COUNCIL SUBCOMMITTEE ON WATER ISSUES MEETING

REGULAR SUBCOMMITTEE MEETING AGENDA

TUESDAY, MAY 4, 2021, 9:30 AM

201 S Cortez Street
Prescott, AZ 86303
Council Chambers

Councilman Steve Blair - Chairman
Councilman Phil Goode - Member
Councilman Steve Sischka - Member

The following Agenda will be considered by the Prescott Council Subcommittee on Water Issues at Regular Subcommittee Meeting pursuant to the Prescott City Charter, Article II, Section 13. Notice of the meeting is given pursuant to Arizona Revised Statutes, Section 38-431.02. One or more members of the Council may be attending the meeting through the use of a technological device.

Viewing & Participation
This meeting may be viewed on Channel 64, Facebook Live or on the City's Website: Live City of Prescott Videos
Or via Zoom by registering in advance: Zoom Registration Link
Comments from the public may be submitted through the City website: Speaker Request Form

1. CALL TO ORDER

2. ROLL CALL

3. PUBLIC COMMENT

Public comment will be accepted following each agenda item and are limited to three (3) minutes. Please complete a comment card and return it to the City Clerk, speakers will be called in the order received.

4. DISCUSSION & ACTION ITEMS

A. Approval of the April 6, 2021 Meeting Minutes.

Recommended Action: MOVE to approve the April 6, 2021 minutes as presented.

B. Infrastructure Topic - Pumping vs. Recharge 2021 Update

Recommended Action: This item is for discussion only. No formal action will be taken.

C. Review and Discussion of Draft City of Prescott Water and Sewer Connection Policy.

Recommended Action: This item is for discussion only. No formal action will be taken.

5. ADJOURNMENT

EXECUTIVE SESSION

Upon a public majority vote of a quorum of the City Council, the Council may hold an executive session, which will not be open to the public, regarding any item listed on the agenda but only for the following purposes:

(1) Discussion or consideration of personnel matters (A.R.S. §38-431.03(A)(1));
(2) Discussion or consideration of records exempt by law (A.R.S. §38-431.03(A)(2));
(3) Discussion or consultation for legal advice with the city's attorneys (A.R.S. §38-431.03(A)(3));
(4) Discussion or consultation with the city's attorneys regarding the city's position regarding contracts that are the subject of negotiations, in pending or contemplated litigation, or in settlement discussions conducted in order to avoid litigation (A.R.S. § 38-431.03(A)(4));
(5) Discussion or consultation with designated representatives of the city to consider its position and instruct its representatives regarding negotiations with employee organizations (A.R.S. §38-431.03(A)(5));
(6) Discussion, consultation or consideration for negotiations by the city or its designated representatives with members of a tribal council, or its designated representatives, of an Indian reservation located within or adjacent to the city (A.R.S. §38-431.03(A)(6);
(7) Discussion or consultation with designated representatives of the city to consider its position and instruct its representatives regarding negotiations for the purchase, sale or lease of real property (A.R.S. §38-431.03(A)(7)).

THE CITY OF PRESCOTT ENDEAVORS TO MAKE ALL PUBLIC MEETINGS ACCESSIBLE TO PERSONS WITH DISABILITIES. With 72 hours advanced notice, special assistance can be provided for sight and/or hearing-impaired persons at this meeting. Reasonable accommodations will be made upon request for persons with disabilities or non-English speaking residents. Please call the City Clerk (928) 777-1272 to request an accommodation to participate in this public meeting. Prescott TDD number is (928) 445-6811. Additionally, free public relay service is available from Arizona Relay Service at 1-800-367-8939 and more information at www.azrelay.org

Confidentiality

Arizona statute precludes any person receiving executive session information from disclosing that information except as allowed by law. A.R.S. §38-431.03(F). Each violation of this statute is subject to a civil penalty not to exceed $500, plus court costs and attorneys' fees. This penalty is assessed against the person who violates this statute or who knowingly aids, agrees to aid or attempts to aid another person in violating this article. The city is precluded from expending any public monies to employ or retain legal counsel to provide legal services or representation to the public body or any of its officers in any legal action commenced for violation of the statute unless City Council takes a legal action at a properly noticed open meeting to approve of such expenditures prior to incurring any such obligation or indebtedness. A.R.S. §38-431.07(A)(B).

CERTIFICATION OF POSTING OF NOTICE

The undersigned hereby certifies that a copy of the foregoing notice was duly posted at Prescott City Hall on _____ at _____m. in accordance with the statement filed by the Prescott City Council with the City Clerk

Sarah M. Siep

Sarah M. Siep, City Clerk

CITY OF PRESCOTT

COUNCIL AGENDA MEMO

MEETING TYPE/DATE: REGULAR SUBCOMMITTEE MEETING 05- 4-21

DEPARTMENT: City Clerk

AGENDA ITEM: **Approval of the April 6, 2021 Meeting Minutes.**

ITEM SUMMARY

Attached for approval are the Council Subcommittee on Water Issues minutes for the April 6, 2021 meetings.

BACKGROUND

None.

FINANCIAL IMPACT

None.

Recommended Action: **MOVE to approve the April 6, 2021 minutes as presented.**

ATTACHMENTS

1. April 6, 2021 Meeting Minutes.docx

COUNCIL SUBCOMMITTEE ON WATER ISSUES MEETING

REGULAR SUBCOMMITTEE MEETING MINUTES

TUESDAY, APRIL 6, 2021, 9:30 AM

201 S Cortez Street
Prescott, AZ 86303
Council Chambers

Steve Blair, Councilman - Chairman
Phil Goode, Councilman – Member **Steve Sischka, Councilman - Member**

MINUTES OF THE REGULAR SUBCOMMITTEE MEETING OF THE PRESCOTT COUNCIL SUBCOMMITTEE ON WATER ISSUES HELD ON JANUARY 12, 2021, IN THE 201 S CORTEZ STREET PRESCOTT, AZ 86303 COUNCIL CHAMBERS.

The following Agenda will be considered by the Prescott Council Subcommittee on Water Issues at Regular Subcommittee Meeting pursuant to the Prescott City Charter, Article II, Section 13. Notice of the meeting is given pursuant to Arizona Revised Statutes, Section 38-431.02. One or more members of the Council may be attending the meeting through the use of a technological device.

1. **CALL TO ORDER**
   Chairman Blair called the meeting to order at 9:30 a.m.

2. **ROLL CALL**
   Chairman Steve Blair
   Member Steve Sischka
   Member Goode

3. **PUBLIC COMMENT**

   Public Comment will be accepted following each agenda item and limited to three (3) minutes. Please complete a comment card and return it to the City Clerk, speakers will be called in the order received.

Chairman Blair and Water Resources Project Manager Leslie Graser Introduced Arizona Water Awareness Month as well as various websites that promote water awareness, and the urban water cycle exhibit at the City of Prescott Public Library.

4. DISCUSSION & ACTION ITEMS

A. Approval of the March 2, 2021 and March 9, 2021 Meeting Minutes.

MOTION BY MEMBER SISCHKA TO APPROVE ITEM 4.A; SECONDED BY CHAIRMAN GOODE: PASSED [3-0].

B. Infrastructure Topic - Pumping vs. Recharge 2021 Update

Water Resources Project Manager Leslie Graser provided a presentation to the Subcommittee regarding the preliminary total pumped and preliminary total delivered to the recharge facility from January 1 - February 28, 2021:

- Preliminary total pumped – 854.15 AF
- Preliminary total delivered to recharge facility – 624.68 AF

At this point the delivery to the recharge facility is entirely reclaimed effluent supplies, the window for recharge just opened up for surface water as of April 1, 2021. Ms. Graser also provided a modified Monthly Water Pumped (AF) vs. Recharge Deliveries in comparison to the previous year, and asked the Subcommittee if they would like to keep seeing the cumulative as only showing the effluent.

Member Sischka asked how the surface water is pumped down and then pumped right out.

Ms. Graser noted that the city tracks the amount of water that is put down and are working on tracking similar amounts at Chino Wells 1-5.

Member Goode asked for clarification on the approximate recoverable amount of water stored in a month.

Ms. Graser commented that when the statute was written they did not realize the challenges on the operation side, so even though staff is monitoring what is being put down and trying to match it, those amounts don’t have to absolutely match month for month. The state is very understanding as long as municipalities show what they recovered at the end of the year.

Member Sischka noted that on the percent of water pumped vs. percent of water delivered, January was 68%, February was 79% and asked what caused the difference.

Ms. Graser responded that in February there was more effluent available to put towards the recharge facility.

Chairman Blair asked if this means the golf courses did not use it.

Ms. Graser responded that it is a possibility, it was late January when the big storm hit.

Member Sischka asked if rain is received this summer there may be more natural watering of the golf courses.

Ms. Graser replied that the golf courses will probably still use reclaimed supplies but a lesser amount.

This item was for discussion only, no formal action was taken.

C. Focus Topic – Issue Brief on Groundwater and the Assured Water Program dated March 5, 2021

Ms. Graser provided a presentation to the Subcommittee regarding the item that was previously tabled and updates since that time. Post 25 AMA has been working almost two years looking at issues in terms of what the state will be doing after 2025. The document has six areas of opportunity to improve upon the groundwater management and focus topic at this time is Groundwater in the Assured Water Supply Program.

Ms. Graser read the Issue Statement and the Background and informed the committee that the city is in active work process right now to modify their Decision and Order of Assured Water Supply. The city is a designated water provider, and there are two requirements for demonstrating an assured water supply designation: 1) the water for the proposed Certificate or Designation is physically available for 100 years 2) the use of the water is consistent with the management goal of the AMA. Language that the Subcommittee should become familiar with: 1) current demand - water we are pumping right now 2) committed demand – what is set aside for already platted subdivisions 3) projected demand – future water use.

Member Sischka asked how deep the wells in Chino Valley are, and at what level the pumps are set.

Public Works Administration Support Services Manager Gwen Rowitsch responded stating that as a general rule the pumps are set 50-100 ft lower than the static levels of the well, for example the Chino Valley Well #2 static level is around 235 feet, and the pumping level is around 270 feet.

Member Goode asked if the assured water supply status is reevaluated in the Decision and Order that is issued every 15 years and if the city can expect a 10 year term on our Decision and Order this time around.

Ms. Graser stated the city's current Decision and Order is coming to an end soon and had a 20 year window. If the Big Chino had not been approved for construction the city would need to resubmit an Application to Modify by Dec 31, 2021. This time around they are holding more of the designations to a 10 year term however we are going to negotiate for 20, is how we are preparing the documents Member Goode inquired if ADWR will look at the management history and availability of importable water amounts or sources to determine if a longer period of time is justified.

Ms. Graser confirmed.

Chairman Blair asked if, based on the city being part of an AMA and how well water has been managed in Prescott, ADWR might demand we send our water to our outlying communities. At some point in time there will be a need to bring that water in from the Big Chino to manage our area and the areas around us.

Ms. Graser stated it is hard to say, not sure there is a correct answer at this point. It is important to continue the work to prepare this Decision and Order, watch what is going on at the City and State level, then wait and see if there is any reason for ADWR to do a force.
This item was for discussion only, no formal action was taken.

D. Focus Topic – Decision and Order No. 86-401501.0001 Modification Presentation

Ms. Graser provided a presentation to the Subcommittee regarding the kickoff of the modification to Decision and Order of Assured Water Supply, particularly focused on physical availability. The city is not currently bringing in supplies so that won't be part of this modeling exercise, will be looking at the supplies in the active management area. Also is important to note that there are two separate groundwater models, one already in play in the Big Chino with Golder as the consultant and the one presented today.

Member Goode asked if there are two different modeling firms, one working on data for the SRP lawsuit and a second that ADWR will use to determine where the city stands prior to the issuance of this new Assured Water Supply status by the end of the year.

Ms. Graser responded that the city has engaged Matrix, formerly known as Southwest Groundwater, as a consultant to use the ADWR model, then it is filtered back to the department as part of our application.

Member Goode asked when their model will be presented to ADWR in order to make their determination by the end of the year and if Golder will try to get their report done in a similar timeframe so it can be compared.

Ms. Graser responded that August is the pre-application meeting with the state, would like to have the application in by November. The due date as part of existing Decision and Order is Dec. 31, 2021, but trying to get it in early. The Golder modeling report looks at how pumping may impact the Verde, and if there are any mitigation requirements; the original date was set for September 2021 but may not be ready until February 2022. The model being discussed is solely for the Active Management Area; the two sub basins of the little Chino and the Upper Agua Fria.

Ms. Graser continued the presentation with the PrAMA Groundwater Flow Model which was first developed in 1995 and has been updated three times since. This model is currently being updated by Matrix for current pumping, projected pumping, water levels, artificial recharge and other information about aquifer properties. All these things will be part of the city's historic data and projections to show the ADWR that the city can maintain its assured water supply into the future.

- The proposed schedule for the process:
  Data Gathering and Analysis – End of March
- Secure latest ADWR PrAMA model and update historical period through 2020 – End of April
- Build future years into model – End of May
- Run model scenarios and analyze results – June/July
- Report Documentation – August/September

Member of the public Leslie Hoy addressed the subcommittee and asked: 1) if the Big Chino is going to be involved in our Decision and Order this time, 2) if the city bases the Decision and Order current model instead of the new model what impact will that have on the Decision and Order outcome, and 3) when does Ms. Graser anticipate the final Decision and Order will be issued.

Chairman Blair commented that he can't see why, based on what we are able to pump and our conservation efforts, they would make us go to the Big Chino.

Ms. Graser responded: 1) Even though the physical supply is not linked to our infrastructure, that right to the Big Chino will be in our Decision and Order as an inactive supply type. 2) Does not have an answer to second question at this point as she can't see into the future to know which direction we are going, but if the state wants us to use the new model we need a fairly clear date of when it is available so we can meet the timelines required for the application. 3) Will submit a complete and correct application on time, the state will start the review process, if any changes needed or if they have questions we will address them, ultimately rolled into a document signed by the Director and will be issued. Recognized that our last Decision and Order was a workout so are doing their best on this DNO to submit timely, have things organized and documented.

This item was for discussion only, no formal action was taken.

5. ADJOURNMENT

There being no further business to discuss, Chairman Blair adjourned the meeting at 10:32 a.m.

_____
STEVE BLAIR, Chairman

ATTEST:

_____
SARAH M. SIEP, City Clerk

CERTIFICATION

I hereby certify that the foregoing minutes are a true and correct copy of the minutes of the regular Subcommittee Meeting of the Council Subcommittee on Water Issues of the City of Prescott, Arizona held on January 12, 2021. I further certify the meeting was duly called and held and that a quorum was present.

Dated this _____ day of _____, 2021

AFFIX
CITY
SEAL

_____
Sarah M. Siep, City Clerk

CITY OF PRESCOTT

COUNCIL AGENDA MEMO

MEETING TYPE/DATE: REGULAR SUBCOMMITTEE MEETING 05- 4-21

DEPARTMENT: Public Works

AGENDA ITEM: **Infrastructure Topic - Pumping vs. Recharge 2021 Update**

ITEM SUMMARY

This is a standing item for the Subcommittee agenda that compares pumping from wells to the recharge deliveries at the City's Underground Storage Facility (recharge facility).

BACKGROUND

Every year the City collects daily information on its water and wastewater systems. This data is compiled in various formats and subsequently used to meet Annual Water Withdrawal and Use reporting requirements to the Arizona Department of Water Resources (ADWR).

See attachment for the Calendar Year 2021 pumping vs. recharge graph.

The preliminary total pumped in Calendar Year 2021 (January 1-March 31) is 1,320.85 AF.
The preliminary total delivered to the recharge facility in Calendar Year 2021 (January 1 - March 31) is 930.01 AF. This is entirely reclaimed effluent supplies.

FINANCIAL IMPACT

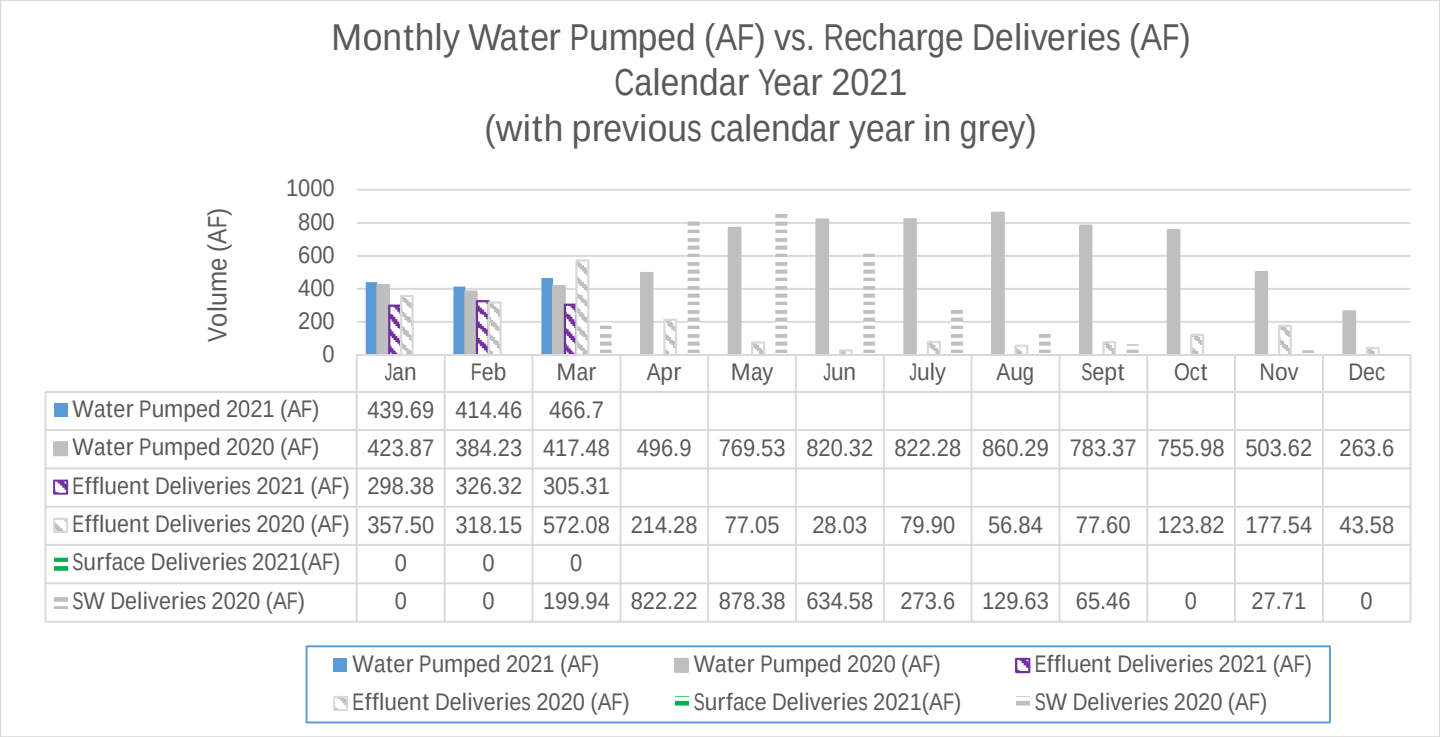
No financial impact is related to this item.

