JOHN STREET POND FEASIBILITY DESIGN ANALYSIS REPORT

DRAFT REPORT RSI-3390

PREPARED BY

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PREPARED FOR

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1 Civic Plaza, #7057
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OCTOBER 2023

Project Number W0505.23002

CERTIFICATION

I, Hugh Floyd, do hereby certify that this report was duly prepared by me or under my direction and that I am a duly registered Professional Engineer under the laws of the state of New Mexico.

Hugh Floyd, P.E.
NMPE No. 16633

Date

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LIST OF ACRONYMS

cfs	cubic feet per second
COA	City of Albuquerque
EOPC	Engineer's Opinion of Probable Cost
GPM	gallons per minute
hp	horsepower
PCSWMM	Personal Computer Storm Water Management Model
SBDMP	South Broadway Drainage Master Plan
SUE	subsurface utility engineering
TC	time of concentration
TDH	total dynamic head

1.0 INTRODUCTION

1.1 PURPOSE

RESPEC Company, LLC (RESPEC) was tasked with conducting a feasibility report for the city-owned property, outlined in red in Figure 1. This task came from the conceptual options proposed in the South Broadway Drainage Master Plan (SBDMP) [RESPEC, 2023][1] to help reduce historical flooding in the South Broadway study area. RESPEC suggested completing a feasibility report on the John Street Pond facility before preparing a full design. In the SBDMP update, RESPEC recommended the city move forward with Option 4, which includes two ponds, a detention pond, a pump station, and storm drain improvements. Furthermore, RESPEC recommended getting more detailed data including topographic and subsurface utility engineering (SUE) because the basis of the SBDMP update was built using as-built information from the 1930s. This detailed information has helped RESPEC refine the proposed options plus give a better idea of what options are feasible.

Figure 1. Vicinity Map.

[1] RESPEC, 2023. *South Broadway Drainage Master Plan*, prepared by RESPEC, Albuquerque, NM, for the City of Albuquerque, Albuquerque, NM.

1.2 SITE CHARACTERISTICS AND FIELDWORK

The property is owned by the City of Albuquerque (COA) and is located at the intersections west of John Street, south of Thaxton Avenue, east of Williams Street, and north of Englewood Drive. The existing site conditions are undisturbed, with slopes ranging from 0.5 percent to 1 percent sloping toward the west. The site has poor land cover comprised of native desert landscapes throughout the property. The surrounding urban area is fully developed and consists of residential lots of varying size and commercial properties.

RESPEC conducted fieldwork at the project site and surrounding areas concerning the John Street feasibility limit in April 2023, including the Barelas Ditch easement, Thaxton Avenue, John Street, and Williams Street. Figure 2 illustrates the areas where key storm drain infrastructure is proposed. The purpose of field observation was to confirm existing site conditions. Additional photographs and an annotated map are included in Appendix A.

1.3 REPORT GOALS

The following project steps are detailed in this report:

- Acquire SUE and a topographic survey for the project area
- Integrate SUE data into the model and design
- Acquire geotechnical analysis of the site for soil conditions, erosion control measures, and slope stability and verify the groundwater level
- Analyze the pump flowrates and horsepower, electrical requirements, and coordinate with pump manufacturers for the pump station, wet well, and force main design
- Explore prefabricated wet well options for the pump station
- Prepare the John Street Pond Facility's construction phasing plan and conceptual level site design
- Provide an Engineer's Opinion of Probable Cost (EOPC)

After the design analysis report is approved, the project's next phase is developing construction plans. The construction plans will encompass the John Street Pond facility with the associated storm drain improvements; however, these improvements will be strategically phased to stay within the COA's budget.

Notes:
Horizontal Datum:
NAD 1983 HARN StatePlane New Mexico Central FIPS 3002 Feet
Orthophoto Source: 2022 MRCOG Bernalillo County with ArcGIS Hybrid Reference Layer

Legend
- Annotated Photos
- Proposed Infrastructure Connections

Figure 2: Annotated Field Map

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Prepared for:

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2.0 HYDROLOGIC ANALYSIS

2.1 EXISTING CONDITIONS

All existing hydrology methodologies and input parameters were extracted from the SBDMP [RESPEC, 2023]. Personal Computer Storm Water Management Model (PCSWMM) hydrology and input parameters, such as the initial abstraction, depression storage, and the curve numbers, were used to discuss the subbasin delineation. Appendix A contains the SBDMP.

