CITY OF ALBUQUERQUE

Planning Department
Alan Varela, Director

Mayor Timothy M. Keller

December 8, 2023

Christopher Archuleta, P.E.
Respec
7770 Jefferson NE, Suite 200
Albuquerque, NM 87109

RE: John Street Pond Feasibility Design Analysis Report
Engineer's Stamp Date: 11/09/23
Hydrology File: L14D067

Dear Mr. Archuleta:

Based upon the information provided in your submittal received 11/09/2023, the Analysis Report is preliminary approved.

PO Box 1293

Albuquerque

NM 87103

www.cabq.gov

PRIOR TO WORK ORDER APPROVAL:

1. Once a 90% Construction Drawings Set is complete, please submit the final design Grading Plans and Drainage Report to Hydrology for review and approval. This digital (.pdf) is emailed to PLNDRS@cabq.gov along with the Drainage Transportation Information Sheet.

If you have any questions, please contact me at 924-3995 or rbrissette@cabq.gov.

Sincerely,

Renée C. Brissette

Renée C. Brissette, P.E. CFM
Senior Engineer, Hydrology
Planning Department

City of Albuquerque

Planning Department
Development & Building Services Division

DRAINAGE AND TRANSPORTATION INFORMATION SHEET (DTIS)

Project Title: John Street Feasibility Design Analysis Report Hydrology File # L14D067
Legal Description: TR A PLAT OF TRACT A HANILY SUBDIVISION CONT 2.8734 AC and MAP 41 TR 328
City Address, UPC, OR Parcel: UPC: 101405628008040717 and 101405629109240718

Applicant/Agent: RESPEC Contact: Christopher Archuleta
Address: 7770 Jefferson St. NE, Suite 200 Albuquerque, NM 87109 Phone: (505) 253-9752
Email: christopher.archuleta@respec.com

Applicant/Owner: ____ Contact: ____
Address: ____ Phone: ____
Email: ____

(Please note that a DFT SITE is one that needs Site Plan Approval & ADMIN SITE is one that does not need it.)

TYPE OF DEVELOPMENT:
- ☐ PLAT (#of lots) ____
- ☐ DFT SITE
- ☐ RESIDENCE
- ☑ ADMIN SITE

RE-SUBMITTAL: ☑ YES ☐ NO

DEPARTMENT: ☐ TRANSPORTATION ☑ HYDROLOGY/DRAINAGE

Check all that apply under Both the Type of Submittal and the Type of Approval Sought:

TYPE OF SUBMITTAL:
- ☐ ENGINEER/ARCHITECT CERTIFICATION
- ☐ PAD CERTIFICATION
- ☐ CONCEPTUAL G&D PLAN
- ☐ GRADING & DRAINAGE PLAN
- ☑ DRAINAGE REPORT
- ☐ DRAINAGE MASTER PLAN
- ☐ CLOMR/LOMR
- ☐ TRAFFIC CIRCULATION LAYOUT (TCL) ADMINISTRATIVE
- ☐ TRAFFIC CIRCULATION LAYOUT FOR DFT APPROVAL
- ☐ TRAFFIC IMPACT STUDY (TIS)
- ☐ STREET LIGHT LAYOUT
- ☐ OTHER (SPECIFY) ____

TYPE OF APPROVAL SOUGHT:
- ☐ BUILDING PERMIT APPROVAL
- ☐ CERTIFICATE OF OCCUPANCY
- ☐ CONCEPTUAL TCL DFT APPROVAL
- ☐ PRELIMINARY PLAT APPROVAL
- ☐ FINAL PLAT APPROVAL
- ☐ SITE PLAN FOR BLDG PERMIT DFT APPROVAL
- ☐ SIA/RELEASE OF FINANCIAL GUARANTEE
- ☐ FOUNDATION PERMIT APPROVAL
- ☐ GRADING PERMIT APPROVAL
- ☐ SO-19 APPROVAL
- ☐ PAVING PERMIT APPROVAL
- ☐ GRADING PAD CERTIFICATION
- ☑ WORK ORDER APPROVAL
- ☐ CLOMR/LOMR
- ☑ OTHER (SPECIFY) DMD Project

DATE SUBMITTED: November 9, 2023

COMMENT RESPONSE LETTER

To: City of Albuquerque Hydrology Section (Planning Department)

From: RESPEC

Date: November 9, 2023

RE: John Street Pond Feasibility Design Analysis Report
Engineer's Stamp Date: No date
Hydrology File: L14D067

COA HYDROLOGY COMMENT RESPONSES

RESPEC's responses are in Blue.

