

**BOA Meeting Agenda  
Peculiar City Board of Aldermen  
Worksession Meeting and Public Hearing  
City Hall – 250 S. Main St  
Tuesday, January 19, 2016 6:30 p.m.**

*Notice is hereby given that the Board of Aldermen of the City of Peculiar will hold a regularly scheduled meeting on Tuesday, January 19, 2015 at 6:30 pm, in the Council Chambers at 250 S. Main St. Representatives of the news media may obtain copies of this notice by contacting the City Clerk at City Hall, 250 S. Main St Peculiar, MO 64078 or by calling 816-779-2221. All proposed Ordinances and Resolutions will be available for viewing prior to the meeting in the Council Chambers.*

1. Call to Order
2. Pledge of Allegiance
3. Roll Call
4. City Clerk – Read the Board of Aldermen Statement
5. Consent Agenda –
  - A. Approval of the Draft Minutes of December 21, 2015 BOA Meeting.
  - B. Approval of the Draft Minutes of January 4, 2016 Worksession Meeting.
6. New Business –
  - A. Resolution No. 2016-01 – A RESOLUTION OF THE BOARD OF ALDERMEN OF THE CITY OF PECULIAR, MISSOURI, APPROVING AND ACCEPTING THE FINAL ENGINEERING REPORT regarding the DEAN LAKE STORM WATER DETENTION/RETENTION BASIN prepared by BARTLETT & WEST ENGINEERS for the CITY of PECULIAR
7. Topic for Discussion –
  - A. New Utility Bill Format and Rate Structure
  - B. Board of Aldermen Policy on Code Enforcement
8. City Administrator Report
9. Aldermen Concerns
10. Aldermen Directives
11. Adjournment

**Board of Aldermen Regular Meeting Minutes  
Monday December 21, 2015**

A regular meeting and public hearing of the Board of Aldermen of the City of Peculiar, Missouri, was held in the Council Chambers in City Hall at 6:30 p.m. on Monday, December 21, 2015. Mayor Holly Stark was absent, Acting Mayor Pro-Tem Patrick Roberts called the meeting to order and all who were present joined in reciting the Pledge of Allegiance.

The following Aldermen responded to roll call: Kelsie McCrea, Jerry Ford, Patrick Roberts, Veronika Ray, Matt Hammack and Donald Turner.

City Staff present for the meeting were City Administrator Brad Ratliff, City Attorney Reid Holbrook, City Planner Cliff McDonald, Chief of Police Harry Gurin, City Engineer Carl Brooks, Business Office Manager Trudy Prickett, Public Works Manager Nick Jacobs, IT Systems Administrator Phillip Costanzo and City Clerk Janet Burlingame.

**City Clerk Janet Burlingame recited the Board of Aldermen Statement.**

**Consent Agenda**

- A. Approval of the Draft Minutes of November 16, 2015 BOA Meeting.**
- B. Approval of the Draft Minutes of December 7, 2015 Worksession Meeting.**

Alderman Ford moved to accept the consent agenda as presented and seconded by Alderman Hammack, consent agenda was approved by a 6-0 roll call vote.

Alderman McCrea	Aye	Alderman Ray	Aye
Alderman Ford	Aye	Alderman Hammack	Aye
Alderman Roberts	Aye	Alderman Turner	Aye

**Public Comment – Steve Flinn regarding non-smoking in public places.**

Raymore resident Steve Flinn discussed the issue of non-smoking in public places in the City of Peculiar. Mr. Flinn explained his concern regarding the dangers of smoking and second hand smoke while recently enjoying a meal at a local restaurant. Mr. Flinn stated Peculiar is a great town, he and his wife would like to be able to enjoy visiting local establishments in a smoke free environment. After discussion ensued amongst Board of Aldermen it was stated that they are not willing to regulate what business do in the City of Peculiar.

**Unfinished Business –**

- A. Bill No. 2015-28 - AN ORDINANCE OF THE CITY OF PECULIAR, MISSOURI ESTABLISHING SECTION 135.090 OF PECULIAR MUNICIPAL CODE TITLED “MOTOR FUEL FEE.”  
2<sup>nd</sup> Reading**

Public Works Manager Nick Jacobs discussed key issues establishing a means to assess and collect the newly passed \$0.01 Motor Fuel Fee. Alderman McCrea gave praise to Mr. Jacobs for never giving up and always searching new ways to get this issue passed. Also, expressing appreciation to the efforts of many other people that worked towards getting this issue passed.

Alderman Ford made a motion to have the second reading of Bill No. 2015-28 by title only. The motion was seconded by Alderman Turner and was approved by a 6-0 voice vote. Alderman Ford made a motion to accept the second reading of Bill No. 2015-28 and place on final passage as ordinance number 12212015. The motion was seconded by Alderman Hammack and was accepted by a 6-0 roll call vote.

Alderman Ford	Aye	Alderman Ray	Aye
Alderman McCrea	Aye	Alderman Roberts	Aye
Alderman Hammack	Aye	Alderman Turner	Aye

**New Business –**

- A. Public Hearing & Bill No. 2015-30 - AN ORDINANCE OF THE BOARD OF ALDERMEN OF THE CITY OF PECULIAR, MISSOURI APPROVING THE REPLAT OF BRADLEY’S CROSSING CONDOMINIUMS LOTS 1 & 2 TO BRADLEY’S CROSSING LOTS 114 THRU 129 AND TRACTS E & F SUBMITTED BY SALLEE REAL ESTATE INVESTMENTS, LLC.  
1<sup>st</sup> Reading**

City Planner Cliff McDonald discussed many key issues regarding the RePlat Application for Bradley’s Crossing Condominiums Lots 1 & 2, to Lots 114 thru 123 and Tracts E & F. The City of Peculiar and Sallee Real Estates Investments, LLC have entered into a development agreement for Bradley’s Crossing in which the City and Sallee share the maintenance of the common areas for four (4) years. After four (4) years the property will be transferred to the property owners association. Discussion ensued amongst Board of Aldermen and City Staff. Attorney for Sallee Real Estates Investments, LLC Greg Musil and Mr. Randy Sallee discussed in detail the proposed plans of the

development agreement. Mr. Musil requested the Board of Aldermen to allow Sallee Homes to build what was approved in 2007 and consider changing the six (6) off street parking spots. Discussion ensued amongst the Board of Aldermen, City Administrator and City Staff.

Alderman Ford made a motion to have the first reading of Bill No. 2015-30 by title only. The motion was seconded by Alderman Hammack and was approved by a 6-0 voice vote. Alderman Ford made a motion to accept the first reading of Bill No. 2015-30. The motion was seconded by Alderman Hammack and was accepted by a 6-0 voice call vote.

Alderman Ford	Aye	Alderman Ray	Aye
Alderman McCrea	Aye	Alderman Roberts	Aye
Alderman Hammack	Aye	Alderman Turner	Aye

**B. Resolution 2015-63 - A RESOLUTION OF THE BOARD OF ALDERMEN OF THE CITY OF PECULIAR, MISSOURI AUTHORIZING THE MAYOR TO EXECUTE A CONTRACT WITH BREIT CONSTRUCTION LLC FOR INSTALLATION OF FORTY-THREE (43) WATER METERS IN THE WINDMILL COUNTRY ESTATES SUBDIVISION IN THE CITY OF PECULIAR, MO**

City Engineer Carl Brooks outlined the project regarding the Windmill Country Estates Water Meter Replacement Improvements in the Windmill Country Estates Subdivision. The homes were constructed with the water meter installed inside the home in lieu of the city standard, typically outside in a grassy area one foot inside of ROW. Discussion ensued amongst Board of Aldermen, City Administrator and City Staff.

Alderman Turner made a motion to adopt Resolution 2015-63. The motion was seconded by Alderman McCrea and was approved by a 6-0 roll call vote.

Alderman Ford	Aye	Alderman Ray	Aye
Alderman McCrea	Aye	Alderman Roberts	Aye
Alderman Hammack	Aye	Alderman Turner	Aye

**C. Resolution 2015-64 - A RESOLUTION OF THE BOARD OF ALDERMEN OF THE CITY OF PECULIAR, MISSOURI AUTHORIZING THE CONTRACT WITH TASER INTERNATIONAL FOR THE UPGRADE OF AXON BODY CAMERAS AND USE OF VIDEO CLOUD STORAGE FOR THE CITY OF PECULIAR POLICE DEPARTMENT.**

Chief of Police Harry Gurin gave information regarding the history of the police body cameras bought in 2013 and the costly cloud storage of data at the time. It was decided during that time to do the cloud storage in-house. IT Systems Administrator Phillip Costanzo discussed the processes of cloud storage and backup of data for the Police Department. With this opportunity, Taser International can offer unlimited cloud storage of data. All body cameras presently owned will be traded up on a 1-1 basis for the newest technology cameras. Discussion ensued amongst the Board of Aldermen and City Administrator.

Alderman Ford made a motion to adopt Resolution 2015-64. The motion was seconded by Alderman Turner and was approved by a 6-0 roll call vote.

Alderman Ford	Aye	Alderman Ray	Aye
Alderman McCrea	Aye	Alderman Roberts	Aye
Alderman Hammack	Aye	Alderman Turner	Aye

**City Administrator Report -**

- City Offices Closed for Christmas Holiday
- Retirement Party for Utility Manager David Shrout
- Awarded the Position of Utility Manager to Nick Jacobs
- City Offices Closed for New Year's Holiday
- Business License
- Senate Bill No. 5
- Economic Development
- New Software Update
- Utility Billing/Rate Structure
- MARC STP/BR Grant Project
- Sanitary Sewer Division
- Water Works Division
- MoDot Interstate Highway I-49 and 211<sup>th</sup> Street Interchange Cost share Project
- Parks & Recreation Department
- Letters to Santa
- Officers Certified for Training
- Watchguard Firewall

**Aldermen Concerns -**

Alderman Ray stated there are still potholes behind Casey's. Alderman Ford made mention of the positive feedback being received on the city website and road conditions on School Road & Hurley. Congratulations to Nick Jacobs for receiving the position of Utility Manager.

**Aldermen Directives -**

Institute the Fuel Fee Ordinance  
Notify Local Fueling Stations  
Bring back Bill No. 2015-30 for 2<sup>nd</sup> Reading / with possible amendment  
Have contract signed with Breit Construction  
Have contract signed with Taser International  
Repair potholes behind Casey's  
Repair road conditions on School Road & Hurley

**Adjournment –**

On a motion from Alderman Ford, second from Alderman Ray, the meeting was adjourned at 8:56 pm with a 6-0 voice vote.

Regular session minutes were taken and transcribed by Janet Burlingame, City Clerk.

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Janet Burlingame, City Clerk

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**Board of Aldermen Regular Meeting Minutes  
Monday, January 4, 2016**

A regular work session meeting and public hearing of the Board of Aldermen of the City of Peculiar, Missouri, was held in the Council Chambers in City Hall at 6:30 p.m. on Monday, January 4, 2016. Mayor Holly Stark called the meeting to order and all who were present joined in reciting the Pledge of Allegiance.

The following Aldermen responded to roll call: Donald Turner, Matt Hammack, Kelsie McCreia, Jerry Ford, Veronika Ray and Pat Roberts.

City Staff present for the meeting were City Administrator Brad Ratliff, City Attorney Reid Holbrook, City Planner Cliff McDonald, Chief of Police Harry Gurin, City Engineer Carl Brooks, Business Office Manager Trudy Prickett, Public Works Manager Nick Jacobs, Codes Enforcement Officer Ty Erickson and City Clerk Janet Burlingame.

**City Clerk Janet Burlingame recited the Board of Aldermen Statement.**

**Unfinished Business –**

- A. Bill No. 2015-30 - AN ORDINANCE OF THE BOARD OF ALDERMEN OF THE CITY OF PECULIAR, MISSOURI APPROVING THE REPLAT OF BRADLEY’S CROSSING CONDOMINIUMS LOTS 1 & 2 TO BRADLEY’S CROSSING LOTS 114 THRU 129 AND TRACTS E & F SUBMITTED BY SALLEE REAL ESTATE INVESTMENTS, LLC.  
2<sup>nd</sup> Reading**

City Planner Cliff McDonald discussed key issues regarding the RePlat Application for Bradley’s Crossing Condominiums. At the last meeting the first reading of the Ordinance was read and approved. The Board of Aldermen directed City Staff to amend Section 3 outlining minimum requirements to develop Tract E into a private park for use by residents in Bradley’s Crossing. Discussion ensued amongst Mayor and Board of Aldermen.

Alderman Roberts made a motion to have the second reading of Bill No. 2015-30 by title only. The motion was seconded by Alderman Ford and was approved by a 6-0 roll vote. Alderman Roberts made a motion to accept the second reading of Bill No. 2015-30 and place on final passage as ordinance number 01042016. The motion was seconded by Alderman Ford and was accepted by a 6-0 roll call vote.

Alderman Ford	Aye	Alderman Ray	Aye
Alderman McCreia	Aye	Alderman Roberts	Aye
Alderman Hammack	Aye	Alderman Turner	Aye

**Topic for Discussion –**

- A. Peculiar Detention Basin – Report by Bartlett & West**

City Engineer Carl Brooks introduced Bartlett & West Todd Kempker to present a final report of Storm Water Improvements Report of the Detention Basin southeast of the I-49 & Peculiar Way (formerly known as 211<sup>th</sup> Street) Interchange. Mr. Kempker began by giving a brief overview and timeline of the Storm Water Improvements Project. He presented a Power Point presentation outlining a report to consider the design of a regional dry detention, wet retention and the conversion of a regional dry detention to a regional wet retention basin for ultimate build-out of the entire proposed CID area on the east side of the interstate. Discussion ensued amongst Mayor, Board of Aldermen and City Administrator. No decision was made at this time.

- B. Board of Alderman Policy on Code Enforcement – Alderman Jerry Ford**

City Administrator Brad Ratliff discussed in detail the process of enforcing codes within the City of Peculiar. In 2007, the Board of Aldermen instructed City Staff to enforce all code violations to the fullest extent. This came with great criticism. It was decided the procedure for enforcing any violations would be complaint driven. Additionally, if City Staff were out and about and seen a violation they were to address the situation but to mainly enforce by complaint driven. Discussion ensued amongst Mayor, Board of Aldermen, City Administrator and City Staff. Mayor Stark assigned a task to the Board of Aldermen to think of alternatives and priorities to share at the next meeting, addressing the issue of enforcing code violations.

- C. New Utility Billing for Customers – Benjamin Hart**

City Administrator Brad Ratliff and CPA Benjamin Hart discussed the utility statement for water and sewer billing purposes. The newly designed statement will inform residents of the actual rates and how they are being utilized. With this bill, the residents can easily see the voter approved bond obligations are being met. The desire is to better inform and educate area residents of how the city functions.

**Aldermen Concerns**

Alderman McCreia voiced concern regarding the lack of trash service currently being provided by Town & Country Disposal. Alderman Turner stated, he appreciated being able to track the City Staff on the website clearing the roads during the recent snow event.

**Aldermen Directives –**

- Update the final RePlat of Bradley's Crossing
- Board of Aldermen were updated on the Storm Water Improvement Report
- Codes Policy/Board to come up with alternatives and priorities
- Track the complaints of Town & Country Disposal to review at contract renewal
- Snow tracking was helpful to watch

**Executive Session –**

Alderman Roberts made a motion to enter into executive session pursuant to RSMo 610.021(13) beginning at 9:00 p.m. for 40 minutes. Seconded by Alderman Turner and was approved by a 6-0 roll call vote.

Alderman Ford	Aye	Alderman Ray	Aye
Alderman McCrea	Aye	Alderman Roberts	Aye
Alderman Hammack	Aye	Alderman Turner	Aye

Alderman Roberts made a motion to exit executive session at 9:40 p.m. and reconvene regular session. Seconded by Alderman Turner and was approved by a 6-0 roll call vote.

Alderman Ford	Aye	Alderman Ray	Aye
Alderman McCrea	Aye	Alderman Roberts	Aye
Alderman Hammack	Aye	Alderman Turner	Aye

Alderman Roberts made a motion to enter again into executive session pursuant to RSMo 610.021(13) beginning at 9:41 p.m. for 30 minutes. Seconded by Alderman Turner and was approved by a 6-0 roll call vote.

Alderman Ford	Aye	Alderman Ray	Aye
Alderman McCrea	Aye	Alderman Roberts	Aye
Alderman Hammack	Aye	Alderman Turner	Aye

Mayor Stark made a motion to exit executive session at 10:00 p.m. and reconvene regular session. Seconded by Alderman Ford and was approved by a 6-0 roll call vote.

Alderman Ford	Aye	Alderman Ray	Aye
Alderman McCrea	Aye	Alderman Roberts	Aye
Alderman Hammack	Aye	Alderman Turner	Aye

**Adjournment -**

On a motion from Alderman Roberts, seconded from Alderman Ford, the meeting was adjourned at 10:01 p.m. with a 6-0 voice vote. Regular work session minutes were taken and transcribed by Janet Burlingame, City Clerk.

\_\_\_\_\_  
Janet Burlingame, City Clerk

**City Administrator**  
*Brad Ratliff*

**City Clerk**  
*Janet Burlingame*

**City Engineer**  
*Carl Brooks*

**Business Office**  
*Trudy Prickett*



**Chief of Police**  
*Harry Gurin*

**City Planner**  
*Cliff McDonald*

**City Attorney**  
*Reid Holbrook*

**Parks Director**  
*Grant Purkey*

**Municipal Offices – 250 S. Main Street, Peculiar, MO 64078**  
**Phone: (816)779-5212 Facsimile: (816)779-1004**

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**To:** Mayor & Board of Aldermen  
**From:** Carl Brooks, City Engineer (cbrooks@cityofpeculiar.com)  
**Date:** **January 12, 2016**  
**Re:** Resolution No. 2016-01, Mayor & Board of Alderman (BOA) Acceptance of the Final Engineering Report regarding the Dean Lake Storm Water Detention/Retention Basin prepared by Bartlett & West Engineers for the City of Peculiar

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### **GENERAL INFORMATION**

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**Applicant:** City Staff  
**Requested Actions:** Approval of resolution  
**Purpose:** Acceptance of the Final Report Storm Water Improvements of a Detention Basin located southeast of the I-49 & Peculiar Way (formerly known as 211<sup>th</sup> Street) Interchange and Peculiar Way Improvements projects for the City of Peculiar, Missouri prepared by Bartlett & West

**Property Location:** SE Corner of I-49 & Peculiar Way (NW corner of Elm St and School Rd)

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### **PROPOSAL**

Acceptance of the proposed Resolution No. 2016-xx, by the Mayor & Board of Alderman (BOA) of the Final Engineering Report regarding the Dean Lake Storm Water Detention/Retention Basin prepared by Bartlett & West Engineers for the City of Peculiar..

### **PREVIOUS ACTIONS**

The City entered into an engineering agreement for the preliminary design of Storm Water Improvements located northwest of School Road and Elm Street with Bartlett & West, in an amount not to exceed \$24,914.00. The City entered into an engineering agreement for the final design, advertisement and construction phase services of Storm Water Improvements located southeast of I-49 & Peculiar Way Interchange and Peculiar Way with Bartlett & West, in an amount not to exceed \$199,000.00. Based on the Aldermen meeting in September, City staff directed Bartlett & West to consider the design of a regional dry detention, wet retention and the conversion of a regional dry detention to a regional wet retention basin for ultimate build-out of the entire proposed CID area on the east side of the interstate, with the ultimate build-out on the west side of the interstate having to build additional storm water improvements. Based on the Aldermen meeting in October, City staff directed Bartlett & West to complete a report considering the design of a regional dry detention, wet retention and the conversion of a regional dry detention to a regional wet retention basin for ultimate build-out of the entire proposed CID area on the east side of the interstate.

Bartlett & West made a presentation of the final report to the Mayor and BOA in January 2015.

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### **KEY ISSUES**

Which type of final design, if any, to be considered as we go forward?

The report provides a total project opinion of probable costs, without the land purchase. The improvements are as follows:

Total project cost is \$1.7M in today's dollars for the dry detention basin

Total project cost is \$3.3M in today's dollars for the wet retention basin

Total project cost is \$4.3M in today's dollars for the dry detention basin converted to a wet retention basin.

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### **STAFF COMMENTS AND SUGGESTIONS**

City staff agrees with the Final Engineering Report regarding the Dean Lake Storm Water Detention/Retention Basin prepared by Bartlett & West Engineers for the City of Peculiar.

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### **STAFF RECOMMENDATION**

City staff recommends passage of this resolution.

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### **ATTACHMENTS**

Resolution 2016-01

Final Engineering Report regarding the Dean Lake Storm Water Detention/Retention Basin prepared by Bartlett & West Engineers for the City of Peculiar

**RESOLUTION NO. 2016-01**

**A RESOLUTION OF THE BOARD OF ALDERMEN OF THE CITY OF PECULIAR, MISSOURI, APPROVING AND ACCEPTING THE FINAL ENGINEERING REPORT regarding the DEAN LAKE STORM WATER DETENTION/RETENTION BASIN prepared by BARTLETT & WEST ENGINEERS for the CITY of PECULIAR**

**WHEREAS**, the City entered into a Supplemental Engineering Agreement with Bartlett & West Engineers for a preliminary design/report of the potential Dean Lake Storm Water Detention/Retention Basin Improvements for the City of Peculiar, and

**WHEREAS**, then the City entered into an additional Supplemental Engineering Agreement with Bartlett & West Engineers for a final report, final engineering design and bidding documents, and limited construction phase services for Dean Lake Storm Water Detention/Retention Basin Improvements for the City of Peculiar, and

**WHEREAS**, based on the final engineering estimated opinion of total probable project cost of Dean Lake Storm Water Detention/Retention Basin Improvements for the City of Peculiar, the Mayor and Board of Aldermen directed the engineer to cease and desist on all further engineering tasks as detailed and outlined in the engineering supplemental agreement.

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**NOW THEREFORE**, be it ordained by the Board of Aldermen of the City of Peculiar, Missouri as follows:

THE FINAL ENGINEERING REPORT regarding the DEAN LAKE STORM WATER DETENTION/RETENTION BASIN prepared by BARTLETT & WEST ENGINEERS for the CITY of PECULIAR

Section 1. That the Mayor is hereby authorized to execute on behalf of the City of Peculiar the above referenced RESOLUTION and the Final Report.

Section 2, the effective date of the resolution shall be \_\_\_\_\_.

BE IT REMEMBERED THE PRECEDING RESOLUTION WAS ADOPTED ON THIS \_\_\_\_\_ DAY OF \_\_\_\_\_, 2016, BY THE FOLLOWING VOTE:

Alderman Ford	_____	Alderman Ray	_____
Alderman Hammack	_____	Alderman Roberts	_____
Alderman McCray	_____	Alderman Turner	_____

APPROVED:

ATTEST:

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Holly Stark, Mayor

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Janet Burlingame, City Clerk

December 16, 2015

Mr. Carl Brooks, PE  
Public Works Director  
City of Peculiar  
250 S. Main Street  
Peculiar, MO 64078

Re: Detention Basin Southeast of I-49 Interchange at 211<sup>th</sup> Street

Dear Mr. Brooks,

We appreciate the opportunity to partner with the City of Peculiar to investigate the potential detention basin on Mr. Dean's property. Attached with this letter is the report summarizing the options that we have developed.

We studied three alternatives that have merit for the City to consider moving forward. A dry basin is the lowest cost solution and is estimated to cost \$1.71 million. A wet basin is a more expensive option at roughly \$3.25 million, but the wet basin provides the aesthetics of a lake and the potential for other recreational uses. An intermediate option is to construct a dry basin now and convert it to a wet basin in the future, but this increases the construction cost. Each of these options is summarized in the report along with the methodology used in our study.

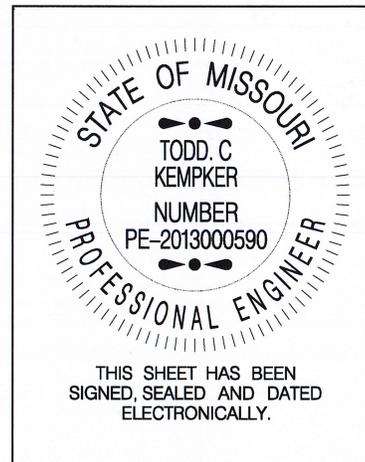
We look forward to working with you in the future on this project and others. Please let us know if you have any questions or comments regarding this report.

Sincerely,



Todd Kempker, P.E.

Attachment



Sealed 12/16/2015

Bartlett & West, Inc.

Certificate of Authority No. 000167 (Engineering)

## EXECUTIVE SUMMARY

The City of Peculiar commissioned a study and this report to investigate potential options for a detention basin southeast of the I-49 interchange at 211<sup>th</sup> Street, which is currently being constructed. The purpose of this detention basin is to reduce flooding hazards in the neighborhood downstream of School Road. This is an area that has experienced significant flooding in the past, and the detention basin is a viable solution to the flooding problems.

The existing hydrology was investigated at the southern end of Mr. Dean's property. The existing peak runoff at this location was found to range from 1040 cfs in a 2-year event to 3320 cfs in a 100-year storm. A hydraulic model downstream of the potential detention location was developed using surveyed information and the calculated peak runoffs for various storm events. This model confirmed that residences would likely experience flooding in a 2-year event, and up to eighteen structures would have the potential of flooding in the 100-year event. The hydraulic model also determined that a 700 cfs flow would be a reasonable target value for the basin's peak discharge in a 100-year event.

Three potential solutions were developed as part of the conceptual study. The first option is to construct a dry detention basin, which is estimated to cost \$1,710,000. A second option is to construct a wet detention basin that retains a permanent pool of water. This option increases the cost to \$3,250,000, and the permanent pool is estimated to cover approximately 22 acres. An intermediate option would be to construct the basin as a dry detention basin with the intentions of converting it to a wet detention basin in the future. In this scenario, the initial cost of the dry basin increases to \$2,010,000, and the total cost after converting to a wet basin would be \$4,340,000 after the construction of both phases.

A geotechnical investigation was conducted to determine the soil composition. It was determined that fat clay existed on site that could be used as the lining of a wet detention basin and the clay core of the dam. It was also determined that rock elevations were deep enough that grading could occur without requiring any excavation of shale or limestone. This subsurface information was utilized when developing the grading plans for each of the options.

The study also included preliminary coordination with the U.S. Army Corps of Engineers to obtain their concerns on the project. During this coordination, it was determined that permitting would be much easier for the dry detention option. A wet detention basin would require an Individual Permit. If a wet basin is desired by the City, it is also possible that the Corps of Engineers would require an alternatives analysis that investigates options of their choosing. Finally, the Corps stated that mitigation would be required to offset stream impacts of a wet basin. It was suggested that mitigation costs could approximate \$350,000, which does not include the additional engineering costs that will be required.

Each of the options investigated during this study would significantly reduce the flooding potential downstream and perform similarly from a hydraulic standpoint. The main differentiator between the options is whether the City desires the aesthetic and recreational benefits of a wet basin. These benefits do come with significant cost increases, either initially or in a future scenario when the basin is converted to maintain a permanent pool.

It is recommended that if a wet detention basin is chosen, coordination with the Corps of Engineers should proceed early in the basin's design to obtain both approval from the Corps as well as refine the mitigation costs for the City's planning purposes.

## INTRODUCTION AND PROJECT BACKGROUND

The City of Peculiar commissioned Bartlett & West to study options for a detention basin west of School Road and southeast of the Interstate 49 interchange with 211<sup>th</sup> Street currently under construction. The residences downstream of this location experience flooding during large rain events. A citywide stormwater master plan, circa 2006, recommended an approximately 15 acre detention basin to address the flooding concerns downstream.

With the new interchange construction taking place and providing additional development potential in the vicinity, the City wanted to further investigate the detention options at this location. A Community Improvement District (CID) is being formed in the area around the interchange to facilitate development. Property owners in the undeveloped area were given the opportunity to opt in or out of the CID. These limits were taken into account in the design of the detention basin to provide a basin large enough to handle any detention needs east of the interstate for future development within the CID, and these limits can be seen in Appendix B.

The purpose of this report is to develop options for the detention basin and the approximate limits and costs of each option. Three options are investigated as part of this study – a dry basin, a wet basin and an option that is initially constructed as a dry basin but has the ability to be converted to a wet basin in the future. This report will provide the City a budgetary number that can be used for future planning and assist in negotiations with property owners on development potential and land acquisition.



Figure 1: Project Location Map

## DESIGN CRITERIA AND METHODOLOGY

The design and calculations for the study followed the Kansas City Metropolitan Chapter of the American Public Works Association Section 5600, which is the standard criteria for municipalities in the region. Specifically, design criteria for the basin characteristics were according to APWA 5608 “Stormwater Detention and Retention”. The key points from this criteria include:

- Basin volume is based upon the 1% probability (100-year), 24-hour rainfall event
- Emergency spillway shall be set at least 6” above the 100-year pool elevation
- Emergency spillway shall be designed for the full 100-year peak flow rate
- Top of dam will be set at least 1’ above the design flow through the emergency spillway
- One-quarter of the wet basin area shall have a depth of at least 10’
- The wet basin shall provide a valve to drain the basin in 72 hours or less

The hydrology calculations were completed utilizing HEC-HMS Version 3.5 developed by the U.S. Army Corps of Engineers. The calculations within the program were performed based on the National Resources Conservation Service’s Technical Report 55 (TR-55) and its curve number methodology. Appendix A displays the hydrologic soil groups taken from the University of Missouri’s Center for Agricultural, Resource and Environmental Systems and used with the tables from TR-55 to obtain a curve number. A SCS Type II Rainfall Distribution was then utilized with the rainfall depths recommended in TR-55. Times of concentration were also calculated according to TR-55, and the routing between the subbasins was performed via the Muskingum-Cunge method and based on publically available digital elevation models.

The calculations for sizing the basin and outfall structure were completed with a combination of spreadsheet calculations and HEC-HMS. The outfall structure was assumed to be a rectangular shape with an open top. At low flows this was assumed to act as a sharp crested weir. The controlling condition of orifice flow through the rectangular opening was also calculated at 1’ increments. The weir flow and orifice flow values were then compared and a lower value for each elevation was chosen since the flow regime of an outfall structure switches from weir flow to orifice flow at the higher elevations. The vertical riser was then designed to flow into a reinforced concrete box culvert. This box culvert was sized based on inlet control nomographs to provide larger flows than those calculated from the riser structure to avoid constricting the basin’s discharge flow within the box culvert. For the dry basin options that do not include a vertical riser, the discharge rates were determined from the inlet control nomograph. This information was compiled in a discharge elevation curve. A storage elevation curve was also developed from the proposed grading plans for each option. The two curves were utilized within HEC-HMS in order to perform the detention basin routing calculations.

## HYDROLOGY

The watershed of the proposed detention basin has four distinct subbasins given the topography, existing improvements such as roadways and associated storm culverts under those roadways, and land use characteristics. The existing conditions summarized in this report are the conditions associated with the current land use with no other development around the interchange. The future conditions summarized in this section and throughout this report describe a future development condition based on the latest Future Land Use Map provided by the City and include development only in the CID limits and only for the portion of those limits east of I-49. As decided by the City of Peculiar, these limits are

the basis of the future conditions scenario to which all 3 detention options were sized. By only including the CID limits for any future development considered in this study, it is understood by the City that future developments outside of the CID limits will be required to detain stormwater runoff to pre-development conditions on their own properties. Refer to Appendix B for an exhibit showing the overall watershed, the subbasins, the future land uses from the most recent City planning map and limits of the CID.

ENTIRE WATERSHED CHARACTERISTICS

Area: 1.65 mi<sup>2</sup>

Average Overall Slope: 1.2%

Development Conditions:

Existing: 65% undeveloped/35% developed

Future: 55% undeveloped/45% developed (includes developed areas in CID limits east of I-49)

SUBBASIN CHARACTERISTICS

Subbasin	Drainage Area (mi <sup>2</sup> )	Existing Composite CN	Future Composite CN	Lag Time (min)
1	0.51	78.64	81.39	29.59
2	0.31	75.52	81.86	28.59
3	0.56	81.54	81.54	35.91
4	0.27	93.79	95.41	22.71

Table 1: Subbasin Characteristics

EXISTING & PROPOSED CONDITIONS PEAK RUNOFF RESULTS

Storm Frequency	Existing Peak Inflow (cfs)	Future* Peak Inflow (cfs)
2	1039.7	1147.7
5	1613.3	1738.4
10	2048.0	2177.5
25	2485.8	2615.5
50	2875.8	3005.0
100	3316.6	3449.2

\* Results based on future developed conditions within CID

Table 2: Hydrology Results for Existing and Proposed Conditions

**HYDRAULICS AND FLOODING ANALYSIS**

The intent of the project is to alleviate the flooding issues that occur in the neighborhood downstream of School Road. According to reports from City officials, flooding occurs in frequent significant rain events and includes the water reaching multiple residences. This is not a recent development and has been something that the property owners have had concerns with for many years. According to the Federal Emergency Management Agency’s (FEMA) Flood Insurance Map, eighteen structures are within

the 100-year floodplain. It should be noted that this is a Zone A floodplain and has not been part of a detailed study by FEMA.

During Bartlett & West's study, a detailed analysis was performed to verify the flooding issues and develop a target flow for the detention basin's peak outfall. This study included the field survey of cross-sections throughout the neighborhood as well as obtaining flow lines and culvert sizes for the crossings between School Road and Harr Grove Road. This information was then input into HEC-RAS Version 4.1 to develop a hydraulic model. The model included box culvert crossings at School Road, Glengera Street and Harr Grove Road, as well as low-water crossings at 1<sup>st</sup> Street and Hurley Street. During the survey, low opening elevations and adjacent grade elevations were obtained on the houses that bordered the channel.

The existing hydrology presented in Table 1 above was input into the hydraulic model to assess the current flooding scenario. The hydraulic model produced a 100-year floodplain that coincided well with the floodplain shown on the FEMA map, and verified that eighteen structures along the channel would have a high probability of flooding during an event of this magnitude as shown in Appendix C. The hydraulic model also showed that a 2-year event was large enough to create flooding issues at many of these homes.

The hydraulic model was then studied to determine a flow value that the channel could accept without having water above the low opening elevation of any of the residences, which was determined to be 700 cfs. The limits of a 700 cfs peak runoff event are shown on Appendix C along with the 100-year existing floodplain from the Bartlett & West model. It should be noted that the 700 cfs peak runoff does not achieve one foot of freeboard to several residences. While this factor of safety is often desired when analyzing flooding, it was impractical to obtain flow rates low enough to provide this level of service throughout the neighborhood. It should also be noted that one out-building is within the floodplain of this target event. However, the target 700 cfs peak runoff would have a significant impact on reducing flooding in the neighborhood and is 21.1% of the existing 100-year flood. Therefore, it was chosen as the target value for the peak discharge from a proposed detention basin in the 100-year event.

#### COORDINATION

During the study, Bartlett & West and the City coordinated with both the current property owner of the detention basin's site and the United States Army Corps of Engineers to obtain their concerns on the project. It was understood that these entities would be critical for the project's success and should be included early-on in the decision-making process. The following section summarizes the discussions with each party.

##### Property Owner – Mr. Dean

The City coordinated with Mr. Gary Dean prior to commencing the study. It was understood going into the study that Mr. Dean was considering donating the land for the detention basin to the City. In return for his donation, the City would construct the basin and would not require any future stormwater detention from Mr. Dean or future owners on this property.

During the project, a meeting was held that included Mr. Dean, the City and Bartlett & West and concluded with several follow-up conversations between the City and the property owner. Mr. Dean, his attorney and his third-party engineer were provided the conceptual drawings of the detention basin

along with the calculations. During this process, Mr. Dean gave approval to the City on the limits of the basin and his willingness to donate the property. At the time of the study, Mr. Dean did not have a preference on whether it was a wet or dry detention basin and was willing to donate the land for either option.

While the approximate limits of the detention basin were shared, proposed property lines have not been developed or shared with Mr. Dean at the time of this report. It was requested by Mr. Dean and his representatives that any property lines developed would be larger than the strict limits of the basin and would include any property that he deemed to be undevelopable due to the basin's construction.

#### United States Army Corps of Engineers

In the early stages of the study, the City was considering the option of moving ahead with the construction of a wet detention basin. To further explore that potential, a Section 404 permit was submitted to the Corps of Engineers. Subsequent to the Corps receiving the permit, a meeting was held with the City, Bartlett & West and Ms. Kailey Jones, the representative for the Corps of Engineers. During this meeting, Ms. Jones expressed concern with the ability for the Corps to permit the wet basin. The concern was that the purpose of the project, as listed on the permit application, was for flood control. She stated that the Corps of Engineers is only allowed to permit the least environmentally impactful, practical alternative. Her concern was that a dry detention basin would have less of an impact to the existing stream and provide similar flood control. She suggested that the project's purpose would likely need to be modified to include reasons that the City is desiring a wet detention basin. These reasons could include public safety for the downstream residents, aesthetic enhancements to the area, recreational purposes (which could include a trail around the lake) and/or economic development. The Corps of Engineers also suggested that an alternatives analysis would likely be required to prove that this is the appropriate option. It is very possible that the Corps will desire alternatives to be investigated beyond those that the City has requested and that are represented in this report.

It was also noted by the Corps of Engineers that mitigation would be required for a wet detention basin option. The Corps of Engineers allows for a stream impact of three hundred linear feet or less in their Nationwide permits. When impacting a longer length of stream, an individual permit is required. The stream will be considered to be impacted by grading, filling or if it is impounded by water for a lengthy period of time. If a dry detention basin is utilized, the length of the stream impact could be limited to roughly the width of the dam, which could be within the three hundred foot limit. However, for a wet detention basin the stream impact at this site will be far greater than the three hundred foot limit. In this case, a mitigation plan will be required. It was suggested that if the mitigation is achieved by payment and not by some other method, the price could be in the range of \$350,000. It is expected that some of the stream impacts could be offset by stream credits in the watershed, but the repairs to obtain those credits will also require costs, and it is unlikely that the full amount of stream credits can be obtained in this manner.

#### PROPOSED OPTIONS

After discussions between Bartlett & West and the City of Peculiar during the initial study phase of the project, Bartlett & West was tasked with investigating three options for the detention basin: a dry basin, a wet basin and an option that is initially constructed as a dry basin but has the ability to be converted to a wet basin in the future. In order to determine the feasibility of constructing the berm using in-situ fat

clay material for each of the three options, Bartlett & West subcontracted with Terracon to complete nine geotechnical soil borings. Refer to Appendix D for a map of the boring locations and Appendix E for the boring logs from that field investigation.

This data was used to create surfaces of these soil strata in order to determine whether the limits and depths of excavation for each of the three options generated enough fat clay for the core of the dam construction as required by Terracon. By ensuring enough fat clay was excavated, contractor provided fill material was completely eliminated for each of the three options. After initial grading design was completed, elevation-volume data was compiled for use in HEC-HMS. Similarly, elevation-discharge data was calculated for the overflow structure configuration for each of the three options. This data along with the hydrology inputs from the previous section above produced peak outflow and elevation information.

*OPTION 1: DRY BASIN (APPROXIMATE PROJECT COSTS - \$1,710,000)*

The first option consists of the construction of a dry detention basin. The grading associated with this option consists of grading outside of a one hundred foot wide stream buffer by cutting into the existing grade while maintaining a positive slope back towards the stream to allow for complete drainage of the dry basin and to obtain additional storage volume. The limits of the excavation on either side of the stream are based on excavating enough material to construct the dam. For this study it was assumed that a clay core would not be provided in this option and additional fat clay excavation was not sought out. The total volume of excavation for this option is 78,560 CY.

One benefit of this option is given the relatively quick drain-down time of the dry basin, the existing sewer line would not have to be relocated out of the basin limits and bolt-down manhole lids could simply be installed on all manholes that are inundated during a storm event. However, it is recommended that the sanitary sewer directly under the dam be replaced with ductile iron to handle the increased load.

The dry basin high water elevation during the SCS Type II Rainfall 100-year storm event is 963.0. Based on the requirements of APWA 5608, the spillway elevation is 963.5 and the top of dam elevation is at 968.5. The overflow structure for this option consists of a 7' X 6' RCB 144 feet in length. See Appendix H for an exhibit of the preliminary grading and outflow structure and Appendix I for the cost estimate breakdown. The results of the HEC-HMS model for this option are as follows:

<b>Storm Frequency</b>	<b>Existing Peak Inflow (cfs)</b>	<b>Future* Peak Inflow (cfs)</b>	<b>Future* Peak Outflow (cfs)</b>	<b>Future* Peak Elevation</b>
2	1039.7	1147.7	432.8	957.2
5	1613.3	1738.4	483.8	959.0
10	2048.0	2177.5	508.7	960.2
25	2485.8	2615.5	537.7	961.2
50	2875.8	3005.0	560.4	962.1
100	3316.6	3449.2	567.5	963.0

\* Results based on future developed conditions within CID.

Table 3: Hydrology Results for Dry Detention Basin Option

OPTION 2: WET BASIN (APPROXIMATE PROJECT COSTS - \$3,250,000)

The second option consists of the construction of a wet detention basin that would detain stormwater addressing downstream flooding issues and allow for an approximate 22 acre lake that would serve as an amenity for the surrounding development. The grading associated with this option consists of grading from the banks of the stream throughout the limits of the basin at a depth that will still allow for a 2' clay liner to remain after excavation. The limits of the excavation are based on excavating enough fat clay material to satisfy the construction of the dam core. The total volume of excavation for this option is 125,450 CY. Due to the continuous pool depth with the wet basin option, the existing sanitary sewer must be relocated for those portions within the wet basin footprint.

The wet basin high water elevation during the SCS Type II Rainfall 100 year storm event is 965.1. The spillway elevation is 965.6 and the top of dam elevation is at 970.6. The overflow structure for this option consists of a 7' X 8' RCB 140 feet in length, with a 7' X 7' riser structure with weir elevation of 957.5. A 36" pipe would also be provided to drain the lake on an as needed basis. Appendix H shows the conceptual design of this option, and a detailed cost estimate can be found in Appendix I. The results of the HEC-HMS model for this option is as follows:

Storm Frequency	Existing Peak Inflow (cfs)	Future* Peak Inflow (cfs)	Future* Peak Outflow (cfs)	Future* Peak Elevation
2	1039.7	1147.7	363.4	960.4
5	1613.3	1738.4	477.2	961.6
10	2048.0	2177.5	529.7	962.7
25	2485.8	2615.5	576.4	963.5
50	2875.8	3005.0	613.0	964.3
100	3316.6	3449.2	650.1	965.1

\* Results based on future developed conditions within CID.

Table 4: Hydrology Results for Wet Detention Basin Option

OPTION 3: DRY BASIN WITH OPTION TO UPGRADE TO WET BASIN (APPROXIMATE PROJECT COSTS - \$4,340,000)

PHASE 1: DRY BASIN (APPROXIMATE PROJECT COSTS - \$2,010,000)

Because the initial cost of the wet basin is likely outside the City's budget, a third option was developed that allowed a dry basin to be constructed initially and modified at a later date to convert it to a wet basin. The first phase consists of the construction of a dry detention basin that has the dam required for the wet basin option. The grading associated with this option is similar to Option 1 in that it consists of grading from outside the stream buffer by cutting into the existing grade while maintaining a positive slope back towards the stream to allow for complete drainage of the dry basin. The difference between Phase 1 of Option 3 and Option 1 is that the limits of grading are slightly greater in order to excavate enough fat clay material for the construction of the dam with a height appropriate for the Phase 2 wet basin transition as well as providing the clay core. The total volume of excavation for this option is 97,400 CY. As in Option 1, a full sanitary sewer relocation is not needed.