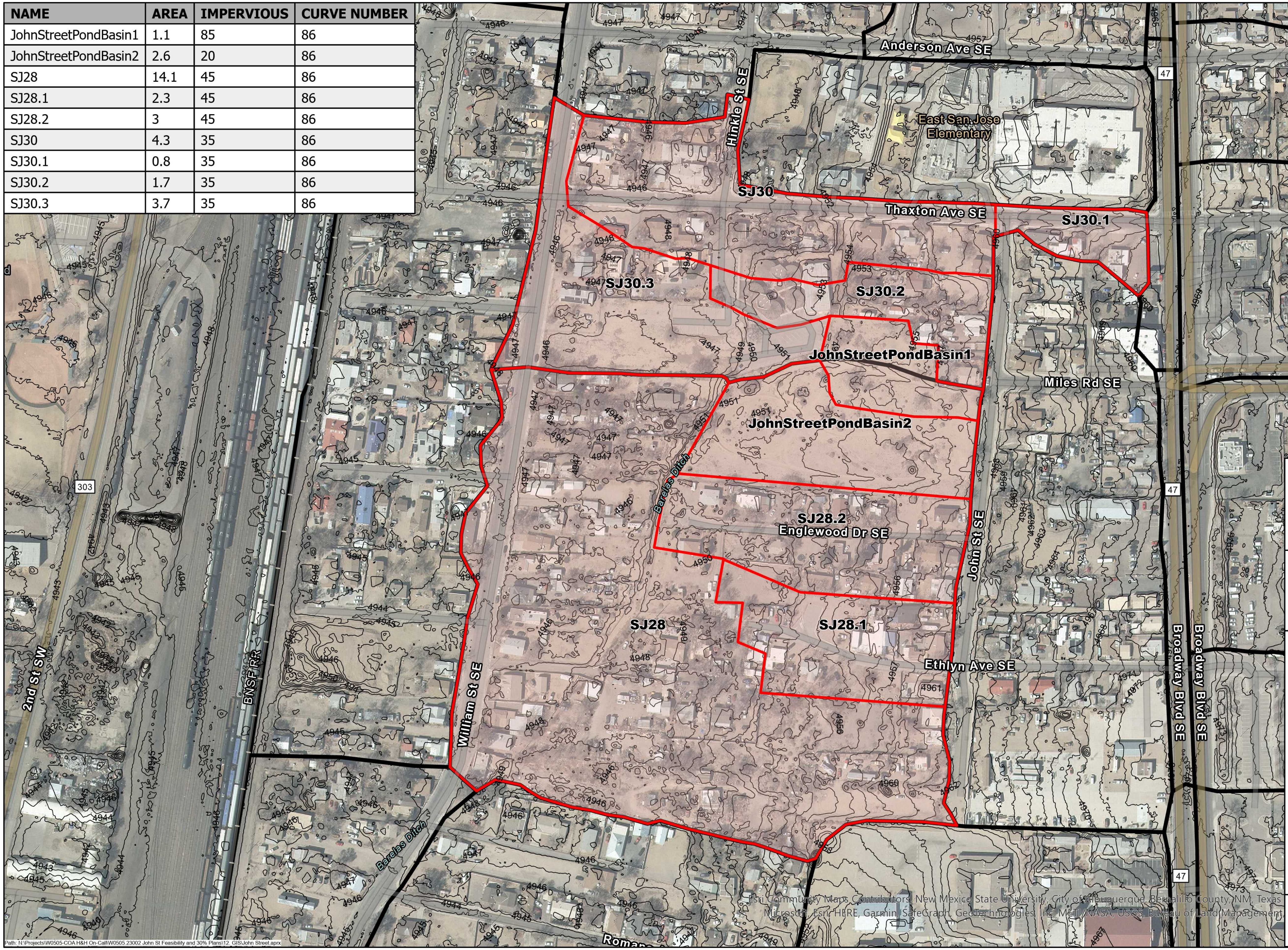
2.2 PROPOSED CONDITIONS

Some basin boundaries were strategically split to analyze runoff volumes and peak discharges going to the proposed John Street Pond. The proposed John Street Pond Basin 1 and John Street Pond Basin 2's impervious parameter was updated from the existing conditions to reflect the proposed improvements. Table 1 compares the existing and proposed basin impervious parameters. Figure 3 illustrates the proposed conditions basin boundaries around the John Street Pond.

Table 1. Summary Personal Computer Storm Water Management Model Input Parameters

Existing Basin Name	Impervious (%)	Proposed Basin Name	Impervious (%)
SJ28	45	John Street Basin 2	20
SJ30	35	John Street Basin 1	85

NAME	AREA	IMPERVIOUS	CURVE NUMBER
JohnStreetPondBasin1	1.1	85	86
JohnStreetPondBasin2	2.6	20	86
SJ28	14.1	45	86
SJ28.1	2.3	45	86
SJ28.2	3	45	86
SJ30	4.3	35	86
SJ30.1	0.8	35	86
SJ30.2	1.7	35	86
SJ30.3	3.7	35	86



Notes:
Horizontal Datum:
NAD 1983 HARN StatePlane New Mexico Central FIPS 3002 Feet
Orthophoto Source: 2022 MRCOG Bernalillo County with ArcGIS Hybrid Reference Layer
Elevation Data: 1 foot contours extracted from 2018 MRCOG LiDAR data.

Legend

- Existing South Broadway Basins
- Proposed John Street Basins
- 1 ft Contours

Figure 3: Proposed Subbasin Map

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3.0 HYDRAULIC ANALYSIS

This design analysis report reassesses the John Street Pond and provides a more detailed facility analysis. The existing hydraulic system for South Broadway indicates significant deficiencies throughout the South Broadway Watershed. Options to help mitigate flooding throughout the system in the SBDMP were developed. The SBDMP provided the COA with a list of proposed improvements and recommended priorities that were listed in the order that each proposed project should be designed and constructed. The priority from the SBDMP was to analyze and develop construction plans for the John Street Pond. RESPEC used the COA's *Design Process Manual* [COA, 2020][2] for the improvement's design criteria.

3.1 EXISTING CONDITIONS

RESPEC updated the existing conditions PCSWMM model from the SBDMP [RESPEC, 2023] using SUE information provided by High Mesa Consulting Group [Cala, 2023][3] for the area between Thaxton Avenue and Englewood Drive and Broadway Boulevard and Williams Street. This information included storm drainpipe sizes, inverts, and manhole rim elevations. The SBDMP is included in Appendix A and provides further insight into the hydraulic modeling parameters. The updated model version was also updated to version 5.2.4.