1. Once the Report is ready for approval, please provide an engineer's stamp with a signature and date. Report is stamped, signed, and dated.

2. Please note that the Hydrology Section has yet to review and approve the updated South Broadway Drainage Management Plan (March, 2023. Please note that these DMPs are used by the Hydrology Section to ensure that new developments within the watershed follows any site restrictions to the allowable discharge as outlined in these MDPs. Something else to note is that the City of Albuquerque has a limit of 430 cfs in the San Jose Drain at the City Limit which makes this at capacity currently all the way to the Rio Grande River. South Broadway DMP (2023) has been submitted to hydrology.

3. In 2.1 Existing Conditions, the section just refers to the updated SBDMP without a map. A map showing the existing subbasins similar to Figure 3 (Proposed Subbasin Map) would be helpful. A figure showing existing conditions subbasins in the vicinity to John Street Pond was added to the report.

4. In 2.2 Proposed Conditions, why are all the Curve Number (CN) the same? Hydrology section has found if you are using a soil map within Albuquerque, then the resulting flows are off. As in the DPM, Hydrology Section recommends using the following CNs depending on the land treatment and using a weighted CN.

    a. The use of just four Curve Number (CN) values, one for each of the land treatments already described in the DPM: A=76, B=80, C=85 and D=98. This way the hydrologic soil groups don't need to be determined to select the CN and the soil maps do not need to be consulted.
    b. For example, John Street Pond Basin 1 has 85% impervious but uses a CN 86. If you use a weighted CN, then you get 0.85*98 + 0.15*85 which gives a CN 96.

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c. For example, John Street Pond Basin 2 has 20% impervious but uses a CN 86. If you use a weighted CN, then you get 0.20*98 + 0.80*85 which gives a CN 87.6.

As you can see using the weighted CN gets a more accurate representation of the existing conditions or proposed conditions. RESPEC maintained the same hydrology procedures discussed in the Alameda SWMM Drainage Study (October 2022) report, which is also referenced in the South Broadway DMP (March 2023). The Alameda SWMM Drainage Study discusses in depth the hydrology practices and curve number (CN) selection. Below is a screenshot of verbiage from the Alameda SWMM Drainage Study report for context. The subarea routing method used, from the SWMM hydrology manual, was the "impervious method" which routes the directly connected area (roofs to driveways into the street into the storm systems) over pervious area (grass, compacted parking lots, etc.). Since the area around John Street Pond has similar lot sizes, the CN selected was applied to the pervious area of the subbasin. Since the Hydrologic soils report showed a mixture of groups A-D for the watershed, RESPEC conservatively used CNs in HSG C since the drainage area is developed with compacted pervious soils. Therefore, for these lots around the John Street area, RESPEC used an average CN of lot sizes 1/8, 1/3 and 1/4. RESPEC will provide the Alameda SWMM Drainage Study report.

parameters are crucial in determining runoff and volume estimates in the model.

2.2.1 OVERVIEW OF SWMM HYDROLOGY

The hydrologic methods available in PCSWMM provides an effective tool for the analysis of subbasins that occur in valley conditions that are typically depressed and unable to drain out. This is because PCSWMM treats each subbasin or sub-catchment as a polygon for which a volume analysis is performed to generate a runoff hydrograph. The sub-catchment polygon is divided into an impervious portion, representing the directly connected impervious areas and a pervious portion which represents all pervious areas. The two types of areas are then internally routed using a subarea routing method. There are three principal methods for subarea routing which are discussed in detail the general definition of terms below. Initial abstractions for areas that are depressed can then be manipulated to capture effect of depression storage and excess ponding that will occur. There are several key parameters that are required to generate hydrographs.

A general definition of terms is provided below:

» **Sub-catchment:** The equivalent term for a subbasin.

» **Area:** Subbasin area based measured from ArcGIS Pro.

» **Hydrologic Area Width:** The estimated width for sheet flow. This is a difficult parameter to estimate as the width for sheet flow in any subbasin is subjective. Alternatively, PCSWMM recommends computing the longest flow path, as this is a parameter easily measured based on topographic data. The overland flow width can then be estimated by taking the ratio of the basin area to the longest flow path. PCSWMM recommends that this parameter is one that should be calibrated as the width and area for the sub-catchment greatly affects the peak. For this analysis, RESPEC measured the longest flow path for each sub-catchment. PCSWMM has a built-in function that lets the user determine if the flow path or the width will be used as the direct input. The Alameda Drain model was set to select the longest flow path as the direct input which allowed the model to compute the width. Flow path lengths were adjusted for some sub-catchments to calibrate the runoff results.

