June 7, 2021

Todd Hager
Planning & Development Services
15151 E. Alameda Parkway
Aurora, Colorado 80012

Re: Buckley Yard Commercial- Infrastructure Site Plan and Plat

Mr. Hager,

Thank you for your comments regarding the initial submission for the Buckley Yard Commercial Infrastructure Site Plan and Plat. The following are staff comments dated May 13, 2021 from the city staff and community members. Olsson responses are in RED text.

Initial Submission Review

- Ensure the Site Plan is consistent with the Plat.
- No landscape plan included. Will the R.O.W. landscaping be maintained by the metro district or master developer? If so it will need to be part of the site plan (Planning).
- Show/label proposed street lights (Civil Engineering).
- Corresponding civil plans will need to include traffic signal plan at the intersection of Alameda Dr and Airport Blvd (Traffic Engineering)
- Storm Drainage Development Fees due 7.63 acres x $1,242.00 = $9,476.46 (Revenue)
- There are some License Agreement issues. See the comments on the document(s). Contact Grace Gray (ggray@auroragov.org) for the License Agreement concerns. Please note that the site plan cannot be approved until all the items needed are submitted, fully reviewed and ready to record. Make sure the Site Plan information matches the proposed Plat (Real Property).

Planning Department Comments

1. Community Questions, Comments and Concerns
   1A. Referrals were sent to eleven registered neighborhood organizations and three outside agencies. Written comments were received from Xcel Energy and can be found attached to this letter. Please respond to their comments within the response letter for your next submission.

2. Completeness and Clarity of the Application
   2A. General Comment: Main comments are within this document. Please refer to the redmarked documents for smaller technical comments that would not translate well in this document.
   Review of document has been completed as well.
3. Zoning and Land Use Comments
   Site Plan Sheet 1

3A. Change the title to Buckley Yard Commercial Infrastructure Site Plan and delete & Preliminary Plat on all sheets where written.

The titleblock has been revised as requested.

3B. No landscape plan included. Will the R.O.W. landscaping be maintained by the metro district or master developer? If so it will need to be part of this site plan.

Landscaping design and plans will be with the SDP.

3C. Missing: Signature Block, Data Block, Amendment Block, and Site Plan notes.

Above information has been added to the cover sheet.

3D. Change all sheets to reflect 1, 2, 3, etc.

Sheet numbering has been revised as requested.

Sheet 2

3E. Provide elevation of monument sign. Separate details sheet. Needs to be part of the plan set.

Sign elevations have been provided to the end of the set.

4. Signage Issues

4A. Provide plans for monument sign.

Sign elevations have been provided to the end of the set.

5. Landscaping Issues (Kelly Bish / 303-739-7189 / kbish@auroragov.org / Comments in bright teal)

5A. No landscape plans provided.

Landscaping design and plans will be with the SDP.

6. Addressing (Phil Turner / 303-739-7357 / pcturner@auroragov.org)

6A. Please provide a digital .shp or .dwg file for addressing and other GIS mapping purposes. Include the parcel, street line, easement and building footprint layers at a minimum. Please ensure that the digital file provided in a NAD 83 feet, Stateplane, Central Colorado projection so it will display correctly within our GIS system. Please eliminate any line work outside of the target area. Please contact me if you need additional information about this digital file.

CAD file has been included with this submittal.

REFERRAL COMMENTS FROM OTHER DEPARTMENTS AND AGENCIES

7. Civil Engineering (Kristin Tanabe / 303-739-7306 / KTanabe@auroragov.org / Comments in green)

Site Plan

Sheet 1

7A. Add notes, see redmarked PDF.

Notes have been added to the cover sheet as requested.

7B. Include required site plan notes.

Site plan notes have been added to the cover sheet.

Sheet 2

7C. 25’ radius required on arterial roads.

Radii have been revised to 25’ as requested on plan comments.

7D. Label retaining wall. Indicate material type, height range or max height. Railing required for all walls over 30".

Additional information added for retaining wall.

7E. Show/label proposed street lights. Add a note that street light locations are conceptual and that final street light locations will be determined by photometric analysis submitted with the street lighting plan in the civil plan submittal. Sheet 3 as well.

Street lights have been shown and a note has been added as requested as well as a reference to the utility plan for labeling/locations

Sheet 3

7F. Sidewalk is required to be detached per pre-application notes.

Sidewalk along Alameda Pkwy has been detached.

Sheet 4

7G. Label retaining wall. Indicate material type. Railing required for all walls over 30".

Additional information added for retaining wall.

7H. Show/label maintenance access, label slopes - 4:1 max side slope, 2% min slope in pond bottom, show/label 100- year water surface elevation, indicate direction of emergency overflow.

Maintenance access identified and slopes in pond shown, 100-yr WSEL added and emergency overflow identified.

Sheet 5

7I. Min 2% slope for all non-paved areas.

All area have been revised to meet or exceed the min 2% slope.

7J. There is no existing storm.

This has been revised.

Sheet 6 & 7

7K. Street lights are required on Airport and Alameda. Sheet 7 too.

Street lights have been added as requested.

7L. Add a note that street light locations are conceptual and that final street light locations will be determined by photometric analysis submitted with the street lighting plan in the civil plan submittal. Sheet 7 too.

A note has been added to both utility sheets with this language.

Plat

Sheet 2

7M. Remove reference to ROW

8. Traffic Engineering (Brianna Medema / 303-739-7336 / bmedema@auroragov.org / Comments in amber) Site Plan

Sheet 1

8A. Corresponding civil plans will need to include traffic signal plan at the intersection of Alameda Dr and Airport Blvd.

Traffic Signal Plans will be provided with CDs are required.

8B. Add note. See redlined PDF.

Note has been added to cover sheet as requested.

8C. Per traffic signal escrow ordinance and pre-app notes. traffic signal escrow will apply for vertical development.

Noted, thank you.

Sheet 2

8D. Construct updated directional crossing ramps.

Ramps and cross walks have been revised as requested.

8E. Clearly show ROW line and provide traffic signal easement from PT of PT or ROW line radius. Ensure monument sign is outside of traffic signal easement.

Easements have been added to the SW and NW corners of the site as requested.

8F. Show right turn arrows, "only" symbols and Right Lane Must Turn Right signage consistent a lane drop. See MUTCD Figure 3B-11.

Signage and striping has been added as requested.

8G. Maintain consistent hatching for detectable warning dome areas.

All hatching revised to match throughout the plan set.

8H. Remove north-south crossing ramps. Reconfigure east-west ramps as appropriate.
North ramps have been removed and the area has been reconfigured.

8I. Provide sight triangles per COA TE-12 at all access points and internal intersections (typ.).
Sight triangles for roadway infrastructure added, sight triangles for the pad site accesses will be provided with SDP.

Sheet 3

8J. Provide dimension for total left turn lane storage. (existing plus extension). MTIS recommends 500'.
Outer most dimension has been lengthened to show the full lane lengths.

8K. Clearly show detectable warning domes with a dark hatched area (typ.).
All hatching revised to match throughout the plan set.

8L. General comments throughout.
Comments have been completed.

8M. Provide pedestrian crossing bump-out and provide full alignment of east-west crossing ramps.
East portion of this intersection has been revised to match the west portion.

Plat – No Comments

9. Fire / Life Safety (Jeff Goorman / 303-739-7464 / jgoorman@auroragov.org / Comments in blue)
Site Plan
Sheet 1
9A. Add Right Of Way for Ingress and Egress of Emergency Vehicles note. RIGHT OF WAY FOR INGRESS AND EGRESS FOR SERVICE AND EMERGENCY VEHICLES IS GRANTED OVER, ACROSS, ON AND THROUGH ANY AND ALL PRIVATE ROADS AND WAYS NOW OR HEREAFTER ESTABLSHIED ON THE DESCRIBED PROPERTY, AND THE SAME ARE HEREBY DESIGNATED AS “SERVICE/EMERGENCY AND UTILITY EASEMENTS AND SHALL BE POSTED “NO PARKING - FIRE LANE
This note has been added to the cover sheet as note #4.
Sheet 3
9B. This Modified Local Street Type 2 detail shows the travel lanes 20’ travel lane where the site plan above shows a 24’ travel lane. The site plan and the street detail shall accurately reflect each other.
The street has remained, and the street section has been revised to show a 24’ FL-FL.
9C. With this street not being a private street not built to a public standard with a 20’ travel lane no parking signs with tow away sign shall be posted.
MUTCD No parking signs have been added to this section of road.
Plat
Sheet 2
9D. Plat and Site Plan shall accurately reflect each other.
Easements have been revised to match the Plat

10. Aurora Water (Reviewer Name / 303-739-7490 / sdekoski@auroragov.org / Comments in red)
Site Plan
Sheet 6
10A. Show water meter location for each let. If water meter is not located in the ROW, then a 10' wide pocket easement will be necessary for the water meter pits.
Water meters have been added to the tree lawn areas for each service.

10B. Water and sanitary sewer mains can be installed in a 26' utility easement. Water and sanitary sewer mains must be 10' apart. Single public water mains would require a 16' utility easement.

Mains have been revised to separation of 11’ CL-CL and the easements have been revised to meet city standards.

Sheet 7

10C. Private fire line to be a min. of 5' from either the domestic water service and the irrigation service/meter. Move fire line to the outside of domestic service line.

Fire line has been moved further north to create more separation between services.

10D. Show water meter location with 10' pocket easement on each lot, if water meter is not located in the ROW.

All meters are within the ROW.

10E. General comments in redmarked document.

Redlines on plans are addressed.

11. PROS (Michelle Teller / 303-739-7437 / mteller@auroragov.org / Comments in mauve)
    11A. No PROS issue. Would like to see next submittal still.

12. Revenue: Aurora Water/TAPS (Diana Porter / dsporter@auroragov.org)
    12A. Storm Drainage Development Fees due 7.63 acres x $1,242.00 = $9,476.46

    Fees will be paid when appropriate.

    12B. Commercial users with meters one and one-half inches and smaller with landscaped areas not served by a separate irrigation system shall be charged an outdoor fee based upon the total landscaped area

    Noted

13. Real Property (Maurice Brooks / 303-739-7294 / mbrooks@auroragov.org / Comments in magenta)
    General Comment
    13A. There are some License Agreement issues. See the comments on the document(s). Contact Grace Gray (ggray@auroragov.org) for the License Agreement concerns. Please note that the site plan cannot be approved until all the items needed are submitted, fully reviewed and ready to record. Make sure the Site Plan information matches the proposed Plat.

    License agreements are in progress for the requested infrastructure.

    Site Plan
    Sheet 1
    13B. General comment, edit.

    Unclear what this refers to, but all comments on this sheet have been addressed.

    Sheet 2
    13C. The retaining wall located in the Drainage easement needs to be covered by a License Agreement. Contact Grace Gray (ggray@auroragov.org) to start the process.

    License agreements are in progress for the requested infrastructure.

    13D. Since these Lots and Block are divided by a public R.O.W. (Quintero Way), then these Lots and Block will need a new numbering status

    Blocks have been added to labels.

    13E. General comments in redmarked document.

    General comments have been addressed.

    Sheet 3
    13F. General comments in redmarked document.

    General comments have been addressed.

    Sheet 4

13G. The retaining wall located in the Drainage easement needs to be covered by a License Agreement. Contact Grace Gray (ggray@auroragov.org) to start the process.

License agreements are in progress for the requested infrastructure.

Plat

Sheet 1

13H. Add the underlying Lot, Block and Subdivision info.

Blocks have been added to labels.

13I. Change to a metes and bounds description for this new plat.

The description has been updated.

13J. Send in a closure sheet to confirm this area. See redmarked document.

This has been provided.

13K. Add the public Street names within 1/2 mile of the site.

This has been added.

13L. Just Tract E is being granted to the City of Aurora (see below Note #5).

This has been addressed.

13M. Enter the Title Commitment number and date of issuance.

This has been addressed in Surveyor's Notes #6.

13N. Change note 8 to the "Overflight" statement from the Subdivision Plat Checklist.

This has been addressed in Surveyor's Notes #8.

13O. Add a note showing the differences between the as measured bearings, distances and curve data and the platted bearing, distances and curve data.

This has been addressed in Surveyor's Notes #10.

13P. Send in the closure sheet for the description.

This has been provided.

13Q. Send in the State Monument Records for the aliquot corners used in the plat.

This has been provided.

13R. Send in the Certificate of Taxes Due for the site. Obtained from the County Treasurer's office.

This has been provided.

13S. Add the State of registry - match the Title Commitment

This has been added.

13T. move this type of information to Note #6, from Title Commitment.

This has been moved to Surveyor's Note #6.

13U. Tract E is granted to the City of Aurora for drainage purposes and will be constructed by the developer to City of Aurora specifications.

This has been addressed.

13V. General comments in redmarked document.

General comments have been addressed.

13W. See AES Rule 1.6.A.2.a.1) (a) ... When opting to seal only the cover page(s) of documents and plats, a notation shall be incluced in the title block of every page noting that all seals for the documents or plats are applied to the cover page(s).

This has been addressed.

Sheet 2

13X. A portion of this Drainage easement is in these Tracts C&D - is it going to be the maintenance responsibility of the land owner?

Stormwater facilities will be maintained by the metro district.

13Y. Parcel table - this information should be on the graphic illustration not in a table.

The table has been removed and added to the Plat.

13Z. Add the Point of Commencement and the Point of Beginning on the plat.

This has been added to the Plat.

13AA. Add Tic Marks at the change of direction throughout the platted area.
Tick Marks (crows feet) has been added in specific locations.
13BB. If an easement crosses a Lot or Tract line, then the distances should be shown on both sides of the Lot or Tract line.
Additional distances are now shown.
13CC. Since these Lots and Block are divided by a public R.O.W. (Quintero Way), then these Lots and Block will need a new numbering status.
Lots and blocks have been renumbered.
13DD. General comments in redmarked document.
The general comments have been addressed.

14. Xcel Energy (Donna George / 303-571-3306 / donna.l.george@xcelenergy.com)
14A. See Xcel's comments which is attached with this referral response.

Public Service Company of Colorado's (PSCo) Right of Way & Permits Referral Desk has reviewed the infrastructure site plans and plat for Buckley Yard Commercial and requests that a 10-foot utility easement is dedicated abutting East Alameda Parkway (Lot 1 and Tract F) as roughly depicted below:

PSCo also requests that the following language is added to the plat:

Permanent structures, improvements, objects, buildings, wells, water meters and other objects that may interfere with the utility facilities or use thereof (Interfering Objects) shall not be permitted within said utility easements and the utility providers, as grantees, may remove any Interfering Objects at no cost to such grantees, including, without limitation, vegetation. Public Service Company of Colorado (PSCo) and its successors reserve the right to require additional easements and to require the property owner to grant PSCo an easement on its standard form.

Please be aware PSCo owns and operates existing natural gas distribution facilities along East Alameda Parkway. The property owner/developer/contractor must complete the application process for any new natural gas or electric service, or modification to existing facilities via xcelenergy.com/InstallAndConnect. It is then the responsibility of the developer to contact the Designer assigned to the project for approval of design details.