The high water elevation during the SCS Type II Rainfall 100 year storm event after the first phase of construction for Option 3 is 963.1. Based on the requirements for the wet dam height, the spillway elevation is 965.2 and the top of dam elevation is at 970.2. The overflow structure for this option

consists of a 7' X 9' RCB 154 feet in length with a 3' concrete flow restricting headwall. This headwall allows for the appropriate discharge rates in the dry scenario while still providing a box culvert size that does not restrict flow after Phase 2's construction. The preliminary layouts and cost estimates can be found in the appendices. The results of the HEC-HMS model for this option is as follows:

Storm Frequency	Existing Peak Inflow (cfs)	Future* Peak Inflow (cfs)	Future* Peak Outflow (cfs)	Future* Peak Elevation
2	1039.7	1147.7	434.9	957.3
5	1613.3	1738.4	486.5	959.2
10	2048.0	2177.5	512.1	960.3
25	2485.8	2615.5	540.6	961.3
50	2875.8	3005.0	561.0	962.1
100	3316.6	3449.2	568.9	963.1

\* Results based on future developed conditions within CID.

Table 5: Hydrology Results for the Dry Phase of Option 3

*PHASE 2: WET BASIN (APPROXIMATE PROJECT COSTS - \$2,330,000)*

The second phase consists of the construction of a wet detention basin by further excavating to achieve an appropriate normal pool depth. This additional excavation will produce a lake very similar to Option 2 with a permanent pool of approximately 22 acres. The grading of the basin's pool will ensure that a two foot fat clay liner is maintained. Since the Phase 1 portion of construction excavated enough fat clay material for the construction of the dam, the excavation during Phase 2 is only required to create a ten foot deep pool over a quarter of the lake's area to satisfy the requirements of APWA 5608. The total volume of excavation for this option is 102,205 CY. Because the dam is included in the Phase 1 construction, very little fill would be required during this phase. It is anticipated that this material could be placed on Mr. Dean's property to assist him in leveling off areas for development. During this phase, the existing sanitary sewer that is within the footprint of the wet basin must also be relocated.

The wet basin high water elevation during the SCS Type II Rainfall 100 year storm event is 964.7. The spillway elevation is 965.2 and the top of dam elevation is at 970.2. For this option the 7' X 9' box culvert installed in Phase 1 would be modified to remove the wings and accept a vertical riser structure. A 7' X 7' vertical riser would then be installed in front of the box culvert. This structure would be very similar to the one proposed in Option 2 and would have a weir elevation of 957.5. As in Option 2, the design would also include a pipe to drain the lake.

Storm Frequency	Existing Peak Inflow (cfs)	Future* Peak Inflow (cfs)	Future* Peak Outflow (cfs)	Future* Peak Elevation
2	1039.7	1147.7	358.1	960.3
5	1613.3	1738.4	469.8	961.5
10	2048.0	2177.5	519.3	962.4
25	2485.8	2615.5	563.7	963.2
50	2875.8	3005.0	599.2	964.0
100	3316.6	3449.2	634.3	964.7

\* Results based on future developed conditions within CID.

Table 6: Hydrology Results for the Wet Phase of Option 3

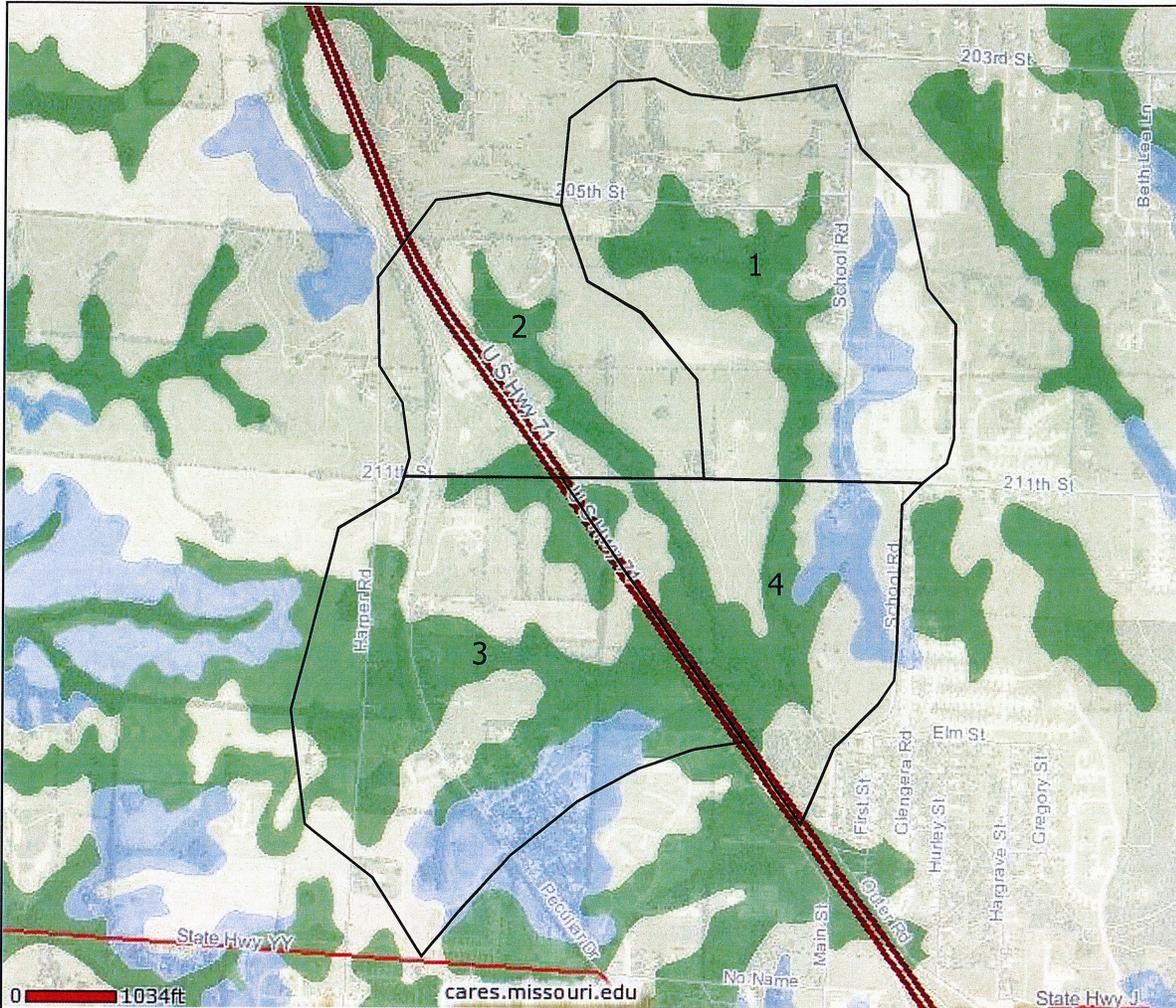
## SUMMARY AND RECOMMENDATIONS

Three detention basin options were sized to handle future development within the portion of the Community Improvement District that is east of Interstate 49. The options include both a wet and dry basin as well as an option that can be constructed as the dry basin initially and converted to a wet basin later. Each option functions on a very similar level hydraulically, so there is no clear engineering reason to choose an option. The low cost solution is to construct a dry basin at \$1.71 million. A wet basin increases the cost approximately \$1.54 million, but may be desired by the City due to the aesthetics and recreational opportunities. An intermediate option is to construct the phased approach option. However, this option is expected to have an initial cost \$300,000 greater than the dry basin and long term project costs \$1.09 million above the initial wet basin option, which could make the long term viability of this option cost prohibitive. These numbers are 2015 costs without inflation included, which should be taken into account in future budgeting.

It should be noted that the U.S. Army Corps of Engineers will likely expect additional alternatives to be evaluated if a wet basin is chosen. While coordinating with the Corps during this study, it was stated that they would need an alternatives memorandum that investigated additional options and was able to show why a wet basin is the best option for this location. If the wet basin is chosen by the City, it is recommended that the next step include detailed coordination with the Corps of Engineers, and would likely include more alternatives to be studied and detailed mitigation options that could be pursued. The goal of this coordination would be a memorandum of understanding or other form of preliminary approval for the City's chosen option and also defining what the mitigation needs would be if the City continued with this project in the future.

**APPENDIX A**  
**HYDROLOGIC SOIL GROUPS**

# Peculiar HSG



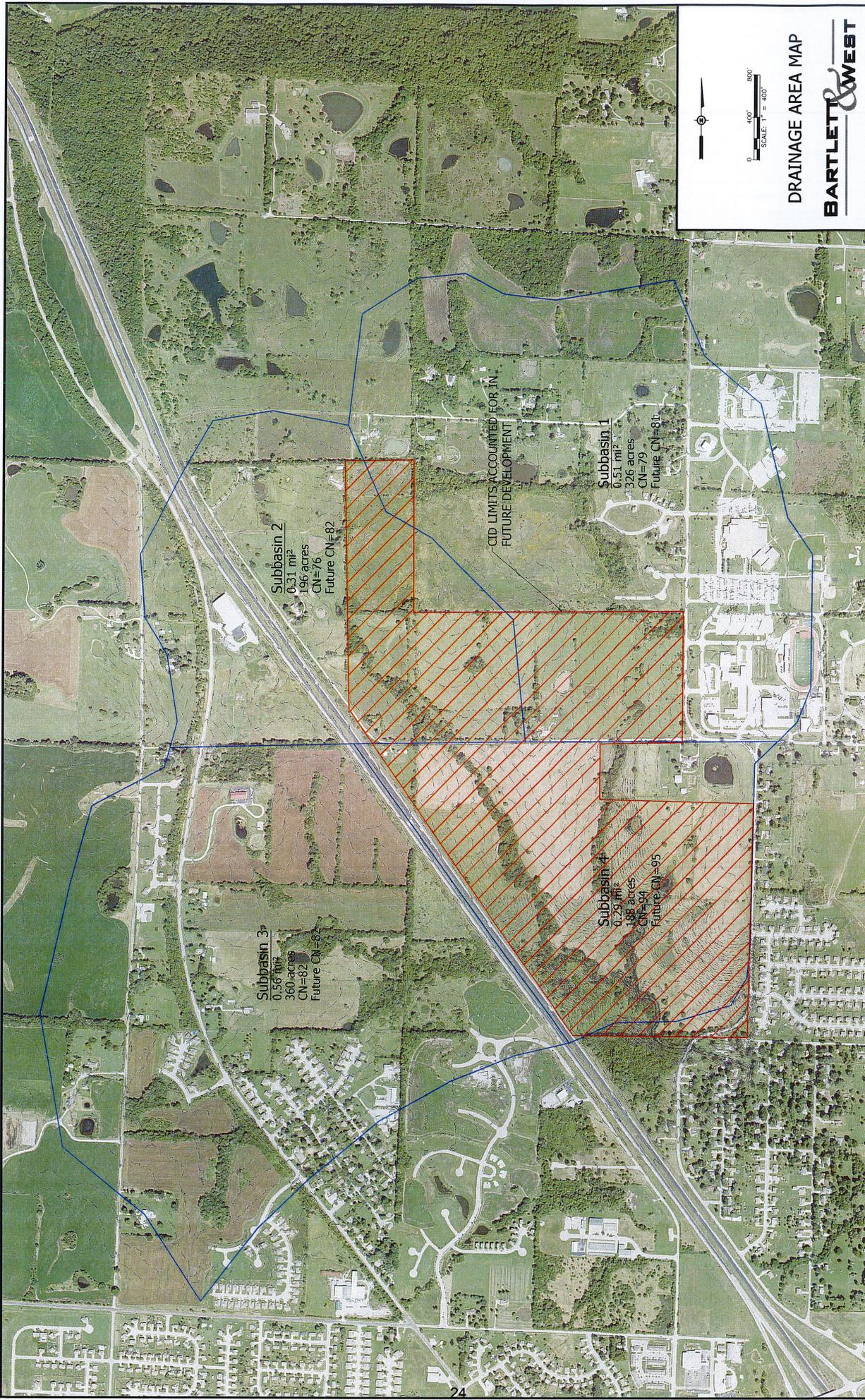
## Legend

- ZOOM TO VIEW:**  
**MoDOT Roads and Highways, 2007**
- Interstate
  - U.S. Highway
  - State Numbered Highway
  - State Lettered Highway
  - Principal Road
  - Road or Street
  - Private Road or Drive
- Hydrologic Soil Groups (Dom. Condition)**
- B
  - B/D
  - C
  - C/D
  - D (Low Infiltration / High Runoff Potential)
  - Not Rated
- 2010 Aerial Photos (NAIP)**
- A (High Infiltration / Low Runoff Potential) (cont)

## Locator Map



**APPENDIX B**  
**SUBBASIN EXHIBITS**



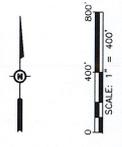
Subbasin 2  
 0.31 mi<sup>2</sup>  
 196 acres  
 CN=76  
 Future CN=82

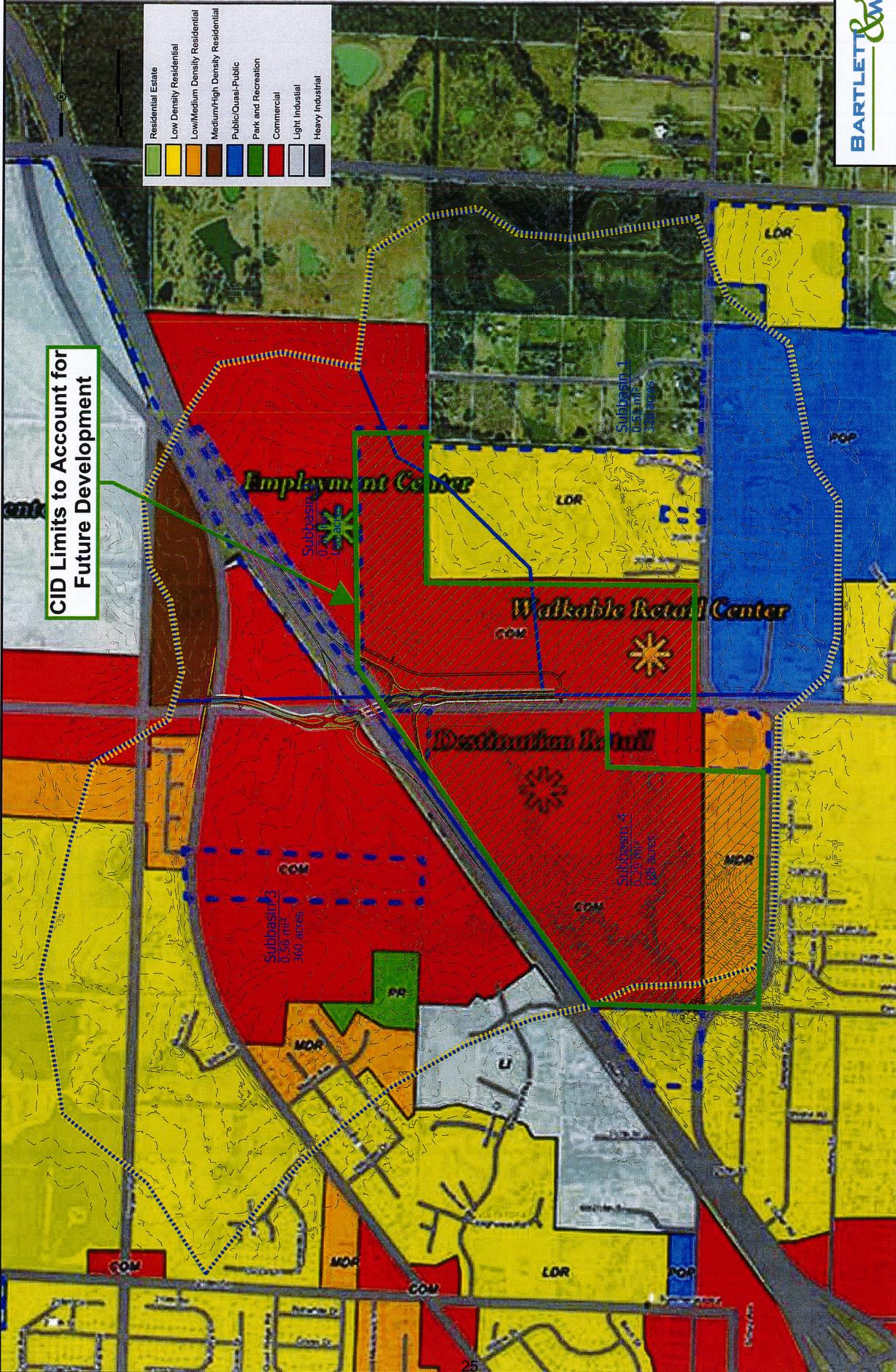
Subbasin 1  
 0.51 mi<sup>2</sup>  
 326 acres  
 CN=79  
 Future CN=81

Subbasin 3  
 0.56 mi<sup>2</sup>  
 360 acres  
 CN=82  
 Future CN=82

Subbasin 4  
 0.29 mi<sup>2</sup>  
 188 acres  
 CN=94  
 Future CN=95

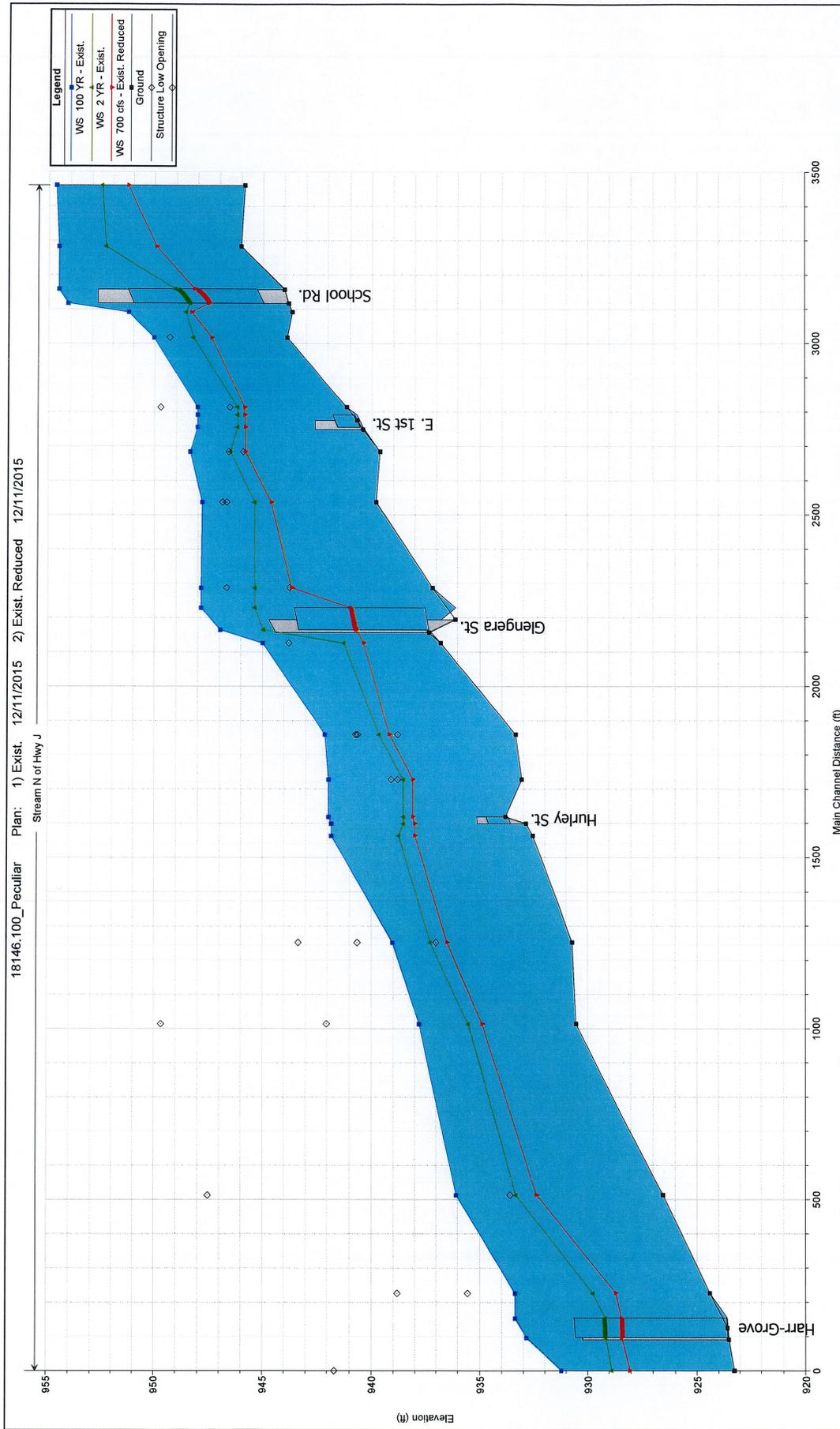
CID LIMITS ACCOUNTED FOR IN  
 FUTURE DEVELOPMENT

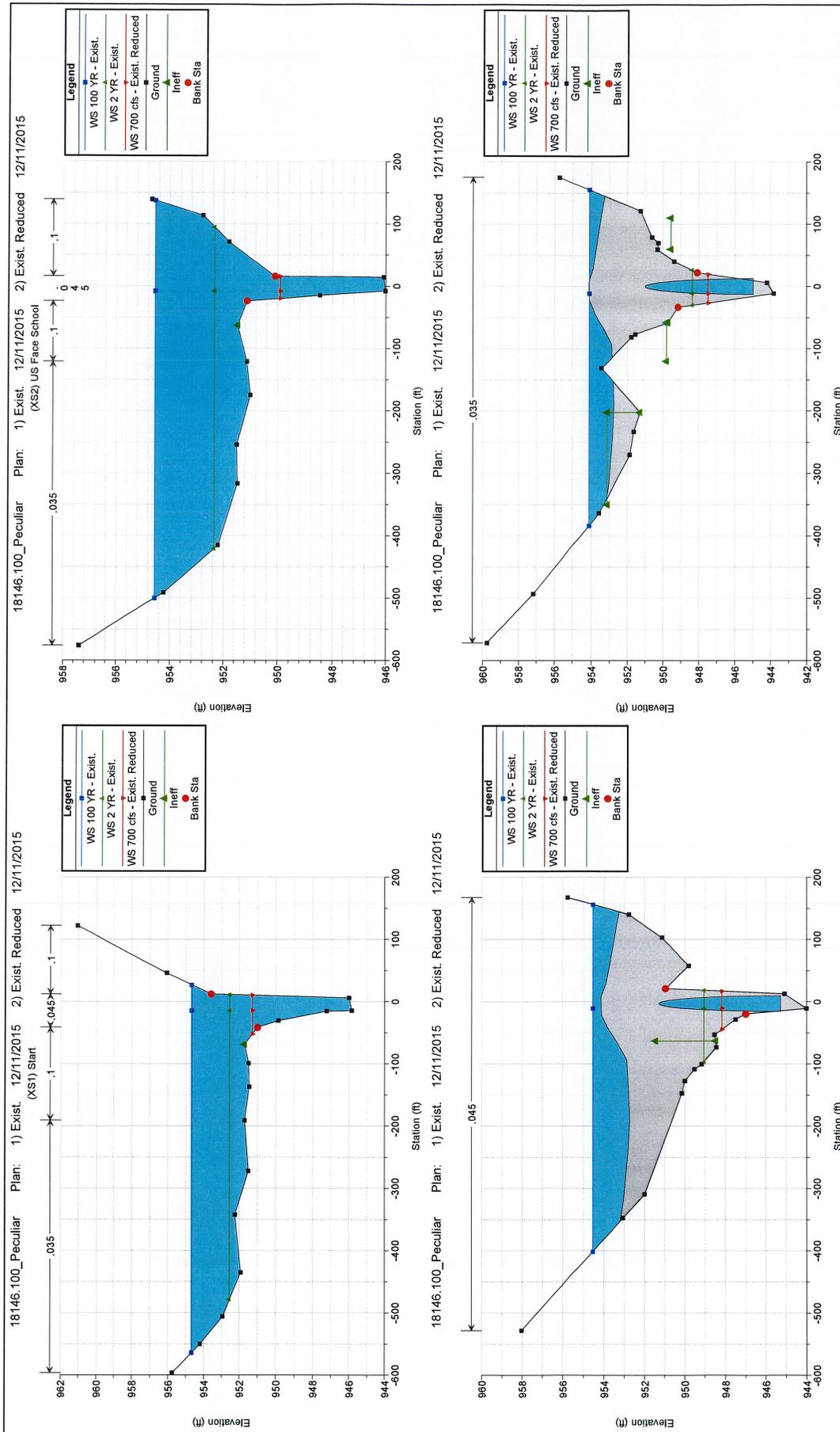


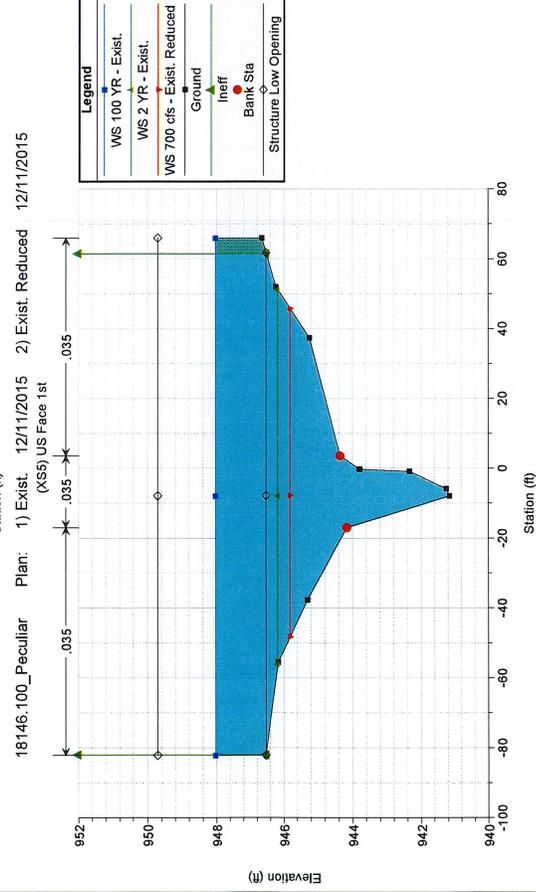
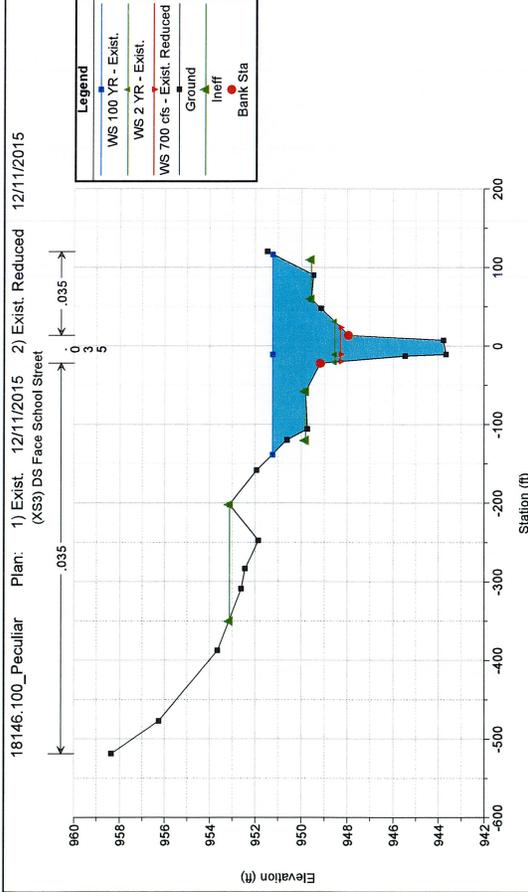
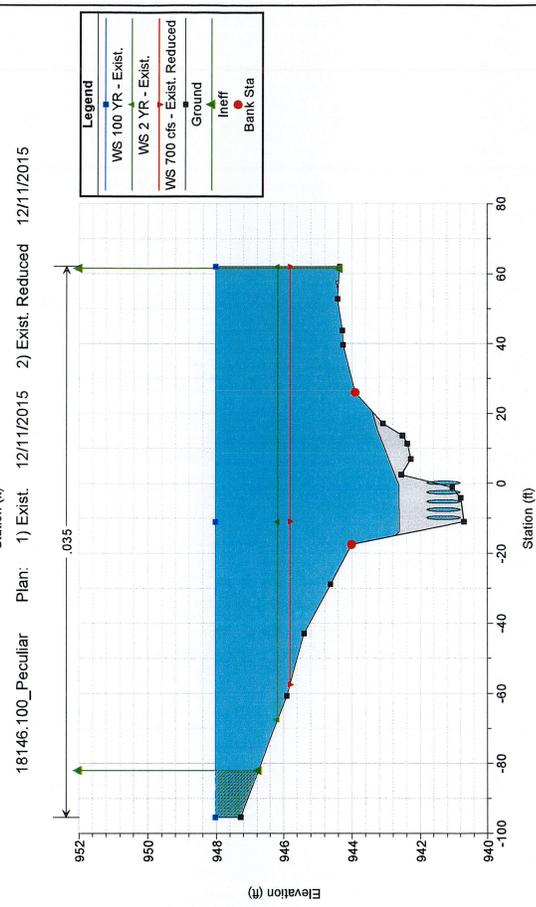
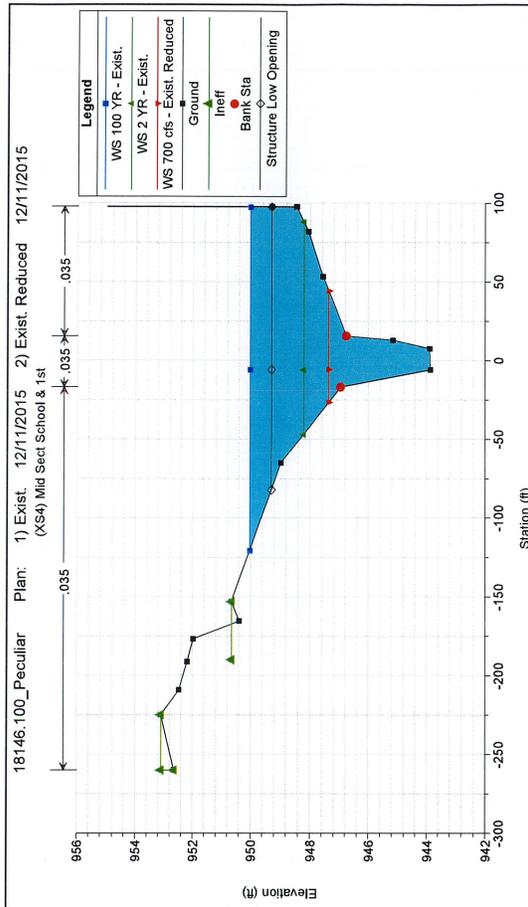


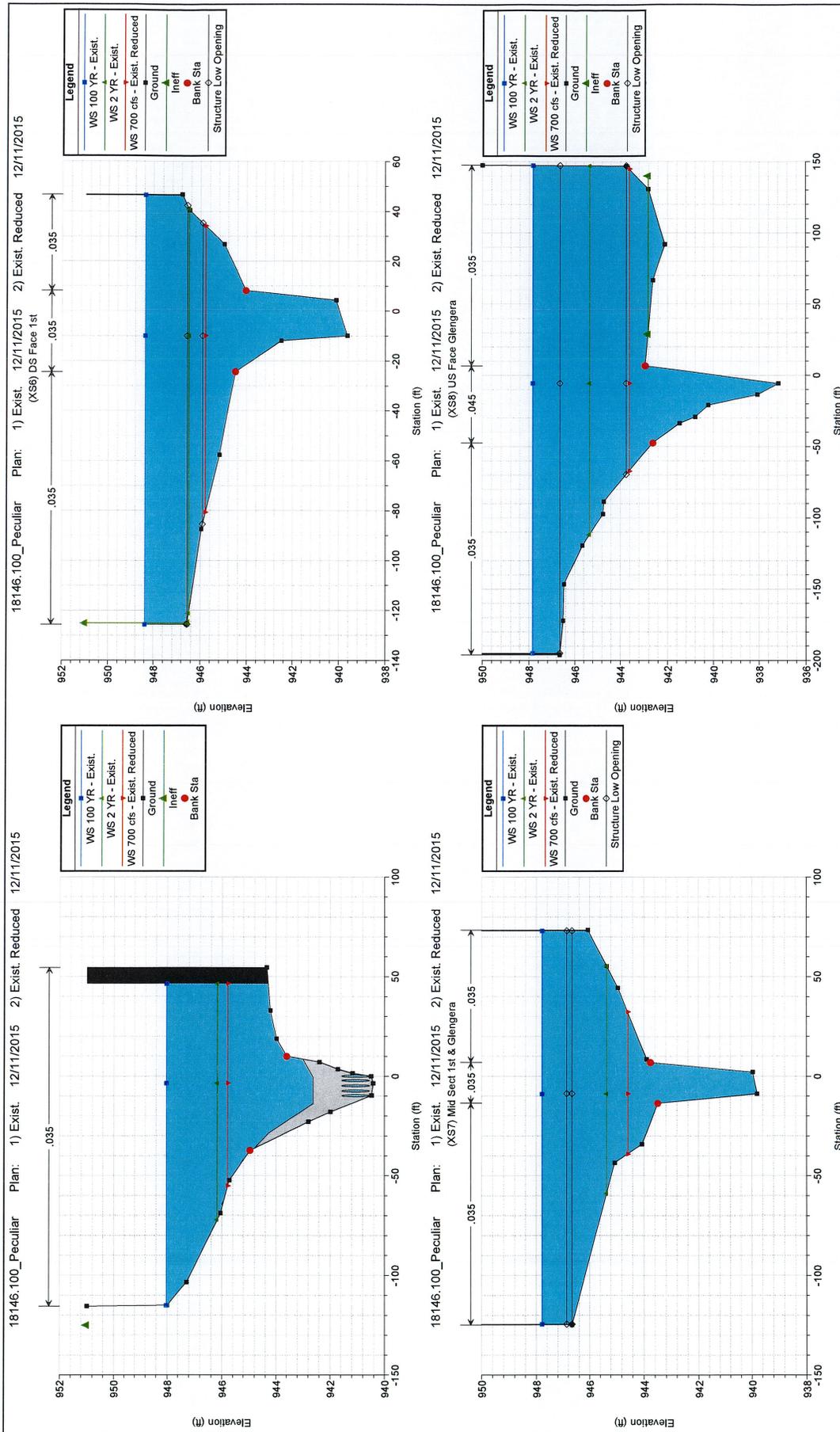
**APPENDIX C**  
**HYDRAULIC RESULTS**



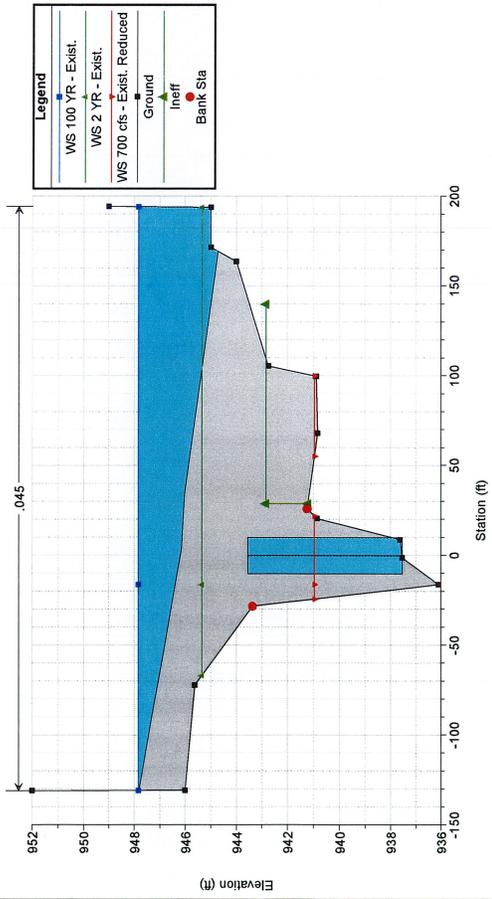




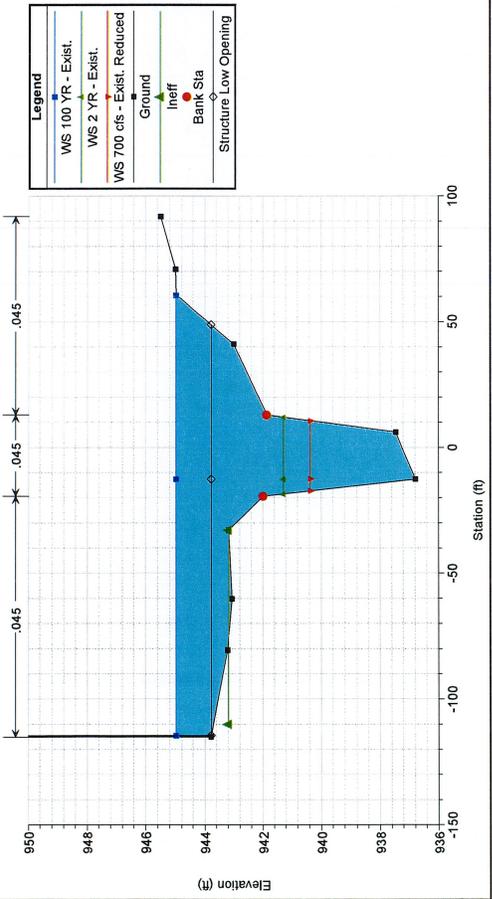




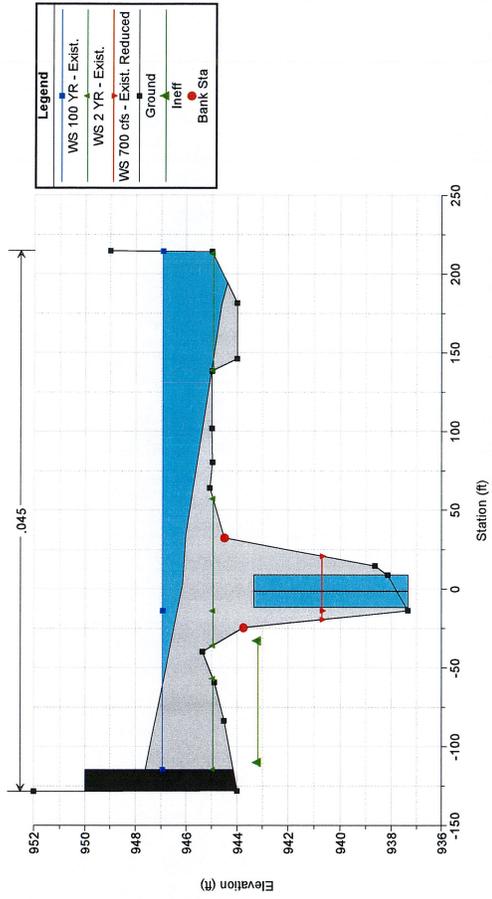
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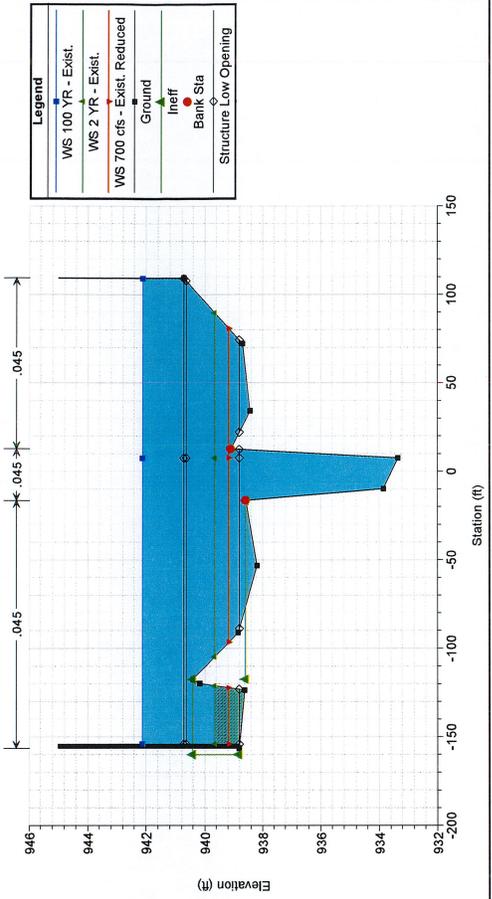
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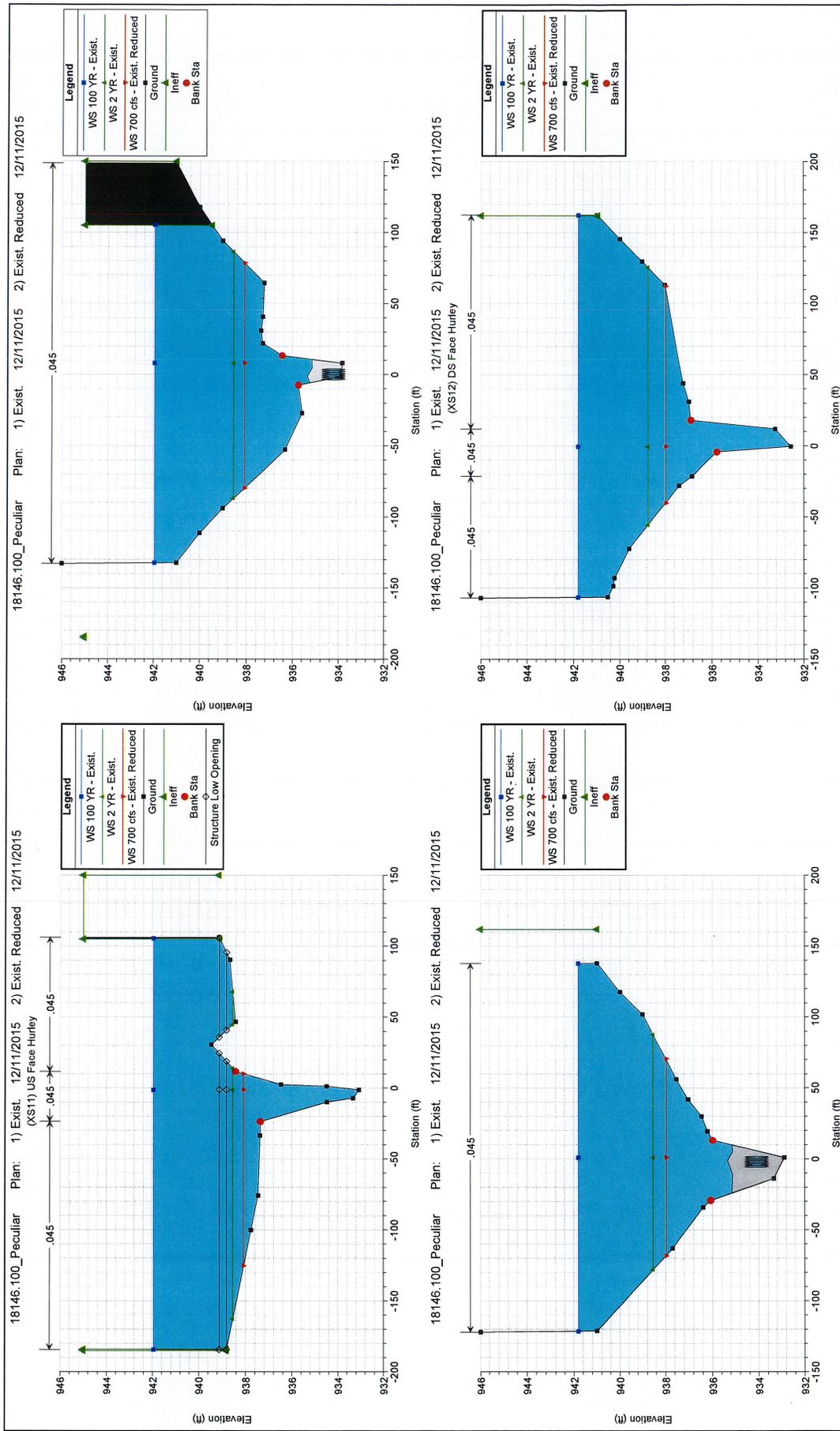