» **Subarea Routing Method:** Determines how the computed runoff for a sub-catchment polygon gets routed internally. There are three primary routing methods: pervious, impervious or outlet.

- The Pervious method assumes that some percentage of the runoff from the impervious area is directed through the pervious area in the sub-catchment. This method requires a composite curve number to be defined for the entire sub-catchment.
- The Impervious method implies that some portion of the pervious area is routed over the directly connected impervious area. This method requires the directly connected impervious area be defined as a percentage whereas a curve number is assigned to pervious area.
- The outlet method does not do internal routings. In this method, runoff from both the impervious area and pervious area are routed directly to the outlet of the sub-catchment.

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5. Figure 4, Overview of Storm Drain Improvements. It would be very helpful if you include the Q100 at the storm pipe for both the existing and the proposed on the map. (See below) This should be help explain how the whole proposed system will help with the capacity in the existing storm drain by the proposed detention & pump station.
These were added to the figure.

6. In 3.2.1 John Street Gravity Pond. For Option 1 & Option 2, the emergency spillway Q100 is shown in the tables but which design is being proposed for the COA Ported Riser Principle Spillway is being used in each option and the Q100 at the discharge is not mentioned either. Option 1 has a 30-inch RCP and Option 2 has a 24-inch RCP but that is all the information is given. These were discussed and revised in the report.

JOHN STREET POND FEASIBILITY DESIGN ANALYSIS REPORT

REPORT RSI-3390

City of Albuquerque
Planning Department
Development Review Services
HYDROLOGY SECTION
PRELIMINARY APPROVED
DATE: 12/08/23
BY: Renée C. Brissette
HydroTrans # L14D067

THESE PLANS AND/OR REPORT ARE CONCEPTUAL ONLY. MORE INFORMATION MAY BE NEEDED IN THEM AND SUBMITTED TO HYDROLOGY FOR BUILDING PERMIT APPROVAL.

PREPARED BY
Christopher Archuleta
Shamas Din
Hugh Floyd

RESPEC
7770 Jefferson Street NE, Suite 200
Albuquerque, New Mexico 87109

PREPARED FOR
One Albuquerque
1 Civic Plaza, #7057
Albuquerque, New Mexico 87109

NOVEMBER 2023

Project Number W0505.23002

RESPEC

CERTIFICATION

I, Christopher S. Archuleta, 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.

Christopher S. Archuleta, P.E.
NMPE No. 29025

CHRISTOPHER S. ARCHULETA
NEW MEXICO
29025
PROFESSIONAL ENGINEER

November 9, 2023

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

John Street Feasibility Design Analysis Report

November 2023

N

0 100 200 Feet

Prepared for:

ONE ALBUQUERQUE

Prepared by:

RESPEC

COMMUNITY DESIGN SOLUTIONS
7770 JEFFERSON STREET SUITE 200
ALBUQUERQUE, NEW MEXICO 87109
WWW.RESPEC.COM PHONE: (505) 253-9718

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. Figure 3 illustrates the existing conditions basin boundaries around the John Street Pond from 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 4 illustrates the proposed conditions basin boundaries around the John Street Pond.

Table 1. Summary of 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	Curve Number	Area (ac)	Impervious (%)
SJ28*	86	22.7	45
SJ30*	86	10.9	50

Notes:
Horizontal Datum:
Name: 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.
*Existing Subbasin Boundaries are referencing the South Broadway DMP (2023) in the vicinity to John Street Pond.

