Prepared For:

UPPER TRINITY
REGIONAL WATER DISTRICT

LAKE RALPH HALL



WATER AND WASTEWATER MASTER PLAN



April 2025

STATE OF TEXAS
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DEFINITIONS

The following terms are used throughout this report. The definitions may provide the reader a better understanding of the subtle difference between several of these terms.

Average Day Demand (ADD) – Annual water consumption divided by the number of days in a year. The average daily water demand is the average water demand a system experiences over a one-day period. Typically measured in units of Million Gallons Per Day (MGD).

Certificate of Convenience and Necessity (CCN) – This is a state defined and certified geographic area granting its owner exclusive rights to provide water and wastewater service within its designated boundary.

Collector – Wastewater collector lines typically consist of smaller piping that have direct service connections.

Connection – A single family residential unit or each commercial and industrial establishment to which drinking water is supplied from the system.

Demand (Consumption) – Volume of water used for a given time period, typically measured in units of Million Gallons Per Day (MGD) or Gallons Per Minute (gpm).

Dry Weather – A period of time during which no rainfall occurs. No rainfall influenced inflow and infiltration into the wastewater system is expected during this time.

Force Main - A pressurized wastewater pipe that conveys wastewater under pressure from the discharge side of the pump.

Interceptor – Larger wastewater lines that collect flow from other wastewater lines and have no direct service connections.

Lift Station – A lift station is a pumping station that moves wastewater from a lower elevation to a higher elevation.

Maximum Day Demand (MDD) – Water consumption, in volume of water, used on the highest consumption day in a year. Typically measured in units of Million Gallons Per Day (MGD) or Gallons Per Minute (gpm)

Peak Hour Demand (PHD) – The maximum one-hour water demand that a system experienced or is anticipated to experience during a particular year or other time period. Typically measured in units of Million Gallons Per Day (MGD) or Gallons Per Minute (gpm).

Peaking Factors – A peaking factor is applied to the average day demand to determine maximum day demand in water applications. An additional peaking factor is then applied to the maximum day demand to determine peak hour demand. In wastewater applications, the peaking factor is a factor applied to the average day flow to determine wet weather flow conditions.

Pressure Plane – A network of water pipes having a common pressure range; each plane may be separated from the other planes by closed valves or pressure-regulating valves and have separate pump stations and storage facilities.

Wet Weather – A period of time during which rainfall occurs. Rainfall-influenced inflow and infiltration into the wastewater system is expected during this time.

1.0 EXECUTIVE SUMMARY

Upper Trinity Regional Water District ("UTRWD") retained Kimley-Horn and Associates, Inc. ("Kimley-Horn") to develop a Water Master Plan ("WMP") and a Wastewater Master Plan ("WWMP") to provide systematic upgrades and expansions for water and wastewater infrastructure around the proposed Lake Ralph Hall ("LRH") reservoir. The scope of this study was to plan for infrastructure within the LRH Zoning Boundary which is defined as the land within 5,000 feet of the proposed reservoir's anticipated shoreline.

This document's goal is to serve as an infrastructure planning resource for water and wastewater providers within the LRH Zoning Boundary. It does not provide a defined planning period for proposed water and wastewater projects since the rate of future development around LRH is unknown. Instead, this document estimates a "likely buildout scenario" for land around the lake by using future land use parcels, duty factors developed for water demand/wastewater flow generation and considering the likelihood of parcels to develop. Infrastructure was then sized and planned for an interim demand scenario; this interim scenario is a reduction of the likely buildout scenario developed by UTRWD and Kimley-Horn to represent a feasible first phase of infrastructure to construct. It is recommended that this study be updated every 5 or 10 years as development occurs so that there is always an adequate master plan in place.

Future demand projections within the Zoning Boundary were determined based on land use and parcel acreage provided via Geographic Information System ("GIS") data obtained from UTRWD. Through coordination with UTRWD and analysis of another similar north Texas lakeside community, Kimley-Horn developed separate duty factors for "high season" and "low season" to represent transient population, since lakeside communities typically see a significant fluctuation in both occupancy rate and capita per household due to the population influx during summer months and holiday weekends. **Table 1.01** summarizes the duty factor developed for each future land use.

TABLE 1.01 – AVERAGE DAY DUTY FACTOR SUMMARY

Future Land Use Category	Water "Low Season" Duty Factor (Gal/acre)	Water "High Season" Duty Factor (Gal/acre)	Wastewater "Low Season" Duty Factor (Gal/acre)	Wastewater "High Season" Duty Factor (Gal/acre)
Rural Residential	26.5	74	21	59
Large Lot Residential	97	269.5	78	216
Medium Lot Residential	194	539	155	431
Lake Commercial	480	784	384	627
General Commercial	480	784	384	627
City of Ladonia	1,210	1,210	968	968
Institutional	150	150	120	120

Using the water and wastewater duty factors established in this report, the average day water demand and wastewater loading for each parcel was calculated by using the following formula:

(Duty Factor) * (Parcel Acreage) * (% Developable) = Average Day Demand/Flow

For the WMP, the Zoning Boundary overlaps with six (6) existing public water systems. A steady state hydraulic model was prepared for each provider using data gathered from meetings with each water supplier, record information, Texas Commission on Environmental Quality ("TCEQ") Drinking Water Watch data, and system maps. Future land use demands were modeled under average day, max day, and peak hourly demand scenarios.

Projected connection counts for each provider including new connections based on zoning boundary development densities, existing connection counts, and (only for Ladonia and McCraw Chapel with more than half of their CCN within the zoning boundary) extrapolated growth unit counts outside the zoning boundary but inside the CCN. Using TCEQ minimum capacity criteria, elements of each water system, including supply, pumping, ground storage, elevated storage, and piping were evaluated against established design criteria. **Table 1.02** summarizes the additional facility requirements for each existing water provider.

TABLE 1.02 – INTERIM SCENARIO WATER CAPACITY SUMMARY

Provider	Additional Water Supply Required (MGD)	Additional EST Capacity Required (gal)*	Additional Pressure Tank Capacity Required (gal)	Additional Total Storage Required (gal)	Additional Pumping Capacity Required (MGD)
City of Ladonia	0.49	0.05	-	-	-
Gober MUD	-	-	-	-	-
Bartley Woods WSC	-	-	620	1,200	-
Dial WSC	0.03	-	200	-	-
McCraw Chapel WSC	0.81	-	21,020	210,200	1.37**
North Hunt SUD	-	-	-		-

*EST = Elevated Storage Tank
**Represents firm pumping capacity and not total pumping capacity.

For the WWMP, the City of Ladonia is the only existing wastewater service provider within the Zoning Boundary. Kimley-Horn evaluated a regional planning approach for this study, which assumes that a future regional wastewater provider will develop centralized wastewater systems on the north and west shorelines of LRH, and the City of Ladonia will serve as the regional wastewater provider on the south shoreline. Kimley-Horn separated the Zoning Boundary into four (4) wastewater service areas consisting of a total of seventeen (17) major drainage basins to plan for future wastewater infrastructure. **Table 1.03** summarizes the flows and treatment plant size required for each proposed wastewater service area.

TABLE 1.03 – INTERIM SCENARIO WASTEWATER TREATMENT PLANT SIZES

Wastewater Service Area	Interim Average Dry Day Flow (MGD)	Interim Peak Wet Weather Flow (MGD)	Proposed Treatment Plant Size (MGD)
South (Ladonia)	0.45	1.81	0.70
Northwest	0.25	1.02	0.40
Northeast	0.08	0.33	0.125
West	0.01	0.05	0.02

2.0 INTRODUCTION

2.1 OBJECTIVE

Upper Trinity Regional Water District ("UTRWD") retained Kimley-Horn and Associates, Inc. ("Kimley-Horn") to develop a Water Master Plan ("WMP") and Wastewater Master Plan ("WWMP") to provide systematic upgrades and expansions for water and wastewater infrastructure around the proposed Lake Ralph Hall reservoir ("LRH") to serve future development within the Zoning Boundary. LRH will be located directly north of the City of Ladonia within Fannin County, Texas.

This document's goal is to serve as an infrastructure planning resource for water and wastewater providers within the LRH Zoning Boundary. It does not provide a defined planning period for proposed water and wastewater projects since the rate of future development around LRH is unknown. Instead, this document estimates a "likely buildout scenario" for land around the lake by utilizing future land use parcels and considering the likelihood of parcels to develop. Infrastructure was sized and planned for an interim demand scenario; this interim scenario is a reduction of the likely buildout scenario developed by UTRWD and Kimley-Horn to represent a feasible first phase of infrastructure to construct.

2.2 SCOPE

The scope of this study relating to both the WMP and WWMP is to:

- Develop water demand and wastewater loads projections within the LRH Zoning Boundary and associated water and wastewater duty factors for approved future land use categories.
- Evaluate peaking factors for water demand and wastewater loading by researching similar historical uses.
- Incorporate developed water and wastewater duty factors and peaking factors into water and wastewater models to evaluate and size the necessary facilities to serve future developments under buildout and interim demand scenarios.

2.3 ZONING BOUNDARY

The Zoning Boundary is defined as the area within 5,000 feet of the reservoir's anticipated shoreline. See **Exhibit A** for an illustration of the Zoning Boundary. It is anticipated that the proposed LRH will drive significant development within the Zoning Boundary, increasing water demands and wastewater loads in the area. The entire Zoning Boundary encompasses an area totaling 35,658 acres, of which 7,561 acres will become the proposed reservoir and 28,097 acres will make up the surrounding land. Future demands from developments that are outside of the Zoning Boundary but within a utility provider's Certificate of Convenience and Necessity ("CCN") boundary was considered to appropriately size future infrastructure around LRH. However, infrastructure outside of the Zoning Boundary was not proposed as part of this study unless it is required to serve parcels within the Zoning Boundary.

LEGEND

Utility Provider

- Existing Water CCN Boundary
- Assumed Water CCN Boundary
- North Hunt SUD Limits
- Ladonia Water Limits
- Gober MUD Limits
- Bartley Woods WSC Limits
- McCraw Chapel WSC Limits
- Dial WSC Limits
- No Existing Provider

Map Features

- Ladonia City Limits
- 5,000' Zoning Boundary
- Lake Ralph Hall Limits
- Pipeline Easement
- 100-Year Floodplain
- Leon Hurse Dam
- Roadway
- Stream

Note:
1. Bartley Woods WSC and Gober MUD have no formal boundary, so a service boundary based on existing water infrastructure was assumed.

5000' LAKE ZONING BOUNDARY

Bartley Woods WSC[1]

McCraw Chapel WSC

Dial WSC

Gober MUD[1]

North Hunt SUD

City of Ladonia

LAKE RALPH HALL CONSERVATION POOL 551 MSL

LEON HURSE DAM

LADONIA CITY LIMITS

RAW WATER PIPELINE EASEMENT

FM 1550 · FM 2990 · FM 68 · FM 64 · FM 2456 · FM 3568

CR 3340 · CR 3360 · CR 3241 · CR 3350 · CR 3375 · CR 3395 · CR 3370 · CR 3355 · CR 3380 · CR 3635 · CR 3640 · CR 3545 · CR 3940 · CR 3935 · CR 3735

State Highway 34 · State Highway 50

Rabbs Creek · Bonds Creek · Pecan Bend Creek · Ledgers Branch · Allen Creek · Long Branch · Hedrick Branch · Baker Creek · North Sulphur River

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Kimley»Horn

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January 2025

Zoning Boundary Map
Lake Ralph Hall
Water/Wastewater Master Plan

LAKE RALPH HALL

A

3.0 LAND USE & DUTY FACTOR DEVELOPMENT

3.1 LAND USE

Kimley-Horn derived future land use categories from the previously completed comprehensive plan and the zoning districts outlined in the *2023 Fannin County Lake Ralph Hall Zoning Regulations*. A brief description of each land use type is provided in **Table 3.01**.

TABLE 3.01 – LAND USE SUMMARY

Zoning District*	Future Land Use Category	Description
Agriculture & Ranching	**Rural Residential**	Land that is intended for agriculture and ranching operations and the development of rural single-family houses on lots not less than five (5) acres.**
Rural Estate Single-Family	**Large Lot Residential**	Land that is intended for the development of single-family houses on lots not less than one (1) acre.
Low Density Single-Family	**Medium Lot Residential**	Land that is intended for the development of single-family houses on lots not less than one-half (1/2) acre.
Lake Commercial	**Lake Commercial**	Land that is intended for the development of retail uses, consumer services, regional lake attractions, and supporting residential functions.
Retail & Commercial	**General Commercial**	Land that is intended for the development of retail uses, consumer services, and supporting residential functions.
City of Ladonia	**City of Ladonia**	Land that is within the city limits of Ladonia and can feature both residential and commercial use. It assumes demands equivalent to six (6) households per acre.
-	**Institutional**	Land that is intended for churches, infrastructure facilities, and cemeteries outside of the City of Ladonia.
Lake Operations District	**UTRWD Riparian**	Land that is owned by UTRWD and is intended for operations and protection of the shoreline.
Government Conservation	**Government Ownership**	Land that is intended for the conservation of public land (federal, state, and local government properties) surrounding the lake which can be used for camping, hunting, or other recreational activities.
-	**Reservoir Facility**	Land that is occupied by the Leon Hurse Dam, which will impound LRH, and its associated facilities.
Right-of-Way	**Right-of-Way**	Land that is intended for transportation and utility purposes such as major highways, public roadways, pipelines, and other types of easements.

*Official Zoning Districts from the adopted *2023 Fannin County Lake Ralph Hall Zoning Regulations.*
**The *2023 Fannin County Lake Ralph Hall Zoning Regulations* listed this zoning district as having a single-family household for every three (3) acres but was increased to every five (5) acres for this study.

The future land use map and the added planned developments can be found on **Exhibit B**.

LEGEND

Future Land Use

- City of Ladonia
- General Commercial
- Government Ownership
- Institutional
- Lake Commercial
- Large Lot Residential
- Medium Lot Residential
- Right of Way
- Reservoir Facility
- Rural Residential
- UTRWD Riparian

Map Features

- Ladonia City Limits
- 5,000' Zoning Boundary
- Lake Ralph Hall Limits
- Pipeline Easement
- 100-Year Floodplain
- Leon Hurse Dam
- Roadway
- Stream

5000' LAKE ZONING BOUNDARY

LEON HURSE DAM

LAKE RALPH HALL
CONSERVATION POOL
551 MSL

RAW WATER PIPELINE EASEMENT

LADONIA CITY LIMITS

FM 1550
CR 3440
State Highway 34
FM 1550
Rabbs Creek
Davis Creek
Rabbs Creek
CR 3375
CR 3365
Leggets Branch
CR 3370
FM 2990
CR 3360
CR 3340
Rabbs Creek
CR 3341
Bois D'Arc Creek
CR 3350
FM 68
Allen Creek
North Sulphur River
CR 3735
Long Creek
CR 3355
CR 3380
CR 3395
FM 2990
CR 3640
Roberts Branch
CR 3655
CR 3645
CR 3650
FM 64
Country Ln
Fowler Ln
Shelby Ln
Stevens
Wilson
Elliot
Bonham
W Main
Mill
Depot
Church
Jackson
Cole
Taylor
Eastman
E Main
Paris
Redner
Store
1st
2nd
3rd
4th
Park
Commerce
McFarland
South
Kean
State Highway 34
CR 3940
State Highway 50
FM 2456
CR 3935
North Sulphur River

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Kimley»Horn

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January 2025

Future Land Use Map
Lake Ralph Hall
Water/Wastewater Master Plan

LAKE RALPH HALL

B

3.2 DEMAND PROJECTIONS

RESIDENTIAL DEVELOPMENT DENSITY

Future demand projections within the Zoning Boundary were determined based on future land use and parcel acreage provided via GIS data obtained from UTRWD. Additionally, separate "high season" and "low season" criteria were assumed for occupancy rate and capita per household to represent transient population.

The following descriptions and **Table 3.02** summarize the factors used to determine the capita per acre for each land use type:

Households per acre - Represents the density of the land use type represented by the number of households per acre. Households per acre were derived from the future land use descriptions outlined in **Table 3.01**.

Capita per Household - Number of people per household, varies throughout the year. It was assumed that the influx of residents and guests during the high season will increase the average number of people living within a given household.

Occupancy Rate - Proportion of residents that are occupying their homes at a given time. The high season value of 98% was incorporated from the Comprehensive Plan, while the low season value of 60% was determined through engineering judgement and coordination with UTRWD. The "City of Ladonia" and "institutional" future land use categories were projected to have constant occupancy rate and capita per household values due to its assumed stable year-round inhabitance.

Undevelopable Area Reduction - Represents the proportion of land that is unable to be developed due to the presence of right-of-way, steep grades, public parks, or other factors that will prevent development. Percentages were determined through engineering judgement and coordination with UTRWD.

TABLE 3.02 – DUTY FACTOR ASSUMPTIONS

Future Land Use	Maximum Lots per Acre	Capita Per Household	Occupancy Rate	Undevelopable Area Reduction
Rural Residential	0.20	2.94 / 5	60% / 98%	25%
Large Lot Residential	1	2.94 / 5	60% / 98%	45%
Medium Lot Residential	2	2.94 / 5	60% / 98%	45%
City of Ladonia	6	2.94	98%	30%
Lake Commercial	-	-	60% / 98%	20%
General Commercial	-	-	60% / 98%	20%
Institutional	1	1	100%	-

*Low season criteria are shown in **black**, high season criteria is shown in **blue**

PERCENT DEVELOPABLE FACTOR

A percent developable factor ("% Developable") was used to represents desirability and likelihood of specific demand-incurring parcels (parcels with duty factors greater than zero) to develop by taking into account a parcel's proximity to the lake shoreline, geography within the Zoning Boundary, and known developer interest. Parcels were either categorized as "100% developable" or "50% developable".

The percent developable factor is separate from the 'undevelopable area reduction' factor listed in **Table 3.02.** The undevelopable area reduction factor was a component of creating future land use duty factors for water demand/wastewater flow generation; this factor applies to all parcels of the same land use category to account for factors that make development difficult, such as variable terrain which limits lot space available for structures, right-of-way ("ROW") allocation within a property, surface drainageways, open spaces such as pocket parks or common landscape areas incorporated into developments, and the infeasibility of every lot area matching the minimum lot size of the land use.

The percent developable factor applies to specific desirable parcels to account for likelihood of development. Through analysis of lakeside communities along Possum Kingdom Lake, Kimley-Horn determined that parcels within 1,000 feet of the lake shoreline, excluding tributaries and floodplain, have a high likelihood of full development. Therefore, this study assumes that the development pattern around LRH will prioritize developments that are closer in proximity to the lake shoreline. This study assumes that all demand-incurring parcels inside a 1,000-foot buffer, as well as all lake commercial parcels on the eastern side of the lake, will be 100% developable. Additionally, general commercial, medium lot residential, institutional, and the City of Ladonia future land use parcels were assumed to be 100% developable. Several properties with existing developer interest on the northeastern and southwestern shorelines of LRH were also designated as 100% developable.

All remaining parcels with an associated demand were assigned a 50% developable designation, as it was deemed unlikely that they will fully develop to maximum density. A percent developable map can be found in **Exhibit C**.

The equation below indicates how water demands and wastewater flows were calculated:

(Duty Factor) * (Parcel Acreage) * (% Developable) = Average Day Demand/Flow

Here, Average Day Demand/Flow represents either the High Season Average Day (i.e. typical High Season Day) or Low Season Average Day (i.e. typical Low Season Day) demand or flow depending on what water/wastewater duty factor is used in the equation. Duty factor development is discussed in the following sections.

Finally, the equation above was used to develop buildout water demands and wastewater flows. These flows were then reduced to develop an interim scenario developed by UTRWD and Kimley-Horn to represent a feasible first phase of infrastructure to construct. See Interim Demand Scenario section.

Percent Developable Map
Lake Ralph Hall
Water/Wastewater Master Plan

Kimley»Horn

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Feet

January 2025

C

LEGEND

Future Land Use
- City of Ladonia
- General Commercial
- Government Ownership
- Institutional
- Lake Commercial
- Large Lot Residential
- Medium Lot Residential
- Right of Way
- Reservoir Facility
- Rural Residential
- UTRWD Riparian

Map Features
- Ladonia City Limits
- 5,000' Zoning Boundary
- Lake Ralph Hall Limits
- Pipeline Easement
- 100-Year Floodplain
- Zero Demand Area
- 50% Developable Area
- 100% Developable Area
- Leon Hurse Dam
- Roadway
- Stream

5000' LAKE ZONING BOUNDARY

LEON HURSE DAM

RAW WATER PIPELINE EASEMENT

LADONIA CITY LIMITS

LAKE RALPH HALL
CONSERVATION POOL
551 MSL

FM 1550
CR 3440
FM 1569
CR 3375
CR 3360
CR 3340
CR 3341
CR 3350
FM 68
CR 3735
CR 3355
CR 3380
CR 3395
CR 3640
CR 3595
CR 3630
CR 3590
FM 69
FM 1566
State Highway 34
State Highway 50
CR 3940
FM 2456
CR 3935

Rabbs Creek
Rabbs Creek Tributary
Rabbs Creek Tributary 2
Rabbs Creek Tributary 3
Rabbs Creek Tributary 4
Rabbs Creek Tributary 5
Rabbs Creek Tributary 6
Rabbs Creek Tributary 7
Rabbs Creek Tributary 8
Rabbs Creek Tributary 9
Rabbs Creek Tributary 10
Rabbs Creek Tributary 11
Rabbs Creek Tributary

SEASONAL DUTY FACTORS

Separate "high season" and "low season" duty factors were developed to represent transient population since it is anticipated to see a significant increase in water demand during summer months and holidays due to the surrounding communities being comprised largely of lakeside vacation homes. Communities with a high proportion of vacation homes typically see a significant fluctuation in both occupancy rate and capita per household. To accurately project LRH demands, it was deemed necessary to develop separate duty factors for each scenario rather than use TCEQ assumed peaking factors that are used for a residential community with stable inhabitance.

WATER DEMAND

Water demand was assumed on a per-capita basis for residential and City of Ladonia land use parcels, and a per-acre basis for commercial land use parcels.

Per Capita Water Demand – A per-capita water demand basis calculates the water duty factor by including the amount of water a single person (aka capita) will require. The water duty factor for a per-capita basis is calculated using the following formula:

Water Duty Factor = (Households per Acre) * (Capita per Household) * (Occupancy Rate) * (Per Capita Water Demand) * (1 – Undevelopable Area Reduction)

For residential future land use parcels, 100 gallons per capita per day ("gpcpd") was assumed based on engineering judgment and coordination with UTRWD. For institutional future land use parcels, one occupant utilizing 150 gpd of average day water demand was assumed.

Per Acre Water Demand – A per-acre water demand basis calculates the water duty factor by including the amount of water an acre of land will require. The water duty factor for a per-acre basis is calculated using the following formula:

Water Duty Factor = (Occupancy Rate) * (Per-Acre Duty Factor) * (1 – Undevelopable Area Reduction)

For future land uses without an assumed density factor, an average day water demand per acre of developable land was assumed. Lake commercial and general commercial future land use parcels assumed 1,000 gpd per acre based on engineering judgment and evaluation of similar land uses.

PEAKING FACTOR DEVELOPMENT

Through correspondence with the Brazos River Authority, Kimley-Horn obtained 2022 and 2023 water demand data for Possum Kingdom Water Supply Corporation ("PKWSC"). PKWSC is located along Possum Kingdom Lake west of Fort Worth, with the makeup of the community largely comprising of lakeside vacation homes.

Possum Kingdom Lake and the proposed LRH are both located in north Texas and are a similar distance away from the Dallas-Fort Worth Metroplex. Due to these similarities, Kimley-Horn utilized the PKWSC demand data as a reference to support the development of water peaking factors for LRH to accurately represent the buildout water demands of the lakeside community.

To analyze the PKWSC demand data, January and February were chosen to be analyzed as "low season" and June through August as "High Season". PKWSC 2022 and 2023 demand data can be seen in **Figure 1** and **Table 3.03**, with demand values being given in GPD.

FIGURE 3.01 – POSSUM KINGDOM WSC DEMANDS

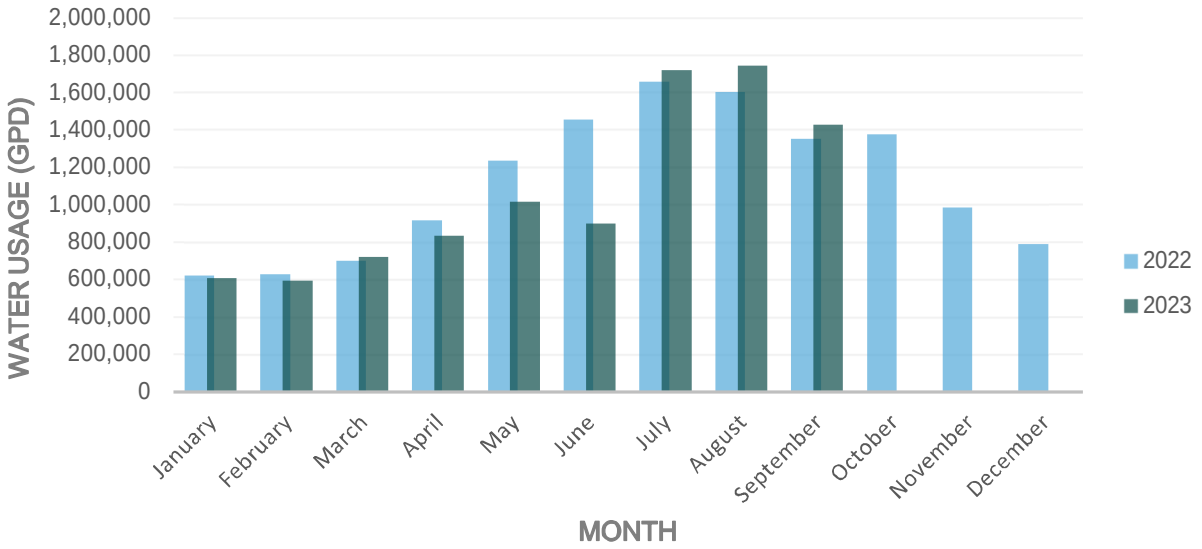


TABLE 3.03 – POSSUM KINGDOM WSC DEMAND SUMMARY

Year	Average "Low" Season Demand (GPD)	Average "High" Season Demand (GPD)	Max Day Demand (GPD)	Average Day Demand (GPD)
2022	624,898	1,569,142	2,299,987	1,102,504
2023	591,406	1,458,230	2,048,006	-

For max day LRH water demand, a "high" season average to MDD peaking factor of **1.435** was derived from PKWSC data by dividing the annual maximum day demand by the average "high" season demand for both 2022 and 2023 and averaging the two values.

WASTEWATER LOADS

For wet weather wastewater flow, a peaking factor of **4.0** times the "high" season average day demand was assumed per TCEQ §217.32 due to the lack of site-specific data.

Table 3.04 calculates the "high season" and "low season" water and wastewater duty factors. Wastewater duty factors were assumed to be 80% of water duty factors.

TABLE 3.04 – FUTURE LAND USE DUTY FACTORS

Future Land Use	Households Per Acre	Capita Per Household	Occupancy Rate	Per Capita Water Demand (GPD/Capita)	Per Acre Duty Factor (GPD/Acre)	Undevelopable Area Reduction	Water Duty Factor (GPD/acre)	Wastewater Duty Factor (GPD/acre)
Rural Residential	0.20	2.94 / 5	60% / 98%	100	-	25%	**26 / 74**	**21 / 59**
Large Lot Residential	1	2.94 / 5	60% / 98%	100	-	45%	**97 / 270**	**78 / 216**
Medium Lot Residential	2	2.94 / 5	60% / 98%	100	-	45%	**194 / 539**	**155 / 431**
City of Ladonia	6	2.94	98%	100	-	30%	**1,210**	**968**
Lake Commercial	-	-	60% / 98%	-	1,000	20%	**480 / 784**	**384 / 627**
General Commercial	-	-	60% / 98%	-	1,000	20%	**480 / 784**	**384 / 627**
Institutional	1	1	100%	150	-	-	**150**	**120**
UPRWD Riparian	-	-	-	-	-	-	**0**	**0**
Government Ownership	-	-	-	-	-	-	**0**	**0**
Reservoir Facility	-	-	-	-	-	-	**0**	**0**
Right-of-way	-	-	-	-	-	-	**0**	**0**

Notes:

1. Low Season Duty Factors shown in **Black**, High Season Duty Factors shown in **Blue.**
2. Water Duty Factor = (Households per Acre) * (Capita per Household) * (Occupancy Rate) * (Per Capita Water Demand) * (Per Acre Duty Factor) * (1 – % Undevelopable Area Reduction)
3. Wastewater Duty Factor = Water Duty Factor * 80%

INTERIM DEVELOPMENT SCENARIO

Upon initial review of the likely buildout peak water demands and wastewater loads generated using the criteria outlined above, UTRWD and Kimley-Horn determined that it was appropriate to provide a shorter-term demand scenario for water and wastewater infrastructure around LRH. Oversized water infrastructure could lead to water quality issues due to stagnation and unnecessary financial burden on utility providers for sizing infrastructure for developments with unknown development timelines. Upon guidance from UTRWD, 25% of the likely buildout scenario outlined above has been assumed appropriate for interim infrastructure planning.