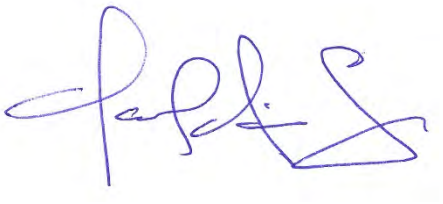
Additional easements *will* need to be acquired by separate document (i.e. transformers) – be sure to ask the Designer to contact a Right-of-Way & Permits Agent.

As a safety precaution, PSCo would like to remind the developer to call the Utility Notification Center by dialing 811 for utility locates prior to construction.

Donna George - Right of Way and Permits

Public Service Company of Colorado dba Xcel Energy
Office: 303-571-3306 – Email: donna.l.george@xcelenergy.com

Regards,



Josh Erramouspe
Olsson

Related RSNs:
MDR: 1501736
Site Development Plan PDR: 1538227
Filing 2 PDR: 1535413

Added to bottom of title page.

1st Review - Please contact Rifka Wine with questions.
RWine@bhinc.com

MINARY DRAINAGE REPORT

Advisory note: PDR approval is required prior to civil plan approval.

Noted.

SUBDIVISION
O. 1

PLEASE DO NOT RESUBMIT UNTIL COMMENTS FROM OUTSIDE AGENCIES, AS LISTED BELOW, HAVE BEEN RECEIVED.

SITE PLAN

MAINTENANCE ELIGIBILITY PROGRAM (MEP)

MHFD Referral Review Comments **For Internal MHFD Use Only.**

MEP ID: 106325

Submittal ID: 10006189

MEP Phase: Referral

Date: April 30, 2021

To: **Rifka Wine**

Via Aurora Website

RE: MHFD Referral Review Comments

Project Name: Buckley Yard F1 (RSN 1535408)

Drainageway: East Toll Gate Creek

This letter is in response to the request for our comments concerning the referenced project. We have reviewed this proposal only as it relates to maintenance eligibility of major drainage features, in this case:

- Spillway and pipe outfalls from full spectrum detention ponds

We have the following comments to offer:

1) This site is within the 10,000' critical zone of Buckley Air Force Base. As such, the 100-yr flow of the pond must drain within 40 hours. Please ensure the pond meets this requirement.

2) Please evaluate the condition of the outfall path from the proposed detention pond. It appears that flows leaving the proposed detention pond pipe outfall will be less than historic conditions, however, the path of spillway flows should also be considered. What protection will be provided for the spillway, if needed?

We appreciate the opportunity to review this proposal. Please feel free to contact me with any questions or concerns.

Sincerely,
Mark Schutte, P.E., CFM
Project Engineer, Sand Creek
Mile High Flood District

Pond drains to 97% empty in both the 10 and 100 year events within 40 hours.

Rip-rap added around spillway for erosion control, see drainage plan sheets.

Olsson Project No.: 020-2569

Page numbers updated.

Page 1 - page numbers must match PDF page numbers

TABLE OF CONTENTS

APPENDICES

REPORT CERTIFICATION

I hereby certify that this report for the final drainage design of Buckley Yard was prepared by me, or under my direct supervision, in accordance with the provisions of the City of Aurora Storm Drainage Design & Technical Criteria Manual for the owners thereof.

_____

Josh Erramouspe, P.E.

State of Colorado No. 42141

A. INTRODUCTION

1. Location

The proposed project (entitled Buckley Yard) is located within Lot 1, Block 2 of Tollgate Village Subdivision Filing No. 14 in the northwest quarter of Section 16, Township 4 South, Range 66 West of the 6th Principle Meridian, City of Aurora, County of Arapahoe, State of Colorado. The site is bordered by N Airport Boulevard to the West, E Alameda Drive to the North, a future residential subdivision to the east, and E Alameda Parkway to the south.

Figure 1: Vicinity Map

Existing surrounding developments include several commercial properties to the south and west and the future Signature Park to the north. The future residential subdivision to the east is in the design phase under a separate plan set and with a separate drainage study.

2. Proposed Development

The site is approximately 7 acres of vacant land to be subdivided into 5 commercial lots. Ground cover consists primarily of native grasses. Generally, the site slopes from south to north with

average slopes of 0.5% to 1% in the south half of the site, and 3% to 4% in the north half of the site. Soils in this area consist of Fondis silt loams and Renohill-Buick loams and classify as Hydrologic Soil Group C & D according to the Custom Soil Resource Report (see Appendix A).

Proposed development of the site includes construction of a private drive, utility, and stormwater infrastructure to serve the future commercial lots. In addition to the private drive, a 50' right-of way public street is proposed to provide connectivity through the commercial area between Airport Blvd to the west and the future residential subdivision to the east. For the analysis completed and presented with this report the commercial parcels and proposed roadways are assumed to be 95% impervious and the proposed detention tract is assumed to be 2% impervious.

Include Section A.2.c Requested Variances. Variance for detention and water quality for basins OS-G and OS-F as requested in e-mail 4/8/2021

Section added for requested variances and variance outlined in previous email correspondence described.

B. HIS NAGE

1. Overall n

a. There is g on to the site.

b. There ay near the site. Located north and east of the site and reside ast Tollgate Creek, and its associated floodplain. The floodplain boundary is off-site and is not expected to be impacted by development of the site. East Tollgate Creek has an overall drainage area of approximately 9 square miles and a 100-year peak discharge of 8,100 at the location of the site. Despite the proximity to the FEMA 100-year floodplain, the entirety of the site is located within Flood Zone X, as defined by FIRM map number 08005C0183L revised September 4, 2020. A copy of the FIRM can be found in Appendix 1 of this report.

2. Drainage Patterns through Property

In the existing condition, the site generally slopes from south to north towards an existing swale that discharges to an existing 24" RCP. This culvert runs under E Alameda Dr near the intersection of E Alameda Dr with N Airport Blvd. This outfall has been defined as design point EX1 in the Buckley Yard Master Drainage Report by JR Engineering, dated February 2021.

3. Outfalls Downstream from Property

The 24" RCP culvert mentioned in the previous section outfalls to a swale that eventually discharges at East Tollgate Creek.

added, MDR has been approved

RSN 1501736. This has not yet been approved. Please do not resubmit until the MDR is approved.

C. DESIGN CRITERIA

1. List References

a. Buckley Yard Master Drainage Report - JR Engineering, Inc.
b. Tollgate Village Filing No.14 - ICON Engineering, Inc. EDN: 208094
c. Bristol Commercial Center Filing Subdivision No. 6 Final Drainage Report (COA# 2001-3088) - Innovative Land Consultants, Inc. EDN: 970218
d. Shea Center Subdivision Filing No. 1 Final Drainage Report (COA# 201156) EDN: 206192
e. Urban Storm Drainage Criteria Manual (USDCM) - MHFCD
f. Storm Drainage Design & Technical Criteria Manual (Criteria Manual) - City of Aurora

Add Adjacent subdivision drinage report for Buckley Yard FLG #02 (RSN 1535413)

Added

2. Hydrologic Criteria

a. Rainfall intensities were determined using the equations provided in the Criteria Manual. P1 values were determined from the charts contained within the MHFCD and the Criterial Manual. To be consistent with the master drainage study, a P1 value of 0.98 was used for the 2-year event and 2.66 for the 100-year event.
b. The Rational Method was utilized to determine runoff values for the site. A composite percent imperviousness of 95% was assumed for each of the commercial lots.
c. Water quality and runoff attenuation for the site will be provided in a detention pond at the north end of the site. Calculations for the required storage volume were completed using the City's formulas and assuming a composite imperviousness for the tributary area of approximately 90%. Using Mile High Flood Control District's MHFD-Detention v4.03 spreadsheet, the pond was sized to hold the total volume necessary to meet the City's required release rate of 1 cfs per acre of tributary area.
d. The 2-year and 100-year storm events were analyzed for the minor and major storms, respectively.

3. Hydraulic Criteria

a. This report was completed in accordance with the City of Aurora Storm Drainage and Technical Criteria Manual.
b. Inlets and pipes will be designed for the 100-year storm.
c. Storm sewer pipe and water surface profiles will be provided with the Final Drainage Report.
d. East Tollgate Creek is the major drainage way located to the north and east of the site.

D. DRAINAGE PLAN

1. General Concept

a. There is no off-site flow running on to the site. The existing 24" RCP will be maintained as the outfall point for the developed site. A storm sewer pipe is proposed along the western boundary of the site to collect and convey stormwater from each of the developed commercial lots to the detention pond at the north end of the site. The detention pond will include an outlet structure to control the release rate of the Water Quality Capture Volume, 10-year storm event, and 100-year storm event. Storm events greater than the 100-year will overtop the pond and flow overland to E Alameda Dr. Emergency overflow from each of the commercial lots will overtop the western curb of the parking area within the lots and the sidewalk along N Airport Blvd and flow overland to N Airport Blvd.

b. The private access drive located east of the site will be conveyed to a detention pond designed and constructed with the future residential development to the east of the commercial site. This detention pond must be installed and functioning prior to acceptance of the private roadway infrastructure construction.

Full spectrum detention required per MD (RSN 1501736)

Water quality and detention will be provided for the site in a shared detention pond at the north end of the site. Permanent water quality best management practices will be included with development of each of the commercial sites to provide additional water quality treatment before on-site stormwater enters the shared storm sewer system.

Noted, language updated to reflect this.

ecific Details

Basins for the site in the existing condition are defined in the Buckley Yard Master Drainage Report as Basin A. Sub-basins have been broken out for development of the commercial site. A summary of the basin area and total runoff generation is as follows:

Basin ID	Area (ac)	Minor Q (2-yr) (cfs)	Major Q (100-yr) (cfs)
B-1	1.03	2.64	7.93
B-2	0.81	2.08	6.23
B-3	0.90	2.31	6.93
B-4	1.15	2.95	8.85
B-5	1.30	3.33	10.00
B-6	0.29	0.74	2.23
B-7	0.31	0.01	1.07
OS-A	0.36	0.92	2.77
OS-B	0.44	1.13	3.39
OS-C	0.34	0.87	2.62
OS-D	0.42	1.08	3.23
OS-E	0.11	0.17	0.71
OS-F	0.33	0.25	1.65
OS-G	0.07	0.15	0.50
OS-H	18.18	0.27	34.38

B-1-5 are comprised of the commercial lots and are assumed to be 95% impervious. Runoff generated within these basins will be captured by on-site inlets and storm sewer as needed that will discharge to a private storm sewer. The storm sewer trunk main will convey stormwater generated within the lots to the detention pond at the north end of the site.

B-6 is comprised of the S Quintero Way right-of-way. Runoff generated in this basin will be captured by 2 curb inlets on grade on either side of the street and be conveyed to the detention pond.

B-7 is comprised of the detention pond and surrounding area within Tract E tributary to the detention pond. Runoff generated within this basin will be detained and released through the outlet structure for the pond.

Discuss emergency overflows for these sump inlets in the text.

OS-A is comprised of the majority of Tract A of the site and is assumed to be 95% impervious. Runoff generated within this basin will flow to a Type R curb inlet at the north end of the basin, and eventually to the detention pond proposed with the adjacent residential development.

Emergency overflow discussion added. Note that OS-C and OS-D are not sump inlets.

OS-B is comprised of the majority of Tract B of the site and is assumed to be 95% impervious. Runoff generated within this basin will flow to a Type R curb inlet at the north end of the basin, and eventually to the detention pond proposed with the adjacent residential development.

OS-C is comprised of the majority of Tract C of the site and is assumed to be 95% impervious. Runoff generated within this basin will flow to a Type R curb inlet at the north end of the basin, and eventually to the detention pond proposed with the adjacent residential development.

OS-D is comprised of the majority of Tract D of the site and is assumed to be 95% impervious. Runoff generated within this basin will flow to a Type R curb inlet at the north end of the basin, and eventually to the detention pond proposed with the adjacent residential development.

Include info from previously approved report or new calcs to show that the existing system has capacity.

OS-E is comprised of the area of the site downstream of the inlets within OS-C and OS-D. This area flows to the existing inlet on the south side of E Alameda Drive at design point EX2 defined in the Buckley Yard Master Drainage Report. The existing inlet is sized to convey 8.4 cfs in the 2-year event, and any overflow is designed to overtop the street and overland flow to the area downstream of E [illegible] Drive. The increase in flow to the inlet with development of the site is

Calc provided for the existing Alameda Dr basin. Calc shows a reduction in tributary area and increase in imperviousness. The net effect is a decrease in total runoff in the basin implying adequate capacity would exist, see calcs sheet in appendices.

small compared to the inlet designed capacity and is not expected to cause negative impacts to the area downstream.

OS-F is comprised of the curb and gutter and tree lawn along N Airport Boulevard, as well as the area within the accesses into the site that are not able to be captured by on-site storm sewer. This area flows to an existing inlet in N Airport Boulevard approximately 600 feet north of the site. No information was found regarding sizing and capacity of this inlet, but the surrounding areas were analyzed to determine an existing tributary area of approximately 4 acres of public right-of way. The increase in area tributary to the inlet with development of the site is small compared to the inlet's existing tributary area and is not expected to cause negative impacts to the downstream.

OS-G is comprised of a short length of the proposed private drive that will flow to E Alameda Parkway. This area flows to the same inlet that receives stormwater from Basin OS-F. As stated in the OS-F description, the increase in area tributary to the inlet with development of the site is small compared to the inlet's existing tributary area and is not expected to cause negative impacts to the downstream.

OS-H is comprised of the remaining tract that will be developed as a residential subdivision by others. the area in this basin will remain untouched with development of the commercial site. Runoff generated in this basin in the interim condition will continue to follow the existing drainage patterns for the area.

b. The development is not within TOD or Urban Center.
c. A detention pond is proposed at the north end of the site to provide water quality treatment and runoff attenuation. A storm sewer trunk main is proposed to collect and convey stormwater from each of the five commercial lots and S Quintero Way right-of-way to the detention pond. The pond will be designed with an outlet structure to control the release rate to the existing 24" RCP culvert at the north end of the site.
d. Emergency overflow paths are provided for all proposed inlets that will safely convey stormwater away from the future buildings.
e. There are no unusual drainage problems identified with this development.
f. Grass buffers and grass swales will be designed where possible to limit directly connected impervious areas. A full spectrum detention pond is designed for the development to provide water quality treatment and runoff attenuation. These permanent BMP's will be designed and constructed with development of each commercial lot.
g. Erosion control best management practices will be designed with the construction documents for the project and implemented during construction to limit erosion and transportation of sediment off the site. These temporary BMP's will be designed, installed,

and maintained in accordance with Mile High Flood District's Urban Storm Drainage Manual Volume 3.

h. No open channels are proposed with development of the site.
i. No roadside ditches are proposed with development of the site.
j. No additional requirements from the Outfall Systems Plan were found.