3.2 PROPOSED CONDITIONS

RESPEC is proposing future improvements to include a gravity and pump station pond, where an electric building will house a wet well and all required accessories for pumps. The southern pond, John Street Gravity Pond, will divert flows from Broadway Boulevard through a 66-inch storm drain that eventually discharges into the Barelas Ditch storm drain toward the property's southwest corner. The John Street Gravity Pond will divert flows by one of the following two storm drain alternatives:

- Diverting water from Broadway Boulevard heading west on Thaxton Avenue, south on John Street, and into the pond
- Diverting water west on Gibson Boulevard, south onto John Street, and into the pond

The northern pond, John Street Pump Station Pond, will divert flows from Williams Street through a 66-inch storm drain pumped into either Williams Street or Broadway Boulevard. For the John Street Pump Station Pond, RESPEC's initial analysis was to continue the storm drain east on Thaxton Avenue, south through the existing Barelas Ditch easement into the pond; however, the storm drain corridor would be too constricted and may cause stability issues through the easement. The John Street Pump Station Pond is discussed further in Section 3.2.2. Figure 4 provides an overview of the storm drain improvements. Detailed plan and profiles of the storm drain alternatives are included in Appendix B.

3.2.1 JOHN STREET GRAVITY POND

Option 1 has a 6-foot embankment with a standard COA principal spillway ported riser that will discharge to the Barelas Ditch storm drain. The Barelas Ditch storm drain will be replaced with a new

[2] **City of Albuquerque, 2020.** *Design Process Manual*, prepared by the City of Albuquerque, Albuquerque, NM.

[3] **Cala, C. G., 2023.** *Proposed John Street Pond, Albuquerque, NM*, prepared by High Mesa Consulting Group, Albuquerque, NM.

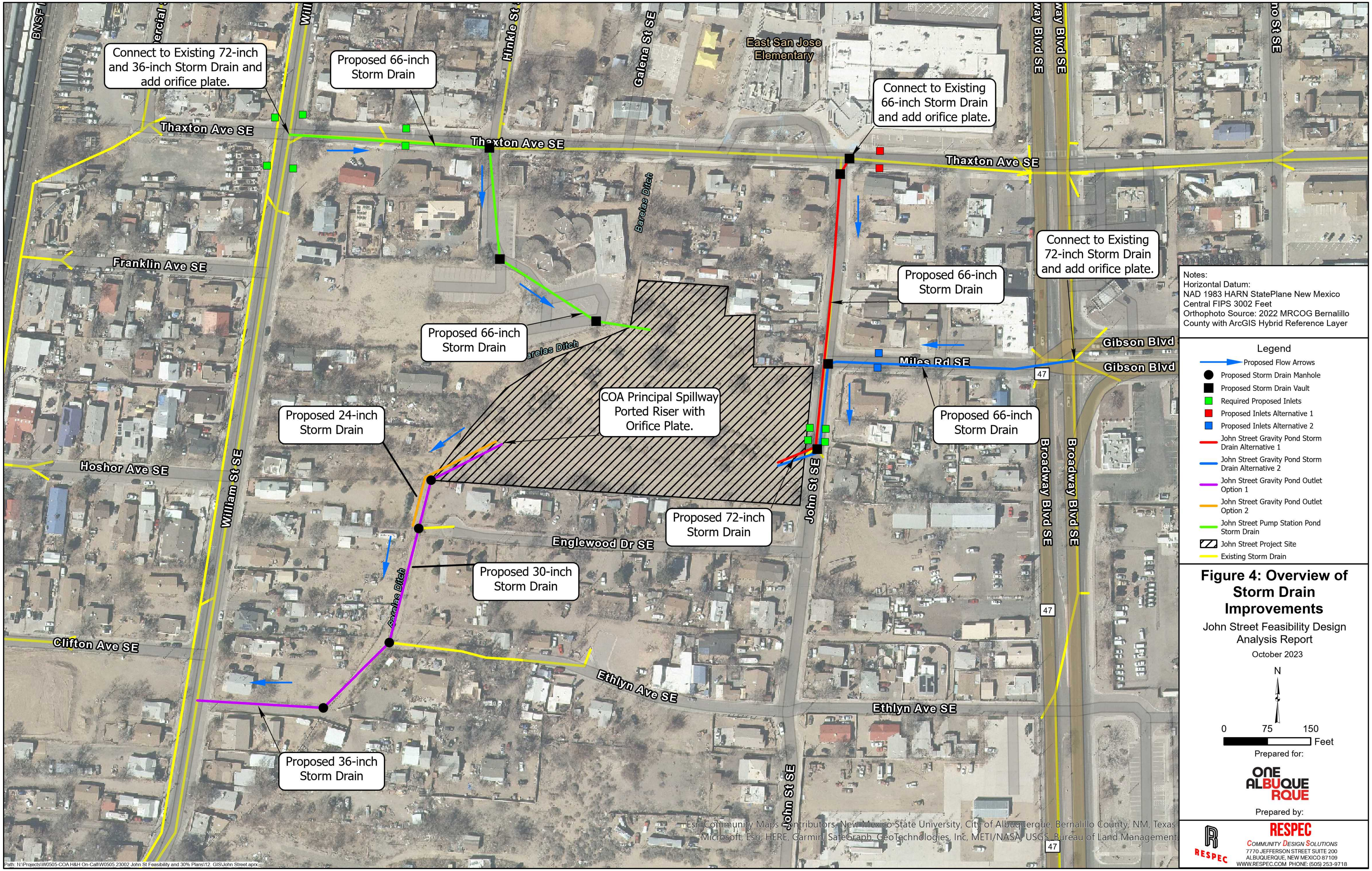

Figure 4: Overview of Storm Drain Improvements

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October 2023

storm drain connecting to Williams Street's existing storm drain. The emergency spillway is designed to convey the 100-year inflow discharge and will be lined with shotcrete for erosion protection. The storm drain inlet will have a riprap apron to help dissipate the 166 cubic feet per second (cfs) of flow that enters the pond. The summary of improvements for Option 1 is listed in Table 2. This apron basin was designed following the *Drainage Process Manual* [COA, 2020]. Detailed calculations for the design process are provided in Appendix B. Figure 5 illustrates the detailed grading plan for Option 1. The cost for Alternative 1 is $7,177,000, and for Alternative 2 is $7,266,000. An EOPC for each alternative is included in Appendix C.