Recommended Action: **This item is for discussion only. No formal action will be taken.**

ATTACHMENTS

1. Pumping vs Recharge_4 20 2021.docx

Attachment 1



	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec
Water Pumped 2021 (AF)	439.69	414.46	466.7									
Water Pumped 2020 (AF)	423.87	384.23	417.48	496.9	769.53	820.32	822.28	860.29	783.37	755.98	503.62	263.6
Effluent Deliveries 2021 (AF)	298.38	326.32	305.31									
Effluent Deliveries 2020 (AF)	357.50	318.15	572.08	214.28	77.05	28.03	79.90	56.84	77.60	123.82	177.54	43.58
Surface Deliveries 2021(AF)	0	0	0									
SW Deliveries 2020 (AF)	0	0	199.94	822.22	878.38	634.58	273.6	129.63	65.46	0	27.71	0

Total pumped: 1,320.85 AF

Total delivered to recharge: 930.01 AF (All reclaimed effluent)

Percent of water pumped in 2021 vs.water delivered to the recharge facility:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Average
68%	79%	65%										71%

Note 1: All volumes are deemed provisional until the City files its Annual Water Withdrawal and Use Report to ADWR in March each year. Pumping volumes are based on City production wells 1-5, and AP2 and 3. Recharge deliveries are based on meters located at the City's underground storage facility (recharge facility) which include feeds from Airport WRF, Sundog WWTP, and asurface pipeline. At this time, no evaporation losses have been applied to these volumes.

Note 2: In accordance with A.R.S. §45-851.01(B), surface water supplies,

If water is stored pursuant to a water storage permit and its use is based on a decreed or appropriative water right, the approximate recoverable amount of water **stored in a month shall be recovered on or before the last day of the following month or within the same calendar year,** *whichever is earlier, unless the water is credited to a long-term storage account as prescribed by section 45-852.01*

Note 3: The City holds a non-recoverable long-term storage account for permanent recharge volumes (City Charter, Article I, Section IV).

CITY OF PRESCOTT

COUNCIL AGENDA MEMO

MEETING TYPE/DATE: **REGULAR SUBCOMMITTEE MEETING** **05- 4-21**

DEPARTMENT: **Public Works**

AGENDA ITEM: **Review and Discussion of Draft City of Prescott Water and Sewer Connection Policy.**

ITEM SUMMARY

Review and discussion of Draft City of Prescott Water and Sewer Connection Policy.

BACKGROUND

In June 2020, the Mayor and Council formed the Mayor's Commission on Water and Sewer Connections to develop a written policy for existing and future water customers to connect to municipal sewer service.

The Commission is Chaired by Councilman Steve Blair and includes seven members of the community. The Commission began meeting monthly in July 2021 to create a draft policy. The draft policy includes, I) Mission and Goals; II) Sewer Connection Policy; and III) Cost Responsibility, Fees and Funding. Additionally, Carollo Engineers developed the "2020 Sewer Connection Study" to identify unsewered areas, infrastructure needs and cost estimates in support of the policy.

FINANCIAL IMPACT

N/A

Recommended Action: **This item is for discussion only. No formal action will be taken.**

ATTACHMENTS

1. DRAFT Water and Sewer Connection Policy_WIC.doc
2. Carollo - 2020 Sewer Connections DRAFT Study - Dec 2020.pdf

DRAFT
City of Prescott Water and Sewer Connection Policy
2021

I. Mission and Goals

The Mission and Goals of the Water and Sewer Connection Policy is to reduce the negative environmental impacts of septic systems on the natural streams, lakes and reservoirs in and around the City of Prescott and to decrease pumping impacts to the aquifer within the Prescott Active Management Area (PrAMA) through increased recharge of effluent.

1. Reduce Environmental Impacts. The Upper Granite Creek Watershed Pollutant Reduction Plan ("Plan") completed in November 2020 identified E. coli, including human E. coli and its associated nutrients, as point source pollutants within the Upper Granite Creek Watershed and Watson Lake Reservoir. These pollutants exceed the Total Maximum Daily Load (TMDL) that the waterbody can withstand without creating an impairment of that surface water's designed beneficial use(s) under the Arizona Department of Environmental Quality (ADEQ) and Clean Water Act (CWA) water quality standards. To reduce and /or eliminate the pollutants and their associated nutrients (ie Nitrogen and Phosphorous), and specifically human E. coli from the watershed, the Plan recommends connecting septic systems to municipal sewer system whenever possible, with a goal of reducing or eliminating all human E. coli and associated nutrients. The Plan also identified the reduction or elimination of septic systems as an "Essential" priority and recommends "Enforcement of an ordinance requiring connection to sewer system when system is available or for new development in septic-tank areas."

   There is a direct correlation between the lakes and streams and unsewered areas within the Prescott area. Reducing or eliminating point source pollutants will improve the Quality of Life for residents and visitors and maintain the recreational uses of the watershed and reservoirs.

2. Increase Recharge of Effluent. The City operates and maintains a recharge facility at the Airport Water Reclamation Facility. The facility is permitted through ADWR to recharge up to 12,000 acre feet per year. Treated effluent that is not sold for reuse, is recharged into the aquifer at this facility. The City's average return rate of water pumped versus effluent recharged is approximately 63% (2019) city wide. This number increases in areas of newer construction north of the City due to newer fixtures, native landscaping, and energy efficient building codes. Homes which use septic systems bring little to no recharge back to the aquifer due to the volume of discharge from a septic system and distance to the aquifer through the natural filtration process.

II. Sewer Connection Policy

Applicability. This policy shall only apply to individual residential dwelling units. New subdivisions, multi-family residential and commercial projects shall construct and connect to City Sewer as a condition of receiving water service.

Connections. Any parcel(s) receiving City water shall connect to City sewer and/or convert from septic system to sewer within the following guidelines:

1. New Home Construction Adjacent to or Abutting a Sewer Main. New construction receiving City water shall connect to an existing sewer main when the home is built, if the sewer main is adjacent to or abutting the property.

2. New Home Construction Not Adjacent to or Abutting a Sewer Main. If new home construction receiving City water is not adjacent to or abutting a sewer main, the property owner will be required to extend the sewer main and connect to it. At the request of the owner, a reimbursement district per PCC 2-1-11 may be created to recover additional costs. This policy is not required for parcels located within the 12 unsewered areas identified in the Carollo report dated December 2020.

3. Use of Septic System. The Public Works Director or his designee may allow septic systems that would otherwise be prohibited by these rules. In all cases of installation of new septic systems, the owner shall sign and the City shall record in the office of the Yavapai County Recorder Office, an instrument requiring abandonment of the septic system and connection to an abutting or adjacent sewer main when available, regardless of the age or condition of the septic system.

4. Existing Homes Connecting to Existing Sewer Mains. Existing Homes receiving City water which are using a septic system and that are adjacent to or abutting a sewer main will be required to connect to City sewer at the soonest occurrence of:

    a. Within 18-months of adoption of the Sewer Connection Policy.

    b. When the property is sold and ownership transferred.

    c. When the existing septic system and/or leach field fail.

5. Existing Homes Connecting to New Sewer Mains. A Sewer Connection Program shall be established which will identify and prioritize the design, construction and funding for new sewer mains in those areas that are served by City water but are currently on septic systems. The Program will include annual funding in the City's budget for design and construction of projects within unsewered areas. At the completion of construction of the sewer main, existing homes will be required to connect to the new mains:

    a. As part of new sewer construction, or the soonest of:

        i. Within 18-months of the completion of construction of the new sewer main.

ii. When the property is sold and ownership transferred.

iii. When the existing septic system and/or leach field fail.

III. Cost Responsibility, Fees and Funding

1. Cost Responsibility. The responsibility for cost of improvements will be as follows:

    a. Trunk Mains and Treatment Plant. Cost to construct trunk mains and the water reclamation facility (treatment plants) is supported by the rate payers and development impact fees (DIF). The DIF cost shall be paid by the property owner.

    b. Collection Mains. Cost to construct the Collection Mains is paid by the Wastewater Fund rate payers and fees. The cost of design and construction of the Collection Mains shall be paid by the Wastewater Fund.

        - The cost of construction of Collection Mains will vary greatly in each unsewered area subject to the amount of gravity sewer or low pressure sewer to be constructed, the difficulty of excavation and the necessity for lift station(s). The average cost per parcel will also vary based on the number of parcels to be served within each unsewered area.

    c. On-Site Improvements. Cost to connect to the sewer main, abandonment of the septic system and DIF shall be paid by the property owner.

    d. Monthly Sewer Bill. The monthly bill for usage of the sewer system and treatment facility shall be paid by the property owner.

2. Fees and Penalties. To assist with the cost of the Sewer Connection Program, the following fees shall be assessed as part of the monthly utility bill to parcels that receive City water but are not connected to sewer:

    a. A monthly sewer fee, equal to the amount of the average sewer bill by class, will be assessed to those water users that are adjacent and abutting a sewer main but not connected to the sewer.

    b. A water finite resource fee or water surcharge will be assessed to those water users that are not connected to the sewer to help recover the loss of the ability to recharge.

    c. A water pollution penalty will be assessed to those water users that are adjacent and abutting a sewer main but not connected to the sewer.

3. Funding. Funding for the Water and Sewer Connection Policy are comprised of grant opportunities, the Wastewater Fund (sewer rate payers), the private property owners, Improvement Districts and Reimbursement Districts.

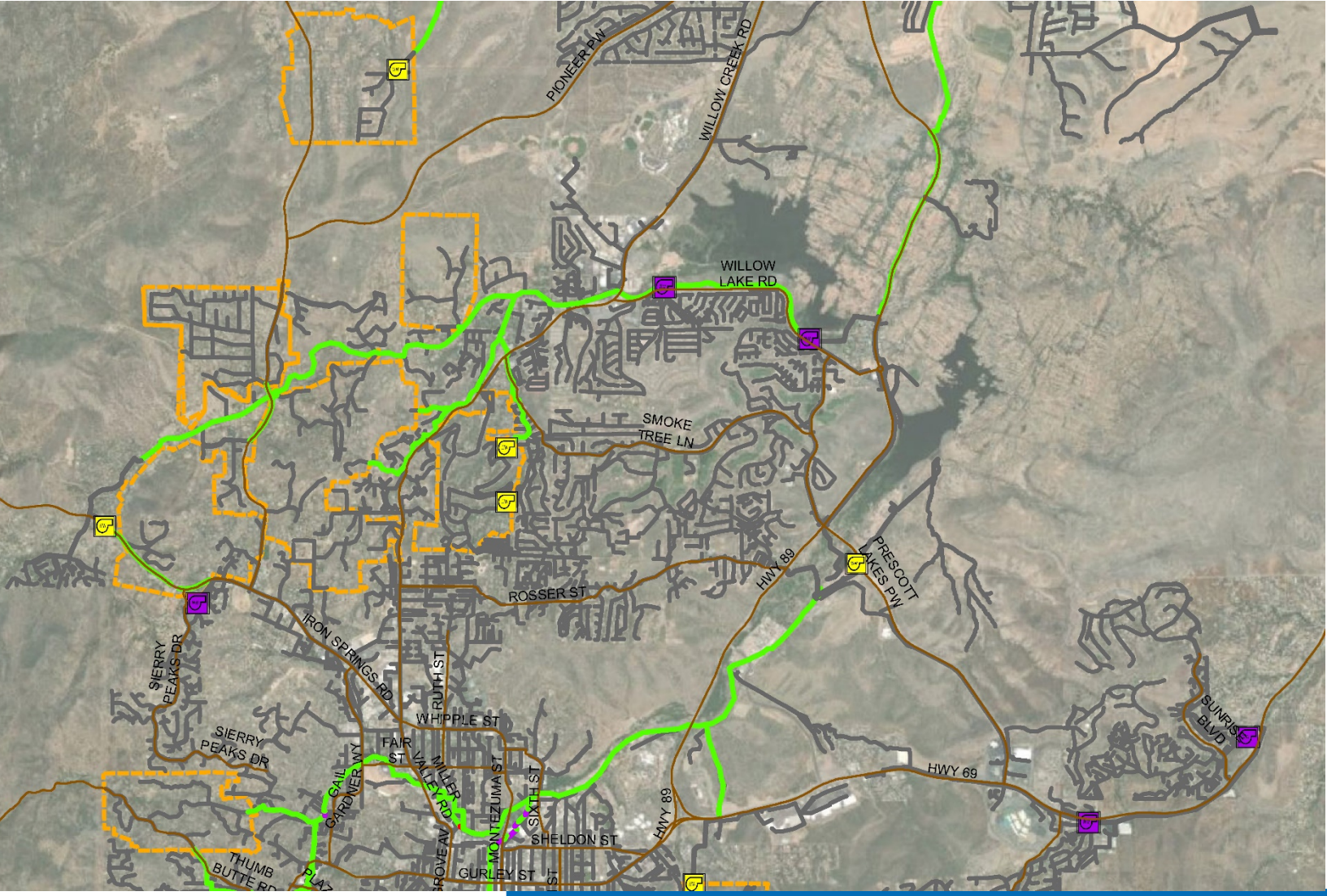
IV. Summary

A Sewer Connection Program will be established to implement septic conversion to sewer and establish a 20-25 year design, construction, funding and implementation plan. Prioritization for construction of unsewered areas within the Sewer Connection Program will include the difficulty of construction, is the area inside the City or outside the City, coordination with other City projects such as water main or street reconstruction, the number of septic systems that can be removed, benefits to watershed, amount of recharge achieved and the cost.

Future septic system approvals should be minimal to maintain ADEQ and Clean Water Act compliance and will not be permitted for new subdivisions or commercial projects. Financial hardships shall not be used as a basis for not connecting to sewer. A cooperative agreement with Yavapai County Environmental Services related to issuance of septic system permits will be required to enforce the Sewer Connection Policy.

The conversion of septic systems to sewer for water customers within the City's water service area is an "Essential" priority for the community. Quality of life issues, reduction of pollutants, and increased recharge to the aquifer are the goals of the policy, which can be met with the implementation of a Sewer Connection Program.

DRAFT



City of Prescott

2020 SEWER CONNECTIONS STUDY

2nd DRAFT | December 2020

carollo

City of Prescott

2020 SEWER CONNECTIONS STUDY

2nd DRAFT | December 2020

This document is released for the purpose of information exchange review and planning only under the authority of Richard Humpherys, December 20, 2020, State of Arizona, PE License No. 36578.

Contents

Appendices

Tables

Figures

Abbreviations

$/LF	cost per linear foot
2018	2018 Water and Wastewater Models Study
AACE	Association for the Advancement of Cost Engineers
ac-ft	acre-foot
AFY	acre-feet per year
CIP	Capital Improvement Plan
City	City of Prescott
d/D	depth over diameter
fps	feet per second
ft	foot (feet)
GIS	Geographic Information System
gpad	gallons per acre per day
gpcd	gallons per capita per day
gpm	gallons per minute
MG	million gallons
Study	2020 Sewer Connections Study
WRF	water reclamation facility

2020 SEWER CONNECTIONS STUDY

1.1 Introduction

The 2020 Sewer Connections Study (Study) purpose is to provide engineering support to the Mayor's Commission on Water & Sewer Connections. The purpose of this commission is to develop a sewer service expansion program to convert twelve areas from septic systems to municipal sewer service in the twelve unsewered areas where the City of Prescott (City) provides water service but not sewer service. Most of these areas are located outside of the City boundary. The objectives for converting septic systems to municipal service are as follows:

- Improve water quality in the streams that run through Prescott,
- Strengthen the City's water resource portfolio with the additional reclaimed water that comes from providing wastewater service to additional customers,
- Improve service to customers.

This study builds upon the information in the 2018 Water and Wastewater Models Study (2018 Study).

The purpose of this report is to present the results of this Study. This report presents the following information:

1. Anticipated population for each unsewered area when fully developed.
2. Wastewater flows including peak flows from each unsewered area.
3. Reclaimed water resource expected from each unsewered area.
4. Concept level infrastructure needed within each unsewered area.
5. Planning level costs to construct the infrastructure needed to provide wastewater service to each area.
6. Suggested septic system conversion prioritization

1.2 Unsewered Area Wastewater Flows

1.2.1 Population Estimates

Wastewater flows are correlated to population, so population is used to estimate wastewater flows. The population was estimated by counting the number of parcels in each unsewered area and multiplying the parcels by the City's average household population of 2.11 people/house. The population estimates assume that every property parcel is fully developed with a house, and each house is occupied year-round. Some of the areas still have a significant percentage of the land that is not yet developed, and there is no guarantee that all parcels will develop, so population estimates are expected to be conservative. Table 1 presents the estimated population by unsewered area.

The City provided a listing of the customers that receive water service but not wastewater service, with the assumption that customers who do not receive wastewater service have septic systems. This list consists of 3,097 customers. The City also provided a map showing the parcels of these customers and this map is included in Appendix A. To a large extent, the customers

without sewer service are in the areas shown in Figure 1. There are a few customers with septic systems that are located outside of the septic areas in Figure 1, and there are also parcels that do not currently have an account with the City, indicating that parcels in the unsewered areas are not all developed. The 3,375 parcels listed in Table 1 will be used to estimate wastewater flows when fully developed. Customers with septic systems not in the twelve unsewered areas are included in the flow estimates.

Table 1 Projected Population in the Study Areas

Unsewered Area	No. of Parcels	Estimated Population
1	159	335
2	609	1,285
3	272	574
4	354	747
5	304	641
6	421	888
7	395	833
8	295	622
9	48	101
10	368	776
11	114	241
12	36	76
Subtotal	**3,375**	**7,119**
Not in an Unsewered Area	520	1,097
Total	**3,895**	**8,216**

Note:
(1) The 520 parcels that are not sewered are water customers that are not in a specific unsewered area.

1.2.2 Wastewater Flows

The City uses an estimate of 4,044 gallons per household per month (64 gallons per capita per day [gpcd]) to estimate wastewater flows. The City also acknowledged that the average flow of 3,000 gallons per household per month (47 gpcd) may be closer to actual wastewater flows. Both unit flows will be used to estimate wastewater or reclaimed water flows. Wastewater flow estimates are used for two purposes:

1. Determine the size of infrastructure needed to convey the wastewater, and
2. Estimate the reclaimed water volume that can be generated from the wastewater.

Wastewater flow estimates should be conservative for infrastructure planning to make sure that infrastructure is sized adequately. Wastewater flow estimates for water resource planning should be as accurate as possible to correctly estimate the volume of water resource that will be available from the wastewater in the form of treated reclaimed water. For this study, the flow rate of 64 gpcd will be used to estimate average daily wastewater flows for sizing infrastructure. The flow rate of 47 gpcd will be used to estimate wastewater flows that will be used to calculate reclaimed water flows. To estimate the volume of reclaimed water available from the wastewater, a reclaimed water/wastewater ratio of 0.93 is assumed to account for the water losses in the wastewater treatment process and solids handling.

