity to serve the existing flows plus the proposed flows generated by the Development.

APPENDIX A

Figure 1: Vicinity Map
Figure 2: On Site Sanitary Sewer Figure
Figure 3: Off Site Sanitary Sewer Figure



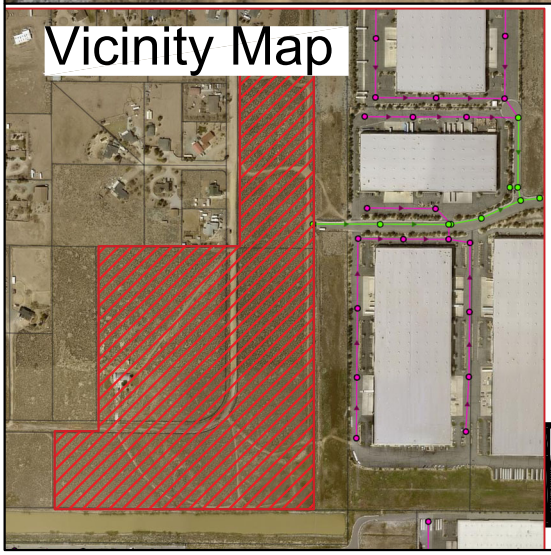


Figure 1: Vicinity Map
Osage Corner Subdivision

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N.T.S.

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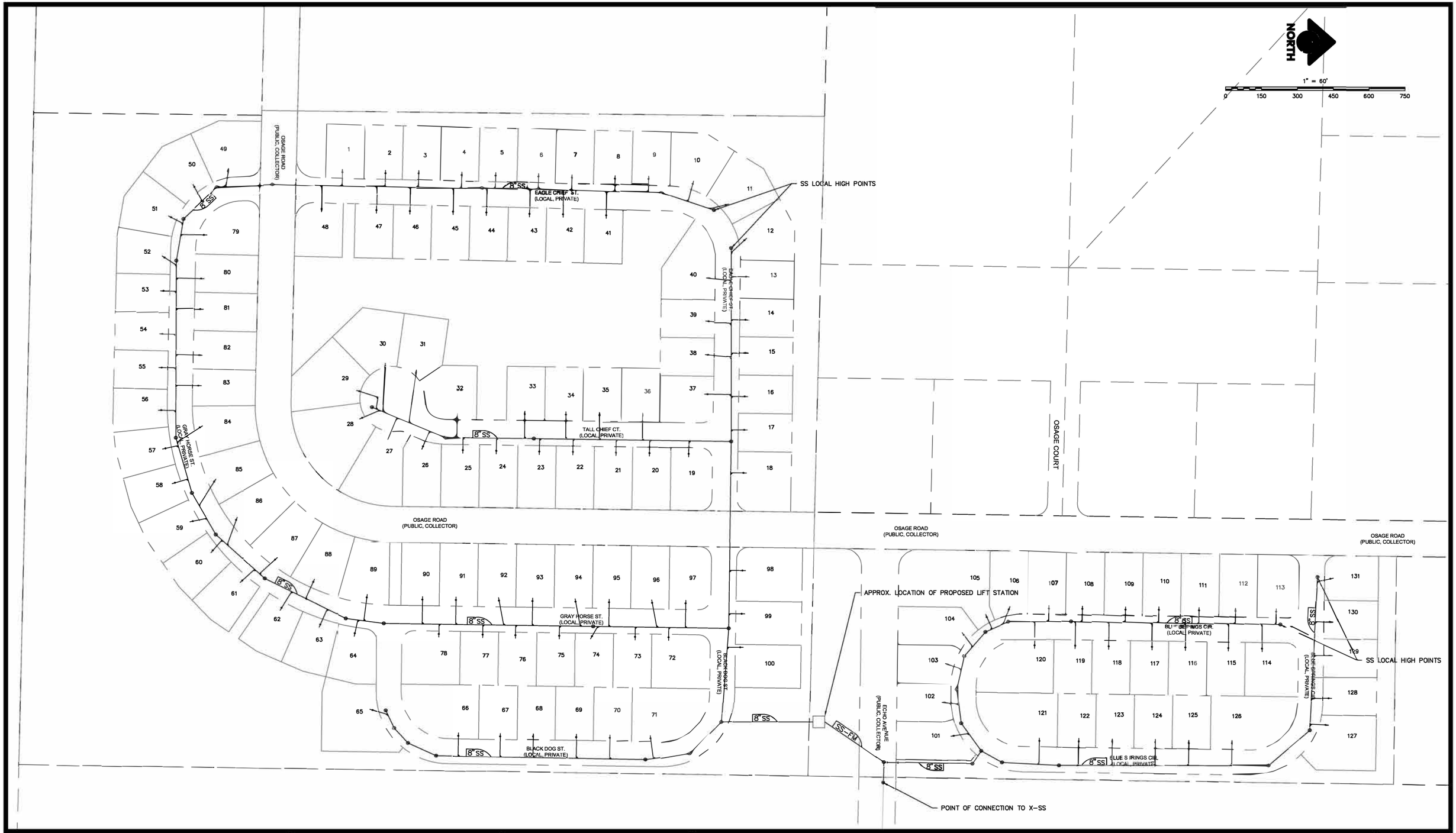