Table 2. Option 1 Summary of Improvements

Structure Type	Description
Pond	Pond Invert = 4,941 feet (ft) Top of Pond = 4,957 ft Design Volume = 10.5 acre-ft to the emergency spillway
Emergency Spillway	Shotcrete lined spillway 1 ft deep by 65 ft long to convey 100-year flow = 166 cfs
Inlet Apron	27 ft wide by 32 ft long by 3 ft deep; riprap thickness is 2 ft using D_{50} of 12 inches

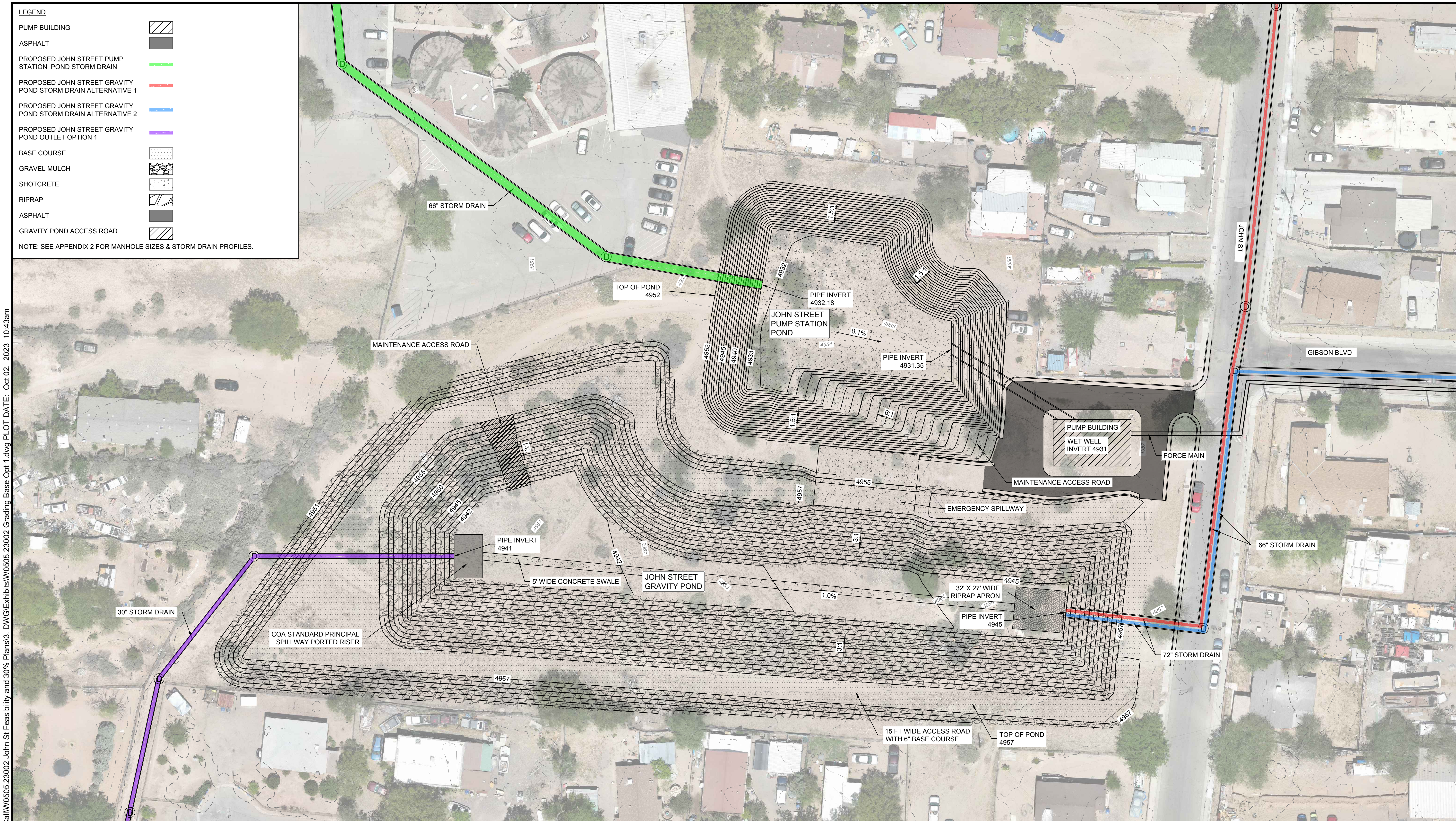
Option 2 has a 6-foot (ft) embankment with a standard COA principal spillway ported riser that will discharge to the Barelas Ditch storm drain. The Barelas Ditch storm drain will be replaced with a new storm drain that will connect to the existing storm drain in Williams Street. The emergency spillway is designed to convey the 100-year inflow discharge and will be lined with shotcrete for erosion protection. The storm drain inlet will have a riprap apron to help dissipate the 195 cfs of flow that enters the pond. The summary of improvements for Option 2 is listed in Table 3. This apron basin was designed following the *Drainage Process Manual* [COA, 2020]. Detailed calculations for the design process are provided in Appendix B. Figure 6 illustrates the detailed grading plan for Option 2. The cost for Alternative 1 is $6,600,000 and $6,779,000 for Alternative 2. An EOPC is included in Appendix C.