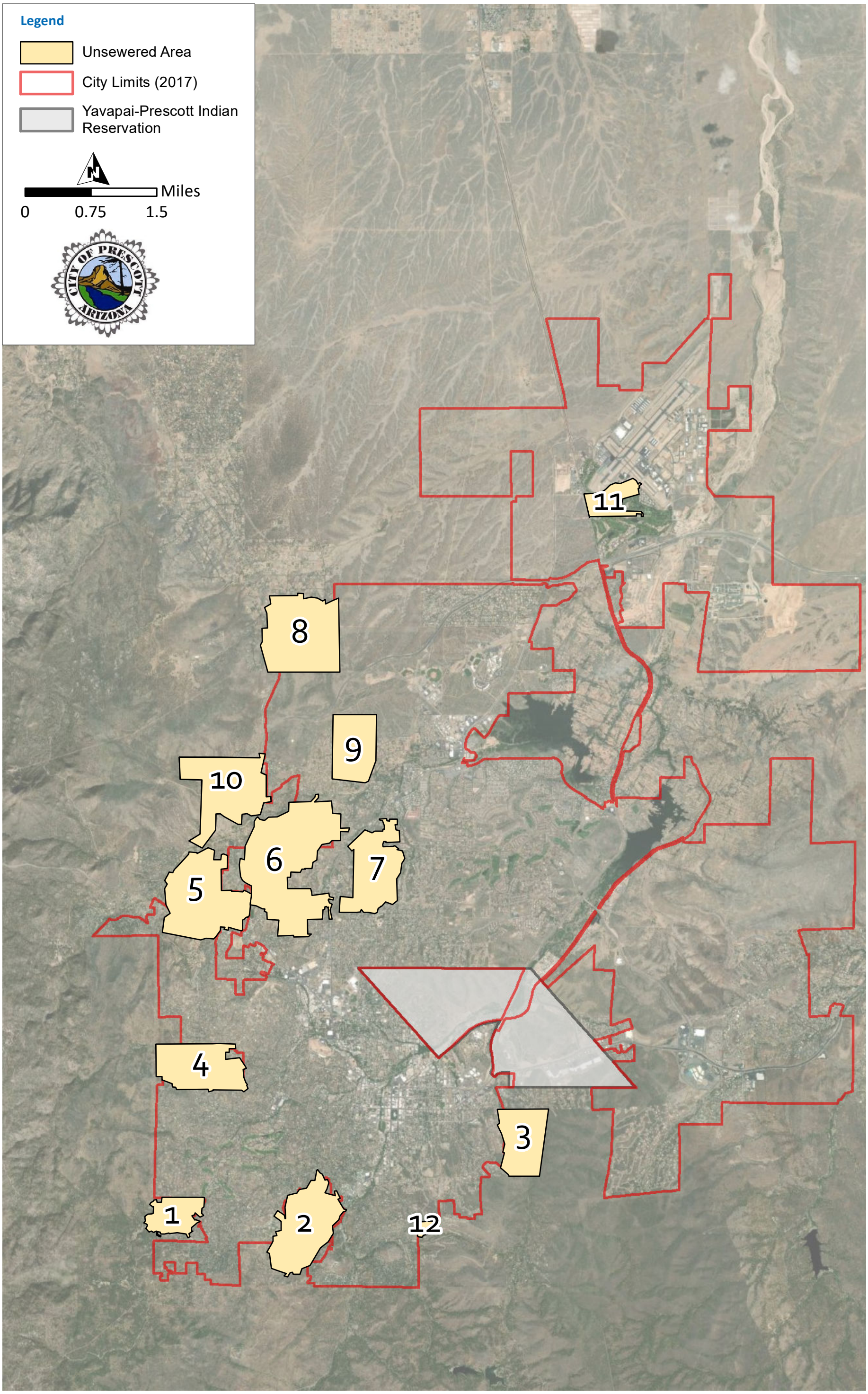


Figure 1 City of Prescott Unsewered Areas

File Path: M:\Client\Prescott\12094A00\2020 Septic System Study\GIS\mxd\Deliverables\TM 1\Figure 1 City of Prescott Unsewered Areas.mxd

The acreage in each Unsewered area was calculated using Geographic Information System (GIS) data provided by the City for previous projects. Based on the acreage and number of parcels, nine of the unsewered areas fell under the zoning classification of Low Density Residential 1. The remaining four areas would be classified as Rural Residential. The unit wastewater flow for Low Density Residential 1, is 125 gallons per acre per day (gpad) (Source: Table 2.16, from 2018 Water & Wastewater Model Report). Based on the unit wastewater flow, total unsewered area, and estimated population, the wastewater flow was calculated to be 63 gpcd, which is very close to the 64 gpcd provided by the City, providing a level of confidence that the unit wastewater flows are reasonable.

1.2.3 Peak Flows

In the 2018 Water and Wastewater Models study, daily peak flows were estimated based on data obtained from flow monitoring tests. However, measured flows are not available for the unsewered areas. Therefore, wastewater peaking factors can be calculated based on population using a set of formulas taken from the Arizona Administrative Code, Section 18. These peaking factors are shown in Table 2.

The populations from Table 1 and the peaking factors from Table 2 are used to calculate peaking factors at the outlet of each unsewered area and are presented in Table 3.

Table 2 Peaking Factors from the Arizona Administrative Code

Upstream Population	Dry Weather Peaking Factor
100	3.62
200	3.14
300	2.90
400	2.74
500	2.64
600	2.56
700	2.50
800	2.46
900	2.42
1,000	2.38
1,001 to 10,000	(6.330 X p-0.231)+ 1.094
10,001 to 100,000	(6.177 X p-0.233)+ 1.128
More than 100,000	(4.500 X p-0.174)+ 0.945

Source:
Arizona Administrative Code, Section 18

Table 3 Peaking Factor at the Outlet of each Unsewered Area

Unsewered Area	Estimated Population	Dry Weather Peaking Factor
1	335	2.84
2	1,285	2.31
3	574	2.58
4	747	2.48
5	641	2.54
6	888	2.42
7	833	2.44
8	622	2.55
9	101	3.62
10	776	2.47
11	241	3.04
12	76	3.62

Table 4 shows the daily average and peak wastewater flow using the unit flow of 64 gpcd.

Table 4 Wastewater Flows in each Unsewered Area

Unsewered Area	Average Daily Wastewater Flow (gpm)	Peak Hourly Wastewater Flow (gpm)
1	14.9	42.3
2	57.0	131.5
3	25.5	65.7
4	33.1	82.2
5	28.5	72.3
6	39.4	95.4
7	37.0	90.2
8	27.6	70.4
9	4.5	16.2
10	34.4	85.0
11	10.7	32.5
12	3.4	12.2
Not in an Unsewered Area	48.7	115.8
Total	**364.6**	**911.6**

Abbreviation:
gpm = gallons per minute

Peak wet weather flows used to evaluate pipe capacity in the 2018 Water and Wastewater Models Study are based on wet weather flow estimates using a methodology established from an analysis of storm inflows in 2004. In this study, storm inflows are estimated to be an additional 30 percent of dry weather flows in the Sundog basin and an additional 15 percent in the Airport basin. However, much of the historical inflow has come from pipes near or crossing

creeks, so similar inflows may not occur in the new infrastructure constructed in the unsewered areas because the pipes will be new and located mostly on hilly terrain. However, to maintain consistency with the methods used previously, the same wet weather flow estimate methodology will be used for the unsewered areas.

1.2.4 Reclaimed Water Flows

Table 5 presents the average daily reclaimed water flows from each unsewered area using the wastewater unit flow rate of 47 gpcd.

Table 5 Reclaimed Water Flows in each Unsewered Area

Unsewered Area	Daily Reclaimed Water Flow Rate (gpm)	Annual Reclaimed Water Volume (MG)	Annual Reclaimed Water Volume (AFY)
1	10	5	16.6
2	39	21	63.4
3	18	9	28.3
4	23	12	36.9
5	20	10	31.7
6	27	14	43.9
7	26	13	41.2
8	19	10	30.7
9	3	2	5.0
10	24	12	38.3
11	7	4	11.9
12	2	1	3.8
Subtotal	**218**	**114**	**351.6**
Not in a Specific Unsewered Area	34	18	54.2
Total	**252**	**132**	**405.7**

Abbreviations:
MG = million gallons; AFY = acre-feet per year

A total reclaimed water annual volume of 405.7 AFY can be expected once all the unsewered areas are converted to the City's sewer system and every property parcel is developed.

1.3 Unsewered Area Sewer Conveyance Infrastructure

Each of the unsewered areas was evaluated using GIS tools to determine the wastewater infrastructure that could serve the area. The parcel GIS layer was used to determine the number and location of properties that would be served. The parcel layer was also useful to identify street right of ways where sewer pipes could be located. The City provided an updated set of elevation contours that were used to determine where properties could be served by gravity sewers and where grinder pumps or lift stations would be required.

A model was not used to finalize the infrastructure plan for each area. The pipe and lift station capacities would be finalized at the detailed design stage.

1.3.1 Gravity Mains

The preferred method of conveying wastewater in the unsewered areas is by gravity pipes wherever possible because of the lower installation and significantly reduced operating cost when compared with a grinder pump or a lift station with a force main.

An eight-inch pipe is the minimum diameter for gravity sewer construction and is therefore used wherever flows can go by gravity. The maximum flow rates in Table 4 are well within the capacities of an eight-inch gravity sewer pipe, so all the gravity pipes in the unsewered areas are assumed to be eight inches in diameter.

Manholes are typically installed at grade changes, changes in sewer pipe sizes, alignment changes, and intersections with other sewer pipes. In addition, manholes should be located to facilitate sewer cleaning (See A.A.C R18-9 E301(d)(3)(a)). The maximum manhole spacing for eight-inch pipes was set at 400 feet (ft).

1.3.2 Grinder Pumps and Pressurized Mains

A grinder pump is used in areas where the wastewater cannot flow by gravity to a sewer interceptor. Grinder pumps convey the wastewater from a single home to a pipe in the adjacent street. In some cases, the pipe in the street will be a gravity sewer when the house is located on the downhill side of the street. In other cases, the grinder pump will pump into a pressurized pipe in the adjacent street along with the grinder pumps from other homes. The pressurized pipe would then discharge into a gravity main. Grinder pumps can work well when the pressurized pipe in the street delivers water up the street to a higher elevation. Grinder pumps can also work in hilly terrain with ups and downs. Where the highest elevation of the pressurized pipe is more than thirty-four feet above the outlet to the pressurized pipe, air valves will be required on the pressurized pipe to avoid vapor lock.

The grinder pump delivers wastewater to a pressurized pipe in the street which could be a three or four-inch diameter pipe depending on the number of connections. A four-inch pipe is assumed for cost estimating purposes, and the pipe diameter would be finalized when the pipeline is designed.

The grinder pump and the force main to the street is assumed to be the responsibility of the homeowner and is not included in the City's capital cost estimates. However, grinder pump costs are included in the costs used to prioritize unsewered area conversions. Appendix B contains a sample of the type of grinder pump that would be used for this type of installation.

1.3.3 Lift Stations

A lift station is used when wastewater cannot flow by gravity into the Prescott collection system. The City's preference on lift stations is to have at least fifty homes to help justify the cost of a lift station. Seven lift stations have fifty or more houses served by the lift station. Lift stations have also been planned at locations where the topography does not allow flow by gravity or use of grinder pumps. Five of the twelve unsewered areas require one or more lift stations, representing 1,446 parcels or 43 percent of the total unsewered parcels.

Lift stations for this application are duplex pumps where one pump acts as the duty pump and the other as the standby pump. The required pumping capacity is provided by a single duty pump. Lift station sizes will be finalized during the design process. For the purposes of

estimating lift station costs, lift stations are sized to provide four times the average hourly flow rate.

Table 6 presents the lift stations that have been identified for the unsewered areas. Appendix C presents typical lift station information for this application.

Table 6 Lift Stations in Unsewered Areas

Unsewered Area	Force Main Length (ft)	Parcels	Capacity (gpm)	Static Head (ft)
2	693	296	110	23
3	420	142	53	29
3	2,503	242	90	44
5	721	153	57	50
7	2,315	192	72	110
7	382	259	97	18
8	795	162	60	98

In the event of power outages, the City can provide protection by installing a generator onsite, or by using portable generators.

The Arizona Administrative Code requires that new force mains downstream from lift stations be designed to maintain a minimum flow velocity of 3 feet per second (fps) and a maximum flow velocity of 7 fps (A.A.C. R 18-9-E301(D)(4)(a)). This velocity criterion promotes scouring so that the solids deposited in the force main while the pumps are off will be transported downstream when the pumps are operating. Wastewater retention time in the pipeline should also be considered in sizing force mains to avoid excessive hydrogen sulfide generation.

1.3.4 Unsewered Area Descriptions

Area 1 can be served primarily by gravity with three small areas where grinder pumps are used to avoid having lift stations serving only a few parcels. The downstream gravity sewers that serve this area are already in place. Although some rock excavation is anticipated and this area is smaller than most of the other areas, the cost of providing sewer service in the area is relatively less expensive.

Area 2 is often referred to as Mountain Club. This is the largest area in terms of the number of parcels and the geographical area. Rock excavation will be required, and portions of the area will be served by gravity sewers, grinder pumps, and a lift station. The gravity sewers needed to convey wastewater from the area are in place.

Area 3 is located on the southeast side of the City where excavation may not be difficult. The area will be served by a combination of gravity pipes and grinder pumps. Two lift stations are required to move the wastewater out of the area. The downstream lift station will need to deliver wastewater to a force main that may also need to carry wastewater for other future developments in the area. The timing of when sewer could be brought to this area may be influenced by other development north of Area 3.

Area 4 may require rock excavation but is expected to be the least expensive area to implement a sewer system on a cost per parcel basis. Most of the area will be served by gravity pipes and a few isolated areas will be served with grinder pumps.

Area 5 is in a rocky area on the west side of the City. Wastewater service will be provided by both gravity pipes and grinder pumps. A lift station and force main will be required outside of the area to deliver a significant portion of the flow to an existing force main located on the west side of the service area. A gravity sewer on the east side of the area that is shared with Area 6 will need to be constructed before this area can be fully converted. Area 5 will be one of the more expensive areas to convert to a sewer system.

Area 6 is in a rocky area on the west side of the City. Most of the area can be served by gravity pipes but some areas will be better served by grinder pumps. A lift station is not needed for this area. Area 6 will also be one of the more expensive areas to convert to a sewer system. A gravity sewer on the west side of the area that is shared with Area 5 will need to be constructed before this area can be fully converted.

Area 7 is also located in a rocky area with difficult terrain. Wastewater flows will be collected by a combination of gravity sewers and grinder pumps. Two lift stations will be required to move the wastewater out of the area. Downstream infrastructure is in place for this area.

Area 8 serves a development located in the northwest part of the City. By using grinder pumps in much of the area, two lift stations can be avoided. One lift station will be needed to move wastewater out of the area. There is not development nearby with the City's sewer pipes, so a gravity main to the area will be needed to convey the wastewater to the Airport wastewater treatment facility. For this reason, this area should be converted to sewer later than other unsewered areas so that other developments can help pay for the common gravity sewer.

Area 9 is located on the northern part of the City where excavation will not be difficult. The entire area will be served by gravity. Area 9 will be expensive to provide wastewater service on a per parcel basis because the area only has forty-eight parcels although the total cost is the lowest of all the unsewered areas. Downstream infrastructure is in place for this area.

Area 10 is in the northwest part of the City. It will be served by gravity except for one area that requires grinder pumps. Excavation should not be difficult. Downstream infrastructure is in place for this area. This area does not require a lift station and has few grinder pumps so it will be relatively less expensive to convert to sewer.

Area 11 is located near the airport where excavation should be easy. The entire area can be served by gravity sewer pipes. Therefore, the cost of cost of converting this area to a sewer system is comparatively lower. Downstream infrastructure is in place for this area.

Area 12 is located on the southwest of the City along the Senator highway. The area can be served by grinder pumps but needs a gravity pipeline to be constructed along the highway before it can be served. Although the City's sewer system serves the development to the west, pipes would need to go through private property to provide service to this area. This area is the most expensive area to serve on a per parcel basis and would be one of the last areas to convert to a sewer system.

Appendix D contains maps of each unsewered area showing the infrastructure needed to provide wastewater service.

1.3.5 Collection System Downstream of the Unsewered Areas

Basins that require infrastructure outside the physical boundary of the unsewered area to connect to the City's sewer system are 3, 5, 6, 8, and 12. Most of this infrastructure is already in the City's buildout plan but is not in the Capital Improvement Plan (CIP) because this infrastructure is planned for year 2050. These pipes will need to be constructed before these areas can be served.

The capacity of the pipes downstream from each unsewered area to the Airport Water Reclamation Facility (WRF) by buildout were evaluated using the model to determine if the downstream pipes that either exist today or are planned for buildout in the 2018 study have enough capacity. The flows exiting each unsewered area were modeled with the diurnal pattern associated with the flow monitoring basin that the unsewered area is located within. Where a lift station is used to deliver water from the unsewered area, the lift station flow was modeled. The model predicted that the downstream pipes all have enough capacity. Figure 2 presents a map of the depth over diameter (d/D) associated with the downstream pipes to demonstrate that the d/D does not exceed 0.9 for any of the downstream pipes.

1.4 Capital Improvement Projects

1.4.1 Unit Costs

Cost estimated have been developed for the wastewater capital improvement projects identified in this study. These estimates were prepared in accordance with the guidelines of the Association for the Advancement of Cost Engineers (AACE) International for a Class 5 estimate unless otherwise noted. Table 7 summarizes the AACE International cost estimating classifications, the level of project definition (percent of design), uses appropriate cost estimating methodologies, and the expected accuracy of each class. Design work would need to be undertaken to obtain more precise cost estimates.