It is unknown at what rate land around LRH will develop, and it is challenging to reliably predict future demands beyond 10 years in the future even with historical data. Therefore, proposed ultimate buildout infrastructure has been excluded from this study. It is recommended that this study be updated every 5 or 10 years as development occurs so that there is always an adequate master plan in place.

4.0 WATER MASTER PLAN (WMP)

4.1 EXISTING WATER INFRASTRUCTURE

The Zoning Boundary overlaps with six (6) existing public water systems. Future land use parcels were assigned a water service provider based on the Public Utility Commission of Texas's CCN boundaries. Bartley Woods WSC and Gober MUD do not have formal boundaries, so a service boundary based on existing water infrastructure was assumed for both providers. Parcels outside of the CCN boundaries were assigned a provider of "Other" and were assumed to be served by one of the water providers in the future.

Existing demand and connection count data for each water supplier was collected from TCEQ's Drinking Water Watch and in-person meetings with water supplier staff and is summarized in **Table 4.01** below. Note that MDD data for Gober MUD, Bartley Woods WSC, and McCraw Chapel WSC was not available.

TABLE 4.01 – EXISTING WATER SERVICE PROVIDER DATA

Water Service Provider	Existing Connection Count	Existing ADD (GPD)	Existing MDD (GPD)	Service Area Within Zoning Boundary
City of Ladonia	329*	77,000	264,000	67.29%
Gober MUD	164	31,000	No Data	18.7%
Bartley Woods WSC	245	76,000	No Data	11.8%
Dial WSC	154	34,000	54,000	32.3%
McCraw Chapel WSC	115	28,000	No Data	61.20%
North Hunt SUD	1,503	429,000	932,000	2.8%

*Per coordination with the City of Ladonia, the city has a total of 329 meters (both in service and out of service). At the time of this master plan, TCEQ Drinking Water Watch shows Ladonia as having 557 connections.

Existing infrastructure capacities for each provider are summarized below in **Table 4.02**.

TABLE 4.02 – EXISTING WATER SERVICE PROVIDER CAPACITIES

Water Service Provider	Existing Available Supply (MGD)	Existing GST Capacity (MGD)	Existing EST Capacity (MGD)	Existing Pressure Tank Capacity (gal)	Existing Total Pump Capacity (MGD)
City of Ladonia	0.79	0.26	0.10	-	2.50
Gober MUD	0.19	0.06	-	6,000	0.72
Bartley Woods WSC	0.28	0.06	-	5,500	0.95
Dial WSC	0.11	0.04	-	3,000	0.58
McCraw Chapel WSC	0.10	-	-	-	-
North Hunt SUD*	0.28	-	0.10	-	-

*North Hunt SUD only includes the northernmost elevated storage tank and water well.
**Ground Storage Tank (GST) and Elevated Storage Tank (EST)

A map of the existing water infrastructure and CCN boundaries can be seen on **Exhibit D**. A map of the proposed service area expansion for each provider can be seen on **Exhibit E**. **Table 4.03** summarizes the proposed demand generating future land use breakdown for each water provider using the service area expansion boundaries, excluding non-demand generating land values (i.e. ROW, Reservoir Facilities, etc.).

Existing Water Infrastructure
Lake Ralph Hall
Water/Wastewater Master Plan

Kimley»Horn

This map product is for informational purposes and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. It does not represent an on-the-ground survey and represents only the approximate relative location of property boundaries.

3,000 1,500 0 3,000
Feet

January 2025

McCraw Chapel WSC Master Meter
Supply from Honey Grove = 0.1 MGD

Dial WSC Pump Station
Supply from Well = 0.11 MGD
(2) - 200 GPM Pumps
(2) - 20,000 Gallon GSTs
(1) - 3,000 Gallon HPT

Bartley Woods WSC Pump Station
Supply from Well = 0.28 MGD
(2) - 330 GPM Pumps
(2) - 30,000 Gallon GSTs
(1) - 1,500 Gallon HPT
(1) - 4,000 Gallon HPT

Gober MUD Pump Station
Supply from Well = 0.19 MGD
(2) - 250 GPM Pumps
(2) - 32,000 Gallon GSTs
(2) - 3,000 Gallon HPTs

North Hunt SUD Highway 68 EST
Supply from Well = 0.28 MGD

Ladonia Pump Station #1
Supply from Well = 0.33 MGD
(2) - 500 GPM Pumps
(1) - 55,000 Gallon GST
(1) - 100,000 Gallon EST

Ladonia Pump Station #2
Supply from Well = 0.46 MGD
(2) - 350 GPM Pumps
(1) - 200,000 Gallon GST

LRH North Construction Well
Supply from Well = 0.5 MGD

LRH South Construction Well
Supply from Well = 0.5 MGD

5000' LAKE ZONING BOUNDARY

END OF NORTH HUNT SUD LINES

McCraw Chapel WSC

Dial WSC

Bartley Woods WSC[1]

Gober MUD[1]

City of Ladonia

North Hunt SUD[2]

LAKE RALPH HALL
CONSERVATION POOL
551 MSL

LEGEND

Water Infrastructure
- Existing Well or Pump Station
- Existing Elevated Storage Tank
- Existing Meter
- Existing Water Lines

Service Areas
- Existing Water CCN Boundary
- Assumed Water CCN Boundary
- North Hunt SUD Limits
- Ladonia Water Limits
- Gober MUD Limits
- Bartley Woods WSC Limits
- McCraw Chapel WSC Limits
- Dial WSC Limits

Map Features
- Ladonia City Limits
- 5000' Lake Zoning Buffer
- Lake Ralph Hall Limits
- Pipeline Easement
- 100-Year Floodplain
- Leon Hurse Dam

Notes:
1. Bartley Woods WSC and Gober MUD have no formal boundary, so a service boundary based on existing water infrastructure was assumed.
2. Only North Hunt SUD's north water system is shown on this exhibit.

LAKE RALPH HALL

D

LEGEND

Utility Provider

- Existing Water CCN Boundary
- Assumed Water CCN Boundary
- North Hunt SUD Limits
- Ladonia Water Limits
- Gober MUD Limits
- Bartley Woods WSC Limits
- McCraw Chapel WSC Limits
- Dial WSC Limits

Map Features

- Ladonia City Limits
- 5,000' Zoning Boundary
- Lake Ralph Hall Limits
- Pipeline Easement
- 100-Year Floodplain
- Leon Hurse Dam
- Roadway
- Stream

Service Area Expansion

- North Hunt SUD Service Area Expansion
- Ladonia Water Service Area Expansion
- Gober MUD Service Area Expansion
- McCraw Chapel WSC Service Area Expansion

Note:
1. Bartley Woods WSC and Gober MUD have no formal boundary, so a service boundary based on existing water infrastructure was assumed.

5000' LAKE ZONING BOUNDARY

MCCRAW CHAPEL WSC SERVICE AREA EXPANSION

MCCRAW CHAPEL WSC SERVICE AREA EXPANSION (PER MCCRAW/DIAL AGREEMENT)

GOBER MUD SERVICE AREA EXPANSION

NORTH HUNT SUD SERVICE AREA EXPANSION

LADONIA SERVICE AREA EXPANSION

LADONIA CITY LIMITS

RAW WATER PIPELINE EASEMENT

LEON HURSE DAM

McCraw Chapel WSC

Dial WSC

Bartley Woods WSC[1]

Gober MUD[1]

North Hunt SUD

City of Ladonia

LAKE RALPH HALL CONSERVATION POOL 551 MSL

FM 1550 · FM 2590 · FM 1559 · FM 64 · FM 68 · FM 2456 · FM 3568 · State Highway 34 · State Highway 50 · CR 3340 · CR 3360 · CR 3341 · CR 3350 · CR 3375 · CR 3365 · CR 3330 · CR 3395 · CR 3380 · CR 3355 · CR 3735 · CR 3640 · CR 3635 · CR 3945 · CR 3940 · CR 3935 · Country Ln · Fowler Ln · Shelby Ln · Wilson · Elliot · Stevens · Bonham · W Main · Mill · Depot · Church · Jackson · Gole · Taylor · Eastman · Paris · E Main · Stone · Redner · Commerce · Park · 1st · 2nd · 3rd · 4th · McFarland · Kean · South

Pecan Creek · Alum Creek · Long Creek · Dees Creek · Peach Tree Creek · Hoggett Branch · Rabbit Creek · Rocky Creek · Mehrle Branch · North Sulphur River

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Kimley»Horn

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2,000 1,000 0 2,000
Feet

January 2025

Water Provider Service Area Expansions Map
Lake Ralph Hall
Water/Wastewater Master Plan

LAKE RALPH HALL

E

TABLE 4.03 – WATER PROVIDER FUTURE LAND USES WITHIN 5,000' ZONING BOUNDARY

Water Provider	Rural Residential Acres	Developable Rural Residential Acres	Large Lot Residential Acres	Developable Large Lot Residential Acres	Medium Lot Residential Acres	Developable Medium Lot Residential Acres	General Commercial Acres	Developable General Commercial Acres	Lake Commercial Acres	Developable Lake Commercial Acres	City of Ladonia Acres	Institutional Acres	Total Acreage	Water Provider Developable Acreage
City of Ladonia	853.7	427.2	3,285.7	3,285.7	128.3	128.3	-	-	299.3	273.7	503.9	21.1	5,092.0	4,639.9
Gober MUD	1,708.7	921.0	-	-	-	-	-	-	-	-	-	-	1,842.0	921.0
Bartley Woods WSC	1,386.8	693.4	383.3	251.7	-	-	-	-	-	-	-	-	1,770.2	945.1
Dial WSC	60.8	30.4	70.2	35.1	-	-	-	-	-	-	-	-	131.0	65.5
McCraw Chapel WSC	3,386.2	1,715.1	2,845.3	2,117.2	146.7	146.7	19.8	19.8	887.2	771.3	-	0.7	7,285.9	4,770.7
North Hunt SUD	636.1	251.4	-	-	-	-	-	-	1.7	0.8	-	0.6	505.1	252.8
Total	**8,032.27**	**4,038.47**	**6,584.61**	**5,689.65**	**275.01**	**275.01**	**19.81**	**19.81**	**1,188.25**	**1,045.80**	**503.90**	**22.35**	**16,626.20**	**11,595.01**

4.2 WATER DEMAND

WATER FUTURE LAND USE DUTY FACTORS

"High season" water duty factors were determined in **Section 3** and are listed in **Table 3.04.**

WATER PROVIDER DEMANDS

Water demands are typically broken into three (3) categories:

Average Day Demand (ADD) – ADD is the average daily water demand a given system experiences over a one-day period and can be calculated by dividing annual water consumption by the number of days in a year. For this study, separate average day water factors were developed for "low season" daily demand and "high season" daily demands due to the high fluctuation in demand and occupancy typically seen in communities with significant transient populations. "Low season" daily demand multiplied by the number of "low season" days summed with the "high season" daily demand multiplied by the number of "high season" days divided by 365 gives us the ADD. ADD is the most useful for determining total annual water supply need.

Max Day Demand (MDD) – Water consumption, in volume of water, used on the highest consumption day in a year. **Section 3.2** of this study found that a "high season" daily demand to MDD peaking factor of 1.435 should be used based on historical data from a similar lakeside community.

Peak Hourly Demand (PHD) – The maximum one-hour water demand that a distribution system will experience during a particular year or any other time. For this study 1.85 times the "high season" MDD was used for all water providers.

NOTES ON FUTURE PROJECTIONS FOR WATER PROVIDERS

The overlap between the Zoning Boundary and North Hunt SUD's CCN represents about 3% of the total acreage of North Hunt's CCN. Because of this low percentage, a comprehensive analysis of all of North Hunt's connection counts and resulting storage, elevated storage, pumping requirements, and required water supply was not completed. A review of North Hunt's nearby water facility sizes indicate that North Hunt can serve the additional connections within the Zoning Boundary with minor system modifications since the Zoning Boundary demands comprise a small percent of their total system.

For all of the existing water providers other than North Hunt, Kimley-Horn calculated existing water demands + new connections and demands within the Zoning Boundary. For the City of Ladonia and McCraw Chapel WSC, the overlap between the Zoning Boundary and the entity's respective CCN's is over 50% (i.e. more than half the CCN is within the Zoning Boundary). To assist with more reasonable facility sizing, for these two water providers, Kimley-Horn extrapolated future connections and demands in the remaining CCN area outside of the Zoning Boundary to estimate needed future water supply, ground and elevated storage, and pumping needs.

A breakdown in the interim development scenario water demands from within the Zoning Boundary for each water provider can be seen in **Table 4.04.** This does not include any demands outside of the Zoning Boundary.

TABLE 4.04 – INTERIM SCENARIO WATER PROVIDER LRH-ONLY DEMANDS

Water Service Provider	LRH Low Season Average Daily Demand (MGD)	LRH High Season Average Daily Demand (MGD)	LRH Max Day Demand (MGD)*	LRH Annual Average Day Demand (GPD)	LRH Total Annual Water Volume (AF/year)
City of Ladonia	0.275	0.453	0.651	333,528	374
Gober MUD	0.006	0.016	0.023	8,954	10
Bartley Woods WSC	0.011	0.030	0.043	16,941	19
Dial WSC	0.001	0.003	0.004	1,667	2
McCraw Chapel WSC	0.165	0.349	0.501	225,338	252
North Hunt SUD	0.002	0.006	0.009	3,479	4
Total	0.59	0.857	1.229	589,909	661

*MDD is equal to 1.435 times the "High Season" ADD, as calculated in Section 3.2.

Each water provider's total future MDD and PHD demand for the "interim scenario" is calculated in **Table 4.05** and includes demands outside of the LRH Zoning Boundary.

TABLE 4.05 – INTERIM SCENARIO WATER PROVIDER SCENARIO LRH + CCN DEMANDS

Water Service Provider	LRH Max Day Demand (MGD)	Demand Outside of Zoning Buffer (MGD) (Existing MDD + Extrapolation**)	Total Max Day Demand (MGD)	MDD to PHD Peaking Factor	Peak Hour Demand (MGD)
City of Ladonia**	0.651	0.237	0.888	1.85x	1.64
Gober MUD	0.023	0.115	0.138	1.85x	0.26
Bartley Woods WSC	0.043	0.172	0.215	1.85x	0.40
Dial WSC	0.004	0.108	0.112	1.85x	0.21
McCraw Chapel WSC**	0.501	0.238	0.739	1.85x	1.37
North Hunt SUD*	0.009	n/a	0.009	1.85x	0.02
Total	1.229	0.86	2.09	-	3.87

*Since the Zoning Boundary area is a negligible percentage of the total North Hunt SUD area, total MDD for North Hunt SUD was not evaluated.
**Values include extrapolated future demands for entire CCN.

4.3 WATER INFRASTRUCTURE ANALYSIS

WATER ANALYSIS CRITERIA

A summary of the design criteria used to plan each water providers future infrastructure can be seen in **Table 4.06** below. The criteria follow guidelines set by TCEQ as well as engineering judgement.

TABLE 4.06 – WATER DESIGN CRITERIA SUMMARY

Item	TCEQ Criteria
Water Supply	Overall capacity to meet 0.60 gpm per connection and able to meet the system's Maximum Day Demand (MDD)
Elevated Storage	Overall capacity to meet 100 gallons per connection. Only applicable for systems with more than 2,500 connections.
Pressure Vessel	Overall capacity to meet 100 gallons per connection. Only applicable for systems with less than 2,500 connections.
Total Storage	Overall capacity to meet 200 gallons per connection
Pumping Facilities	Total capacity of at least 2 gpm per connection, or 1,000 gpm minimum and the ability to meet peak hourly demands with the largest pump out of service at each pressure plane, whichever is less.
Pressure	Normal conditions = 35 psi minimum Emergency conditions = 20 psi minimum *110 psi maximum*
Velocity	*7 ft/s maximum*

*Italicized criteria are non-TCEQ criteria.

CONNECTION COUNT

The number of connections that are served by a water system is not only an important data point for operation of the system, but it also determines TCEQ requirements for system infrastructure.

To project a connection count for each water provider, residential parcels use the households per acre criteria outlined in **Section 3.1**. For every 500 gpd of "high season" average day demand for commercial and City of Ladonia parcels, one single-family equivalent connection was counted. Each institutional parcel is considered one connection. Lastly, existing connection counts were added to the LRH connection count to get a total water provider connection count.

Table 4.07 calculates the number of connections each water provider should be expected to serve from development around LRH.

TABLE 4.07 – INTERIM SCENARIO WATER PROVIDER CONNECTION COUNT

Water Provider	Existing + Extrapolated Connections	Developable Rural Residential Acres	Interim Rural Residential Connections (1)	Developable Large Lot Residential Acres	Interim Large Lot Residential Connections (1)	Developable Medium Lot Residential Acres	Interim Medium Lot Residential Connections (1)	General & Lake Commercial ADD (gpd)	Interim General & Lake Commercial Connections (2)	Developable City of Ladonia Acres	Interim City of Ladonia Connections (1)	Institutional Connections (3)	Total LRH Interim Scenario Connections	Total Interim Scenario Water Provider Connections
City of Ladonia	338*	427.2	16	3,285.7	452	128.3	35	53,642	109	503.9	529	2	**1,143**	**1,481**
Gober MUD	164	921.0	32	-	-	-	-	-	-	-	-	-	**32**	**196**
Bartley Woods WSC	245	693.4	26	251.7	35	-	-	-	-	-	-	-	**61**	**306**
Dial WSC	154	30.4	1	35.1	5	-	-	-	-	-	-	-	**6**	**160**
McCraw Chapel WSC	339*	1,715.1	64	2,117.2	291	146.7	40	155,054	316	-	-	1	**712**	**1,051**
North Hunt SUD	1,503	251.4	12	-	-	-	-	166	1	-	-	1	**14**	**1,517**
Total	**2,743**	**4,038.47**	**151**	**5,689.65**	**782**	**275.01**	**75**	**204,978**	**426**	**503.90**	**529**	**4**	**1,968**	**4,711**

*Values include extrapolated future demands for entire CCN.

Notes:

1. Interim Scenario Residential or Ladonia Connection = (Developable Acreage) * (Households per Acre) * (1 – % Undevelopable Area Reduction) * (25% Interim Scenario Factor)
2. Interim Scenario Commercial Connection = (Commercial “High Season” ADD) / (98% Occupancy Rate) / (“High Season” Residential Equivalent Single-Family Connection) * (25% Interim Scenario Factor)
3. Interim Scenario Institutional Connection = (Institutional “High Season” ADD) / (“High Season” Residential Equivalent Single-Family Connection) * (25% Interim Scenario Factor)

WATER SUPPLY EVALUATION

Each water provider has separate water supply needs and options to meet the future required water supply. This report does not explore the feasibility for water supply options to each water provider. Each water provider can choose to either develop their own water supply or collaborate with other providers to share a regional water supply. For the interim demand scenario, it has been assumed that all water providers will meet their supply requirements from groundwater.

Table 4.08 summarizes the supply requirements required by each water provider.

TABLE 4.08 – INTERIM SCENARIO WATER SUPPLY CAPACITY

Provider	Future Connection Count Interim Scenario	Required Water Supply (MGD)*	Existing Water Supply (MGD)	Supply Surplus / Deficit (MGD)
City of Ladonia	1,481	1.28	0.79	**-0.49**
Gober MUD	196	0.17	0.19	**+0.02**
Bartley Woods WSC	306	0.26	0.28	**+0.02**
Dial WSC	160	0.14	0.11	**-0.03**
McCraw Chapel WSC	1,051	0.91	0.10	**-0.81**
North Hunt SUD**	14	0.01	0.28	**+0.27**

*0.6 gallons per minute required per connection and ability to meet MDD as shown in **Table 4.06**.

**Existing connections from the rest of the North Hunt SUD system were not included the capacity analysis, and only infrastructure within the Zoning Boundary is included for North Hunt SUD.

As shown in table above, Ladonia, Dial WSC, and McCraw Chapel WSC will require additional supply from interim development around LRH. Bartley Woods WSC, Gober MUD, and North Hunt SUD will not require additional supply from growth within the LRH Zoning Boundary based on these projections.

While Bartley Woods WSC does not need additional supply for the interim development scenario, its projected connection count exceeds 250 connections which requires the water system to have a second water supply source (i.e. another well, interconnect, etc.) per TCEQ.

PRESSURE CAPACITY ANALYSIS

Pressure maintenance facilities for public water systems typically come in two (2) forms: elevated storage tanks ("EST") or hydropneumatic (pressure) tanks. Per TCEQ, public water systems with a connection count less than 2,500 connections can maintain pressure by utilizing pressure tanks. For systems with 2,500 connections or more, elevated storage tanks must be used to maintain pressure unless an alternate capacity requirement ("ACR") is obtained. Kimley-Horn did not assume an ACR for the WMP.

Tables 4.09 and **4.10** below shows minimum capacity for systems requiring elevated storage tanks and pressure vessels respectively.

TABLE 4.09 – INTERIM SCENARIO ELEVATED STORAGE CAPACITY

Provider	Future Connection Count Interim Scenario	Required EST Capacity (MGD)*	Existing EST Capacity (MGD)	EST Capacity Surplus / Defecit (MGD)
City of Ladonia	1,481	0.15	0.1	**-0.05**
North Hunt SUD	14	<0.01	0.1	**+0.99**

*100 gallons required per connection as shown in **Table 4.06**.
**Existing connections from the rest of the North Hunt SUD system were not included the capacity analysis.

TABLE 4.10 – INTERIM SCENARIO PRESSURE TANK CAPACITY

Provider	Future Connection Count Interim Scenario	Required Pressure Tank Capacity (gal)*	Existing Pressure Tank Capacity (gal)	Pressure Tank Capacity Surplus / Defecit (gal)
Gober MUD	196	3,920	6,000	**+2,080**
Bartley Woods WSC	306	6,120	5,500	**-620**
Dial WSC	160	3,200	3,000	**-200**
McCraw Chapel WSC	1,051	21,020	0	**-21,020**

*20 gallons required per connection as shown in **Table 4.06**.

As shown in the tables above, Ladonia and McCraw Chapel WSC will require additional EST capacity to serve future development around LRH. Dial WSC, and Bartley Woods WSC will require additional pressure tank capacity to serve development around LRH. North Hunt SUD and Gober MUD will not require pressure improvements to serve development around LRH for the interim scenario.

Pressure maintenance facility required sizes for Gober MUD, Bartley Woods WSC, and Dial WSC were based on existing connections summed with new connections required within the Zoning Boundary only. These pressure maintenance facilities will serve areas outside of the Zoning Boundary, as well. Additional analysis should be performed to identify the total facility size needed for the entire CCN/pressure plane.

TOTAL STORAGE CAPACITY ANALYSIS

Total storage capacity is equivalent to the sum of EST capacity and ground storage tank ("GST") capacity. Per TCEQ §290.45(a)(4), pressure tank capacity is not included in total storage capacity.

Table 4.11 below shows the minimum storage capacity requirements for each water provider.

TABLE 4.11 – INTERIM SCENARIO TOTAL STORAGE CAPACITY

Provider	Future Connection Count Interim Scenario	Required Total Storage Capacity (gal)	Existing Total Storage Capacity (gal)	Total Storage Capacity Surplus / Defecit (gal)
City of Ladonia	1,481	296,200	355,000	**+58,800**
Gober MUD	196	39,200	64,000	**+24,800**
Bartley Woods WSC	306	61,200	60,000	**-1,200**
Dial WSC	160	32,000	40,000	**+8,000**
McCraw Chapel WSC	1,051	210,200	0	**-210,200**
North Hunt SUD	14	2,800	100,000	**+97,200**

*200 gallons per connection as shown in **Table 4.06**.

As shown in the table above, Bartley Woods WSC, Dial WSC, and McCraw Chapel WSC will require additional GST capacity to serve future development around LRH. North Hunt SUD will not require additional storage facilities to serve future development around LRH based on the interim scenario. Ladonia and Gober MUD will not require ground storage improvements to serve development around LRH.

Storage facility required capacities for Gober MUD, Bartley Woods WSC, and Dial WSC were based on existing connections summed with new connections required within the planning buffer only. These storage facilities will serve areas outside of the planning buffer, as well. These calculations only represent the additional capacity required for the planning buffer development. Additional analysis should be performed to identify the total facility size needed for the entire CCN/pressure plane.

PUMPING CAPACITY ANALYSIS

Per TCEQ, water system pump facilities must be sized to meet the smaller of the two values in the criteria below:

Criterion 1 – Total pump capacity of 2.0 gpm per connection.

Criterion 2 – A total pump capacity of at least 1,000 gpm (1.44 MGD) and the ability to meet peak hourly demands with the largest pump out of service (ability to meet peak hour demands with the largest pump out of service means that the firm pumping capacity of the water provider should exceed peak hour demands).

Gober MUD, Bartley Woods WSC, and Dial WSC were controlled by Criterion 1 since their connection count x 2.0 gpm is smaller than Criterion 2's 1,000 gpm threshold. **Table 4.12** below shows the minimum pump capacity requirements for each water provider except North Hunt SUD.

TABLE 4.12 – INTERIM SCENARIO TOTAL PUMPING CAPACITY

Provider	Future Connection Count (Interim Scenario)	Required Total Pumping Capacity (MGD)	Existing Total Pumping Capacity (MGD)	Total Pump Capacity Surplus / Deficit (MGD)
Gober MUD	196	0.56	0.72	**+0.16**
Bartley Woods WSC	306	0.86	0.95	**+0.09**
Dial WSC	160	0.46	0.58	**+0.12**

*Total capacity of at least 2.0 gpm per connection as shown in **Table 4.06**.

The City of Ladonia and McCraw Chapel WSC were controlled by Criterion 2 since their total connection count x 2.0 gpm is greater than the Criterion 2 values, and the smaller value controls. **Table 4.13** below shows the minimum firm pump capacity required for those two systems.

TABLE 4.13 – INTERIM SCENARIO FIRM PUMPING CAPACITY

Provider	Future Connection Count Interim Scenario	Future Peak Hourly Demands (MGD)	Existing Firm Pumping Capacity (MGD)	Firm Pump Capacity Surplus / Deficit (MGD)
City of Ladonia	1,481	1.64	1.73	**+0.09**
McCraw Chapel WSC	1,051	1.37	0	**-1.37**

*Minimum of 1,000 gpm and able to meet peak hour demands with largest pump out of service as shown in **Table 4.06**.

Based on the results in **Table 4.12** and **4.13**, McCraw Chapel WSC is the only water provider that needs additional pump capacity improvements to serve the interim demand scenario.

4.4 WATER MODEL

WATER MODEL BUILD

To evaluate the future water systems, a hydraulic model for each water service provider was built using InfoWater® Pro by Autodesk. The information required to build the model and the corresponding data sources used are listed in **Table 4.14**.

TABLE 4.14 – WATER MODEL BUILD DATA

Infrastructure	Required Data	Data Source
Piping	▶ Length ▶ Diameter ▶ Alignment	▶ Record Drawings ▶ System Maps
Junctions	▶ Elevation ▶ Demand	▶ LiDAR ▶ Future Land Use Parcels
Pumps	▶ Capacity ▶ Invert Elevations	▶ TCEQ Drinking Water Watch ▶ LiDAR
Tanks	▶ Capacity ▶ Elevation ▶ Head Range	▶ TCEQ Drinking Water Watch ▶ Record Drawings

To evaluate performance of the network, several computational runs were made with varied combinations of demand levels, pump combinations, water levels in the tanks, pipe diameters, adding and removing pipes, etc. If the necessary criteria were not met, the system was repeatedly adjusted and re-analyzed until satisfactory results were obtained.

It is important to note that a high-level steady state model was prepared for each water provider and was not calibrated using existing daily trend data. The purpose of this document is to be a resource to assist in planning future water infrastructure around LRH. Final sizes, alignments, and functionality of future infrastructure will be determined by the engineer of record at the time of engineering design.

Kimley-Horn utilized LiDAR data from the Texas Natural Resources Information System (TNRIS) for the topographic surface to determine elevations. On average, TNRIS elevation data is within approximately five (5) feet of accuracy.

WATER MODEL SCENARIOS

The following scenarios were modeled:

"High Season" Average Day Demand – Ran separately for each water provider under normal operating conditions for "High Season" demands.

"High Season" Maximum Day Demand – Ran separately for each water provider under normal operating conditions for the "Future Development" demands. Required to determine if pressures stay above 35 psi.