Table 3. Option 2 Summary of Improvements

Structure Type	Description
Pond	Pond invert = 4,947.4 ft Top of Pond = 4,957 ft Design Volume = 8.2 acre-ft to the emergency spillway
Emergency Spillway	shotcrete lined spillway 1 ft deep by 80 ft long to convey 100-year flow = 195 cfs
Inlet Apron	27 ft wide by 32 ft long by 3 ft deep; riprap thickness is 2.5 ft using D_{50} of 15 inches

3.2.2 JOHN STREET PUMP STATION POND AND SITE DESIGN

The John Street Pump Station Pond will have 1V:1.5H shotcrete lined slopes and a 1V:6H shotcrete lined access road. Figures 5 and 6 illustrate the grading plan for the John Street Pump Station Pond. The John Street Pump Station Pond will flow into the concrete wet well and include a duplex or triplex pump station, depending on the chosen pump configuration, that will be housed in a 30-ft by 50-ft building along with the wet well and electrical components. This building will be located on the property's east side and accessible from John Street. There are three pump station configurations described in the following text. An overview of the pump station building and entrance to the site is illustrated in Figure 7.



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Option 1-Alternative 1 - Pond Routing Summary
John Street Feasibility Design Analysis Report

Name	Invert Elev. (ft)	Rim Elev. (ft)	Max. Depth (ft)	Max. HGL (ft)	Max. Total Inflow (cfs)	Max. Outflow (cfs)	Total Inflow (MG) *	Total Inflow Volume (AF)	Pond Design Volume (AF) **	Pond Design Depth (ft)	Freeboard to Top of Pond	Comments
John Street Gravity Pond	4941.00	4957	13.16	4954.16	155.9	13.20	5.19	15.93	10.5	16.00	2.84	Top of Pond = 4957
John Street Pump Station Pond	4931.00	4946	14.32	4945.32	120.7	18.00	5.21	15.99	4.8	15.00	0.68	Top of Wet Well = 4946

Option 1-Alternative 2 - Pond Routing Summary
John Street Feasibility Design Analysis Report

Name	Invert Elev. (ft)	Rim Elev. (ft)	Max. Depth (ft)	Max. HGL (ft)	Max. Total Inflow (cfs)	Max. Outflow (cfs)	Total Inflow (MG) *	Total Inflow Volume (AF)	Pond Design Volume (AF) **	Pond Design Depth (ft)	Freeboard to Top of Pond	Comments
John Street Gravity Pond	4941.00	4957	12.27	4953.27	165.6	12.74	4.72	14.49	10.5	16.00	3.73	Top of Pond = 4957
John Street Pump Station Pond	4931.00	4946	13.7	4944.70	111.6	18.00	4.58	14.06	4.8	15.00	1.30	Top of Wet Well = 4946

*Pond volume converting from million gallons (MG) to acre-ft (AF) is multiplying by 3.07.
**Design volume measured to the emergency spillway

N

0 30 60
SCALE: 1" = 30'

FIGURE 5: JOHN STREET GRADING OPTION 1

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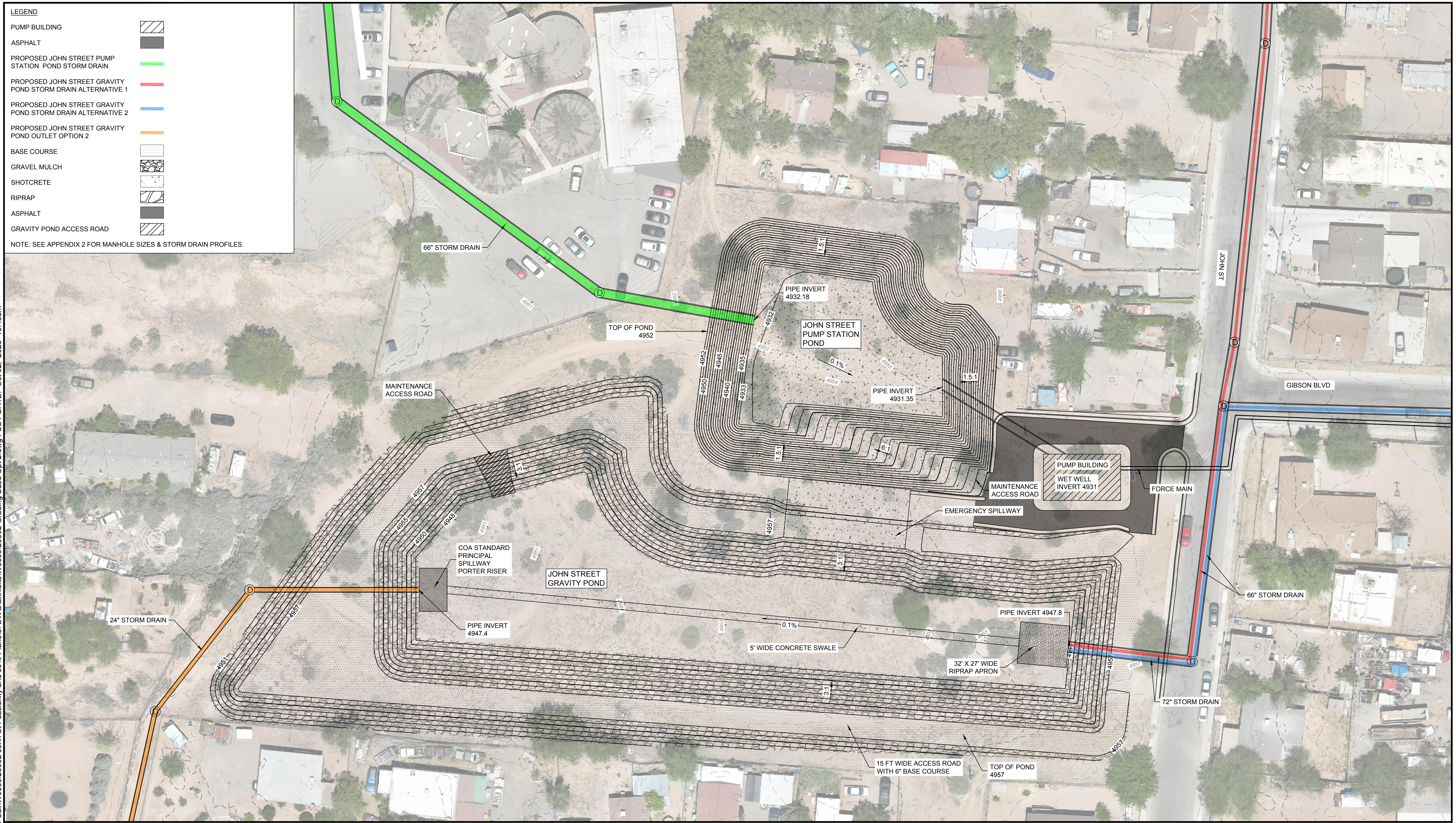