E. CONCLUSIONS

1. Compliance with Standards

The preliminary design for the site was completed in compliance with City of Aurora Storm Drainage Design & Technical Criteria Manual, Roadway Design & Construction Manual, and the Urban Storm Drainage Criteria Manual. All runoff generated on site from design storms up to the 100-year event will be attenuated in a shared detention pond and safely conveyed through the site by storm drainage infrastructure and released to the outfall points in East Tollgate Creek.

2. Summary of Concept

a. The proposed design has considered contributing 100-year stormwater runoff generated on site and analyzed site conditions for any offsite runoff tributary to the site. Overall historic drainage patterns will be maintained with development of the site. Stormwater infrastructure will be designed to convey the 100-year storm event. Detention and water quality have been provided for via the on-site full spectrum detention pond.
b. The proposed development will provide necessary inlets and water quality/detention facilities and stormwater infrastructure to provide adequate on-site drainage and stormwater quality treatment.
c. The proposed project site as designed will not have adverse effects on the adjacent upstream or downstream areas. The drainage design generally follows the historic patterns and existing infrastructure has been used for conveyance when possible. The net effect of this development will be an increase in imperviousness and an increase in runoff flow rates. Streets, gutters, inlets, and other storm sewer appurtenances have been designed to mitigate this increase.

F. LIST OF REFERENCES

- City of Aurora Storm Drainage Design and Technical Criteria Manual, September 2010
- City of Aurora Roadway Design & Construction Specifications, September 2010
- Mile High Flood District Criteria Manual, Volume 1 August 2018, Volume 2 September 2017, and Volume 3 November 2010
- Shea Center Subdivision Filing No. 14 Final Drainage Report, approved October 24, 2001 EDN: 206192
- Final Drainage Report for Bristol Commercial Center Filing Subdivision Filing No. 6 approved November 20, 2018. EDN 21820
- Final Drainage Report Tollgate Village Filing No. 14 approved August 20, 2008 EDN: 208094

Added to list of references.

Buckley Yard Master Drainage Report

Buckley Yard FLG #02 Preliminary Drainage Report

Bristol Commercial Center #03 (EDN 970218)

Bristol Commercial Center #06 (EDN 218210)

Already provided.

APPENDIX 1
Hydrologic Computations

TABLE 1
RUNOFF COEFFICIENTS AND PERCENTS IMPERVIOUS

LAND USE OR SURFACE CHARACTERISTICS	PERCENT IMPERVIOUS	FREQUENCY			
		2	5	10	100
Business:					
Commercial Areas	95	.87	.87	.88	.89
Neighborhood Areas	85	.60	.65	.70	.80
Residential:					
Single-Family (**)	(*)	.40	.45	.50	.60
Multi-Unit (detached)	60	.45	.50	.60	.70
Multi-Unit (attached)	75	.60	.65	.70	.80
1/2 Acre Lot or Larger	(*)	.30	.35	.40	.60
Apartments	80	.65	.70	.70	.80
Industrial:					
Light Areas	80	.71	.72	.76	.82
Heavy Areas	90	.80	.80	.85	.90
Parks, Cemeteries	5	.10	.10	.35	.60
Playgrounds	10	.15	.25	.35	.65
Schools	50	.45	.50	.60	.70
Railroad Yard Areas	15	.40	.45	.50	.60
Undeveloped Areas:					
Historic Flow Analysis, Greenbelts, Agricultural	2	(See "Lawns")			
Off-Site Flow Analysis (when land use not defined)	45	.43	.47	.55	.65

Include second page of this table for streets.

Second page added.