Table 7 AACE International Cost Estimating Classification Summary

Estimate Class	Maturity Level of Project Definition Deliverables (Level of Engineering Design)	End Use	Typical Cost Estimating Methodology Used	Expected Accuracy Range (Low/High)
Class 5	0% to 2%	Conceptual screening	Capacity factored, parametric models, judgment or analogy	L: -20% to -50% H: +30% to +100%
Class 4	1% to 15%	Study or feasibility	Equipment factored or parametric models	L: -15% to -30% H: +20% to +50%
Class 3	10% to 40%	Budget authorization or control	Semi-detailed unit costs with assembly level line items	L: -10% to -20% H: +10% to +30%
Class 2	30% to 75%	Control or bid/tender	Detailed unit cost with forced detailed take-off	L: -5% to -10% H: +5% to +20%
Class 1	65% to 100%	Check estimate or bid/tender	Detailed unit cost with detailed take-off	L: -3% to -10% H: +3% to +15%

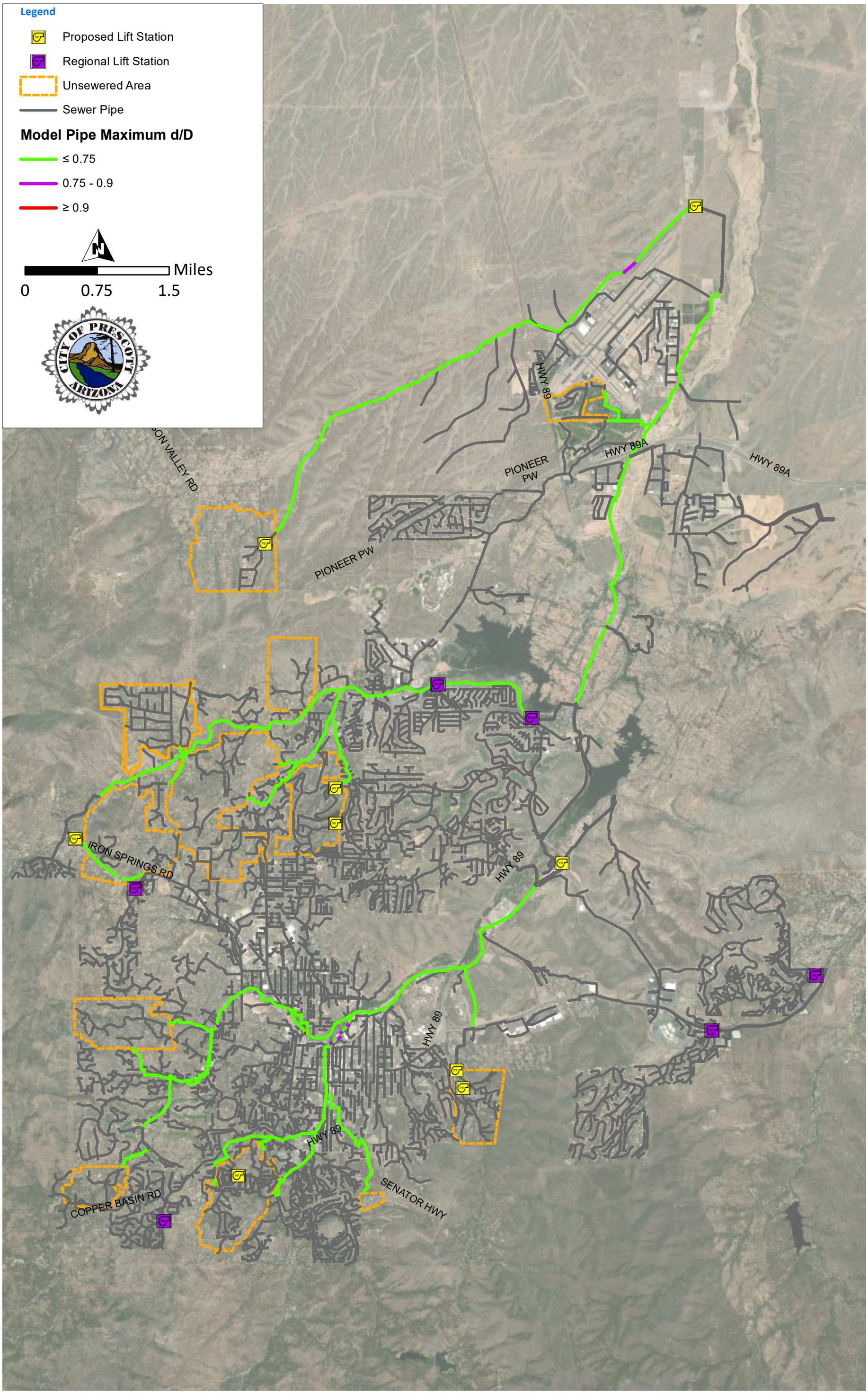


Figure 2 Pipe Capacity Downstream of the Converted Unsewered Areas

Unit costs were developed for the wastewater projects using Carollo's cost estimating database, bid tabs provided by the City, and information provided by equipment suppliers and contractors. When multiplied by the capacity, quantity, or size of infrastructure, the unit construction cost represents what the City should expect to pay a contractor to construct the project. The City will have other expenses to complete the project including design, inspection, project management, and contingencies. A multiplier of 1.4 was used to represent these additional costs and applied to the construction cost to obtain a project cost. The project cost is the amount that should be budgeted for the project. Table 8 presents a summary of pipeline and lift station unit costs.

Appendix E contains details of the pipeline unit cost calculations.

Table 8 Unit Costs

Infrastructure	Unit Construction Cost ($)
Force Mains and Pressurized Pipes	**($/LF)**
4-inch medium excavation	130
4-inch difficult excavation	173
Gravity Sewers	**($/LF)**
8-inch medium excavation	144
8-inch difficult excavation	187
Lift Stations	**($/ea)**
Medium excavation	300,000
Difficult excavation	320,000
Grinder Pumps	10,000

Notes:
(1) Generators are not included in the lift station costs. An additional $25,000 should be budgeted for a generator at a lift station.
(2) Construction Cost = estimated price paid to a contractor
(3) ENR CCI = 11539
Abbreviation:
$/LF = cost per linear foot

1.4.2 Project Summary

Table 9 summarizes the conveyance infrastructure needed to serve the unsewered areas with associated costs. Table 10 presents the infrastructure needed to provide the downstream infrastructure to connect to the City's wastewater system.

Table 9 Capital Costs to Serve Unsewered Areas

Unsewered Area	Description	Diameter (in)	Length (ft.)	Peak Flow Rate (gpm)	Unit Cost ($)	Construction Cost ($)	Project Cost ($)
1	Gravity Main	8	9,000		187	1,673,000	2,342,000
	Pressurized Pipe	4	3,000		173	585,000	819,000
	Subtotal					**2,258,000**	**3,161,000**
2	Gravity Main	8	42,464		187	7,948,000	11,127,000
	Pressurized Pipe	4	15,613		173	2,703,000	3,784,000
	Lift Station			110		320,000	448,000
	Subtotal					**10,971,000**	**15,359,000**
3	Gravity Main	8	21,586		144	3,116,000	4,362,000
	Pressurized Pipe	4	4,163		130	543,000	760,000
	Lift Station			53		300,000	420,000
	Lift Station			90		300,000	420,000
	Subtotal					**4,259,000**	**5,963,000**
4	Gravity Main	8	17,817		187	3,335,000	4,669,000
	Pressurized Pipe	4	2,174		173	376,000	526,000
	Subtotal					**3,711,000**	**5,195,000**
5	Gravity Main	8	15,400		187	2,883,000	4,036,000
	Pressurized Pipe	4	19,173		173	3,320,000	4,648,000
	Subtotal					**6,203,000**	**8,684,000**
6	Gravity Main	8	42,881		187	8,026,000	11,236,000
	Pressurized Pipe	4	11,061		173	1,915,000	2,681,000
	Subtotal					**9,941,000**	**13,917,000**

Table 9 Capital Costs to Serve Unsewered Areas (continued)

Unsewered Area	Description	Diameter (in)	Length (ft.)	Peak Flow Rate (gpm)	Unit Cost ($)	Construction Cost ($)	Project Cost ($)
7	Gravity Main	8	25,401		187	4,755,000	6,657,000
	Pressurized Pipe	4	13,108		173	2,270,000	3,128,000
	Lift Station			72		320,000	448,000
	Lift Station			97		320,000	448,000
	Subtotal					**7,665,000**	**10,731,000**
8	Gravity Main	8	8,108		144	1,170,000	1,638,000
	Pressurized Pipe	4	12,692		130	1,654,000	2,316,000
	Lift Station			60		300,000	420,000
	Subtotal					**3,124,000**	**4,374,000**
9	Gravity Main	8	7,706		144	1,102,000	1,557,000
10	Gravity Main	8	37,054		144	5,349,000	7,489,000
	Pressurized Pipe	4	2,000		130	216,000	302,000
	Subtotal					**5,565,000**	**7,791,000**
11	Gravity Main	8	10,000		144	**1,405,000**	**1,967,000**
12	Pressurized Pipe	8	3,401		130	**443,000**	**620,000**
	Total Cost					**56,657,000**	**79,320,000**
	Total Length of Gravity Pipe		**237,508**				
	Total Length of Force Main		**86,123**				

Notes:
(1) Pipe unit cost includes rock excavation for areas 1,2,4,5,6 and 7.
(2) Four-inch pressurized pipes have been included in the cost estimate. At the design stage it may be possible to reduce the diameter of some force mains to three inches.
(3) Costs do not include capital improvements to interceptors downstream from the unsewered areas.
(4) ENR CCI = 11539

Table 10 Required Conveyance Infrastructure Downstream of Unsewered Areas

Unsewered Area	Description	Diameter (in)	Length (ft.)	Peak Flow Rate (gpm)	Unit Cost ($)	Construction Cost ($)	Project Cost ($)
3	Gravity Main	8	1,221		144	176,000	246,000
	Pressurized Pipe	4	3,033		130	395,000	553,000
	Subtotal					**571,000**	**799,000**
5	Gravity Main	8	6,436		187.18	1,205,000	1,687,000
	Pressurized Pipe	4	721		173.15	125,000	175,000
	Lift Station			57		320,000	448,000
	Subtotal					**1,650,000**	**2,310,000**
5,6	Gravity Main	8	4,646		187.18	671,000	939,000
8	Gravity Main	8	11,935		144	1,723,000	2,412,000
12	Gravity Main	8	3,672		144	577,000	808,000
	Total					**5,192,000**	**7,268,000**

1.4.3 Project Prioritization

The cost of converting each unsewered area varies based on the length of pipe, excavation difficulty, and whether a lift station is required. Although the City is not expected to pay capital or operating costs for grinder pumps, the homeowner will need to bear this expense, so grinder pump costs are included in the prioritization evaluation. Each unsewered area was ranked based on the cost per parcel, whether grinder pump systems would be required in some areas, and whether lift stations would be required.

The cost of infrastructure outside of the unsewered area could be shared with other developments, but determining a practical split is not practical at this time, so the entire cost of this infrastructure is assumed to be paid for by the unsewered areas.

Costs were normalized by the number of property parcels served in each area to determine the cost per parcel. Then unsewered areas were grouped according to the cost, level of difficulty, and timing to determine a priority for converting the unsewered areas. Cost is the largest determining factor in the grouping. Table 11 presents a project prioritization summary.

1.4.3.1 Group 1 – Unsewered Areas with the Least Difficulty in Converting to Sewer Service

Unsewered areas 1, 4, 10, and 11 all have a cost per parcel that is equal to or less than $21,000. These areas do not need a lift station. Although areas one and four are expected to have a difficult excavation, the cost/parcel is still lower than other areas. Group 1 areas are not dependent on new infrastructure outside of the area to be able to provide service.

1.4.3.2 Group 2 – Unsewered Areas with Moderate Difficulty Converting to Sewer Service

Group 2 unsewered areas include 2, 3, 8, and 9. Areas 2, 3, and 8 will require at least one lift station. Area 2 will have difficult excavation and has the highest total cost of any area but has a relatively favorable cost/parcel because of the relatively higher number of property parcels served. Areas 3 and 8 will require additional infrastructure outside of the area to provide wastewater service and are therefore expected to be converted after other areas. Area 9 will be straightforward to convert to sewer service but has a higher cost/parcel due to the relatively small number of parcels that will be served.

1.4.3.3 Group 3 – Unsewered Areas with the Most Difficulty Converting to Sewer Service

Group 3 unsewered areas consist of areas 5, 6, 7, and 12. Areas 5, 6, and 7 are expected to have difficult excavation. Area 7 will require two lift stations. Areas 5 and 12 will require infrastructure outside of the unsewered area to provide service and therefore will probably be converted after other areas. These four areas have the highest cost per parcel of the twelve unsewered areas. Area 12 is relatively straightforward to implement once a gravity main is constructed along the Senator Highway, but the small number of parcels makes the cost/parcel very high.

Table 11 Project Prioritization Summary

Unsewered Area	Parcels	Number of Lift Stations Required	Difficult Excavation	Parcels Using Grinder Pumps	Reclaimed Water Provided to the City at Buildout (AFY)	Unsewered Area Infrastructure Project Cost ($)	Downstream Sewer Infrastructure Cost ($)	Total City Project Cost ($)	Off-site Improvements per Parcel ($) [2]
1	159	0	Yes	48	16.6	3,161,000		3,161,000	20,000
2	609	1	Yes	155	63.4	15,359,000		15,359,000	25,000
3	272	2		69	28.3	5,963,000	799,000	6,762,000	25,000
4	354	0	Yes	26	36.9	5,195,000		5,195,000	15,000
5	304	1	Yes	130	31.7	8,684,000	2,779,500	11,463,500	38,000
6	421	0	Yes	68	43.9	13,917,000	469,500	14,386,500	34,000
7	395	2	Yes	115	41.2	10,731,000		10,731,000	27,000
8	295	1		85	30.7	4,374,000	2,412,000	6,786,000	23,000
9	48	0		0	5	1,557,000		1,557,000	32,000
10	368	0		15	38.3	7,791,000		7,791,000	21,000
11	114	0		0	11.9	1,967,000		1,967,000	17,000
12	36	0		36	3.8	620,000	808,000	1,428,000	40,000
13[1]	520	0		0	54.2	0	0	0	0
Total	**3,895**	**7**	**6 Difficult Excavation**	**747**	**405.7**	**79,320,000**	**7,268,000**	**86,588,000**	**26,417 (Average)**

Notes:
(1) Area 13 represents the 520 unsewered lots in the city that are not in a defined unsewered area.
(2) Does not include on-lot improvements to connect.
(3) ENR CCI = 11539

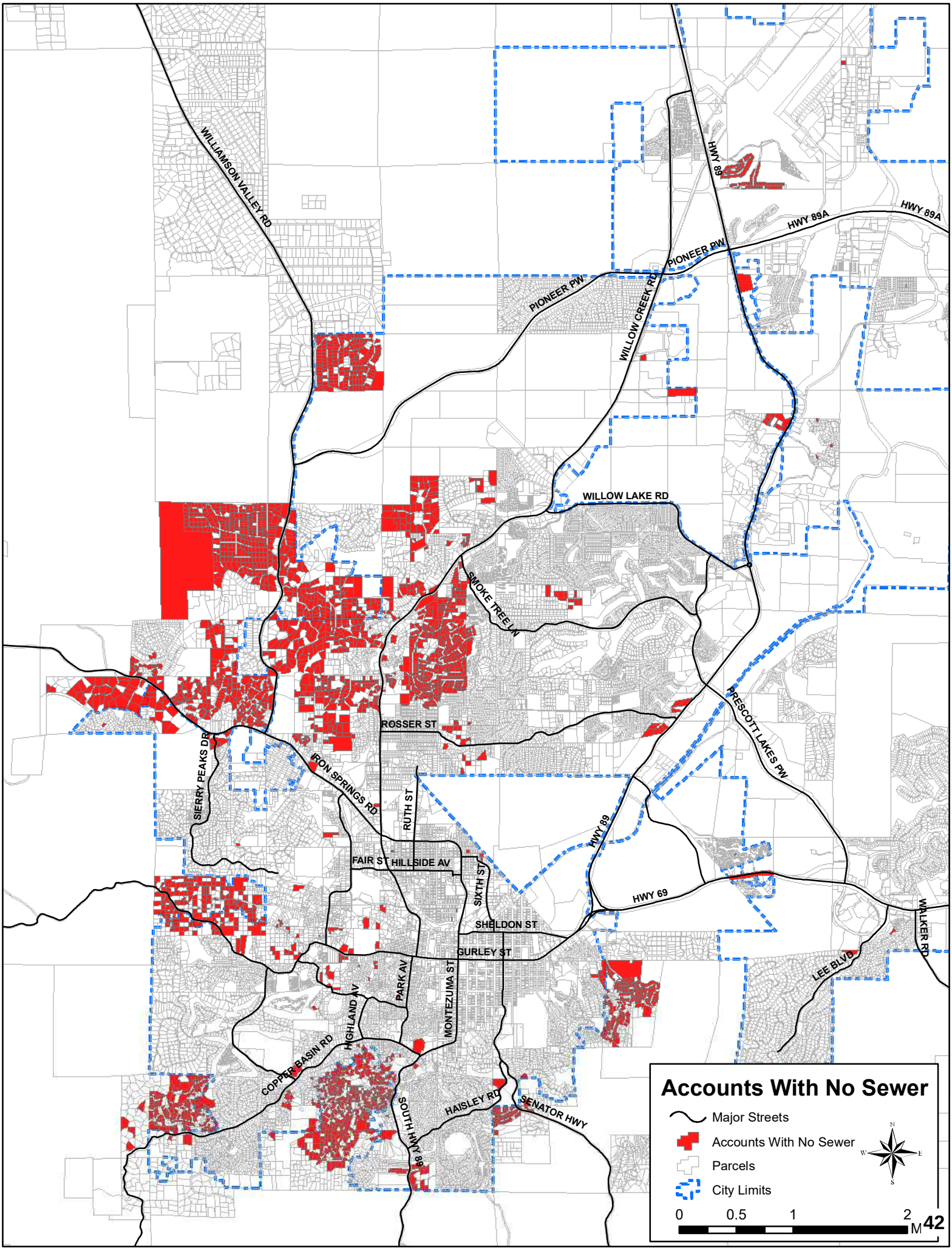
1.5 Project Summary

The following conclusions are drawn from this study:

1. There are 3,895 property parcels that currently would be served by septic systems if fully developed. When developed these parcels would house approximately 8,218 people.
2. When fully developed and converted to City sewer service, the average daily wastewater flow from these areas would be 364.6 gpm.
3. When fully developed and converted to City sewer service, the unsewered areas plus the parcels not in a specific unsewered area are expected to provide 405.7 AFY of reclaimed water to augment the City's water resource portfolio.
4. The infrastructure needed to convert all twelve unsewered areas to municipal sewer service is 237,508 ft. of eight-inch gravity sewer pipe, 86,123 ft. of pressurized and force main pipe, 7 lift stations, and 747 grinder pumps.
5. The project cost of converting all twelve unsewered areas to sewer service is expected to be $79,320,000 for infrastructure inside each unsewered area and $7,268,000 for infrastructure off-site of the unsewered areas for a total of $86,588,000.
6. Each unsewered area was placed in a grouping based on the cost and relative difficulty of constructing a sewer system. The groupings are:
   a. Group 1, Least Difficult: 1, 4, 10, 11; a total of 995 parcels.
   b. Group 2, Moderate Difficulty: 2, 3, 8, 9; a total of 1,224 parcels.
   c. Group 3, Most Difficult: 5, 6, 7, 12; a total of 1,156 parcels.