Peak Hour Demand – Ran separately for each water provider under normal operating conditions for the "Future Development" demands. Required to determine if pressures stay above 35 psi and velocities stay below 7 fps.

Maximum Day Demand + Fire Flow – Ran only for Ladonia due the higher density of demand and connections compared to the other water providers. Junctions unable to flow at 1,500 gpm while maintaining the TCEQ minimum pressure of 20 psi throughout the system under future MDD fail the fire flow test. Only junctions on waterlines 6" or larger were analyzed for fire flow.

For the water providers other than Ladonia, fire flow was not a factor in determining water line sizes. Should a future proposed development desire fire flow, a separate evaluation will be required.

4.5 WATER CAPITAL IMPROVEMENTS

From the master planning process, a recommended list of improvements has been developed to provide water service for the interim scenario. Project planning may need to be accelerated or decelerated depending on the pace of development around LRH. **Table 4.15** below summarizes the additional capacity required for each water provider.

TABLE 4.15 – INTERIM SCENARIO REQUIRED WATER IMPROVEMENTS SUMMARY

Provider	Additional Water Supply Required (MGD)	Additional EST Capacity Required (MGD)	Additional Pressure Tank Capacity Required (gal)	Additional Total Storage Required (MGD)	Additional Pump Facility Capacity Required (MGD)
City of Ladonia	0.49	0.05	-	-	-
Gober MUD	-	-	-	-	-
Bartley Woods WSC	-	-	620	1,200	-
Dial WSC	0.03	-	200	-	-
McCraw Chapel WSC	0.81	-	21,020	210,200	1.37*
North Hunt SUD	-	-	-		-

*Represents firm pumping capacity and not total pumping capacity

An overall water improvement map can be found on **Exhibit F**.

Overall Water Infrastructure Interim Buildout Scenario

Water/Wastewater Master Plan

Kimley»Horn

This map product is for informational purposes and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. It does not represent an on-the-ground survey and represents only the approximate relative location of property boundaries.

3,000 1,500 0 3,000
Feet

April 2025

F

McCraw Chapel WSC Master Meter

Dial WSC Pump Station

LRH North Construction Well

LRH South Construction Well

5000' LAKE ZONING BOUNDARY

Ladonia Pump Station #1

Ladonia Pump Station #2

Bartley Woods WSC Pump Station

Gober MUD Pump Station

North Hunt SUD Highway 68 EST

McCraw Chapel WSC

Dial WSC

Bartley Woods WSC[1]

Gober MUD[1]

North Hunt SUD[2]

City of Ladonia

LAKE RALPH HALL CONSERVATION POOL 551 MSL

Brotherton
Dodd City
Windom
Burnett
White Rock
English
Shady Grove
Prairie Point
Cluster Point
Flag Springs
Bagby
Pecan Gap
Bailey
Oak Grove
Prairie Woods
Slivey
Lissie
Leonard Grove

E State Highway 56
State Highway 34
State Highway 11
State Highway 50
FM 271
FM 68
FM 1550
FM 2077
FM 1570
FM 824
FM 64
FM 2456
FM 1532
CR 3425
CR 3460
CR 3489
CR 3375
CR 3360
CR 3350
CR 3355
CR 3395
CR 3380
CR 3640
CR 3635
CR 3645
CR 3920
CR 3930
CR 3940
CR 3615
CR 3650
CR 3630
CR 3635
Merrill Creek
Bartley Road Creek
Doty Branch
Pilot Creek
Bartley Creek
Pecan Creek
Long Creek
North Sulphur River
Silver Creek
Parker Creek

Notes:
1. Bartley Woods WSC and Gober MUD have no formal boundary, so a service boundary based on existing water infrastructure was assumed.
2. Only North Hunt SUD's north water system is shown on this exhibit.

LEGEND

Water Infrastructure
- Well or Pump Station
- Existing Elevated Storage Tank
- Proposed Elevated Storage Tank
- M Existing Meter
- Existing Water Lines
- Proposed Water Lines

Service Areas
- Existing Water CCN Boundary
- Assumed Water Service Boundary
- North Hunt SUD Limits
- Ladonia Water Limits
- Gober MUD Limits
- Bartley Woods WSC Limits
- McCraw Chapel WSC Limits
- Dial WSC Limits

Map Features
- Ladonia City Limits
- 5000' Lake Zoning Buffer
- Lake Ralph Hall Limits
- Pipeline Easement
- 100-Year Floodplain
- Leon Hurse Dam

5.0 WASTEWATER MASTER PLAN (WWMP)

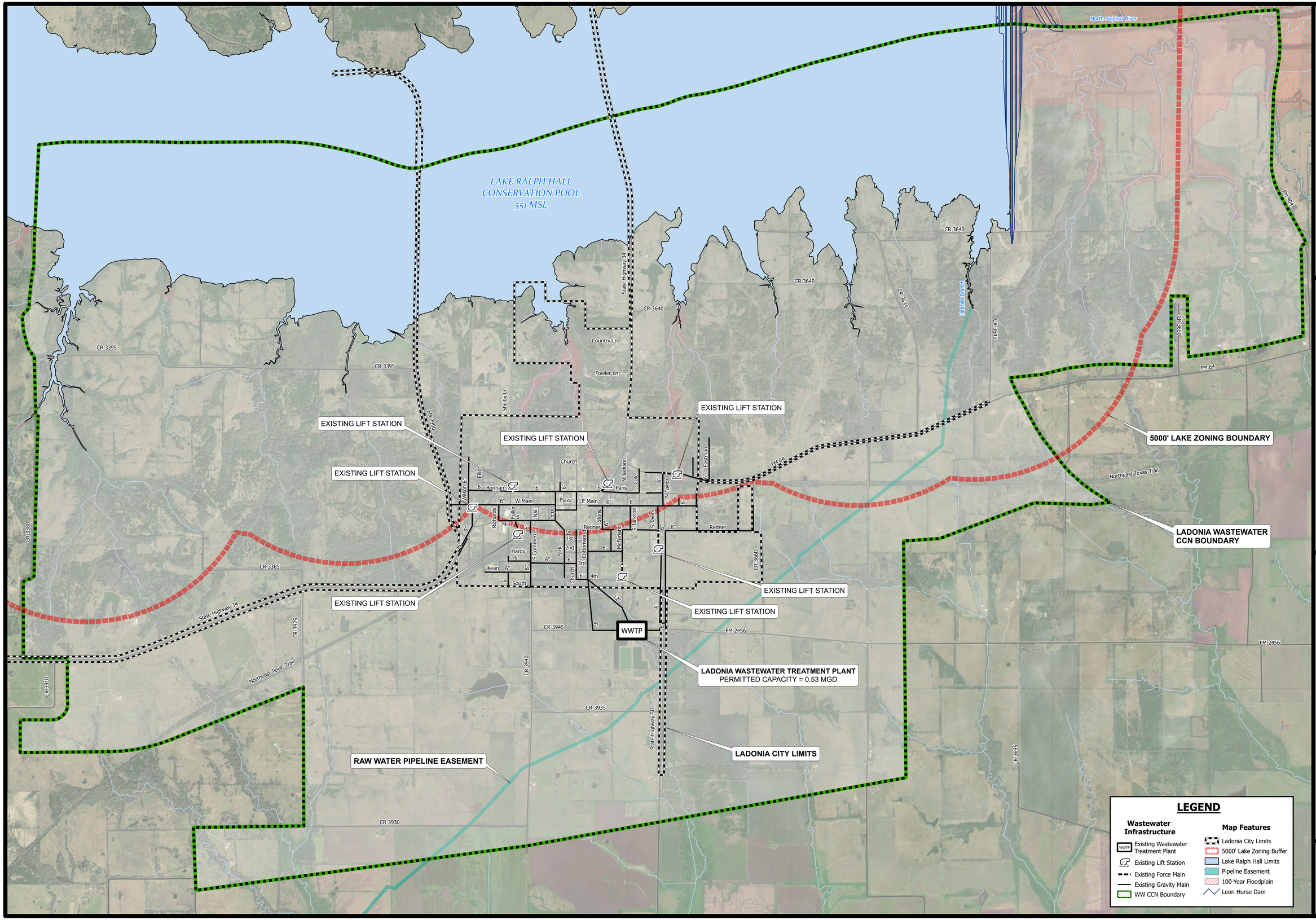
5.1 EXISTING WASTEWATER INFRASTRUCTURE

The City of Ladonia owns the sole existing wastewater CCN around LRH and therefore owns and operates the only existing centralized wastewater system within the Zoning Boundary. The City's existing wastewater system consists of a single basin with 56,500 feet of 6-inch to 12-inch wastewater lines, the majority of which are 6-inch collector lines. The City owns and operates seven (7) wastewater lift stations and one (1) wastewater treatment plant ("WWTP") with a permitted capacity of 0.53 MGD. Existing facilities were not analyzed as part of this study unless they serve future land use parcels within the Zoning Boundary.

Many existing residents within the LRH Zoning Boundary are not located within a wastewater CCN and therefore discharge wastewater into on-site sewage facilities ("OSSF"). While OSSFs have some advantages over a centralized wastewater system in the form of reduced infrastructure and energy costs, future water quality of the proposed reservoir could be impacted by an abundance of OSSFs since they have a higher malfunction rate then centralized wastewater systems. Because of this, OSSFs were excluded from the LRH WWMP.

Due to approved zoning limitations of OSSF's and protection of LRH water quality, a centralized wastewater approach was evaluated in this study. **This study is focused on new development around LRH and not existing OSSF's.**

A map of Ladonia's existing wastewater system and CCN can be found on **Exhibit G**.



Kimley»Horn

This map product is for informational purposes and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. It does not represent an on-the-ground survey and represents only the approximate relative location of property boundaries.

800 400 0 800
Feet

January 2025

City of Ladonia
Existing Wastewater Infrastructure
Water/Wastewater Master Plan

LAKE RALPH HALL

G

5.1 WASTEWATER PLANNING METHODOLOGY

PLANNING APPROACH

The LRH WWMP explores a regionalized wastewater planning approach for future wastewater infrastructure around LRH. It assumes that a larger wastewater provider(s) will develop a long-range infrastructure plan to construct an integrated wastewater network leading to regional WWTP(s). These facilities are often permanent, concrete facilities with more stringent permit limits due to having a higher flowrate. These facilities and associated trunklines have a higher initial cost and therefore present a challenge to raise funds for without knowing how fast an area will develop.

This document does not predict the rate of development, or which developments would install "package plants" or other types of single-user facilities for their treatment solutions.

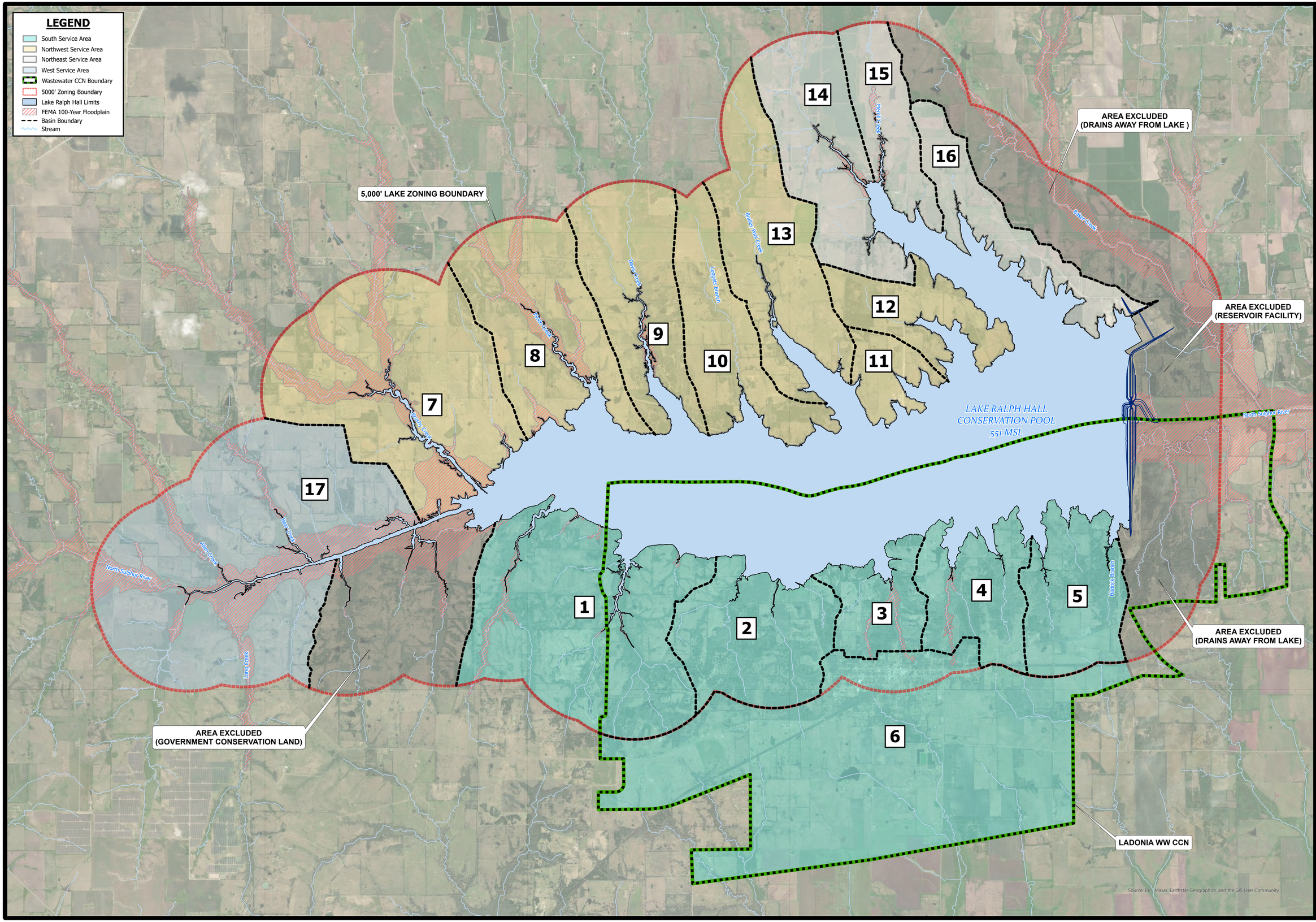
The LRH WWMP makes the following assumptions:

- Future regional wastewater provider(s) will develop separate regional wastewater networks along the north, east, and west shoreline of LRH.
- The City of Ladonia will serve as the regional wastewater provider for the majority of the south shoreline of LRH.

The most significant challenge with a regionalized approach on the north, east, and west shoreline is the lack of an existing regional wastewater provider(s). If the primary driver for water/wastewater infrastructure are developers, then they may choose to implement a "package plant" or other types of treatment facilities in advance of collaborating to create a regional solution. A large number of existing single-development treatment facilities may be challenging to retroactively consolidate into a larger integrated wastewater system without a master plan in place.

WASTEWATER BASIN DELINEATION

Kimley-Horn separated the Zoning Boundary into four (4) wastewater service areas consisting of a total of seventeen (17) major drainage basins for planning future wastewater infrastructure. Each major basin will have its own interceptors and will have an end-of-line facility of either a regional lift station that will pump to another drainage basin or a wastewater treatment plant that will discharge clean effluent to LRH. **Exhibit H** shows the proposed wastewater basin and wastewater service area map.



Kimley»Horn

This map product is for informational purposes and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. It does not represent an on-the-ground survey and represents only the approximate relative location of property boundaries.

2,000 1,000 0 2,000
Feet

January 2025

Wastewater Basin Delineation Map

Water/Wastewater Master Plan

LAKE RALPH HALL

H

5.2 WASTEWATER FLOWS

WASTEWATER FLOW CATEGORIES

Wastewater flows are typically categorized by the following:

Dry Weather Average Day Flow – The average daily flow during periods without rainfall. This flow factor is used to assess the flow generated from wastewater users without considering inflow and infiltration (I&I) from groundwater and stormwater. For this study, only the "high season" average day flow was used to size future wastewater infrastructure. "Low season" flow factors were not used for the WWMP since facilities must convey the maximum flow.

Wet Weather Peak Flow – The peak maximum flowrate that a wastewater system sees, and typically occurs during storm events due to I&I. This flow factor is used to size the collection system's wastewater lines and lift stations. For wet weather LRH wastewater flow, a peaking factor of 4.0 times the "high season" average day flow was assumed per TCEQ §217.32 due to the lack of historical flow data.

EXISTING WASTEWATER FLOWS

This study does not provide a timeline or planning window for the proposed wastewater infrastructure. Due to this, historical wastewater flow data of the existing Ladonia wastewater system was not analyzed. It has been assumed that all existing wastewater lines have minimum TCEQ slopes, and all proposed wastewater infrastructure will utilize a peaking factor of 4 per §217.32.

FUTURE LAND USE WASTEWATER FACTORS

Dry weather high-season wastewater duty factors were determined in **Table 3.04** in **Section 3**.

OTHER LADONIA CCN FLOWS

The City of Ladonia Basin (Basin 7) is represented as two (2) distinct categories in this report:

6a – The portion of Ladonia's city limits that fall within the LRH Zoning Boundary. Wastewater loads for this category were calculated in the same manner as the other basins.

6b – The portion of Ladonia's city limits that do not fall within the LRH Zoning Boundary. Wastewater loads for this category were assumed to be the same as the "City of Ladonia" future land use category and were calculated in the same manner as category 7a. This category was used for sizing proposed conveyance and treatment infrastructure within the city limits.

Land within Ladonia's wastewater CCN but outside of the city limits and Zoning Boundary was not included in the WWMP facility sizing.

WASTEWATER LOADING SUMMARY

Wastewater flows were allocated to each basin depending on the makeup of future land use parcels within each basin's limits. **Table 5.02** summarizes the future flow projections for each service area and major basin.

TABLE 5.01 – INTERIM SCENARIO WASTEWATER FLOW PROJECTIONS

Basin No.	Basin Name	Interim Dry Weather Flow (MGD)	Interim Wet Weather Flow (MGD)
South Service Area			
1	West Ladonia Basin	0.07	0.28
2	Northwest Ladonia Basin	0.05	0.22
3	North Ladonia Basin	0.09	0.34
4	Northeast Ladonia Basin	0.06	0.23
5	East Ladonia Basin	0.03	0.14
6a	City of Ladonia Basin	0.05	0.22
6b	City of Ladonia City Limits	0.09	0.38
Northwest Service Area			
7	Brushy Creek Basin	0.02	0.06
8	Pickle Creek Basin	0.02	0.09
9	Davis Creek Basin	0.02	0.09
10	Leggets Branch Basin	0.03	0.11
11	South Bug Tussle Basin	0.02	0.09
12	North Bug Tussle Basin	0.02	0.08
13	Bradley Pool Creek Basin	0.08	0.31
Northeast Service Area			
14	West Merrill Creek Basin	0.03	0.13
15	Upper Merrill Creek Basin	0.01	0.04
16	Lower Merrill Creek Basin	0.02	0.12
West Service Area			
17	West LRH Basin	0.01	0.05

Note: This table only lists native flows generated by each individual basin and does not include flows generated from other basins. See **Table 5.03** for a list of cumulative wastewater loads that proposed infrastructure is sized for.

5.3 WASTEWATER INFRASTRUCTURE CRITERIA

Kimley-Horn utilized criteria established by the TCEQ along with additional criteria determined by engineering judgement to evaluate each major infrastructure component of the wastewater system. TCEQ criteria are summarized below in **Table 5.03**.

TABLE 5.02 – WASTEWATER DESIGN CRITERIA

Item	TCEQ Criteria	Additional Criteria
Gravity Main	▶ Wastewater collection system must handle the transport of peak dry weather flow plus inflow and infiltration ((TCEQ §217.53(a)). ▶ Minimum Diameter allowed for a gravity pipe is six inches (TCEQ Section §217.53(j)). ▶ All wastewater collection systems must contain slopes sufficient to allow a velocity when flowing full of not less than 2.0 feet per second ("fps") and not greater than 10.0 fps (TCEQ §217.63(l)).	▶ Minimum depth of 5' to top of pipe. ▶ Maximum depth of 25' to top of pipe. ▶ Maximum pipe capacity of 80%. ▶ Same topographic surface slope if it meets TCEQ velocity criteria.
Force Main	▶ Force mains shall be a minimum of four inches in diameter unless it is used in conjunction with a grinder pump station. ▶ For a lift station with two pumps: o A minimum velocity of 3.0 feet per second ▶ For a lift station with three or more pumps: o A minimum velocity of 2.0 feet per second with only the smallest pump operating at full speed. o A minimum velocity of 5.0 feet per second or greater must occur in a force main at least twice per day. ▶ A maximum velocity of 6.0 fps. For pipelines higher than 6.0 fps, a report must certify that the pipeline can withstand high and low negative surge pressures in event of sudden pump failure. (TCEQ §217.67(a)).	▶ Diameter determined by a maximum allowable velocity of 6.0 fps at the wet weather flowrate. No velocities that exceed 6.0 fps were considered. ▶ Grinder pump stations were not considered. All force mains shall be 4.0 inches in diameter, with pumps sized to meet a minimum velocity of 3.0 fps.
Lift Station	▶ A lift station must have at least two pumps. The firm pumping capacity of a lift station must handle the peak flow (TCEQ §217.61(c)).	▶ none
WWTP	▶ If the average day flow is greater than or equal to 1.0 MGD, then the wastewater treatment plant design flow is equal to the average day flow. (TCEQ §217.32(1)(A)). ▶ If the average day flow is less than 1.0 MGD, then the wastewater treatment plant design flow is equal to 1.5 times the average day flow. (TCEQ §217.32(1)(B)).	▶ Locations shall be able to discharge to upstream LRH tributaries and shall not discharge directly to the proposed reservoir.

Kimley-Horn used LiDAR data from the Texas Natural Resources Information System ("TNRIS") for the topographic surface to determine alignment, slope, and depth. On average, TNRIS elevation data is within approximately five (5) feet of accuracy.

WASTEWATER FACILITY SIZING

A summary of the proposed wastewater end-of-line facility sizing can be found in **Table 5.04**.

TABLE 5.03 – INTERIM SCENARIO WASTEWATER FACILITY SIZING

Basin No.	Basin Name	Upstream Basins	Cumulative Dry Weather Flow (MGD)	Cumulative Wet Weather Flow (MGD)	Resulting Facility Size (MGD)**
South Service Area					
1	West Ladonia Basin*	-	0.07	0.28	**0.28 MGD Lift Station**
2	Northwest Ladonia Basin	1	0.12	0.50	**0.50 MGD Lift Station**
3	North Ladonia Basin	-	0.09	0.34	**0.34 MGD Lift Station**
4	Northeast Ladonia Basin	5	0.09	0.37	**0.37 MGD Lift Station**
5	East Ladonia Basin	-	0.03	0.14	**0.17 MGD Lift Station***
6a	City of Ladonia Basin	1,2,3,4,5	0.36	1.43	**0.70 MGD WWTP**
6b	City of Ladonia City Limits	1,2,3,4,5,6a	0.45	1.81	
Northwest Service Area					
7	Brushy Creek Basin	-			**0.17 MGD Lift Station***
8	Pickle Creek Basin	7	0.06	0.26	**0.26 MGD Lift Station**
9	Davis Creek Basin	7,8	0.09	0.34	**0.34 MGD Lift Station**
10	Leggets Branch Basin	7,8,9	0.11	0.45	**0.45 MGD Lift Station**
11	South Bug Tussle Basin	-			**0.17 MGD Lift Station***
12	North Bug Tussle Basin	11	0.12	0.47	**0.47 MGD Lift Station**
13	Bralley Pool Creek Basin	7,8,9,10,11,12	0.25	1.02	**0.40 MGD WWTP**
Northeast Service Area					
14	West Merrill Creek Basin	-	0.03	0.13	**0.17 MGD Lift Station***
15	Upper Merrill Creek Basin	14	0.05	0.21	**0.21 MGD Lift Station**
16	Lower Merrill Creek Basin	14,15	0.08	0.33	**0.125 MGD WWTP**
West Service Area					
17	West LRH Basin	-	0.01	0.05	**0.02 MGD WWTP**

*Facility size reflects pumping rate to achieve a velocity of 3.0 ft/s in a minimum 4-inch force main.
**Lift station sizes in this table reflect firm pumping capacity and not total pumping capacity.

5.4 WASTEWATER CAPITAL IMPROVEMENTS

From the master planning process, a recommended list of improvements has been developed to provide wastewater service for the interim scenario.

A wastewater treatment plant master plan and receiving stream evaluation were not performed as part of the LRH WWMP. Upon instruction from UTRWD, an optional effluent pump station has been included in the City of Ladonia's list of improvements to provide the option to pump effluent to one of the reservoir's tributaries. A separate permit would be required for this effluent outfall project.

Detailed wastewater improvement maps for the south, north, and west wastewater service areas can be found in **Exhibit I, J, and K,** respectively**. Appendix B** includes a detailed wastewater improvement map and quantities for each basin.

LEGEND

Wastewater Basins
- Basin 1 Limits
- Basin 2 Limits
- Basin 3 Limits
- Basin 4 Limits
- Basin 5 Limits
- Basin 6 Limits

Wastewater Infrastructure
- WWTP Exist Wastewater Treatment Plant
- Exist Lift Station
- Exist Force Main
- Exist Gravity Sewer
- Prop Lift Station
- Prop Force Main
- Prop Gravity Sewer
- Prop Effluent Pump Station
- Prop Effluent FM Option 1
- Prop Effluent FM Option 2

Map Features
- 5000' Zoning Boundary
- Ladonia City Limits
- Wastewater CCN Boundary
- Lake Ralph Hall Limits
- FEMA 100-Year Floodplain
- Raw Water Pipeline Easement
- Leon Hurse Dam
- Roadway
- Stream

South Wastewater System (Interim Development Scenario)

Basin ID	Basin Name	Basin AD (gpd)	Basin Peak (gpd)	Upstream Basins	Cumulative AD (gpd)	Cumulative Peak (gpd)	Facility Name	Facility Size (mgd)
1	West Ladonia Basin	69,976	279,904	-	69,976	279,904	**CR 3380 Lift Station**	0.28
2	Northwest Ladonia Basin	54,532	218,129	1	124,508	498,033	**CR 3395 Lift Station**	0.50
3	North Ladonia Basin	85,691	342,765	-	85,691	342,765	**Lake Admin HQ Lift Station**	0.34
4	Northeast Ladonia Basin	58,729	234,915	5	93,632	374,528	**East SH 34 Lift Station**	0.37
5	East Ladonia Basin	34,903	139,613	-	34,903	139,613	**CR 3635 North Lift Station**	0.20
6a (Planning)	City of Ladonia Basin	54,090	216,360	1,2,3,4,5	357,921	1,431,685	**Ladonia WWTP**[1]	0.70
6b (City Limits)		94,100	376,398	1,2,3,4,5,6a	452,021	1,808,083		

LAKE RALPH HALL CONSERVATION POOL 551 MSL

CR 3380 LS (0.28 MGD)

CR 3395 LS (0.50 MGD)

LAKE ADMIN HQ LS (0.34 MGD)

EAST SH 34 LS (0.37 MGD)

CR 3635 NORTH LS (0.20 MGD)

1 2 3 4 5 6

5000' LAKE ZONING BOUNDARY

LADONIA CITY LIMITS

LADONIA WASTEWATER TREATMENT PLANT
PERMITTED CAPACITY = 0.53 MGD
EXPAND AVG. DAY CAPACITY = 0.70 MGD

PROPOSED EFFLUENT PIPELINE OPTION 2: FOLLOW EXISTING PIPELINE EASEMENT

LADONIA WASTEWATER CCN BOUNDARY

PROPOSED EFFLUENT PIPELINE OPTION 1: FOLLOW EXISTING AND FUTURE ROW NORTH

FUTURE EFFLUENT PUMP STATION

Notes:
1. WWTP size determined by multiplying the cumulative average day demand by 1.5 per TCEQ §217.32.
2. The infrastructure alignments, locations, and sizes shown in this figure are preliminary in nature and do not reflect infrastructure internal to each development. Final alignments, locations, and sizes shall be determined by the engineer of record at the time of engineering design.