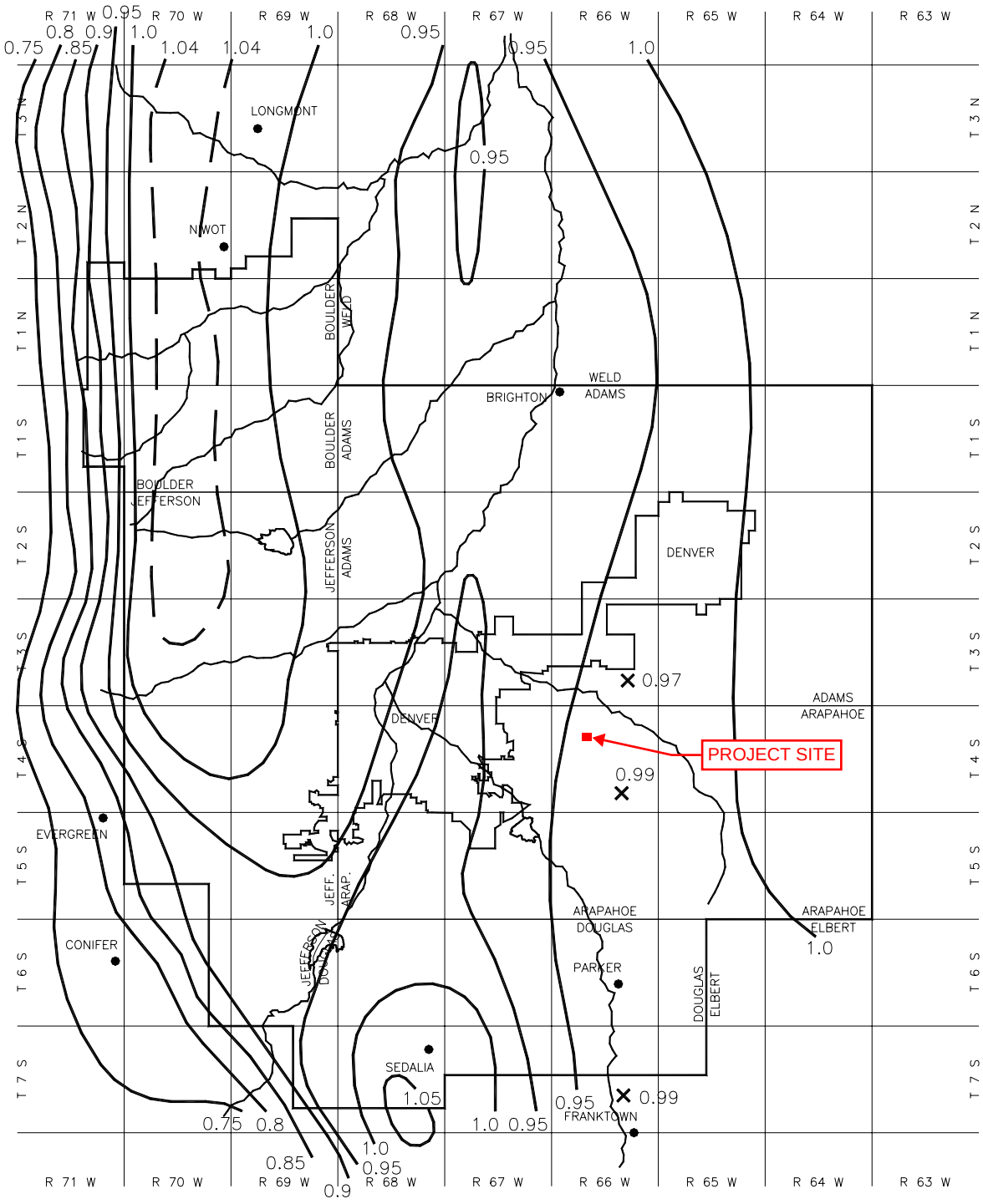


Figure RA-1—Rainfall Depth-Duration-Frequency: 2-Year, 1-Hour Rainfall

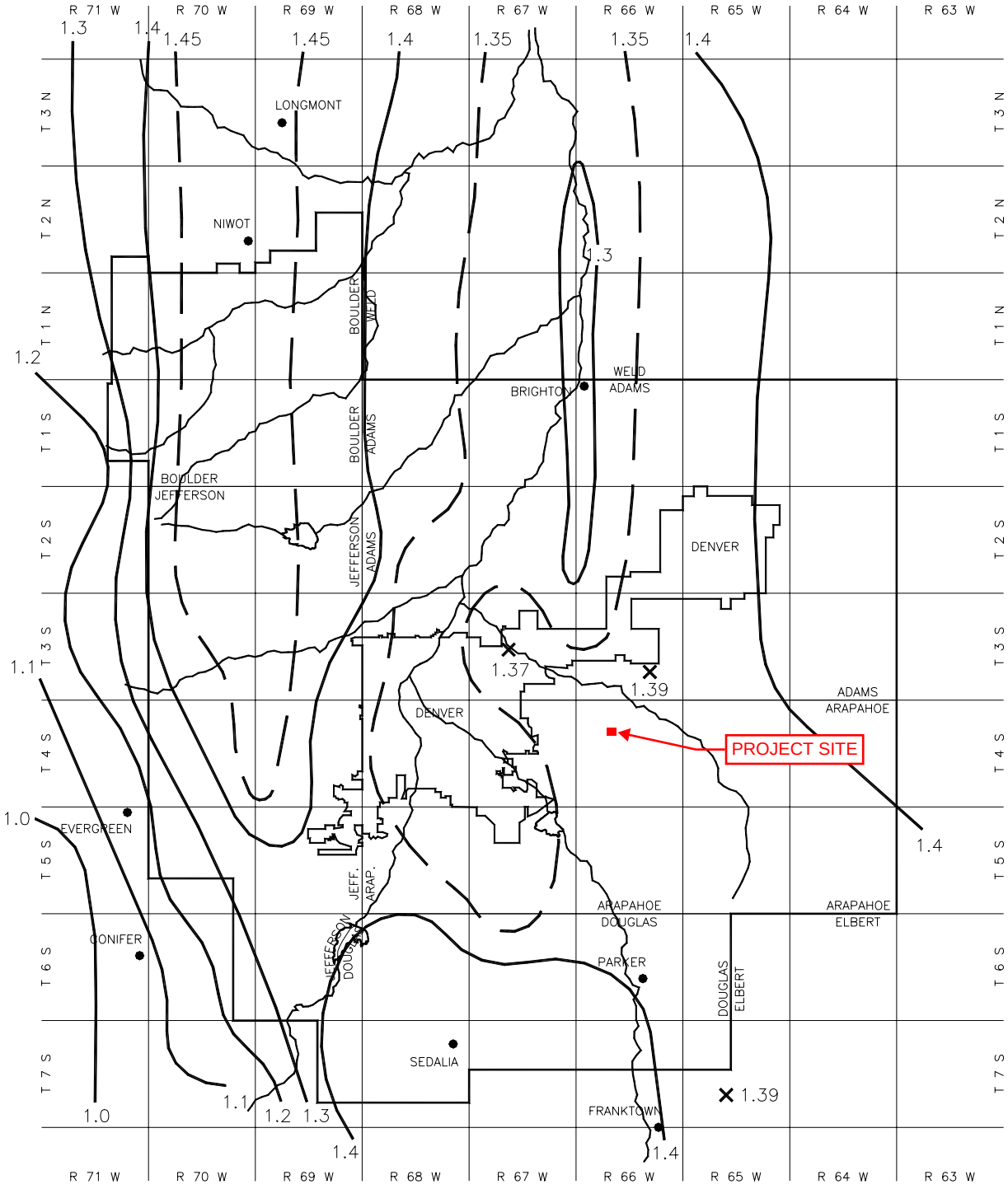


Figure RA-2—Rainfall Depth-Duration-Frequency: 5-Year, 1-Hour Rainfall

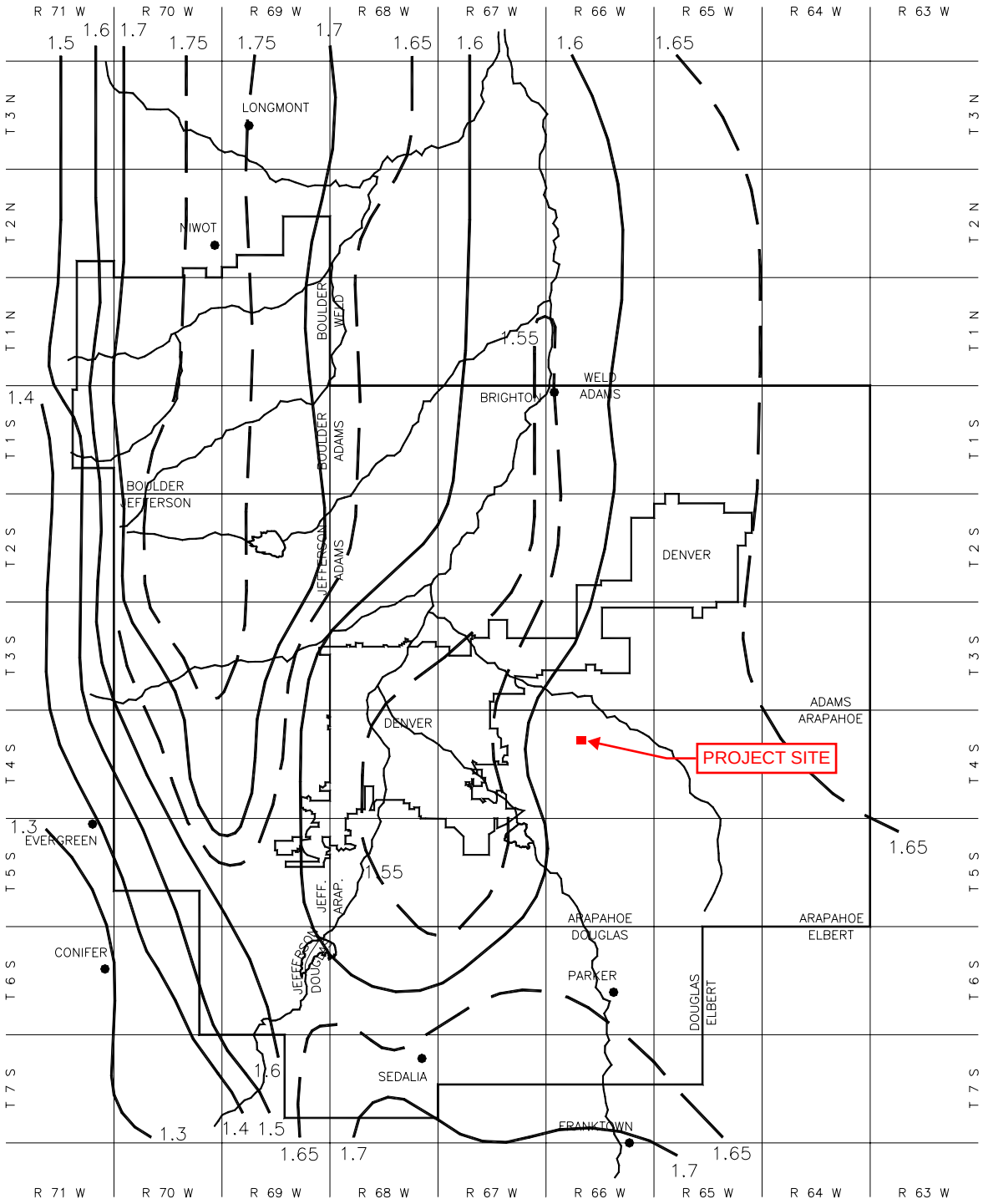


Figure RA-3—Rainfall Depth-Duration-Frequency: 10-Year, 1-Hour Rainfall

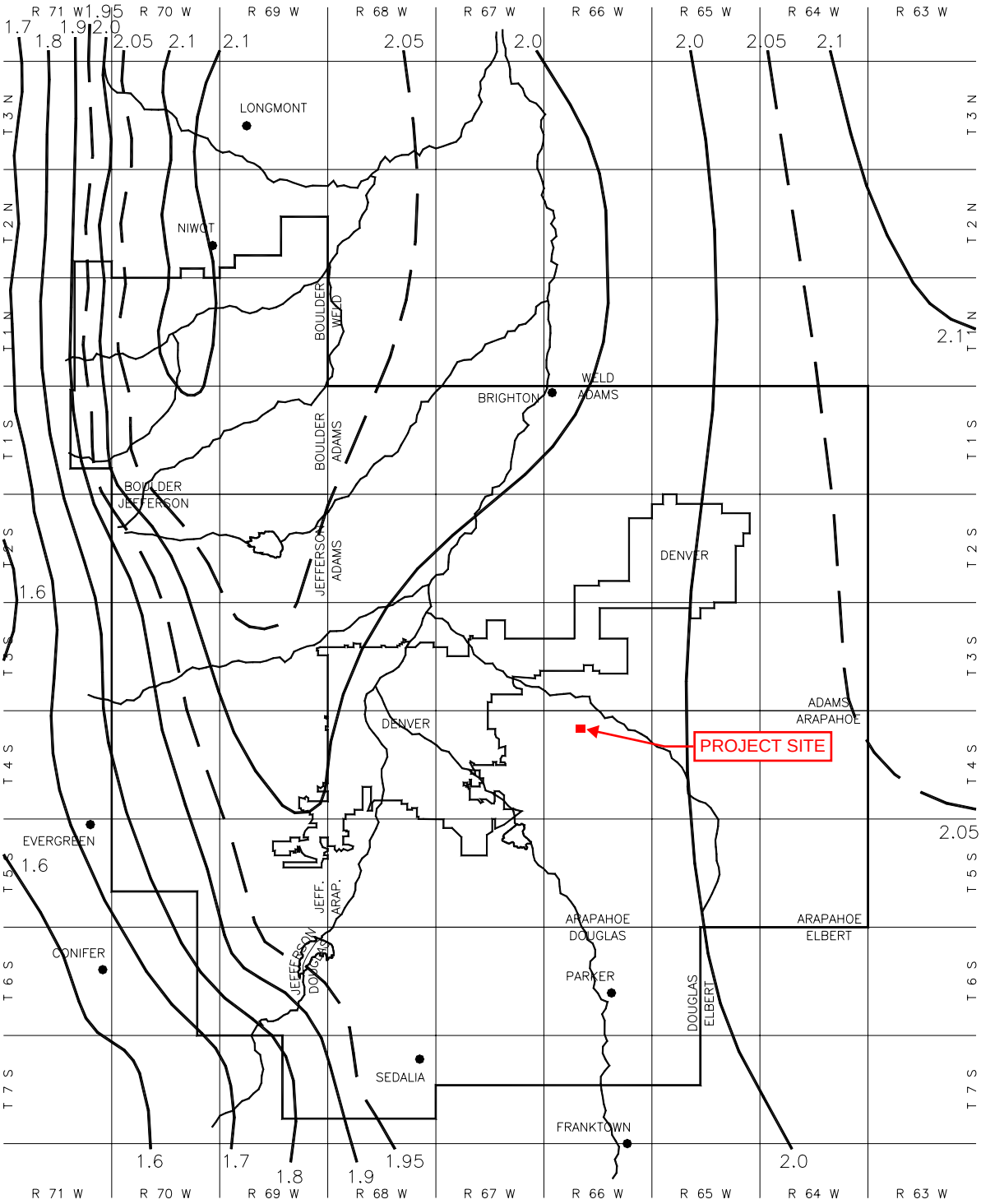


Figure RA-4—Rainfall Depth-Duration-Frequency: 25-Year, 1-Hour Rainfall

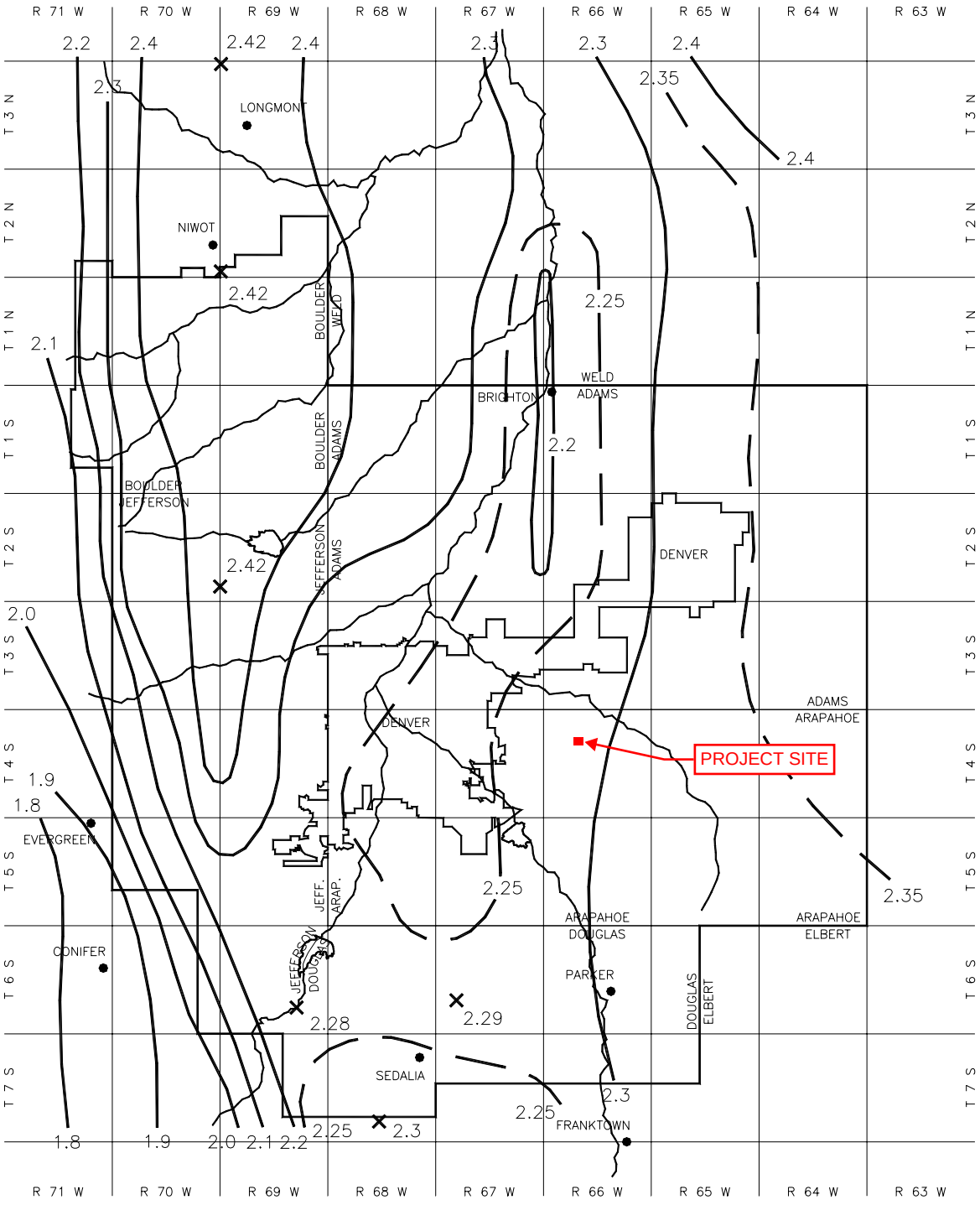


Figure RA-5—Rainfall Depth-Duration-Frequency: 50-Year, 1-Hour Rainfall

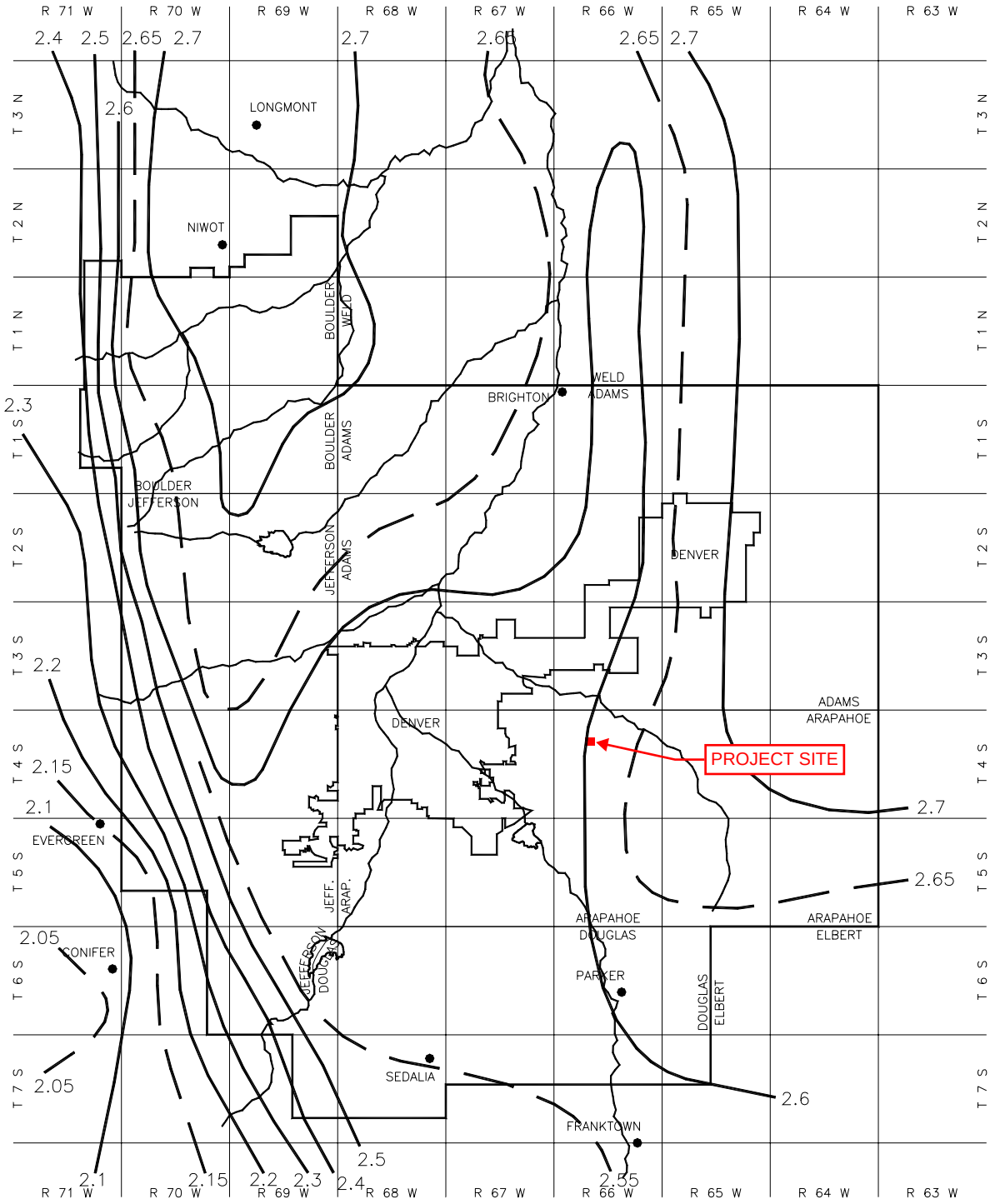


Figure RA-6—Rainfall Depth-Duration-Frequency: 100-Year, 1-Hour Rainfall

COA Equation 5.4 required.

ToC calcs revised to use this methodology.

Ca… using Rational Method

Designer: EMORTON …0 release…
Company: OLSSON
Date: 4/19/2021
Project: BUCKLEY YARD COMMERCIAL
Location: AURORA, CO

Cells of thi…
Cells of thi…
Cells of thi…

$$t_i = \frac{0.395(1.1 - C_5)\sqrt{L_i}}{S_i^{0.33}}$$

$$t_t = \frac{L_t}{60K\sqrt{S_t}} = \frac{L_t}{60V_t}$$

Selected $t_c = \max\{t_{minimum}, \min(\text{Computed } t_c, \text{Regional } t_c)\}$

Regional $t_c = (26 - 17i) + \frac{L_t}{60(14i + 9)\sqrt{S_t}}$

Computed $t_c = t_i + t_t$

$t_{minimum}$ = 5 (urban)
$t_{minimum}$ = 10 (non-urban)

Select UDFCD location for NOAA Atlas 14 Rainfall Depths from the pulldown list OR enter your own depths obtained from the NOAA website (click this link)