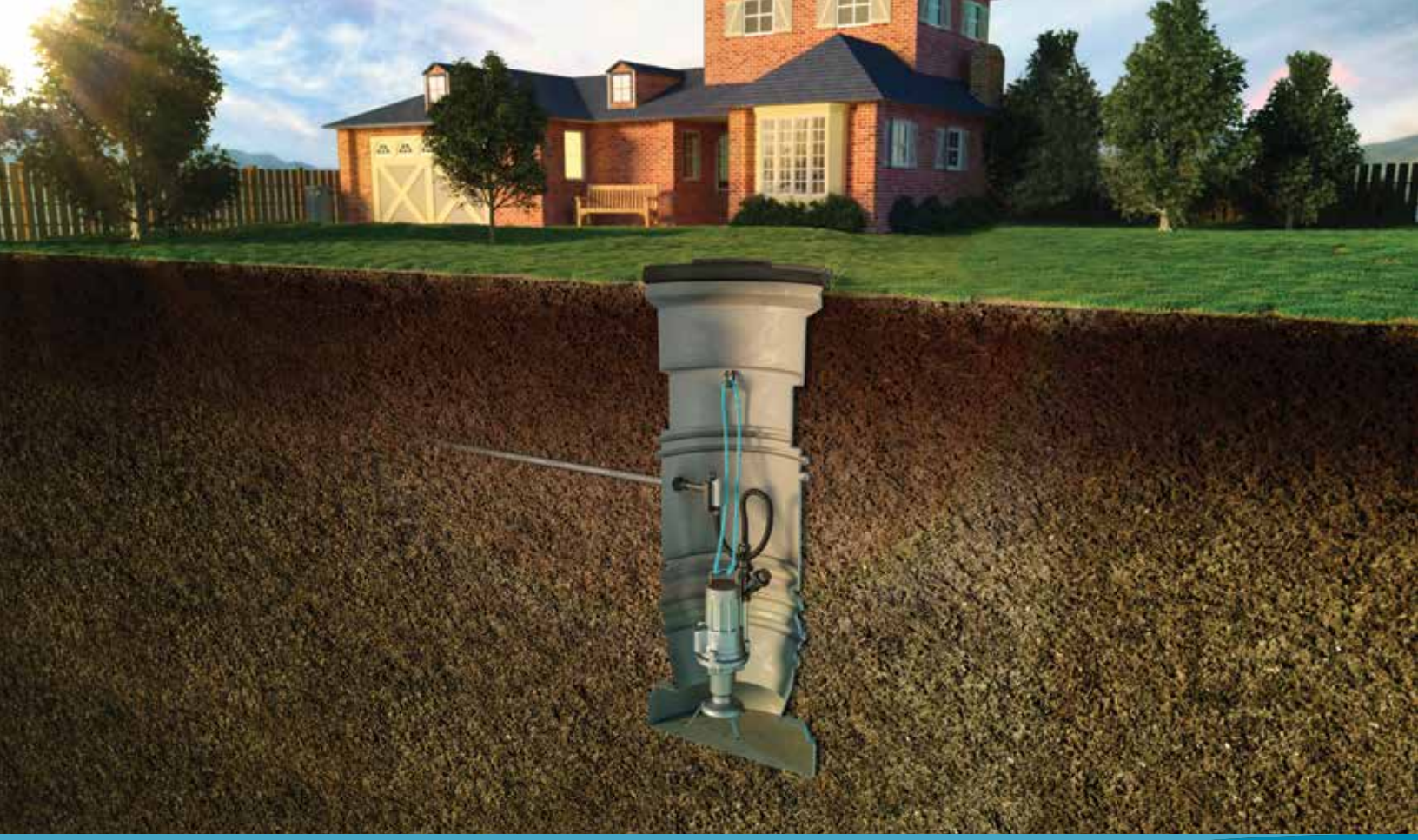
Appendix A

CITY OF PRESCOTT WATER CUSTOMERS THAT DO NOT HAVE A SEWER ACCOUNT


WILLIAMSON VALLEY RD
HWY 89
HWY 89A
HWY 89A
PIONEER PW
PIONEER PW
WILLOW CREEK RD
WILLOW LAKE RD
SMOKE TREE LN
PRESCOTT LAKES PW
ROSSER ST
SIERRY PEAKS DR
IRON SPRINGS RD
RUTH ST
FAIR ST
HILLSIDE AV
SIXTH ST
HWY 89
HWY 69
SHELDON ST
GURLEY ST
WALKER RD
LEE BLVD
PARK AV
MONTEZUMA ST
HIGHLAND AV
COPPER BASIN RD
SOUTH HWY 89
HAISLEY RD
SENATOR HWY
Accounts With No Sewer
Major Streets
Accounts With No Sewer
Parcels
City Limits
N
W
E
S
0
0.5
1
2
M

Appendix B

GRINDER PUMP INFORMATION



Compit Pressure Sewer System

WITH PROGRESSIVE CAVITY OR CENTRIFUGAL GRINDER PUMPS

FLYGT
a xylem brand

Does "One Size Fits All" Fit Your Design Requirements?

With more than 300,000 grinder pumps in successful service since the early 1980s, Flygt understands the importance of pump selection in the overall performance of your pressure sewer system. That's why Flygt Compit Pressure Sewer Systems offer two proven grinder pump technologies to better meet your specific needs–progressive cavity or centrifugal hydraulics. By matching the right technology to your system demands, we can improve performance efficiency and lower energy consumption and annual operating costs.

Flygt Progressive Cavity Pump

- The Flygt centrifugal grinder pump family includes the same pumps used in municipal and commercial pump stations since the early 1980's
- Predictable performance with flow ranging from 6-15 gallons per minute for most system designs
- Exclusive double-row lower bearing and wear sleeve provide increased shaft stabilization and longer motor and seal life
- Exclusive seal cavity design comprised of two independent mechanical seals that run in a food-grade oil bath, eliminating foreign-debris damage and delivering longer run times between service
- Trickle-impregnated method of insulating motor windings results in 80-90% fill rate and eliminates air pockets, allowing the motor to run at a lower temperature for extended motor life

Flygt Centrifugal Grinder Pumps

- Rugged, municipal-designed pump with a higher head capacity and more flow at run-out
- Wide range of performance with flows over 200 gallons per minute
- Based on a flexible modular design all sizes have the same discharge size and several interchangeable impellers to meet today's demands and tomorrow's growth
- Exclusive seal cavity design comprised of two independent mechanical seals, one running in a food grade oil bath and the other running in the pump media with spin out that eliminates foreign-debris damage and enabling longer run times between service
- Trickle-impregnated method of insulating motor windings results in 80-90% fill rate and eliminates air pockets, allowing the motor to run at a lower temperature for extended motor life

1 Compit 460 / 570 Small Residential and Commercial Applications

- Total storage capacity from 120 to 150 gallons
- The Compit 570 was designed for northern climates where the discharge needs to be below the frost line which can be over 4 ft.
- Both the 460 and 570 basins are easy to install, with eight flat panels for easy-to-locate station penetrations
- Compatible pumps: M3000 Series centrifugal and 3068.175 progressive cavity pumps

2 Compit 900 Large Residential and Small Commercial Applications

- A simplex station design with total storage capacity near 240 gallons and heights ranging from 74" to 118" with extension
- Cover materials include polyethylene, or concrete for traffic-rated applications
- Easy to install with two bosses for electrical or venting and a single predetermined inlet boss
- Large bottom flange eliminates the need for concrete ballasting, lowering install time and cost
- The bottom is bowl shaped to promote solids removal and reduce resting volume
- Compatible pump: 3068.175 progressive cavity

3 Compit 2000 / 2500 Hotels, Multiple Homes, Commercial and Smaller Municipal Station Applications

- Total storage capacity from 500 to 625 gallons
- Practical basin design saves valuable installation time by allowing the inlet field to be installed anywhere between ribs
- The cover is screwed on and sealed with an adhesive gasket to keep odors confined to the station or vented to a remote location
- The bottom is hopper shaped to direct all solids down to the pump inlet, allowing easy removal before issues arise and reducing resting volume
- Compatible pumps: M3000 Series Centrifugal and 3068.175 progressive cavity

Reduce Running and Service Costs with Flygt Monitoring & Control Solutions

Maximize the efficiency of your Compit Pressure Sewer System with Flygt monitoring and controls. The Flygt control offer focuses on reducing downtime while making the system easy to operate, and providing the homeowner proven municipal grade technology for residential use.

Flygt FGC211 Intelligent Control

Advantages

- Motor protection with built-in overload protection and user-defined maximum motor current
- Maintenance runs will exercise for one second every four days to keep seals adequately lubricated
- Automatic reset from the FGC allows the end-user to enter the number of automatic restarts from 1-200. The counter clears after a successful restart
- Starting and power on delay to prevent an over-pressure situation, the FGC starts pumps with a delay of 1-120 seconds when starting the pumps after a power interruption

Flygt Phase Conversion Panel

Advantages

- Nearly double the starting torque and up to 30% energy savings when compared to single phase systems
- Additional motor protection will shut pump down in under or over voltage conditions
- Self starting system does not require start and run capacitors to run the pump
- Reduced operating cost and low stress on the motor due to reduced in rush starting current

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Let's Solve Water

Flygt is a brand of Xylem, whose 12,000 employees are addressing the most complex issues in the global water market.

www.xylemwatersolutions.com/scs/usa

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Appendix C

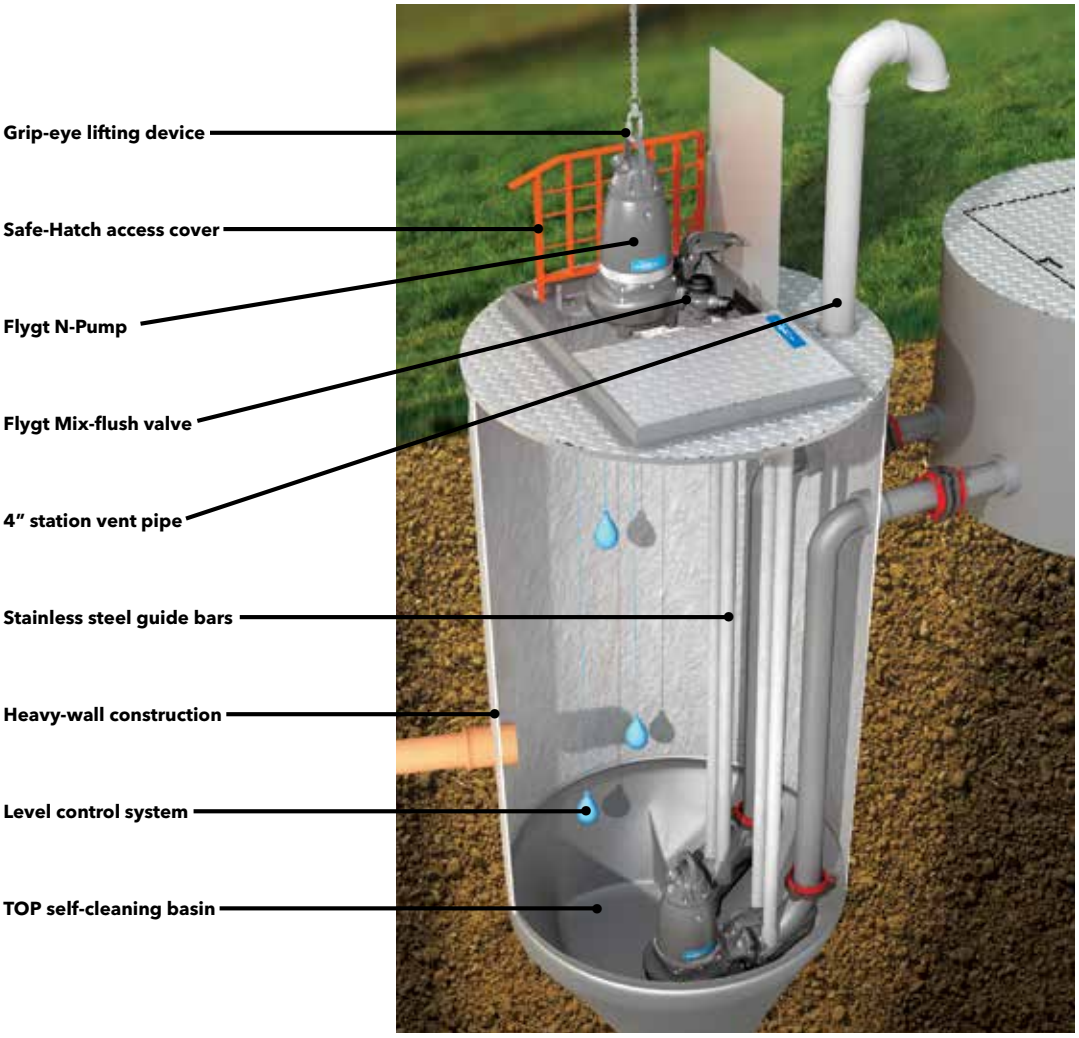
LIFT STATION INFORMATION

TOP Pre-Engineered Fiberglass Pump Station

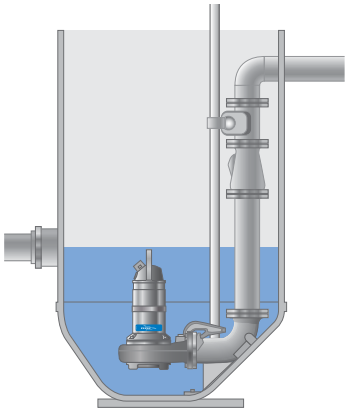
THE OPTIMUM PUMP STATION

FLYGT
a xylem brand

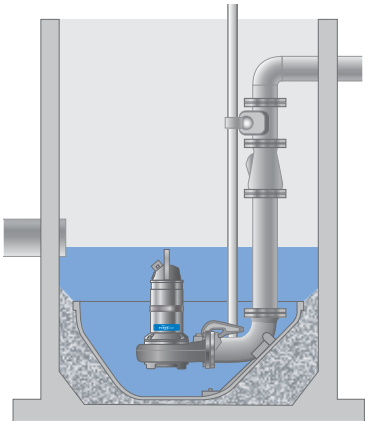
Flygt TOP Pre-Engineered Pump Station



The self-cleaning team: Flygt TOP Sump and N-Pump



TURNKEY PUMP STATIONS
Install a prepackaged pump station with Flygt TOP self cleaning design in corrosion resistant fiberglass construction.



RETROFIT EXISTING SUMPS
Install the prefabricated Flygt TOP sump floor and fill the gap between the old floor and the new with concrete. Wait a few hours until dry, then put your pump station back online. No additional excavation is required.

N IMPELLER & WEAR PLATE
N-Impeller with back swept vanes and guide pin with relief groove provide sustained efficiency while pumping modern trash such as flushable wipes.

Continuously removes suspended solids

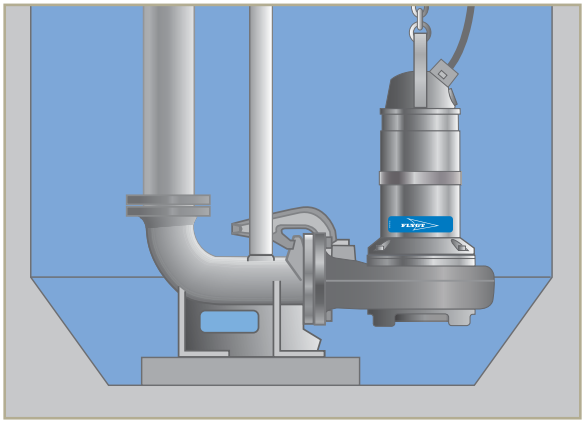
The Flygt TOP station delivers outstanding self-cleaning performance both in laboratory tests and under real-life operating conditions.

Flygt conducted a laboratory test comparing the Flygt TOP sump to a traditional sump. The test sumps were each filled with 105 US gallons (400 liters) of water and 108 lbs. (49 kg) of sand. The water was pumped back and forth 10 times from one sump to the other.

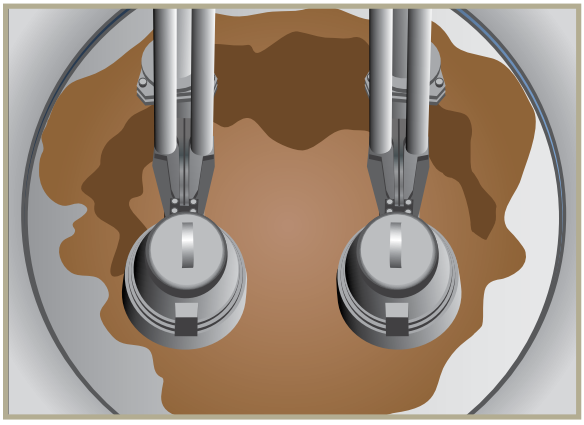
At the end of the test 207 lbs. (94 kg) of solids accumulated in the conventional sump, while only 9 lbs. (4 kg) of solids remained in the TOP sump.

These lab test results are replicated on a daily basis in thousands of Flygt TOP stations operating around the world. The results are definitive: Flygt TOP stations with self cleaning hopper shaped bottom reduce settled solids in turn reducing maintenance and downtime.

Conventional pump sump

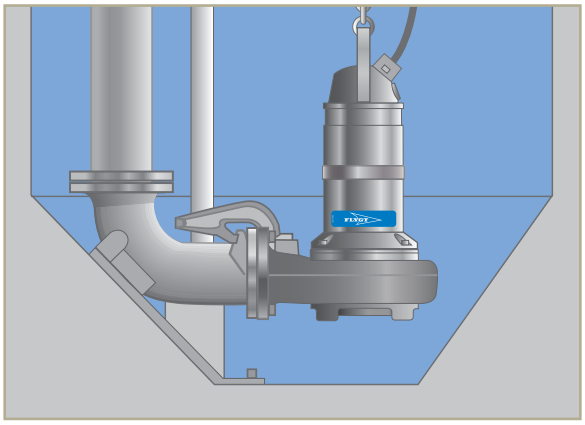


Conventional large flat sump floor encourages buildup of sludge and solids.

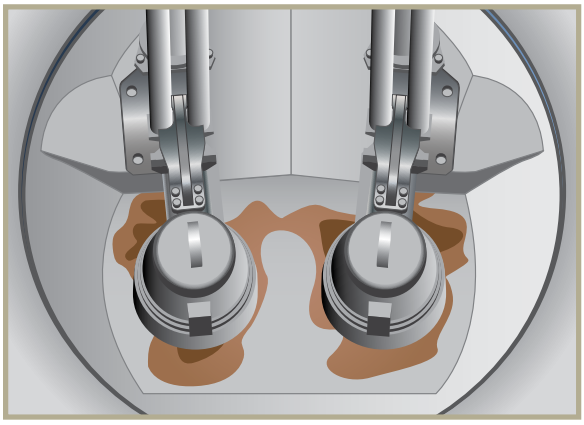


The further away the sumps walls are from the pumps, the greater the sedimentation.

Flygt TOP sump



Minimal floor area and optimized geometries ensure high velocity, which efficiently suspends settled solids in wastewater.

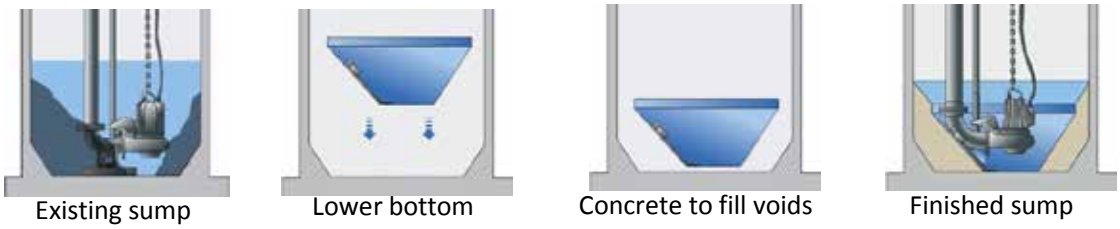


Optimized geometry draws any solids remaining in the sump closer to the pumps, where pump suction is the strongest. This eliminates the risk of solids buildup.

Retrofits easier and turnkey solutions possible

Top Stations are available as turnkey fully assembled pump stations, with rails, valves, and all discharge piping fully assembled. The other option is to retrofit the exsiting station with a TOP self-cleaning bottom. Just lower the insert into the station, fill the gap between the old floor and the new with concrete.