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Kimley»Horn

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1,500 750 0 1,500
Feet

February 2025

South Wastewater Infrastructure Interim Buildout Scenario

Water/Wastewater Master Plan

LAKE RALPH HALL

1

LEGEND

Wastewater Basins

- Basin 7 Limits
- Basin 8 Limits
- Basin 9 Limits
- Basin 10 Limits
- Basin 11 Limits
- Basin 12 Limits
- Basin 13 Limits
- Basin 14 Limits
- Basin 15 Limits
- Basin 16 Limits

Infrastructure and Map Features

- WWTP — Prop WWTP
- Prop Lift Station
- Prop Gravity Sewer
- Prop Force Main
- 5,000' Zoning Boundary
- Lake Ralph Hall Limits
- 100-Year Floodplain
- Leon Hurse Dam
- Roadway
- Stream

Northwest Wastewater System (Interim Development Scenario)

Basin ID	Basin Name	Basin AD (gpd)	Basin Peak (gpd)	Upstream Basins	Cumulative AD (gpd)	Cumulative Peak (gpd)	Facility Name	Facility Size (mgd)
7	Brushy Creek Basin	42,480	169,920	-	42,480	169,920	**Brushy Creek Lift Station**	0.17
8	Pickle Creek Basin	21,323	85,291	7	63,803	255,211	**Pickle Creek Lift Station**	0.26
9	Davis Creek Basin	21,491	85,963	7,8	85,294	341,175	**Davis Creek Lift Station**	0.34
10	Leggets Branch Basin	28,013	112,053	7,8,9	113,307	453,227	**Leggets Branch Lift Station**	0.45
11	South Bug Tussle Basin	42,480	169,920	-	42,480	169,920	**South Bug Tussle Lift Station**	0.17
12	North Bug Tussle Basin	76,063	304,253	11	118,543	474,173	**North Bug Tussle Lift Station**	0.47
13	Bralley Pool Creek Basin	23,112	92,447	7,8,9,10,11,12	254,962	1,019,848	**Bralley Pool Creek WWTP**	0.40

Northeast Wastewater System (Interim Development Scenario)

Basin ID	Basin Name	Basin AD (gpd)	Basin Peak (gpd)	Upstream Basins	Cumulative AD (gpd)	Cumulative Peak (gpd)	Facility Name	Facility Size (mgd)
14	West Merrill Creek Basin	42,480	169,920	-	42,480	169,920	**West Merrill Creek Lift Station**	0.17
15	Upper Merrill Creek Basin	10,984	43,937	14	53,464	213,857	**Upper Merrill Creek Lift Station**	0.21
16	Lower Merril Creek Basin	29,523	118,093	14,15	82,987	331,949	**Merrill Creek WWP**	0.125

BRALLEY POOL CREEK WASTEWATER TREATMENT PLANT
PERMITTED CAPACITY = 0.40 MGD

MERRILL CREEK WASTEWATER TREATMENT PLANT
PERMITTED CAPACITY = 0.125 MGD

5000' LAKE ZONING BOUNDARY

UPPER MERRILL CREEK LS = 0.21 MGD

WEST MERRILL CREEK LS = 0.17 MGD

NORTH BUG TUSSLE LS = 0.47 MGD

SOUTH BUG TUSSLE LS = 0.17 MGD

DAVIS CREEK LS = 0.34 MGD

PICKLE CREEK LS = 0.26 MGD

LEGGETS BRANCH LS = 0.45 MGD

BRUSHY CREEK LS = 0.17 MGD

LAKE RALPH HALL
CONSERVATION POOL
551 MSL

Notes:
1. WWTP size determined by multiplying the cumulative average day demand by 1.5 per TCEQ §217.32
2. The infrastructure alignments, locations, and sizes shown in this exhibit are preliminary in nature. Final alignments, locations, and sizes shall be determined by the engineer of record at the time of engineering design.

Kimley»Horn

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Feet

January 2025

North Wastewater Infrastructure Interim Buildout Scenario

Water/Wastewater Master Plan

LAKE RALPH HALL

J

LEGEND

- Prop WWTP
- Prop Gravity Sewer
- Basin 17 Limits
- 5,000' Zoning Boundary
- Lake Ralph Hall Limits
- 100-Year Floodplain
- Roadway
- Stream

West Wastewater System (Interim Development Scenario)

Basin	Basin Name	Basin AD (gpd)	Basin Peak (gpd)	Upstream Basins	Cumulative AD (gpd)	Cumulative Peak (gpd)	Facility Name	Facility Size (mgd)
17	West Lake Ralph Hall Basin	13,434	53,738	-	13,434	53,738	**West Lake Ralph Hall WWTP[1]**	0.02

CR 3335
CR 3340
CR 3341
CR 3350
CR 3715
Carpenter RD
FM 3735
FM 68
Bear Creek
Berry Creek
Allen Creek
Long Creek
North Sulphur River
WWTP
WEST LAKE RALPH HALL
WASTEWATER TREATMENT PLANT
PERMITTED CAPACITY = 0.02 MGD
SIPHON OR FORCE MAIN CROSSING REQUIRED
5000' LAKE ZONING BOUNDARY
17
Maxar, Microsoft

Notes:
1. WWTP size determined by dividing the cumulative average day demand in the service area by 75% per TCEQ §305.126.
2. The infrastructure alignments, locations, and sizes shown in this exhibit are preliminary in nature. Final alignments, locations, and sizes shall be determined by the engineer of record at the time of engineering design.

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750 375 0 750
Feet

January 2025

West Wastewater Infrastructure Interim Buildout Scenario

Water/Wastewater Master Plan

LAKE RALPH HALL

K

6.0 CONCLUSION

UTRWD commissioned this water and wastewater master plan to support the communities and water/wastewater service providers around the new Lake Ralph Hall reservoir and provide a roadmap for future infrastructure planning. Although the rate of future development is uncertain, UTRWD hopes this document will provide guidance for communities to navigate future growth.

This document is recommended to be a living document which may be updated in 5- to 10-year intervals based on growth around the lake, both within the zoning boundary and outside of it.

Kimley-Horn would like to thank the following people for their contributions to the development of the master plan:

- UTRWD: Kaylee Waldo, P.E.; Ed Motley, P.E.; Doug Janeway; Ronna Hartt, P.E.; Jason Pierce
- Brazos River Authority: Aaron Abel
- City of Ladonia: Grady Howard
- McCraw Chapel WSC: Tom Wishard, James Moffatt
- Dial WSC: Henry and Denise Spruce
- Bartley Woods WSC: Lance Capehart
- Gober MUD: Jan Johnson
- North Hunt SUD: Stacey Nicholson

APPENDIX A – WATER IMPROVEMENT MAPS

LEGEND

Water Infrastructure
- Existing Well or Pump Station
- Existing Water Lines
- Proposed Water Lines

Service Areas
- Existing Water CCN Boundary
- Assumed Service Area Boundary
- Gober MUD Limits
- Gober MUD Limits Expansion

Map Features
- 5000' Lake Zoning Buffer
- Lake Ralph Hall Limits
- 100-Year Floodplain
- Roadway
- Stream

Notes:
1. Bartley Woods WSC and Gober MUD have no formal boundary, so a service area boundary based on existing water infrastructure was assumed.
2. The infrastructure alignments, locations, and sizes shown in this figure are preliminary in nature. Final alignments, locations, and sizes shall be determined by the engineer of record at the time of engineering design.
3. The infrastructure depicted in this exhibit do not include infrastructure internal to each development, and only reflect regional infrastructure.

Bartley Woods WSC

Gober MUD

North Hunt SUD

EXISTING GOBER MUD PUMP STATION

FM271 1" 1.5" CR3130

FM271 2" CR3135 2"

6" FM27 6" 8" 8" 2" 4" 6" 3" CR3310 2"

CR3135 1" 6" FM68 6" FM68 6" 6" 6" CR3755 6" 3" CR3310

3" FM68

CR3710 2" 3" 3" CR3710 2" CR3710 3" 3" CR3715

3" FM68 4" 3" 2" 3" 2" 2" 1 CR3350 1.5" 1.5" 3" CR3352 2" 4" 1.5" 2.5" 2 2.5" 3" FM68

CR3340 2.5" 4 2.5" CR3340 4" 4" 3 4" CR33413" 3" CR3340 5 3" 6 CR3341 3"

PROJECT LIST

1. Parallel FM68 to CR3352 4" Water Main
2. New South Gober 2.5" Water Main
3. New East Gober 4" Water Main
4. New CR3340 2.5" Water Main
5. New CR3340 3" Water Main
6. New CR3341 3" Water Main

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

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1,000 500 0 1,000
Feet

January 2025

Gober MUD
Water Infrastructure
Interim Buildout Scenario
Water/Wastewater Master Plan

LAKE RALPH HALL

A1

Kimley-Horn & Associates, Inc.

Client:	Upper Trinity Regional Water District	Date:	2/28/2025
Project:	Lake Ralph Hall Water and Wastewater Master Plan	Prepared By:	HGW
KHA No.:	64568005	Checked By:	AKM
1	Gober MUD Water Improvements		Page 1 of 2

Item No.	Item Description	Quantity	Unit
	Project 1: Parallel FM68 to CR3352 4" Water Main		
1	4" Water Line	10,200	LF
2	10" Casing BOTOC	100	LF
3	4" Resilient Seated Gate Valve	10	EA
4	Air Release Valve	6	EA
5	Blow Off Valve	6	EA
6	Connect to Existing Water Line (<12")	6	EA
7	Water Line Trench Safety	10,100	LF
8	Hydromulch Repair	16,900	SY
	Project 2: New South Gober 2.5" Water Main		
1	2.5" Water Line	4,000	LF
2	6" Casing BOTOC	100	LF
3	2.5" Resilient Seated Gate Valve	4	EA
4	Air Release Valve	3	EA
5	Blow Off Valve	3	EA
6	Connect to Existing Water Line (<12")	1	EA
7	Water Line Trench Safety	3,900	LF
8	Hydromulch Repair	6,500	SY
	Project 3: New East Gober 4" Water Main		
1	4" Water Line	6,400	LF
2	10" Casing BOTOC	100	LF
3	4" Resilient Seated Gate Valve	7	EA
4	Air Release Valve	4	EA
5	Blow Off Valve	4	EA
6	Connect to Existing Water Line (<12")	1	EA
7	Water Line Trench Safety	6,300	LF
8	Hydromulch Repair	10,500	SY
	Project 4: New CR3340 2.5" Water Main		
1	2.5" Water Line	3,600	LF
2	6" Casing BOTOC	100	LF
3	2.5" Resilient Seated Gate Valve	4	EA
4	Air Release Valve	2	EA
5	Blow Off Valve	2	EA
6	Connect to Existing Water Line (<12")	2	EA
7	Water Line Trench Safety	3,500	LF
8	Hydromulch Repair	5,900	SY

Kimley-Horn & Associates, Inc.			
Client:	Upper Trinity Regional Water District	Date:	2/28/2025
Project:	Lake Ralph Hall Water and Wastewater Master Plan	Prepared By:	HGW
KHA No.:	64568005	Checked By:	AKM
1	Gober MUD Water Improvements		Page 2 of 2

Item No.	Item Description	Quantity	Unit
	Project 5: New CR3340 3" Water Main		
1	3" Water Line	3,200	LF
2	8" Casing BOTOC	100	LF
3	3" Resilient Seated Gate Valve	3	EA
4	Air Release Valve	2	EA
5	Blow Off Valve	2	EA
6	Connect to Existing Water Line (<12")	1	EA
7	Water Line Trench Safety	3,100	LF
8	Hydromulch Repair	5,200	SY
	Project 6: New CR3341 3" Water Main		
1	3" Water Line	4,700	LF
2	8" Casing BOTOC	100	LF
3	3" Resilient Seated Gate Valve	5	EA
4	Air Release Valve	3	EA
5	Blow Off Valve	3	EA
6	Connect to Existing Water Line (<12")	2	EA
7	Water Line Trench Safety	4,600	LF
8	Hydromulch Repair	7,700	SY

LEGEND

Water Infrastructure
- Existing Well or Pump Station
- Existing Water Lines
- Proposed Water Lines

Service Areas
- Existing Water CCN Boundary
- Assumed Service Area Boundary
- Bartley Woods WSC Limits

Map Features
- 5000' Lake Zoning Buffer
- Lake Ralph Hall Limits
- 100-Year Floodplain
- Roadway
- Stream

Notes:
1. Bartley Woods WSC and Gober MUD have no formal boundary, so a service area boundary based on existing water infrastructure was assumed.
2. The infrastructure alignments, locations, and sizes shown in this figure are preliminary in nature. Final alignments, locations, and sizes shall be determined by the engineer of record at the time of engineering design.
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Kimley»Horn

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2,000 1,000 0 2,000
Feet

January 2025

Bartley Woods WSC
Water Infrastructure
Interim Buildout Scenario
Water/Wastewater Master Plan

Bartley Woods WSC

Gober MUD

McCraw Chapel WSC

LAKE RALPH HALL

LAKE RALPH HALL CONSERVATION POOL 551 MSL

PROPOSED MCCRAW-BARTLEY INTERCONNECT

CR3010 · CR3070 · CR3020 · CR3025 · CR3040 · CR3035 · CR3106 · CR3060 · CR3250 · CR3331 · CR3343 · CR3332 · CR3340 · CR3360 · FM271 · FM1550 · FM2077 · FM1743

EXISTING BARTLEY WOODS WSC PUMP STATION

EXISTING	ADDITIONAL REQUIRED
Supply - 194 gpm	Supply - n/a
Pressure - 5,500 Gal	Pressure - 620 Gal
Ground Storage - 60,000 Gal	Ground Storage - 1,200 Gal
Pumping - 660 gpm	Pumping - n/a

PROJECT LIST

1. Existing Bartley Woods WSC Pump Station Improvements
2. Parallel FM1550 6" Water Main
3. Parallel CR3331 4" Water Main
4. Parallel CR3343 4" Water Main
5. Bartley Woods - McCraw Chapel 4" Interconnect
6. CR3360 4" Water Loop
7. CR3340 4" Water Main
8. New CR3332 4" Water Main

A2

Kimley-Horn & Associates, Inc.

Client:	Upper Trinity Regional Water District	Date:	2/28/2025
Project:	Lake Ralph Hall Water and Wastewater Master Plan	Prepared By:	HGW
KHA No.:	64568005	Checked By:	AKM
2	Bartley Woods		Page 1 of 2

Item No.	Item Description	Quantity	Unit
	Project 1: Existing Bartley Woods WSC Pump Station Improvements		
1	2,500-Gallon Hydropneumatic Tank	1	LS
2	5,000-Gallon Ground Storage Tank	1	LS
	Project 2: Parallel FM1550 6" Water Main		
1	6" Water Line	19,400	LF
2	12" Casing BOTOC	100	LF
3	6" Resilient Seated Gate Valve	20	EA
4	Air Release Valve	10	EA
5	Blow Off Valve	10	EA
6	Connect to Existing Water Line (<12")	8	EA
7	Water Line Trench Safety	19,300	LF
8	Hydromulch Repair	32,400	SY
	Project 3: Parallel CR331 4" Water Main		
1	6" Water Line	3,100	LF
2	12" Casing BOTOC	100	LF
3	6" Resilient Seated Gate Valve	3	EA
4	Air Release Valve	2	EA
5	Blow Off Valve	2	EA
6	Connect to Existing Water Line (<12")	8	EA
7	Water Line Trench Safety	3,000	LF
8	Hydromulch Repair	5,200	SY
	Project 4: Parallel CR3343 4" Water Main		
1	4" Water Line	5,000	LF
2	10" Casing BOTOC	100	LF
3	4" Resilient Seated Gate Valve	5	EA
4	Air Release Valve	3	EA
5	Blow Off Valve	3	EA
6	Connect to Existing Water Line (<12")	2	EA
7	Water Line Trench Safety	4,900	LF
8	Hydromulch Repair	8,400	SY

Kimley-Horn & Associates, Inc.			
Client:	Upper Trinity Regional Water District	Date:	2/28/2025
Project:	Lake Ralph Hall Water and Wastewater Master Plan	Prepared By:	HGW
KHA No.:	64568005	Checked By:	AKM
2	Bartley Woods		Page 2 of 2
Item No.	Item Description	Quantity	Unit
	Project 5: Bartley Woods - McCraw Chapel 4" Interconnect		
1	4" Water Line	2,600	LF
2	10" Casing BOTOC	100	LF
3	4" Resilient Seated Gate Valve	3	EA
4	Air Release Valve	2	EA
5	Blow Off Valve	2	EA
6	Connect to Existing Water Line (<12")	2	EA
7	Water Line Trench Safety	2,500	LF
8	Hydromulch Repair	4,400	SY
	Project 6: CR3360 4" Water Loop		
1	4" Water Line	8,600	LF
2	10" Casing BOTOC	200	LF
3	4" Resilient Seated Gate Valve	9	EA
4	Air Release Valve	5	EA
5	Blow Off Valve	5	EA
6	Connect to Existing Water Line (<12")	1	EA
7	Water Line Trench Safety	8,400	LF
8	Hydromulch Repair	14,400	SY
	Project 7: CR3340 4" Water Main		
1	4" Water Line	4,800	LF
2	10" Casing BOTOC	100	LF
3	4" Resilient Seated Gate Valve	5	EA
4	Air Release Valve	3	EA
5	Blow Off Valve	3	EA
6	Connect to Existing Water Line (<12")	2	EA
7	Water Line Trench Safety	4,700	LF
8	Hydromulch Repair	7,700	SY
	Project 8: New CR3332 4" Water Main		
1	3" Water Line	6,100	LF
2	8" Casing BOTOC	100	LF
3	3" Resilient Seated Gate Valve	6	EA
4	Air Release Valve	4	EA
5	Blow Off Valve	4	EA
6	Connect to Existing Water Line (<12")	2	EA
7	Water Line Trench Safety	6,000	LF
8	Hydromulch Repair	10,200	SY

LEGEND

Water Infrastructure
- Proposed Pump Station
- Existing Well or Pump Station
- Existing Water Lines
- Proposed Water Lines

Service Areas
- Existing Water CCN Boundary
- Dial WSC Limits

Map Features
- 5000' Lake Zoning Buffer
- Lake Ralph Hall Limits
- 100-Year Floodplain
- Roadway
- Stream
- Leon Hurse Dam

Dial WSC

McCraw Chapel WSC

PROPOSED MCCRAW-DIAL INTERCONNECT

EXISTING DIAL WSC PUMP STATION

PROPOSED LRH NORTH PUMP STATION

ADDITIONAL REQUIRED (DIAL)	ADDITIONAL REQUIRED (MCCRAW)
Supply - 20 gpm	Supply - 327 gpm
Pressure - 200 gal	Pressure - 11,467 gal
	Ground Storage - 115,667 gal
	Pumping - 478 gpm

PROJECT LIST

1. McCraw Chapel - Dial 4" Interconnect
2. FM 1550 4" Water Main

LAKE RALPH HALL CONSERVATION POOL 551 MSL

Kimley»Horn

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1,000 500 0 1,000
Feet

February 2025

Dial WSC Water Infrastructure Interim Buildout Scenario

Water/Wastewater Master Plan

LAKE RALPH HALL

A3

Kimley-Horn & Associates, Inc.

Client:	Upper Trinity Regional Water District	Date:	2/28/2025
Project:	Lake Ralph Hall Water and Wastewater Master Plan	Prepared By:	HGW
KHA No.:	64568005	Checked By:	AKM
3	Dial WSC Water Improvements		Page 1 of 1

Item No.	Item Description	Quantity	Unit
	Project 1: McCraw Chapel - Dial 4" Interconnect		
1	Supply (17 GPM)	1	LS
2	Pressure (100 Gal.)	1	LS
3	4" Interconnect	1	LS
	Project 2: FM 1550 4" Water Main		
1	4" Water Line	4,200	LF
2	10" Casing BOTOC	300	LF
3	4" Resilient Seated Gate Valve	5	EA
4	Air Release Valve	3	EA
5	Blow Off Valve	3	EA
6	Connect to Existing Water Line (<12")	6	EA
7	Water Line Trench Safety	3,900	LF
8	Hydromulch Repair	7,000	SY

LEGEND

Water Infrastructure
- Proposed Pump Station
- Existing Well or Pump Station
- Existing Water Lines
- Proposed Water Lines
- M Existing Master Meter

Service Areas
- Existing Water CCN Boundary
- Assumed Service Area Boundary
- McCraw Water Limits
- McCraw Water Limits Expansion

Map Features
- 5000' Lake Zoning Buffer
- Lake Ralph Hall Limits
- 100-Year Floodplain
- Roadway
- Stream
- Leon Hurse Dam

PROJECT LIST

1. Proposed LRH North Pump Station
2. Lake Crossing 8" Water Transmission Main
3. East FM1550 8" Water Transmission Main
4. McCraw Chapel WSC Pump Station #1
5. West FM 1550 8" Water Transmission Main
6. FM 2990 4" Water Main
7. McCraw Chapel - Bartley Woods 4" Interconnect
8. CR 3489 / FM 1550 6" Water Loop
9. CR 3365 4" Water Main
10. CR 3370 4" Water Main
11. SH 34 6" Water Main
12. CR 3600 4" Water Main
13. CR 3365 2.5" Water Main

MCCRAW CHAPEL WSC MASTER METER
Supply from Honey Grove = 0.1 MGD

PROPOSED MCCRAW CHAPEL WSC PUMP STATION #1
Supply - 217 gpm
Pressure - 9,553 gal
Ground Storage - 94,533 gal
Firm Pumping Capacity - 478 gpm

PROPOSED MCCRAW-BARTLEY INTERCONNECT

PROPOSED INTERCONNECT (DIAL/MCCRAW)

PROPOSED LRH NORTH PUMP STATION

ADDITIONAL REQUIRED (MCCRAW)	ADDITIONAL REQUIRED (DIAL)
Supply - 327 gpm	Supply - 20 gpm
Pressure - 11,467 gal	Pressure - 200 gal
Ground Storage - 115,667 gal	
Firm Pump Capacity - 478 gpm	

Notes:
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2. The infrastructure depicted in this exhibit do not include infrastructure internal to each development, and only reflect regional infrastructure.
3. Line sizes shown above do not provide fire flow. If fire flow is desired by a proposed development, a separate evaluation will be required.

Maxar, Texas Parks & Wildlife, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, USFWS

A4

LAKE RALPH HALL

McCraw Chapel WSC Water Infrastructure Interim Buildout Scenario

Water/Wastewater Master Plan

1,000 500 0 1,000
Feet

February 2025

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Kimley-Horn & Associates, Inc.

Client:	Upper Trinity Regional Water District	Date:	6/3/2025
Project:	Lake Ralph Hall Water and Wastewater Master Plan	Prepared By:	HGW
KHA No.:	64568005	Checked By:	AKM
4	McCraw Chapel WSC		Page 1 of 4

Item No.	Item Description	Quantity	Unit
	Project 1: Proposed LRH North Pump Station		
1	Supply (330 GPM)	1	LS
2	Pressure (11,467 Gal.)	1	LS
3	Ground Storage (115,667 Gal.)	1	LS
4	Firm Pump Capactiy (478 GPM)	1	LS
	Project 2: Lake Crossing 10" Water Transmission Main		
1	10" Water Line	9,500	LF
2	20" Casing BOTOC	300	LF
3	10" Resilient Seated Gate Valve	10	EA
4	Air Release Valve	5	EA
5	Blow Off Valve	5	EA
6	Connect to Existing Water Line (<12")	2	EA
7	Fire Hydrant Assembly	20	EA
8	Water Line Trench Safety	9,200	LF
9	Hydromulch Repair	15,900	SY
	Project 3: East FM 1550 10" Water Transmission Main		
1	10" Water Line	7,100	LF
2	20" Casing BOTOC	200	LF
3	10" Resilient Seated Gate Valve	7	EA
4	Air Release Valve	4	EA
5	Blow Off Valve	4	EA
6	Connect to Existing Water Line (<12")	3	EA
7	Fire Hydrant Assembly	15	EA
8	Water Line Trench Safety	6,900	LF
9	Hydromulch Repair	11,900	SY

Kimley-Horn & Associates, Inc.			
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KHA No.:	64568005	Checked By:	AKM
4	McCraw Chapel WSC		Page 2 of 4

Item No.	Item Description	Quantity	Unit
	Project 4: McCraw Chapel WSC Pump Station #1		
1	Supply (214 GPM)	1	LS
2	Pressure (9.553 Gal.)	1	LS
3	Ground Storage (9.553 Gal.)	1	LS
4	Firm Pumping Capacity (478 GPM)	1	LS
	Project 5: West FM 1550 12" Water Transmission Main		
1	12" Water Line	15,200	LF
2	10" Casing BOTOC	400	LF
3	24" Resilient Seated Gate Valve	16	EA
4	Air Release Valve	8	EA
5	Blow Off Valve	8	EA
6	Connect to Existing Water Line (<12")	4	EA
7	Fire Hydrant Assembly	32	EA
8	Water Line Trench Safety	14,800	LF
9	Hydromulch Repair	25,400	SY
	Project 6: FM 2990 10/12" Water Main		
1	10" Water Line	2,700	LF
2	12" Water Line	5,000	LF
3	24" Casing BOTOC	100	LF
4	12" Resilient Seated Gate Valve	5	EA
5	Air Release Valve	3	EA
6	Blow Off Valve	3	EA
7	Connect to Existing Water Line (<12")	2	EA
8	Fire Hydrant Assembly	11	EA
9	Water Line Trench Safety	4,900	LF
10	Hydromulch Repair	8,400	SY
	Project 7: McCraw Chapel - Bartley Woods 10" Interconnect		
1	10" Water Line	2,500	LF
2	20" Casing BOTOC	100	LF
3	10" Resilient Seated Gate Valve	3	EA
4	Air Release Valve	2	EA
5	Blow Off Valve	2	EA
6	Connect to Existing Water Line (<12")	1	EA
7	Fire Hydrant Assembly	6	EA
8	Water Line Trench Safety	2,400	LF
9	Hydromulch Repair	4,200	SY

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4	McCraw Chapel WSC		Page 3 of 4

Item No.	Item Description	Quantity	Unit
	Project 8: CR 3489 / FM 1550 10" Water Loop		
1	10" Water Line	17,900	LF
2	20" Casing BOTOC	500	LF
3	10" Resilient Seated Gate Valve	18	EA
4	Air Release Valve	10	EA
5	Blow Off Valve	10	EA
6	Connect to Existing Water Line (<12")	2	EA
7	Fire Hydrant Assembly	37	EA
8	Water Line Trench Safety	17,400	LF
9	Hydromulch Repair	29,900	SY
	Project 9: CR 3365 4" Water Main		
1	4" Water Line	7,900	LF
2	10" Casing BOTOC	200	LF
3	4" Resilient Seated Gate Valve	8	EA
4	Air Release Valve	5	EA
5	Blow Off Valve	5	EA
6	Connect to Existing Water Line (<12")	1	EA
7	Fire Hydrant Assembly	17	EA
8	Water Line Trench Safety	7,700	LF
9	Hydromulch Repair	13,200	SY
	Project 10: CR 3370 4" Water Main		
1	4" Water Line	5,800	LF
2	10" Casing BOTOC	200	LF
3	4" Resilient Seated Gate Valve	6	EA
4	Air Release Valve	3	EA
5	Blow Off Valve	3	EA
6	Connect to Existing Water Line (<12")	1	EA
7	Fire Hydrant Assembly	12	EA
8	Water Line Trench Safety	5,600	LF
9	Hydromulch Repair	9,700	SY
	Project 11: SH 34 10" Water Main		
1	10" Water Line	3,700	LF
2	20" Casing BOTOC	100	LF
3	10" Resilient Seated Gate Valve	4	EA
4	Air Release Valve	2	EA
5	Blow Off Valve	2	EA
6	Connect to Existing Water Line (<12")	1	EA
7	Fire Hydrant Assembly	8	EA
8	Water Line Trench Safety	3,600	LF
9	Hydromulch Repair	6,200	SY

Kimley-Horn & Associates, Inc.			
Client:	Upper Trinity Regional Water District	Date:	6/3/2025
Project:	Lake Ralph Hall Water and Wastewater Master Plan	Prepared By:	HGW
KHA No.:	64568005	Checked By:	AKM
4	McCraw Chapel WSC		Page 4 of 4

Item No.	Item Description	Quantity	Unit
	Project 12: CR 3600 10" Water Main		
1	10" Water Line	3,800	LF
2	20" Casing BOTOC	100	LF
3	10" Resilient Seated Gate Valve	4	EA
4	Air Release Valve	2	EA
5	Blow Off Valve	2	EA
6	Connect to Existing Water Line (<12")	1	EA
7	Fire Hydrant Assembly	8	EA
8	Water Line Trench Safety	3,700	LF
9	Hydromulch Repair	6,400	SY
	Project 13: CR 3365 2.5" Water Main		
1	2.5" Water Line	3,500	LF
2	6" Casing BOTOC	100	LF
3	2.5" Resilient Seated Gate Valve	4	EA
4	Air Release Valve	2	EA
5	Blow Off Valve	2	EA
6	Connect to Existing Water Line (<12")	1	EA
7	Fire Hydrant Assembly	8	EA
8	Water Line Trench Safety	3,400	LF
9	Hydromulch Repair	5,900	SY
	Project 14: North FM1550 8" Water Main		
1	8" Water Line	10,700	LF
2	16" Casing BOTOC	300	LF
3	8" Resilient Seated Gate Valve	11	EA
4	Air Release Valve	6	EA
5	Blow Off Valve	6	EA
6	Connect to Existing Water Line (<12")	2	EA
7	Fire Hydrant Assembly	22	EA
8	Water Line Trench Safety	10,400	LF
9	Hydromulch Repair	7,700	SY

PROJECT LIST

1. New Far West Ladonia 8" Water Loop
2. New Ladonia Elevated Storage Tank #2
3. New Central West Ladonia 8" Water Loop #1
4. New Central West Ladonia 8" Water Loop #2
5. New Central Ladonia 6" Water Looping Project
6. New Shelby Lane 6" Water Main
7. New Ladonia Small Diameter Connectivity Water Lines
8. New SH34 8" Water Main
9. New FM3640 8" Water Main
10. Parallel FM64 8" Water Main
11. FM64 Water Main 4" Extension
12. New FM3635 to FM3645 8" Water Loop
13. Proposed LRH South Pump Station
14. SH34 4" Water Line Loop
15. Country Lane 6" Water Main

McCraw Chapel WSC

Dial WSC

FUTURE POTENTIAL 8" INTERCONNECT WITH MCCRAW CHAPEL WSC

LAKE RALPH HALL CONSERVATION POOL 551 MSL

PROPOSED LRH SOUTH PUMP STATION
Supply - 347 gpm
Ground Storage - 115,667 gal
Total Pumping - 1,156 gpm

PROPOSED LADONIA EST #2
Elevated Storage - 48,100 Gal

PROPOSED 4" INTERCONNECT WITH NORTH HUNT SUD

PROPOSED 4" INTERCONNECT WITH DELTA COUNTY MUD

EXISTING RAW WATER STUBOUT

EXISTING RAW WATER PIPELINE

North Hunt SUD

SH34 · CR3640 · Country Ln · Fowler Ln · Shelby Ln · W Main St · FM2990 · CR3635 · CR3645 · FM64 · FM3680 · FM3940 · FM3945 · SH50 · FM2456

LEGEND

Water Infrastructure
- Proposed Pump Station
- Existing Well or Pump Station
- Existing Water Lines
- Proposed Water Lines
- Future Water Lines
- Existing Elevated Storage Tank
- Proposed Elevated Storage Tank

Service Areas
- Existing Water CCN Boundary
- Assumed Service Area Boundary
- Ladonia Water Limits
- Ladonia Water Limits Expansion
- Ladonia City Limits

Map Features
- 5000' Lake Zoning Buffer
- Lake Ralph Hall Limits
- 100-Year Floodplain
- Pipeline Easement
- Roadway
- Stream
- Leon Hurse Dam

Notes:
1. The infrastructure alignments, locations, and sizes shown in this figure are preliminary in nature. Final alignments, locations, and sizes shall be determined by the engineer of record at the time of engineering design.
2. The infrastructure depicted in this exhibit do not include infrastructure internal to each development, and only reflect regional infrastructure.