	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
1-hour rainfall depth, P1 (in) =	0.96	1.39	1.62	2.00	2.28	2.60

	a	b	c
Rainfall Intensity Equation Coefficients =	28.50	10.00	0.786

$$I(in/hr) = \frac{a * P_1}{(b + t_c)^c}$$

$$Q(cfs) = CIA$$

Subcatchment Name	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C		Overland (Initial) Flow Time			Channelized (Travel) Flow Time					Time of Concentration			Rainfall Intensity, I (in/hr)						Peak Flow, Q (cfs)					
				2-yr	100-yr	Overland Flow Length L_i (ft)	Overland Flow Slope S_i (ft/ft)	Overland Flow Time t_i (min)	Channelized Flow Length L_t (ft)	Channelized Flow Slope S_t (ft/ft)	NRCS Conveyance Factor K	Channelized Flow Velocity V_t (ft/sec)	Channelized Flow Time t_t (min)	Computed t_c (min)	Regional t_c (min)	Selected t_c (min)	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
B-1	1.03	D	95.0	0.79	0.87	50.00	0.020	2.95	200.00	0.010	20	2.00	1.67	4.62	11.34	5.00	3.26	4.71	5.49	6.78	7.73	8.82	2.64	3.93	4.70	5.95	6.87	7.93
B-2	0.81	D	95.0	0.79	0.87	50.00	0.020	2.95	200.00	0.010	20	2.00	1.67	4.62	11.34	5.00	3.26	4.71	5.49	6.78	7.73	8.82	2.08	3.09	3.70	4.68	5.40	6.23
B-3	0.90	D	95.0	0.79	0.87	50.00	0.020	2.95	200.00	0.010	20	2.00	1.67	4.62	11.34	5.00	3.26	4.71	5.49	6.78	7.73	8.82	2.31	3.43	4.11	5.20	6.00	6.93
B-4	1.15	D	95.0	0.79	0.87	50.00	0.030	2.58	200.00	0.010	20	2.00	1.67	4.25	11.34	5.00	3.26	4.71	5.49	6.78	7.73	8.82	2.95	4.39	5.25	6.64	7.67	8.85
B-5	1.30	D	95.0	0.79	0.87	50.00	0.030	2.58	200.00	0.010	20	2.00	1.67	4.25	11.34	5.00	3.26	4.71	5.49	6.78	7.73	8.82	3.33	4.96	5.93	7.50	8.67	10.00
B-6	0.29	D	95.0	0.79	0.87	12.00	0.030	1.27	200.00	0.010	20	2.00	1.67	2.93	11.34	5.00	3.26	4.71	5.49	6.78	7.73	8.82	0.74	1.11	1.32	1.67	1.93	2.23
B-7	0.31	D	2.0	0.01	0.49	12.00	0.030	4.56	200.00	0.010	7	0.70	4.76	9.33	29.25	10.00	2.60	3.76	4.38	5.41	6.17	7.03	0.01	0.06	0.20	0.55	0.77	1.07
OS-A	0.36	D	95.0	0.79	0.87	12.00	0.020	1.45	430.00	0.020	20	2.83	2.53	3.98	12.12	5.00	3.26	4.71	5.49	6.78	7.73	8.82	0.92	1.37	1.64	2.08	2.40	2.77
OS-B	0.44	D	95.0	0.79	0.87	12.00	0.020	1.45	430.00	0.020	20	2.83	2.53	3.98	12.12	5.00	3.26	4.71	5.49	6.78	7.73	8.82	1.13	1.68	2.01	2.54	2.93	3.39
OS-C	0.34	D	95.0	0.79	0.87	12.00	0.030	1.27	470.00	0.030	20	3.46	2.26	3.53	11.88	5.00	3.26	4.71	5.49	6.78	7.73	8.82	0.87	1.30	1.55	1.96	2.27	2.62
OS-D	0.42	D	95.0	0.79	0.87	12.00	0.030	1.27	470.00	0.030	20	3.46	2.26	3.53	11.88	5.00	3.26	4.71	5.49	6.78	7.73	8.82	1.08	1.60	1.92	2.42	2.80	3.23
OS-E	0.11	D	60.0	0.47	0.73	12.00	0.010	3.60	20.00	0.010	20	2.00	0.17	3.77	15.99	5.00	3.26	4.71	5.49	6.78	7.73	8.82	0.17	0.27	0.35	0.49	0.59	0.71
OS-F	0.33	D	35.0	0.26	0.63	5.00	0.020	2.50	870.00	0.025	20	3.16	4.59	7.09	26.65	7.09	2.94	4.26	4.96	6.12	6.98	7.96	0.25	0.45	0.64	1.04	1.30	1.65
OS-G	0.07	D	80.0	0.65	0.81	12.00	0.020	2.05	20.00	0.010	20	2.00	0.17	2.22	12.57	5.00	3.26	4.71	5.49	6.78	7.73	8.82	0.15	0.23	0.28	0.36	0.43	0.50
OS-H	18.18	D	2.0	0.01	0.49	300.00	0.020	26.09	735.00	0.030	10	1.73	7.07	33.16	33.28	33.16	1.42	2.05	2.39	2.96	3.37	3.84	0.27	1.92	6.39	17.74	24.68	34.38
ExAirport	4.00	D	90.0	0.74	0.85	36.00	0.020	2.86	2800.00	0.025	20	3.16	14.76	17.61	24.36	17.61	2.02	2.92	3.40	4.20	4.79	5.46	5.97	8.97	10.80	13.82	16.04	18.61
Pr Airport	4.40	D	90.0	0.74	0.85	36.00	0.020	2.86	2800.00	0.025	20	3.16	14.76	17.61	24.36	17.61	2.02	2.92	3.40	4.20	4.79	5.46	6.57	9.87	11.87	15.21	17.64	20.47

100% impervious for paved streets per SDDTC Table 1

Calculated as composite imperviousness based on actual paved versus landscaped areas (39%).

100% impervious required for pond

Revised to 100%.

100% impervious for paved streets per SDDTC Table 1

Subcatchment contains landscaped buffers. Calcs performed with actual pervious vs. impervious areas and composite imperviousness ~75% (validated with OS-A) which implies 95% imperviousness is plenty conservative. Increasing this to a full 100% impervious will result in the pond not working. the current design provides excess volume in the pond without being additionally conservative in the imperviousness values.

0.87

0.89

For subcatchment OS-F, C values derived from composite imperviousness as discussed. B-6 and B-7 values revised, B7 values actually slightly higher since imperviousness is 100%.

0.87 per SDDTC Table 1 (typ)

0.89 per SDDTC Table 1 (typ)

Revised to match these numbers.

NOTE: New rational calculation spreadsheet used with City of Aurora methodologies for computing Time of Concentration. Format of spreadsheet different than the one depicted in this submittal but overall content is the same.

APPENDIX 2
Hydraulic Computations

	B-1	B-2	B-3	B-4	B-5	B-6	B-7	Total	
Watershed Area =	1.03	0.81	0.90	1.15	1.30	0.29	0.31	5.79	ac
Watershed Imperviousness =	95	95	95	95	95	95	2	90.02	%
100YR Intensity =	9.022	9.022	9.022	9.022	9.022	9.022	9.022	9.022	in/hr
WQCV =	0.038	0.030	0.034	0.043	0.048	0.011	0.000	0.205	ac-ft
1.2*WQCV =	0.046	0.036	0.040	0.051	0.058	0.013	0.000	**0.246**	ac-ft
MHFD-Detention EURV =	0.097	0.077	0.085	0.109	0.12	0.027	0.000	**0.518**	ac-ft
100-yr Volume =	0.169	0.133	0.147	0.188	0.213	0.048	0.000	0.898	ac-ft
Total Volume Required (100-yr + EURV/2) =	0.217	0.171	0.190	0.243	0.275	0.061	0.000	**1.157**	ac-ft
Total Volume =	9,465	7,459	8,276	10,583	11,959	2,658	9	50,410	CF
10YR Allowable Release Rate =	0.309	0.243	0.270	0.345	0.390	0.087	0.093	1.74	cfs
100YR Allowable Release Rate =	1.030	0.810	0.900	1.150	1.300	0.290	0.310	5.79	cfs
100YR Overflow Rate =	8.27	6.50	7.23	9.23	10.44	2.33	2.49	46.49	cfs

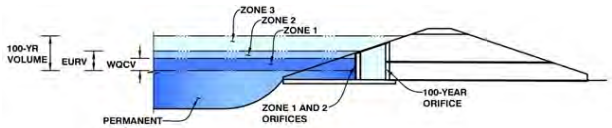
Detention Pond Volume Required	Buckley Yard Commercial	olsson 1880 Fall River Drive, Suite 200 Loveland, CO 80538 Tel. 970-461-7733

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.03 (May 2020)

Project: **Buckley Yard**

Basin ID: **Commercial Ponds**



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	**EDB**	
Watershed Area =	5.79	acres
Watershed Length =	900	ft
Watershed Length to Centroid =	300	ft
Watershed Slope =	0.020	ft/ft
Watershed Imperviousness =	90.00%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	0.0%	percent
Percentage Hydrologic Soil Groups C/D =	100.0%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	

After providing required inputs above including 1-hour rainfall depths, click 'Run CUHP' to generate runoff hydrographs using the embedded Colorado Urban Hydrograph Procedure.

			Optional User Overrides	
Water Quality Capture Volume (WQCV) =	0.246	acre-feet	0.246	acre-feet
Excess Urban Runoff Volume (EURV) =	0.517	acre-feet		acre-feet
2-yr Runoff Volume (P1 = 0.98 in.) =	0.398	acre-feet	0.98	inches
5-yr Runoff Volume (P1 = 1.36 in.) =	0.582	acre-feet	1.36	inches
10-yr Runoff Volume (P1 = 1.61 in.) =	0.705	acre-feet	1.61	inches
25-yr Runoff Volume (P1 = 2 in.) =	0.900	acre-feet	2.00	inches
50-yr Runoff Volume (P1 = 2.29 in.) =	1.044	acre-feet	2.29	inches
100-yr Runoff Volume (P1 = 2.66 in.) =	1.230	acre-feet	2.66	inches
500-yr Runoff Volume (P1 = 3.14 in.) =	1.468	acre-feet		inches
Approximate 2-yr Detention Volume =	0.388	acre-feet		
Approximate 5-yr Detention Volume =	0.569	acre-feet		
Approximate 10-yr Detention Volume =	0.670	acre-feet		
Approximate 25-yr Detention Volume =	0.770	acre-feet		
Approximate 50-yr Detention Volume =	0.800	acre-feet		
Approximate 100-yr Detention Volume =	0.860	acre-feet		

Define Zones and Basin Geometry

Zone 1 Volume (WQCV) =	0.246	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.271	acre-feet
Zone 3 Volume (User Defined - Zones 1 & 2) =	0.640	acre-feet
Total Detention Basin Volume =	1.157	acre-feet
Initial Surcharge Volume (ISV) =	user	ft^3
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (H_{total}) =	user	ft
Depth of Trickle Channel (H_{TC}) =	user	ft
Slope of Trickle Channel (S_{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S_{main}) =	user	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	user	
Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	ft^2
Volume of Basin Floor (V_{FLOOR}) =	user	ft^3
Depth of Main Basin (H_{MAIN}) =	user	ft
Length of Main Basin (L_{MAIN}) =	user	ft
Width of Main Basin (W_{MAIN}) =	user	ft
Area of Main Basin (A_{MAIN}) =	user	ft^2
Volume of Main Basin (V_{MAIN}) =	user	ft^3
Calculated Total Basin Volume (V_{total}) =	**user**	acre-feet

Depth Increment = ft

Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	9	0.000		
5474.6	--	0.10	--	--	--	151	0.003	8	0.000
5474.7	--	0.20	--	--	--	513	0.012	41	0.001
5474.8	--	0.30	--	--	--	1,036	0.024	119	0.003
5474.9	--	0.40	--	--	--	1,652	0.038	253	0.006
5475	--	0.50	--	--	--	2,369	0.054	454	0.010
5475.1	--	0.60	--	--	--	3,187	0.073	732	0.017
5475.2	--	0.70	--	--	--	4,033	0.093	1,093	0.025
5475.3	--	0.80	--	--	--	4,803	0.110	1,535	0.035
5475.4	--	0.90	--	--	--	5,419	0.124	2,046	0.047
5475.5	--	1.00	--	--	--	5,912	0.136	2,612	0.060
5475.6	--	1.10	--	--	--	6,327	0.145	3,224	0.074
5475.7	--	1.20	--	--	--	6,668	0.153	3,874	0.089
5475.8	--	1.30	--	--	--	6,934	0.159	4,554	0.105
5475.9	--	1.40	--	--	--	7,127	0.164	5,257	0.121
5476	--	1.50	--	--	--	7,245	0.166	5,976	0.137
5476.1	--	1.60	--	--	--	7,323	0.168	6,704	0.154
5476.2	--	1.70	--	--	--	7,401	0.170	7,440	0.171
5476.3	--	1.80	--	--	--	7,479	0.172	8,184	0.188
5476.4	--	1.90	--	--	--	7,558	0.174	8,936	0.205
5476.5	--	2.00	--	--	--	7,637	0.175	9,696	0.223
5476.6	--	2.10	--	--	--	7,716	0.177	10,464	0.240
5476.7	--	2.20	--	--	--	7,795	0.179	11,239	0.258
5476.8	--	2.30	--	--	--	7,874	0.181	12,023	0.276
5476.9	--	2.40	--	--	--	7,954	0.183	12,814	0.294
5477	--	2.50	--	--	--	8,034	0.184	13,613	0.313
5477.1	--	2.60	--	--	--	8,114	0.186	14,421	0.331
5477.2	--	2.70	--	--	--	8,194	0.188	15,236	0.350
5477.3	--	2.80	--	--	--	8,275	0.190	16,060	0.369
5477.4	--	2.90	--	--	--	8,355	0.192	16,891	0.388
5477.5	--	3.00	--	--	--	8,436	0.194	17,731	0.407
5477.6	--	3.10	--	--	--	8,518	0.196	18,578	0.427
5477.7	--	3.20	--	--	--	8,599	0.197	19,434	0.446
5477.8	--	3.30	--	--	--	8,681	0.199	20,298	0.466
5477.9	--	3.40	--	--	--	8,762	0.201	21,170	0.486
5478	--	3.50	--	--	--	8,845	0.203	22,051	0.506
5478.1	--	3.60	--	--	--	8,927	0.205	22,939	0.527
5478.2	--	3.70	--	--	--	9,009	0.207	23,836	0.547
5478.3	--	3.80	--	--	--	9,092	0.209	24,741	0.568
5478.4	--	3.90	--	--	--	9,175	0.211	25,654	0.589
5478.5	--	4.00	--	--	--	9,258	0.213	26,576	0.610
5478.6	--	4.10	--	--	--	9,341	0.214	27,506	0.631
5478.7	--	4.20	--	--	--	9,425	0.216	28,444	0.653
5478.8	--	4.30	--	--	--	9,509	0.218	29,391	0.675
5478.9	--	4.40	--	--	--	9,593	0.220	30,346	0.697
5479	--	4.50	--	--	--	9,677	0.222	31,310	0.719
5479.1	--	4.60	--	--	--	9,761	0.224	32,282	0.741
5479.2	--	4.70	--	--	--	9,846	0.226	33,262	0.764
5479.3	--	4.80	--	--	--	9,931	0.228	34,251	0.786
5479.4	--	4.90	--	--	--	10,016	0.230	35,248	0.809
5479.5	--	5.00	--	--	--	10,101	0.232	36,254	0.832
	--		--	--	--				
	--		--	--	--				
	--		--	--	--				
	--		--	--	--				
	--		--	--	--				
	--		--	--	--				
	--		--	--	--				

Do not include sizing of orifices or restrictor plates in PDR.

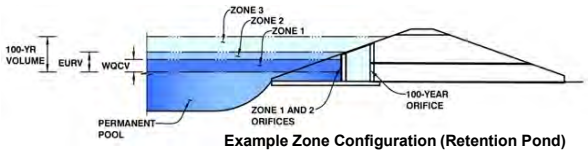
Removed from report.