Option 2-Alternative 1 - Pond Routing Summary
John Street Feasibility Design Analysis Report

Name	Invert Elev. (ft)	Rim Elev. (ft)	Max. Depth (ft)	Max. HGL (ft)	Max. Total Inflow (cfs)	Max. Outflow (cfs)	Total Inflow (MG)*	Total Inflow Volume (AF)	Pond Design Volume (AF) **	Pond Design Depth (ft)	Freeboard to Top of Pond	Comments
John Street Gravity Pond	4947.40	4957	6.09	4953.49	148.6	20.01	2.35	7.21	8.2	9.60	3.51	Top of Pond = 4957
John Street Pump Station Pond	4931.00	4946	14.43	4945.43	143.4	18.00	4.44	13.63	4.8	15.00	0.57	Top of Wet Well = 4946

Option 2-Alternative 2 - Pond Routing Summary
John Street Feasibility Design Analysis Report

Name	Invert Elev. (ft)	Rim Elev. (ft)	Max. Depth (ft)	Max. HGL (ft)	Max. Total Inflow (cfs)	Max. Outflow (cfs)	Total Inflow (MG)*	Total Inflow Volume (AF)	Pond Design Volume (AF) **	Pond Design Depth (ft)	Freeboard to Top of Pond	Comments
John Street Gravity Pond	4947.40	4957	7.54	4954.94	194.6	31.83	4.69	14.40	8.2	9.60	2.06	Top of Pond = 4957
John Street Pump Station Pond	4931.00	4946	14.21	4945.21	132.1	18.00	4.65	14.28	4.8	15.00	0.79	Top of Wet Well = 4946

*Pond volume converting from million gallons (MG) to acre-ft (AF) is multiplying by 3.07.
**Design volume measured to the emergency spillway

N
0 30 60
SCALE: 1" = 30'

FIGURE 6: JOHN STREET GRADING OPTION 2
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LEGEND

PUMP BUILDING	SHOTCRETE
ASPHALT	RIPRAP
PROPOSED JOHN STREET GRAVITY POND STORM DRAIN ALTERNATIVE 1	
PROPOSED JOHN STREET GRAVITY POND STORM DRAIN ALTERNATIVE 2	
BASE COURSE	
GRAVEL MULCH	

N

0 10 20

SCALE: 1" = 10'

FIGURE 7:
JOHN STREET
BUILDING SITE PLAN

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NAME: N:\Projects\W0505-COA H&H On-Call\W0505.23002 John St Feasibility and 30% Plans\3. DWG\Exhibits\W0505.23002 Wet Well Bldg Drive.dwg PLOT DATE: Oct 02, 2023 10:47am

Pump Station Design Specifications:

- Wet well depth = 15 ft
- Broadway (total dynamic head [TDH]) = 25 ft
- Williams (TDH) = 20 ft
- Pond design volume = 4.7 acre-ft at 1.5H:1V slope
- Pump discharge (target flowrate) = 18 cfs or 8,100 gallons per minute
- Force main diameter discharge line = 24 inches with approximately 3 ft per second velocities

3.2.3 CONFIGURATION 1: DUPLEX SYSTEM (2 X FLYGT NP3531, 90HP)

This system contains two pumps: one sump pump for low flows with a total flowrate of approximately 1 cfs and one main pump that pumps 18 cfs, the total designed flowrate for the pump station. With this configuration, a third pump could be installed if the other pump fails or as a backup. The backup pump would have the same specifications as the main pump and provide room for upgrades. In this configuration, the pumps will be running in parallel. The sump pump is a 5-horsepower (hp) pump with a 6-inch discharge line with 67 percent operating efficiency. The main pump is a 90-hp pump with a 20-inch discharge line with 81 percent operating efficiency. The wet well would not be prefabricated, and the minimum dimensions would need to be 12 ft by 20 ft or 12 ft in diameter.

3.2.4 CONFIGURATION 2: TRIPLEX SYSTEM (3 X FLYGT NP3202, 35HP)

This system will contain three pumps: one sump pump for low flows with a total flowrate of approximately 1 cfs and two main pumps that pump 18 cfs combined (approximately 9 cfs per pump), the total designed flowrate for the pump station. With this configuration, a fourth pump could be installed if the other pump fails or as a backup. The backup pump would have the same specifications as the main pumps and provide room for upgrades. In this configuration, the pumps will be running in parallel. The sump pump is a 5-hp pump with a 6-inch discharge line and 67 percent operating efficiency. The main pump is a 34-hp pump with a 12-inch discharge line and 78 percent operating efficiency. The wet well would not be prefabricated, and the minimum dimensions would need to be 12 ft by 13 ft or 15 ft in diameter.