Legend
Existing South Broadway Basins
1 ft Contours

Figure 3: Existing Subbasin Map

John Street Feasibility Design Analysis Report

November 2023

N

0 100 200 Feet

Prepared for:

ONE ALBUQUERQUE

Prepared by:

RESPEC
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ALBUQUERQUE, NEW MEXICO 87109
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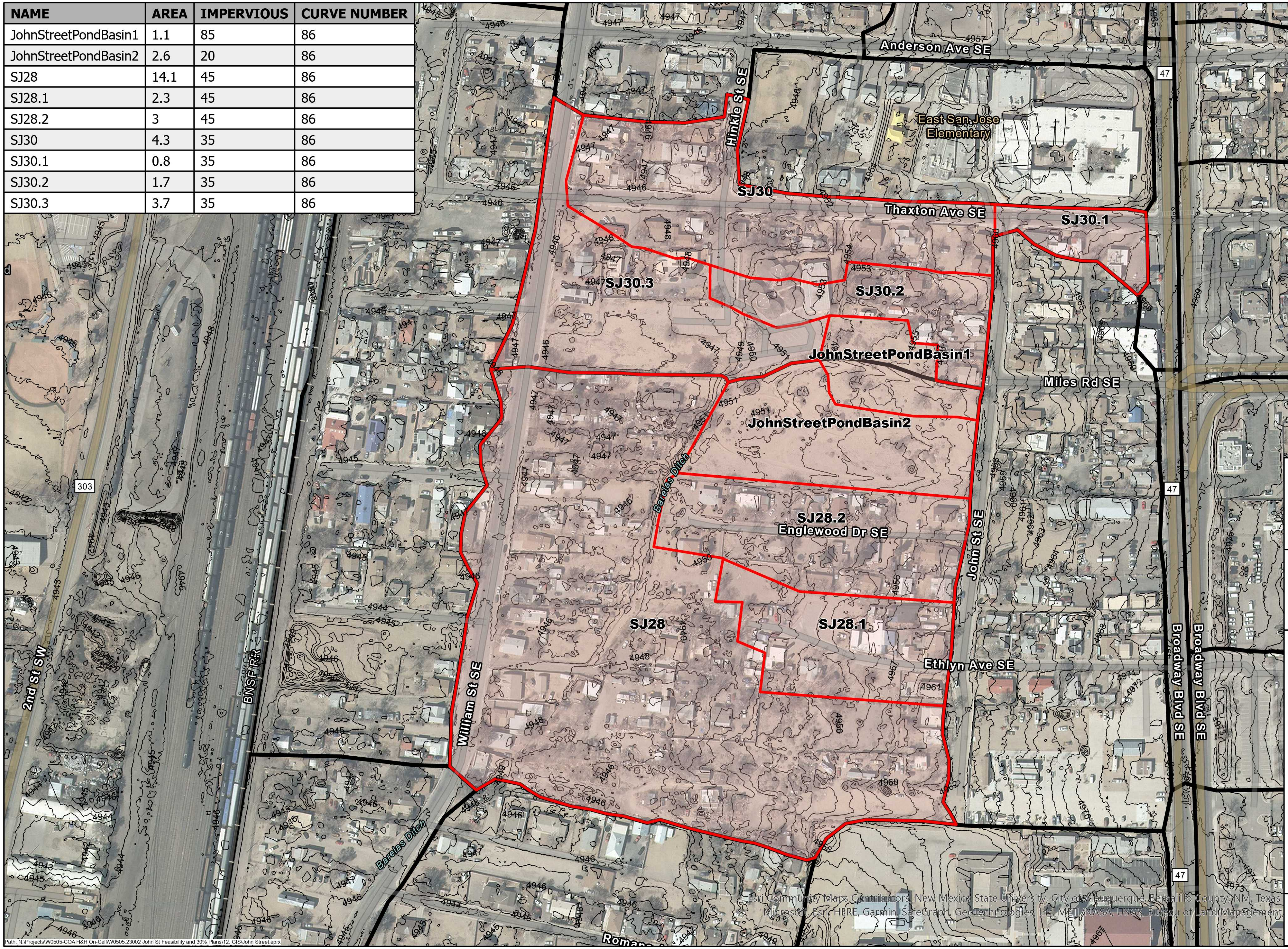
NAME	AREA	IMPERVIOUS	CURVE NUMBER
JohnStreetPondBasin1	1.1	85	86
JohnStreetPondBasin2	2.6	20	86
SJ28	14.1	45	86
SJ28.1	2.3	45	86
SJ28.2	3	45	86
SJ30	4.3	35	86
SJ30.1	0.8	35	86
SJ30.2	1.7	35	86
SJ30.3	3.7	35	86



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 4: Proposed Subbasin Map

John Street Feasibility Design Analysis Report

November 2023

N

0 100 200 Feet

Prepared for:

ONE ALBUQUERQUE

Prepared by:

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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 5 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.