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SCALE: 1"=150'	DESIGNED BY:
JOB #:	CHECKED BY:
*	DRAWN BY: BGROVE
*	

OSAGE TENTATIVE MAP
SANITARY SEWER FIGURE

SHEET 1 OF 1

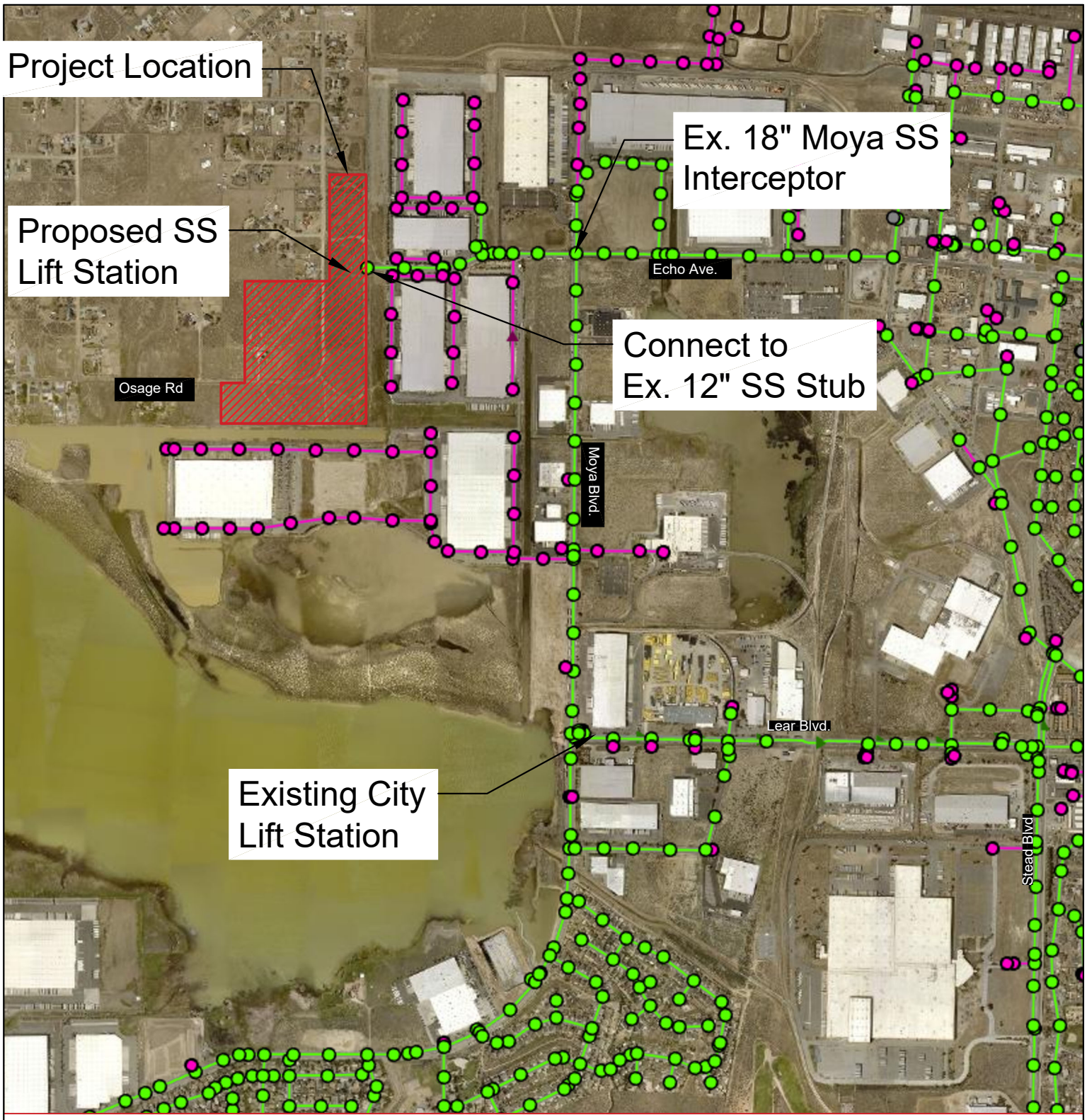

Figure 3: Offsite Sanitary Sewer

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APPENDIX B

Flow Depth Calculation Sheets

Pipe Flow Depth - d/D Calculation Sheet

Osage Corner Offsite Flows - Section 1

Inputs

Pipe Diameter, **D** = **12** in

Manning roughness, n_{full} = **0.014**

COR 0.014

Pipe Slope, **S** = **0.0033** ft/ft

Volumetric Flow Rate, **Q** = **89** gpm

Calculations

Pipe Diameter, **D** = **1.000** ft

Pipe radius, r = 0.500 ft

Volumetric Flow Rate, **Q** = **0.20** cfs

The Manning equation can be rearranged to:

$Q/(1.49*S^{1/2}) = (A*R^{2/3})/n$

$Q/(1.49*S^{1/2})$ = **2.317** (target value)

CALCULATE d/D

Normal Depth, **d**

d (ft)	h (ft)	θ (rad)	**A** (ft^2)
0.247	0.247	2.080	0.151

n	P (ft)	$(A*R^{2/3})/n$	Δ target
0.0180	1.040	**2.317**	0.000

Depth to Diameter Ratio (d/D)

d (ft)	**D (ft)**	**d/D**
0.247	1.000	**0.25**

Pipe Flow Depth - d/D Calculation Sheet