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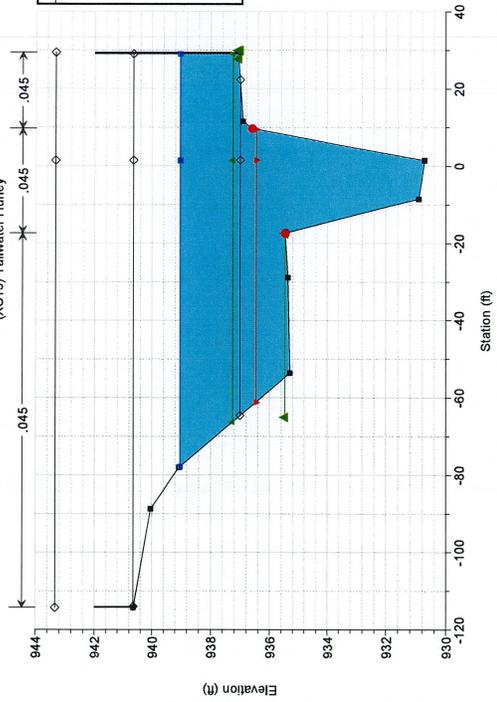


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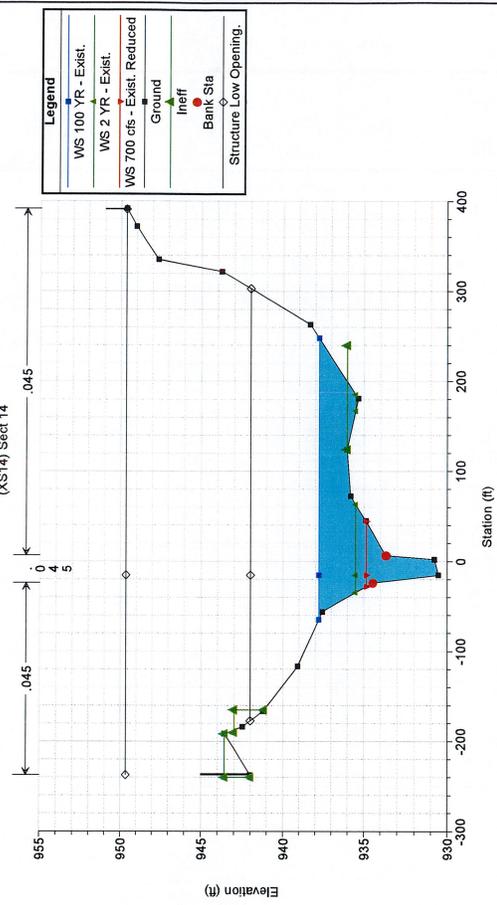




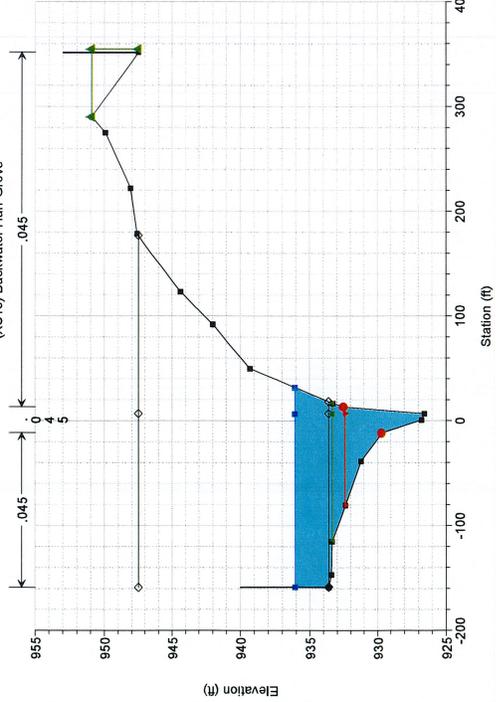
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(XS13) Tailwater Hurley



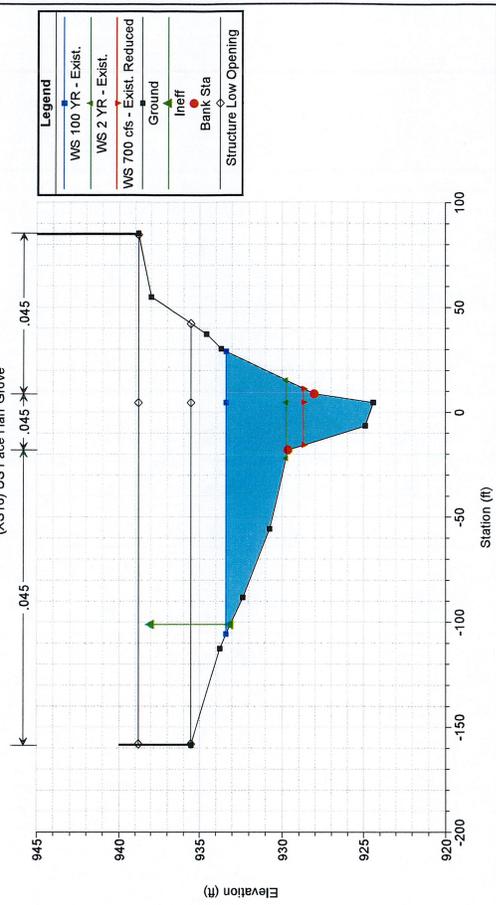
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(XS14) Sect 14

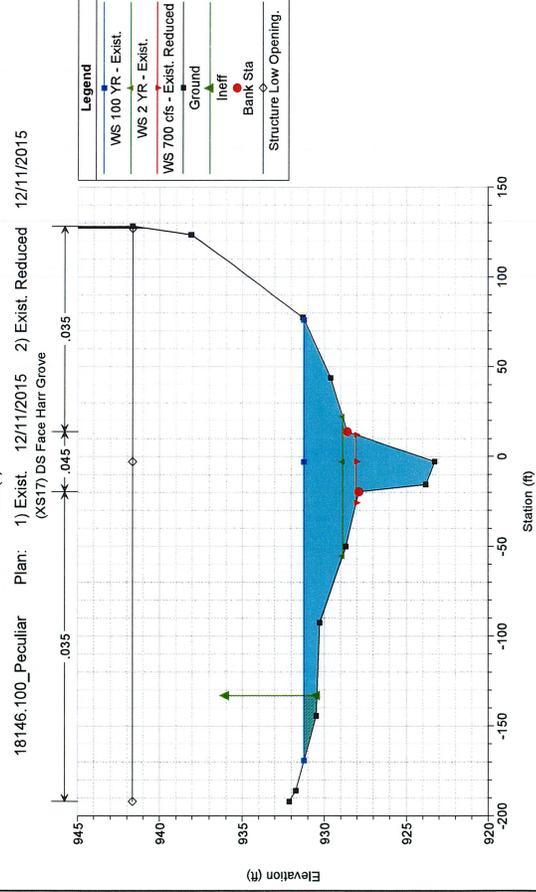
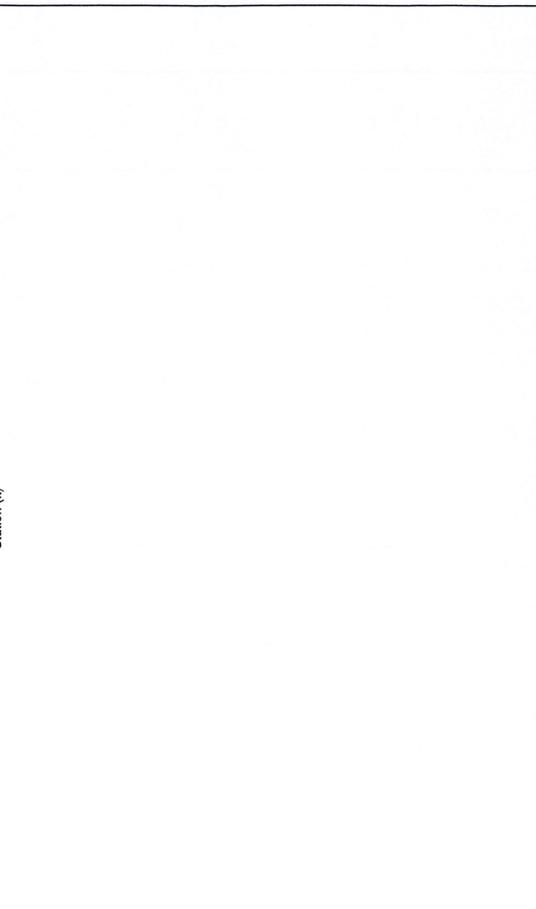
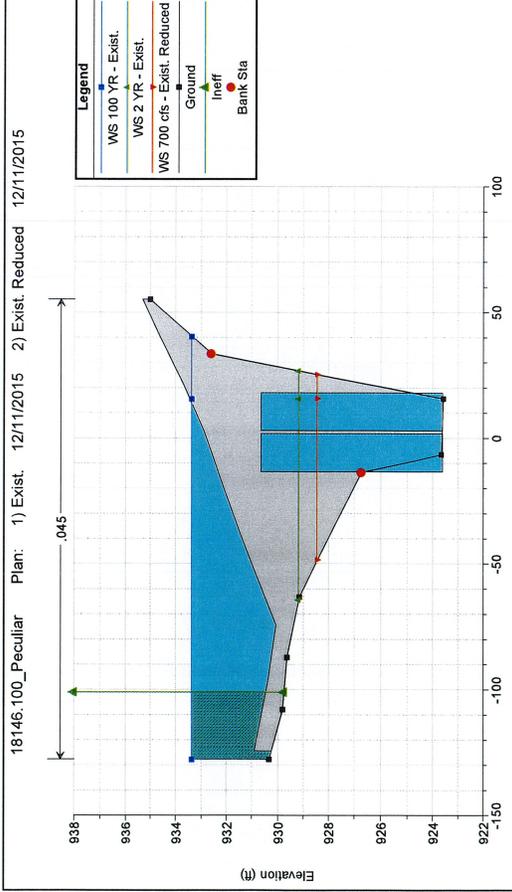
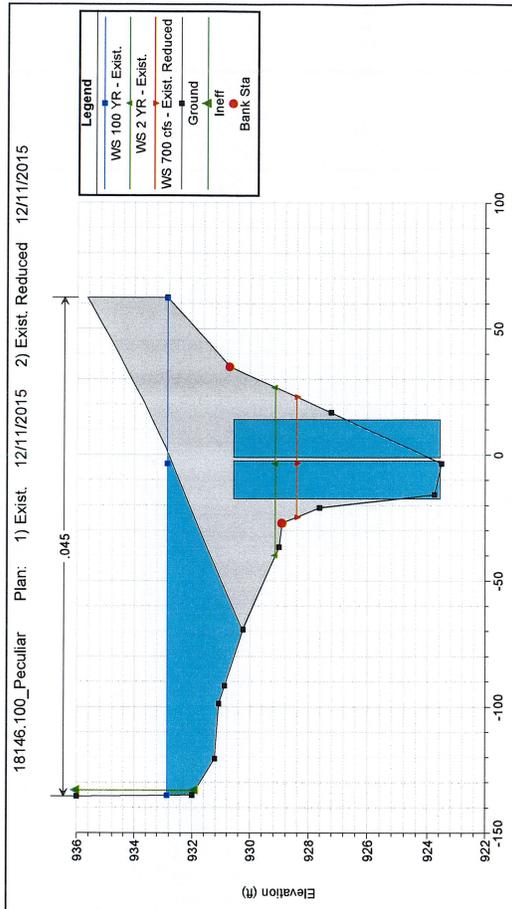


18146.100\_Peculiar Plan: 1) Exist. 12/11/2015 2) Exist. Reduced 12/11/2015  
(XS15) Backwater Harr Grove



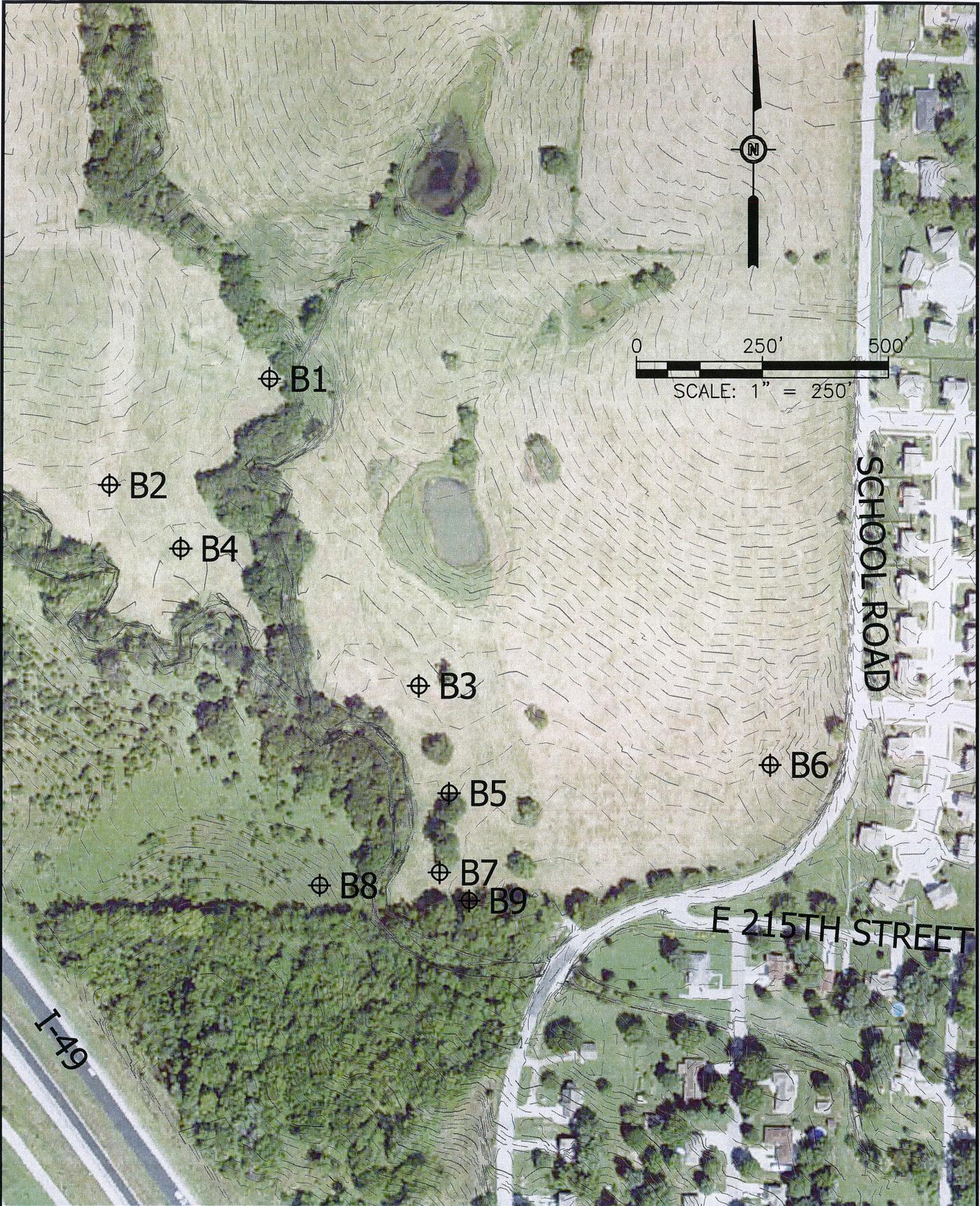
18146.100\_Peculiar Plan: 1) Exist. 12/11/2015 2) Exist. Reduced 12/11/2015  
(XS16) US Face Harr Grove





**APPENDIX D**  
**BORING LOCATIONS MAP**

Drawing Name: C:\Users\dcr01439\Desktop\Peculiar 18146.100\18146.100\_Geotech\_DCF.dwg Layout Name: Layout1 Plotted on: 11/11/2015 11:02:35 PM



WWW.BARTWEST.COM

### PECULIAR DETENTION BASIN BORING LOCATIONS

PROJ NO:  
18146.100  
DATE:  
12-16-2015

SHEET NUMBER  
**1**  
OF 1

**APPENDIX E**  
**BORING LOGS**

# BORING LOG NO. B-1

**PROJECT:** Proposed Earthen Dam for 20 acre Lake

**CLIENT:** Bartlett & West Engineers, Inc.  
Jefferson City, Missouri

**SITE:**

**Peculiar, Missouri**

GRAPHIC LOG	LOCATION See Exhibit A-2	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	HAND PENETROMETER (psf)	LABORATORY TORVANE/HP (psf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS
	Surface Elev.: 957 (Ft.)										LL-PL-PI
	DEPTH ELEVATION (Ft.)										
1.0	<b>TOPSOIL</b>	956									
3.0	<b>LEAN CLAY</b> , trace silt, gray brown to brown, very stiff to hard	954			10		9000 (HP)		13	90	45-21-24
5.0	<b>FAT CLAY</b> , gray brown to dark brown, stiff				24		7500 (HP)		21	100	
8.5	<b>SHALY FAT CLAY</b> , brown to olive brown, highly weathered	948.5									
10.4	<b>LIMESTONE</b> , olive brown to gray brown, highly weathered	946.5									
10.7	<b>LIMESTONE</b> , olive brown to gray brown, highly weathered	946.5									
	<b>Auger Refusal on limestone at 10.7 Feet</b>										

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic SPT Hammer

Advancement Method:  
Continuous Flight Auger

See Exhibit A-1 for description of field procedures  
See Appendix B for description of laboratory procedures and additional data (if any).

Notes:

Abandonment Method:  
Boring backfilled with soil cuttings upon completion.

See Appendix C for explanation of symbols and abbreviations.

**WATER LEVEL OBSERVATIONS**

*Groundwater not encountered*



Boring Started: 8/17/2015

Boring Completed: 8/17/2015

Drill Rig: RC-550

Driller: RC-Zach

Project No.: 02155135

Exhibit: A-3

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_02155135.GPJ TERRACON2015.GDT 8/27/15

# BORING LOG NO. B-2

**PROJECT:** Proposed Earthen Dam for 20 acre Lake

**CLIENT:** Bartlett & West Engineers, Inc.  
Jefferson City, Missouri

**SITE:**  
**Peculiar, Missouri**

GRAPHIC LOG	LOCATION See Exhibit A-2	DEPTH (FL.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	HAND PENETROMETER (psf)	LABORATORY TORVANE/HP (psf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS
	DEPTH ELEVATION (FL.)										LL-PL-PI
	<b>TOPSOIL</b>	1.0									
	<b>LEAN CLAY</b> , trace silt, gray brown to brown, medium stiff to stiff	3.0			6		9000 (HP)		18	94	
	<b>FAT CLAY</b> , gray brown, stiff	5.0			9		3000 (HP)		23	101	51-19-32
	<b>SHALE</b> , brown to olive brown, highly weathered	8.5			13				27	98	
	<b>LIMESTONE</b> , gray to gray brown, highly weathered	11.8									
	<b>Auger Refusal on limestone at 12.1 Feet</b>	12.1									

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic SPT Hammer

Advancement Method:  
Continuous Flight Auger

See Exhibit A-1 for description of field procedures  
See Appendix B for description of laboratory procedures and additional data (if any).

Notes:

Abandonment Method:  
Boring backfilled with soil cuttings upon completion.

See Appendix C for explanation of symbols and abbreviations.

**WATER LEVEL OBSERVATIONS**  
Groundwater not encountered



Boring Started: 8/17/2015	Boring Completed: 8/17/2015
Drill Rig: RC-550	Driller: RC-Zach
Project No.: 02155135	Exhibit: A-4

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_02155135.GPJ TERRACON2015.GDT 8/27/15

# BORING LOG NO. B-3

**PROJECT:** Proposed Earthen Dam for 20 acre Lake

**CLIENT:** Bartlett & West Engineers, Inc.  
Jefferson City, Missouri

**SITE:**

**Peculiar, Missouri**

GRAPHIC LOG	LOCATION See Exhibit A-2	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	HAND PENETROMETER (psf)	LABORATORY TORVANE/HP (psf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS
	Surface Elev.: 954.3 (Ft.) ELEVATION (Ft.)										LL-PL-PI
	<b>TOPSOIL</b>	1.0									
	<b>LEAN CLAY</b> , trace silt, gray brown to brown, very stiff to hard	3.0			6		9000 (HP)		17		
	<b>FAT CLAY</b> , gray brown to dark brown, stiff	5.0			12		4000 (HP)		23	103	55-18-37
	<b>SHALY FAT CLAY</b> , brown to olive brown, highly weathered	8.5			15		9000 (HP)		25	96	
	<b>LIMESTONE</b> , olive brown to gray brown, highly weathered	10.8									
	<b>Auger Refusal on limestone at 11 Feet</b>	11.0									

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic SPT Hammer

Advancement Method:  
Continuous Flight Auger

See Exhibit A-1 for description of field procedures  
See Appendix B for description of laboratory procedures and additional data (if any).

Notes:

Abandonment Method:  
Boring backfilled with soil cuttings upon completion.

See Appendix C for explanation of symbols and abbreviations.

**WATER LEVEL OBSERVATIONS**

Groundwater not encountered



Boring Started: 8/17/2015

Boring Completed: 8/17/2015

Drill Rig: RC-550

Driller: RC-Zach

Project No.: 02155135

Exhibit: A-5

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_02155135.GPJ TERRACON2015.GDT 8/27/15

# BORING LOG NO. B-4

**PROJECT:** Proposed Earthen Dam for 20 acre Lake

**CLIENT:** Bartlett & West Engineers, Inc.  
Jefferson City, Missouri

**SITE:**  
**Peculiar, Missouri**

GRAPHIC LOG	LOCATION See Exhibit A-2	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	HAND PENETROMETER (psf)	LABORATORY TORVANE/HP (psf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS
	Surface Elev.: 955.9 (Ft.)										LL-PL-PI
	ELEVATION (Ft.)										
1.0	<b>TOPSOIL</b>	955									
	<b>LEAN CLAY</b> , trace silt, gray brown to brown, very stiff to hard				6		7000 (HP)		22	94	
					8		2500 (HP)		24	99	46-17-29
8.5	<b>FAT CLAY</b> , trace silt, brown to olive brown, medium stiff to stiff	947.5					2000 (HP)		25	101	
10.3	<b>LIMESTONE</b> , olive brown to gray brown, highly weathered	945.5									
10.6	<b>LIMESTONE</b> , olive brown to gray brown, highly weathered	945.5									
	<i>Auger Refusal on limestone at 10.6 Feet</i>										

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic SPT Hammer

Advancement Method:  
Continuous Flight Auger

See Exhibit A-1 for description of field procedures  
See Appendix B for description of laboratory procedures and additional data (if any).

Notes:

Abandonment Method:  
Boring backfilled with soil cuttings upon completion.

See Appendix C for explanation of symbols and abbreviations.

**WATER LEVEL OBSERVATIONS**

*Groundwater not encountered*



Boring Started: 8/17/2015

Boring Completed: 8/17/2015

Drill Rig: RC-550

Driller: RC-Zach

Project No.: 02155135

Exhibit: A-6

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_02155135.GPJ TERRACON2015.GDT\_8/27/15

# BORING LOG NO. B-5

**PROJECT:** Proposed Earthen Dam for 20 acre Lake

**CLIENT:** Bartlett & West Engineers, Inc.  
Jefferson City, Missouri

**SITE:**  
**Peculiar, Missouri**

GRAPHIC LOG	LOCATION See Exhibit A-2	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	HAND PENETROMETER (psf)	LABORATORY TORVANE/HP (psf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS
	Surface Elev.: 953.3 (Ft.)										ELEVATION (Ft.)
	<b>TOPSOIL</b>	1.0									
	<b>LEAN CLAY</b> , trace roots, dark brown, stiff	3.0			17		4000 (HP)		25	90	44-22-22
	<b>FAT CLAY</b> , gray brown, stiff	5.0			23			2900	25	101	53-20-33
	<b>SHALE</b> , brown to gray brown, highly weathered	9.0									
	<b>LIMESTONE</b> , gray brown to gray	9.8			10				25	93	
	<b>LIMESTONE</b> , gray brown to gray	10.0			X				14		
	<b>Auger Refusal on limestone at 11 Feet</b>	11.0									

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic SPT Hammer

Advancement Method:  
Continuous Flight Auger

See Exhibit A-1 for description of field procedures  
See Appendix B for description of laboratory procedures and additional data (if any).

Notes:

Abandonment Method:  
Boring backfilled with soil cuttings upon completion.

See Appendix C for explanation of symbols and abbreviations.

**WATER LEVEL OBSERVATIONS**  
*Groundwater not encountered*

13910 West 96th Terrace  
Lenexa, Kansas

Boring Started: 8/20/2015  
Drill Rig: CME-850  
Project No.: 02155135

Boring Completed: 8/20/2015  
Driller: DB  
Exhibit: A-7

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_02155135.GPJ TERRACON2015.GDT 8/27/15

# BORING LOG NO. B-6

**PROJECT:** Proposed Earthen Dam for 20 acre Lake

**CLIENT:** Bartlett & West Engineers, Inc.  
Jefferson City, Missouri

**SITE:**

**Peculiar, Missouri**

GRAPHIC LOG	LOCATION See Exhibit A-2	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	HAND PENETROMETER (psf)	LABORATORY TORVANE/HP (psf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS
	Surface Elev.: 957.4 (Ft.)										ELEVATION (Ft.)
1.0	<b>TOPSOIL</b>	956.5									
8.5	<b>FAT CLAY</b> , gray brown to reddish brown, stiff to very stiff	949			24			3700	18	100	57-18-39
12.5	<b>SHALEY FAT CLAY</b> , light brown, hard	945			23		7000 (HP)		24	101	
14.5	<b>SHALE</b> , olive brown to gray, highly weathered	943			10		8800		18	123	
14.5	<b>Auger Refusal on limestone at 14.5 Feet</b>	943			4				11		

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic SPT Hammer

Advancement Method:  
Continuous Flight Auger

See Exhibit A-1 for description of field procedures  
See Appendix B for description of laboratory procedures and additional data (if any).

Notes:

Abandonment Method:  
Boring backfilled with soil cuttings upon completion.

See Appendix C for explanation of symbols and abbreviations.

**WATER LEVEL OBSERVATIONS**  
Groundwater not encountered



Boring Started: 8/20/2015  
Drill Rig: CME-850  
Project No.: 02155135

Boring Completed: 8/20/2015  
Driller: DB  
Exhibit: A-8

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_02155135.GPJ TERRACON2015.GDT\_8/27/15

# BORING LOG NO. B-7

**PROJECT:** Proposed Earthen Dam for 20 acre Lake

**CLIENT:** Bartlett & West Engineers, Inc.  
Jefferson City, Missouri

**SITE:**

**Peculiar, Missouri**

GRAPHIC LOG	LOCATION See Exhibit A-2	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	HAND PENETROMETER (psf)	LABORATORY TORVANE/HP (psf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS
	Surface Elev.: 952.7 (Ft.)										LL-PL-PI
	DEPTH ELEVATION (Ft.)										
	<b>TOPSOIL</b>	1.0									
	<b>FAT CLAY</b> , gray brown, stiff to very stiff	951.5		8			5000 (HP)		26		53-22-31
	<b>SHALE</b> , brown to dark brown, highly weathered	943.5		18			8000 (HP)				54-21-33
	<b>LIMESTONE</b> , gray, highly weathered	942.5		11					32	90	
	<b>LIMESTONE</b> , gray, highly weathered <i>Auger Refusal on limestone at 10.3 Feet</i>	942.5									
		10.3									

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic SPT Hammer

Advancement Method:  
Continuous Flight Auger

See Exhibit A-1 for description of field procedures  
See Appendix B for description of laboratory procedures and additional data (if any).

Notes:

Abandonment Method:  
Boring backfilled with soil cuttings upon completion.

See Appendix C for explanation of symbols and abbreviations.

**WATER LEVEL OBSERVATIONS**

*Groundwater not encountered*



Boring Started: 8/20/2015

Boring Completed: 8/20/2015

Drill Rig: CME-850

Driller: DB

Project No.: 02155135

Exhibit: A-9

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_02155135.GPJ TERRACON2015.GDT\_8/27/15

# BORING LOG NO. B-8

**PROJECT:** Proposed Earthen Dam for 20 acre Lake

**CLIENT:** Bartlett & West Engineers, Inc.  
Jefferson City, Missouri

**SITE:**  
**Peculiar, Missouri**

GRAPHIC LOG	LOCATION See Exhibit A-2	DEPTH (FL.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (in.)	HAND PENETROMETER (psf)	LABORATORY TORVANE/HP (psf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS
	Surface Elev.: 961.6 (Fl.) ELEVATION (FL.)										LL-PL-PI
1.0	<b>TOPSOIL</b>	960.5									
5.0	<b>FAT CLAY</b> , gray brown to brown, medium stiff to stiff	956.5		☞					29		85-31-54
5.0	<b>SHALEY FAT CLAY</b> , brown, medium stiff to stiff	956.5	5	☞					24		64-38-26
9.5	<b>SHALEY FAT CLAY</b> , brown, medium stiff to stiff	952		☞					21		
9.5	<b>Auger Refusal on apparent limestone at 9.5 Feet</b>	952		☞					23		

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic SPT Hammer

Advancement Method:  
Continuous Flight Auger

See Exhibit A-1 for description of field procedures  
See Appendix B for description of laboratory procedures and additional data (if any).

Notes:

Abandonment Method:  
Boring backfilled with soil cuttings upon completion.

See Appendix C for explanation of symbols and abbreviations.

**WATER LEVEL OBSERVATIONS**  
*Groundwater not encountered*

13910 West 96th Terrace  
Lenexa, Kansas

Boring Started: 8/22/2015  
Drill Rig: HA  
Project No.: 02155135

Boring Completed: 8/22/2015  
Driller: AP  
Exhibit: A-10

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_02155135.GPJ TERRACON2015.GDT 8/27/15

# BORING LOG NO. B-9

**PROJECT:** Proposed Earthen Dam for 20 acre Lake

**CLIENT:** Bartlett & West Engineers, Inc.  
Jefferson City, Missouri

**SITE:**

**Peculiar, Missouri**

GRAPHIC LOG	LOCATION See Exhibit A-2	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	RECOVERY (In.)	HAND PENETROMETER (psf)	LABORATORY TORVANE/HP (psf)	UNCONFINED COMPRESSIVE STRENGTH (psf)	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS
	Surface Elev.: 951.5 (Ft.)										LL-PL-PI
	ELEVATION (Ft.)										
	<b>TOPSOIL</b>	1.0									
	<b>FAT CLAY</b> , dark brown, very stiff	3.0			15		8000 (HP)		24	90	
	<b>FAT CLAY</b> , brown to gray brown, stiff	7.5			10		4000 (HP)				51-19-32
	<b>SHALE</b> , gray brown to gray, highly weathered	7.8									
	<i>Auger Refusal on limestone at 7.8 Feet</i>	944									
		943.5									

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic SPT Hammer

Advancement Method:  
Continuous Flight Auger

See Exhibit A-1 for description of field procedures  
See Appendix B for description of laboratory procedures and additional data (if any).

Notes:

Abandonment Method:  
Boring backfilled with soil cuttings upon completion.

See Appendix C for explanation of symbols and abbreviations.

**WATER LEVEL OBSERVATIONS**

*Groundwater not encountered*



Boring Started: 8/20/2015

Boring Completed: 8/20/2015

Drill Rig: CME-850

Driller: DB

Project No.: 02155135

Exhibit: A-11

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL\_02155135.GPJ TERRACON2015.GDT 8/27/15

**APPENDIX F**  
**DETENTION BASIN CURVES**

### DRY BASIN ELEVATION - DISCHARGE CURVE

RCB	
B (ft)	7
D (ft)	5
FL Elev.	946.4
# of Cells	1

7' X 5'				
Elevation (ft)	HW/D	Q/B	Box Discharge (cfs)	Discharge (cfs)
946	-0.1			
947	0.1	0	0.0	<b>0.0</b>
948	0.3	4	28.0	<b>28.0</b>
949	0.5	10	70.0	<b>70.0</b>
950	0.7	16	112.0	<b>112.0</b>
951	0.9	24	168.0	<b>168.0</b>
952	1.1	32	224.0	<b>224.0</b>
953	1.3	40	280.0	<b>280.0</b>
954	1.5	45	315.0	<b>315.0</b>
955	1.7	51	357.0	<b>357.0</b>
956	1.9	56	392.0	<b>392.0</b>
957	2.1	61	427.0	<b>427.0</b>
958	2.3	65	455.0	<b>455.0</b>
959	2.5	69	483.0	<b>483.0</b>
960	2.7	72	504.0	<b>504.0</b>
961	2.9	76	532.0	<b>532.0</b>
962	3.1	80	560.0	<b>560.0</b>
963	3.3	81	567.0	<b>567.0</b>
964	3.5	84	588.0	<b>588.0</b>
965	3.7	90	630.0	<b>630.0</b>
966	3.9	92	644.0	<b>644.0</b>
967	4.1	95	665.0	<b>665.0</b>
Water surface elevation	Ratio of headwater depth over height of box culvert	Flow volume per 1' width of box culvert	Maximum flow volume through box culvert	Maximum flow volume through system

### WET BASIN ELEVATION - DISCHARGE CURVE

Riser Structure

L (ft)	7
W (ft)	7
Elev.	957.5

RCB

B (ft)	7
D (ft)	8
Elev.	946.4
# of Cells	1

Weir and Orifice Eqns from MoDOT EPG

Elevation (ft)	Head (ft)	7' X 7'	7' X 7'	7' X 8'			Discharge (cfs)
		Weir Discharge	Orifice Discharge	HW/D	Q/B	Box Discharge (cfs)	
947	0.0	0	0	0.1	0	0	<b>0.0</b>
948	0.0	0	0	0.2	3	0	<b>0.0</b>
949	0.0	0	0	0.3	9	0	<b>0.0</b>
950	0.0	0	0	0.5	20	140	<b>0.0</b>
951	0.0	0	0	0.6	27	189	<b>0.0</b>
952	0.0	0	0	0.7	35	245	<b>0.0</b>
953	0.0	0	0	0.8	42	294	<b>0.0</b>
954	0.0	0	0	1.0	58	406	<b>0.0</b>
955	0.0	0	0	1.1	67	469	<b>0.0</b>
956	0.0	0	0	1.2	73	511	<b>0.0</b>
957	0.0	0	0	1.3	80	560	<b>0.0</b>
958	0.5	27.7	166.8	1.5	92	644	<b>27.7</b>
959	1.5	145.5	289.0	1.6	99	693	<b>145.5</b>
960	2.5	318.7	373.0	1.7	104	728	<b>318.7</b>
961	3.5	535.3	441.4	1.8	110	770	<b>441.4</b>
962	4.5	791.0	500.5	2.0	120	840	<b>500.5</b>
963	5.5	1083.3	553.3	2.1	125	875.0	<b>553.3</b>
964	6.5	1410.4	601.5	2.2	129	903.0	<b>601.5</b>
965	7.5	1771.0	646.1	2.3	131	917.0	<b>646.1</b>
966	8.5	2164.6	687.9	2.5	140	980.0	<b>687.9</b>
967	9.5	2590.4	727.2	2.6	143	1001.0	<b>727.2</b>
Water surface elevation	Headwater depth over top of riser structure	Maximum flow volume over riser structure as a weir	Maximum flow volume through riser structure as an orifice	Ratio of headwater depth over height of box culvert	Flow volume per 1' width of box culvert	Maximum flow volume through box culvert	Maximum flow volume through system

**DRY TO WET BASIN - PHASE 1 (DRY) ELEVATION - DISCHARGE CURVE**

RCB	
B (ft)	7
D (ft)	5
Elev.	946.4
# of Cells	1

Elevation (ft)	7' X 5'			Discharge (cfs)
	HW/D	Q/B	Box Discharge (cfs)	
946	-0.1			
947	0.1	0	0.0	<b>0.0</b>
948	0.3	4	28.0	<b>28.0</b>
949	0.5	10	70.0	<b>70.0</b>
950	0.7	16	112.0	<b>112.0</b>
951	0.9	24	168.0	<b>168.0</b>
952	1.1	32	224.0	<b>224.0</b>
953	1.3	40	280.0	<b>280.0</b>
954	1.5	45	315.0	<b>315.0</b>
955	1.7	51	357.0	<b>357.0</b>
956	1.9	56	392.0	<b>392.0</b>
957	2.1	61	427.0	<b>427.0</b>
958	2.3	65	455.0	<b>455.0</b>
959	2.5	69	483.0	<b>483.0</b>
960	2.7	72	504.0	<b>504.0</b>
961	2.9	76	532.0	<b>532.0</b>
962	3.1	80	560.0	<b>560.0</b>
963	3.3	81	567.0	<b>567.0</b>
964	3.5	84	588.0	<b>588.0</b>
965	3.7	90	630.0	<b>630.0</b>
966	3.9	92	644.0	<b>644.0</b>
967	4.1	95	665.0	<b>665.0</b>
Water surface elevation	Ratio of headwater depth over height of box culvert	Flow volume per 1' width of box culvert	Maximum flow volume through box culvert	Maximum flow volume through system

### DRY TO WET BASIN - PHASE 2 (WET) ELEVATION - DISCHARGE CURVE

Riser Structure	
L (ft)	7
W (ft)	7
Elev.	957.5

RCB	
B (ft)	7
D (ft)	8
Elev.	946.4
# of Cells	1

Weir and Orifice Eqns from MoDOT EPG

Elevation (ft)	Head (ft)	7' X 7'		7' X 8'			Discharge excluding downstream RCB controls (cfs)	Discharge including downstream RCB controls (cfs)
		Weir Discharge	Orifice Discharge	HW/D	Q/B	Box Discharge (cfs)		
947	0.0	0.0	0.0	0.1	0	0	<b>0.0</b>	<b>0.0</b>
948	0.0	0.0	0.0	0.2	3	0	<b>0.0</b>	<b>0.0</b>
949	0.0	0.0	0.0	0.3	9	0	<b>0.0</b>	<b>0.0</b>
950	0.0	0.0	0.0	0.5	20	140	<b>0.0</b>	<b>0.0</b>
951	0.0	0.0	0.0	0.6	27	189	<b>0.0</b>	<b>0.0</b>
952	0.0	0.0	0.0	0.7	35	245	<b>0.0</b>	<b>0.0</b>
953	0.0	0.0	0.0	0.8	42	294	<b>0.0</b>	<b>0.0</b>
954	0.0	0.0	0.0	1.0	58	406	<b>0.0</b>	<b>0.0</b>
955	0.0	0.0	0.0	1.1	67	469	<b>0.0</b>	<b>0.0</b>
956	0.0	0.0	0.0	1.2	73	511	<b>0.0</b>	<b>0.0</b>
957	0.0	0.0	0.0	1.3	80	560	<b>0.0</b>	<b>0.0</b>
958	0.5	27.7	166.8	1.5	92	644	<b>27.7</b>	<b>27.7</b>
959	1.5	145.5	289.0	1.6	99	693	<b>145.5</b>	<b>145.5</b>
960	2.5	316.6	373.0	1.7	104	728	<b>316.6</b>	<b>316.6</b>
961	3.5	530.4	441.4	1.8	110	770	<b>441.4</b>	<b>441.4</b>
962	4.5	781.9	500.5	2.0	120	840	<b>500.5</b>	<b>500.5</b>
963	5.5	1068.2	553.3	2.1	125	875.0	<b>553.3</b>	<b>553.3</b>
964	6.5	1387.4	601.5	2.2	129	903.0	<b>601.5</b>	<b>601.5</b>
965	7.5	1738.2	646.1	2.3	131	917.0	<b>646.1</b>	<b>646.1</b>
966	8.5	2119.6	687.9	2.5	140	980.0	<b>687.9</b>	<b>687.9</b>
967	9.5	2531.0	727.2	2.6	143	1001.0	<b>727.2</b>	<b>727.2</b>
Water surface elevation	Headwater depth over top of riser structure	Maximum flow volume over riser structure as a weir	Maximum flow volume through riser structure as an orifice	Ratio of headwater depth over height of box culvert	Flow volume per 1' width of box culvert	Maximum flow volume through box culvert	Maximum flow volume through system	Maximum flow volume through system

## ELEVATION-STORAGE CURVES

<b>Dry Basin Option</b>	
Elevation (ft)	Storage (ac-ft)
945	0.00
946	0.09
947	0.26
948	0.53
949	1.00
950	1.74
951	2.78
952	4.28
953	7.11
954	11.96
955	19.65
956	30.82
957	46.09
958	66.00
959	90.03
960	119.00
961	151.97
962	188.50
963	228.32
964	271.30
965	317.50
966	371.18

<b>Wet Basin Option</b>	
Elevation (ft)	Storage (ac-ft)
945	0.00
946	0.00
947	0.00
948	0.00
949	0.00
950	0.00
951	0.00
952	0.00
953	0.00
954	0.00
955	0.00
956	0.00
957	0.00
958	11.68
959	36.55
960	64.71
961	95.95
962	130.16
963	167.15
964	206.93
965	251.79
966	300.74
967	353.71

<b>Dry-to-Wet Option - Phase 1</b>	
Elevation (ft)	Storage (ac-ft)
945	0.00
946	0.09
947	0.25
948	0.52
949	0.99
950	1.74
951	2.80
952	4.29
953	7.04
954	11.76
955	19.28
956	30.21
957	44.73
958	63.44
959	86.11
960	114.51
961	147.62
962	184.64
963	225.18
964	269.01
965	318.08
966	371.05