Retrofit Solution install process



TOP Sizes	TOP 4	TOP 5	TOP 6	TOP 100 Retrofit Liner	TOP 150 Retrofit Liner
Station Diameter	4 ft.	5 ft.	6 ft.	4 ft.	5 ft.
Discharge Sizes	2, 3, 4"		2, 3, 4, 6"	2, 3, 4, 6"	
Pipe Material	316 Stainless Steel /PVC			Determined by Engineer	

Depths up to 25 ft. standard. Designs over 25 ft. possible please consult factory

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Tel 704.409.9700
Fax 704.295.9080
855-XYL-H2O1 (855-995-4261)
www.xyleminc.com

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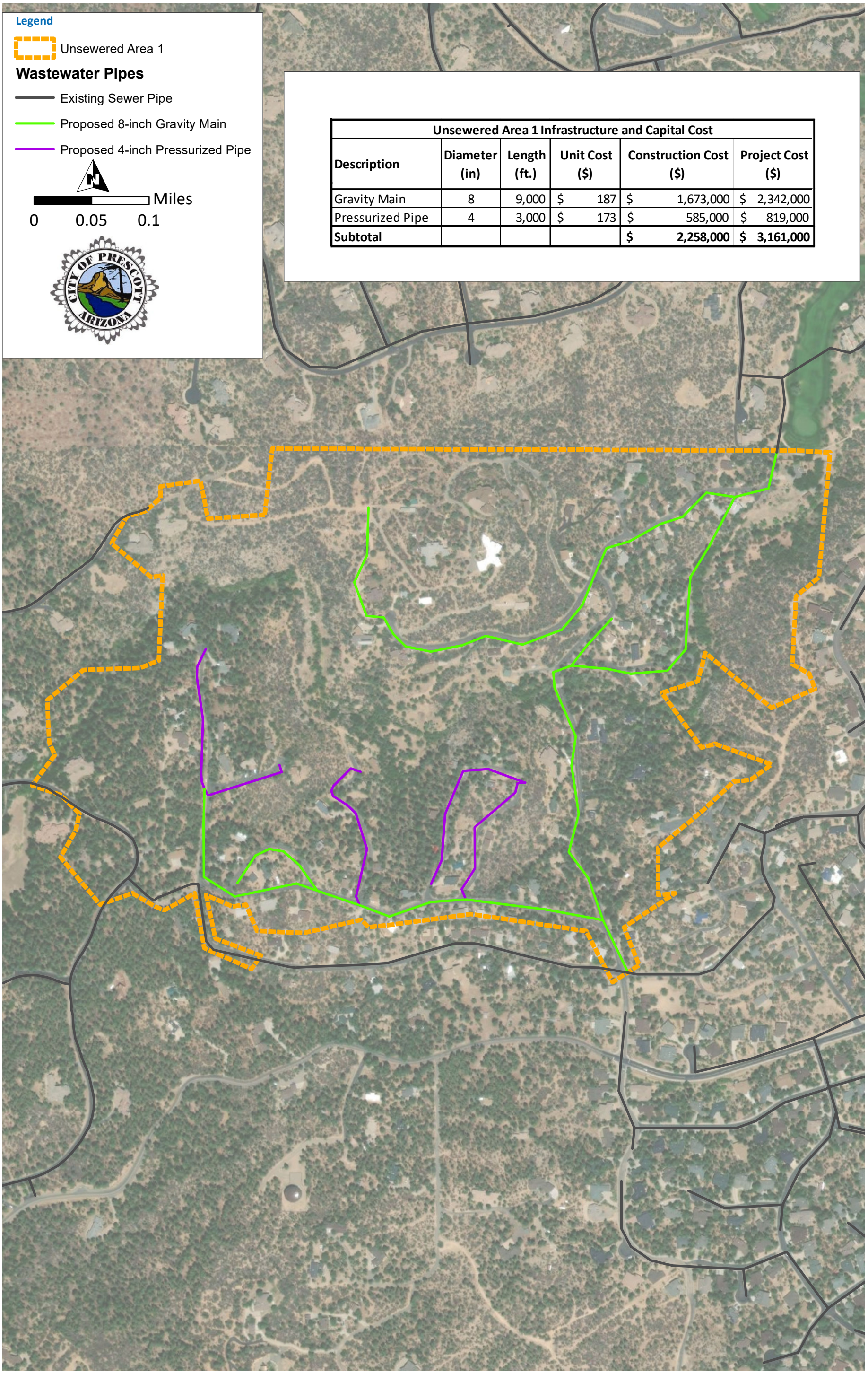
Appendix D

UNSEWERED AREA CAPITAL IMPROVEMENT MAPS



Unsewered Area 1 Infrastructure and Capital Cost					
Description	**Diameter (in)**	**Length (ft.)**	**Unit Cost ($)**	**Construction Cost ($)**	**Project Cost ($)**
Gravity Main	8	9,000	$ 187	$ 1,673,000	$ 2,342,000
Pressurized Pipe	4	3,000	$ 173	$ 585,000	$ 819,000
Subtotal				**$ 2,258,000**	**$ 3,161,000**

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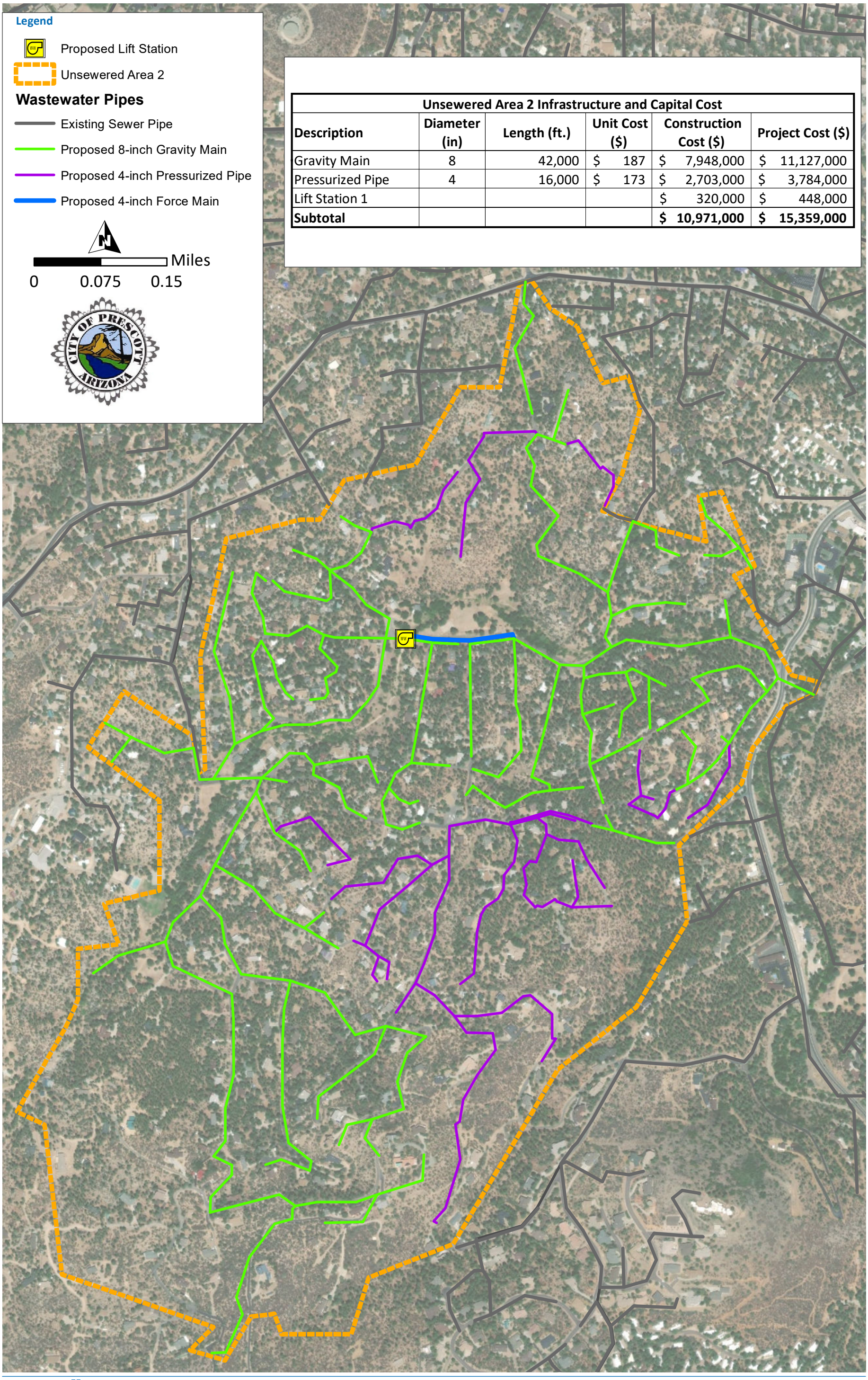
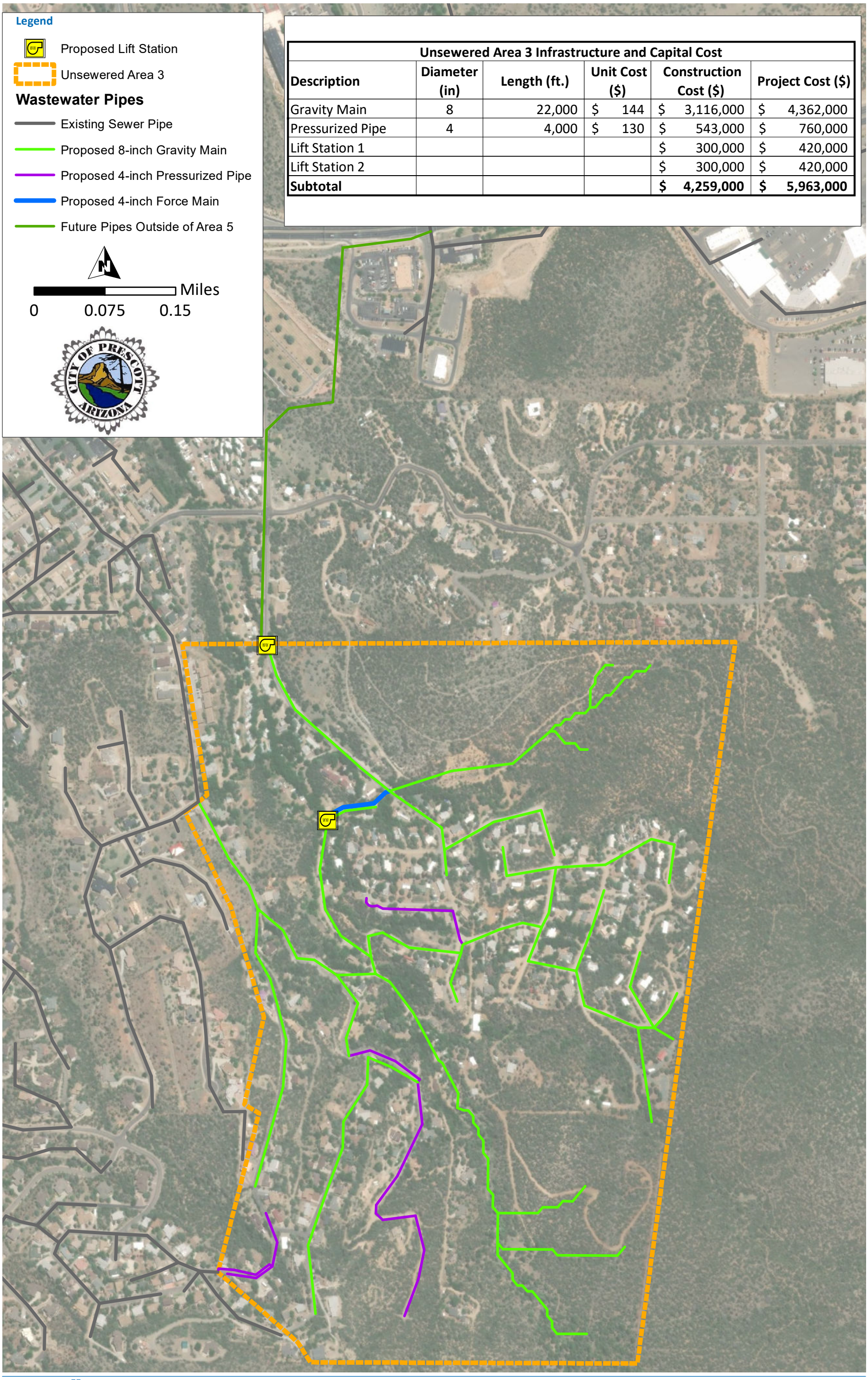
Figure D.1 Unsewered Area 1



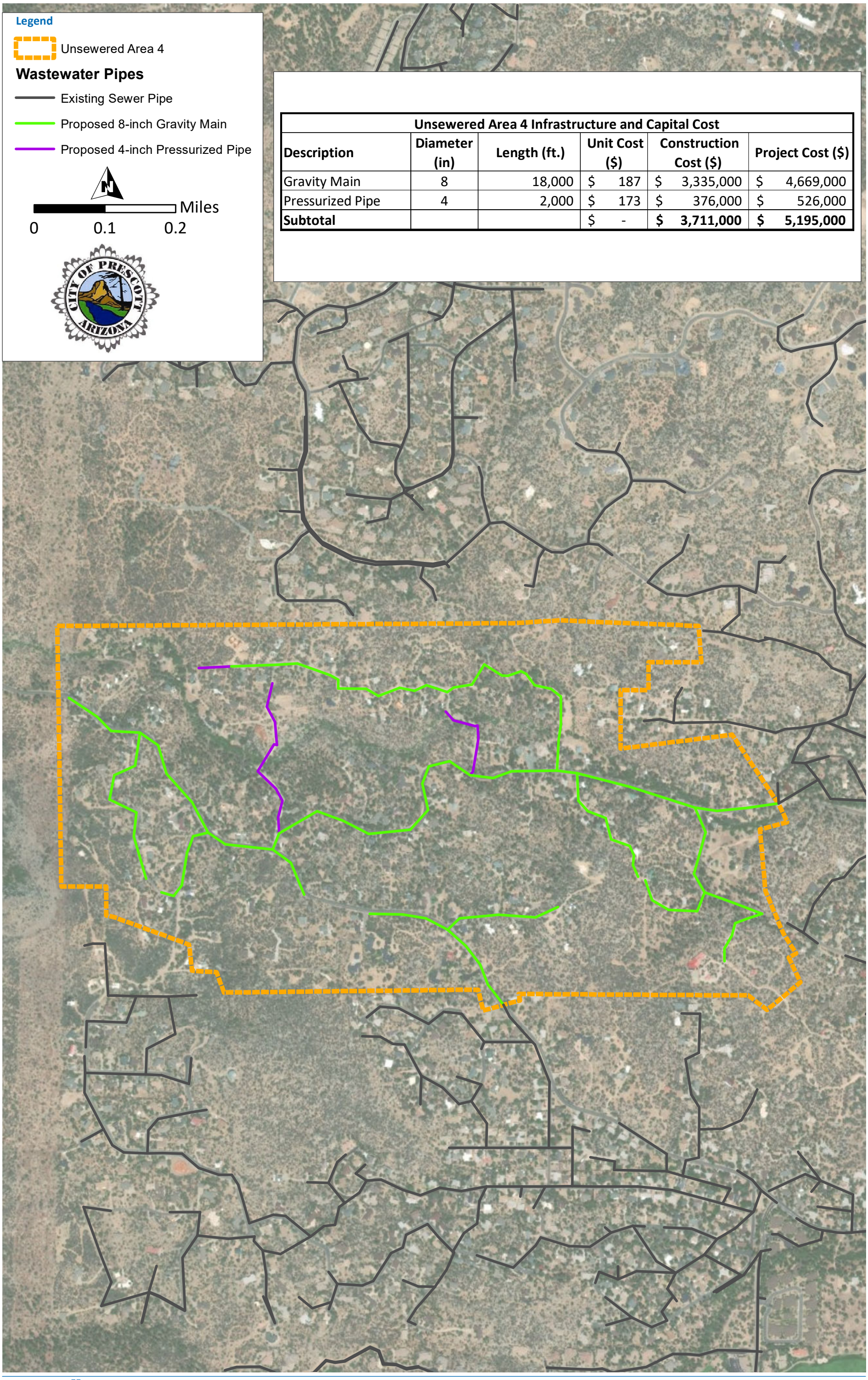
Unsewered Area 2 Infrastructure and Capital Cost					
Description	**Diameter (in)**	**Length (ft.)**	**Unit Cost ($)**	**Construction Cost ($)**	**Project Cost ($)**
Gravity Main	8	42,000	$ 187	$ 7,948,000	$ 11,127,000
Pressurized Pipe	4	16,000	$ 173	$ 2,703,000	$ 3,784,000
Lift Station 1				$ 320,000	$ 448,000
Subtotal				**$ 10,971,000**	**$ 15,359,000**

Figure D.2 Unsewered Area 2



Unsewered Area 3 Infrastructure and Capital Cost					
Description	**Diameter (in)**	**Length (ft.)**	**Unit Cost ($)**	**Construction Cost ($)**	**Project Cost ($)**
Gravity Main	8	22,000	$ 144	$ 3,116,000	$ 4,362,000
Pressurized Pipe	4	4,000	$ 130	$ 543,000	$ 760,000
Lift Station 1				$ 300,000	$ 420,000
Lift Station 2				$ 300,000	$ 420,000
Subtotal				**$ 4,259,000**	**$ 5,963,000**

Figure D.3 Unsewered Area 3



Unsewered Area 4 Infrastructure and Capital Cost					
Description	**Diameter (in)**	**Length (ft.)**	**Unit Cost ($)**	**Construction Cost ($)**	**Project Cost ($)**
Gravity Main	8	18,000	$ 187	$ 3,335,000	$ 4,669,000
Pressurized Pipe	4	2,000	$ 173	$ 376,000	$ 526,000
Subtotal			$ -	**$ 3,711,000**	**$ 5,195,000**