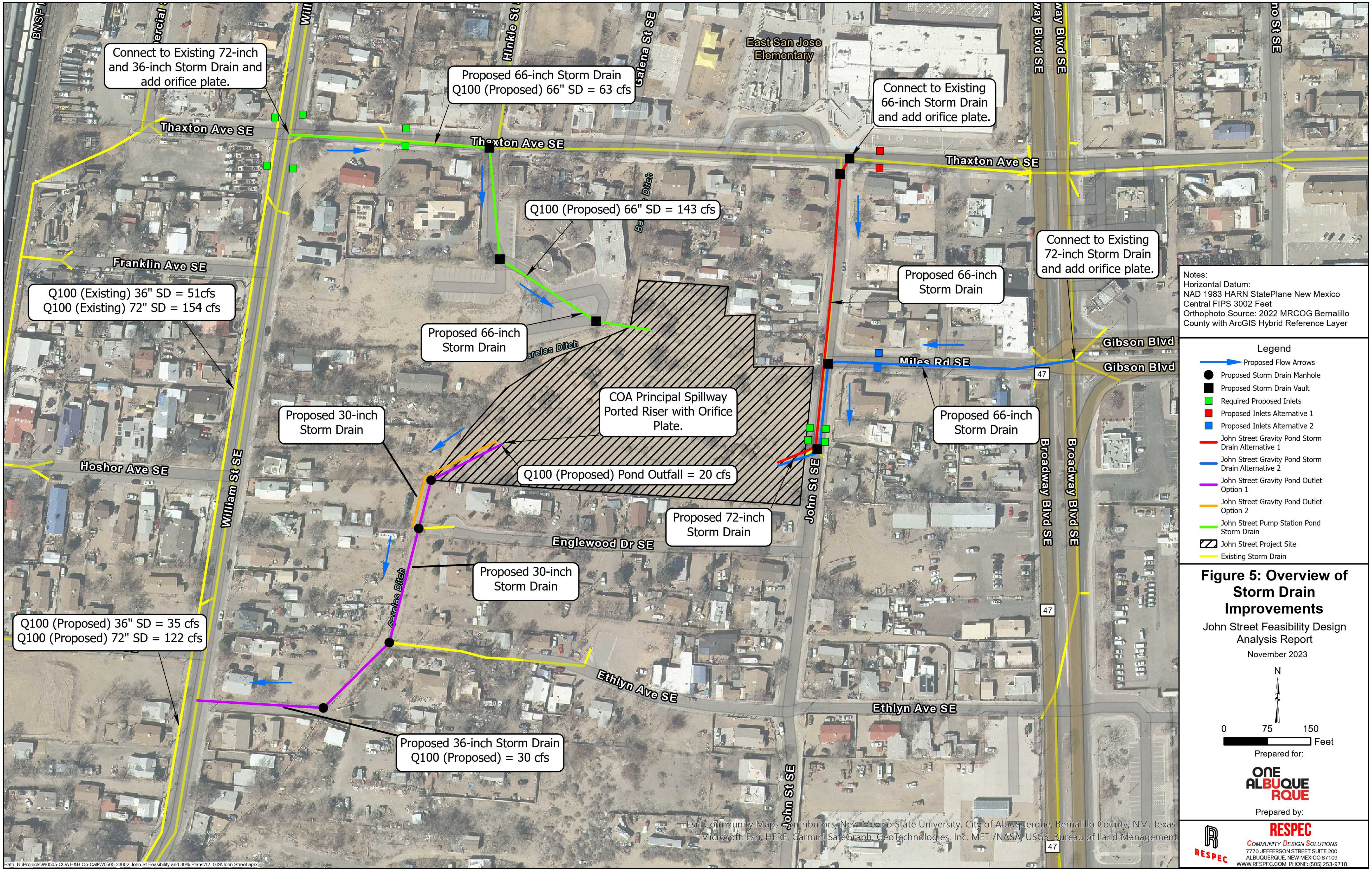


Figure 5: Overview of Storm Drain Improvements

John Street Feasibility Design Analysis Report

November 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 6 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 COA Ported Riser Principal Spillway Design # 19, Type 4 (30-inch outfall). 100-year flow = xxx cfs
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