Osage Corner Offsite Flows - Section 2

Inputs

Pipe Diameter, **D** = **12** in

Manning roughness, $\mathbf{n_{full}}$ = **0.014**

COR 0.014

Pipe Slope, **S** = **0.0170** ft/ft

Volumetric Flow Rate, **Q** = **89** gpm

Calculations

Pipe Diameter, **D** = **1.000** ft

Pipe radius, r = 0.500 ft

Volumetric Flow Rate, **Q** = **0.20** cfs

The Manning equation can be rearranged to:

$Q/(1.49*S^{1/2}) = \mathbf{(A*R^{2/3})/n}$

$Q/(1.49*S^{1/2})$ = **1.021** (target value)

CALCULATE d/D

Normal Depth, **d**

d (ft)	h (ft)	θ (rad)	**A** (ft^2)
0.163	0.163	1.664	0.084

n	P (ft)	$\mathbf{(A*R^{2/3})/n}$	Δ target
0.0177	0.832	**1.021**	0.000

Depth to Diameter Ratio (d/D)

d (ft)	**D (ft)**	**d/D**
0.163	1.000	**0.16**

Pipe Flow Depth - d/D Calculation Sheet

Osage Corner Offsite Flows - Section 3

Inputs

Pipe Diameter, **D** = **12** in

Manning roughness, $\mathbf{n_{full}}$ = **0.014**

COR 0.014

Pipe Slope, **S** = **0.0019** ft/ft

Volumetric Flow Rate, **Q** = **89** gpm

Calculations

Pipe Diameter, **D** = **1.000** ft

Pipe radius, r = 0.500 ft

Volumetric Flow Rate, **Q** = **0.20** cfs

The Manning equation can be rearranged to:

$Q/(1.49*S^{1/2}) = \mathbf{(A*R^{2/3})/n}$

$Q/(1.49*S^{1/2})$ = **3.053** (target value)

CALCULATE d/D

Normal Depth, **d**

d (ft)	h (ft)	θ (rad)	**A** (ft^2)
0.284	0.284	2.249	0.184

n	P (ft)	$\mathbf{(A*R^{2/3})/n}$	Δ target
0.0180	1.125	**3.053**	0.000

Depth to Diameter Ratio (d/D)

d (ft)	**D (ft)**	**d/D**
0.284	1.000	**0.28**

Pipe Flow Depth - d/D Calculation Sheet

Osage Corner Offsite Flows - Section 4

Inputs

Pipe Diameter, **D** = **12** in

Manning roughness, $\mathbf{n_{full}}$ = **0.014**

COR 0.014

Pipe Slope, **S** = **0.0043** ft/ft

Volumetric Flow Rate, **Q** = **89** gpm

Calculations

Pipe Diameter, **D** = **1.000** ft

Pipe radius, r = 0.500 ft

Volumetric Flow Rate, **Q** = **0.20** cfs

The Manning equation can be rearranged to:

$Q/(1.49*S^{1/2}) = \mathbf{(A*R^{2/3})/n}$

$Q/(1.49*S^{1/2})$ = **2.029** (target value)

CALCULATE d/D

Normal Depth, **d**

d (ft)	h (ft)	θ (rad)	**A** (ft^2)
0.231	0.231	2.004	0.137

n	P (ft)	$\mathbf{(A*R^{2/3})/n}$	Δ target
0.0179	1.002	**2.029**	0.000

Depth to Diameter Ratio (d/D)

d (ft)	**D (ft)**	**d/D**
0.231	1.000	**0.23**

Pipe Flow Depth - d/D Calculation Sheet

Osage Corner Offsite Flows - Section 5

Inputs

Pipe Diameter, **D** = **12** in

Manning roughness, $\mathbf{n_{full}}$ = **0.014**

COR 0.014

Pipe Slope, **S** = **0.0060** ft/ft

Volumetric Flow Rate, **Q** = **89** gpm

Calculations

Pipe Diameter, **D** = **1.000** ft

Pipe radius, r = 0.500 ft

Volumetric Flow Rate, **Q** = **0.20** cfs

The Manning equation can be rearranged to:

$Q/(1.49*S^{1/2}) = \mathbf{(A*R^{2/3})/n}$

$Q/(1.49*S^{1/2})$ = **1.718** (target value)

CALCULATE d/D

Normal Depth, **d**

d (ft)	h (ft)	θ (rad)	**A** (ft^2)
0.212	0.212	1.914	0.122

n	P (ft)	$\mathbf{(A*R^{2/3})/n}$	Δ target
0.0179	0.957	**1.718**	0.000

Depth to Diameter Ratio (d/D)

d (ft)	**D (ft)**	**d/D**
0.212	1.000	**0.21**

Pipe Flow Depth - d/D Calculation Sheet

Osage Corner Offsite Flows - Section 6

Inputs

Pipe Diameter, **D** = **12** in

Manning roughness, $\mathbf{n_{full}}$ = **0.014**

COR 0.014

Pipe Slope, **S** = **0.0063** ft/ft

Volumetric Flow Rate, **Q** = **89** gpm

Calculations

Pipe Diameter, **D** = **1.000** ft

Pipe radius, r = 0.500 ft

Volumetric Flow Rate, **Q** = **0.20** cfs

The Manning equation can be rearranged to:

$Q/(1.49*S^{1/2}) = \mathbf{(A*R^{2/3})/n}$

$Q/(1.49*S^{1/2})$ = **1.677** (target value)