<b>Dry-to-Wet Option - Phase 2</b>	
Elevation (ft)	Storage (ac-ft)
945	0.00
946	0.00
947	0.00
948	0.00
949	0.00
950	0.00
951	0.00
952	0.00
953	0.00
954	0.00
955	0.00
956	0.00
957	0.00
958	10.80
959	34.98
960	64.55
961	98.56
962	136.23
963	177.18
964	221.22
965	270.33
966	323.30
967	380.09

## **APPENDIX G**

# **DETENTION BASIN HYDROLOGY AND HYDRAULICS**

**Peculiar Detention Basin Design**

**Preliminary Detention Basin Options - Hydrology & Hydraulic Summaries**

Date: December 16, 2015  
Project No.: 18146.100

**HYDROLOGY:**

Subbasin	Drainage Area (mi <sup>2</sup> )	Existing Composite CN	Future* Composite CN	Lag Time (min)
1*	0.51	78.64	81.39	29.59
2*	0.31	75.52	81.86	28.59
3	0.56	81.54	81.54	35.91
4*	0.27	93.79	95.41	22.71

\* Results based on future developed conditions within CID

**HYDRAULIC RESULTS (Q<sub>p</sub>, Q<sub>10</sub>, High Water Elevations):**

**DRY BASIN OPTION:**

Storm Frequency	Existing Peak Inflow (cfs)	Future* Peak Inflow (cfs)	Future* Peak Outflow (cfs)	Future* Peak Elevation
2	1039.7	1147.7	432.8	957.2
5	1613.3	1738.4	483.8	959.0
10	2048.0	2177.5	508.7	960.2
25	2485.8	2615.5	537.7	961.2
50	2875.8	3005.0	560.4	962.1
100	3316.6	3449.2	567.5	963.0

\* Results based on future developed conditions within CID

**DRY-TO-WET BASIN OPTION, PHASE 1-DRY:**

Storm Frequency	Existing Peak Inflow (cfs)	Future* Peak Inflow (cfs)	Future* Peak Outflow (cfs)	Future* Peak Elevation
2	1039.7	1147.7	434.9	957.3
5	1613.3	1738.4	486.5	959.2
10	2048.0	2177.5	512.1	960.3
25	2485.8	2615.5	540.6	961.3
50	2875.8	3005.0	561.0	962.1
100	3316.6	3449.2	568.9	963.1

\* Results based on future developed conditions within CID

**DRY-TO-WET BASIN OPTION, PHASE 2-WET:**

Storm Frequency	Existing Peak Inflow (cfs)	Future* Peak Inflow (cfs)	Future* Peak Outflow (cfs)	Future* Peak Elevation
2	1039.7	1147.7	358.1	960.3
5	1613.3	1738.4	469.8	961.5
10	2048.0	2177.5	519.3	962.4
25	2485.8	2615.5	563.7	963.2
50	2875.8	3005.0	599.2	964.0
100	3316.6	3449.2	634.3	964.7

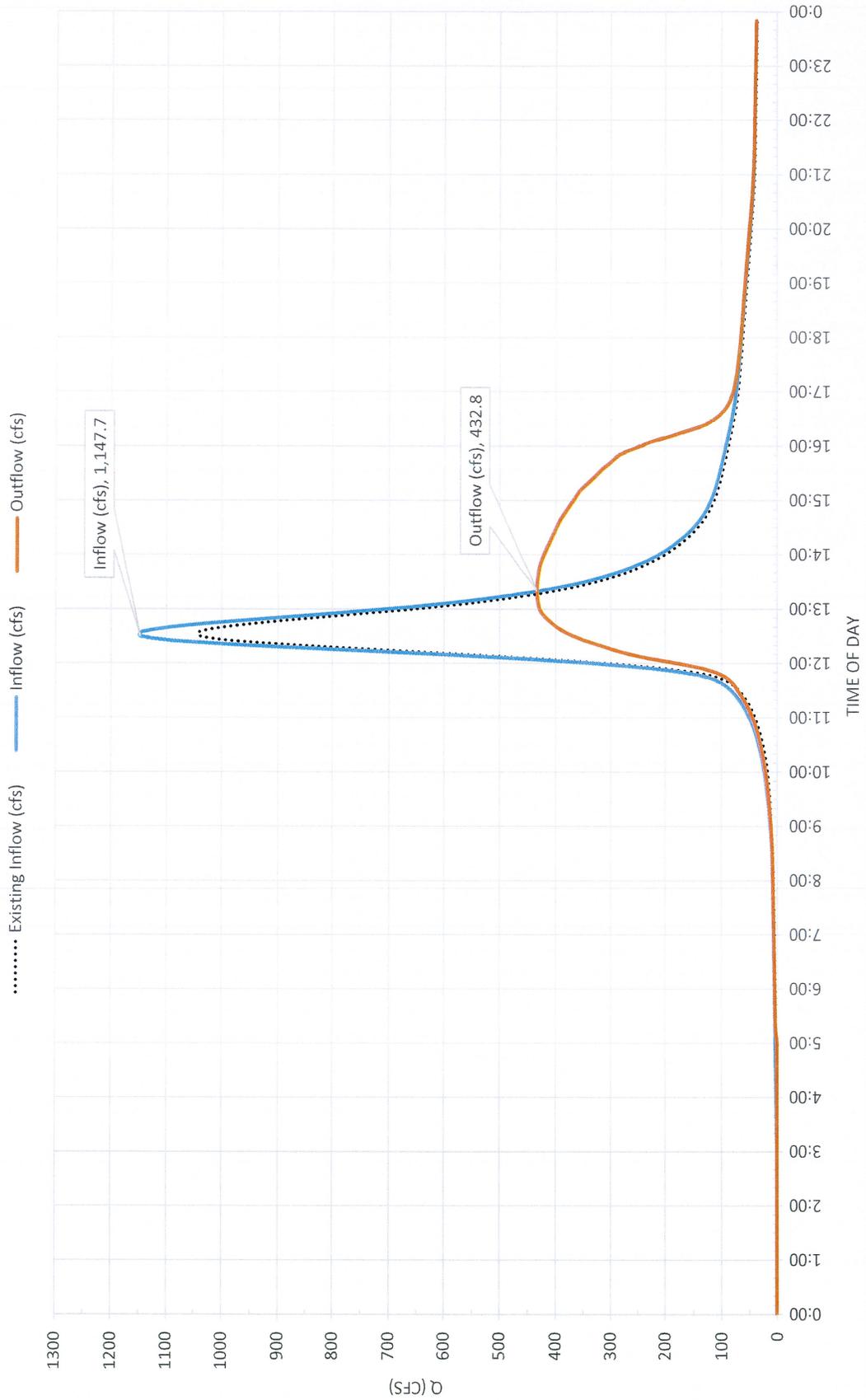
\* Results based on future developed conditions within CID

**WET BASIN OPTION:**

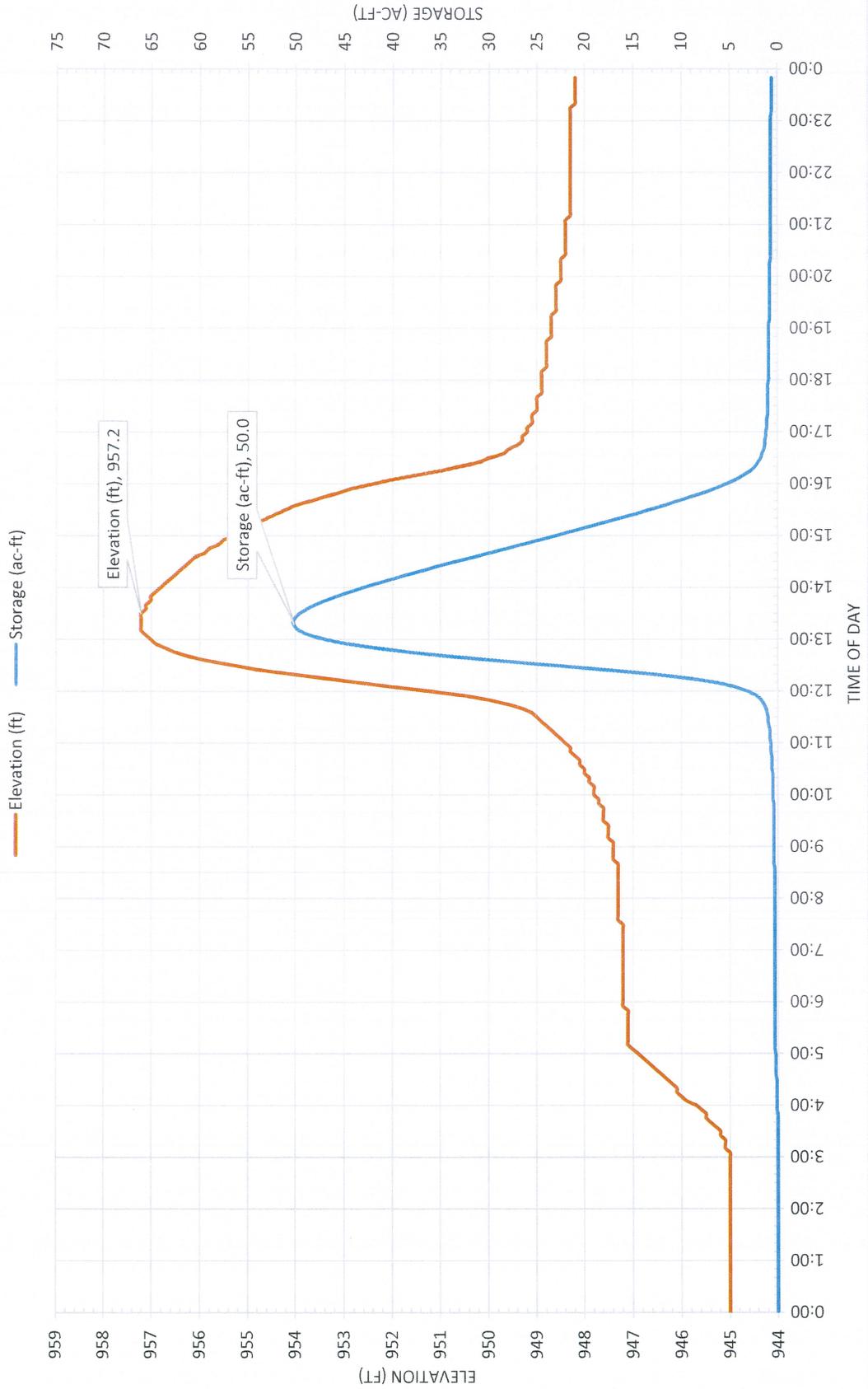
Storm Frequency	Existing Peak Inflow (cfs)	Future* Peak Inflow (cfs)	Future* Peak Outflow (cfs)	Future* Peak Elevation
2	1039.7	1147.7	363.4	960.4
5	1613.3	1738.4	477.2	961.6
10	2048.0	2177.5	529.7	962.7
25	2485.8	2615.5	576.4	963.5
50	2875.8	3005.0	613.0	964.3
100	3316.6	3449.2	650.1	965.1

\* Results based on future developed conditions within CID

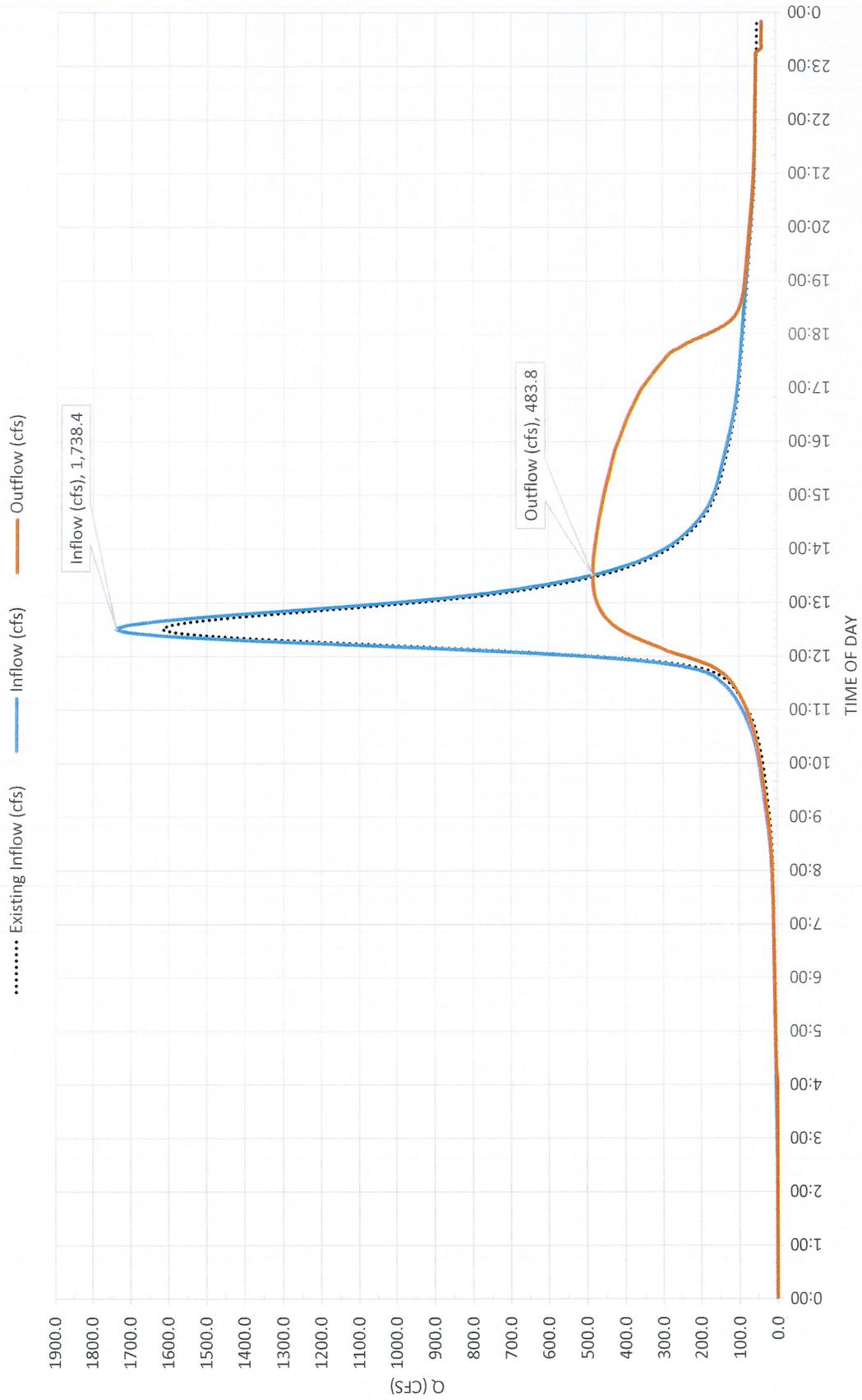
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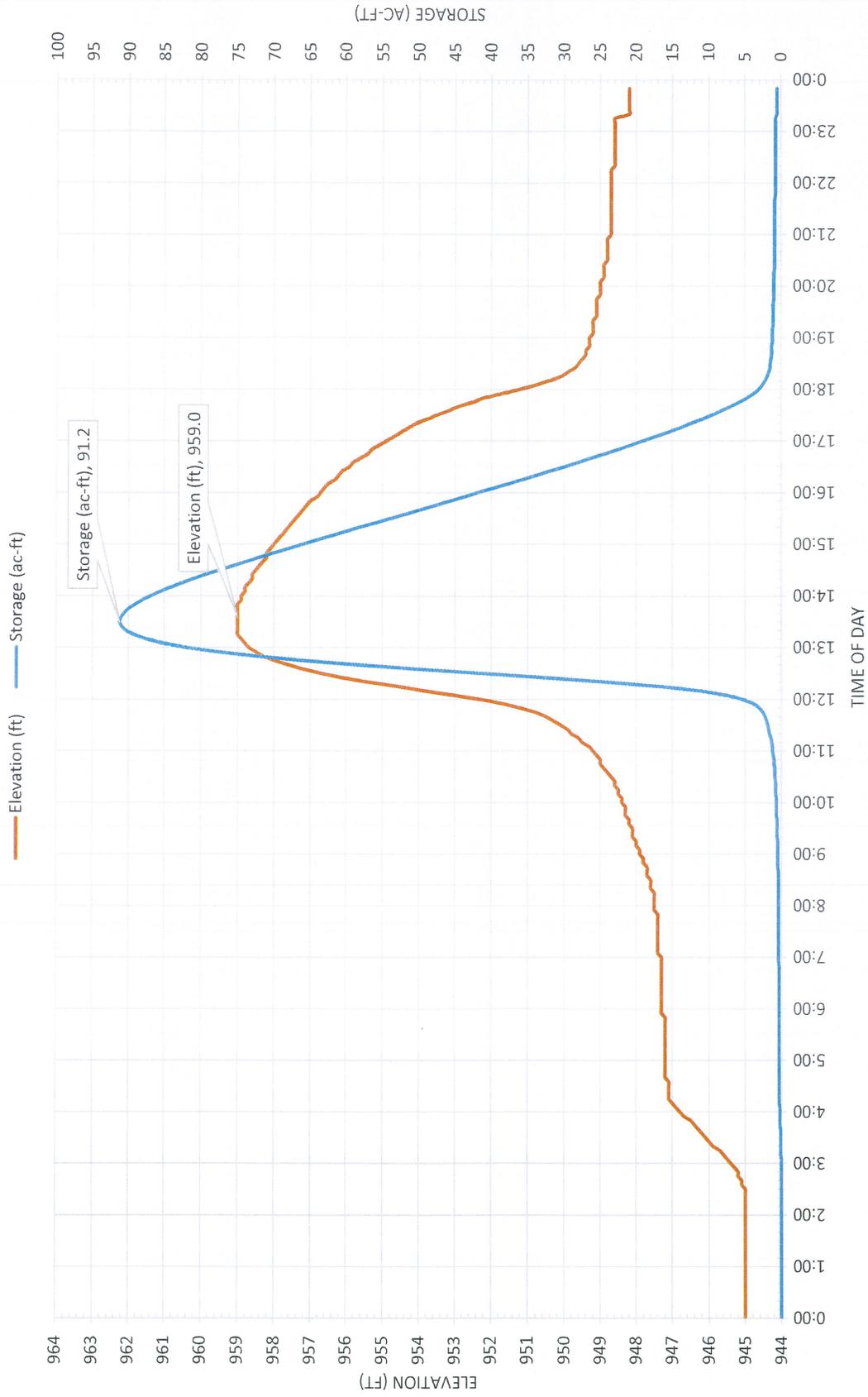
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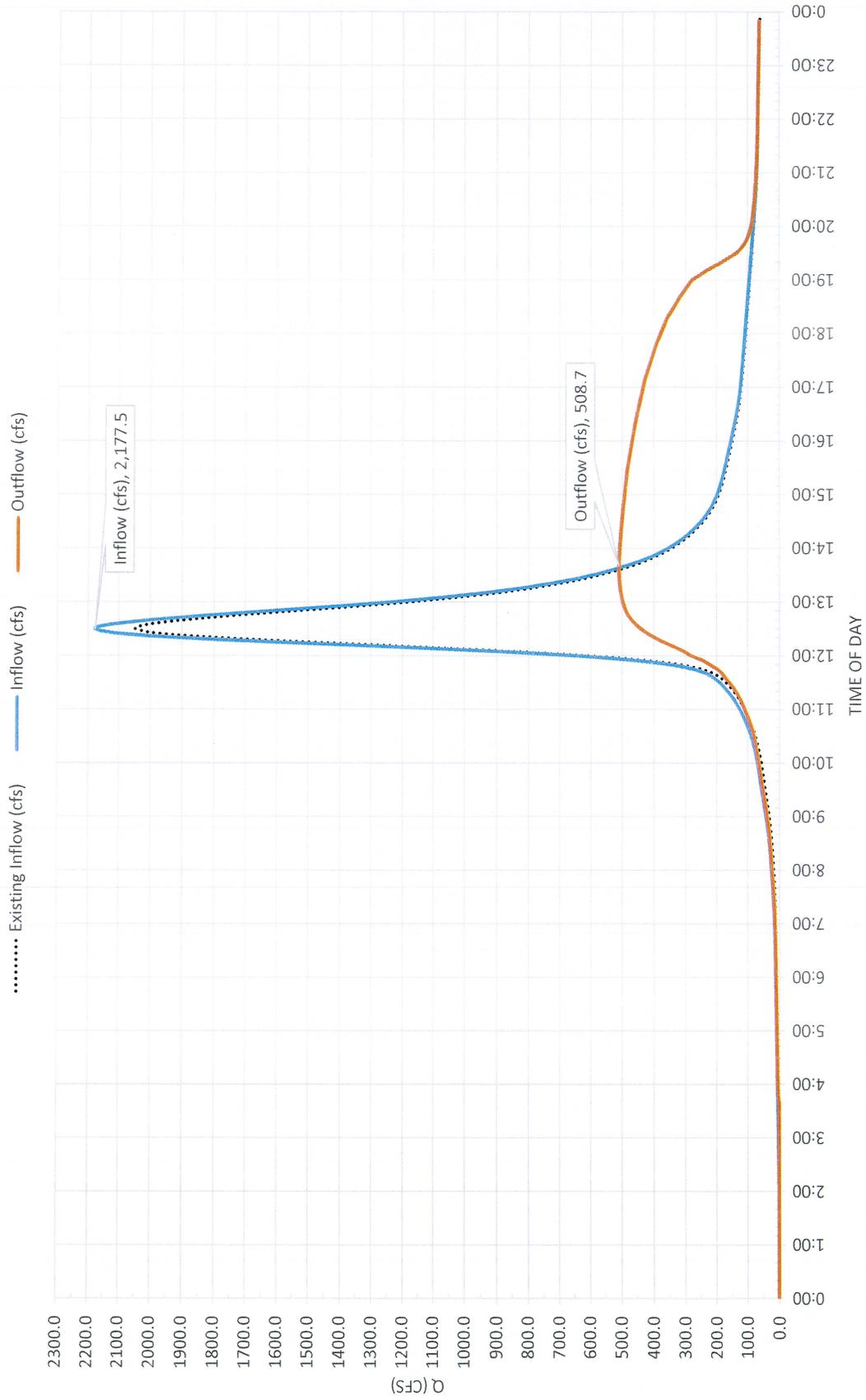
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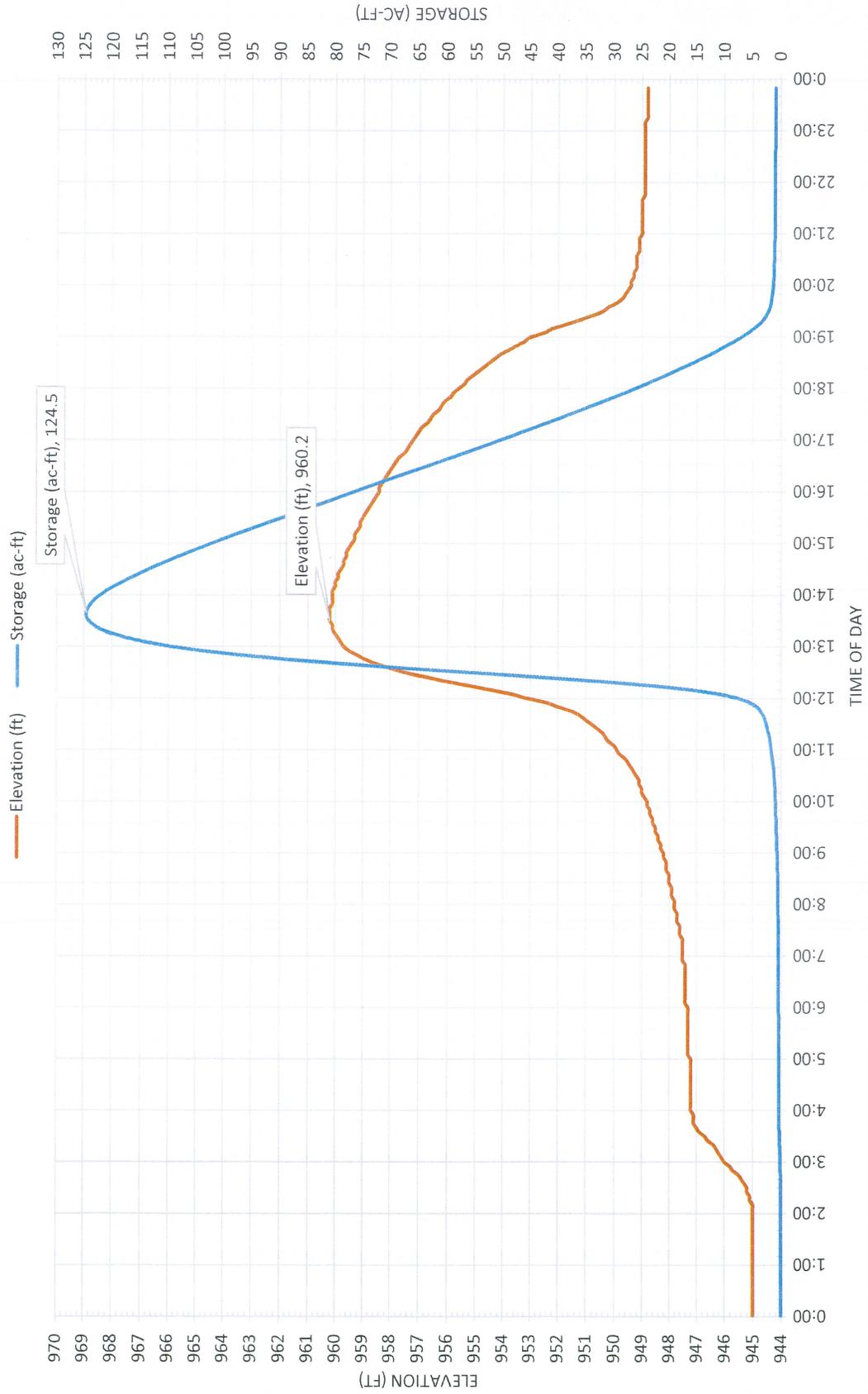
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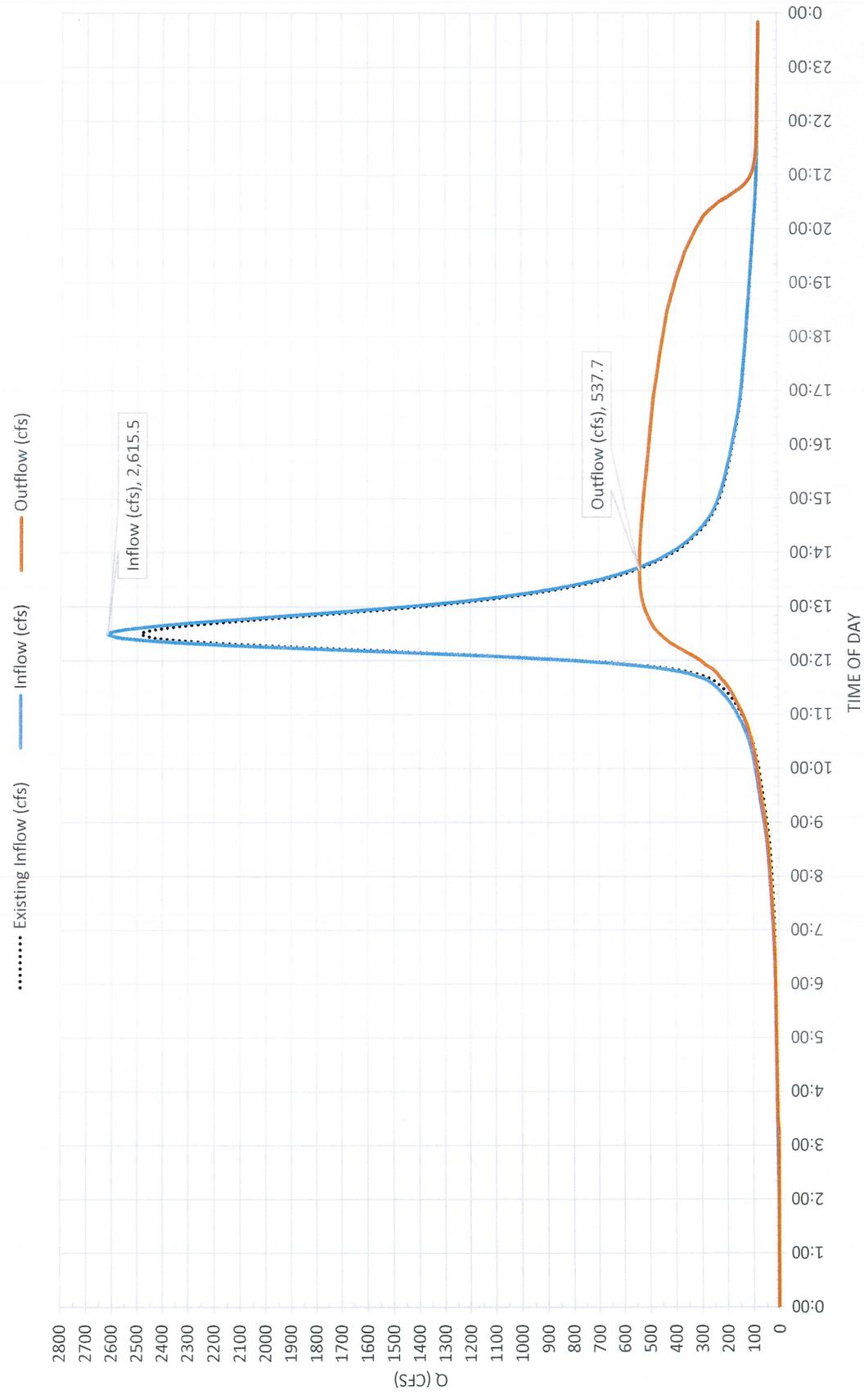
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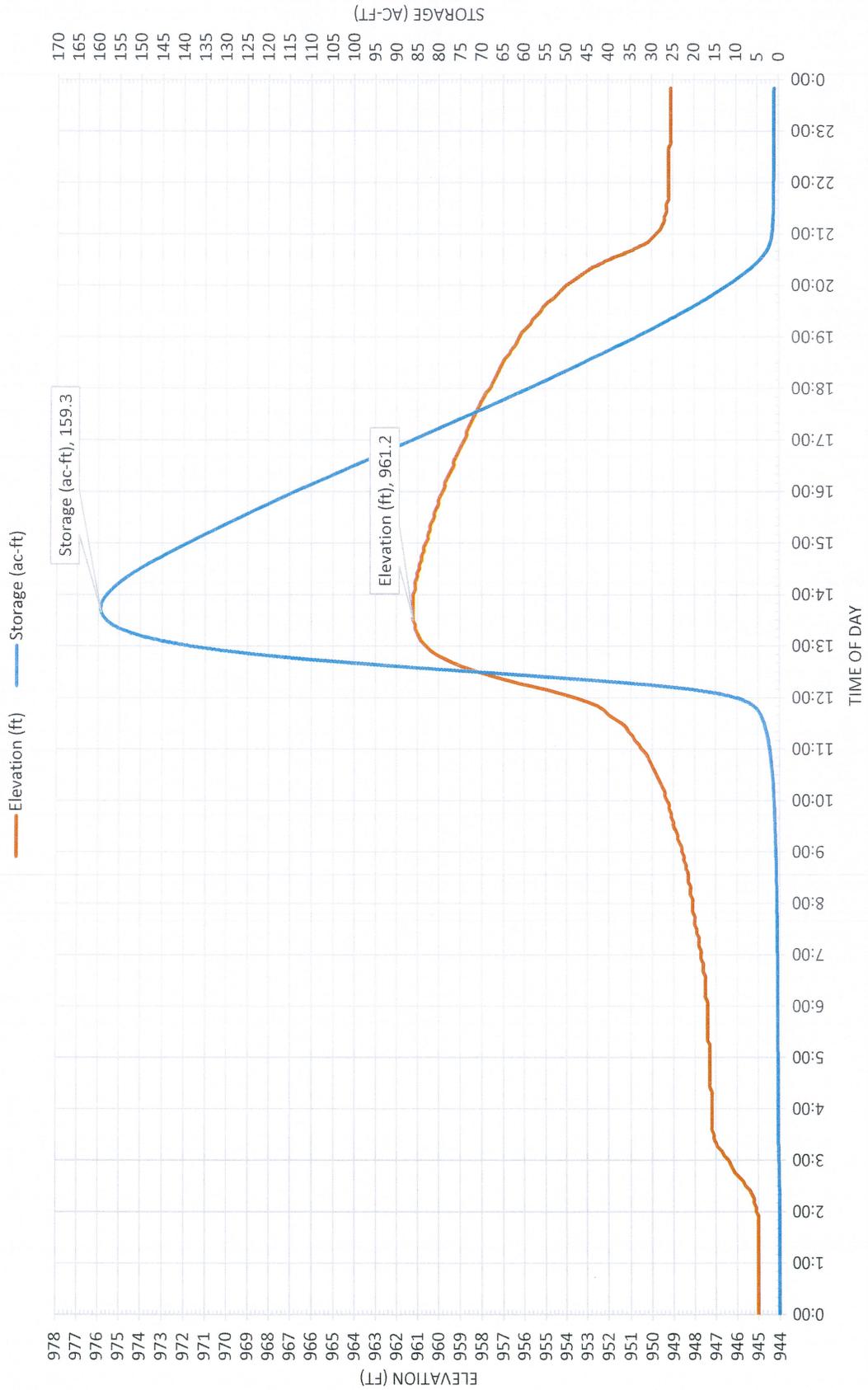
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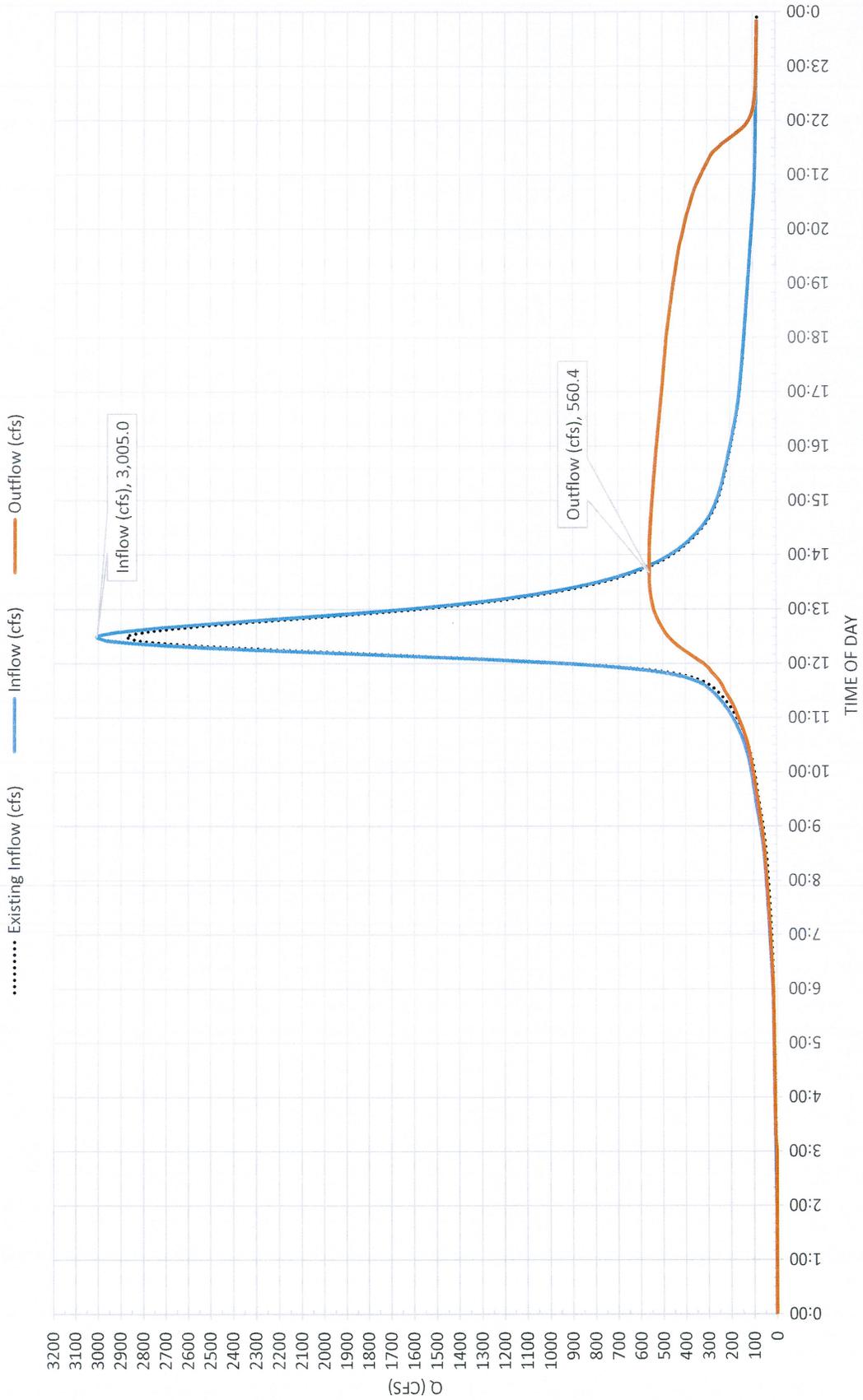
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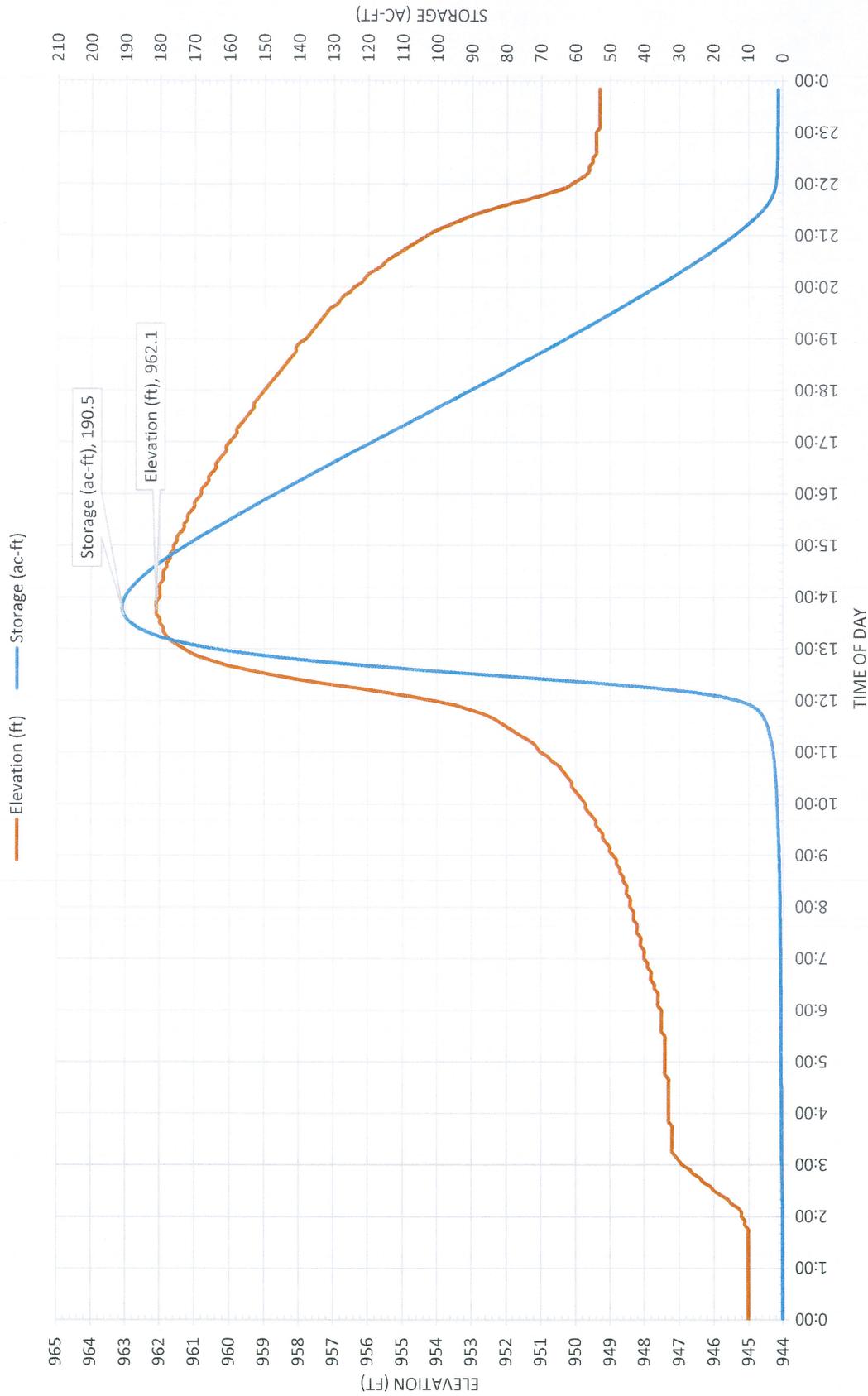
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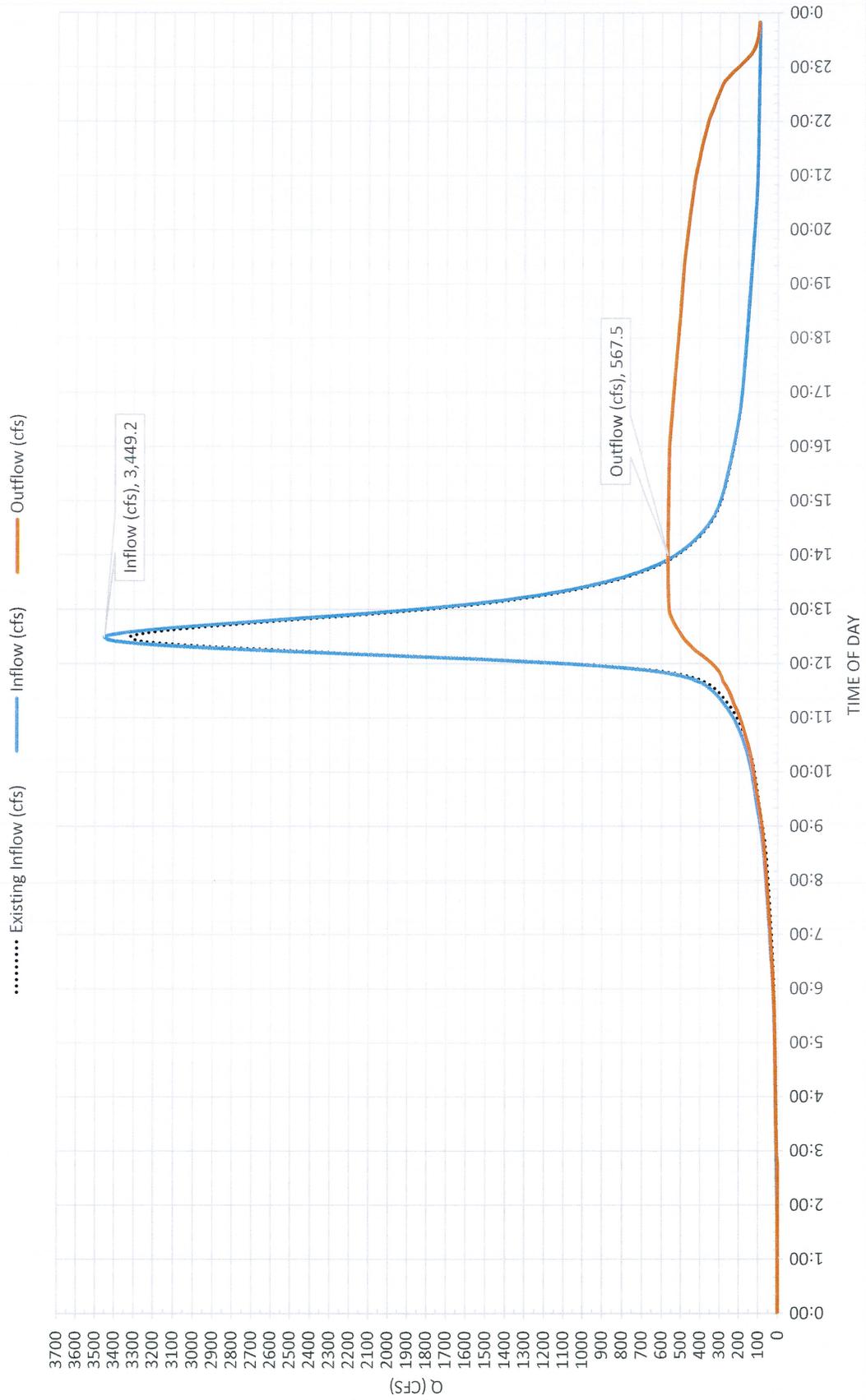
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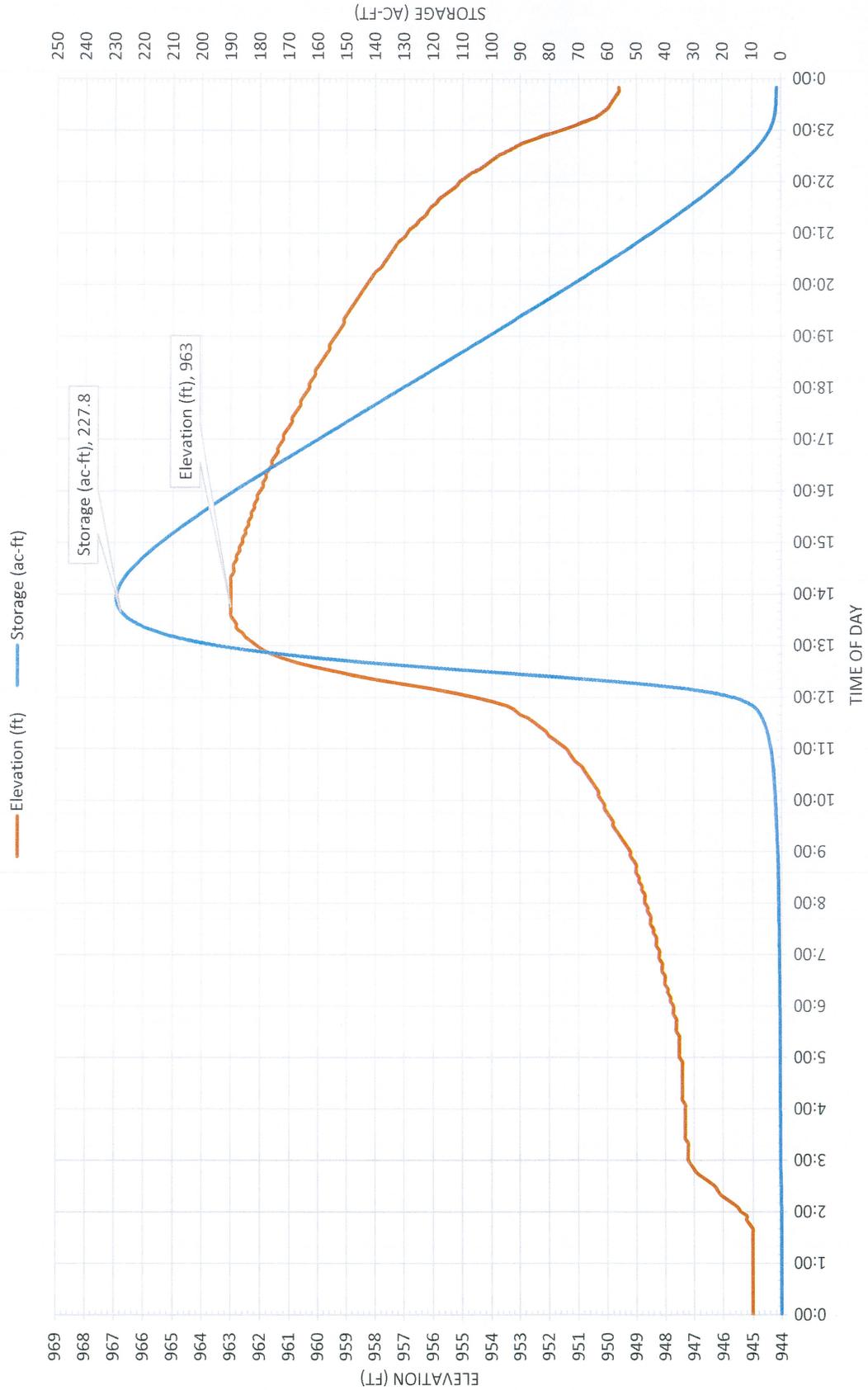
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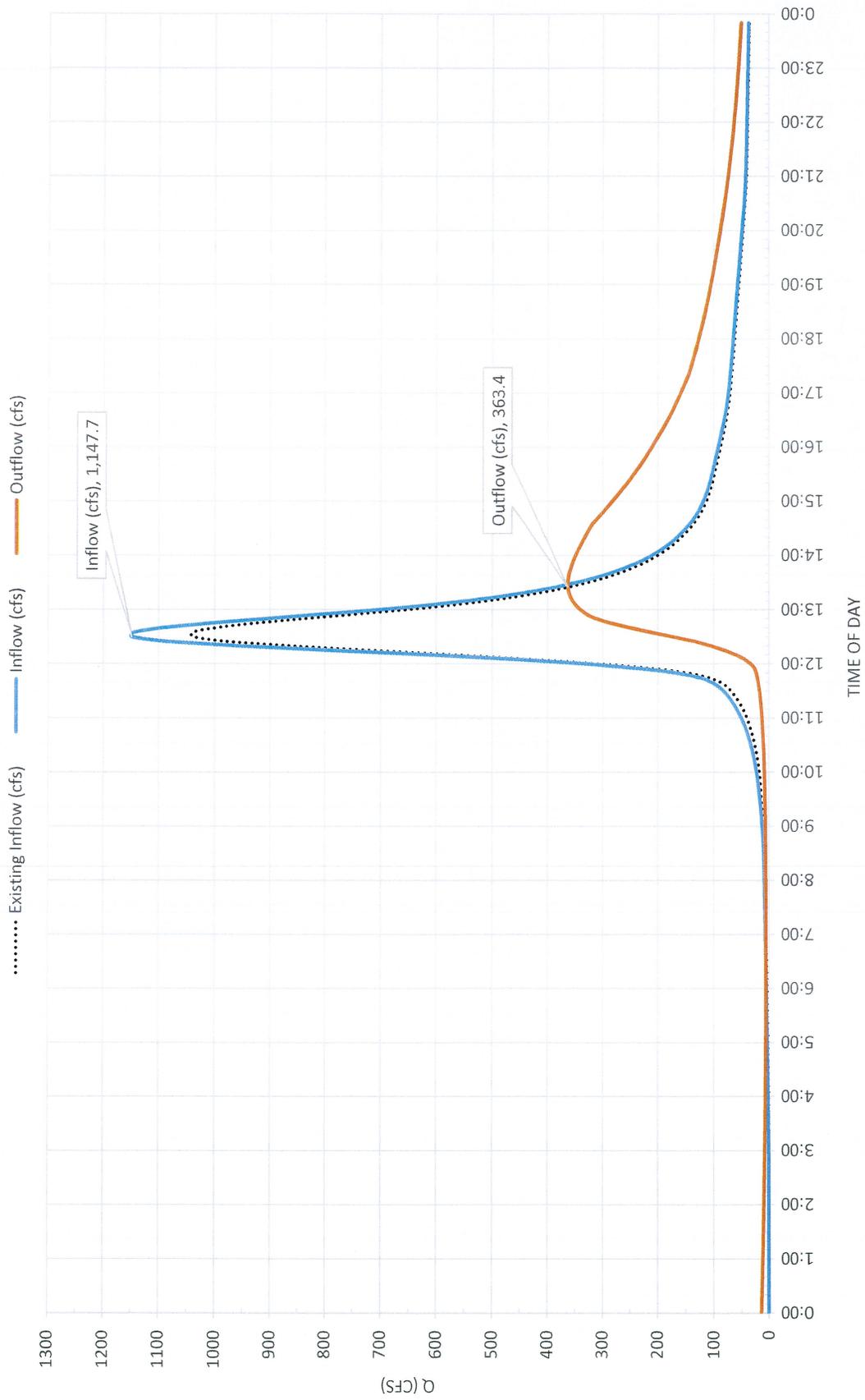
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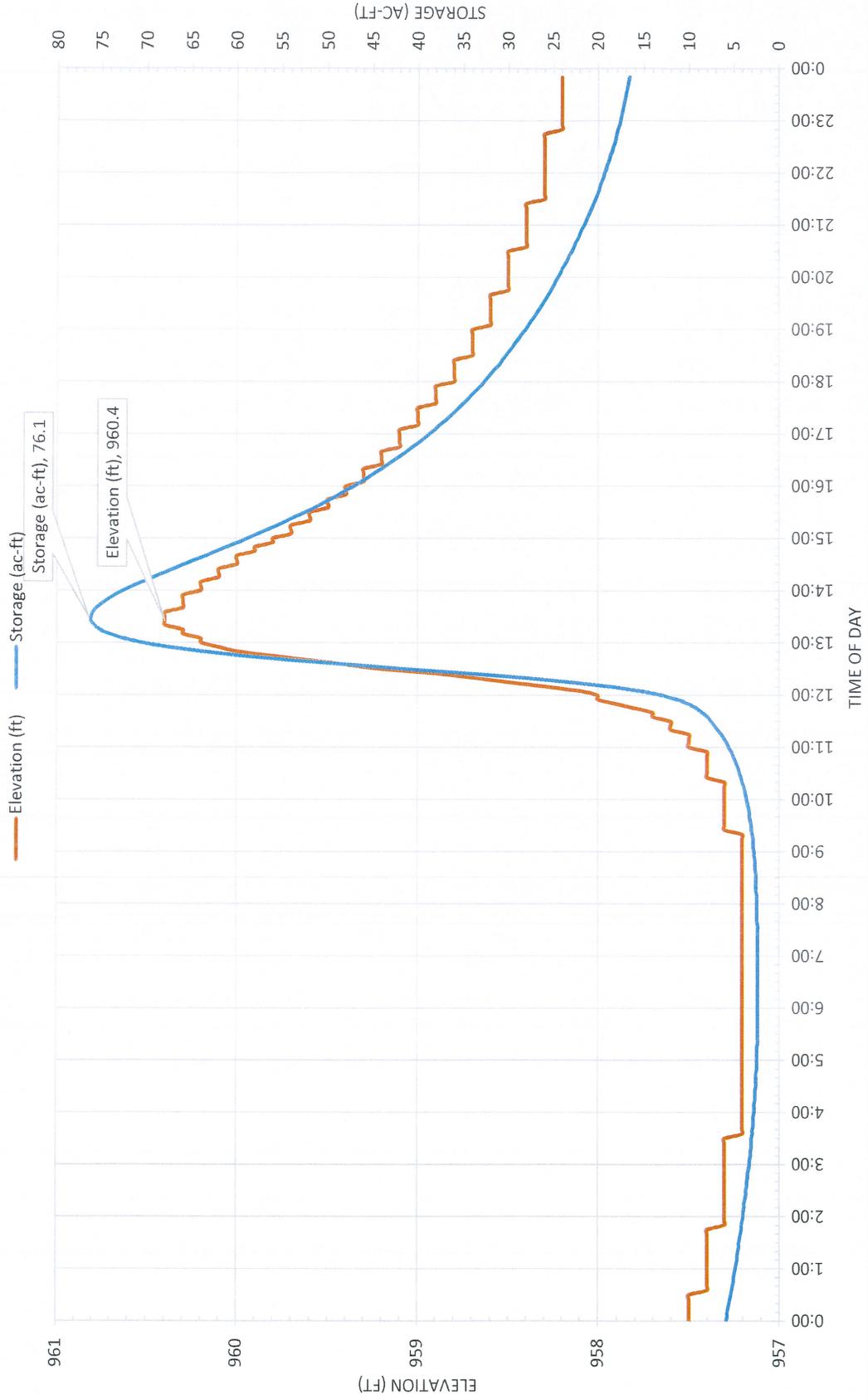
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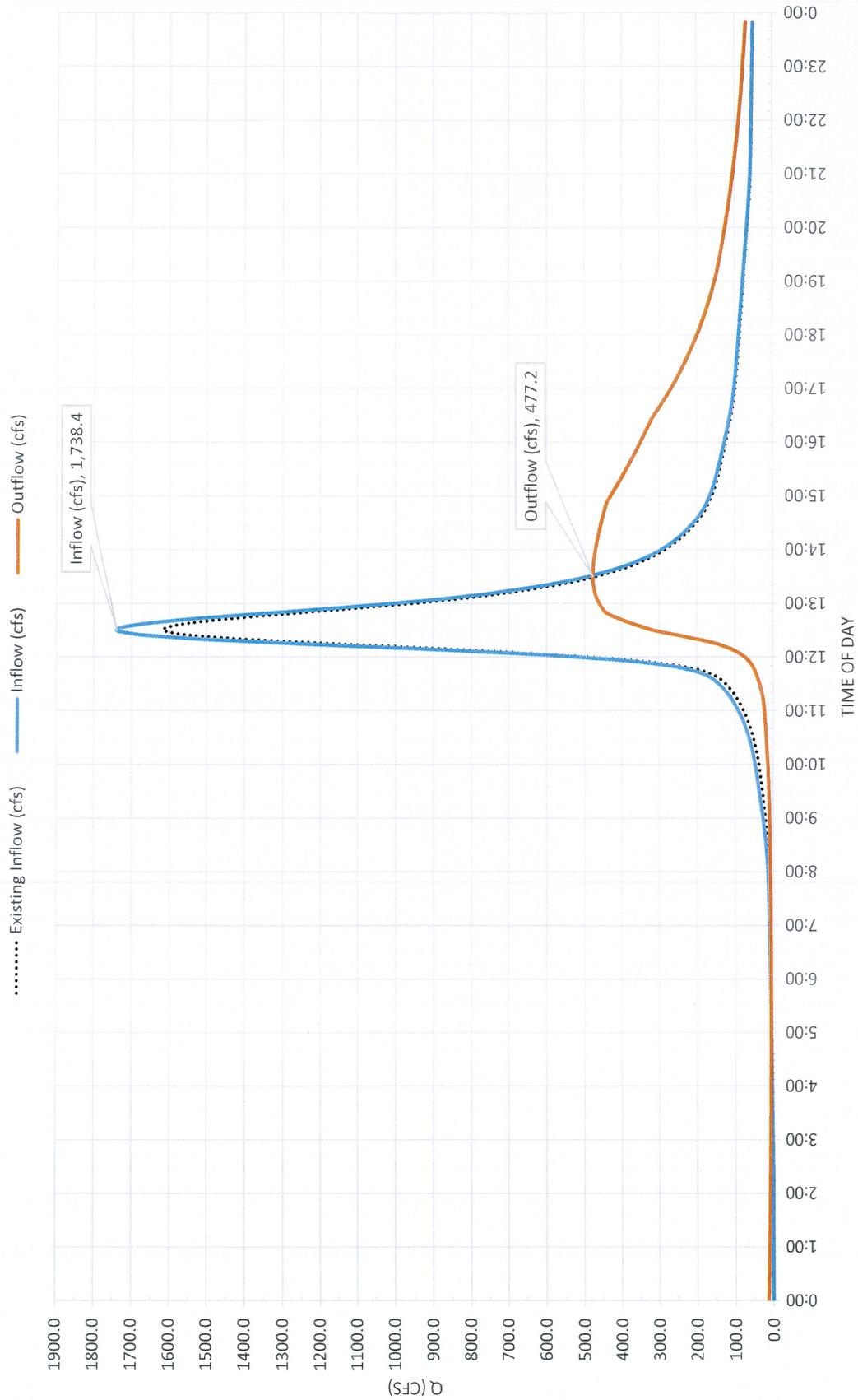
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2-YEAR STORM EVENT  
WITH FUTURE CID LAND USE**