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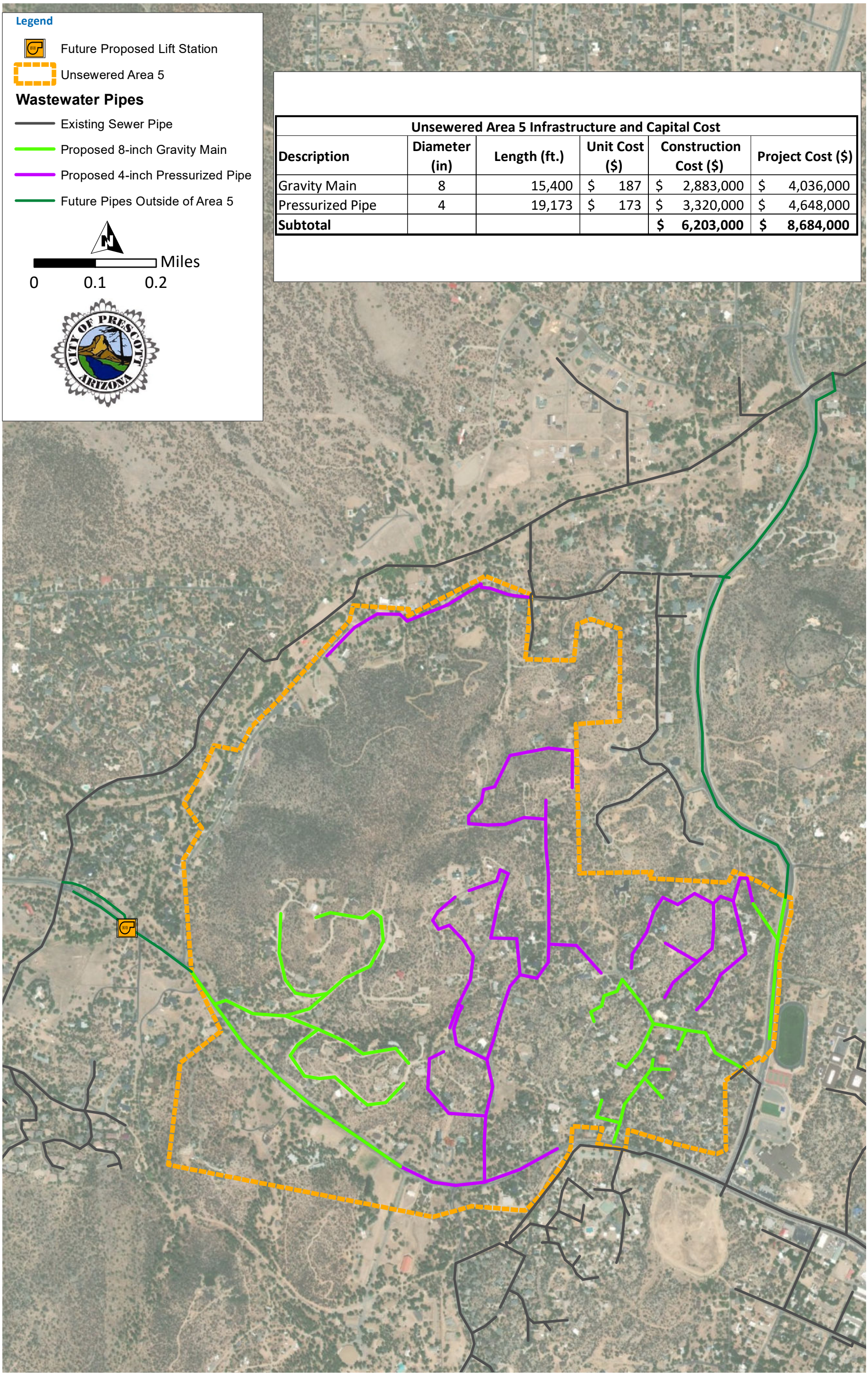
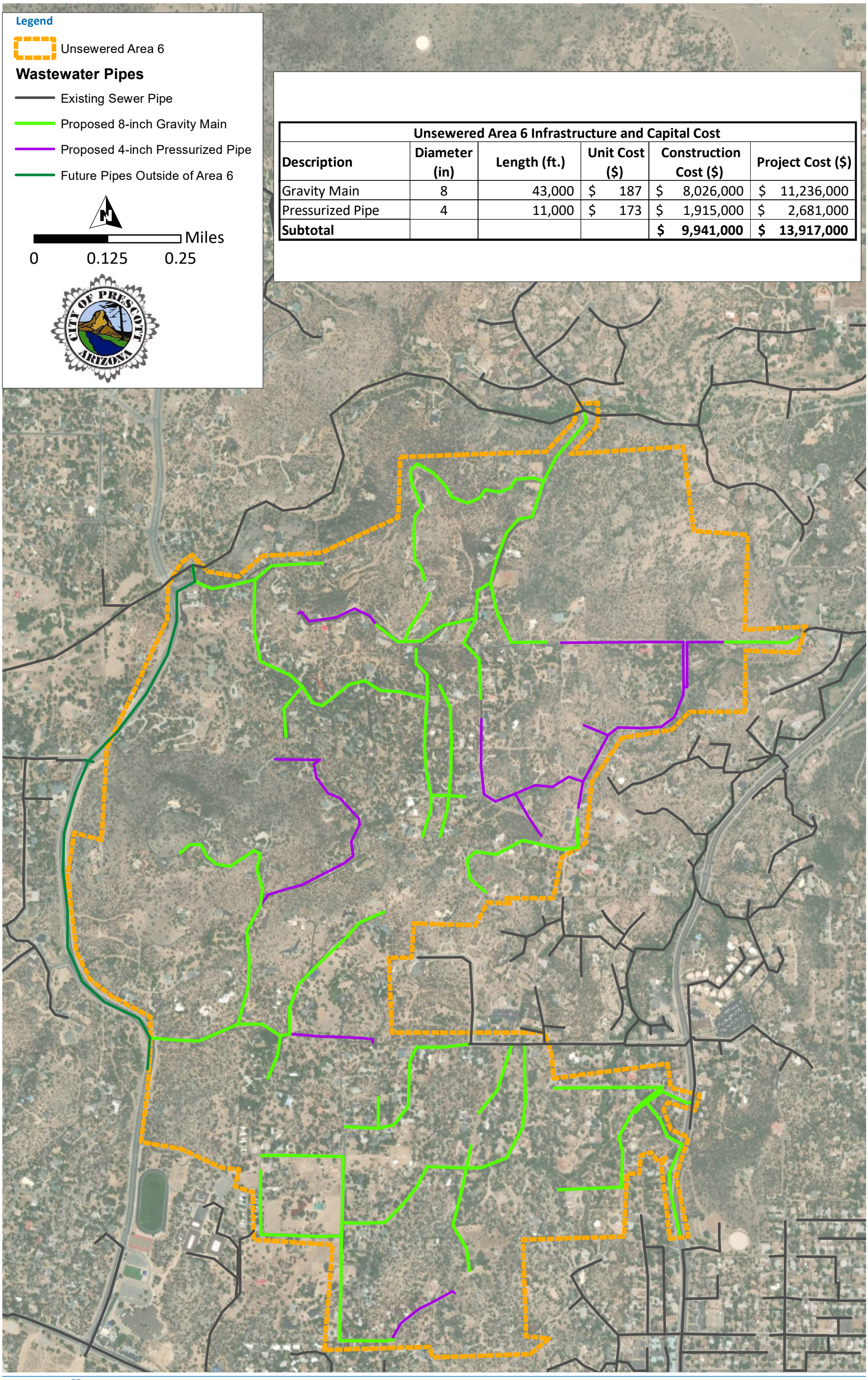
Figure D.4 Unsewered Area 4

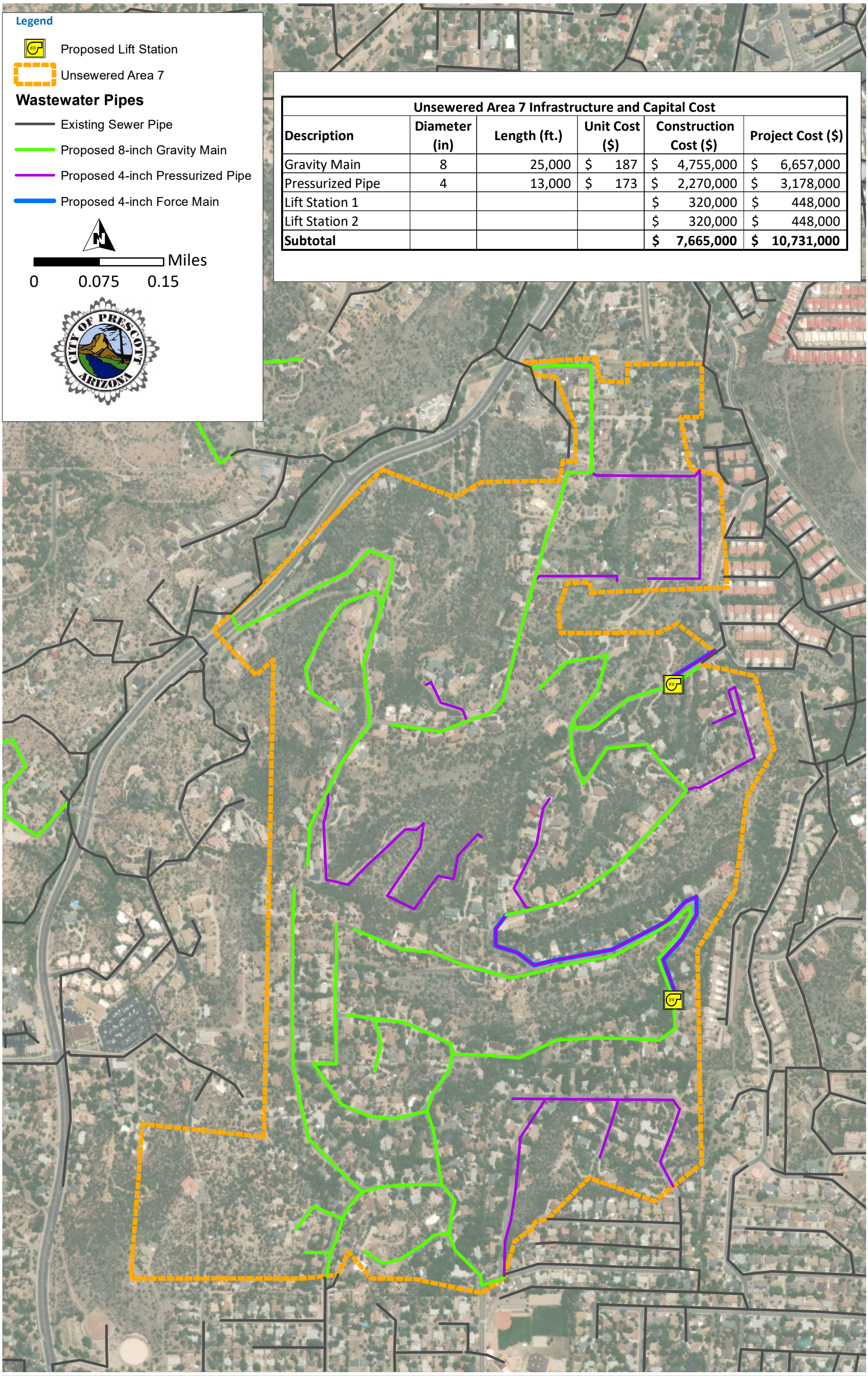


Unsewered Area 5 Infrastructure and Capital Cost					
Description	**Diameter (in)**	**Length (ft.)**	**Unit Cost ($)**	**Construction Cost ($)**	**Project Cost ($)**
Gravity Main	8	15,400	$ 187	$ 2,883,000	$ 4,036,000
Pressurized Pipe	4	19,173	$ 173	$ 3,320,000	$ 4,648,000
Subtotal				**$ 6,203,000**	**$ 8,684,000**



Unsewered Area 6 Infrastructure and Capital Cost					
Description	**Diameter (in)**	**Length (ft.)**	**Unit Cost ($)**	**Construction Cost ($)**	**Project Cost ($)**
Gravity Main	8	43,000	$ 187	$ 8,026,000	$ 11,236,000
Pressurized Pipe	4	11,000	$ 173	$ 1,915,000	$ 2,681,000
Subtotal				**$ 9,941,000**	**$ 13,917,000**

Figure D.6 Unsewered Area 6



Unsewered Area 7 Infrastructure and Capital Cost					
Description	**Diameter (in)**	**Length (ft.)**	**Unit Cost ($)**	**Construction Cost ($)**	**Project Cost ($)**
Gravity Main	8	25,000	$ 187	$ 4,755,000	$ 6,657,000
Pressurized Pipe	4	13,000	$ 173	$ 2,270,000	$ 3,178,000
Lift Station 1				$ 320,000	$ 448,000
Lift Station 2				$ 320,000	$ 448,000
Subtotal				**$ 7,665,000**	**$ 10,731,000**

Legend

Proposed Lift Station

Unsewered Area 8

Wastewater Pipes

Existing Sewer Pipe

Proposed 8-inch Gravity Main

Proposed 4-inch Pressurized Pipe

Proposed 4-inch Force Main

Future Pipes Outside of Area 8

N

0 0.1 0.2 Miles

Unsewered Area 8 Infrastructure and Capital Cost					
Description	**Diameter (in)**	**Length (ft.)**	**Unit Cost ($)**	**Construction Cost ($)**	**Project Cost ($)**
Gravity Main	8	8,108	$ 144	$ 1,170,000	$ 1,638,000
Pressurized Pipe	4	12,692	$ 130	$ 1,654,000	$ 2,316,000
Lift Station 1				$ 300,000	$ 420,000
Subtotal				**$ 3,124,000**	**$ 4,374,000**

Figure D.8 Unsewered Area 8

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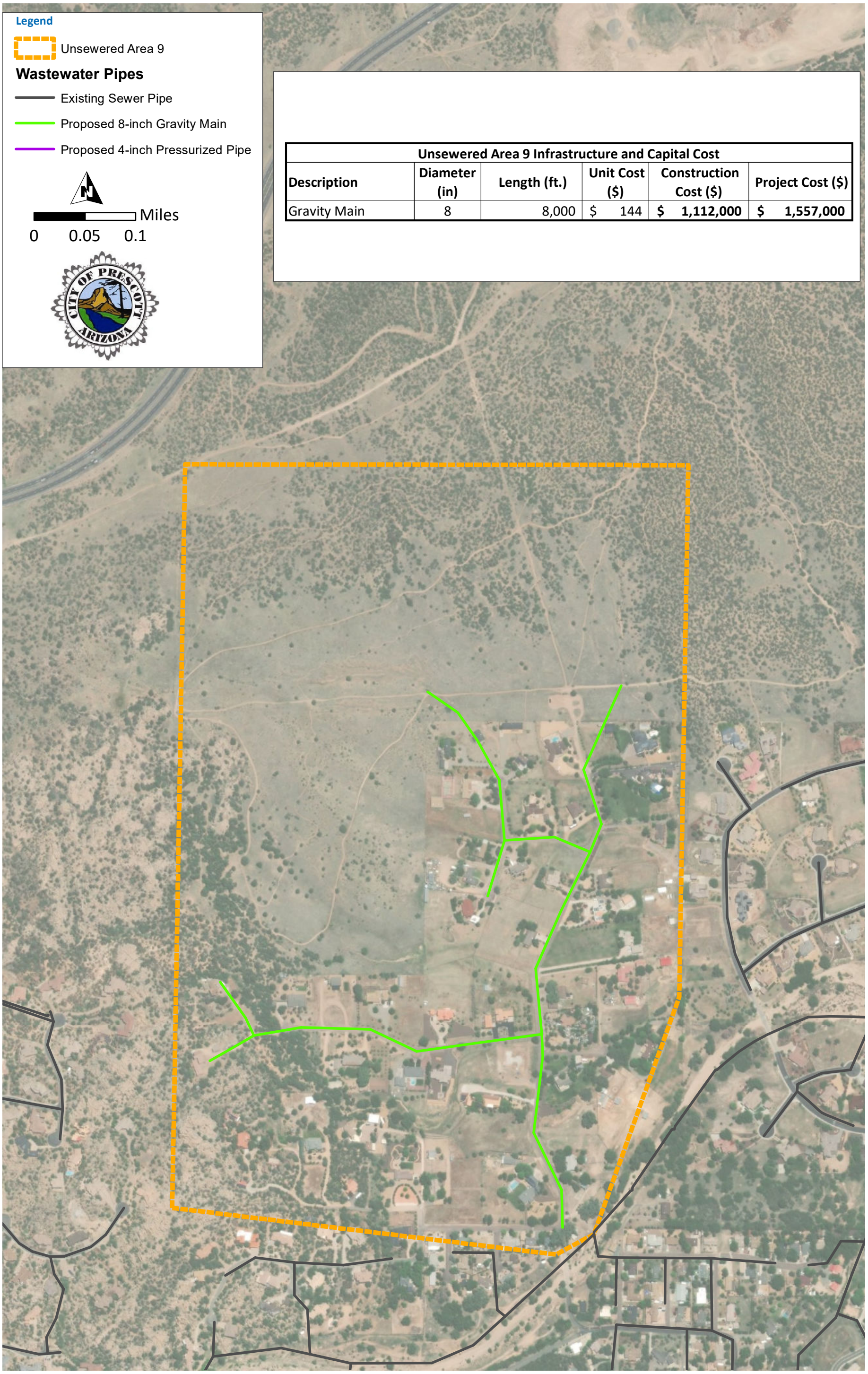

Unsewered Area 9 Infrastructure and Capital Cost					
Description	**Diameter (in)**	**Length (ft.)**	**Unit Cost ($)**	**Construction Cost ($)**	**Project Cost ($)**
Gravity Main	8	8,000	$ 144	**$ 1,112,000**	**$ 1,557,000**

Figure D.9 Unsewered Area 9

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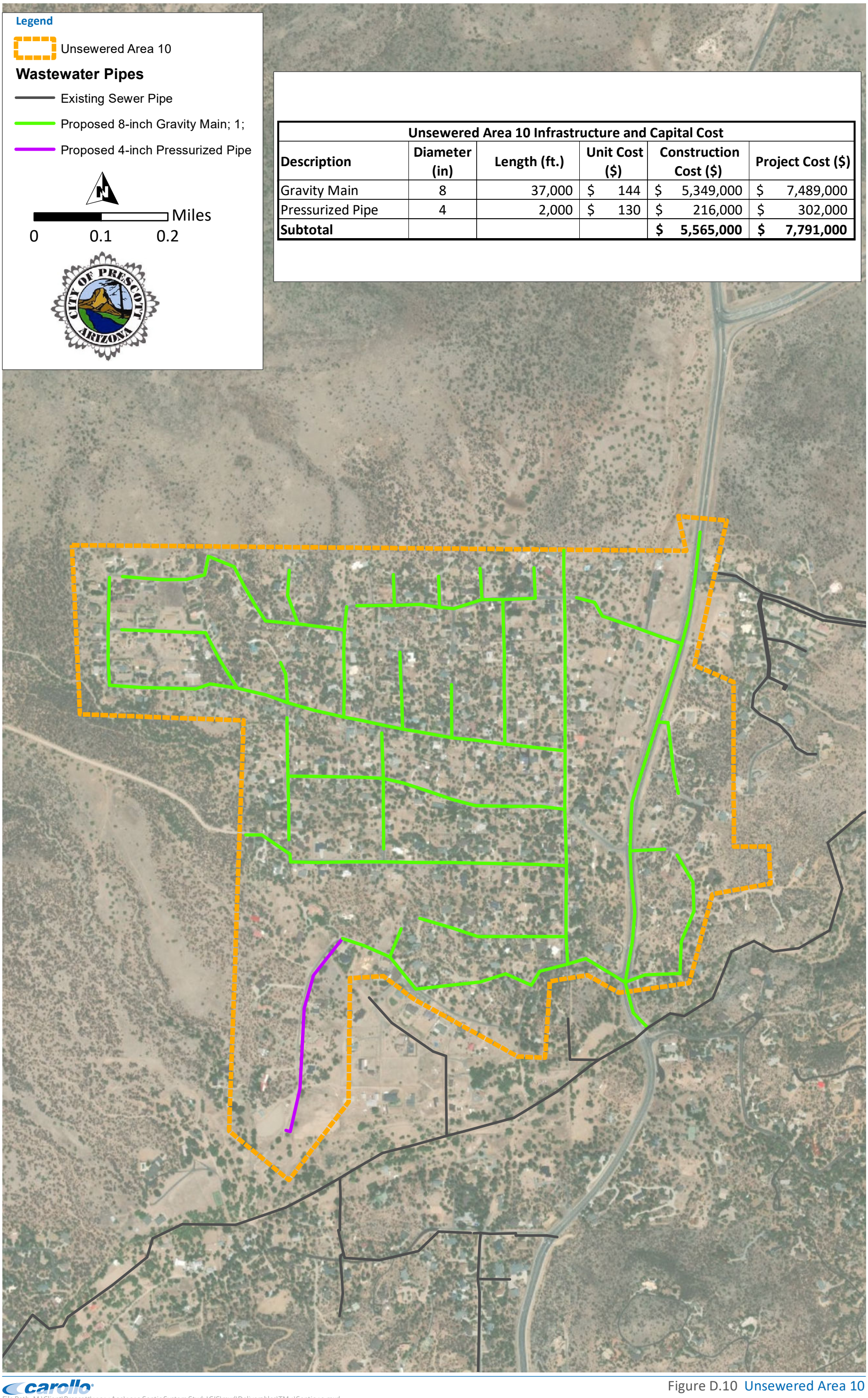