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.03 (May 2020)

Project: Buckley Yard

Basin ID: Commercial Ponds



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	2.14	0.246	Orifice Plate
Zone 2 (EURV)	3.56	0.271	Circular Orifice
Zone 3 (User)	#VALUE!	0.640	Weir&Pipe (Circular)
Total (all zones)		1.157	

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

Underdrain Orifice Invert Depth =	N/A	ft (distance below the filtration media surface)	Underdrain Orifice Area =	N/A	ft²
Underdrain Orifice Diameter =	N/A	inches	Underdrain Orifice Centroid =	N/A	feet

Calculated Parameters for Underdrain

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

Invert of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)	WQ Orifice Area per Row =	6.806E-03	ft²
Depth at top of Zone using Orifice Plate =	2.14	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	6.00	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	0.98	sq. inches (diameter = 1-1/8 inches)	Elliptical Slot Area =	N/A	ft²

Calculated Parameters for Plate

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	0.50	1.00	1.50				
Orifice Area (sq. inches)	0.98	0.98	0.98	0.98				

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

	Zone 2 Circular	Not Selected			Zone 2 Circular	Not Selected	
Invert of Vertical Orifice =	2.14	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Area =	0.27	N/A	ft²
Depth at top of Zone using Vertical Orifice =	3.56	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Centroid =	0.29	N/A	feet
Vertical Orifice Diameter =	7.00	N/A	inches				

Calculated Parameters for Vertical Orifice

User Input: Overflow Weir (Dropbox with Flat or Sloped Grate and Outlet Pipe OR Rectangular/Trapezoidal Weir (and No Outlet Pipe))

	Zone 3 Weir	Not Selected			Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	3.60	N/A	ft (relative to basin bottom at Stage = 0 ft)	Height of Grate Upper Edge, H_t =	3.60	N/A	feet
Overflow Weir Front Edge Length =	2.92	N/A	feet	Overflow Weir Slope Length =	2.92	N/A	feet
Overflow Weir Grate Slope =	0.00	N/A	H:V	Grate Open Area / 100-yr Orifice Area =	10.94	N/A	
Horiz. Length of Weir Sides =	2.92	N/A	feet	Overflow Grate Open Area w/o Debris =	5.97	N/A	ft²
Overflow Grate Open Area % =	70%	N/A	%, grate open area/total area	Overflow Grate Open Area w/ Debris =	2.98	N/A	ft²
Debris Clogging % =	50%	N/A	%				

Calculated Parameters for Overflow Weir

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Zone 3 Circular	Not Selected			Zone 3 Circular	Not Selected	
Depth to Invert of Outlet Pipe =	0.50	N/A	ft (distance below basin bottom at Stage = 0 ft)	Outlet Orifice Area =	0.55	N/A	ft²
Circular Orifice Diameter =	10.00	N/A	inches	Outlet Orifice Centroid =	0.42	N/A	feet
				Half-Central Angle of Restrictor Plate on Pipe =	N/A	N/A	radians

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	4.90	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	0.29	feet
Spillway Crest Length =	50.00	feet	Stage at Top of Freeboard =	6.19	feet
Spillway End Slopes =	20.00	H:V	Basin Area at Top of Freeboard =	0.23	acres
Freeboard above Max Water Surface =	1.00	feet	Basin Volume at Top of Freeboard =	0.83	acre-ft

Calculated Parameters for Spillway

Routed Hydrograph Results

The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	0.98	1.36	1.61	2.00	2.29	2.66	3.14
CUHP Runoff Volume (acre-ft) =	0.246	0.517	0.398	0.582	0.705	0.900	1.044	1.230	1.468
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	0.398	0.582	0.705	0.900	1.044	1.230	1.468
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	0.2	1.8	2.8	5.3	6.7	8.8	11.2
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.04	0.31	0.48	0.91	1.16	1.52	1.93
Peak Inflow Q (cfs) =	N/A	N/A	7.4	10.5	12.3	16.1	18.7	22.3	26.5
Peak Outflow Q (cfs) =	0.2	1.6	0.7	1.3	1.60	5.2	5.4	5.79	10.8
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.7	0.6	1.0	0.8	0.7	1.0
Structure Controlling Flow =	Plate	Vertical Orifice 1	Vertical Orifice 1	Vertical Orifice 1	Vertical Orifice 1	Outlet Plate 1	Outlet Plate 1	Outlet Plate 1	N/A
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	N/A	N/A	0.6	0.6	0.6	0.6
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	37	40	41	40	40	38	37	36	34
Time to Drain 99% of Inflow Volume (hours) =	**40**	45	46	46	46	45	44	43	42
Maximum Ponding Depth (ft) =	2.14	3.56	2.63	3.17	3.57	3.88	4.17	4.77	5.00
Area at Maximum Ponding Depth (acres) =	0.18	0.20	0.19	0.20	0.20	0.21	0.22	0.23	0.23
Maximum Volume Stored (acre-ft) =	0.247	0.518	0.337	0.440	0.520	0.583	0.647	0.779	0.832

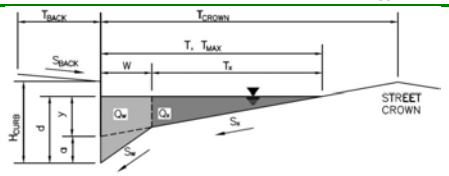
Version 4.06 Released August 2018

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Enter Your Project Name Here

Inlet ID: Inlet A



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	20.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.013	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	18.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.030	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.020	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	10.0	18.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	6.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☐	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**4.3**	**14.1**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

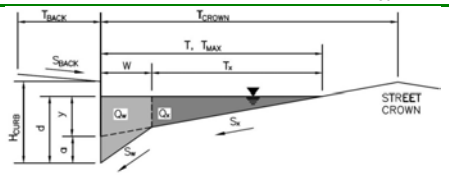
Version 4.06 Released August 2018

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Enter Your Project Name Here

Inlet ID: Inlet B



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	20.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.013	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	18.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.030	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.020	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	10.0	18.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	6.0	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☐	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**4.3**	**14.2**	**cfs**

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

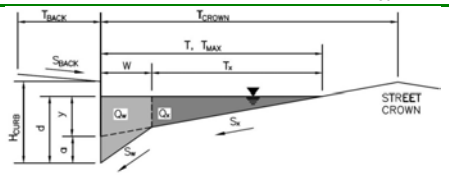
Version 4.06 Released August 2018

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Enter Your Project Name Here

Inlet ID: Inlet C



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	20.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.013	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	18.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.020	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	10.0	18.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	6.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**SUMP**	**SUMP**	**cfs**

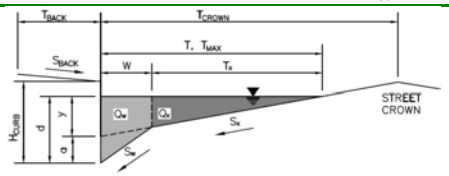
Version 4.06 Released August 2018

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: Enter Your Project Name Here

Inlet ID: Inlet D



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	20.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.013	
Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	18.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.020	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	10.0	18.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	6.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	**Q_{allow} =**	**SUMP**	**SUMP**	**cfs**

APPENDIX 3

Reference Information

Include pertinent pages from previous studies for this site with site outlined on maps and pertinent information highlighted.

reference information added to report where available and highlighted for convenience

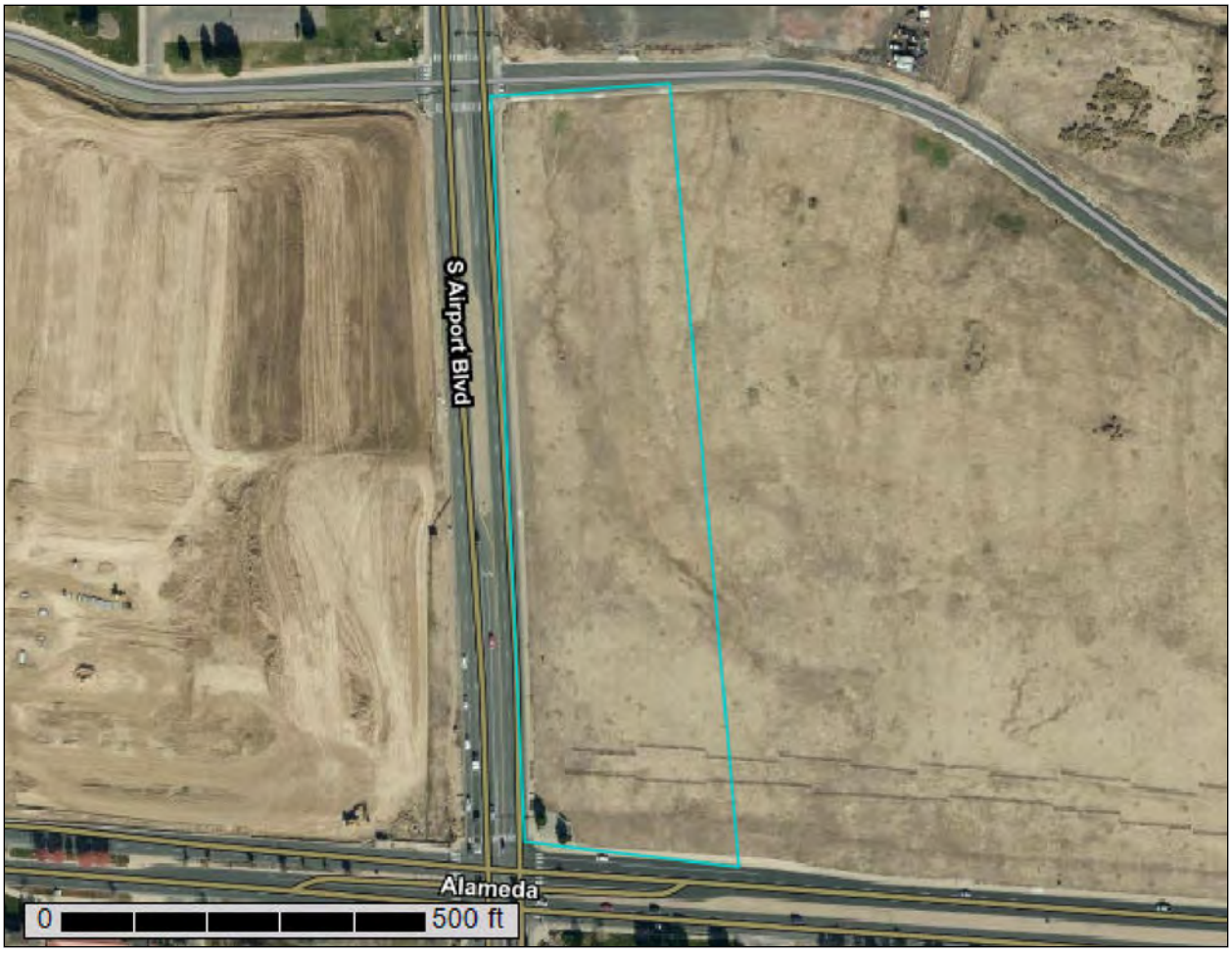
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Arapahoe County, Colorado



April 6, 2021

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

Map Scale: 1:1,910 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 25 50 100 150

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Arapahoe County, Colorado
Survey Area Data: Version 16, Jun 4, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Oct 3, 2018—Dec 4, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
FdB	Fondis silt loam, 1 to 3 percent slopes	4.1	63.2%
RhD	Renohill-Buick loams, 3 to 9 percent slopes	2.4	36.8%
Totals for Area of Interest		**6.5**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,

onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Arapahoe County, Colorado

FdB—Fondis silt loam, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 34yh
Elevation: 4,700 to 6,200 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 150 to 170 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Fondis and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Fondis

Setting

Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty and/or loamy

Typical profile

H1 - 0 to 7 inches: silt loam
H2 - 7 to 27 inches: clay
H3 - 27 to 60 inches: clay loam

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water capacity: High (about 10.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3c
Hydrologic Soil Group: C
Ecological site: R049XY202CO - Loamy Foothill
Hydric soil rating: No

Minor Components

Weld

Percent of map unit: 10 percent
Hydric soil rating: No

Buick

Percent of map unit: 5 percent
Hydric soil rating: No

RhD—Renohill-Buick loams, 3 to 9 percent slopes

Map Unit Setting

National map unit symbol: 34z0
Elevation: 3,600 to 6,200 feet
Mean annual precipitation: 11 to 16 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Renohill and similar soils: 65 percent
Buick and similar soils: 25 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Renohill

Setting

Landform: Drainageways
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loam silty and clayey alluvium

Typical profile

H1 - 0 to 4 inches: loam
H2 - 4 to 18 inches: clay loam, clay
H2 - 4 to 18 inches: loam, clay loam
H3 - 18 to 30 inches: unweathered bedrock
H3 - 18 to 30 inches:
H4 - 30 to 34 inches:

Properties and qualities

Slope: 3 to 9 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water capacity: High (about 9.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: R067BY002CO - Loamy Plains
Hydric soil rating: No

Description of Buick

Setting

Landform: Ridges
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium and/or eolian deposits

Typical profile

H1 - 0 to 4 inches: loam
H2 - 4 to 20 inches: clay loam
H3 - 20 to 60 inches: sandy clay loam, clay loam
H3 - 20 to 60 inches:

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Available water capacity: Very high (about 17.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4c
Hydrologic Soil Group: C
Ecological site: R067BY002CO - Loamy Plains
Hydric soil rating: No

Minor Components

Litle

Percent of map unit: 5 percent
Hydric soil rating: No

Fondis

Percent of map unit: 5 percent
Hydric soil rating: No

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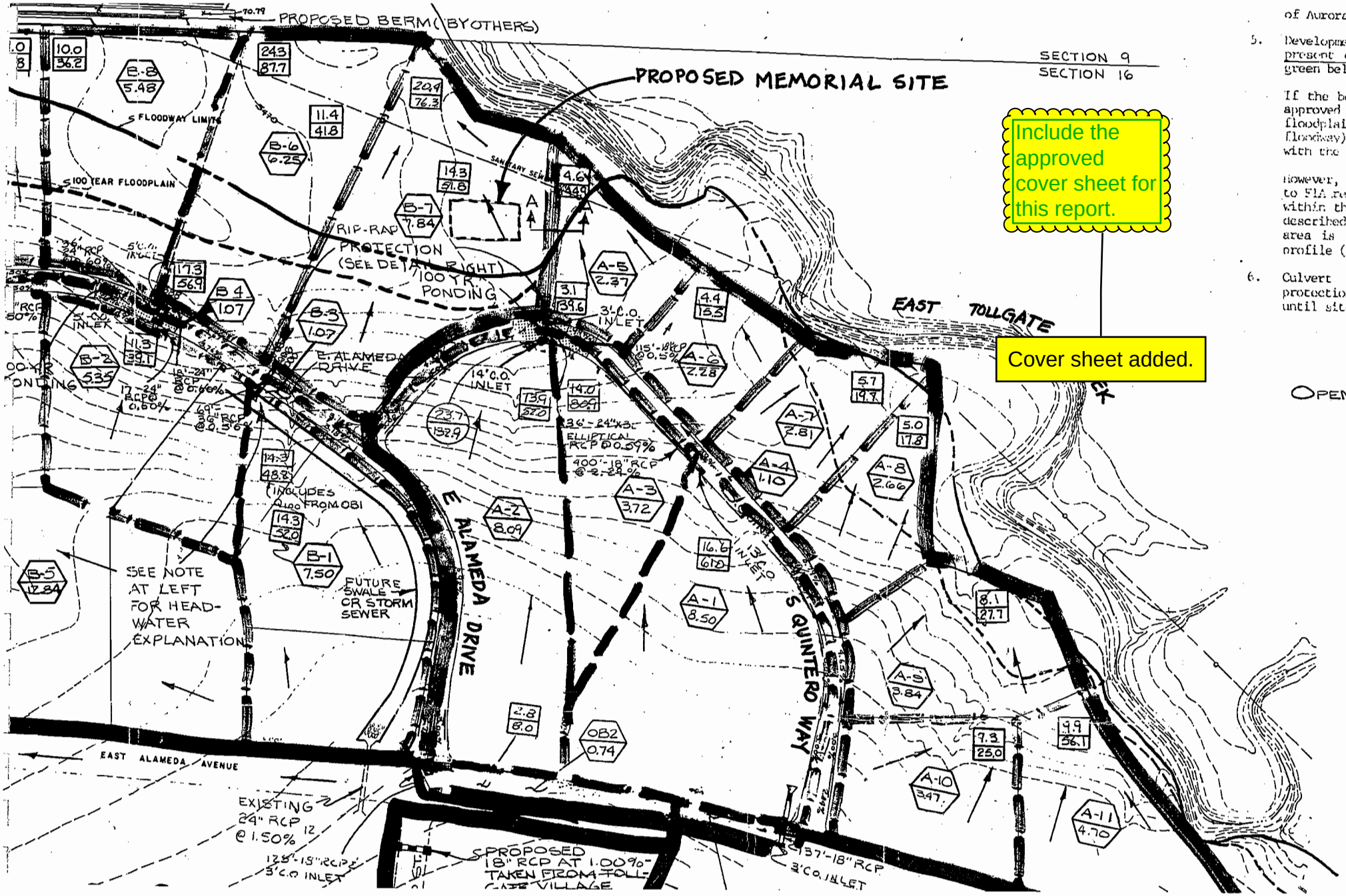


Include the approved cover sheet for this report.