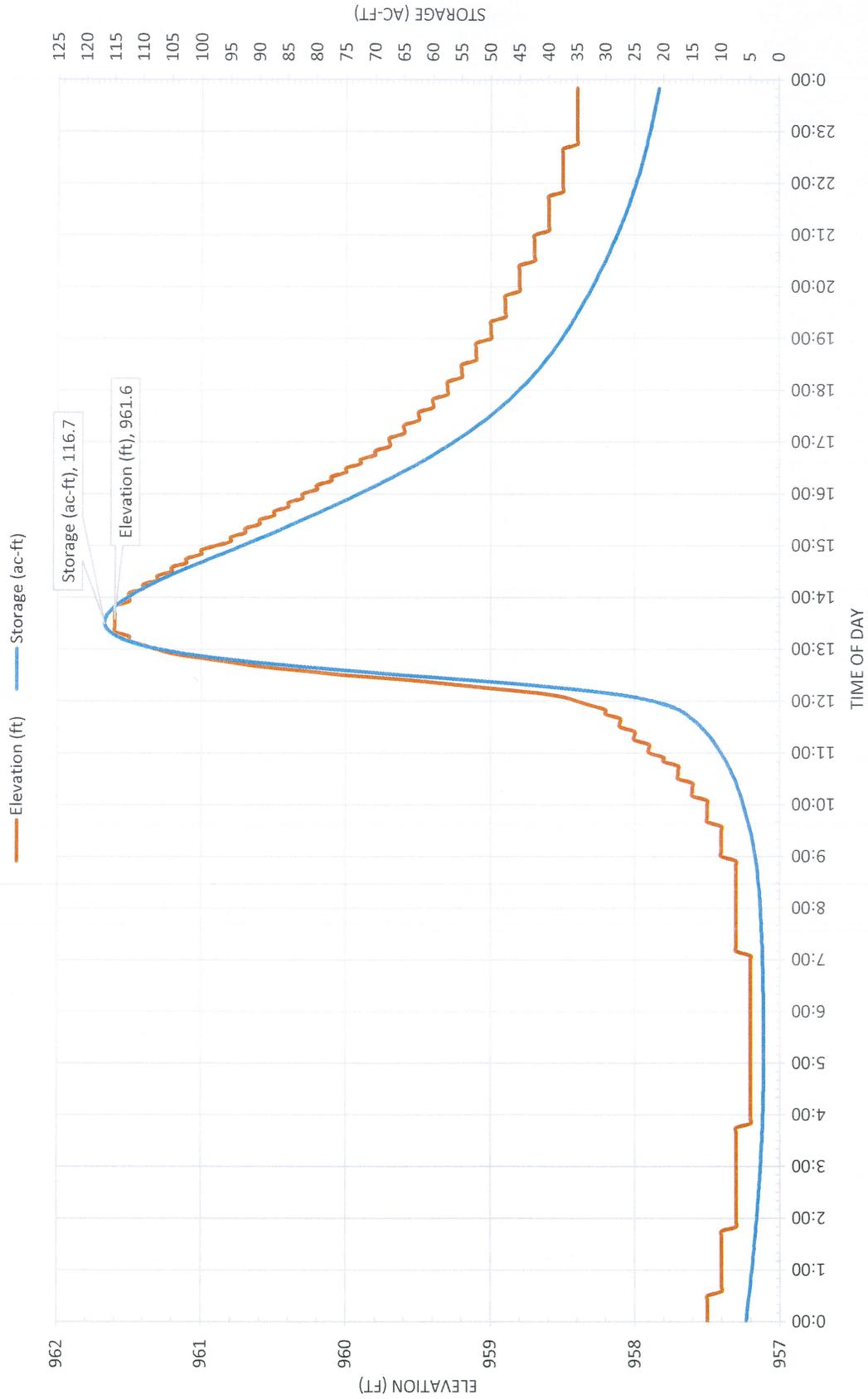
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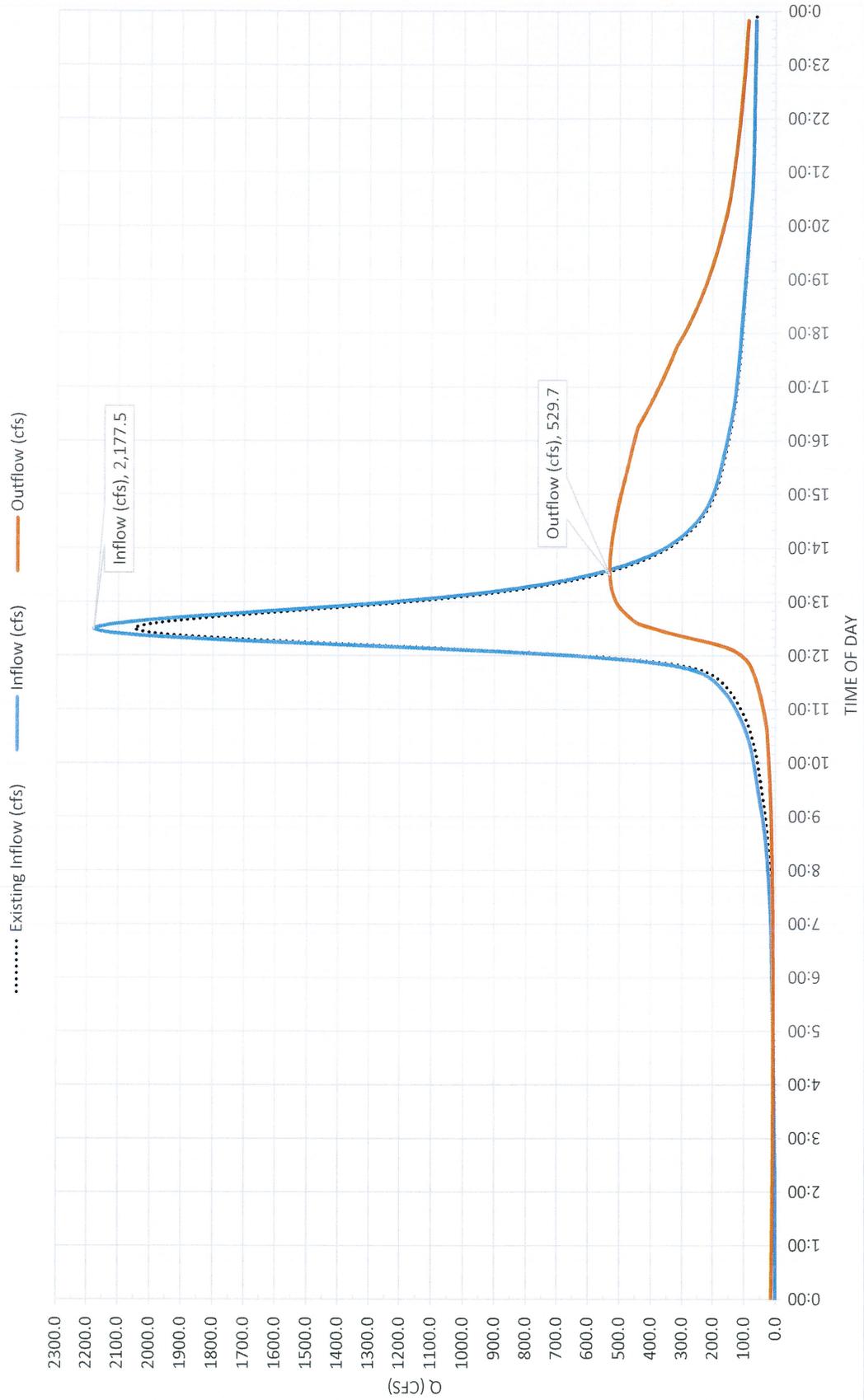
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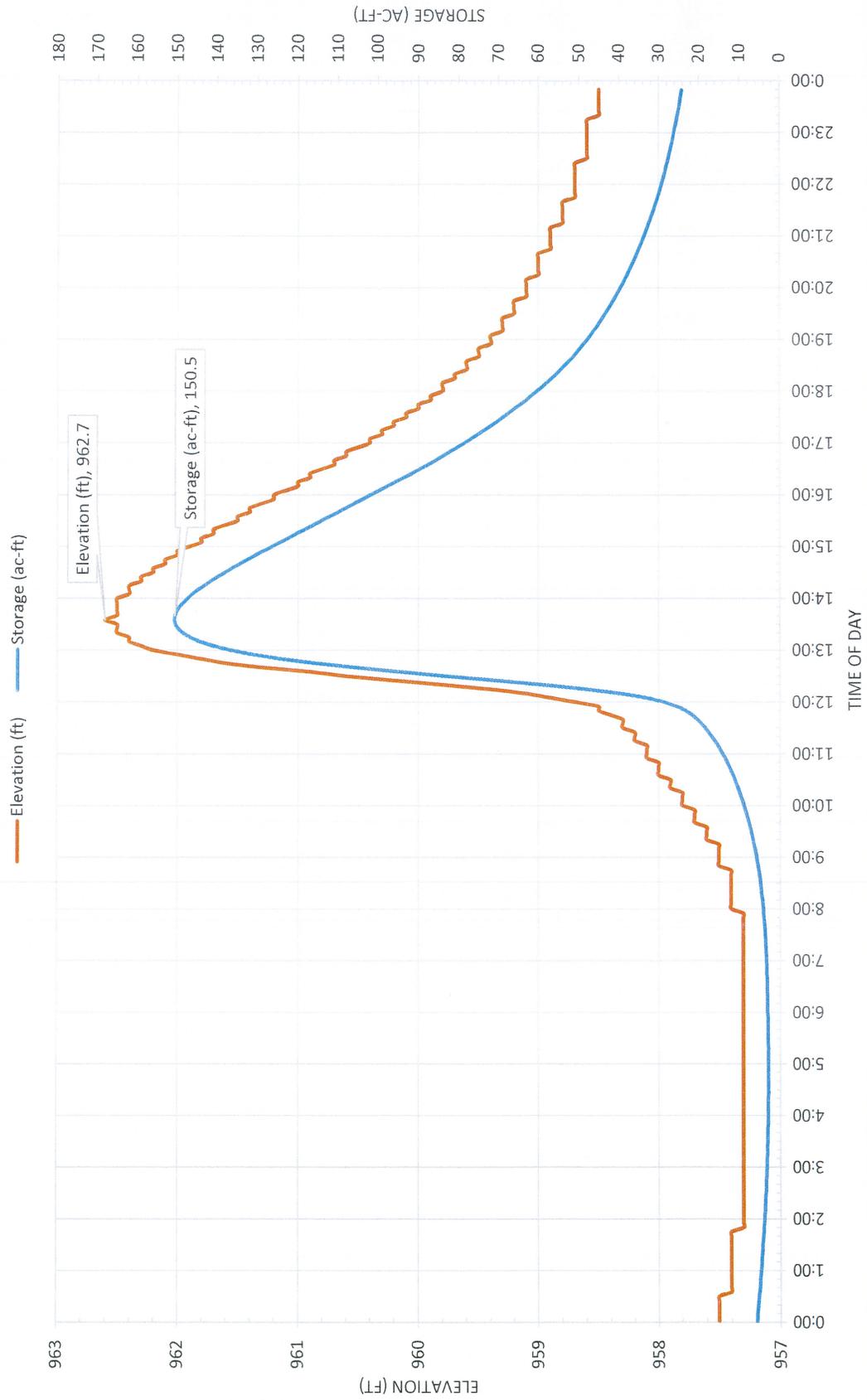
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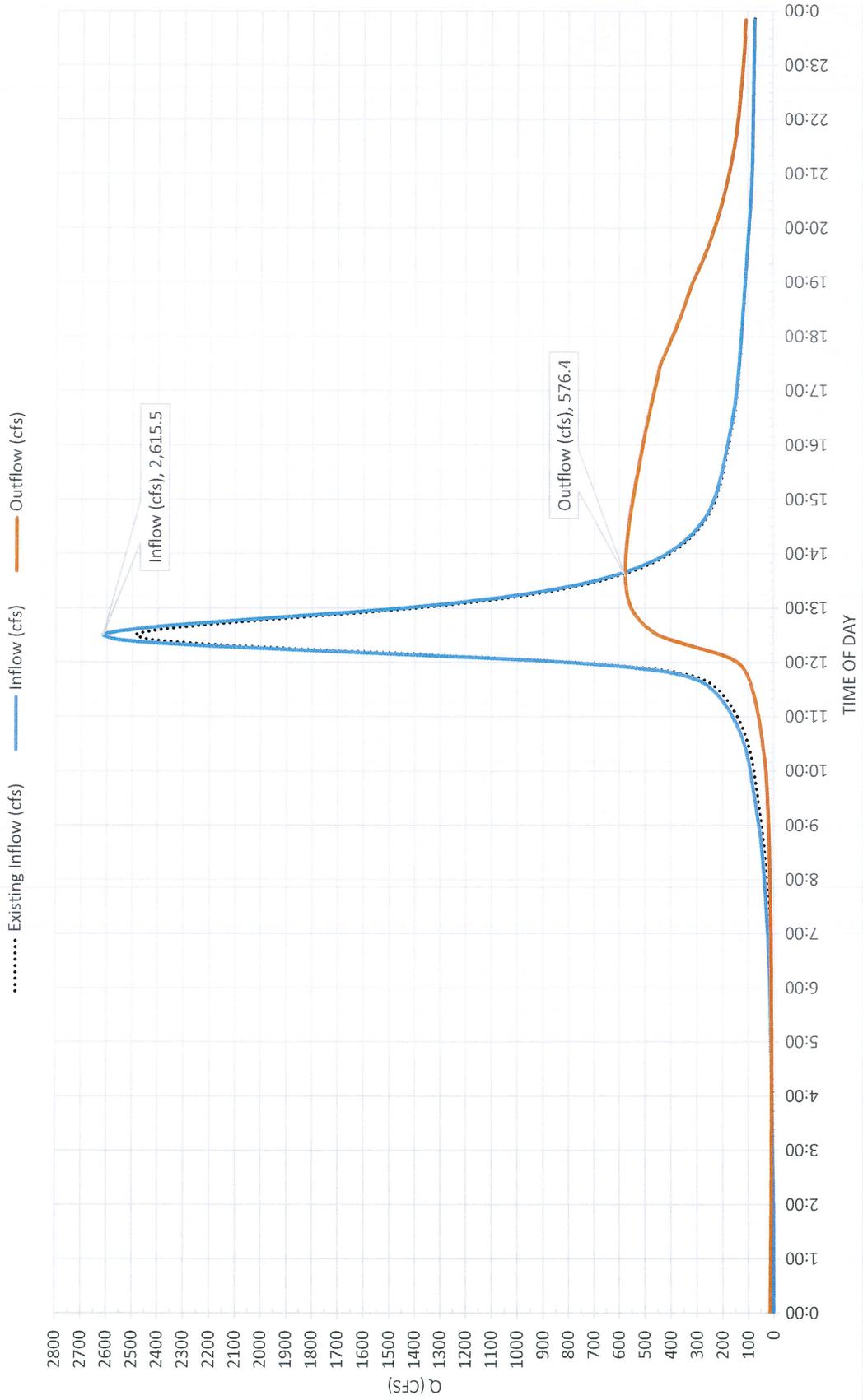
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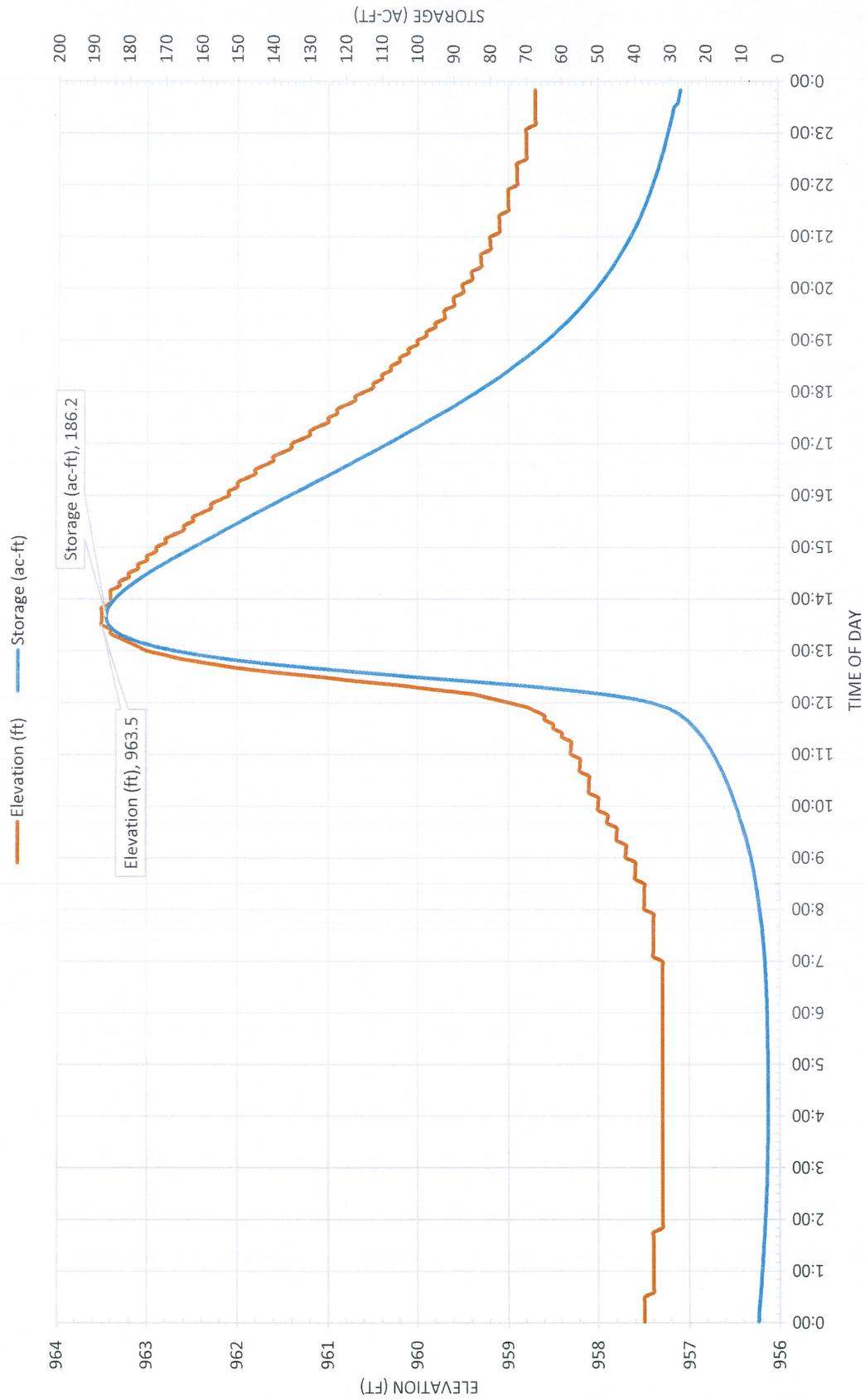
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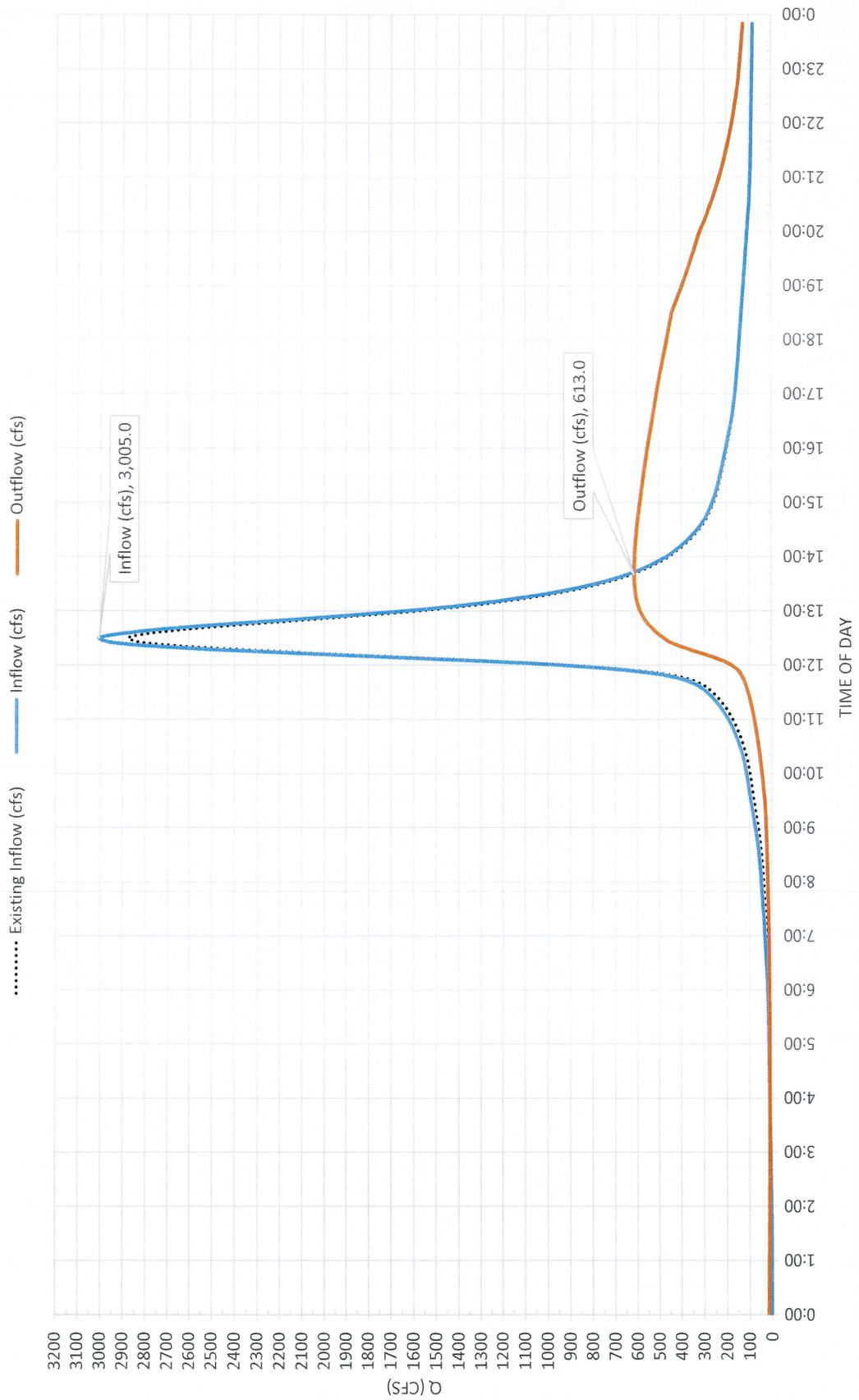
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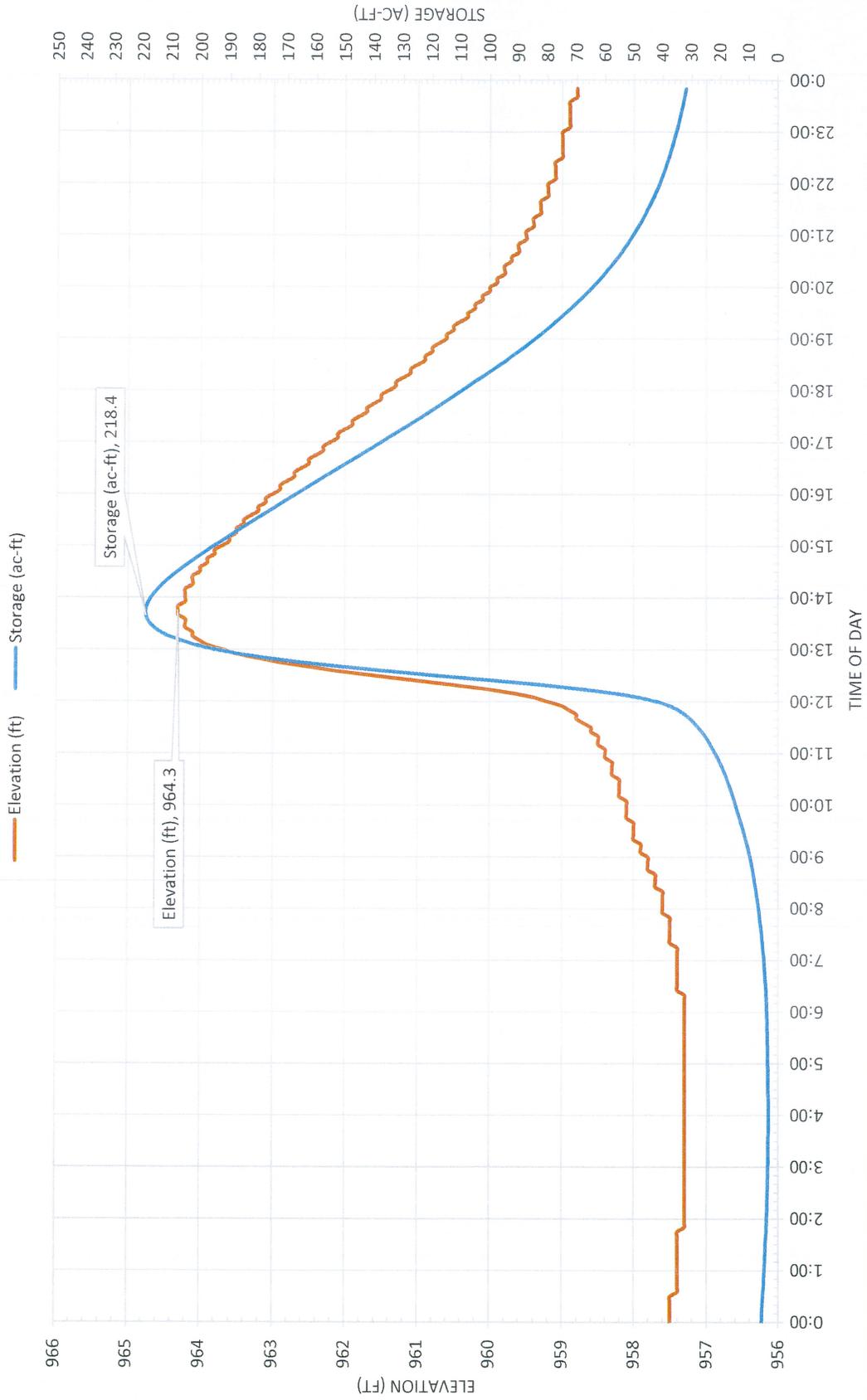
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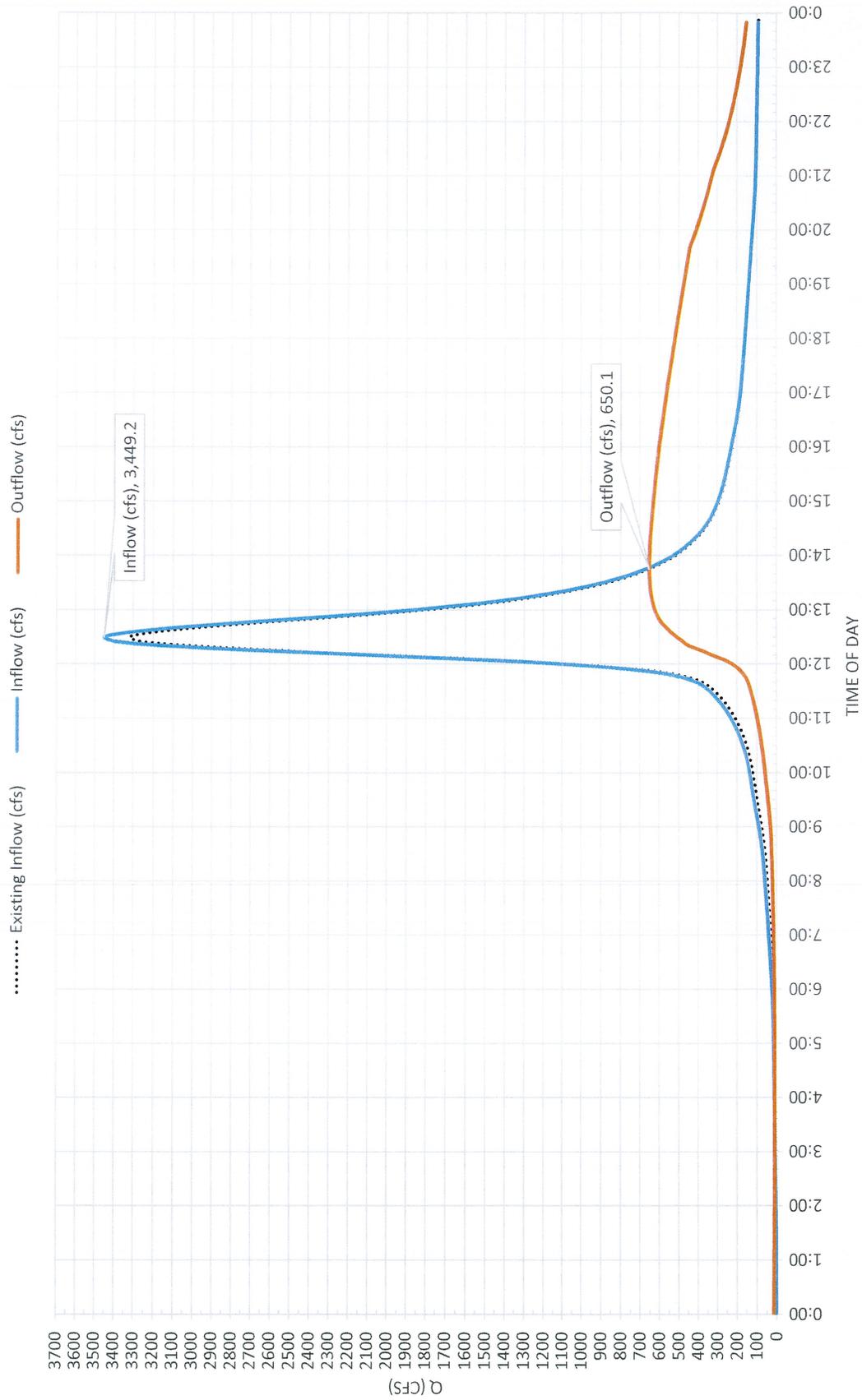
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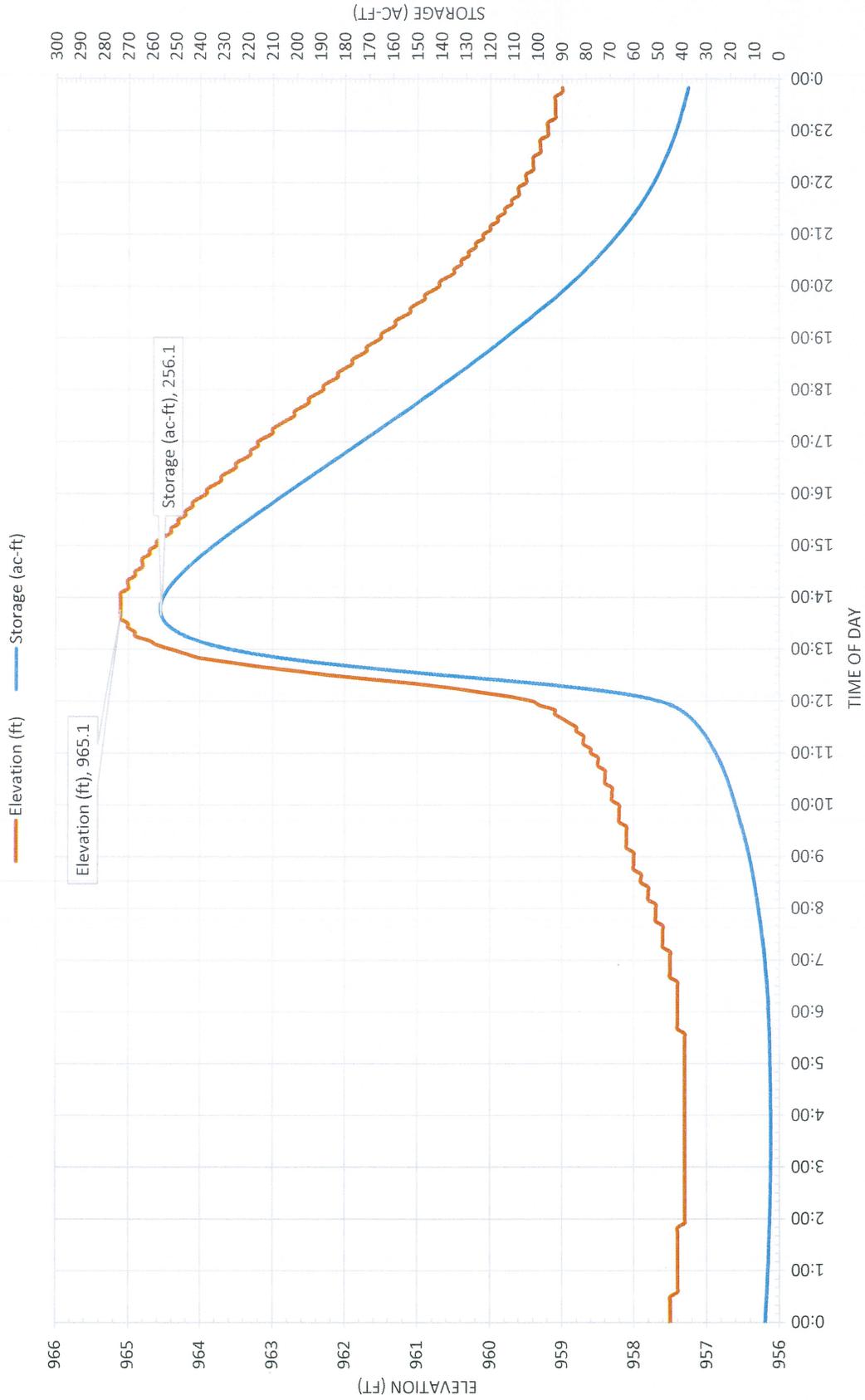
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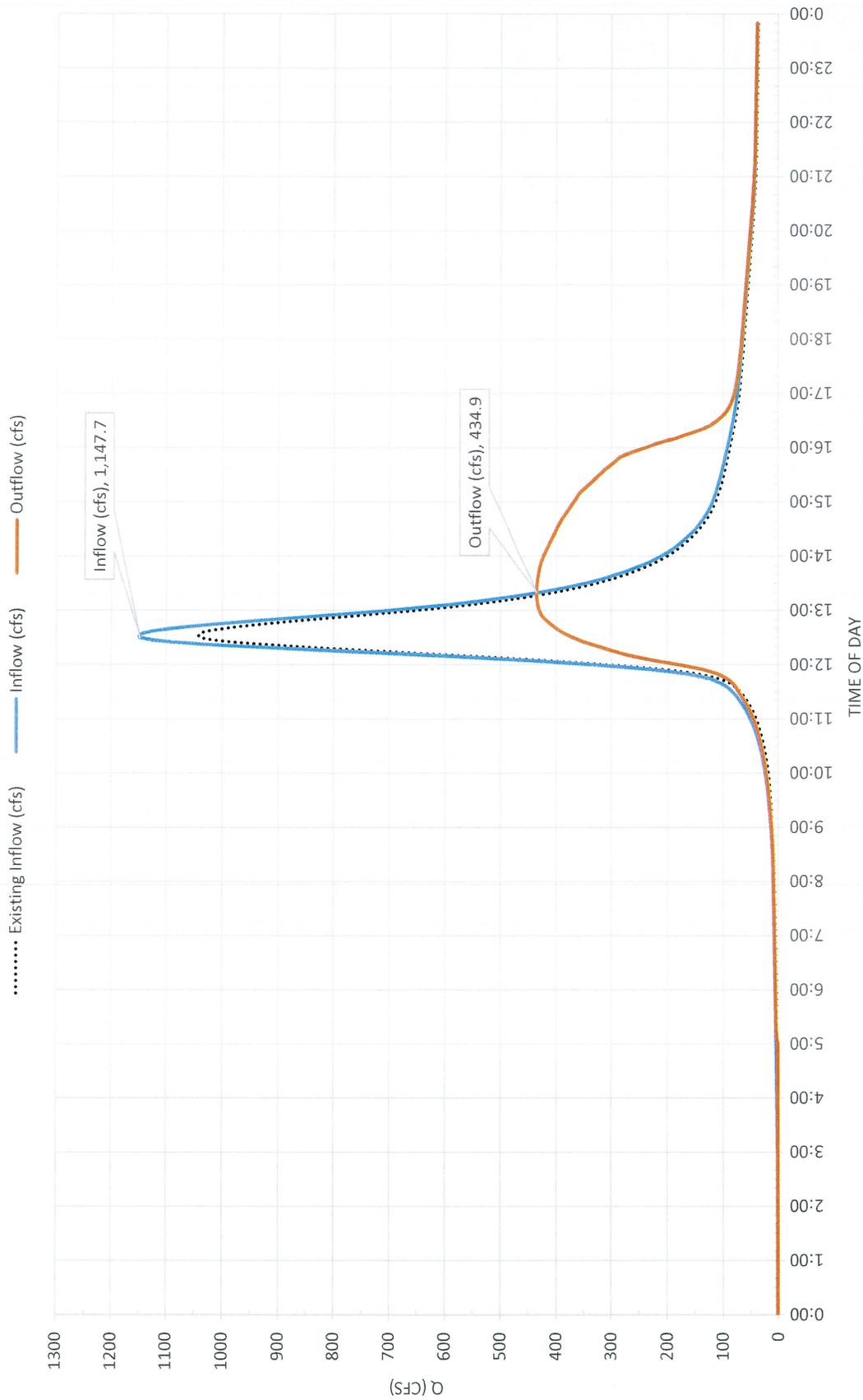
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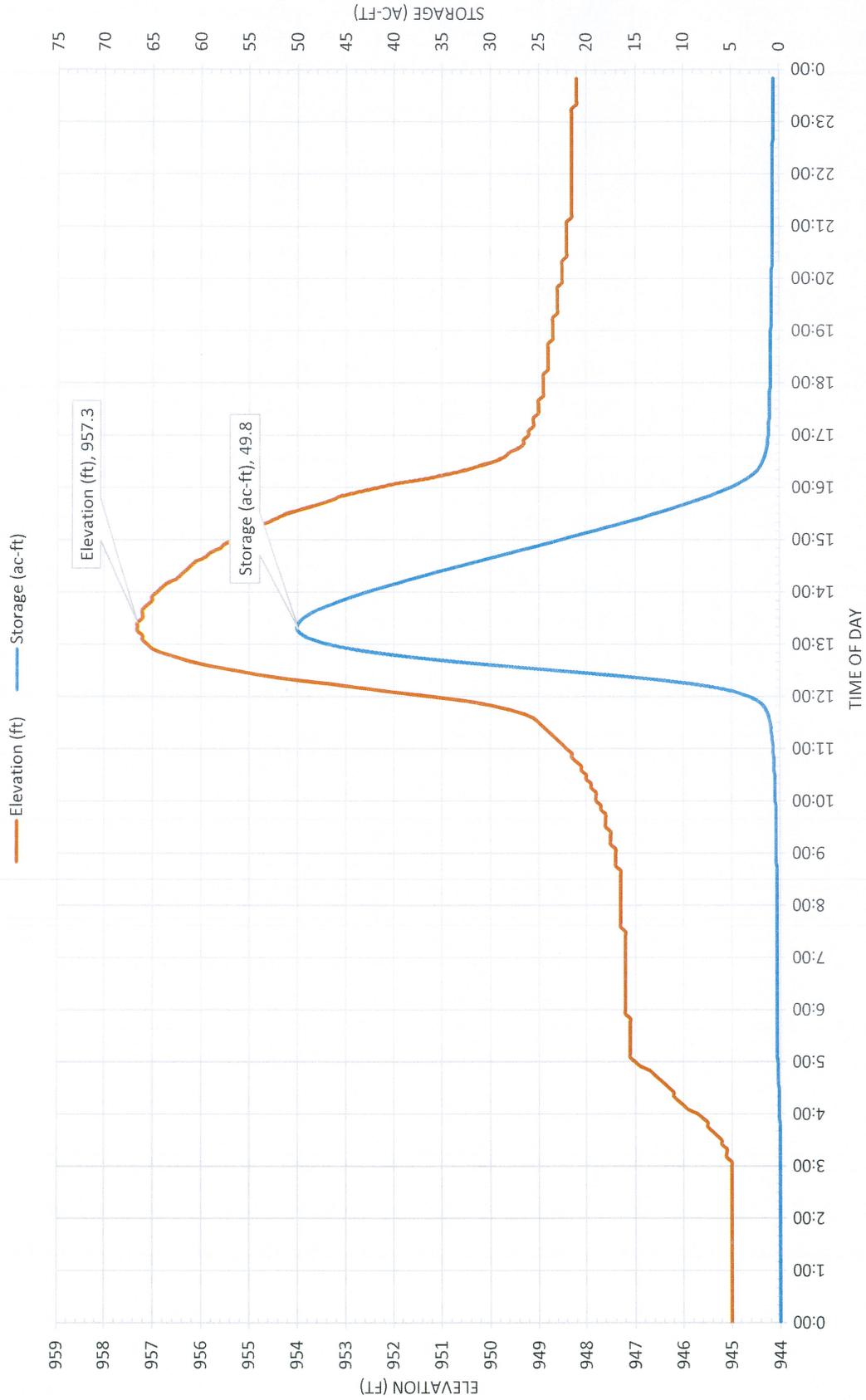
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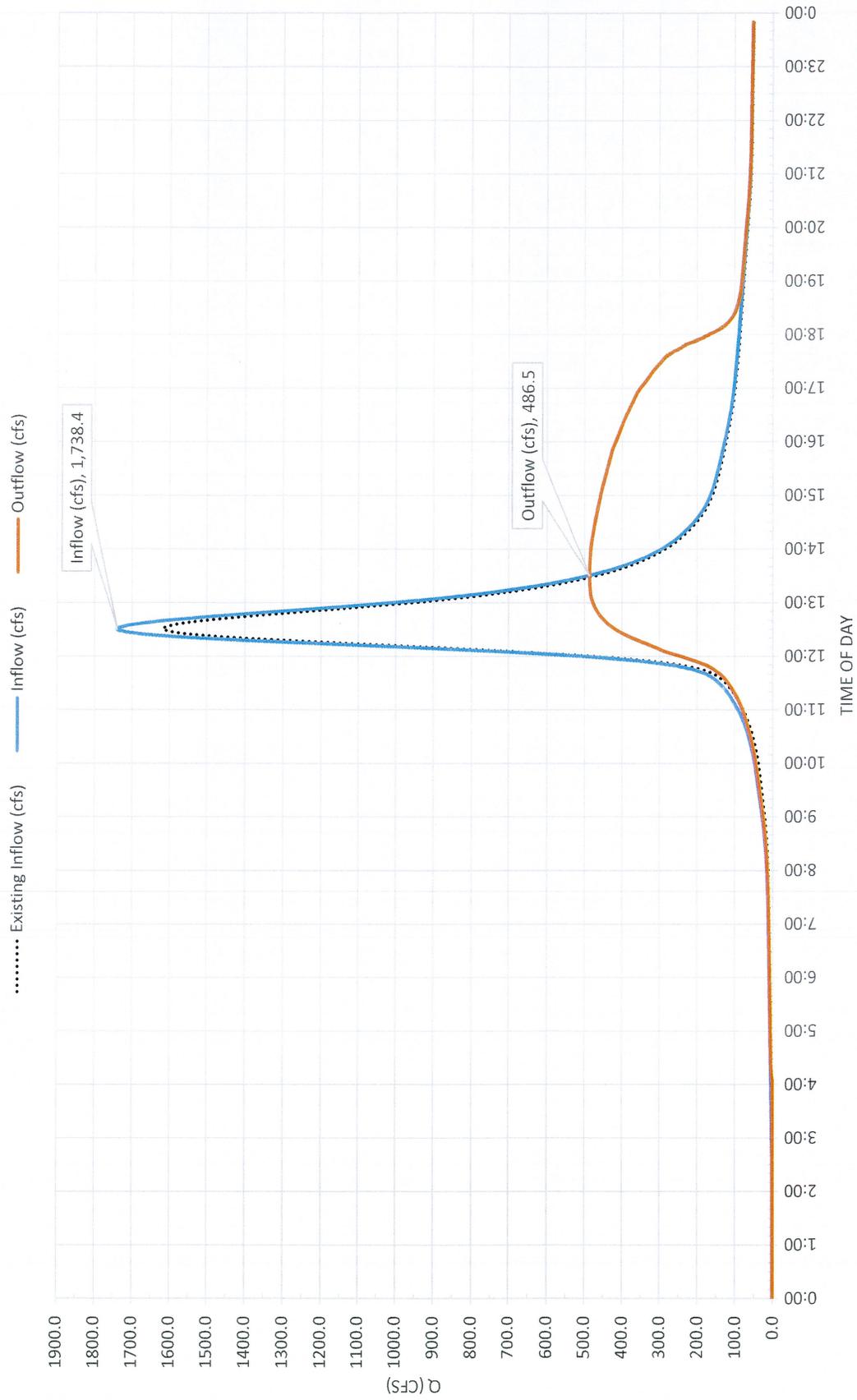
**DRY-TO-WET BASIN OPTION - PHASE 1  
2-YEAR STORM EVENT  
WITH FUTURE CID LAND USE**