Unsewered Area 10 Infrastructure and Capital Cost					
Description	**Diameter (in)**	**Length (ft.)**	**Unit Cost ($)**	**Construction Cost ($)**	**Project Cost ($)**
Gravity Main	8	37,000	$ 144	$ 5,349,000	$ 7,489,000
Pressurized Pipe	4	2,000	$ 130	$ 216,000	$ 302,000
Subtotal				**$ 5,565,000**	**$ 7,791,000**

carollo

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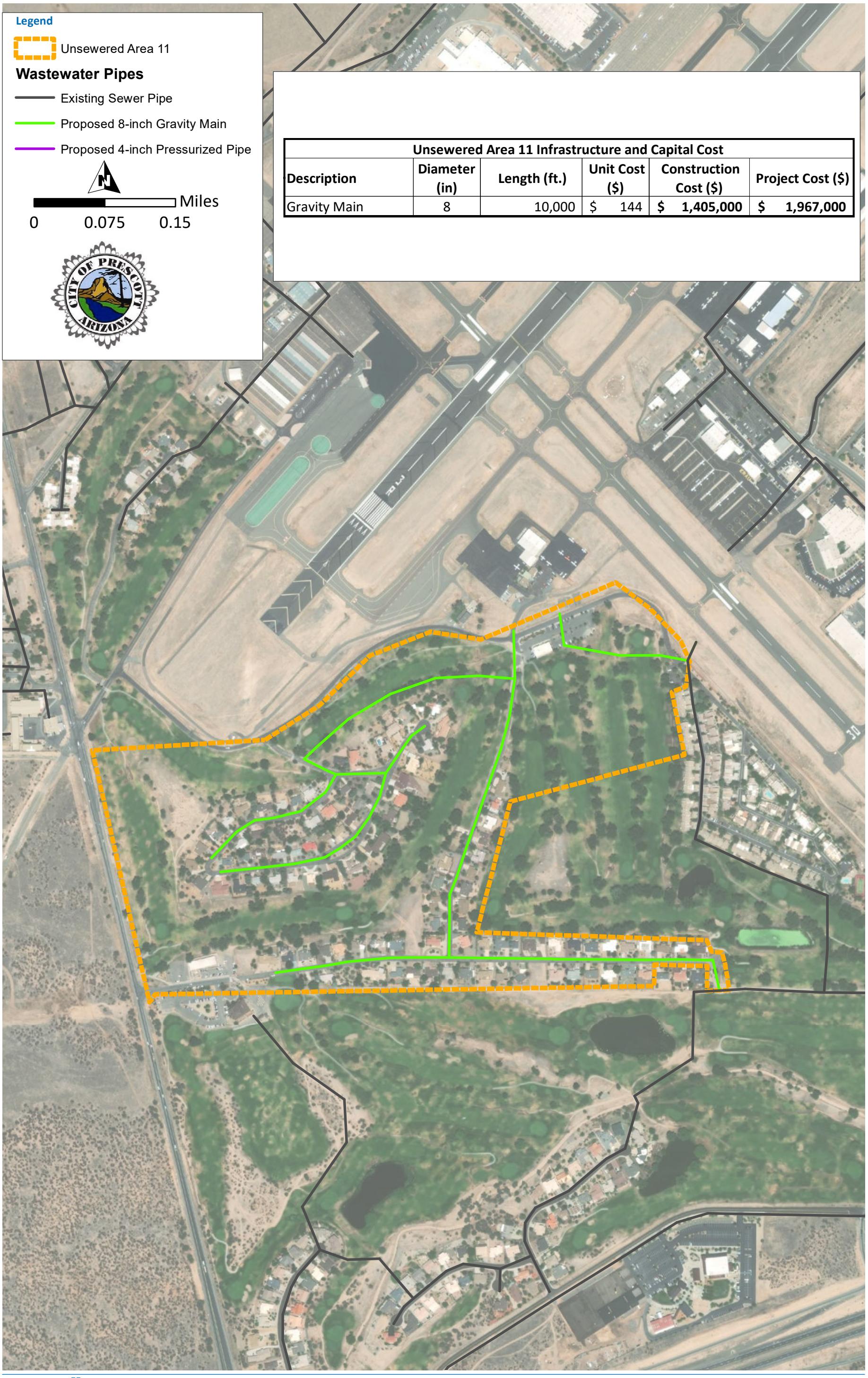
Figure D.10 Unsewered Area 10



Unsewered Area 11 Infrastructure and Capital Cost					
Description	**Diameter (in)**	**Length (ft.)**	**Unit Cost ($)**	**Construction Cost ($)**	**Project Cost ($)**
Gravity Main	8	10,000	$ 144	**$ 1,405,000**	**$ 1,967,000**

Figure D.11 Unsewered Area 11

File Path: M:\Client\Prescott\12094A00\2020 Septic System Study\GIS\mxd\Deliverables\TM 1\Septic 11.mxd

Unsewered Area 12 Infrastructure and Capital Cost					
Description	**Diameter (in)**	**Length (ft.)**	**Unit Cost ($)**	**Construction Cost ($)**	**Project Cost ($)**
Gravity Main	8	3,258	$ 130	**$ 443,000**	**$ 620,000**

Figure D.12 Unsewered Area 12

File Path: M:\Client\Prescott\12094A00\2020 Septic System Study\GIS\mxd\Deliverables\TM 1\Septic 12.mxd

Appendix E

UNIT COSTS

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Engineers...Working Wonders With Water™

PROJECT :	**2020 Sewer Connections Study**	**LOCATION FACTOR:**	**1.00**
JOB # :	**12094A.00**	**DATE :**	December-20
CLIENT :	**City of Prescott**	**ENR :**	**11413**
ELEMENT :	**4-Inch grravity Sewer Pipe**	**BY :**	AQC

	DESCRIPTION	QUAN	UNIT	MATERIAL & LABOR	SUB	UNIT COST	SUBTOTAL	TOTAL
PIPE	4" SCH 40 PVC PIPE IN A TRENCH	1	LF	$ 10.75	$0.00	$ 10.75	$ 10.75	
	TOTAL PIPING (per LF)							**$ 10.75**
EXCAV	EARTHWORK							
& BACKFILL	Cat 225 Trackhoe, 1-1/2CY Bucket, Class B (Medium Digging), 0-16' D	0.65	CY	$ 3.05	$0.00	$ 3.05	$ 1.97	
	Hand Excavation, Class B Material to 5' Depth	0.02	CY	$ 105.08	$0.00	$ 105.08	$ 2.10	
	8' D X 2' W Trench and Manhole Boxes	0.01	Day	$ 28.00	$0.00	$ 28.00	$ 0.28	
	Imported Pipe Bed & Zone/Confined Structure Backfill, Class B Material	0.24	CY	$ 60.29	$0.00	$ 60.29	$ 14.32	
	Imported Trench Backfill/Unconfined Struct. BF, Class B Material	0.38	CY	$ 53.04	$0.00	$ 53.04	$ 20.33	
	Controlled Density Fill (CDF)	0.04	CY	$ 90.00	$0.00	$ 90.00	$ 3.83	
	10% Site Specific Requirements	1.00	LS	$ 3.90	$0.00	$ 3.90		
	20 CY Dump Truck, 20 Miles/Round Trip	1.73	CY	$ 7.15	$0.00	$ 7.15	$ 12.37	
	Excavation	0.70	CY			$ -	$ -	
	TOTAL EARTHWORK (per LF)							**$ 55.21**
PAVING	ASPHALT PAVEMENT CUTTING	8.0	inFT	$ 0.64	$0.00	$ 0.64	$ 5.12	
DEMO &	REMOVE 4"-6" ASPHALT PAVEMENT	0.6	SY	$ 0.68	$0.11	$ 0.79	$ 0.44	
REPLACEMENT	REPLACE 4"-6" ASPHAULT PAVEMENT	0.6	SY	$ 55.95	$4.48	$ 60.43	$ 33.57	
	TOTAL PAVING (per LF)							**$ 39.13**
FITTINGS	6" 90° CLDI MJ BEND	2	EA	$ 932.77	$0.00	$932.77	$1,865.54	
& VALVES								
	TOTAL (per 1/4 Mile)						$ 1,866	
	TOTAL FITTING & VALVES (per LF)							**$ 1.41**
	OVERHEAD (10%)							**$ 10.65**
	CONSTRUCTION PROFIT (6%)							**$ 6.39**
	SALES TAX (65% of above costs at 9.8%)							**$ 6.78**
	CONTINGENCY (15%)							
	GENERAL CONDITIONS (15%)							
	TRAFFIC CONTROL, LF							
	CONSTRUCTION COST, LF (52%)							**$ 130.32**
	PROJECT COST, LF (140%)							**$ 182.45**

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PROJECT :	**2020 Sewer Connections Study**	**LOCATION FACTOR:**	**1.00**
JOB # :	**12094A.00**	**DATE :**	December-20
CLIENT :	**City of Prescott**	**ENR :**	**11413**
ELEMENT :	**4-Inch grravity Sewer Pipe, Rock Excavation**	**BY :**	AQC

	DESCRIPTION	QUAN	UNIT	MATERIAL & LABOR	SUB	UNIT COST	SUBTOTAL	TOTAL
PIPE	4" SCH 40 PVC PIPE IN A TRENCH	1	LF	$ 10.75	$0.00	$ 10.75	$ 10.75	
	TOTAL PIPING (per LF)							**$ 10.75**
EXCAV	EARTHWORK							
& BACKFILL	Cat 225 Trackhoe, 1-1/2CY Bucket, Class B (Medium Digging), 0-16' D	0.65	CY	$ 3.05	$0.00	$ 3.05	$ 1.97	
	Hand Excavation, Class B Material to 5' Depth	0.02	CY	$ 105.08	$0.00	$ 105.08	$ 2.10	
	8' D X 2' W Trench and Manhole Boxes	0.01	Day	$ 28.00	$0.00	$ 28.00	$ 0.28	
	Imported Pipe Bed & Zone/Confined Structure Backfill, Class B Material	0.24	CY	$ 60.29	$0.00	$ 60.29	$ 14.32	
	Imported Trench Backfill/Unconfined Struct. BF, Class B Material	0.38	CY	$ 53.04	$0.00	$ 53.04	$ 20.33	
	Controlled Density Fill (CDF)	0.04	CY	$ 90.00	$0.00	$ 90.00	$ 3.83	
	10% Site Specific Requirements	1.00	LS	$ 3.90	$0.00	$ 3.90		
	20 CY Dump Truck, 20 Miles/Round Trip	1.73	CY	$ 7.15	$0.00	$ 7.15	$ 12.37	
	Excavation	0.70	CY			$ 50.00	$ 35.00	
	TOTAL EARTHWORK (per LF)							**$ 90.21**
PAVING	ASPHALT PAVEMENT CUTTING	8.0	inFT	$ 0.64	$0.00	$ 0.64	$ 5.12	
DEMO &	REMOVE 4"-6" ASPHALT PAVEMENT	0.6	SY	$ 0.68	$0.11	$ 0.79	$ 0.44	
REPLACEMENT	REPLACE 4"-6" ASPHAULT PAVEMENT	0.6	SY	$ 55.95	$4.48	$ 60.43	$ 33.57	
	TOTAL PAVING (per LF)							**$ 39.13**
FITTINGS	6" 90° CLDI MJ BEND	2	EA	$ 932.77	$0.00	$932.77	$1,865.54	
& VALVES								
	TOTAL (per 1/4 Mile)						$ 1,866	
	TOTAL FITTING & VALVES (per LF)							**$ 1.41**
	OVERHEAD (10%)							**$ 14.15**
	CONSTRUCTION PROFIT (6%)							**$ 8.49**
	SALES TAX (65% of above costs at 9.8%)							**$ 9.01**
	CONTINGENCY (15%)							
	GENERAL CONDITIONS (15%)							
	TRAFFIC CONTROL, LF							
	CONSTRUCTION COST, LF (52%)							**$ 173.15**
	PROJECT COST, LF (140%)							**$ 242.42**

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PROJECT :	**City of Prescott 2020 Sewer Connections Study**	**LOCATION FACTOR:**	**1.00**
JOB # :	**12094A.00**	**DATE :**	December-20
CLIENT :	**City of Prescott**	**ENR :**	**11413**
ELEMENT :	**8-inch Gravity Sewer Pipe**	**BY :**	AQC

	ITEM NO. (Carollo Code)	DESCRIPTION	QUAN	UNIT	MATERIAL & LABOR	SUB	UNIT COST	SUBTOTAL	TOTAL
PIPE	1526511003	8" SDR-26 PVC SEWER PIPE, IN TRENCH	1	LF	$ 7.49	$0.00	$ 7.49	$ 7.49	
		TOTAL PIPING (per LF)							**$ 7.49**
EXCAV		EARTHWORK							
& BACKFILL	0230025034	Cat 225 Trackhoe, 1-1/2CY Bucket, Class B (Mec	0.68	CY	$ 3.05	$0.00	$ 3.05	$ 2.08	
	0230025005	Hand Excavation, Class B Material to 5' Depth	0.02	CY	$ 105.08	$0.00	$ 105.08	$ 2.22	
	0226023007	8' D X 2' W Trench and Manhole Boxes	0.01	Day	$ 28.00	$0.00	$ 28.00	$ 0.28	
	0230025062	Imported Pipe Bed & Zone/Confined Structure Ba	0.32	CY	$ 60.29	$0.00	$ 60.29	$ 19.26	
	0230025065	Imported Trench Backfill/Unconfined Struct. BF, C	0.33	CY	$ 53.04	$0.00	$ 53.04	$ 17.73	
	0230025073	Controlled Density Fill (CDF)	0.04	CY	$ 90.00	$0.00	$ 90.00	$ 3.34	
		10% Site Specific Requirements	1.00	LS	$ 4.16	$0.00	$ 4.16		
	0230027014	20 CY Dump Truck, 20 Miles/Round Trip	1.82	CY	$ 7.15	$0.00	$ 7.15	$ 13.01	
		Rock Excavation	0.7	CY			$0.00	$0.00	
		TOTAL EARTHWORK (per LF)							**$ 57.92**
PAVING	0222011001	ASPHALT PAVEMENT CUTTING	8.0	inFT	$ 0.64	$0.00	$ 0.64	$ 5.12	
DEMO &	0222011005	REMOVE 4"-6" ASPHALT PAVEMENT	0.6	SY	$ 0.68	$0.11	$ 0.79	$ 0.45	
REPLACEMENT	0274243021	4" AC PAVING ON 8" ABC	0.6	SY	$ 54.80	$4.38	$ 59.18	$ 33.98	
		TOTAL PAVING (per LF)							**$ 39.55**
MANHOLES	0258011003	48" X 8' Deep Precast Manhole, No Ring, Cover,	4	EA	$ 3,445.82	$0.00	$3,445.82	$13,783.27	
	0258013064	24" Dia. X 400 LB Heavy Traffic Manhole Frame &	4	EA	$ 459.24	$0.00	$459.24	$ 1,837	
	0258013073	Concrete Manhole Invert, Single Channel	4	EA	$ 387.26	$0.00	$387.26	$ 1,549	
		TOTAL (per 1/4 Mile)						$ 17,169	
		TOTAL MANHOLES (per LF)							**$ 13.01**
		OVERHEAD (10%)							**$ 11.80**
		CONSTRUCTION PROFIT (6%)							**$ 7.08**
		SALES TAX (65% of above costs at 9.8%)							**$ 7.51**
		CONTINGENCY (15%)							
		GENERAL CONDITIONS (15%)							
		TRAFFIC CONTROL, LF							
		CONSTRUCTION COST, LF (52%)							**$ 144.35**
		PROJECT COST, LF (140%)							**$ 202.09**

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PROJECT :	**City of Prescott 2020 Sewer Connections Study**	**LOCATION FACTOR:**	**1.00**
JOB # :	**12094A.00**	**DATE :**	December-20
CLIENT :	**City of Prescott**	**ENR :**	**11413**
ELEMENT :	**8-inch Gravity Sewer Pipe Rock Excavation**	**BY :**	AQC

	ITEM NO. (Carollo Code)	DESCRIPTION	QUAN	UNIT	MATERIAL & LABOR	SUB	UNIT COST	SUBTOTAL	TOTAL
PIPE	1526511003	8" SDR-26 PVC SEWER PIPE, IN TRENCH	1	LF	$ 7.49	$0.00	$ 7.49	$ 7.49	
		TOTAL PIPING (per LF)							**$ 7.49**
EXCAV & BACKFILL		EARTHWORK							
	0230025034	Cat 225 Trackhoe, 1-1/2CY Bucket, Class B (Mec	0.68	CY	$ 3.05	$0.00	$ 3.05	$ 2.08	
	0230025005	Hand Excavation, Class B Material to 5' Depth	0.02	CY	$ 105.08	$0.00	$ 105.08	$ 2.22	
	0226023007	8' D X 2' W Trench and Manhole Boxes	0.01	Day	$ 28.00	$0.00	$ 28.00	$ 0.28	
	0230025062	Imported Pipe Bed & Zone/Confined Structure Ba	0.32	CY	$ 60.29	$0.00	$ 60.29	$ 19.26	
	0230025065	Imported Trench Backfill/Unconfined Struct. BF, C	0.33	CY	$ 53.04	$0.00	$ 53.04	$ 17.73	
	0230025073	Controlled Density Fill (CDF)	0.04	CY	$ 90.00	$0.00	$ 90.00	$ 3.34	
		10% Site Specific Requirements	1.00	LS	$ 4.16	$0.00	$ 4.16		
	0230027014	20 CY Dump Truck, 20 Miles/Round Trip	1.82	CY	$ 7.15	$0.00	$ 7.15	$ 13.01	
		Rock Excavation	0.7	CY			$50.00	$35.00	
		TOTAL EARTHWORK (per LF)							**$ 92.92**
PAVING	0222011001	ASPHALT PAVEMENT CUTTING	8.0	inFT	$ 0.64	$0.00	$ 0.64	$ 5.12	
DEMO &	0222011005	REMOVE 4"-6" ASPHALT PAVEMENT	0.6	SY	$ 0.68	$0.11	$ 0.79	$ 0.45	
REPLACEMENT	0274243021	4" AC PAVING ON 8" ABC	0.6	SY	$ 54.80	$4.38	$ 59.18	$ 33.98	
		TOTAL PAVING (per LF)							**$ 39.55**
MANHOLES	0258011003	48" X 8' Deep Precast Manhole, No Ring, Cover,	4	EA	$ 3,445.82	$0.00	$3,445.82	$13,783.27	
	0258013064	24" Dia. X 400 LB Heavy Traffic Manhole Frame &	4	EA	$ 459.24	$0.00	$459.24	$ 1,837	
	0258013073	Concrete Manhole Invert, Single Channel	4	EA	$ 387.26	$0.00	$387.26	$ 1,549	
		TOTAL (per 1/4 Mile)						$ 17,169	
		TOTAL MANHOLES (per LF)							**$ 13.01**
		OVERHEAD (10%)							**$ 15.30**
		CONSTRUCTION PROFIT (6%)							**$ 9.18**
		SALES TAX (65% of above costs at 9.8%)							**$ 9.74**
		CONTINGENCY (15%)							
		GENERAL CONDITIONS (15%)							
		TRAFFIC CONTROL, LF							
		CONSTRUCTION COST, LF (52%)							**$ 187.18**
		PROJECT COST, LF (140%)							**$ 262.05**