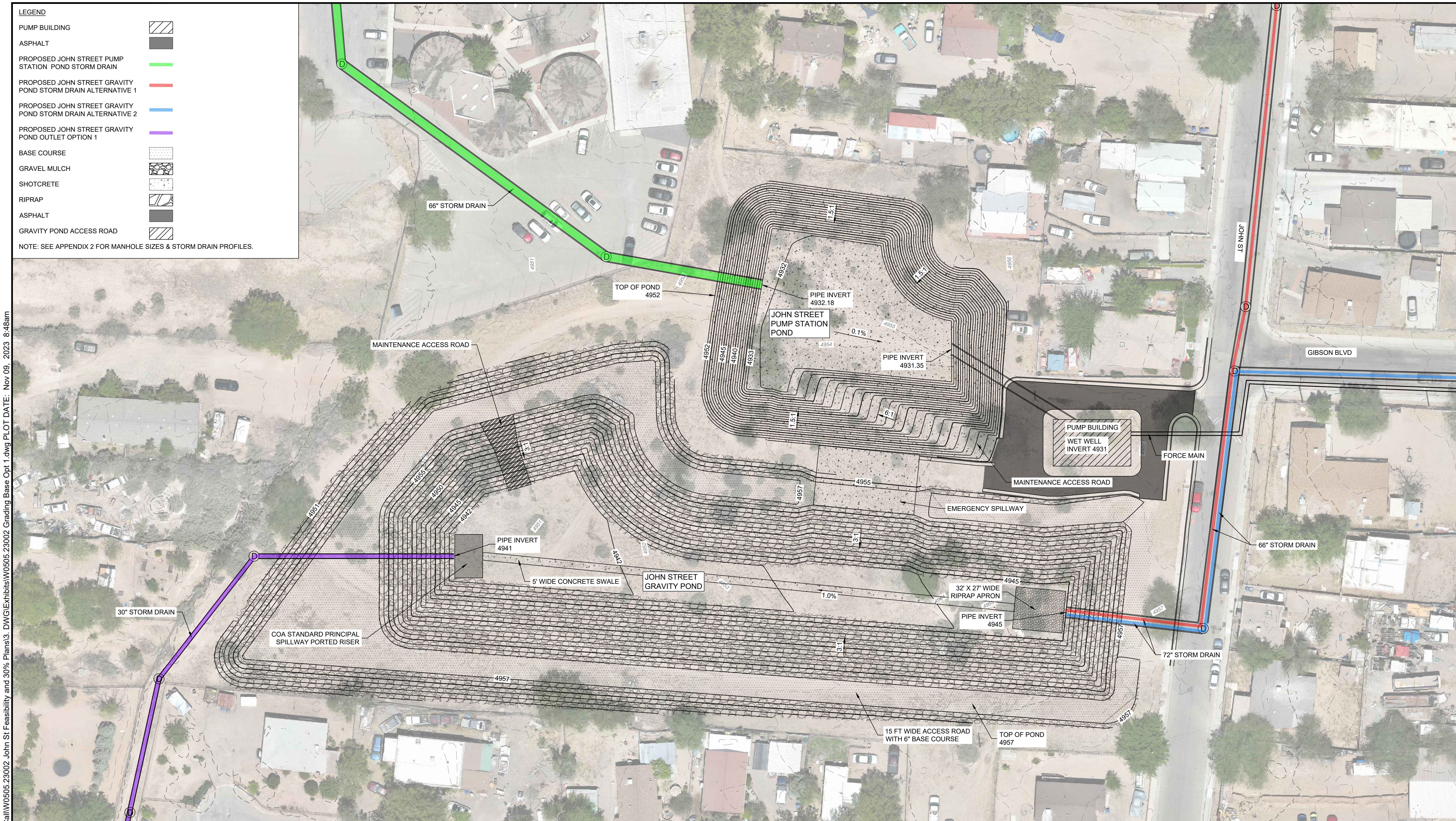
Option 2 has a 6-foot (ft) embankment with a standard COA principal spillway ported riser that will discharge to the Barelas Ditch storm drain. The Barelas Ditch storm drain will be replaced with a new storm drain that will connect to the existing storm drain in Williams Street. The emergency spillway 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 7 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 COA Ported Riser Principal Spillway Design # 1, Type 1 (30-inch outfall). 100-year flow = xxx cfs
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 6 and 7 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 8.