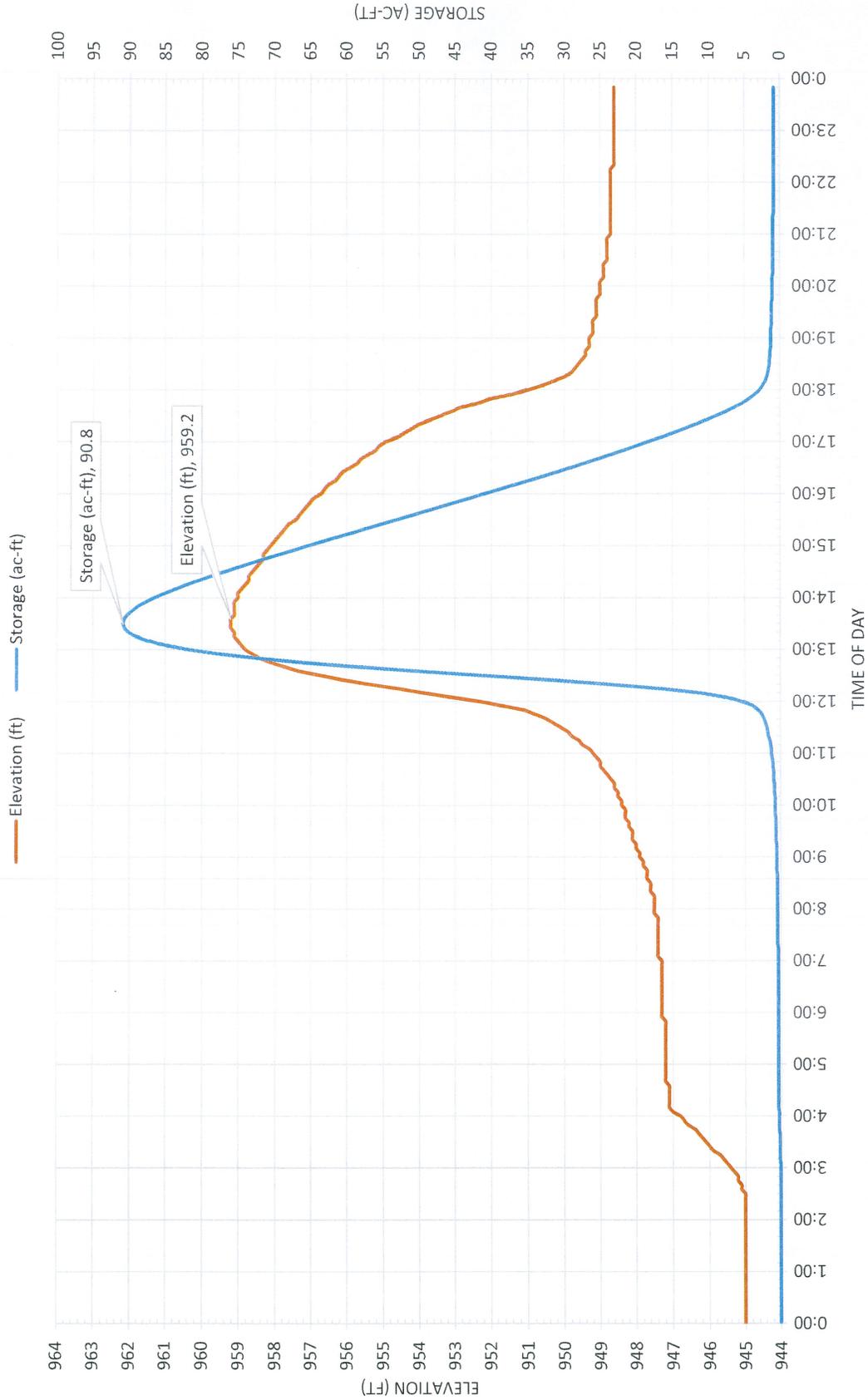
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# DRY-TO-WET BASIN OPTION - PHASE 1 5-YEAR STORM EVENT WITH FUTURE CID LAND USE



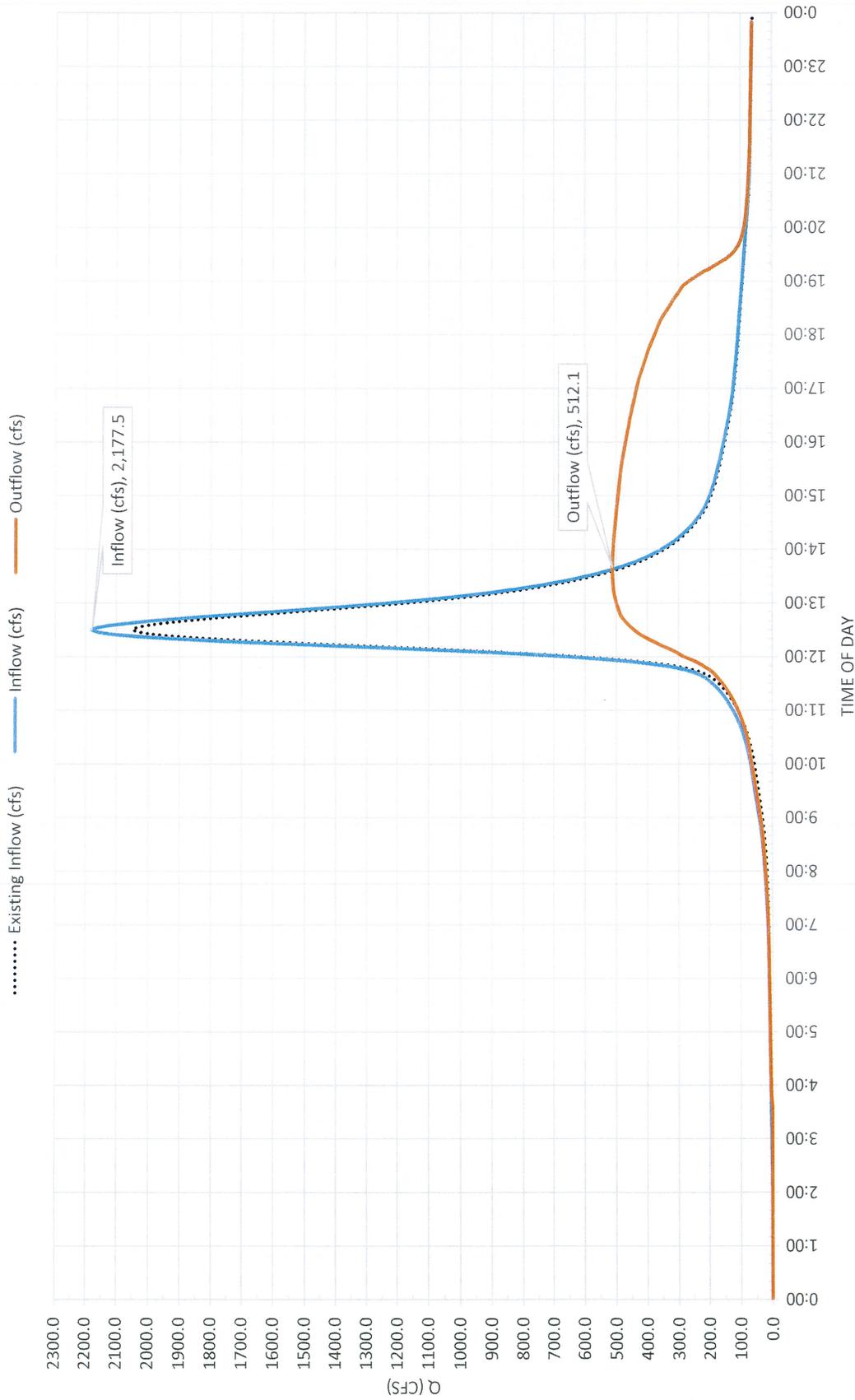
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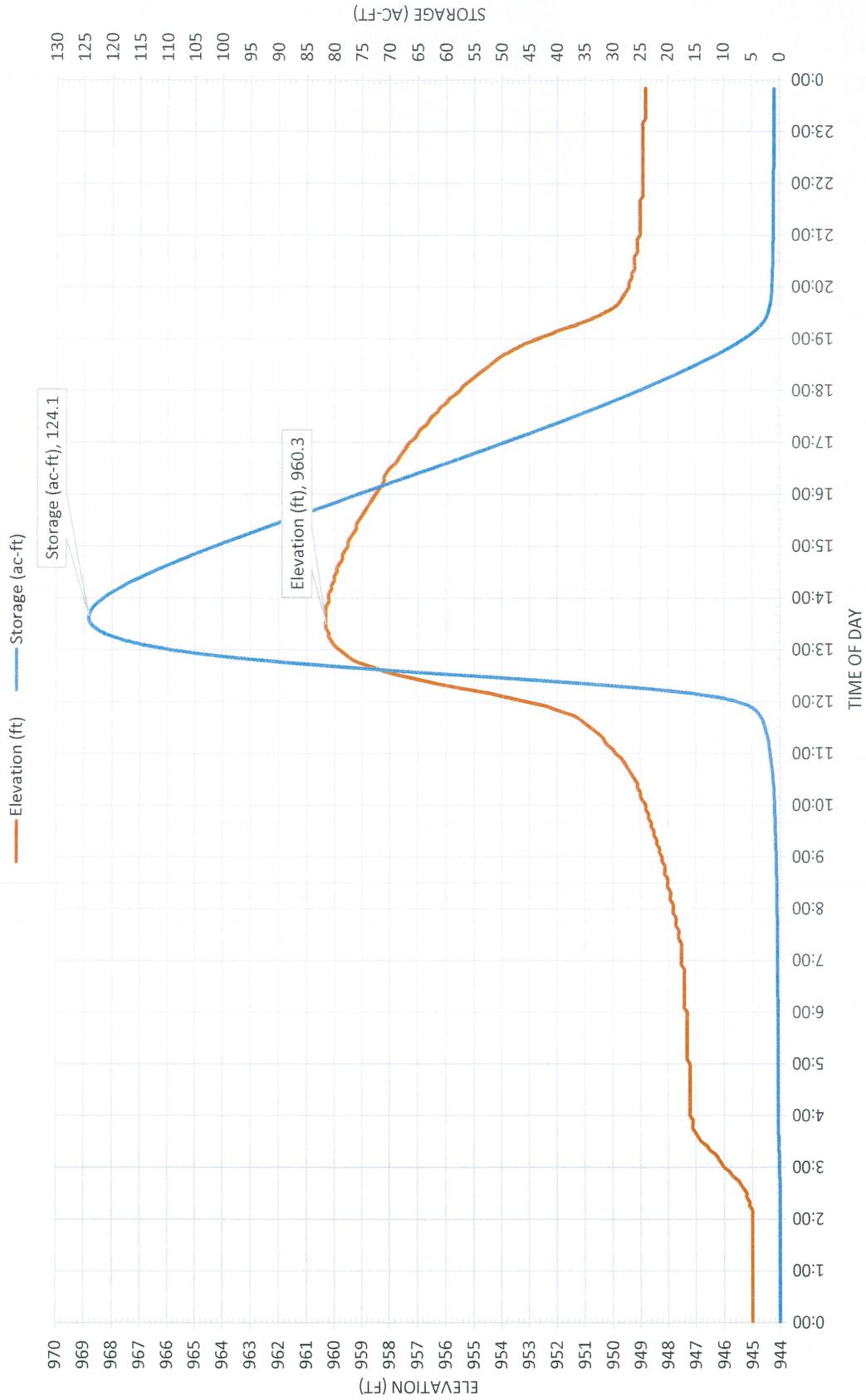
# DRY-TO-WET BASIN OPTION - PHASE 1