Kimley»Horn

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1,000 500 0 1,000 Feet

February 2025

City of Ladonia
Water Infrastructure
Interim Buildout Scenario
Water/Wastewater Master Plan

LAKE RALPH HALL

A5

Kimley-Horn & Associates, Inc.

Client:	Upper Trinity Regional Water District	Date:	6/3/2025
Project:	Lake Ralph Hall Water and Wastewater Master Plan	Prepared By:	HGW
KHA No.:	64568005	Checked By:	AKM
5	Ladonia Water Improvements		Page 1 of 3

Item No.	Item Description	Quantity	Unit
	Project #1: New Far West Ladonia 8" Water Loop		
1	8" Water Line	10,800	LF
2	16" Casing BOTOC	400	LF
3	8" Resilient Seated Gate Valve	11	EA
4	Air Release Valve	6	EA
5	Blow Off Valve	6	EA
6	Fire Hydrant Assembly	23	EA
7	Connect to Existing Water Line (<12")	15	EA
8	Water Line Trench Safety	10,400	LF
9	Hydromulch Repair	18,000	SY
	Project #2: New Ladonia Elevated Storage Tank #2		
1	50,000-Gallon Elevated Storage Tank	1	LS
	Project 3: New Central West Ladonia 8" Water Loop #1		
1	6" Water Line	2,900	LF
2	8" Water Line	13,000	LF
3	16" Casing BOTOC	100	LF
4	8" Resilient Seated Gate Valve	13	EA
5	Air Release Valve	8	EA
6	Blow Off Valve	8	EA
7	Fire Hydrant Assembly	32	EA
8	Connect to Existing Water Line (<12")	4	EA
9	Water Line Trench Safety	12,900	LF
10	Hydromulch Repair	21,700	SY
	Project #4: New Central West Ladonia 8" Water Loop #2		
1	10" Water Line	8400	LF
2	20" Casing BOTOC	200	LF
3	10" Resilient Seated Gate Valve	8.6	EA
4	Air Release Valve	5	EA
5	Blow Off Valve	5	EA
6	Fire Hydrant Assembly	18	EA
7	Connect to Existing Water Line (<12")	4	EA
8	Water Line Trench Safety	8,200	LF
9	Hydromulch Repair	14,000	SY
	Project #5: New Central Ladonia 6" Water Looping Project		
1	8" Water Line	7100	LF
2	16" Casing BOTOC	200	LF
3	8" Resilient Seated Gate Valve	7.3	EA
4	Air Release Valve	4	EA
5	Blow Off Valve	4	EA
6	Fire Hydrant Assembly	15	EA
7	Connect to Existing Water Line (<12")	5	EA
8	Water Line Trench Safety	6900	LF
9	Hydromulch Repair	11900	SY

Kimley-Horn & Associates, Inc.			
Client:	Upper Trinity Regional Water District	Date:	6/3/2025
Project:	Lake Ralph Hall Water and Wastewater Master Plan	Prepared By:	HGW
KHA No.:	64568005	Checked By:	AKM
5	Ladonia Water Improvements		Page 2 of 3

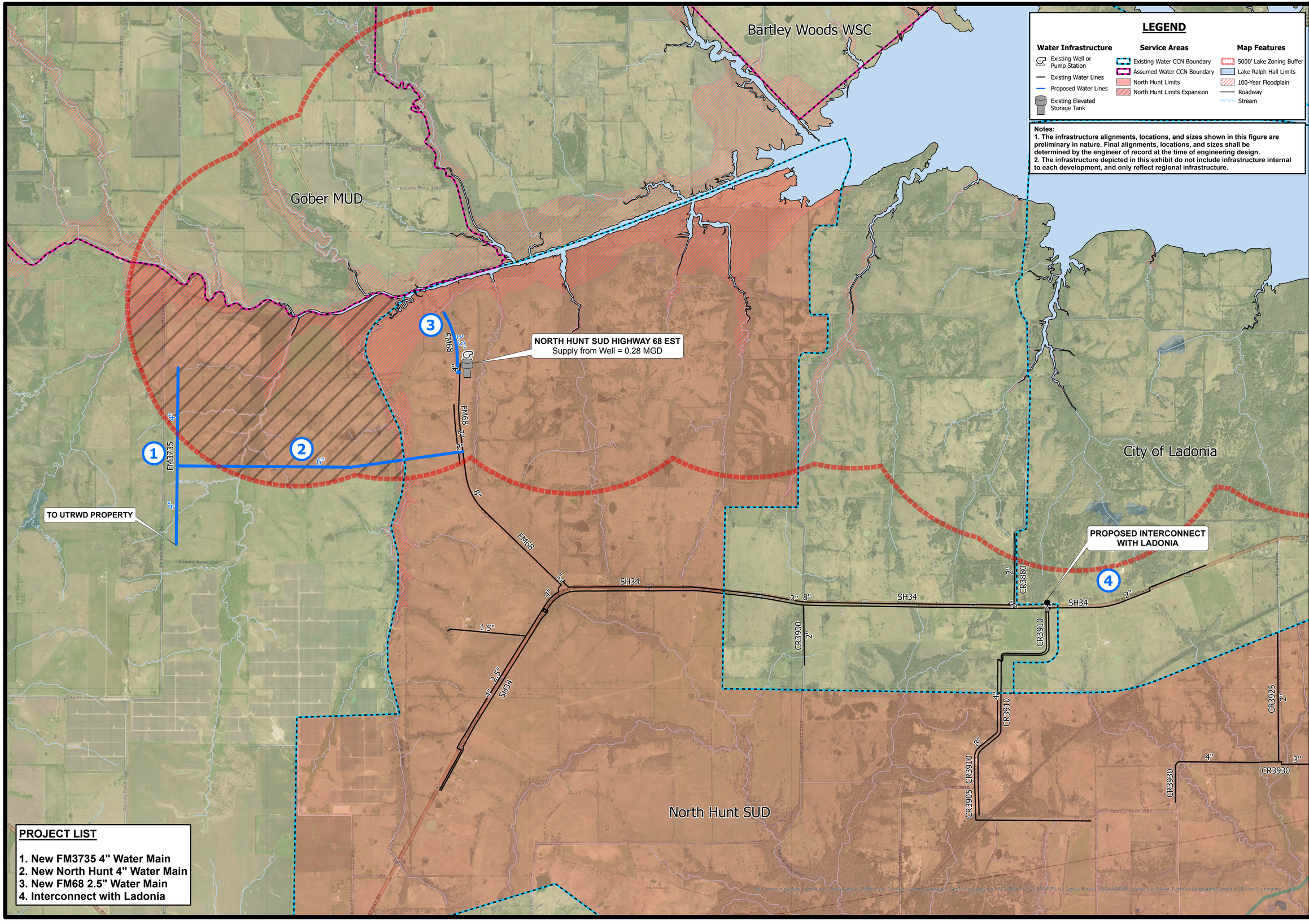
Item No.	Item Description	Quantity	Unit
	Project #6: New Shelby Lane 6" Water Main		
1	6" Water Line	4,800	LF
2	12" Casing BOTOC	100	LF
3	6" Resilient Seated Gate Valve	5	EA
4	Air Release Valve	3	EA
5	Blow Off Valve	3	EA
6	Fire Hydrant Assembly	10	EA
7	Connect to Existing Water Line (<12")	2	EA
8	Water Line Trench Safety	4,700	LF
9	Hydromulch Repair	8,000	SY
	Project #7: New Ladonia Small Diameter Connectivity Water Lines		
1	6" Water Line	900	LF
2	12" Casing BOTOC	300	LF
3	6" Resilient Seated Gate Valve	1	EA
4	Air Release Valve	1	EA
5	Blow Off Valve	1	EA
6	Connect to Existing Water Line (<12")	4	EA
7	Water Line Trench Safety	600	LF
8	Hydromulch Repair	1,000	SY
	Project #8: New SH34 8" Water Main		
1	8" Water Line	7,400	LF
2	16" Casing BOTOC	700	LF
3	8" Resilient Seated Gate Valve	8	EA
4	Air Release Valve	5	EA
5	Blow Off Valve	5	EA
6	Fire Hydrant Assembly	17	EA
7	Connect to Existing Water Line (<12")	6	EA
8	Water Line Trench Safety	6,700	LF
9	Hydromulch Repair	11,200	SY
	Project #9: New FM3640 8" Water Main		
1	8" Water Line	7,300	LF
2	16" Casing BOTOC	500	LF
3	8" Resilient Seated Gate Valve	8	EA
4	Air Release Valve	4	EA
5	Blow Off Valve	4	EA
6	Fire Hydrant Assembly	16	EA
7	Connect to Existing Water Line (<12")	2	EA
8	Water Line Trench Safety	6,800	LF
9	Hydromulch Repair	12,200	SY
	Project #10: Parallel FM64 8" Water Main		
1	8" Water Line	11,500	LF
2	16" Casing BOTOC	1,200	LF
3	8" Resilient Seated Gate Valve	13	EA
4	Air Release Valve	7	EA
5	Blow Off Valve	7	EA
6	Fire Hydrant Assembly	26	EA
7	Connect to Existing Water Line (<12")	9	EA
8	Water Line Trench Safety	10,300	LF
9	Hydromulch Repair	17,200	SY

Kimley-Horn & Associates, Inc.			
Client:	Upper Trinity Regional Water District	Date:	6/3/2025
Project:	Lake Ralph Hall Water and Wastewater Master Plan	Prepared By:	HGW
KHA No.:	64568005	Checked By:	AKM
5	Ladonia Water Improvements		Page 3 of 3

Item No.	Item Description	Quantity	Unit
	Project #11: FM64 Water Main 4" Extension		
1	8" Water Line	4,000	LF
2	16" Casing BOTOC	100	LF
3	8" Resilient Seated Gate Valve	4	EA
4	Air Release Valve	3	EA
5	Blow Off Valve	3	EA
6	Connect to Existing Water Line (<12")	1	EA
7	Water Line Trench Safety	3,900	LF
8	Hydromulch Repair	6,500	SY
	Project #12: New FM3635 to FM3645 8" Water Loop		
1	8" Water Line	11,200	LF
2	16" Casing BOTOC	600	LF
3	8" Resilient Seated Gate Valve	4	EA
4	Air Release Valve	3	EA
5	Blow Off Valve	3	EA
6	Fire Hydrant Assembly	9	EA
7	Connect to Existing Water Line (<12")	4	EA
8	Water Line Trench Safety	3,900	LF
9	Hydromulch Repair	18,700	SY
	Project #13: Proposed LRH South Pump Station		
1	Groundwater Well Cooling Tower	1	LS
2	100,000-Gallon Ground Storage Tank	1	LS
3	1.16 MGD Pump Station	1	LS
	Project #14: SH34 4" Water Line Loop		
1	4" Water Line	20,000	LF
2	10" Casing BOTOC	600	LF
3	4" Resilient Seated Gate Valve	20	EA
4	Air Release Valve	11	EA
5	Blow Off Valve	11	EA
6	Fire Hydrant Assembly	42	EA
7	Connect to Existing Water Line (<12")	4	EA
8	Water Line Trench Safety	20,600	LF
9	Hydromulch Repair	33,400	SY
	Project #15: Country Lane 6" Water Line		
1	6" Water Line	3,700	LF
2	12" Casing BOTOC	100	LF
3	6" Resilient Seated Gate Valve	4	EA
4	Air Release Valve	2	EA
5	Blow Off Valve	2	EA
6	Fire Hydrant Assembly	8	EA
7	Connect to Existing Water Line (<12")	2	EA
8	Water Line Trench Safety	3,600	LF
9	Hydromulch Repair	6,200	SY

North Hunt SUD Water Infrastructure Interim Buildout Scenario

Water/Wastewater Master Plan



LEGEND

Water Infrastructure	Service Areas	Map Features
Existing Well or Pump Station	Existing Water CCN Boundary	5000' Lake Zoning Buffer
Existing Water Lines	Assumed Water CCN Boundary	Lake Ralph Hall Limits
Proposed Water Lines	North Hunt Limits	100-Year Floodplain
Existing Elevated Storage Tank	North Hunt Limits Expansion	Roadway
		Stream

Notes:
1. The infrastructure alignments, locations, and sizes shown in this figure are preliminary in nature. Final alignments, locations, and sizes shall be determined by the engineer of record at the time of engineering design.
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PROJECT LIST

1. New FM3735 4" Water Main
2. New North Hunt 4" Water Main
3. New FM68 2.5" Water Main
4. Interconnect with Ladonia

Kimley»Horn

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1,000 500 0 1,000
Feet

January 2025

LAKE RALPH HALL

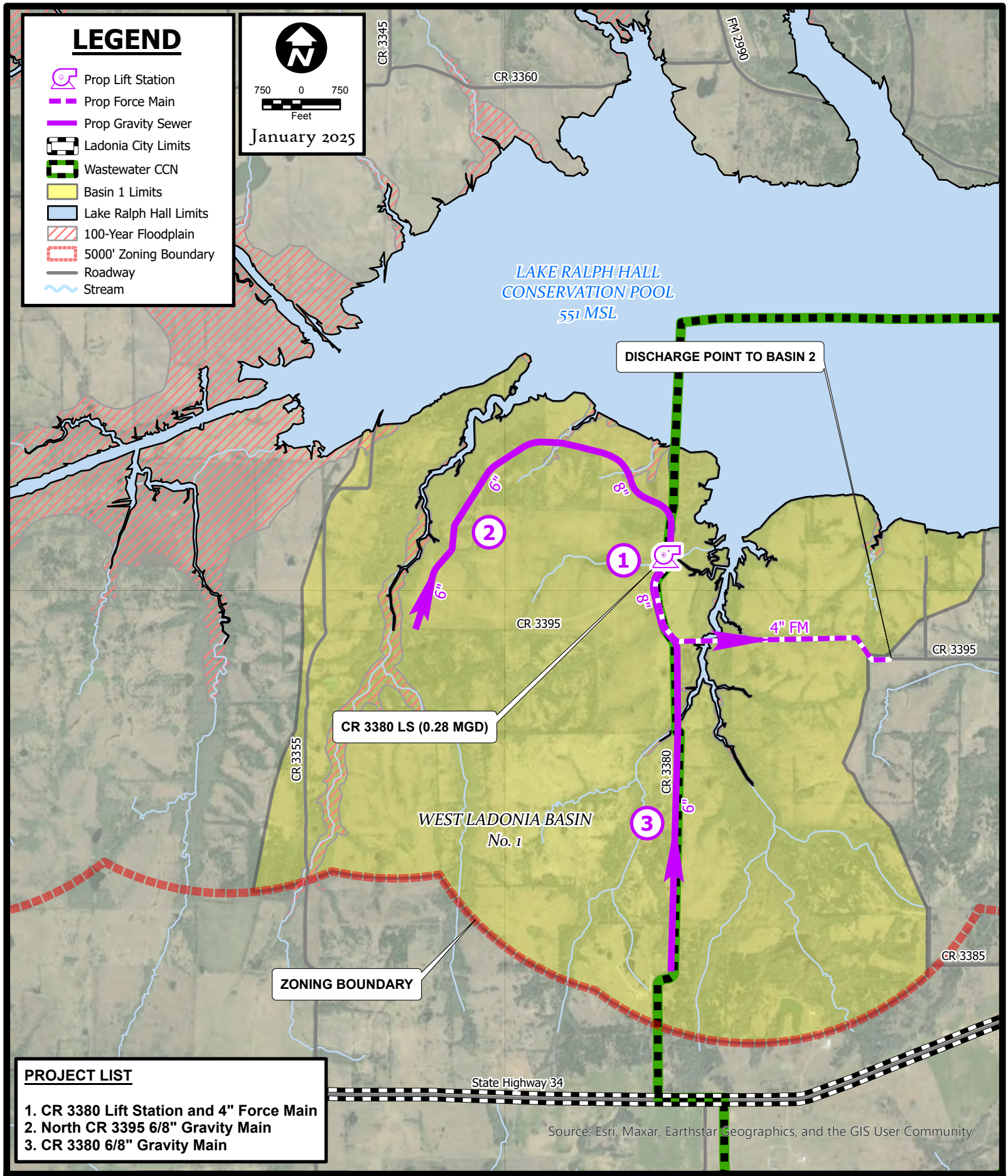
A6

Kimley-Horn & Associates, Inc.

Client:	Upper Trinity Regional Water District	Date:	2/28/2025
Project:	Lake Ralph Hall Water and Wastewater Master Plan	Prepared By:	HGW
KHA No.:	64568005	Checked By:	AKM
6	North Hunt SUD Water Improvements		Page 1 of 1

Item No.	Item Description	Quantity	Unit
	Project 1: New FM3735 4" Water Main		
1	4" Water Line	5,600	LF
2	10" Casing BOTOC	100	LF
3	4" Resilient Seated Gate Valve	6	EA
4	Air Release Valve	3	EA
5	Blow Off Valve	3	EA
6	Fire Hydrant Assembly	3	EA
7	Connect to Existing Water Line (<12")	1	EA
8	Water Line Trench Safety	5,500	LF
9	Hydromulch Repair	9,200	SY
	Project 2: New North Hunt 4" Water Main		
1	4" Water Line	8,800	LF
2	10" Casing BOTOC	100	LF
3	4" Resilient Seated Gate Valve	9	EA
4	Air Release Valve	5	EA
5	Blow Off Valve	5	EA
6	Fire Hydrant Assembly	5	EA
7	Connect to Existing Water Line (<12")	1	EA
8	Water Line Trench Safety	8,700	LF
9	Hydromulch Repair	14,500	SY
	Project 3: New FM68 2.5" Water Main		
1	2.5" Water Line	2,100	LF
2	6" Casing BOTOC	100	LF
3	2.5" Resilient Seated Gate Valve	2	EA
3	Air Release Valve	2	EA
4	Blow Off Valve	2	EA
5	Connect to Existing Water Line (<12")	1	EA
6	Water Line Trench Safety	2,000	LF
7	Hydromulch Repair	3,400	SY
	Project 4: Interconnect with Ladonia		
1	4" Interconnect	1	LS

APPENDIX B – WASTEWATER IMPROVEMENT MAPS



PROJECT LIST

1. CR 3380 Lift Station and 4" Force Main
2. North CR 3395 6/8" Gravity Main
3. CR 3380 6/8" Gravity Main

B01

LAKE RALPH HALL

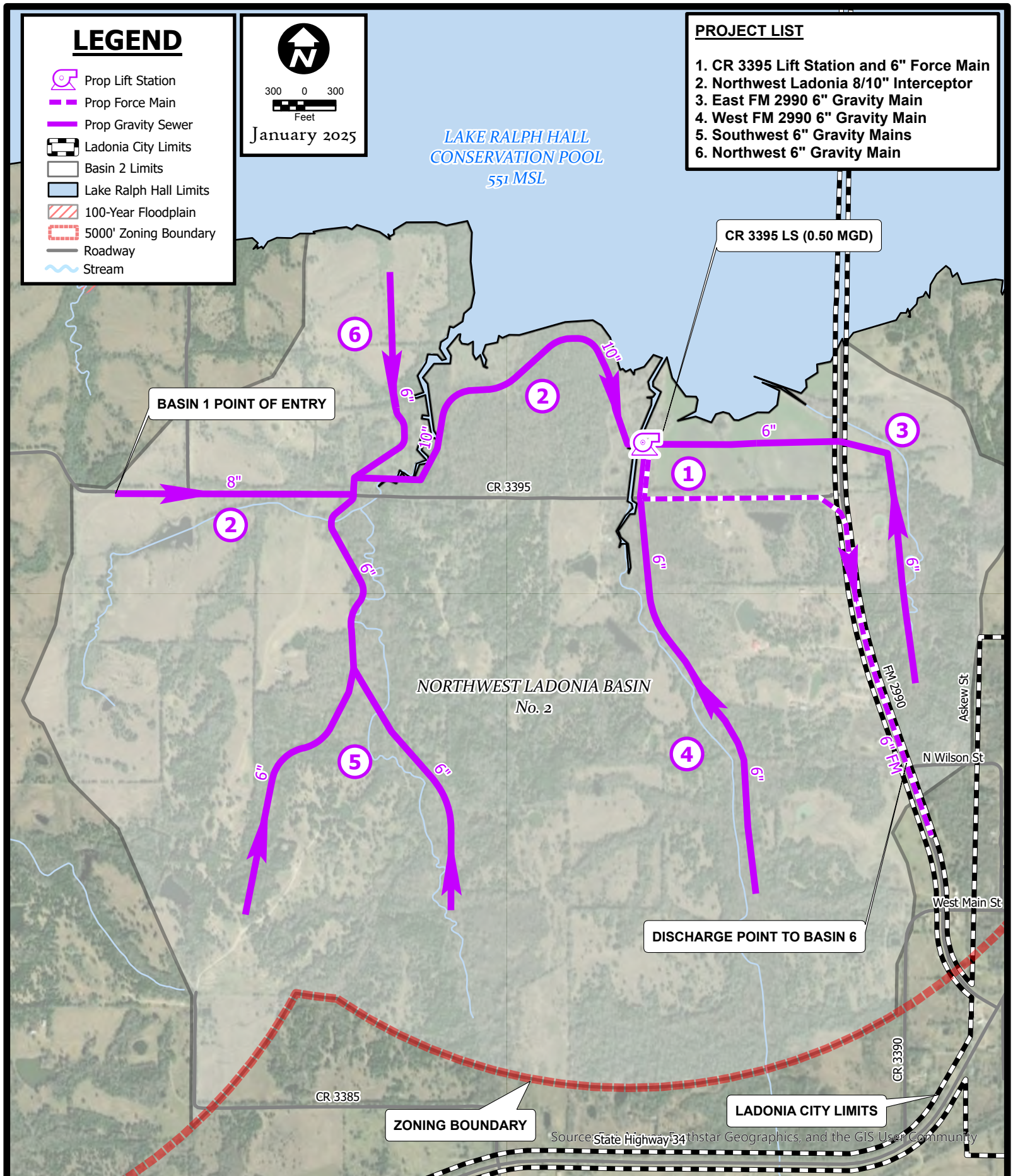
West Ladonia Basin
Wastewater Infrastructure
Interim Development Scenario
Water/Wastewater Master Plan

Kimley»Horn

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Kimley-Horn & Associates, Inc.			Quantity Sheet
Client:	Upper Trinity Regional Water District	Date:	2/27/2025
Project:	Lake Ralph Hall Water and Wastewater Master Plan	Prepared By:	ASM
KHA No.:	64568005	Checked By:	AKM
Basin #1	West Ladonia Basin		

Item No.	Item Description	Quantity	Unit
	Project 1: CR 3380 Lift Station and 4" Force Main		
1	4" Force Main	6,140	LF
2	12" Bore and Steel Casing	300	LF
3	4" Plug Valve	4	EA
4	Air Release Valve	2	EA
5	0.28 MGD Lift Station	1	LS
6	Sewer Line Trench Safety	5,840	LF
7	Hydromulch Repair	10,240	SY
	Project 2: North CR 3395 6/8" Gravity Main		
1	6" Sanitary Sewer	4,930	LF
2	8" Sanitary Sewer	5,350	LF
3	12" Bore and Steel Casing	100	LF
4	16" Bore and Steel Casing	50	LF
5	4' Manhole	21	EA
6	Sewer Line Trench Safety	10,130	LF
7	Hydromulch Repair	16,890	SY
	Project 3: CR 3380 6" Gravity Main		
1	6" Sanitary Sewer	6,440	LF
2	12" Bore and Steel Casing	100	LF
3	4' Manhole	13	EA
4	Sewer Line Trench Safety	6,340	LF
5	Hydromulch Repair	10,570	SY



B02

LAKE RALPH HALL

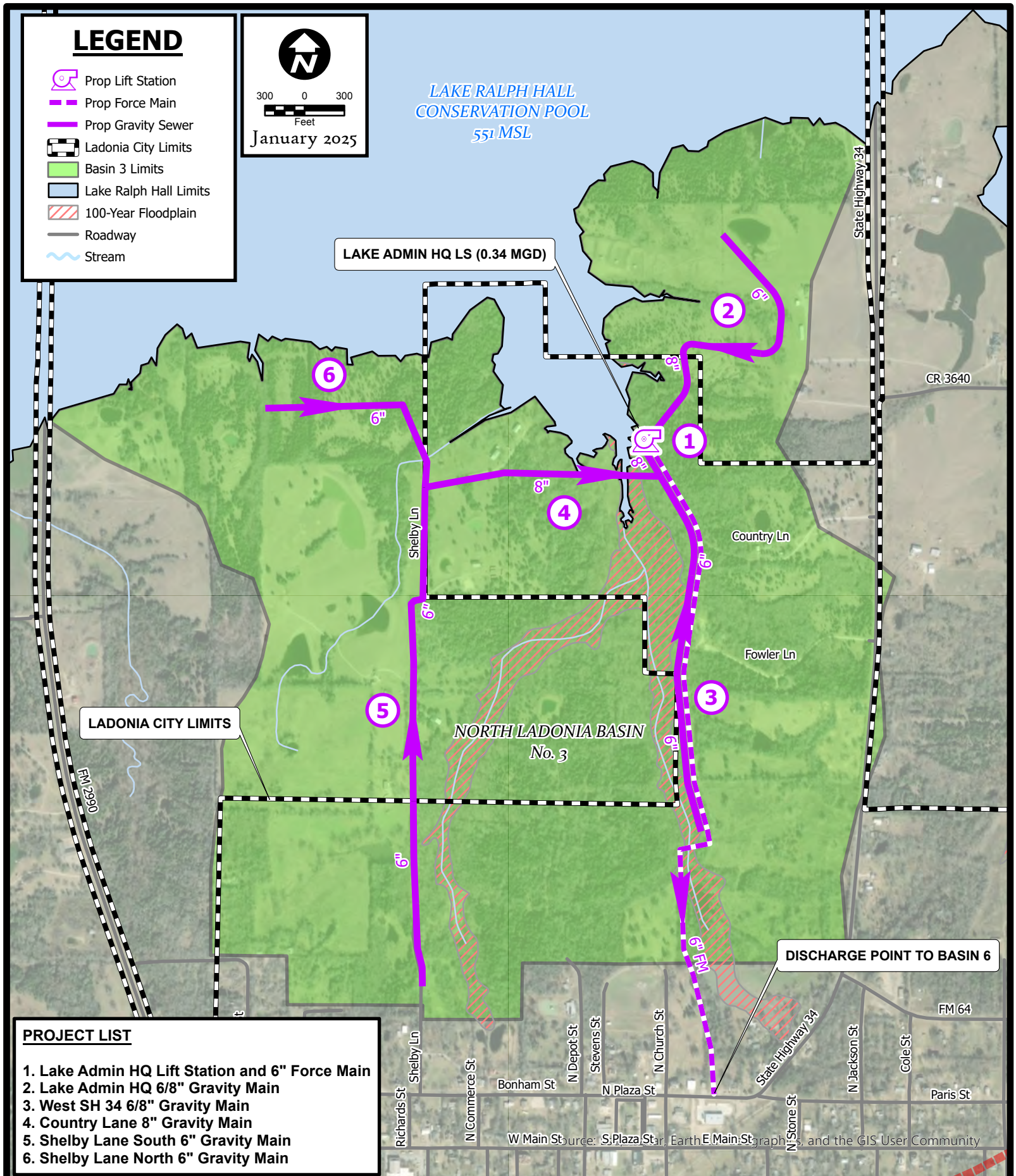
Northwest Ladonia Basin
Wastewater Infrastructure
Interim Development Scenario
Water/Wastewater Master Plan