NAME: N:\Projects\W0505-COA H&H On-Call\W0505.23002 John St Feasibility and 30% Plans\3. DWG\Exhibits\W0505.23002 Grading Base Opt 1.dwg PLOT DATE: Nov 09, 2023 8:48am

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 6: JOHN STREET GRADING OPTION 1

November 2023

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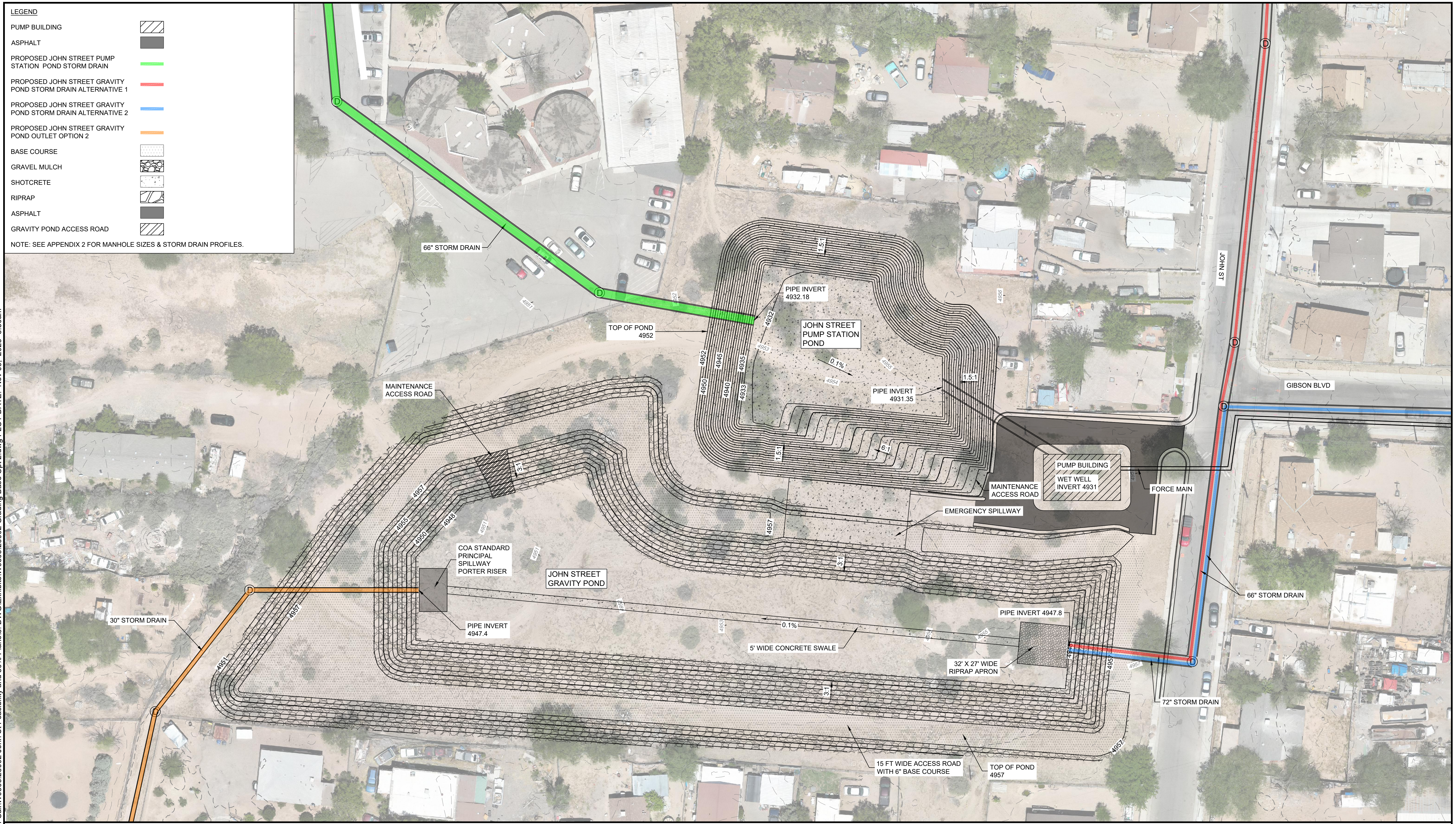

NAME: N:\Projects\W0505-COA H&H On-Call\W0505.23002 John St Feasibility and 30% Plans\3. DWG\Exhibits\W0505.23002 Grading Base Opt 2.dwg PLOT DATE: Nov 09, 2023 8:50am

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

0 30 60
SCALE: 1" = 30'

FIGURE 7: JOHN STREET GRADING OPTION 2
November 2023

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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 8: 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: Nov 09, 2023 8:52am

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.