## 10-YEAR STORM EVENT

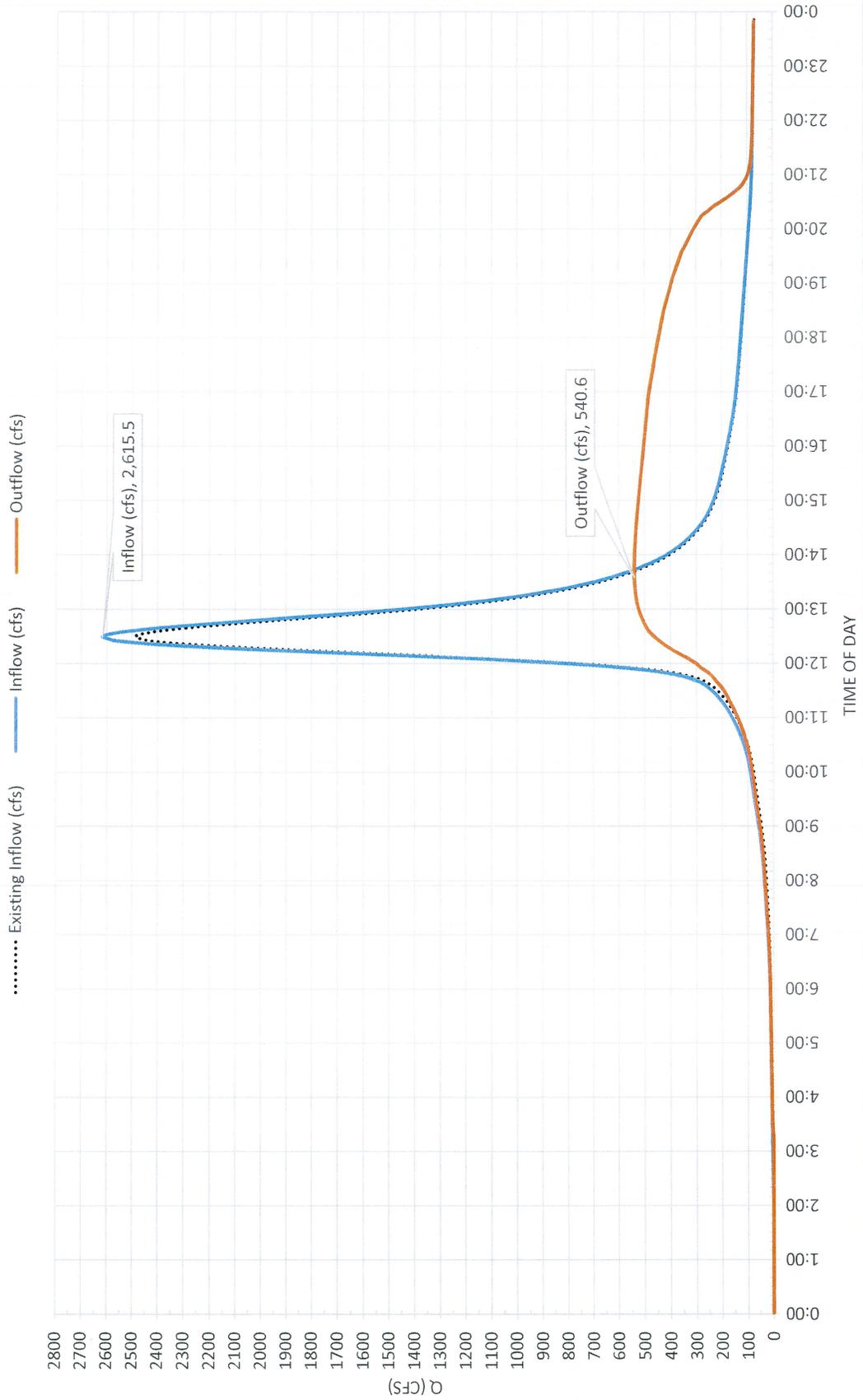
### WITH FUTURE CID LAND USE



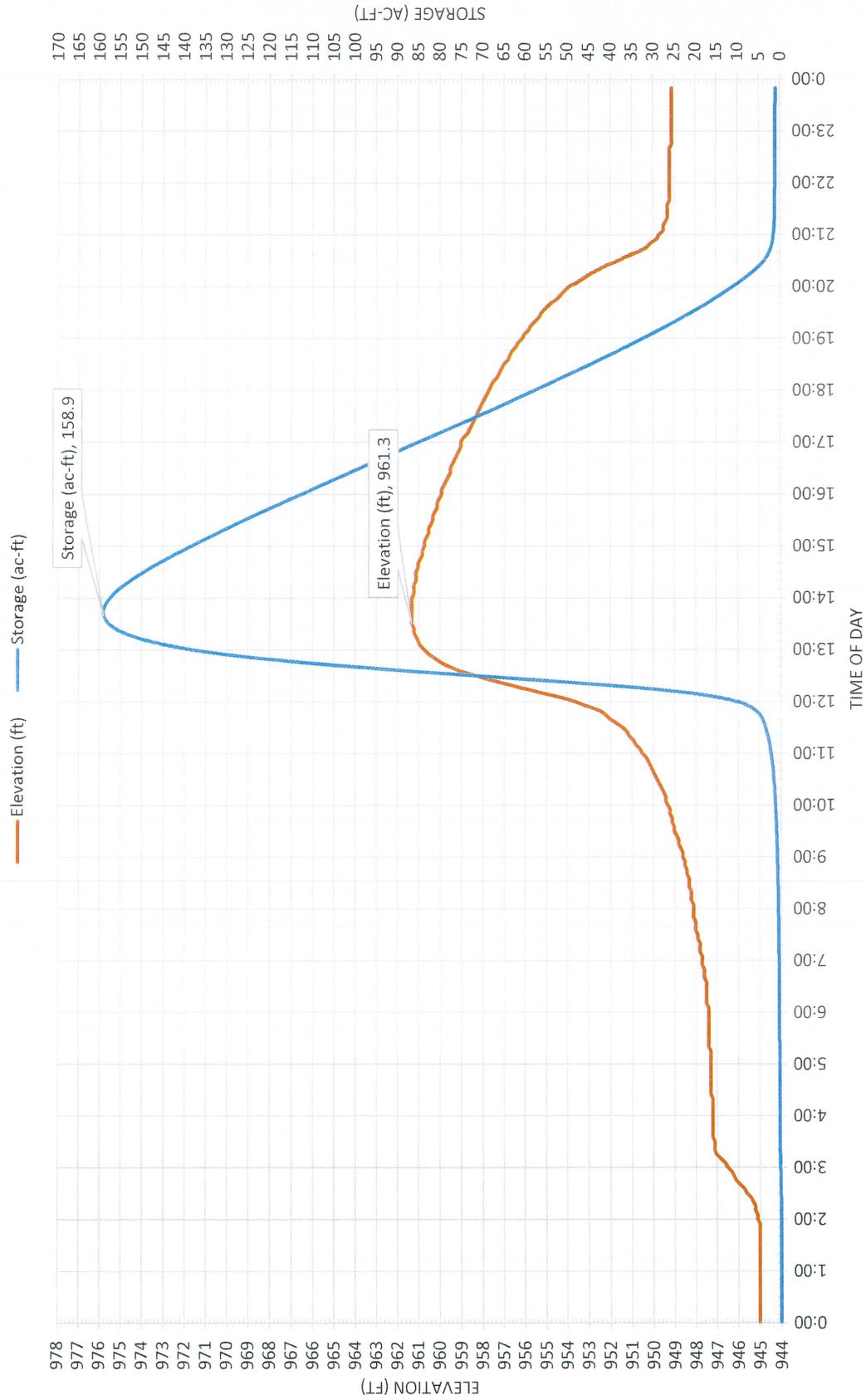
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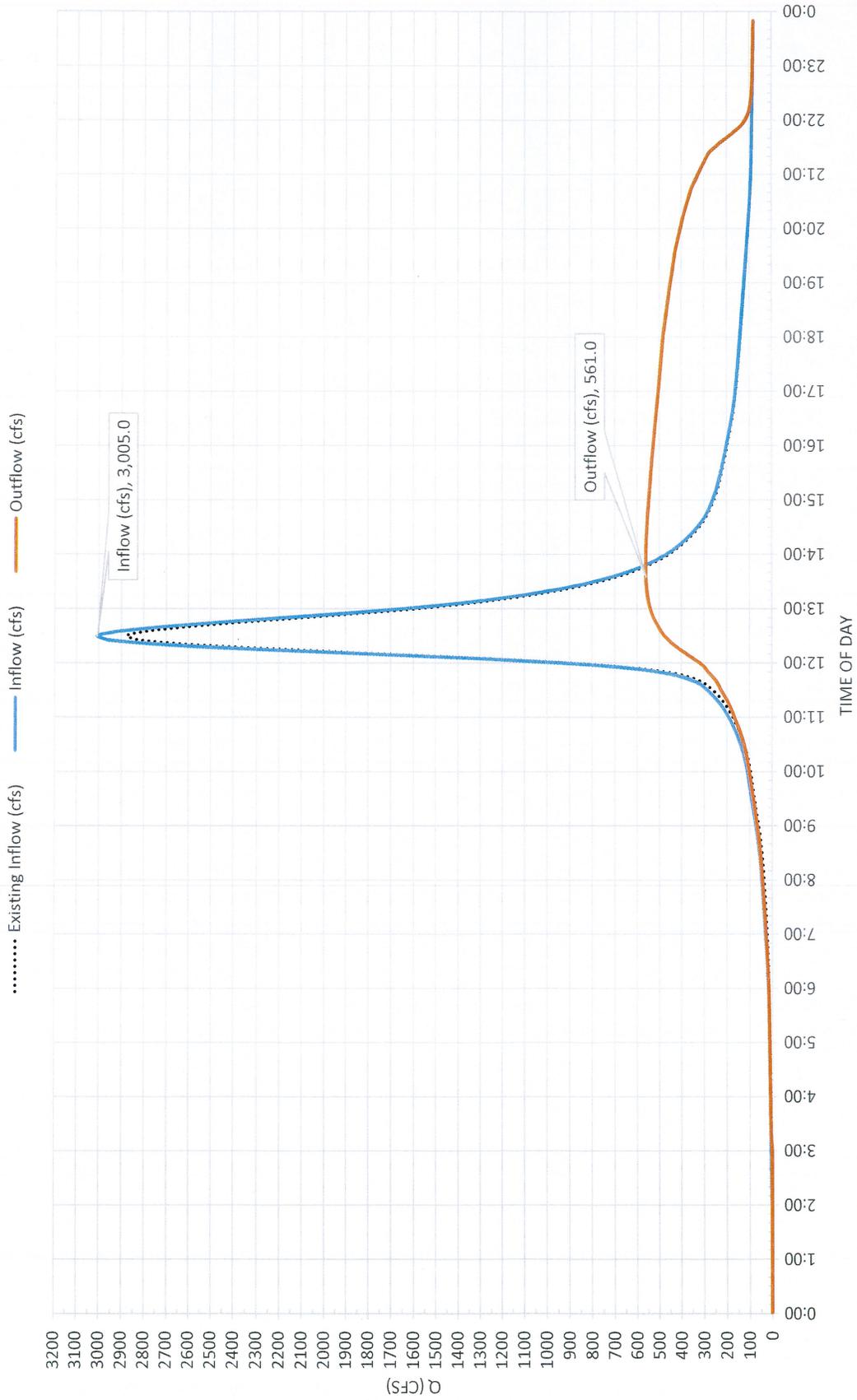
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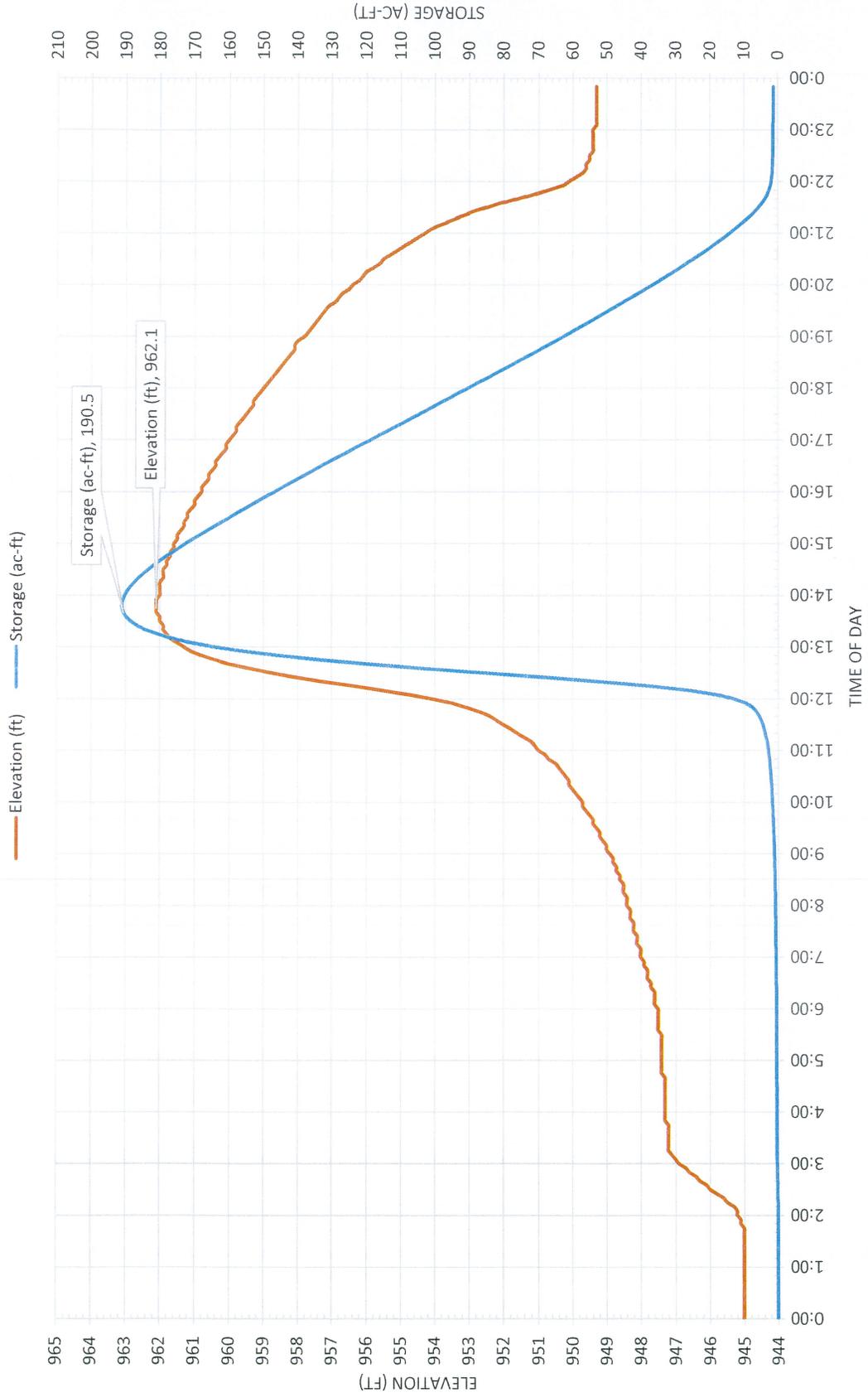
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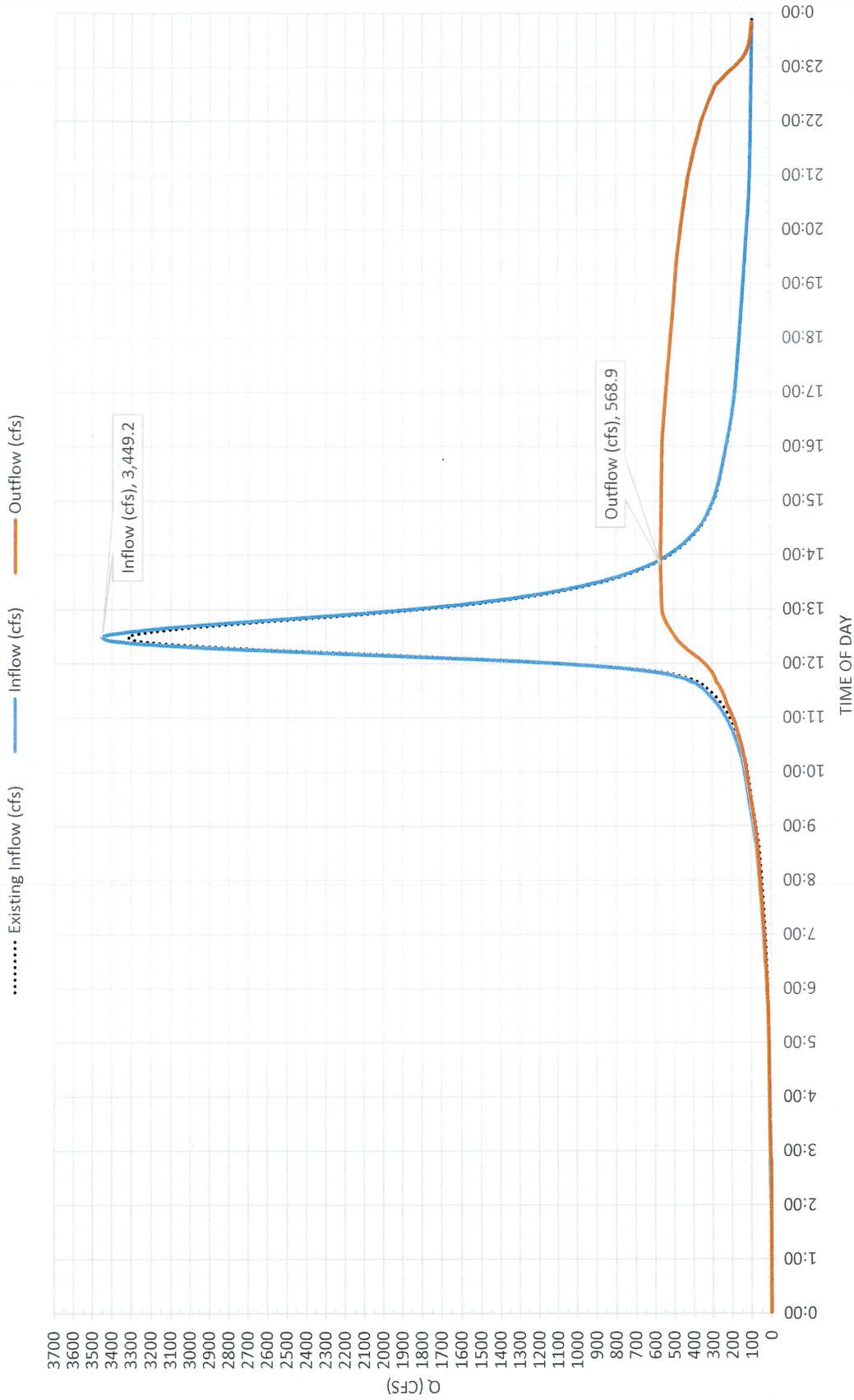
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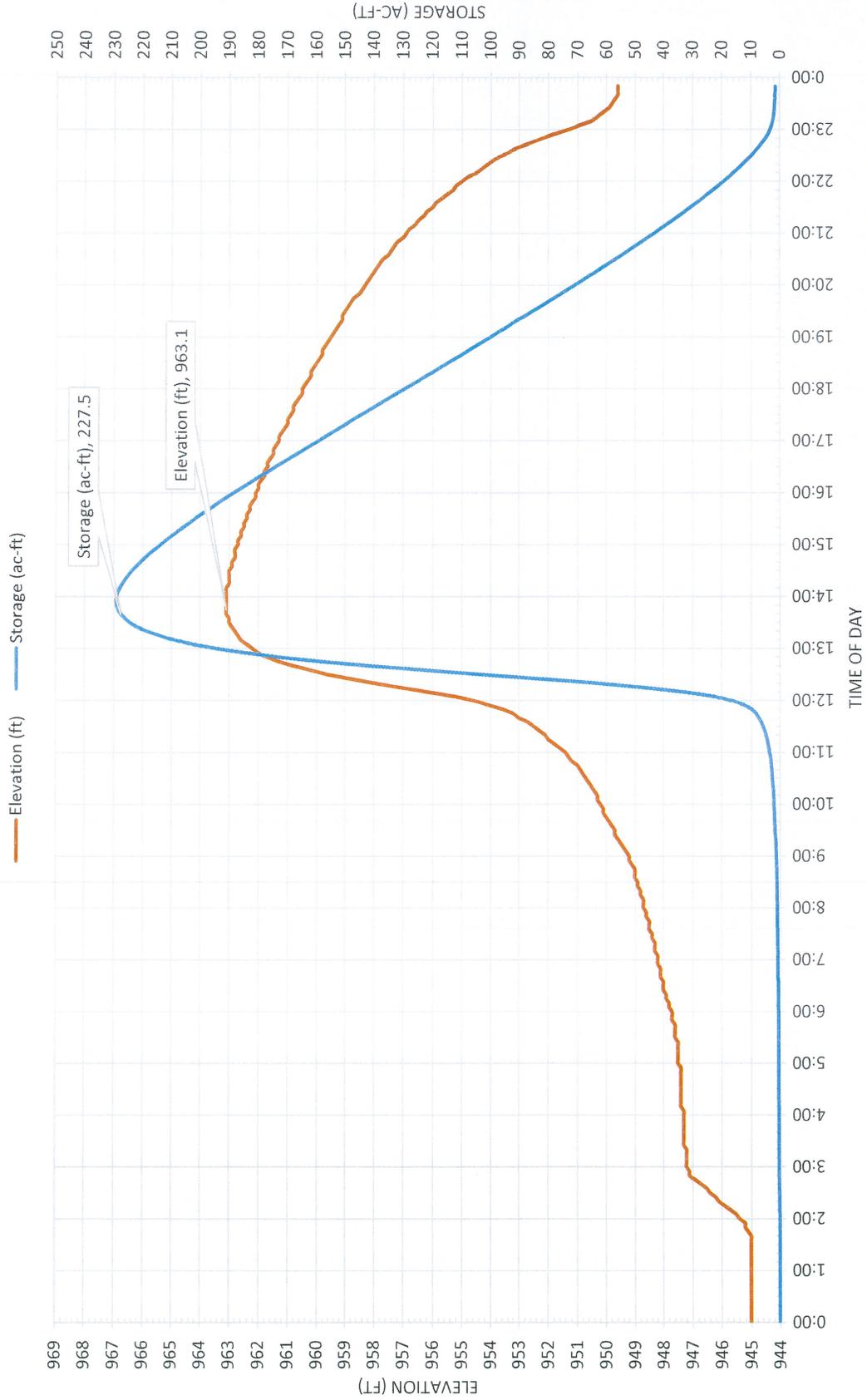
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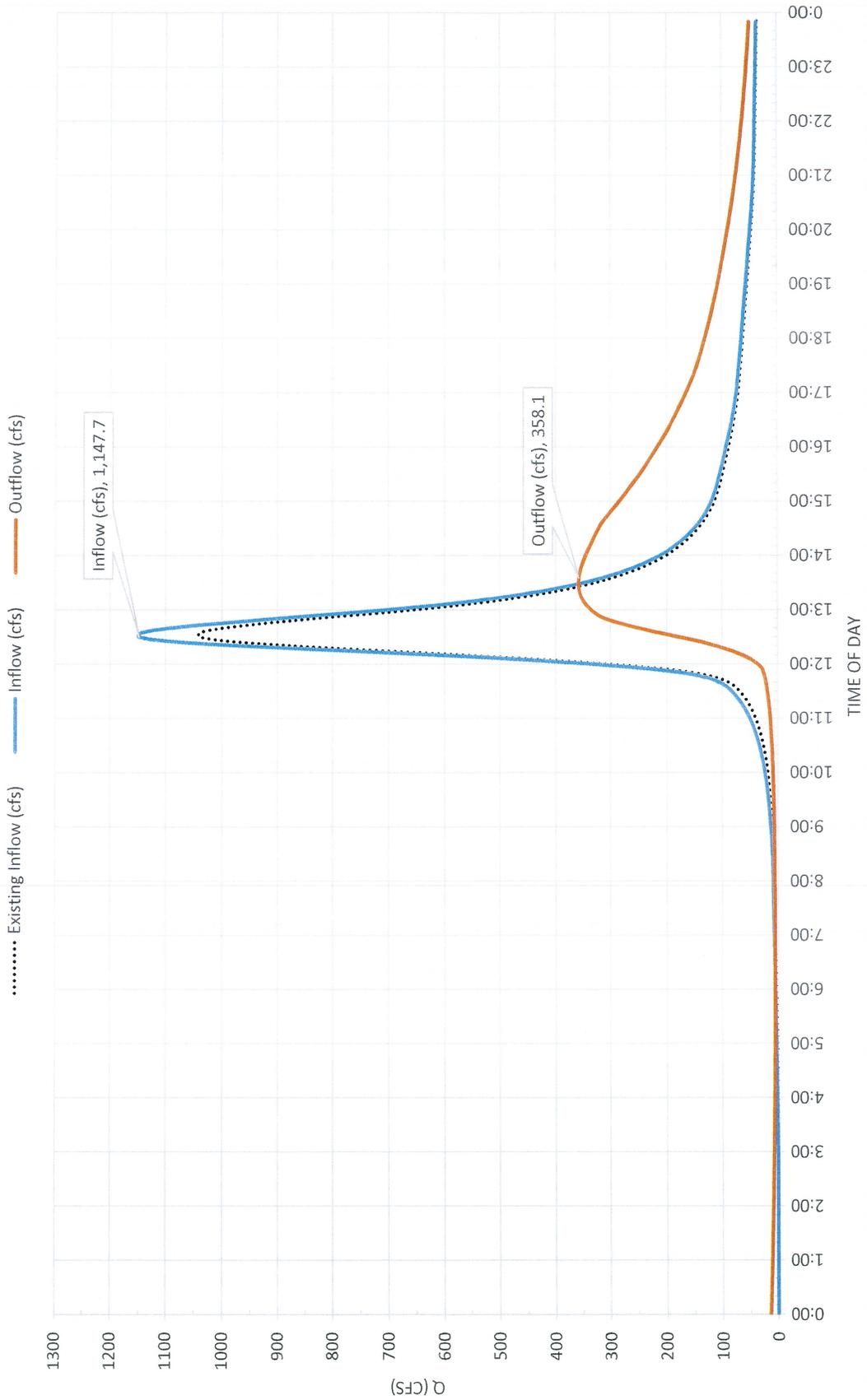
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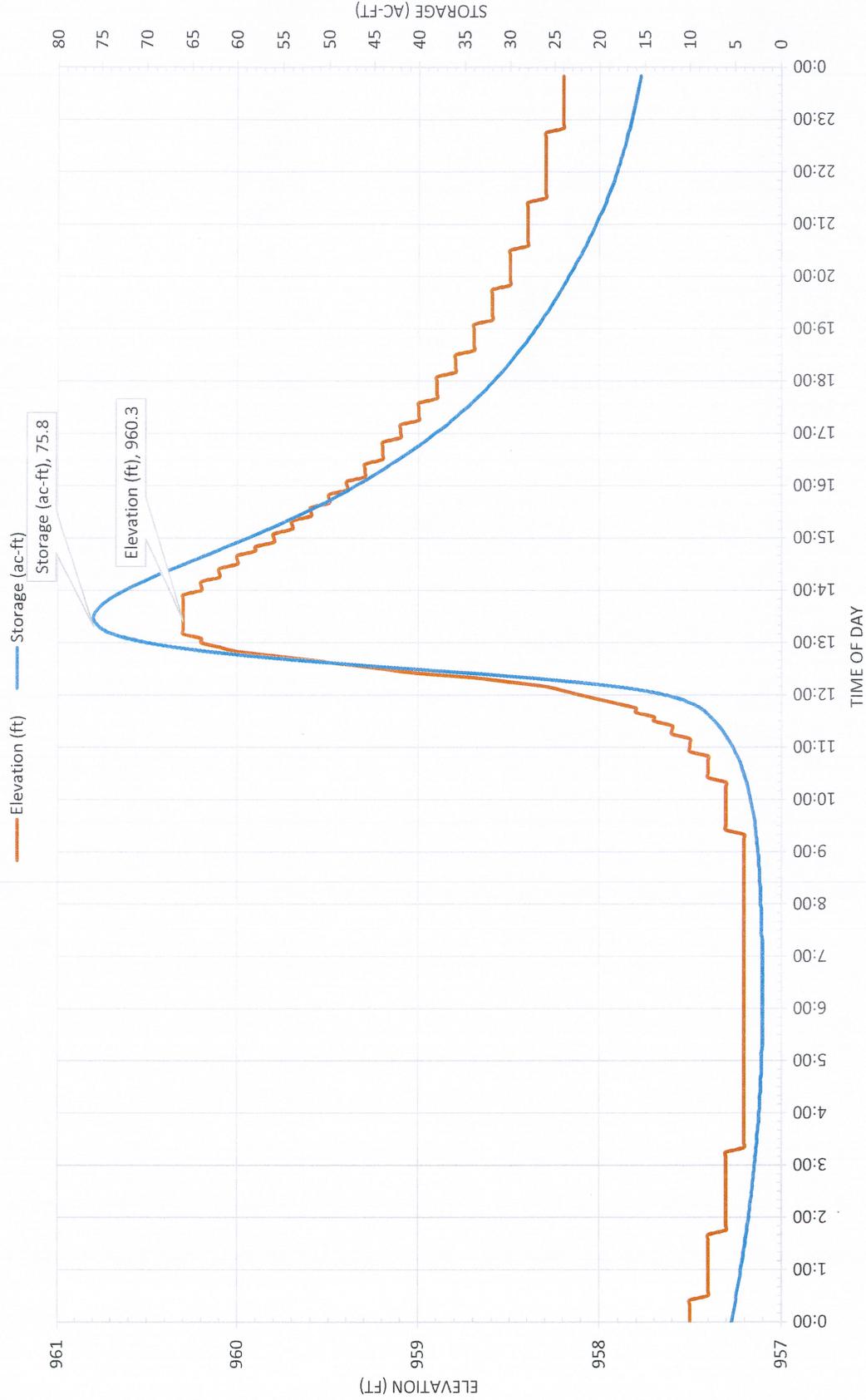
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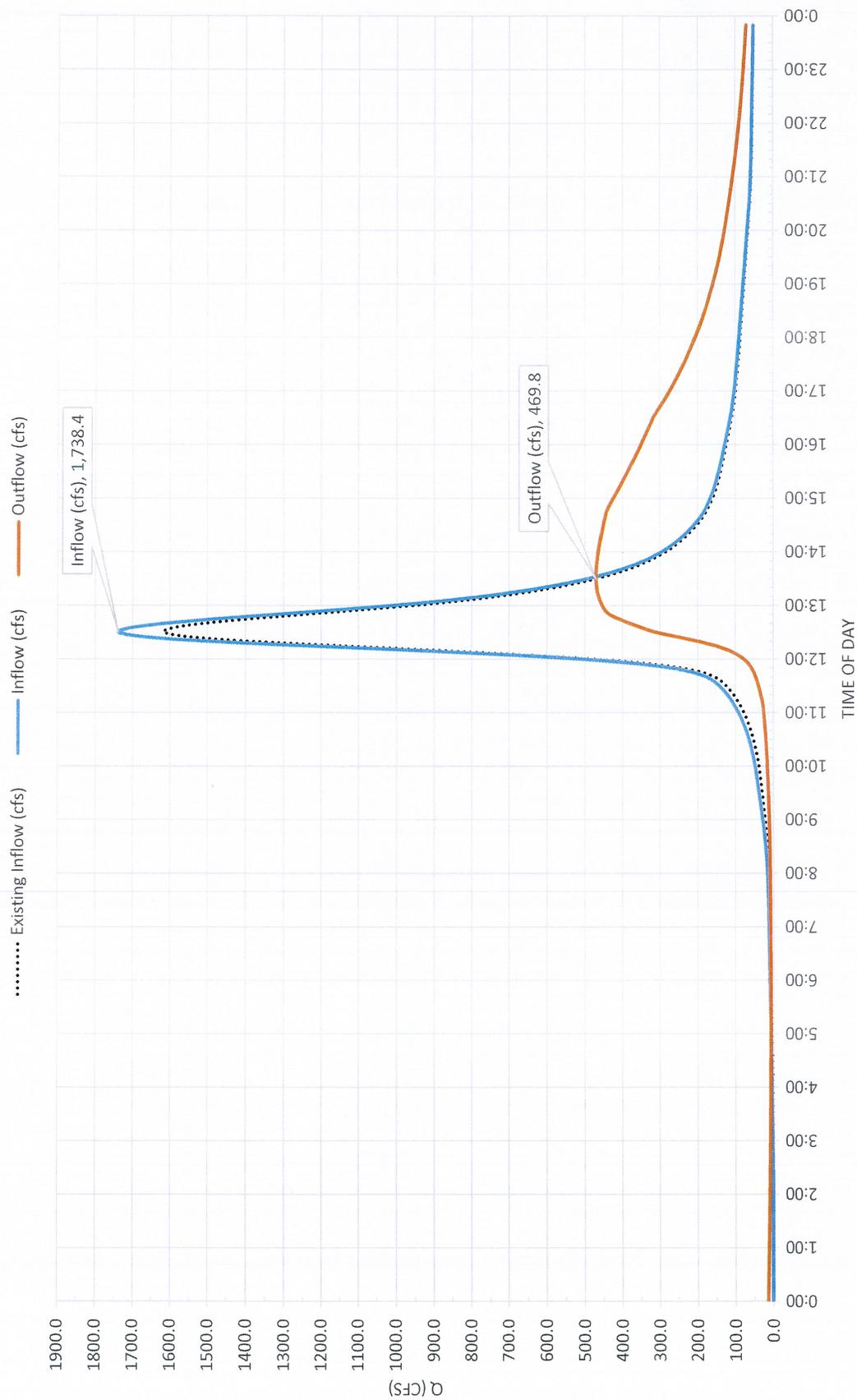
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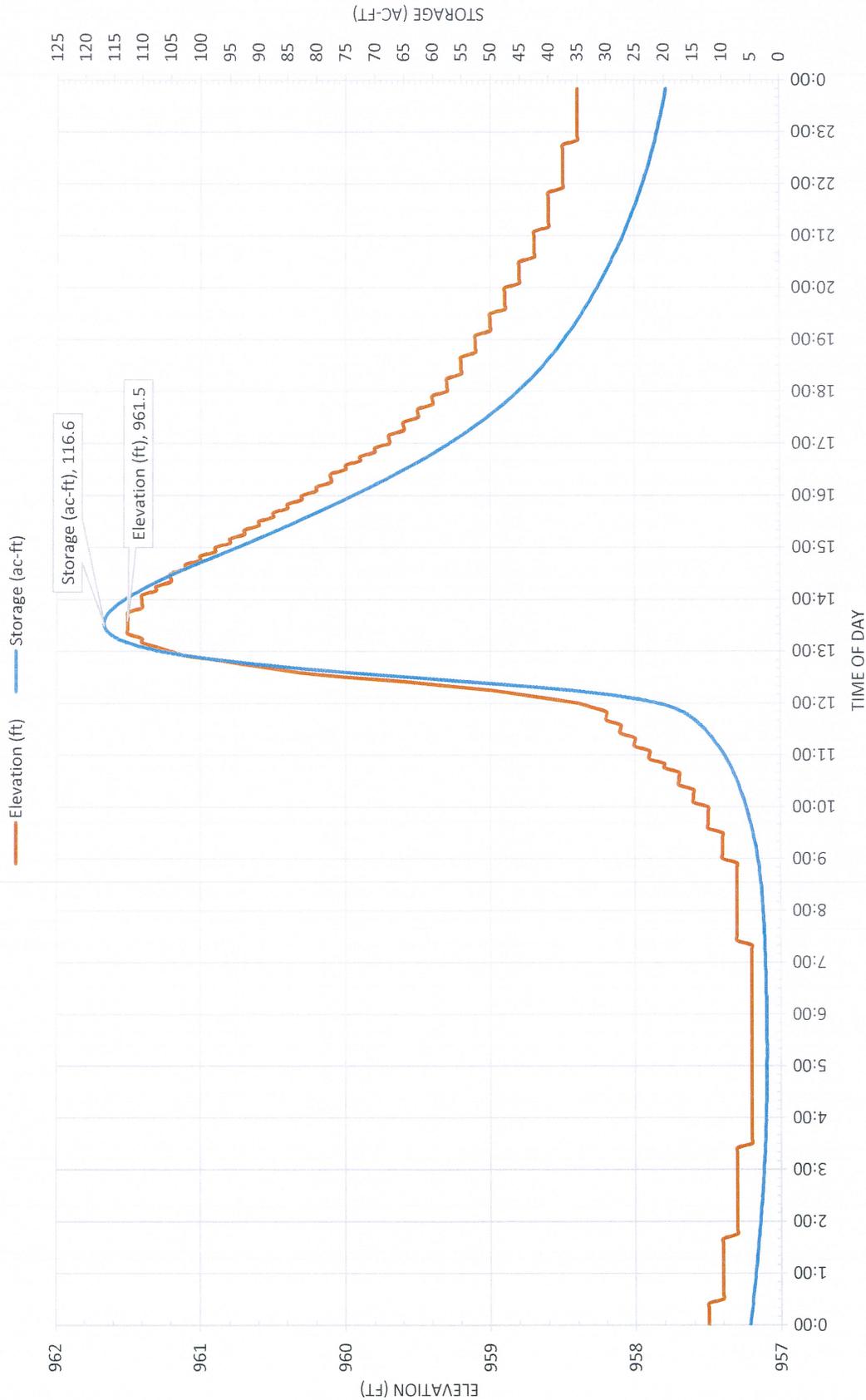
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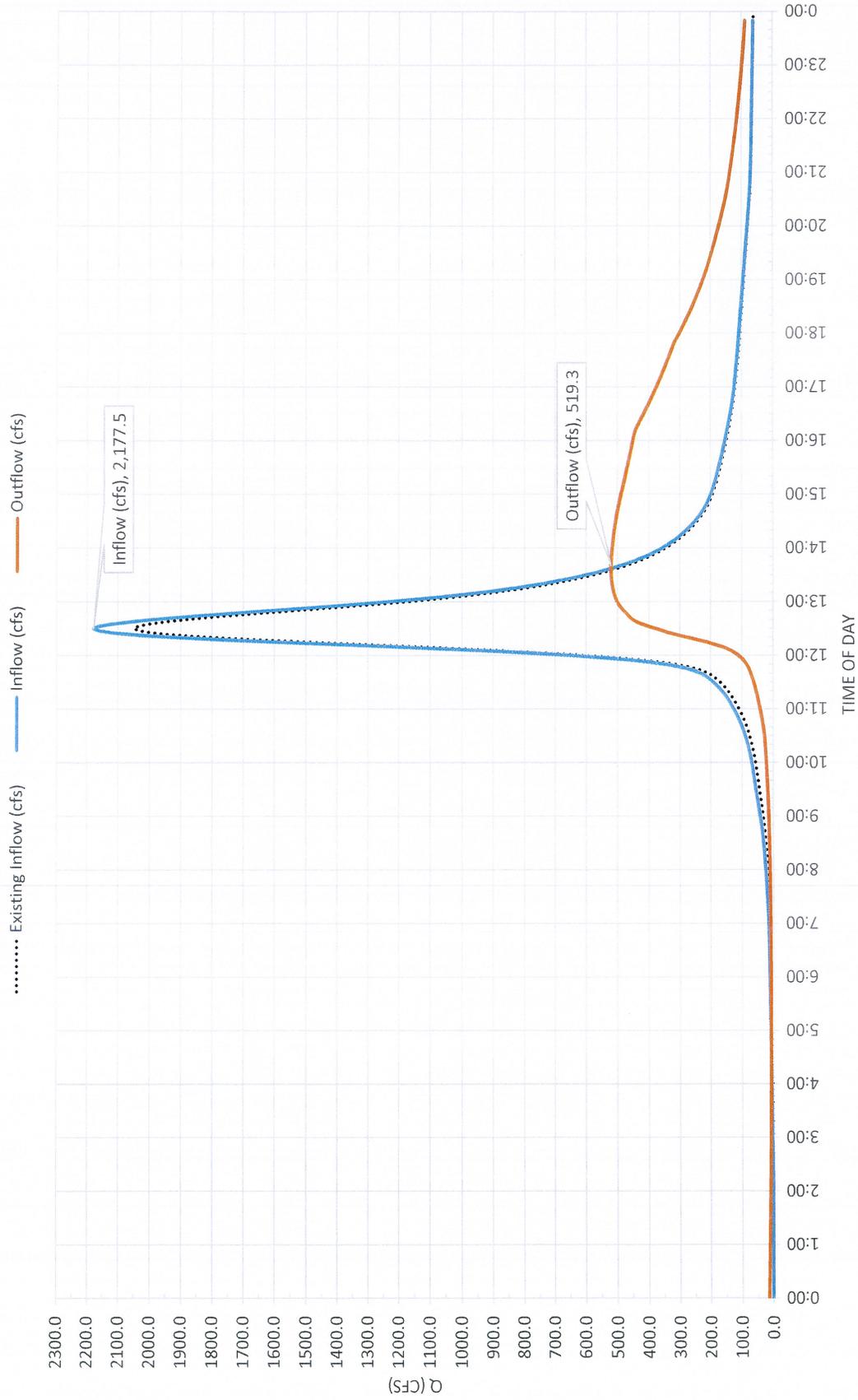
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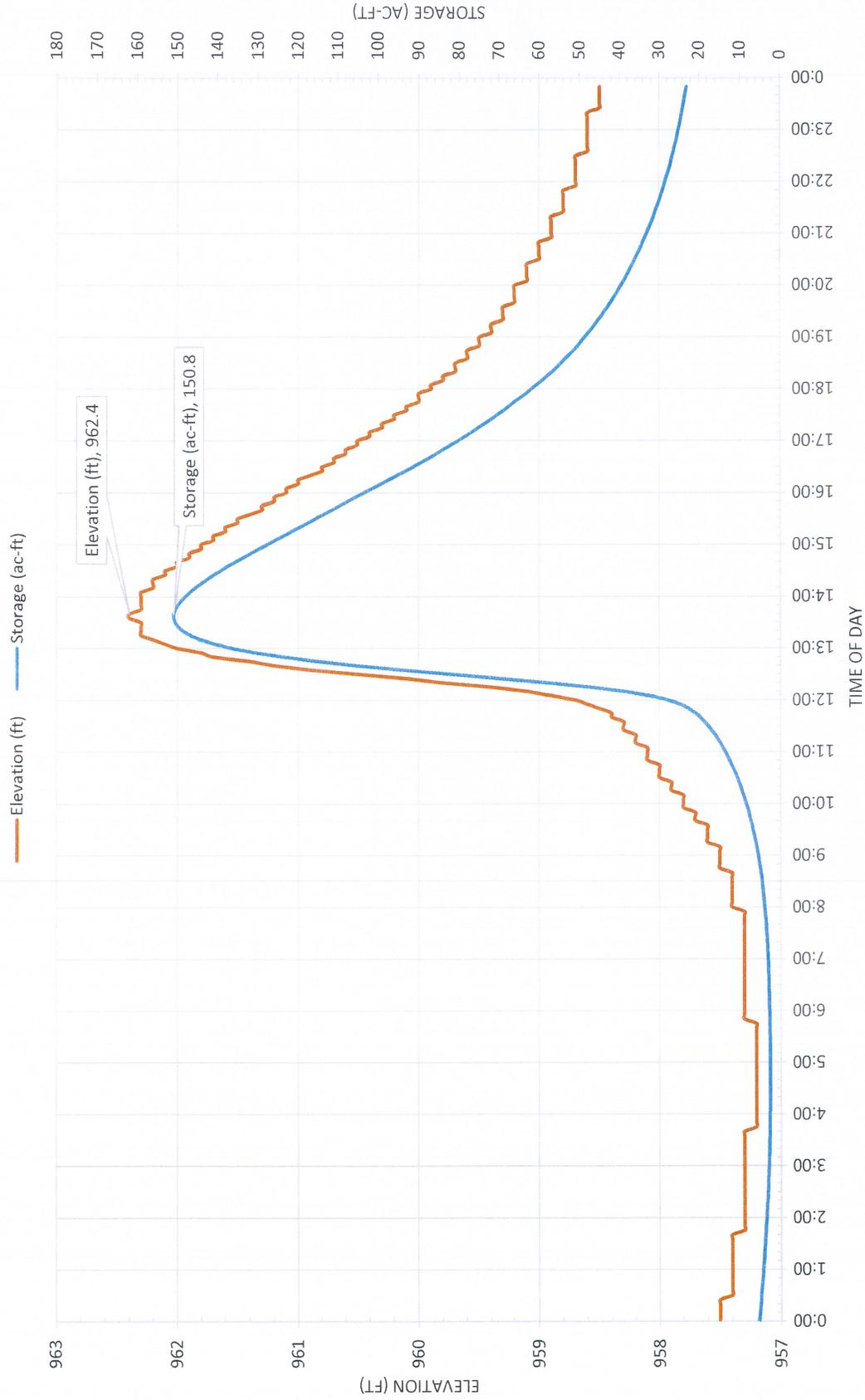
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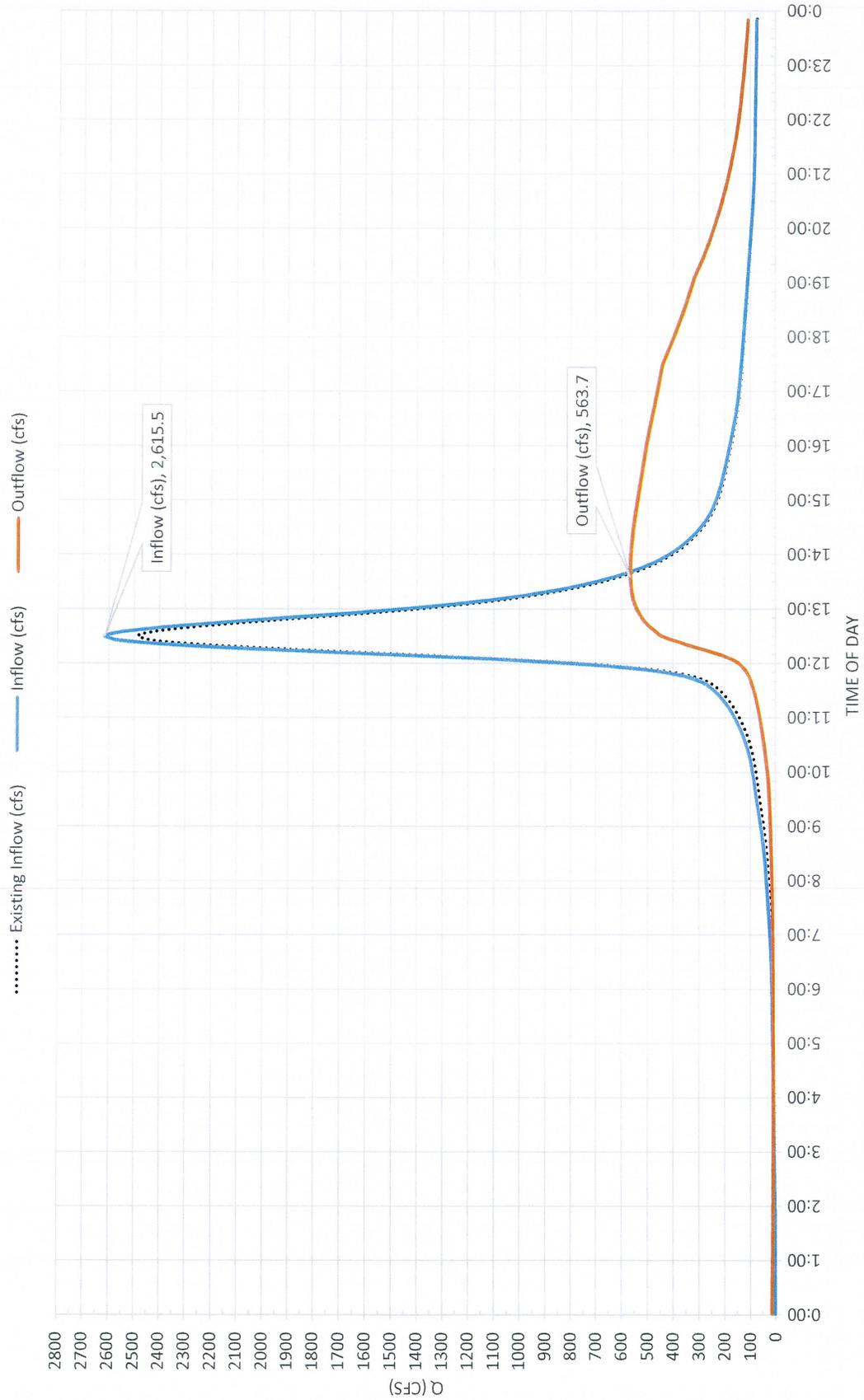
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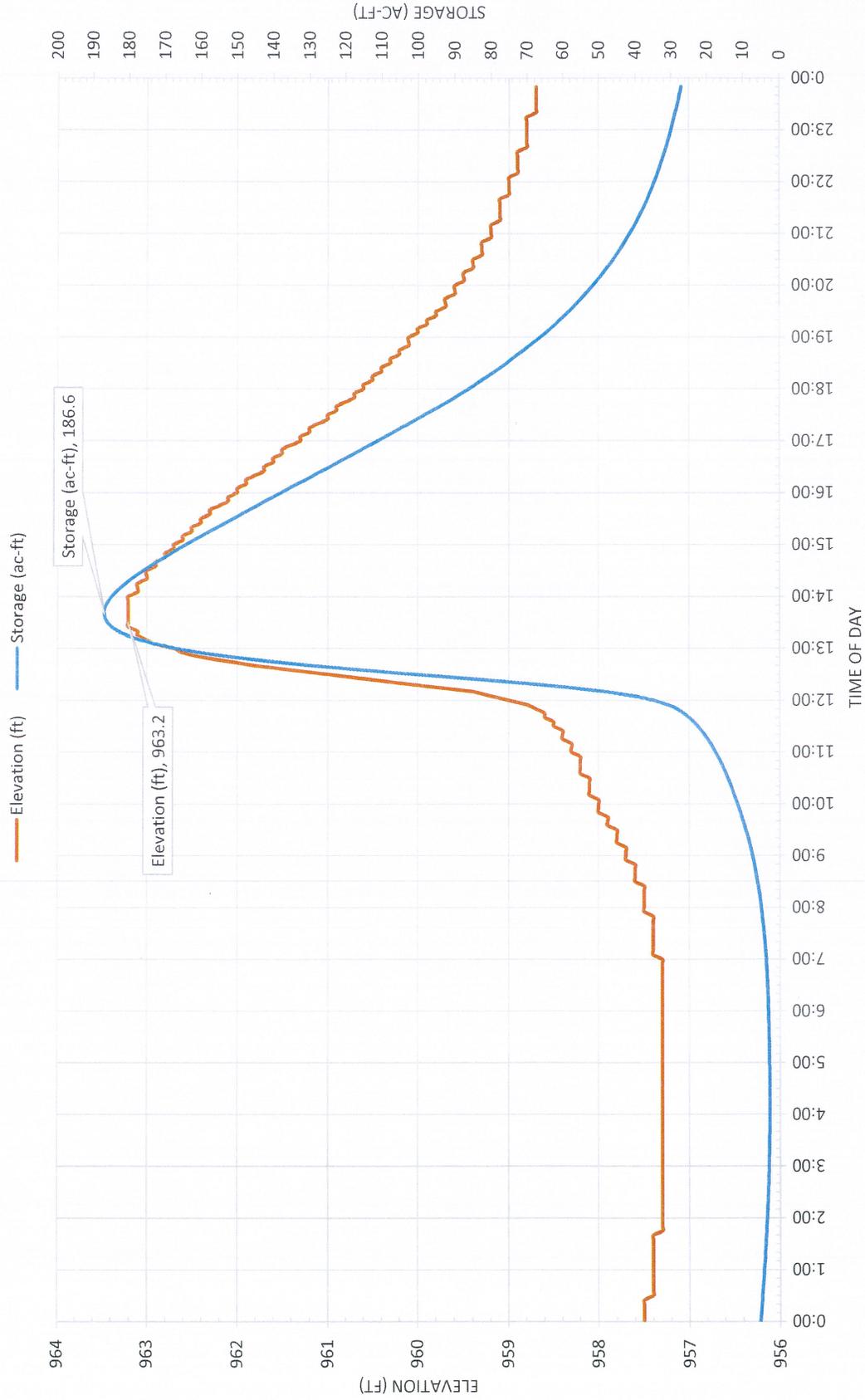
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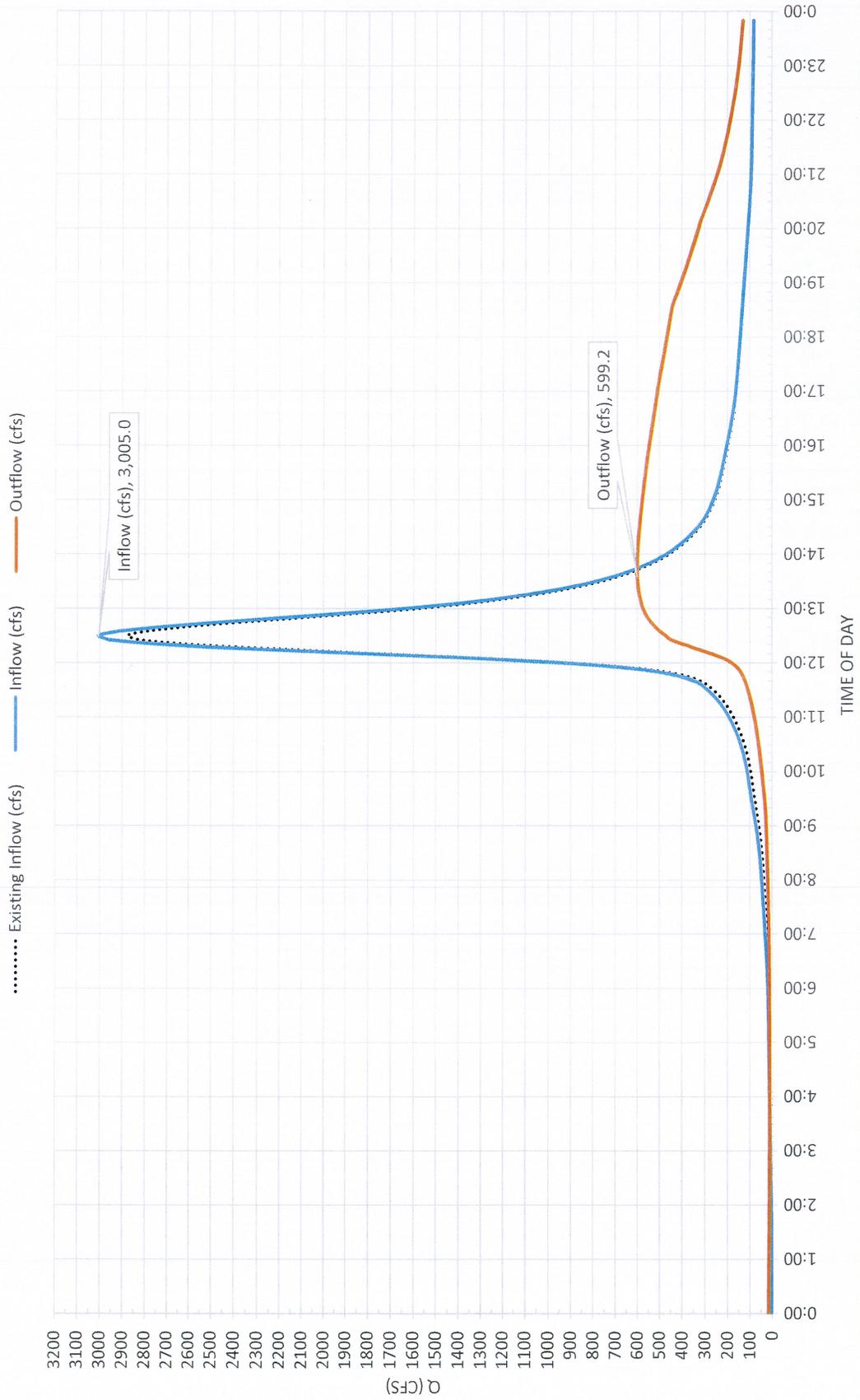
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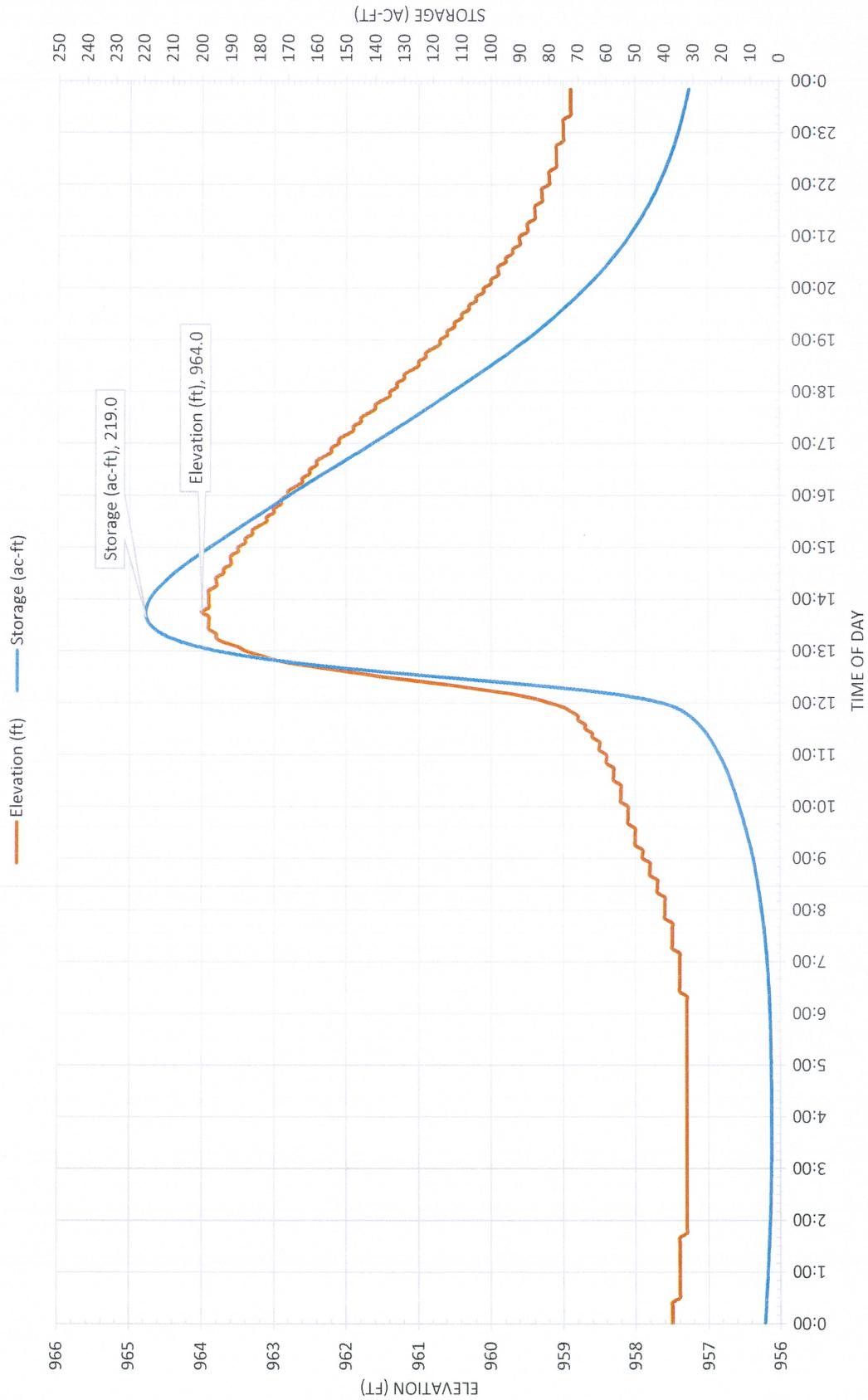
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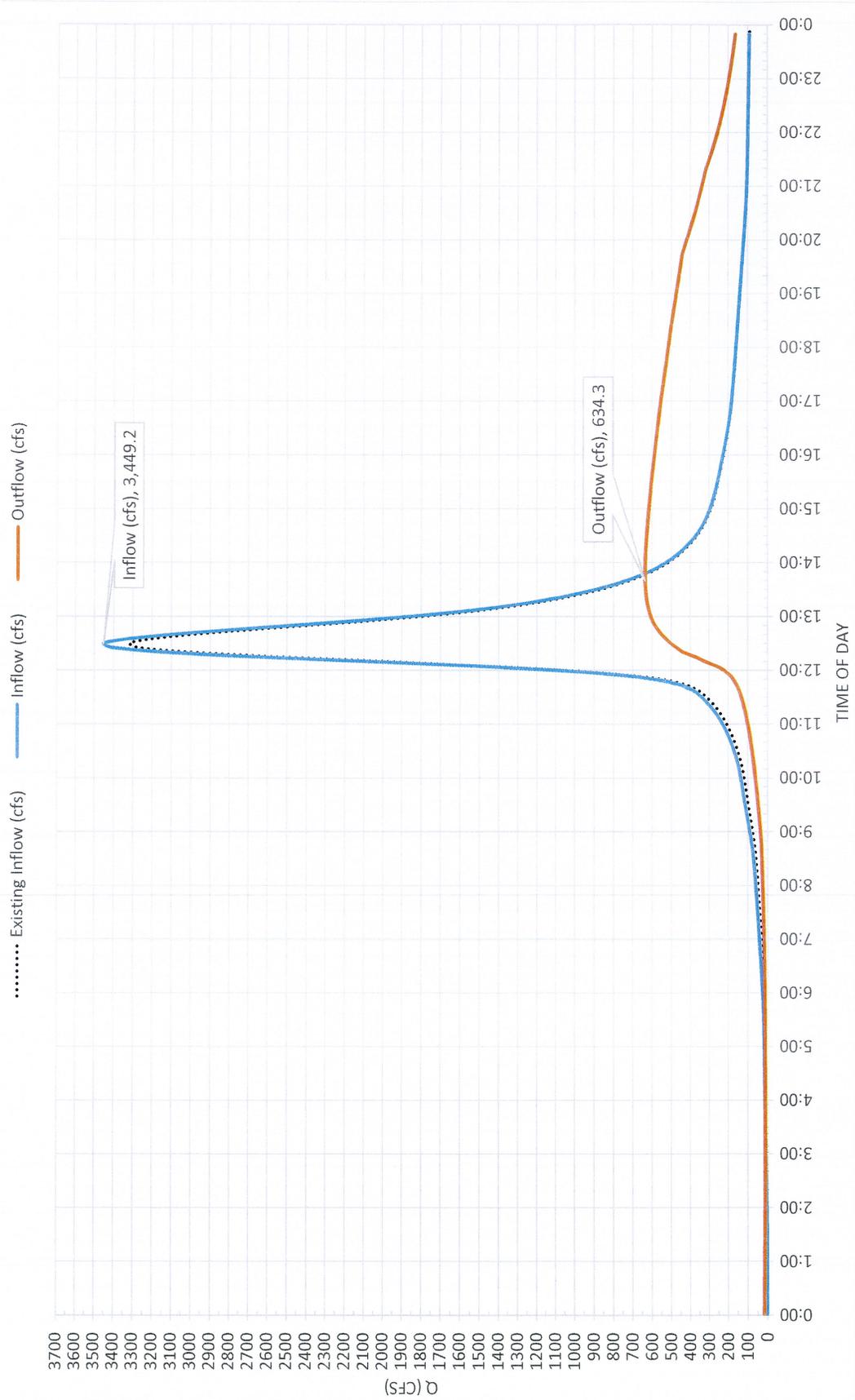
# DRY-TO-WET BASIN OPTION - PHASE 2 50-YEAR STORM EVENT WITH FUTURE CID LAND USE