3.2.5 CONFIGURATION 3: DUPLEX SYSTEM (4 X FLYGT NP3153, 20HP)

This system will have two separate wet wells to house two main pumps in each wet well, four pumps in total. There will be a third wet well with one sump pump for low flows and a total flowrate of approximately 1 cfs. In each wet well, two main pumps will pump 9 cfs combined (approximately 4.5 cfs per pump) in each wet well. In this configuration, the pumps will be running in parallel. The sump pump is a 5-hp pump with a 6-inch discharge line and 67 percent operating efficiency. The main pump is a 20-hp pump with an 8-inch discharge line and 78 percent operating efficiency. The wet well would be prefabricated with a 6-ft diameter.

RESPEC coordinated with manufacturers to prepare a prefabricated pump system to lower construction costs and reduce lead time. RESPEC will continue to work with pump manufacturers to ensure the best available options are provided during the project's next phases. The cost estimates included the backup pumps in each configuration; however, to simplify calculations, backup pumps were not included in this design report.

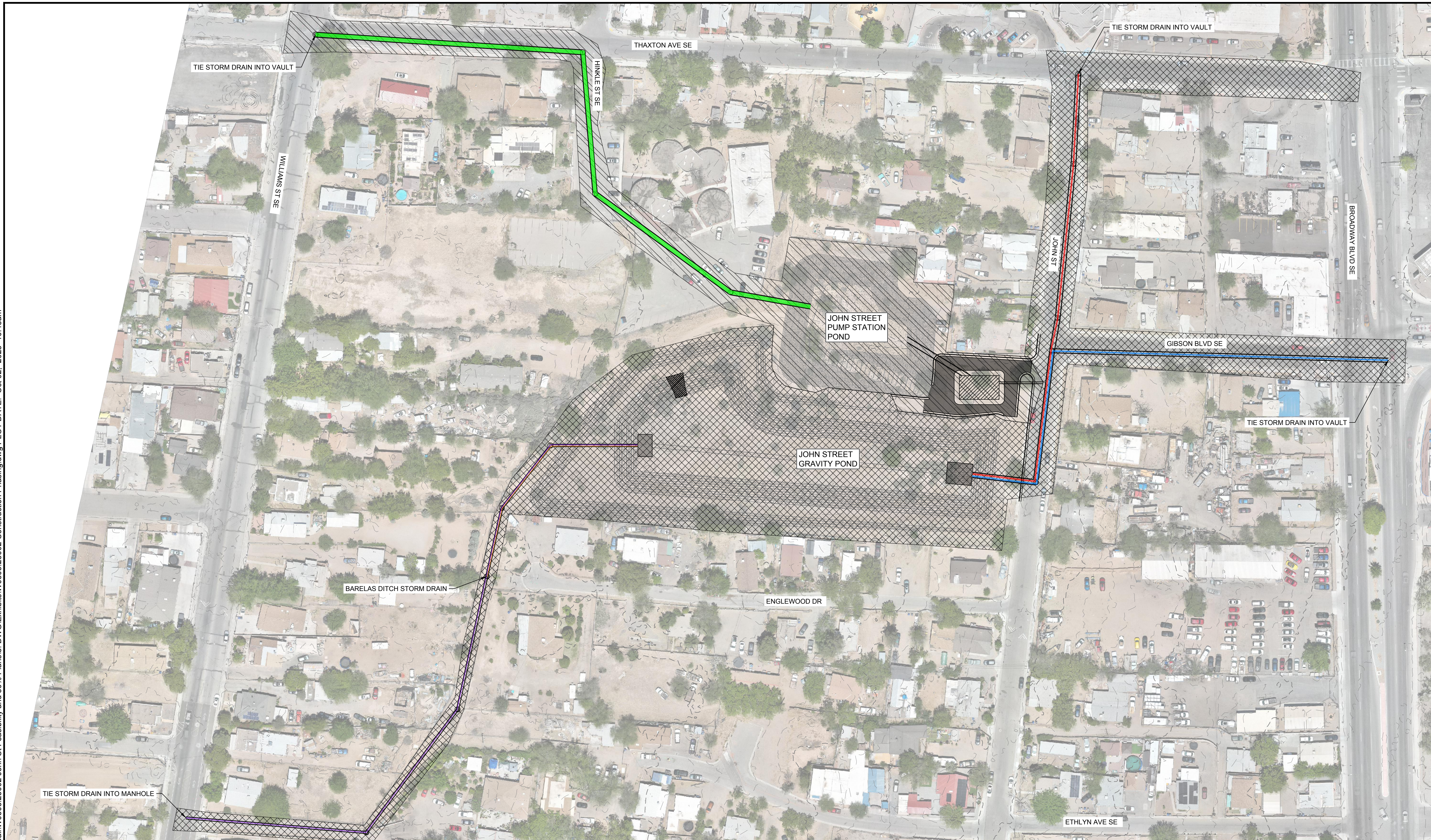
The pump specifications, minimum wet well sizes, curves, and other related information from the manufacturer are provided in Appendix B as well as the preliminary calculations, pump curves, and pump schematics for the pump station. Appendix B also includes the electrical requirements and calculations as a supplemental report. The estimated costs for each pump configuration are listed in Table 4, and the detailed cost breakdowns are included in Appendix C.