Cover sheet added.

of Aurora.

5. Development w present condit green belts, a

If the berm i approved by al floodplain (fr floodway) with the applic

However, if th to FIA require within the flo described abov area is filled profile (with t

6. Culvert disch protection, and until sites are

SUBDIVISION TOLLGATE #14
LOCATION AURORA, CO.
JOB NO. 49921
DESIGN STORM 2 YR. RECURRENCE INTERVAL
MAJOR STORM 100 YR.
COMPUTATIONS BY J.P.D DATE 9/10/80

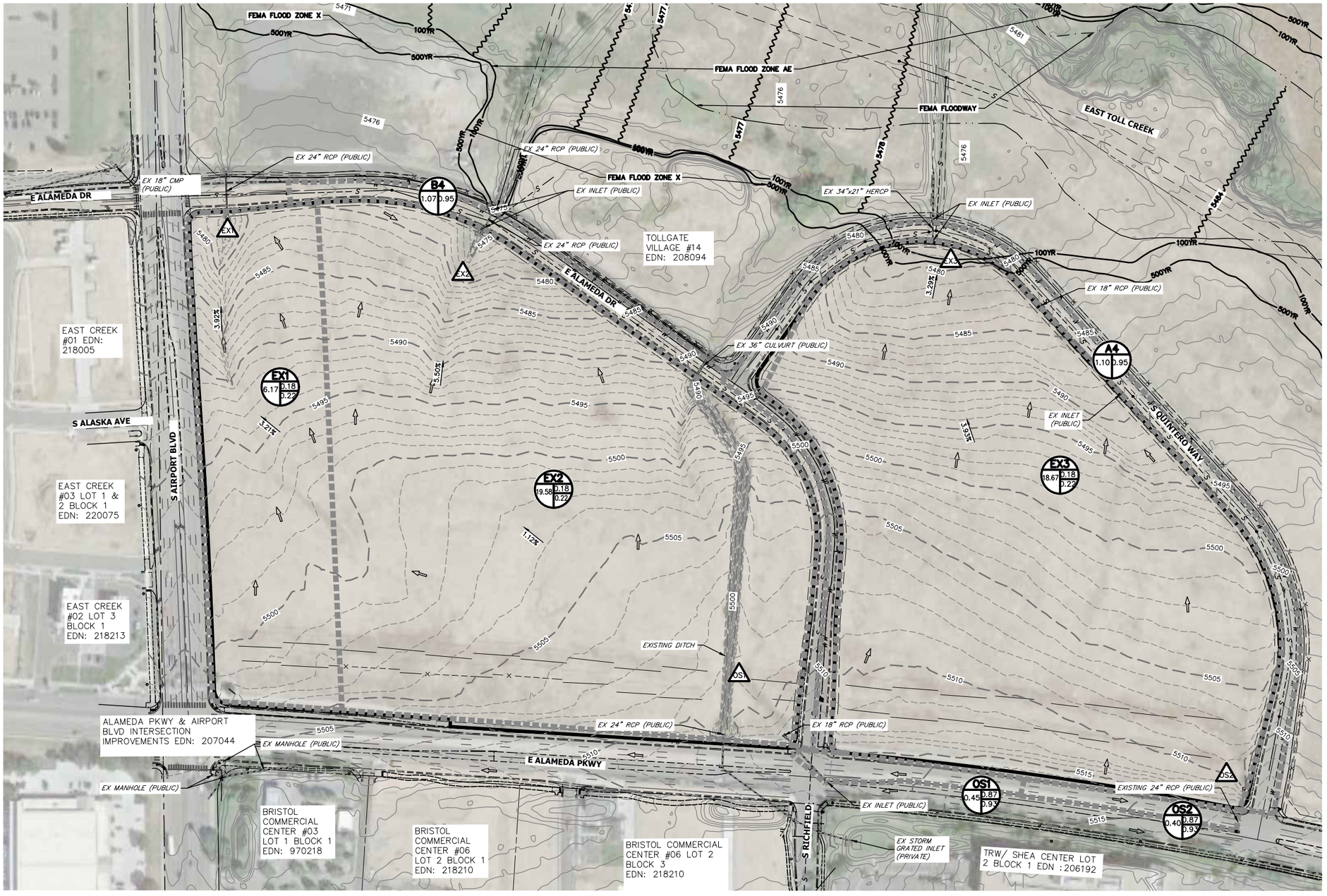
MSM CONSULTANTS, INC.
570 W. 44th. AVENUE
DENVER, COLORADO 80216

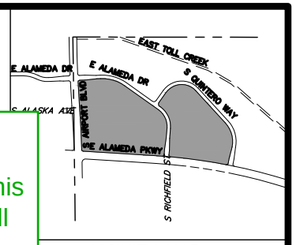
RUNOFF COMPUTATIONS
(Rational Method)

PAGE ____ OF ____

Area Designation	A (Acres)	c	c_f	$\bar{c}$ = (c x c_f)	A·$\bar{c}$	ΣA·$\bar{c}$	t_c (min)	I (in/hr)	Q = (ΣA·$\bar{c}$)·I cfs	Street capacity cfs	Flow in Pipe cfs	Pipe Dia. in.	Slope %	Length ft.	VEL V fps	Δt (min)	
OB1	15.4	0.2	1.0	0.2	3.08		25.0	1.75	5.4								FROM ADDENDUM TO FINAL DRAINAGE STUDY TOLLGATE #12 BY MSM
			1.25	0.25	3.85		22.0	5.1	19.6								
OB2	0.74	0.95	1.0	0.95	0.70		5.0	9.0	2.8								NOV. 1979
			1.25	1.00	0.74		5.0	10.75	8.0								t_c = 5.0 MIN STREET FLOW
OB1 + OB2						3.78	25.0	1.75	6.6								
						4.95	22.0	5.1	25.3								
B1	7.58	0.7		0.70	5.31		12.0	2.7	14.3						3.8	8.0 / 4.0	t_c INITIAL = 8.0 FROM ROOF
				0.88	6.67		11.0	7.6	52.0				2.6	900	5.0	8.0 / 3.0	
OB1+OB2+B1	100 YR HISTORIC AC.			AC			29.8										36" RCP
	+ 2 YR. DEV. AC.			4.95+5.31		10.26	25.7	4.7	48.2		48.2		2.3	1000	4.5	3.7	SIZED TO CARRY TH
																	(SEE NOTE ON DRAINAGE PLAN FOR HEADWATER CONSIDERATI
B2	5.35	0.7		0.70	3.75		9.8	3.0	11.3						4.7	8.0 / 1.8	24" RCP SIZED FOR 2 YR. DEV. @ HW/D = 0.9 Total HW = 3.65
				0.88	4.71		9.4	8.3	39.1				4.8	500	6.0	8.0 / 1.4	
+B3	1.07	0.95		0.95	1.01	4.76	9.8	3.0	14.3								Q_{100} in B2 = 23.0 cfs
				1.00	1.07	5.78	9.4	8.3	48.0								ASSUME REMAINDER TOPS CURB
+B4	1.07	0.95			1.01	5.77	9.8	3.0	17.3								
					1.07	6.85	9.4	8.3	56.9		17.3						
B3 OR B4 :	2 YR				1.01		9.4	8.3	8.4	5' C.D. INLET							SIZED FOR Q_2 30" RCP H/W/D = 1.0 Q_{100} @ 4.2/2.5 = 1.7 = 40 cfs Assume
B5	12.84	0.7		0.7	8.99		15.3	2.35	21.1						3.2	8.0 / 7.3	REMAINDER TOPS CURB AND FLOWS INTO BUCKLEY ROAD
				0.88	11.30		13.6	6.9	78.0				1.4	1400	4.2	8.0 / 5.6	

BUCKLEY YARD - HISTORIC CONDITIONS MAP





VICINITY MAP
1"=1000'

Include the approved version of this map, as well as the approved cover sheet of this Master Drainage Report.

- PROPOSED STORM SEWER
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- 5000 — EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- DRAINAGE BASIN
- A = BASIN DESIGNATION
  B = AREA IN ACRES
  C = 2–YR RUNOFF COEFFICIENT
  D = 100–YR RUNOFF COEFFICIENT
- 1 — DESIGN POINT
- HP — HIGH POINT
- LP — LOW POINT
- DRAINAGE ARROW
- EXISTING DRAINAGE ARROW
- POND EMERGENCY OUTFLOW
- PROPOSED DRAINAGE SWALE
- 100 YR — 100 YR FLOODPLAIN
- 500 YR — 500 YR FLOODPLAIN
- 54XX — BASE FLOOD ELEVATION
- FEMA FLOODWAY

EXISTING 5100 PROPOSED 5100

BENCHMARK

ELEVATIONS ARE BASED OFF OF CITY OF AURORA CONTROL BENCHMARK NO. 0456616NW002 A 3" DIAM. BRASS CAP ON THE EAST SIDE OF A CURB OPENING INLET STRUCTURE BEING AT THE EAST PCR AT THE S.E. CORNER OF ALAMEDA PARKWAY AND S. BUCKLEY RD. SAID CAP BEING 3.0 FT. S. OF THE FLOWLINE. LOOPED TO AKA 11–053
BENCHMARK #0456616NW002
AURORA DATUM = 5503.43.
NAVD 1988

ENGINEER'S STATEMENT

THIS REPRODUCIBLE SEPIA IS A FACSIMILE OF A SIGNED AND SEALED PRINT TRANSMITTED TO THE CITY OF AURORA, ENGINEERING DEPARTMENT.

PREPARED UNDER MY SUPERVISION

COLORADO OF CURTIS W. WILLIAMS 34270 REGISTERED PROFESSIONAL ENGINEER

(KURTIS WILLIAMS), P.E.
COLORADO P.E. 34270
FOR AND ON BEHALF OF JR ENGINEERING, LLC.

DATE

CITY OF AURORA PLAN REVIEW IS ONLY FOR GENERAL CONFORMANCE WITH CITY OF AURORA DESIGN CRITERIA AND THE CITY CODE. THE CITY IS NOT RESPONSIBLE FOR THE ACCURACY AND ADEQUACY OF THE DESIGN, OF DIMENSIONS AND ELEVATIONS WHICH SHALL BE CONFIRMED AND CORRELATED AT THE JOB SITE. THE CITY OF AURORA, THROUGH THE APPROVAL OF THIS DOCUMENT, ASSUMES NO RESPONSIBILITY FOR THE COMPLETENESS AND/ OR ACCURACY OF THIS DOCUMENT.

BASIN SUMMARY TABLE

Tributary Sub-basin	Area (acres)	Percent Impervious	C_2	C_{100}	Q_2 (cfs)	Q_{100} (cfs)
EX1	6.17	5%	0.18	0.22	2.6	8.8
EX2	19.58	5%	0.18	0.22	7.8	25.8
EX3	18.67	5%	0.18	0.22	7.9	26.1
OS1	0.45	100%	0.87	0.93	1.2	3.6
OS2	0.40	100%	0.87	0.93	1.2	3.3
A4	1.1			0.95	3.1	7.6
B4	1.07			0.95	3.0	8.4
DP OS1						28.7

NOTES:

FEMA FLOODPLAIN INFORMATION OBTAINED FROM FIRM MAP NUMBER 08005C0183L EFFECTIVE 9/4/2020.

Approved For One Year From This Date

City Engineer — Date

Water Department — Date

N

100 50 0 100 200
ORIGINAL SCALE: 1" = 100'

HISTORIC CONDITIONS MAP
BUCKLEY YARD
JOB NO. 16044.00
02/05/21
SHEET 1 OF 1

J·R ENGINEERING
A Westrian Company
Centennial 303–740–9393 • Colorado Springs 719–593–2593
Fort Collins 970–491–9888 • www.jrengineering.com

Noted.

All Easements by Separate Document and License Agreements must be executed prior to Civil Plan Approval.
For Easements, contact Andy Niquette: (303) 739-7325
For License Agreements, contact Grace Gray: (303) 739-7277

Pond Certification will be required.

Noted.

Labeled.

Wall height labeled.

Label FEMA Floodplain

Label cross pan

Label retaining wall height. Preliminary section and material not required.

Swale terminated prior to pond and flows picked up in inlet. Additional inlet added north of this location and directed into pond to pick up nuisance flows. Could not direct swale into pond because of swale FL elevation relative to top of pond elevation.

30", label as public, assess that this culvert has capacity for the pond release rate. In final drainage, riprap at downstream end of this culvert will be required to be analyzed.

PROPOSED OUTLET STRUCTURE

E ALAMEDA

OS-E
0.11 | 60

Labeled.

label as public

Redirect swale into pond, include rundown.

Show/label maintenance access to bottom of pond and to top of outlet structure. Label slopes - 4:1 max side slope, 2% min. slope in pond bottom, show/label 100-yr water surface elevation, show location and direction of emergency overflow with unique arrow. Show and label drainage easement for pond.

B-7
0.31 | 2

PROPOSED CURB INLET

PROPOSED DETENTION POND

Label all inlets in sump, add arrow and cross section for emergency overflows for all sump inlets.

Maintenance access labeled. 4:1 side slope at maintenance access point, steeper side slope needed for pond to fit in tract. 2% min. pond bottom slope provided. Emergency overflow locations shown with arrow. Pond drainage easement shown and labeled.