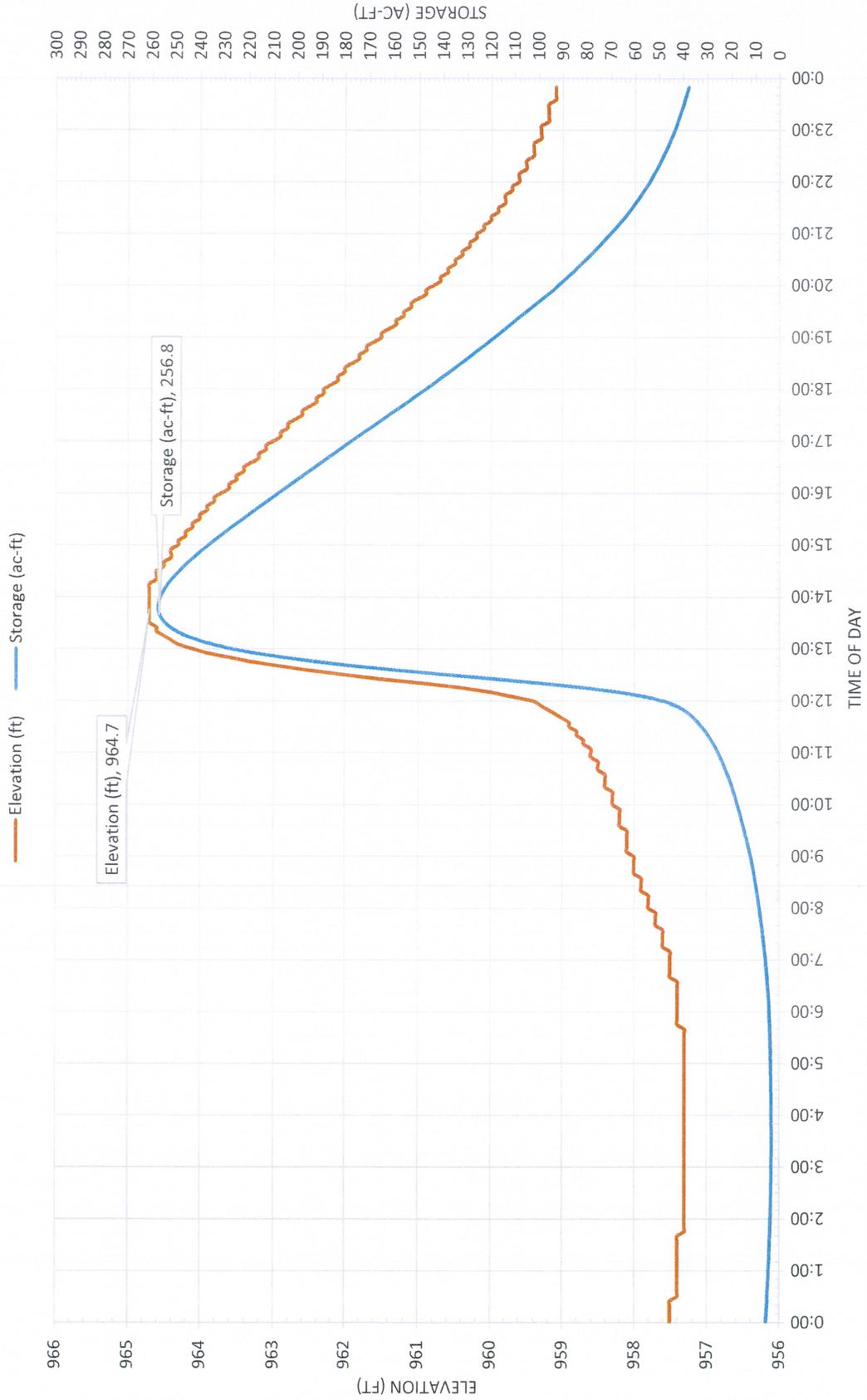
# DRY-TO-WET BASIN OPTION - PHASE 2 50-YEAR STORM EVENT WITH FUTURE CID LAND USE



# DRY-TO-WET BASIN OPTION - PHASE 2 100-YEAR STORM EVENT WITH FUTURE CID LAND USE



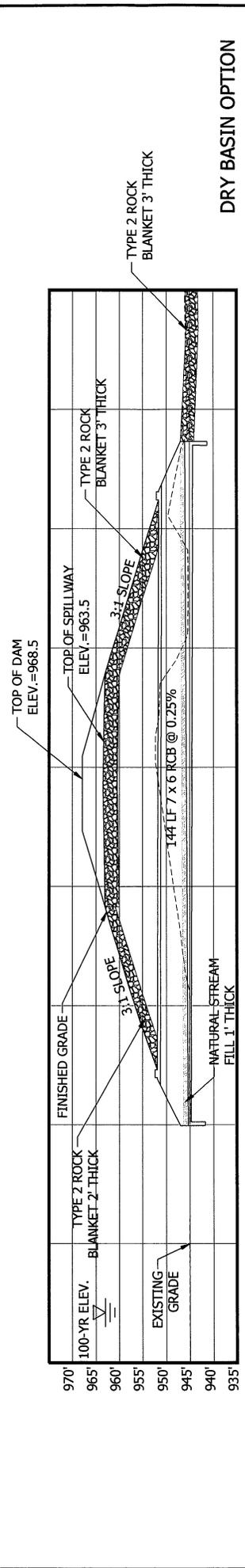
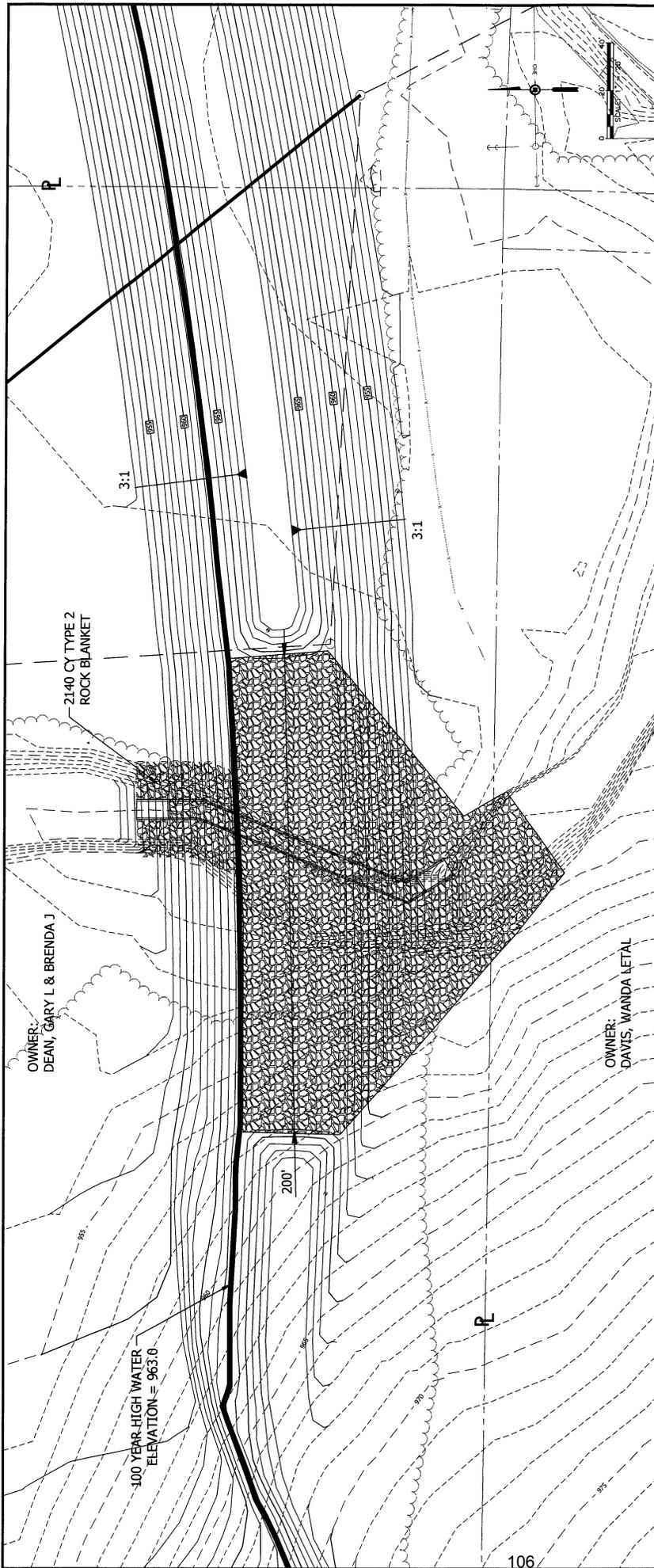
# DRY-TO-WET BASIN OPTION - PHASE 2 100-YEAR STORM EVENT WITH FUTURE CID LAND USE



## **APPENDIX H**

# **CONCEPT PLANS FOR DETENTION BASIN OPTIONS**





**BARTLETT & WEST**

SCALE: 1" = 10'

DRY BASIN OPTION

Small vertical text at the bottom of the page, likely a project or drawing number.



**WET BASIN OPTION**

**BARTLETT & WEST**

EXISTING SEWER

REALIGNED SEWER

OWNER:  
DEAN, GARY L & BRENDA J

SCHOOL ROAD

213TH TERRACE

3% SLOPE

3% SLOPE

3% SLOPE

TOP OF DAM  
(ELEV. = 970.6')

7x7' RISER  
(ELEV. = 957.5')

TOP OF ROAD  
(ELEV. = 953')

ELM STREET

EAST STREET

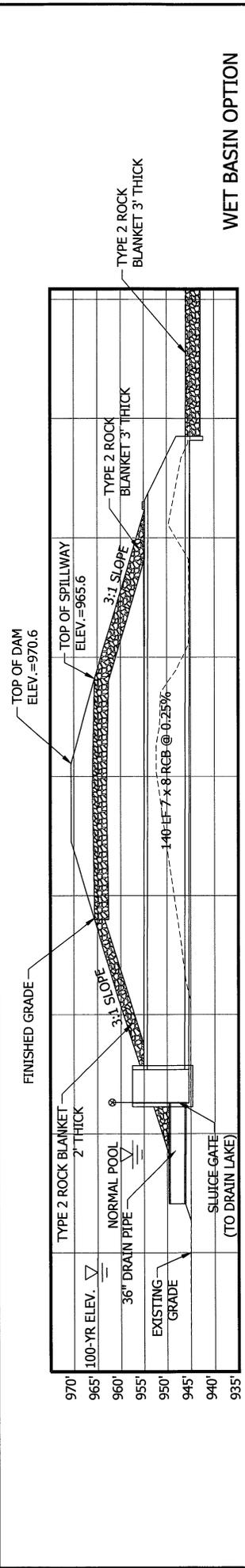
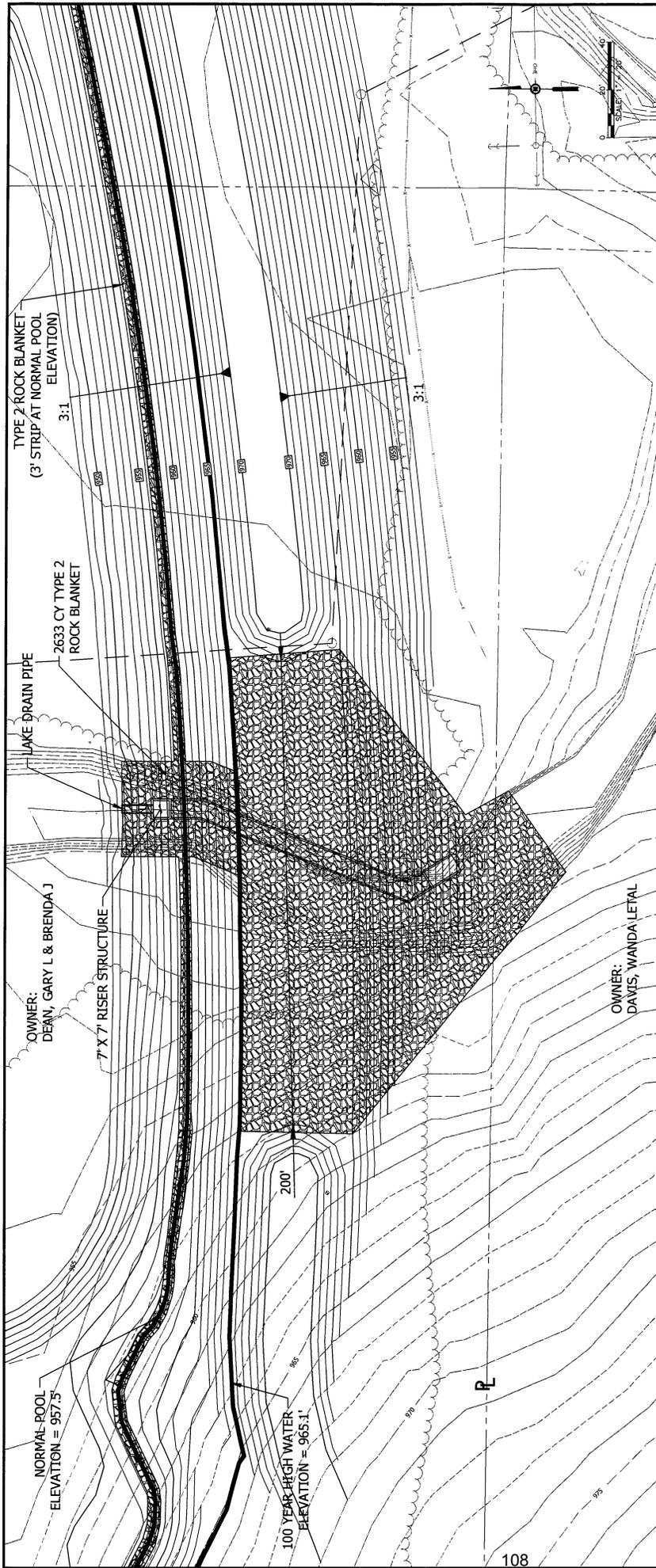
EMERGENCY  
SPILLWAY  
(ELEV. = 965.6')

OWNER:  
DAVIS, WANDA LETAL

INTERSTATE 49

PERMANENT  
POOL 21.6 AC  
(ELEV. = 937.5')

100-YR FLOOD  
STORAGE 48.2 AC  
(ELEV. = 965.1')



WET BASIN OPTION

**BARTLETT & WEST**

SCALE: 1" = 10'

NO PART OF THIS DRAWING IS TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM.

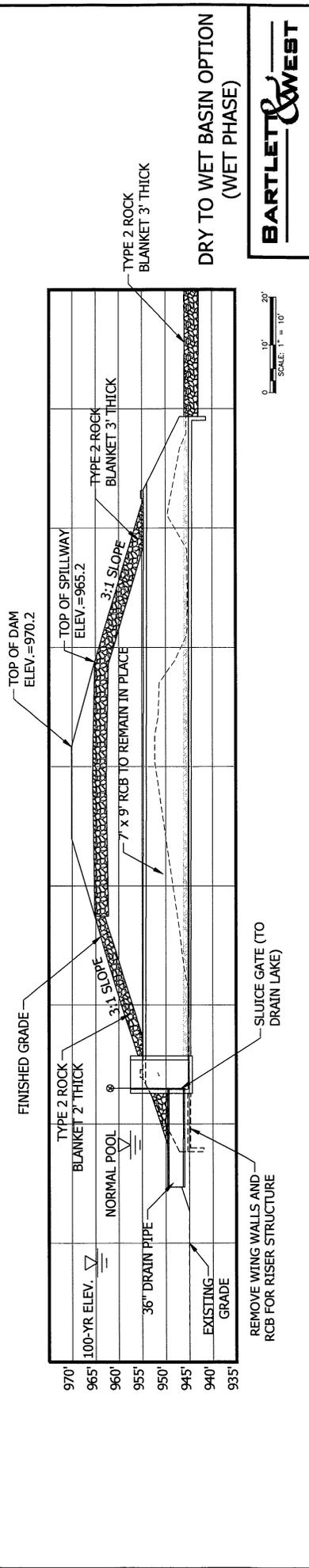
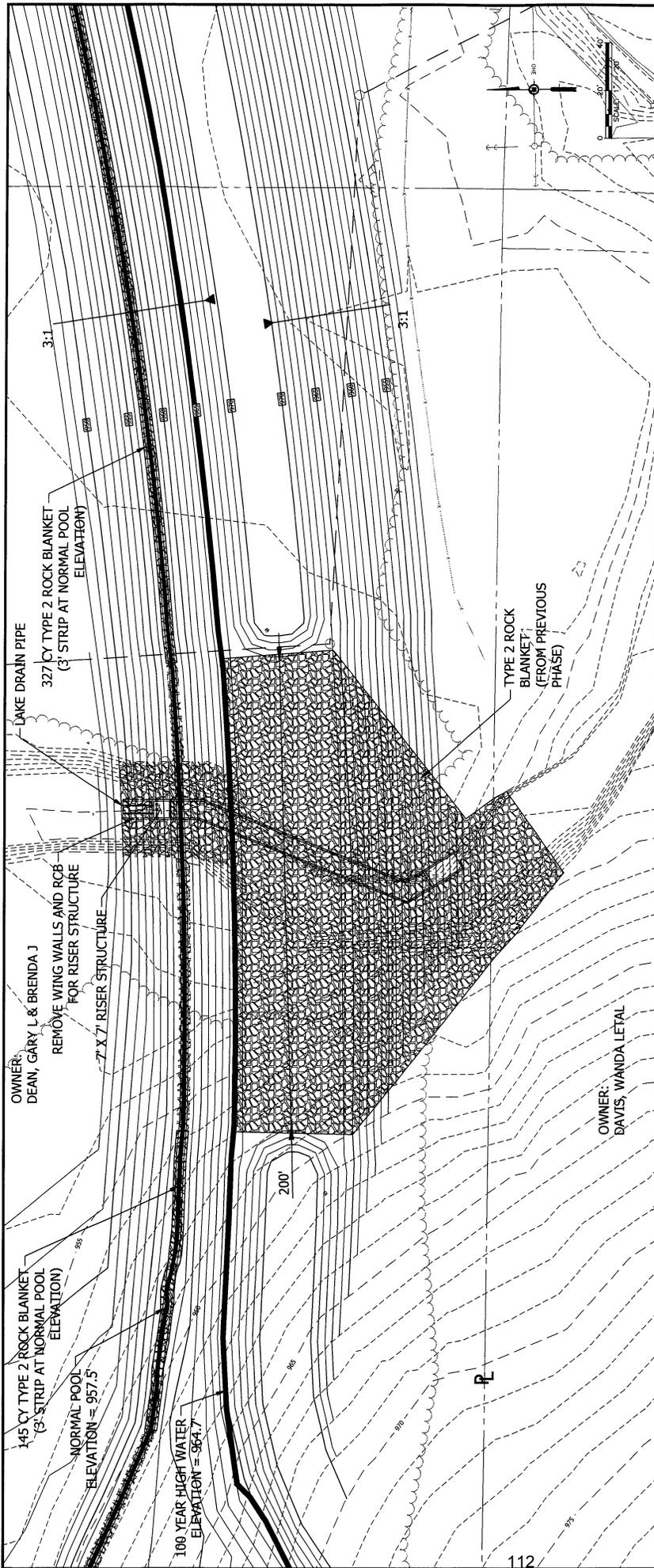


**DRY TO WET BASIN OPTION  
(DRY PHASE)**









**APPENDIX I**  
**COST ESTIMATES**



Preliminary Engineer's Estimate

Date: December 16, 2015  
 Project No.: 18146.100

Dry Basin Option					
ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	EXTENSION
1	Mobilization	%	7.0%	\$75,166.00	\$75,166.00
2	Removals, Clearing and Grubbing	AC	18	\$3,500.00	\$63,000.00
3	Contractor Furnished Surveying	LS	1	\$20,000.00	\$20,000.00
4	10" Ductile Iron Pipe	LF	399	\$150.00	\$59,850.00
5	7' x 6' RCB	LF	144	\$700.00	\$100,800.00
6	Four-Foot Diameter Manhole, Complete	EA	2	\$3,750.00	\$7,500.00
7	Abandon Existing Sewer Manhole	EA	1	\$500.00	\$500.00
8	Tie to Existing Sanitary Sewer	EA	2	\$3,000.00	\$6,000.00
6	Type 2 Rock Blanket	CY	2140	\$50.00	\$107,000.00
7	Class A Excavation	CY	78,560	\$5.00	\$392,800.00
8	Compacting Embankment (dam)	CY	35,415	\$5.00	\$177,075.00
9	Excessive Fill Placement on-site	CY	25,720	\$2.00	\$51,440.00
10	Replacement of Stockpiled Topsoil	CY	17,425	\$1.00	\$17,425.00
11	Erosion Control	LS	1	\$20,000.00	\$20,000.00
12	Cleanup, Final Grading, Seed, Mulch & Fertilize	AC	18	\$2,800.00	\$50,400.00
				<b>Subtotal</b>	<b>\$1,235,437.00</b>
	Contingency			10%	\$123,544.00
				<b>Construction Cost :</b>	<b>\$1,358,981.00</b>
	Engineering	LS	1	\$250,000.00	\$250,000.00
	Construction Administration	LS	1	\$100,000.00	\$100,000.00
	Permitting (Assumes No Mitigation)	LS	1	\$0.00	\$0.00
	Private Utility Relocation (Unknown)	EA	1	\$0.00	\$0.00
				<b>Total Estimated Project Cost :</b>	<b>\$1,708,981.00</b>

This project cost opinion was prepared using bid tabulation information available at the time of preparation and is prepared in good faith using engineer's judgment and experience. The engineer makes no guarantee as to the actual costs for construction.

# Preliminary Engineer's Estimate



Date: December 16, 2015  
 Project No.: 18146.100

Wet Basin Option					
ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	EXTENSION
1	Mobilization	%	7.0%	\$132,539.00	\$132,539.00
2	Removals, Clearing and Grubbing	AC	23	\$3,500.00	\$80,500.00
3	Contractor Furnished Surveying	LS	1	\$30,000.00	\$30,000.00
4	36" RCP	LF	14	\$120.00	\$1,680.00
5	36" RCP End Section	EA	1	\$1,500.00	\$1,500.00
6	10" SDR 35 PVC	LF	3150	\$100.00	\$315,000.00
7	8" SDR 35 PVC	LF	10	\$75.00	\$750.00
8	Sluice Gate w/ Riser	EA	1	\$35,000.00	\$35,000.00
9	7' x 8' RCB	LF	140	\$800.00	\$112,000.00
10	7' x 7' Riser Structure	VF	15	\$1,000.00	\$15,000.00
11	Riser Trash Hood	LS	1	\$15,000.00	\$15,000.00
12	Four-Foot Diameter Manhole, Complete	EA	13	\$3,750.00	\$48,750.00
13	Remove Existing Sewer Manhole	EA	11	\$1,000.00	\$11,000.00
14	Tie to Existing Sanitary Sewer	EA	4	\$3,000.00	\$12,000.00
15	Connection to Existing Sewer Service Lateral	EA	2	\$2,500.00	\$5,000.00
16	Type 2 Rock Blanket	CY	2,571	\$50.00	\$128,550.00
17	Class A Excavation	CY	125,450	\$5.00	\$627,250.00
18	Compacting Embankment (dam)	CY	47,675	\$5.00	\$238,375.00
19	Excessive Fill Placement on-site	CY	53,875	\$2.00	\$107,750.00
20	Replacement of Stockpiled Topsoil	CY	23,900	\$1.00	\$23,900.00
21	Erosion Control	LS	1	\$20,000.00	\$20,000.00
22	Cleanup, Final Grading, Seed, Mulch & Fertilize	AC	23	\$2,800.00	\$64,400.00
<b>Subtotal:</b>					<b>\$2,178,435.00</b>
Contingency				10%	\$217,844.00
<b>Construction Cost:</b>					<b>\$2,396,279.00</b>
Engineering		LS	1	\$250,000.00	\$250,000.00
Construction Administration		LS	1	\$150,000.00	\$150,000.00
Permitting (Assumes Compensatory Mitigation)		LS	1	\$450,000.00	\$450,000.00
Private Utility Relocation (Unknown)		EA	1	\$0.00	\$0.00
<b>Total Estimated Project Cost :</b>					<b>\$3,246,279.00</b>

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## Preliminary Engineer's Estimate



Date: December 16, 2015  
Project No.: 18146.100

<b>Dry-to-Wet Basin Option - Dry Phase</b>					
ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	EXTENSION
1	Mobilization	%	7.0%	\$91,993.00	\$91,993.00
2	Removals, Clearing and Grubbing	AC	23	\$3,500.00	\$80,500.00
3	Contractor Furnished Surveying	LS	1	\$20,000.00	\$20,000.00
4	10" Ductile Iron Pipe	LF	399	\$150.00	\$59,850.00
5	7' x 9' RCB	LF	154	\$850.00	\$130,900.00
6	Four-Foot Diameter Manhole, Complete	EA	2	\$3,750.00	\$7,500.00
7	Abandon Existing Sewer Manhole	EA	1	\$500.00	\$500.00
8	Tie to Existing Sanitary Sewer	EA	2	\$3,000.00	\$6,000.00
9	Type 2 Rock Blanket	CY	2,311	\$50.00	\$115,550.00
10	Class A Excavation	CY	97,400	\$5.00	\$487,000.00
11	Compacting Embankment (dam)	CY	49,300	\$5.00	\$246,500.00
12	Excessive Fill Placement on-site	CY	27,380	\$2.00	\$54,760.00
13	Replacement of Stockpiled Topsoil	CY	20,720	\$1.00	\$20,720.00
14	Erosion Control	LS	1	\$20,000.00	\$20,000.00
15	Cleanup, Final Grading, Seed, Mulch & Fertilize	AC	23	\$2,800.00	\$64,400.00
<b>Subtotal</b>					<b>\$1,512,014.00</b>
	Contingency			10%	\$151,202.00
<b>Construction Cost:</b>					<b>\$1,663,216.00</b>
	Engineering	LS	1	\$250,000.00	\$250,000.00
	Construction Administration	LS	1	\$100,000.00	\$100,000.00
	Permitting (Assumes No Mitigation)	LS	1	\$0.00	\$0.00
	Private Utility Relocation (Unknown)	EA	1	\$0.00	\$0.00
<b>Total Estimated Project Cost :</b>					<b>\$2,013,216.00</b>

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# Preliminary Engineer's Estimate

Date: December 16, 2015  
 Project No.: 18146.100

Dry-to-Wet Basin Option - Wet Phase					
ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	EXTENSION
1	Mobilization	%	7.0%	\$90,272.00	\$90,272.00
2	Removals, Clearing and Grubbing	AC	13	\$3,500.00	\$45,500.00
3	Contractor Furnished Surveying	LS	1	\$15,000.00	\$15,000.00
4	Partial Removal of Box Culvert	LS	1	\$20,000.00	\$20,000.00
5	36" RCP	LF	14	\$120.00	\$1,680.00
6	36" RCP End Section	EA	1	\$1,500.00	\$1,500.00
7	10" SDR 35 PVC	LF	3150	\$85.00	\$267,750.00
8	8" SDR 35 PVC	LF	10	\$75.00	\$750.00
9	Sluice Gate w/ Riser	EA	1	\$35,000.00	\$35,000.00
10	7' x 7' Riser Structure	VF	15	\$1,000.00	\$15,000.00
11	Riser Trash Hood	LS	1	\$15,000.00	\$15,000.00
12	Four-Foot Diameter Manhole, Complete	EA	13	\$3,750.00	\$48,750.00
13	Abandon Existing Sewer Manhole	EA	10	\$500.00	\$5,000.00
14	Tie to Existing Sanitary Sewer	EA	4	\$3,000.00	\$12,000.00
15	Connection to Existing Sewer Service Lateral	EA	2	\$2,500.00	\$5,000.00
16	Type 2 Rock Blanket	CY	388	\$50.00	\$19,400.00
17	Class A Excavation	CY	102,205	\$5.00	\$511,025.00
18	Excessive Fill Placement on-site	CY	84,630	\$2.00	\$169,260.00
19	Replacement of Stockpiled Topsoil	CY	17,575	\$1.00	\$17,575.00
20	Erosion Control	LS	1	\$20,000.00	\$20,000.00
21	Cleanup, Final Grading, Seed, Mulch & Fertilize	AC	23	\$2,800.00	\$64,400.00
<b>Subtotal</b>					<b>\$1,483,723.00</b>
	Contingency			10%	\$148,373.00
<b>Construction Cost:</b>					<b>\$1,632,096.00</b>
	Engineering	LS	1	\$150,000.00	\$150,000.00
	Construction Administration	LS	1	\$100,000.00	\$100,000.00
	Permitting (Assumes Compensatory Mitigation)	LS	1	\$450,000.00	\$450,000.00
	Private Utility Relocation (Unknown)	EA	1	\$0.00	\$0.00
<b>Total Estimated Project Cost:</b>					<b>\$2,332,096.00</b>
<b>Total Estimated Project Cost (Wet and Dry Phases):</b>					<b>\$4,345,312.00</b>

This project cost opinion was prepared using bid tabulation information available at the time of preparation and is prepared in good faith using engineer's judgment and experience. The engineer makes no guarantee as to the actual costs for construction.

**City Administrator**  
*Brad Ratliff*

**City Clerk**  
*Janet Burlingame*

**City Engineer**  
*Carl Brooks*

**Business Office**  
*Trudy Prickett*



**Chief of Police**  
*Harry Gurin*

**City Planner**  
*Cliff McDonald*

**City Attorney**  
*Reid Holbrook*

**Parks Director**  
*Grant Purkey*

**Municipal Offices – 250 S. Main Street, Peculiar, MO 64078**  
**Phone: (816)779-5212 Facsimile: (816)779-1004**

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**To:** Board of Aldermen  
**From:** Nick Jacobs  
**Date:** January 14<sup>th</sup>, 2016  
**Re:** New Utility Bill and rate structure

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**GENERAL INFORMATION**

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**Applicant:** Staff

**Status of Applicant:** N/A

**Requested Actions:** Inform the Board regarding the new utility bill format and rate structure.

**Date of Application:** January 14, 2016

**Purpose:** Inform the Board regarding the new utility bill format and rate structure.

**Property Location (if applicable):**

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**PROPOSAL**

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At the January 4<sup>th</sup> BOA Meeting staff brought a topic for discussion regarding the new utility bill format and a new proposed rate structure. Since that meeting staff has been trying to tweak the rate structure so there was no change to the customer and were unable to do so without causing great fiscal impact to the customers. Staff has withdrawn the proposed rate structure and will be sticking with the current rate structure as adopted by the Board of Aldermen. All of the existing rates will stay the same with the only change being that the base rate will be changed to read “Voter Aprvd WTR Bond and Voter Aprvd SWR Bond” on the new bills. These charges will include the first 1,000 gallons of water just as the base rate currently does. The minimum amount will be the same as before but this will outline to the customer what the money they are paying is going to. The \$12.00 bond charge will also be included into the Voter Aprvd SWR Bond fee as one lump sum instead of 2.

It is the desire of staff to show a simpler more broken out bill and this will accomplish it. In the future when rates are changed the Voter Aprvd WTR Bond and Voter Aprvd SWR Bond charges will be adjusted accordingly to meet the fiscal years bond payment requirements.

As stated before the rates are not changing just the titles of charges and how they appear on the bill.

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**PREVIOUS ACTIONS**

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1. Was brought as a topic for discussion at the January 4<sup>th</sup> BOA Meeting.

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**KEY ISSUES**

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- a. Present to the board the final draft of the new utility bill and inform them of service title changes.

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**STAFF COMMENTS AND SUGGESTIONS**

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Staff did their due diligence trying to establish a rate per gallon and found that at the current time with the transition to the new software being imminent that there was not a feasible way to accomplish this task without undue fiscal impact on the customers.

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**STAFF RECOMMENDATION**

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**ATTACHMENTS**

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- (1) New Utility Bill.

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**STAFF CONTACT:** Nick Jacobs  
Utility Manager  
njacobs@cityofpeculiar.com



**City of Peculiar**

250 S. Main  
 Peculiar, MO 64078  
 816-779-5212

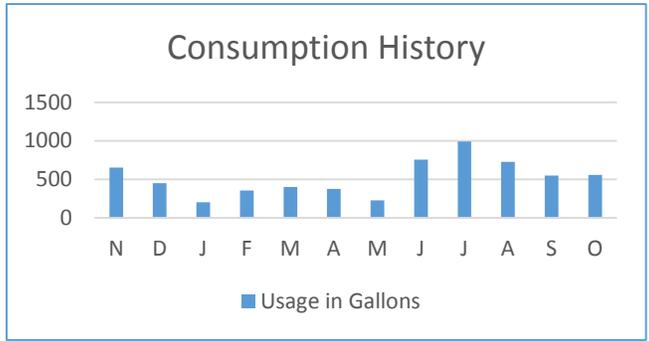
[www.cityofpeculiar.org](http://www.cityofpeculiar.org)

**Utility Statement**



\*Special Notes Here\*

<b>Name on Account</b>			
John Doe 123 Anything Peculiar, MO 64078			
<b>Account Number</b>		<b>Service Address</b>	
12234-1		123 Anything	
<b>Service Period</b>		<b>Meter Readings</b>	
From	To	Previous	Present
10/18/15	11/18/15	7500	9500



Previous Balance	\$121.40
Payments	\$121.40
Adjustments	
Penalties	
Past Due Balance	
<b>Due Date</b>	<b>12/15/15</b>

**WATER (consumption in gallons)**

Fees and Charges	Consumption	Amount
Water	1000	\$16.52
Voter Aprvd Wtr Bond	1000	\$20.96
Primacy Fee		\$0.25
TOTAL WATER		\$37.73

**SEWER (consumption in gallons)**

Fees and Charges	Consumption	Amount
Sewer	1000	\$7.65
Voter Aprvd Swr Bond	1000	\$27.80
TOTAL SEWER		\$35.45

**TRASH, TAXES & OTHER FEES**

Fees and Charges	Amount
Trash Residential	\$14.80
Taxes (cumulative) will be broken down internally	\$1.41
Admin Fee	N/A
Deposit Refund	N/A
Returned Check Fee	N/A
TOTAL TRASH, TAXES & OTHER FEES	\$16.21

**Notes**

Utility Bills are due upon receipt. The last day to pay to avoid penalties is the 15<sup>th</sup>.

Utility Bills not paid in full by the 23<sup>rd</sup> of each month are subject to disconnect by ordinance, and applicable administrative fees will apply regardless on any actual disconnection.

The City of Peculiar is not responsible for the timeliness of the United States Postal Service or for payments left in the available drop box.

Failure to receive your bill does not exempt you from monthly payments, penalties, or disconnection.

<b>TOTAL UTILITY BILL DUE BY 12/15/2015</b>	<b>\$89.39</b>
<b>TOTAL UTILITY BILL DUE AFTER 12/15/2015 (10% Penalty)</b>	<b>\$98.16</b>

**Policy on Code Enforcement**  
**To be presented by Board of Aldermen**