CALCULATE d/D

Normal Depth, **d**

d (ft)	h (ft)	θ (rad)	**A** (ft^2)
0.209	0.209	1.902	0.119

n	P (ft)	$\mathbf{(A*R^{2/3})/n}$	Δ target
0.0179	0.951	**1.677**	0.000

Depth to Diameter Ratio (d/D)

d (ft)	**D (ft)**	**d/D**
0.209	1.000	**0.21**

Pipe Flow Depth - d/D Calculation Sheet

Osage Corner Offsite Flows - Section 7

Inputs

Pipe Diameter, **D** = **12** in

Manning roughness, $\mathbf{n_{full}}$ = **0.014**

COR 0.014

Pipe Slope, **S** = **0.0015** ft/ft

Volumetric Flow Rate, **Q** = **89** gpm

Calculations

Pipe Diameter, **D** = **1.000** ft

Pipe radius, r = 0.500 ft

Volumetric Flow Rate, **Q** = **0.20** cfs

The Manning equation can be rearranged to:

$Q/(1.49*S^{1/2}) = \mathbf{(A*R^{2/3})/n}$

$Q/(1.49*S^{1/2})$ = **3.436** (target value)

CALCULATE d/D

Normal Depth, **d**

d (ft)	h (ft)	θ (rad)	**A** (ft^2)
0.302	0.302	2.328	0.200

n	P (ft)	$\mathbf{(A*R^{2/3})/n}$	Δ target
0.0180	1.164	**3.436**	0.000

Depth to Diameter Ratio (d/D)

d (ft)	**D (ft)**	**d/D**
0.302	1.000	**0.30**

Pipe Flow Depth - d/D Calculation Sheet

Osage Corner Offsite Flows - Section 8

Inputs

Pipe Diameter, **D** = **12** in

Manning roughness, $\mathbf{n_{full}}$ = **0.014**

COR 0.014

Pipe Slope, **S** = **0.0042** ft/ft

Volumetric Flow Rate, **Q** = **89** gpm

Calculations

Pipe Diameter, **D** = **1.000** ft

Pipe radius, r = 0.500 ft

Volumetric Flow Rate, **Q** = **0.20** cfs

The Manning equation can be rearranged to:

$Q/(1.49*S^{1/2}) = \mathbf{(A*R^{2/3})/n}$

$Q/(1.49*S^{1/2})$ = **2.054** (target value)

CALCULATE d/D

Normal Depth, **d**

d (ft)	h (ft)	θ (rad)	**A** (ft^2)
0.232	0.232	2.011	0.138

n	P (ft)	$\mathbf{(A*R^{2/3})/n}$	Δ target
0.0179	1.005	**2.054**	0.000

Depth to Diameter Ratio (d/D)

d (ft)	**D (ft)**	**d/D**
0.232	1.000	**0.23**

Pipe Flow Depth - d/D Calculation Sheet

Osage Corner Offsite Flows - Section 9

Inputs

Pipe Diameter, **D** = **12** in

Manning roughness, $\mathbf{n_{full}}$ = **0.014**

COR 0.014

Pipe Slope, **S** = **0.0035** ft/ft

Volumetric Flow Rate, **Q** = **89** gpm

Calculations

Pipe Diameter, **D** = **1.000** ft

Pipe radius, r = 0.500 ft

Volumetric Flow Rate, **Q** = **0.20** cfs

The Manning equation can be rearranged to:

$Q/(1.49*S^{1/2}) = \mathbf{(A*R^{2/3})/n}$

$Q/(1.49*S^{1/2})$ = **2.250** (target value)

CALCULATE d/D

Normal Depth, **d**

d (ft)	h (ft)	θ (rad)	**A** (ft^2)
0.243	0.243	2.063	0.148

n	P (ft)	$\mathbf{(A*R^{2/3})/n}$	Δ target
0.0180	1.031	**2.249**	0.000

Depth to Diameter Ratio (d/D)

d (ft)	**D (ft)**	**d/D**
0.243	1.000	**0.24**