Kimley»Horn

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Kimley-Horn & Associates, Inc.			Quantity Sheet
Client:	Upper Trinity Regional Water District	Date:	2/27/2025
Project:	Lake Ralph Hall Water and Wastewater Master Plan	Prepared By:	ASM
KHA No.:	64568005	Checked By:	AKM
Basin #2	Northwest Ladonia Basin Project Summary		

Item No.	Item Description	Quantity	Unit
	Project 1: CR 3395 Lift Station and 6" Force Main		
1	6" Force Main	5,730	LF
2	12" Bore and Steel Casing	200	LF
3	6" Plug Valve	3	EA
4	Air Release Valve	2	EA
5	0.50 MGD Lift Station	1	LS
6	Sewer Line Trench Safety	5,530	LF
7	Hydromulch Repair	9,550	SY
	Project 2: Northwest Ladonia 8/10" Interceptor		
1	10" Sanitary Sewer	4,250	LF
2	8" Sanitary Sewer	2,300	LF
3	16" Bore and Steel Casing	450	LF
4	4' Manhole	9	EA
5	Sewer Line Trench Safety	3,800	LF
6	Hydromulch Repair	6,340	SY
	Project 3: East FM 2990 6" Gravity Main		
1	6" Sanitary Sewer	4,580	LF
2	12" Bore and Steel Casing	50	LF
3	4' Manhole	10	EA
4	Sewer Line Trench Safety	4,530	LF
5	Hydromulch Repair	7,550	SY
	Project 4: West FM 2990 6" Gravity Main		
1	6" Sanitary Sewer	4,610	LF
2	12" Bore and Steel Casing	50	LF
3	4' Manhole	10	EA
4	Sewer Line Trench Safety	4,560	LF
5	Hydromulch Repair	7,600	SY
	Project 5: Southwest 6" Gravity Mains		
1	6" Sanitary Sewer	7,230	LF
2	12" Bore and Steel Casing	50	LF
3	4' Manhole	15	EA
4	Sewer Line Trench Safety	7,180	LF
5	Hydromulch Repair	11,970	SY
	Project 6: Northwest 6" Gravity Main		
1	6" Sanitary Sewer	2,420	LF
2	4' Manhole	5	EA
3	Sewer Line Trench Safety	2,420	LF
4	Hydromulch Repair	4,040	SY



PROJECT LIST

1. Lake Admin HQ Lift Station and 6" Force Main
2. Lake Admin HQ 6/8" Gravity Main
3. West SH 34 6/8" Gravity Main
4. Country Lane 8" Gravity Main
5. Shelby Lane South 6" Gravity Main
6. Shelby Lane North 6" Gravity Main

B03

LAKE RALPH HALL

North Ladonia Basin
Wastewater Infrastructure
Interim Development Scenario
Water/Wastewater Master Plan

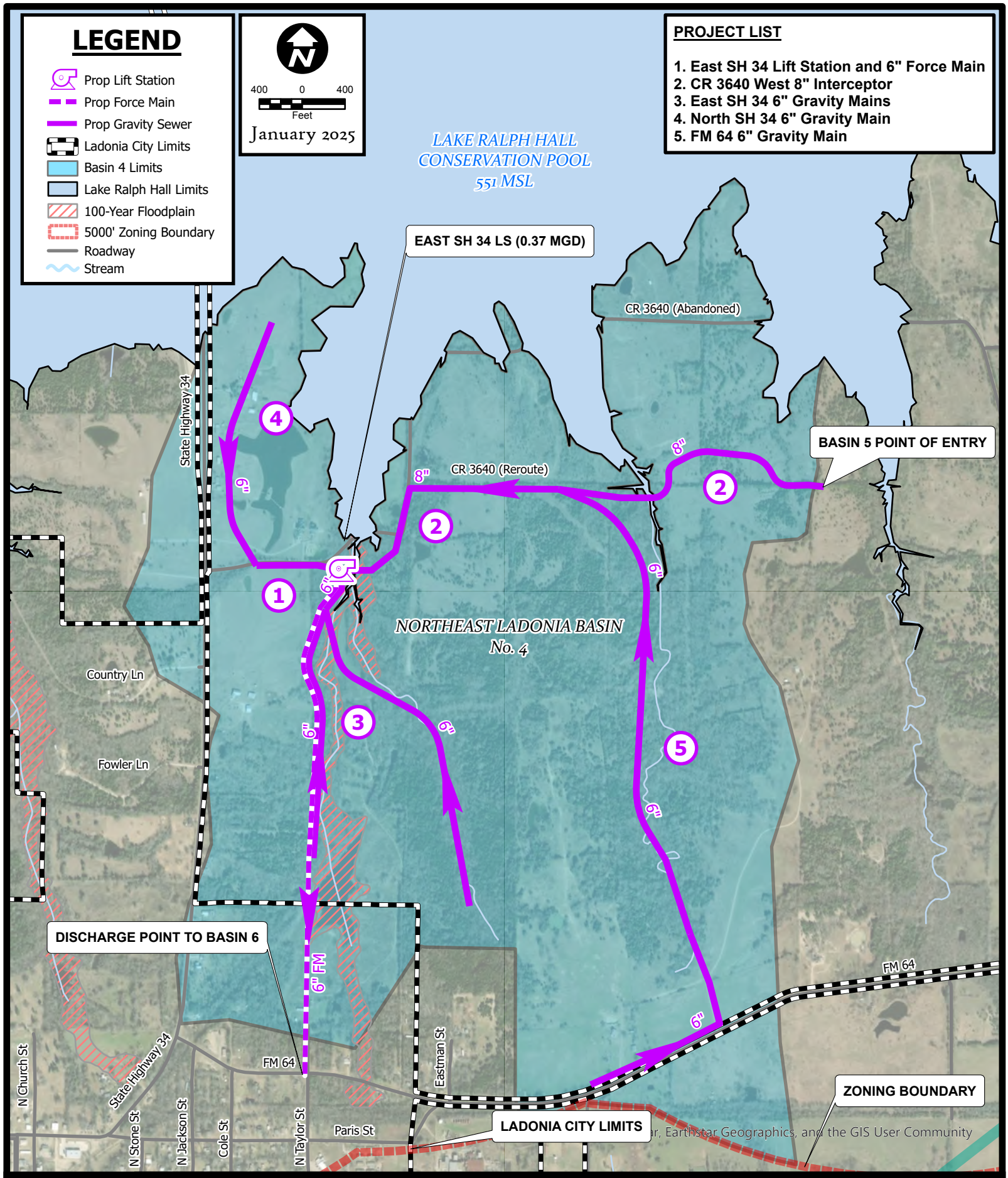
Kimley»Horn

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Source: S Plaza Star, Earthstar Geographics, and the GIS User Community

Kimley-Horn & Associates, Inc.			Quantity Sheet
Client:	Upper Trinity Regional Water District	Date:	2/27/2025
Project:	Lake Ralph Hall Water and Wastewater Master Plan	Prepared By:	ASM
KHA No.:	64568005	Checked By:	AKM
Basin #3	North Ladonia Basin Project Summary		

Item No.	Item Description	Quantity	Unit
	Project 1: Lake Admin HQ Lift Station and 6" Force Main		
1	6" Force Main	5,280	LF
2	12" Bore and Steel Casing	200	LF
3	6" Plug Valve	3	EA
4	Air Release Valve	2	EA
5	0.34 MGD Lift Station	1	LS
6	Sewer Line Trench Safety	5,080	LF
7	Hydromulch Repair	8,800	SY
	Project 2: Lake Admin HQ 6/8"Gravity Main		
1	6" Sanitary Sewer	1,150	LF
2	8" Sanitary Sewer	1,400	LF
3	16" Bore and Steel Casing	50	LF
4	4' Manhole	6	EA
5	Sewer Line Trench Safety	2,500	LF
6	Hydromulch Repair	4,170	SY
	Project 3: West SH 34 6/8" Gravity Main		
1	6" Sanitary Sewer	2,770	LF
2	8" Sanitary Sewer	330	LF
3	16" Bore and Steel Casing	100	LF
4	4' Manhole	7	EA
5	Sewer Line Trench Safety	3,000	LF
6	Hydromulch Repair	5,000	SY
	Project 4: Country Lane 8" Gravity Main		
1	8" Sanitary Sewer	1,790	LF
2	16" Bore and Steel Casing	200	LF
3	4' Manhole	4	EA
4	Sewer Line Trench Safety	1,590	LF
5	Hydromulch Repair	2,650	SY
	Project 5: Shelby Lane South 6" Gravity Main		
1	6" Sanitary Sewer	3,840	LF
2	12" Bore and Steel Casing	100	LF
3	4' Manhole	8	EA
4	Sewer Line Trench Safety	3,740	LF
5	Hydromulch Repair	6,240	SY
	Project 6: Shelby Lane North 6" Gravity Main		
1	6" Sanitary Sewer	1,700	LF
2	12" Bore and Steel Casing	50	LF
3	4' Manhole	4	EA
4	Sewer Line Trench Safety	1,650	LF
5	Hydromulch Repair	2,750	SY



B04

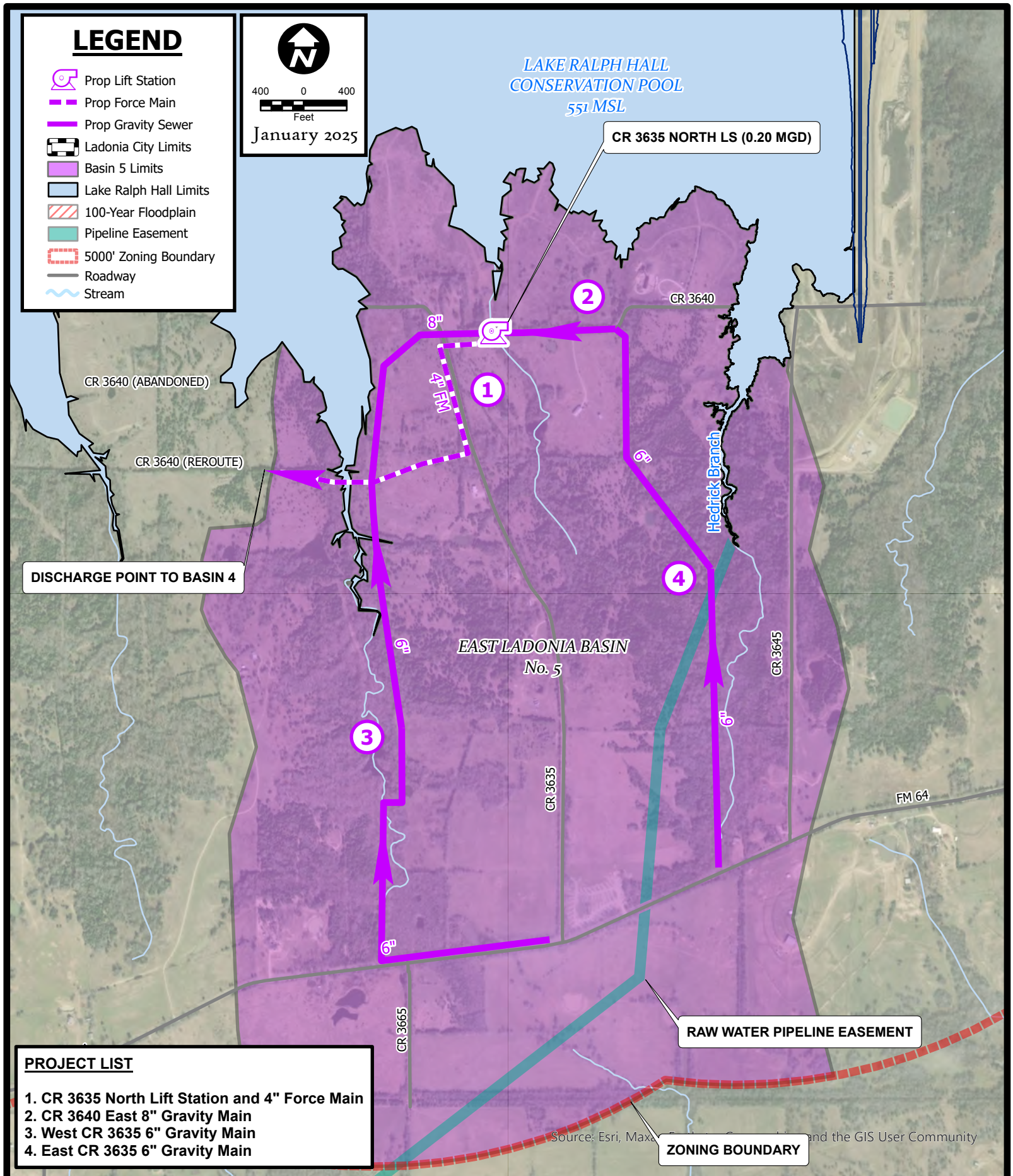
Northeast Ladonia Basin
Wastewater Infrastructure
Interim Development Scenario
Water/Wastewater Master Plan

Kimley»Horn

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Kimley-Horn & Associates, Inc.			Quantity Sheet
Client:	Upper Trinity Regional Water District	Date:	2/27/2025
Project:	Lake Ralph Hall Water and Wastewater Master Plan	Prepared By:	ASM
KHA No.:	64568005	Checked By:	AKM
Basin #4	Northeast Ladonia Basin Project Summary		

Item No.	Item Description	Quantity	Unit
	Project 1: East SH 34 Lift Station and 6" Force Main		
1	6" Force Main	4,820	LF
2	12" Bore and Steel Casing	50	LF
3	6" Plug Valve	3	EA
4	Air Release Valve	2	EA
5	0.37 MGD Lift Station	1	LS
6	Sewer Line Trench Safety	4,770	LF
7	Hydromulch Repair	8,040	SY
	Project 2: CR 3640 West 8" Interceptor		
1	8" Sanitary Sewer	5,400	LF
2	16" Bore and Steel Casing	500	LF
3	4' Manhole	11	EA
4	Sewer Line Trench Safety	4,900	LF
5	Hydromulch Repair	8,170	SY
	Project 3: East SH 34 6" Gravity Mains		
1	6" Sanitary Sewer	6,080	LF
2	12" Bore and Steel Casing	100	LF
3	4' Manhole	13	EA
4	Sewer Line Trench Safety	5,980	LF
5	Hydromulch Repair	9,970	SY
	Project 4: North SH 34 6" Gravity Main		
1	6" Sanitary Sewer	3,210	LF
2	12" Bore and Steel Casing	50	LF
3	4' Manhole	7	EA
4	Sewer Line Trench Safety	3,160	LF
5	Hydromulch Repair	5,270	SY
	Project 5: FM 64 6" Gravity Main		
1	6" Sanitary Sewer	6,870	LF
2	12" Bore and Steel Casing	100	LF
3	4' Manhole	14	EA
4	Sewer Line Trench Safety	6,770	LF
5	Hydromulch Repair	11,290	SY



B05

LAKE RALPH HALL

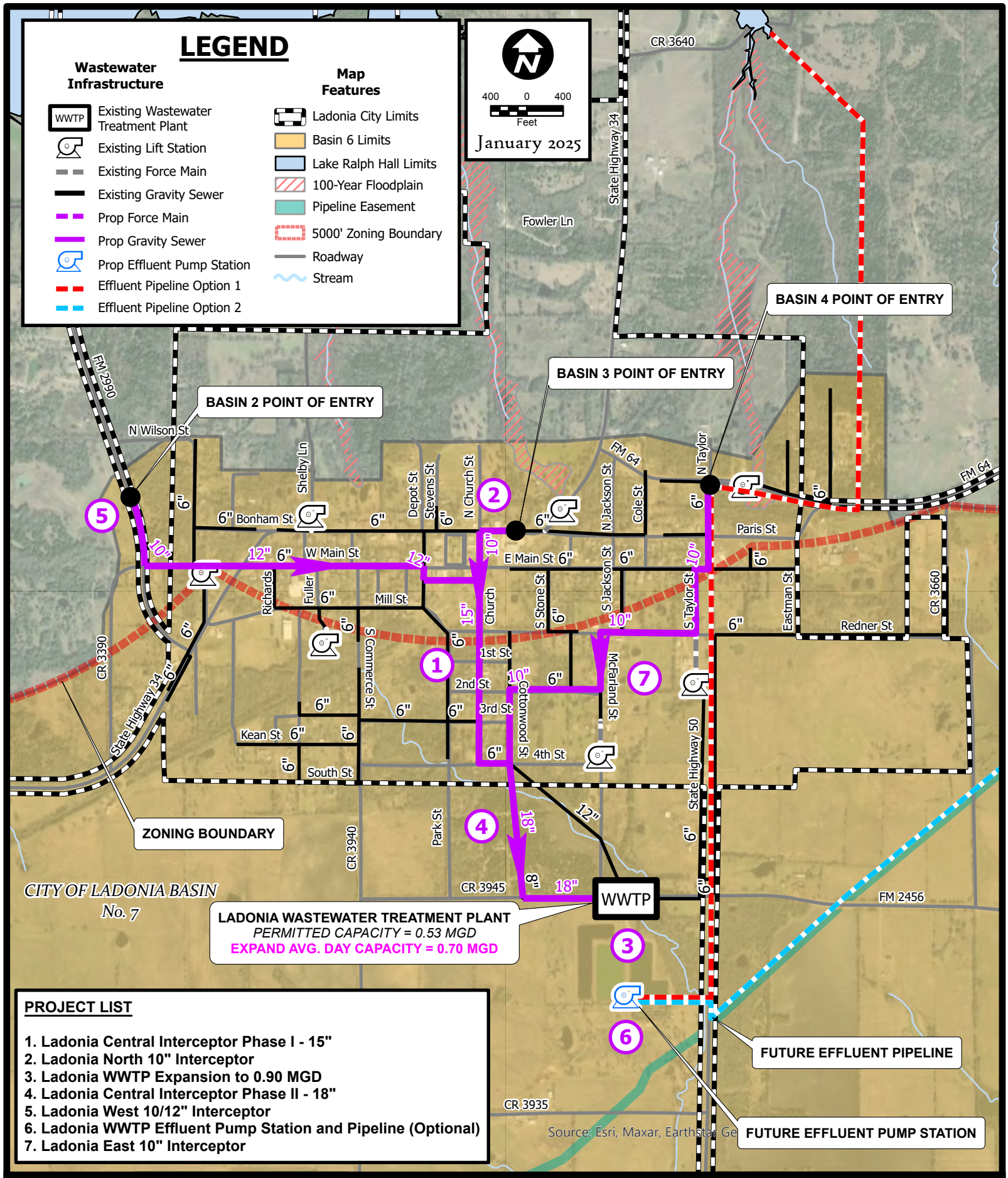
East Ladonia Basin
Wastewater Infrastructure
Interim Development Scenario
Water/Wastewater Master Plan

Kimley»Horn

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Kimley-Horn & Associates, Inc.			Quantity Sheet
Client:	Upper Trinity Regional Water District	Date:	2/27/2025
Project:	Lake Ralph Hall Water and Wastewater Master Plan	Prepared By:	ASM
KHA No.:	64568005	Checked By:	AKM
Basin #5	East Ladonia Basin Project Summary		

Item No.	Item Description	Quantity	Unit
	Project 1: CR 3635 North Lift Station and 4" Force Main		
1	4" Force Main	3,430	LF
2	12" Bore and Steel Casing	300	LF
3	4" Plug Valve	2	EA
4	Air Release Valve	1	EA
5	0.20 MGD Lift Station	1	LS
6	Sewer Line Trench Safety	3,130	LF
7	Hydromulch Repair	5,720	SY
	Project 2: CR 3640 8" Gravity Main		
1	8" Sanitary Sewer	1,130	LF
2	16" Bore and Steel Casing	100	LF
3	4' Manhole	3	EA
4	Sewer Line Trench Safety	1,030	LF
5	Hydromulch Repair	1,720	SY
	Project 3: West CR 3635 6" Gravity Main		
1	6" Sanitary Sewer	6,220	LF
2	12" Bore and Steel Casing	200	LF
3	4' Manhole	13	EA
4	Sewer Line Trench Safety	6,020	LF
5	Hydromulch Repair	10,040	SY
	Project 4: East CR 3635 6" Gravity Main		
1	6" Sanitary Sewer	5,320	LF
2	12" Bore and Steel Casing	200	LF
3	4' Manhole	11	EA
4	Sewer Line Trench Safety	5,120	LF
5	Hydromulch Repair	8,540	SY



B06

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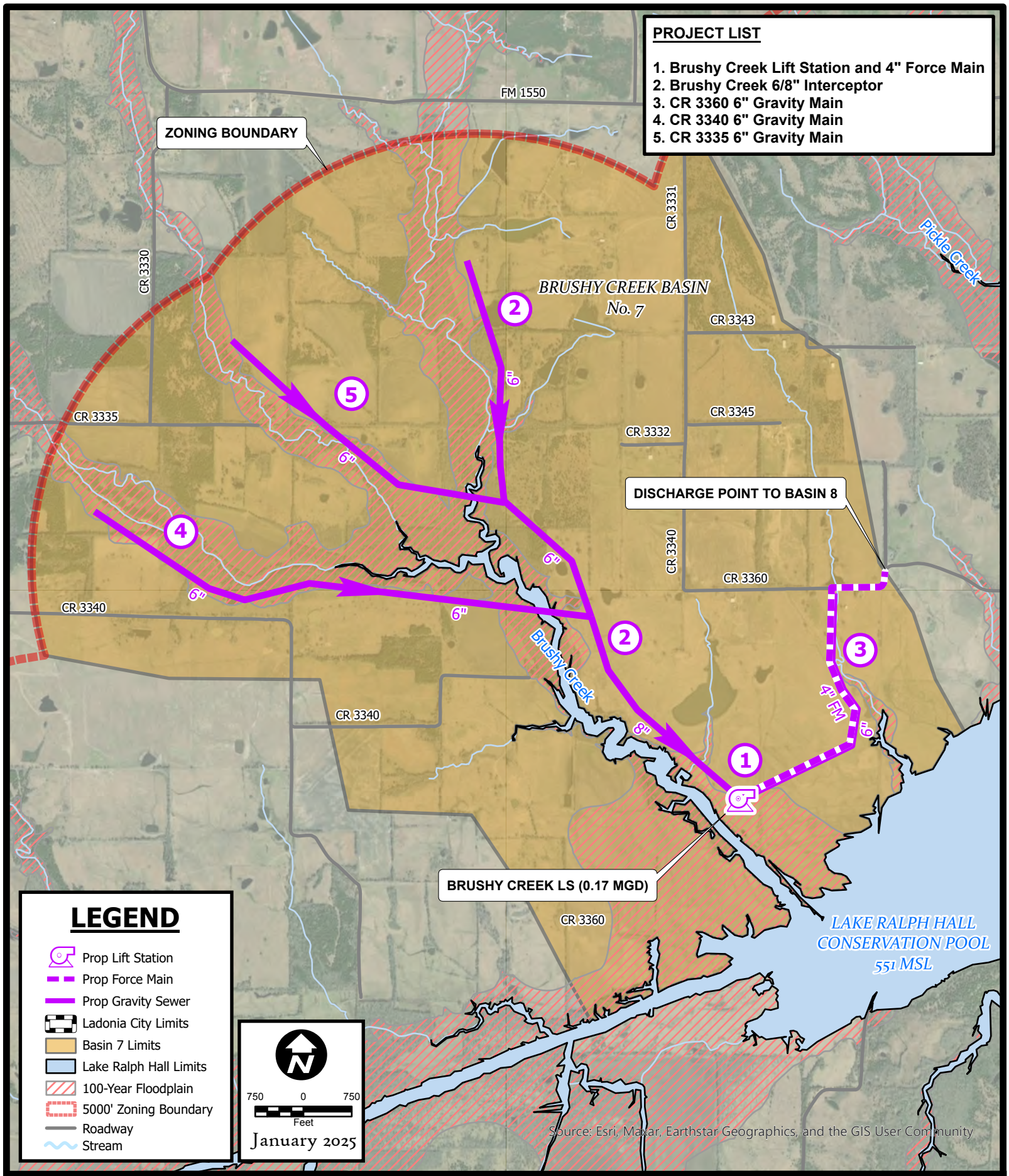
City of Ladonia Basin
Wastewater Infrastructure
Interim Development Scenario
Water/Wastewater Master Plan

Kimley»Horn

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Kimley-Horn & Associates, Inc.			Quantity Sheet
Client:	Upper Trinity Regional Water District	Date:	2/27/2025
Project:	Lake Ralph Hall Water and Wastewater Master Plan	Prepared By:	ASM
KHA No.:	64568005	Checked By:	AKM
Basin #6	City of Ladonia Basin Project Summary		

Item No.	Item Description	Quantity	Unit
	Project 1: Ladonia Central Interceptor Phase 1 - 15"		
1	15" Sanitary Sewer	2,370	LF
2	24" Bore and Steel Casing	150	LF
3	5' Manhole	5	EA
4	Sewer Line Trench Safety	2,220	LF
5	Pavement Repair	1,320	SY
	Project 2: Ladonia North 10" Interceptor		
1	12" Sanitary Sewer	920	LF
3	20" Bore and Steel Casing	50	LF
5	5' Manhole	2	EA
6	Lift Station Decommission	1	LS
7	Sewer Line Trench Safety	870	LF
8	Pavement Repair	520	SY
	Project 3: Ladonia WWTP Expansion to 0.70 MGD		
1	Wastewater Treatment Plant Expansion	1	LS
	Project 4: Central Interceptor Phase II - 18"		
1	18" Sanitary Sewer	2,640	LF
2	24" Bore and Steel Casing	50	LF
3	5' Manhole	6	EA
4	Sewer Line Trench Safety	2,590	LF
5	Pavement Repair	1,467	SY
	Project 5: Ladonia West 10/12" Interceptor		
1	10" Sanitary Sewer	2,140	LF
2	12" Sanitary Sewer	1,390	LF
3	16" Bore and Steel Casing	50	LF
4	20" Bore and Steel Casing	150	LF
5	4' Manhole	8	EA
6	Sewer Line Trench Safety	3,330	LF
7	Pavement Repair	1,970	SY
	Project 6: Ladonia WWTP Effluent Pump Station and Pipeline		
1	16" Effluent Pipeline	16,000	LF
2	24" Bore and Steel Casing	1,000	LF
3	16" Butterfly Valve	8	EA
4	Air Release Valve	8	EA
5	2.8 MGD Effluent Pump Station	1	LS
6	Effluent Line Trench Safety	15,000	LF
7	Hydromulch Repair	25,000	SY
	Project 7: East 10" Interceptor		
1	10" Sanitary Sewer	5,342	LF
2	16" Bore and Steel Casing	150	LF
3	4' Manhole	11	EA
4	Sewer Line Trench Safety	5,192	LF
5	Pavement Repair	2,970	SY