Table 4. Pump Station Estimated Costs

Configuration No.	Configuration Type	Total Cost ($)
1	Duplex System	1,230,000
2	Triplex System	894,300
3	Duplex Stations	574,000

4.0 CONCLUSION AND RECOMMENDATION

In this feasibility report, RESPEC focused on two pond options with two storm drain alternatives for the John Street facility. The gravity pond options focus on balancing earthwork quantities, creating enough storage volume for this project phase while accommodating additional runoff volume that could be conveyed from future improvements. The pump station pond was similar between options since the focus was refining the pump station system, wet well size, and exploring prefabricated options, but created additional design volume in the pond for future improvements. RESPEC recommends Option 2, Alternative 1 with Pump Configuration 3, to be the most effective. This option creates sufficient capacity in the system for this project phase and plans for future improvements to the system as additional funding becomes available. The project will be split into two phases: (1) constructing the John Street Pump Station Pond and (2) diverting the storm drain on Williams Street. The second phase is constructing the John Street Gravity Pond, diverting the storm drain on Broadway Boulevard, and improving the Barelas Ditch storm drain. This phasing plan is depicted in Figure 8.



LEGEND

CONSTRUCTION PHASE I

CONSTRUCTION PHASE II

PROPOSED JOHN STREET PUMP STATION POND STORM DRAIN

PROPOSED JOHN STREET GRAVITY POND STORM DRAIN ALTERNATIVE 1

PROPOSED JOHN STREET GRAVITY POND STORM DRAIN ALTERNATIVE 2

PROPOSED JOHN STREET GRAVITY POND OUTLET OPTION 1

PROPOSED JOHN STREET GRAVITY POND OUTLET OPTION 2

N

0 60 120

SCALE: 1" = 60'

FIGURE 8: JOHN STREET CONSTRUCTION PHASING

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APPENDIX A

BACKGROUND INFORMATION

APPENDIX A: BACKGROUND INFORMATION

The following items are included in Appendix A:

- Albuquerque Bernalillo County Water Utility Authority As-Builts
- City of Albuquerque Standard Documents
  - Principal Spillway Ported Riser Drawings
  - Principal Spillway Ported Riser Report
- RESPEC Site Visit
  - Photographs
  - Annotated Photograph Map
- *South Broadway Drainage Master Plan* by RESPEC
- *John Street Storm Drain Engineering Report* by GEO-TEST

APPENDIX B
HYDRAULIC ANALYSIS

APPENDIX B: HYDRAULIC ANALYSIS

The following items are included in Appendix B:

- Existing Conditions South Broadway Model (PCSWMM 5.2.4)
- Proposed Conditions Model Option 1 (Alt1 & Alt 2) and Option 2 (Alt 1 & Alt 2) – PCSWMM 5.2.4
- Table 2.1 Elevation Storage Discharge – John Street Gravity Pond Option 1
- Table 2.2 Elevation Storage Discharge – John Street Pump Station Pond Option 1
- Table 2.3 Elevation Storage Discharge – John Street Gravity Pond Option 2
- Table 2.4 Elevation Storage Discharge – John Street Pump Station Pond Option 2
- Table 2.5 Option 1-Alternative 1 - Pond Routing Summary
- Table 2.6 Option 1-Alternative 2 - Pond Routing Summary
- Table 2.7 Option 2-Alternative 1 - Pond Routing Summary
- Table 2.8 Option 2-Alternative 2 - Pond Routing Summary
- Table 2.9 Riprap Apron Sizing Option 1
- Table 2.10 Riprap Apron Sizing Option 2
- Table 2.11 John Street Sump Inlet Calculations
- Table 2.12 Williams Street Sump Inlet Calculations
- John Street Proposed Storm Drain Plan and Profiles
- CTA Electrical Feasibility Report for John Street Pond
- Proposed Storm Drain Hydraulic Grade Line Profiles (SWMM)
  - Option 1 Alternative 1 Gravity Plan & Profile (with PCSWMM HGL)
  - Option 1 Alternative 1 Pump Plan & Profile (with PCSWMM HGL)
  - Option 1 Alternative 2 Gravity Plan & Profile (with PCSWMM HGL)
  - Option 1 Alternative 2 Pump Plan & Profile (with PCSWMM HGL)
  - Option 2 Alternative 1 Gravity Plan & Profile (with PCSWMM HGL)
  - Option 2 Alternative 1 Pump Plan & Profile (with PCSWMM HGL)
  - Option 2 Alternative 2 Gravity Plan & Profile (with PCSWMM HGL)
  - Option 2 Alternative 2 Pump Plan & Profile (with PCSWMM HGL)
- Supporting Documents and References
  - Pump Manufacturer Curves
  - Pump Manufacturer Wet Well Details
  - Urban Storm Drainage Criteria Manual (USDCM) Volume 2
  - Mile High Flood District (MHFD) Riprap Type Specification
  - Hydraulic Design of WW Lift Stations
  - COA Type "A" Double Wing SD 2201A
  - COA DPM Type Double A 2% Slope on Grade Nominal Grate Capacity

APPENDIX C

ENGINEER'S OPINION OF PROBABLE COST

APPENDIX C: ENGINEER'S OPINION OF PROBABLE COST

The following items are included in Appendix C:

- Table 3.1 Engineers Opinion of Probable Cost – Option 1 Alternative 1
- Table 3.2 Engineers Opinion of Probable Cost – Option 1 Alternative 2
- Table 3.3 Engineers Opinion of Probable Cost – Option 2 Alternative 1
- Table 3.4 Engineers Opinion of Probable Cost – Option 2 Alternative 2
- Table 3.5 Pump Station Configuration Cost Estimates