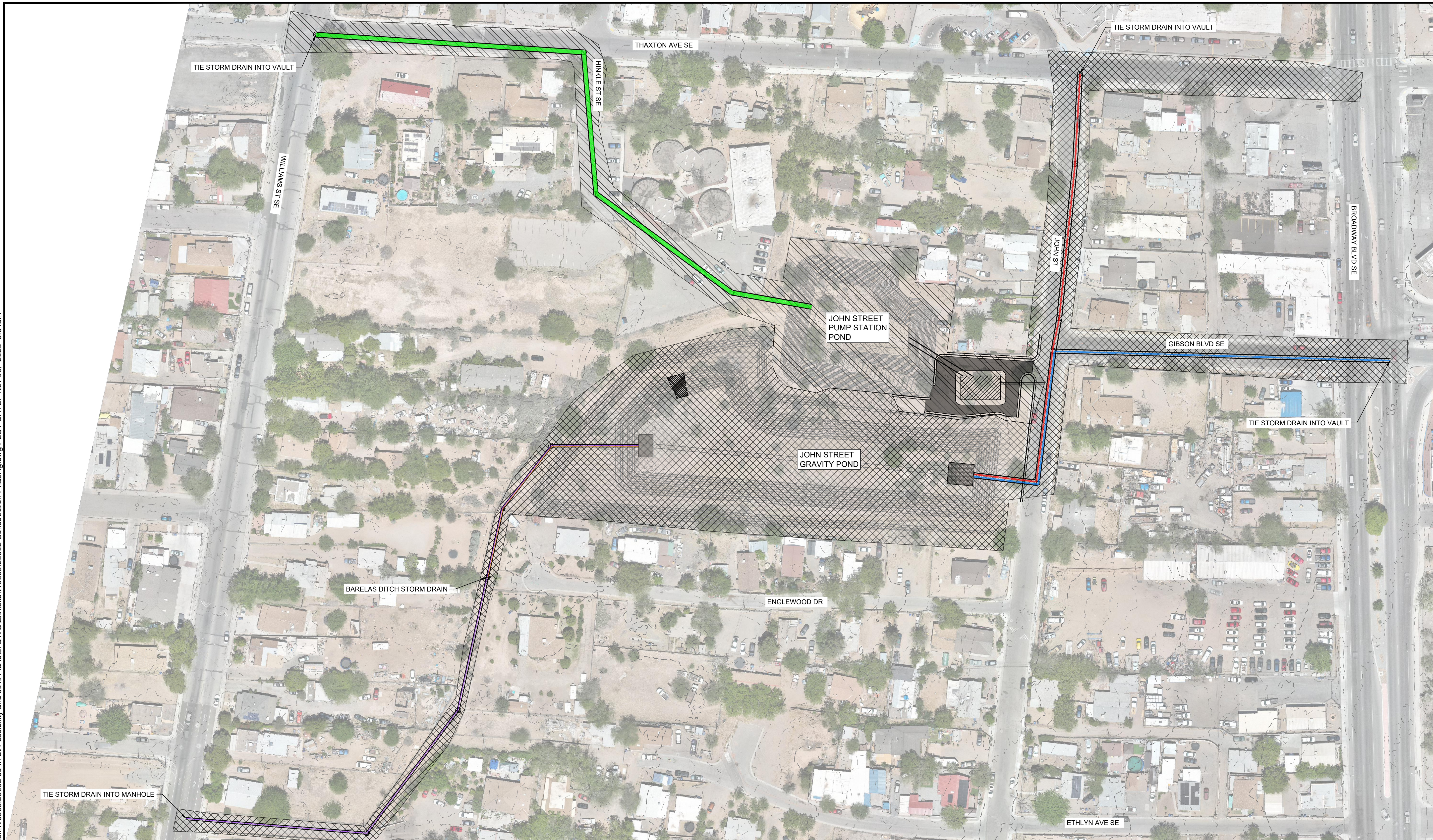
The pump specifications, minimum wet well sizes, curves, and other related information from the manufacturer are provided in Appendix B as well as the preliminary calculations, pump curves, and pump schematics for the pump station. Appendix B also includes the electrical requirements and calculations 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 9.



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 9: JOHN STREET CONSTRUCTION PHASING

November 2023

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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 Construction Phasing.dwg PLOT DATE: Nov 09, 2023 8:54am

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 Conceptual 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