B07

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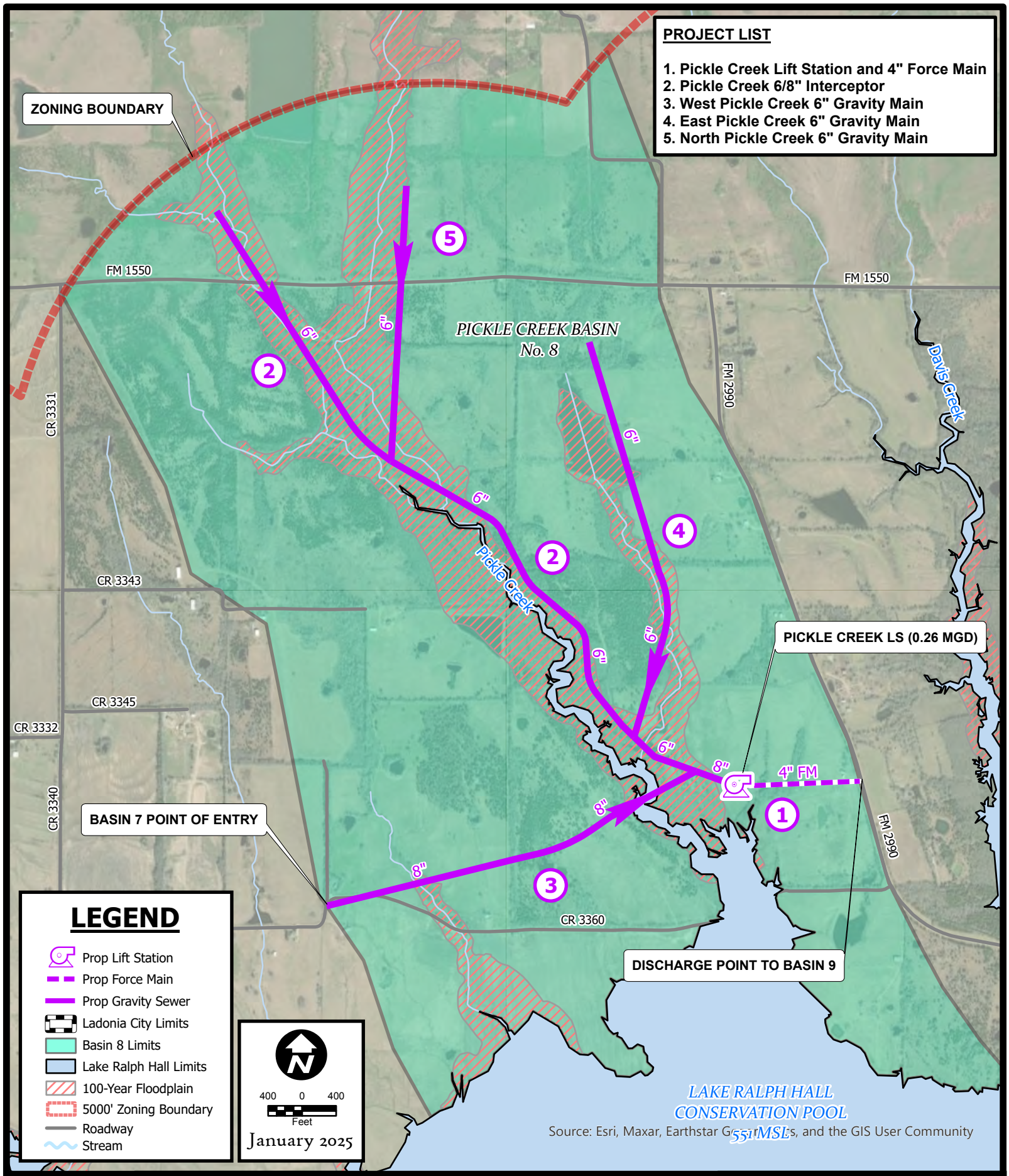
West Ladonia Basin
Wastewater Infrastructure
Interim Development Scenario
Water/Wastewater Master Plan

Kimley»Horn

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Kimley-Horn & Associates, Inc.			Quantity Sheet
Client:	Upper Trinity Regional Water District	Date:	2/27/2025
Project:	Lake Ralph Hall Water and Wastewater Master Plan	Prepared By:	ASM
KHA No.:	64568005	Checked By:	AKM
Basin #7	Brushy Creek Basin Project Summary		

Item No.	Item Description	Quantity	Unit
	Project 1: Brushy Lift Station and 4" Force Main		
1	4" Force Main	5,560	LF
2	12" Bore and Steel Casing	200	LF
3	4" Plug Valve	3	EA
4	Air Release Valve	2	EA
5	0.17 MGD Lift Station	1	LS
6	Sewer Line Trench Safety	5,360	LF
7	Hydromulch Repair	9,270	SY
	Project 2: Brushy Creek 6/8" Interceptor		
1	6" Sanitary Sewer	6,150	LF
2	8" Sanitary Sewer	3,790	LF
3	12" Bore and Steel Casing	200	LF
4	16" Bore and Steel Casing	100	LF
5	4' Manhole	13	EA
6	Sewer Line Trench Safety	5,950	LF
7	Hydromulch Repair	9,920	SY
	Project 3: CR 3360 6" Gravity Main		
1	6" Sanitary Sewer	4,400	LF
2	12" Bore and Steel Casing	100	LF
3	4' Manhole	9	EA
4	Sewer Line Trench Safety	4,300	LF
5	Hydromulch Repair	7,170	SY
	Project 4: CR 3340 6" Gravity Main		
1	6" Sanitary Sewer	8,180	LF
2	12" Bore and Steel Casing	100	LF
3	4' Manhole	17	EA
4	Sewer Line Trench Safety	8,080	LF
5	Hydromulch Repair	13,470	SY
	Project 5: CR 3335 6" Gravity Main		
1	6" Sanitary Sewer	5,100	LF
2	12" Bore and Steel Casing	100	LF
3	4' Manhole	11	EA
4	Sewer Line Trench Safety	5,000	LF
5	Hydromulch Repair	20	SY



B08

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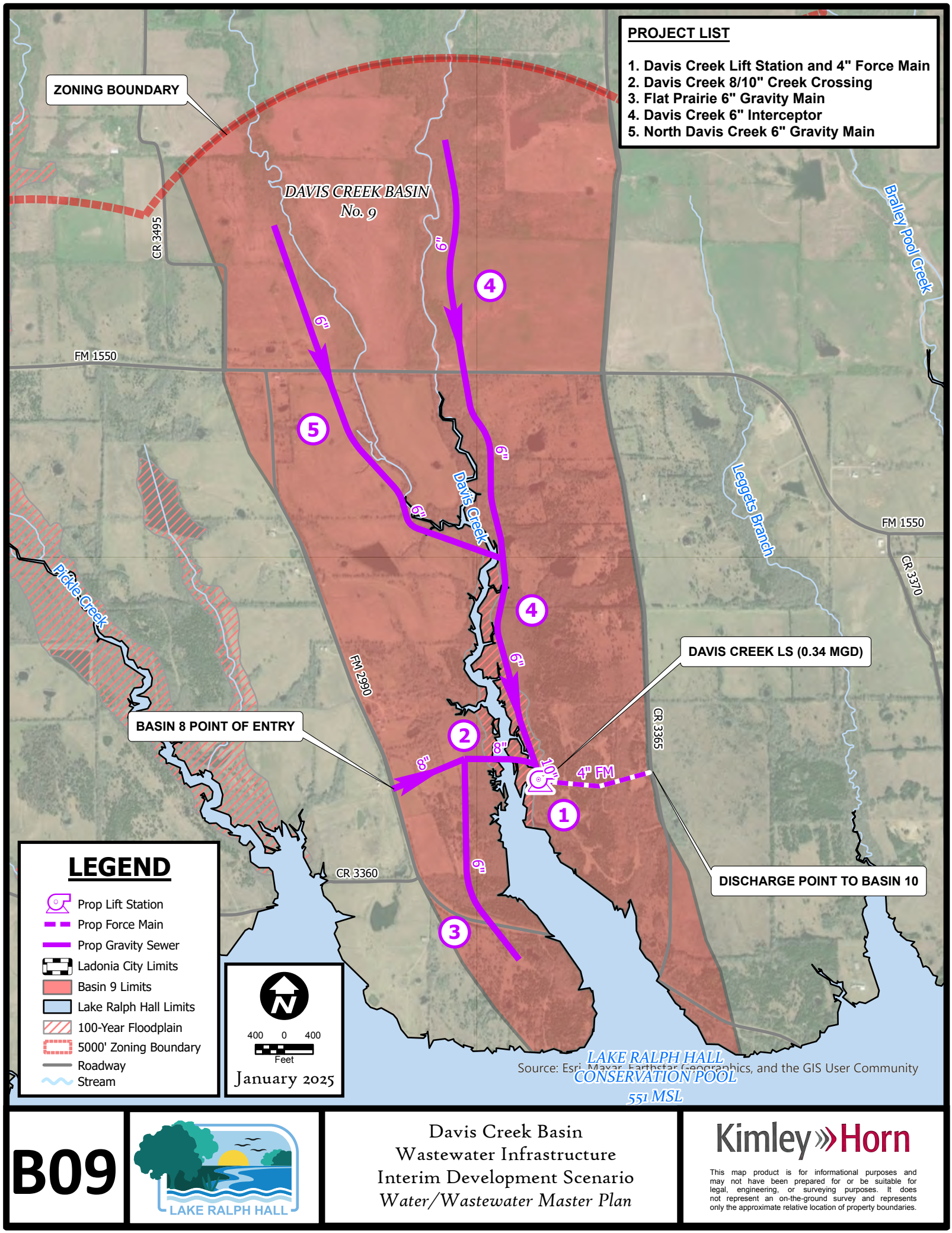
Pickle Creek Basin
Wastewater Infrastructure
Interim Development Scenario
Water/Wastewater Master Plan

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Kimley-Horn & Associates, Inc.			Quantity Sheet
Client:	Upper Trinity Regional Water District	Date:	2/27/2025
Project:	Lake Ralph Hall Water and Wastewater Master Plan	Prepared By:	ASM
KHA No.:	64568005	Checked By:	AKM
Basin #8	Pickle Creek Basin Project Summary		

Item No.	Item Description	Quantity	Unit
	Project 1: Pickle Creek Lift Station and 4" Force Main		
1	4" Force Main	1,440	LF
2	12" Bore and Steel Casing	50	LF
3	4" Plug Valve	1	EA
4	Air Release Valve	1	EA
5	0.26 MGD Lift Station	1	LS
6	Sewer Line Trench Safety	1,390	LF
7	Hydromulch Repair	2,400	SY
	Project 2: Pickle Creek 6/8" Interceptor		
1	6" Sanitary Sewer	8,980	LF
2	8" Sanitary Sewer	520	LF
3	12" Bore and Steel Casing	150	LF
4	16" Bore and Steel Casing	50	LF
5	4' Manhole	19	EA
6	Sewer Line Trench Safety	9,300	LF
7	Hydromulch Repair	15,500	SY
	Project 3: West Pickle Creek 6" Gravity Main		
1	6" Sanitary Sewer	4,660	LF
2	12" Bore and Steel Casing	300	LF
3	4' Manhole	10	EA
4	Sewer Line Trench Safety	4,360	LF
5	Hydromulch Repair	7,270	SY
	Project 4: East Pickle Creek 6" Gravity Main		
1	6" Sanitary Sewer	4,830	LF
2	12" Bore and Steel Casing	50	LF
3	4' Manhole	10	EA
4	Sewer Line Trench Safety	4,780	LF
5	Hydromulch Repair	7,970	SY
	Project 5: North Pickle Creek 6" Gravity Main		
1	6" Sanitary Sewer	3,240	LF
2	12" Bore and Steel Casing	50	LF
3	4' Manhole	7	EA
4	Sewer Line Trench Safety	3,190	LF
5	Hydromulch Repair	5,320	SY



B09

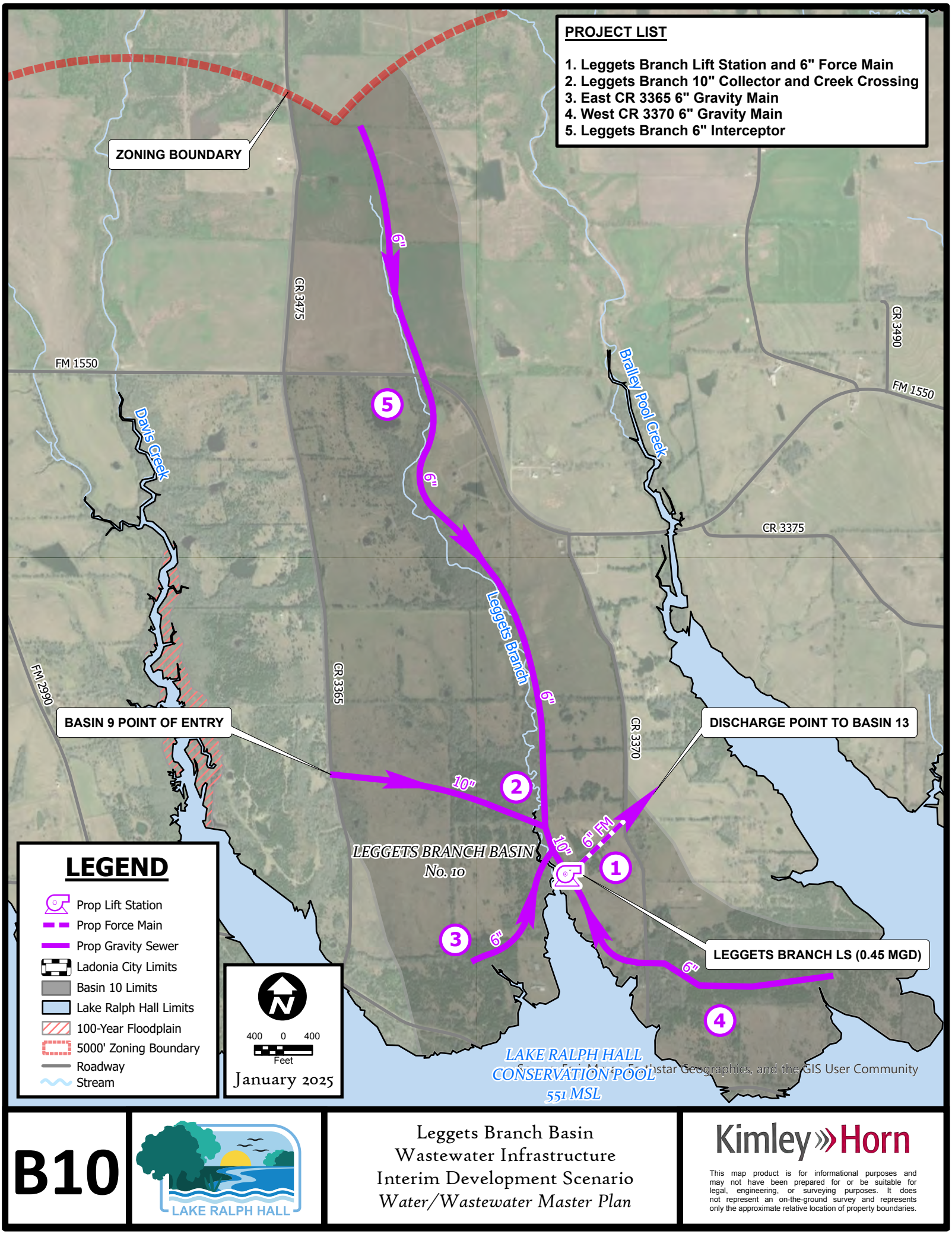
Davis Creek Basin
Wastewater Infrastructure
Interim Development Scenario
Water/Wastewater Master Plan

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Kimley-Horn & Associates, Inc.			Quantity Sheet
Client:	Upper Trinity Regional Water District	Date:	2/27/2025
Project:	Lake Ralph Hall Water and Wastewater Master Plan	Prepared By:	ASM
KHA No.:	64568005	Checked By:	AKM
Basin #9	Davis Creek Basin Project Summary		

Item No.	Item Description	Quantity	Unit
	Project 1: Davis Creek Lift Station and 4" Force Main		
1	4" Force Main	1,540	LF
2	12" Bore and Steel Casing	50	LF
3	4" Plug Valve	1	EA
4	Air Release Valve	1	EA
5	0.34 MGD Lift Station	1	LS
6	Sewer Line Trench Safety	1,490	LF
7	Hydromulch Repair	2,570	SY
	Project 2: Davis Creek 8/10" Crossing		
1	8" Sanitary Sewer	2,080	LF
2	10" Sanitary Sewer	260	LF
3	16" Bore and Steel Casing	300	LF
4	4' Manhole	5	EA
5	Sewer Line Trench Safety	1,780	LF
6	Hydromulch Repair	2,970	SY
	Project 3: Flat Pairie 6" Gravity Main		
1	6" Sanitary Sewer	3,020	LF
2	12" Bore and Steel Casing	50	LF
3	4' Manhole	7	EA
4	Sewer Line Trench Safety	2,970	LF
5	Hydromulch Repair	4,950	SY
	Project 4: Davis Creek 6" Interceptor		
1	6" Sanitary Sewer	2,940	LF
2	12" Bore and Steel Casing	100	LF
3	4' Manhole	6	EA
4	Sewer Line Trench Safety	2,840	LF
5	Hydromulch Repair	4,740	SY
	Project 5: North Davis Creek 6" Gravity Main		
1	6" Sanitary Sewer	6,000	LF
2	12" Bore and Steel Casing	200	LF
3	4' Manhole	12	EA
4	Sewer Line Trench Safety	5,800	LF
5	Hydromulch Repair	9,670	SY



B10

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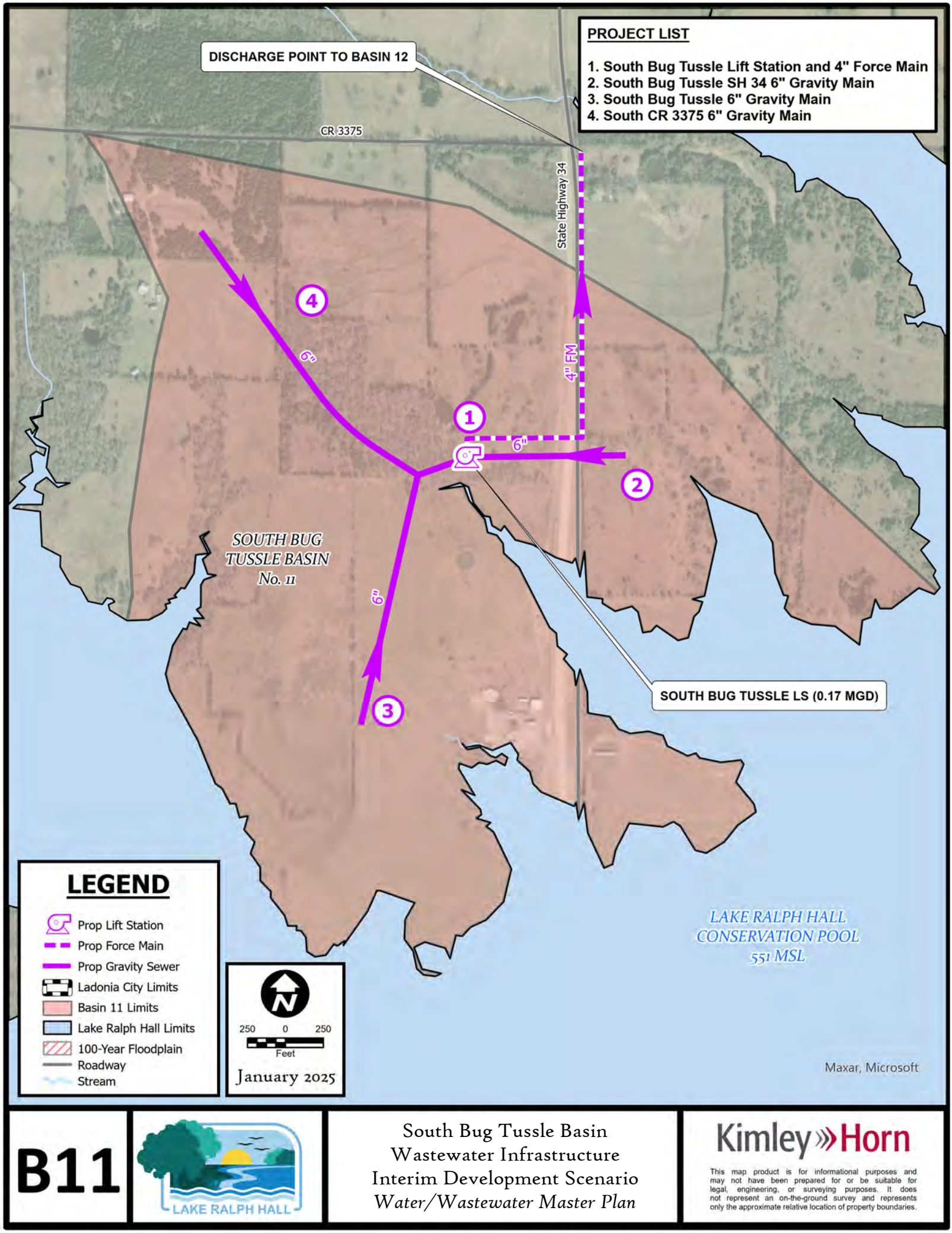
Leggets Branch Basin
Wastewater Infrastructure
Interim Development Scenario
Water/Wastewater Master Plan

Kimley»Horn

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Kimley-Horn & Associates, Inc.			Quantity Sheet
Client:	Upper Trinity Regional Water District	Date:	2/27/2025
Project:	Lake Ralph Hall Water and Wastewater Master Plan	Prepared By:	ASM
KHA No.:	64568005	Checked By:	AKM
Basin #10	Leggets Branch Basin Project Summary		

Item No.	Item Description	Quantity	Unit
	Project 1: Leggets Branch Lift Station and 6" Force Main		
1	6" Force Main	1,110	LF
2	12" Bore and Steel Casing	50	LF
3	6" Plug Valve	1	EA
4	Air Release Valve	1	EA
5	0.45 MGD Lift Station	1	LS
6	Sewer Line Trench Safety	1,060	LF
7	Hydromulch Repair	1,850	SY
	Project 2: Leggets Branch 10" Collector and Creek Crossing		
2	10" Sanitary Sewer	3,860	LF
3	16" Bore and Steel Casing	100	LF
4	4' Manhole	8	EA
5	Sewer Line Trench Safety	3,760	LF
6	Hydromulch Repair	6,270	SY
	Project 3: East CR 3365 6" Gravity Main		
1	6" Sanitary Sewer	2,040	LF
2	12" Bore and Steel Casing	100	LF
3	4' Manhole	5	EA
4	Sewer Line Trench Safety	1,940	LF
5	Hydromulch Repair	3,240	SY
	Project 4: West CR 3370 6" Gravity Main		
1	6" Sanitary Sewer	4,460	LF
2	12" Bore and Steel Casing	50	LF
3	4' Manhole	9	EA
4	Sewer Line Trench Safety	4,410	LF
5	Hydromulch Repair	7,350	SY
	Project 5: Leggets Branch 6" Interceptor		
1	6" Sanitary Sewer	10,430	LF
2	12" Bore and Steel Casing	200	LF
3	4' Manhole	21	EA
4	Sewer Line Trench Safety	10,230	LF
5	Hydromulch Repair	17,050	SY



B11

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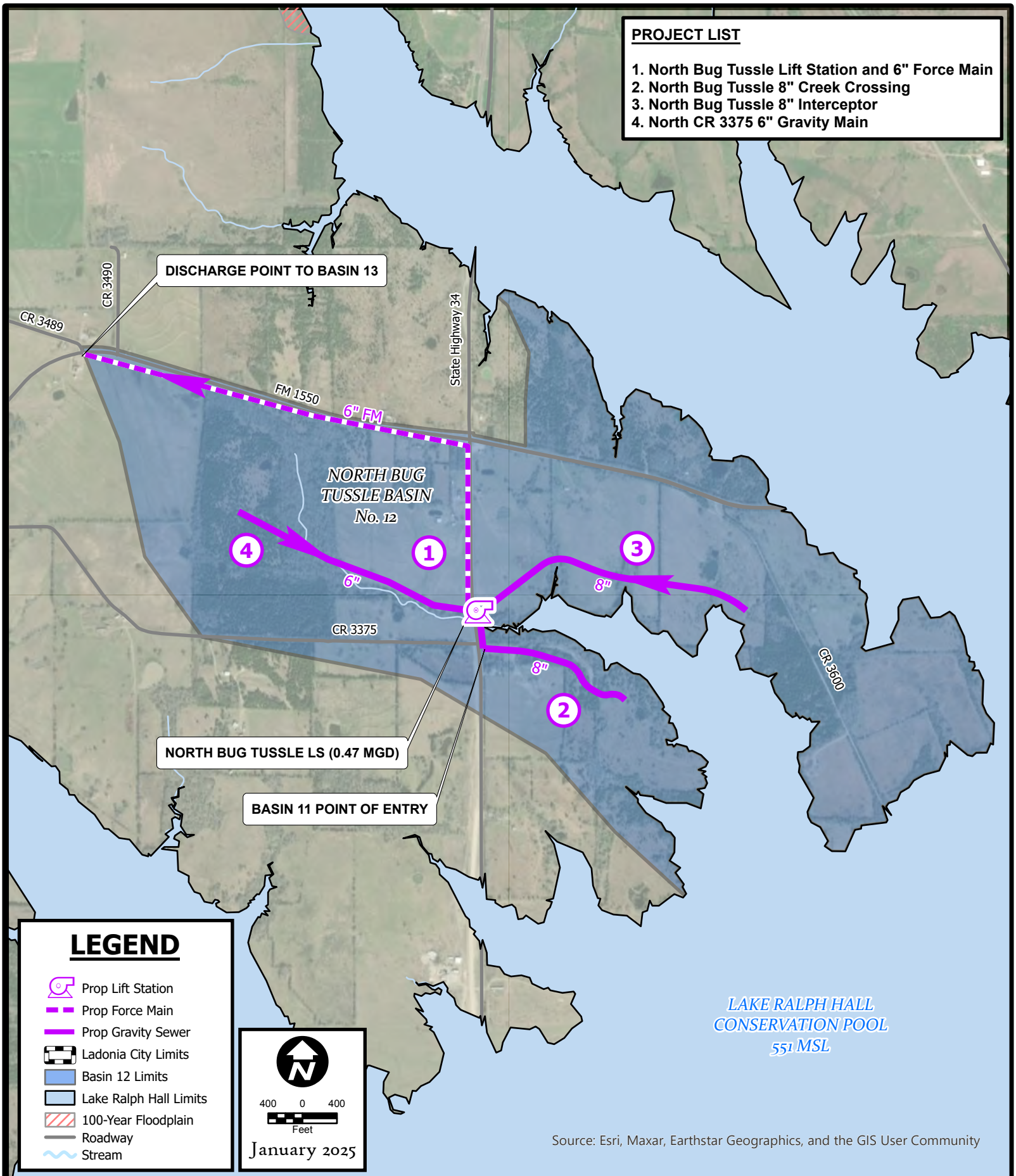
South Bug Tussle Basin
Wastewater Infrastructure
Interim Development Scenario
Water/Wastewater Master Plan

Kimley»Horn

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Kimley-Horn & Associates, Inc.			Quantity Sheet
Client:	Upper Trinity Regional Water District	Date:	2/27/2025
Project:	Lake Ralph Hall Water and Wastewater Master Plan	Prepared By:	ASM
KHA No.:	64568005	Checked By:	AKM
Basin #11	South Bug Tussle Basin		

Item No.	Item Description	Quantity	Unit
	Project 1: South Bug Tussle Lift Station and 4" Force Main		
1	4" Force Main	2,770	LF
2	12" Bore and Steel Casing	100	LF
3	4" Plug Valve	2	EA
4	Air Release Valve	1	EA
5	0.17 MGD Lift Station	1	LS
6	Sewer Line Trench Safety	2,670	LF
7	Hydromulch Repair	4,620	SY
	Project 2: South Bug Tussle SH 34 6" Gravity Main		
1	6" Sanitary Sewer	1,040	LF
2	12" Bore and Steel Casing	150	LF
3	4' Manhole	3	EA
4	Sewer Line Trench Safety	890	LF
5	Hydromulch Repair	1,490	SY
	Project 3: South Bug Tussle 6" Gravity Main		
1	6" Sanitary Sewer	2,040	LF
2	12" Bore and Steel Casing	100	LF
3	4' Manhole	5	EA
4	Sewer Line Trench Safety	1,940	LF
5	Hydromulch Repair	3,240	SY
	Project 4: South CR 3375 6" Gravity Main		
1	6" Sanitary Sewer	2,180	LF
3	4' Manhole	5	EA
4	Sewer Line Trench Safety	2,180	LF
5	Hydromulch Repair	3,640	SY