PROPOSED BASIN

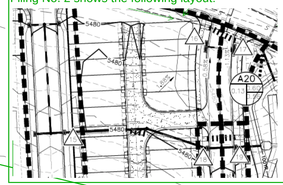
PROPOSED GRATE INLET

PROPOSED STUB FOR FUTURE CONNECTION

Include 10-yr and 100-yr volumes (including WQCV), WSELs for the 10-year and 100-year and WQCV, allowable release rates, maximum depth.

COA freeboard requirement: 1' min from 100yr WSEL to spillway crest. COA considers 100yr to be 100yr +1/2EURV for full spectrum ponds. Full spectrum detention required per MD (RSN 1501736). MHFD freeboard requirement: 1' min freeboard from 100yr WSEL over emergency weir up to top of embankment. PD must include calc of 100yr WSEL over weir to determine freeboard.

What is this connecting to? This is showing work offsite, letter from adjacent land owner required to allow this construction. This is contingent on installation of SD to east. Buckley Yard Filing No. 2 shows the following layout:



These inlets are on grade.

Include design points and accumulated flows at design points.

Requested information included in callout.

B-5
1.30 | 95

Design points added.

PROPOSED STORM SEWER

S AIRPORT BLVD

Add note on plan: as property is developed, each property is responsible for maintaining surface overflows.

Note added.

For this pond, the wall serves as the spillway (emergency weir). The flow depth over the spillway when in use is expected to be approximately 3".

OS-C
0.34 | 95

PRIVATE DRIVE 1

OS-D
0.42 | 95

OS-H
18.18 | 2

Show, dimension, and label all easements, all ROW (typ.)

Easement and ROW shown and labeled.

Show added lane on Airport. Drainage for adjacent roadways required to be addressed in this PD.

Added lane on Airport Blvd shown. Subcatchment OS-I added for existing impervious area to remain impervious with project.

PROPOSED GRATE INLET

PROPOSED STUB FOR FUTURE CONNECTION

PROPOSED DRAIN BASIN W/SOLID COVER

B-4
1.15 | 95

PROPOSED SWALE

Label Buckley Yard Filing 2 (RSN 1535413)

Labeled

MATCHLINE
SEE SHEET 3 OF 4

MATCHLINE
SEE SHEET 2 OF 4

1. Design points added.
2. Existing and proposed easements, tracts labeled with dimensions.
3. Pond data added to drainage plan (note: this pond data is also depicted in the appendix of the report).
4. all proposed pipes, swales, and inlets are designed to convey the 100 year storm event and are proposed to be privately owned and maintained. license agreements are being drafted for private infrastructure located within ROW
5. City of Aurora benchmark information added.
6. Note added.

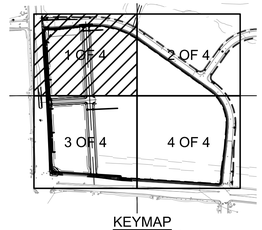
Noted.

Drainage Plan shall be uploaded as separate full-size PDF. Historic and offsite maps may remain as 11x17 in appendix to report.

Required plan items missing (SDDTC Section 2.34:
1. Design points. Basin size, minor and major runoff at design points.
2. Existing and proposed easements (drainage, utility, fire land, etc.), and tract dimensions.
3. Detention ponding limits, 10-yr and 100-yr volumes (including WQCV), WSELs for the 10-yr and 100-yr pond volumes and WQCV, release rates, maximum depth, emergency overflow location and direction
4. Labeling of all proposed drainage facilities, either public or private, inlets, pipes, swales, tracts, etc., with the design storm frequency, e.g., "private storm sewer, 100-year storm capacity."
5. City of Aurora benchmark (NAVD88).
6. "City of Aurora plan review is only for general conformance with City of Aurora Design Criteria and City Code. The City is not responsible for the accuracy and adequacy of the design, of dimensions and elevations which shall be confirmed and correlated to the job site. The City of Aurora, through the approval of this document, assumes no responsibility for the completeness and/or accuracy of this document."

N

0' 15' 30' 60'
SCALE IN FEET



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SCALE: 1" = 500'

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PROPOSED STORM SEWER	SD
BASIN DELINEATION	
DRAINAGE ARROW	

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FLOOD ZONE

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B-7	0.01	1.07
OS-A	0.92	2.77
OS-B	1.13	3.39
OS-C	0.87	2.62
OS-D	1.08	3.23
OS-E	0.17	0.71
OS-F	0.25	1.65
OS-G	0.15	0.50
OS-H	0.27	34.38

Include % Imp for all basins

Added.

Approved For One Year From This Date

City Engineer — Date

Water Department — Date

olsson
1880 Fall River Drive, Suite 200
Loveland, CO 80538
TEL 970.461.7733
www.olsson.com

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REV. NO.	DATE	REVISIONS DESCRIPTION
		REVISIONS

PRELIMINARY DRAINAGE PLAN
BUCKLEY YARD SUBDIVISION FILING NO. 1
INFRASTRUCTURE SITE PLAN
AURORA, COLORADO
2021

drawn by: BK
checked by: EM
approved by: JE
QA/QC by: JE/EM
project no.: 020-2569
drawing no.: C_PBASN_0202569
date: 4/19/2021

SHEET
1 OF 4

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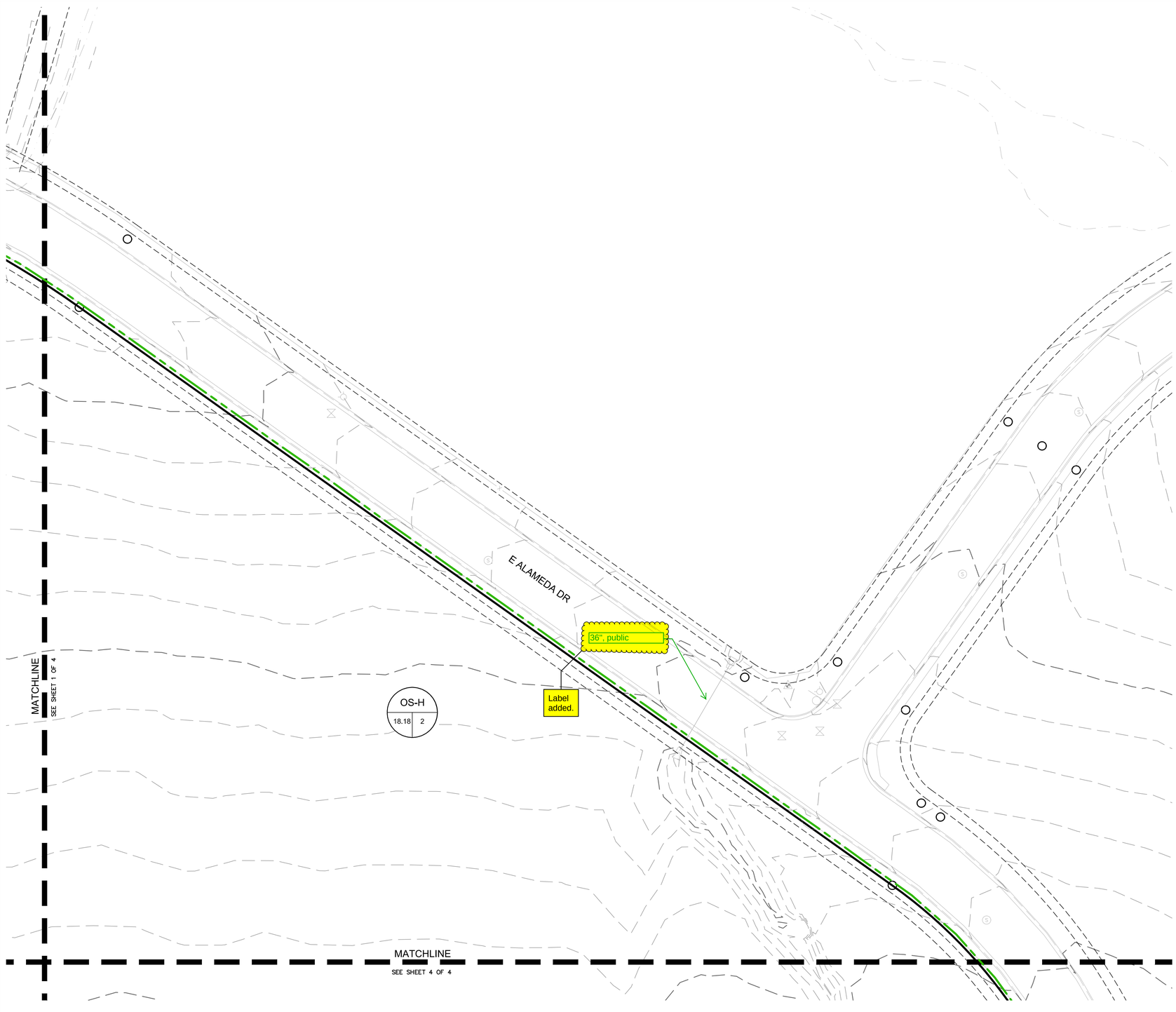
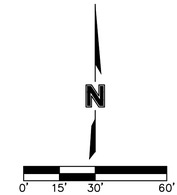
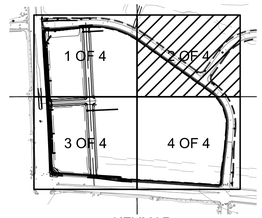
C_PBASE_0202569
C_PUTIL_0202569







KEYMAP
SCALE: 1" = 500'

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Include % Imp for all basins

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OS-F	0.25	1.65
OS-G	0.15	0.50
OS-H	0.27	34.38

Added.

Removed.

This is only required on first sheet of drainage plan

Approved For One Year From This Date

City Engineer Date

Water Department Date

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QA/QC by:	JE/EM
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SHEET
2 OF 4

DWG: F:\2020\2501-3000\020-2569\40-DESIGN\AUTOCAD\FINAL PLANS\XREF\C_PBASN_0202569.dwg USER: emorton
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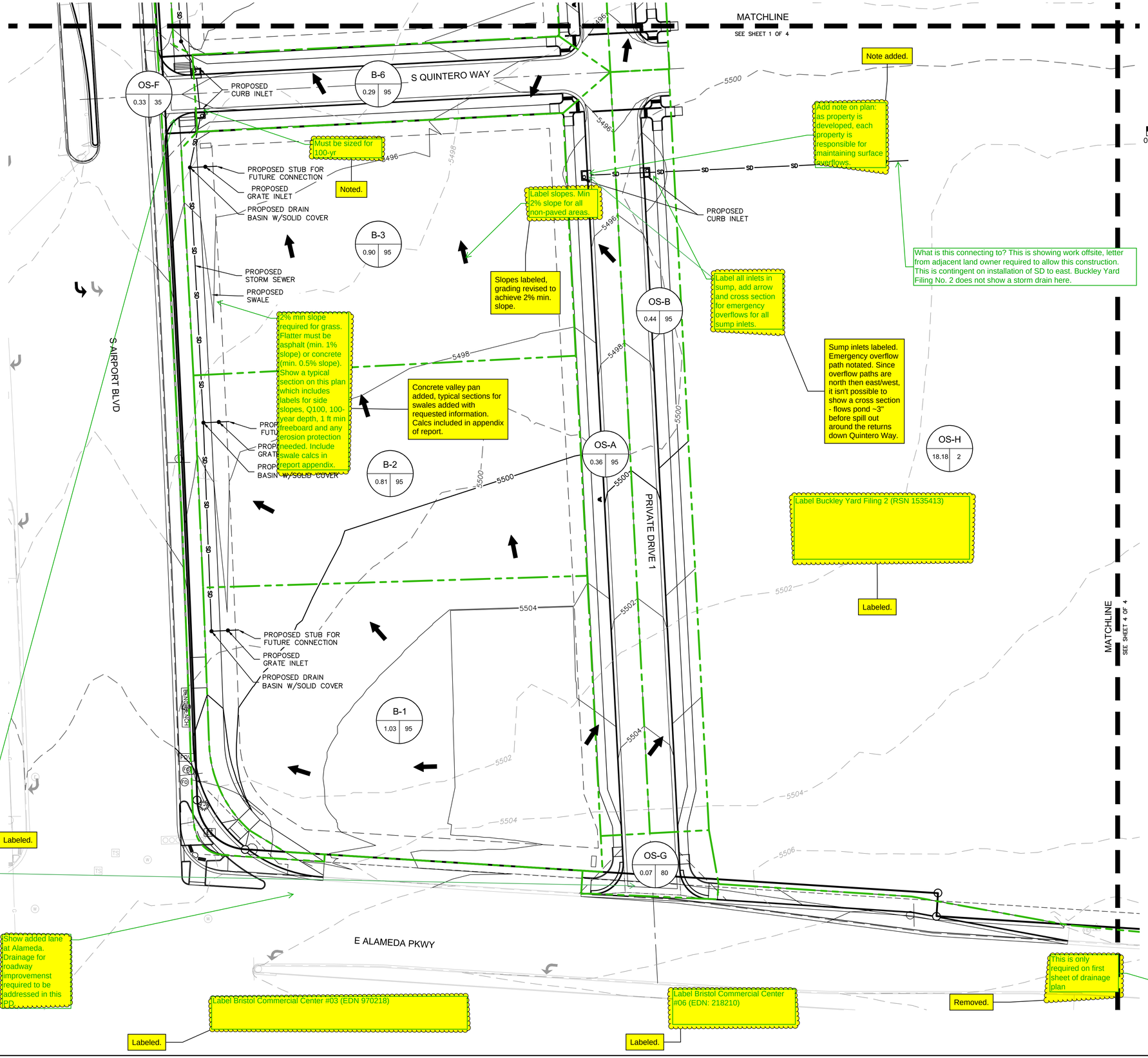

0' 15' 30' 60'
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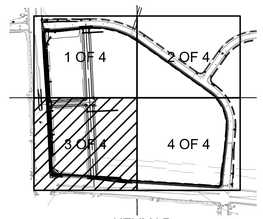

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SHEET 3 OF 4

DWG: C_XBASE_0202569 C_PTBLK_0202569
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C_PBASE_ISP_0202569 C_PUTIL_0202569 C_PBNDY_0202569

MATCHLINE
SEE SHEET 2 OF 4

MATCHLINE
SEE SHEET 3 OF 4

E ALAMEDA DR

E ALAMEDA PKWY

OS-H
18.18 | 2

Label as public

Label added.

18", label as public

Removed.

This is only required on first sheet of drainage plan

Include 9% Imp for all basins

Added.

N

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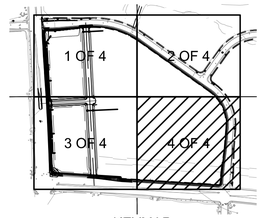

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DATE: Apr 19, 2021 12:14pm XREFS: C_XBASE_0202569 C_PBASE_ISP_0202569 C_PUTIL_0202569 C_PBNDY_0202569 C_PBASE_0202569 C_PTBLK_0202569

BUCKLEY YARD

Aurora, CO

March 2021

Olsson Project No. 020-2569