B12

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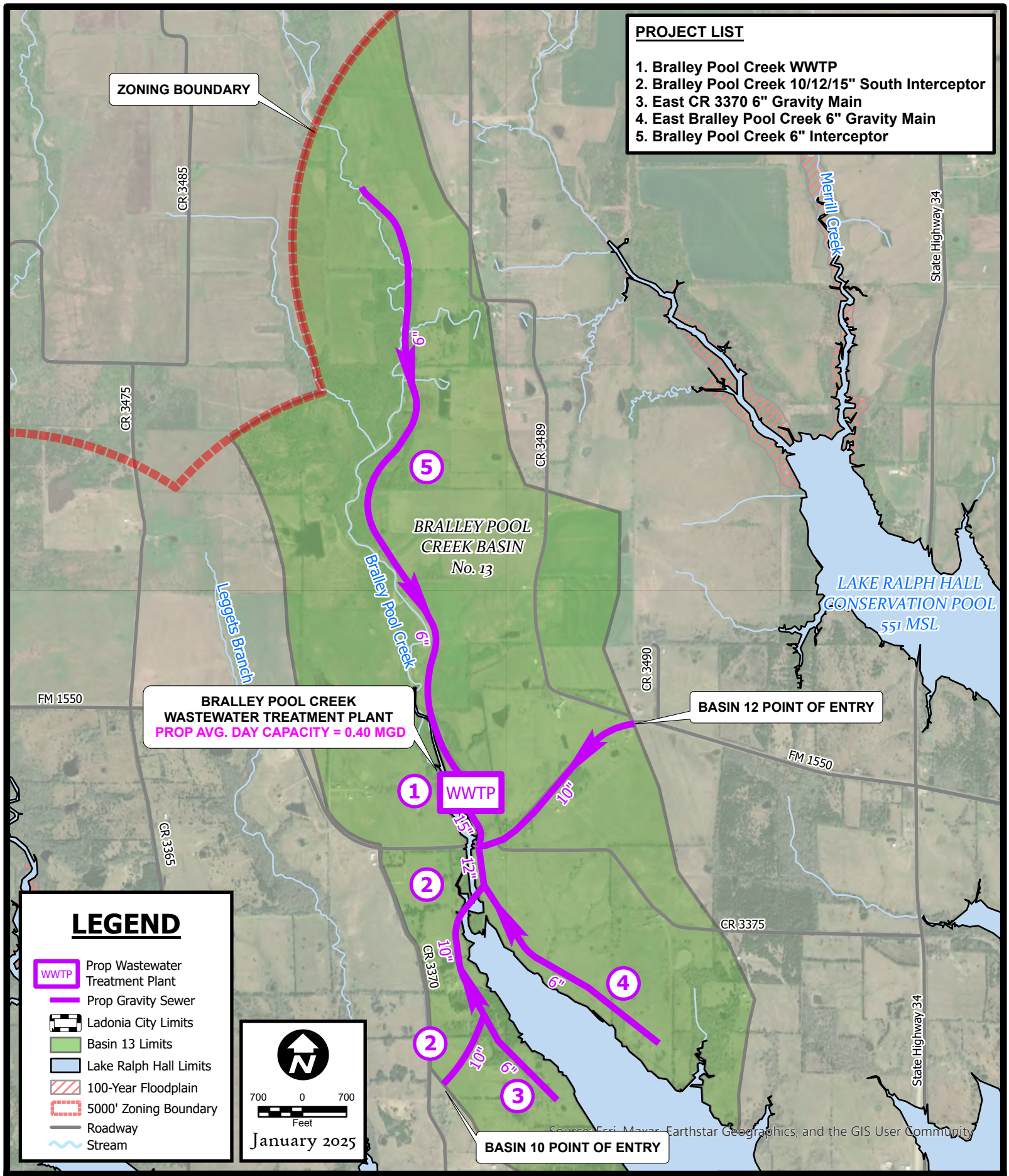
North Bug Tussle Basin
Wastewater Infrastructure
Interim Development Scenario
Water/Wastewater Master Plan

Kimley»Horn

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Kimley-Horn & Associates, Inc.			Quantity Sheet
Client:	Upper Trinity Regional Water District	Date:	2/27/2025
Project:	Lake Ralph Hall Water and Wastewater Master Plan	Prepared By:	ASM
KHA No.:	64568005	Checked By:	AKM
Basin #12	North Bug Tussle Basin		

Item No.	Item Description	Quantity	Unit
	Project 1: North Bug Tussle Lift Station and 6" Force Main		
1	6" Force Main	6,630	LF
2	12" Bore and Steel Casing	100	LF
3	6" Plug Valve	4	EA
4	Air Release Valve	2	EA
5	0.47 MGD Lift Station	1	LS
6	Sewer Line Trench Safety	6,530	LF
7	Hydromulch Repair	11,050	SY
	Project 2: North Bug Tussle 8" Creek Crossing		
1	8" Sanitary Sewer	2,280	LF
2	16" Bore and Steel Casing	100	LF
3	4' Manhole	5	EA
4	Sewer Line Trench Safety	2,180	LF
5	Hydromulch Repair	3,640	SY
	Project 3: North Bug Tussle 8" Interceptor		
1	8" Sanitary Sewer	3,430	LF
3	16" Bore and Steel Casing	50	LF
4	4' Manhole	7	EA
5	Sewer Line Trench Safety	3,380	LF
6	Hydromulch Repair	5,640	SY
	Project 4: North CR 3375 6" Gravity Main		
1	6" Sanitary Sewer	3,070	LF
2	12" Bore and Steel Casing	50	LF
3	4' Manhole	7	EA
4	Sewer Line Trench Safety	3,020	LF
5	Hydromulch Repair	5,040	SY



B13

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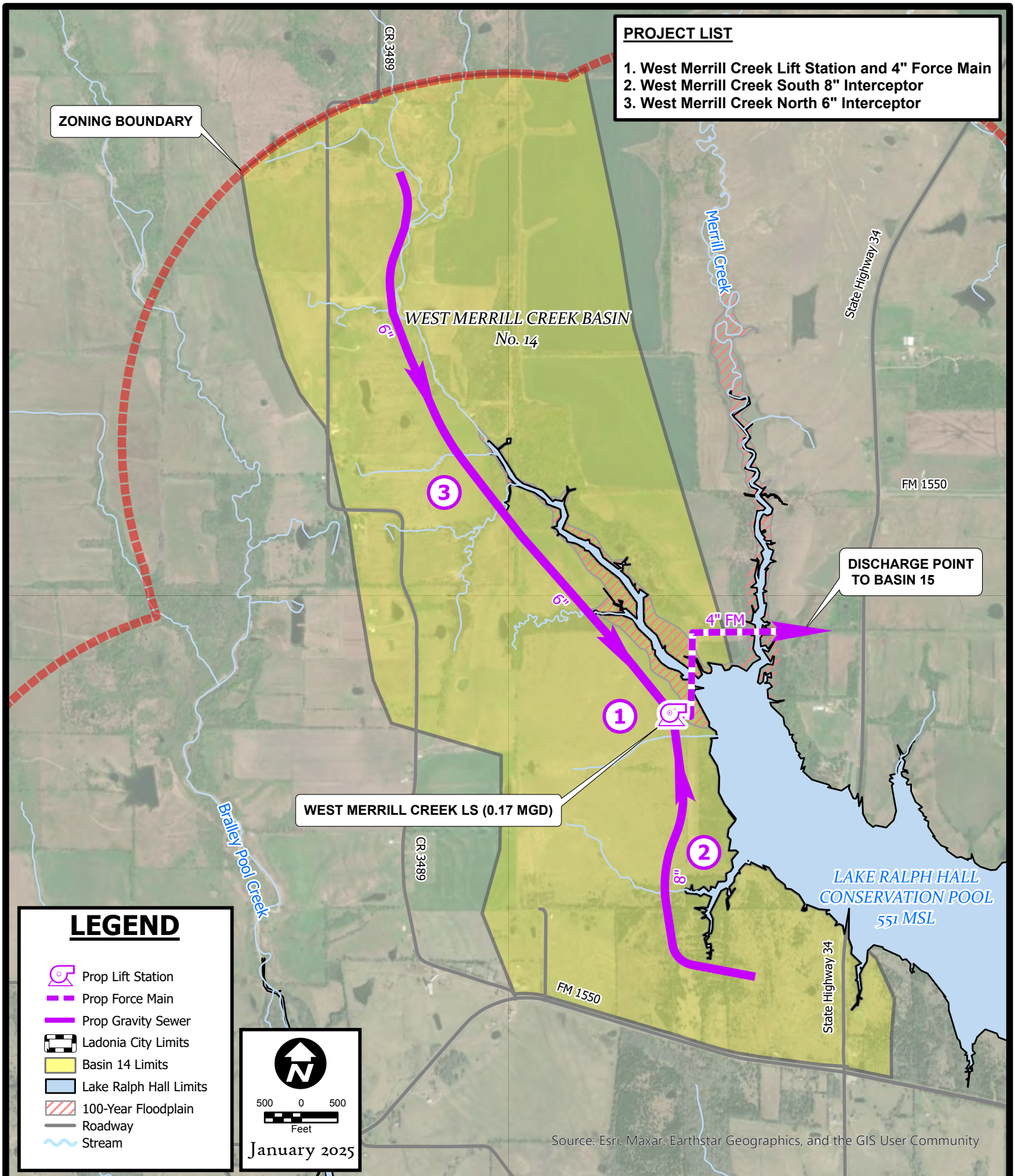
Bralley Pool Creek Basin
Wastewater Infrastructure
Interim Development Scenario
Water/Wastewater Master Plan

Kimley»Horn

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Kimley-Horn & Associates, Inc.			Quantity Sheet
Client:	Upper Trinity Regional Water District	Date:	2/27/2025
Project:	Lake Ralph Hall Water and Wastewater Master Plan	Prepared By:	ASM
KHA No.:	64568005	Checked By:	AKM
Basin #13	Bralley Pool Creek Basin		

Item No.	Item Description	Quantity	Unit
	Project 1: Bralley Pool Creek Wastewater Treatment Plant		
1	0.40 MGD Wastewater Treatment Plant	1	LS
	Project 2: Bralley Pool Creek 10/12/15" South Interceptor		
1	10" Sanitary Sewer	3,590	LF
2	12" Sanitary Sewer	620	LF
3	15" Sanitary Sewer	940	LF
4	16" Bore and Steel Casing	300	LF
5	20" Bore and Steel Casing	50	LF
6	24" Bore and Steel Casing	50	LF
7	4' Manhole	8	EA
8	Sewer Line Trench Safety	3,290	LF
9	Hydromulch Repair	5,490	SY
	Project 3: East CR 3370 6" Gravity Main		
1	6" Sanitary Sewer	1,790	LF
2	12" Bore and Steel Casing	100	LF
3	4' Manhole	4	EA
4	Sewer Line Trench Safety	1,690	LF
5	Hydromulch Repair	2,820	SY
	Project 4: East Bralley Pool Creek 6" Gravity Main		
1	6" Sanitary Sewer	3,810	LF
2	12" Bore and Steel Casing	50	LF
3	4' Manhole	8	EA
4	Sewer Line Trench Safety	3,760	LF
5	Hydromulch Repair	6,270	SY
	Project 5: Bralley Pool Creek 6" Interceptor		
1	6" Sanitary Sewer	10,590	LF
2	12" Bore and Steel Casing	100	LF
3	4' Manhole	22	EA
4	Sewer Line Trench Safety	10,490	LF
5	Hydromulch Repair	17,490	SY
	Project 6: Bralley Pool Creek East 10" Interceptor		
1	10" Sanitary Sewer	3,250	LF
2	16" Bore and Steel Casing	100	LF
3	4' Manhole	7	EA
4	Sewer Line Trench Safety	3,150	LF
5	Hydromulch Repair	5,250	SY



B14

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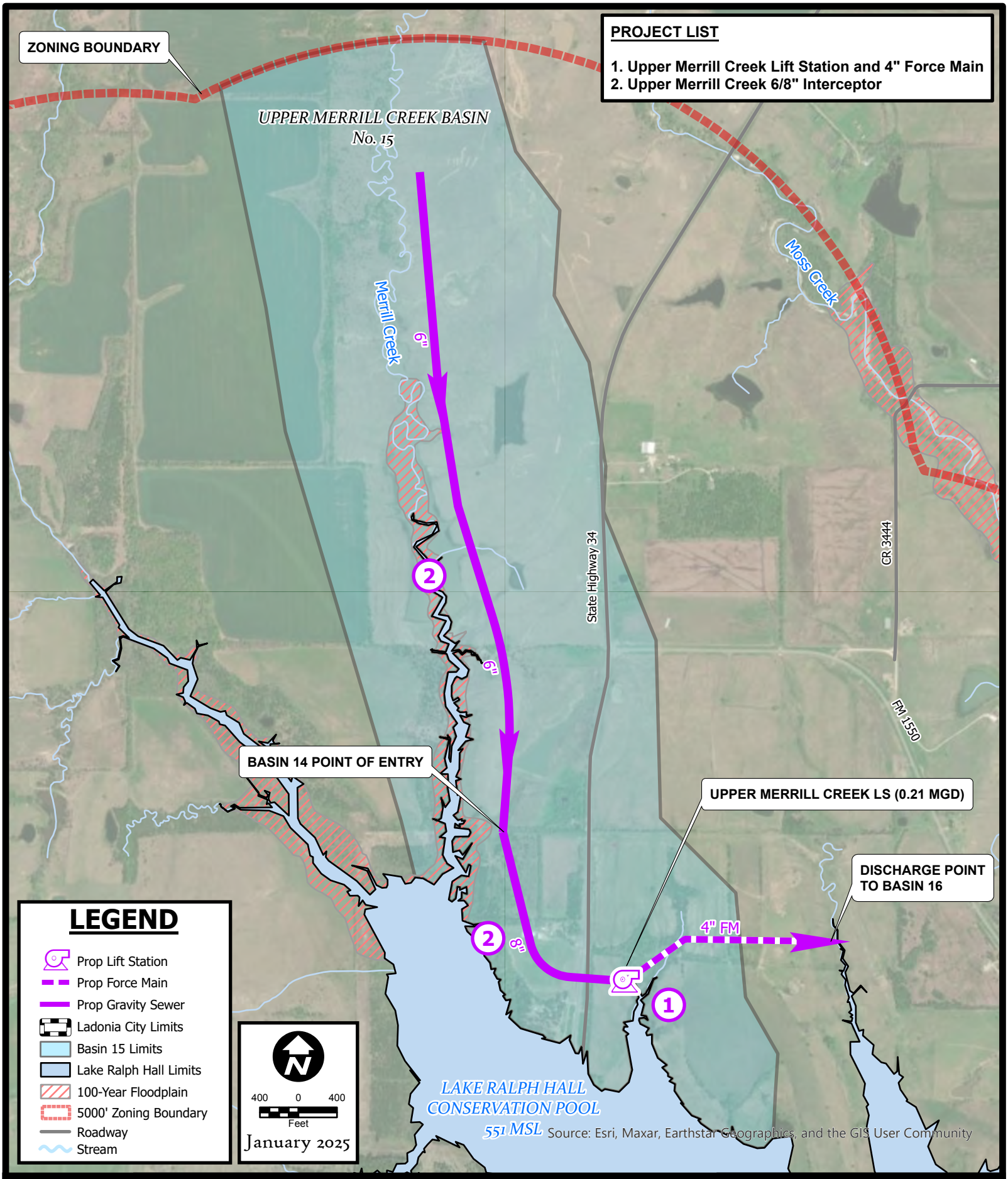
West Merrill Creek Basin
Wastewater Infrastructure
Interim Development Scenario
Water/Wastewater Master Plan

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Kimley-Horn & Associates, Inc.			Quantity Sheet
Client:	Upper Trinity Regional Water District	Date:	2/27/2025
Project:	Lake Ralph Hall Water and Wastewater Master Plan	Prepared By:	ASM
KHA No.:	64568005	Checked By:	AKM
Basin #14	West Merrill Creek Basin		

Item No.	Item Description	Quantity	Unit
	Project 1: West Merrill Creek Lift Station and 4" Force Main		
1	4" Force Main	2,860	LF
2	12" Bore and Steel Casing	150	LF
3	4" Plug Valve	2	EA
4	Air Release Valve	1	EA
5	0.17 MGD Lift Station	1	LS
6	Sewer Line Trench Safety	2,710	LF
7	Hydromulch Repair	4,770	SY
	Project 2: West Merrill Creek South 8" Interceptor		
1	8" Sanitary Sewer	4,500	LF
2	16" Bore and Steel Casing	100	LF
3	4' Manhole	9	EA
4	Sewer Line Trench Safety	4,400	LF
5	Hydromulch Repair	7,340	SY
	Project 3: West Merrill Creek North 6" Interceptor		
1	6" Sanitary Sewer	8,760	LF
3	12" Bore and Steel Casing	200	LF
5	4' Manhole	18	EA
6	Sewer Line Trench Safety	8,560	LF
7	Hydromulch Repair	14,270	SY



B15

LAKE RALPH HALL

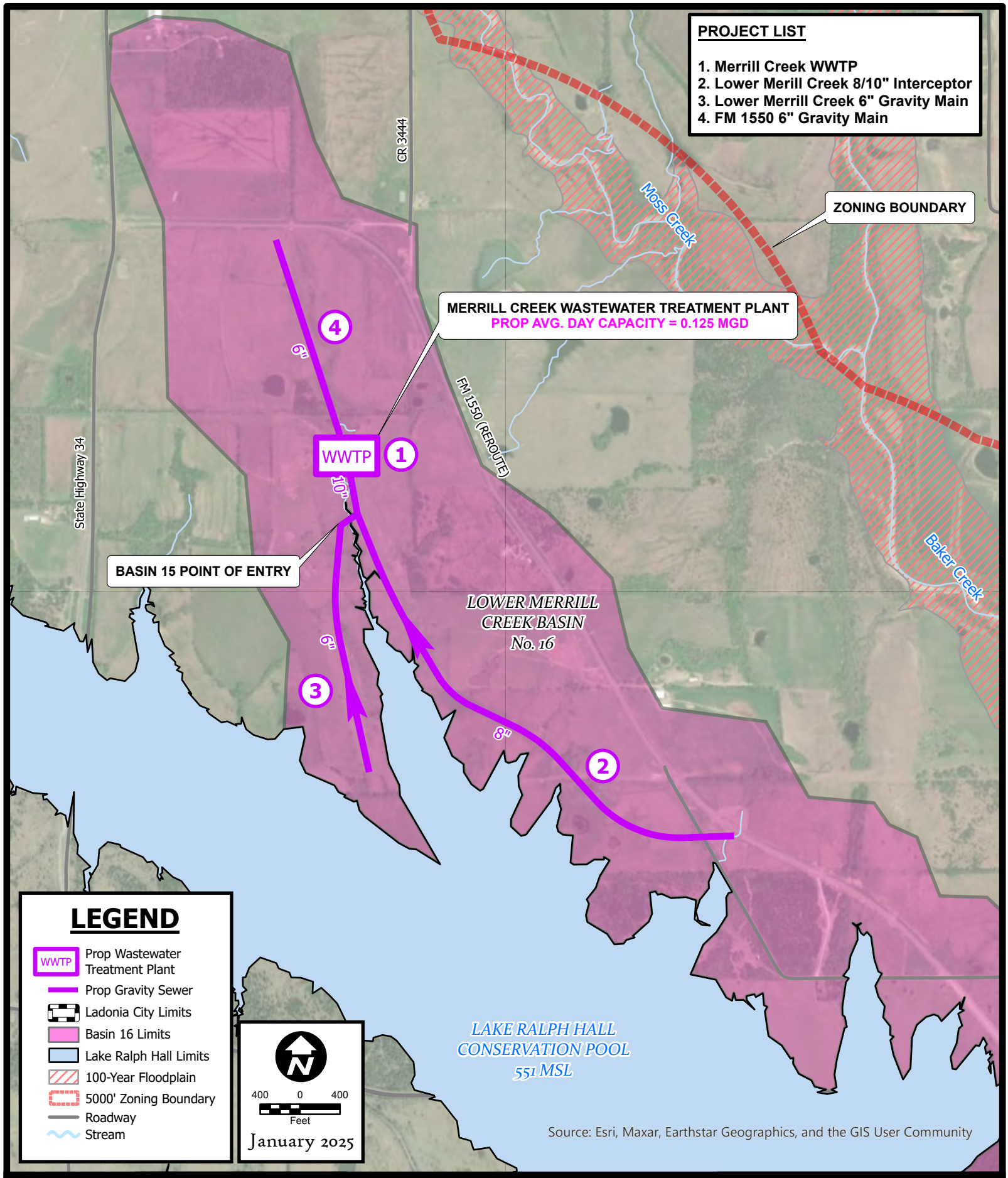
Upper Merrill Creek Basin
Wastewater Infrastructure
Interim Development Scenario
Water/Wastewater Master Plan

Kimley»Horn

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Kimley-Horn & Associates, Inc.			Quantity Sheet
Client:	Upper Trinity Regional Water District	Date:	2/27/2025
Project:	Lake Ralph Hall Water and Wastewater Master Plan	Prepared By:	ASM
KHA No.:	64568005	Checked By:	AKM
Basin #15	Upper Merrill Creek Basin		

Item No.	Item Description	Quantity	Unit
	Project 1: Upper Merrill Creek Lift Station and 4" Force Main		
1	4" Force Main	2,240	LF
2	12" Bore and Steel Casing	50	LF
3	4" Plug Valve	2	EA
4	Air Release Valve	1	EA
5	0.25 MGD Lift Station	1	LS
6	Sewer Line Trench Safety	2,190	LF
7	Hydromulch Repair	3,740	SY
	Project 2: Upper Merrill Creek 6/8" Interceptor		
1	6" Sanitary Sewer	6,940	LF
2	8" Sanitary Sewer	2,350	LF
3	12" Bore and Steel Casing	100	LF
4	16" Bore and Steel Casing	50	LF
5	4' Manhole	19	EA
6	Sewer Line Trench Safety	9,140	LF
7	Hydromulch Repair	15,240	SY



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LAKE RALPH HALL

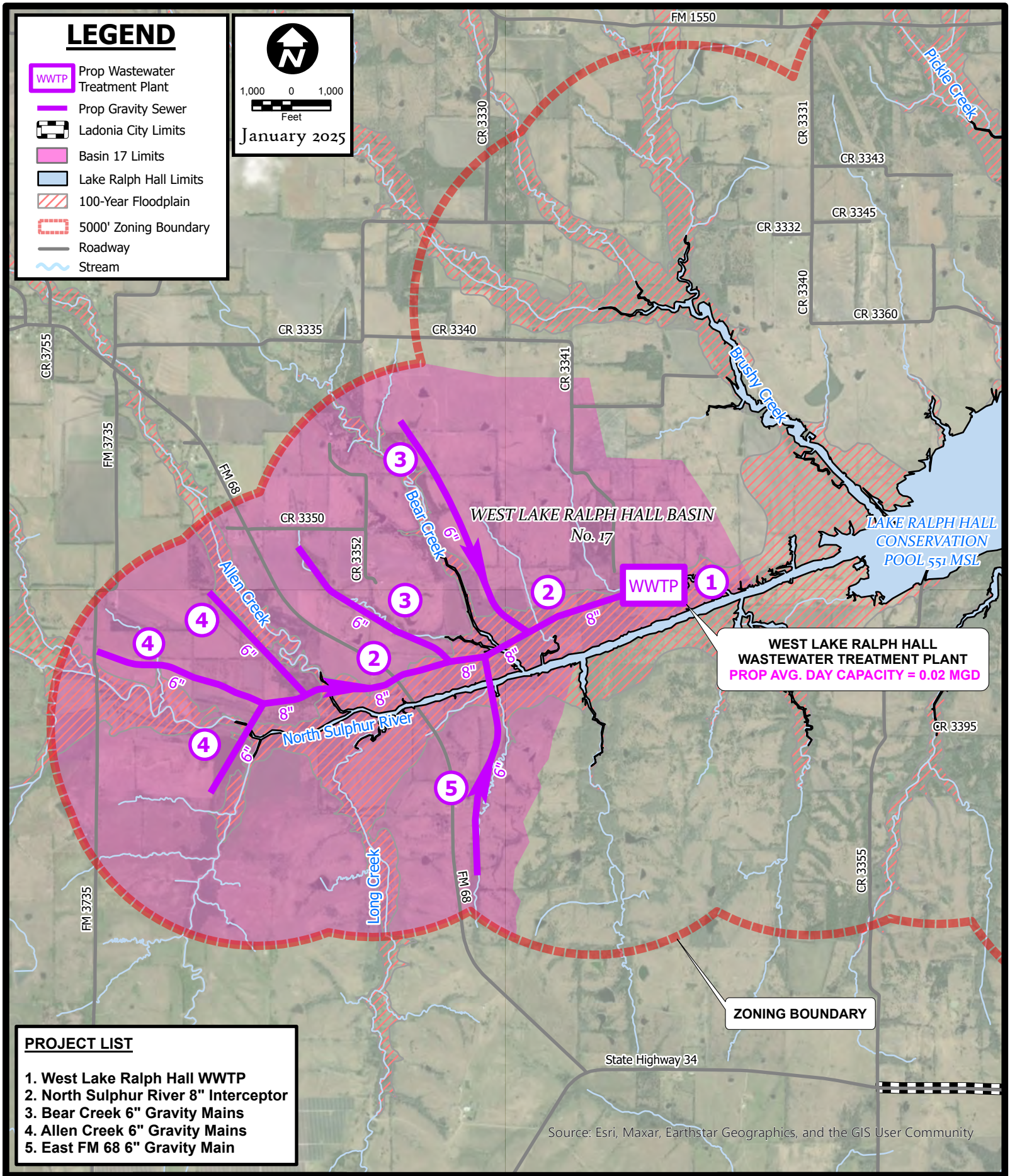
Lower Merrill Creek Basin
Wastewater Infrastructure
Interim Development Scenario
Water/Wastewater Master Plan

Kimley»Horn

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Kimley-Horn & Associates, Inc.			Quantity Sheet
Client:	Upper Trinity Regional Water District	Date:	2/27/2025
Project:	Lake Ralph Hall Water and Wastewater Master Plan	Prepared By:	ASM
KHA No.:	64568005	Checked By:	AKM
Basin #16	Lower Merrill Creek Basin		

Item No.	Item Description	Quantity	Unit
	Project 1: Merrill Creek Wastewater Treatment Plant		
1	0.125 MGD Wastewater Treatment Plant	1	LS
	Project 2: West Merrill Creek 8/10" Interceptor		
1	8" Sanitary Sewer	5,360	LF
2	10" Sanitary Sewer	600	LF
3	16" Bore and Steel Casing	50	LF
4	4' Manhole	12	EA
6	Sewer Line Trench Safety	5,910	LF
7	Hydromulch Repair	9,850	SY
	Project 3: Lower Merrill Creek 6" Gravity Main		
1	6" Sanitary Sewer	2,720	LF
3	12" Bore and Steel Casing	100	LF
5	4' Manhole	6	EA
6	Sewer Line Trench Safety	2,620	LF
7	Hydromulch Repair	4,370	SY
	Project 4: FM 1550 6" Gravity Main		
1	6" Sanitary Sewer	2,280	LF
2	12" Bore and Steel Casing	50	LF
3	4' Manhole	5	EA
4	Sewer Line Trench Safety	2,230	LF
5	Hydromulch Repair	3,720	SY



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LAKE RALPH HALL

West Lake Ralph Hall Basin
Wastewater Infrastructure
Interim Development Scenario
Water/Wastewater Master Plan

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Kimley-Horn & Associates, Inc.			Quantity Sheet
Client:	Upper Trinity Regional Water District	Date:	2/27/2025
Project:	Lake Ralph Hall Water and Wastewater Master Plan	Prepared By:	ASM
KHA No.:	64568005	Checked By:	AKM
Basin #17	West Lake Ralph Hall Basin		

Item No.	Item Description	Quantity	Unit
	Project 1: Brushy Creek Wastewater Treatment Plant		
1	0.02 MGD Wastewater Treatment Plant	1	LS
	Project 2: North Sulphur River 8" Interceptor		
1	8" Sanitary Sewer	15,070	LF
2	16" Bore and Steel Casing	500	LF
3	4' Manhole	31	EA
4	Sewer Line Trench Safety	14,570	LF
5	Hydromulch Repair	24,290	SY
	Project 3: Bear Creek 6" Gravity Mains		
1	6" Sanitary Sewer	4,960	LF
2	12" Bore and Steel Casing	200	LF
3	4' Manhole	10	EA
4	Sewer Line Trench Safety	4,760	LF
5	Hydromulch Repair	7,940	SY
	Project 4: Allen Creek 6" Gravity Mains		
1	6" Sanitary Sewer	10,740	LF
3	4' Manhole	100	EA
4	Sewer Line Trench Safety	10,640	LF
5	Hydromulch Repair	17,740	SY
	Project 5: East FM 6" Gravity Main		
1	6" Sanitary Sewer	5,700	LF
2	12" Bore and Steel Casing	150	LF
3	4' Manhole	12	EA
4	Sewer Line Trench Safety	5,550	LF
5	Hydromulch Repair	9,250	SY